UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

See Ref.

February 16, 1989

Docket No: 50-390/391

APPLICANT: Tennessee Valley Authority (TVA)

FACILITY: Watts Bar Nuclear Plant, Units 1 and 2

SUBJECT: MEETING SUMMARY FOR THE JANUARY 18-19, 1989 MEETING REGARDING WATTS BAR CORRECTIVE ACTION PROGRAMS

On January 18-19, 1989, a meeting was held in Rockville, Maryland between the NRC staff and representatives of TVA. The purpose of the meeting was to discuss the Corrective Action Programs (CAPs) at Watts Bar Nuclear Plant (WBN) in the civil/structural area. Attachment 1 is the list of attendees and Attachment 2 is a copy of the handouts provided by TVA at the meeting.

TVA opened the meeting by stating that the objective of the Watts Bar Program Plan (WBPP) is to perform a systematic evaluation of the WBN design and construction, to develop corrective actions as required, and to prepare the WBN Nuclear Performance Plan (NPP), Volume 4. TVA further stated that, at present, there are 27 special programs at Watts Bar. These programs were or are being developed to resolve the nonconforming issues identified through the employee concerns, internal TVA and external audits and reviews, and the routine process for identifying conditions adverse to quality.

TVA has developed CAPs to address some of their special programs. These CAPs are broad in scope, address issues generically or programmatically and in some cases address the cumulative effect of several minor issues. The five CAPs in the civil/structural area are: Seismic Analysis, Hanger and Analysis Update Program (HAAUP), Category 1 Cable Tray and Cable Tray Supports, Electrical Conduit and Conduit Supports, and HVAC Duct and Duct Supports.

TVA stated that it is seeking NRC staff concurrence on the approach outlined in the above CAPs and NRC acceptance of the critical case evaluation approach used for the resolution of some of these issues. The NRC staff stated that, because many of these CAPs provide insufficient detail describing the program, a safety evaluation cannot be written at this time. The staff will be providing comments on the approach defined in these program plans and will be monitoring the progress as the implementation of CAPs proceeds.

The Seismic Analysis CAP forms the basic input for the resolution of issues in the other civil/structural CAPs. The presentation and the ensuing discussion centered on the seismic issues, seismic analysis criteria and the interface with other CAPs in the civil/structural area. TVA stated that the seismic issues which led to the formation of the Seismic Analysis CAP include:

8903010385 890216
PDR ADOCK 05000390
A PDC

DF01
1/1

memo

- integration time step used to perform time history analysis
- soil properties and soil-structure interaction concerns
- torsional modeling of structures
- seismic analysis criteria for the Additional Diesel Generator Building (ADGB)

The Seismic Analysis CAP addresses the approach to resolve these issues and the effect of these issues on the analysis of seismic Category I structures. TVA stated that the original analysis of Category I structures was performed consistent with the FSAR commitments and used methodologies that were prevalent at that time. Some of the Category I structures will be evaluated to address the issues raised in this area. The evaluation will use a new artifical ground motion time-history record to generate site specific response spectra for all applicable damping values. The structural damping values will be consistent with those specified in RG 1.61. According to TVA, this approach meets the guidelines of SRP Section 3.7.1. The site-specific response spectra will be used to evaluate those concerns related to design issues not considered to be orignal plant licensing commitments. However, design basis calculations will use seismic criteria consistent with the FSAR and licensing commitments and an updated building structural model. The staff found this approach acceptable and will continue to monitor the application of these seismic criteria in TVA's evaluations and analyses.

The HAAUP was established to address piping-related issues concerning implementation of NRC bulletins/open items, employee concerns, NCRs, and internal/external reviews. The root causes were identified as lack of interface control of design input/output, inadequate design/analysis methodology, and incomplete design documentation. TVA stated that HAAUP CAP will update the design criteria, verify as-built piping configurations, reanalyze piping and pipe supports and implement modifications. The design input will use amplified response spectra (ARS) from the Seismic Analysis CAP. The verification methods to be used in the HAAUP will be walkdown and evaluation, critical case evaluation, and detailed analyses. The staff stated that it does not understand TVA's approach and procedures regarding detailed walkdown and evaluation for rigorously analyzed piping and critical case evaluation to be used for other analysis. The staff will review the material presented by TVA and will provide its comments at a later date.

The CAPs in the area of conduit, cable tray, and HVAC supports address design, construction, and documentation issues in these areas. TVA plans to use walkdown and critical case evaluations to resolve the identified issues. TVA is in the process of finalizing walkdown procedures. The staff advised that the conduit, cable tray, and HVAC CAPs should be revised to describe the problem areas and discuss the corrective actions taken to specifically resolve each problem area.

In conclusion, the staff stated that, in order to better understand the approach used in the CAPs and to address many of the staff's questions, follow-up meetings/discussions will be needed in some of the areas. The staff will provide comments as the review proceeds.

Original signed by

Rajender Auluck, Project Manager
TVA Projects Division
Office of Nuclear Reactor Regulation

Attachments:
1. List of Attendees
2. Copy of Handouts

cc w/attachments:
See next page

OFC	:NRR:TVA/LA	:NRR:TVA/PM	:TVA:AD/P	:NRR:TVA:EB/BC			
NAME	:MSimms MLS	:RAuluck:dw RA	:SBlack	:DTerao DT	:	:	: : :
DATE	:2/16/89	:2/16/89	:2/16/89	:2/16/89	:	:	:

OFFICIAL RECORD COPY

DISTRIBUTION FOR MEETING SUMMARY DATED: February 16, 1989

Facility: Watts Bar Nuclear Plant, Units 1 and 2*

Docket File	
NRC PDR	
Local PDR	
Projects Reading	
ADSP Reading	
D. Crutchfield	
B. D. Liaw	
S. Black	
R. Pierson	
R. Auluck	
M. Simms	
F. McCoy	R-II
J. Rutberg	15-B-18
J. Fair	
D. Terao	
T. Cheng	
M. Branch	
G. Walton	
G. Georgiev	
G. Hubbard	
ACRS (10)	
GPA/PA	2-G-5
GPA/CA	16-G-19
S. Varga	14-E-4
E. Jordan	MNBB-3302
B. Grimes	9-A-2
P. Gwynn	16-H-3
J. Scarborough	16-H-3
G. Marcus	16-H-3
T. Elsasser	16-G-15
L. Norrholm	16-G-15
C. Ader	16-H-3
WBN Reading File	

*cc: Licensee/Applicant & Service List

cc:
General Counsel
Tennessee Valley Authority
400 West Summit Hill Drive
E11 B33
Knoxville, Tennessee 37902

Mr. R. L. Gridley
Tennessee Valley Authority
5N 157B Lookout Place
Chattanooga, Tennessee 37402-2801

Mr. R. A. Pedde
Tennessee Valley Authority
Watts Bar Nuclear Plant
P.O. Box 800
Spring City, Tennessee 37381

Mr. D. McCloud
Tennessee Valley Authority
Watts Bar Nuclear Plant
P.O. Box 800
Spring City, Tennessee 37381

Mr. D. L. Williams
Tennessee Valley Authority
400 West Summit Hill Drive
W10 B85
Knoxville, Tennessee 37902

Honorable Johnny Powell
County Judge
Meigs County Courthouse
Route 2
Decatur, Tennessee 37322

Tennessee Department of Health
and Environment
ATTN: Director, Bureau of Environment
T.E.R.R.A. Building, 1st Floor
150 9th Avenue North
Nashville, Tennessee 37219-5404

Honorable Robert Aikman
County Judge
Rhea County Courthouse
Dayton, Tennessee 37321

Regional Administrator, Region II
U.S. Nuclear Regulatory Commission
101 Marietta Street, N.W.
Atlanta, Georgia 30323

Resident Inspector/Watts Bar NP
c/o U. S. Nuclear Regulatory Commission
Route 2, Box 300
Spring City, Tennessee 37381

Dr. Henry Myers, Science Advisor
Committee on Interior
and Insular Affairs
U.S. House of Representatives
Washington. D.C. 20515

Tennessee Valley Authority
Rockville Office
11921 Rockville Pike
Suite 402
Rockville, Maryland 20852

Mr. Oliver D. Kingsley, Jr.
Senior Vice President, Nuclear Power
Tennessee Valley Authority
6N 38A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Enclosure 1

MEETING WITH TVA

January 18, 1989

Rajender Auluck	NRC/NRR
Thomas Cheng	NRC/NRR
D. Terao	NRC/NRR
John Fair	NRC/NRR
Suzanne Black	NRC/NRR
Frank McCoy	NRC/NRR
Morris Branch	NRC/NRR
Glen Walton	NRC/NRR
John McCall	TVA
Robert A. Pedde	TVA
Rao Mandava	TVA
Ed Fuller	TVA
Tom Ippolito	TVA
Edward J. Vigluicci	TVA
R. Joe Hunt	TVA
Rod Rogers	Bechtel
James G. Adair	TVA
L. C. M. Roddy	TVA
John F. Cox	TVA
Dennis E. McCloud	TVA
Fred L. Moreadith	TVA
Bob Pierson	NRC/NRR
G. B. Georgiev	NRC/NRR
G. T. Hubbard	NRC/NRR
Walter Horn	TVA
Orhan Gurbus	Bechtel
Syed A. Bokhari	TVA
Roger C. Wieser	Stone and Webster
Ken Barr	NRC/NRR
Ron Carle	TVA

MEETING WITH TVA

January 19, 1989

Rajender Auluck	NRC/NRR
Tom Cheng	NRC/NRR
R. Joe Hunt	TVA
Orhan Gurbus	Bechtel
John McCall	TVA
Ruben O. Hernandez	TVA
Dennis E. McCloud	TVA
Morris Branch	NRC
Glen Walton	NRC
Ken Barr	NRC
R. E. Shewmaker	NRC
F. L. Moreadith	TVA
R. L. Rogers	Bechtel
John E. Cox	TVA
James G. Adair	TVA
Ronald L. Carle	TVA
Walter Horn	TVA
Ronald L. Beck	Bechtel
Syed A. Bokhari	TVA

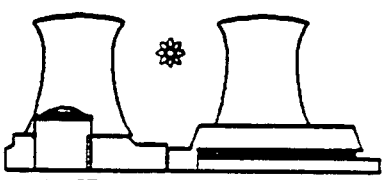
ENCLOSURE 2

WATTS BAR NUCLEAR PLANT

PRESENTATION OF CIVIL CORRECTIVE ACTION PROGRAMS TO THE NUCLEAR REGULATORY COMMISSION

ROCKVILLE, MARYLAND

JANUARY 18 & 19, 1989



NRC PRESENTATION

WBN COMPUTER GRAPHICS UNIT (CNC)

WBN CORRECTIVE ACTION PROGRAMS MEETING WITH NRC JANUARY 18 & 19, 1989

AGENDA

I.	INTRODUCTION	E. D. FULLER
II.	CAP DEVELOPMENT AND CONTROLS	E. D. FULLER
III.	CIVIL PROGRAM OVERVIEW	J. K. McCALL
IV.	PRESENTATION OF CAPS	
	• SEISMIC ANALYSIS	R. J. HUNT
	• HANGER AND ANALYSIS UPDATE	S. A. BOKHARI
	• ELECTRICAL CONDUIT AND CONDUIT SUPPORT	J. G. ADAIR
	• CATEGORY I CABLE TRAY AND CABLE TRAY SUPPORTS	J. G. ADAIR
	• HVAC DUCT AND DUCT SUPPORTS	J. G. ADAIR
V.	SUMMARY	E. D. FULLER

NRC PRESENTATION

WBN COMPUTER GRAPHICS UNIT (JKA)

WBN CORRECTIVE ACTION PROGRAMS

- CAP PRESENTATION SCHEDULE
- DECEMBER 20, 1988 MEETING
- NRC REVIEW OF CAPS
  - CONCURRENCE ON APPROACH - 2 WEEK
  - IMPLEMENTATION - REVIEW TO FOLLOW
- CAP DEVELOPMENT PROCESS AND CONTROLS

WBN COMPUTER GRAPHICS UNIT (JKA)

CAP PRESENTATION PLAN

PRESENTATION MEETING	CAP	DATE SUBMITTED TO NRC	
01/18/89 & 01/19/89	• SEISMIC ANALYSIS	11/18/88	
	• HANGER AND ANALYSIS UPDATE	11/18/88	
	• CATEGORY I CABLE TRAY AND CABLE TRAY SUPPORTS	11/18/88	
	• ELECTRICAL CONDUIT AND CONDUIT SUPPORTS	11/18/88	
	• HVAC DUCT AND DUCT SUPPORTS	11/18/88	
WEEK OF 01/30/89	• WELDING	01/13/89	
	• DESIGN BASELINE AND VERIFICATION	10/20/88	
	• QA RECORDS	12/21/88	
WEEK OF 02/13/89	• CABLE ISSUES	12/16/88	
	• ELECTRICAL ISSUES	01/23/89	(SCHEDULE)
	• INSTRUMENT LINES	12/23/88	
	• FIRE PROTECTION	12/16/88	
IF REQUESTED BY NRC	• QUALITY ASSURANCE LIST	10/27/88	
	• CONTAINMENT ISOLATION	10/20/88	
	• VENDOR INFORMATION	12/14/88	
	• REPLACEMENT ITEMS (PIECE PARTS)	12/14/88	
	• HEAT CODE TRACEABILITY	12/23/88	
	• PRESTART TEST	12/30/88	
	• EQUIPMENT SEISMIC QUALIFICATION	12/23/88	

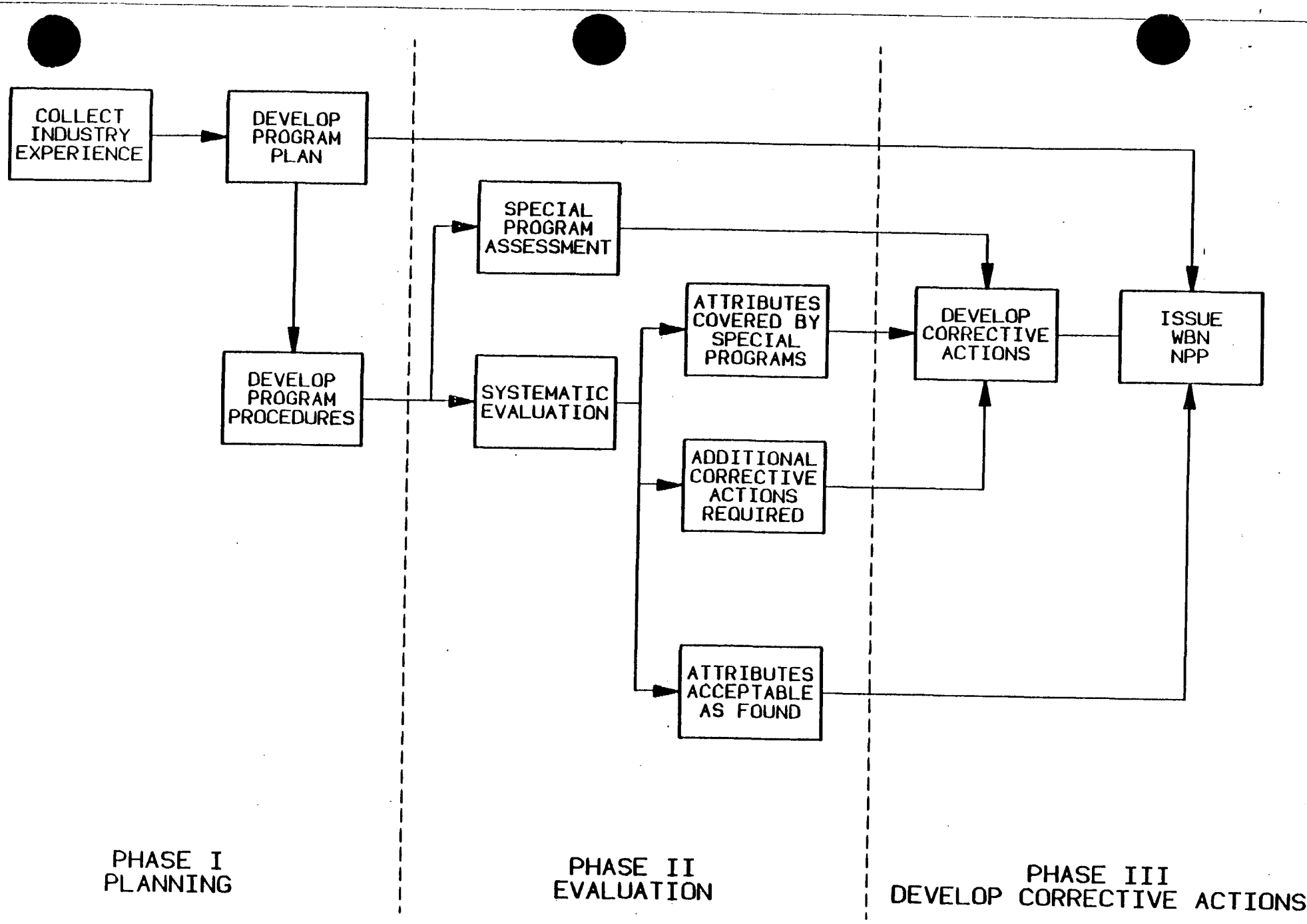
COMPUTER GRAPHICS UNIT (JKA)

WBN COMPUTER GRAPHICS UNIT (JKA)

PROGRAM OBJECTIVE

- REASONABLE ASSURANCE:
  - DEFICIENCIES DETECTED
  - CORRECTIVE ACTIONS DEFINED
- DEVELOP WATTS BAR NUCLEAR PERFORMANCE PLAN - VOL 4

WBN COMPUTER GRAPHICS UNIT (JKA)



WATTS BAR PROGRAM PLAN

WBN COMPUTER GRAPHICS UNIT (JKA)

CORRECTIVE ACTIONS

- SOURCES OF CORRECTIVE ACTIONS
  - EXISTING SPECIAL PROGRAMS
  - SYSTEMATIC EVALUATION
- CORRECTIVE ACTION PROGRAMS (CAP):
  - BROAD SCOPE
  - GENERIC/PROGRAMMATIC
  - MAY COMBINE SEVERAL MINOR ACTIONS

CAP DEVELOPMENT & REVIEW

- ISSUE THOROUGHLY DEFINED
- ISSUE THOROUGHLY RESOLVED
- ROOT CAUSE CLEARLY IDENTIFIED
- INTERFACE WITH OTHER PROGRAMS
- TREND ANALYSIS
- GENERIC IMPLICATIONS ANALYSIS
- RECURRENCE CONTROL
- LICENSING REQUIREMENTS SATISFIED
- SQN & BFN EXPERIENCE INCORPORATED

CAP COMMITMENTS

- CAP ACTIONS ASSURED AND CONTROLLED WITH IMPLEMENTATION PROCEDURES
- CAP COMMITMENTS CONTROLLED THROUGH CCTS PROGRAM
- CONSISTENCY OF COMMITMENTS
  - 10 CFR 50.55(e) AND VIOLATION RESPONSES
  - EMPLOYEE CONCERN REPORTS
  - FSAR AND SER
  - EXEMPTION REQUESTS

NRC PRESENTATION

CAP IMPLEMENTATION

- CAP PROJECT MANAGER RESPONSIBLE TO SITE DIRECTOR
- CAP RESPONSIBLE ENGINEER
- CAP LEAD LICENSING ENGINEER

CAP REVISION PROCESS

- REVISION PROCESS CONTROLLED BY ORIGINAL ISSUANCE PROCEDURES
- COMPARABLE REVIEW AND APPROVAL (SIGNOFF) AS ORIGINAL ISSUANCE
- WBPT OR SENIOR MANAGEMENT REVIEW AND APPROVAL

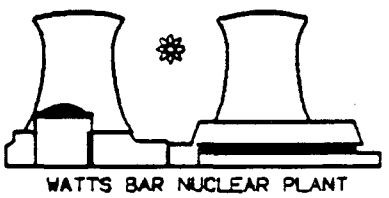
WATTS BAR NUCLEAR PLANT

PRESENTATION OF CIVIL CORRECTIVE ACTION PROGRAMS TO THE NUCLEAR REGULATORY COMMISSION

ROCKVILLE, MARYLAND

JANUARY 18 & 19, 1989

CIVIL PROGRAM OVERVIEW



NRC PRESENTATION

CIVIL PROGRAM OVERVIEW

- BACKGROUND
- CIVIL PROGRAM DESCRIPTION
- CRITERIA ISSUES
- IMPLEMENTATION METHODS

NRC PRESENTATION

BACKGROUND

- LESSONS LEARNED
- EMPLOYEE CONCERNS
- NONCONFORMING CONDITIONS (CAQS)
- REVIEWS (INTERNAL/EXTERNAL)
- NRC OPEN ITEMS

NRC PRESENTATION

CIVIL PROGRAM DESCRIPTION

- STRUCTURES
- SUPPORTED SYSTEMS
- SPECIAL TOPICS

STRUCTURES

FEATURES

- DYNAMIC ANALYSIS
- CONCRETE
- STEEL
- CONTAINMENT
- MASONRY WALLS
- EMBEDMENTS
- PLATFORMS

COMPLIANCE BASIS

- SEISMIC ANALYSIS CAP
- DESIGN BASELINE AND VERIFICATION PROGRAM CAP
- CAQ CLOSEOUT
- INTERFACE CLOSEOUT
- EMPLOYEE CONCERN CLOSEOUT
- NON-CIVIL PROGRAM CAPS

YBN COMPUTER GRAPHICS UNIT (CNS)

SUPPORTED SYSTEMS

FEATURES	COMPLIANCE BASIS*
• REACTOR COOLANT SYSTEM.....	• HAAUP CAP
• LARGE BORE PIPING.....	• HAAUP CAP
• SMALL BORE PIPING.....	• HAAUP CAP
• II/I PIPING.....	• HAAUP CAP
• INSTRUMENT TUBING.....	• HAAUP/INSTRUMENT LINE CAPS
• CABLE TRAYS.....	• CABLE TRAY CAP
• CONDUIT.....	• CONDUIT CAP
• HVAC.....	• HVAC CAP

*COMPLIANCE BASIS APPLICABLE TO ALL FEATURES

- SEISMIC ANALYSIS CAP
- DBVP CAP
- CAQ CLOSEOUT
- INTERFACE CLOSEOUT
- EMPLOYEE CONCERN CLOSEOUT
- NON-CIVIL PROGRAM CAPS

SPECIAL TOPICS

FEATURES	COMPLIANCE BASIS*
• EQUIPMENT SEISMIC QUALIFICATION..... (MECHANICAL, ELECTRICAL, TANKS, AND HEAT EXCHANGERS)	• EQUIPMENT SEISMIC CAP
• GEOTECHNICAL..... (SLOPE STABILITY, BURIED STRUCTURES, ETC.)	• DBVP CAP
• PIPE RUPTURE.....	• HAAUP CAP
• TORNADO ANLYSIS.....	• DBVP CAP
• HEAVY LOADS.....	• DBVP CAP
• EXTERNAL FLOODING.....	• DBVP CAP
• SYSTEM/COMPONENT SEPARATION.....	• DBVP CAP
• II/I NON-PIPING.....	• DBVP CAP

*COMPLIANCE BASIS APPLICABLE TO ALL FEATURES

- SEISMIC ANALYSIS
- DBVP CAP
- CAQ CLOSEOUT
- INTERFACE CLOSEOUT
- EMPLOYEE CONCERN CLOSEOUT
- NON-CIVIL PROGRAM CAPS

CIVIL PROGRAM SUMMARY

- ENCOMPASSES COMPLETE CIVIL SCOPE
- SCOPE COVERED BY CAPS AND OTHER PROGRAMS
- FSAR AND CRITERIA UPDATES REQUIRED
- TECHNICAL ADEQUACY AND COMPLIANCE WITH LICENSING REQUIREMENTS ENSURED

NRC PRESENTATION

WRN COMPUTER GRAPHICS UNIT (CNC)

CRITERIA ISSUES

- SEISMIC CRITERIA
  - ORIGINAL BASIS
  - UPDATED BASIS
  - IMPLEMENTATION
- ANALYSIS AND DESIGN METHODS
- LEAK BEFORE BREAK

IMPLEMENTATION METHODS

- REANALYSIS
- CRITICAL CASE EVALUATIONS
- STUDIES

NRC PRESENTATION

CRITICAL CASE EVALUATIONS

- TOTAL POPULATION
- WALKTHROUGH
- INDEPENDENT REVIEW
- BOUNDING CRITICAL CASES
- EVALUATION
- DOCUMENTATION
- REVIEW FOR UNACCEPTABLE ATTRIBUTES

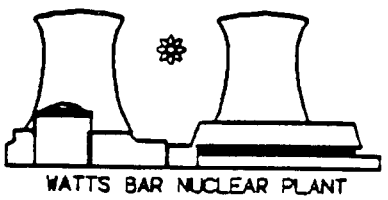
WATTS BAR NUCLEAR PLANT

PRESENTATION OF CIVIL CORRECTIVE ACTION PROGRAMS TO THE NUCLEAR REGULATORY COMMISSION

ROCKVILLE, MARYLAND

JANUARY 18 & 19, 1989

SEISMIC ANALYSIS



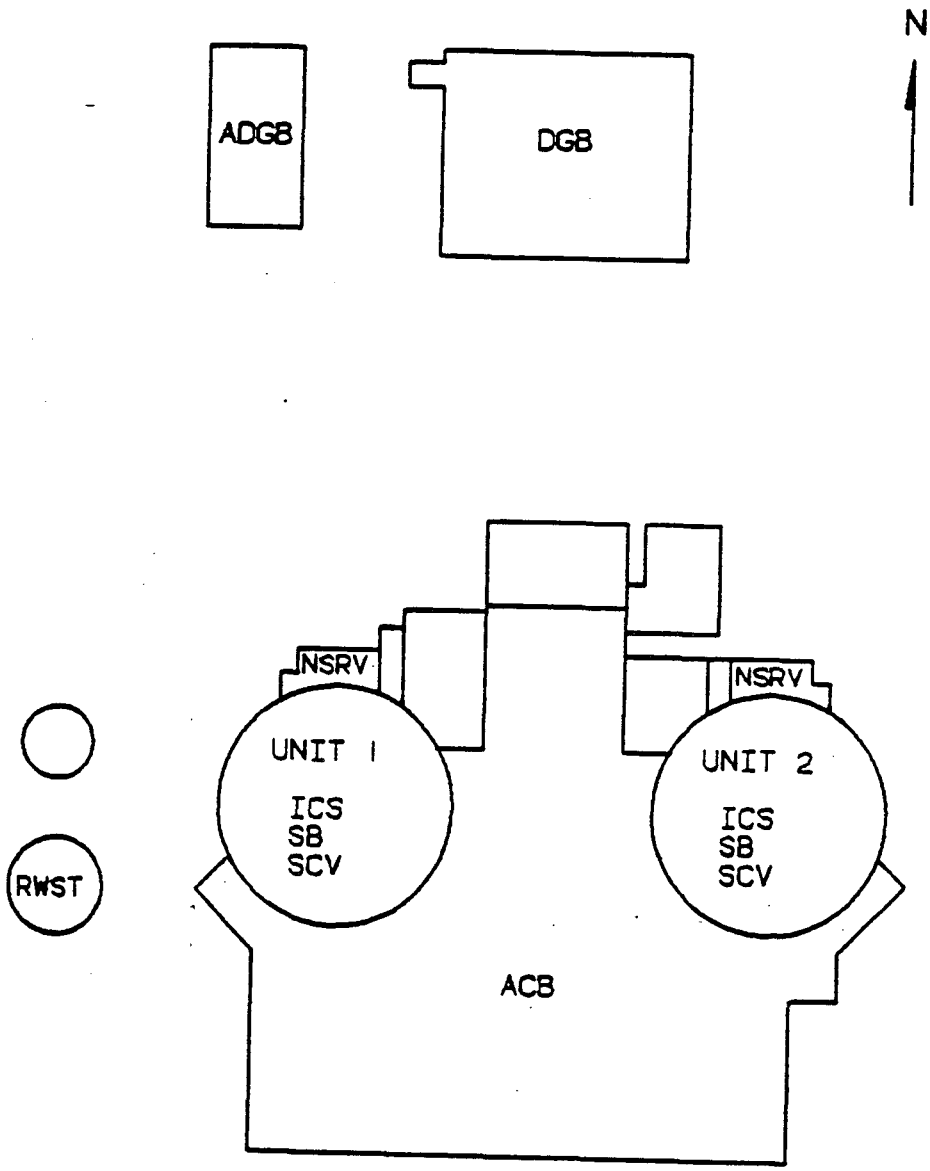
WBN SEISMIC ANALYSIS CAP

PRESENTATION OUTLINE

- BACKGROUND
- DESCRIPTION OF SEISMIC ANALYSIS CAP
- IMPLEMENTATION OF SEISMIC ANALYSIS CAP
- SUMMARY

BACKGROUND

- SEISMIC ANALYSIS
- EMPLOYEE CONCERNS AND CAQRS
- ASSESS AGAINST CURRENT PRACTICES
- CALCULATION REVIEW
- SEISMIC ANALYSIS CAP



INTERNAL CONCRETE STRUCTURE (ICS)
SHIELD BUILDING (SB)
STEEL CONTAINMENT VESSEL (SCV)
NORTH STEAM VALVE ROOM (NSVR)
INTAKE PUMPING STRUCTURE (IPS)
REFUELING WATER STORAGE TANK (RWST)
AUXILIARY/CONTROL BUILDING (ACB)
DIESEL GENERATOR BUILDING (DGB)
ADDITIONAL DIESEL GENERATOR BUILDING (ADGB)

WBN SEISMIC CATEGORY I STRUCTURES

PURPOSE OF SEISMIC ANALYSIS CAP

"ENSURE ADEQUACY OF SEISMIC ANALYSIS FOR CAT I STRUCTURES"

- REVIEW CRITERIA, CALCULATIONS, FSAR, SER
- ADDRESS SEISMIC ANALYSIS ISSUES
- UPDATE CRITERIA AND FSAR
- PROVIDE INPUT TO OTHER CAPS

NRC PRESENTATION

DESCRIPTION OF SEISMIC ANALYSIS CAP

- SEISMIC ISSUES ADDRESSED
- SEISMIC ANALYSIS CRITERIA
- SEISMIC ANALYSIS CAP INTERFACES

SEISMIC ISSUES ADDRESSED

- INTEGRATION TIME STEP
- SOIL PROPERTIES AND SOIL-STRUCTURE INTERACTION CONCERNS
- TORSIONAL MODELING

SEISMIC ANALYSIS CRITERIA

DESIGN BASIS GROUND RESPONSE SPECTRA

- CRITERIA A: ALL CAT I STRUCTURES EXCEPT ADGB

- SITE SPECIFIC GROUND RESPONSE SPECTRA (SSRS): USED TO VERIFY ADEQUACY OF CRITERIA A

- CRITERIA B: FOR ADGB

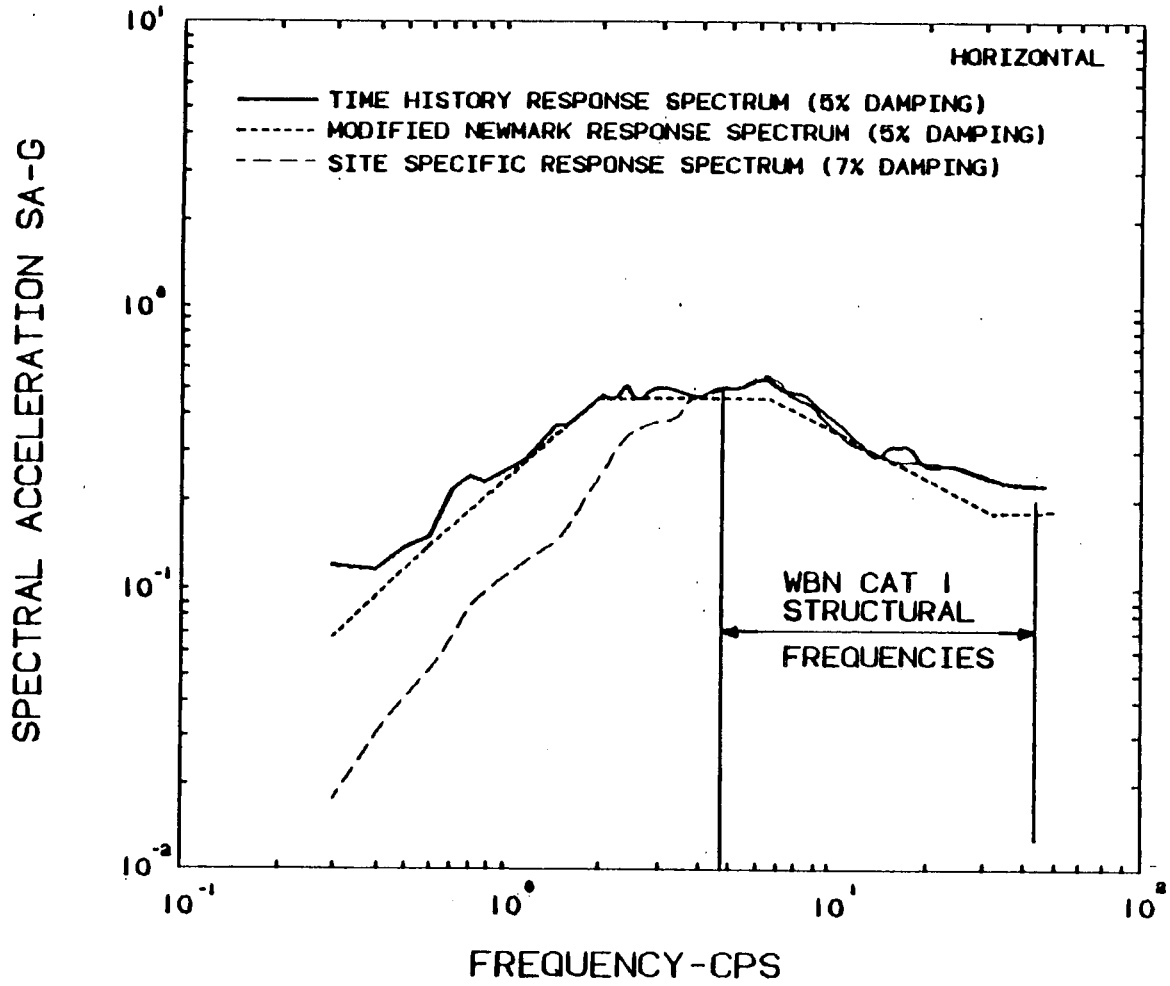
SEISMIC ANALYSIS CRITERIA

ATTRIBUTES	ORIGINAL	UPDATED
DESIGN BASIS GROUND RESPONSE SPECTRA	MODIFIED NEWMARK	SSRS
PEAK GROUND ACCEL.		
SSE	0.18 G HOR, 0.12 G VERT	0.215 G HOR, 0.15 G VERT
OBE	0.09 G HOR, 0.06 G VERT	0.09 G HOR, 0.06 G VERT
ARTIFICIAL TIME-HISTORY RECORDS	FOUR ARTIFICAL TIME HISTORY RECORDS. USE AVERAGE OF FOUR RESPONSES, SAME FOUR USED IN EACH DIRECTION INDEPENDENTLY	THREE STATISTICALLY INDEPENDENT RECORDS - ONE FOR EACH DIRECTION
T-H SPECTRA VS DESIGN	ENVELOPS BOTH MODIFIED NEWMARK AND SSRS	ENVELOPS SSRS
STRUCTURAL MODELS	FSAR	SRP
DAMPING	FSAR	RG 1.61
PEAK BROADENING	FSAR (±10%)	SRP (±) 15%)

UPDATED CRITERIA IS CONSISTENT AND COMPATIBLE WITH CURRENT PRACTICES AND SRP PROVISIONS.

NRC PRESENTATION

TVA WATTS BAR



COMPARISON OF HORIZONTAL DESIGN BASIS GROUND RESPONSE SPECTRA FOR CRITERIA A

SEISMIC ANALYSIS - STRUCTURAL DAMPING

	ORIG. ANALYSIS		REANALYSIS		JUSTIFICATION/ SOURCE FOR PROPOSED VALUES
	OBE	SSE	OBE	SSE	
STRUCTURES					
• STEEL CONTAINMENT VESSEL	1	1	2	4	RG 1.61
• SHIELD BUILDING	2	5	4	7	RG 1.61
• INTERIOR CONCRETE STRUCTURE	2	5	4	7	RG 1.61
• NORTH STEAM VALVE ROOM	5	5	4	7	RG 1.61
• DIESEL GENERATOR BUILDING	5	5	4	7	RG 1.61
• ADDITIONAL DIESEL GENERATOR BUILDING	4	7	4	7	RG 1.61
• OTHER CONCRETE STRUCTURES	5	5	(A)	(A)	FSAR

(A) NO REANALYSIS OF THESE STRUCTURES IS PLANNED

WBN COMPUTER GRAPHICS UNIT (CNC)

SEISMIC ANALYSIS CAP INTERFACES

- CABLE TRAY CAP
- CONDUIT CAP
- HVAC CAP
- HAAUP CAP
- INSTRUMENT LINE CAP
- EQUIPMENT SEISMIC QUALIFICATION CAP

IMPLEMENTATION OF SEISMIC ANALYSIS CAP

- STATUS
- ONGOING SEISMIC REANALYSIS AND EVALUATIONS
- SEISMIC CRITERIA FOR SYSTEMS AND COMPONENTS

WBN COMPUTER GRAPHICS UNIT (CNC)

SEISMIC ANALYSIS CAP STATUS

- CRITERIA REVIEW: COMPLETED
  - ORIGINAL ANALYSIS: CONSISTENT WITH FSAR AND STATE-OF-ART (1970s)
  - REANALYSIS: CONSISTENT WITH SRP
- UPDATED CRITERIA DOCUMENTATION: UNDERWAY
- REANALYSIS: UNDERWAY
- EVALUATIONS: PRELIMINARY COMPLETED, FINAL TO FOLLOW
- FSAR UPDATE: START IN FEBRUARY

NRC PRESENTATION

ONGOING SEISMIC REANALYSIS AND EVALUATIONS

CATEGORY I STRUCTURES

STRUCTURE	REASONS FOR REANALYSIS
REACTOR BUILDING (ICS, SCV, SB)	TORSIONAL CONSTANT, SHEAR CENTER MODELING
DIESEL GENERATOR BUILDING	SOIL MODULUS SSI METHODOLOGY
ADDITIONAL DIESEL GENERATOR BUILDING	PILE MODELING CONSISTENT CRITERIA
NORTH STEAM VALVE ROOM	TORSIONAL CONSTANT

ONGOING SEISMIC REANALYSIS AND EVALUATIONS

SUBSYSTEM AND COMPONENT EVALUATIONS

- EVALUATE EFFECTS OF NEW ARS
- EVALUATE FLOOR FLEXIBILITY EFFECTS

USE OF ARS IN EVALUATIONS

ARS		EVALUATION OF EXISTING DESIGN	MODIFICATIONS	NEW DESIGN
STRUCTURES NOT REANALYZED		OLD ARS	OLD ARS	OLD ARS
REANALYZED STRUCTURES	NEW ARS ENVELOPED BY OLD ARS	NONE	NEW ARS	NEW ARS
	NEW ARS EXCEEDS OLD ARS	EVALUATE SYSTEMS AND COMPONENTS, FIX AS REQUIRED	NEW ARS	NEW ARS

NRC PRESENTATION

SEISMIC CRITERIA FOR SYSTEMS AND COMPONENTS

- EVALUATE EFFECT OF NEW SPECTRA (SRP-COMPATIBLE)
- USE DAMPING VALUES (SRP-COMPATIBLE)
  - RG 1.61 DAMPING
  - CODE CASE N411 DAMPING
  - DAMPING BASED ON TEST DATA
- ANALYSIS TECHNIQUES
  - EQUIVALENT STATIC
  - RESPONSE SPECTRUM ANALYSIS
  - TIME-HISTORY ANALYSIS
- ACCOUNTING FOR UNCERTAINTIES
  - PEAK BROADENING
  - PEAK SHIFTING
- SPATIAL COMBINATIONS
  - 3D SQUARE-ROOT-OF-SUM-OF-SQUARES FOR PIPING
  - 2D ABSOLUTE SUM FOR STRUCTURES AND OTHER COMMODITIES

SEISMIC ANALYSIS - SUBSYSTEM DAMPING

ITEM	ORIGINAL DESIGN (A) OBE	ORIGINAL DESIGN (A) SSE	PROPOSED FOR DESIGN VERIFICATION/ FUTURE WORK OBE	PROPOSED FOR DESIGN VERIFICATION/ FUTURE WORK SSE	JUSTIFICATION/ SOURCE FOR PROPOSED VALUES
PIPING, 12" OR LARGER	0.5	1	2	3	RG 1.61
LESS THAN 12"	0.5	1	1	2	RG 1.61
OPTIONAL	----	----	N411	N411	RG 1.84
CABLE TRAY SYSTEM	4	5	7	7	TEST RESULTS (B)
CONDUIT SYSTEM	(C)	2	7	7	TEST RESULTS (B)
HVAC SYSTEMS	(D)	7	7	7	TEST RESULTS (B)
EQUIPMENT	2	3	2	3	RG 1.61

(A) DAMPING IS NOT GIVEN EXPLICITLY IN THE FSAR FOR ALL COMMODITIES

(B) PROJECTED VALUES. ACTUAL VALUES TO BE USED WILL BE BASED ON TEST DATA AND APPROVED BY NRC.

(C) DESIGN IS BASED ON SSE ONLY

(D) OBE LOADS ARE ASSUMED TO BE 1/2 SSE LOADS

SUMMARY AND CONCLUSIONS

- IMPLEMENTATION WILL ENSURE TECHNICAL ADEQUACY
- ORIGINAL CRITERIA: COMPLIES WITH FSAR/SER
- UPDATED CRITERIA: COMPLIES WITH SRP/CURRENT PRACTICES
- PRELIMINARY CONCLUSIONS: NO IMPACT ON HARDWARE
- ONGOING ANALYSIS AND EVALUATIONS WILL RESOLVE ALL ISSUES

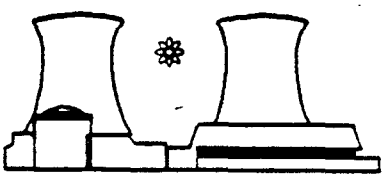
WATTS BAR NUCLEAR PLANT

PRESENTATION OF CIVIL CORRECTIVE ACTION PROGRAMS TO THE NUCLEAR REGULATORY COMMISSION

ROCKVILLE, MARYLAND

JANUARY 18 & 19, 1989

HANGER AND ANALYSIS UPDATE PROGRAM



NRC PRESENTATION

HANGER AND ANALYSIS UPDATE PROGRAM (HAAUP)

PRESENTATION OUTLINE

- BACKGROUND
- DESCRIPTION OF PROGRAM
- SCOPE
- VERIFICATION PLAN
- RECURRENCE CONTROL
- PROGRAM DOCUMENTATION
- CONCLUSIONS

NRC PRESENTATION

BACKGROUND

HAAUP WAS ESTABLISHED TO ADDRESS THE FOLLOWING ISSUES

- IMPLEMENTATION OF NRC BULLETINS/OPEN ITEMS
- EMPLOYEE CONCERNS
- NONCONFORMING CONDITIONS (CAQs, PIRs, NCRs, SCRs)
- REVIEWS (INTERNAL/EXTERNAL)

WBN COMPUTER GRAPHICS UNIT (CNC)

CATEGORIES OF ISSUES AND ROOT CAUSES

INTERFACE CONTROL OF DESIGN INPUT/OUTPUT

- DESIGN INPUT WAS NOT CONSISTENTLY DEFINED AND CONTROLLED
- DESIGN OUTPUT WAS NOT CLEARLY DEFINED AND WAS NOT CONSISTENTLY IMPLEMENTED BY CONSTRUCTION

DESIGN/ANALYSIS METHODOLOGY

- DESIGN CRITERIA FOR PIPING ANALYSIS AND PIPE SUPPORT DESIGN DID NOT SPECIFY A CONSISTENT AND COMPREHENSIVE SET OF DESIGN AND ANALYSIS METHODS

LEVEL OF DESIGN DOCUMENTATION

- REQUIREMENTS FOR CLOSURE OF UNVERIFIED ASSUMPTIONS AND DOCUMENTATION OF ENGINEERING JUDGEMENTS WERE NEITHER FULLY DEFINED NOR PROCEDURALLY CONTROLLED

DESCRIPTION OF PROGRAM

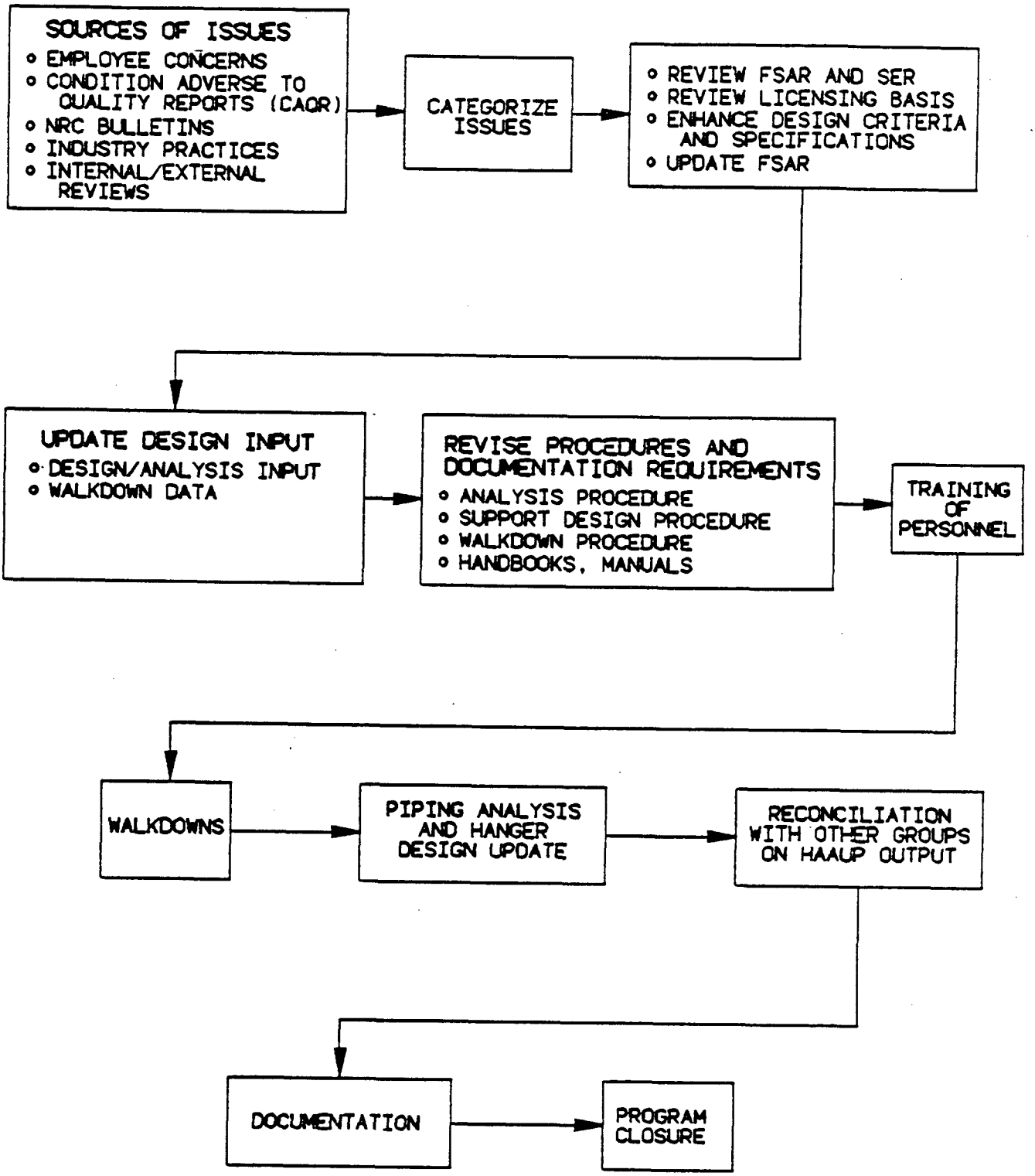
- EVALUATE/RESOLVE THE ISSUES
- UPDATE DESIGN CRITERIA AND FSAR
- UPDATE/ESTABLISH ENGINEERING PROCEDURES
- IMPLEMENT RECURRENCE CONTROL MEASURES
- UPDATE DESIGN INPUTS, e.g.,
  - SEISMIC RESPONSE SPECTRA
  - OPERATING MODES
- VERIFY AS-BUILT CONFIGURATION
- PERFORM PIPING AND PIPE SUPPORT REVIEW AND UPDATE
- RECONCILE HAAUP OUTPUT WITH OTHER GROUPS
- IMPLEMENT REQUIRED MODIFICATIONS
- UPDATE DOCUMENTATION

SCOPE

- CATEGORY I LARGE BORE (> 2" OD) PIPING
- CATEGORY I SMALL BORE (≤ 2.0" OD) PIPING
- CATEGORY I(L) PIPING
- INSTRUMENT LINES
- ASSOCIATED SUPPORTS

PROGRAM VERIFICATION PLAN

FEATURES	APPROX. SUPPORT NOs	METHOD
RIGOROUSLY ANALYZED ASME PIPING	8600	DETAILED WALKDOWN AND EVALUATION
ALTERNATELY ANALYZED SMALL BORE ASME CLASS 2/3 PIPING	6200	CRITICAL CASE EVALUATION
CATEGORY I(L) PRESSURE BOUNDARY RETENTION PIPING	3500	CRITICAL CASE EVALUATION
CATEGORY I(L) POSITION RETENTION PIPING	8900	EVALUATE PRIOR WORST CASE EVALUATION
PIPE RUPTURE ANALYSIS	-	EVALUATE PIPE BREAK LOCATIONS
SUPPORT COMPONENT SUBSTITUTIONS	-	SAMPLING PROGRAM (95/95 CRITERIA)
INSTRUMENT LINES	-	COUPLED TO PIPING - ANALYZE WITH PIPE DECOUPLED FROM PIPE - INST LINE CAP



FLOWCHART OF HAAUP ACTIVITIES
FOR RIGOROUSLY ANALYZED PIPING

CRITICAL CASE EVALUATION FOR SMALL BORE PIPING

- PROGRAM PREPARATION
- ENGINEERING OVERVIEW
- ENGINEERING EVALUATION

PROGRAM PREPARATION

UPDATE DESIGN REQUIREMENTS

- PIPING & PIPE SUPPORT DESIGN CRITERIA HAVE BEEN REVISED

ESTABLISH PRESCREEN ATTRIBUTES, e.g.,

- CAQR's
- OPERATING MODES (TEMPERATURE/PRESSURE)
- BLDG. & LOCATION (FLOOR RESPONSE SPECTRA)
- ECCENTRIC VALVE OPERATORS

DEFINE POPULATION

- ALL CATEGORY I SMALL BORE ASME CLASS 2/3 PIPING.

ANALYZE INITIAL GROUP TO VERIFY CRITICAL ATTRIBUTES

- HIGH TEMPERATURE LINES
- HIGH SEISMIC RESPONSE LINES
- LINES WITH VALVE OPERATORS

ENGINEERING OVERVIEW

DEVELOP CRITICAL CASE EVALUATION PLAN

- PREPARE PROCEDURES
- TRAIN PERSONNEL IN
  - PROCEDURES
  - CRITICAL ATTRIBUTES (SPANS, CLAMPS ETC.)

PERFORM WALKTHROUGH

- CRITICAL ATTRIBUTES
- DOCUMENT INSTALLATIONS REVIEWED
- IDENTIFY OBVIOUSLY DEFICIENT INSTALLATIONS

IDENTIFY/DOCUMENT POTENTIAL CRITICAL CASES

- REVIEW WALKTHROUGH DOCUMENTS
- IDENTIFY POTENTIAL CRITICAL CASES
- DOCUMENT JUSTIFICATION

ENGINEERING EVALUATION

GROUP CRITICAL CASES

- GROUP BY ATTRIBUTES
  - MOTOR OPERATED VALVES
  - HIGH SEISMIC RESPONSE
  - HIGH TEMPERATURE
  - LONG CANTILEVER SUPPORTS

IDENTIFY FINAL CRITICAL CASES

- ENVELOPING CASES
- REVIEW BY SENIOR ENGINEERING GROUP

WALKDOWN FINAL CRITICAL CASES FOR AS-BUILT INFORMATION

- DETAILED WALKDOWN OF CRITICAL CASES

EVALUATE CRITICAL CASES

- RIGOROUS ANALYSIS
- TESTING AS REQUIRED

IMPLEMENT REQUIRED MODIFICATIONS

- GENERIC FOR UNACCEPTABLE ATTRIBUTES (OPERATOR SUPPORTS)
- SPECIFIC FOR UNACCEPTABLE CRITICAL CASE
- ASSESS EFFECT OF MODS ON POPULATION

ISSUE FINAL REPORT

CATEGORY I(L) PRESSURE BOUNDARY RETENTION PIPING

ISSUE

- VERIFY THAT ALL CATEGORY I(L) PRESSURE BOUNDARY RETENTION PIPING AND SUPPORTS COMPLY WITH THE UPDATED DESIGN CRITERIA

SCOPE

- NON-ASME PIPING THAT MUST RETAIN ITS PRESSURE BOUNDARY INTEGRITY DURING ALL PLANT CONDITIONS
- ASSOCIATED PIPE SUPPORTS

METHODOLOGY

- CRITICAL CASE EVALUATION USING THE SAME APPROACH AS DESCRIBED FOR ALTERNATELY ANALYZED SMALL BORE PIPING

CATEGORY I(L) POSITION RETENTION PIPING

ISSUE

- VERIFY THAT ALL CATEGORY I(L) POSITION RETENTION PIPING AND SUPPORTS COMPLY WITH THE UPDATED DESIGN CRITERIA

SCOPE

- NON-ASME PIPING THAT MUST BE SUPPORTED SUCH THAT UNACCEPTABLE INTERACTIONS WITH SAFETY RELATED ITEMS DO NOT OCCUR

METHODOLOGY

- ORIGINAL PIPING DESIGN - ANSI B31.1 DEAD WEIGHT SPAN
- ORIGINAL SUPPORT DESIGN - TYPICALS
- EVALUATION REPORT (SCR WBNCEB8537) WILL BE REVIEWED TO ENSURE COMPLIANCE WITH THE UPDATED DESIGN CRITERIA

PIPE RUPTURE

ISSUE

- VERIFY THAT PIPE BREAK LOCATIONS COMPLY WITH THE UPDATED DESIGN CRITERIA AND APPROPRIATE SRPs

SCOPE

- HIGH AND MODERATE ENERGY PIPING SYSTEMS

METHODOLOGY

- HIGH ENERGY PIPING SYSTEMS
  - WILL BE REVIEWED TO VERIFY PIPE BREAK LOCATIONS
  - ARBITRARY INTERMEDIATE BREAKS WILL BE ELIMINATED WHERE STRESSES REMAIN BELOW THE THRESHOLD LIMIT
  - A WALKDOWN OF AREAS CONTAINING SAFETY RELATED COMPONENTS WILL BE CONDUCTED TO ENSURE UNACCEPTABLE INTERACTIONS DO NOT EXIST
- MODERATE ENERGY PIPING SYSTEMS
  - CALCULATIONS WILL BE REVIEWED TO CONFIRM OR IDENTIFY NEW CRACK EXCLUSION ZONES

LEAK BEFORE BREAK

- A SEPARATE SUBMITTAL WILL BE MADE TO THE NRC

PIPE SUPPORT COMPONENT SUBSTITUTIONS

ISSUE

- VERIFY THAT SUBSTITUTIONS OF VARIOUS PIPE SUPPORT STANDARD COMPONENTS WITH WBN FABRICATED PARTS COMPLIES WITH THE APPROPRIATE LOAD CAPACITIES

SCOPE

- ALL CATEGORY I AND I(L) PIPE SUPPORTS WITHIN THE HAAUP SCOPE

METHODOLOGY

- A STATISTICAL SAMPLE OF STANDARD COMPONENT SUPPORTS WILL BE EVALUATED TO ENSURE 95/95 RELIABILITY AND CONFIDENCE THAT THE PIPE SUPPORT COMPONENT PARTS ARE CONSISTENT WITH SPECIFIED DESIGN BASIS

INSTRUMENT LINES

ISSUE

- VERIFY THAT ALL INSTRUMENT LINES AND SUPPORTS COMPLY WITH THE UPDATED DESIGN CRITERIA

SCOPE

- INSTRUMENT LINES THAT CANNOT BE DECOUPLED FROM THE PROCESS PIPING ANALYSIS WILL BE INCLUDED WITH THE PIPING ANALYSIS/EVALUATION
- INSTRUMENT LINES THAT CAN BE DECOUPLED FROM THE PROCESS PIPING WILL BE INCLUDED IN THE INSTRUMENT LINE CAP

METHODOLOGY

- ORIGINAL ANALYSIS - COOKBOOK
- ORIGINAL SUPPORT DESIGN - TYPICALS
- INSTRUMENT LINES COUPLED TO PROCESS PIPING WILL BE EVALUATED WITH THE PROCESS PIPING
- OTHER INSTRUMENT LINES WILL BE QUALIFIED UNDER INSTRUMENT LINE CAP

RECURRENCE CONTROL MEASURES

INTERFACE CONTROL

- ENGINEERING PROCEDURES HAVE BEEN STRENGTHENED TO CONTROL DESIGN INPUT/OUTPUT
- SINGLE SOURCE OF CONSTRUCTION TOLERANCES

DESIGN METHODOLOGY

- REVISED DESIGN CRITERIA
- REVISED DESIGN PROCEDURES
- OTHER DOCUMENTS (HANDBOOKS, MANUALS)

DOCUMENTATION

- PROCEDURES FOR CALCULATIONS (e.g. ENG. JUDGEMENTS)
- AUDITS

PROGRAM DOCUMENTATION

- ENHANCED DESIGN CRITERIA AND PROCEDURES
- WALKDOWN PACKAGES FOR RIGOROUSLY ANALYZED PIPING AND PIPE SUPPORTS
- DOCUMENT COMPLIANCE WITH DESIGN CRITERIA
  - -UPDATED CALCULATIONS FOR RIGOROUSLY ANALYZED PIPING AND PIPE SUPPORTS
  - -DESIGN CHANGE NOTICES
- TRACK OPEN ITEMS FOR CLOSURE
- HAAUP FINAL REPORT DOCUMENTING PROGRAM CLOSURE

CONCLUSIONS

COMPLETION OF PROGRAM WILL ENSURE THAT PIPING AND PIPE SUPPORT INSTALLATIONS:

- ARE STRUCTURALLY ADEQUATE
- MEET DESIGN CRITERIA
- COMPLY WITH LICENSING REQUIREMENTS
- ARE PROPERLY DOCUMENTED

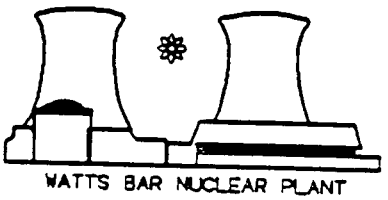
WATTS BAR NUCLEAR PLANT

PRESENTATION OF CIVIL CORRECTIVE ACTION PROGRAMS TO THE NUCLEAR REGULATORY COMMISSION

ROCKVILLE, MARYLAND

JANUARY 18 & 19, 1989

CONDUIT
CABLE TRAY
HVAC



CONDUIT/CABLE TRAY/HVAC CAPS

- BACKGROUND
- DESIGN/CONSTRUCTION PROCESS
- CAP ELEMENTS
- UNIQUE ISSUES FOR CAP IMPLEMENTATION
- SUMMARY

NRC PRESENTATION

WBN COMPUTER GRAPHICS UNIT (CNC)

BACKGROUND

- DESIGN ISSUES
  - -INCOMPLETE DESIGN CRITERIA
  - -OUTPUT DOCUMENTS NOT ENVELOPING ALL DESIGN REQUIREMENTS
- CONSTRUCTION ISSUES
  - -INSTALLED CONFIGURATION NOT COMPLYING WITH DESIGN DOCUMENTS
  - -MISSING SUPPORT IDENTIFICATION TAGS
- DOCUMENTATION ISSUES
  - -MISSING DOCUMENTATION
  - -DISCREPANCIES BETWEEN INSTALLED CONFIGURATION DOCUMENTATION

WBN COMPUTER GRAPHICS UNIT (CNC)

DESIGN AND CONSTRUCTION PROCESS

	• CONDUIT	• CABLE TRAY	• HVAC
DESIGN	TYPICAL DESIGN SUPPORTS	UNIQUELY DES SUPPORTS	TYP DES SUPPORTS
CONST	FIELD ROUTED	ENGR ROUTED	ENGR ROUTED
APPROX POPULATION OF SUPP	35,000	3,700	2,500

CAP ELEMENTS

- UPDATE DESIGN BASIS
- UPDATE DESIGN OUTPUT DOCUMENTS
- REVISE IMPLEMENTING PROCEDURES
- CRITICAL CASE EVALUATIONS

NRC PRESENTATION

WBN COMPUTER GRAPHICS UNIT (CNC)

UPDATE BASIS DESIGN

- REVIEW LICENSING COMMITMENTS
- REVIEW CRITERIA FOR ADEQUACY
- UPDATE DESIGN CRITERIA AND FSAR

UPDATE DESIGN OUTPUT DOCUMENTS AND PROCEDURES

- UPDATE DRAWINGS
  - -TO BE IN COMPLIANCE WITH REVISED DESIGN BASIS

- ISSUE ENGINEERING REQUIREMENTS SPECIFICATIONS
  - -COMBINE CIVIL INSTALLATION REQUIREMENTS INTO ONE DOCUMENT

- REVISE IMPLEMENTING PROCEDURES
  - -COMPLIANCE WITH OUTPUT REQUIREMENTS

CRITICAL CASE EVALUATION

- PROGRAM PREPARATION
- ENGR. OVERVIEW
- ENGR. EVALUATION

UNIQUE ISSUES FOR CAP IMPLEMENTATION

CONDUIT CAP

- OVERSPANS
- CONCENTRATED WEIGHTS
- CANTILEVER LENGTHS
- TRANSITION BETWEEN TRAYS
- INSTALLATION DISCREPANCIES

CABLE TRAY CAP

- FITTINGS
- CABLE TRAY COVERS
- CABLE TRAY ORIENTATION
- CABLE TIE WRAP
- INSTALLATION DISCREPANCIES
- UNDOCUMENTED INSPECTION OF SUPPORTS

HVAC CAP

- HEAVY GAUGE DUCT
- CONCENTRATED WEIGHTS
- CANTILEVER LENGTHS
- CUTOUTS
- INSTALLATION DISCREPANCIES

DISTRIBUTION FOR MEETING SUMMARY DATED: February 16, 1989

Facility: Watts Bar Nuclear Plant, Units 1 and 2*

Docket File	
NRC PDR	
Local PDR	
Projects Reading	
ADSP Reading	
D. Crutchfield	
B. D. Liaw	
S. Black	
R. Pierson	
R. Auluck	
M. Simms	
F. McCoy	R-II
J. Rutberg	15-B-18
J. Fair	
D. Terao	
T. Cheng	
M. Branch	
G. Walton	
G. Georgiev	
G. Hubbard	
ACRS (10)	
GPA/PA	2-G-5
GPA/CA	16-G-19
S. Varga	14-E-4
E. Jordan	MNBB-3302
B. Grimes	9-A-2
P. Gwynn	16-H-3
J. Scarborough	16-H-3
G. Marcus	16-H-3
T. Elsasser	16-G-15
L. Norrholm	16-G-15
C. Ader	16-H-3
WBN Reading File	

*cc: Licensee/Applicant & Service List

cc:
General Counsel
Tennessee Valley Authority
400 West Summit Hill Drive
E11 B33
Knoxville, Tennessee 37902

Mr. R. L. Gridley
Tennessee Valley Authority
5N 157B Lookout Place
Chattanooga, Tennessee 37402-2801

Mr. R. A. Pedde
Tennessee Valley Authority
Watts Bar Nuclear Plant
P.O. Box 800
Spring City, Tennessee 37381

Mr. D. McCloud
Tennessee Valley Authority
Watts Bar Nuclear Plant
P.O. Box 800
Spring City, Tennessee 37381

Mr. D. L. Williams
Tennessee Valley Authority
400 West Summit Hill Drive
W10 B85
Knoxville, Tennessee 37902

Honorable Johnny Powell
County Judge
Meigs County Courthouse
Route 2
Decatur, Tennessee 37322

Tennessee Department of Health
and Environment
ATTN: Director, Bureau of Environment
T.E.R.R.A. Building, 1st Floor
150 9th Avenue North
Nashville, Tennessee 37219-5404

Honorable Robert Aikman
County Judge
Rhea County Courthouse
Dayton, Tennessee 37321

Regional Administrator, Region II
U.S. Nuclear Regulatory Commission
101 Marietta Street, N.W.
Atlanta, Georgia 30323

Resident Inspector/Watts Bar NP
c/o U. S. Nuclear Regulatory Commission
Route 2, Box 300
Spring City, Tennessee 37381

Dr. Henry Myers, Science Advisor
Committee on Interior
and Insular Affairs
U.S. House of Representatives
Washington. D.C. 20515

Tennessee Valley Authority
Rockville Office
11921 Rockville Pike
Suite 402
Rockville, Maryland 20852

Mr. Oliver D. Kingsley, Jr.
Senior Vice President, Nuclear Power
Tennessee Valley Authority
6N 38A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Enclosure 1

MEETING WITH TVA

January 18, 1989

Rajender Auluck	NRC/NRR
Thomas Cheng	NRC/NRR
D. Terao	NRC/NRR
John Fair	NRC/NRR
Suzanne Black	NRC/NRR
Frank McCoy	NRC/NRR
Morris Branch	NRC/NRR
Glen Walton	NRC/NRR
John McCall	TVA
Robert A. Pedde	TVA
Rao Mandava	TVA
Ed Fuller	TVA
Tom Ippolito	TVA
Edward J. Vigluicci	TVA
R. Joe Hunt	TVA
Rod Rogers	Bechtel
James G. Adair	TVA
L. C. M. Roddy	TVA
John F. Cox	TVA
Dennis E. McCloud	TVA
Fred L. Moreadith	TVA
Bob Pierson	NRC/NRR
G. B. Georgiev	NRC/NRR
G. T. Hubbard	NRC/NRR
Walter Horn	TVA
Orhan Gurbus	Bechtel
Syed A. Bokhari	TVA
Roger C. Wieser	Stone and Webster
Ken Barr	NRC/NRR
Ron Carle	TVA

MEETING WITH TVA

January 19, 1989

Rajender Auluck	NRC/NRR
Tom Cheng	NRC/NRR
R. Joe Hunt	TVA
Orhan Gurbus	Bechtel
John McCall	TVA
Ruben O. Hernandez	TVA
Dennis E. McCloud	TVA
Morris Branch	NRC
Glen Walton	NRC
Ken Barr	NRC
R. E. Shewmaker	NRC
F. L. Moreadith	TVA
R. L. Rogers	Bechtel
John E. Cox	TVA
James G. Adair	TVA
Ronald L. Carle	TVA
Walter Horn	TVA
Ronald L. Beck	Bechtel
Syed A. Bokhari	TVA

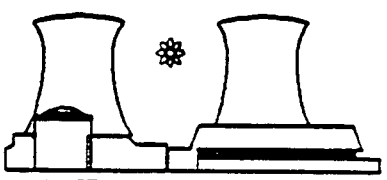
ENCLOSURE 2

WATTS BAR NUCLEAR PLANT

PRESENTATION OF CIVIL CORRECTIVE ACTION PROGRAMS TO THE NUCLEAR REGULATORY COMMISSION

ROCKVILLE, MARYLAND

JANUARY 18 & 19, 1989



NRC PRESENTATION

WBN COMPUTER GRAPHICS UNIT (CNC)

WBN CORRECTIVE ACTION PROGRAMS MEETING WITH NRC JANUARY 18 & 19, 1989

AGENDA

I.	INTRODUCTION	E. D. FULLER
II.	CAP DEVELOPMENT AND CONTROLS	E. D. FULLER
III.	CIVIL PROGRAM OVERVIEW	J. K. McCALL
IV.	PRESENTATION OF CAPS	
	• SEISMIC ANALYSIS	R. J. HUNT
	• HANGER AND ANALYSIS UPDATE	S. A. BOKHARI
	• ELECTRICAL CONDUIT AND CONDUIT SUPPORT	J. G. ADAIR
	• CATEGORY I CABLE TRAY AND CABLE TRAY SUPPORTS	J. G. ADAIR
	• HVAC DUCT AND DUCT SUPPORTS	J. G. ADAIR
V.	SUMMARY	E. D. FULLER

NRC PRESENTATION

WBN COMPUTER GRAPHICS UNIT (JKA)

WBN CORRECTIVE ACTION PROGRAMS

- CAP PRESENTATION SCHEDULE
- DECEMBER 20, 1988 MEETING
- NRC REVIEW OF CAPS
  - CONCURRENCE ON APPROACH - 2 WEEK
  - IMPLEMENTATION - REVIEW TO FOLLOW
- CAP DEVELOPMENT PROCESS AND CONTROLS

WBN COMPUTER GRAPHICS UNIT (JKA)

CAP PRESENTATION PLAN

PRESENTATION MEETING	CAP	DATE SUBMITTED TO NRC	
01/18/89 & 01/19/89	• SEISMIC ANALYSIS	11/18/88	
	• HANGER AND ANALYSIS UPDATE	11/18/88	
	• CATEGORY I CABLE TRAY AND CABLE TRAY SUPPORTS	11/18/88	
	• ELECTRICAL CONDUIT AND CONDUIT SUPPORTS	11/18/88	
	• HVAC DUCT AND DUCT SUPPORTS	11/18/88	
WEEK OF 01/30/89	• WELDING	01/13/89	
	• DESIGN BASELINE AND VERIFICATION	10/20/88	
	• QA RECORDS	12/21/88	
WEEK OF 02/13/89	• CABLE ISSUES	12/16/88	
	• ELECTRICAL ISSUES	01/23/89	(SCHEDULE)
	• INSTRUMENT LINES	12/23/88	
	• FIRE PROTECTION	12/16/88	
IF REQUESTED BY NRC	• QUALITY ASSURANCE LIST	10/27/88	
	• CONTAINMENT ISOLATION	10/20/88	
	• VENDOR INFORMATION	12/14/88	
	• REPLACEMENT ITEMS (PIECE PARTS)	12/14/88	
	• HEAT CODE TRACEABILITY	12/23/88	
	• PRESTART TEST	12/30/88	
	• EQUIPMENT SEISMIC QUALIFICATION	12/23/88	

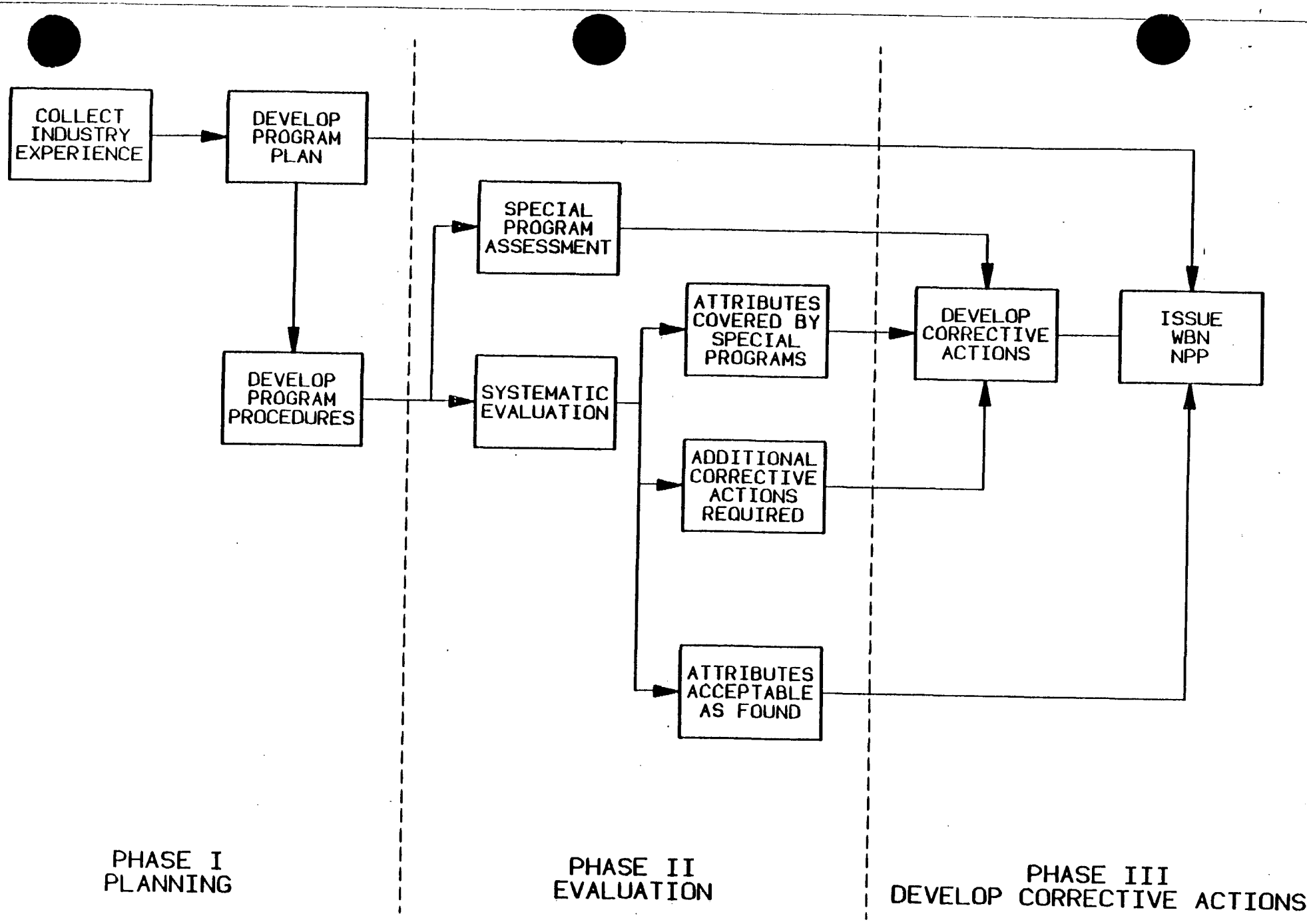
COMPUTER GRAPHICS UNIT (JKA)

WBN COMPUTER GRAPHICS UNIT (JKA)

PROGRAM OBJECTIVE

- REASONABLE ASSURANCE:
  - DEFICIENCIES DETECTED
  - CORRECTIVE ACTIONS DEFINED
- DEVELOP WATTS BAR NUCLEAR PERFORMANCE PLAN - VOL 4

WBN COMPUTER GRAPHICS UNIT (JKA)



WATTS BAR PROGRAM PLAN

WBN COMPUTER GRAPHICS UNIT (JKA)

CORRECTIVE ACTIONS

- SOURCES OF CORRECTIVE ACTIONS
  - EXISTING SPECIAL PROGRAMS
  - SYSTEMATIC EVALUATION
- CORRECTIVE ACTION PROGRAMS (CAP):
  - BROAD SCOPE
  - GENERIC/PROGRAMMATIC
  - MAY COMBINE SEVERAL MINOR ACTIONS

CAP DEVELOPMENT & REVIEW

- ISSUE THOROUGHLY DEFINED
- ISSUE THOROUGHLY RESOLVED
- ROOT CAUSE CLEARLY IDENTIFIED
- INTERFACE WITH OTHER PROGRAMS
- TREND ANALYSIS
- GENERIC IMPLICATIONS ANALYSIS
- RECURRENCE CONTROL
- LICENSING REQUIREMENTS SATISFIED
- SQN & BFN EXPERIENCE INCORPORATED

CAP COMMITMENTS

- CAP ACTIONS ASSURED AND CONTROLLED WITH IMPLEMENTATION PROCEDURES
- CAP COMMITMENTS CONTROLLED THROUGH CCTS PROGRAM
- CONSISTENCY OF COMMITMENTS
  - 10 CFR 50.55(e) AND VIOLATION RESPONSES
  - EMPLOYEE CONCERN REPORTS
  - FSAR AND SER
  - EXEMPTION REQUESTS

NRC PRESENTATION

CAP IMPLEMENTATION

- CAP PROJECT MANAGER RESPONSIBLE TO SITE DIRECTOR
- CAP RESPONSIBLE ENGINEER
- CAP LEAD LICENSING ENGINEER

CAP REVISION PROCESS

- REVISION PROCESS CONTROLLED BY ORIGINAL ISSUANCE PROCEDURES
- COMPARABLE REVIEW AND APPROVAL (SIGNOFF) AS ORIGINAL ISSUANCE
- WBPT OR SENIOR MANAGEMENT REVIEW AND APPROVAL

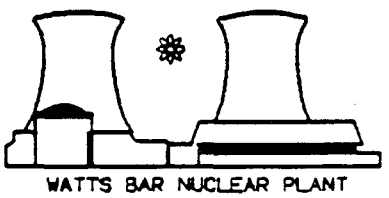
WATTS BAR NUCLEAR PLANT

PRESENTATION OF CIVIL CORRECTIVE ACTION PROGRAMS TO THE NUCLEAR REGULATORY COMMISSION

ROCKVILLE, MARYLAND

JANUARY 18 & 19, 1989

CIVIL PROGRAM OVERVIEW



NRC PRESENTATION

CIVIL PROGRAM OVERVIEW

- BACKGROUND
- CIVIL PROGRAM DESCRIPTION
- CRITERIA ISSUES
- IMPLEMENTATION METHODS

NRC PRESENTATION

BACKGROUND

- LESSONS LEARNED
- EMPLOYEE CONCERNS
- NONCONFORMING CONDITIONS (CAQS)
- REVIEWS (INTERNAL/EXTERNAL)
- NRC OPEN ITEMS

NRC PRESENTATION

CIVIL PROGRAM DESCRIPTION

- STRUCTURES
- SUPPORTED SYSTEMS
- SPECIAL TOPICS

STRUCTURES

FEATURES

- DYNAMIC ANALYSIS
- CONCRETE
- STEEL
- CONTAINMENT
- MASONRY WALLS
- EMBEDMENTS
- PLATFORMS

COMPLIANCE BASIS

- SEISMIC ANALYSIS CAP
- DESIGN BASELINE AND VERIFICATION PROGRAM CAP
- CAQ CLOSEOUT
- INTERFACE CLOSEOUT
- EMPLOYEE CONCERN CLOSEOUT
- NON-CIVIL PROGRAM CAPS

YBN COMPUTER GRAPHICS UNIT (CNS)

SUPPORTED SYSTEMS

FEATURES	COMPLIANCE BASIS*
• REACTOR COOLANT SYSTEM.....	• HAAUP CAP
• LARGE BORE PIPING.....	• HAAUP CAP
• SMALL BORE PIPING.....	• HAAUP CAP
• II/I PIPING.....	• HAAUP CAP
• INSTRUMENT TUBING.....	• HAAUP/INSTRUMENT LINE CAPS
• CABLE TRAYS.....	• CABLE TRAY CAP
• CONDUIT.....	• CONDUIT CAP
• HVAC.....	• HVAC CAP

*COMPLIANCE BASIS APPLICABLE TO ALL FEATURES

- SEISMIC ANALYSIS CAP
- DBVP CAP
- CAQ CLOSEOUT
- INTERFACE CLOSEOUT
- EMPLOYEE CONCERN CLOSEOUT
- NON-CIVIL PROGRAM CAPS

SPECIAL TOPICS

FEATURES	COMPLIANCE BASIS*
• EQUIPMENT SEISMIC QUALIFICATION..... (MECHANICAL, ELECTRICAL, TANKS, AND HEAT EXCHANGERS)	• EQUIPMENT SEISMIC CAP
• GEOTECHNICAL..... (SLOPE STABILITY, BURIED STRUCTURES, ETC.)	• DBVP CAP
• PIPE RUPTURE.....	• HAAUP CAP
• TORNADO ANLYSIS.....	• DBVP CAP
• HEAVY LOADS.....	• DBVP CAP
• EXTERNAL FLOODING.....	• DBVP CAP
• SYSTEM/COMPONENT SEPARATION.....	• DBVP CAP
• II/I NON-PIPING.....	• DBVP CAP

*COMPLIANCE BASIS APPLICABLE TO ALL FEATURES

- SEISMIC ANALYSIS
- DBVP CAP
- CAQ CLOSEOUT
- INTERFACE CLOSEOUT
- EMPLOYEE CONCERN CLOSEOUT
- NON-CIVIL PROGRAM CAPS

CIVIL PROGRAM SUMMARY

- ENCOMPASSES COMPLETE CIVIL SCOPE
- SCOPE COVERED BY CAPS AND OTHER PROGRAMS
- FSAR AND CRITERIA UPDATES REQUIRED
- TECHNICAL ADEQUACY AND COMPLIANCE WITH LICENSING REQUIREMENTS ENSURED

NRC PRESENTATION

WRN COMPUTER GRAPHICS UNIT (CNC)

CRITERIA ISSUES

- SEISMIC CRITERIA
  - ORIGINAL BASIS
  - UPDATED BASIS
  - IMPLEMENTATION
- ANALYSIS AND DESIGN METHODS
- LEAK BEFORE BREAK

IMPLEMENTATION METHODS

- REANALYSIS
- CRITICAL CASE EVALUATIONS
- STUDIES

NRC PRESENTATION

CRITICAL CASE EVALUATIONS

- TOTAL POPULATION
- WALKTHROUGH
- INDEPENDENT REVIEW
- BOUNDING CRITICAL CASES
- EVALUATION
- DOCUMENTATION
- REVIEW FOR UNACCEPTABLE ATTRIBUTES

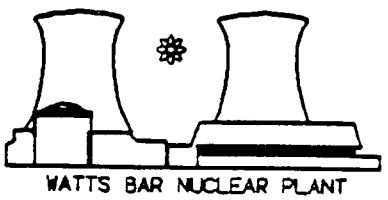
WATTS BAR NUCLEAR PLANT

PRESENTATION OF CIVIL CORRECTIVE ACTION PROGRAMS TO THE NUCLEAR REGULATORY COMMISSION

ROCKVILLE, MARYLAND

JANUARY 18 & 19, 1989

SEISMIC ANALYSIS



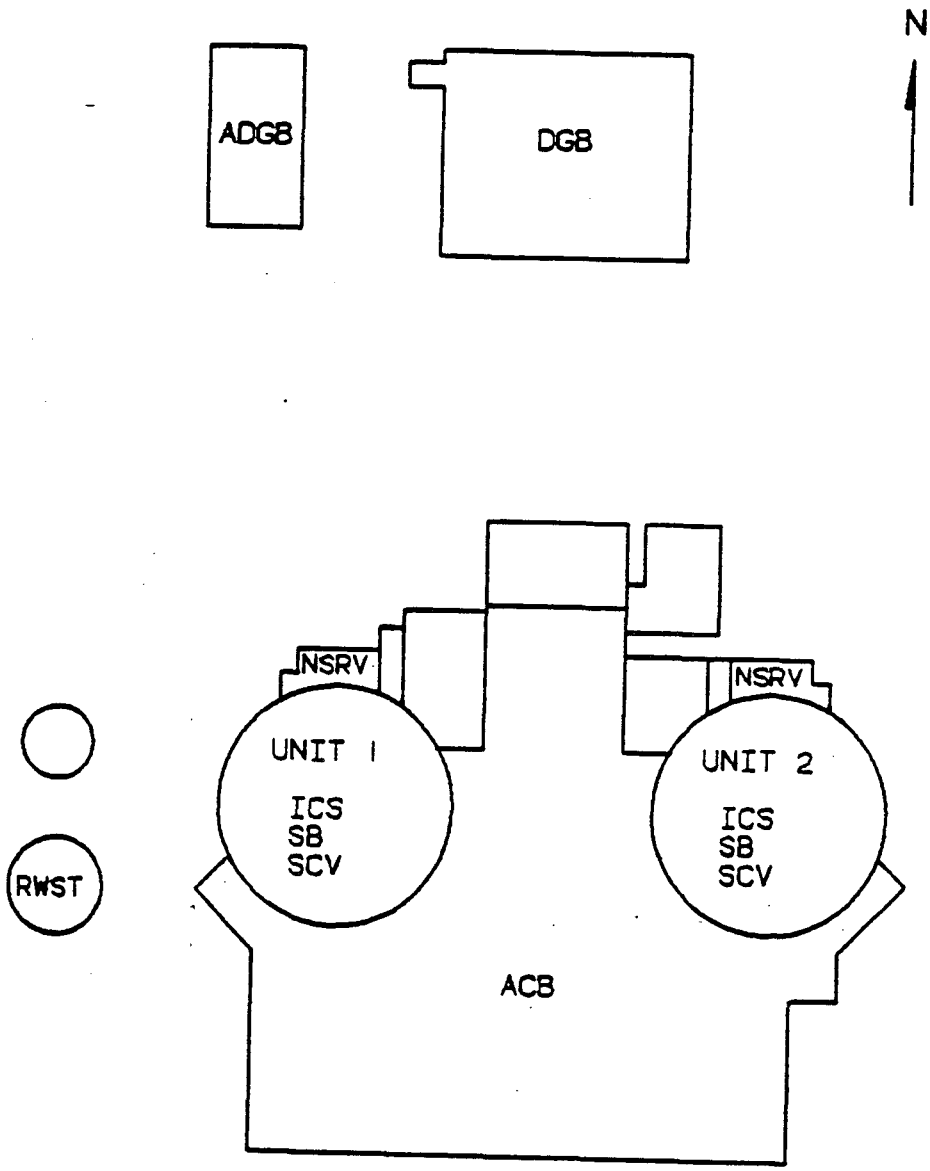
WBN SEISMIC ANALYSIS CAP

PRESENTATION OUTLINE

- BACKGROUND
- DESCRIPTION OF SEISMIC ANALYSIS CAP
- IMPLEMENTATION OF SEISMIC ANALYSIS CAP
- SUMMARY

BACKGROUND

- SEISMIC ANALYSIS
- EMPLOYEE CONCERNS AND CAQRS
- ASSESS AGAINST CURRENT PRACTICES
- CALCULATION REVIEW
- SEISMIC ANALYSIS CAP



INTERNAL CONCRETE STRUCTURE (ICS)
SHIELD BUILDING (SB)
STEEL CONTAINMENT VESSEL (SCV)
NORTH STEAM VALVE ROOM (NSVR)
INTAKE PUMPING STRUCTURE (IPS)
REFUELING WATER STORAGE TANK (RWST)
AUXILIARY/CONTROL BUILDING (ACB)
DIESEL GENERATOR BUILDING (DGB)
ADDITIONAL DIESEL GENERATOR BUILDING (ADGB)

WBN SEISMIC CATEGORY I STRUCTURES

PURPOSE OF SEISMIC ANALYSIS CAP

"ENSURE ADEQUACY OF SEISMIC ANALYSIS FOR CAT I STRUCTURES"

- REVIEW CRITERIA, CALCULATIONS, FSAR, SER
- ADDRESS SEISMIC ANALYSIS ISSUES
- UPDATE CRITERIA AND FSAR
- PROVIDE INPUT TO OTHER CAPS

NRC PRESENTATION

DESCRIPTION OF SEISMIC ANALYSIS CAP

- SEISMIC ISSUES ADDRESSED
- SEISMIC ANALYSIS CRITERIA
- SEISMIC ANALYSIS CAP INTERFACES

SEISMIC ISSUES ADDRESSED

- INTEGRATION TIME STEP
- SOIL PROPERTIES AND SOIL-STRUCTURE INTERACTION CONCERNS
- TORSIONAL MODELING

SEISMIC ANALYSIS CRITERIA

DESIGN BASIS GROUND RESPONSE SPECTRA

- CRITERIA A: ALL CAT I STRUCTURES EXCEPT ADGB

- SITE SPECIFIC GROUND RESPONSE SPECTRA (SSRS): USED TO VERIFY ADEQUACY OF CRITERIA A

- CRITERIA B: FOR ADGB

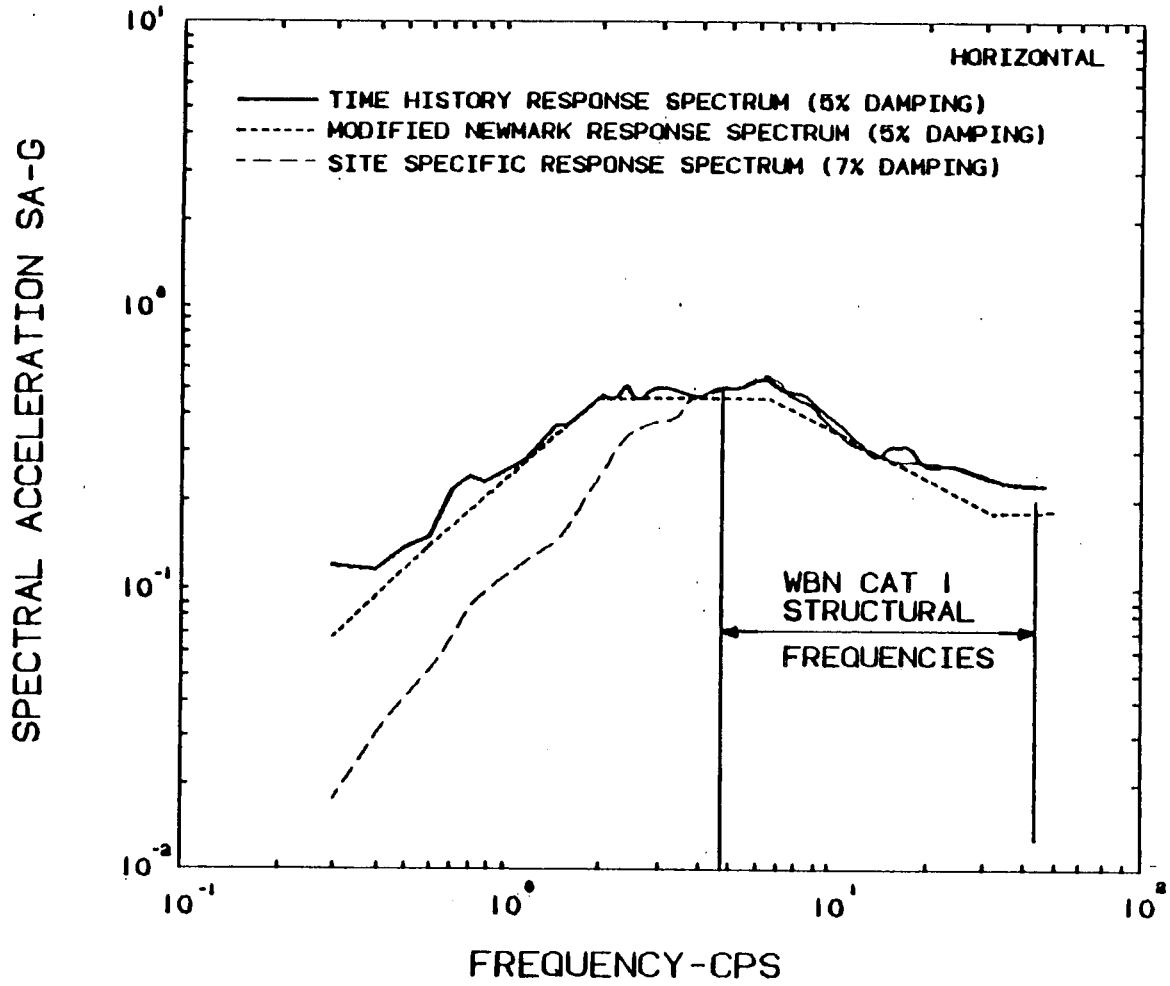
SEISMIC ANALYSIS CRITERIA

ATTRIBUTES	ORIGINAL	UPDATED
DESIGN BASIS GROUND RESPONSE SPECTRA	MODIFIED NEWMARK	SSRS
PEAK GROUND ACCEL.		
SSE	0.18 G HOR, 0.12 G VERT	0.215 G HOR, 0.15 G VERT
OBE	0.09 G HOR, 0.06 G VERT	0.09 G HOR, 0.06 G VERT
ARTIFICIAL TIME-HISTORY RECORDS	FOUR ARTIFICAL TIME HISTORY RECORDS. USE AVERAGE OF FOUR RESPONSES, SAME FOUR USED IN EACH DIRECTION INDEPENDENTLY	THREE STATISTICALLY INDEPENDENT RECORDS - ONE FOR EACH DIRECTION
T-H SPECTRA VS DESIGN	ENVELOPS BOTH MODIFIED NEWMARK AND SSRS	ENVELOPS SSRS
STRUCTURAL MODELS	FSAR	SRP
DAMPING	FSAR	RG 1.61
PEAK BROADENING	FSAR (±10%)	SRP (±) 15%)

UPDATED CRITERIA IS CONSISTENT AND COMPATIBLE WITH CURRENT PRACTICES AND SRP PROVISIONS.

NRC PRESENTATION

TVA WATTS BAR



COMPARISON OF HORIZONTAL DESIGN BASIS GROUND RESPONSE SPECTRA FOR CRITERIA A

SEISMIC ANALYSIS - STRUCTURAL DAMPING

	ORIG. ANALYSIS		REANALYSIS		JUSTIFICATION/ SOURCE FOR PROPOSED VALUES
	OBE	SSE	OBE	SSE	
STRUCTURES					
• STEEL CONTAINMENT VESSEL	1	1	2	4	RG 1.61
• SHIELD BUILDING	2	5	4	7	RG 1.61
• INTERIOR CONCRETE STRUCTURE	2	5	4	7	RG 1.61
• NORTH STEAM VALVE ROOM	5	5	4	7	RG 1.61
• DIESEL GENERATOR BUILDING	5	5	4	7	RG 1.61
• ADDITIONAL DIESEL GENERATOR BUILDING	4	7	4	7	RG 1.61
• OTHER CONCRETE STRUCTURES	5	5	(A)	(A)	FSAR

(A) NO REANALYSIS OF THESE STRUCTURES IS PLANNED

WBN COMPUTER GRAPHICS UNIT (CNC)

SEISMIC ANALYSIS CAP INTERFACES

- CABLE TRAY CAP
- CONDUIT CAP
- HVAC CAP
- HAAUP CAP
- INSTRUMENT LINE CAP
- EQUIPMENT SEISMIC QUALIFICATION CAP

IMPLEMENTATION OF SEISMIC ANALYSIS CAP

- STATUS
- ONGOING SEISMIC REANALYSIS AND EVALUATIONS
- SEISMIC CRITERIA FOR SYSTEMS AND COMPONENTS

WBN COMPUTER GRAPHICS UNIT (CNC)

SEISMIC ANALYSIS CAP STATUS

- CRITERIA REVIEW: COMPLETED
  - ORIGINAL ANALYSIS: CONSISTENT WITH FSAR AND STATE-OF-ART (1970s)
  - REANALYSIS: CONSISTENT WITH SRP
- UPDATED CRITERIA DOCUMENTATION: UNDERWAY
- REANALYSIS: UNDERWAY
- EVALUATIONS: PRELIMINARY COMPLETED, FINAL TO FOLLOW
- FSAR UPDATE: START IN FEBRUARY

NRC PRESENTATION

ONGOING SEISMIC REANALYSIS AND EVALUATIONS

CATEGORY I STRUCTURES

STRUCTURE	REASONS FOR REANALYSIS
REACTOR BUILDING (ICS, SCV, SB)	TORSIONAL CONSTANT, SHEAR CENTER MODELING
DIESEL GENERATOR BUILDING	SOIL MODULUS SSI METHODOLOGY
ADDITIONAL DIESEL GENERATOR BUILDING	PILE MODELING CONSISTENT CRITERIA
NORTH STEAM VALVE ROOM	TORSIONAL CONSTANT

ONGOING SEISMIC REANALYSIS AND EVALUATIONS

SUBSYSTEM AND COMPONENT EVALUATIONS

- EVALUATE EFFECTS OF NEW ARS
- EVALUATE FLOOR FLEXIBILITY EFFECTS

USE OF ARS IN EVALUATIONS

ARS		EVALUATION OF EXISTING DESIGN	MODIFICATIONS	NEW DESIGN
STRUCTURES NOT REANALYZED		OLD ARS	OLD ARS	OLD ARS
REANALYZED STRUCTURES	NEW ARS ENVELOPED BY OLD ARS	NONE	NEW ARS	NEW ARS
	NEW ARS EXCEEDS OLD ARS	EVALUATE SYSTEMS AND COMPONENTS, FIX AS REQUIRED	NEW ARS	NEW ARS

NRC PRESENTATION

SEISMIC CRITERIA FOR SYSTEMS AND COMPONENTS

- EVALUATE EFFECT OF NEW SPECTRA (SRP-COMPATIBLE)
- USE DAMPING VALUES (SRP-COMPATIBLE)
  - RG 1.61 DAMPING
  - CODE CASE N411 DAMPING
  - DAMPING BASED ON TEST DATA
- ANALYSIS TECHNIQUES
  - EQUIVALENT STATIC
  - RESPONSE SPECTRUM ANALYSIS
  - TIME-HISTORY ANALYSIS
- ACCOUNTING FOR UNCERTAINTIES
  - PEAK BROADENING
  - PEAK SHIFTING
- SPATIAL COMBINATIONS
  - 3D SQUARE-ROOT-OF-SUM-OF-SQUARES FOR PIPING
  - 2D ABSOLUTE SUM FOR STRUCTURES AND OTHER COMMODITIES

SEISMIC ANALYSIS - SUBSYSTEM DAMPING

ITEM	ORIGINAL DESIGN (A) OBE	ORIGINAL DESIGN (A) SSE	PROPOSED FOR DESIGN VERIFICATION/ FUTURE WORK OBE	PROPOSED FOR DESIGN VERIFICATION/ FUTURE WORK SSE	JUSTIFICATION/ SOURCE FOR PROPOSED VALUES
PIPING, 12" OR LARGER	0.5	1	2	3	RG 1.61
LESS THAN 12"	0.5	1	1	2	RG 1.61
OPTIONAL	----	----	N411	N411	RG 1.84
CABLE TRAY SYSTEM	4	5	7	7	TEST RESULTS (B)
CONDUIT SYSTEM	(C)	2	7	7	TEST RESULTS (B)
HVAC SYSTEMS	(D)	7	7	7	TEST RESULTS (B)
EQUIPMENT	2	3	2	3	RG 1.61

(A) DAMPING IS NOT GIVEN EXPLICITLY IN THE FSAR FOR ALL COMMODITIES

(B) PROJECTED VALUES. ACTUAL VALUES TO BE USED WILL BE BASED ON TEST DATA AND APPROVED BY NRC.

(C) DESIGN IS BASED ON SSE ONLY

(D) OBE LOADS ARE ASSUMED TO BE 1/2 SSE LOADS

SUMMARY AND CONCLUSIONS

- IMPLEMENTATION WILL ENSURE TECHNICAL ADEQUACY
- ORIGINAL CRITERIA: COMPLIES WITH FSAR/SER
- UPDATED CRITERIA: COMPLIES WITH SRP/CURRENT PRACTICES
- PRELIMINARY CONCLUSIONS: NO IMPACT ON HARDWARE
- ONGOING ANALYSIS AND EVALUATIONS WILL RESOLVE ALL ISSUES

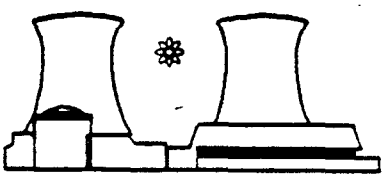
WATTS BAR NUCLEAR PLANT

PRESENTATION OF CIVIL CORRECTIVE ACTION PROGRAMS TO THE NUCLEAR REGULATORY COMMISSION

ROCKVILLE, MARYLAND

JANUARY 18 & 19, 1989

HANGER AND ANALYSIS UPDATE PROGRAM



NRC PRESENTATION

HANGER AND ANALYSIS UPDATE PROGRAM (HAAUP)

PRESENTATION OUTLINE

- BACKGROUND
- DESCRIPTION OF PROGRAM
- SCOPE
- VERIFICATION PLAN
- RECURRENCE CONTROL
- PROGRAM DOCUMENTATION
- CONCLUSIONS

NRC PRESENTATION

BACKGROUND

HAAUP WAS ESTABLISHED TO ADDRESS THE FOLLOWING ISSUES

- IMPLEMENTATION OF NRC BULLETINS/OPEN ITEMS
- EMPLOYEE CONCERNS
- NONCONFORMING CONDITIONS (CAQs, PIRs, NCRs, SCRs)
- REVIEWS (INTERNAL/EXTERNAL)

WBN COMPUTER GRAPHICS UNIT (CNC)

CATEGORIES OF ISSUES AND ROOT CAUSES

INTERFACE CONTROL OF DESIGN INPUT/OUTPUT

- DESIGN INPUT WAS NOT CONSISTENTLY DEFINED AND CONTROLLED
- DESIGN OUTPUT WAS NOT CLEARLY DEFINED AND WAS NOT CONSISTENTLY IMPLEMENTED BY CONSTRUCTION

DESIGN/ANALYSIS METHODOLOGY

- DESIGN CRITERIA FOR PIPING ANALYSIS AND PIPE SUPPORT DESIGN DID NOT SPECIFY A CONSISTENT AND COMPREHENSIVE SET OF DESIGN AND ANALYSIS METHODS

LEVEL OF DESIGN DOCUMENTATION

- REQUIREMENTS FOR CLOSURE OF UNVERIFIED ASSUMPTIONS AND DOCUMENTATION OF ENGINEERING JUDGEMENTS WERE NEITHER FULLY DEFINED NOR PROCEDURALLY CONTROLLED

DESCRIPTION OF PROGRAM

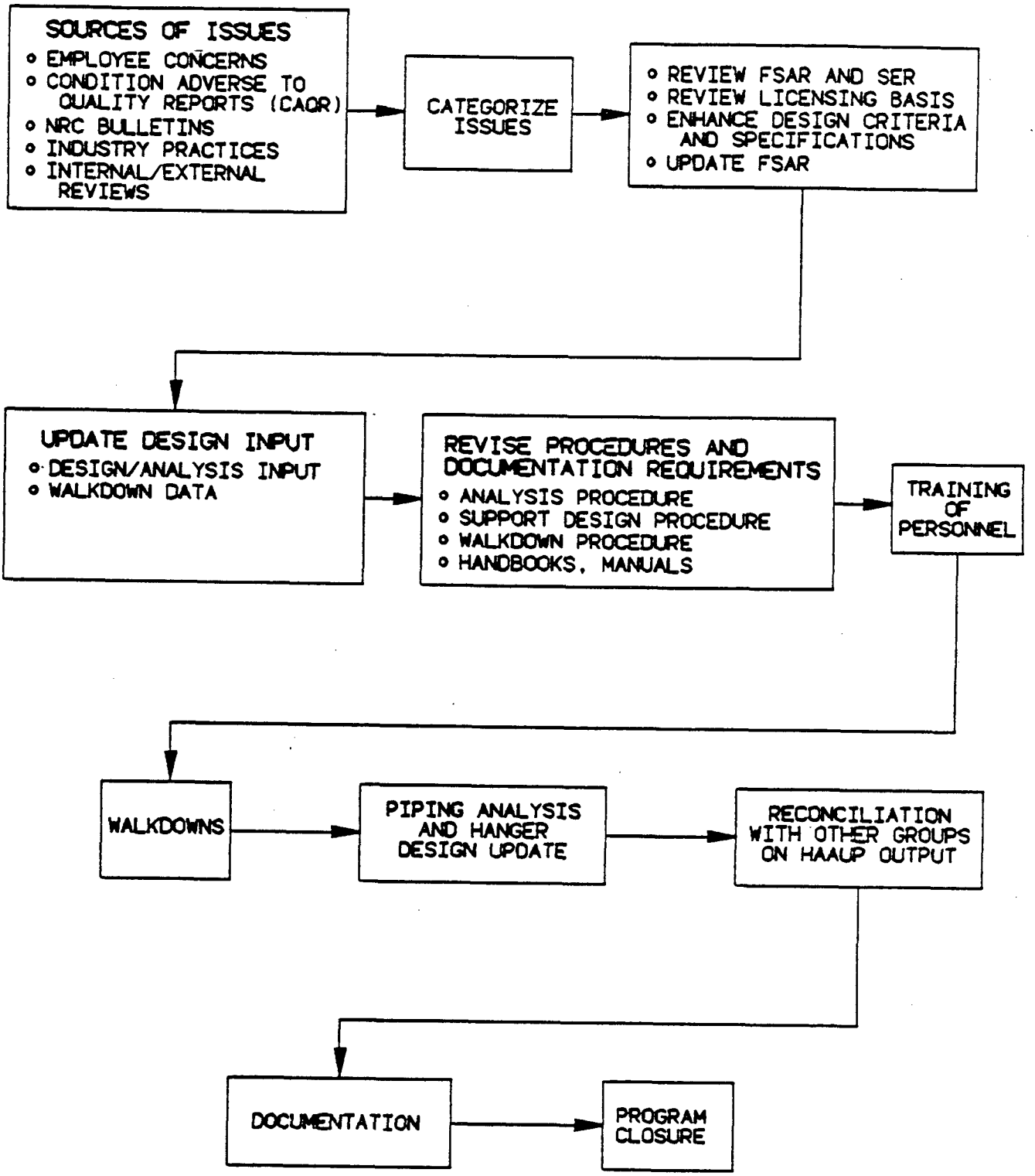
- EVALUATE/RESOLVE THE ISSUES
- UPDATE DESIGN CRITERIA AND FSAR
- UPDATE/ESTABLISH ENGINEERING PROCEDURES
- IMPLEMENT RECURRENCE CONTROL MEASURES
- UPDATE DESIGN INPUTS, e.g.,
  - SEISMIC RESPONSE SPECTRA
  - OPERATING MODES
- VERIFY AS-BUILT CONFIGURATION
- PERFORM PIPING AND PIPE SUPPORT REVIEW AND UPDATE
- RECONCILE HAAUP OUTPUT WITH OTHER GROUPS
- IMPLEMENT REQUIRED MODIFICATIONS
- UPDATE DOCUMENTATION

SCOPE

- CATEGORY I LARGE BORE (> 2" OD) PIPING
- CATEGORY I SMALL BORE (≤ 2.0" OD) PIPING
- CATEGORY I(L) PIPING
- INSTRUMENT LINES
- ASSOCIATED SUPPORTS

PROGRAM VERIFICATION PLAN

FEATURES	APPROX. SUPPORT NOs	METHOD
RIGOROUSLY ANALYZED ASME PIPING	8600	DETAILED WALKDOWN AND EVALUATION
ALTERNATELY ANALYZED SMALL BORE ASME CLASS 2/3 PIPING	6200	CRITICAL CASE EVALUATION
CATEGORY I(L) PRESSURE BOUNDARY RETENTION PIPING	3500	CRITICAL CASE EVALUATION
CATEGORY I(L) POSITION RETENTION PIPING	8900	EVALUATE PRIOR WORST CASE EVALUATION
PIPE RUPTURE ANALYSIS	-	EVALUATE PIPE BREAK LOCATIONS
SUPPORT COMPONENT SUBSTITUTIONS	-	SAMPLING PROGRAM (95/95 CRITERIA)
INSTRUMENT LINES	-	COUPLED TO PIPING - ANALYZE WITH PIPE DECOUPLED FROM PIPE - INST LINE CAP



FLOWCHART OF HAAUP ACTIVITIES
FOR RIGOROUSLY ANALYZED PIPING

CRITICAL CASE EVALUATION FOR SMALL BORE PIPING

- PROGRAM PREPARATION
- ENGINEERING OVERVIEW
- ENGINEERING EVALUATION

PROGRAM PREPARATION

UPDATE DESIGN REQUIREMENTS

- PIPING & PIPE SUPPORT DESIGN CRITERIA HAVE BEEN REVISED

ESTABLISH PRESCREEN ATTRIBUTES, e.g.,

- CAQR's
- OPERATING MODES (TEMPERATURE/PRESSURE)
- BLDG. & LOCATION (FLOOR RESPONSE SPECTRA)
- ECCENTRIC VALVE OPERATORS

DEFINE POPULATION

- ALL CATEGORY I SMALL BORE ASME CLASS 2/3 PIPING.

ANALYZE INITIAL GROUP TO VERIFY CRITICAL ATTRIBUTES

- HIGH TEMPERATURE LINES
- HIGH SEISMIC RESPONSE LINES
- LINES WITH VALVE OPERATORS

ENGINEERING OVERVIEW

DEVELOP CRITICAL CASE EVALUATION PLAN

- PREPARE PROCEDURES
- TRAIN PERSONNEL IN
  - PROCEDURES
  - CRITICAL ATTRIBUTES (SPANS, CLAMPS ETC.)

PERFORM WALKTHROUGH

- CRITICAL ATTRIBUTES
- DOCUMENT INSTALLATIONS REVIEWED
- IDENTIFY OBVIOUSLY DEFICIENT INSTALLATIONS

IDENTIFY/DOCUMENT POTENTIAL CRITICAL CASES

- REVIEW WALKTHROUGH DOCUMENTS
- IDENTIFY POTENTIAL CRITICAL CASES
- DOCUMENT JUSTIFICATION

ENGINEERING EVALUATION

GROUP CRITICAL CASES

- GROUP BY ATTRIBUTES
  - MOTOR OPERATED VALVES
  - HIGH SEISMIC RESPONSE
  - HIGH TEMPERATURE
  - LONG CANTILEVER SUPPORTS

IDENTIFY FINAL CRITICAL CASES

- ENVELOPING CASES
- REVIEW BY SENIOR ENGINEERING GROUP

WALKDOWN FINAL CRITICAL CASES FOR AS-BUILT INFORMATION

- DETAILED WALKDOWN OF CRITICAL CASES

EVALUATE CRITICAL CASES

- RIGOROUS ANALYSIS
- TESTING AS REQUIRED

IMPLEMENT REQUIRED MODIFICATIONS

- GENERIC FOR UNACCEPTABLE ATTRIBUTES (OPERATOR SUPPORTS)
- SPECIFIC FOR UNACCEPTABLE CRITICAL CASE
- ASSESS EFFECT OF MODS ON POPULATION

ISSUE FINAL REPORT

CATEGORY I(L) PRESSURE BOUNDARY RETENTION PIPING

ISSUE

- VERIFY THAT ALL CATEGORY I(L) PRESSURE BOUNDARY RETENTION PIPING AND SUPPORTS COMPLY WITH THE UPDATED DESIGN CRITERIA

SCOPE

- NON-ASME PIPING THAT MUST RETAIN ITS PRESSURE BOUNDARY INTEGRITY DURING ALL PLANT CONDITIONS
- ASSOCIATED PIPE SUPPORTS

METHODOLOGY

- CRITICAL CASE EVALUATION USING THE SAME APPROACH AS DESCRIBED FOR ALTERNATELY ANALYZED SMALL BORE PIPING

CATEGORY I(L) POSITION RETENTION PIPING

ISSUE

- VERIFY THAT ALL CATEGORY I(L) POSITION RETENTION PIPING AND SUPPORTS COMPLY WITH THE UPDATED DESIGN CRITERIA

SCOPE

- NON-ASME PIPING THAT MUST BE SUPPORTED SUCH THAT UNACCEPTABLE INTERACTIONS WITH SAFETY RELATED ITEMS DO NOT OCCUR

METHODOLOGY

- ORIGINAL PIPING DESIGN - ANSI B31.1 DEAD WEIGHT SPAN
- ORIGINAL SUPPORT DESIGN - TYPICALS
- EVALUATION REPORT (SCR WBNCEB8537) WILL BE REVIEWED TO ENSURE COMPLIANCE WITH THE UPDATED DESIGN CRITERIA

PIPE RUPTURE

ISSUE

- VERIFY THAT PIPE BREAK LOCATIONS COMPLY WITH THE UPDATED DESIGN CRITERIA AND APPROPRIATE SRPs

SCOPE

- HIGH AND MODERATE ENERGY PIPING SYSTEMS

METHODOLOGY

- HIGH ENERGY PIPING SYSTEMS
  - WILL BE REVIEWED TO VERIFY PIPE BREAK LOCATIONS
  - ARBITRARY INTERMEDIATE BREAKS WILL BE ELIMINATED WHERE STRESSES REMAIN BELOW THE THRESHOLD LIMIT
  - A WALKDOWN OF AREAS CONTAINING SAFETY RELATED COMPONENTS WILL BE CONDUCTED TO ENSURE UNACCEPTABLE INTERACTIONS DO NOT EXIST
- MODERATE ENERGY PIPING SYSTEMS
  - CALCULATIONS WILL BE REVIEWED TO CONFIRM OR IDENTIFY NEW CRACK EXCLUSION ZONES

LEAK BEFORE BREAK

- A SEPARATE SUBMITTAL WILL BE MADE TO THE NRC

PIPE SUPPORT COMPONENT SUBSTITUTIONS

ISSUE

- VERIFY THAT SUBSTITUTIONS OF VARIOUS PIPE SUPPORT STANDARD COMPONENTS WITH WBN FABRICATED PARTS COMPLIES WITH THE APPROPRIATE LOAD CAPACITIES

SCOPE

- ALL CATEGORY I AND I(L) PIPE SUPPORTS WITHIN THE HAAUP SCOPE

METHODOLOGY

- A STATISTICAL SAMPLE OF STANDARD COMPONENT SUPPORTS WILL BE EVALUATED TO ENSURE 95/95 RELIABILITY AND CONFIDENCE THAT THE PIPE SUPPORT COMPONENT PARTS ARE CONSISTENT WITH SPECIFIED DESIGN BASIS

INSTRUMENT LINES

ISSUE

- VERIFY THAT ALL INSTRUMENT LINES AND SUPPORTS COMPLY WITH THE UPDATED DESIGN CRITERIA

SCOPE

- INSTRUMENT LINES THAT CANNOT BE DECOUPLED FROM THE PROCESS PIPING ANALYSIS WILL BE INCLUDED WITH THE PIPING ANALYSIS/EVALUATION
- INSTRUMENT LINES THAT CAN BE DECOUPLED FROM THE PROCESS PIPING WILL BE INCLUDED IN THE INSTRUMENT LINE CAP

METHODOLOGY

- ORIGINAL ANALYSIS - COOKBOOK
- ORIGINAL SUPPORT DESIGN - TYPICALS
- INSTRUMENT LINES COUPLED TO PROCESS PIPING WILL BE EVALUATED WITH THE PROCESS PIPING
- OTHER INSTRUMENT LINES WILL BE QUALIFIED UNDER INSTRUMENT LINE CAP

RECURRENCE CONTROL MEASURES

INTERFACE CONTROL

- ENGINEERING PROCEDURES HAVE BEEN STRENGTHENED TO CONTROL DESIGN INPUT/OUTPUT
- SINGLE SOURCE OF CONSTRUCTION TOLERANCES

DESIGN METHODOLOGY

- REVISED DESIGN CRITERIA
- REVISED DESIGN PROCEDURES
- OTHER DOCUMENTS (HANDBOOKS, MANUALS)

DOCUMENTATION

- PROCEDURES FOR CALCULATIONS (e.g. ENG. JUDGEMENTS)
- AUDITS

PROGRAM DOCUMENTATION

- ENHANCED DESIGN CRITERIA AND PROCEDURES
- WALKDOWN PACKAGES FOR RIGOROUSLY ANALYZED PIPING AND PIPE SUPPORTS
- DOCUMENT COMPLIANCE WITH DESIGN CRITERIA
  - -UPDATED CALCULATIONS FOR RIGOROUSLY ANALYZED PIPING AND PIPE SUPPORTS
  - -DESIGN CHANGE NOTICES
- TRACK OPEN ITEMS FOR CLOSURE
- HAAUP FINAL REPORT DOCUMENTING PROGRAM CLOSURE

CONCLUSIONS

COMPLETION OF PROGRAM WILL ENSURE THAT PIPING AND PIPE SUPPORT INSTALLATIONS:

- ARE STRUCTURALLY ADEQUATE
- MEET DESIGN CRITERIA
- COMPLY WITH LICENSING REQUIREMENTS
- ARE PROPERLY DOCUMENTED

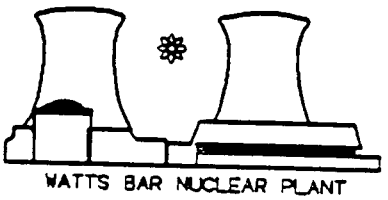
WATTS BAR NUCLEAR PLANT

PRESENTATION OF CIVIL CORRECTIVE ACTION PROGRAMS TO THE NUCLEAR REGULATORY COMMISSION

ROCKVILLE, MARYLAND

JANUARY 18 & 19, 1989

CONDUIT
CABLE TRAY
HVAC



CONDUIT/CABLE TRAY/HVAC CAPS

- BACKGROUND
- DESIGN/CONSTRUCTION PROCESS
- CAP ELEMENTS
- UNIQUE ISSUES FOR CAP IMPLEMENTATION
- SUMMARY

NRC PRESENTATION

WBN COMPUTER GRAPHICS UNIT (CNC)

BACKGROUND

- DESIGN ISSUES
  - -INCOMPLETE DESIGN CRITERIA
  - -OUTPUT DOCUMENTS NOT ENVELOPING ALL DESIGN REQUIREMENTS
- CONSTRUCTION ISSUES
  - -INSTALLED CONFIGURATION NOT COMPLYING WITH DESIGN DOCUMENTS
  - -MISSING SUPPORT IDENTIFICATION TAGS
- DOCUMENTATION ISSUES
  - -MISSING DOCUMENTATION
  - -DISCREPANCIES BETWEEN INSTALLED CONFIGURATION DOCUMENTATION

WBN COMPUTER GRAPHICS UNIT (CNC)

DESIGN AND CONSTRUCTION PROCESS

	• CONDUIT	• CABLE TRAY	• HVAC
DESIGN	TYPICAL DESIGN SUPPORTS	UNIQUELY DES SUPPORTS	TYP DES SUPPORTS
CONST	FIELD ROUTED	ENGR ROUTED	ENGR ROUTED
APPROX POPULATION OF SUPP	35,000	3,700	2,500

CAP ELEMENTS

- UPDATE DESIGN BASIS
- UPDATE DESIGN OUTPUT DOCUMENTS
- REVISE IMPLEMENTING PROCEDURES
- CRITICAL CASE EVALUATIONS

NRC PRESENTATION

WBN COMPUTER GRAPHICS UNIT (CNC)

UPDATE BASIS DESIGN

- REVIEW LICENSING COMMITMENTS
- REVIEW CRITERIA FOR ADEQUACY
- UPDATE DESIGN CRITERIA AND FSAR

UPDATE DESIGN OUTPUT DOCUMENTS AND PROCEDURES

- UPDATE DRAWINGS
  - -TO BE IN COMPLIANCE WITH REVISED DESIGN BASIS

- ISSUE ENGINEERING REQUIREMENTS SPECIFICATIONS
  - -COMBINE CIVIL INSTALLATION REQUIREMENTS INTO ONE DOCUMENT

- REVISE IMPLEMENTING PROCEDURES
  - -COMPLIANCE WITH OUTPUT REQUIREMENTS

CRITICAL CASE EVALUATION

- PROGRAM PREPARATION
- ENGR. OVERVIEW
- ENGR. EVALUATION

UNIQUE ISSUES FOR CAP IMPLEMENTATION

CONDUIT CAP

- OVERSPANS
- CONCENTRATED WEIGHTS
- CANTILEVER LENGTHS
- TRANSITION BETWEEN TRAYS
- INSTALLATION DISCREPANCIES

CABLE TRAY CAP

- FITTINGS
- CABLE TRAY COVERS
- CABLE TRAY ORIENTATION
- CABLE TIE WRAP
- INSTALLATION DISCREPANCIES
- UNDOCUMENTED INSPECTION OF SUPPORTS

HVAC CAP

- HEAVY GAUGE DUCT
- CONCENTRATED WEIGHTS
- CANTILEVER LENGTHS
- CUTOUTS
- INSTALLATION DISCREPANCIES