(APR 0 2 1980)

MEETING SUMMARY DISTRIBUTION

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P. Kreutzer
OI&E (6)
R. Fraley, ACRS (16)
J. Buchanan
TERA
D. Ross
W. Kane
T. Novak
S. Israel
G. Mazetis
P. Matthews
C. Liang
B. Wilson
Z. Rosztoczy
P. Norian
B. Sheron
W. Jensen
R. Capra
R. Woodruff
P. Tam
G. Holahan
D. Zieman
T. Speis
B. Wilson
A. Gill
T. Harpster
L. Phillips
R. Tedesco

8004210328

*50-268, 50-270, 50-287,
50-289, 50-302, 50-312
50-313, 50-346

APR 0 2 1980

MEMORANDUM FOR: T. M. Novak, Chief, Reactor Systems Branch, DSS

FROM: B. L. Siegel, Reactor Systems Branch, DSS

SUBJECT: SUMMARY OF FEBRUARY 22, 1980 MEETING WITH THE BABCOCK AND WILCOX (B&W) OWNERS GROUP TO DISCUSS ABNORMAL TRANSIENT OPERATIONAL GUIDELINES (ATOG)

On February 22, 1980, the B&W Owner's Group and representatives of B&W met with the NRC staff in Bethesda, Maryland, to provide the staff with an update of the Owner's Group program for complying with the requirements of Section 2.1.9 of NUREG-0578 (Analysis of Design and Off-Normal Transients). Enclosure 1 is a copy of the meeting agenda. A list of attendees is provided in Enclosure 2.

The B&W Owner's Group provided a handout of their presentation. Enclosure 3, which is a copy of this handout, contains the following: 1) flow chart of the program, 2) the purpose of some of the major functions, 3) the categories of transients selected for analyses, 4) representative boudding curves that identify safe and unsafe normal operation and post-transient conditions, 5) an outline of the B&W operating guidelines concept, 6) outlines of the types of immediate and followup procedural actions to be performed for the categories of accidents selected, and 7) an outline of the technical basis being developed that provides justification for the operational procedures.

During the course of the meeting, the following issues relative to the Owner's Group presentation were raised and discussed:

- Consequential Failures (failures due to environment): Owner's Group stated instrumentation failures and errors are being considered, however, equipment failures were not. Long-term commitment to consequential failures was noted and intthe short-term it was stated that these type failures would be included if justified based on previous experience. Consequential failures inside containment (i.e., control systems, PORV, control valves) will be included.

- ATOG Study Limitations: Owner's Group stated initial effort directed at transients during power operation because it covers most of the conditions of concern. Some of the other operational modes will be covered by the ICC guidelines.

OFFICE ►						
SURNAME ►						
DATE ►						

- Quality Control of ATOG: Based on Owner's Group comment that scenarios were postulated to determine if they were covered by the event trees developed, the staff questioned if records were being kept of all work being performed under ATOG. The Owner's Group stated that everything of importance has been included, however, not all the scenarios developed have been documented.

- Application of Guidelines: Owner's Group stated that the decision as to the degree to which the plant specific procedures are adopted from the guidelines will be up to the individual utilities. This may vary from complete adoption to partial folding into existing plant procedures.

- Schedule: The Owner's Group stated that they could not meet the early 1980 (March 31, 1980) completion date identified in Table B-2 of NUREG-0578. Projected completion date is Mid-1980 with implementation about August 1980.

Following the presentation, a staff caucus was held during which it was agreed that the B&W Owner's Group approach to complying with the requirements of Section 2.1.9 of NUREG-0578 was acceptable. It was also decided that the Owner's Group should provide a sample package for the staff's evaluation which contains:

1. Events trees

2. Draft guidelines (including a written description of methodology and how it was determined)

3. Description of how Items 1 and 2 mesh into overall effort for the development of emergency operational guidelines (i.e., ICC guidelines)

The Owner's Group was requested to provide a schedule for the above package and notify the staff by February 29th. The dates provided were April 1, 1980 for the event trees and July 1, 1980 for the guidelines and description of how this effort meshes with the overall effort.

Byron L. Siegel
Reactor Systems Branch
Division of Systems Safety

Enclosures:
1. Agenda
2. List of Attendees
3. B&W ATOG Presentation

OFFICE ►	DSS:RSB	DSS:RSB	DSS:RSB			
SURNAME ►	BSiegel:mf	GMazetis	TNovak			
DATE ►	4/ /80	4/ /80	4/ /80			

Enclosure 1

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

FEB 15 80

Docket Nos.: 50-269, 50-270, 50-287
50-289, 50-302, 50-312,
50-313, 50-346

MEMORANDUM FOR: W. F. Kane, Acting Chief, Standardization Branch
Division of Project Management

FROM: R. A. CAPRA, B&W Project Manager,
Standardization Branch, DPM

SUBJECT: FORTHCOMING MEETING WITH THE ABNORMAL TRANSIENT OPERATIONAL GUIDELINES (ATOG) SUBCOMMITTEE OF THE BABCOCK & WILCOX OWNERS' GROUP

TIME & DATE: 12:15 P.M., FRIDAY, FEBRUARY 22, 1980

LOCATION: Phillips Building - Room 422

PURPOSE: To discuss with the B&W Owners' Group the progress made on the "ABNORMAL TRANSIENT OPERATIONAL GUIDELINES" program in support of Section 2.1.9 of NUREG-0578

PARTICIPANTS: NRC: T. Novak, S. Israel, G. Mazetis, B. Wilson, B. Boger, B. Siegel, L. Phillips, R. Capra

B&W LICENSEES: (ATOG SUBCOMMITTEE OF THE B&W OWNERS' GROUP):

Duke Power Company (Oconee 1, 2 & 3)
Metropolitan Edison Co. (TMI-1)
Florida Power Corporation (Crystal River 3)
Sacramento Municipal Utility District (Rancho Seco)
Arkansas Power & Light Company (ANO-1)
Toledo Edison Co. (Davis-Bessel)

B&W : J. Kelly, D. Napior, et al

R. A. Capra

R. A. Capra, Project Manager
Standardization Branch
Division of Project Management

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M. Fairtile
H. Silver

S. Wookey
D. Garner
G. Vissing
R. Ingram
P. Kreutzer
OELD - S. Lewis, D. Black, R. Hoefling
OI&E (3)
OSD
S. Showe, I&E (PWR)
Receptionist, Bethesda
R. Fraley, ACRS (16)
TERA
J. Buchanan
NRC Participants
W. Gammill
J. Souder - Adv. copy for R-S LPDR

* Docket Nos: 50-269, 50-270, 50-287, 50-302, 50-312, 50-313, 50-346

ENCLOSURE 2

LIST OF MEETING ATTENDEES

NRC/B&W OWNERS GROUP MEETING ON ATOG

B. Wilson	NRC/OLB
B. Siegel	NRC/RSB
T. M. Novak	NRC/RSB
G. M. Holahan	NRC/AB
W. L. Jensen	NRC/AB
S. Israel	NRC/RSB
A. M. Gill	NRC/RSB
T. Harpster	NRC
L. E. Phillips	NRC/AB
Z. Rosztoczy	NRC/AB
T. J. Myers	Toledo Edison
J. N. Pope	Duke Power Co.
R. L. Gill	Duke Power Co.
S. R. Lewis	Duke Power Co.
H. M. Perry	Florida Power Co.
D. A. Napior	B&W
R. J. Finnin	B&W
J. J. Kelly	B&W
R. C. Twilley	B&W

ABNORMAL TRANSIENT OPERATING GUIDELINES (ATOG)

B&W OWNERS GROUP
SUBCOMMITTEE MEETING

FEBRUARY 22, 1980

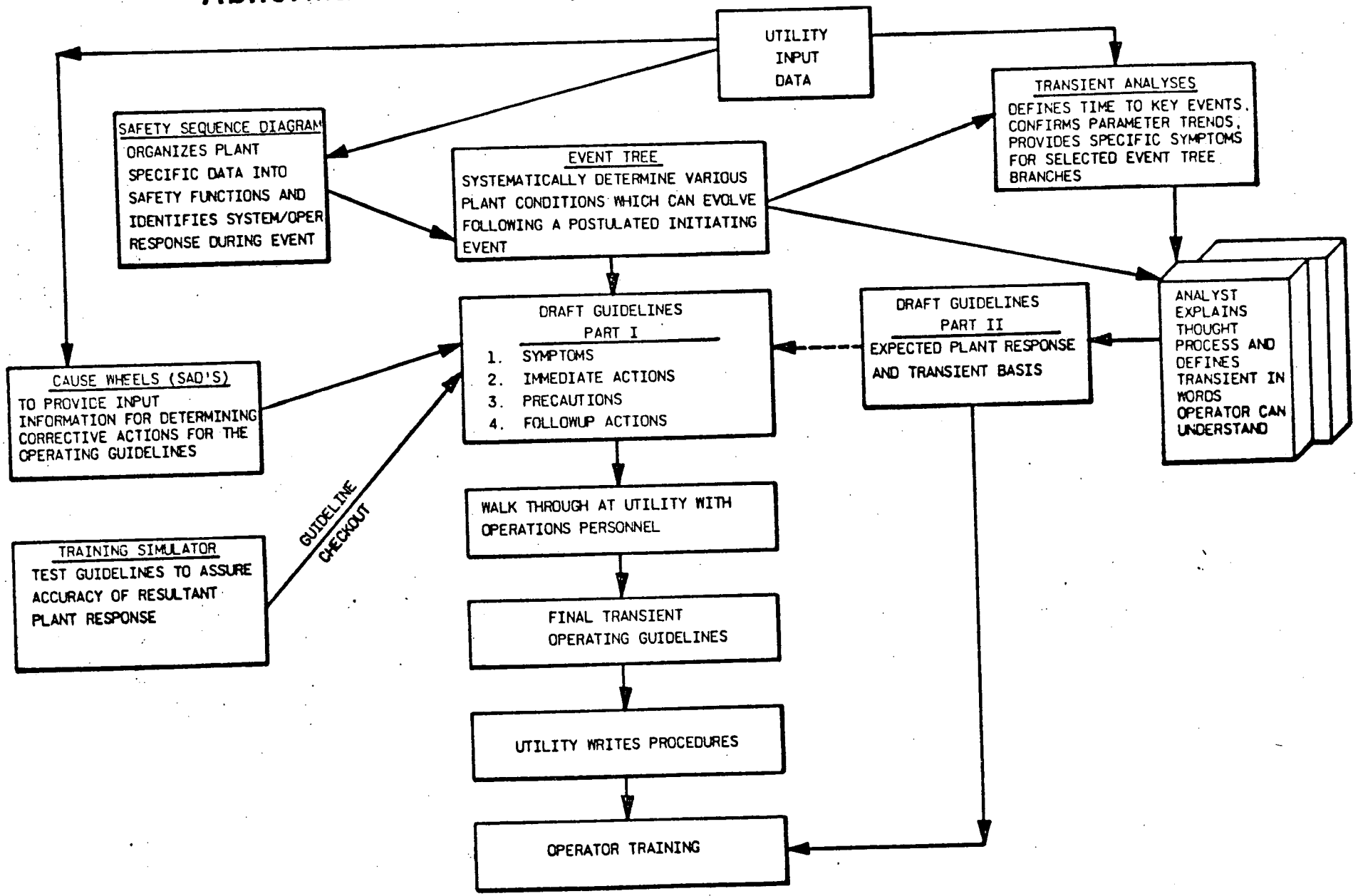
ATOG Objective

Simplify operator problem of identifying and treating abnormal transients

Transients Selected for Guideline Preparation

- Increase in heat removal by secondary system
  - Small steam leaks
  - Excessive feedwater flow
- Decrease in heat removal by secondary system
  - Loss of feedwater
  - Loss of station power
- Decrease in reactor coolant inventory
  - Steam generator tube rupture
  - Inadequate core cooling
  - Loss of coolant

Abnormal transient operating guidelines program



Event Trees

Purpose — Systematically determine various plant conditions which can evolve following a postulated initiating event

Assumptions — Initial conditions
Equipment failures
Operator action

Analysis

Purpose: Realistically portray expected plant response

Analyze: Design success path
All single failure paths

Discuss subsequent failures:
Verify LOCA paths covered in small break guidelines

Design Basis/Expected Plant Response

- Communication between designer and operator
- Supports operator action portion of guidelines
- Written for operator understanding

Training Simulator

- Test various methods of approach to guidelines
- Verify final product
- Train operator

Operator Feedback

- Detailed review of event trees
- Input to guideline format
- Plant walk through
- Training

ATOG OBJECTIVES

I. KEEP THE CORE COOLED - PROVIDE ADEQUATE CORE COOLING

II. MINIMIZE RADIATION RELEASE

III. PREVENT A LOCA - IF POSSIBLE

IV. PREVENT OR MINIMIZE EQUIPMENT DAMAGE

V. TERMINATE TRANSIENT - STABILIZE PLANT

VI. IMPROVE THE COMMUNICATION OF INSTRUCTIONS TO THE OPERATOR TO HELP HIM PROPERLY MANAGE THE TRANSIENT

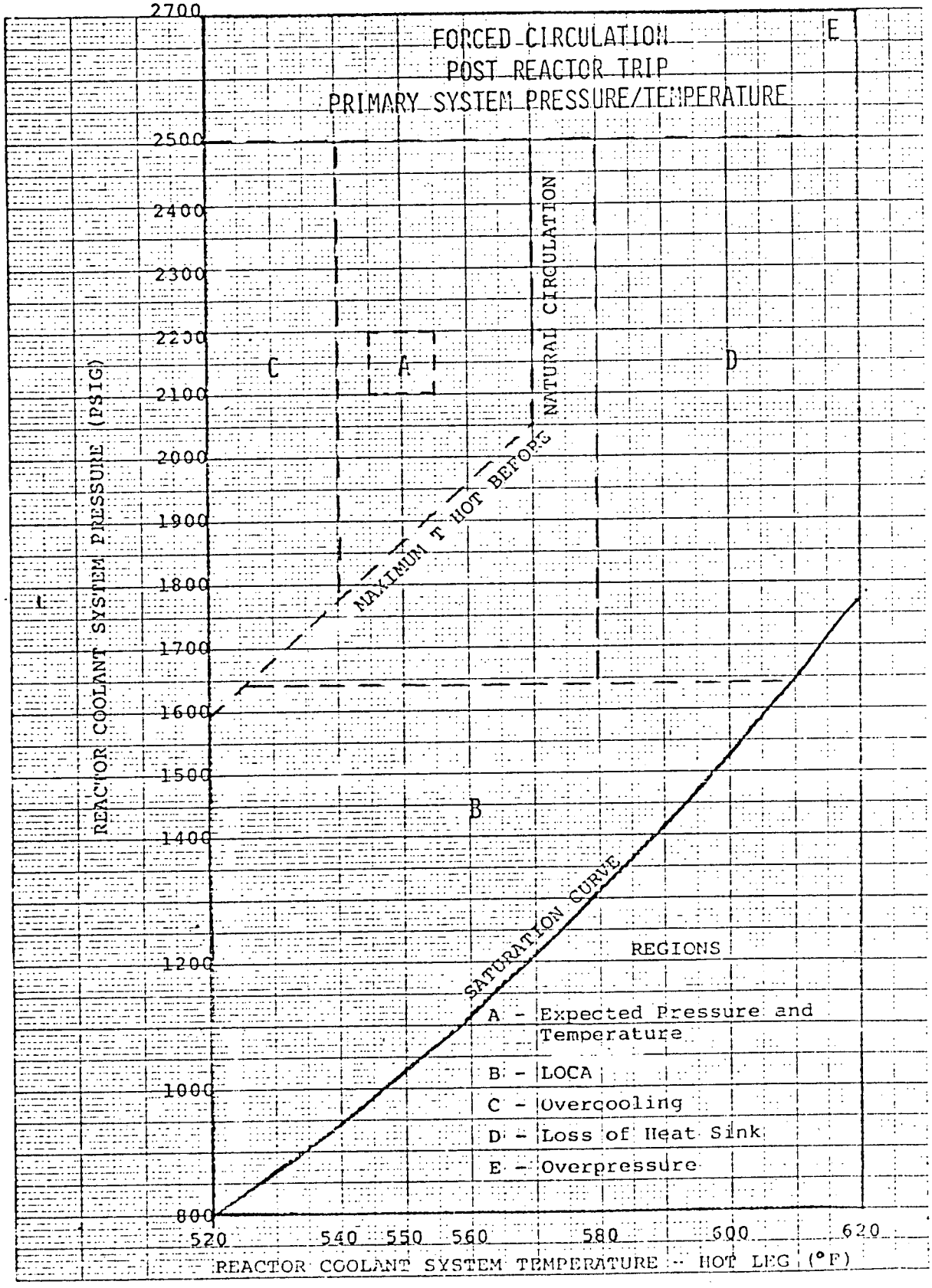
SYMPTOMS

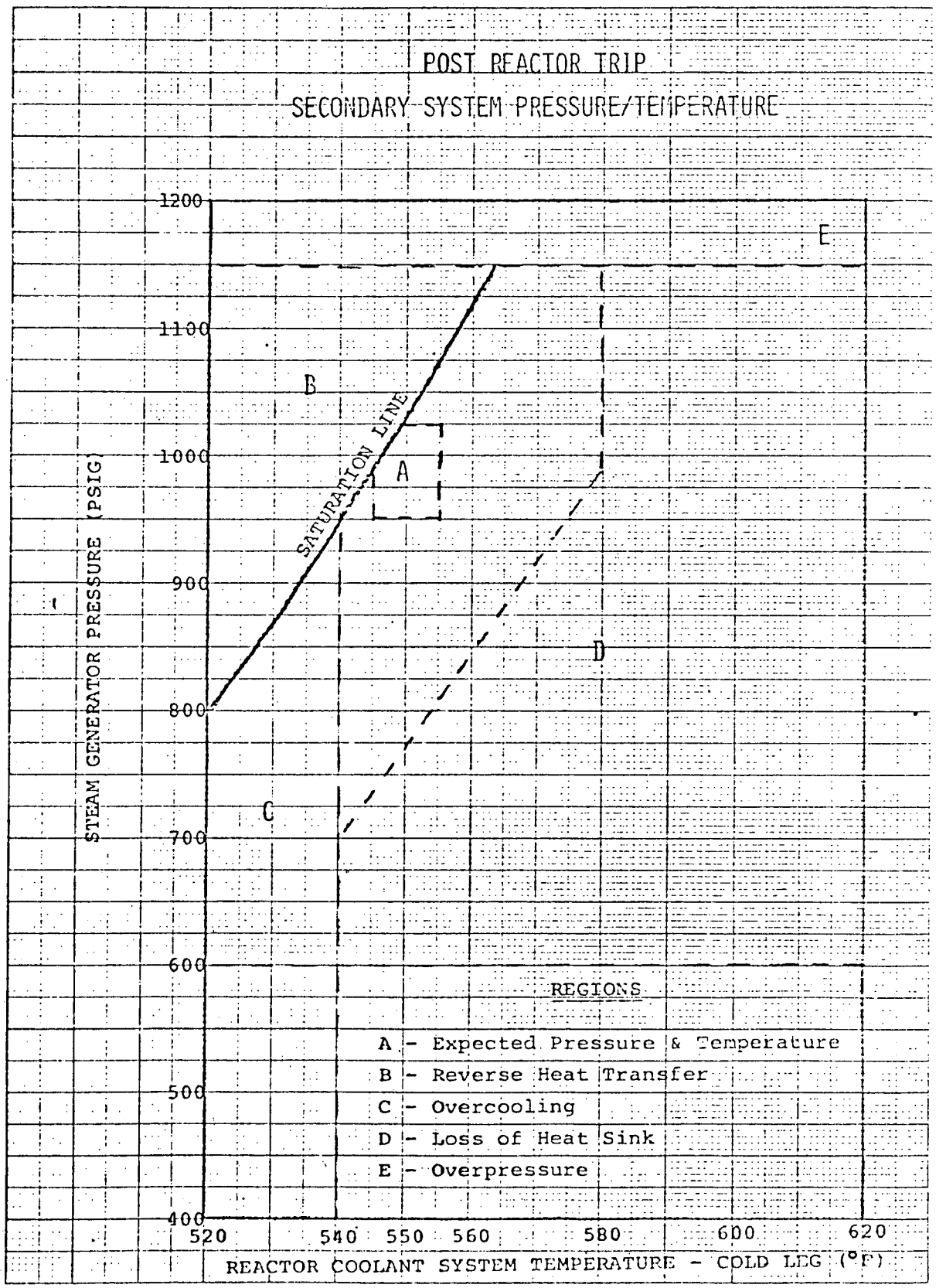
1. LACK OF ADEQUATE SUBCOOLING MARGIN .

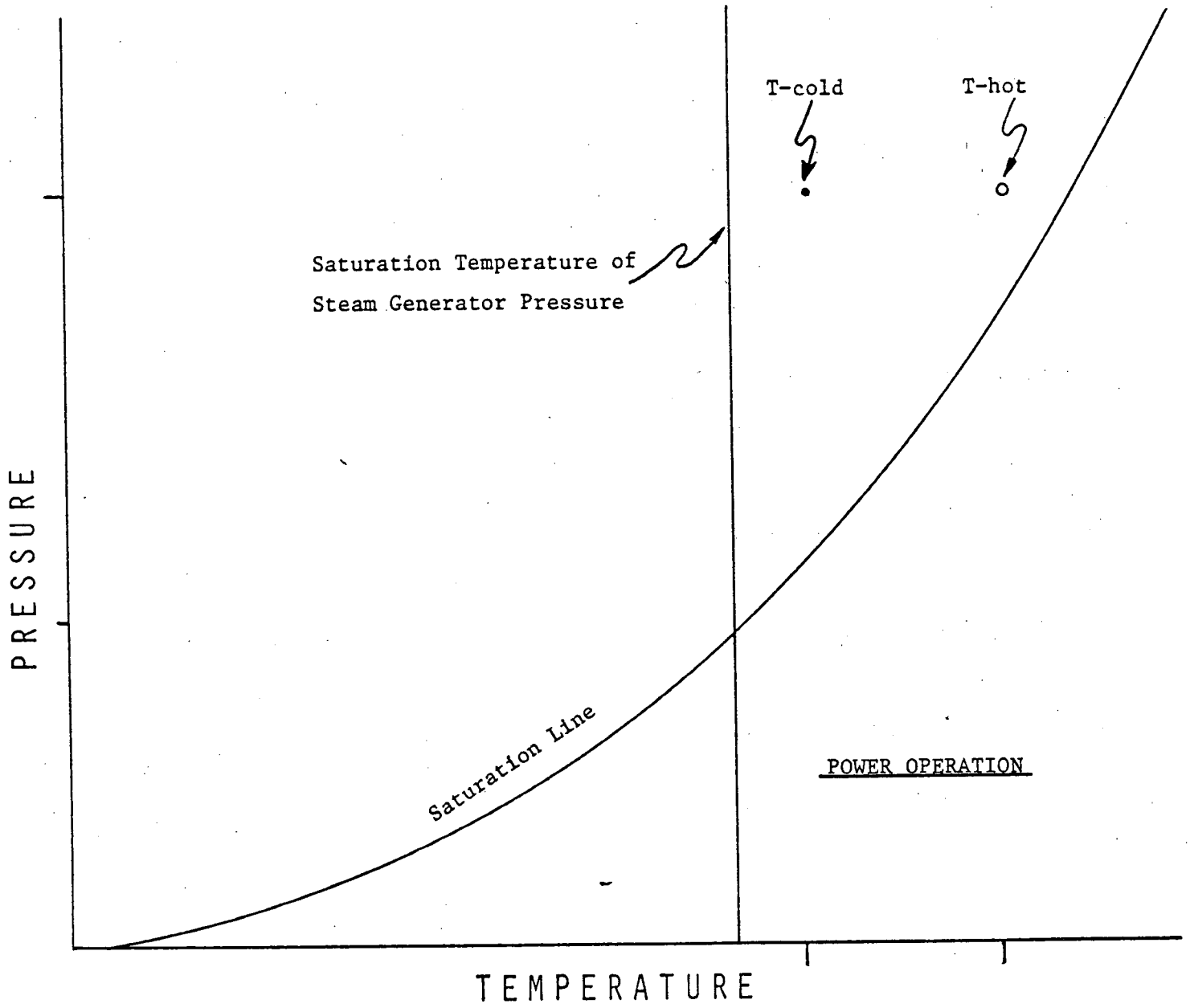
2. LACK OF PRIMARY TO SECONDARY HEAT TRANSFER

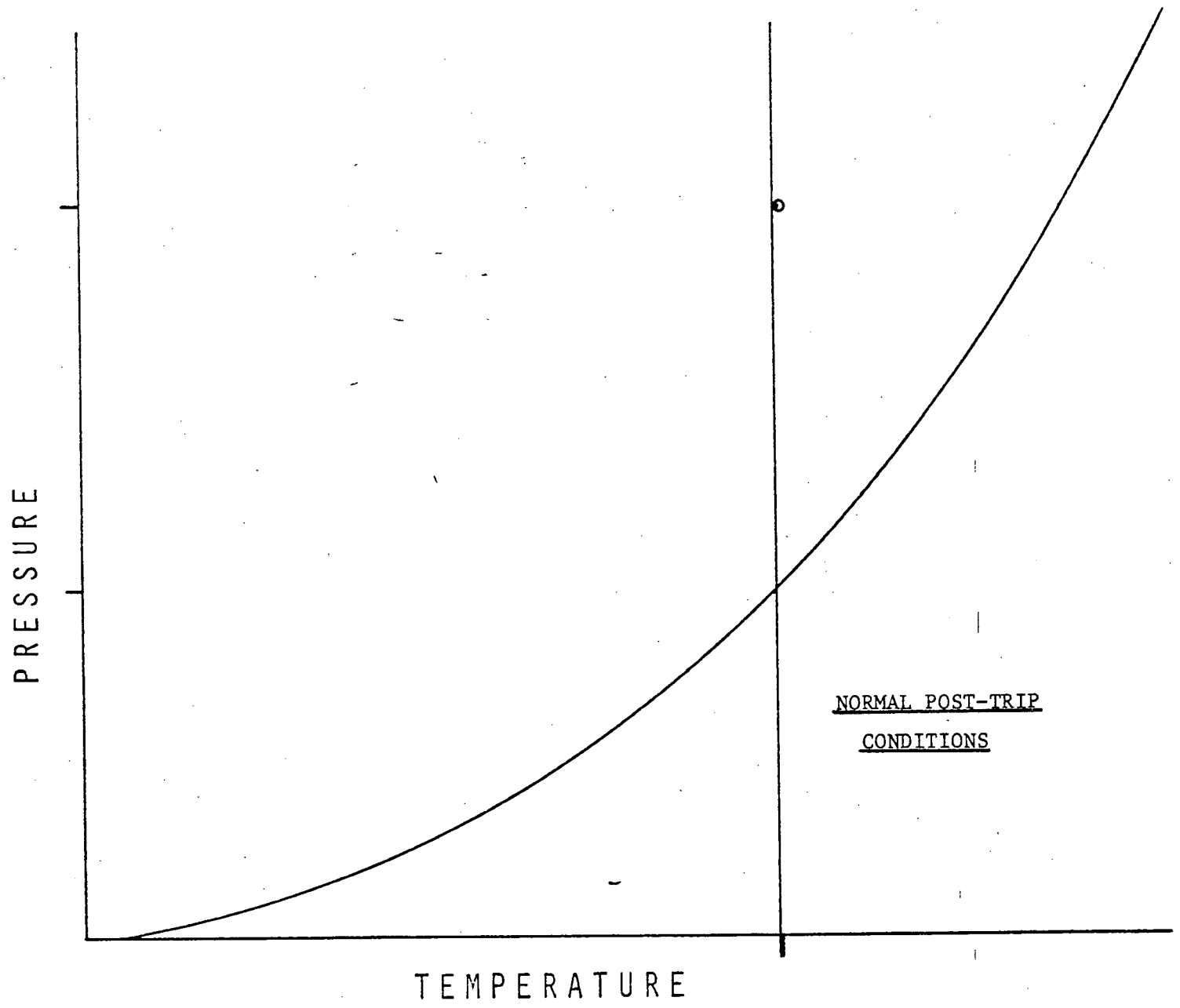
3. TOO MUCH PRIMARY TO SECONDARY HEAT TRANSFER

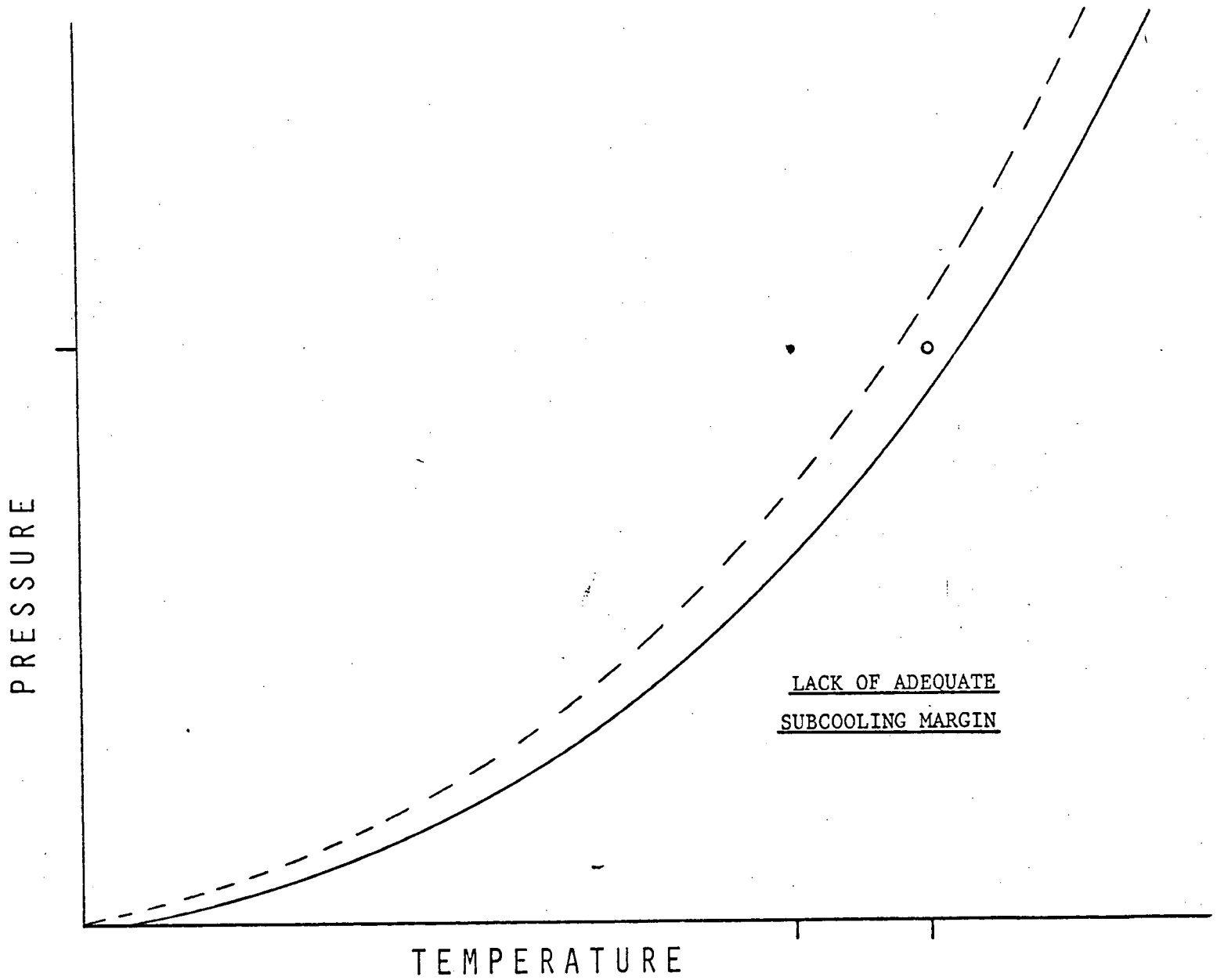
4. NORMAL

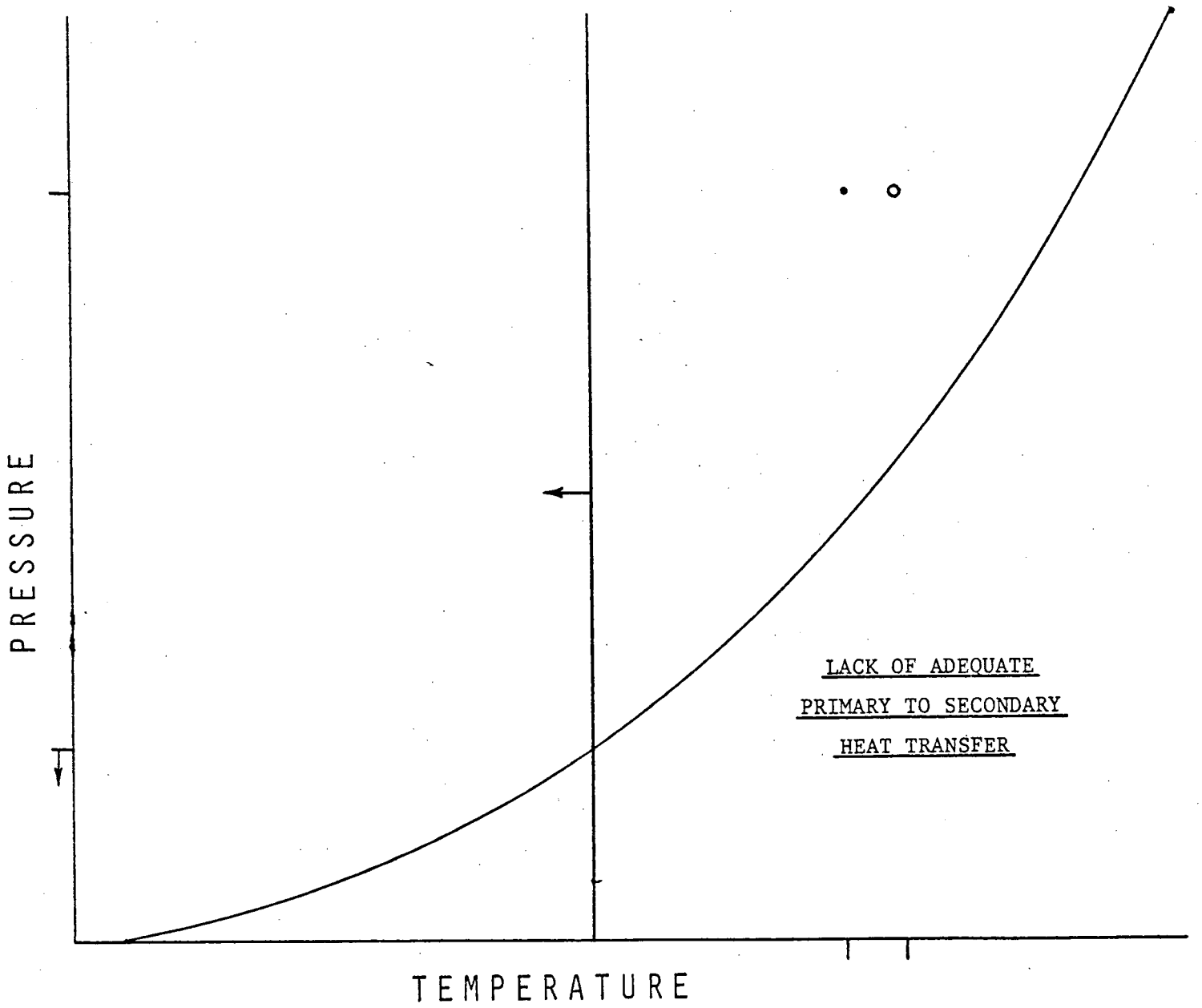

FORCED CIRCULATION
POST REACTOR TRIP
PRIMARY SYSTEM PRESSURE/TEMPERATURE
REACTOR COOLANT SYSTEM PRESSURE (PSIG)
REACTOR COOLANT SYSTEM TEMPERATURE - HOT LEG (°F)
2700
2500
2400
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
1200
1000
800
520
540
550
560
580
600
620
A
B
C
D
E
MAXIMUM T HOT BEFORE NATURAL CIRCULATION
SATURATION CURVE
REGIONS
A - Expected Pressure and Temperature
B - LOCA
C - Overcooling
D - Loss of Heat Sink
E - Overpressure

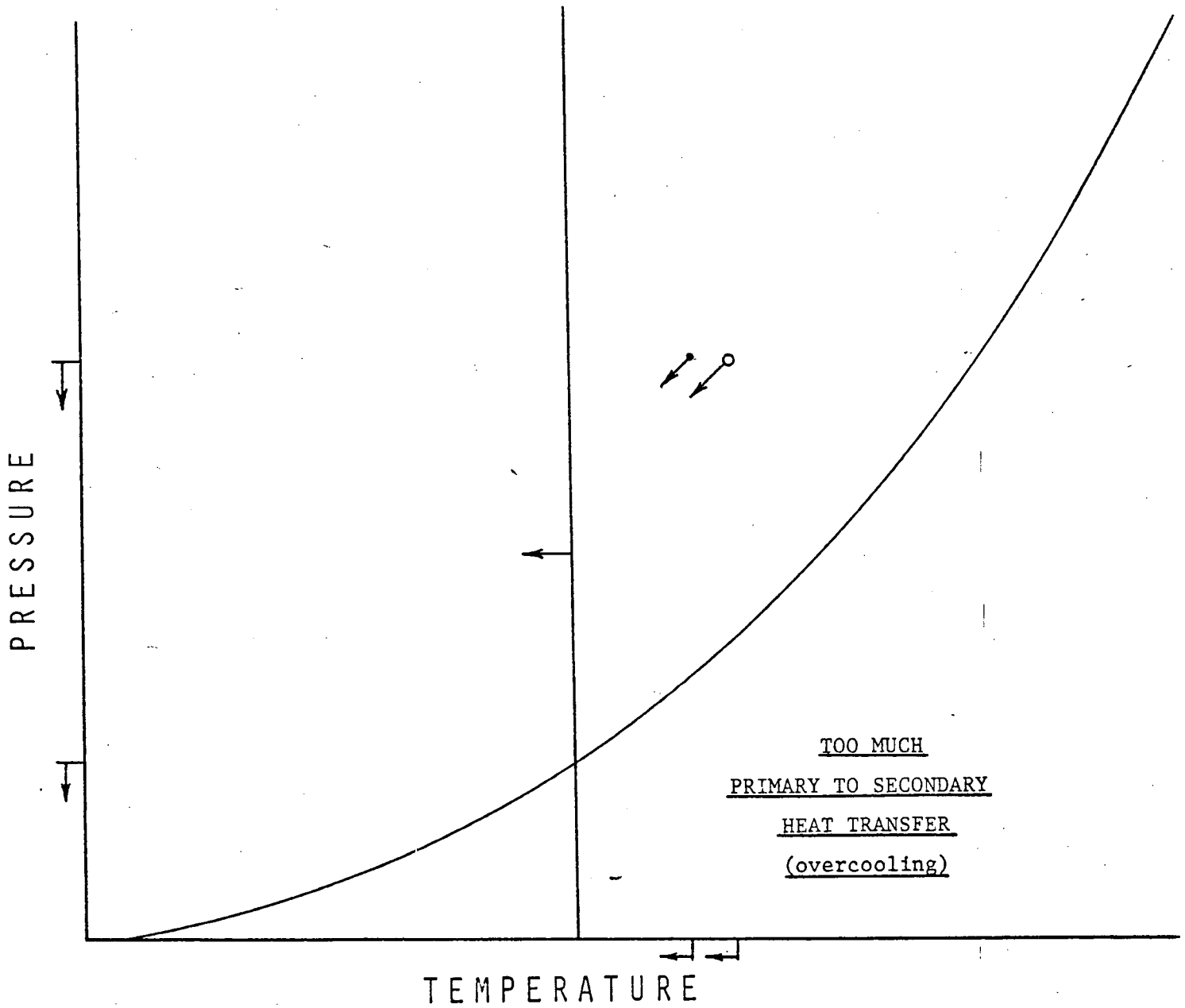

POST REACTOR TRIP
SECONDARY SYSTEM PRESSURE/TEMPERATURE
STEAM GENERATOR PRESSURE (PSIG)
1200
1100
1000
900
800
700
600
500
400
SATURATION LINE
A
B
C
D
E
REGIONS
A - Expected Pressure & Temperature
B - Reverse Heat Transfer
C - Overcooling
D - Loss of Heat Sink
E - Overpressure
520
540
550
560
580
600
620
REACTOR COOLANT SYSTEM TEMPERATURE - COLD LEG (°F)


T-cold
T-hot
Saturation Temperature of
Steam Generator Pressure
Saturation Line
POWER OPERATION
PRESSURE
TEMPERATURE


PRESSURE
TEMPERATURE
NORMAL POST-TRIP
CONDITIONS


PRESSURE
TEMPERATURE
LACK OF ADEQUATE
SUBCOOLING MARGIN


PRESSURE
TEMPERATURE
LACK OF ADEQUATE
PRIMARY TO SECONDARY
HEAT TRANSFER


PRESSURE
TEMPERATURE
TOO MUCH
PRIMARY TO SECONDARY
HEAT TRANSFER
(overcooling)

B&W operating guideline concept

Part I: Procedural	Immediate actions	Actions to be taken in immediate response to a reactor trip
	Follow-up actions	Actions for treatment of lack of adequate subcooling margin, lack of primary to secondary heat transfer and too much primary to secondary heat transfer
	Long term plant recovery	Directions for appropriate follow on procedures after plant stability is achieved
Part II: Technical basis	Expected plant response and design basis	A discussion, written for operator comprehension, of the design plant response to each initiating event, potential failures and possible corrective actions. This section discusses the heat transfer from the core to the ultimate heat sink during different aspects of each transient and explains why the operator is taking each action. The format closely parallels Part I.

REACTOR TRIP

ADEQUATE CORE COOLING

I. IMMEDIATE ACTIONS

II. VERIFICATION OF KEY PLANT PARAMETERS AND VITAL EQUIPMENT STATUS.

- A. CORRECTIVE ACTIONS (IF NECESSARY)
- B. ALTERNATE ACTIONS (IF NECESSARY)

III. IDENTIFICATION OF FOLLOWUP ACTIONS

- A. "NORMAL" PLANT RESPONSE – FURTHER ACTIONS (RETURN TO POWER/COOLDOWN) AT PLANT MANAGEMENTS DISCRETION
- B. LACK OF ADEQUATE SUBCOOLING MARGIN
- C. LACK OF PRIMARY TO SECONDARY HEAT TRANSFER
- D. TOO MUCH PRIMARY TO SECONDARY HEAT TRANSFER (OVERCOOLING)

IV. ACTIONS FOR LACK OF ADEQUATE SUBCOOLING MARGIN

A. INITIAL ACTIONS

B. IF INITIAL ACTIONS REGAINED SUBCOOLING TREAT OTHER SYMPTOMS OR COOLDOWN/HEATUP PLANT

C. IF INITIAL ACTIONS DID NOT REGAIN SUBCOOLING START HPI (IF NOT ALREADY AUTO-INITIATED)

D. IF SUBCOOLING IS REGAINED TREAT OTHER SYMPTOMS OR COOLDOWN PLANT.

E. IF SUBCOOLING IS NOT REGAINED FOLLOW ACTIONS FOR A LOCA (IF DEPRESSURIZED FAR ENOUGH) OR GO TO NEXT SECTION (IF NECESSARY) OR COOLDOWN PLANT.

V. ACTIONS FOR TREATMENT OF LACK OF PRIMARY TO SECONDARY HEAT TRANSFER

A. FEED OTSGs TO APPROPRIATE LEVEL IF NECESSARY

B. IF HEAT TRANSFER IS REGAINED GO TO APPROPRIATE COOLDOWN/HEATUP PROCEDURE

C. IF HEAT TRANSFER IS NOT REGAINED

1. INITIATE HPI (IF NOT AUTO-INITIATED)

2. IF OTSGs CANNOT BE FED THEN COOLDOWN

3. IF OTSG LEVELS ARE CORRECT BUMP RC PUMPS

D. IF HEAT TRANSFER IS REGAINED THEN COOLDOWN WITH OTSGs

E. IF HEAT TRANSFER CANNOT BE REGAINED CONTINUE HPI COOLING

VI. ACTIONS FOR TREATMENT OF TOO MUCH PRIMARY TO SECONDARY HEAT TRANSFER

A. REACTOR BUILDING TEMPERATURE/PRESSURE INCREASING

1. NO SLBIC ACTUATION

A. ACTIONS TO STOP COOLDOWN
B. COOLDOWN PLANT

2. SLBIC ACTUATION

A. ACTIONS (STOP COOLDOWN IF SLBIC DIDN'T)
B. COOLDOWN PLANT

B. REACTOR BUILDING TEMPERATURE/PRESSURE NORMAL

1. INITIAL ACTIONS

2. NO SLBIC ACTUATION

A. ACTIONS TO STOP COOLDOWN
B. PLANT HEATUP/COOLDOWN AT DISCRETION OF PLANT MANAGEMENT

3. SLBIC ACTUATION

A. ACTIONS (STOP COOLDOWN IF SLBIC DIDN'T)
B. PLANT HEATUP/COOLDOWN AT DISCRETION OF PLANT MANAGEMENT

ATOG GUIDELINES
PART II

SECTION 1. FUNDAMENTALS OF REACTOR CONTROL FOR ACCIDENTS

INTRODUCTION

A. BASIC HEAT TRANSFER
B. ABNORMAL ACCIDENT DIAGNOSIS AND MITIGATION
C. POST ACCIDENT SYSTEM STABILITY DETERMINATION
D. FOLLOWUP ACTIONS

APPENDIX A - SUPERHEAT, SATURATION, SUBCOOLING
APPENDIX B - NATURAL CIRCULATION

SECTION 2. GUIDELINES FOR SELECTED ACCIDENTS WITH MULTIPLE EQUIPMENT FAILURES

A. EXCESSIVE MAIN FEEDWATER
B. SLB
C. STR
D. LOSS OF A/C POWER
E. LOSS OF MAIN FEEDWATER
F. SBLOCA

"FOLDOUT" SUMMARIES

I. - BASIC HEAT TRANSFER RELATIONSHIPS
   - DIAGNOSIS AND MITIGATION

II. - EXCESSIVE FEEDWATER
    - LOMFW
    - STR
    - LOSS OF A/C POWER
    - SLB

PART II

Section 1. FUNDAMENTALS OF REACTOR CONTROL FOR ACCIDENTS

INTRODUCTION

A. Basic Heat Transfer

- Steam Generator Pressure Control
- Steam Generator Inventory Control
- Reactor Coolant Inventory Control
- Reactor Coolant Pressure Control

B. Abnormal Accident Diagnosis and Mitigation

- Immediate actions (2 to 3 minutes)
- Quick followup actions (Equipment Status)
- Abnormal? (ATOG or not)
  a) P-T plot description
  b) Pre-trip discussion
  c) Normal post trip transient
  d) Abnormal post trip transient
- Subcooling rule
  a) with over-heating
  b) with over-cooling
- Backup methods of cooling
  a) HPI
  b) LPI
  c) Condensate Pump
  d) Auxiliary Feedwater Pump
- Cause Wheels
- Preferred method of equipment operation
  a) RCP's
  b) HPI Throttling
  c) Termination of MFW

C. Post Accident System Stability Determination

- Checklist for defining stability
- Measure of successful termination of transient

D. Followup Actions

- Decide long term plant disposition
- Transfer to appropriate procedure

Appendix A - Superheat, Saturation, Subcooling

Appendix B - Natural Circulation

Section 2. GUIDELINES FOR SELECTED ACCIDENTS WITH MULTIPLE EQUIPMENT FAILURES

A. Excessive Main Feedwater

- One page summary-

1. General Transient Description Operator Action Summary

   a. Identify the accident
   b. Corrective action
   c. Schematic summary of operator action

2. Excessive Main Feedwater with Other Plant Failures

   - Reactor Pressure
   - Reactor Inventory
   - Steam Pressure
   - Steam Generator Inventory