

January 28, 1997

Mr. Nicholas J. Liparulo, Manager
Nuclear Safety and Regulatory Analysis
Nuclear and Advanced Technology Division
Westinghouse Electric Corporation
P.O. Box 355
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SUBJECT: DISCUSSION ITEMS ON THE MAAP COMPUTER CODE USED IN THE AP600
PROBABILISTIC RISK ASSESSMENT (PRA)

Dear Mr. Liparulo:

As a result of its review of the June 1992 application for design certification of the AP600, the staff has determined that it needs additional information. Specifically, the enclosure to this letter contains discussion items on the MAAP computer code use in the AP600 PRA. We propose that the enclosed discussion items serve as agenda items for a currently unscheduled meeting on the matter. During this meeting the staff will determine which of the enclosed discussion items need to be formally addressed by Westinghouse.

You have requested that portions of the information submitted in the June 1992, application for design certification be exempt from mandatory public disclosure. While the staff has not completed its review of your request in accordance with the requirements of 10 CFR 2.790, that portion of the submitted information is being withheld from public disclosure pending the staff's final determination. The staff concludes that these followon questions do not contain those portions of the information for which exemption is sought. However, the staff will withhold this letter from public disclosure for 30 calendar days from the date of this letter to allow Westinghouse the opportunity to verify the staff's conclusions. If, after that time, you do not request that all or portions of the information in the enclosures be withheld from public disclosure in accordance with 10 CFR 2.790, this letter will be placed in the Nuclear Regulatory Commission Public Document Room.

If you have any questions regarding this matter, you may contact me at (301) 415-1132.

Sincerely,

original signed by:

Joseph M. Sebrosky, Project Manager
Standardization Project Directorate
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

Docket No. 52-003

Enclosure: As stated

cc w/enclosure:

See next page

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WDean, 0-17 G21

JMoore, 0-15 B18

ACRS (11)

RPalla, 0-8 H7

JMonninger, 0-8 H7

JKudrick, 0-8 H7

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Docket No. 52-003
AP600

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DISCUSSION ITEMS RELATED TO THE MAAP COMPUTER CODE USED IN THE AP600 PRA

The following questions are in regard to an effort to compare MAAP and SCDAP results for the early stages of 3BE sequence found in the AP600 PRA.

1. Could we get a copy of the current documentation for the MAAP code?
2. Could we get a copy of version 5 of the AP600 input model?

The following are some specific questions about output variables that are listed in the parameters file (version 5) for the AP600 model. Listed below are excerpts from that file with the questions inserted.

3. Could you please provide a diagram or explanation of relationships of the nodes in the core and the core barrel?

The confusion is as follows:

The axial nodes for TRV() range from 1 to 5 (bottom to top) in PLOTFIL 40 and range from 1 to 9 in PLOTFIL 44 (bottom to where?).

The axial nodes for TCBL() (PLOTFIL 41) range from 1 to 13 (bottom top) and are stated to correspond with the core nodes. How many nodes are in the core and core barrel? Does the parameter file contain, perhaps, only a partial listing of the nodes used in the model?

PLOTFIL: 40 // LOWER PLENUM CORIUM BED BEHAVIOR

**

** LOWER HEAD TEMPERATURE (J,I)

** J: AXIAL ; 1 = BOTTOM, 5 = TOP

** I: RADIAL; 1 = INNER, 5 = OUTER LAMINA

TRV(1,1)	//	temperature of lower head node (1,1)
TRV(1,2)	//	temperature of lower head node (1,2)
TRV(1,3)	//	temperature of lower head node (1,3)
TRV(1,4)	//	temperature of lower head node (1,4)
TRV(1,5)	//	temperature of lower head node (1,5)
TRV(2,1)	//	temperature of lower head node (2,1)
TRV(2,2)	//	temperature of lower head node (2,2)
TRV(2,3)	//	temperature of lower head node (2,3)
TRV(2,4)	//	temperature of lower head node (2,4)
TRV(2,5)	//	temperature of lower head node (2,5)
TRV(3,1)	//	temperature of lower head node (3,1)
TRV(3,2)	//	temperature of lower head node (3,2)
TRV(3,3)	//	temperature of lower head node (3,3)
TRV(3,4)	//	temperature of lower head node (3,4)
TRV(3,5)	//	temperature of lower head node (3,5)
TRV(4,1)	//	temperature of lower head node (4,1)
TRV(4,2)	//	temperature of lower head node (4,2)

Enclosure

```
TRV(4,3) // temperature of lower head node (4,3)
TRV(4,4) // temperature of lower head node (4,4)
TRV(4,5) // temperature of lower head node (4,5)
TRV(5,1) // temperature of lower head node (5,1)
TRV(5,2) // temperature of lower head node (5,2)
TRV(5,3) // temperature of lower head node (5,3)
TRV(5,4) // temperature of lower head node (5,4)
TRV(5,5) // temperature of lower head node (5,5)
```

4. How does TCBL indexing correlate with TRV indexing? See question 3.

```
** CORE BARREL TEMPERATURE (J,I)
** J: AXIAL ; 1 = BOTTOM, 13 = TOP (AXIAL NODALIZATION IS CONSISTENT W/ CORE)
** I: RADIAL; 1 = INNER, 5 = OUTER LAMINA
TCBL(1,1) // temperature of core barrel node (1,1) (K)
TCBL(2,1) // temperature of core barrel node (2,1) (K)
TCBL(3,1) // temperature of core barrel node (3,1) (K)
TCBL(4,1) // temperature of core barrel node (4,1) (K)
TCBL(5,1) // temperature of core barrel node (5,1) (K)
TCBL(6,1) // temperature of core barrel node (6,1) (K)
TCBL(7,1) // temperature of core barrel node (7,1) (K)
TCBL(8,1) // temperature of core barrel node (8,1) (K)
TCBL(9,1) // temperature of core barrel node (9,1) (K)
TCBL(10,1) // temperature of core barrel node (10,1) (K)
TCBL(11,1) // temperature of core barrel node (11,1) (K)
TCBL(12,1) // temperature of core barrel node (12,1) (K)
TCBL(13,1) // temperature of core barrel node (13,1) (K)
```

5. Could you please provide a diagram or description that tells the locations of the rows and columns in the model.

```
ICOLAP(1) // row no. for core collapse in channel 1
ICOLAP(2) // row no. for core collapse in channel 2
ICOLAP(3) // row no. for core collapse in channel 3
ICOLAP(4) // row no. for core collapse in channel 4
ICOLAP(5) // row no. for core collapse in channel 5
ICOLAP(6) // row no. for core collapse in channel 6
ICOLAP(7) // row no. for core collapse in channel 7
ICRUST(1) // row no. for bottom crust in channel 1
ICRUST(2) // row no. for bottom crust in channel 2
ICRUST(3) // row no. for bottom crust in channel 3
ICRUST(4) // row no. for bottom crust in channel 4
ICRUST(5) // row no. for bottom crust in channel 5
ICRUST(6) // row no. for bottom crust in channel 6
ICRUST(7) // row no. for bottom crust in channel 7
ITOPCR(1) // row no. for top crust in channel 1
ITOPCR(2) // row no. for top crust in channel 2
ITOPCR(3) // row no. for top crust in channel 3
ITOPCR(4) // row no. for top crust in channel 4
ITOPCR(5) // row no. for top crust in channel 5
ITOPCR(6) // row no. for top crust in channel 6
ITOPCR(7) // row no. for top crust in channel 7
ILOWMX // highest row no. for low flow region in natural circulation
```

**

PLOTFIL 44 // REACTOR VESSEL THERMAL RESPONSE IN DETAIL

6. What does XTRVII(), SIGW() represent?

```
XTRVII(1),XTRVII(2),XTRVII(3),XTRVII(4),XTRVII(5)
SIGW(1,1),SIGW(1,2),SIGW(1,3),SIGW(1,4),SIGW(1,5)
SIGW(2,1),SIGW(2,2),SIGW(2,3),SIGW(2,4),SIGW(2,5)
SIGW(3,1),SIGW(3,2),SIGW(3,3),SIGW(3,4),SIGW(3,5)
SIGW(4,1),SIGW(4,2),SIGW(4,3),SIGW(4,4),SIGW(4,5)
SIGW(5,1),SIGW(5,2),SIGW(5,3),SIGW(5,4),SIGW(5,5)
```

**

PLOTFIL 83

** SUMMARY PLOT FILE

7. What does "CCI" represent?

XCNDB(1) // CCI PENETRATION DEPTH

**

PLOTFIL 85

** LEVEL 2/LEVEL 3 INTERFACE INFORMATION

8. In variables MFPRB(x,y,z), x apparently represents the species and z apparently represents the compartment number. Is this true? What does y represent?

```
MFPRB(1,1,11),MFPRB(1,2,11),MFPRB(1,3,11) // MASS OF NOBLE GAS IN AUX
BLDG
MFPRB(2,1,11),MFPRB(2,2,11),MFPRB(2,3,11) // MASS OF CSI IN AUX BLDG
MFPRB(3,1,11),MFPRB(3,2,11),MFPRB(3,3,11) // MASS OF TE2 IN AUX BLDG
MFPRB(4,1,11),MFPRB(4,2,11),MFPRB(4,3,11) // MASS OF SRO IN AUX BLDG
MFPRB(5,1,11),MFPRB(5,2,11),MFPRB(5,3,11) // MASS OF MOO2 IN AUX BLDG
MFPRB(6,1,11),MFPRB(6,2,11),MFPRB(6,3,11) // MASS OF CSOH IN AUX BLDG
MFPRB(7,1,11),MFPRB(7,2,11),MFPRB(7,3,11) // MASS OF BAO IN AUX BLDG
MFPRB(8,1,11),MFPRB(8,2,11),MFPRB(8,3,11) // MASS OF LA2O3 IN AUX BLDG
MFPRB(9,1,11),MFPRB(9,2,11),MFPRB(9,3,11) // MASS OF CEO2 IN AUX BLDG
MFPRB(10,1,11),MFPRB(10,2,11),MFPRB(10,3,11) // MASS OF SB IN AUX BLDG
MFPRB(11,1,11),MFPRB(11,2,11),MFPRB(11,3,11) // MASS OF TE2 IN AUX BLDG
MFPRB(12,1,11),MFPRB(12,2,11),MFPRB(12,3,11) // MASS OF UO2 IN AUX BLDG
```

**

END OF PLTMAP

MEETING SUMMARY

SUBJECT: MEETING WITH THE STATE OF MICHIGAN CONCERNING DOSE ASSESSMENT

A meeting was held at NRC Headquarters on January 29, 1997, between the NRC staff and the State of Michigan to discuss the role of the NRC in the State's dose assessment and decision making processes. Personnel from the Federal Emergency Management Agency Headquarters and Region V offices also attended. Enclosure 1 is a list of the meeting attendees. Enclosure 2 is the agenda for the meeting. After a brief overview of the meeting, the attendees toured the NRC Operations Center, focussing on NRC interface with and support of the State during a radiological event. The staff then provided a presentation about the NRC Dose Assessment philosophy and the RASCAL consequence assessment model. This was followed by a demonstration of RASCAL. After the demonstration, the attendees discussed a plan proposed by Michigan to alter the State's operational procedure to include accessing NRC support for decision making and dose assessment. The NRC explained the time and responsibility constraints which would preclude it from providing Michigan with the information the State proposed in a timely fashion. As a result of this discussion, Michigan decided to reevaluate its proposed change to the plan and to coordinate the change with the NRC and the nuclear power plant licensees in Michigan.

Original signed by A. Kugler
 Andrew J. Kugler, Project Manager
 Project Directorate III-1
 Division of Reactor Projects - III/IV
 Office of Nuclear Reactor Regulation

Docket Nos. 50-155, 50-255, 50-315, 50-316, 50-341

Enclosure: As stated

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 10, 1997

MEETING SUMMARY

SUBJECT: MEETING WITH THE STATE OF MICHIGAN CONCERNING DOSE
ASSESSMENT

A meeting was held at NRC Headquarters on January 29, 1997, between the NRC staff and the State of Michigan to discuss the role of the NRC in the State's dose assessment and decision making processes. Personnel from the Federal Emergency Management Agency Headquarters and Region V offices also attended. Enclosure 1 is a list of the meeting attendees. Enclosure 2 is the agenda for the meeting. After a brief overview of the meeting, the attendees toured the NRC Operations Center, focussing on NRC interface with and support of the State during a radiological event. The staff then provided a presentation about the NRC Dose Assessment philosophy and the RASCAL consequence assessment model. This was followed by a demonstration of RASCAL. After the demonstration, the attendees discussed a plan proposed by Michigan to alter the State's operational procedure to include accessing NRC support for decision making and dose assessment. The NRC explained the time and responsibility constraints which would preclude it from providing Michigan with the information the State proposed in a timely fashion. As a result of this discussion, Michigan decided to reevaluate its proposed change to the plan and to coordinate the change with the NRC and the nuclear power plant licensees in Michigan.

A handwritten signature in cursive script, reading "Andrew J. Kugler", is positioned above the typed name.

Andrew J. Kugler, Project Manager
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Office of Nuclear Reactor Regulation

Docket Nos. 50-155, 50-255, 50-315, 50-316, 50-341

Enclosures: As stated

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September 1996

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Dave Minnaar	Michigan Department of Environmental Quality
Robert Tarrant	Michigan State Police
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Dan Bement	Federal Emergency Management Agency, Region V
Tom Ploski	NRC/RIII
Bill Maier	NRR
Stephen Klementowicz	NRR
Janet Quissell	NRR

ENCLOSURE 1

¹ NRC participants were from the Office of Nuclear Reactor Regulation (NRR), the Office for Analysis and Evaluation of Operational Data (AEOD), the Office of State Programs (OSP), and Region III (RIII).

AGENDA FOR TOUR AND MEETING WITH STATE OF MICHIGAN

1/29/97

9:00 AM	GREETING MICHIGAN REPRESENTATIVES	FRANK J. CONGEL, Director, Incident Response Division
9:15 AM	TOUR OF OPERATIONS CENTER	ERIC WEINSTEIN, State Liaison for Incident Response
10:15 AM	INTRODUCTION TO RASCAL - BRIEFING	ABY MOHSENI, RASCAL Project Manager
10:35 AM	RASCAL HANDS ON DEMONSTRATION	
11:00 AM	DISCUSSION OF PROPOSED MICHIGAN DOSE ASSESSMENT PROCESS	ERIC WEINSTEIN/ALL
12:00 N	ADJOURN	

ENCLOSURE 2