Table C-IX.1 QUARTERLY OSLD RESULTS FOR BYRON NUCLEAR GENERATING STATION, 2019

RESULTS IN UNITS OF MREM/QUARTER ± 2 STANDARD DEVIATIONS

STATION CODE	MEAN ± 2 S.D.	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC
BY-01-1	17 ± 4	14	18	18	17
BY-04-1	20 ± 5	17	21	22	20
BY-06-1	17 ± 4	14	19	17	17
BY-08-1 (Ctrl)	17 ± 5	13	18	18	18
BY-21-1	15 ± 4	13	16	17	16
BY-22-1	20 ± 3	18	22	20	21
BY-23-1	20 ± 5	17	22	21	22
BY-24-2	18 ± 3	16	19	19	19
BY-101-1	15 ± 4	12	15	15	17
BY-101-2	16 ± 3	14	16	17	16
BY-102-1	22 ± 7	17	23	24	23
BY-102-2	21 ± 4	19	22	21	24
BY-103-1	20 ± 4	17	21	21	23
BY-103-2	21 ± 4	18	21	23	22
BY-103-3	20 ± 3	18	20	21	21
BY-104-1	22 ± 3	20	22	22	24
BY-104-2	22 ± 5	18	23	22	23
BY-104-3	19 ± 4	15	20	19	20
BY-105-1	21 ± 4	18	23	22	22
BY-105-2	22 ± 5	19	22	21	25
BY-106-1	22 ± 3	19	22	23	22
BY-106-2	20 ± 4	18	22	21	21
BY-107-1	23 ± 4	20	23	24	24
BY-107-2	22 ± 3	20	22	23	24
BY-107-3	19 ± 4	16	20	20	20
BY-108-1	22 ± 3	20	23	23	23
BY-108-2	19 ± 4	17	20	20	21
BY-109-1	20 ± 4	18	21	22	21
BY-109-2	21 ± 5	17	23	21	23
BY-110-1	19 ± 2	17	19	20	20
BY-110-2	19 ± 4	17	18	21	21
BY-111-3	21 ± 6	17	21	23	24
BY-111-4	20 ± 4	18	21	20	22
BY-112-3	20 ± 4	17	21	20	22
BY-112-4	20 ± 5	16	20	22	22
BY-113-1	21 ± 5	18	22	24	22
BY-113-2	18 ± 3	17	18	18	20
BY-114-1	17 ± 3	15	18	17	16
BY-114-2	19 ± 3	18	20	21	20
BY-115-1	20 ± 4	17	21	21	21
BY-115-2	19 ± 3	17	20	21	20
BY-116-1	19 ± 4	16	20	19	19
BY-116-2	18 ± 3	16	18	20	19
BY-116-3	19 ± 3	17	20	19	20
BY-201-3	20 ± 2	18	21	20	21
BY-201-4	21 ± 3	19	22	21	21
BY-202-1	20 ± 3	18	20	21	22
BY-202-2	22 ± 4	19	22	24	23
BY-203-1	17 ± 4	14	17	16	19

Table C-IX.1 QUARTERLY OSLD RESULTS FOR BYRON NUCLEAR GENERATING STATION, 2019

RESULTS IN UNITS OF MREM/QUARTER ± 2 STANDARD DEVIATIONS

STATION CODE	MEAN ± 2 S.D.	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC
BY-203-2	18 ± 2	17	20	19	18
BY-204-1	18 ± 2	16	18	18	18
BY-204-2	20 ± 3	18	22	20	21
BY-205-1	21 ± 4	19	22	22	23
BY-205-2	19 ± 4	17	21	19	20
BY-206-1	22 ± 4	18	23	23	23
BY-206-2	22 ± 3	20	23	21	22
BY-207-1	22 ± 4	19	23	23	23
BY-207-2	21 ± 6	17	23	23	23
BY-208-1	22 ± 5	19	23	21	24
BY-208-2	21 ± 5	18	24	22	21
BY-209-1	21 ± 4	19	22	22	23
BY-209-4	22 ± 3	20	24	22	22
BY-210-3	22 ± 3	20	23	22	23
BY-210-4	20 ± 3	18	21	19	21
BY-211-1	21 ± 4	18	23	22	22
BY-211-4	21 ± 4	18	21	22	23
BY-212-1	23 ± 4	20	24	24	24
BY-212-4	23 ± 3	20	24	24	23
BY-213-1	21 ± 5	18	21	23	24
BY-213-4	22 ± 4	19	23	22	23
BY-214-1	21 ± 3	19	22	23	21
BY-214-4	21 ± 4	18	22	22	22
BY-215-1	21 ± 3	19	22	22	21
BY-215-4	21 ± 3	19	22	22	21
BY-216-1	22 ± 3	20	22	24	22
BY-216-2	21 ± 3	19	22	23	21
BY-301-1	15 ± 3	13	16	17	16
BY-301-2	18 ± 3	16	19	18	19
BY-309-1	19 ± 1	18	20	19	19
BY-309-2	20 ± 4	18	22	21	21
BY-309-3	19 ± 3	17	20	20	18
BY-309-4	18 ± 3	15	18	17	19
BY-314-1	16 ± 3	14	17	16	17

TABLE C-IX.2 MEAN QUARTERLY OSLD RESULTS FOR THE INNER RING, OUTER RING, SPECIAL INTEREST, OTHER, AND CONTROL LOCATIONS FOR BYRON NUCLEAR GENERATING STATION, 2019

RESULTS IN UNITS OF MILLIREM/STD. QUARTER ± 2 STANDARD DEVIATION

COLLECTION PERIOD	INNER RING ± 2 S.D.	OUTER RING ± 2 S.D.	SPECIAL INTEREST ± 2 S.D.	OTHER ± 2 S.D.	CONTROL ± 2 S.D.
JAN-MAR	17 ± 3	18 ± 2	16 ± 3	15 ± 4	13 ± 0
APR-JUN	21 ± 4	22 ± 3	19 ± 4	20 ± 5	18 ± 0
JUL-SEP	21 ± 4	21 ± 4	18 ± 4	19 ± 4	18 ± 0
OCT-DEC	21 ± 4	22 ± 3	19 ± 4	19 ± 5	18 ± 0

TABLE C-IX.3 SUMMARY OF THE AMBIENT DOSIMETRY PROGRAM FOR BYRON NUCLEAR GENERATING STATION, 2019

RESULTS IN UNITS OF MILLIREM/STD. QUARTER ± 2 STANDARD DEVIATION

LOCATION	SAMPLES ANALYZED	PERIOD MINIMUM	PERIOD MAXIMUM	PERIOD MEAN ± 2 S.D.
INNER RING	144	12	25	20 ± 5
OUTER RING	128	14	24	21 ± 4
SPECIAL INTEREST	28	13	22	18 ± 4
OTHER	28	13	22	18 ± 5
CONTROL	4	13	18	17 ± 5

INNER RING STATIONS - BY-101-1, BY-101-2, BY-102-1, BY-102-2, BY-103-1, BY-103-2, BY-103-3, BY-104-1, BY-104-2, BY-104-3, BY-105-1, BY-105-2, BY-106-1, BY-106-2, BY-107-1, BY-107-2, BY-107-3, BY-108-1, BY-108-2, BY-109-1, BY-109-2, BY-110-1, BY-110-2, BY-111-3, BY-111-4, BY-112-3, BY-112-4, BY-113-1, BY-113-2, BY-114-1, BY-114-2, BY-115-1, BY-115-2, BY-116-1, BY-116-2, BY-116-3

OUTER RING STATIONS - BY-201-3, BY-201-4, BY-202-1, BY-202-2, BY-203-1, BY-203-2, BY-204-1, BY-204-2, BY-205-1, BY-205-2, BY-206-1, BY-206-2, BY-207-1, BY-207-2, BY-208-1, BY-208-2, BY-209-1, BY-209-4, BY-210-3, BY-210-4, BY-211-1, BY-211-4, BY-212-1, BY-212-4, BY-213-1, BY-213-4, BY-214-1, BY-214-4, BY-215-1, BY-215-4, BY-216-1, BY-216-2

SPECIAL INTEREST STATIONS - BY-301-1, BY-301-2, BY-309-1*, BY-309-2*, BY-309-3*, BY-309-4*, BY-314-2

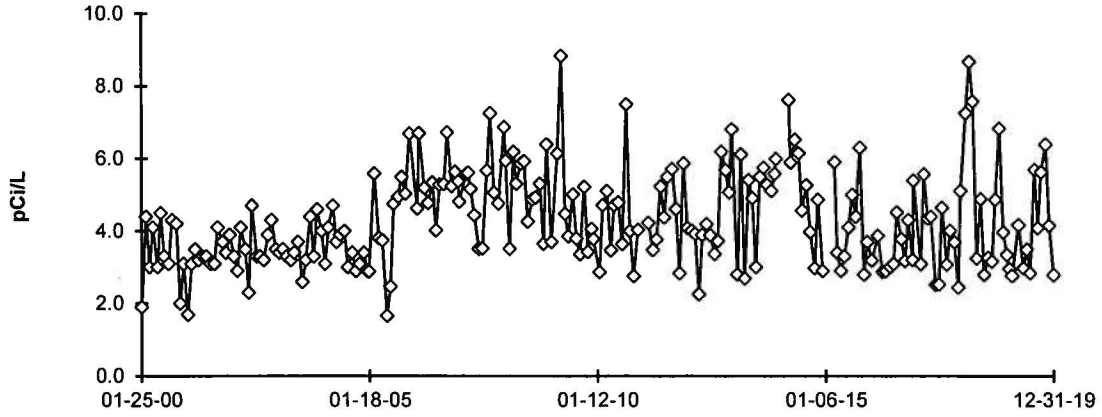
OTHER STATIONS - BY-01-1, BY-04-1, BY-06-1, BY-21-1, BY-22-1,BY-23-1, BY-24

CONTROL STATION - BY-08-1

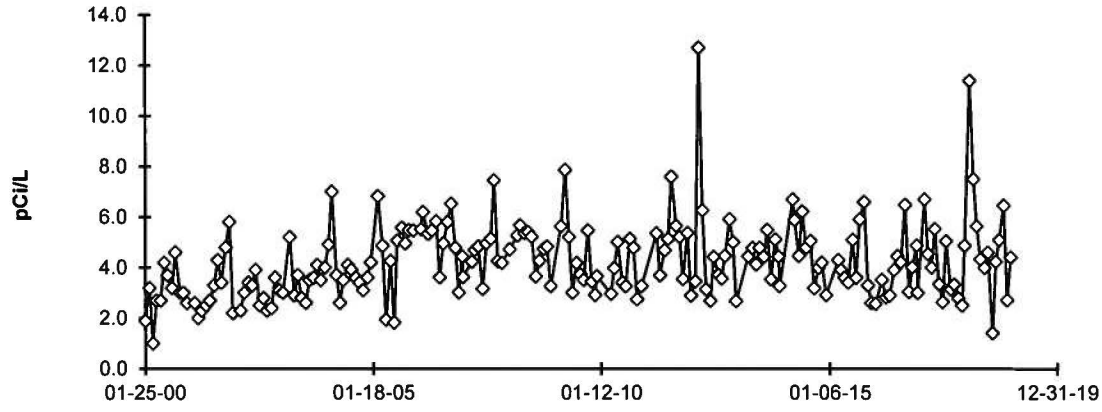
**For ISFSI Monitoring*

FIGURE C-1
Surface Water - Gross Beta - Stations BY-12 and BY-29 (C) Collected in the Vicinity of BNGS, 2000 - 2019

BY-12 Oregon Pool of Rock River, Downstream



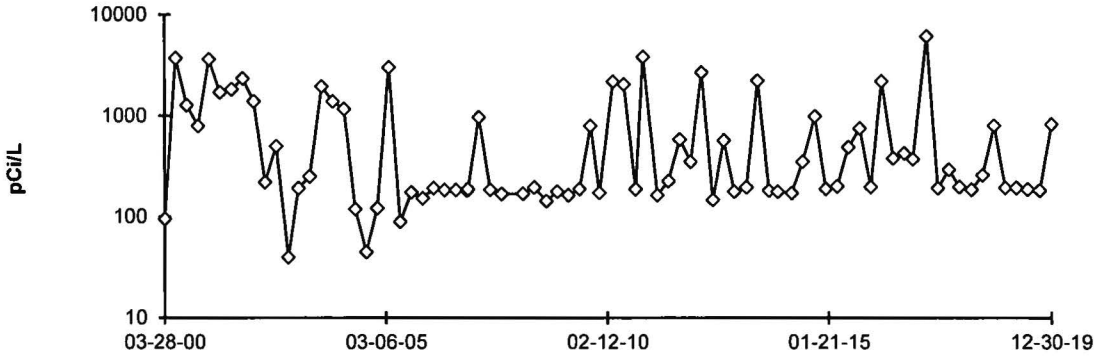
BY-29 (C) Byron, Rock River Upstream



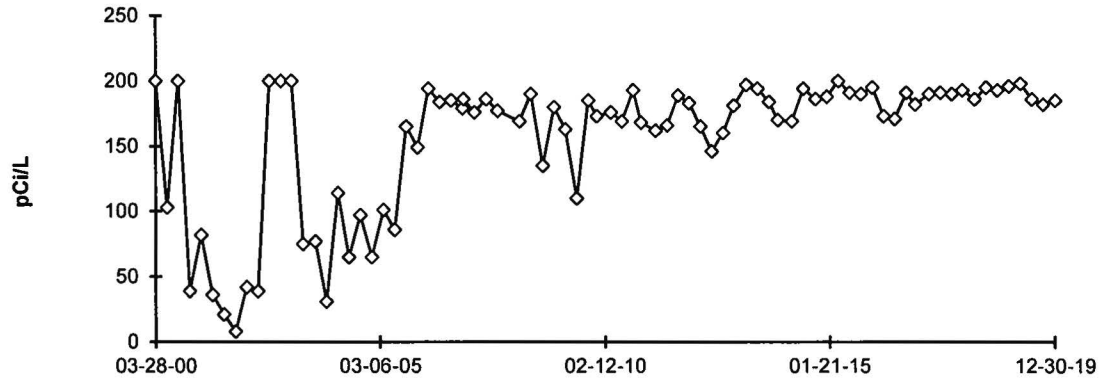
DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MDC VALUES AFTER JUNE 2005

FIGURE C-2
Surface Water - Tritium - Stations BY-12 and BY-29 (C) Collected in the Vicinity of BNGS, 2000 - 2019

BY-12 Oregon Pool of Rock River, Downstream

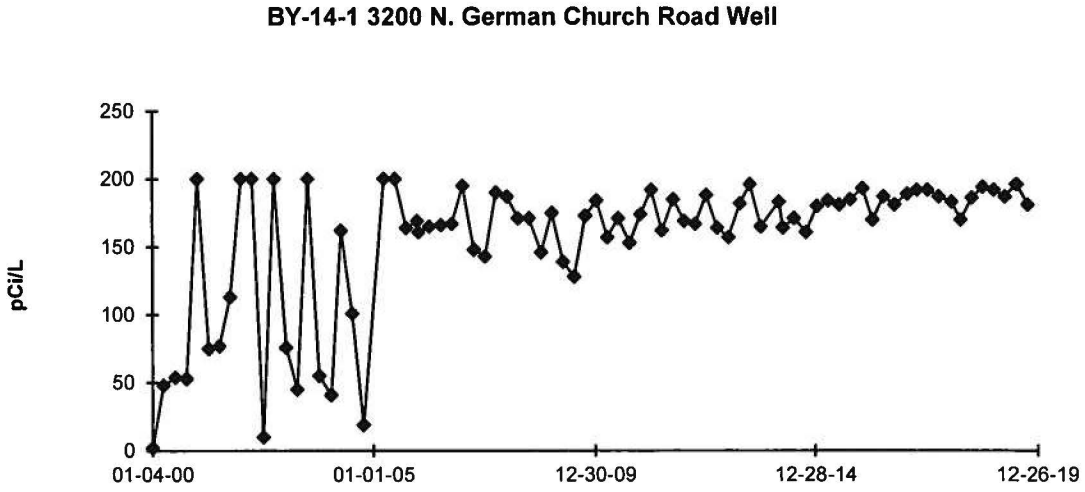


BY-29 (C) Byron, Rock River Upstream



DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MDC VALUES AFTER JUNE 2005

FIGURE C-3
Ground Water - Tritium - Station BY-14-1
Collected in the Vicinity of BNGS, 2000 - 2019



DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MDC VALUES AFTER JUNE 2005

FIGURE C-4
Ground Water - Tritium - Stations BY-18-1
Collected in the Vicinity of BNGS, 2010 - 2019

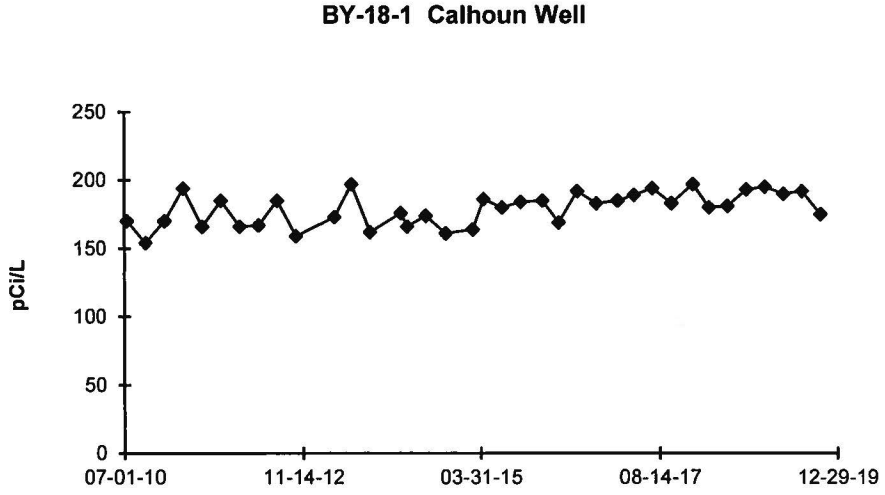
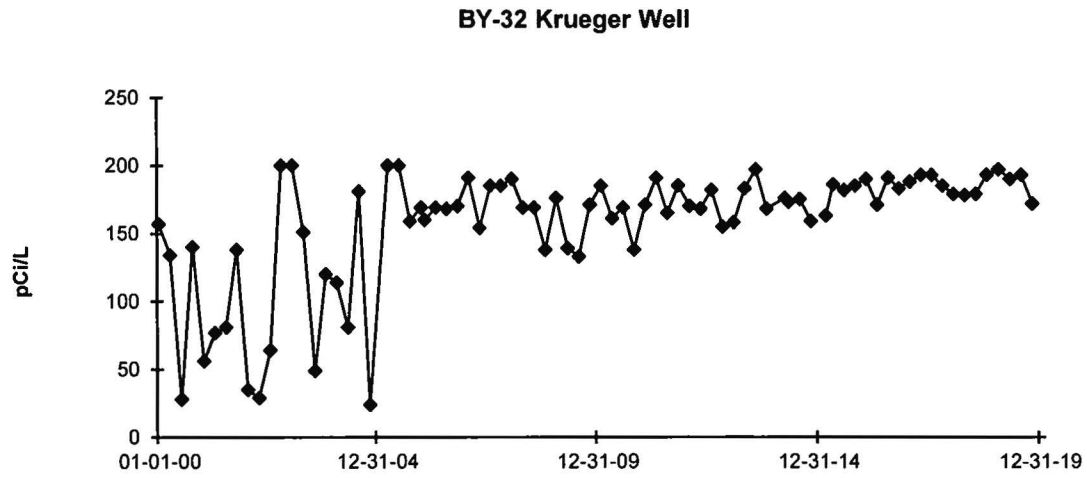


FIGURE C-5
Ground Water - Tritium - Station BY-32
Collected in the Vicinity of BNGS, 2000 - 2019



DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MDC VALUES AFTER JUNE 2005

FIGURE C-6
Ground Water - Tritium - Station BY-35
Collected in the Vicinity of BNGS, 2006 - 2019

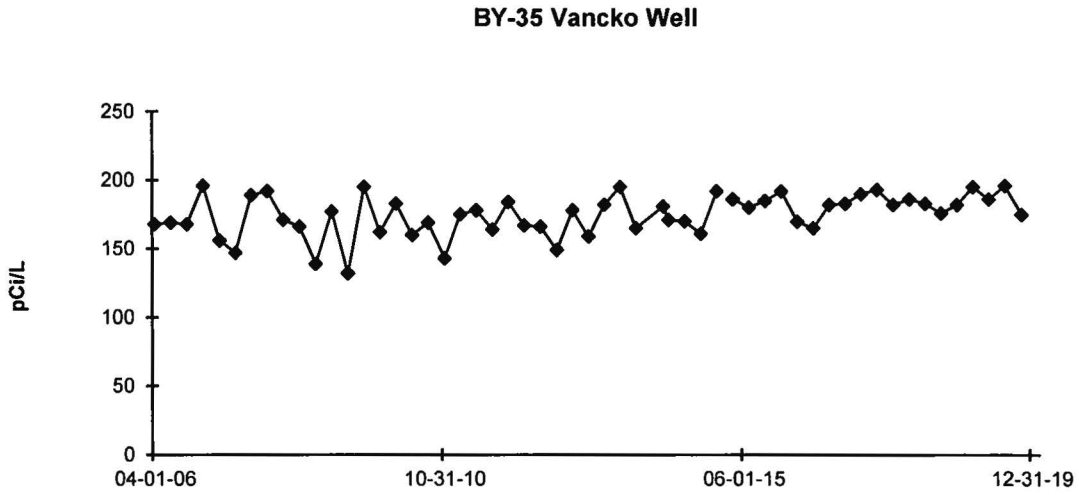
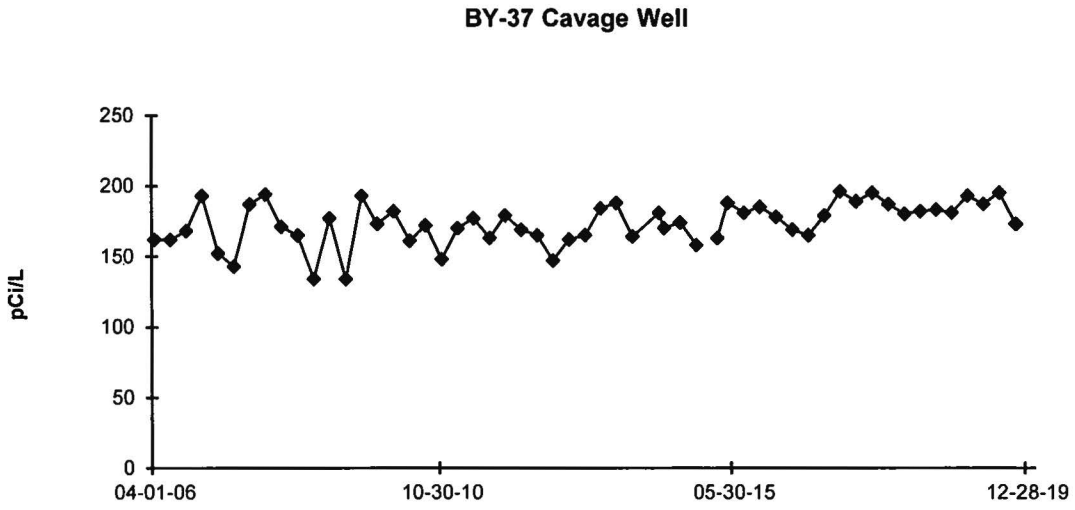


FIGURE C-7
Ground Water - Tritium - Station BY-37
Collected in the Vicinity of BNGS, 2006 - 2019



Ground Water - Tritium - Station BY-38
Collected in the Vicinity of BNGS, 2006 - 2019

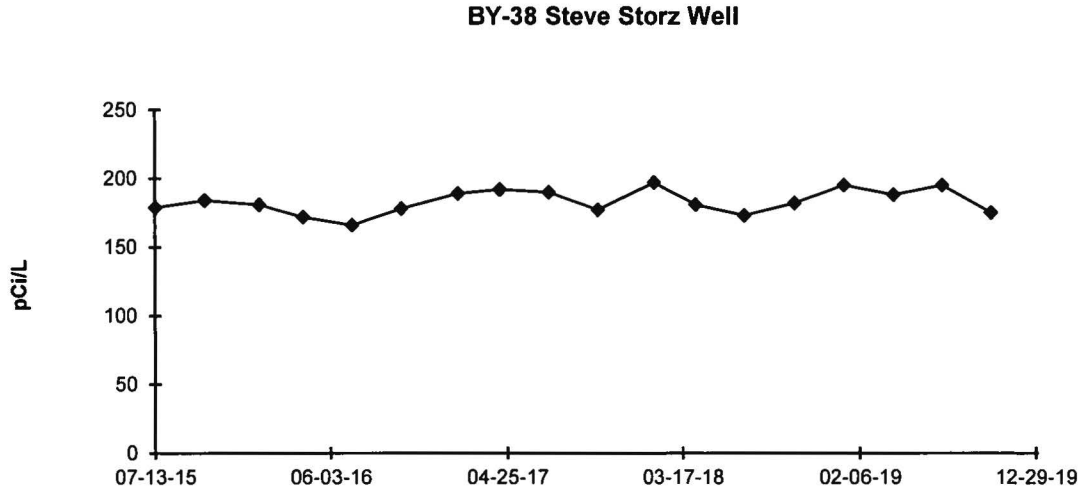
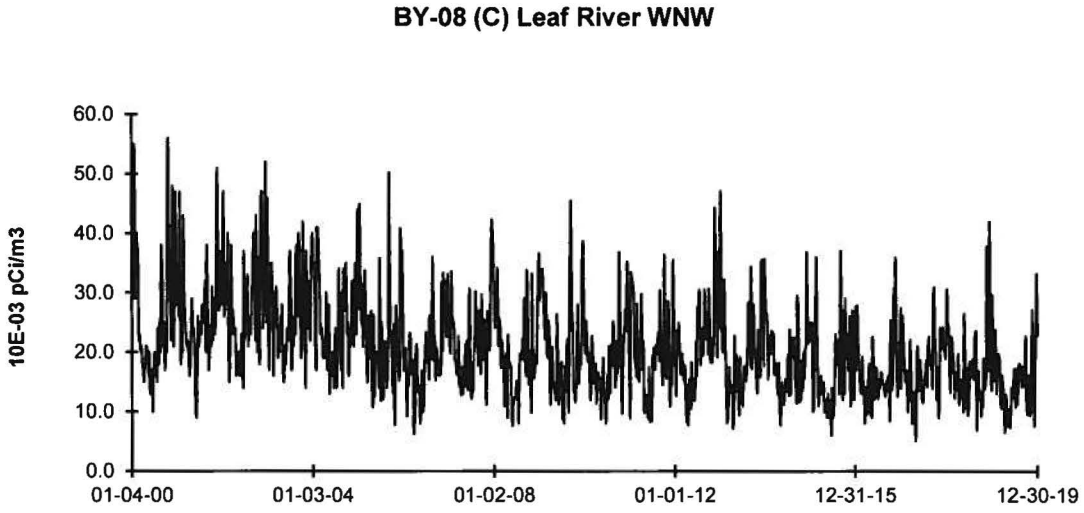


FIGURE C-8
Air Particulate - Gross Beta - Stations BY-08 (C) and BY-21 Collected in the Vicinity of BNGS, 2000 - 2019



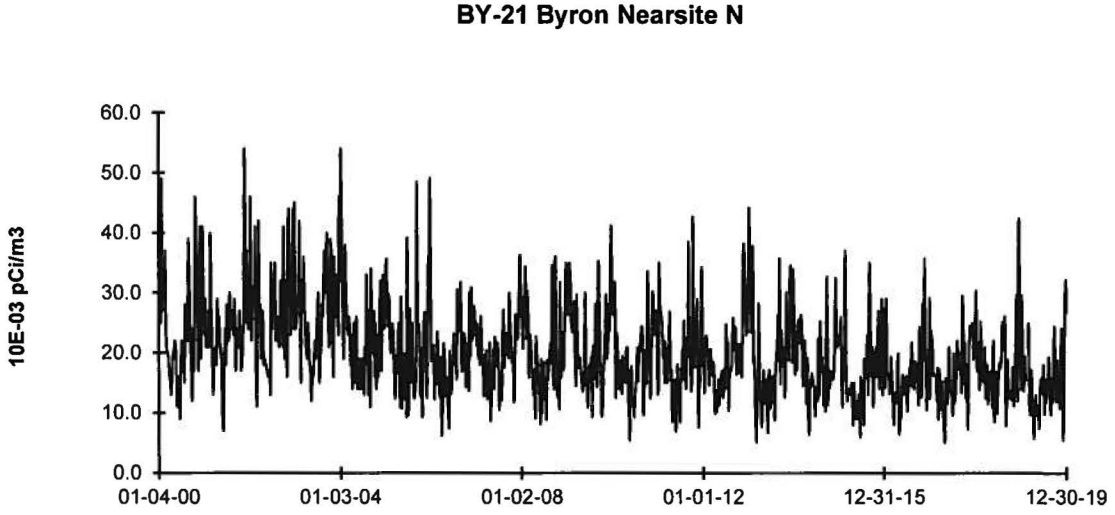
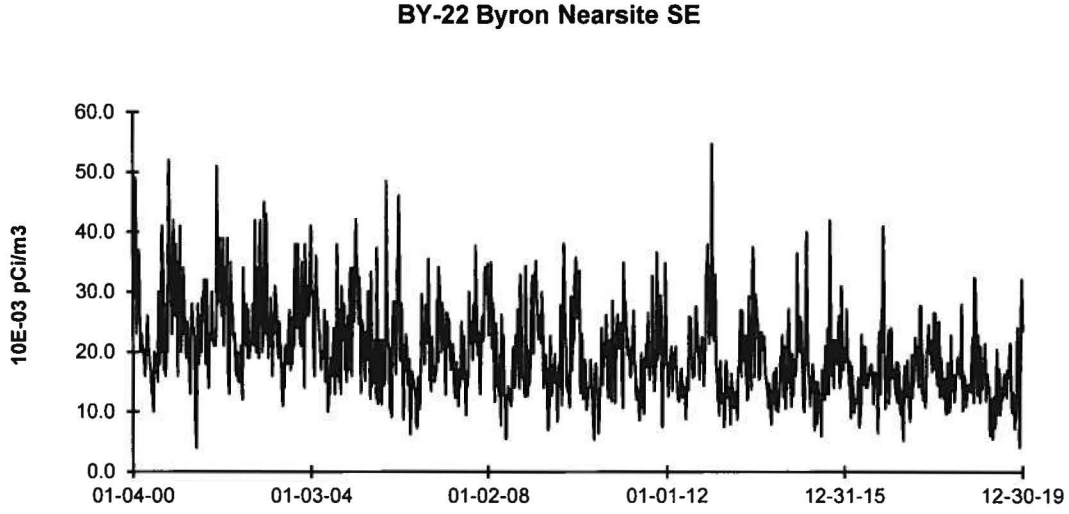


FIGURE C-9
Air Particulate - Gross Beta - Stations BY-22 and BY-23 Collected in the Vicinity of BNGS, 2000 - 2019



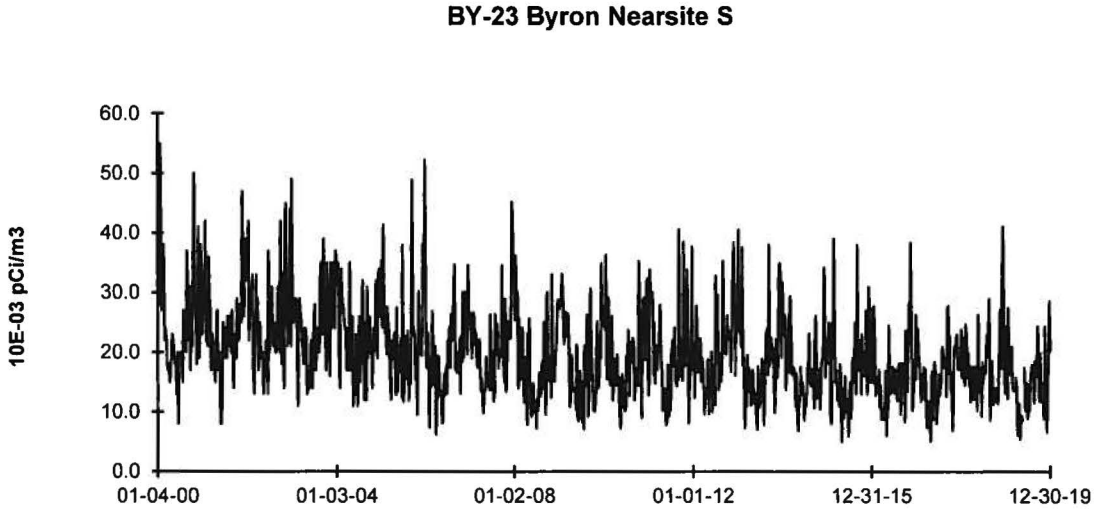


FIGURE C-10
Air Particulate - Gross Beta - Stations BY-24
Collected in the Vicinity of BNGS, 2000 - 2019

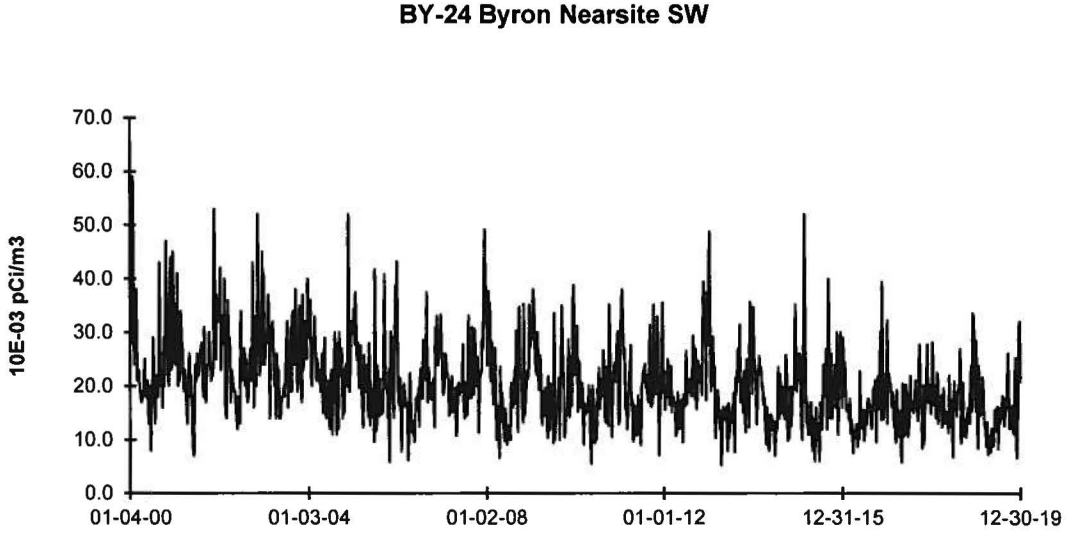
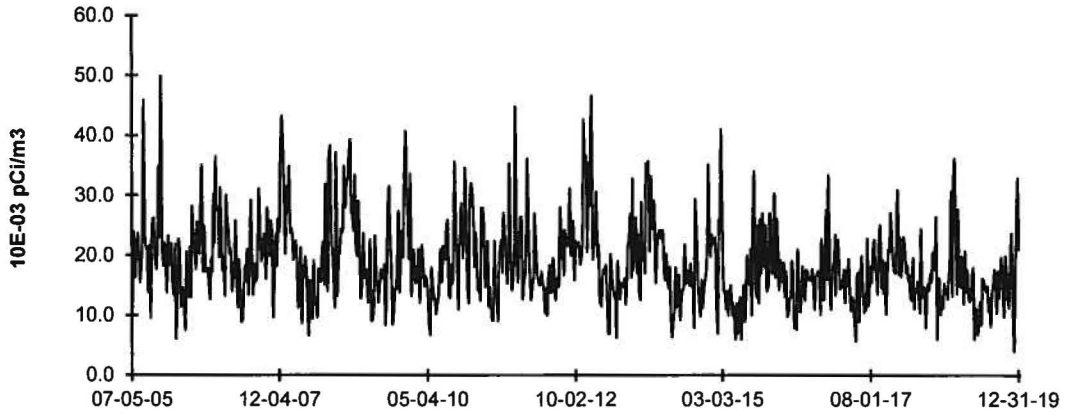
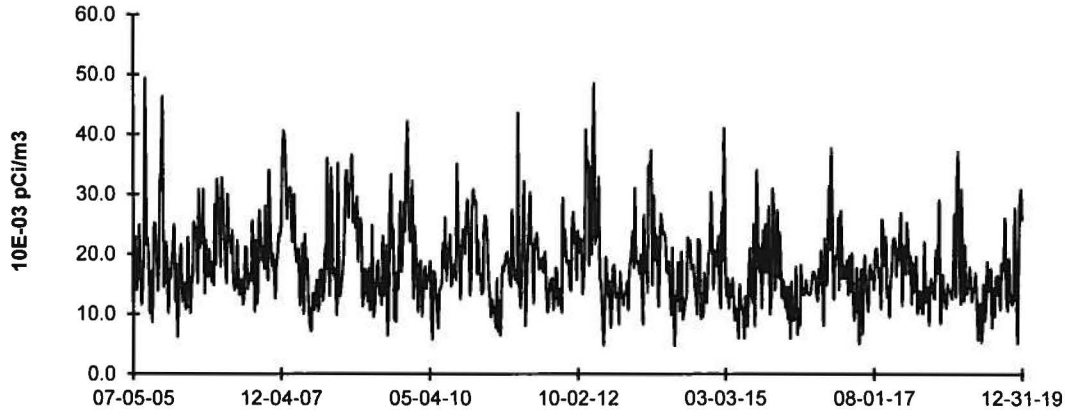


FIGURE C-11
Air Particulate - Gross Beta - Stations BY-01 and BY-04 Collected in the Vicinity of BNGS, 2005 - 2019

BY-01 Byron N

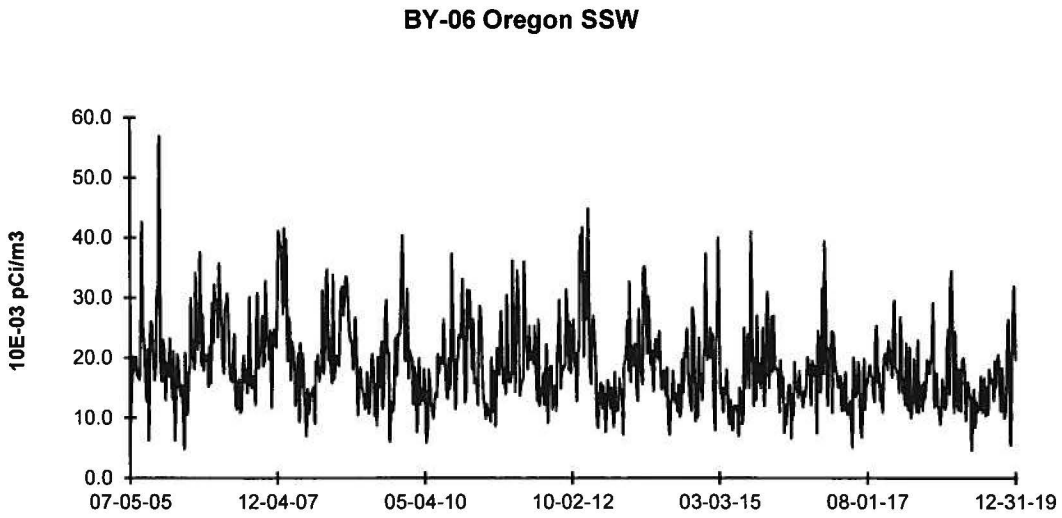


BY-04 Paynes Point SE



Regular analysis of far field air particulate & gross beta did not take place prior to 2005

FIGURE C-12
Air Particulate - Gross Beta - Station BY-06
Collected in the Vicinity of BNGS, 2005 - 2019



Regular analysis of far field air particulate & gross beta did not take place prior to 2005

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APPENDIX D

INTER-LABORATORY COMPARISON PROGRAM

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Table D.1 **Analytics Environmental Radioactivity Cross Check Program**
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Ratio of TBE to Analytics Result	Evaluation [b]
March 2019	E12468A	Milk	Sr-89	pCi/L	87.1	96	0.91	A
			Sr-90	pCi/L	12.6	12.6	1.00	A
	E12469A	Milk	Ce-141	pCi/L	113	117	0.97	A
			Co-58	pCi/L	153	143	1.07	A
			Co-60	pCi/L	289	299	0.97	A
			Cr-51	pCi/L	233	293	0.80	A
			Cs-134	pCi/L	147	160	0.92	A
			Cs-137	pCi/L	193	196	0.98	A
			Fe-59	pCi/L	153	159	0.96	A
			I-131	pCi/L	91.5	89.5	1.02	A
			Mn-54	pCi/L	149	143	1.04	A
			Zn-65	pCi/L	209	220	0.95	A
	E12470	Charcoal	I-131	pCi	77.5	75.2	1.03	A
	E12471	AP	Ce-141	pCi	60.7	70.2	0.87	A
			Co-58	pCi	87.9	85.8	1.02	A
			Co-60	pCi	175	179	0.98	A
			Cr-51	pCi	165	176	0.94	A
			Cs-134	pCi	91.2	95.9	0.95	A
			Cs-137	pCi	120	118	1.02	A
			Fe-59	pCi	108	95.3	1.13	A
			Mn-54	pCi	94.2	85.7	1.10	A
			Zn-65	pCi	102	132	0.77	W
	E12472	Water	Fe-55	pCi/L	2230	1920	1.16	A
	E12473	Soil	Ce-141	pCi/g	0.189	0.183	1.03	A
			Co-58	pCi/g	0.209	0.224	0.93	A
			Co-60	pCi/g	0.481	0.466	1.03	A
			Cr-51	pCi/g	0.522	0.457	1.14	A
			Cs-134	pCi/g	0.218	0.250	0.87	A
			Cs-137	pCi/g	0.370	0.381	0.97	A
			Fe-59	pCi/g	0.263	0.248	1.06	A
			Mn-54	pCi/g	0.248	0.223	1.11	A
			Zn-65	pCi/g	0.371	0.344	1.08	A
	E12474	AP	Sr-89	pCi	88.3	95.2	0.93	A
			Sr-90	pCi	11.7	12.5	0.94	A
August 2019	E12562	Soil	Sr-90	pCi/g	4.710	6.710	0.70	W

(a) The Analytics known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation

(b) Analytics evaluation based on TBE internal QC limits:

A = Acceptable - reported result falls within ratio limits of 0.80-1.20

W = Acceptable with warning - reported result falls within 0.70-0.80 or 1.20-1.30

N = Not Acceptable - reported result falls outside the ratio limits of < 0.70 and > 1.30

Table D.1 **Analytics Environmental Radioactivity Cross Check Program**
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Ratio of TBE to Analytics Result	Evaluation [b]
September 2019	E12475	Milk	Sr-89	pCi/L	70.0	93.9	0.75	W
			Sr-90	pCi/L	12.0	12.9	0.93	A
	E12476	Milk	Ce-141	pCi/L	150	167	0.90	A
			Co-58	pCi/L	170	175	0.97	A
			Co-60	pCi/L	211	211	1.00	A
			Cr-51	pCi/L	323	331	0.98	A
			Cs-134	pCi/L	180	207	0.87	A
			Cs-137	pCi/L	147	151	0.97	A
			Fe-59	pCi/L	156	148	1.05	A
			I-131	pCi/L	81.1	92.1	0.88	A
			Mn-54	pCi/L	160	154	1.04	A
			Zn-65	pCi/L	303	293	1.03	A
	E12477	Charcoal	I-131	pCi	95.9	95.1	1.01	A
	E12478	AP	Ce-141	pCi	129	138	0.93	A
			Co-58	pCi	128	145	0.88	A
			Co-60	pCi	181	174	1.04	A
			Cr-51	pCi	292	274	1.07	A
			Cs-134	pCi	166	171	0.97	A
			Cs-137	pCi	115	125	0.92	A
			Fe-59	pCi	119	123	0.97	A
			Mn-54	pCi	129	128	1.01	A
			Zn-65	pCi	230	242	0.95	A
	E12479	Water	Fe-55	pCi/L	1810	1850	0.98	A
	E12480	Soil	Ce-141	pCi/g	0.305	0.276	1.10	A
			Co-58	pCi/g	0.270	0.289	0.93	A
			Co-60	pCi/g	0.358	0.348	1.03	A
			Cr-51	pCi/g	0.765	0.547	1.40	N[1]
			Cs-134	pCi/g	0.327	0.343	0.95	A
			Cs-137	pCi/g	0.308	0.321	0.96	A
			Fe-59	pCi/g	0.257	0.245	1.05	A
			Mn-54	pCi/g	0.274	0.255	1.07	A
			Zn-65	pCi/g	0.536	0.485	1.11	A
	E12481	AP	Sr-89	pCi	95.9	91.9	1.04	A
			Sr-90	pCi	12.3	12.6	0.97	A
	E12563	Soil	Sr-90	pCi/g	0.392	0.360	1.09	A

(a) The Analytics known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation

(b) Analytics evaluation based on TBE internal QC limits:

A = Acceptable - reported result falls within ratio limits of 0.80-1.20

W = Acceptable with warning - reported result falls within 0.70-0.80 or 1.20-1.30

N = Not Acceptable - reported result falls outside the ratio limits of < 0.70 and > 1.30

*(1) See **NCR 19-27***

DOE's Mixed Analyte Performance Evaluation Program (MAPEP)

Table D.2 **Teledyne Brown Engineering Environmental Services**

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Acceptance Range	Evaluation [b]
February 2019	19-GrF40	AP	Gross Alpha	Bq/sample	0.184	0.528	0.158 - 0.898	A
			Gross Beta	Bq/sample	0.785	0.948	0.474 - 1.422	A
	19-MaS40	Soil	Ni-63	Bq/kg	420	519.0	363 - 675	A
			Sr-90	Bq/kg			*(1)*	NR(3)
	19-MaW40	Water	Am-241	Bq/L	0.764	0.582	0.407 - 0.757	N(4)
			Ni-63	Bq/L	4.72	5.8	4.1 - 7.5	A
			Pu-238	Bq/L	0.443	0.451	0.316 - 0.586	A
			Pu-239/240	Bq/L	-0.00161	0.0045	*(2)*	A
	19-RdF40	AP	U-234/233	Bq/sample	0.1138	0.106	0.074 - 0.138	A
			U-238	Bq/sample	0.107	0.110	0.077 - 0.143	A
	19-RdV40	Vegetation	Cs-134	Bq/sample	2.14	2.44	1.71 - 3.17	A
			Cs-137	Bq/sample	2.22	2.30	1.61 - 2.99	A
			Co-57	Bq/sample	2.16	2.07	1.45 - 2.69	A
			Co-60	Bq/sample	0.02382		*(1)*	A
			Mn-54	Bq/sample	-0.03607		*(1)*	A
			Sr-90	Bq/sample	-0.1060		*(1)*	N(5)
			Zn-65	Bq/sample	1.35	1.71	1.20 - 2.22	W
August 2019	19-GrF41	AP	Gross Alpha	Bq/sample	0.192	0.528	0.158 - 0.898	W
			Gross Beta	Bq/sample	0.722	0.937	0.469 - 1.406	A
	19-MaS41	Soil	Ni-63	Bq/kg	436	629	440 - 818	N(6)
			Sr-90	Bq/kg	444	572	400 - 744	W
	19-MaW41	Water	Am-241	Bq/L				NR(7)
			Ni-63	Bq/L	7.28	9.7	6.8 - 12.6	W
			Pu-238	Bq/L	0.0207	0.0063	*(2)*	A
			Pu-239/240	Bq/L	0.741	0.727	0.509 - 0.945	A
	19-RdF41	AP	U-234/233	Bq/sample	0.0966	0.093	0.065 - 0.121	A
			U-238	Bq/sample	0.0852	0.096	0.067-0.125	A
	19-RdV41	Vegetation	Cs-134	Bq/sample	0.0197		*(1)*	A
			Cs-137	Bq/sample	3.21	3.28	2.30 - 4.26	A
			Co-57	Bq/sample	4.62	4.57	3.20 - 5.94	A
			Co-60	Bq/sample	4.88	5.30	3.71 - 6.89	A
			Mn-54	Bq/sample	4.54	4.49	3.14 - 5.84	A
			Sr-90	Bq/sample	0.889	1.00	0.70 - 1.30	A
			Zn-65	Bq/sample	2.78	2.85	2.00 - 3.71	A

(a) The MAPEP known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation

(b) DOE/MAPEP evaluation:

A = Acceptable - reported result falls within ratio limits of 0.80-1.20

W = Acceptable with warning - reported result falls within 0.70-0.80 or 1.20-1.30

N = Not Acceptable - reported result falls outside the ratio limits of < 0.70 and > 1.30

(1) False positive test

(2) Sensitivity evaluation

*(3) See **NCR 19-12***

*(4) See **NCR 19-13***

*(5) See **NCR 19-14***

*(6) See **NCR 19-25***

*(7) See **NCR 19-26***

Table D.3 **ERA Environmental Radioactivity Cross Check Program**
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Acceptance Limits	Evaluation [b]
April 2019	Rad-117	Water	Ba-133	pCi/L	26.3	24.1	18.6 - 27.8	A
			Cs-134	pCi/L	15.2	12.1	8.39 - 14.4	N[1]
			Cs-137	pCi/L	33.6	33.1	28.8 - 39.4	A
			Co-60	pCi/L	11.9	11.5	8.67 - 15.5	A
			Zn-65	pCi/L	87.1	89.2	80.3 - 107	A
			GR-A	pCi/L	19	19.3	9.56 - 26.5	A
			GR-B	pCi/L	20.2	29.9	19.1 - 37.7	A
			U-Nat	pCi/L	55.5	55.9	45.6 - 61.5	A
			H-3	pCi/L	21500	21400	18700 - 23500	A
			Sr-89	pCi/L	44.9	33.3	24.5 - 40.1	N[2]
			Sr-90	pCi/L	24.5	26.3	19.0 - 30.7	A
			I-131	pCi/L	28.9	28.4	23.6 - 33.3	A
October 2019	Rad-119	Water	Ba-133	pCi/L	42.7	43.8	35.7 - 48.8	A
			Cs-134	pCi/L	53.5	55.9	45.2 - 61.5	A
			Cs-137	pCi/L	77.7	78.7	70.8 - 89.2	A
			Co-60	pCi/L	51.5	53.4	48.1 - 61.3	A
			Zn-65	pCi/L	36.6	34.0	28.5 - 43.1	A
			GR-A	pCi/L	40.5	27.6	14.0 - 36.3	N[3]
			GR-B	pCi/L	36.3	39.8	26.4 - 47.3	A
			U-Nat	pCi/L	27.66	28.0	22.6 - 31.1	A
			H-3	pCi/L	22800	23400	20500 - 25700	A
			Sr-89	pCi/L	47.1	45.5	35.4 - 52.7	A
			Sr-90	pCi/L	32.5	26.5	19.2 - 30.9	N[4]
			I-131	pCi/L	26.0	23.9	19.8 - 28.4	A
December 2019	QR 120419D	Water	Sr-90	pCi/L	20.1	18.6	13.2 - 22.1	A

(a) The ERA known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.

(b) ERA evaluation:
A = Acceptable - Reported value falls within the Acceptance Limits
N = Not Acceptable - Reported value falls outside of the Acceptance Limits

*(1) See **NCR 19-10***
*(2) See **NCR 19-11***
*(3) See **NCR 19-23***
*(4) See **NCR 19-24***

APPENDIX E

EFFLUENT REPORT

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TABLE OF CONTENTS

Table of Contents (cont.)

SUMMARY

Calculations based on gaseous and liquid effluents and meteorological data indicate that public dose due to radioactive material attributable to Byron Station during the period does not exceed regulatory or Offsite Dose Calculation Manual (ODCM) limits.

The Total Effective Dose Equivalent (TEDE) due to licensed activities at Byron Station calculated for the maximum exposed individual for the period is 2.54E-01 mrem. The annual limit on TEDE is 100 mrem.

The assessment of radiation doses to the public is performed in accordance with the ODCM. The results of these analyses confirm that the station is operating in compliance with 10CFR50 Appendix I, 10CFR20 and 40CFR190.

There were no additional operational controls implemented which affected the areas of radiological effluents in 2019.

There were no measurements which exceeded the reporting levels, including any which would not have been attributable to station effluents.

The results of the current radiological environmental monitoring program are approximately the same as those found during the pre-operational studies conducted at Byron Station.

INTRODUCTION

Liquid effluents from Byron Station are released to the Rock River in controlled batches after radioassay of each batch. Gaseous effluents are released to the atmosphere and are calculated on the basis of analyses of weekly grab samples and grab samples of batch releases prior to the release of noble gases as well as continuously collected composite samples of iodine and particulate radioactivity sampled during the course of the year. The results of effluent analyses are summarized on a monthly basis. Airborne concentrations of noble gases, I-131, and particulate radioactivity in offsite areas are calculated using isotopic composition of effluents and meteorological data. C-14 concentration in offsite areas is calculated based on industry-approved methodology for estimation of the amount released and meteorological data.

Environmental monitoring is conducted by sampling at indicator and control (background) locations in the vicinity of Byron Station to measure changes in radiation or radioactivity levels that may be attributable to station operation. If significant changes attributable to Byron Station are measured, these changes are correlated with effluent releases. An environmental monitoring program is conducted which also includes all potential pathways at the site. Gaseous pathways include ground plane (direct), inhalation, vegetation, meat, and milk. Liquid pathways include potable water and freshwater fish. The critical pathway for 2019 gaseous dose was vegetation. The critical pathway for 2019 liquid dose was freshwater fish.

1.0 EFFLUENTS

1.1 Gaseous Effluents to the Atmosphere

Measured concentrations and isotopic composition of noble gases, radioiodine, tritium and particulate radioactivity released to the atmosphere during the year are listed in Table 1.1-1.

A total of 6.62E-01 curies of fission and activation gases were released with a maximum average quarterly release rate of 2.41E-02 µCi/sec.

A total of 1.06E-06 curies of I-131 were released during the year with a maximum average quarterly release rate of 1.35E-07 µCi/sec.

A total of 0.00E+00 curies were released as airborne particulate matter with a maximum average quarterly release rate of 0.00E+00 µCi/sec.

A total of 8.53E+00 curies of other (C-14) radioisotopes were released with a maximum average quarterly release rate of 2.82E-01 µCi/sec.

A total of 5.17E+01 curies of tritium were released with a maximum average quarterly release rate of 2.69E+00 µCi/sec.

Gross alpha-emitting radionuclides were below detectable limits.

1.2 Liquids Released to Rock River

A total of 3.00E+10 liters of radioactive liquid wastes containing 1.17E-02 curies of fission and activation products were discharged with a maximum quarterly average concentration of 1.37E-13 µCi/ml.

A total of 2.12E+03 curies of tritium were discharged with a maximum quarterly average concentration of 1.99E-05 µCi/ml.

A total of 1.28E-04 curies of dissolved and entrained gases were discharged with a maximum quarterly average concentration of 2.16E-15 µCi/ml.

Gross alpha-emitting radionuclides were below detectable limits.

Quarterly release totals of principal radionuclides in liquid effluents are given in Table 1.2-1.

2.0 SOLID RADIOACTIVE WASTE

Solid radioactive wastes were shipped by truck. For detail, refer to Byron Station 2019 Annual Radiological Effluent Release Report.

3.0 DOSE TO MAN

3.1 Gaseous Effluent Pathways

Table 3.2-1 summarizes the doses resulting from releases of airborne radioactivity via the different exposure pathways.

3.1.1 Noble Gases

3.1.1.1 Gamma Dose Rates

Offsite Gamma air and whole body dose rates are shown in Table 3.2-1 and were calculated based on measured release rates, isotopic composition of the noble gases, and average meteorological data for the period. Dose rates based on concurrent meteorological data are shown in Table 3.4-1. Based on measured effluents and average meteorological data, the maximum gamma air dose was 1.851E-04 mrad based on measured effluents and average meteorological data, and 2.68E-05 mrad based on measured effluents and concurrent meteorological data. (Table 3.4-1).

3.1.1.2 Beta Air and Skin Dose Rates

The range of beta particles in air is relatively small (on the order of a few meters or less); consequently, plumes of gaseous effluents may be considered "semi-infinite" for purpose of calculating the dose from beta radiation incident on the skin. However, the actual dose to sensitive skin tissues is difficult to calculate due to the effect of the beta particle energies, thickness of inert skin and clothing covering sensitive tissues. For purposes of this report the skin is taken to have a thickness of 7.0 mg/cm^2 and an occupancy factor of 1.0 is used. The skin dose based on measured effluents and average meteorological data was 1.122E-04 mrem, and 2.92E-05 mrem based on measured effluents and concurrent meteorological data.

The maximum offsite beta air dose for the year based on measured effluents and average meteorological data was

2.05E-05 mrad. The beta air dose based on measured effluents and concurrent meteorological data was 1.21E-05 mrad.

3.1.2 Radioactive Iodine & Particulate

The human thyroid exhibits a significant capacity to concentrate ingested or inhaled iodine. I-131 released during routine operation of the station may be made available to man resulting in a dose to the thyroid. C-14 is also included in this category. C-14 exhibits a capacity to concentrate in bone. C-14 is released in gaseous form and is absorbed into vegetation through photosynthesis. The principal pathways of interest for C-14 are the consumption of vegetation by humans and milk from which animals have ingested C-14 through the consumption of vegetation. With the addition of C-14 to plant effluents, human dose in this category is primarily driven by the release of C-14 from the plant.

The hypothetical dose to the maximum exposed individual living near the station via ingestion of milk and vegetation was calculated. The source of milk and vegetation was assumed to be at the nearest site boundary with the cows pastured and vegetation grown from May through October. The maximum dose from radioactive iodine and particulate (including C-14) to any organ was 6.95E-01 mrem (child/bone) based on measured effluents and average meteorological data and 5.39E-01 mrem based on measured effluents and concurrent meteorological data. The maximum dose from radioactive iodine and particulate (including C-14) to the whole body was 1.42E-01 mrem (child) based on measured effluents and average meteorological data and 1.10E-01 mrem based on measured effluents and concurrent meteorological data.

3.1.3 Gaseous Total Dose

The maximum total dose from gaseous releases to any organ was 6.95E-01 mrem (child/bone) based on measured effluents and average meteorological data, and 5.39E-01 mrem (child/bone) based on measured effluents and concurrent meteorological data. The maximum total dose from gaseous releases to the whole body was 1.42E-01 mrem (child) based on measured effluents and average meteorological data, and 1.10E-01 mrem (child) based on measured effluents and concurrent meteorological data.

3.2 Liquid Effluent Pathways

The principal pathways through the aquatic environment for potential doses to man from liquid waste are ingestion of potable water and eating aquatic foods. Liquid dose was calculated based on the ingestion of potable water and sport fish. It should be noted, however, there were no communities within 10 km downstream of the plant using the Rock River for drinking water. NRC-developed equations were used to calculate the doses to the whole body, bone, liver, thyroid, kidney, lung, lower GI tract, and skin. Specific parameters for use in the equations are given in the Exelon Offsite Dose Calculation Manual (ODCM). The maximum dose from liquid releases to any organ was 1.45E-01 mrem (adult/gilli). The maximum dose from liquid releases to the whole body was 1.34E-01 mrem (adult).

3.3 Total Dose

The maximum total dose to any organ via both gaseous and liquid effluents to any organ is 7.29E-01 mrem (child/bone). The maximum dose to the whole body via both gaseous and liquid effluents is 2.54E-01 mrem (child).

3.4 Assessment of Dose to Member of Public

Byron Station did not exceed any of the dose limits as shown below based on concurrent or historical meteorological data.

- The RETS limits on dose or dose commitment to a member of the public due to radioactive materials in liquid effluents from each reactor is 1.5 mrem to the whole body or 5 mrem to any organ during any calendar quarter and 3 mrem to the whole body or 10 mrem to any organ during a calendar year.

- The RETS limits on air dose in noble gases released in gaseous effluents to a member of the public from each reactor is 5 mrad for gamma radiation or 10 mrad for beta radiation during any calendar quarter and 10 mrad for gamma radiation or 20 mrad for beta radiation during a calendar year.

- The RETS limits on dose to a member of the public due to radioactive iodine & particulate with half-lives greater than eight days in gaseous effluents released from each reactor is 7.5 mrem to any organ during any calendar quarter and 15 mrem during a calendar year.

- The 10CFR20 limit on Total Effective Dose Equivalent to individual members of the public is 100 mrem during a calendar year.

- The 40CFR190 limits on individual members of the public is 25 mrem to the whole body, 25 mrem to any organ (except thyroid), and 75 mrem to the thyroid.

4.0 SITE METEOROLOGY

Detailed records of the site meteorological measurements taken during each calendar quarter of the year are maintained by the meteorological vendor, retained on site, and are available upon request. The data are presented as cumulative joint frequency distributions of the wind direction for the 250' level and wind speed class by atmospheric stability class determined from the temperature difference between the 250' and 30' levels. Data recovery for all measurements on the meteorological tower was 99.8% during 2019.

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APPENDIX E-1

DATA TABLES AND FIGURES

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Table 1.1-1

RG 1.21 EFFLUENT AND WASTE DISPOSAL REPORT
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES
Unit 1

REPORT FOR 2019	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Gases						
1. Total Release	Ci	4.19E-04	7.29E-02	1.52E-01	1.16E-01	3.41E-01
2. Avg. Release Rate	uCi/sec	5.39E-05	9.27E-03	1.91E-02	1.46E-02	1.08E-02
Iodine-131						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
2. Avg. Release Rate	uCi/sec	(1)	(1)	(1)	(1)	(1)
Particulates Half Life >= 8 days						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
2. Avg. Release Rate	uCi/sec	(1)	(1)	(1)	(1)	(1)
Others						
1. Total Release	Ci	1.01E+00	1.18E+00	1.09E+00	1.12E+00	4.40E+00
2. Avg. Release Rate	uCi/sec	1.30E-01	1.51E-01	1.37E-01	1.41E-01	1.40E-01
Tritium						
1. Total Release	Ci	2.03E+00	4.56E+00	2.79E+00	5.34E+00	1.47E+01
2. Avg. Release Rate	uCi/sec	2.62E-01	5.80E-01	3.51E-01	6.72E-01	4.67E-01
Gross Alpha Radioactivity						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
2. Avg. Release Rate	uCi/sec	(1)	(1)	(1)	(1)	(1)

(1)Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

Table 1.1-1 (cont.)

RG 1.21 EFFLUENT AND WASTE DISPOSAL REPORT
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES
Unit 2

REPORT FOR 2019	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Gases						
1. Total Release	Ci	6.83e-02	1.06E-01	7.14E-02	7.56E-02	3.21E-01
2. Avg. Release Rate	uCi/sec	8.78E-03	1.35E-02	8.98E-03	9.51E-03	1.02E-02
Iodine-131						
1. Total Release	Ci	(1)	1.06E-06	(1)	(1)	1.06E-06
2. Avg. Release Rate	uCi/sec	(1)	1.35E-07	(1)	(1)	3.37E-08
Particulates Half Life >= 8 days						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
2. Avg. Release Rate	uCi/sec	(1)	(1)	(1)	(1)	(1)
Others						
1. Total Release	Ci	1.04E+00	8.44E-01	1.12E+00	1.12E+00	4.13E+00
2. Avg. Release Rate	uCi/sec	1.34E-01	1.07E-01	1.41E-01	1.41E-01	1.31E-01
Tritium						
1. Total Release	Ci	7.55E+00	6.49E+00	6.88E+00	1.61E+01	3.70E+01
2. Avg. Release Rate	uCi/sec	9.71E-01	8.25E-01	8.65E-01	2.02E+00	1.17E+00
Gross Alpha Radioactivity						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
2. Avg. Release Rate	uCi/sec	(1)	(1)	(1)	(1)	(1)

(1)Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

Table 1.2-1

RG 1.21 EFFLUENT AND WASTE DISPOSAL REPORT
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES
Unit 1

REPORT FOR 2019	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
1. Total Release	Ci	1.97E-03	2.08E-03	1.16E-03	6.55E-04	5.86E-03
2. Avg. Diluted Conc.	uCi/ml	1.05E-13	1.37E-13	5.14E-14	3.17E-14	7.69E-14
Tritium						
1. Total Release	Ci	4.58E+02	1.97E+02	6.39E+01	3.42E+02	1.06E+03
2. Avg. Diluted Conc.	uCi/ml	1.99E-05	1.16E-05	6.73E-07	8.91E-06	1.01E-05
Dissolved and Entrained Gases						
1. Total Release	Ci	1.03E-05	9.12E-06	(1)	4.46E-05	6.40E-05
2. Avg. Diluted Conc.	uCi/ml	5.51E-16	6.00E-16	(1)	2.16E-15	8.40E-16
Gross Alpha Radioactivity						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
Volume of liquid waste	liters	3.66E+09	3.59E+09	3.98E+09	3.75E+09	1.50E+10
Volume of dil. water	liters	3.66E+09	3.59E+09	3.98E+09	3.74E+09	1.50E+10

(1) Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

Table 1.2-1 (cont.)

RG 1.21 EFFLUENT AND WASTE DISPOSAL REPORT
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES
Unit 2

REPORT FOR 2019	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
1. Total Release	Ci	1.97E-03	2.08E-03	1.16E-03	6.55E-04	5.86E-03
2. Avg. Diluted Conc.	uCi/ml	1.05E-13	1.37E-13	5.14E-14	3.17E-14	7.69E-14
Tritium						
1. Total Release	Ci	4.58E+02	1.97E+02	6.39E+01	3.42E+02	1.06E+03
2. Avg. Diluted Conc.	uCi/ml	1.99E-05	1.16E-05	6.73E-07	8.91E-06	1.01E-05
Dissolved and Entrained Gases						
1. Total Release	Ci	1.03E-05	9.12E-06	(1)	4.46E-05	6.40E-05
2. Avg. Diluted Conc.	uCi/ml	5.51E-16	6.00E-16	(1)	2.16E-15	8.40E-16
Gross Alpha Radioactivity						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
Volume of liquid waste	liters	3.676+09	3.59E+09	3.98E+09	3.75E+09	1.50E+10
Volume of liquid waste	liters	3.676+09	3.59E+09	3.98E+09	3.74E+09	1.50E+10

(1)Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

Table 3.1-1

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

LIQUID DOSE SUMMARY

Units 1 & 2

Report for: 2019
Unit Range - From: 1 To: 2
Liquid Receptor

=== PERIOD DOSE BY ORGAN AND AGE GROUP (mrem) ========== ANNUAL 2019 =========

Age grp	Bone	Liver	Thyroid	Kidney	Lung	GI-LLI	Skin	TB
ADULT	2.50E-02	1.34E-01	1.32E-01	1.32E-01	1.32E-01	1.45E-01	0.00E+00	1.34E-01
TEEN	2.59E-02	1.01E-01	9.88E-02	9.88E-02	9.88E-02	1.08E-01	0.00E+00	1.01E-01
CHILD	3.41E-02	1.12E-01	1.10E-01	1.10E-01	1.10E-01	1.13E-01	0.00E+00	1.12E-01
INFANT	1.91E-04	4.89E-02	4.89E-02	4.89E-02	4.89E-02	4.89E-02	0.00E+00	4.89E-02

=== SITE DOSE LIMIT ANALYSIS ============================== ANNUAL 2019 =========

Annual - Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
2019 - Admin. Any Organ	ADULT	GILLI	1.45E-01	7.50E+00	1.93E+00
2019 - Admin. Total Body	ADULT	TBODY	1.34E-01	2.25E+00	5.94E+00
2019 - T.Spc. Any Organ	ADULT	GILLI	1.45E-01	1.00E+01	1.45E+00

Critical Pathway: Fresh Water Fish - Sport (FFSP)
Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	9.08E+01
CR-51	1.72E-02
MN-54	4.59E-02
FE-59	3.74E-02
CO-58	3.74E+00
CO-60	2.59E+00
NI-63	2.49E-01
ZR-95	4.87E-04
NB-95	2.51E+00
SB-125	3.39E-03

2019 - T.Spc. Total Body	ADULT	TBODY	1.34E-01	3.00E+00	4.45E+00

Critical Pathway: Fresh Water Fish - Sport (FFSP)
Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	9.86E+01
CR-51	7.44E-05
MN-54	3.10E-03
FE-59	4.67E-03
CO-58	4.49E-01
CO-60	3.30E-01
NI-63	6.28E-01
ZR-95	1.13E-07
NB-95	2.42E-04
SB-125	7.95E-05

Table 3.2-1

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

GASEOUS DOSE SUMMARY

Units 1 & 2

Report for: 2019
Unit Range - From: 1 To: 2

=== I&P DOSE LIMIT ANALYSIS ========== ANNUAL 2019 =========

Annual - Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
2019 - Admin. Any Organ	CHILD	BONE	6.95E-01	1.13E+01	6.18E+00
2019 - Admin. Total Body	CHILD	TBODY	1.42E-01	1.05E+01	1.35E+00
2019 - T.Spc. Any Organ	CHILD	BONE	6.95E-01	1.50E+01	4.63E+00

Receptor: 5 Composite Crit. Receptor - IP
Distance: 800 (meters) Compass Point: SSE
Critical Pathway: Vegetation
Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	0.00E+00
C-14	1.00E+02
I-131	2.71E-05

2019 - T.Spc. Total Body	CHILD	TBODY	1.42E-01	1.50E+01	9.46E-01

Receptor: 5 Composite Crit. Receptor - IP
Distance: 800 (meters) Compass Point: SSE
Critical Pathway: Vegetation
Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	2.06E+00
C-14	9.79E+01
I-131	7.64E-05

Table 3.2-1 (cont.)

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

GASEOUS DOSE SUMMARY

Units 1 & 2

Report for: 2019
Unit Range - From: 1 To: 2

=== NG DOSE LIMIT ANALYSIS ========== ANNUAL 2019 =========			
Annual - Limit	Dose (mrad)	Limit (mrad)	Max % of Limit
2019 - Admin. Gamma	1.85E-04	7.50E+00	2.47E-03
2019 - Admin. Beta	2.05E-05	1.50E+01	1.37E-04
2019 - T.Spc. Gamma	1.85E-04	1.00E+01	1.85E-03

Receptor: 4 Composite Crit. Receptor - NG
Distance: 800 (meters) Compass Point: SSE

Nuclide	Percentage
AR-41	9.62E+01
KR-85M	3.53E-03
XE-135	1.73E-01
XE-133M	6.55E-03
KR-88	2.35E-02
XE-131M	4.95E-05
XE-133	3.63E+00

2019 - T.Spc. Beta	2.05E-05	2.00E+01	1.02E-04

Receptor: 4 Composite Crit. Receptor - NG
Distance: 800 (meters) Compass Point: SSE

Nuclide	Percentage
AR-41	7.54E+01
KR-85M	1.26E-02
XE-135	4.93E-01
XE-133M	6.59E-02
KR-88	1.01E-02
XE-131M	7.84E-04
XE-133	2.40E+01

Table 3.3-1

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

Units 1 & 2

Report for: 2019
Unit Range - From: 1 To: 2

=== MAXIMUM DOSE ANALYSIS ================================ ANNUAL 2019 =========

Dose Type	Age Group	Organ	Dose (mrem)
Any Organ	CHILD	BONE	7.29E-01

Liquid Receptor: 0 Liquid Receptor
Gaseous Receptor: 5 Composite Crit. Receptor - IP
Distance: 800 (meters) Compass Point: SSE

Liquid Dose: 8.51E-02 % of Total: 1.04E+01
Critical Pathway: Fresh Water Fish - Sport (FFSP)
Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	0.00E+00
CR-51	0.00E+00
MN-54	0.00E+00
FE-59	2.55E-02
CO-58	0.00E+00
CO-60	0.00E+00
NI-63	1.00E+02
ZR-95	2.83E-06
NB-95	3.76E-03
SB-125	2.22E-03

Gaseous Dose: 7.33E-01 % of Total: 8.95E+01
Critical Pathway: Vegetation (VEG)
Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	0.00E+00
C-14	1.00E+02
I-131	2.71E-05

Table 3.3-1 (cont.)

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

Units 1 & 2

=== MAXIMUM DOSE ANALYSIS ================================ ANNUAL 2019 =========

Dose Type	Age Group	Organ	Dose (mrem)
Total Body	CHILD	TBODY	2.54E-01

Liquid Receptor: 0 Liquid Receptor
Gaseous Receptor: 5 Composite Crit. Receptor - IP
Distance: 800 (meters) Compass Point: SSE

Liquid Dose: 1.12E-01 % of Total: 4.43E+01
Critical Pathway: Fresh Water Fish - Sport (FFSP)
Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	9.79E+01
CR-51	9.73E-05
MN-54	3.96E-03
FE-59	6.23E-03
CO-58	5.82E-01
CO-60	4.29E-01
NI-63	1.03E+00
ZR-95	1.68E-07
NB-95	3.18E-04
SB-125	1.41E-04

Gaseous Dose: 1.50E-01 % of Total: 5.62E+01
Critical Pathway: Vegetation (VEG)
Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	2.06E+00
C-14	9.79E+01
I-131	7.64E-05

Table 3.4-1

The following are the maximum annual calculated cumulative offsite doses resulting from Byron airborne releases in 2019 based on concurrent meteorological data:

Unit 1:

Dose	*Maximum Value*		*Sector Affected*
gamma air [1]	1.40×10^{-5}	mrad	East
beta air [2]	6.30×10^{-6}	mrad	East
whole body [3]	5.63×10^{-2}	mrem	East
skin [4]	1.53×10^{-5}	mrem	East
organ [5] (child-bone)	2.78×10^{-1}	mrem	East

Unit 1 Compliance Status

10 CFR 50 Appendix I	**Yearly Objective**		**% of Appendix I**
gamma air	10.0	mrad	0.00
beta air	20.0	mrad	0.00
whole body	5.0	mrem	1.13
skin	15.0	mrem	0.00
organ	15.0	mrem	1.85

Unit 2:

Dose	*Maximum Value*		*Sector Affected*
gamma air [1]	1.28×10^{-5}	mrad	East
beta air [2]	5.82×10^{-6}	mrad	East
whole body [3]	5.40×10^{-2}	mrem	East
skin [4]	1.39×10^{-5}	mrem	East
organ [5] (child-bone)	2.61×10^{-1}	mrem	East

Unit 2 Compliance Status

10 CFR 50 Appendix I	**Yearly Objective**		**% of Appendix I**
gamma air	10.0	mrad	0.00
beta air	20.0	mrad	0.00
whole body	5.0	mrem	1.08
skin	15.0	mrem	0.00
organ	15.0	mrem	1.74

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[1] Gamma Air Dose - GASPAR II, NUREG-0597
[2] Beta Air Dose - GASPAR II, NUREG-0597
[3] Whole Body Dose - GASPAR II, NUREG-0597
[4] Skin Dose - GASPAR II, NUREG-0597
[5] Inhalation and Food Pathways Dose - GASPAR II, NUREG-0597

Data recovery: 99.8%

APPENDIX F

METEOROLOGICAL DATA

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