BIG ROCK POINT RISK ASSESSMENT PROJECT

MEETING AGENDA

MARCH 20, 1980 WASH. DC

I.	INTRODUCTION	KD BRIENZO	1:00 PM
II.	CONSUMERS POWER COMPANY POSITION ON BIG ROCK POINT	RB DeWITT	1:05
III.	PROPOSED ACTION PLAN TO ACHIEVE COMPANY OBJECTIVES	FW BUCKMAN	1:20
IV.	PROBABILISTIC METHODOLOGY	PJ WOOD	1:35
V.	LICENSING AND NRC PARTICIPATION	RW HUSTON	1:50
VI.	CONCLUDING REMARKS	RB DeWITT FW BUCKMAN	2:00

INCENTIVES FOR CONTINUING TO OPERATE BRP

ONE OF THE FEW OPERATING PLANTS AT MIDPOINT OF DESIGN LIFE

ACTIVE DOE LWR FUEL RESEARCH PROGRAM

PLANT DISPLACES 3,000 BARRELS OF OIL PER DAY

REPLACEMENT POWER MUST BE TRANSMITTED OVER SEVERAL HUNDRED MILES

BIG ROCK HAS OPERATED SAFELY FOR OVER 17 YEARS

COST OF DEFERRED ITEMS

PROPOSAL DEFERRAL	COST (THOUSANDS OF DOLLARS)
POST-INCIDENT SHIELDING	40,000
TECHNICAL SUPPORT CENTER	4,000
POST-INCIDENT SAMPLING	525
ALTERNATE SHUTDOWN PANEL	250
CONTAINMENT HYDROGEN MONITOR	50
RECIRCULATING PUMP TRIP	1,000
OTHER ATWS MODIFICATIONS/ANALYSES	UNKNOWN
METEOROLOGY TOWER	300
RELOCATE OFF-SITE EMERGENCY RESPONSE CENTER	UNKNOWN

COST OF NON-DEFERRED ITEMS

MODIFICATION	COST (THOUSANDS OF DOLLARS)
REACTOR COOLANT HIGH POINT VENT	36
ADDITIONAL INSTRUMENTATION	300
FIRE PROTECTION	840
ENHANCEMENT OF POST ACCIDENT OPERABILITY	1,300
SEISMIC ANALYSIS (SEP)	1,400
HIGH ENERGY LINE BREAK (SEP)	500

OBJECTIVES OF THE EVALUATION

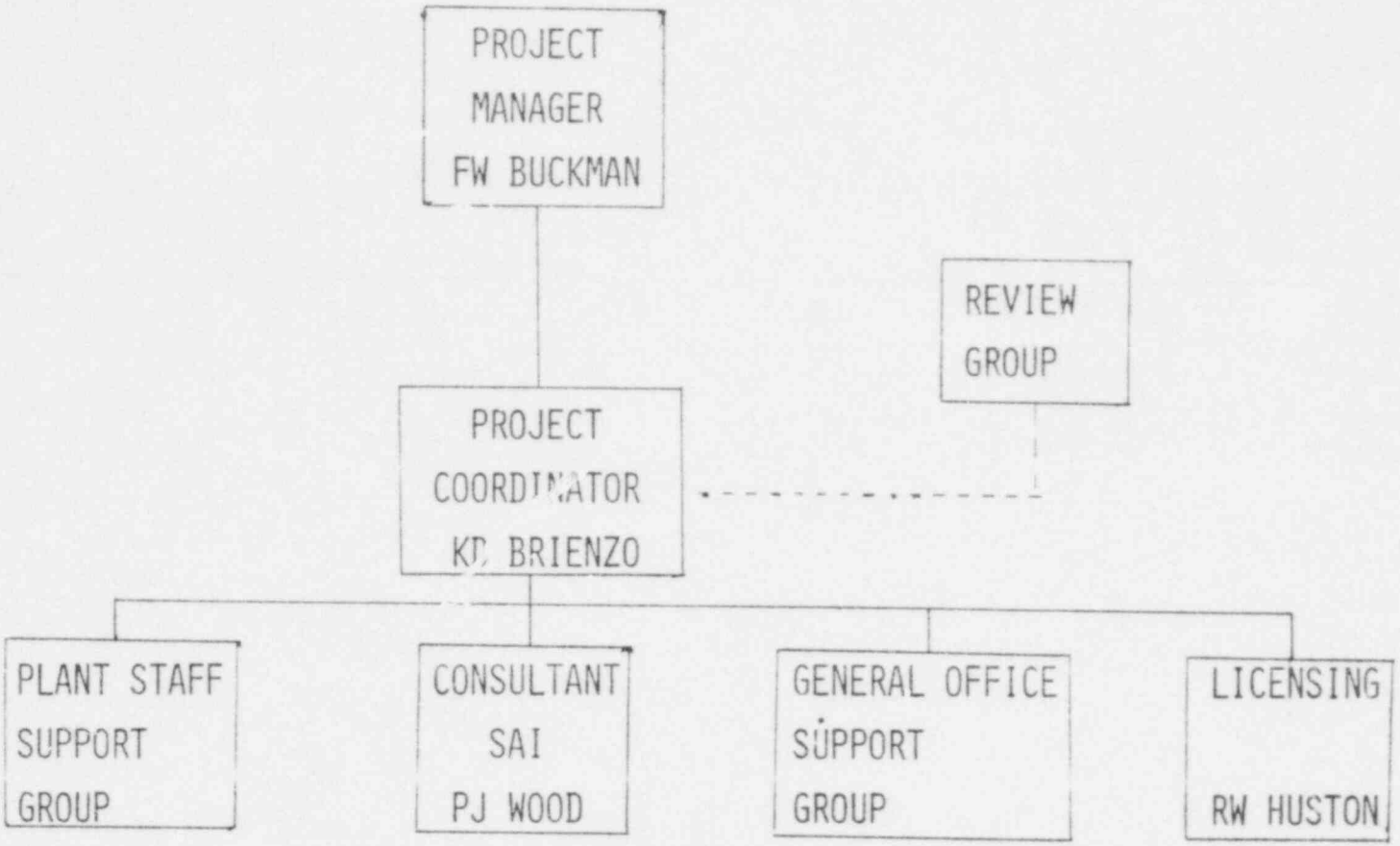
IDENTIFY THOSE ASPECTS OF BIG ROCK POINT THAT CONTRIBUTE MOST SIGNIFICANTLY TO OVERALL PLANT RISK

IF NECESSARY, PROPOSE PLANT MODIFICATIONS THAT WILL REDUCE THE IMPACT OF THE SIGNIFICANT CONTRIBUTORS TO OVERALL PLANT RISK TO AN ACCEPTABLE LEVEL

DETERMINE THE COST OF THE REQUIRED MODIFICATIONS

DECIDE IF THE PRICE FOR CONTINUED OPERATION OF BIG ROCK POINT IS JUSTIFIED

BRP RISK ASSESSMENT PROJECT ORGANIZATION



ITEMS PROPOSED TO BE DEFERRED

POST INCIDENT SHIELDING

TECHNICAL SUPPORT CENTER

POST INCIDENT SAMPLING SYSTEM

ALTERNATE SHUTDOWN PANEL

CONTAINMNET HYDROGEN MONITOR

ATWS MODIFICATIONS

AUTOMATIC ISOLATION OF EMERGENCY CONDENSER

INSTALLATION OF INTERLOCKS ON RECIRCULATION LOOPS

CONSTRUCTION OF A METEOROLOGICAL TOWER

ITEMS FOR WHICH WORK IS ONGOING

REACTOR COOLANT HIGH POINT VENT

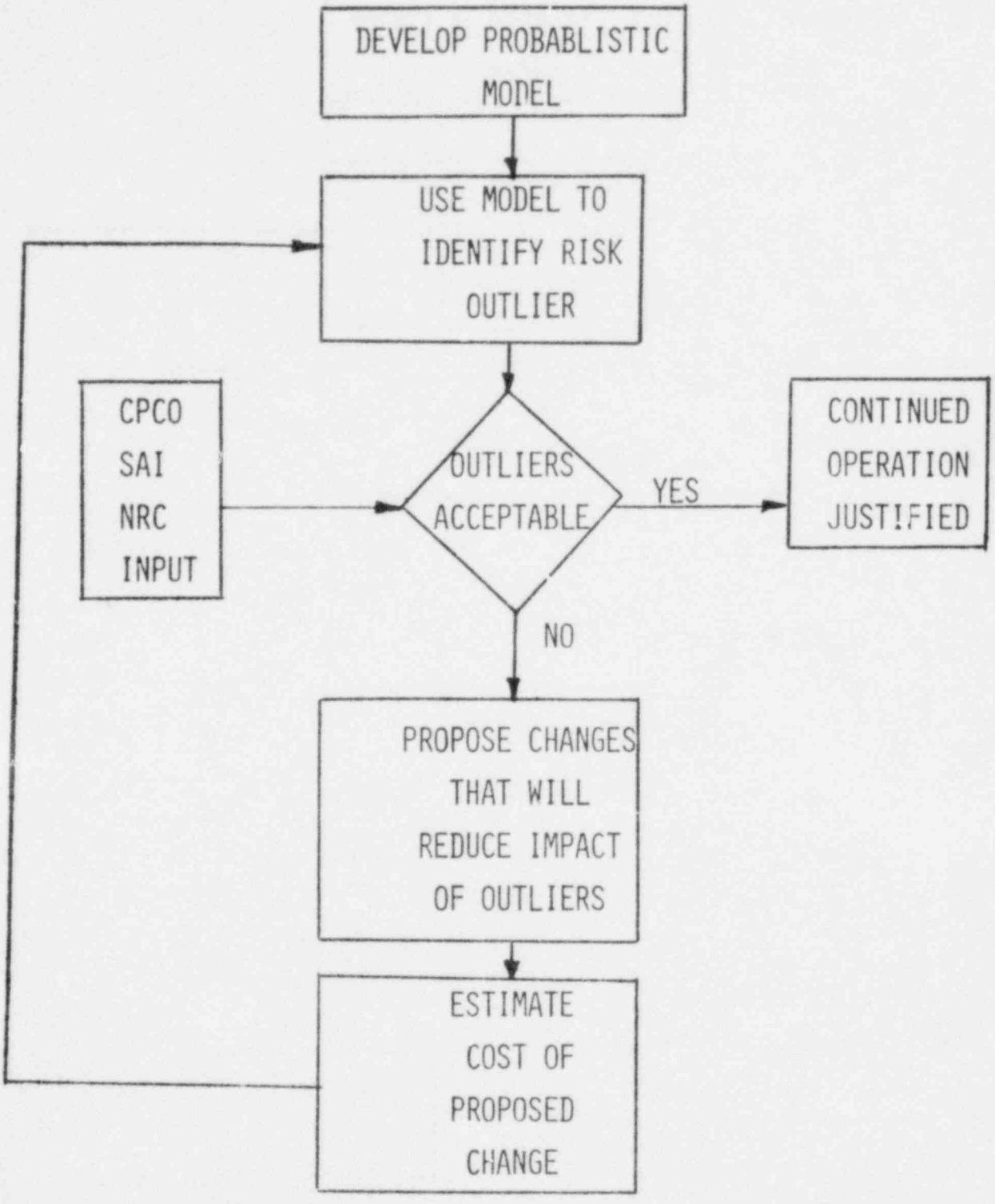
IMPROVED INSTRUMENTATION CAPABILITY

FIRE PROTECTION MODIFICATIONS

ENHANCEMENT OF POST-ACCIDENT OPERABILITY

SEISMIC ANALYSIS

HIGH ENERGY LINE BREAK EVALUATION


DEVELOP PROBABLISTIC MODEL
USE MODEL TO IDENTIFY RISK OUTLIER
CPCO
SAI
NRC
INPUT
OUTLIERS ACCEPTABLE
YES
CONTINUED OPERATION JUSTIFIED
NO
PROPOSE CHANGES THAT WILL REDUCE IMPACT OF OUTLIERS
ESTIMATE COST OF PROPOSED CHANGE

TECHNICAL APPROACH TO THE PROBABILISTIC RISK ASSESSMENT OF THE BIG ROCK POINT PLANT

PAUL J. WOOD
SCIENCE APPLICATIONS, INC.
MONROEVILLE, PA.

MARCH 20, 1980

PRESENTATION CONTENT

- WHY RE-EVALUATE BRP SAFETY USING PRA
- STUDY OBJECTIVE
- TECHNICAL APPROACH
- FORM AND USES OF RESULTS

WHY RE-EVALUATE SAFETY?

- 18 YRS OF OPERATION WITHOUT SERIOUS ACCIDENT
- RECENT SERIOUS SAFETY CONCERNS HAVE BEEN RAISED FOLLOWING TMI-2 ACCIDENT
- EXTENSIVE ARRAY OF CHANGES REQUESTED BY NRC
- OBVIOUS QUESTION: DO SERIOUS SAFETY DEFICIENCIES EXIST?

WHY USE PRA AS EVALUATION BASIS?

- SYSTEMATIC AND COMPREHENSIVE ANALYSIS OF THE SPECTRUM OF POTENTIAL ACCIDENTS AT A PLANT
- THOROUGH DESCRIPTION OF BOTH PROBABILITY OF OCCURRENCE AND CONSEQUENCES OF POTENTIAL ACCIDENTS
- SITE CHARACTERISTICS EXPLICITELY TREATED
- INCORPORATES SYSTEM AS WELL AS HUMAN INVOLVEMENT IN PLANT SAFETY
- HISTORICALLY ROOTED IN BEST ESTIMATE ACCIDENT PHENOMENA ANALYSIS
- USEFUL IN CONTINUING EVALUATION OF PLANT SAFETY ISSUES

OBJECTIVE OF BIG ROCK POINT STUDY

EMPLOY THE TECHNIQUES OF PROBABILISTIC RISK ASSESSMENT (PRA) TO SUPPORT THE CONTINUED SAFE OPERATION OF THE BIG ROCK POINT NUCLEAR PLANT

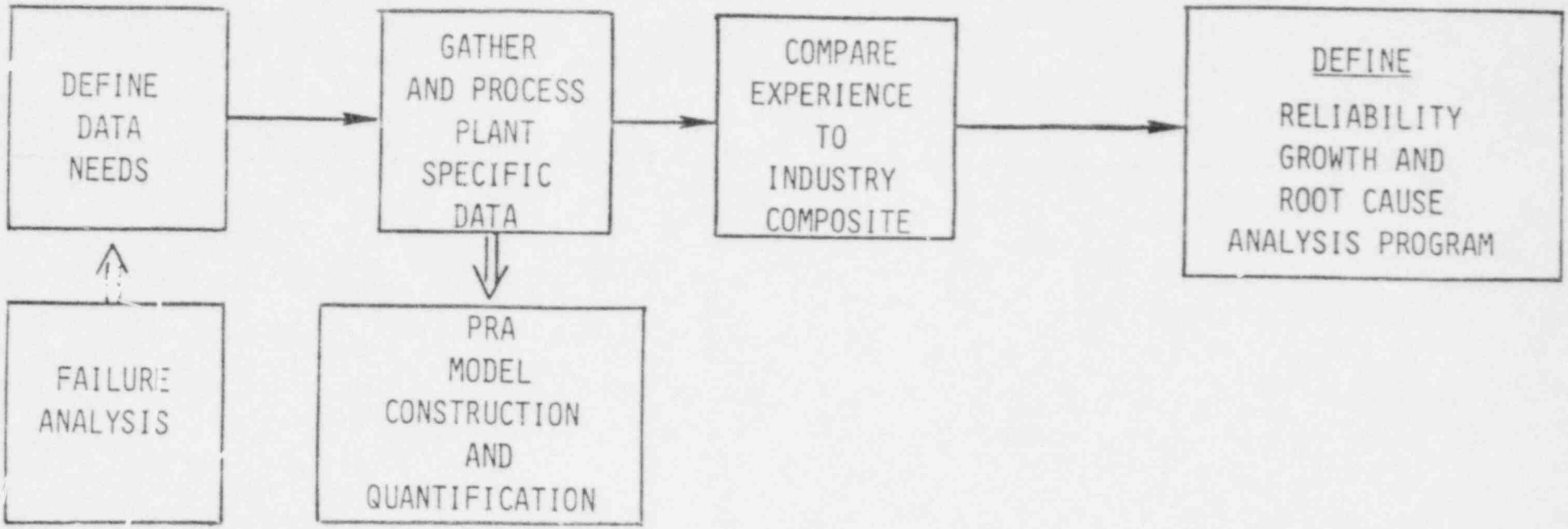
ELEMENTS OF TECHNICAL APPROACH

- PLANT MODELING
- PLANT DATA EVALUATION
- ACCIDENT AND CONSEQUENCE ANALYSIS
- TRACK PLANT AGING PROCESS (PROGRAM DEFINITION)

STAGES OF PLANT MODELING EFFORT

	ACTIVITY	TIME SCALE	SUPPORTED ACTIVITY
1.	PLANT FAILURE ANALYSIS (EVENT TREES AND DEPENDENCY DIAGRAMS)	2 WEEKS	• CATEGORIZE PROBLEM AREAS • DEFINE DATA NEEDS • DEFINE REQ'D ENGR. ANALYSIS • SUPPORT RELEASE CATEGORY DEF. • SUPPORT CONCEPTUAL DESIGN MODS.
2.	PRA MODEL DEVELOPMENT & QUANTIFICATION	3 MONTHS	• CURRENT PLANT RISK ASSESSMENT • SUPPORT PRELIMINARY DESIGN MODS.
3.	PRA MODEL SENSITIVITY STUDIES FOR PLANT MODIFICATIONS	3 MONTHS	• DEFINE ADDITIONAL REQ'D ENGR. ANALYSIS • REFINE RELEASE CATEGORY DEFINITION • SUPPORT VALUE-IMPACT ANALYSIS

DATA EVALUATION



ACCIDENT CONSEQUENCE ANALYSIS

ELEMENTS:

- RE-DEFINE RELEASE CATEGORIES
- EVALUATE SOURCE TERMS
- CALCULATE RELEASE CATEGORY PROBABILITIES
- MODEL SITE CHARACTERISTICS (METEOROLOGY & DEMOGRAPHY)

OUTPUTS:

- RADIONUCLIDE RELEASE DISTRIBUTIONS
- HEALTH CONSEQUENCE DISTRIBUTIONS

FORM OF RESULTS

- CORE DAMAGE PROBABILITY AND UNCERTAINTIES
- DEFINITION OF DOMINANT SEQUENCES BY RELEASE CATEGORY
- DEFINITION OF FAILURES CONTRIBUTING TO DOMINANT SEQUENCES
- DISTRIBUTIONS OF RADIONUCLIDE RELEASES
- DISTRIBUTIONS OF TYPICAL HEALTH EFFECTS

USE OF RESULTS

DOMINANT SEQUENCES
DOMINANT FAILURES
→ DEFINE RISK OUTLIERS
SUPPORT CORRECTIVE ACTION DEFINITION

CORE DAMAGE PROBABILITY
RELEASE DISTRIBUTIONS
SITE CHARACTERISTICS
→ COMPARE TO "NON-ACCEPTANCE" CRITERIA

PROBABILISTIC MODELS
EVALUATED DATA
→ DEFINE FUTURE DATA NEEDS
EVALUATE ACCIDENT SEQUENCE PRECURSORS
DEPICTION OF PLANT AGING PROCESS

FORMAT OF RESULTS:

DOMINANT ACCIDENT SEQUENCES BY RELEASE CATEGORY

RELEASE CATEGORY

1	2	3	4	5
TW-α 2×10^{-7}	TW-γ' 3×10^{-6}	TW-γ 1×10^{-5}	---	A 1×10^{-4}
TC-α 1×10^{-7}	TQUV-γ' 8×10^{-8}	TC-γ 1×10^{-5}		
TWUV-α 5×10^{-9}		TQUV-γ 4×10^{-7}		

REVIEW GROUP

ORGANIZATION	GROUP MEMBER
SYSTEMATIC EVALUATION PROGRAM	WJ BECKIUS (GO)
HEALTH PHYSICS	R SINDERMAN (GO)
ACCIDENT & TRANSIENT ANALYSIS	DJ VANDEWALLE (GO)
CORE PHYSICS	BD WEBB (GO)
GENERATING PLANT MODIFICATIONS	UNKNOWN AT THIS TIME
PLANT LICENSING	DE DEMOOR (BRP)
NRC	UNKNOWN AT THIS TIME