

SUSQUEHANNA STEAM ELECTRIC STATION

Docket Number 50-388 Date: 11-8-94

Completed by R. S. Ball Telephone: (717) 542-3453

Challenges to Main Steam Safety Relief Valves

None.

Changes to the Offsite Dose Calculation Manual

Yes. See Attachment A for changes.

Major Changes to Radioactive Waste Treatment Systems

None.

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SUMMARY OF ODCM CHANGES

Changes other than those of a minor, editorial nature are summarized below.

1. Liquid dose calculation factors for P-32 fish ingestion and composite dose pathways have been revised for adult, teen and child age groups. These factors reflect revision to the basis calculations EC-ENVR-0501 and EC-ENVR-0502, in which credit is taken for a reduction of the P-32 bioaccumulation factor from 100,000 to 3,000. This change has been advised by the NRC in NUREG/CR-1336. Site-Specific Information used by LADTAP II Code, Appendix D, has been revised to show discharge per unit specific to the release period in addition to 11 cfs now stated.
2. Three environmental monitoring TLD stations have been eliminated. Location 3D1 was eliminated due to the removal of the air sampling station at this location, with eventual dismantling of this station. Location 3F1 was removed due to its relatively large distance from SSES, and the interference from overgrown vegetation at the monitoring location. Location 3G5 was eliminated due to concern for safety of sampling personnel when changing out the TLD near a high voltage source. The TLD at location 1D2 has been moved due to elimination of the air sampling station at this site. A replacement site is located approximately 50 yards from the original location. Although the difference in distance between the original and replacement sites from SSES is slight, the new site will be redesignated 1D5. The TLD at location 4E1 has been moved closer to a location where the NRC currently co-monitors direct radiation. The new location is approximately 100 yards from the original, and will be redesignated 4E2. The TLD at location 14E1 has been moved significantly closer to SSES. This new location was sought because of concerns for traffic hazards posed to sampling personnel who change out this badge. The new location is designated 14B3 and is located 1.3 miles WNW.
3. Three particulate/radioiodine air sampling stations have been moved and re-designated. Station 15S4 has been moved to a point 0.4 miles southeast of SSES, at the end of Kline's Road. This station is now 7S7. Station 1D2, in Mocanaqua, has been moved to a point 0.6 miles south-southwest of SSES (east of Confer's Lane, south of the Tower's Club), and is re-designated 10S3. Location 3D1 has been relocated to 0.4 miles west of the former laydown area (west of Confer's Lane); this station is now 13S6.

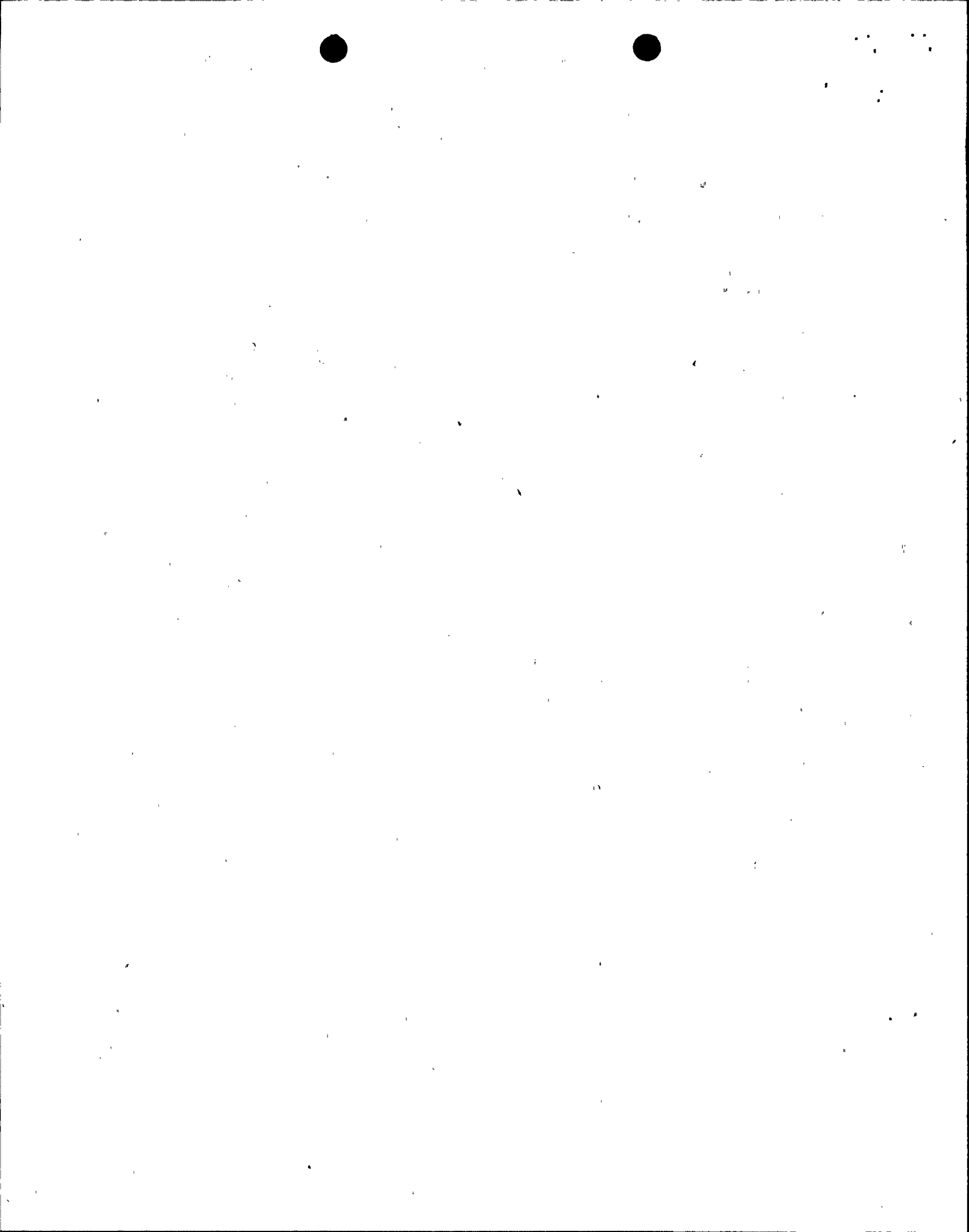


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5.0 . INDIVIDUAL DOSE DUE TO WATERBORNE EFFLUENT

SPECIFICATION 3.11.1.2 - THE DOSE OR DOSE COMMITMENT TO A MEMBER OF THE PUBLIC FROM RADIOACTIVE MATERIALS IN LIQUID EFFLUENTS RELEASED FROM EACH REACTOR UNIT TO UNRESTRICTED AREAS (SEE FIGURE 5.1.3-1) SHALL BE LIMITED:

- a. DURING ANY CALENDAR QUARTER TO LESS THAN OR EQUAL TO 1.5 MREM TO THE TOTAL BODY AND TO LESS THAN OR EQUAL TO 5 MREM TO ANY ORGAN, AND
- b. DURING ANY CALENDAR YEAR TO LESS THAN OR EQUAL TO 3 MREM TO THE TOTAL BODY AND TO LESS THAN OR EQUAL TO 10 MREM TO ANY ORGAN.

The calculations of dose received by the hypothetical maximally exposed individual are based on ingestion of fish, drinking water and exposure on the shoreline. Drinking water is taken from the nearest public drinking water intake location (Danville Water Authority). Shoreline and fish ingestion are associated with the SSES river outfall (edge of initial mixing zone).

Methodology for calculating dose to the maximum hypothetical offsite individual has been developed (1)(2) for separate (fish, drinking water and shoreline exposure) and composite liquid effluent pathways. This methodology incorporates usage, dilution, and transit parameters specific to the SSES site.

(1) PP&L Calculation EC-ENVR-0501

(2) PP&L Calculation EC-ENVR-0502

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Table 5-1a: Dose Factors for Fish Pathway: Maximum Hypothetical Adult (Page 1 of 2)
 Dose Factor Units: mrem-ft³/Ci-sec
 Location: Outfall/FIXED DILUTION

	Usage (U _{ap}) (kg/yr:FISH) =			21				
	Dilution (1/M _p :FISH) =			15.9				
	Transit time (t _f) hrs =			25				
	Isotope	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
1	H-3	0.00e+00	1.37e-04	1.37e-04	1.37e-04	1.37e-04	1.37e-04	1.37e-04
2	C-14	1.90e+01	3.80e+00	3.80e+00	3.80e+00	3.80e+00	3.80e+00	3.80e+00
3	Na-24	7.78e-02	7.78e-02	7.78e-02	7.78e-02	7.78e-02	7.78e-02	7.78e-02
4	P-32	8.00e+02	4.97e+01	3.09e+01	0.00e+00	0.00e+00	0.00e+00	8.99e+01
5	Cr-51	0.00e+00	0.00e+00	7.53e-04	4.50e-04	1.66e-04	9.99e-04	1.89e-01
6	Mn-54	0.00e+00	2.65e+00	5.06e-01	0.00e+00	7.89e-01	0.00e+00	8.12e+00
7	Mn-56	0.00e+00	8.06e-05	1.43e-05	0.00e+00	1.02e-04	0.00e+00	2.57e-03
8	Fe-55	3.99e-01	2.76e-01	6.43e-02	0.00e+00	0.00e+00	1.54e-01	1.58e-01
9	Fe-59	6.20e-01	1.46e+00	5.59e-01	0.00e+00	0.00e+00	4.07e-01	4.86e+00
10	Co-58	0.00e+00	5.36e-02	1.20e-01	0.00e+00	0.00e+00	0.00e+00	1.09e+00
11	Co-60	0.00e+00	1.55e-01	3.43e-01	0.00e+00	0.00e+00	0.00e+00	2.92e+00
12	Ni-63	1.89e+01	1.31e+00	6.33e-01	0.00e+00	0.00e+00	0.00e+00	2.73e-01
13	Ni-65	7.91e-05	1.03e-05	4.69e-06	0.00e+00	0.00e+00	0.00e+00	2.61e-04
14	Cu-64	0.00e+00	1.55e-03	7.26e-04	0.00e+00	3.90e-03	0.00e+00	1.32e-01
15	Zn-65	1.40e+01	4.46e+01	2.02e+01	0.00e+00	2.98e+01	0.00e+00	2.81e+01
16	Zn-69	2.35e-10	4.49e-10	3.13e-11	0.00e+00	2.92e-10	0.00e+00	6.75e-11
17	Br-83	0.00e+00	0.00e+00	1.74e-05	0.00e+00	0.00e+00	0.00e+00	2.51e-05
18	Br-84	0.00e+00	0.00e+00	2.14e-16	0.00e+00	0.00e+00	0.00e+00	1.68e-21
19	Br-85	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
20	Rb-86	0.00e+00	5.90e+01	2.75e+01	0.00e+00	0.00e+00	0.00e+00	1.16e+01
21	Rb-88	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
22	Rb-89	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
23	Sr-89	1.32e+01	0.00e+00	3.80e-01	0.00e+00	0.00e+00	0.00e+00	2.12e+00
24	Sr-90	3.30e+02	0.00e+00	8.11e+01	0.00e+00	0.00e+00	0.00e+00	9.54e+00
25	Sr-91	3.99e-02	0.00e+00	1.61e-03	0.00e+00	0.00e+00	0.00e+00	1.90e-01
26	Sr-92	1.57e-04	0.00e+00	6.77e-06	0.00e+00	0.00e+00	0.00e+00	3.10e-03
27	Y-90	2.67e-04	0.00e+00	7.15e-06	0.00e+00	0.00e+00	0.00e+00	2.83e+00
28	Y-91m	2.84e-15	0.00e+00	1.10e-16	0.00e+00	0.00e+00	0.00e+00	8.34e-15
29	Y-91	5.06e-03	0.00e+00	1.35e-04	0.00e+00	0.00e+00	0.00e+00	2.78e+00
30	Y-92	2.30e-07	0.00e+00	6.71e-09	0.00e+00	0.00e+00	0.00e+00	4.02e-03
31	Y-93	1.75e-05	0.00e+00	4.83e-07	0.00e+00	0.00e+00	0.00e+00	5.55e-01
32	Zr-95	1.44e-04	4.62e-05	3.13e-05	0.00e+00	7.25e-05	0.00e+00	1.46e-01
33	Zr-97	2.89e-06	5.83e-07	2.67e-07	0.00e+00	8.80e-07	0.00e+00	1.81e-01
34	Nb-95	2.66e-01	1.48e-01	7.94e-02	0.00e+00	1.46e-01	0.00e+00	8.97e+02
35	Mo-99	0.00e+00	4.82e-02	9.16e-03	0.00e+00	1.09e-01	0.00e+00	1.12e-01

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Table 5-1b: Dose Factors for Fish Pathway: Maximum Hypothetical Teen (Page 1 of 2)
 Dose Factor Units: mrem-ft³/Ci-sec
 Location: Outfall/FIXED DILUTION

	Usage (Uap) (kg/yr:FISH) =			16				
	Dilution (1/Mp:FISH) =			15.9				
	Transit time (tf) hrs =			25				
	Isotope	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
1	H-3	0.00e+00	1.06e-04	1.06e-04	1.06e-04	1.06e-04	1.06e-04	1.06e-04
2	C-14	2.07e+01	4.13e+00	4.13e+00	4.13e+00	4.13e+00	4.13e+00	4.13e+00
3	Na-24	8.02e-02	8.02e-02	8.02e-02	8.02e-02	8.02e-02	8.02e-02	8.02e-02
4	P-32	8.71e+02	5.40e+01	3.38e+01	0.00e+00	0.00e+00	0.00e+00	7.32e+01
5	Cr-51	0.00e+00	0.00e+00	7.76e-04	4.31e-04	1.70e-04	1.11e-03	1.30e-01
6	Mn-54	0.00e+00	2.61e+00	5.17e-01	0.00e+00	7.77e-01	0.00e+00	5.35e+00
7	Mn-56	0.00e+00	8.44e-05	1.50e-05	0.00e+00	1.07e-04	0.00e+00	5.55e-03
8	Fe-55	4.18e-01	2.96e-01	6.91e-02	0.00e+00	0.00e+00	1.88e-01	1.28e-01
9	Fe-59	6.39e-01	1.49e+00	5.76e-01	0.00e+00	0.00e+00	4.71e-01	3.53e+00
10	Co-58	0.00e+00	5.33e-02	1.23e-01	0.00e+00	0.00e+00	0.00e+00	7.34e-01
11	Co-60	0.00e+00	1.55e-01	3.50e-01	0.00e+00	0.00e+00	0.00e+00	2.02e+00
12	Ni-63	1.98e+01	1.38e+00	6.64e-01	0.00e+00	0.00e+00	0.00e+00	2.20e-01
13	Ni-65	8.55e-05	1.09e-05	4.98e-06	0.00e+00	0.00e+00	0.00e+00	5.93e-04
14	Cu-64	0.00e+00	1.63e-03	7.65e-04	0.00e+00	4.12e-03	0.00e+00	1.26e-01
15	Zn-65	1.27e+01	4.41e+01	2.06e+01	0.00e+00	2.83e+01	0.00e+00	1.87e+01
16	Zn-69	2.55e-10	4.87e-10	3.41e-11	0.00e+00	3.18e-10	0.00e+00	8.97e-10
17	Br-83	0.00e+00	0.00e+00	1.89e-05	0.00e+00	0.00e+00	0.00e+00	0.00e+00
18	Br-84	0.00e+00	0.00e+00	2.26e-16	0.00e+00	0.00e+00	0.00e+00	0.00e+00
19	Br-85	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
20	Rb-86	0.00e+00	6.35e+01	2.98e+01	0.00e+00	0.00e+00	0.00e+00	9.39e+00
21	Rb-88	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
22	Rb-89	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
23	Sr-89	1.44e+01	0.00e+00	4.12e-01	0.00e+00	0.00e+00	0.00e+00	1.72e+00
24	Sr-90	2.76e+02	0.00e+00	6.81e+01	0.00e+00	0.00e+00	0.00e+00	7.74e+00
25	Sr-91	4.32e-02	0.00e+00	1.72e-03	0.00e+00	0.00e+00	0.00e+00	1.96e-01
26	Sr-92	1.69e-04	0.00e+00	7.21e-06	0.00e+00	0.00e+00	0.00e+00	4.31e-03
27	Y-90	2.89e-04	0.00e+00	7.79e-06	0.00e+00	0.00e+00	0.00e+00	2.39e+00
28	Y-91m	3.07e-15	0.00e+00	1.17e-16	0.00e+00	0.00e+00	0.00e+00	1.45e-13
29	Y-91	5.49e-03	0.00e+00	1.47e-04	0.00e+00	0.00e+00	0.00e+00	2.25e+00
30	Y-92	2.51e-07	0.00e+00	7.25e-09	0.00e+00	0.00e+00	0.00e+00	6.88e-03
31	Y-93	1.91e-05	0.00e+00	5.23e-07	0.00e+00	0.00e+00	0.00e+00	5.82e-01
32	Zr-95	1.49e-04	4.70e-05	3.23e-05	0.00e+00	6.90e-05	0.00e+00	1.08e-01
33	Zr-97	3.11e-06	6.14e-07	2.83e-07	0.00e+00	9.32e-07	0.00e+00	1.66e-01
34	Nb-95	2.67e-01	1.48e-01	8.17e-02	0.00e+00	1.44e-01	0.00e+00	6.34e+02
35	Mo-99	0.00e+00	5.13e-02	9.79e-03	0.00e+00	1.17e-01	0.00e+00	9.19e-02

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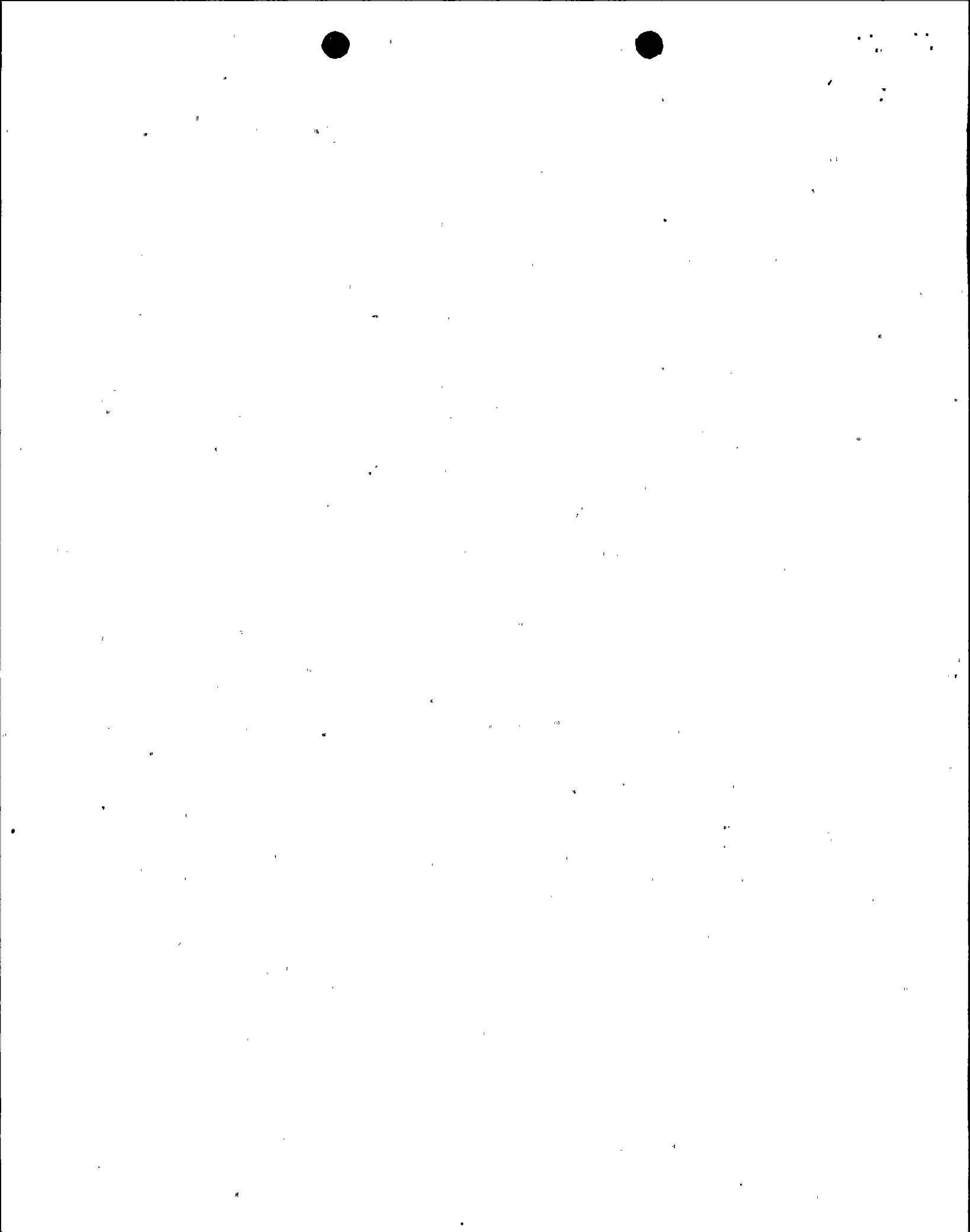


Table 5-1c: Dose Factors for Fish Pathway: Maximum Hypothetical Child (Page 1 of 2)
 Dose Factor Units: mrem-ft³/Ci-sec
 Location: Outfall/FIXED DILUTION

	Usage (Uap) (kg/yr:FISH) =			6.9				
	Dilution (1/Mp:FISH) =			15.9				
	Transit time (tl) hrs =			25				
	Isotope	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI/LLI
1	H-3	0.00e+00	8.72e-05	8.72e-05	8.72e-05	8.72e-05	8.72e-05	8.72e-05
2	C-14	2.66e+01	5.31e+00	5.31e+00	5.31e+00	5.31e+00	5.31e+00	5.31e+00
3	Na-24	8.72e-02	8.72e-02	8.72e-02	8.72e-02	8.72e-02	8.72e-02	8.72e-02
4	P-32	1.12e+03	5.26e+01	4.33e+01	0.00e+00	0.00e+00	0.00e+00	3.10e+01
5	Cr-51	0.00e+00	0.00e+00	8.28e-04	4.59e-04	1.26e-04	8.39e-04	4.39e-02
6	Mn-54	0.00e+00	2.04e+00	5.43e-01	0.00e+00	5.72e-01	0.00e+00	1.71e+00
7	Mn-56	0.00e+00	7.69e-05	1.74e-05	0.00e+00	9.30e-05	0.00e+00	1.11e-02
8	Fe-55	5.49e-01	2.91e-01	9.02e-02	0.00e+00	0.00e+00	1.65e-01	5.39e-02
9	Fe-59	7.75e-01	1.25e+00	6.25e-01	0.00e+00	0.00e+00	3.64e-01	1.31e+00
10	Co-58	0.00e+00	4.25e-02	1.30e-01	0.00e+00	0.00e+00	0.00e+00	2.48e-01
11	Co-60	0.00e+00	1.26e-01	3.72e-01	0.00e+00	0.00e+00	0.00e+00	8.99e-01
12	Ni-63	2.57e+01	1.37e+00	8.74e-01	0.00e+00	0.00e+00	0.00e+00	9.26e-02
13	Ni-65	1.09e-04	1.03e-05	6.01e-06	0.00e+00	0.00e+00	0.00e+00	1.26e-03
14	Cu-64	0.00e+00	1.49e-03	9.03e-04	0.00e+00	3.61e-03	0.00e+00	7.01e-02
15	Zn-65	1.30e+01	3.47e+01	2.16e+01	0.00e+00	2.19e+01	0.00e+00	6.10e+00
16	Zn-69	3.28e-10	4.74e-10	4.38e-11	0.00e+00	2.88e-10	0.00e+00	2.99e-08
17	Br-83	0.00e+00	0.00e+00	2.43e-05	0.00e+00	0.00e+00	0.00e+00	0.00e+00
18	Br-84	0.00e+00	0.00e+00	2.68e-16	0.00e+00	0.00e+00	0.00e+00	0.00e+00
19	Br-85	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
20	Rb-86	0.00e+00	6.15e+01	3.78e+01	0.00e+00	0.00e+00	0.00e+00	3.86e+00
21	Rb-88	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
22	Rb-89	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
23	Sr-89	1.86e+01	0.00e+00	5.32e-01	0.00e+00	0.00e+00	0.00e+00	7.21e-01
24	Sr-90	2.43e+02	0.00e+00	6.17e+01	0.00e+00	0.00e+00	0.00e+00	3.28e+00
25	Sr-91	5.55e-02	0.00e+00	2.09e-03	0.00e+00	0.00e+00	0.00e+00	1.22e-01
26	Sr-92	2.16e-04	0.00e+00	8.66e-06	0.00e+00	0.00e+00	0.00e+00	4.09e-03
27	Y-90	3.74e-04	0.00e+00	1.00e-05	0.00e+00	0.00e+00	0.00e+00	1.07e+00
28	Y-91m	3.92e-15	0.00e+00	1.43e-16	0.00e+00	0.00e+00	0.00e+00	7.68e-12
29	Y-91	7.10e-03	0.00e+00	1.90e-04	0.00e+00	0.00e+00	0.00e+00	9.45e-01
30	Y-92	3.21e-07	0.00e+00	9.20e-09	0.00e+00	0.00e+00	0.00e+00	9.29e-03
31	Y-93	2.45e-05	0.00e+00	6.72e-07	0.00e+00	0.00e+00	0.00e+00	3.65e-01
32	Zr-95	1.81e-04	3.97e-05	3.54e-05	0.00e+00	5.69e-05	0.00e+00	4.14e-02
33	Zr-97	3.95e-06	5.71e-07	3.37e-07	0.00e+00	8.19e-07	0.00e+00	8.64e-02
34	Nb-95	3.16e-01	1.23e-01	8.78e-02	0.00e+00	1.15e-01	0.00e+00	2.27e+02
35	Mo-99	0.00e+00	4.88e-02	1.21e-02	0.00e+00	1.04e-01	0.00e+00	4.04e-02

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Table 5-6a: Composite Dose Factors: Maximum Hypothetical Adult (Page 1 of 2)
 Dose Factor Units: mrem/Ci Released
 Location: Danville (Water Ing.)/Outfall (Fish and Shoreline)/FIXED DILUTION

	Usage (Uap) (kg/yr:FISH) =				Usage (Uap) (kg/yr:WATER) =				GI-LLI	Skin
	Usage (Uap) (hr/yr:SHORE) =				Dilution (1/Mp:SHORE) =					
	Dilution (1/Mp:FISH) =				Dilution (1/Mp:WATER) =					
	Transit time (tf) hrs =				Transit time (tw) hrs =					
	Transit time (tp) hrs =				Transit time (tb) hrs =					
Isotope	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI	Skin		
1	H-3	0.00e+00	3.59e-05	3.59e-05	3.59e-05	3.59e-05	3.59e-05	3.59e-05	0.00e+00	
2	C-14	1.70e+00	3.41e-01	3.41e-01	3.41e-01	3.41e-01	3.41e-01	3.41e-01	0.00e+00	
3	Na-24	7.09e-03	7.09e-03	7.12e-03	7.09e-03	7.09e-03	7.09e-03	7.09e-03	2.58e-05	
4	P-32	7.18e+01	4.46e+00	2.77e+00	0.00e+00	0.00e+00	0.00e+00	8.07e+00	0.00e+00	
5	Cr-51	0.00e+00	0.00e+00	7.72e-05	4.07e-05	1.50e-05	9.04e-05	1.71e-02	1.07e-05	
6	Mn-54	0.00e+00	2.39e-01	4.82e-02	0.00e+00	7.10e-02	0.00e+00	7.31e-01	3.17e-03	
7	Mn-56	0.00e+00	7.25e-06	2.83e-06	0.00e+00	9.21e-06	0.00e+00	2.31e-04	1.59e-08	
8	Fe-55	3.64e-02	2.52e-02	5.87e-03	0.00e+00	0.00e+00	1.40e-02	1.44e-02	0.00e+00	
9	Fe-59	5.66e-02	1.33e-01	5.15e-02	0.00e+00	0.00e+00	3.72e-02	4.43e-01	6.24e-04	
10	Co-58	0.00e+00	4.97e-03	1.19e-02	0.00e+00	0.00e+00	0.00e+00	1.01e-01	8.64e-04	
11	Co-60	0.00e+00	1.44e-02	7.37e-02	0.00e+00	0.00e+00	0.00e+00	2.71e-01	4.93e-02	
12	Ni-63	1.72e+00	1.19e-01	5.78e-02	0.00e+00	0.00e+00	0.00e+00	2.49e-02	0.00e+00	
13	Ni-65	7.20e-06	9.35e-07	8.66e-07	0.00e+00	0.00e+00	0.00e+00	2.37e-05	5.11e-07	
14	Cu-64	0.00e+00	1.43e-04	6.84e-05	0.00e+00	3.61e-04	0.00e+00	1.22e-02	1.27e-06	
15	Zn-65	1.26e+00	4.00e+00	1.81e+00	0.00e+00	2.68e+00	0.00e+00	2.52e+00	1.67e-03	
16	Zn-69	2.11e-11	4.03e-11	2.80e-12	0.00e+00	2.62e-11	0.00e+00	6.06e-12	0.00e+00	
17	Br-83	0.00e+00	0.00e+00	1.57e-06	0.00e+00	0.00e+00	0.00e+00	2.28e-06	1.03e-08	
18	Br-84	0.00e+00	0.00e+00	1.07e-07	0.00e+00	0.00e+00	0.00e+00	1.51e-22	1.25e-07	
19	Br-85	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	
20	Rb-86	0.00e+00	5.29e+00	2.47e+00	0.00e+00	0.00e+00	0.00e+00	1.04e+00	2.00e-05	
21	Rb-88	0.00e+00	0.00e+00	6.27e-09	0.00e+00	0.00e+00	0.00e+00	0.00e+00	7.17e-09	
22	Rb-89	0.00e+00	0.00e+00	1.63e-08	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.96e-08	
23	Sr-89	1.25e+00	0.00e+00	3.60e-02	0.00e+00	0.00e+00	0.00e+00	2.01e-01	4.89e-08	
24	Sr-90	3.13e+01	0.00e+00	7.69e+00	0.00e+00	0.00e+00	0.00e+00	9.05e-01	0.00e+00	
25	Sr-91	3.77e-03	0.00e+00	1.56e-04	0.00e+00	0.00e+00	0.00e+00	1.80e-02	4.55e-06	
26	Sr-92	1.47e-05	0.00e+00	1.81e-06	0.00e+00	0.00e+00	0.00e+00	2.91e-04	1.30e-06	
27	Y-90	2.55e-05	0.00e+00	6.94e-07	0.00e+00	0.00e+00	0.00e+00	2.71e-01	1.02e-08	
28	Y-91m	2.64e-16	0.00e+00	8.49e-08	0.00e+00	0.00e+00	0.00e+00	7.74e-16	9.83e-08	
29	Y-91	4.85e-04	0.00e+00	1.51e-05	0.00e+00	0.00e+00	0.00e+00	2.67e-01	2.35e-06	
30	Y-92	2.18e-08	0.00e+00	2.90e-07	0.00e+00	0.00e+00	0.00e+00	3.82e-04	3.43e-07	
31	Y-93	1.67e-06	0.00e+00	3.80e-07	0.00e+00	0.00e+00	0.00e+00	5.30e-02	4.56e-07	
32	Zr-95	1.97e-05	6.31e-06	4.81e-04	0.00e+00	9.90e-06	0.00e+00	2.00e-02	5.53e-04	
33	Zr-97	3.90e-07	7.87e-08	5.57e-06	0.00e+00	1.19e-07	0.00e+00	2.44e-02	6.44e-06	
34	Nb-95	2.38e-02	1.33e-02	7.39e-03	0.00e+00	1.31e-02	0.00e+00	8.04e+01	3.13e-04	

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Table 5-6b: Composite Dose Factors: Maximum Hypothetical Teen (Page 1 of 2)
 Dose Factor Units: mrem/Ci Released
 Location: Danville (Water Ing.)/Outfall (Fish and Shoreline)/FIXED DILUTION

Usage (Uap) (kg/yr:FISH) =		16			Usage (Uap) (kg/yr:WATER) =			510	
Usage (Uap) (hr/yr:SHORE) =		67			Dilution (1/Mp:SHORE) =			15.9	
Dilution (1/Mp:FISH) =		15.9			Dilution (1/Mp:WATER) =			321	
Transit time (tf) hrs =		25			Transit time (tw) hrs =			25.8	
Transit time (tp) hrs =		1			Transit time (tb) hrs =			131400	
Isotope	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI	Skin	
1	H-3	0.00e+00	2.61e-05	2.61e-05	2.61e-05	2.61e-05	2.61e-05	2.61e-05	0.00e+00
2	C-14	1.85e+00	3.71e-01	3.71e-01	3.71e-01	3.71e-01	3.71e-01	3.71e-01	0.00e+00
3	Na-24	7.30e-03	7.30e-03	7.43e-03	7.30e-03	7.30e-03	7.30e-03	7.30e-03	1.44e-04
4	P-32	7.82e+01	4.84e+00	3.03e+00	0.00e+00	0.00e+00	0.00e+00	6.57e+00	0.00e+00
5	Cr-51	0.00e+00	0.00e+00	1.21e-04	3.90e-05	1.54e-05	1.00e-04	1.18e-02	5.98e-05
6	Mn-54	0.00e+00	2.35e-01	6.16e-02	0.00e+00	7.00e-02	0.00e+00	4.81e-01	1.77e-02
7	Mn-56	0.00e+00	7.59e-06	8.86e-06	0.00e+00	9.61e-06	0.00e+00	5.00e-04	8.88e-06
8	Fe-55	3.81e-02	2.70e-02	6.30e-03	0.00e+00	0.00e+00	1.71e-02	1.17e-02	0.00e+00
9	Fe-59	5.82e-02	1.36e-01	5.55e-02	0.00e+00	0.00e+00	4.29e-02	3.21e-01	3.49e-03
10	Co-58	0.00e+00	4.93e-03	1.55e-02	0.00e+00	0.00e+00	0.00e+00	6.79e-02	4.82e-03
11	Co-60	0.00e+00	1.44e-02	2.67e-01	0.00e+00	0.00e+00	0.00e+00	1.87e-01	2.75e-01
12	Ni-63	1.78e+00	1.26e-01	6.05e-02	0.00e+00	0.00e+00	0.00e+00	2.01e-02	0.00e+00
13	Ni-65	7.77e-06	9.93e-07	2.91e-06	0.00e+00	0.00e+00	0.00e+00	5.38e-05	2.85e-06
14	Cu-64	0.00e+00	1.50e-04	7.69e-05	0.00e+00	3.80e-04	0.00e+00	1.17e-02	7.08e-06
15	Zn-65	1.14e+00	3.96e+00	1.86e+00	0.00e+00	2.54e+00	0.00e+00	1.68e+00	9.35e-03
16	Zn-69	2.29e-11	4.37e-11	3.06e-12	0.00e+00	2.85e-11	0.00e+00	8.05e-11	0.00e+00
17	Br-83	0.00e+00	0.00e+00	1.74e-06	0.00e+00	0.00e+00	0.00e+00	0.00e+00	5.76e-08
18	Br-84	0.00e+00	0.00e+00	5.99e-07	0.00e+00	0.00e+00	0.00e+00	0.00e+00	6.98e-07
19	Br-85	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
20	Rb-86	0.00e+00	5.70e+00	2.68e+00	0.00e+00	0.00e+00	0.00e+00	8.43e-01	1.12e-04
21	Rb-88	0.00e+00	0.00e+00	3.50e-08	0.00e+00	0.00e+00	0.00e+00	0.00e+00	4.00e-08
22	Rb-89	0.00e+00	0.00e+00	9.11e-08	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.09e-07
23	Sr-89	1.36e+00	0.00e+00	3.89e-02	0.00e+00	0.00e+00	0.00e+00	1.62e-01	2.73e-07
24	Sr-90	2.60e+01	0.00e+00	6.43e+00	0.00e+00	0.00e+00	0.00e+00	7.30e-01	0.00e+00
25	Sr-91	4.07e-03	0.00e+00	1.84e-04	0.00e+00	0.00e+00	0.00e+00	1.85e-02	2.54e-05
26	Sr-92	1.58e-05	0.00e+00	7.22e-06	0.00e+00	0.00e+00	0.00e+00	4.03e-04	7.27e-06
27	Y-90	2.76e-05	0.00e+00	7.91e-07	0.00e+00	0.00e+00	0.00e+00	2.27e-01	5.71e-08
28	Y-91m	2.84e-16	0.00e+00	4.74e-07	0.00e+00	0.00e+00	0.00e+00	1.34e-14	5.49e-07
29	Y-91	5.24e-04	0.00e+00	2.57e-05	0.00e+00	0.00e+00	0.00e+00	2.15e-01	1.31e-05
30	Y-92	2.37e-08	0.00e+00	1.61e-06	0.00e+00	0.00e+00	0.00e+00	6.50e-04	1.92e-06
31	Y-93	1.81e-06	0.00e+00	1.91e-06	0.00e+00	0.00e+00	0.00e+00	5.53e-02	2.55e-06
32	Zr-95	1.97e-05	6.23e-06	2.66e-03	0.00e+00	9.15e-06	0.00e+00	1.44e-02	3.09e-03
33	Zr-97	4.07e-07	8.06e-08	3.09e-05	0.00e+00	1.22e-07	0.00e+00	2.18e-02	3.60e-05
34	Nb-95	2.40e-02	1.33e-02	8.81e-03	0.00e+00	1.29e-02	0.00e+00	5.69e+01	1.75e-03

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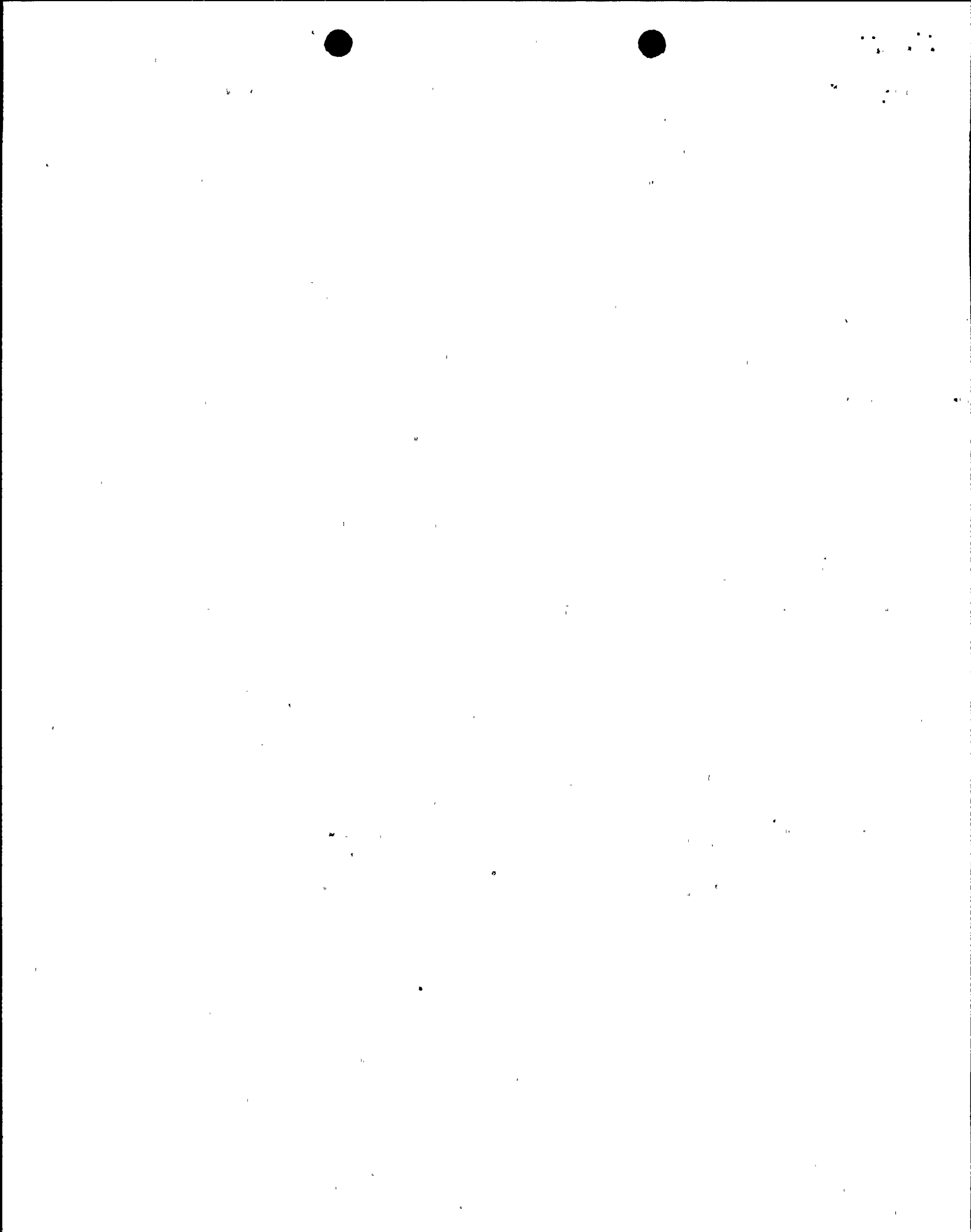


Table 5-6c: Composite Dose Factors: Maximum Hypothetical Child (Page 1 of 2)
 Dose Factor Units: mrem/Ci Released
 Location: Danville (Water Ing.)/Outfall (Fish and Shoreline)/FIXED DILUTION

		Usage (Uap) (kg/yr:FISH) =			Usage (Uap) (kg/yr:WATER) =				
		Usage (Uap) (hr/yr:SHORE) =			Dilution (1/Mp:SHORE) =				
		Dilution (1/Mp:FISH) =			Dilution (1/Mp:WATER) =				
		Transit time (tf) hrs =			Transit time (tw) hrs =				
		Transit time (tp) hrs =			Transit time (tb) hrs =				
	Isotope	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI	Skin
1	H-3	0.00e+00	3.96e-05	3.96e-05	3.96e-05	3.96e-05	3.96e-05	3.96e-05	0.00e+00
2	C-14	2.38e+00	4.77e-01	4.77e-01	4.77e-01	4.77e-01	4.77e-01	4.77e-01	0.00e+00
3	Na-24	8.10e-03	8.10e-03	8.12e-03	8.10e-03	8.10e-03	8.10e-03	8.10e-03	3.01e-05
4	P-32	1.01e+02	4.72e+00	3.89e+00	0.00e+00	0.00e+00	0.00e+00	2.79e+00	0.00e+00
5	Cr-51	0.00e+00	0.00e+00	8.62e-05	4.20e-05	1.15e-05	7.66e-05	4.01e-03	1.25e-05
6	Mn-54	0.00e+00	1.84e-01	5.23e-02	0.00e+00	5.17e-02	0.00e+00	1.55e-01	3.69e-03
7	Mn-56	0.00e+00	6.95e-06	3.14e-06	0.00e+00	8.41e-06	0.00e+00	1.01e-03	1.85e-06
8	Fe-55	5.10e-02	2.71e-02	8.38e-03	0.00e+00	0.00e+00	1.53e-02	5.01e-03	0.00e+00
9	Fe-59	7.21e-02	1.17e-01	5.87e-02	0.00e+00	0.00e+00	3.38e-02	1.21e-01	7.28e-04
10	Co-58	0.00e+00	4.09e-03	1.34e-02	0.00e+00	0.00e+00	0.00e+00	2.39e-02	1.01e-03
11	Co-60	0.00e+00	1.21e-02	8.47e-02	0.00e+00	0.00e+00	0.00e+00	6.73e-02	5.75e-02
12	Ni-63	2.39e+00	1.28e-01	8.12e-02	0.00e+00	0.00e+00	0.00e+00	8.61e-03	0.00e+00
13	Ni-65	1.01e-05	9.50e-07	1.07e-06	0.00e+00	0.00e+00	0.00e+00	1.16e-04	5.98e-07
14	Cu-64	0.00e+00	1.43e-04	8.79e-05	0.00e+00	3.47e-04	0.00e+00	6.73e-03	1.48e-06
15	Zn-65	1.17e+00	3.12e+00	1.94e+00	0.00e+00	1.97e+00	0.00e+00	5.48e-01	1.85e-03
16	Zn-69	2.95e-11	4.26e-11	3.94e-12	0.00e+00	2.58e-11	0.00e+00	2.68e-09	0.00e+00
17	Br-83	0.00e+00	0.00e+00	2.21e-06	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.20e-08
18	Br-84	0.00e+00	0.00e+00	1.25e-07	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.46e-07
19	Br-85	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
20	Rb-86	0.00e+00	5.53e+00	3.40e+00	0.00e+00	0.00e+00	0.00e+00	3.56e-01	2.33e-05
21	Rb-88	0.00e+00	0.00e+00	7.31e-09	0.00e+00	0.00e+00	0.00e+00	0.00e+00	8.36e-09
22	Rb-89	0.00e+00	0.00e+00	1.90e-08	0.00e+00	0.00e+00	0.00e+00	0.00e+00	2.28e-08
23	Sr-89	1.88e+00	0.00e+00	5.36e-02	0.00e+00	0.00e+00	0.00e+00	7.26e-02	5.71e-08
24	Sr-90	2.45e+01	0.00e+00	6.21e+00	0.00e+00	0.00e+00	0.00e+00	3.30e-01	0.00e+00
25	Sr-91	5.55e-03	0.00e+00	2.14e-04	0.00e+00	0.00e+00	0.00e+00	1.22e-02	5.31e-06
26	Sr-92	2.13e-05	0.00e+00	2.22e-06	0.00e+00	0.00e+00	0.00e+00	4.03e-04	1.52e-06
27	Y-90	3.84e-05	0.00e+00	1.04e-06	0.00e+00	0.00e+00	0.00e+00	1.09e-01	1.19e-08
28	Y-91m	3.78e-16	0.00e+00	9.91e-08	0.00e+00	0.00e+00	0.00e+00	7.40e-13	1.15e-07
29	Y-91	7.30e-04	0.00e+00	2.20e-05	0.00e+00	0.00e+00	0.00e+00	9.72e-02	2.74e-06
30	Y-92	3.24e-08	0.00e+00	3.38e-07	0.00e+00	0.00e+00	0.00e+00	9.37e-04	4.00e-07
31	Y-93	2.50e-06	0.00e+00	4.58e-07	0.00e+00	0.00e+00	0.00e+00	3.73e-02	5.32e-07
32	Zr-95	3.42e-05	7.51e-06	5.63e-04	0.00e+00	1.08e-05	0.00e+00	7.84e-03	6.45e-04
33	Zr-97	7.34e-07	1.06e-07	6.52e-06	0.00e+00	1.52e-07	0.00e+00	1.61e-02	7.51e-06
34	Nb-95	2.83e-02	1.10e-02	8.19e-03	0.00e+00	1.04e-02	0.00e+00	2.04e+01	3.85e-04

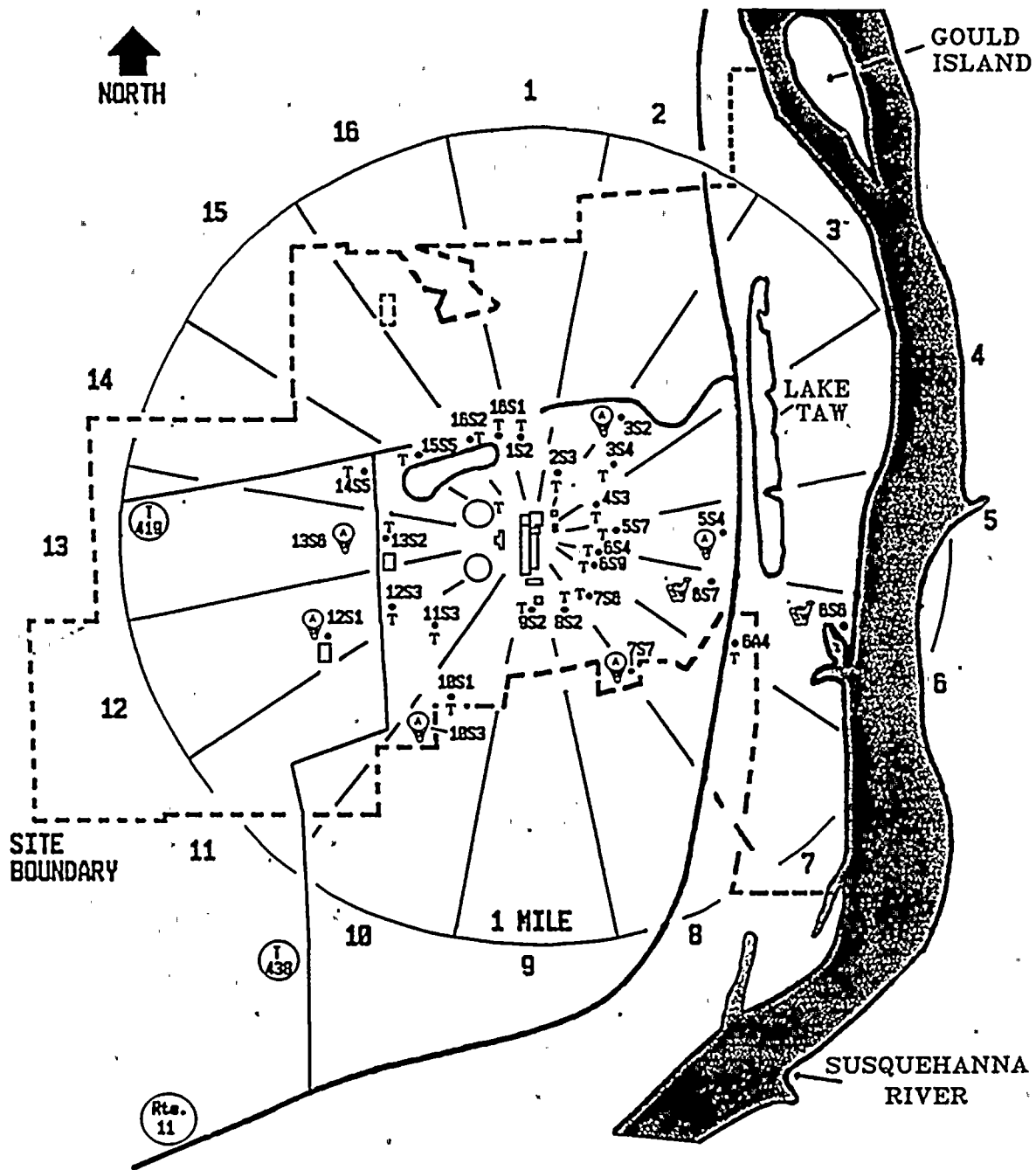
5-6c(1)




APPV *Reels*
 DATE *10/10/94*

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FIGURE 5
 ENVIRONMENTAL MONITORING LOCATIONS
 WITHIN ONE MILE OF THE SSES



-  AIR
-  SURFACE WATER
-  THERMOLUMINESCENT DOSIMETRY

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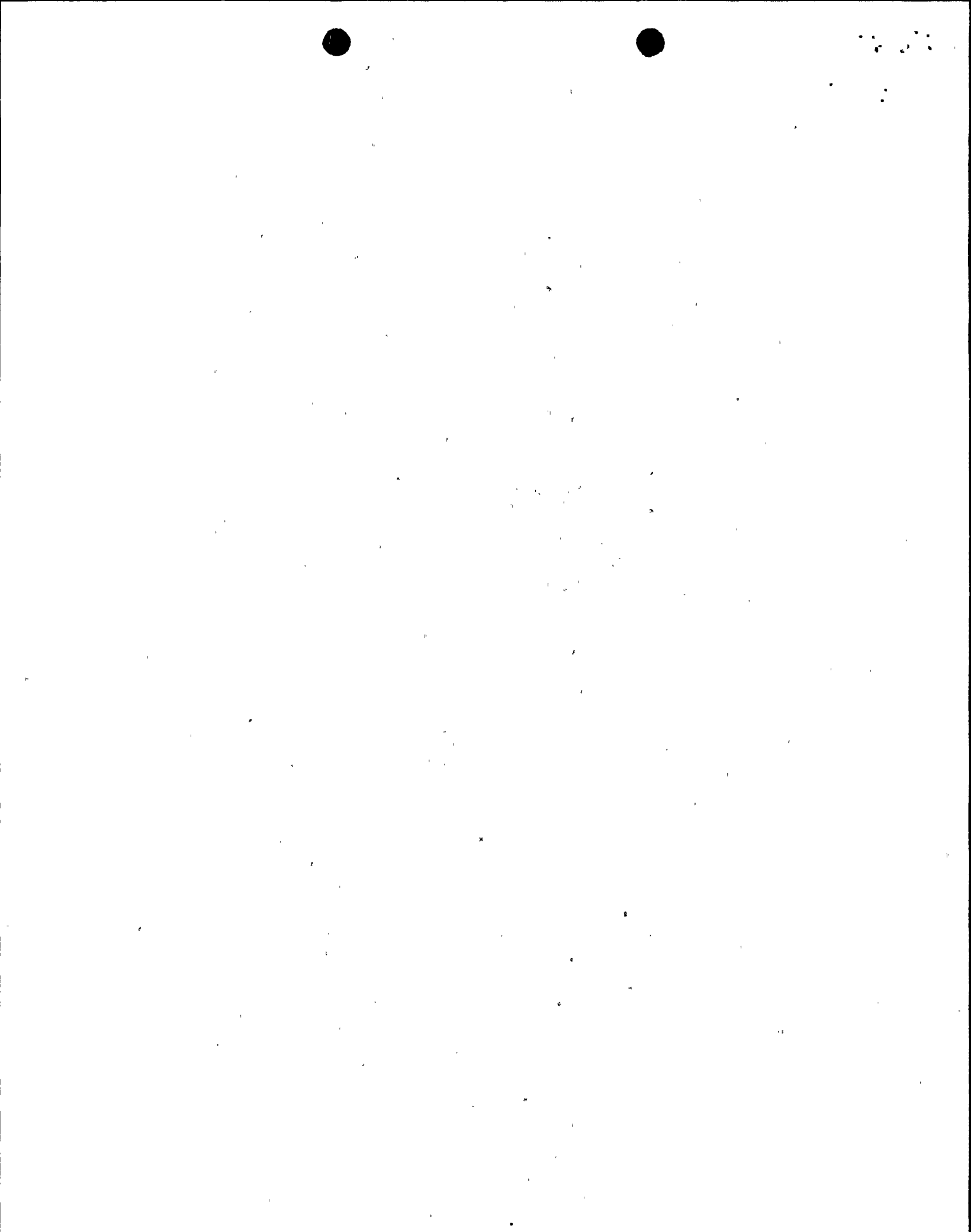
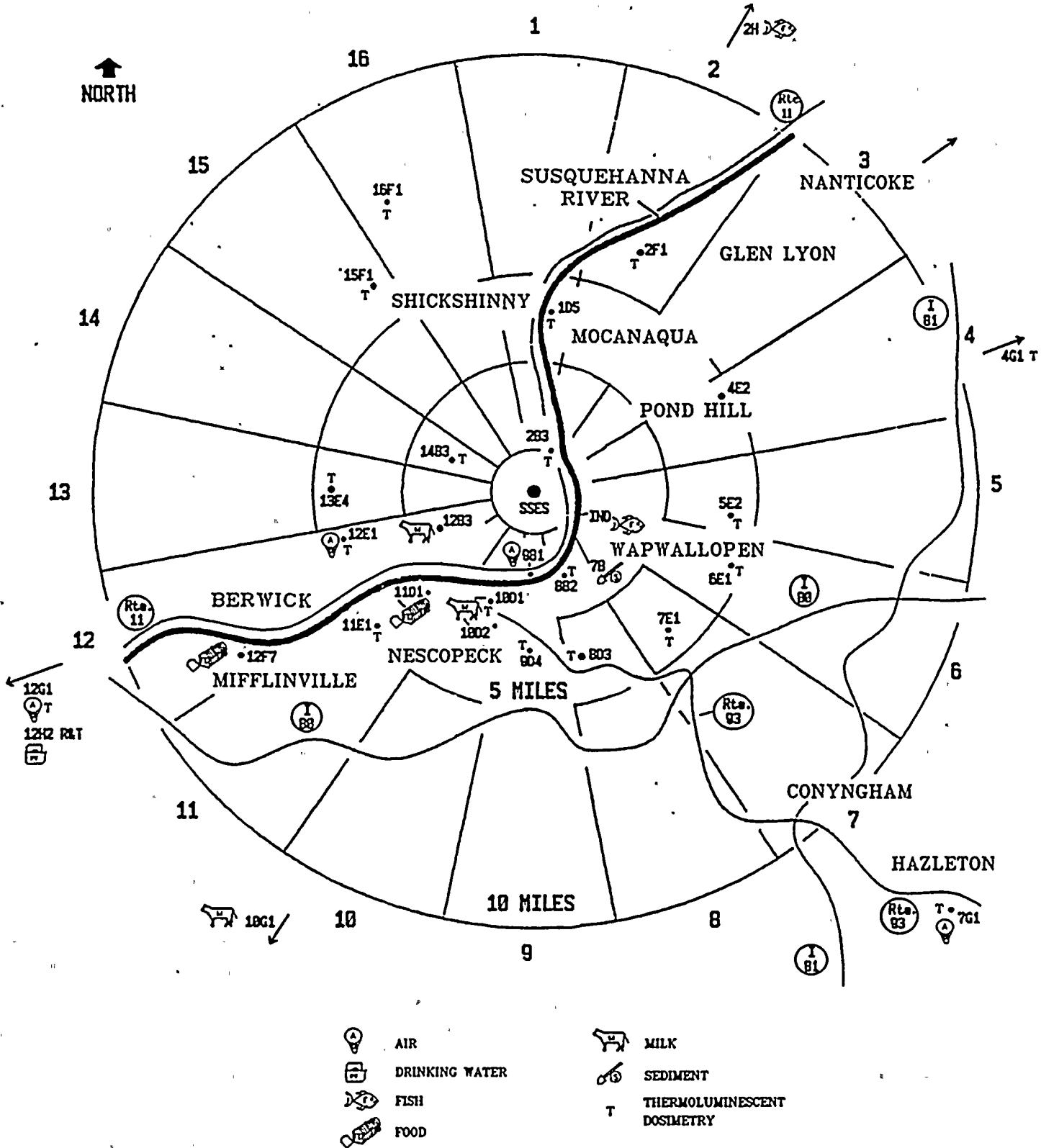


FIGURE 6
 ENVIRONMENTAL MONITORING LOCATIONS
 GREATER THAN ONE MILE FROM THE SSES



APPV PAK
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TABLE 6

OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

<u>Exposure Pathways and/or Sample</u>	<u>Number of Samples and Locations*</u>	<u>Sampling and Collection Frequency</u>	<u>Type and Frequency of Analysis</u>
<u>Airborne</u>			
Radiiodine and Particulates	12S1 0.4 mi WSW - E.O.F. Building	Continual sampler operation with sample collection weekly.**	Radiiodine Canister: analyze weekly for I-131
	9B1 1.3 mi S - Transmission Line		
	5S4 0.8 mi E - Environmental Laboratory		
	12E1 4.7 mi WSW - Berwick Hospital		
	7G1 14 mi SE - PP&L Hazleton Complex*		
	3S2 0.5 mi NE - SSES Backup Met. Tower		
	7S7 0.4 mi SE - End of Kline's Road		
	10S3 0.6 mi SSW - East of Confer's Lane, South of Tower's Club		
	13S6 0.4 mi W - Former Laydown Area, West of Confer's Lane		
	12G1 15 mi WSW - PP&L Bloomsburg Service Center*		
<u>Direct Radiation</u>			
46	1S2 Perimeter Fence - 0.2 mi N	Quarterly	Gamma Dose: Quarterly.
	10S Mocanaqua Sewage Treatment Plant - 4.0 mi N		
	2S3 Perimeter Fence - 0.2 mi NNE		
	2B3 Durabond Corporation - 1.3 mi NNE		
	2F1 St. Adalberts Cemetery - 5.9 mi NNE		
	3S4 Perimeter Fence - 0.3 mi NE		
	4S3 West of Susquehanna APF - 0.2 mi ENE		
	4E2 Ruckles Hill & Pond Hill Roads Intersection 4.7 mi ENE		
	4G1 Crestwood Industrial Park - 14 mi ENE*		
	5S7 Perimeter Fence - 0.3 mi E		
	5E2 Bloss Farm - 4.5 mi E		
	6S4 Perimeter Fence - 0.2 mi ESE		
	6A4 Riverside Restaurant - 0.6 mi ESE		

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Exposure Pathways
and/or SampleNumber of Samples
and Locations*Sampling and
Collection FrequencyType and
Frequency of Analysis

6E1 St. James Church - 4.7 mi ESE
 6S9 Perimeter Fence - 0.2 mi ESE
 7S6 Perimeter Fence - 0.2 mi SE
 7E1 Harwood Transmission Line Pole #2 -
 4.2 mi SE
 7G1 PP&L Hazleton Complex - 14 mi SE^a
 8S2 Perimeter Fence - 0.2 mi SSE
 8B2 LaWall Residence - 1.4 mi SSE
 8D3 Howry Residence - 4.0 mi SSE
 9S2 Security Fence - 0.2 mi S
 9D4 Country Folk Store - 3.6 mi S
 10S1 Post South of Switching Station - 0.4 mi SSW
 10D1 Ross Ryman Farm - 3.0 mi SSW
 11S3 Security Fence - 0.3 mi SW
 11E1 Thomas Residence - 4.7 mi SW
 12S3 Perimeter Fence - 0.4 mi WSW
 12E1 Berwick Hospital - 4.7 mi WSW
 12G1 PP&L Bloomsburg Service Center - 15 mi WSW^a
 13S2 Perimeter Fence - 0.4 mi W
 13E4 Kessler Farm - 4.1 mi W
 14S5 Beach Grove Rd. & Confer's Lane Intersection
 0.5 mi WNW
 14B3 Moskaluk Residence - 1.3 mi. WNW
 15F1 Zawatski Farm - 5.4 mi NW
 15S5 Perimeter Fence - 0.4 mi NW
 16S1 Perimeter Fence - 0.3 mi NNW
 16S2 Perimeter Fence - 0.3 mi NNW
 16F1 Hidlay Residence - 7.8 NNW

Waterborne

Surface	6S6 river water intake line ^a 6S7 cooling tower blowdown discharge line	Monthly composite Monthly composite	Gamma isotopic analysis. Composite tritium analysis at least quarterly.
Drinking	12H2 Danville Water Co. (Approximately 30 miles downstream)	Monthly composite ^b	Gross beta and gamma isotopic analyses monthly. Composite for tritium analysis at least quarterly.
Sediment from Shoreline	7B Bell Bend - 1.2 mi SE	Semi-annually	Gamma isotopic analysis semi-annually.

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APPENDIX D

SITE SPECIFIC INFORMATION USED BY LADTAP II CODE

- 1) Total discharge per unit: 11 cubic feet per second, or specific to release period.
- 2) Total Annual Blowdown Volume: 6.94E8 cubic feet
- 3) Dose to Maximum Hypothetical Individual

Shorewidth Factor: 0.2
Sediment exposure time: 131,400 hr.

USAGE FACTORS

PATHWAY	INFANT	CHILD	TEEN	ADULT
Fish (kg/yr)	0	6.9	16	21
Potable Water (liter/yr)	330	510	510	730
Shoreline (hr/yr)	0	14	67	12

DILUTION FACTORS (DF)

PATHWAY	LOCATION	DF
Fish	Outfall	15.9
Potable Water	Danville	321*
Shoreline	Outfall	15.9

*For estimating purposes. Actual dilution factors at Danville, Pa., for various river levels located in Table 5-4.

TRANSIT TIMES (Tp)

PATHWAY	LOCATION	Tp (hr)
Fish	Outfall	25**
Potable Water	Danville	25.8*
Shoreline	Outfall	1

*For estimating purposes. Actual river transit times at Danville, Pa., for various river levels located in Table 5-4.

**Includes one hour transit from outfall plus 24 hours to consumption.