

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	HISTORICAL CONTEXT OF THE ENERGY REORGANIZATION ACT OF 1974	5
III.	POST-1974 STRUCTURE OF THE NUCLEAR REGULATORY COMMISSION AND THE ROLE OF THE COMMISSIONERS	18
	Introduction	18
	A. The Commissioners and Management Functions	21
	B. The Commissioners and Licensing: <u>Ex Parte</u> Rules	25
	C. The Commissioners and the Emergency Response	32
IV.	PLANT LICENSING	35
	Introduction	35
	A. Avoidance of Licensing Delay via Pre-Application Dealings Between Applicant and NRC Staff	37
	B. Avoidance of Delay at the Construction Permit Phase: Issuance of Pre-Permit "Limited Work Authorizations" and Deferral of Open Safety Concerns to the Operating License Stage	39
	C. Avoidance of Delay at the Operating License Phase: Removal From the Licensing Process of Safety Concerns By Defining Them as "Generic"; Isolation of the ACRS From the Licensing Process; Granting of Operating Licenses With Open Safety Items	42
	D. Avoidance of Delay in the Licensing Process -- Scope of the Design Safety Reviews	62
	E. Intervenors	88
V.	THE OFFICE OF NUCLEAR REGULATORY RESEARCH	92
VI.	INSPECTION AND ENFORCEMENT	96
	Introduction	96
	A. I&E's Reliance on Utilities and Vendors to Monitor Themselves and to Report Deviations from Acceptable Standards	97
	B. I&E's Apparent Inability to Resolve Safety Concerns Raised Within Its Staff	108

C.	I&E's Failure to Systematically Evaluate Operating Data.....	113
D.	I&E Bulletins.....	117
E.	Enforcement.....	120
VII.	OPERATOR LICENSING AND TRAINING.....	126
VIII.	NRC EMERGENCY RESPONSE.....	132
	Introduction.....	132
A.	Communication Problems.....	134
B.	Rapid Depressurization.....	137

TABLE OF CONTENTS

SCOPE OF THE INVESTIGATION	1
CAST OF CHARACTERS	4
GPU/Met Ed	4
Babcock & Wilcox	7
Burns and Roe	10
THE ROLE OF GENERAL PUBLIC UTILITIES SERVICE CORPORATION	13
Nuclear Power Activities Group	13
Budget	22
SITE CHANGE	26
ROLE OF MET ED IN DESIGN OF TMI-2	31
CONTROL ROOM DESIGN	33
Design History	33
Design Performance During the Accident	40
CONTAINMENT ISOLATION CRITERIA SELECTION	44
Burns and Roe	45
B&W	47
GPU	48
Multiple Criteria and the NRC's Involvement	49
GPUSC STARTUP AND TEST GROUP	51
GOING COMMERCIAL	53
MANAGEMENT RELATIONSHIPS WITHIN THE UTILITY	60
GPUSC and Met Ed Generation	60
GPUSC, Met Ed, and TMI Engineering	61
Site Perception of Non-Site Management	64
SITE MANAGEMENT	66
Structure	66

Management Policy	66
Responsibility for Training	67
Unit Superintendent	68
Plan-of-the-Day Meeting	69
Maintenance	69
Shift Foreman	72
Control Room and Auxiliary Operators	73
REVIEW COMMITTEES	75
PROCEDURES	78
Drafting, Review, and Approval of Procedures	79
Met Ed's Role	79
NRC's Role	82
B&W's Role	85
Pressurizer Level and Going Solid	89
Emergency Procedure for Loss of Reactor Coolant	105
Guidance on Termination of High Pressure Injection	105
Applicability of the Loss-of-Coolant Procedure to the March 28, 1979, Accident	110
The Small-Break LOCA	110
Identifying the Open Pilot-Operated Relief Valve	112
ATTENTION TO EXPERIENCE	119
Met Ed Structure	119
B&W Structure	125
Preliminary Safety Concerns	125
Site Problem Reports	127
B&W Users Group	128
B&W Owners Group	128

Davis-Besse September 24, 1977, Transient	129
B&W's Role	130
Met Ed's Role	145
NRC's Role	149
Davis-Besse November 29, 1977, Transient	149
PORV Failure History	150
Michelson Report	152
Condensate Polishers	156
April 23, 1978, Transient	158
Saturation	159
Steam Relief Valve Failure and Other Aspects of the Transient	161
NRC INSPECTIONS	164
MANAGEMENT APPROACH TO THE EMERGENCY	166
Emergency Perception	166
Managing the Emergency	169
Understanding of Core Condition on March 28	174
THE TMI-2 RECOVERY PROGRAM	186
Goals	186
Organizational Structure	187
CONCLUSION	190
APPENDICES	201
APPENDIX A -- Subpoena to GPU	201
APPENDIX B -- Subpoena to Westinghouse	208
APPENDIX C -- List of Deponents	209
APPENDIX D -- NRC Operating License Review of TMI-2	211
APPENDIX E -- Significant Events at TMI-2 Between Time Critical Until Declared Commercial	212

APPENDIX F -- Letter from M. Witman to Commission, Sept. 18, 1979	214
APPENDIX G -- TMI-2 Organizational Chart	218
APPENDIX H -- Memorandum from L. Cartin to R. Luken, Dec. 19, 1978	219
APPENDIX I -- Memorandum from Ed Frederick to Jim Seelinger, May 3, 1978	221
APPENDIX J -- Memorandum from J. Kelly to Distribution, Nov. 1, 1977	222
APPENDIX K -- Memorandum from F. Walters to J. Kelly, Nov. 10, 1977	223
APPENDIX L -- Memorandum from Bert Dunn to Jim Taylor, Feb. 9, 1978	224
APPENDIX M -- Memorandum from Bert Dunn to Jim Taylor, Feb. 16, 1978	226
APPENDIX N -- Memorandum from D. Hallman to B. Karrasch, Aug. 3, 1978	227
APPENDIX O -- GPU Startup Problem Report, Nov. 3, 1977, with attached memorandum from Mike Ross and John Brummer to Gary Miller and Jim Seelinger, Nov. 14, 1977	228

TABLE OF CONTENTS

I.	INTRODUCTION	1
	A. Background of Emergency Preparedness Activities in the U.S	2
	B. Emergency Preparedness -- Local Level	3
	C. Emergency Preparedness -- State Level	6
	D. Emergency Preparedness -- The Federal Government	6
	E. Summary	8
II.	PLANNING IN PLACE AT THE TIME OF THE ACCIDENT AT THREE MILE ISLAND	9
	A. Introduction	9
	B. Analysis of Plans	13
	1. Three Mile Island Emergency Plan, Volumes I and II	13
	2. County and Local Plans	20
	3. State Emergency Plans	28
	4. Federal Emergency Planning	34
	5. Summary Evaluation of the Emergency Planning Context of the Accident at Three Mile Island	43
III.	RESPONSE DURING THE TIME OF THE ACCIDENT AT TMI	45
	A. Introduction	45
	B. Criteria of Adequate Response	45
	C. Analysis of the Response to TMI	49
	1. Response of the TMI Power Station	49
	2. Local and County Response	51
	3. Response of the Commonwealth of Pennsylvania	68
	4. American National Red Cross Response	83
	5. The Federal Agencies Response	84

III. RESPONSE DURING THE TIME OF THE ACCIDENT AT TMI (continued)

D. Overall Evaluation of the Response to the Accident at TMI..... 90

1. The Emergency Response..... 90

2. The Crisis Response..... 92

NOTES..... 98

METHODOLOGY.....104

APPENDIX A -- Analysis of Emergency Plans.....105

APPENDIX B -- The Role of NRC in Emergency Planning and Response.....135

APPENDIX C -- Analysis of Evacuation Behavior.....141

REFERENCES.....163



TABLE OF CONTENTS

I.	INTRODUCTION	4
II.	REACTOR SITING	6
III.	NRC REQUIREMENTS FOR EMERGENCY PLANNING	10
IV.	THE TMI OPERATING LICENSE REVIEW - CONTENTION 8	14
V.	TMI PLAN AND PROCEDURES	17
	A. The Site Emergency Plan	17
	B. The Implementing Procedures	20
VI.	RADIOLOGICAL EMERGENCY PLANNING ACTIVITIES OF FEDERAL GOVERNMENT AGENCIES PRIOR TO THE TMI ACCIDENT	22
	A. Federal Response Plans as of March 28, 1979	22
	1. Interagency Radiological Assistance Plan (IRAP): Department of Energy	22
	2. Federal Response Plan for Peacetime Nuclear Emergencies (FRPPNE): Federal Preparedness Agency	24
	B. Federal Programs Providing Assistance to the States for Radiological Emergency Response Planning	26
VII.	RADIOLOGICAL EMERGENCY PLANNING ACTIVITIES IN PENNSYLVANIA	30
	A. Annex E to the Pennsylvania Disaster Operations Plan	30
	B. BRP Plans	32
VIII.	COUNTY AND LOCAL EMERGENCY PLANNING	34
IX.	CONCLUSION	37
	NOTES	38
	APPENDIX 1	61
	APPENDIX 2	62
	APPENDIX 3	64
	APPENDIX 4	67
	APPENDIX 5	70

TABLE OF CONTENTS

INTRODUCTION

I. WEDNESDAY, MARCH 28, 1979

- A. Early Notifications: 4:00 a.m. to 9:00 a.m.
- B. The Early Development of Information and Communication Problems: 9:00 a.m. to 12 Noon
- C. Information Gathering: 12 Noon to 12 Midnight

II. THURSDAY, MARCH 29, 1979

- A. The Political and Media Convergence Effect: 7:00 a.m. to 3:00 p.m.
- B. The Met Ed Wastewater Discharge, Part I: 2:30 p.m.
- C. The Secretary of Health's Evacuation Proposal 1:30 p.m. to 4:30 p.m.
- D. The Governor's First Public Statement on the TMI Accident: 4:00 p.m. to 6:30 p.m.
- E. The Met Ed Wastewater Discharge, Part II: 4:30 p.m. to 12 Midnight
- F. The Higgins Call to Critchlow Foreshadowing Friday's Events: 10:00 p.m. to 12 Midnight

III. FRIDAY, MARCH 30, 1979

- A. The Evacuation Decisions: 7:00 a.m. to 12:30 p.m.
- B. The Aftermath of Friday Morning: Structuring Federal Support
- C. Centralizing Public Information: 4:00 p.m. to 12 Midnight

IV. SATURDAY, MARCH 31, 1979

- A. Emergency Planning and Effects: 12:01 a.m. to 9:30 a.m.
- B. The HEW Evacuation Recommendations to the White House: 9:30 a.m. to 5:00 p.m.
- C. Responding to the Emergency in Harrisburg: 9:30 a.m. to 3:00 p.m.

	D.	The White House Task Force Meeting: 5:30 p.m. to 9:00 p.m.
	E.	The Hydrogen Bubble Story and the Control of Press Statements: 2:00 p.m. to 12 Midnight
V.		SUNDAY, APRIL 1, 1979
	A.	The Hydrogen Bubble Stimulates Evacuation Discussions: 9:00 a.m. to 1:00 p.m.
	B.	HEW-NRC Consultations: 11:00 a.m. to 1:00 p.m.....
	C.	The President's Visit to the Site: 1:00 p.m. to 4:00 p.m.....
	D.	The Implementation of Federal Emergency Planning Assistance Without a Declaration of Emergency: Sunday Afternoon
	E.	The Bubble Mistake is Realized: 1:15 p.m. to 7:00 p.m.....
	F.	The Evacuation Advisory Remains in Effect: Sunday Evening Decisions
VI.		MONDAY, APRIL 2, 1979
	A.	The Bubble Begins to Disappear: Monday Morning.....
	B.	HEW Potassium Iodide Recommendations: Monday Afternoon.....
	C.	The Immediate Danger Passes: Monday Evening
VII.		THE AFTERMATH
	A.	The Potassium Iodide Issue: Different Perceptions of Risk
	B.	The Withdrawal of the Advisory to Pregnant Women and Preschool Children: Searching for Standards
	C.	The Selection of the Lead Radiological Monitoring Agency: Agency Politics
VIII.		CONCLUSION
		NOTES.....