Westinghouse Electric Corporation **Energy Systems**

Box 355
Pittsburgh Pennsylvania 15230-0355

NTD-NRC-95-4431
DCP/NRC0303
Docket No.: STN-52-003

April 7, 1995

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTENTION: T. R. QUAY

SUBJECT: INFORMATION REQUESTED BY RAI 470.21 REGARDING DISTRIBUTION OF FISSION PRODUCT GROUPS THROUGHOUT A LOCA TRANSIENT SEQUENCE

Dear Mr. Quay:

The enclosure to this letter provides information regarding the distribution of fission products in the containment following a postulated Loss-of-Coolant Accident. This information is provided in response to staff's request for additional information 470.21.

The information in the enclosure includes the following:

1. Masses of cesium iodide in each of the eight containment compartments

2. Masses of each of 12 fission product groups deposited in any of the six containment compartments where deposition can occur.

The two electronic files containing this information are included on a diskette with Jay Lee's copy.

Please contact Brian A. McIntyre on (412) 374-4334 if you have any questions concerning this transmittal.

N. J. Liparulo, Manager
Nuclear Safety Regulatory and Licensing Activities

/nja

Enclosure
Attachment

cc: T. J. Kenyon NRC (w/o Enclosure)
J. Lee NRC
B. A. McIntyre Westinghouse (w/o Attachment, Enclosure)

2367A

140097

9504140203 950407
PDR ADOCK 05200003
A PDR

E004
'/1

ATTACHMENT TO LETTER NTD-NRC-95-4431

RAI 470.21 asks for information regarding fission product source rates into the various compartments in the containment and the distribution of the fission product groups throughout a transient sequence. The areas of concern have been further defined as being the particulate iodine (existing as cesium iodide) in all of the compartments and all particulate groups in any compartment where deposition may occur.

The severe accident Case 3BE, which is a LOCA involving the eight inch direct vessel injection (DVI) line, has been analyzed using the MAAP4 computer code. The code output provides the masses of CsI in each of the containment compartments and the masses of all twelve fission product groups in the deposited state in the containment (six of the eight compartments collect deposited particulates). Plot files containing this data are provided on the enclosed diskette. The files are:

FP1.PLT	Masses of CsI in each containment compartment
FP2.PLT	Masses of all aerosol groups in the deposited state in containment compartments

The data provided in these two plot files include:

MFPRB(i,j,k) = the mass of fission product (kg)

i = fission product group;	i =	1	noble gases, inert aerosols
		2	CsI
		3	TeO_2
		4	SrO
		5	MoO_2
		6	CsOH
		7	BaO
		8	$La_2O_3+Pr_2O_3+Nd_2O_3+Sm_2O_3+Y_2O_3$
		9	CeO_2
		10	Sb
		11	Te_2
		12	$UO_2+NpO_2+PuO_2$
j = fission product state;	j =	1	Gaseous
		2	Aerosol (airborne)
		3	Deposited
k = containment node	k=	1	Loop Compartment 1
		2	Loop Compartment 2
		3	CMT/Accumulator Rooms
		4	Reactor Cavity
		5	IRWST Compartment
		6	Upper Compartment (including refueling canal)
		7	Upper Compartment (next to cylinder wall)
		8	Upper Compartment (dome)

Electronic File FP1. PLT
(first page)

```
-25

AP600 Case 3BE, 8" DVI Line Break
  TIME                 MFPRB(2,1,1)         MFPRB(2,2,1)         MFPRB(2,3,1)         MFPRB(2,1,2)
  MFPRB(2,2,2)         MFPRB(2,3,2)         MFPRB(2,1,3)         MFPRB(2,2,3)         MFPRB(2,3,3)
  MFPRB(2,1,4)         MFPRB(2,2,4)         MFPRB(2,3,4)         MFPRB(2,1,5)         MFPRB(2,2,5)
  MFPRB(2,3,5)         MFPRB(2,1,6)         MFPRB(2,2,6)         MFPRB(2,3,6)         MFPRB(2,1,7)
  MFPRB(2,2,7)         MFPRB(2,3,7)         MFPRB(2,1,8)         MFPRB(2,2,8)         MFPRB(2,3,8)
   SECONDS      KG            KG            KG            KG            KG            KG            KG
  KG            KG            KG            KG            KG            KG            KG            KG
  KG            KG            KG            KG            KG            KG            KG            KG
  KG

   5.000E-03   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
   1.015E+02   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
   2.028E+02   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
   3.035E+02   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
   4.052E+02   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
   5.076E+02   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
   6.077E+02   0.000E+00   0.000E+00   0.000E+00   0.000E+00
```

```
AP600 Case 3BE, 8" DVI Line Break
  TIME               MFPRB(1,3,1)        MFPRB(1,3,2)        MFPRB(1,3,3)        MFPRB(1,3,4)
  MFPRB(1,3,5)       MFPRB(1,3,6)        MFPRB(2,3,1)        MFPRB(2,3,2)        MFPRB(2,3,3)
  MFPRB(2,3,4)       MFPRB(2,3,5)        MFPRB(2,3,6)        MFPRB(3,3,1)        MFPRB(3,3,2)
  MFPRB(3,3,3)       MFPRB(3,3,4)        MFPRB(3,3,5)        MFPRB(3,3,6)        MFPRB(4,3,1)
  MFPRB(4,3,2)       MFPRB(4,3,3)        MFPRB(4,3,4)        MFPRB(4,3,5)        MFPRB(4,3,6)
  MFPRB(5,3,1)       MFPRB(5,3,2)        MFPRB(5,3,3)        MFPRB(5,3,4)        MFPRB(5,3,5)
  MFPRB(5,3,6)       MFPRB(6,3,1)        MFPRB(6,3,2)        MFPRB(6,3,3)        MFPRB(6,3,4)
  MFPRB(6,3,5)       MFPRB(6,3,6)        MFPRB(7,3,1)        MFPRB(7,3,2)        MFPRB(7,3,3)
  MFPRB(7,3,4)       MFPRB(7,3,5)        MFPRB(7,3,6)        MFPRB(8,3,1)        MFPRB(8,3,2)
  MFPRB(8,3,3)       MFPRB(8,3,4)        MFPRB(8,3,5)        MFPRB(8,3,6)        MFPRB(9,3,1)
  MFPRB(9,3,2)       MFPRB(9,3,3)        MFPRB(9,3,4)        MFPRB(9,3,5)        MFPRB(9,3,6)
  MFPRB(10,3,1)      MFPRB(10,3,2)       MFPRB(10,3,3)       MFPRB(10,3,4)       MFPRB(10,3,5)
  MFPRB(10,3,6)      MFPRB(11,3,1)       MFPRB(11,3,2)       MFPRB(11,3,3)       MFPRB(11,3,4)
  MFPRB(11,3,5)      MFPRB(11,3,6)       MFPRB(12,3,1)       MFPRB(12,3,2)       MFPRB(12,3,3)
  MFPRB(12,3,4)      MFPRB(12,3,5)       MFPRB(12,3,6)
   SECONDS      KG            KG            KG            KG            KG            KG            KG
  KG            KG            KG            KG            KG            KG            KG            KG
  KG            KG            KG            KG            KG            KG            KG            KG
  KG            KG            KG            KG            KG            KG            KG            KG
  KG            KG            KG            KG            KG            KG            KG            KG
  KG            KG            KG            KG            KG            KG            KG            KG
  KG            KG            KG            KG            KG            KG            KG            KG
  KG            KG            KG            KG            KG            KG            KG            KG
  KG            KG            KG            KG            KG            KG            KG            KG
  KG

   5.000E-03   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
  0.000E+00   0.000E+00   0.000E+00
```

Electronic File FP2.PLT
(first two pages)

```
 1.015E+02   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00
 2.028E+02   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00
 3.035E+02   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
0.000E+00   0.000E+00   0.000E+00
 4.052E+02   0.000E+00   0.000E+00   0.000E+00   0.000E+00
```