

APPENDIX C-1
SUMMARY OF WATER AND SEDIMENT MONITORING DATA

TABLE C-1.1.1

TOTAL RADIOACTIVITY CONCENTRATIONS OF LIQUID EFFLUENTS RELEASED
FROM WVDP LAGOON 3 IN 1988
(CURIES)

	ALPHA	BETA	H-3	C-14	Sr-90	I-129	Cs-137
1ST QTR	8.39 ± 6.2 E-04	1.48 ± 0.3 E-02	2.38 ± 0.2 E-01	<1.2 E-03	2.22 ± 0.2 E-03	1.29 ± 0.1 E-04	1.10 ± 0.2 E-02
2ND QTR	7.01 ± 3.3 E-04	3.13 ± 0.7 E-03	1.15 ± 0.1 E-01	<3.9 E-04	6.81 ± 0.7 E-04	2.82 ± 0.3 E-05	1.24 ± 0.9 E-03
3RD QTR	***NO RELEASE THIS PERIOD***						
4TH QTR	7.05 ± 3.5 E-04	6.06 ± 1.0 E-03	3.25 ± 0.1 E-01	<2.7 E-03	5.05 ± 0.4 E-04	2.92 ± 0.7 E-05	3.68 ± 3.6 E-04
1988 TOTALS	2.25 ± 0.8 E-03	2.45 ± 0.3 E-02	6.78 ± 0.2 E-01	<3.0 E-03	3.41 ± 0.2 E-03	1.86 ± 0.1 E-04	1.26 ± 0.2 E-02
AVERAGE (μCi/mL)	7.41 E-08	8.07 E-07	2.23 E-05	<9.9 E-08	1.12 E-07	6.13 E-09	4.15 E-07
	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	
1ST QTR	3.68 ± 0.8 E-04	1.32 ± 0.5 E-05	1.35 ± 0.3 E-04	2.72 ± 1.2 E-07	2.60 ± 1.2 E-07	1.19 ± 0.2 E-06	
2ND QTR	3.25 ± 0.3 E-04	4.25 ± 0.6 E-06	1.21 ± 0.1 E-04	2.79 ± 0.9 E-07	8.84 ± 5.0 E-08	1.22 ± 0.5 E-07	
3RD QTR	***NO RELEASE THIS PERIOD***						
4TH QTR	3.19 ± 0.3 E-04	7.60 ± 3.6 E-06	9.87 ± 1.4 E-05	3.97 ± 3.9 E-07	<2.7 E-07	2.54 ± 1.6 E-07	
1988 TOTALS	1.01 ± 0.1 E-03	2.51 ± 0.6 E-05	3.55 ± 0.3 E-04	9.48 ± 4.2 E-07	3.48 ± 3.0 E-07	1.57 ± 0.3 E-06	
AVERAGE (μCi/mL)	3.33 E-08	8.27 E-10	1.17 E-08	3.12 E-11	1.15 E-11	5.17 E-10	

TABLE C-1.1.2

COMPARISON OF 1988 LAGOON 3 LIQUID EFFLUENT
RADIOACTIVITY CONCENTRATIONS WITH DOE GUIDELINES

ISOTOPE	TOTAL μCi RELEASED ^a	AVG CONC ($\mu\text{Ci}/\text{mL}$)	DCG ($\mu\text{Ci}/\text{mL}$)	PERCENT OF DCG
Alpha	2.25 E+03	7.41 E-08	NA ^b	--
Beta	2.45 E+04	8.07 E-07	NA ^b	--
H-3	6.78 E+05	2.23 E-05	2.0 E-03	1.1
C-14	<3.0 E+03	<9.9 E-08	7.0 E-05	0.1
Sr-90	3.41 E+03	1.12 E-07	1.0 E-06	11.2
I-129	1.86 E+02	6.13 E-09	5.0 E-07	1.2
Cs-137	1.26 E+04	4.15 E-07	3.0 E-06	13.8
U-234 ^c	1.01 E+03	3.33 E-08	5.0 E-07	6.7
U-235 ^c	2.51 E+01	8.27 E-10	6.0 E-07	0.1
U-238 ^c	3.55 E+02	1.17 E-08	6.0 E-07	2.0
Pu-238	9.48 E-01	3.12 E-11	4.0 E-08	<0.1
Pu-239	3.48 E-01	1.15 E-11	3.0 E-08	<0.1
Am-241	1.57 E+00	5.17 E-11	3.0 E-08	0.2
Total				36.6 ^d

Notes:

- ^a Total Volume Released = $3.03 \text{ E}+10$ mL, measured at actual on-site release point.
- ^b Derived Concentration Guides (DCG) are not specified for gross alpha or beta activity.
- ^c Total U(μgm) = $1.07 \text{ E}+09$; Average U(mg/L) = $3.57 \text{ E}-02$
- ^d Total percent DCG for specific measured radionuclides

TABLE C-1.2

RADIOACTIVITY CONCENTRATIONS IN SURFACE WATER
UPSTREAM OF WVDP AT FOX VALLEY (WFBCBKG)
($\mu\text{Ci/mL}$)

1988	ALPHA	BETA	H-3	SR-90	CS-137
JAN	<7.3 E-10	2.24 \pm 1.2 E-09	<1.0 E-07		
FEB	<1.0 E-09	3.10 \pm 1.2 E-09	<1.0 E-07		
MAR	<7.6 E-10	5.37 \pm 1.2 E-09	<1.0 E-07		
1ST QTR				<1.6 E-09	<2.1 E-08
APR	<9.9 E-10	4.08 \pm 1.0 E-09	<1.0 E-07		
MAY	<7.8 E-10	3.44 \pm 1.0 E-09	<1.0 E-07		
JUN	<9.1 E-10	4.25 \pm 1.1 E-09	<1.0 E-07		
2ND QTR				3.64 \pm 1.5 E-09	<2.1 E-08
JUL	<6.4 E-10	3.99 \pm 1.1 E-09	<1.0 E-07		
AUG	1.80 \pm 1.3 E-09	3.30 \pm 1.0 E-09	<1.0 E-07		
SEP	<8.6 E-10	3.65 \pm 1.0 E-09	<1.0 E-07		
3RD QTR				2.35 \pm 1.4 E-09	<2.1 E-08
OCT	<9.8 E-10	3.74 \pm 1.0 E-09	<1.0 E-07		
NOV	2.06 \pm 1.4 E-09	3.40 \pm 1.0 E-09	<1.0 E-07		
DEC	<5.0 E-10	3.44 \pm 1.1 E-09	<1.0 E-07		
4TH QTR				1.49 \pm 1.2 E-09	<2.1 E-08

TABLE C-1.3

RADIOACTIVITY CONCENTRATIONS IN SURFACE WATER
DOWNSTREAM OF WVDP AT THOMAS CORNERS (WFBCTCB)
($\mu\text{Ci/mL}$)

1988	ALPHA	BETA	H-3	SR-90	CS-137
JAN	<1.3 E-09	5.61 \pm 1.4 E-09	<1.0 E-07		
FEB	<1.3 E-09	4.87 \pm 1.4 E-09	<1.0 E-07		
MAR	9.22 \pm 9.0 E-10	3.79 \pm 1.0 E-09	<1.2 E-07		
1ST QTR				<1.7 E-09	<2.1 E-08
APR	1.79 \pm 1.3 E-09	5.08 \pm 1.1 E-09	<1.0 E-07		
MAY	<5.4 E-10	4.52 \pm 1.1 E-09	1.47 \pm 1.2 E-07		
JUN	<9.0 E-10	7.37 \pm 1.4 E-09	<1.0 E-07		
2ND QTR				3.23 \pm 1.5 E-09	<2.1 E-08
JUL	<6.9 E-10	7.61 \pm 1.4 E-09	<1.0 E-07		
AUG	<7.6 E-10	7.37 \pm 1.4 E-09	<1.0 E-07		
SEP	1.41 \pm 1.2 E-09	8.16 \pm 1.4 E-09	<1.0 E-07		
3RD QTR				4.14 \pm 1.6 E-09	<2.1 E-08
OCT	<8.0 E-10	7.24 \pm 1.3 E-09	<1.0 E-07		
NOV	<1.0 E-09	4.23 \pm 1.1 E-09	<1.0 E-07		
DEC	<8.8 E-10	5.47 \pm 1.2 E-09	<1.0 E-07		
4TH QTR				2.64 \pm 1.5 E-09	<2.1 E-08

TABLE C-1.4.1

RADIOACTIVITY CONCENTRATIONS IN SURFACE WATER
DOWNSTREAM OF WVDP AT FRANKS CREEK (WNSPOO6)
($\mu\text{Ci/mL}$)

1988	ALPHA	BETA	H-3
JAN	<4.2 E-09	1.49 \pm 0.1 E-07	2.51 \pm 0.2 E-06
FEB	<9.7 E-10	2.55 \pm 0.2 E-08	2.02 \pm 1.2 E-07
MAR	1.24 \pm 1.2 E-09	1.89 \pm 0.2 E-08	3.01 \pm 1.3 E-07
1ST QTR			
APR	<1.5 E-09	4.32 \pm 0.3 E-08	9.08 \pm 1.4 E-07
MAY	<9.8 E-10	1.98 \pm 0.2 E-08	<1.0 E-07
JUN	5.89 \pm 3.0 E-09	5.14 \pm 0.3 E-08	2.50 \pm 1.7 E-07
2ND QTR			
JUL	<1.4 E-09	4.09 \pm 0.3 E-08	2.70 \pm 1.2 E-07
AUG	<1.3 E-09	3.64 \pm 0.3 E-08	3.11 \pm 1.3 E-07
SEP	<1.1 E-09	3.99 \pm 0.3 E-08	2.09 \pm 1.2 E-07
3RD QTR			
OCT	2.81 \pm 2.1 E-09	5.37 \pm 0.3 E-08	2.56 \pm 0.2 E-06
NOV	<1.3 E-09	2.17 \pm 0.2 E-08	1.22 \pm 1.1 E-07
DEC	<1.0 E-09	1.99 \pm 0.2 E-08	1.40 \pm 1.1 E-07
4TH QTR			

TABLE C-1.4.2

RADIOACTIVITY CONCENTRATIONS IN SURFACE WATER
DOWNSTREAM OF WDP AT FRANKS CREEK (WNSP006)
($\mu\text{Ci/mL}$)

DATE	C-14	Sr-90	I-129	C-137	U-234
T QTR	<7.0 E-08	1.82 \pm 0.3 E-08	<5.0 E-10	1.58 \pm 0.5 E-07	1.28 \pm 0.3 E-09
D QTR	1.20 \pm 0.5 E-07	1.81 \pm 0.3 E-08	<5.0 E-10	5.17 \pm 4.6 E-08	1.81 \pm 1.5 E-09
D QTR	<3.5 E-06	2.16 \pm 0.3 E-08	2.73 \pm 1.4 E-09	4.73 \pm 2.1 E-08	4.10 \pm 1.6 E-10
H QTR	<2.1 E-07	1.02 \pm 0.1 E-08	<2.0 E-09	6.92 \pm 4.3 E-08	1.25 \pm 0.4 E-09
	U-235	U-238	Pu-238	Pu-239	Am-241
T QTR	<1.4 E-11	5.70 \pm 1.3 E-10	2.58 \pm 1.7 E-11	2.35 \pm 1.7 E-11	<1.2 E-11
D QTR	4.86 \pm 4.8 E-11	7.02 \pm 5.8 E-10	1.79 \pm 1.3 E-11	6.32 \pm 2.2 E-11	2.39 \pm 1.3 E-11
D QTR	<2.0 E-10	2.50 \pm 1.3 E-10	<2.0 E-10	<2.0 E-10	3.00 \pm 2.0 E-10
H QTR	<2.9 E-10	6.36 \pm 2.8 E-10	<5.0 E-11	7.84 \pm 4.9 E-11	6.57 \pm 2.8 E-10

TABLE C-1.5

RADIOACTIVITY CONCENTRATIONS IN SURFACE WATER
DOWNSTREAM OF BUTTERMILK CREEK AT FELTON BRIDGE (WFFELBR)
($\mu\text{Ci}/\text{mL}$)

1988	ALPHA	BETA	H-3	SR-90	CS-137
JAN	<6.9 E-10	3.01 \pm 1.2 E-09	<1.0 E-07	2.11 \pm 2.1 E-09	<2.1 E-08
FEB	<1.4 E-09	3.87 \pm 1.3 E-09	<1.0 E-07	<1.9 E-09	<2.1 E-08
MAR	<1.0 E-09	7.32 \pm 1.4 E-09	<1.0 E-07	4.91 \pm 2.0 E-09	<2.1 E-08
APR	2.52 \pm 1.8 E-09	7.80 \pm 1.4 E-09	<1.0 E-07	2.92 \pm 1.5 E-09	<2.1 E-08
MAY	1.76 \pm 1.4 E-09	4.98 \pm 1.2 E-09	<1.3 E-07	3.30 \pm 1.3 E-09	<2.1 E-08
JUN	<9.1 E-10	4.24 \pm 1.1 E-09	<1.0 E-07	3.48 \pm 1.6 E-09	<2.1 E-08
JUL	<8.7 E-10	5.00 \pm 1.2 E-09	<1.0 E-07	1.14 \pm 1.0 E-09	<2.1 E-08
AUG	<8.2 E-10	3.33 \pm 1.0 E-09	<1.0 E-07	1.71 \pm 1.2 E-09	<2.1 E-08
SEP	<1.2 E-09	3.73 \pm 1.1 E-09	<1.0 E-07	<1.1 E-09	<2.1 E-08
OCT	1.87 \pm 1.8 E-09	6.30 \pm 1.3 E-09	<1.0 E-07	8.92 \pm 2.1 E-09	<2.1 E-08
NOV	<1.1 E-09	2.83 \pm 1.0 E-09	<1.0 E-07	3.50 \pm 1.6 E-09	<2.1 E-08
DEC	<1.4 E-09	5.14 \pm 1.2 E-09	<1.0 E-07	3.86 \pm 1.5 E-09	<2.1 E-08

TABLE C-1.6
 RADIOACTIVITY CONCENTRATIONS IN POTABLE WELL WATER
 AROUND THE WVDP SITE - 1988
 ($\mu\text{Ci/mL}$)

<u>Sample I.D.</u>	<u>Alpha</u>	<u>Beta</u>	<u>Tritium</u>	<u>Cs-137</u>
WFWEL 01	<1.1 E-09	1.35 \pm 0.97 E-09	<1.0 E-07	<3.7 E-08
WFWEL 03	<1.1 E-09	2.76 \pm 1.17 E-09	<1.0 E-07	<3.7 E-08
WFWEL 04	<1.4 E-09	2.09 \pm 1.32 E-09	<1.0 E-07	<3.7 E-08
WFWEL 06	<6.4 E-10	<8.0 E-10	<1.0 E-07	<3.7 E-08
WFWEL 07	<9.3 E-10	<8.8 E-10	<1.0 E-07	<3.7 E-08
WFWEL 10	<9.5 E-10	<9.3 E-10	<1.0 E-07	<3.7 E-08

TABLE C-1.7
 1988 RADIOACTIVITY CONCENTRATIONS IN STREAM SEDIMENT AROUND WVDP SITE
 ($\mu\text{Ci/mL}$, dry weight from upper 15 cm)

Location	Date	K-40	Cs-137
SFBCSED	June 1988	$1.24 \pm 0.1 \text{ E-05}$	$7.72 \pm 3.8 \text{ E-08}$
SFSDSED	June 1988	$1.28 \pm 0.2 \text{ E-05}$	$3.79 \pm 1.4 \text{ E-07}$
SFTCSSED	June 1988	$8.91 \pm 1.7 \text{ E-06}$	$2.68 \pm 0.2 \text{ E-06}$
SFCCSED	June 1988	$1.25 \pm 0.2 \text{ E-05}$	$4.67 \pm 1.3 \text{ E-07}$
SFBISED	June 1988	$1.08 \pm 0.1 \text{ E-05}$	$5.33 \pm 3.7 \text{ E-08}$
SFBCSED	Oct. 1988	$1.20 \pm 0.1 \text{ E-05}$	$4.65 \pm 3.9 \text{ E-08}$
SFSDSED	Nov. 1988	$1.52 \pm 0.2 \text{ E-05}$	$7.18 \pm 1.5 \text{ E-07}$
SFTCSSED	Oct. 1988	$1.36 \pm 0.2 \text{ E-05}$	$1.91 \pm 0.2 \text{ E-06}$
SFCCSED	Oct. 1988	$1.20 \pm 0.2 \text{ E-05}$	$4.25 \pm 3.8 \text{ E-08}$
SFBISED	Oct. 1988	$1.08 \pm 0.1 \text{ E-05}$	$6.73 \pm 3.8 \text{ E-08}$

TABLE C-1.8

1988 CONTRIBUTION BY NEW YORK STATE LOW-LEVEL WASTE
DISPOSAL AREA TO RADIOACTIVITY IN WVDP LIQUID EFFLUENTS
(Curies)

	1988 Totals
Gross Alpha	< 5.3 E-07
Gross Beta	6.43 ± 0.3 E-04
Tritium	4.35 ± 0.1 E-02
Sr-90	3.45 ± 0.1 E-04
I-129	7.79 ± 2.7 E-07
Cs-137	3.63 ± 3.0 E-05
