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WSRC-RP-94-250

Key Words Dose
 AXAIR89Q
 SAR
 JCO

Retention: Lifetime

**UPDATE OF HB-LINE CONSEQUENCES BASED ON NEW
METEOROLOGICAL AND POPULATION DATABASES IN
AXAIR89Q (U)**

M.E. DelGenio

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D. Christ
(Name and Title)

Date: 3 MAR 94

Issued: March 1994

SRTC

SAVANNAH RIVER TECHNOLOGY CENTER
Westinghouse Savannah River Company
Savannah River Site
Aiken, SC 29808

PREPARED FOR THE U.S. DEPARTMENT OF ENERGY UNDER CONTACT NO. DE-AC09-89SR18035

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Document: WSRC-RP-94-250

Title: Update Of HB-Line Consequences Based on New Meteorological and
Population Databases in AXAIR89Q (U)

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Introduction

The Safety Analysis Report (SAR) Rev. 1 and Justification for Continued Operation (JCO) for HB-Line were written for the present mission of HB-Line to produce Pu-238 oxide in support of the NASA Cassini mission^{1,2}. Both the SAR and the JCO were approved by DOE in 1992 prior to restart of the HB-Line Facility. An Environmental Assessment (EA) is currently being prepared for HB-Line. The EA reports consequence and risk information from the SAR and JCO. The HB-Line EA summarizes the doses for the following accidents; earthquake (ground level release) and propagated fire as in the JCO, and medium energetic and low energetic event as in the SAR. Four receptors are reported in the EA; maximum offsite individual, onsite worker, offsite population, and onsite population.

Additional analysis and/or an update of the present analysis is needed for the EA. The purpose of this report is to provide this necessary analysis. All of the changes result in a decrease to the doses as reported in the HB-Line SAR and JCO. Therefore, the SAR and JCO will not be updated at this time to incorporate these updated doses.

Discussion

The following is a summary of the updates that are reported in this report:

- **Population Doses** - Since the JCO and SAR do not include population doses for two accidents; a propagated fire and a ground level release for an earthquake, this analysis will provide these doses. In addition, the doses for medium energetic event and low energetic event will be updated to the new onsite and offsite population databases that have recently been incorporated into the AXAIR89Q code. The offsite population database used in the HB-Line SAR is based on the 1980 U. S. Census while the new database is based on the 1990 U. S. Census. For this analysis, the 1990 population distribution is projected to 1994 based on assumed growth rates for the area. The onsite population database that was used in the HB-Line SAR and JCO is based on a typical 1989 site population distribution while the new database is based on a typical 1992 site population distribution.
- **Onsite Worker Dose (Co-located worker)** - The SAR does not report doses to the onsite worker. The JCO analyzes the onsite worker at a distance of 100 meters from the release point using 99.5% meteorology for propagated fire and earthquake. This analysis will analyze the onsite worker at a distance of 640 meters from the release point using 50% meteorology in accordance with more recent DOE guidance. The doses will be calculated for all the accidents reported in the JCO.
- **Maximum Offsite Individual Dose** - Since the time the SAR and JCO were written, a new meteorological database has been incorporated into the AXAIR89Q dose code. The HB-Line SAR and JCO doses are calculated using the "old" meteorological database based on data collected during the five period of 1982 - 1986. The new meteorological database is based on data collected during the five year period of 1987 - 1991. This analysis will update the doses using the new meteorological database for all the accidents reported in the JCO. The new meteorological database results in a decrease in the dose from a release from H-Area.

Analysis Method

This analysis is not intended to reevaluate the source terms in the HB-Line SAR or JCO. A new SAR is currently being prepared in accordance with DOE Order 5480.23. New source terms will be addressed in the new SAR. This analysis only updates the consequences to the new meteorological and population databases using the same source terms as those in the HB-Line SAR and JCO.

The following assumptions are used in the analysis:

- The curies released to the environment are the same as those in the HB-Line SAR and JCO.
- The following worst-case curie fraction was used in the analysis. This is the same curie fraction used in the HB-Line SAR and JCO.

	<u>Curie Fraction</u>
Pu-238	0.642
Pu-241	0.358

- The above curie fraction was used as the input to the AXAIR89Q consequence computer code, Version 1.2, for both a ground level and stack release from H-Area. Appendix A contains the AXAIR89Q input and output. The doses obtained from AXAIR89Q represent clearance class W, plutonium nitrate. The doses calculated for the Plutonium Oxide Facility use clearance class Y, plutonium oxide. To convert the AXAIR89Q doses from clearance class W to Y the doses from AXAIR89Q were multiplied by the ratio of dose factor for class Y to dose factor for class W. The dose factors are from DOE/EH/--0071, *Internal Dose Conversion Factors for Calculation of Dose to the Public*³. The ratios are as follows:

Pu-238	$DF_Y/DF_W = 300/460 = 0.652$
Pu-239	$DF_Y/DF_W = 5.7/10 = 0.57$

Tables 1 & 2 summarize the doses per 1 curie release. Table 1 is used for the Scrap Recovery Facility doses, based on lung clearance class W (plutonium nitrate) and Table 2 is used for the Plutonium Oxide Facility doses, based on lung clearance class Y (plutonium oxide).

- The earthquake assumes a ground level release and all other accidents assume a release from the 61 meter stack.

Results and Conclusion

Table 3 summarizes the updated doses for earthquake, propagated fire, medium energetic event and low energetic event for inclusion in the HB-Line Environmental Assessment.

Tables 4 & 5 summarize the updated doses for all the accidents reported in the HB-Line JCO. Table 4 contains doses for the Scrap Recovery Facility and Table 5 contains doses for the Plutonium Oxide Facility.

Tables 6 & 7 summarize the updated maximum offsite individual risks for all the accidents reported in the HB-Line JCO. Table 6 contains risks for the Scrap Recovery Facility and Table 7 contains risks for the Plutonium Oxide Facility.

In summary, this analysis updates the doses in the HB-Line JCO incorporating the following changes:

- Use of the new meteorological database in the AXAIR89Q consequence code based on the five year period of 1987 - 1991.
- Use of the new offsite population database in the AXAIR89Q consequence code based on the 1990 U. S. Census.
- Use of the new onsite population database in the AXAIR89Q consequence code based on a typical 1992 site population distribution.
- Define the onsite worker (co-located worker) to be located 640 meters from the release point. Use 50% meteorology for this receptor.

The net result of the above changes is a decrease in the total dose for all accidents analyzed in the SAR and JCO.

References

1. Safety Analysis - 200 Area, Separations Area Operations, Building 221-H B-Line, Scrap Recovery Facility and Plutonium Oxide Facility, Rev 1, DPSTSA-200-10-2, July 1991
2. Justification for Continued Operation, HB-Line, WSRC-RP-92-981, Westinghouse Savannah River Company, October 1992
3. Internal Dose Conversion Factors for Calculation of Dose to the Public, DOE/EH-0071, U.S. Department of Energy, July 1988

Table 1. Dose per 1 Curie Total Release from HB-Line
(Lung Clearance Class W - Plutonium Nitrate)

	Curie Fraction	Effective Dose Equivalent*			
		MOI	640 m	Offsite Pop	Onsite Pop
		99.5% Met	50% Met		
		(mrem/Ci)		(person rem/Ci)	
Ground Level Release					
Pu-238	6.42E-01	6.15E+02	4.96E+03	5.13E+03	3.08E+03
Pu-241	3.58E-01	7.45E+00	6.01E+01	6.22E+01	3.73E+01
Total	1.00E+00	6.22E+02	5.02E+03	5.19E+03	3.11E+03
Stack Release					
Pu-238	6.42E-01	3.35E+02	6.20E+02	4.06E+03	1.40E+03
Pu-241	3.58E-01	4.06E+00	7.52E+00	4.92E+01	1.70E+01
Total	1.00E+00	3.39E+02	6.28E+02	4.11E+03	1.42E+03
MOI - Maximum Offsite Individual					

Table 2. Dose per 1 Curie Total Release from HB-Line
(Lung Clearance Class Y - Plutonium Oxide)

	Curie Fraction	Effective Dose Equivalent*			
		MOI	640 m	Offsite Pop	Onsite Pop
		99.5% Met	50% Met		
		(mrem/Ci)		(person rem/Ci)	
Ground Level Release					
Pu-238	6.42E-01	4.01E+02	3.23E+03	3.35E+03	2.01E+03
Pu-241	3.58E-01	4.25E+00	3.43E+01	3.55E+01	2.13E+01
Total	1.00E+00	4.05E+02	3.27E+03	3.38E+03	2.03E+03
Stack Release					
Pu-238	6.42E-01	2.18E+02	4.04E+02	2.65E+03	9.13E+02
Pu-241	3.58E-01	2.31E+00	4.29E+00	2.80E+01	9.69E+00
Total	1.00E+00	2.21E+02	4.09E+02	2.68E+03	9.23E+02
MOI - Maximum Offsite Individual					

*AXAIR89Q Version 1.2 - 1987 - 1991 meteorological database
Offsite population based on 1990 U.S. Census
Onsite population based on 1992 population database

Table 3. Summary of Consequences for the HB-Line Environmental Assessment**Scrap Recovery Facility**

	Curie Release	Effective Dose Equivalent			
		MOI	640 m	Offsite Pop	Onsite Pop
		99.5% Met (mrem)	50% Met (mrem)		
Earthquake	1.49E-02	9.27E+00	7.48E+01	7.74E+01	4.63E+01
Propagated Fire	2.95E-01	1.00E+02	1.85E+02	1.21E+03	4.18E+02
Medium Energetic Event	3.47E-02	1.18E+01	2.18E+01	1.43E+02	4.92E+01
Low Energetic Event	1.73E-02	5.87E+00	1.09E+01	7.11E+01	2.45E+01

Plutonium Oxide Facility

	Curie Release	Effective Dose Equivalent			
		MOI	640 m	Offsite Pop	Onsite Pop
		99.5% Met (mrem)	50% Met (mrem)		
Earthquake	6.13E-03	2.48E+00	2.00E+01	2.07E+01	1.24E+01
Propagated Fire	1.21E-01	2.67E+01	4.94E+01	3.24E+02	1.12E+02
Medium Energetic Event	1.92E-02	4.24E+00	7.85E+00	5.14E+01	1.77E+01
Low Energetic Event	9.53E-04	2.10E-01	3.89E-01	2.55E+00	8.79E-01

MOI - Maximum Offsite Individual

Table 4. Scrap Recovery Facility - Consequences
Updated to New Meteorological and Population Databases
AXAIR89Q, Version 1.2

	Curie Release	Effective Dose Equivalent			
		MOI	640 m	Offsite Pop	Onsite Pop
		99.5% Met	50% Met		
		(mrem)	(person rem)		
LE (both HEPA stages fail)	1.73E-02	5.87E+00	1.09E+01	7.11E+01	2.45E+01
LE (stage 1 HEPA fails)	1.73E-04	5.87E-02	1.09E-01	7.11E-01	2.45E-01
LE (stage 2 HEPA fails)	1.73E-04	5.87E-02	1.09E-01	7.11E-01	2.45E-01
ME (both HEPA stages fail)	3.47E-02	1.18E+01	2.18E+01	1.43E+02	4.92E+01
ME (room B')	1.85E-04	6.27E-02	1.16E-01	7.60E-01	2.62E-01
RAR (room B')	7.35E-08	2.49E-05	4.61E-05	3.02E-04	1.04E-04
LE (cabinet B)	1.73E-06	5.87E-04	1.09E-03	7.11E-03	2.45E-03
ME (stage 1 HEPA fails)	3.47E-04	1.18E-01	2.18E-01	1.43E+00	4.92E-01
ME (stage 2 HEPA fails)	3.47E-04	1.18E-01	2.18E-01	1.43E+00	4.92E-01
RAR (cabinet B)	6.40E-12	2.17E-09	4.02E-09	2.63E-08	9.07E-09
Earthquake (grd release)	1.49E-02	9.27E+00	7.48E+01	7.74E+01	4.63E+01
ME (cabinet B)	3.47E-06	1.18E-03	2.18E-03	1.43E-02	4.92E-03
RAR (both HEPA stages fail)	6.40E-08	2.17E-05	4.02E-05	2.63E-04	9.07E-05
RAR (stage 1 HEPA fails)	6.40E-10	2.17E-07	4.02E-07	2.63E-06	9.07E-07
RAR (stage 2 HEPA fails)	6.40E-10	2.17E-07	4.02E-07	2.63E-06	9.07E-07

LE - Low Energetic Event

ME - Medium Energetic Event

RAR - Residual Release Activity

Table 5. Plutonium Oxide Facility - Consequences
Updated to New Meteorological and Population Databases
AXAIR89Q, Version 1.2

	Curie Release	Effective Dose Equivalent			
		MOI		640 m	
		99.5% Met	50% Met	Offsite Pop	Onsite Pop
		(mrem)		(person rem)	
LE (both HEPA stages fail)	9.53E-04	2.10E-01	3.89E-01	2.55E+00	8.79E-01
ME (both HEPA stages fail)	1.92E-02	4.24E+00	7.85E+00	5.14E+01	1.77E+01
AL (both HEPA stages fail)	7.38E-04	1.63E-01	3.02E-01	1.97E+00	6.81E-01
RAR (room B')	4.95E-08	1.09E-05	2.02E-05	1.32E-04	4.57E-05
ME (room B')	9.90E-05	2.19E-02	4.05E-02	2.65E-01	9.14E-02
LE (stage 1 HEPA fails)	9.53E-06	2.10E-03	3.89E-03	2.55E-02	8.79E-03
LE (stage 2 HEPA fails)	9.53E-06	2.10E-03	3.89E-03	2.55E-02	8.79E-03
ME (stage 1 HEPA fails)	1.92E-04	4.24E-02	7.85E-02	5.14E-01	1.77E-01
ME (stage 2 HEPA fails)	1.92E-04	4.24E-02	7.85E-02	5.14E-01	1.77E-01
Earthquake (grd release)	6.13E-03	2.48E+00	2.00E+01	2.07E+01	1.24E+01
LE (cabinet B)	9.53E-08	2.10E-05	3.89E-05	2.55E-04	8.79E-05
ME (cabinet B)	1.92E-06	4.24E-04	7.85E-04	5.14E-03	1.77E-03
RAR (both HEPA stages fail)	4.58E-08	1.01E-05	1.87E-05	1.23E-04	4.23E-05
RAR (cabinet B)	4.58E-12	1.01E-09	1.87E-09	1.23E-08	4.23E-09
RAR (stage 1 HEPA fails)	4.58E-10	1.01E-07	1.87E-07	1.23E-06	4.23E-07
RAR (stage 2 HEPA fails)	4.58E-10	1.01E-07	1.87E-07	1.23E-06	4.23E-07

LE - Low Energetic Event

ME - Medium Energetic Event

RAR - Residual Release Activity

Table 6 Scrap Recovery Facility - Maximum Offsite Individual Risk
 Updated to New Meteorological and Population Databases
 AXAIR89Q, Version 1.2

	MOI Dose (mrem)	Frequency* (per year)	Risk (mrem/yr)
LE (both HEPA stages fail)	5.87E+00	2.10E-01	1.23E+00
LE (stage 1 HEPA fails)	5.87E-02	2.20E+00	1.29E-01
LE (stage 2 HEPA fails)	5.87E-02	2.20E+00	1.29E-01
ME (both HEPA stages fail)	1.18E+01	3.70E-03	4.35E-02
ME (room B')	6.27E-02	4.30E-01	2.70E-02
RAR (room B')	2.49E-05	1.30E+02	3.24E-03
LE (cabinet B)	5.87E-04	2.40E+01	1.41E-02
ME (stage 1 HEPA fails)	1.18E-01	4.00E-02	4.71E-03
ME (stage 2 HEPA fails)	1.18E-01	4.00E-02	4.71E-03
RAR (cabinet B)	2.17E-09	1.30E+02	2.82E-07
Earthquake (grd release)	9.27E+00	1.70E-04	1.58E-03
ME (cabinet B)	1.18E-03	4.30E-01	5.06E-04
RAR (both HEPA stages fail)	2.17E-05	1.10E+00	2.39E-05
RAR (stage 1 HEPA fails)	2.17E-07	1.20E+01	2.60E-06
RAR (stage 2 HEPA fails)	2.17E-07	1.20E+01	2.60E-06

* Frequency from SAR

LE - Low Energetic Event

ME - Medium Energetic Event

RAR - Residual Release Activity

Table 7 Plutonium Oxide Facility - Maximum Offsite Individual Risk
Updated to New Meteorological and Population Databases
AXAIR89Q, Version 1.2

	MOI Dose (mrem)	Frequency* (per year)	Risk (mrem/yr)
LE (both HEPA stages fail)	2.10E-01	6.00E-02	1.26E-02
ME (both HEPA stages fail)	4.24E+00	7.00E-04	2.97E-03
AL (both HEPA stages fail)	1.63E-01	1.40E-02	2.28E-03
RAR (room B')	1.09E-05	1.70E+02	1.86E-03
ME (room B')	2.19E-02	8.00E-02	1.75E-03
LE (stage 1 HEPA fails)	2.10E-03	6.00E-01	1.26E-03
LE (stage 2 HEPA fails)	2.10E-03	6.00E-01	1.26E-03
ME (stage 1 HEPA fails)	4.24E-02	7.00E-03	2.97E-04
ME (stage 2 HEPA fails)	4.24E-02	7.00E-03	2.97E-04
Earthquake (grd release)	2.48E+00	1.70E-04	4.22E-04
LE (cabinet B)	2.10E-05	6.00E+00	1.26E-04
ME (cabinet B)	4.24E-04	7.00E-02	2.97E-05
RAR (both HEPA stages fail)	1.01E-05	1.00E+00	1.01E-05
RAR (cabinet B)	1.01E-09	1.40E+02	1.42E-07
RAR (stage 1 HEPA fails)	1.01E-07	1.00E+01	1.01E-06
RAR (stage 2 HEPA fails)	1.01E-07	1.00E+01	1.01E-06

* Frequency from SAR

LE - Low Energetic Event

ME - Medium Energetic Event

RAR - Residual Release Activity

Appendix A
AXAIR89Q
Input & Output

2/23/77
11:30

```
*****
*                               *
*           AXAIR VERSION 1.2   *
*                               *
*   SRTC DOSE ASSESSMENT OF A POSTULATED *
*   ACCIDENTAL RELEASE TO THE ATMOSPHERE *
*   ----- *
*   MODULES IN TENVT.CONFIG.FORT WITH *
*   THE FOLLOWING VERSION NUMBERS: *
*   AXAIN93   VERSION 2.01 *
*   AXATERLQ  VERSION 2.01 *
*   AXAPO93   VERSION 2.08 *
*   AXMET89Q  VERSION 2.11 *
*   PRIMUSLQ  VERSION 2.01 *
*   AXDOS89Q  VERSION 2.22 *
*                               *
*   H-AREA STACK RELEASE *
*   HB-LINE UPDATE JCO DOSES *
*                               *
*****
```

THE LOCATION OF THE RELEASE IS H AREA (AT ASSUMED SRS-GRID COORDINATES: EAST 64257. FT; NORTH 70415. FT).
THE RELEASE IS FROM A STACK HEIGHT OF 61. METERS ABOVE GRADE (GRADE ELEVATION SAME AS ADJACENT TERRAIN.)
THE CALENDAR YEAR FOR THE POSTULATED RELEASE IS 1994

THE ANALYSIS IS FOR ALL 16 COMPASS SECTORS.

DAUGHTER INGROWTH WILL BE LIMITED TO PARENTS WITH A HALF-LIFE LESS THAN 24 HOURS.

50% INDIVIDUAL AND 99.5% INDIVIDUAL & POPULATION DOSE CALCULATIONS WILL BE PERFORMED

ICRP30 DOSE VALUES WERE USED IN THE CALCULATIONS. USE ONLY ADULT DOSES WITH ICRP30.

1987-1991 METEOROLOGY USED IN THE CALCULATIONS.

ON-SITE MAXIMUM INDIVIDUAL DOSES ARE GIVEN AT 1 DISTANCES FROM THE SOURCE.

DISTANCES FROM THE SOURCE, IN MILES, ARE:
0.40

GAMMA-SHINE METHOD: NONUNIFORM PLUME UPPER-BOUND APPROXIMATION.

NUMBER OF RELEASED RADIONUCLIDES = 2

TABLE OF RELEASES OF RADIOACTIVITY

NUCLIDE	1ST PERIOD		2ND PERIOD		3RD PERIOD		4TH PERIOD		5TH PERIOD	
	CURIES	HOURS	CURIES	HOURS	CURIES	HOURS	CURIES	HOURS	CURIES	HOURS
PU-238	6.42E-01	2.								
PU-241	3.58E-01	2.								

STACK RELEASE

2/25/94
11:39

SUMMARY OF WORST-SECTOR, WORST-CASE (99.5%) DOSE VALUES (REM OR PERSON-REM)

	EFF.D.E.	ORG. DOSE	ORGAN	AGE/DIST	SECTOR
OFFSITE MAXIMUM INDIVIDUAL	3.39E-01	5.97E+00	B. SURF.	ADULT	NW
OFFSITE POPULATION (50 MILES)	4.11E+03	7.24E+04	B. SURF.		WNW
ONSITE POPULATION	1.42E+03	2.50E+04	B. SURF.		WNW
AREA (1 MILE RADIUS) MAX IND. (USING GIVEN DIST. < 1 MILE)	2.46E+00	4.34E+01	B. SURF.	0.40 MILES	WSW
AREA (1 MILE) POPULATION DOSE	9.66E+02	1.70E+04	B. SURF.		WNW

SUMMARY OF 50% PROBABILITY DOSE VALUES (REM OR PERSON-REM)

	EFF.D.E.	ORG. DOSE	ORGAN	AGE/DIST
OFFSITE MAXIMUM INDIVIDUAL	6.59E-02	1.16E+00	B. SURF.	ADULT
AREA (1 MILE RADIUS) MAX IND. (SAME DISTANCE AS WORST DOSE)	6.28E-01	1.11E+01	B. SURF.	0.40 MILES

2/25/94
10:56

```
*****
*                               *
*           AXAIR VERSION 1.2   *
*                               *
*   SRTC DOSE ASSESSMENT OF A POSTULATED *
*   ACCIDENTAL RELEASE TO THE ATMOSPHERE *
*   ----- *
*   MODULES IN TENVT.CONFIG.FORT WITH *
*   THE FOLLOWING VERSION NUMBERS: *
*   AXAIN93   VERSION 2.01 *
*   AXATERLQ  VERSION 2.01 *
*   AXAPO93   VERSION 2.08 *
*   AXMET89Q  VERSION 2.11 *
*   PRIMUSLQ  VERSION 2.01 *
*   AXDOS89Q  VERSION 2.22 *
*                               *
*   H-AREA GROUND RELEASE *
*   HB-LINE UPDATE JCO DOSES *
*                               *
*****
```

THE LOCATION OF THE RELEASE IS H AREA (AT ASSUMED SRS-GRID COORDINATES: EAST 64257. FT; NORTH 70415. FT).
THE RELEASE IS FROM GROUND LEVEL OR A BUILDING VENT (BLDG MINIMUM VERTICAL X-SECTION = 0. SQ. METERS).
THE CALENDAR YEAR FOR THE POSTULATED RELEASE IS 1994
THE ANALYSIS IS FOR ALL 16 COMPASS SECTORS.
DAUGHTER INGROWTH WILL BE LIMITED TO PARENTS WITH A HALF-LIFE LESS THAN 24 HOURS.
50% INDIVIDUAL AND 99.5% INDIVIDUAL & POPULATION DOSE CALCULATIONS WILL BE PERFORMED
ICRP30 DOSE VALUES WERE USED IN THE CALCULATIONS. USE ONLY ADULT DOSES WITH ICRP30.
1987-1991 METEOROLOGY USED IN THE CALCULATIONS.
ONSITE MAXIMUM INDIVIDUAL DOSES ARE GIVEN AT 1 DISTANCES FROM THE SOURCE.
DISTANCES FROM THE SOURCE, IN MILES, ARE:
0.40
GAMMA-SHINE METHOD: NONUNIFORM PLUME UPPER-BOUND APPROXIMATION.
NUMBER OF RELEASED RADIONUCLIDES = 2

TABLE OF RELEASES OF RADIOACTIVITY

NUCLIDE	1ST PERIOD		2ND PERIOD		3RD PERIOD		4TH PERIOD		5TH PERIOD	
	CURIES	HOURS	CURIES	HOURS	CURIES	HOURS	CURIES	HOURS	CURIES	HOURS
PU-238	6.42E-01	2.								
PU-241	3.58E-01	2.								

WSRC-RP-94-250

GROUND RELEASE

2/25/94
11:22

SUMMARY OF WORST-SECTOR, WORST-CASE (99.5%) DOSE VALUES (REM OR PERSON-REM)

	EFF.D.E.	ORG. DOSE	ORGAN	AGE/DIST	SECTOR
OFFSITE MAXIMUM INDIVIDUAL	6.22E-01	1.10E+01	B. SURF.	ADULT	N
OFFSITE POPULATION (50 MILES)	5.19E+03	9.15E+04	B. SURF.		WNW
ONSITE POPULATION	3.11E+03	5.49E+04	B. SURF.		WNW
AREA (1 MILE RADIUS) MAX IND. (USING GIVEN DIST. < 1 MILE)	1.53E+01	2.70E+02	B. SURF.	0.40 MILES	NE
AREA (1 MILE) POPULATION DOSE	2.47E+03	4.36E+04	B. SURF.		WNW

SUMMARY OF 50% PROBABILITY DOSE VALUES (REM OR PERSON-REM)

	EFF.D.E.	ORG. DOSE	ORGAN	AGE/DIST
OFFSITE MAXIMUM INDIVIDUAL	8.46E-02	1.49E+00	B. SURF.	ADULT
AREA (1 MILE RADIUS) MAX IND. (SAME DISTANCE AS WORST DOSE)	5.02E+00	8.85E+01	B. SURF.	0.40 MILES

DATE

FILMED

6 / 27 / 94

END