



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

March 6, 1981

MEMORANDUM FOR: Distribution

FROM: M. Silberberg, Chief  
Experimental Advanced Safety Technology Research Branch

SUBJECT: REPORT ON TECHNICAL BASES FOR ESTIMATING FISSION  
T BEHAVIOR DURING LWR ACCIDENTS

Enclosed for your review and comment is a draft copy of the subject report.

The report is provided in preparation for the Peer Review Group on March 17 and 18 at 9:00 A.M. at 1717 H Street, N. W., Washington, D. C. in Room 1046.

I would appreciate receiving written comments you wish to offer on March 17. We have decided to extend the review and comment period for the report to April 1. All written comments must be received by this date to be included for our consideration.

A preliminary agenda for the March 17-18 meeting is enclosed.

Please note that this is a draft report with limited distribution and should not be cited for publication.

I appreciate your participation and interest in this review and look forward to working with you at the meeting.

*Mel Silberberg*  
M. Silberberg, Chairman  
Peer Review

Enclosure: As stated

## PRELIMINARY AGENDA

### TUESDAY, MARCH 17

9:00 A.M.	Welcome	NRC
9:15 A.M.	Objectives and Organization of Meeting	NRC
9:20 A.M.	Overview of Key Areas	NRC
9:50 A.M.	Accident Sequence Characteristics	BCL
10:20 A.M.	Break	
10:30 A.M.	Discussion	
11:00 A.M.	Fission Product Release from Fuel	ORNL
11:40 A.M.	Discussion	
12:30 P.M.	Lunch	
1:30 P.M.	Chemistry of Cs and I	Sandia/ORNL
2:15 P.M.	Discussion	
3:15 P.M.	Break	
3:30 P.M.	Recent Data from Foreign Countries	
4:30 P.M.	Summary of Key Points	
5:00 P.M.	Adjourn	

### WEDNESDAY, MARCH 18

9:00 A.M.	Fission Product Transport in Primary System	BCL
9:30 A.M.	Discussion	
10:15 A.M.	Break	

10:30 A.M.	Fission Product Transport Through Containment	BCL
11:10 A.M.	Discussion	
12:00 Noon	Lunch	
1:00 P.M.	Effects on ESFs	NRC
1:30 P.M.	Discussion	
2:10 P.M.	Summary of Key Points	
2:30 P.M.	Break	
2:45 P.M.	Summary Comments and Wrapup	
4:00 P.M.	Adjourn	

March 17 - 18, 1981  
Attendance  
Review Meeting on "Technical Bases" Report

NAME	AFFILIATION	NAME	AFFILIATION
C. N. Kelber	NRC-RES (17th only)	J. T. Bell	ORNL (17th only)
M. Silberberg	NRC-RES	T. S. Kress	ORNL
R. Sherry	NRC-RES	W. F. Pasedag	NRC
R. C. Vogel	EPRI	A. K. Postma	NRC
B. Washburn	DOE	B. D. Liaw	NRC/OCM
D. Schweitzer	BNL	D. W. Pyatt	NRC/SD
A. P. Malinauskas	ORNL (17th only)	R. M. Elrock	Sandia
D. O. Campbell	ORNL (17th only)	R. A. Sallach	Sandia
W. R. Stratton	LANL	R. P. Wichner	ORNL
L. Devell	STUDSVIK SWE	J. A. Gieseke	BCL
C. Devillers	CEA-France	M. R. Kuhlman	Battelle
J. B. Ainscough	UKAEA-UK	K. W. Lee	Battelle
D. F. Torgerson	AECL-Canada	R. R. Robbins	EG&G Idaho
C. E. Johnson	ANL	A. Sparo	NRC-RES (17th only)
R. K. Hilliard	HEDL	Jacques Read	NRC-NRR (17th only)
R. M. Wallace	SRL	John Long	NRC-NRR
David Garvin	NBS	M. A. Cunningham	NRC-RES
Lloyd R. Zurwalt	NCSU	Joanne Darn	McGraw-Hill(17th only)
D. Walker	W-OPS	T. J. Walker	NRC-RES
Paul Blackburn	ANL	J. G. Stampelos	NSC
John Matuszek	N.Y.State Health	Raphael Kasper	NSOC
Gordon Thompson	U.C.S.	Garry G. Young	ACRS
James Smith	General Elec. Co.	Wm. Bock	ACRS
N. R. Horton	General Elec. Co.	M. Ichikawa	JAERI-Japan (18th only)
Donald A. Nitti	Babcock & Wilcox	T. R. Young	C. E. Inc.
Alan D. Miller	EPRI/NSAC		
Harry A. Morewitz	Rockwell Int'l.		
Robert L. Ritzman	SAI		
G. Kaiser	NUS		

# Tech Basis Report

P-2

			Date	Pages	
14)	✓ A.W. Castleman, Jr.	U of Colorado	3/24/81	7	*
	(+ Paper)				
15)	✓ R.H. Buchholz,	GE	3/17/81	6	*
16)	✓ R.H. Buchholz,	GE	3/31/81	14	*
17)	✓ B.M. Gehl,	ANL	3/27/81	10	*
18)	✓ D.F. Torgerson,	AECL	3/27/81	5	*
19)	✓ T.C. Mark,	ACRS	3/17/81	3	*
20)	✓ A.P. Malinawkas,	ORNL	3/16/81	15	*
21)	✓ D. o. Cambell,	ORNL	3/16/81	2	*
22)	✓ D. Garvin,	NBS	3/16/81	6	*
23)	✓ L.R. Zumwalt,	NCSU	3/16/81	3	*
24)	✓ M. Levenson,	Bechtel	3/20/81	2	*
25)	✓ L.S. Tong,	RES	3/22/81	1	*
26)	✓ A.K. Postma,	BCT	3/25/81	9	*
27)	✓ R.M. Wallace,	SRL	3/23/81	2	*
28)	✓ C Deviller,		3/25/81	6	*
	(*'s have been sent out previously)				
29)	✓ W Stratton,	LASL	3/27/81	2	*

## Tech Basic Report - Comments

P 1

157

pages

Comments	Comment Letter Date	Marked Done	Pages
1) ✓ R. Vogel - EPRI	3/30/81	✓ * X	16
2) ✓ J.B. Ainscough - UKAEA	3/30/81 (Telex)	✓ * X	7
3) ✓ G. Thompson - UCS	3/31/81	✓ * X	3
4) ✓ H.E. Schierer - Combustion Engineering	4/1/81	✓ * X	2
5) ✓ J.M. Anderson - Westinghouse	3/31/81	✓ * X	6
6) ✓ R.K. Hilliard - HEDL	3/27/81	✓ ✓ * X	6
7) ✓ P.E. Blackburn - ANL	3/30/81	✓ * X	2
8) ✓ C.E. Johnson - ANL (+ PAPER)	3/30/81	✓ * X	3
9) ✓ S. Levine - NUS	3/30/81	✓ * X	6
10) ✓ D. Schwitzer - BNL	3/30/81	✓ * X	3
11) ✓ R.L. Ritzman - SAI	3/25/81	✓ * X	4
12) ✓ L. Devell - Studvik	4/1/81	✓ * X	1
13) ✓ L. Brewer - UC-Berkeley	3/25/81	✓ * X	4

Resolution of comments

comments by Castleman

chapter 1 § Abstract	chapter 3	chapter 4	chapter 5 (V) Vapor (A) Aqueous	chapter 6 & 7	chapter 8
Pg 1 P1		Pg 2 1st - full P	Pg 1 P2 (V)		
		Page 2 last P	Pg 2 last P (V)	Pg 3 1st full P - last part 2 sentences	
Pg 3 last P			Pg 3 1st full P (A)		
Pg 4 1st full P		Pg 4 1st full P - last few sentences	Pg 4 2nd full P (A)		
Pg 4 3rd full P		Pg 4 last P	Pg 5 2nd full P (V)		
		Pg 5 1st full P	Pg 5 3rd full P (V)		
			Pg 5 last P (A)		
			Pg 6 1st full P (A)		
			Pg 6 2nd full P (V)		
			Pg 6 3rd full P (A)		

# Resolution of comments

comments by Develter

chapter 1 § Abstract	chapter 3	chapter 4 <del>chapter 4</del> <del>chapter 4</del>	chapter 5 (V) vapor (A) aqueous	chapter 6 & 7	chapter 8
item 1 item 3 item 5 item 8 P1 " 8 P2 item 8 P3 line 1 item 8 P4	item 2	<del>item 5</del> item 4 P2	item 5 (A) item 7 (V)	item 4 item 5 item 6 P1 item 6 P2 item 6 P3 item 6 P4 item 8 P3 item 8 P4 item 8 P5 item 9 P1	

Comments by Ritzmann

item 1 item 2 item 3 item 6 item 8 item 9 item 10		item 4 item 7 item 8	item 5 (V)	item 3 item 6 item 10	
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# Resolution of comments

comments by Johnson

chapter 2 § Abstract	chapter 3	chapter 4	chapter 5 (V) vapor (A) aqueous	chapter 6 & 7	chapter 8
Pg 1 P 4 Page 3 Items 1, 2, 3		Page 1 P 2 <del>Pg 2 P</del> Page 2 ALL	Page 1 P 2 (V) Page 1 P 3 (V) Page 3 P 1 (V) P 2 (V)		

Comments by BLACKBURN

Pg 1 last P	ALL
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Comments by Thompson

Pg 1 Items 1 & 2 <del>ALL</del> Pg 2 Items 3 & 4 <del>ALL</del> Pg 3 ALL		Pg 2 item 4 P 2	Pg 2 items 5
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Comments by Scherer

Page 1 all Page 2 items 2, 3, 4 Page last main P	Pg 2 item 3		Pg 2 items 3, 4, 5
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# Resolution of comments

comments by Vogel

chapter 1	chapter 3	chapter 4	chapter 5 (V) Vapor (A) Aqueous	chapter 6 & 7	chapter 8
§ Abstract Pg 1 all <del>Pg 2</del> Pg 2 last P				Pg 2 P 1 P 2 P 3	
<u>Specific Comments</u>					
Pg 1 "Abstract"	*	last comment on pg 1	Pg 3 3rd full comment (V)	and 2 Pg 1 "Abstract Chapter 1, etc"	
Pg 2 1st full comment 2nd comment	Page 3 (Chap 3 comments)		Pg 3 4th full comment (A)	All except last comment on pg 1	
Pg 9 4th comment	Pg 8 a) b) c)	Pg 3 1st full comment Pg 5, 6, 7, 8 (chapter 4 comments)	Pg 8 last comment (V)	Pg 2 - last comment	
Pg 13 2nd comment: 2nd P		except for March comments on page 8 i.e. a) b)	Pg 9 1st, 2nd & 3rd comment (V)	Pg 3 2nd full comment	
			Pg 9	Pg 3 1st comment	
				Pg 4 1st comment	
				Pg 4 2nd comment	
		Pg 8 1st "chapter 5" comment		Pg 9, 10, 11, 12 13, 14 all comments	
				on <del>the</del> chapters 6 & 7	

\* Also note comments on chapter 2 on page 4

# Resolution of comments

comments by Brewer

chapter 1 § Abstract	chapter 3	chapter 4	chapter 5	chapter 6 & 7	chapter 8
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Pg 1 P2, 3  
Pg 2 all  
Problem 5  
(worth 25pts  
partial credit  
will be given)

comments by Devell

Item 1  
Item 2  
Item 3  
Item 4

item 2  
item 3

item 2 (V)  
item 5 (A)

item 3

comment by Hilliard

General

Item (1)  
Item (2)  
Item (4)  
Item (7)

Item (3)  
Item (5)

Specific Comments

Pg 4 chap 4  
# 4

Pg 2 last IP  
Pg 3 1st  
comment for  
chap 4

chapter 4  
comments

~~chap 4 comment~~  
# 1 (A)  
# 2 (A)  
Pg 3 chapter  
5 comments

~~Page 4 comment~~  
Pages 4 & 5  
chapter 6 &  
7 comments

Pg 5 chap 8  
comment

Pg 5 chap 8  
comment

# Resolution of comments

comments by ~~III~~ Anderson

chapter 1 § Abstract	chapter 3	chapter 4	chapter 5 V (vapor) A (aqueous)	chapter 6 & 7	chapter 8
Pg 1 Opening TP's Item 1 Item 3 Pg 2 last IP		Item 2	Item 2 (v)	<del>Item 2</del>	
<u>Specific Comments</u>					
Pg 1 <del>Item 1.1</del> comments Pg 1 <del>Item 1.3</del> comments  Pg 3 section 7 <del>Item</del> #2	Pg 1 last comment	Pg 2 section 4 comments	Pg 1-1.3 #2 Pg 1-1.3 comment #2 (v) Pg 1-1.3 comments #4 (?) (A)  Pg 2 section 5 comments (Do you agree?) (v)	Pg 2 and 3 Section 6 and 7 comments Pg 3 section 8 comment	Pg 3 & 4 section 8 comment
		Pg 4 last comment	Pg 4 last comment		

Resolution of comments

comments by ~~GE~~ Buchholz

chapter 1 § Abstract	chapter 3	chapter 4	chapter 5 (V) Vapor (A) aqueous	chapter 6 & 7	chapter 8
Set 1 - March 17 (1973)					
Page 2 last IP	Page 1 IP 2 Page 3 item 3) Page 2 IP 1 Page 2 item 3)			Page 2 item 1) " 1 item 2 # Page 2 IP 1 " 2 item 3) " 2 " 2)	
Attachment to March 17 letter					
Page 1 - I 1st comment Pg 2 - III - ALL	Pg 1 - I "Additional Comments"  Pg 2 - II 3rd comment on assumptions			Pg 1 - I - 2nd comment 3rd comment  Pg 1 - II 1st and second comment on "assumptions"	
Set 2 - "Additional Comments" March 31, 91					
Pg 1 IP 2 Pg 2 item 2) Pg 2 2nd IP from bottom Pg 2 last IP Pg 3 W	Pg 2 item 1) " 2 item 3)			Pg 2 item 2)	
Attachment entitled "GE comments on NUREG-0772 Draft"					
Category A					
item 1. item 2.				item 1. item 2	

# Resolution of comments

## comments by Buchholz - continued

chapter 1 § Abstract	chapter 3	chapter 4	chapter 5 (A) aqueous (V) vapor	chapter 6 & 7	chapter 8
Category A cont.			item 6 (A) item 9 (a) (A & V?) item 9 (b) (V)	<del>item 3</del> item 3 item 4 item 5 item 7 item 8	
Category B cont.			item 1. " 2. item 3.	item 2 item 4 item 6	items

## Comments by Torgerson

A General Comments

item 2 \*  
 item 3  
 item 4

~~item 3~~ \*

B Specific Comments

All of Category B comments

\* have you received copies of AECL 6812 from Mel?

# Resolution of comments

## Comments by Schwitzer

chapter 1 § Abstract	chapter 3	chapter 4	chapter 5 (V) vapor (A) aqueous	chapter 6 & 7	chapter 8
item 1  last 2 R on page 3		item 2 <del>item 2</del> Bottom 3 R on page 2 and top 2 full R on page 3	item 2 (v) item 3 (v)		
Comments by		Levine			

### General Comments

item 2 1st R		item 2 (ii) R1		item 2 (i)	
item 2 (ii) R1				item 2 (ii) R2	
item 2 (ii) R2				item 3	
item 2 (ii) R3					
item 3					

### Important Technical Points

item 1	item 2 R1 and R2	item 5 R1	item 5 (v) R1	item 3	
item 2 R1 R2		item 5 R2			
item 4		Table on last page			
item 5 R2					

# Resolution of comments

## comments by Levenson

chapter 1 § Abstract	chapter 3	chapter 4	chapter 5	chapter 6 & 7	chapter 8
P 1, 2, 3, 4, 5				<del>chip</del> P 3	
Comments by R. M. Wallace					
P 1 - 1st half P 2 P 3		Pg 2 last P	P 1 - last half		
Comments by Ainscough					
Pg 1 P 2 Pg 1 P 3 Pg 2 P 1		Pg 1 P 2 Pg 2 and 3 chop 4 comments	← Pg 1 - P 2 Pages 3, 4, 5 chop. 5 comments	Pgs 5 and 6 chop 6 & 7 comments	Pg 6 chop comments
[ See editorial comments last page ]					
Comments by L. S. Tong					
ALL					



# Resolution of comments

comments by Gehl

chapter 1 § Abstract	chapter 3	chapter 4	chapter 5	chapter 6 & 7	chapter 8
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ALL.

comments by Postma

-Cover letter :

Page 1,  
P 2 (A)  
Pages 2-7  
(I) (A)

Page 1, P 3  
~~P 2~~  
pages 7, 8

comments by Zumwalt

item 2  
item 3  
item 4  
item 5  
item 6  
item 7

item 2

items

items

Comments by Corvill

item 1

item 2 P 1

item 2 P 2,

3, 4, 5, (V)

item 2 P 3

6, 7, 8, 9, 10(A)

Page 5

Page 5

# Resolution of comments

comments by Campbell

chapter 1	chapter 3	chapter 4	chapter 5	chapter 6 & 7	chapter 8
§ Abstract					
Pg 1 P1	Pg 1	Pg 2 P2			
" P2	(chapter 2 comment)				
" P3	next to last				
" P4	P				
" P5	Pg 1 - last P:				
	Pg 2 P1				
Pg 2 P4				Pg 2 P1	
				Pg 2 P3	
				Pg 2 P4	
				Pg 2 P5	

# Resolution of comments

Comments by Malinowski

chapter 1 § Abstract	chapter 3	chapter 4	chapter 5	chapter 6 & 7	chapter 8
Section 1.1 P 1 & 2	Comments on sections 2.1, 2.2, 2.3	Comments on chapter 4 & Appendix B	Comments on chapter 5	Comments on chapters 6 and 7.	chap 8 comment
Section 1.1.4 P 1 & 3	comments on chap 3			Section 1.1 P 3 section 1.1.4 P 2	
Section 1.3.1					
Section 1.4.3					also → Section 1.3.3 and 1.3.4 P 2, 2, 3
ACRS comments					
item 1					
item 2					
item 3					
item 4					
item 5				item 5	
item 6				item 6	item 6
item 7	←				→ item 7
item 8					

# Resolution of Comments

## Comments by Stratton

Chapter 1: Abstract	chap 3	Chap 4 Pg 3 item 9 Pg 3 item 10	chap 5 Pg 3 item 9	Chap 6 & 7 Pg 2 items 4 <del>5 and 6</del> Pg 3 item 11 Pg 3 item 9	Chap 8 Pg 3 item 9
Pg 1 ALL Pg 2 ALL Pg 3 Items 7, 8, 11 and last TP	Pg 3 item 9				

# Resolution of Comments

## Comments by Stratton

Chapter 1 is Abstract	chap 3	chap 4	chap 5	chap 6 & 7	chap 8
Pg 1 ALL Pg 2 ALL Pg 3 Items 7, 8, 11 o.d last TP	Pg 3 Item 9	Pg 3 item 9 Pg 3 Item 10	Pg 3 item 9	Pg 2 items 4 <del>5 and 6</del> Pg 3 item 11 Pg 3 item 9	Pg 3 item 9