From: "Mancuso, Joseph A." <X2JMANCU@southernco.com>
To: "Mark Notich" <mdn@nrc.gov>
Date: 2/5/2007 11:01:22 AM
Subject: Westinghouse Accident Release LTR-CRA-06-21.pdf
cc: "James T. Davis" <JTDAVIS@southernco.com>,"Tom C. Moorer" <TCMOORER@southernco.com>

Mark,

I have attached a PDF version of the Westinghouse LTR-CRA-06-2 APlOOO Accident Releases and Doses as a Function of Time, that does not have the proprietary protection statement. This document was scanned and OCR'd however it may not pass your requirements. We recommend that you print it out as a hard copy to replace the original letter. If there is anything else that I can help you with please give me a call.

<<Westinghouse Accident Release LTR-CRA-06-21.pdf>>

Joe Mancuso
Nuclear Development
Southern Nuclear
205.992.7516 Office
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Hearing Identifier: Vogtle_Public
Email Number: 165

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Creation Date: 2/5/2007 11:01:22 AM
From: "Mancuso, Joseph A." <X2JMANCU@southernco.com>

Created By: X2JMANCU@southernco.com

Recipients "James T. Davis" <JTDAVIS@southernco.com>,"Tom C. Moorer" <TCMOORER@southernco.com>
"Mark Notich" <mdn@nrc.gov>

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Reply Requested: No
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None

Concealed Subject: No
Security: Standard

Westinghouse

To: J. L. Whiteman

Date: February 1,2006

From: Containment & Radiological Analysis
Ext: 412-374-5585
Fax: 412-374-5099

Our ref: LTR-CRA-06-21

Ref: 1. Bechtel Request for Information RFI No. 25144-000-GRI-GEX-0021,12/14/2005
(a copy of page 1 of this document is attached)

Subject: **AP1000 Accident Releases and Doses as a Function of Time**

In response to Reference 1, the computer runs for the AP1000 accident radiological consequences analyses have been reviewed and the activity releases and doses have been extracted for the significant time intervals and are provided in the following pages. As requested, the accidents addressed are:

- Large break LOCA
- Main steam line break with accident-initiated iodine spike
- Main steam line break with pre-existing iodine spike
- Locked rotor with feedwater unavailable
- Locked rotor with feedwater available
- Rod ejection
- Steam generator tube rupture with accident-initiated iodine spike
- Steam generator tube rupture with pre-existing iodine spike
- Small line break outside containment
- Fuel handling accident

All the analyses, except for the LOCA, used the following atmospheric dispersion values for the LPZ:

EAB	8.0E-4 sec/m^3
LPZ (0-8 hr)	5.0E-4 sec/m^3
LPZ (8-24 hr)	3.0E-4 sec/m^3
LPZ (24-96 hr)	1.5E-4 sec/m^3
LPZ (96-720 hr)	8.0E-5 sec/m^3

The LOCA analysis was revised to address recalculated values for the activity removal coefficients and this required the definition of lower values for the atmospheric dispersion factors in order to obtain acceptable doses (the revised dispersion factors were not applied to the other events). The atmospheric dispersion factors for the LOCA are:

EAB	5.1E-4 sec/m^3
LPZ (0-8 hr)	2.2E-4 sec/m^3
LPZ (8-24 hr)	1.6E-4 sec/m^3
LPZ (24-96 hr)	1.0E-4 sec/m^3
LPZ (96-720 hr)	8.0E-5 sec/m^3

Activity releases that are lower than 1.0E-10 Ci are reported as being zero. Note also that the doses provided here are the actual calculated doses and do not include the rounding-up that is reflected in the doses reported in the DCD.

J. L. Grover
Containment & Radiological Analysis

Verifier: S. T. Kinnas
Containment & Radiological Analysis

Approved: S. I. Dederer
Acting Manager
Containment & Radiological Analysis

REQUEST FOR INFORMATION (RFI)

RFI NUMBER: 25144-000-GRI-GEX-00021	DATE: December 14,2005
PROJECT NUMBER: 25144	PROJECT NAME: SNC ALWR ESP Project
PREPARED BY: S. Jha/D. Kemp	**PHONE/FAX:** 301-228-6435/240-379-2842 DISCIPLINE: Nuclear
TO: C. Pierce	
REFERENCE **DRAWING(S)/DOCUMENT(S):**	Westinghouse Doc. APP-0000-XI-001 **REV.:** 3 AP1000 DCD 14
SPECIFICATION(S): N/A	**REV.:**

INFORMATION REQUESTED:

Request for DCD Post Accident Doses (by Time Step) and DCD Source Terms (by Time Step)

For the Vogtle ESP. Bechtel intends to ratio the radiological dose consequences of design basis accidents based on the difference of the short-term atmospheric dispersion factors for Vogtle Site and those assumed in the DCD (but not reported in the DCD). In order to accomplish this effort, Bechtel also needs the DCD time-dependent low population zone (LPZ) doses for each accident which is analyzed for longer than 8 hrs. The DCD only provides the total dose at the LPZ.

The attached 3 emails were provided by Westinghouse for the Dominion Project, North Anna, for this same purpose. However, the DCD no longer agrees with the attached information (total doses have changed). Also, when the North Anna Application was prepared, Westinghouse did not have the activity releases for the Failure of Small Lines Carrying Primary Coolant Outside Containment (FSL).

Bechtel needs the following information for the Vogtle Analyses:

1. Provide the Westinghouse / DCD time-dependent LPZ doses for the following accidents: Loss of Coolant Accident (LOCA), Steam Generator Tube Rupture (SGTR) with Pre-Existing Iodine Spike, SGTR with Accident-Initiated Iodine Spike, Main Steam Line Break (MSLB) with Pre-Existing Iodine Spike, MSLB with Accident-Initiated Iodine Spike, and Rod Ejection. The 0 – 8 hr LPZ doses for the Locked Rotor and the Fuel Handling Accident (FHA) are in the DCD.

2. Provide the Westinghouse / DCD time dependent isotopic activity releases (gaseous source terms) for LOCA, SGTR with Pre-Existing Iodine Spike, SGTR with Accident-Initiated Iodine Spike, MSLB with Pre-Existing Iodine Spike, MSLB with Accident-Initiated Iodine Spike, FHA, Locked Rotor, and Rod Ejection.

3. Provide the Westinghouse / DCD time-dependent source terms for the FSL It is assumed that the LPZ dose provided in the DCD is for a single time step of 0 – 8 hr. If this is not the case, also provide the time-dependent LPZ doses for the FSL.

RESPONSE REQUIRED BY: February 1, 2006.

IMPACTS: The requested information will be used in the ESP application in Section 15 of the Safety Analysis Report and in Section 7.1 of the Environmental Report. If the information is nat received by the required date. the schedule for completing these sections may be delayed

APPROVED FOR ISSUANCE TO SNC:

EGS: DAK DATE: December 21,2005

PE: John S Prebula DATE: December 21, 2005

RESPONSE INFORMATION

TO: John Prebula / Robert Prunty	FROM: Charles R. Pierce
OF: Bechtel Power Corporation	OF: Southern Nuclear Operating Company

Official record electronically approved in EDMS

Summary of Releases and Doses for the AP1000

Official record electronically approved in EDMS

Large Break Loss-of-Coolant Accident (LOCA)

		TEDE Dose (rem)
EAB	1.4-3.4 hr	2.43E+01
LPZ	0-8 hr	2.17E+01
	8-24 hr	7.69E-01
	24-96 hr	3.71E-01
	96-720 hr	8.70E-01

LOCA Activity Releases (Ci)					
	1.4-3.4 hr	0-8 hr	8-24 hr	24-96 hr	96-720 hr
I-130	5.637E+01	1.119E+02	5.373E+00	7.100E-01	1.270E-02
I-131	1.676E+03	3.485E+03	2.664E+02	2.386E+02	7.193E+02
I-132	1.232E+03	2.137E+03	1.637E+01	1.456E-02	0.000E+00
I-133	3.232E+03	6.541E+03	3.826E+02	1.042E+02	1.040E+01
I-134	6.599E+02	1.138E+03	2.964E-01	6.791E-08	0.000E+00
I-135	2.558E+03	4.894E+03	1.578E+02	6.085E+00	3.161E-03
Kr-85m	1.416E+03	3.771E+03	1.874E+03	8.559E+01	1.216E-03
Kr-85	8.306E+01	2.968E+02	7.055E+02	1.585E+03	1.360E+04
Kr-87	1.098E+03	1.945E+03	4.966E+01	4.053E-03	0.000E+00
Kr-88	3.111E+03	7.260E+03	1.697E+03	1.745E+01	4.087E-07
Xe-131m	8.257E+01	2.935E+02	6.787E+02	1.372E+03	5.570E+03
Xe-133m	4.431E+02	1.539E+03	3.153E+03	4.109E+03	2.582E+03
Xe-133	1.469E+04	5.187E+04	1.158E+05	2.056E+05	4.070E+05
Xe-135m	1.062E+01	3.594E+01	2.144E-07	0.000E+00	0.000E+00
Xe-135	3.150E+03	9.638E+03	1.011E+04	2.106E+03	8.682E+00
Xe-138	3.105E+01	1.204E+02	1.584E-07	0.000E+00	0.000E+00
Rb-86	3.039E+00	6.320E+00	2.985E-01	9.828E-02	5.128E-01
Cs-134	2.584E+02	5.381E+02	2.569E+01	9.112E+00	7.736E+01
Cs-136	7.328E+01	1.523E+02	7.159E+00	2.284E+00	9.877E+00
Cs-137	1.505E+02	3.134E+02	1.497E+01	5.319E+00	4.572E+01
Cs-138	1.498E+02	3.296E+02	2.183E-03	0.000E+00	0.000E+00
Sb-127	2.417E+01	4.801E+01	2.286E+00	5.674E-01	7.823E-01
Sb-129	5.104E+01	8.936E+01	1.505E+00	4.945E-03	4.903E-08
Te-127m	3.150E+00	6.304E+00	3.162E-01	1.109E-01	8.710E-01
Te-127	2.048E+01	3.827E+01	1.146E+00	2.745E-02	1.327E-04
Te-129m	1.072E+01	2.145E+01	1.071E+00	3.647E-01	2.355E+00
Te-129	1.879E+01	2.833E+01	2.689E-02	3.544E-08	0.000E+00
Te-131m	3.167E+01	6.196E+01	2.640E+00	3.345E-01	7.809E-02

LOCA Activity Releases (Ci)					
	1.4-3.4 hr	0-8 hr	8-24 hr	24-96 hr	96-720 hr
Te-132	3.228E+02	6.404E+02	3.019E+01	7.040E+00	7.831E+00
Sr-89	9.228E+01	1.846E+02	9.238E+00	3.190E+00	2.263E+01
Sr-90	7.948E+00	1.591E+01	7.993E-01	2.840E-01	2.442E+00
Sr-91	9.677E+01	1.810E+02	5.459E+00	1.348E-01	7.056E-04
Sr-92	6.830E+01	1.131E+02	1.014E+00	5.149E-04	0.000E+00
Ba-139	5.436E+01	8.302E+01	1.485E-01	9.906E-07	0.000E+00
Ba-140	1.627E+02	3.249E+02	1.606E+01	5.106E+00	2.166E+01
Mo-99	2.146E+01	4.252E+01	1.981E+00	4.288E-01	3.779E-01
Tc-99M	1.472E+01	2.662E+01	6.048E-01	5.265E-03	1.333E-06
Ru-103	1.731E+01	3.462E+01	1.730E+00	5.928E-01	3.985E+00
Ru-105	8.177E+00	1.436E+01	2.483E-01	8.864E-04	1.172E-08
Ru-106	5.702E+00	1.141E+01	5.731E-01	2.029E-01	1.698E+00
Rh-105	1.028E+01	2.018E+01	8.812E-01	1.287E-01	4.144E-02
Ce-141	3.890E+00	7.780E+00	3.884E-01	1.321E-01	8.451E-01
Ce-143	3.460E+00	6.784E+00	2.934E-01	4.047E-02	1.142E-02
Ce-144	2.941E+00	5.886E+00	2.955E-01	1.045E-01	8.677E-01
Pu-238	9.159E-03	1.834E-02	9.211E-04	3.272E-04	2.815E-03
Pu-239	8.059E-04	1.613E-03	8.104E-05	2.879E-05	2.478E-04
Pu-240	1.181E-03	2.365E-03	1.188E-04	4.221E-05	3.633E-04
Pu-241	2.655E-01	5.314E-01	2.670E-02	9.482E-03	8.143E-02
Np-239	4.484E+01	8.867E+01	4.078E+00	8.147E-01	5.702E-01
Y-90	8.078E-02	1.600E-01	7.437E-03	1.588E-03	1.345E-03
Y-91	1.185E+00	2.371E+00	1.187E-01	4.116E-02	2.995E-01
Y-92	7.894E-01	1.351E+00	1.795E-02	2.859E-05	0.000E+00
Y-93	1.214E+00	2.280E+00	7.084E-02	1.976E-03	1.422E-05
Nb-95	1.595E+00	3.190E+00	1.593E-01	5.435E-02	3.554E-01
Zr-95	1.586E+00	3.175E+00	1.590E-01	5.523E-02	4.077E-01
Zr-97	1.425E+00	2.742E+00	1.031E-01	6.733E-03	3.705E-04
La-140	1.672E+00	3.291E+00	1.462E-01	2.362E-02	9.620E-03
La-141	1.030E+00	1.785E+00	2.705E-02	6.411E-05	2.009E-10
La-142	5.379E-01	8.308E-01	2.091E-03	3.394E-08	0.000E+00
Nd-147	6.161E-01	1.230E+00	6.064E-02	1.895E-02	7.287E-02
Pr-143	1.390E+00	2.777E+00	1.374E-01	4.397E-02	1.940E-01
Am-241	1.196E-04	2.394E-04	1.203E-05	4.273E-06	3.677E-05
Cm-242	2.821E-02	5.647E-02	2.833E-03	9.978E-04	8.078E-03
Cm-244	3.463E-03	6.934E-03	3.483E-04	1.237E-04	1.063E-03

Main Steam Line Break with Accident-Initiated Iodine Spike

Time Period	LPZ Dose (rem TEDE)
0-2 hr	5.06E-01
2-8 hr	5.18E-01
8-24 hr	3.77E-01
24-72 hr	5.36E-01

	Activity Releases (Ci)			
	(0-2 hr)	(2-8 hr)	(8-24 hr)	(24-72 hr)
Kr-85m	6.855E-02	1.141E-01	6.796E-02	6.177E-03
Kr-85	2.824E-01	8.462E-01	2.250E+00	6.686E+00
Kr-87	2.755E-02	1.342E-02	5.291E-04	8.602E-08
Kr-88	1.124E-01	1.372E-01	4.037E-02	8.269E-04
Xe-131m	1.277E-01	3.791E-01	9.810E-01	2.700E+00
Xe-133m	1.585E-01	4.506E-01	1.038E+00	2.054E+00
Xe-133	1.178E+01	3.454E+01	8.644E+01	2.161E+02
Xe-135m	3.043E-03	1.325E-05	0.000E+00	0.000E+00
Xe-135	3.098E-01	6.896E-01	8.351E-01	3.384E-01
Xe-138	3.985E-03	1.138E-05	0.000E+00	0.000E+00
I-130	4.198E-01	9.950E-01	1.583E+00	1.009E+00
I-131	2.600E+01	5.730E+01	1.558E+02	4.134E+02
I-132	4.617E+01	9.739E+01	2.238E+01	1.819E-01
I-133	4.908E+01	1.137E+02	2.269E+02	2.553E+02
I-134	1.343E+01	1.859E+01	2.651E-01	8.415E-07
I-135	3.235E+01	7.739E+01	7.828E+01	1.772E+01
Cs-134	1.898E+01	1.951E-01	5.185E-01	1.540E+00
Cs-136	2.822E+01	2.862E-01	7.428E-01	2.060E+00
Cs-137	1.366E+01	1.407E-01	3.739E-01	1.112E+00
Cs-138	1.012E+01	1.018E-03	4.424E-07	0.000E+00

Main Steam Line Break with Pre-Existing Iodine Spike

Time Period	LPZ Dose (rem TEDE)
0-2 hr	4.83E-01
2-8 hr	9.78E-02
8-24 hr	7.18E-02
24-72 hr	1.08E-01

	Activity Releases (Ci)			
	(0-2 hr)	(2-8 hr)	(8-24 hr)	(24-72 hr)
Kr-85m	6.855E-02	1.141E-01	6.796E-02	6.177E-03
Kr-85	2.824E-01	8.462E-01	2.250E+00	6.686E+00
Kr-87	2.755E-02	1.342E-02	5.291E-04	8.602E-08
Kr-88	1.124E-01	1.372E-01	4.037E-02	8.269E-04
Xe-131m	1.277E-01	3.791E-01	9.810E-01	2.700E+00
Xe-133m	1.585E-01	4.506E-01	1.038E+00	2.054E+00
Xe-133	1.178E+01	3.454E+01	8.644E+01	2.161E+02
Xe-135m	3.043E-03	1.325E-05	0.000E+00	0.000E+00
Xe-135	3.098E-01	6.896E-01	8.351E-01	3.384E-01
Xe-138	3.985E-03	1.138E-05	0.000E+00	0.000E+00
I-130	3.591E-01	1.417E-01	2.093E-01	1.334E-01
I-131	2.402E+01	1.211E+01	3.096E+01	8.216E+01
I-132	3.052E+01	4.142E+00	8.061E-01	6.552E-03
I-133	4.335E+01	1.898E+01	3.534E+01	3.976E+01
I-134	6.742E+00	1.633E-01	1.429E-03	4.535E-09
I-135	2.600E+01	8.156E+00	7.542E+00	1.707E+00
Cs-134	1.898E+01	1.951E-01	5.185E-01	1.540E+00
Cs-136	2.822E+01	2.862E-01	7.428E-01	2.060E+00
Cs-137	1.366E+01	1.407E-01	3.739E-01	1.112E+00
Cs-138	1.012E+01	1.018E-03	4.424E-07	0.000E+00

Locked Rotor Accident

Time Period	No Feedwater LPZ Dose (rem TEDE)
0-1.5 hr	3.89E-01

Time Period	Feedwater Available LPZ Dose (rem TEDE)
0-2 hr	1.29E-01
2-8 hr	6.65E-01

	No Feedwater		Feedwater Available		
	(0-1.5 hr)		(0-2 hr)	(2-8 hr)	(6-8 hr)
Kr-85m	8.158E+01		1.048E+02	1.744E+02	4.128E+01
Kr-85	7.576E+00		1.010E+01	3.026E+01	1.008E+01
Kr-87	1.204E+02		1.431E+02	6.965E+01	5.428E+00
Kr-88	2.078E+02		2.619E+02	3.197E+02	6.047E+01
Xe-131m	3.771E+00		5.026E+00	1.492E+01	4.945E+00
Xe-133m	2.021E+01		2.685E+01	7.636E+01	2.477E+01
Xe-133	6.664E+02		8.874E+02	2.601E+03	8.570E+02
Xe-135m	3.240E+01		3.282E+01	1.429E-01	2.677E-06
Xe-135	1.591E+02		2.082E+02	4.635E+02	1.315E+02
Xe-138	1.288E+02		1.301E+02	3.717E-01	3.009E-06
I-130	8.447E-01		1.171E-01	1.329E+00	5.652E-01
I-131	3.774E+01		5.394E+00	7.513E+01	3.459E+01
I-132	2.789E+01		3.450E+00	1.484E+01	3.950E+00
I-133	4.855E+01		6.862E+00	8.291E+01	3.644E+01
I-134	2.884E+01		2.760E+00	2.980E+00	2.091E-01
I-135	4.188E+01		5.679E+00	5.221E+01	2.045E+01
Cs-134	1.290E+00		1.822E-01	2.403E+00	1.110E+00
Cs-136	5.634E-01		8.451E-02	7.786E-01	3.465E-01
Cs-137	7.739E-01		1.099E-01	1.411E+00	6.506E-01
Cs-138	6.080E+00		7.291E-01	3.349E+00	1.127E+00
Rb-86	1.329E-02		1.828E-03	2.730E-02	1.272E-02

Note: The releases for the 6-8 hour period are identified because this is the limiting time period for the 2-hour site boundary dose.

Rod Ejection

Time Period	LPZ Dose (rem TEDE)
0-2 hr	1.76E+00
2-8 hr	2.82E+00
8-24 hr	7.84E-01
24-96 hr	6.32E-02
96-720 hr	2.06E-02

	Activity Releases (Ci)				
	(0-2 hr)	(2-8 hr)	(8-24 hr)	(24-96 hr)	(96-720 hr)
Kr-85m	1.123E+02	6.480E+01	3.868E+01	1.767E+00	2.511E-05
Kr-85	5.012E+00	5.599E+00	1.492E+01	3.353E+01	2.877E+02
Kr-87	1.823E+02	2.596E+01	1.025E+00	8.366E-05	0.000E+00
Kr-88	2.912E+02	1.184E+02	3.491E+01	3.589E-01	8.407E-09
Xe-131m	4.938E+00	5.457E+00	1.416E+01	2.864E+01	1.162E+02
Xe-133m	2.666E+01	2.809E+01	6.485E+01	8.450E+01	5.311E+01
Xe-133	8.789E+02	9.581E+02	2.404E+03	4.267E+03	8.446E+03
Xe-135m	7.341E+01	5.304E-02	4.333E-09	0.000E+00	0.000E+00
Xe-135	2.148E+02	1.720E+02	2.088E+02	4.347E+01	1.793E-01
Xe-138	2.987E+02	1.378E-01	3.194E-09	0.000E+00	0.000E+00
I-130	4.897E+00	7.276E+00	4.321E+00	2.030E-01	2.946E-04
I-131	1.358E+02	2.452E+02	2.313E+02	3.101E+01	1.675E+01
I-132	1.528E+02	9.936E+01	9.852E+00	8.236E-03	0.000E+00
I-133	2.722E+02	4.396E+02	3.176E+02	2.280E+01	2.410E-01
I-134	1.663E+02	2.851E+01	1.367E-01	4.478E-08	0.000E+00
I-135	2.387E+02	2.974E+02	1.186E+02	2.393E+00	7.322E-05
Cs-134	3.082E+01	6.216E+01	6.030E+01	7.760E+00	5.164E+00
Cs-136	8.787E+00	1.751E+01	1.666E+01	2.049E+00	6.584E-01
Cs-137	1.793E+01	3.616E+01	3.509E+01	4.520E+00	3.051E+00
Cs-138	1.086E+02	7.046E+00	1.682E-03	0.000E+00	0.000E+00
Rb-86	3.623E-01	7.272E-01	6.956E-01	8.674E-02	3.417E-02

Small Line Break Outside Containment

LPZ Dose = 1.02 rem TEDE

	Activity Releases (Ci)
	(0-0.5 hr)
Kr-85m	1.241E+01
Kr-85	4.398E+01
Kr-87	7.047E+00
Kr-88	2.212E+01
Xe-131m	1.993E+01
Xe-133m	2.500E+01
Xe-133	1.843E+03
Xe-135m	2.588E+00
Xe-135	5.202E+01
Xe-138	3.645E+00
I-130	1.888E+00
I-131	9.256E+01
I-132	3.494E+02
I-133	2.007E+02
I-134	1.579E+02
I-135	1.680E+02
Cs-134	4.157E+00
Cs-136	6.163E+00
Cs-137	2.996E+00
Cs-138	2.214E+00

Steam Generator Tube Rupture with Accident-Initiated Iodine Spike

Time Period	LPZ Dose (rem TEDE)
0-2 hr	5.13E-01
2-8 hr	1.14E-01
8-24 hr	1.69E-01

	Activity Releases (Ci)		
	(0-2 hr)	(2-8 hr)	(8-24 hr)
Kr-85m	5.530E+01	1.929E+01	7.529E-03
Kr-85	2.204E+02	1.085E+02	1.339E-01
Kr-87	2.393E+01	3.612E+00	9.119E-05
Kr-88	9.222E+01	2.651E+01	5.429E-03
Xe-131m	9.961E+01	4.876E+01	5.909E-02
Xe-133m	1.238E+02	5.914E+01	6.609E-02
Xe-133	9.192E+03	4.468E+03	5.291E+00
Xe-135m	3.443E+00	5.862E-03	0.000E+00
Xe-135	2.455E+02	1.019E+02	7.101E-02
Xe-138	4.560E+00	5.068E-03	0.000E+00
I-130	8.870E-01	1.619E-01	8.238E-01
I-131	4.363E+01	1.142E+01	6.761E+01
I-132	1.472E+02	4.857E+00	1.291E+01
I-133	9.334E+01	1.996E+01	1.084E+02
I-134	5.587E+01	6.043E-02	5.942E-02
I-135	7.614E+01	9.880E+00	4.378E+01
Cs-134	1.626E+00	6.053E-02	2.163E-01
Cs-136	2.417E+00	8.860E-02	3.144E-01
Cs-137	1.173E+00	4.366E-02	1.560E-01
Cs-138	5.639E-01	2.914E-06	5.730E-07

Steam Generator Tube Rupture with Pre-Existing Iodine Spike

Time Period	LPZ Dose (rem TEDE)
0-2 hr	1.10E+00
2-8 hr	6.17E-02
8-24 hr	7.24E-02

	Activity Releases (Ci)		
	(0-2 hr)	(2-8 hr)	(8-24 hr)
Kr-85m	5.530E+01	1.929E+01	7.529E-03
Kr-85	2.204E+02	1.085E+02	1.339E-01
Kr-87	2.393E+01	3.612E+00	9.119E-05
Kr-88	9.222E+01	2.651E+01	5.429E-03
Xe-131m	9.961E+01	4.876E+01	5.909E-02
Xe-133m	1.238E+02	5.914E+01	6.609E-02
Xe-133	9.192E+03	4.468E+03	5.291E+00
Xe-135m	3.443E+00	5.862E-03	0.000E+00
Xe-135	2.455E+02	1.019E+02	7.101E-02
Xe-138	4.560E+00	5.068E-03	0.000E+00
I-130	1.794E+00	5.388E-02	2.680E-01
I-131	1.206E+02	5.267E+00	3.063E+01
I-132	1.416E+02	7.428E-01	1.923E+00
I-133	2.160E+02	7.634E+00	4.062E+01
I-134	2.741E+01	4.401E-03	4.227E-03
I-135	1.272E+02	2.696E+00	1.165E+01
Cs-134	1.626E+00	6.053E-02	2.163E-01
Cs-136	2.417E+00	8.860E-02	3.144E-01
Cs-137	1.173E+00	4.366E-02	1.560E-01
Cs-138	5.639E-01	2.914E-06	5.730E-07

Fuel Handling Accident

LPZ Dose = 3.44 rem TEDE

	Activity Releases (Ci)
	(0-2 hr)
Kr-85m	3.418E2
Kr-85	1.109E3
Kr-87	6.00E-2
Kr-88	1.070E2
Xe-131m	5.544E2
Xe-133m	2.801E3
Xe-133	9.657E4
Xe-135m	1.262E3
Xe-135	2.490E4
I-130	2.510E0
I-131	3.763E2
I-132	3.014E2
I-133	2.401E2
I-135	3.940E1