

APPENDIX 1

Environmental, Inc. Midwest Laboratory
Final Report for the Point Beach Nuclear Plant
and
Other Analyses
Reporting Period: January – December 2019

91 pages follow

MONTHLY
PROGRESS REPORT
NextEra Energy

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

THE POINT BEACH NUCLEAR PLANT
TWO RIVERS, WISCONSIN

PREPARED AND SUBMITTED
BY
ENVIRONMENTAL INCORPORATED MIDWEST LABORATORY

Project Number: 8006

Reporting Period: January-December, 2019

Reviewed and
Approved by _____



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Date _____

1/31/20

Distribution: S. Bartels, 1 hardcopy, 1 email

POINT BEACH NUCLEAR PLANT

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1.0 INTRODUCTION

The following constitutes the current Monthly Progress Report for the Environmental Radiological Monitoring Program conducted at the Point Beach Nuclear Plant, Two Rivers, Wisconsin. Results of completed analyses are presented in the attached tables. Missing entries indicate analyses that are not completed. These results will appear in subsequent reports. Data tables reflect sample analysis results for both Technical Specification requirements and Special Interest locations and samples are randomly selected within the Program monitoring area to provide additional data for cross-comparisons.

For all gamma isotopic analyses, the spectrum is computer scanned from 80 to 2048 KeV. Specifically included are Mn-54, Fe-59, Co-58, Co-60, Zn-65, Zr-95, Nb-95, Ru-103, Ru-106, I-131, Ba-La-140, Cs-134, Cs-137, Ce-141, and Ce-144. Naturally occurring gamma-emitters, such as K-40 and Ra daughters, are frequently detected in soil and sediment samples. Specific isotopes listed are K-40, Tl-208, Pb-212, Bi-214, Ra-226 and Ac-228. The results reported under "Other Gammas" may be Co-60, Ru-103 or any other radionuclide which is indicative of other gammas for the sample type. "Other Gammas" do not include naturally occurring radionuclides.

All concentrations, except gross beta, are decay corrected.

All samples were collected within the scheduled period unless noted otherwise in the Listing of Missed Samples.

POINT BEACH NUCLEAR PLANT
2.0 LISTING OF MISSED SAMPLES

Sample Type	Location	Expected Collection Date	Reason
LW	E-005	02-13-19	No sample due to icy conditions.
LW	E-006	02-13-19	No sample due to icy conditions.
LW	E-033	02-13-19	No sample due to icy conditions.
LW	E-006	03-12-19	No sample due to icy conditions.
LW	E-033	03-12-19	No sample due to icy conditions.
SL	E-05	August'19	No algae growth in the pond.
SL	E-12	August'19	No algae growth in the pond.
AP/AP	All Stations	08-07-19	Equipment malfunction due to erroneous settings. The volumes too low to use in calculations. Batch discarded per station request.
VE	E-F6	09-04-19	No vegetables planted this year.
SS	E-005	10-15-19	Sediment not collected due to high water/unsafe conditions.
TLD	E-43	4Qtr'19	TLD lost in snow.

POINT BEACH NUCLEAR PLANT

3.0 Data Tables

POINT BEACH NUCLEAR PLANT

Table 1. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131.

Location: E-01, Meteorological Tower

Units: pCi/m³

Collection: Continuous, weekly exchange.

Date Collected	Vol. (m ³)	Gross Beta	I-131	Date Collected	Vol. (m ³)	Gross Beta	I-131
<u>Required LLD</u>		<u>0.010</u>	<u>0.030</u>	<u>Required LLD</u>		<u>0.010</u>	<u>0.030</u>
01-09-19	303	0.040 ± 0.004	< 0.007	07-09-19	305	0.012 ± 0.003	< 0.012
01-16-19	302	0.022 ± 0.004	< 0.023	07-17-19	339	0.019 ± 0.003	< 0.010
01-22-19	260	0.019 ± 0.004	< 0.009	07-24-19	304	0.015 ± 0.003	< 0.015
01-29-19	308	0.027 ± 0.004	< 0.009	07-31-19	312	0.025 ± 0.003	< 0.008
02-06-19	355	0.025 ± 0.003	< 0.005	08-07-19		NS ^b	
02-14-19	347	0.023 ± 0.003	< 0.006	08-15-19	339	0.018 ± 0.003	< 0.011
02-20-19	262	0.033 ± 0.005	< 0.009	08-21-19	258	0.017 ± 0.004	< 0.014
02-28-19	357	0.043 ± 0.004	< 0.010	08-28-19	302	0.014 ± 0.003	< 0.011
03-06-19	262	0.033 ± 0.005	< 0.008	09-04-19	312	0.018 ± 0.003	< 0.007
03-13-19	300	0.041 ± 0.004	< 0.009	09-10-19	258	0.015 ± 0.003	< 0.017
03-20-19	302	0.026 ± 0.004	< 0.007	09-18-19	342	0.020 ± 0.003	< 0.011
03-27-19	308	0.019 ± 0.003	< 0.011	09-25-19	295	0.037 ± 0.004	< 0.009
				10-03-19	345	0.019 ± 0.003	< 0.015
1st Quarter				3rd Quarter			
Mean ± s.d.		0.029 ± 0.009	< 0.009	Mean ± s.d.		0.019 ± 0.007	< 0.012
04-04-19	346	0.021 ± 0.003	< 0.013	10-09-19	260	0.016 ± 0.004	< 0.017
04-10-19	258	0.022 ± 0.004	< 0.007	10-16-19	304	0.019 ± 0.003	< 0.008
04-17-19	291	0.016 ± 0.003	< 0.019	10-23-19	304	0.020 ± 0.003	< 0.011
04-24-19	302	0.015 ± 0.003	< 0.006	11-01-19	402	0.015 ± 0.002	< 0.010
05-01-19	299	0.017 ± 0.003	< 0.015				
05-09-19	338	0.012 ± 0.003	< 0.008	11-07-19	262	0.022 ± 0.004	< 0.010
05-15-19	257	0.014 ± 0.003	< 0.011	11-14-19	315	0.023 ± 0.003	< 0.008
05-22-19	302	0.011 ± 0.003	< 0.015	11-20-19	260	0.034 ± 0.004	< 0.019
05-28-19	264	0.010 ± 0.003	< 0.017	11-26-19	261	0.031 ± 0.004	< 0.023
06-05-19	215	0.019 ± 0.004	< 0.010	12-04-19	357	0.015 ± 0.003	< 0.015
06-12-19	293	0.014 ± 0.003	< 0.018	12-11-19	313	0.024 ± 0.003	< 0.009
06-19-19	304	0.016 ± 0.003	< 0.014	12-19-19	368	0.034 ± 0.004	< 0.018
06-26-19	298	0.012 ± 0.003	< 0.013	12-26-19	303	0.046 ± 0.004	< 0.022
07-02-19	259	0.023 ± 0.004	< 0.014	01-03-20	341	0.031 ± 0.004	< 0.014
2nd Quarter				4th Quarter			
Mean ± s.d.		0.016 ± 0.004	< 0.013	Mean ± s.d.		0.025 ± 0.009	< 0.014
				Cumulative Average		0.022 ± 0.009	< 0.012

^a Lower volume due to power outage.

^b No sample; see table 2.0 .Listing of Missed Samples.

POINT BEACH NUCLEAR PLANT

Table 1. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131.

Location: E-02, Site Boundary Control Center

Units: pCi/m³

Collection: Continuous, weekly exchange.

Date Collected	Vol. (m ³)	Gross Beta	I-131	Date Collected	Vol. (m ³)	Gross Beta	I-131
<u>Required LLD</u>		<u>0.010</u>	<u>0.030</u>	<u>Required LLD</u>		<u>0.010</u>	<u>0.030</u>
01-09-19	300	0.034 ± 0.004	< 0.008	07-09-19	306	0.013 ± 0.003	< 0.012
01-16-19	309	0.020 ± 0.003	< 0.022	07-17-19	349	0.016 ± 0.003	< 0.010
01-22-19	260	0.018 ± 0.004	< 0.009	07-24-19	299	0.014 ± 0.003	< 0.015
01-29-19	309	0.023 ± 0.004	< 0.009	07-31-19	311	0.024 ± 0.003	< 0.008
02-06-19	354	0.027 ± 0.003	< 0.005	08-07-19		NS ^b	
02-14-19	349	0.020 ± 0.003	< 0.006	08-15-19	347	0.016 ± 0.003	< 0.010
02-20-19	262	0.030 ± 0.005	< 0.009	08-21-19	254	0.022 ± 0.004	< 0.014
02-28-19	345	0.032 ± 0.004	< 0.010	08-28-19	301	0.011 ± 0.003	< 0.011
03-06-19	262	0.030 ± 0.004	< 0.008	09-04-19	312	0.020 ± 0.003	< 0.007
03-13-19	301	0.038 ± 0.004	< 0.009	09-10-19	258	0.015 ± 0.003	< 0.017
03-20-19	302	0.024 ± 0.004	< 0.007	09-18-19	342	0.020 ± 0.003	< 0.011
03-27-19	308	0.019 ± 0.003	< 0.011	09-25-19	298	0.035 ± 0.004	< 0.009
				10-03-19	350	0.017 ± 0.003	< 0.014
1st Quarter				3rd Quarter			
Mean ± s.d.		0.026 ± 0.007	< 0.009	Mean ± s.d.		0.019 ± 0.007	< 0.012
04-04-19	346	0.020 ± 0.003	< 0.013	10-09-19	260	0.018 ± 0.004	< 0.017
04-10-19	228	0.017 ± 0.004	< 0.008	10-16-19	303	0.019 ± 0.003	< 0.008
04-17-19	267	0.016 ± 0.003	< 0.020	10-23-19	295	0.017 ± 0.003	< 0.011
04-24-19	303	0.014 ± 0.003	< 0.006	11-01-19	397	0.015 ± 0.002	< 0.010
05-01-19	309	0.017 ± 0.003	< 0.014				
05-09-19	338	0.014 ± 0.003	< 0.008	11-06-19	215	0.027 ± 0.005	< 0.012
05-15-19	256	0.015 ± 0.003	< 0.011	11-14-19	348	0.023 ± 0.003	< 0.007
05-22-19	303	0.011 ± 0.003	< 0.015	11-20-19	259	0.038 ± 0.005	< 0.020
05-28-19	260	0.006 ± 0.003	< 0.017	11-26-19	257	0.029 ± 0.004	< 0.024
06-05-19	344	0.016 ± 0.003	< 0.006	12-04-19	351	0.018 ± 0.003	< 0.015
06-12-19	303	0.017 ± 0.003	< 0.018	12-11-19	313	0.028 ± 0.004	< 0.009
06-19-19	302	0.018 ± 0.003	< 0.014	12-19-19	336	0.042 ± 0.004	< 0.019
06-26-19	298	0.011 ± 0.003	< 0.013	12-26-19	303	0.059 ± 0.005	< 0.022
07-02-19	259	0.021 ± 0.004	< 0.014	01-03-20	342	0.029 ± 0.004	< 0.013
2nd Quarter				4th Quarter			
Mean ± s.d.		0.015 ± 0.004	< 0.013	Mean ± s.d.		0.028 ± 0.013	< 0.014
Cumulative Average						0.022 ± 0.009	< 0.012

^a Lower flow to air sampler

^b No sample; see table 2.0 .Listing of Missed Samples.

POINT BEACH NUCLEAR PLANT

Table 1. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131.

Location: E-03, West Boundary

Units: pCi/m³

Collection: Continuous, weekly exchange.

Date Collected	Vol. (m ³)	Gross Beta	I-131	Date Collected	Vol. (m ³)	Gross Beta	I-131
Required LLD		0.010	0.030	Required LLD		0.010	0.030
01-09-19	301	0.032 ± 0.004	< 0.007	07-09-19	299	0.012 ± 0.003	< 0.012
01-16-19	304	0.020 ± 0.003	< 0.023	07-17-19	341	0.018 ± 0.003	< 0.010
01-22-19	255	0.019 ± 0.004	< 0.009	07-24-19	291	0.014 ± 0.003	< 0.015
01-29-19	312	0.026 ± 0.004	< 0.009	07-31-19	300	0.024 ± 0.003	< 0.008
02-06-19	346	0.024 ± 0.003	< 0.006	08-07-19		NS ^a	
02-14-19	354	0.019 ± 0.003	< 0.006	08-15-19	339	0.019 ± 0.003	< 0.011
02-20-19	261	0.032 ± 0.005	< 0.009	08-21-19	253	0.020 ± 0.004	< 0.014
02-28-19	346	0.032 ± 0.004	< 0.010	08-28-19	304	0.013 ± 0.003	< 0.011
03-06-19	262	0.033 ± 0.005	< 0.008	09-04-19	301	0.020 ± 0.004	< 0.008
03-13-19	301	0.039 ± 0.004	< 0.009	09-10-19	261	0.012 ± 0.003	< 0.016
03-20-19	302	0.024 ± 0.004	< 0.007	09-18-19	342	0.019 ± 0.003	< 0.011
03-27-19	309	0.017 ± 0.003	< 0.011	09-25-19	304	0.037 ± 0.004	< 0.009
				10-03-19	345	0.019 ± 0.003	< 0.015
1st Quarter Mean ± s.d.		0.026 ± 0.007	< 0.009	3rd Quarter Mean ± s.d.		0.019 ± 0.007	< 0.012
04-04-19	350	0.016 ± 0.003	< 0.013	10-09-19	259	0.018 ± 0.004	< 0.017
04-10-19	258	0.020 ± 0.004	< 0.007	10-16-19	304	0.021 ± 0.004	< 0.008
04-17-19	303	0.017 ± 0.003	< 0.018	10-23-19	304	0.023 ± 0.003	< 0.011
04-24-19	301	0.012 ± 0.003	< 0.006	11-01-19	403	0.016 ± 0.003	< 0.010
05-01-19	304	0.019 ± 0.003	< 0.015				
05-09-19	343	0.012 ± 0.002	< 0.008	11-07-19	263	0.018 ± 0.004	< 0.010
05-15-19	259	0.015 ± 0.003	< 0.011	11-14-19	303	0.024 ± 0.003	< 0.008
05-22-19	301	0.011 ± 0.003	< 0.015	11-20-19	256	0.037 ± 0.005	< 0.020
05-28-19	260	0.006 ± 0.003	< 0.017	11-26-19	260	0.029 ± 0.004	< 0.023
06-05-19	333	0.014 ± 0.003	< 0.006	12-04-19	358	0.014 ± 0.003	< 0.015
06-12-19	303	0.015 ± 0.003	< 0.018	12-11-19	313	0.024 ± 0.003	< 0.009
06-19-19	302	0.014 ± 0.003	< 0.014	12-19-19	350	0.030 ± 0.003	< 0.019
06-26-19	298	0.010 ± 0.003	< 0.013	12-26-19	303	0.045 ± 0.004	< 0.022
07-02-19	255	0.020 ± 0.004	< 0.015	01-03-20	339	0.031 ± 0.004	< 0.014
2nd Quarter Mean ± s.d.		0.014 ± 0.004	< 0.013	4th Quarter Mean ± s.d.		0.025 ± 0.009	< 0.014
				Cumulative Average		0.021 ± 0.008	< 0.012

^a No sample; see table 2.0 .Listing of Missed Samples.

POINT BEACH NUCLEAR PLANT

Table 1. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131.

Location: E-04, North Boundary

Units: pCi/m³

Collection: Continuous, weekly exchange.

Date Collected	Vol. (m ³)	Gross Beta	I-131	Date Collected	Vol. (m ³)	Gross Beta	I-131
Required LLD		0.010	0.030	Required LLD		0.010	0.030
01-09-19	302	0.032 ± 0.004	< 0.007	07-09-19	308	0.014 ± 0.003	< 0.012
01-16-19	302	0.019 ± 0.003	< 0.023	07-17-19	349	0.017 ± 0.003	< 0.010
01-22-19	259	0.018 ± 0.004	< 0.009	07-24-19	289	0.015 ± 0.003	< 0.015
01-29-19	317	0.025 ± 0.004	< 0.008	07-31-19	303	0.027 ± 0.004	< 0.008
02-06-19	351	0.025 ± 0.003	< 0.005	08-07-19		NS ^a	
02-14-19	355	0.020 ± 0.003	< 0.006	08-15-19	350	0.019 ± 0.003	< 0.010
02-20-19	262	0.027 ± 0.004	< 0.009	08-21-19	256	0.022 ± 0.004	< 0.014
02-28-19	351	0.033 ± 0.004	< 0.010	08-28-19	304	0.012 ± 0.003	< 0.011
03-06-19	262	0.035 ± 0.005	< 0.008	09-04-19	299	0.024 ± 0.004	< 0.008
03-13-19	301	0.040 ± 0.004	< 0.009	09-10-19	264	0.013 ± 0.003	< 0.016
03-20-19	302	0.024 ± 0.004	< 0.007	09-18-19	341	0.019 ± 0.003	< 0.011
03-27-19	309	0.017 ± 0.003	< 0.011	09-25-19	304	0.038 ± 0.004	< 0.009
				10-03-19	343	0.020 ± 0.003	< 0.015
1st Quarter				3rd Quarter			
Mean ± s.d.		0.026 ± 0.007	< 0.009	Mean ± s.d.		0.020 ± 0.007	< 0.012
04-04-19	345	0.020 ± 0.003	< 0.013	10-09-19	260	0.018 ± 0.004	< 0.017
04-10-19	258	0.020 ± 0.004	< 0.007	10-16-19	303	0.024 ± 0.004	< 0.008
04-17-19	303	0.016 ± 0.003	< 0.018	10-23-19	302	0.019 ± 0.003	< 0.011
04-24-19	299	0.012 ± 0.003	< 0.006	11-01-19	401	0.017 ± 0.003	< 0.010
05-01-19	299	0.021 ± 0.003	< 0.015				
05-09-19	338	0.012 ± 0.003	< 0.008	11-06-19	217	0.021 ± 0.005	< 0.012
05-15-19	259	0.015 ± 0.003	< 0.011	11-14-19	355	0.023 ± 0.003	< 0.007
05-22-19	305	0.012 ± 0.003	< 0.015	11-20-19	257	0.034 ± 0.004	< 0.020
05-28-19	264	0.009 ± 0.003	< 0.017	11-26-19	257	0.030 ± 0.004	< 0.024
06-05-19	342	0.016 ± 0.003	< 0.006	12-04-19	357	0.015 ± 0.003	< 0.015
06-12-19	303	0.015 ± 0.003	< 0.018	12-11-19	313	0.027 ± 0.004	< 0.009
06-19-19	302	0.013 ± 0.003	< 0.014	12-19-19	372	0.040 ± 0.004	< 0.017
06-26-19	298	0.013 ± 0.003	< 0.013	12-26-19	299	0.050 ± 0.005	< 0.022
07-02-19	259	0.020 ± 0.004	< 0.014	01-03-20	336	0.036 ± 0.004	< 0.014
2nd Quarter				4th Quarter			
Mean ± s.d.		0.015 ± 0.004	< 0.013	Mean ± s.d.		0.027 ± 0.010	< 0.014
Cumulative Average						0.022 ± 0.009	< 0.012

^a No sample; see table 2.0 .Listing of Missed Samples.

POINT BEACH NUCLEAR PLANT

Table 1. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131.

Location: E-08, G.J. Francar Residence

Units: pCi/m³

Collection: Continuous, weekly exchange.

Date Collected	Vol. (m ³)	Gross Beta	I-131	Date Collected	Vol. (m ³)	Gross Beta	I-131
Required LLD		0.010	0.030	Required LLD		0.010	0.030
01-09-19	307	0.034 ± 0.004	< 0.007	07-09-19	305	0.017 ± 0.003	< 0.012
01-16-19	304	0.020 ± 0.003	< 0.023	07-17-19	349	0.017 ± 0.003	< 0.010
01-22-19	260	0.021 ± 0.004	< 0.009	07-24-19	297	0.016 ± 0.003	< 0.015
01-29-19	317	0.025 ± 0.004	< 0.008	07-31-19	306	0.026 ± 0.003	< 0.008
02-06-19	365	0.025 ± 0.003	< 0.005	08-07-19		NS ^a	
02-14-19	353	0.020 ± 0.003	< 0.006	08-15-19	338	0.019 ± 0.003	< 0.011
02-20-19	264	0.031 ± 0.005	< 0.009	08-21-19	257	0.020 ± 0.004	< 0.014
02-28-19	358	0.031 ± 0.003	< 0.010	08-28-19	303	0.013 ± 0.003	< 0.011
03-06-19	262	0.034 ± 0.005	< 0.008	09-04-19	307	0.019 ± 0.003	< 0.007
03-13-19	287	0.039 ± 0.004	< 0.009	09-10-19	260	0.014 ± 0.003	< 0.017
03-20-19	298	0.023 ± 0.004	< 0.007	09-18-19	347	0.020 ± 0.003	< 0.011
03-27-19	306	0.021 ± 0.003	< 0.011	09-25-19	301	0.037 ± 0.004	< 0.009
				10-03-19	353	0.015 ± 0.003	< 0.014
1st Quarter				3rd Quarter			
Mean ± s.d.		0.027 ± 0.006	< 0.009	Mean ± s.d.		0.019 ± 0.007	< 0.012
04-04-19	347	0.018 ± 0.003	< 0.013	10-09-19	256	0.016 ± 0.004	< 0.017
04-10-19	258	0.017 ± 0.004	< 0.007	10-16-19	308	0.022 ± 0.004	< 0.007
04-17-19	303	0.013 ± 0.003	< 0.018	10-23-19	300	0.018 ± 0.003	< 0.011
04-24-19	291	0.012 ± 0.003	< 0.006	11-01-19	390	0.016 ± 0.003	< 0.010
05-01-19	302	0.018 ± 0.003	< 0.015				
				11-06-19	218	0.023 ± 0.005	< 0.012
05-09-19	340	0.013 ± 0.003	< 0.008	11-14-19	356	0.019 ± 0.003	< 0.007
05-15-19	258	0.015 ± 0.003	< 0.011	11-20-19	253	0.035 ± 0.005	< 0.020
05-22-19	298	0.010 ± 0.003	< 0.015	11-26-19	264	0.030 ± 0.004	< 0.023
05-28-19	264	0.006 ± 0.003	< 0.017				
				12-04-19	360	0.014 ± 0.003	< 0.014
06-05-19	334	0.013 ± 0.003	< 0.006	12-11-19	315	0.026 ± 0.004	< 0.009
06-12-19	297	0.016 ± 0.003	< 0.018	12-19-19	364	0.034 ± 0.004	< 0.018
06-19-19	302	0.015 ± 0.003	< 0.014	12-26-19	292	0.047 ± 0.005	< 0.023
06-26-19	300	0.015 ± 0.003	< 0.013	01-03-20	332	0.032 ± 0.004	< 0.014
07-02-19	259	0.020 ± 0.004	< 0.015				
2nd Quarter				4th Quarter			
Mean ± s.d.		0.014 ± 0.004	< 0.013	Mean ± s.d.		0.026 ± 0.010	< 0.014
Cumulative Average						0.021 ± 0.008	< 0.012
Indicator Locations Annual Mean ± s.d.						0.022 ± 0.009	< 0.012

^a No sample; see table 2.0 .Listing of Missed Samples.

POINT BEACH NUCLEAR PLANT

Table 1. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131.

Location: E-20, Silver Lake

Units: pCi/m³

Collection: Continuous, weekly exchange.

Date Collected	Vol. (m ³)	Gross Beta	I-131	Date Collected	Vol. (m ³)	Gross Beta	I-131
<u>Required LLD</u>		<u>0.010</u>	<u>0.030</u>	<u>Required LLD</u>		<u>0.010</u>	<u>0.030</u>
01-09-19	306	0.033 ± 0.004	< 0.007	07-09-19	302	0.017 ± 0.003	< 0.012
01-16-19	302	0.019 ± 0.003	< 0.023	07-17-19	342	0.016 ± 0.003	< 0.010
01-22-19	260	0.016 ± 0.003	< 0.009	07-24-19	290	0.018 ± 0.003	< 0.015
01-29-19	317	0.027 ± 0.004	< 0.008	07-31-19	302	0.027 ± 0.004	< 0.008
02-06-19	344	0.027 ± 0.003	< 0.006	08-07-19		NS ^a	
02-14-19	351	0.021 ± 0.003	< 0.006	08-15-19	343	0.018 ± 0.003	< 0.010
02-20-19	262	0.032 ± 0.005	< 0.009	08-21-19	256	0.028 ± 0.004	< 0.014
02-28-19	352	0.036 ± 0.004	< 0.010	08-28-19	300	0.013 ± 0.003	< 0.011
03-06-19	261	0.032 ± 0.005	< 0.008	09-04-19	302	0.020 ± 0.004	< 0.007
03-13-19	298	0.042 ± 0.004	< 0.009	09-10-19	263	0.014 ± 0.003	< 0.016
03-20-19	302	0.026 ± 0.004	< 0.007	09-18-19	345	0.023 ± 0.003	< 0.011
03-27-19	304	0.014 ± 0.003	< 0.012	09-25-19	300	0.038 ± 0.004	< 0.009
				10-03-19	343	0.019 ± 0.003	< 0.015
1st Quarter				3rd Quarter			
Mean ± s.d.		0.027 ± 0.008	< 0.009	Mean ± s.d.		0.021 ± 0.007	< 0.012
04-04-19	344	0.019 ± 0.003	< 0.013	10-09-19	261	0.018 ± 0.004	< 0.017
04-10-19	258	0.018 ± 0.004	< 0.007	10-16-19	302	0.021 ± 0.004	< 0.008
04-17-19	297	0.012 ± 0.003	< 0.018	10-23-19	303	0.021 ± 0.003	< 0.011
04-24-19	302	0.015 ± 0.003	< 0.006	11-01-19	401	0.015 ± 0.002	< 0.010
05-01-19	300	0.016 ± 0.003	< 0.015				
05-09-19	338	0.013 ± 0.003	< 0.008	11-07-19	266	0.023 ± 0.004	< 0.010
05-15-19	258	0.017 ± 0.003	< 0.011	11-14-19	304	0.022 ± 0.003	< 0.008
05-22-19	300	0.008 ± 0.003	< 0.015	11-20-19	258	0.036 ± 0.005	< 0.020
05-28-19	260	0.011 ± 0.003	< 0.017	11-26-19	261	0.028 ± 0.004	< 0.023
06-05-19	345	0.016 ± 0.003	< 0.006	12-04-19	362	0.017 ± 0.003	< 0.014
06-12-19	301	0.016 ± 0.003	< 0.018	12-11-19	313	0.030 ± 0.004	< 0.009
06-19-19	302	0.017 ± 0.003	< 0.014	12-19-19	351	0.036 ± 0.004	< 0.018
06-26-19	299	0.013 ± 0.003	< 0.013	12-26-19	296	0.046 ± 0.005	< 0.023
07-02-19	255	0.019 ± 0.004	< 0.015	01-03-20	337	0.035 ± 0.004	< 0.014
2nd Quarter				4th Quarter			
Mean ± s.d.		0.015 ± 0.003	< 0.013	Mean ± s.d.		0.027 ± 0.009	< 0.014
				Cumulative Average		0.022 ± 0.009	< 0.012
				Control Annual Mean ± s.d.		0.022 ± 0.009	< 0.012

^a No sample; see table 2.0 .Listing of Missed Samples.

POINT BEACH NUCLEAR PLANT

Table 2. Gamma emitters in quarterly composites of air particulate filters

Units: pCi/m³

Location	Lab Code Req. LLD	Be-7 -	Be-7 MDC	Cs-134 0.01	Cs-134 MDC	Cs-137 0.01	Cs-137 MDC	(Other) Co-60 (0.10)	(Other) (Co-60) MDC	Volume m ³
<u>1st Quarter</u>										
E-01	EAP- 1290	0.083 ± 0.014	-	0.0000 ± 0.0004	< 0.0009	-0.0001 ± 0.0005	< 0.0008	0.0002 ± 0.0005	< 0.0008	3664
E-02	- 1291	0.076 ± 0.013	-	0.0000 ± 0.0005	< 0.0009	-0.0002 ± 0.0004	< 0.0004	-0.0001 ± 0.0005	< 0.0005	3659
E-03	- 1292	0.082 ± 0.014	-	0.0003 ± 0.0005	< 0.0009	-0.0004 ± 0.0006	< 0.0006	0.0001 ± 0.0006	< 0.0005	3652
E-04	- 1293	0.087 ± 0.018	-	-0.0004 ± 0.0007	< 0.0013	-0.0001 ± 0.0007	< 0.0008	-0.0012 ± 0.0009	< 0.0007	3673
E-08	- 1294	0.071 ± 0.015	-	0.0004 ± 0.0004	< 0.0008	0.0002 ± 0.0005	< 0.0009	0.0001 ± 0.0007	< 0.0007	3680
E-20	- 1295	0.085 ± 0.018	-	-0.0001 ± 0.0006	< 0.0010	0.0005 ± 0.0007	< 0.0012	-0.0003 ± 0.0009	< 0.0010	3658
<u>2nd Quarter</u>										
E-01	EAP- 2719	0.083 ± 0.020	-	-0.0035 ± 0.0010	< 0.0014	-0.0009 ± 0.0008	< 0.0011	0.0002 ± 0.0009	< 0.0009	4026
E-02	- 2720	0.093 ± 0.018	-	-0.0004 ± 0.0006	< 0.0009	-0.0005 ± 0.0006	< 0.0006	0.0000 ± 0.0007	< 0.0007	4115
E-03	- 2721	0.082 ± 0.015	-	-0.0012 ± 0.0007	< 0.0011	0.0000 ± 0.0007	< 0.0010	-0.0003 ± 0.0007	< 0.0004	4169
E-04	- 2722	0.075 ± 0.014	-	0.0003 ± 0.0005	< 0.0009	0.0000 ± 0.0004	< 0.0008	0.0003 ± 0.0007	< 0.0009	4173
E-08	- 2723	0.070 ± 0.016	-	-0.0005 ± 0.0006	< 0.0009	0.0006 ± 0.0006	< 0.0005	0.0000 ± 0.0006	< 0.0004	4153
E-20	- 2724	0.065 ± 0.016	-	-0.0001 ± 0.0004	< 0.0008	-0.0004 ± 0.0005	< 0.0007	-0.0003 ± 0.0006	< 0.0006	4158
<u>3rd Quarter</u>										
E-01	EAP- 4053	0.056 ± 0.027	-	-0.0018 ± 0.0009	< 0.0015	-0.0008 ± 0.0010	< 0.0014	-0.0001 ± 0.0011	< 0.0009	3709
E-02	- 4054	0.083 ± 0.021	-	-0.0015 ± 0.0007	< 0.0011	0.0005 ± 0.0004	< 0.0006	-0.0003 ± 0.0009	< 0.0010	3728
E-03	- 4055	0.070 ± 0.017	-	-0.0008 ± 0.0005	< 0.0009	-0.0003 ± 0.0004	< 0.0005	0.0001 ± 0.0004	< 0.0005	3678
E-04	- 4056	0.074 ± 0.016	-	0.0003 ± 0.0005	< 0.0008	0.0000 ± 0.0005	< 0.0006	0.0002 ± 0.0005	< 0.0006	3709
E-08	- 4057	0.072 ± 0.018	-	-0.0008 ± 0.0007	< 0.0011	-0.0002 ± 0.0006	< 0.0008	0.0003 ± 0.0008	< 0.0009	3723
E-20	- 4058	0.071 ± 0.019	-	0.0000 ± 0.0006	< 0.0010	-0.0001 ± 0.0005	< 0.0006	-0.0001 ± 0.0008	< 0.0009	3689
<u>4th Quarter</u>										
E-01	EAP- 5067	0.059 ± 0.013	-	-0.0001 ± 0.0004	< 0.0008	0.0003 ± 0.0005	< 0.0008	-0.0002 ± 0.0005	< 0.0006	4048
E-02	- 5068	0.058 ± 0.011	-	-0.0007 ± 0.0005	< 0.0008	0.0001 ± 0.0005	< 0.0006	-0.0002 ± 0.0005	< 0.0003	3979
E-03	- 5069	0.052 ± 0.013	-	-0.0002 ± 0.0005	< 0.0009	0.0000 ± 0.0006	< 0.0011	0.0005 ± 0.0007	< 0.0004	4012
E-04	- 5070	0.065 ± 0.015	-	-0.0003 ± 0.0005	< 0.0008	0.0000 ± 0.0006	< 0.0010	0.0003 ± 0.0007	< 0.0006	4027
E-08	- 5071	0.054 ± 0.011	-	-0.0001 ± 0.0005	< 0.0008	-0.0001 ± 0.0004	< 0.0006	0.0001 ± 0.0005	< 0.0005	4008
E-20	- 5072	0.053 ± 0.012	-	-0.0003 ± 0.0006	< 0.0009	0.0000 ± 0.0005	< 0.0008	-0.0002 ± 0.0005	< 0.0003	4013
Annual Means ± d.		0.072 ± 0.012		-0.0005 ± 0.0009	< 0.0010	-0.0001 ± 0.0004	< 0.0008	0.0000 ± 0.0003	< 0.0007	

POINT BEACH NUCLEAR PLANT

Table 3. Radioactivity in milk samples

Collection: Monthly

Sample Description and Concentration (pCi/L)							
<u>E-11 Lambert Dairy Farm</u>							
Collection Date	01-09-19	MDC	02-13-19	MDC	03-13-19	MDC	Required LLD
Lab Code	EMI- 62		EMI- 410		EMI- 696		
Sr-89	-0.9 ± 0.8	< 0.8	0.1 ± 0.6	< 0.6	-0.2 ± 0.7	< 0.7	5.0
Sr-90	0.9 ± 0.4	< 0.6	0.4 ± 0.3	< 0.5	0.8 ± 0.3	< 0.5	1.0
I-131	-0.07 ± 0.14	< 0.25	0.08 ± 0.15	< 0.26	0.18 ± 0.21	< 0.37	0.5
K-40	1298 ± 103	-	1431 ± 128		1264 ± 108		
Cs-134	-2.0 ± 1.9	< 3.8	1.0 ± 1.8	< 3.9	-1.2 ± 1.9	< 3.4	5.0
Cs-137	1.0 ± 2.2	< 4.3	-1.4 ± 2.5	< 3.1	-0.7 ± 2.3	< 3.6	5.0
Ba-La-140	-1.1 ± 1.5	< 1.2	0.5 ± 2.2	< 2.7	1.6 ± 1.7	< 2.2	5.0
Other (Co-60)	-3.0 ± 2.5	< 2.4	-1.9 ± 2.4	< 1.7	-1.0 ± 2.3	< 2.3	15.0
Collection Date	04-10-19	MDC	05-08-19	MDC	06-12-19	MDC	Required LLD
Lab Code	EMI- 1206		EMI- 1583		EMI- 2047		
Sr-89	-0.1 ± 0.7	< 0.7	-0.3 ± 0.9	< 0.9	-0.1 ± 0.7	< 0.6	5.0
Sr-90	0.6 ± 0.3	< 0.5	0.8 ± 0.4	< 0.6	0.7 ± 0.3	< 0.5	1.0
I-131	0.00 ± 0.15	< 0.28	-0.08 ± 0.13	< 0.25	0.05 ± 0.15	< 0.26	0.5
K-40	1355 ± 116		1341 ± 120		1399 ± 121		
Cs-134	-2.0 ± 2.6	< 4.7	-0.9 ± 2.2	< 4.3	-2.0 ± 2.1	< 4.0	5.0
Cs-137	0.5 ± 2.7	< 4.4	0.6 ± 2.5	< 3.8	-0.6 ± 2.3	< 2.8	5.0
Ba-La-140	-2.5 ± 2.8	< 3.4	-0.2 ± 1.7	< 1.8	-2.3 ± 1.9	< 3.7	5.0
Other (Co-60)	-0.7 ± 3.4	< 2.5	0.6 ± 2.9	< 3.7	1.9 ± 2.1	< 1.7	15.0

POINT BEACH NUCLEAR PLANT

Table 3. Radioactivity in milk samples

Collection: Monthly

Sample Description and Concentration (pCi/L)							
<u>E-11 Lambert Dairy Farm</u>							
Collection Date	07-10-19	MDC	08-14-19	MDC	09-11-19	MDC	Required LLD
Lab Code	EMI- 2463		EMI- 3040		EMI- 3388		
Sr-89	-0.1 ± 0.7	< 0.7	-0.1 ± 0.7	< 0.7	0.4 ± 0.8	< 0.8	5.0
Sr-90	0.8 ± 0.3	< 0.4	0.6 ± 0.3	< 0.5	0.7 ± 0.3	< 0.5	1.0
I-131	0.02 ± 0.14	< 0.24	-0.05 ± 0.22	< 0.44	0.01 ± 0.12	< 0.22	0.5
K-40	1200 ± 113	-	1285 ± 104	-	1285 ± 109	-	
Cs-134	-2.2 ± 2.1	< 3.5	1.3 ± 1.8	< 3.2	-1.3 ± 2.1	< 3.6	5.0
Cs-137	-0.1 ± 2.5	< 4.2	-0.1 ± 2.4	< 3.2	1.2 ± 1.9	< 2.9	5.0
Ba-La-140	-2.5 ± 2.3	< 3.1	-4.4 ± 2.0	< 2.5	-2.7 ± 2.0	< 1.4	5.0
Other (Co-60)	-3.4 ± 2.6	< 2.9	-1.6 ± 2.4	< 3.3	1.1 ± 2.4	< 2.9	15.0
Collection Date	10-09-19	MDC	11-13-19	MDC	12-11-19	MDC	Required LLD
Lab Code	EMI- 3753		EMI- 4341		EMI- 4676		
Sr-89	-0.4 ± 1.1	< 1.1	0.4 ± 0.7	< 0.7	-0.4 ± 0.8	< 0.9	5.0
Sr-90	0.7 ± 0.4	< 0.7	0.5 ± 0.3	< 0.5	0.6 ± 0.3	< 0.6	1.0
I-131	0.06 ± 0.21	< 0.42	-0.14 ± 0.15	< 0.29	-0.18 ± 0.17	< 0.38	0.5
K-40	1473 ± 116	-	1337 ± 76	-	1263 ± 111	-	
Cs-134	0.7 ± 1.8	< 3.5	-1.8 ± 1.3	< 2.7	-2.7 ± 2.3	< 4.0	5.0
Cs-137	2.7 ± 2.3	< 4.3	-1.5 ± 1.7	< 2.9	-1.6 ± 2.4	< 3.8	5.0
Ba-La-140	-2.3 ± 2.3	< 3.4	-6.3 ± 5.5	< 4.9	0.3 ± 2.1	< 2.3	5.0
Other (Co-60)	-1.8 ± 1.8	< 1.6	-0.2 ± 1.6	< 1.9	1.1 ± 2.2	< 4.2	15.0

POINT BEACH NUCLEAR PLANT

Table 3. Radioactivity in milk samples

Collection: Monthly

Sample Description and Concentration (pCi/L)							
<u>E-21 Strutz Dairy Farm</u>							
Collection Date	01-09-19	MDC	02-13-19	MDC	03-13-19	MDC	Required LLD
Lab Code	EMI- 63		EMI- 411		EMI- 697		
Sr-89	-0.1 ± 0.7	< 0.8	-0.3 ± 0.6	< 0.7	-0.5 ± 0.7	< 0.8	5.0
Sr-90	0.2 ± 0.3	< 0.6	0.4 ± 0.3	< 0.5	0.5 ± 0.3	< 0.5	1.0
I-131	0.05 ± 0.14	< 0.24	-0.12 ± 0.15	< 0.28	0.03 ± 0.18	< 0.33	0.5
K-40	1399 ± 101	-	1365 ± 114		1387 ± 115		
Cs-134	-1.5 ± 2.0	< 3.2	-0.2 ± 2.0	< 3.6	0.6 ± 2.4	< 5.0	5.0
Cs-137	2.0 ± 2.0	< 3.2	0.4 ± 2.2	< 3.6	0.6 ± 2.5	< 3.5	5.0
Ba-La-140	-1.4 ± 1.5	< 1.8	3.1 ± 2.0	< 2.9	-1.9 ± 2.4	< 4.3	5.0
Other (Co-60)	-0.4 ± 1.9	< 2.9	1.4 ± 2.1	< 4.1	0.4 ± 2.5	< 3.7	15.0
Collection Date	04-10-19	MDC	05-08-19	MDC	06-12-19	MDC	Required LLD
Lab Code	EMI- 1207		EMI- 1584		EMI- 2048		
Sr-89	-0.8 ± 0.8	< 0.8	0.0 ± 0.8	< 0.9	-0.4 ± 0.6	< 0.6	5.0
Sr-90	0.7 ± 0.3	< 0.5	0.5 ± 0.3	< 0.6	0.4 ± 0.3	< 0.5	1.0
I-131	0.13 ± 0.14	< 0.24	-0.04 ± 0.13	< 0.24	-0.02 ± 0.13	< 0.24	0.5
K-40	1391 ± 120		1405 ± 112		1405 ± 107		
Cs-134	-1.7 ± 2.2	< 3.8	-1.2 ± 2.0	< 3.6	0.3 ± 1.8	< 3.1	5.0
Cs-137	0.9 ± 2.2	< 3.7	0.3 ± 2.4	< 2.7	-1.2 ± 2.0	< 3.3	5.0
Ba-La-140	-1.9 ± 1.6	< 2.1	2.2 ± 1.2	< 1.5	0.2 ± 2.0	< 4.0	5.0
Other (Co-60)	-0.2 ± 2.4	< 3.0	0.7 ± 2.0	< 3.0	1.1 ± 2.2	< 3.4	15.0

POINT BEACH NUCLEAR PLANT

Table 3. Radioactivity in milk samples

Collection: Monthly

Sample Description and Concentration (pCi/L)							
<u>E-21 Strutz Dairy Farm</u>							
Collection Date	07-10-19	MDC	08-14-19	MDC	09-11-19	MDC	Required LLD
Lab Code	EMI- 2464		EMI- 3041		EMI- 3389		
Sr-89	0.1 ± 0.6	< 0.8	0.0 ± 0.7	< 0.8	-0.2 ± 0.8	< 0.9	5.0
Sr-90	0.2 ± 0.2	< 0.5	0.3 ± 0.3	< 0.5	0.3 ± 0.3	< 0.6	1.0
I-131	0.06 ± 0.14	< 0.25	0.16 ± 0.23	< 0.45	0.10 ± 0.13	< 0.23	0.5
K-40	1406 ± 72	-	1417 ± 121	-	1300 ± 115	-	
Cs-134	-0.4 ± 1.2	< 2.3	-1.7 ± 2.4	< 4.3	1.2 ± 2.2	< 3.9	5.0
Cs-137	1.0 ± 1.5	< 2.5	1.0 ± 2.6	< 4.2	0.1 ± 2.5	< 3.5	5.0
Ba-La-140	-4.4 ± 1.2	< 4.6	-1.2 ± 1.8	< 2.0	0.6 ± 1.4	< 2.9	5.0
Other (Co-60)	0.7 ± 1.5	< 3.0	1.9 ± 2.2	< 2.6	0.6 ± 2.4	< 2.3	15.0
Collection Date	10-09-19	MDC	11-13-19	MDC	12-11-19	MDC	Required LLD
Lab Code	EMI- 3754		EMI- 4342		EMI- 4677		
Sr-89	-0.5 ± 0.8	< 1.0	-0.4 ± 0.6	< 0.7	-0.7 ± 0.8	< 0.9	5.0
Sr-90	0.3 ± 0.3	< 0.5	0.6 ± 0.3	< 0.5	0.5 ± 0.3	< 0.6	1.0
I-131	-0.05 ± 0.19	< 0.39	-0.18 ± 0.18	< 0.39	-0.01 ± 0.16	< 0.29	0.5
K-40	1376 ± 117	-	1479 ± 110	-	1408 ± 113	-	
Cs-134	-0.8 ± 2.3	< 3.7	0.5 ± 1.8	< 3.3	-4.2 ± 2.6	< 4.5	5.0
Cs-137	1.5 ± 2.5	< 3.9	1.0 ± 2.0	< 3.7	1.0 ± 2.7	< 2.7	5.0
Ba-La-140	-1.9 ± 2.0	< 3.0	3.0 ± 1.4	< 3.8	-1.9 ± 2.4	< 4.3	5.0
Other (Co-60)	0.8 ± 2.7	< 2.8	0.2 ± 2.4	< 3.8	0.8 ± 2.5	< 4.3	15.0

POINT BEACH NUCLEAR PLANT

Table 3. Radioactivity in milk samples

Collection: Monthly

Sample Description and Concentration (pCi/L)							
<u>E-40 Barta</u>							
Collection Date	01-09-19	MDC	02-13-19	MDC	03-13-19	MDC	Required LLD
Lab Code	EMI- 64		EMI- 412		EMI- 698		
Sr-89	0.0 ± 0.7	< 0.8	0.1 ± 0.6	< 0.7	-0.1 ± 0.7	< 0.7	5.0
Sr-90	0.4 ± 0.3	< 0.6	0.2 ± 0.3	< 0.5	0.4 ± 0.3	< 0.5	1.0
I-131	0.08 ± 0.13	< 0.23	-0.03 ± 0.22	< 0.45	0.02 ± 0.17	< 0.31	0.5
K-40	1570 ± 120		1411 ± 121		1454 ± 135		
Cs-134	-0.5 ± 2.4	< 4.4	1.2 ± 1.9	< 3.0	-0.9 ± 2.3	< 4.7	5.0
Cs-137	-2.1 ± 2.5	< 3.4	-1.3 ± 2.2	< 3.1	-0.6 ± 2.5	< 4.4	5.0
Ba-La-140	0.3 ± 2.1	< 3.9	-0.3 ± 2.0	< 2.4	0.2 ± 2.6	< 2.9	5.0
Other (Co-60)	-0.7 ± 2.5	< 2.9	-1.7 ± 2.6	< 3.4	-2.4 ± 2.4	< 1.2	15.0
Collection Date	04-10-19	MDC	05-08-19	MDC	06-12-19	MDC	Required LLD
Lab Code	EMI- 1208		EMI- 1585		EMI- 2049		
Sr-89	-0.2 ± 0.7	< 0.7	0.0 ± 0.7	< 0.8	-0.5 ± 0.6	< 0.6	5.0
Sr-90	0.6 ± 0.3	< 0.4	0.4 ± 0.3	< 0.5	0.7 ± 0.3	< 0.6	1.0
I-131	0.11 ± 0.15	< 0.26	-0.08 ± 0.15	< 0.28	0.03 ± 0.15	< 0.27	0.5
K-40	1309 ± 116		1415 ± 113		1345 ± 110		
Cs-134	-1.9 ± 2.3	< 4.2	0.0 ± 2.0	< 3.3	1.0 ± 2.0	< 3.7	5.0
Cs-137	0.1 ± 2.3	< 3.1	-1.0 ± 2.2	< 3.0	1.8 ± 2.4	< 3.9	5.0
Ba-La-140	-3.3 ± 2.8	< 3.4	-1.8 ± 1.8	< 2.2	-2.5 ± 2.0	< 3.8	5.0
Other (Co-60)	0.2 ± 2.5	< 2.0	-1.8 ± 2.2	< 2.1	1.7 ± 2.3	< 3.4	15.0

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Table 3. Radioactivity in milk samples

Collection: Monthly

Sample Description and Concentration (pCi/L)							
<u>E-40 Barta</u>							
Collection Date	07-10-19	MDC	08-14-19	MDC	09-11-19	MDC	Required LLD
Lab Code	EMI- 2465		EMI- 3042		EMI- 3390		
Sr-89	-1.0 ± 0.7	< 0.7	0.1 ± 0.6	< 0.7	0.1 ± 0.6	< 0.7	5.0
Sr-90	0.8 ± 0.3	< 0.5	0.1 ± 0.3	< 0.5	0.3 ± 0.2	< 0.5	1.0
I-131	0.04 ± 0.15	< 0.26	0.07 ± 0.20	< 0.35	-0.06 ± 0.22	< 0.49	0.5
K-40	1424 ± 56	-	1503 ± 121	-	1471 ± 127	-	
Cs-134	0.0 ± 0.9	< 1.6	0.1 ± 2.3	< 4.3	-1.6 ± 2.2	< 4.5	5.0
Cs-137	-0.1 ± 1.1	< 1.5	-0.4 ± 2.6	< 3.7	0.7 ± 2.5	< 3.4	5.0
Ba-La-140	-4.0 ± 1.0	< 4.9	-2.3 ± 2.0	< 2.7	-0.9 ± 2.4	< 2.9	5.0
Other (Co-60)	-0.6 ± 1.1	< 1.1	0.2 ± 2.9	< 4.3	2.1 ± 2.7	< 4.0	15.0
Collection Date	10-09-19	MDC	11-13-19	MDC	12-11-19	MDC	Required LLD
Lab Code	EMI- 3755		EMI- 4343		EMI- 4678		
Sr-89	-0.1 ± 0.7	< 0.8	-0.7 ± 0.6	< 0.7	-0.1 ± 0.7	< 0.7	5.0
Sr-90	0.4 ± 0.3	< 0.5	0.7 ± 0.3	< 0.5	0.3 ± 0.3	< 0.5	1.0
I-131	0.12 ± 0.15	< 0.26	-0.05 ± 0.18	< 0.38	-0.02 ± 0.21	< 0.42	0.5
K-40	1497 ± 130	-	1425 ± 78	-	1465 ± 119	-	
Cs-134	1.3 ± 1.7	< 3.7	0.3 ± 1.3	< 2.4	-3.4 ± 2.3	< 4.4	5.0
Cs-137	1.6 ± 2.5	< 4.1	0.9 ± 1.5	< 2.6	0.8 ± 2.3	< 3.7	5.0
Ba-La-140	-0.6 ± 9.3	< 1.9	0.7 ± 1.3	< 3.5	-1.2 ± 2.3	< 4.8	5.0
Other (Co-60)	-0.7 ± 2.8	< 3.6	1.0 ± 1.4	< 2.6	0.9 ± 2.4	< 4.5	15.0
Sr-89 Annual Mean + s.d.	-0.2 ± 0.3						
Sr-90 Annual Mean + s.d.	0.5 ± 0.2						
I-131 Annual Mean + s.d.	0.01 ± 0.09						
K-40 Annual Mean + s.d.	1388 ± 79						
Cs-134 Annual Mean + s.d.	-0.7 ± 1.4						
Cs-137 Annual Mean + s.d.	0.2 ± 1.1						
Ba-La Annual Mean + s.d.	-1.2 ± 2.1						
Co-60 Annual Mean + s.d.	-0.1 ± 1.4						

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Table 4. Radioactivity in Well Water Samples, E-10

Collection: Quarterly

Units: pCi/L

	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Req. LLD	Annual Mean $\pm$ s.d
Collection Date	01-15-19	04-09-19	07-30-19	10-08-19		
Lab Code	EW- 149	EW- 1192	EW- 2828	EW- 3716		
Gross Beta	1.6 $\pm$ 0.8	1.4 $\pm$ 1.1	1.6 $\pm$ 1.2	1.9 $\pm$ 1.2	4.0	1.6 $\pm$ 0.2
H-3	-32 $\pm$ 81	39 $\pm$ 73	1 $\pm$ 70	44 $\pm$ 73	500	12.9 $\pm$ 36.0
Sr-89	0.2 $\pm$ 0.3	0.1 $\pm$ 0.4	0.2 $\pm$ 0.5	-0.1 $\pm$ 0.4	5.0	0.1 $\pm$ 0.1
Sr-90	-0.3 $\pm$ 0.2	0.0 $\pm$ 0.2	-0.1 $\pm$ 0.2	0.0 $\pm$ 0.2	1.0	-0.1 $\pm$ 0.1
I-131	-0.15 $\pm$ 0.18	-0.10 $\pm$ 0.22	-0.10 $\pm$ 0.19	-0.04 $\pm$ 0.14	0.5	-0.10 $\pm$ 0.05
Mn-54	0.5 $\pm$ 1.9	1.2 $\pm$ 1.8	1.1 $\pm$ 2.8	0.9 $\pm$ 2.7	10	0.9 $\pm$ 0.3
Fe-59	-1.3 $\pm$ 3.8	-6.7 $\pm$ 4.4	0.9 $\pm$ 4.9	-1.8 $\pm$ 5.8	30	-2.2 $\pm$ 3.2
Co-58	1.5 $\pm$ 1.9	-1.8 $\pm$ 1.8	0.5 $\pm$ 2.5	-0.6 $\pm$ 2.6	10	-0.1 $\pm$ 1.4
Co-60	0.8 $\pm$ 1.9	-1.9 $\pm$ 2.0	-0.6 $\pm$ 3.0	-1.5 $\pm$ 3.0	10	-0.8 $\pm$ 1.2
Zn-65	0.2 $\pm$ 3.4	-1.3 $\pm$ 4.6	-1.8 $\pm$ 6.2	-17.7 $\pm$ 7.4	30	-5.1 $\pm$ 8.4
Zr-Nb-95	-4.5 $\pm$ 2.9	-2.3 $\pm$ 2.2	0.8 $\pm$ 2.6	-3.7 $\pm$ 3.2	15	-2.4 $\pm$ 2.3
Cs-134	-1.9 $\pm$ 2.2	-2.0 $\pm$ 2.2	-0.8 $\pm$ 2.7	-1.1 $\pm$ 2.9	10	-1.5 $\pm$ 0.6
Cs-137	0.6 $\pm$ 2.2	0.8 $\pm$ 2.2	1.0 $\pm$ 3.1	-2.2 $\pm$ 3.1	10	0.0 $\pm$ 1.5
Ba-La-140	0.4 $\pm$ 2.5	-1.0 $\pm$ 2.5	-4.1 $\pm$ 8.5	-2.2 $\pm$ 3.1	15	-1.7 $\pm$ 1.9
Other (Ru-103)	-1.9 $\pm$ 1.9	-0.6 $\pm$ 2.5	-0.3 $\pm$ 2.6	0.0 $\pm$ 2.8	30	-0.7 $\pm$ 0.8

MDC Data

Collection Date	01-15-19	04-09-19	07-30-19	10-08-19		
Lab Code	EW- 149	EW- 1192	EW- 2828	EW- 3716		
Gross Beta	< 1.2	< 2.0	< 2.1	< 2.0	4.0	< 1.8
H-3	< 177	< 152	< 152	< 151	500	< 158.0
Sr-89	< 0.5	< 0.6	< 0.6	< 0.6	5.0	< 0.6
Sr-90	< 0.5	< 0.5	< 0.5	< 0.5	1.0	< 0.5
I-131	< 0.43	< 0.47	< 0.35	< 0.25	0.5	< 0.38
Mn-54	< 3.0	< 3.0	< 4.5	< 4.4	10	< 3.7
Fe-59	< 3.3	< 3.9	< 7.0	< 5.8	30	< 5.0
Co-58	< 3.8	< 1.6	< 4.3	< 3.3	10	< 3.2
Co-60	< 2.8	< 1.5	< 1.6	< 4.6	10	< 2.6
Zn-65	< 5.0	< 6.9	< 8.1	< 9.2	30	< 7.3
Zr-Nb-95	< 4.8	< 3.2	< 5.1	< 3.4	15	< 4.1
Cs-134	< 3.4	< 4.0	< 5.5	< 5.7	10	< 4.6
Cs-137	< 3.5	< 3.2	< 6.2	< 3.6	10	< 4.1
Ba-La-140	< 4.2	< 3.4	< 3.8	< 3.4	15	< 3.7
Other (Ru-103)	< 2.8	< 4.5	< 4.2	< 3.4	30	< 3.7

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Table 5. Lake water, analyses for gross beta, iodine-131 and gamma emitting isotopes.

Location: E-01 (Meteorological Tower)

Collection: Monthly composites

Units: pCi/L

	MDC		MDC		MDC		MDC		
Lab Code	ELW- 65		ELW- 416		ELW- 699		ELW- 1188		
Date Collected	01-08-19		02-13-19		03-12-19		04-09-19		Req. LLD
Gross beta	4.9 ± 0.8	< 0.9	0.9 ± 0.5	< 0.9	1.5 ± 0.6	< 0.9	2.0 ± 0.6	< 0.9	4.0
I-131	0.01 ± 0.14	< 0.24	-0.04 ± 0.14	< 0.25	-0.01 ± 0.19	< 0.34	0.07 ± 0.18	< 0.32	0.5
Be-7	3.9 ± 15.5	< 35.5	-9.2 ± 32.2	< 57.9	6.4 ± 22.9	< 45.3	-4.7 ± 21.6	< 41.0	
Mn-54	-0.9 ± 1.8	< 2.3	0.6 ± 3.9	< 6.2	-0.5 ± 2.8	< 4.7	1.6 ± 2.4	< 3.2	10
Fe-59	0.7 ± 3.8	< 8.5	-0.7 ± 6.6	< 9.1	-2.8 ± 4.9	< 3.6	-0.6 ± 4.4	< 6.6	30
Co-58	-1.2 ± 1.8	< 2.7	2.9 ± 3.3	< 6.3	1.2 ± 2.3	< 4.5	-0.9 ± 2.1	< 3.3	10
Co-60	0.2 ± 1.8	< 2.7	4.7 ± 3.5	< 5.5	-2.3 ± 3.0	< 3.0	-1.0 ± 2.4	< 2.2	10
Zn-65	1.4 ± 4.1	< 6.9	-30.2 ± 8.4	< 11.4	0.4 ± 5.7	< 6.9	-0.9 ± 4.1	< 3.6	30
Zr-Nb-95	1.7 ± 2.3	< 5.1	-13.4 ± 4.6	< 8.7	-0.4 ± 2.8	< 5.4	-1.4 ± 2.7	< 4.5	15
Cs-134	-1.1 ± 2.0	< 3.5	-1.0 ± 3.5	< 6.7	-0.9 ± 2.3	< 4.6	0.1 ± 2.4	< 4.7	10
Cs-137	-1.2 ± 2.3	< 3.4	-1.4 ± 3.4	< 6.0	-0.4 ± 2.6	< 4.9	-2.4 ± 2.8	< 3.0	10
Ba-La-140	0.2 ± 2.3	< 6.2	1.9 ± 4.7	< 6.3	2.6 ± 3.3	< 4.9	4.1 ± 2.7	< 3.2	15
Other (Ru-103)	0.3 ± 1.6	< 3.5	-1.7 ± 3.1	< 4.0	-0.7 ± 2.5	< 3.1	-0.1 ± 2.7	< 3.3	30
Lab Code	ELW- 1577		ELW- 2102		ELW- 2466		ELW- 3043		
Date Collected	05-08-19		06-12-19		07-10-19		08-14-19		Req. LLD
Gross beta	1.1 ± 0.6	< 0.9	0.7 ± 0.5	< 0.9	0.7 ± 0.5	< 0.9	1.1 ± 0.5	< 0.8	4.0
I-131	-0.02 ± 0.21	< 0.43	0.01 ± 0.17	< 0.31	0.05 ± 0.13	< 0.23	-0.07 ± 0.24	< 0.49	0.5
Be-7	-0.2 ± 21.0	< 39.1	5.7 ± 15.5	< 37.2	-12.4 ± 12.6	< 26.8	-13.9 ± 14.0	< 22.3	
Mn-54	1.0 ± 1.9	< 3.8	1.0 ± 1.8	< 3.5	0.7 ± 1.4	< 1.8	1.9 ± 1.8	< 3.1	10
Fe-59	-1.0 ± 3.2	< 4.9	-1.6 ± 3.0	< 3.3	2.0 ± 2.9	< 7.2	-0.3 ± 3.0	< 5.1	30
Co-58	0.3 ± 1.9	< 3.5	1.1 ± 1.6	< 2.9	-0.7 ± 1.7	< 2.1	-1.2 ± 1.8	< 1.9	10
Co-60	-0.7 ± 2.0	< 2.0	-1.0 ± 1.7	< 2.3	0.7 ± 1.8	< 1.9	-0.4 ± 2.1	< 2.4	10
Zn-65	-0.6 ± 4.7	< 6.5	0.6 ± 3.0	< 4.3	-0.7 ± 3.4	< 3.3	0.5 ± 3.3	< 4.1	30
Zr-Nb-95	-1.8 ± 2.2	< 4.3	1.6 ± 1.9	< 4.3	-3.0 ± 1.5	< 2.4	-0.4 ± 1.9	< 2.8	15
Cs-134	0.4 ± 2.1	< 4.0	-0.8 ± 1.8	< 3.4	1.0 ± 1.7	< 2.8	0.4 ± 1.6	< 3.0	10
Cs-137	-1.1 ± 2.1	< 2.3	0.3 ± 1.9	< 3.2	0.1 ± 1.7	< 2.2	1.2 ± 1.9	< 3.4	10
Ba-La-140	1.7 ± 1.9	< 10.0	-0.3 ± 1.7	< 6.5	-3.6 ± 2.2	< 12.1	-0.9 ± 1.9	< 4.0	15
Other (Ru-103)	-2.0 ± 2.3	< 4.3	-1.7 ± 1.7	< 4.1	-2.9 ± 1.8	< 3.3	1.8 ± 1.5	< 3.9	30
Lab Code	ELW- 3391		ELW- 3707		ELW- 4344		ELW- 4689		
Date Collected	09-11-19		10-07-19		11-13-19		12-12-19		Req. LLD
Gross beta	2.3 ± 0.6	< 0.9	1.6 ± 1.0	< 1.8	1.3 ± 0.6	< 0.9	2.0 ± 0.6	< 0.9	4.0
I-131	-0.01 ± 0.17	< 0.30	-0.04 ± 0.16	< 0.29	0.06 ± 0.14	< 0.25	-0.08 ± 0.14	< 0.27	0.5
Be-7	7.8 ± 14.1	< 31.4	-3.0 ± 15.1	< 43.7	6.1 ± 16.7	< 42.9	-16.8 ± 14.3	< 37.1	
Mn-54	0.3 ± 1.7	< 2.7	0.7 ± 1.5	< 1.9	-0.3 ± 1.9	< 3.3	-0.1 ± 1.6	< 2.6	10
Fe-59	0.5 ± 3.2	< 4.4	-0.6 ± 3.2	< 6.9	1.7 ± 3.6	< 8.0	-1.3 ± 3.0	< 6.6	30
Co-58	-0.9 ± 1.6	< 1.6	0.1 ± 1.3	< 2.1	-1.9 ± 1.8	< 2.0	1.8 ± 1.8	< 3.8	10
Co-60	-0.9 ± 1.7	< 1.6	1.3 ± 1.6	< 1.7	-0.4 ± 2.4	< 2.8	-1.2 ± 2.2	< 2.0	10
Zn-65	-1.8 ± 3.3	< 1.7	3.2 ± 3.4	< 4.9	-2.3 ± 3.5	< 5.6	-2.1 ± 3.3	< 2.9	30
Zr-Nb-95	0.2 ± 2.0	< 4.8	-2.7 ± 1.8	< 2.7	-5.5 ± 2.5	< 5.7	-1.9 ± 1.8	< 4.2	15
Cs-134	1.1 ± 1.8	< 3.5	-1.5 ± 1.7	< 3.0	-1.9 ± 2.0	< 3.8	-0.7 ± 1.9	< 3.3	10
Cs-137	0.3 ± 2.2	< 4.1	-0.8 ± 1.8	< 1.8	0.2 ± 2.6	< 4.2	-0.2 ± 2.2	< 2.8	10
Ba-La-140	-0.8 ± 1.3	< 3.0	0.5 ± 1.8	< 5.6	0.7 ± 2.5	< 7.8	2.3 ± 2.0	< 8.7	15
Other (Ru-103)	-1.0 ± 1.4	< 2.9	-1.6 ± 1.5	< 2.4	-0.2 ± 1.8	< 4.6	-1.2 ± 1.7	< 4.4	30

POINT BEACH

Table 5. Lake water, analyses for gross beta, iodine-131 and gamma emitting isotopes.

Location: E-05 (Two Creeks Park)

Collection: Monthly composites

Units: pCi/L

	MDC		MDC		MDC		MDC		
Lab Code	ELW- 66		NS ^a		ELW- 700		ELW- 1189		
Date Collected	01-08-19		02-13-19		03-12-19		04-09-19		Req. LLD
Gross beta	2.6 ± 0.7	< 0.9	-	-	1.1 ± 0.5	< 0.9	1.8 ± 0.6	< 0.9	4.0
I-131	0.03 ± 0.13	< 0.23	-	-	-0.12 ± 0.16	< 0.31	0.02 ± 0.17	< 0.31	0.5
Be-7	-4.0 ± 13.4	< 28.9	-	-	-2.4 ± 14.1	< 23.7	-1.5 ± 16.3	< 32.4	
Mn-54	1.3 ± 1.6	< 2.3	-	-	-0.4 ± 1.7	< 2.8	0.1 ± 1.8	< 2.3	10
Fe-59	-1.9 ± 2.8	< 5.2	-	-	-0.1 ± 2.8	< 3.1	-0.8 ± 3.3	< 6.1	30
Co-58	0.6 ± 1.8	< 2.8	-	-	-0.3 ± 1.8	< 1.6	-0.4 ± 1.6	< 2.6	10
Co-60	-0.6 ± 1.8	< 2.2	-	-	0.2 ± 1.8	< 1.0	0.7 ± 2.3	< 2.6	10
Zn-65	3.9 ± 3.7	< 5.4	-	-	-2.8 ± 3.9	< 2.7	-1.1 ± 3.5	< 4.3	30
Zr-Nb-95	-2.1 ± 1.7	< 2.6	-	-	-2.4 ± 2.1	< 2.7	0.8 ± 1.9	< 2.9	15
Cs-134	0.3 ± 1.9	< 3.4	-	-	0.3 ± 1.7	< 3.2	-1.5 ± 1.8	< 2.9	10
Cs-137	0.8 ± 2.0	< 3.0	-	-	-1.2 ± 2.0	< 2.3	0.7 ± 2.0	< 2.6	10
Ba-La-140	-4.6 ± 2.3	< 4.2	-	-	-0.7 ± 1.5	< 3.0	0.8 ± 2.2	< 3.4	15
Other (Ru-103)	1.0 ± 1.8	< 3.7	-	-	0.1 ± 1.7	< 3.5	-0.8 ± 1.7	< 3.6	30
Lab Code	ELW- 1578		ELW- 2103		ELW- 2467		ELW- 3044		
Date Collected	05-08-19		06-13-19		07-10-19		08-15-19		Req. LLD
Gross beta	0.6 ± 0.5	< 0.9	1.4 ± 0.6	< 0.9	1.1 ± 0.5	< 0.9	1.4 ± 0.6	< 0.9	4.0
I-131	-0.16 ± 0.18	< 0.38	0.15 ± 0.17	< 0.29	0.04 ± 0.12	< 0.21	0.04 ± 0.21	< 0.42	0.5
Be-7	15.5 ± 14.2	< 32.6	2.9 ± 21.0	< 47.1	2.5 ± 11.5	< 32.8	-3.3 ± 20.3	< 44.3	
Mn-54	1.0 ± 1.6	< 2.4	-0.3 ± 2.0	< 4.1	0.7 ± 1.3	< 2.1	0.2 ± 1.9	< 3.7	10
Fe-59	0.3 ± 3.9	< 5.8	0.7 ± 4.0	< 8.6	2.9 ± 2.1	< 4.0	1.0 ± 4.1	< 8.7	30
Co-58	0.6 ± 1.5	< 3.1	0.8 ± 1.7	< 2.7	-1.8 ± 1.4	< 1.9	-0.1 ± 1.9	< 2.1	10
Co-60	0.4 ± 2.3	< 1.8	0.8 ± 1.9	< 2.6	-1.0 ± 1.5	< 2.4	-1.7 ± 1.9	< 2.4	10
Zn-65	-4.0 ± 3.7	< 3.1	-1.8 ± 3.7	< 3.8	-0.1 ± 2.7	< 2.9	-5.6 ± 4.0	< 2.9	30
Zr-Nb-95	-0.9 ± 1.8	< 3.5	-1.7 ± 2.3	< 5.0	-1.2 ± 1.5	< 3.3	-3.9 ± 2.2	< 2.5	15
Cs-134	0.0 ± 1.9	< 3.5	-3.0 ± 2.1	< 4.4	0.1 ± 1.5	< 2.9	0.2 ± 2.2	< 4.3	10
Cs-137	-1.6 ± 2.1	< 2.4	0.5 ± 2.4	< 3.7	-0.7 ± 1.7	< 2.6	1.0 ± 2.2	< 3.6	10
Ba-La-140	1.0 ± 2.0	< 7.4	-2.1 ± 2.0	< 5.8	0.4 ± 1.5	< 6.4	-0.7 ± 2.7	< 6.4	15
Other (Ru-103)	-1.0 ± 1.9	< 2.4	-1.3 ± 2.4	< 4.0	-2.8 ± 1.6	< 4.2	2.1 ± 2.1	< 4.1	30
Lab Code	ELW- 3392		ELW- 3708		ELW- 4345		ELW- 4690		
Date Collected	09-11-19		10-07-19		11-13-19		12-12-19		Req. LLD
Gross beta	1.2 ± 0.5	< 0.9	1.3 ± 0.5	< 0.9	1.2 ± 0.5	< 0.9	0.9 ± 0.5	< 0.9	4.0
I-131	0.11 ± 0.16	< 0.28	0.02 ± 0.18	< 0.32	0.00 ± 0.12	< 0.22	-0.19 ± 0.19	< 0.36	0.5
Be-7	-14.2 ± 14.0	< 40.2	-12.9 ± 13.1	< 29.0	-7.0 ± 19.0	< 44.5	-7.7 ± 12.7	< 19.8	
Mn-54	-0.4 ± 1.9	< 3.6	1.0 ± 1.5	< 2.1	-1.6 ± 1.8	< 2.1	1.3 ± 1.7	< 3.0	10
Fe-59	-0.5 ± 2.4	< 3.0	-1.4 ± 2.7	< 4.6	-1.1 ± 3.8	< 8.2	2.8 ± 3.0	< 5.7	30
Co-58	-0.2 ± 1.5	< 2.2	0.0 ± 1.5	< 2.4	2.3 ± 1.6	< 2.7	0.1 ± 1.6	< 2.2	10
Co-60	-0.8 ± 1.7	< 1.8	-0.6 ± 1.4	< 1.8	0.3 ± 2.1	< 3.4	0.3 ± 1.6	< 2.4	10
Zn-65	-0.1 ± 2.6	< 3.2	0.9 ± 3.2	< 4.6	-0.2 ± 4.0	< 3.5	1.0 ± 3.2	< 4.0	30
Zr-Nb-95	-0.8 ± 1.7	< 2.6	0.8 ± 1.9	< 3.5	-1.0 ± 2.1	< 3.3	-1.6 ± 1.9	< 2.4	15
Cs-134	-0.9 ± 1.5	< 2.6	-0.2 ± 1.5	< 3.0	-1.2 ± 2.2	< 4.1	-1.7 ± 1.9	< 3.4	10
Cs-137	-0.8 ± 2.2	< 2.7	1.8 ± 1.9	< 3.7	0.0 ± 2.2	< 2.0	2.0 ± 2.1	< 3.5	10
Ba-La-140	-0.3 ± 2.0	< 8.0	-1.1 ± 1.8	< 4.1	-4.0 ± 2.1	< 8.0	-2.7 ± 2.4	< 3.0	15
Other (Ru-103)	-0.9 ± 1.7	< 4.2	-0.2 ± 1.5	< 3.2	-2.6 ± 2.1	< 3.6	0.4 ± 1.7	< 4.2	30

^a "NS" = No sample; see Table 2.0, Listing of Missed Samples.

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Table 5. Lake water, analyses for gross beta, iodine-131 and gamma emitting isotopes.

Location: E-06 (Coast Guard Station)

Collection: Monthly composites

Units: pCi/L

	MDC		MDC		MDC		MDC		
Lab Code	ELW- 67		NS ^a		NS ^a		ELW- 1190		Req. LLD
Date Collected	01-08-19		02-13-19		03-12-19		04-09-19		
Gross beta	2.8 ± 0.7	< 0.9	-	-	-	-	2.0 ± 0.6	< 0.9	4.0
I-131	-0.10 ± 0.13	< 0.24	-	-	-	-	0.07 ± 0.16	< 0.28	0.5
Be-7	5.1 ± 13.8	< 35.7	-	-	-	-	1.0 ± 13.5	< 30.3	
Mn-54	-1.1 ± 2.1	< 2.4	-	-	-	-	-1.2 ± 1.7	< 2.1	10
Fe-59	-1.5 ± 2.9	< 3.7	-	-	-	-	-1.9 ± 3.4	< 2.9	30
Co-58	0.7 ± 1.6	< 2.8	-	-	-	-	-0.1 ± 1.4	< 2.2	10
Co-60	-0.6 ± 1.5	< 2.3	-	-	-	-	-0.3 ± 1.8	< 2.6	10
Zn-65	-0.2 ± 3.9	< 6.0	-	-	-	-	-1.4 ± 3.3	< 3.8	30
Zr-Nb-95	0.4 ± 1.8	< 3.0	-	-	-	-	-2.4 ± 2.1	< 2.9	15
Cs-134	-0.9 ± 2.0	< 3.8	-	-	-	-	0.4 ± 1.7	< 3.2	10
Cs-137	-1.3 ± 1.8	< 2.2	-	-	-	-	1.7 ± 2.0	< 3.1	10
Ba-La-140	2.0 ± 1.4	< 3.5	-	-	-	-	0.2 ± 1.9	< 2.7	15
Other (Ru-103)	0.3 ± 1.5	< 3.3	-	-	-	-	0.5 ± 1.6	< 3.3	30
Lab Code	ELW- 1579		ELW- 2104		ELW- 2468		ELW- 3045		Req. LLD
Date Collected	05-08-19		06-13-19		07-10-19		08-15-19		
Gross beta	1.2 ± 0.6	< 0.9	1.0 ± 0.5	< 0.9	1.1 ± 0.5	< 0.9	1.1 ± 0.5	< 0.8	4.0
I-131	0.01 ± 0.15	< 0.27	0.19 ± 0.25	< 0.48	-0.10 ± 0.12	< 0.23	0.12 ± 0.15	< 0.26	0.5
Be-7	-5.4 ± 16.9	< 45.3	11.8 ± 13.0	< 32.6	12.1 ± 17.7	< 42.0	4.3 ± 13.0	< 27.6	
Mn-54	-0.4 ± 1.7	< 2.0	-0.5 ± 1.6	< 1.9	-0.8 ± 1.8	< 2.5	-1.2 ± 1.7	< 2.3	10
Fe-59	-2.9 ± 2.8	< 3.7	1.5 ± 3.2	< 7.4	4.6 ± 3.2	< 7.3	1.4 ± 2.6	< 4.3	30
Co-58	0.5 ± 1.7	< 3.7	1.2 ± 1.4	< 2.8	0.8 ± 1.6	< 2.7	0.2 ± 1.4	< 2.3	10
Co-60	0.6 ± 1.5	< 2.0	1.0 ± 2.0	< 1.9	-1.2 ± 2.1	< 1.9	0.7 ± 1.8	< 1.7	10
Zn-65	-0.8 ± 3.4	< 3.7	0.3 ± 3.2	< 4.6	3.3 ± 3.9	< 5.9	0.9 ± 3.0	< 3.5	30
Zr-Nb-95	1.9 ± 1.9	< 4.8	-2.0 ± 1.6	< 2.1	-0.5 ± 1.5	< 2.8	-1.9 ± 1.7	< 2.3	15
Cs-134	-2.8 ± 1.7	< 2.9	-1.0 ± 1.7	< 3.1	-2.2 ± 1.6	< 3.3	-0.7 ± 1.5	< 2.8	10
Cs-137	0.3 ± 2.0	< 2.5	-2.5 ± 2.1	< 2.6	-0.1 ± 2.0	< 2.1	2.2 ± 1.7	< 2.7	10
Ba-La-140	-4.2 ± 2.1	< 6.1	-3.3 ± 1.8	< 4.9	-6.9 ± 6.1	< 9.0	0.5 ± 1.9	< 4.8	15
Other (Ru-103)	-1.3 ± 1.5	< 2.5	-0.5 ± 1.5	< 3.6	-2.9 ± 2.2	< 6.1	-0.1 ± 1.6	< 4.2	30
Lab Code	ELW- 3393		ELW- 3709		ELW- 4346		ELW- 4692		Req. LLD
Date Collected	09-11-19		10-07-19		11-13-19		12-12-19		
Gross beta	1.0 ± 0.5	< 0.9	2.3 ± 1.1	< 1.7	0.9 ± 0.6	< 0.9	1.1 ± 0.5	< 0.9	4.0
I-131	-0.07 ± 0.18	< 0.33	0.27 ± 0.28	< 0.48	0.04 ± 0.13	< 0.24	0.01 ± 0.21	< 0.43	0.5
Be-7	6.7 ± 14.7	< 36.1	12.5 ± 15.4	< 44.1	-8.3 ± 18.1	< 39.2	-6.3 ± 19.6	< 38.1	
Mn-54	0.3 ± 1.7	< 2.0	1.4 ± 1.7	< 3.4	-1.3 ± 1.8	< 2.2	-0.3 ± 2.3	< 4.1	10
Fe-59	-2.7 ± 3.0	< 4.5	-0.6 ± 3.7	< 8.4	0.7 ± 4.4	< 8.6	-4.1 ± 4.4	< 6.5	30
Co-58	0.4 ± 1.6	< 2.0	-0.1 ± 1.8	< 2.5	0.0 ± 1.7	< 3.9	-0.2 ± 1.6	< 2.8	10
Co-60	-0.2 ± 1.6	< 2.2	-0.1 ± 1.9	< 2.1	1.5 ± 2.1	< 2.9	-1.4 ± 2.0	< 1.8	10
Zn-65	-0.5 ± 3.7	< 5.3	-0.5 ± 4.0	< 5.7	-1.6 ± 4.7	< 6.7	-3.1 ± 4.3	< 5.6	30
Zr-Nb-95	-0.7 ± 2.1	< 3.3	2.1 ± 2.4	< 4.8	-3.3 ± 2.1	< 2.7	-1.3 ± 2.3	< 5.4	15
Cs-134	-0.2 ± 1.8	< 3.4	-0.6 ± 2.1	< 3.2	-0.9 ± 2.0	< 3.5	-1.7 ± 2.2	< 4.2	10
Cs-137	0.2 ± 2.0	< 2.1	-2.1 ± 2.2	< 2.6	1.7 ± 1.9	< 3.1	-0.5 ± 2.7	< 4.6	10
Ba-La-140	-1.2 ± 2.0	< 4.2	-5.4 ± 2.5	< 7.9	-3.1 ± 2.2	< 7.0	-2.6 ± 2.0	< 4.0	15
Other (Ru-103)	0.7 ± 1.8	< 3.2	-2.0 ± 1.9	< 3.5	-2.2 ± 1.9	< 2.7	1.8 ± 2.4	< 5.3	30

^a "NS" = No sample; see Table 2.0, Listing of Missed Samples.

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Table 5. Lake water, analyses for gross beta, iodine-131 and gamma emitting isotopes.

Location: E-33 (Kewaunee)

Collection: Monthly composites

Units: pCi/L

	MDC		MDC		MDC		MDC		
Lab Code	ELW- 68		NS ^a		NS ^a		ELW- 1191		Req LLD
Date Collected	01-11-18		02-13-19		03-12-19		04-09-19		
Gross beta	2.2 ± 0.6	< 0.8	-	-	-	-	1.3 ± 0.6	< 0.8	4.0
I-131	-0.04 ± 0.13	< 0.24	-	-	-	-	0.00 ± 0.16	< 0.28	0.5
Be-7	-6.6 ± 12.7	< 27.9	-	-	-	-	15.4 ± 15.1	< 28.6	
Mn-54	1.3 ± 1.6	< 2.3	-	-	-	-	0.5 ± 1.9	< 3.5	10
Fe-59	0.8 ± 2.5	< 5.1	-	-	-	-	2.1 ± 3.0	< 4.8	30
Co-58	-0.8 ± 1.7	< 2.2	-	-	-	-	-0.9 ± 1.6	< 2.2	10
Co-60	-0.2 ± 1.7	< 2.1	-	-	-	-	0.2 ± 1.9	< 1.9	10
Zn-65	0.4 ± 2.7	< 2.4	-	-	-	-	-2.4 ± 3.2	< 2.2	30
Zr-Nb-95	-0.4 ± 1.8	< 4.0	-	-	-	-	-2.1 ± 2.0	< 3.1	15
Cs-134	0.2 ± 1.7	< 2.7	-	-	-	-	-0.8 ± 1.8	< 2.9	10
Cs-137	0.8 ± 2.0	< 3.7	-	-	-	-	1.6 ± 2.0	< 3.6	10
Ba-La-140	-0.3 ± 1.8	< 2.5	-	-	-	-	-1.8 ± 2.3	< 4.5	15
Other (Ru-103)	-0.4 ± 1.5	< 2.6	-	-	-	-	-0.2 ± 1.6	< 3.7	30
Lab Code	ELW- 1580		ELW- 2105		ELW- 2469		ELW- 3046		Req LLD
Date Collected	05-08-19		06-13-19		07-10-19		08-15-19		
Gross beta	1.6 ± 0.6	< 0.9	1.3 ± 0.5	< 0.8	1.3 ± 0.5	< 0.8	1.1 ± 0.6	< 0.9	4.0
I-131	-0.04 ± 0.14	< 0.25	0.16 ± 0.25	< 0.48	0.06 ± 0.12	< 0.22	0.16 ± 0.17	< 0.28	0.5
Be-7	-7.6 ± 13.9	< 34.4	-11.8 ± 20.8	< 42.1	1.2 ± 13.5	< 35.3	-2.8 ± 19.9	< 32.2	
Mn-54	0.2 ± 1.8	< 2.8	0.3 ± 1.9	< 3.0	-0.8 ± 1.5	< 2.4	2.1 ± 1.8	< 3.2	10
Fe-59	-0.9 ± 3.2	< 4.3	-0.7 ± 3.4	< 4.7	-3.7 ± 4.0	< 7.6	-2.3 ± 3.2	< 4.6	30
Co-58	1.7 ± 1.7	< 3.6	-0.3 ± 1.8	< 3.0	-1.4 ± 1.7	< 2.5	-0.2 ± 1.7	< 1.8	10
Co-60	0.6 ± 1.9	< 3.2	1.4 ± 1.7	< 2.0	0.4 ± 1.5	< 2.5	-1.2 ± 2.4	< 1.5	10
Zn-65	-1.5 ± 3.3	< 5.4	2.2 ± 3.9	< 4.4	1.9 ± 3.3	< 3.7	-1.5 ± 4.5	< 3.5	30
Zr-Nb-95	-1.1 ± 1.8	< 4.6	1.7 ± 2.2	< 5.7	-3.2 ± 1.7	< 4.2	-1.5 ± 2.3	< 4.6	15
Cs-134	-0.3 ± 1.9	< 3.4	1.0 ± 2.1	< 4.5	-0.4 ± 1.6	< 3.2	-1.3 ± 2.0	< 4.1	10
Cs-137	-2.1 ± 1.9	< 2.5	-0.1 ± 2.2	< 3.4	-1.2 ± 1.8	< 1.9	0.4 ± 2.4	< 2.4	10
Ba-La-140	4.8 ± 2.0	< 9.6	-4.7 ± 2.2	< 6.3	0.6 ± 2.3	< 9.7	-2.5 ± 2.5	< 4.6	15
Other (Ru-103)	-1.5 ± 1.5	< 2.8	-1.4 ± 2.1	< 4.7	-0.7 ± 1.4	< 4.2	1.7 ± 2.1	< 3.9	30
Lab Code	ELW- 3394		ELW- 3711		ELW- 4347		ELW- 4693		Req LLD
Date Collected	09-11-19		10-07-19		11-13-19		12-12-19		
Gross beta	1.5 ± 0.6	< 0.8	1.3 ± 1.0	< 1.7	1.8 ± 0.6	< 0.8	0.8 ± 0.5	< 0.9	4.0
I-131	0.04 ± 0.17	< 0.30	-0.05 ± 0.20	< 0.37	0.00 ± 0.12	< 0.23	-0.01 ± 0.15	< 0.27	0.5
Be-7	0.6 ± 12.9	< 32.9	-11.1 ± 13.3	< 28.1	7.9 ± 13.7	< 46.6	-1.4 ± 14.7	< 36.3	
Mn-54	-1.3 ± 1.6	< 1.7	0.4 ± 1.6	< 2.3	0.7 ± 1.9	< 3.6	-0.7 ± 2.0	< 3.1	10
Fe-59	0.4 ± 3.1	< 3.7	-3.6 ± 2.8	< 3.3	-0.6 ± 3.3	< 7.4	0.2 ± 3.5	< 8.9	30
Co-58	-0.8 ± 1.6	< 2.0	0.3 ± 1.6	< 2.9	1.1 ± 1.5	< 2.7	0.2 ± 1.7	< 3.3	10
Co-60	1.1 ± 1.8	< 2.2	-0.8 ± 1.5	< 1.3	1.8 ± 1.6	< 2.1	1.1 ± 1.8	< 2.9	10
Zn-65	2.0 ± 3.2	< 3.9	-0.9 ± 2.8	< 2.9	0.9 ± 2.8	< 3.7	0.3 ± 3.5	< 6.5	30
Zr-Nb-95	-2.7 ± 1.8	< 2.5	1.5 ± 1.7	< 4.1	-1.9 ± 1.6	< 3.4	-2.8 ± 2.2	< 4.9	15
Cs-134	0.1 ± 1.5	< 3.2	0.9 ± 1.7	< 3.0	0.8 ± 1.5	< 2.8	1.5 ± 1.7	< 3.3	10
Cs-137	0.5 ± 1.9	< 3.3	1.7 ± 1.6	< 2.9	1.3 ± 1.8	< 2.1	0.8 ± 1.9	< 3.2	10
Ba-La-140	4.4 ± 5.8	< 5.9	-2.5 ± 2.1	< 5.7	0.7 ± 1.5	< 7.4	-2.6 ± 1.9	< 6.4	15
Other (Ru-103)	-0.3 ± 1.5	< 2.3	-1.7 ± 1.5	< 2.8	1.6 ± 1.5	< 4.3	-5.0 ± 1.7	< 2.8	30

^a "NS" = No sample; see Table 2.0, Listing of Missed Samples.

Annual

Annual

All locations	Mean ± s.d.		Mean ± s.d.		Mean ± s.d.
Gross Beta	1.4 ± 0.8				
I-131	0.01 ± 0.08	Co-58	0.1 ± 1.0	Cs-134	-0.5 ± 1.0
Be-7	-0.9 ± 8.0	Co-60	0.0 ± 1.1	Cs-137	0.0 ± 1.2
Mn-54	0.1 ± 0.9	Zn-65	-0.9 ± 4.7	Ba-La-140	-0.7 ± 2.5
Fe-59	-0.3 ± 1.8	Zr-Nb-95	-1.3 ± 2.4	Ru-103	-0.5 ± 1.3

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Table 6. Lake water, analyses for tritium, strontium-89 and strontium-90.
Collection: Quarterly composites of weekly grab samples
Units: pCi/L

E-01 (Meteorological Tower)								
Location	1st Qtr.	MDC	2nd Qtr.	MDC	3rd Qtr.	MDC	4th Qtr.	MDC
Lab Code	ELW- 745		ELW- 2174		ELW- 3462		ELW- 4752	
H-3	4 ± 73	< 154	687 ± 103	^a < 150	41 ± 83	< 153	142 ± 85	< 160
Sr-89	-0.03 ± 0.66	< 0.83	0.28 ± 0.55	< 0.63	-0.31 ± 0.58	< 0.71	-0.32 ± 0.57	< 0.68
Sr-90	0.21 ± 0.26	< 0.51	0.24 ± 0.25	< 0.48	0.27 ± 0.26	< 0.50	0.21 ± 0.28	< 0.56

E-05 (Two Creeks Park)								
Location	1st Qtr.		2nd Qtr.		3rd Qtr.		4th Qtr.	
Lab Code	ELW- 746		ELW- 2175		ELW- 3463		ELW- 4753	
H-3	107 ± 79	< 154	52 ± 73	< 150	52 ± 83	< 153	137 ± 84	< 160
Sr-89	-0.17 ± 0.65	< 0.85	0.15 ± 0.58	< 0.67	0.45 ± 0.59	< 0.80	-0.29 ± 0.66	< 0.78
Sr-90	0.19 ± 0.26	< 0.50	0.34 ± 0.28	< 0.52	0.03 ± 0.24	< 0.50	0.31 ± 0.32	< 0.62

E-06 (Coast Guard Station)								
Location	1st Qtr.		2nd Qtr.		3rd Qtr.		4th Qtr.	
Lab Code	ELW- 747		ELW- 2176		ELW- 3464		ELW- 4754	
H-3	-26 ± 72	< 156	20 ± 71	< 150	50 ± 83	< 153	8 ± 77	< 160
Sr-89	-0.85 ± 1.34	< 1.67	0.01 ± 0.49	< 0.57	0.54 ± 0.62	< 0.71	-0.01 ± 0.62	< 0.71
Sr-90	0.25 ± 0.23	< 0.44	0.19 ± 0.25	< 0.48	0.22 ± 0.25	< 0.49	0.19 ± 0.30	< 0.59

E-33 (Kewaunee)								
Location	1st Qtr.		2nd Qtr.		3rd Qtr.		4th Qtr.	
Lab Code	ELW- 748		ELW- 2177		ELW- 3465		ELW- 4755	
H-3	-4 ± 73	< 156	-41 ± 67	< 150	65 ± 84	< 153	495 ± 101 ^b	< 160
Sr-89	0.03 ± 1.37	< 1.77	-0.23 ± 0.49	< 0.62	0.19 ± 0.53	< 0.61	0.09 ± 0.50	< 0.63
Sr-90	0.14 ± 0.22	< 0.44	0.21 ± 0.25	< 0.47	0.26 ± 0.23	< 0.42	-0.03 ± 0.24	< 0.53

^a Reanalysis result 575 ± 100 pCi/L.

^b Reanalysis result 496 ± 119 pCi/L.

Tritium Annual Mean ± s.d.	112 ± 197
Sr-89 Annual Mean ± s.d.	-0.03 ± 0.34
Sr-90 Annual Mean ± s.d.	0.20 ± 0.09

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Table 7. Fish, analyses for gross beta and gamma emitting isotopes.

Location: E-13

Collection: Quarterly

Units: pCi/g wet

		Sample Description and Concentration					
		MDC		MDC		MDC	Req. LLD
Collection Date	01-07-19			01-22-19			02-06-19
Lab Code	EF- 681			EF- 682			EF- 683
Type	Coho Salmon			Catfish			Burbot
K-40	2.75 ± 0.40	-		2.17 ± 0.42	-		1.89 ± 0.33
Mn-54	-0.004 ± 0.009	< 0.016		0.008 ± 0.009	< 0.014		-0.001 ± 0.008
Fe-59	0.015 ± 0.020	< 0.094		0.009 ± 0.016	< 0.040		0.002 ± 0.017
Co-58	-0.008 ± 0.009	< 0.019		0.002 ± 0.008	< 0.019		-0.007 ± 0.009
Co-60	-0.001 ± 0.011	< 0.012		0.001 ± 0.010	< 0.019		0.006 ± 0.009
Zn-65	-0.011 ± 0.026	< 0.039		-0.007 ± 0.021	< 0.039		-0.013 ± 0.019
Cs-134	0.002 ± 0.011	< 0.023		-0.007 ± 0.009	< 0.016		-0.001 ± 0.008
Cs-137	0.020 ± 0.012	< 0.020		0.007 ± 0.011	< 0.018		0.020 ± 0.012
Other (Ru-103)	-0.043 ± 0.010	< 0.046		0.007 ± 0.007	< 0.033		0.010 ± 0.007
Collection Date	06-16-19			06-16-19			06-16-19
Lab Code	EF- 2216			EF- 2217			EF- 2218
Type	Lake Herring			Whitefish			Burbot
K-40	3.05 ± 0.39	-		3.09 ± 3.09	-		1.56 ± 1.56
Mn-54	0.002 ± 0.008	< 0.013		0.002 ± 0.007	< 0.011		-0.006 ± 0.011
Fe-59	-0.035 ± 0.019	< 0.040		0.013 ± 0.016	< 0.043		-0.006 ± 0.022
Co-58	-0.009 ± 0.008	< 0.016		-0.005 ± 0.007	< 0.014		0.002 ± 0.011
Co-60	0.001 ± 0.010	< 0.011		-0.006 ± 0.009	< 0.007		0.005 ± 0.011
Zn-65	0.002 ± 0.023	< 0.033		-0.004 ± 0.017	< 0.027		0.004 ± 0.026
Cs-134	-0.003 ± 0.008	< 0.017		-0.003 ± 0.009	< 0.013		-0.008 ± 0.010
Cs-137	0.017 ± 0.011	< 0.017		0.016 ± 0.009	< 0.016		0.007 ± 0.013
Other (Ru-103)	-0.002 ± 0.009	< 0.038		0.003 ± 0.006	< 0.034		0.017 ± 0.009

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Table 7. Fish_i analyses for gross beta and gamma emitting isotopes.

Location: E-13

Collection: Quarterly

Units: pCi/g wet

		Sample Description and Concentration (pCi/g wet)					
		MDC		MDC		MDC	Req. LLD
Collection Date	07-19-19			08-16-19			
Lab Code	EF- 3236			EF- 3237			
Type	Salmon			Perch			
				08-16-19			
				EF- 3238			
				Brown Trout			
K-40	2.51 ± 0.44	-		3.32 ± 0.54	-	2.31 ± 0.39	
Mn-54	0.012 ± 0.014	< 0.027		-0.002 ± 0.016	< 0.026	0.006 ± 0.010	< 0.019 0.13
Fe-59	-0.006 ± 0.025	< 0.067		0.000 ± 0.028	< 0.072	-0.007 ± 0.020	< 0.028 0.26
Co-58	-0.002 ± 0.010	< 0.032		0.017 ± 0.013	< 0.023	0.011 ± 0.009	< 0.020 0.13
Co-60	-0.002 ± 0.013	< 0.016		-0.004 ± 0.015	< 0.021	0.001 ± 0.010	< 0.011 0.13
Zn-65	-0.013 ± 0.035	< 0.071		-0.028 ± 0.037	< 0.068	0.002 ± 0.020	< 0.030 0.26
Cs-134	-0.005 ± 0.012	< 0.022		-0.019 ± 0.014	< 0.025	-0.017 ± 0.011	< 0.016 0.13
Cs-137	0.008 ± 0.015	< 0.024		0.057 ± 0.033	< 0.034	0.016 ± 0.013	< 0.024 0.15
Other (Ru-103)	0.013 ± 0.011	< 0.056		-0.009 ± 0.012	< 0.029	0.001 ± 0.008	< 0.019 0.5
Collection Date	08-24-19			10-27-19			
Lab Code	EF- 3239			EF- 4616			
Type	Rainbow Trout			Lake Whitefish			
				10-30-19			
				EF- 4617			
				Lake Trout			
K-40	2.51 ± 0.45	-		2.34 ± 0.36	-	2.39 ± 0.36	-
Mn-54	-0.004 ± 0.008	< 0.015		0.005 ± 0.009	< 0.019	0.006 ± 0.009	< 0.013 0.13
Fe-59	0.001 ± 0.023	< 0.036		-0.038 ± 0.017	< 0.061	-0.013 ± 0.019	< 0.057 0.26
Co-58	-0.002 ± 0.009	< 0.019		0.013 ± 0.009	< 0.016	-0.005 ± 0.008	< 0.015 0.13
Co-60	0.001 ± 0.011	< 0.009		-0.002 ± 0.009	< 0.013	0.001 ± 0.008	< 0.009 0.13
Zn-65	-0.002 ± 0.023	< 0.018		-0.001 ± 0.018	< 0.029	-0.003 ± 0.021	< 0.031 0.26
Cs-134	0.005 ± 0.010	< 0.019		-0.020 ± 0.009	< 0.015	-0.016 ± 0.009	< 0.016 0.13
Cs-137	0.045 ± 0.018	< 0.018		0.005 ± 0.010	< 0.016	0.010 ± 0.012	< 0.023 0.15
Other (Ru-103)	0.010 ± 0.010	< 0.022		-0.008 ± 0.008	< 0.038	0.019 ± 0.009	< 0.048 0.5

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Table 7. Fish, analyses for gross beta and gamma emitting isotopes.

Location: E-13

Collection: Quarterly

Units: pCi/g wet

Sample Description and Concentration (pCi/g wet)					Req. LLD
	MDC		MDC	MDC	
Collection Date	11-11-19		11-23-19		
Lab Code	EF- 4618		EF- 4619		
Type	Catfish		Lake Whitefish		
K-40	2.44 ± 0.37	-	2.18 ± 0.37	-	
Mn-54	0.005 ± 0.008	< 0.018	-0.003 ± 0.009	< 0.014	0.13
Fe-59	0.021 ± 0.020	< 0.076	0.004 ± 0.019	< 0.036	0.26
Co-58	-0.011 ± 0.008	< 0.017	-0.006 ± 0.010	< 0.013	0.13
Co-60	0.002 ± 0.010	< 0.015	-0.004 ± 0.010	< 0.013	0.13
Zn-65	-0.003 ± 0.020	< 0.034	-0.003 ± 0.020	< 0.027	0.26
Cs-134	0.002 ± 0.009	< 0.017	-0.002 ± 0.009	< 0.018	0.13
Cs-137	0.014 ± 0.011	< 0.019	0.012 ± 0.011	< 0.020	0.15
Other (Ru-103)	-0.002 ± 0.007	< 0.032	0.000 ± 0.008	< 0.022	0.5

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Table 8. Radioactivity in shoreline sediment samples

Collection: Annual

Sample Description and Concentration (pCi/g dry)						
	MDC		MDC		MDC	
Collection Date	10/15/2019		10/15/2019		10/15/2019	
Lab Code	ESS- 3993		ESS-3994		ESS- 3995	LLD
			NS ^a			
Location	E-01		E-05		E-06	
Be-7	0.465 ± 0.221	-	-		0.052 ± 0.065	< 0.221
K-40	5.954 ± 0.390	-	-		2.251 ± 0.336	-
Cs-134	-0.014 ± 0.007	< 0.011	-		-0.026 ± 0.010	< 0.013
Cs-137	0.009 ± 0.009	< 0.016	-		-0.001 ± 0.010	< 0.017
Tl-208	0.057 ± 0.014	-	-		0.568 ± 0.034	-
Pb-212	0.163 ± 0.022	-	-		1.328 ± 0.045	-
Bi-214	0.226 ± 0.030	-	-		1.219 ± 0.055	-
Ra-226	0.391 ± 0.156	< 0.322	-		2.199 ± 0.294	-
Ac-228	0.202 ± 0.053	-	-		1.696 ± 0.076	-
Collection Date	10/15/2019		10/15/2019			
Lab Code	ESS- 3996		ESS- 3997			
Location	E-12		E-33			
Be-7	0.078 ± 0.046	< 0.167	0.154 ± 0.067	< 0.189		
K-40	4.826 ± 0.330	-	2.867 ± 0.258	-		-
Cs-134	-0.001 ± 0.005	< 0.010	-0.015 ± 0.008	< 0.011		0.15
Cs-137	0.008 ± 0.007	< 0.011	0.031 ± 0.012	< 0.018		0.15
Tl-208	0.041 ± 0.014	-	0.364 ± 0.031	-		-
Pb-212	0.095 ± 0.015	-	0.989 ± 0.037	-		-
Bi-214	0.101 ± 0.027	-	0.871 ± 0.047	-		-
Ra-226	0.277 ± 0.149	-	1.474 ± 0.244	-		-
Ac-228	0.135 ± 0.047	-	1.140 ± 0.077	-		-

^a No sample; see table 2.0 .Listing of Missed Samples.

	Annual Mean ±s.d.
Be-7	0.187 ± 0.190
K-40	3.97 ± 1.72
Cs-134	-0.01 ± 0.01
Cs-137	0.012 ± 0.013
Tl-208	0.26 ± 0.26
Pb-212	0.64 ± 0.61
Bi-214	0.60 ± 0.53
Ra-226	1.09 ± 0.92
Ac-228	0.79 ± 0.76

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Table 9. Radioactivity in soil samples

Collection: Annual

Sample Description and Concentration (pCi/g dry)							
	MDC		MDC		MDC		
Collection Date	10/15/2019		10/15/2019		10/15/2019		Req.
Lab Code	ESO- 3998		ESO- 3999		ESO- 4000		LLD
Location	E-01		E-02		E-03		
Be-7	-0.060 ± 0.10	< 0.20	0.188 ± 0.10	< 0.32	0.168 ± 0.07	< 0.22	
K-40	13.35 ± 0.70	-	19.69 ± 0.77	-	14.70 ± 0.65	-	-
Cs-134	-0.004 ± 0.01	< 0.02	-0.011 ± 0.01	< 0.018	-0.011 ± 0.01	< 0.01	0.15
Cs-137	0.011 ± 0.02	< 0.03	0.051 ± 0.02	< 0.024	0.021 ± 0.01	< 0.02	0.15
Tl-208	0.131 ± 0.04	-	0.161 ± 0.04	-	0.137 ± 0.03	-	-
Pb-212	0.336 ± 0.03	-	0.457 ± 0.04	-	0.287 ± 0.03	-	-
Bi-214	0.375 ± 0.05	-	0.429 ± 0.05	-	0.204 ± 0.04	-	-
Ra-226	0.915 ± 0.29	-	1.023 ± 0.30	-	0.676 ± 0.24	-	-
Ac-228	0.478 ± 0.12	-	0.611 ± 0.11	-	0.388 ± 0.07	-	-
Collection Date	10/15/2019		10/15/2019		10/16/2019		
Lab Code	ESO- 4001		ESO- 4002		ESO- 4003		
Location	E-04		E-06		E-08		
Be-7	-0.011 ± 0.07	< 0.25	-0.057 ± 0.07	< 0.17	0.164 ± 0.08	< 0.27	
K-40	15.35 ± 0.68	-	11.67 ± 0.56	-	12.89 ± 0.68	-	-
Cs-134	-0.007 ± 0.01	< 0.01	-0.005 ± 0.01	< 0.01	0.006 ± 0.01	< 0.01	0.15
Cs-137	0.039 ± 0.02	< 0.02	0.037 ± 0.02	< 0.02	0.157 ± 0.03	< 0.02	0.15
Tl-208	0.152 ± 0.03	-	0.075 ± 0.02	-	0.103 ± 0.03	-	-
Pb-212	0.302 ± 0.04	-	0.167 ± 0.03	-	0.234 ± 0.03	-	-
Bi-214	0.307 ± 0.05	-	0.230 ± 0.03	-	0.426 ± 0.05	-	-
Ra-226	0.618 ± 0.26	-	0.423 ± 0.18	< 0.37	0.767 ± 0.26	-	-
Ac-228	0.448 ± 0.08	-	0.200 ± 0.06	-	0.348 ± 0.08	-	-
Collection Date	10/15/2019		10/16/2019		Annual		
Lab Code	ESO- 4004		ESO- 4005				
Location	E-09		E-20		Mean ± s.d.		
Be-7	0.056 ± 0.08	< 0.30	0.035 ± 0.09	< 0.36	0.060 ± 0.10		
K-40	17.57 ± 0.77	-	20.53 ± 0.88	-	15.72 ± 3.24		-
Cs-134	-0.005 ± 0.01	< 0.02	0.000 ± 0.01	< 0.02	-0.005 ± 0.01		0.15
Cs-137	0.091 ± 0.02	< 0.02	0.163 ± 0.03	< 0.03	0.07 ± 0.06		0.15
Tl-208	0.141 ± 0.03	-	0.182 ± 0.03	-	0.14 ± 0.03		-
Pb-212	0.381 ± 0.04	-	0.576 ± 0.04	-	0.34 ± 0.13		-
Bi-214	0.400 ± 0.05	-	0.497 ± 0.05	-	0.36 ± 0.10		-
Ra-226	0.823 ± 0.28	-	1.148 ± 0.29	-	0.80 ± 0.23		-
Ac-228	0.438 ± 0.08	-	0.646 ± 0.12	-	0.44 ± 0.14		-

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Table 10. Radioactivity in vegetation samples

Collection: Tri-annual

Sample Description and Concentration (pCi/g wet)							
Location	E-01	MDC	E-02	MDC	E-03	MDC	
Collection Date	05-29-19		05-29-19		05-29-19		
Lab Code	EG- 1906		EG- 1907		EG- 1908		Req. LLD
Be-7	0.89 ± 0.16	-	0.38 ± 0.22	-	0.92 ± 0.19	-	-
K-40	4.88 ± 0.42	-	4.19 ± 0.47	-	5.81 ± 0.42	-	-
I-131	0.005 ± 0.006	< 0.027	-0.004 ± 0.011	< 0.024	0.003 ± 0.007	< 0.027	0.060
Cs-134	0.000 ± 0.006	< 0.012	-0.011 ± 0.011	< 0.022	-0.003 ± 0.007	< 0.012	0.060
Cs-137	-0.007 ± 0.008	< 0.010	-0.004 ± 0.012	< 0.020	-0.004 ± 0.008	< 0.010	0.080
Other (Co-60)	0.007 ± 0.007	< 0.008	0.002 ± 0.013	< 0.016	0.003 ± 0.007	< 0.012	0.060
Location	E-04		E-06		E-08		
Collection Date	05-29-19		05-29-19		05-29-19		
Lab Code	EG- 1909		EG- 1910		EG- 1911		Req. LLD
Be-7	1.46 ± 0.21	-	0.84 ± 0.23	-	1.00 ± 0.25	-	-
K-40	4.95 ± 0.41	-	4.27 ± 0.44	-	6.75 ± 0.49	-	-
I-131	-0.017 ± 0.009	< 0.025	-0.006 ± 0.010	< 0.039	0.002 ± 0.008	< 0.026	0.060
Cs-134	0.003 ± 0.008	< 0.015	-0.004 ± 0.010	< 0.020	0.000 ± 0.007	< 0.014	0.060
Cs-137	-0.004 ± 0.008	< 0.010	0.016 ± 0.012	< 0.019	-0.004 ± 0.009	< 0.015	0.080
Other (Co-60)	-0.012 ± 0.011	< 0.009	0.009 ± 0.010	< 0.012	-0.003 ± 0.008	< 0.007	0.060
Location	E-09		E-20				
Collection Date	05-29-19		05-29-19				
Lab Code	EG- 1912		EG- 1913				Req. LLD
Ratio (wet/dry)							
Gross Beta							
Be-7	1.00 ± 0.15	-	0.79 ± 0.14	-			-
K-40	4.85 ± 0.40	-	5.83 ± 0.38	-			-
I-131	0.008 ± 0.006	< 0.023	0.001 ± 0.005	< 0.021			0.060
Cs-134	-0.001 ± 0.006	< 0.011	-0.002 ± 0.006	< 0.010			0.060
Cs-137	0.004 ± 0.007	< 0.014	0.003 ± 0.006	< 0.011			0.080
Other (Co-60)	0.006 ± 0.006	< 0.007	0.001 ± 0.007	< 0.008			0.060

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Table 10. Radioactivity in vegetation samples
Collection: Tri-annual

Sample Description and Concentration (pCi/g wet)							
Location	E-01	MDC	E-02	MDC	E-03	MDC	
Collection Date	07-23-19		07-23-19		07-23-19		
Lab Code	EG- 2751		EG- 2752		EG- 2754		Req. LLD
Be-7	2.43 ± 0.28	-	1.96 ± 0.29	-	2.69 ± 0.38	-	-
K-40	4.92 ± 0.49	-	4.47 ± 0.46	-	6.13 ± 0.66	-	-
I-131	0.012 ± 0.010	< 0.030	0.018 ± 0.010	< 0.035	0.012 ± 0.014	< 0.035	0.060
Cs-134	-0.010 ± 0.011	< 0.019	0.000 ± 0.008	< 0.015	-0.001 ± 0.013	< 0.024	0.060
Cs-137	0.005 ± 0.011	< 0.017	0.000 ± 0.011	< 0.020	-0.006 ± 0.015	< 0.019	0.080
Other (Co-60)	0.004 ± 0.011	< 0.020	-0.003 ± 0.011	< 0.013	-0.002 ± 0.014	< 0.022	0.060
Location	E-04		E-06		E-08		
Collection Date	07-23-19		07-23-19		07-23-19		
Lab Code	EG- 2755		EG- 2756		EG- 2757		Req. LLD
Be-7	1.96 ± 0.23	-	1.04 ± 0.22	-	2.31 ± 0.43	-	-
K-40	4.82 ± 0.40	-	5.94 ± 0.53	-	5.50 ± 0.58	-	-
I-131	-0.006 ± 0.009	< 0.031	0.004 ± 0.009	< 0.034	0.009 ± 0.013	< 0.042	0.060
Cs-134	0.005 ± 0.008	< 0.015	-0.001 ± 0.009	< 0.016	-0.001 ± 0.012	< 0.013	0.060
Cs-137	-0.003 ± 0.010	< 0.016	0.006 ± 0.011	< 0.016	0.000 ± 0.014	< 0.027	0.080
Other (Co-60)	-0.006 ± 0.008	< 0.011	0.005 ± 0.010	< 0.019	0.012 ± 0.012	< 0.014	0.060
Location	E-09		E-20				
Collection Date	07-23-19		07-23-19				
Lab Code	EG- 2758		EG- 2759				Req. LLD
Be-7	1.76 ± 0.28	-	2.14 ± 0.33	-			-
K-40	5.46 ± 0.55	-	6.93 ± 0.57	-			-
I-131	-0.017 ± 0.009	< 0.023	-0.022 ± 0.014	< 0.046			0.060
Cs-134	-0.008 ± 0.010	< 0.017	-0.011 ± 0.011	< 0.023			0.060
Cs-137	0.006 ± 0.011	< 0.016	0.008 ± 0.013	< 0.021			0.080
Other (Co-60)	0.012 ± 0.009	< 0.012	-0.002 ± 0.013	< 0.017			0.060

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Table 10. Radioactivity in vegetation samples
Collection: Tri-annual

Sample Description and Concentration (pCi/g wet)							
Location	E-01	MDC	E-02	MDC	E-03	MDC	
Collection Date	09-26-19		09-26-19		09-26-19		
Lab Code	EG- 3599		EG- 3600		EG- 3602		Req. LLD
Be-7	3.67 ± 0.35	-	4.35 ± 0.27	-	4.73 ± 0.30	-	-
K-40	5.22 ± 0.48	-	5.48 ± 0.41	-	5.81 ± 0.45	-	-
I-131	-0.002 ± 0.012	< 0.032	0.008 ± 0.008	< 0.027	-0.011 ± 0.008	< 0.022	0.060
Cs-134	-0.005 ± 0.009	< 0.018	-0.008 ± 0.007	< 0.014	-0.005 ± 0.007	< 0.012	0.060
Cs-137	0.016 ± 0.010	< 0.015	0.005 ± 0.008	< 0.010	0.001 ± 0.008	< 0.012	0.080
Other (Co-60)	0.005 ± 0.010	< 0.011	0.004 ± 0.009	< 0.013	0.002 ± 0.008	< 0.008	0.060
Location	E-04		E-06		E-08		
Collection Date	09-26-19		09-27-19		09-26-19		
Lab Code	EG- 3603		EG- 3604		EG- 3605		Req. LLD
Be-7	5.73 ± 0.39	-	1.19 ± 0.22	-	7.75 ± 0.46	-	-
K-40	4.75 ± 0.44	-	2.85 ± 0.37	-	4.75 ± 0.48	-	-
I-131	0.006 ± 0.011	< 0.026	-0.010 ± 0.011	< 0.024	0.001 ± 0.010	< 0.028	0.060
Cs-134	-0.004 ± 0.009	< 0.017	0.005 ± 0.010	< 0.019	-0.005 ± 0.010	< 0.018	0.060
Cs-137	0.006 ± 0.011	< 0.020	0.087 ± 0.027	± 0.027	0.011 ± 0.011	< 0.022	0.080
Other (Co-60)	0.012 ± 0.010	< 0.012	0.001 ± 0.010	< 0.013	0.006 ± 0.010	< 0.015	0.060
Location	E-09		E-20				
Collection Date	09-26-19		09-26-19				
Lab Code	EG- 3606		EG- 3607				Req. LLD
Be-7	5.49 ± 0.37	-	4.44 ± 0.35	-			-
K-40	5.80 ± 0.49	-	6.42 ± 0.57	-			-
I-131	0.001 ± 0.011	< 0.039	-0.007 ± 0.009	< 0.030			0.060
Cs-134	0.001 ± 0.009	< 0.017	-0.002 ± 0.010	< 0.017			0.060
Cs-137	-0.001 ± 0.010	< 0.012	0.009 ± 0.012	< 0.019			0.080
Other (Co-60)	0.001 ± 0.011	< 0.014	-0.006 ± 0.012	< 0.015			0.060

Be-7 Annual Mean ± s.d. 2.54 ± 1.94
 K-40 Annual Mean ± s.d. 5.28 ± 0.90
 I-131 Annual Mean ± s.d. -0.001 ± 0.010
 Cs-134 Annual Mean ± s.d. -0.003 ± 0.005
 Cs-137 Annual Mean ± s.d. 0.006 ± 0.018
 Co-60 Annual Mean ± s.d. 0.002 ± 0.006

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Table 11. Aquatic Vegetation, analyses for gross beta and gamma emitting isotopes.

Collection: Annual

Units: pCi/g wet

Sample Description and Concentration				
Collection Date		MDC		
Lab Code	NS ^a		NS ^a	
Location	E-05		E-12	
Be-7	-		-	-
K-40	-		-	-
Co-58	-		-	0.25
Co-60	-		-	0.25
Cs-134	-		-	0.25
Cs-137	-		-	0.25

^a"NS" = No sample. See Table 2.0, Listing of Missed Samples.

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Table 12. Ambient Gamma Radiation ^a
LLD/7days: < 1mR/TLD

1st. Quarter, 2019

Date Annealed:		12-06-18	Days in the field		81
Date Placed:		01-10-19	Days from Annealing		
Date Removed:		04-01-19	to Readout:		127
Date Read:		04-12-19			

Location	Days in Field	Total mR	Net mR	mR/Std Qtr (91 days)	Net mR per 7 days
<u>Indicator</u>					
E-1	81	15.9 ± 0.2	8.1 ± 0.9	9.1 ± 1.0	0.70 ± 0.08
E-2	81	21.3 ± 1.0	13.5 ± 1.1	15.2 ± 1.2	1.17 ± 0.10
E-3	81	19.0 ± 1.3	11.3 ± 1.4	12.7 ± 1.6	0.97 ± 0.12
E-4	81	16.4 ± 1.3	8.6 ± 1.4	9.7 ± 1.6	0.74 ± 0.12
E-5	81	17.6 ± 0.8	9.9 ± 0.9	11.1 ± 1.1	0.85 ± 0.08
E-6	81	17.9 ± 0.6	10.1 ± 0.7	11.3 ± 0.8	0.87 ± 0.06
E-7	81	18.9 ± 1.0	11.2 ± 1.1	12.6 ± 1.3	0.97 ± 0.10
E-8	81	17.1 ± 1.0	9.4 ± 1.1	10.5 ± 1.3	0.81 ± 0.10
E-9	81	18.9 ± 1.0	11.1 ± 1.1	12.5 ± 1.3	0.96 ± 0.10
E-12	81	16.5 ± 0.9	8.8 ± 1.0	9.9 ± 1.1	0.76 ± 0.09
E-14	81	16.6 ± 0.4	8.8 ± 0.6	9.9 ± 0.7	0.76 ± 0.06
E-15	81	18.8 ± 0.8	11.0 ± 0.9	12.4 ± 1.0	0.95 ± 0.08
E-16B	81	20.6 ± 0.6	12.8 ± 0.8	14.4 ± 0.9	1.11 ± 0.08
E-17	81	20.1 ± 1.0	12.3 ± 1.1	13.8 ± 1.3	1.06 ± 0.10
E-18	81	18.4 ± 1.0	10.7 ± 1.2	12.0 ± 1.3	0.92 ± 0.10
E-22	81	19.6 ± 1.1	11.9 ± 1.2	13.3 ± 1.4	1.03 ± 0.11
E-23	81	17.5 ± 0.4	9.7 ± 0.6	10.9 ± 0.7	0.84 ± 0.05
E-24	81	19.3 ± 1.0	11.6 ± 1.2	13.0 ± 1.3	1.00 ± 0.10
E-25	81	17.1 ± 0.3	9.4 ± 0.6	10.5 ± 0.7	0.81 ± 0.05
E-26B	81	18.6 ± 1.1	10.8 ± 1.2	12.2 ± 1.3	0.94 ± 0.10
E-27	81	21.2 ± 0.7	13.4 ± 0.8	15.1 ± 1.0	1.16 ± 0.07
E-28	81	14.3 ± 0.6	6.6 ± 0.7	7.4 ± 0.8	0.57 ± 0.06
E-29	81	16.2 ± 1.1	8.5 ± 1.2	9.5 ± 1.3	0.73 ± 0.10
E-30	81	18.3 ± 1.0	10.6 ± 1.1	11.9 ± 1.3	0.91 ± 0.10
E-31	81	18.2 ± 0.4	10.4 ± 0.7	11.7 ± 0.7	0.90 ± 0.06
E-32	81	21.4 ± 0.8	13.7 ± 0.9	15.4 ± 1.0	1.18 ± 0.08
E-38	81	19.5 ± 0.9	11.7 ± 1.0	13.2 ± 1.1	1.01 ± 0.09
E-39	81	19.0 ± 1.2	11.3 ± 1.3	12.6 ± 1.4	0.97 ± 0.11
E-41	81	17.1 ± 1.1	9.4 ± 1.2	10.5 ± 1.3	0.81 ± 0.10
E-42	81	18.6 ± 0.6	10.9 ± 0.8	12.2 ± 0.9	0.94 ± 0.07
E-43	81	17.0 ± 1.2	9.3 ± 1.3	10.4 ± 1.5	0.80 ± 0.12
E-44	81	17.4 ± 0.4	9.7 ± 0.7	10.8 ± 0.7	0.83 ± 0.06
<u>Control</u>					
E-20	81	17.1 ± 0.8	9.4 ± 0.9	10.5 ± 1.0	0.81 ± 0.08
Mean ± s.d.		18.2 ± 1.6	10.5 ± 1.6	11.8 ± 1.8	0.90 ± 0.13
<u>In-Transit Exposure</u>					
		<u>Date Annealed</u>	<u>Date Read</u>	<u>ITC-1</u>	<u>ITC-2</u>
		12-06-18	01-11-19	5.6 ± 0.2	5.3 ± 0.5
		03-05-19	04-12-19	6.8 ± 0.3	7.4 ± 0.6

^a The CaSO₄:Dy dosimeter cards provide four separate readout areas. Values listed represent the mean and standard deviation of the average of the four readings.

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Table 12. Ambient Gamma Radiation ^a
LLD/7days: < 1mR/TLD

2nd Quarter, 2019

Date Annealed:		03-05-19	Days in the field	91
Date Placed:		04-01-19	Days from Annealing	
Date Removed:		07-01-19	to Readout:	122
Date Read:		07-05-19		

Location	Days in Field	Total mR	Net mR	mR/Std Qtr (91 days)	Net mR per 7 days
<u>Indicator</u>					
E-1	91	17.4 ± 0.3	12.5 ± 0.8	12.5 ± 0.8	0.96 ± 0.06
E-2	91	21.6 ± 1.2	16.7 ± 1.4	16.7 ± 1.4	1.29 ± 0.11
E-3	91	23.9 ± 1.8	19.0 ± 1.9	19.0 ± 1.9	1.46 ± 0.15
E-4	91	20.2 ± 0.9	15.3 ± 1.2	15.3 ± 1.2	1.17 ± 0.09
E-5	91	20.8 ± 0.7	15.9 ± 1.0	15.9 ± 1.0	1.23 ± 0.08
E-6	91	17.8 ± 0.4	12.9 ± 0.8	12.9 ± 0.8	0.99 ± 0.06
E-7	91	19.5 ± 1.2	14.6 ± 1.4	14.6 ± 1.4	1.13 ± 0.11
E-8	91	19.2 ± 1.0	14.3 ± 1.2	14.3 ± 1.2	1.10 ± 0.09
E-9	91	20.6 ± 1.1	15.7 ± 1.3	15.7 ± 1.3	1.21 ± 0.10
E-12	91	15.4 ± 0.6	10.5 ± 0.9	10.5 ± 0.9	0.81 ± 0.07
E-14	91	22.2 ± 1.3	17.3 ± 1.5	17.3 ± 1.5	1.33 ± 0.12
E-15	91	21.6 ± 1.5	16.8 ± 1.7	16.8 ± 1.7	1.29 ± 0.13
E-16B	91	20.3 ± 0.5	15.4 ± 0.9	15.4 ± 0.9	1.19 ± 0.07
E-17	91	21.1 ± 0.9	16.2 ± 1.1	16.2 ± 1.1	1.25 ± 0.09
E-18	91	23.0 ± 1.1	18.1 ± 1.3	18.1 ± 1.3	1.40 ± 0.10
E-22	91	21.9 ± 0.8	17.0 ± 1.1	17.0 ± 1.1	1.31 ± 0.08
E-23	91	24.7 ± 0.8	19.8 ± 1.1	19.8 ± 1.1	1.53 ± 0.08
E-24	91	21.6 ± 1.4	16.7 ± 1.6	16.7 ± 1.6	1.28 ± 0.12
E-25	91	21.4 ± 0.9	16.5 ± 1.2	16.5 ± 1.2	1.27 ± 0.09
E-26B	91	19.2 ± 0.7	14.3 ± 1.0	14.3 ± 1.0	1.10 ± 0.08
E-27	91	23.0 ± 1.0	18.1 ± 1.3	18.1 ± 1.3	1.39 ± 0.10
E-28	91	17.4 ± 0.3	12.5 ± 0.8	12.5 ± 0.8	0.97 ± 0.06
E-29	91	16.6 ± 0.7	11.7 ± 1.0	11.7 ± 1.0	0.90 ± 0.08
E-30	91	20.8 ± 1.1	15.9 ± 1.3	15.9 ± 1.3	1.22 ± 0.10
E-31	91	23.1 ± 1.9	18.2 ± 2.0	18.2 ± 2.0	1.40 ± 0.15
E-32	91	25.0 ± 0.8	20.1 ± 1.1	20.1 ± 1.1	1.54 ± 0.08
E-38	91	20.3 ± 0.3	15.4 ± 0.8	15.4 ± 0.8	1.19 ± 0.06
E-39	91	20.7 ± 0.5	15.8 ± 0.9	15.8 ± 0.9	1.21 ± 0.07
E-41	91	19.5 ± 0.3	14.6 ± 0.8	14.6 ± 0.8	1.12 ± 0.06
E-42	91	22.2 ± 1.1	17.3 ± 1.3	17.3 ± 1.3	1.33 ± 0.10
E-43	91	21.1 ± 0.7	16.3 ± 1.0	16.3 ± 1.0	1.25 ± 0.08
E-44	91	19.4 ± 0.5	14.5 ± 0.9	14.5 ± 0.9	1.12 ± 0.07
<u>Control</u>					
E-20	91	19.6 ± 0.6	14.7 ± 0.9	14.7 ± 0.9	1.13 ± 0.07
Meant±s.d.		20.7 ± 2.2	15.8 ± 2.2	15.8 ± 2.2	1.21 ± 0.17
<u>In-Transit Exposure</u>					
		<u>Date Annealed</u>	<u>Date Read</u>	<u>ITC-1</u>	<u>ITC-2</u>
		03-05-19	04-12-19	6.8 ± 0.3	7.4 ± 0.6
		06-18-19	07-05-19	2.7 ± 0.1	2.7 ± 0.2

^a The CaSO₄:Dy dosimeter cards provide four separate readout areas. Values listed represent the mean and standard deviation of the average of the four readings.

POINT BEACH NUCLEAR PLANT

Table 12. Ambient Gamma Radiation ^a
LLD/7days: < 1mR/TLD

3rd Quarter, 2019

Date Annealed:		06-18-19	Days in the field		93
Date Placed:		07-01-19	Days from Annealing		
Date Removed:		10-02-19	to Readout:		120
Date Read:		10-16-19			
Location	Days in Field	Total mR	Net mR	mR/Std Qtr (91 days)	Net mR per 7 days
<u>Indicator</u>					
E-1	93	17.1 ± 0.4	12.9 ± 0.6	12.6 ± 0.6	0.97 ± 0.05
E-2	93	21.5 ± 0.7	17.3 ± 0.8	16.9 ± 0.8	1.30 ± 0.06
E-3	93	21.3 ± 1.5	17.1 ± 1.6	16.7 ± 1.5	1.28 ± 0.12
E-4	93	16.5 ± 1.2	12.3 ± 1.3	12.0 ± 1.3	0.93 ± 0.10
E-5	93	19.7 ± 0.8	15.5 ± 0.9	15.2 ± 0.9	1.17 ± 0.07
E-6	93	17.5 ± 0.7	13.3 ± 0.9	13.0 ± 0.8	1.00 ± 0.06
E-7	93	18.8 ± 0.7	14.6 ± 0.8	14.3 ± 0.8	1.10 ± 0.06
E-8	93	18.1 ± 1.0	13.9 ± 1.1	13.6 ± 1.1	1.04 ± 0.09
E-9	93	21.0 ± 0.6	16.8 ± 0.8	16.4 ± 0.7	1.26 ± 0.06
E-12	93	15.1 ± 0.7	10.9 ± 0.8	10.6 ± 0.8	0.82 ± 0.06
E-14	93	17.2 ± 0.4	12.9 ± 0.6	12.7 ± 0.6	0.97 ± 0.04
E-15	93	20.5 ± 0.7	16.3 ± 0.8	15.9 ± 0.8	1.23 ± 0.06
E-16B	93	20.7 ± 0.6	16.5 ± 0.7	16.2 ± 0.7	1.24 ± 0.05
E-17	93	20.2 ± 0.8	16.0 ± 0.9	15.6 ± 0.9	1.20 ± 0.07
E-18	93	22.2 ± 1.2	18.0 ± 1.3	17.6 ± 1.3	1.36 ± 0.10
E-22	93	21.0 ± 1.2	16.8 ± 1.3	16.5 ± 1.2	1.27 ± 0.09
E-23	93	19.0 ± 0.5	14.8 ± 0.7	14.5 ± 0.7	1.11 ± 0.05
E-24	93	20.2 ± 0.9	16.0 ± 1.0	15.7 ± 1.0	1.21 ± 0.08
E-25	93	18.0 ± 0.2	13.8 ± 0.5	13.5 ± 0.5	1.04 ± 0.04
E-26B	93	19.9 ± 0.8	15.7 ± 1.0	15.3 ± 0.9	1.18 ± 0.07
E-27	93	22.4 ± 0.8	18.2 ± 0.9	17.8 ± 0.9	1.37 ± 0.07
E-28	93	14.4 ± 0.6	10.2 ± 0.8	10.0 ± 0.8	0.77 ± 0.06
E-29	93	15.3 ± 1.0	11.1 ± 1.1	10.9 ± 1.0	0.84 ± 0.08
E-30	93	18.3 ± 1.3	14.1 ± 1.4	13.8 ± 1.4	1.06 ± 0.10
E-31	93	18.6 ± 0.5	14.4 ± 0.7	14.1 ± 0.7	1.09 ± 0.05
E-32	93	23.7 ± 1.0	19.5 ± 1.1	19.1 ± 1.1	1.47 ± 0.08
E-38	93	21.2 ± 1.0	17.0 ± 1.1	16.6 ± 1.1	1.28 ± 0.08
E-39	93	19.2 ± 0.6	15.0 ± 0.8	14.6 ± 0.7	1.13 ± 0.06
E-41	93	19.0 ± 0.6	14.8 ± 0.7	14.5 ± 0.7	1.12 ± 0.06
E-42	93	20.8 ± 0.7	16.6 ± 0.9	16.3 ± 0.8	1.25 ± 0.07
E-43	93	19.1 ± 1.3	14.9 ± 1.4	14.6 ± 1.3	1.12 ± 0.10
E-44	93	17.3 ± 0.7	13.1 ± 0.8	12.8 ± 0.8	0.99 ± 0.06
<u>Control</u>					
E-20	93	19.2 ± 0.9	15.0 ± 1.0	14.6 ± 1.0	1.13 ± 0.07
Mean±s.d.		19.2 ± 2.2	15.0 ± 2.2	14.7 ± 2.1	1.13 ± 0.16
<u>In-Transit Exposure</u>					
		<u>Date Annealed</u>	<u>Date Read</u>	<u>ITC-1</u>	<u>ITC-2</u>
		06-18-19	07-05-19	2.7 ± 0.1	2.7 ± 0.2
		09-10-19	10-16-19	5.5 ± 0.3	6.0 ± 0.3

^a The CaSO₄:Dy dosimeter cards provide four separate readout areas. Values listed represent the mean and standard deviation of the average of the four readings.

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Table 12. Ambient Gamma Radiation ^a
LLD/7days: < 1mR/TLD

4th Quarter, 2019

Date Annealed:	09-10-19	Days in the field	92
Date Placed:	10-02-19	Days from Annealing	
Date Removed:	01-02-20	to Readout:	119
Date Read:	01-07-20		

Location	Days in Field	Total mR	Net mR	mR/Std Qtr (91 days)	Net mR per 7 days
<u>Indicator</u>					
E-1	92	17.9 ± 0.3	12.2 ± 0.6	12.1 ± 0.6	0.93 ± 0.05
E-2	92	21.4 ± 1.2	15.7 ± 1.3	15.6 ± 1.3	1.20 ± 0.10
E-3	92	23.8 ± 1.4	18.1 ± 1.5	17.9 ± 1.5	1.38 ± 0.12
E-4	92	19.9 ± 0.6	14.3 ± 0.8	14.1 ± 0.7	1.09 ± 0.06
E-5	92	21.1 ± 0.9	15.5 ± 1.0	15.3 ± 1.0	1.18 ± 0.08
E-6	92	17.8 ± 0.4	12.1 ± 0.6	12.0 ± 0.6	0.92 ± 0.05
E-7	92	18.2 ± 0.6	12.6 ± 0.8	12.4 ± 0.7	0.96 ± 0.06
E-8	92	18.7 ± 1.0	13.1 ± 1.1	13.0 ± 1.1	1.00 ± 0.09
E-9	92	20.6 ± 0.7	15.0 ± 0.9	14.8 ± 0.8	1.14 ± 0.07
E-12	92	17.9 ± 1.4	12.3 ± 1.5	12.1 ± 1.5	0.93 ± 0.11
E-14	92	21.0 ± 1.7	15.4 ± 1.8	15.2 ± 1.8	1.17 ± 0.14
E-15	92	23.8 ± 1.9	18.1 ± 2.0	17.9 ± 1.9	1.38 ± 0.15
E-16B	92	19.9 ± 0.5	14.3 ± 0.7	14.1 ± 0.7	1.09 ± 0.06
E-17	92	21.0 ± 0.8	15.4 ± 0.9	15.2 ± 0.9	1.17 ± 0.07
E-18	92	22.6 ± 1.2	17.0 ± 1.3	16.8 ± 1.3	1.29 ± 0.10
E-22	92	21.8 ± 0.7	16.2 ± 0.8	16.0 ± 0.8	1.23 ± 0.06
E-23	92	24.2 ± 0.7	18.5 ± 0.9	18.3 ± 0.9	1.41 ± 0.07
E-24	92	24.9 ± 1.6	19.3 ± 1.6	19.1 ± 1.6	1.47 ± 0.12
E-25	92	20.9 ± 1.0	15.3 ± 1.2	15.1 ± 1.1	1.16 ± 0.09
E-26B	92	18.9 ± 0.4	13.2 ± 0.7	13.1 ± 0.7	1.01 ± 0.05
E-27	92	22.7 ± 0.9	17.1 ± 1.0	16.9 ± 1.0	1.30 ± 0.08
E-28	92	16.6 ± 0.3	11.0 ± 0.6	10.8 ± 0.6	0.83 ± 0.05
E-29	92	13.2 ± 1.6	7.6 ± 1.7	7.5 ± 1.7	0.58 ± 0.13
E-30	92	20.8 ± 0.7	15.1 ± 0.9	15.0 ± 0.9	1.15 ± 0.07
E-31	92	22.8 ± 1.7	17.1 ± 1.8	16.9 ± 1.8	1.30 ± 0.14
E-32	92	24.8 ± 0.7	19.2 ± 0.9	19.0 ± 0.9	1.46 ± 0.07
E-38	92	20.1 ± 0.4	14.4 ± 0.6	14.3 ± 0.6	1.10 ± 0.05
E-39	92	20.2 ± 0.8	14.6 ± 0.9	14.4 ± 0.9	1.11 ± 0.07
E-41	92	19.6 ± 0.8	14.0 ± 0.9	13.8 ± 0.9	1.06 ± 0.07
E-42	92	22.1 ± 1.1	16.5 ± 1.2	16.3 ± 1.2	1.25 ± 0.09
E-43	92		NS ^b		
E-44	92	19.2 ± 0.4		13.6 ± 0.6	13.4 ± 0.6
<u>Control</u>					
E-20	92	19.6 ± 0.6	14.0 ± 0.8	13.8 ± 0.8	1.06 ± 0.06
Mean±s.d.		20.1 ± 1.5	14.9 ± 2.5	19.7 ± 1.5	1.14 ± 0.19
<u>In-Transit Exposure</u>					
		<u>Date Annealed</u>	<u>Date Read</u>	<u>ITC-1</u>	<u>ITC-2</u>
		09-10-19	10-16-19	5.5 ± 0.3	6.0 ± 0.3
		12-04-19	01-07-20	5.6 ± 0.2	5.6 ± 0.2

^a The CaSO₄:Dy dosimeter cards provide four separate readout areas. Values listed represent the mean and standard deviation of the average of the four readings.

^b "NS" = No sample; see Table 2.0, Listing of Missed Samples.

Annual Indicator Mean±s.d.	19.7 ± 2.4	14.1 ± 3.0	14.3 ± 2.7	1.1 ± 0.2
Annual Control Mean±s.d.	18.9 ± 1.2	13.2 ± 2.6	13.4 ± 2.0	1.0 ± 0.2
Annual Indicator/Control Mean±s.d.	19.7 ± 2.4	14.0 ± 3.0	14.2 ± 2.6	1.1 ± 0.2

POINT BEACH NUCLEAR PLANT

Table 13. Groundwater Tritium Monitoring Program
(Monthly Collections)
Units = pCi/L

Intermittent Streams							
Sample ID		GW-01				GW-02	
Collection Date	Lab Code	Tritium	MDC	Collection Date	Lab Code	Tritium	MDC
01-15-19	EW-153	7 ± 82	< 177	01-15-19	EW-154	102 ± 86	< 177
02-21-19		NS ^a		02-21-19		NS ^a	
03-27-19	EW-915	103 ± 79	< 155	03-27-19	EW-917	171 ± 82	< 155
04-16-19	EW-1333	6 ± 74	< 156	04-16-19	EW-1334	97 ± 79	< 156
05-15-19	EW-1718	31 ± 74	< 149	05-15-19	EW-1719	215 ± 83	< 149
06-20-19	EW-2211	12 ± 70	< 150	06-20-19	EW-2212	160 ± 79	< 150
07-18-19	EW-2624	25 ± 75	< 159	07-18-19	EW-2625	62 ± 77	< 159
08-29-19	EW-3230	127 ± 79	< 155	08-29-19	EW-3231	238 ± 85	< 155
09-18-19	EW-3466	74 ± 77	< 151	09-18-19	EW-3467	209 ± 85	< 151
10-08-19	EW-3720	40 ± 73	< 151	10-08-19	EW-3721	158 ± 79	< 151
11-20-19	EW-4478	35 ± 74	< 156	11-20-19	EW-4479	135 ± 80	< 156
12-19-19		NS ^a		12-19-19		NS ^a	
Mean ± s.d.		46 ± 42		Mean ± s.d.		155 ± 57	

Sample ID		GW-03				GW-17	
Collection Date	Lab Code	Tritium	MDC	Collection Date	Lab Code	Tritium	MDC
01-15-19	EW-155	25 ± 83	< 177	01-15-19	EW-157	87 ± 86	< 177
02-21-19		NS ^a		02-21-19		NS ^a	
03-27-19	EW-918	59 ± 76	< 155	03-27-19	EW-920	154 ± 82	< 155
04-16-19	EW-1335	0 ± 73	< 156	04-16-19	EW-1337	196 ± 84	< 156
05-15-19	EW-1720	54 ± 75	< 149	05-15-19	EW-1724	238 ± 85	< 149
06-20-19	EW-2213	12 ± 70	< 150	06-20-19	EW-2215	421 ± 91	< 150
07-18-19	EW-2626	49 ± 76	< 159	07-18-19	EW-2629	53 ± 77	< 159
08-29-19	EW-3232	102 ± 78	< 155	08-29-19	EW-3235	96 ± 77	< 155
09-18-19	EW-3469	21 ± 74	< 151	09-18-19	EW-3471	204 ± 84	< 151
10-08-19	EW-3722	38 ± 72	< 151	10-08-19	EW-3723	108 ± 77	< 151
11-20-19	EW-4480	37 ± 74	< 156	11-20-19	EW-4482	188 ± 83	< 156
12-19-19		NS ^a		12-19-19		NS ^a	
Mean ± s.d.		40 ± 29		Mean ± s.d.		175 ± 105	

Wells			
Sample ID		GW-04 (EIC Well)	
Collection Date	Lab Code	Tritium	MDC
01-15-19	EW-156	-81 ± 78	< 177
02-21-19	EW-481	-27 ± 77	< 157
03-27-19	EW-919	14 ± 74	< 155
04-16-19	EW-1336	30 ± 75	< 156
05-15-19	EW-1721	-3 ± 72	< 149
06-20-19	EW-2214	-5 ± 69	< 150
07-18-19	EW-2628	-90 ± 68	< 159
08-29-19	EW-3234	-14 ± 71	< 155
09-18-19	EW-3470	-36 ± 78	< 153
10-18-19	EW-3992	53 ± 73	< 150
11-20-19	EW-4481	53 ± 75	< 156
12-19-19	EW-4825	35 ± 79	< 160
Mean ± s.d.		-6 ± 47	

^a "NS" = No sample; creeks frozen.

POINT BEACH NUCLEAR PLANT

Table 13. Groundwater Tritium Monitoring Program
(Monthly Collections)
Units = pCi/L

Beach Drains							
S-1				S-3			
Collection Date	Lab Code	Tritium	MDC	Collection Date	Lab Code	Tritium	MDC
01-03-19	ESW- 13	186 ± 79	< 147	01-03-19		NF ^a	
02-21-19		NF ^a		02-21-19		NF ^a	
03-14-19	ESW- 712	458 ± 96	< 154	03-14-19	ESW- 713	326 ± 90	< 154
04-04-19	ESW- 1057	277 ± 88	< 155	04-04-19		NF ^a	
05-02-19	ESW- 1516	270 ± 86	< 150	05-02-19		NF ^a	
06-06-19	ESW- 2173	253 ± 84	< 150	06-06-19		NF ^a	
07-01-19	ESW- 2302	209 ± 83	< 149	07-01-19		NF ^a	
08-08-19	EWV- 2965	280 ± 91	< 153	08-08-19		NF ^a	
09-05-19	EWV- 3316	265 ± 87	< 154	09-05-19		NF ^a	
10-03-19	EWV- 3697	471 ± 96	< 147	10-03-19		NF ^a	
11-07-19	EWV- 4256	205 ± 83	< 154	11-07-19	ESW- 4257	216 ± 84	< 154
12-05-19	EWV- 4621	360 ± 90	< 150	12-05-19	EWV- 4623	265 ± 86	< 150
Mean ± s.d.		294 ± 96		Mean ± s.d.		269 ± 55	
S-7				S-8			
Collection Date	Lab Code	Tritium	MDC	Collection Date	Lab Code	Tritium	MDC
01-03-19		NF ^a		01-03-19		NF ^a	
02-21-19		NF ^a		02-21-19		NF ^a	
03-14-19		NF ^a		03-14-19		NF ^a	
04-04-19		NF ^a		04-04-19		NF ^a	
05-02-19		NF ^a		05-02-19		NF ^a	
06-06-19		NF ^a		06-06-19		NF ^a	
07-01-19		NF ^a		07-01-19		NF ^a	
08-08-19		NF ^a		08-08-19		NF ^a	
09-05-19		NF ^a		09-05-19		NF ^a	
10-03-19		NF ^a		10-03-19		NF ^a	
11-07-19		NF ^a		11-07-19		NF ^a	
12-05-19		NF ^a		12-05-19		NF ^a	
Mean ± s.d.				Mean ± s.d.			
S-9				S-10			
Collection Date	Lab Code	Tritium	MDC	Collection Date	Lab Code	Tritium	MDC
01-03-19		NF ^a		01-03-19		NF ^a	
02-21-19		NF ^a		02-21-19		NF ^a	
03-14-19	ESW- 715	631 ± 103	< 154	03-14-19		NF ^a	
04-04-19		NF ^a		04-04-19		NF ^a	
05-02-19		NF ^a		05-02-19		NF ^a	
06-06-19		NF ^a		06-06-19		NF ^a	
07-01-19		NF ^a		07-01-19		NF ^a	
08-08-19		NF ^a		08-08-19		NF ^a	
09-05-19		NF ^a		09-05-19		NF ^a	
10-03-19		NF ^a		10-03-19		NF ^a	
11-07-19		NF ^a		11-07-19		NF ^a	
12-05-19		NF ^a		12-05-19		NF ^a	
Mean ± s.d.				Mean ± s.d.			

^a "NF" = No flow.

POINT BEACH NUCLEAR PLANT

Table 13. Groundwater Tritium Monitoring Program
(Monthly Collections)
Units = pCi/L

Beach Drains (cont.)							
S-12				S-13			
Sample ID							
Collection Date	Lab Code	Tritium	MDC	Collection Date	Lab Code	Tritium	MDC
01-03-19		NF ^a		01-03-19		NF ^a	
02-21-19		NF ^a		02-21-19		NF ^a	
03-14-19		NF ^a		03-14-19		NF ^a	
04-04-19		NF ^a		04-04-19		NF ^a	
05-02-19		NF ^a		05-02-19		NF ^a	
06-06-19		NF ^a		06-06-19		NF ^a	
07-01-19		NF ^a		07-01-19		NF ^a	
08-08-19		NF ^a		08-08-19		NF ^a	
09-05-19		NF ^a		09-05-19	ESW- 3317	234 ± 85	< 154
10-03-19		NF ^a		10-03-19		NF ^a	
11-07-19		NF ^a		11-07-19		NF ^a	
12-05-19	EW- 4624	305 ± 88	< 150	12-05-19		NF ^a	
Mean ± s.d.				Mean ± s.d.			

Sample ID U2 Façade Subsurface Drain Sump

Collection Date	Lab Code	Tritium	MDC
01-31-19	EW- 637	808 ± 110	< 155
02-28-19	EW- 638	923 ± 114	< 155
03-31-19	EW- 1051	924 ± 116	< 153
04-30-19	EW- 1704	1580 ± 136	< 150
06-04-19	EW- 2053	1470 ± 131	< 150
06-30-19	EW- 2631	1784 ± 146	< 159
07-31-19	EW- 2964	1681 ± 144	< 153
08-31-19	EW- 3395	1703 ± 143	< 147
09-30-19	EW- 3684	1412 ± 132	< 151
10-31-19	EW- 4613	8932 ± 291	< 151
11-26-19	EW- 4614	10877 ± 318	< 150
12-31-19	EW- 4997	5886 ± 240	< 158
Mean ± s.d.		3165 ± 3444	

^a "NF" = No flow.

^c for recount/reanalyses results see app. F

^b Recount result = 1620 ± 137 pCi/L.

POINT BEACH NUCLEAR PLANT

Beach Drains

Units: = pCi/L Gamma isotopic analysis

Location	S-1		S-3		S-7		S-8	
Collection Date	01-03-19		01-03-19		01-03-19		01-03-19	
Lab Code	EW- 13	MDC	NF ^a	MDC	NF ^a	MDC	NF ^a	MDC
Be-7	-4.2 ± 18.2	< 32.5	-		-		-	
Mn-54	1.2 ± 2.5	< 4.7	-		-		-	
Fe-59	-1.0 ± 4.3	< 8.6	-		-		-	
Co-58	-0.8 ± 2.4	< 2.3	-		-		-	
Co-60	0.3 ± 2.2	< 2.8	-		-		-	
Zn-65	-5.9 ± 5.0	< 3.6	-		-		-	
Zr-Nb-95	-0.5 ± 2.3	< 4.6	-		-		-	
Cs-134	-0.3 ± 2.2	< 4.4	-		-		-	
Cs-137	-1.4 ± 2.4	< 2.7	-		-		-	
Ba-La-140	-1.4 ± 3.3	< 5.1	-		-		-	
Location	S-9		S-10		S-12		S-13	
Collection Date	01-03-19		01-03-19		01-03-19		01-03-19	
Lab Code	NF ^a		NF ^a		NF ^a		NF ^a	
Be-7	-		-		-		-	
Mn-54	-		-		-		-	
Fe-59	-		-		-		-	
Co-58	-		-		-		-	
Co-60	-		-		-		-	
Zn-65	-		-		-		-	
Zr-Nb-95	-		-		-		-	
Cs-134	-		-		-		-	
Cs-137	-		-		-		-	
Ba-La-140	-		-		-		-	
Location	S-1		S-3		S-7		S-8	
Collection Date	02-21-19		02-21-19		02-21-19		02-21-19	
Lab Code	NF ^a		NF ^a		NF ^a		NF ^a	
Be-7	-		-		-		-	
Mn-54	-		-		-		-	
Fe-59	-		-		-		-	
Co-58	-		-		-		-	
Co-60	-		-		-		-	
Zn-65	-		-		-		-	
Zr-Nb-95	-		-		-		-	
Cs-134	-		-		-		-	
Cs-137	-		-		-		-	
Ba-La-140	-		-		-		-	

^a "NF" = No flow.

POINT BEACH NUCLEAR PLANT

Beach Drains (cont.)

Units: = pCi/L

Gamma isotopic analysis

Location	S-9		S-10		S-12		S-13	
Collection Date	02-21-19		02-21-19		02-21-19		02-21-19	
Lab Code	NF ^a	MDC	NF ^a	MDC	NF ^a		NF ^a	MDC
Be-7	-		-		-		-	
Mn-54	-		-		-		-	
Fe-59	-		-		-		-	
Co-58	-		-		-		-	
Co-60	-		-		-		-	
Zn-65	-		-		-		-	
Zr-Nb-95	-		-		-		-	
Cs-134	-		-		-		-	
Cs-137	-		-		-		-	
Ba-La-140	-		-		-		-	
Location	S-1		S-3		S-7 NF ^a		S-8 NF ^a	
Collection Date	03-14-19		03-14-19		03-14-19		03-14-19	
Lab Code	EW- 712		EW- 713					
Be-7	5.1 ± 15.5	< 35.4	11.7 ± 14.3	< 33.9	-		-	
Mn-54	1.2 ± 1.9	< 3.3	-0.9 ± 2.0	< 2.8	-		-	
Fe-59	-1.0 ± 3.1	< 4.5	-0.4 ± 3.2	< 3.2	-		-	
Co-58	-1.2 ± 1.5	< 1.9	-1.4 ± 1.9	< 2.8	-		-	
Co-60	0.9 ± 1.8	< 2.5	0.7 ± 2.0	< 3.0	-		-	
Zn-65	0.6 ± 3.3	< 5.7	-0.6 ± 4.0	< 7.7	-		-	
Zr-Nb-95	-0.4 ± 2.0	< 3.8	-2.8 ± 2.3	< 3.7	-		-	
Cs-134	0.9 ± 1.9	< 3.6	-0.9 ± 2.1	< 3.6	-		-	
Cs-137	1.4 ± 1.9	< 3.5	-0.3 ± 2.2	< 3.6	-		-	
Ba-La-140	-0.8 ± 1.7	< 2.6	1.0 ± 1.9	< 2.6	-		-	
Location	S-9		S-10 NF ^a		S-12 NF ^a		S-13 NF ^a	
Collection Date	03-14-19		03-14-19		03-14-19		03-14-19	
Lab Code	EW- 715							
Fe-55	-201 ± 335	< 570						
Ni-63	0.0 ± 42	< 69						
Sr-89	-0.3 ± 0.8	< 1.1						
Sr-90	0.04 ± 0.25	< 0.5						
Tc-99	-2.3 ± 6.9	< 11.4						
Be-7	-20.7 ± 26.4	< 34.6	-		-		-	
Mn-54	-1.7 ± 3.0	< 4.0	-		-		-	
Fe-59	-4.7 ± 6.1	< 5.8	-		-		-	
Co-58	0.8 ± 2.3	< 4.2	-		-		-	
Co-60	-2.7 ± 3.6	< 4.1	-		-		-	
Zn-65	-9.4 ± 7.8	< 12.7	-		-		-	
Zr-Nb-95	-7.0 ± 3.4	< 7.1	-		-		-	
Cs-134	-0.3 ± 2.9	< 5.3	-		-		-	
Cs-137	0.7 ± 3.0	< 5.2	-		-		-	
Ba-La-140	-1.4 ± 3.3	< 3.3	-		-		-	

^a "NF" = No flow.

POINT BEACH NUCLEAR PLANT

Beach Drains (cont.)

Units: = pCi/L

Gamma isotopic analysis

Location	S-1		S-3		S-7		S-8	
Collection Date	04-04-19		04-04-19		04-04-19		04-04-19	
Lab Code	EW- 1057	MDC		MDC	NF ^a		NF ^a	MDC
Be-7	-1.2 ± 22.3	< 37.7	-		-		-	
Mn-54	1.8 ± 2.4	< 3.6	-		-		-	
Fe-59	0.6 ± 5.0	< 8.4	-		-		-	
Co-58	1.7 ± 2.1	< 2.6	-		-		-	
Co-60	1.1 ± 2.8	< 4.0	-		-		-	
Zn-65	2.2 ± 4.7	< 7.0	-		-		-	
Zr-Nb-95	0.0 ± 2.2	< 2.8	-		-		-	
Cs-134	0.2 ± 2.0	< 4.1	-		-		-	
Cs-137	-0.3 ± 2.9	< 4.7	-		-		-	
Ba-La-140	0.5 ± 3.2	< 2.8	-		-		-	
Location	S-9		S-10		S-12		S-13	
Collection Date	04-04-19		04-04-19		04-04-19		04-04-19	
Lab Code	NF ^a		NF ^a		NF ^a			
Be-7	-		-		-		-	
Mn-54	-		-		-		-	
Fe-59	-		-		-		-	
Co-58	-		-		-		-	
Co-60	-		-		-		-	
Zn-65	-		-		-		-	
Zr-Nb-95	-		-		-		-	
Cs-134	-		-		-		-	
Cs-137	-		-		-		-	
Ba-La-140	-		-		-		-	
Location	S-1		S-3		S-7		S-8	
Collection Date	05-02-19		05-02-19		05-02-19		05-02-19	
Lab Code	EW- 1516	MDC	NF ^a		NF ^a		NF ^a	
Be-7	-2.6 ± 17.7	< 43.1	-		-		-	
Mn-54	-0.3 ± 2.0	< 2.7	-		-		-	
Fe-59	-1.8 ± 4.4	< 6.2	-		-		-	
Co-58	-0.5 ± 2.0	< 3.2	-		-		-	
Co-60	-0.1 ± 1.8	< 1.1	-		-		-	
Zn-65	0.2 ± 3.3	< 2.9	-		-		-	
Zr-Nb-95	-2.7 ± 2.2	< 4.2	-		-		-	
Cs-134	1.0 ± 1.8	< 3.7	-		-		-	
Cs-137	-0.7 ± 1.7	< 1.9	-		-		-	
Ba-La-140	-3.6 ± 1.6	< 4.2	-		-		-	

^a "NF" = No flow.

POINT BEACH NUCLEAR PLANT

Beach Drains (cont.)

Units: = pCi/L

Gamma isotopic analysis

Location	S-9	S-10	S-12	S-13
Collection Date	05-02-19	05-02-19	05-02-19	05-02-19
Lab Code	NF ^a	NF ^a	NF ^a	NF ^a
Be-7	-	-	-	-
Mn-54	-	-	-	-
Fe-59	-	-	-	-
Co-58	-	-	-	-
Co-60	-	-	-	-
Zn-65	-	-	-	-
Zr-Nb-95	-	-	-	-
Cs-134	-	-	-	-
Cs-137	-	-	-	-
Ba-La-140	-	-	-	-
Location	S-1	S-3	S-7	S-8
Collection Date	06-06-19	06-06-19	06-06-19	06-06-19
Lab Code	EW- 2173	NF ^a	NF ^a	NF ^a
Be-7	1.6 ± 17.6	< 36.8	-	-
Mn-54	-1.0 ± 2.2	< 2.7	-	-
Fe-59	1.9 ± 4.0	< 9.1	-	-
Co-58	-2.6 ± 1.9	< 2.4	-	-
Co-60	0.7 ± 1.7	< 1.9	-	-
Zn-65	0.4 ± 3.8	< 4.3	-	-
Zr-Nb-95	0.2 ± 1.7	< 3.6	-	-
Cs-134	-1.8 ± 2.1	< 4.2	-	-
Cs-137	-1.2 ± 2.1	< 1.6	-	-
Ba-La-140	-2.1 ± 2.3	< 6.4	-	-
Location	S-9	S-10	S-12	S-13
Collection Date	06-06-19	06-06-19	06-06-19	06-06-19
Lab Code	NF ^a	NF ^a	NF ^a	NF ^a
Be-7	-	-	-	-
Mn-54	-	-	-	-
Fe-59	-	-	-	-
Co-58	-	-	-	-
Co-60	-	-	-	-
Zn-65	-	-	-	-
Zr-Nb-95	-	-	-	-
Cs-134	-	-	-	-
Cs-137	-	-	-	-
Ba-La-140	-	-	-	-

^a "NF" = No flow.

POINT BEACH NUCLEAR PLANT

Beach Drains (cont.)

Units: = pCi/L

Gamma isotopic analysis

Location	S-1		S-3		S-7		S-8	
Collection Date	07-01-19		07-01-19		07-01-19		07-01-19	
Lab Code	EW- 2302	MDC	NF ^a	MDC	NF ^a		NF ^a	MDC
Be-7	6.1 ± 9.7	< 31.9			-		-	
Mn-54	-1.0 ± 1.0	< 1.4			-		-	
Fe-59	-3.1 ± 2.1	< 5.0			-		-	
Co-58	-0.8 ± 1.0	< 2.0			-		-	
Co-60	-0.6 ± 1.2	< 1.8			-		-	
Zn-65	0.2 ± 2.1	< 2.8			-		-	
Zr-Nb-95	0.0 ± 1.0	< 3.9			-		-	
Cs-134	-0.9 ± 1.0	< 2.2			-		-	
Cs-137	-0.6 ± 1.2	< 1.8			-		-	
Ba-La-140	-1.9 ± 1.2	< 14.8			-		-	
Location	S-9		S-10		S-12		S-13	
Collection Date	07-01-19		07-01-19		07-01-19		07-01-19	
Lab Code	NF ^a		NF ^a		NF ^a		NF ^a	
Be-7	-		-		-		-	
Mn-54	-		-		-		-	
Fe-59	-		-		-		-	
Co-58	-		-		-		-	
Co-60	-		-		-		-	
Zn-65	-		-		-		-	
Zr-Nb-95	-		-		-		-	
Cs-134	-		-		-		-	
Cs-137	-		-		-		-	
Ba-La-140	-		-		-		-	
Location	S-1		S-3		S-7		S-8	
Collection Date	08-08-19		08-08-19		08-08-19		08-08-19	
Lab Code	EW- 2965		NF ^a		NF ^a		NF ^a	
Be-7	15.7 ± 17.1	< 37.7	-		-		-	
Mn-54	1.4 ± 2.0	< 4.0	-		-		-	
Fe-59	-3.9 ± 3.4	< 5.2	-		-		-	
Co-58	-0.1 ± 1.9	< 2.1	-		-		-	
Co-60	0.7 ± 1.9	< 2.4	-		-		-	
Zn-65	2.2 ± 3.4	< 3.5	-		-		-	
Zr-Nb-95	-3.7 ± 2.1	< 2.3	-		-		-	
Cs-134	-0.1 ± 2.0	< 4.3	-		-		-	
Cs-137	0.1 ± 2.3	< 3.5	-		-		-	
Ba-La-140	-7.2 ± 7.5	< 4.0	-		-		-	

^a "NF" = No flow.

POINT BEACH NUCLEAR PLANT

Beach Drains (cont.)

Units: = pCi/L

Gamma isotopic analysis

Location	S-9		S-10		S-12		S-13	
Collection Date	08-08-19		08-08-19		08-08-19		08-08-19	
Lab Code	NF ^a	MDC	NF ^a	MDC	NF ^a	MDC	NF ^a	MDC
Be-7	-		-		-		-	
Mn-54	-		-		-		-	
Fe-59	-		-		-		-	
Co-58	-		-		-		-	
Co-60	-		-		-		-	
Zn-65	-		-		-		-	
Zr-Nb-95	-		-		-		-	
Cs-134	-		-		-		-	
Cs-137	-		-		-		-	
Ba-La-140	-		-		-		-	
Location	S-1		S-3		S-7		S-8	
Collection Date	09-05-19		09-05-19		09-05-19		09-05-19	
Lab Code	EW- 3316	MDC	NF ^a	MDC	NF ^a	MDC	NF ^a	MDC
Be-7	9.7 ± 14.6	< 24.9	-		-		-	
Mn-54	-0.6 ± 1.8	< 3.4	-		-		-	
Fe-59	-0.2 ± 3.5	< 5.7	-		-		-	
Co-58	-0.4 ± 1.9	< 2.2	-		-		-	
Co-60	-0.3 ± 1.9	< 2.8	-		-		-	
Zn-65	-2.3 ± 3.6	< 6.1	-		-		-	
Zr-Nb-95	-1.9 ± 2.0	< 5.4	-		-		-	
Cs-134	-0.3 ± 1.8	< 3.2	-		-		-	
Cs-137	-1.2 ± 2.1	< 1.7	-		-		-	
Ba-La-140	-2.3 ± 1.9	< 3.4	-		-		-	
Location	S-9		S-10		S-12		S-13	
Collection Date	09-05-19		09-05-19		09-05-19		09-05-19	
Lab Code	NF ^a	MDC	NF ^a	MDC	NF ^a	MDC	EW- 3317	MDC
Be-7	-		-		-		-7.2 ± 16.2	< 29.4
Mn-54	-		-		-		0.3 ± 1.6	< 2.4
Fe-59	-		-		-		-1.5 ± 2.8	< 4.5
Co-58	-		-		-		-1.2 ± 1.7	< 1.7
Co-60	-		-		-		1.7 ± 1.8	< 2.3
Zn-65	-		-		-		-3.5 ± 3.3	< 3.3
Zr-Nb-95	-		-		-		-2.1 ± 1.9	< 3.0
Cs-134	-		-		-		-0.4 ± 1.6	< 3.0
Cs-137	-		-		-		-0.1 ± 2.2	< 3.0
Ba-La-140	-		-		-		-1.9 ± 2.0	< 4.9

^a "NF" = No flow.

POINT BEACH NUCLEAR PLANT

Beach Drains (cont.)

Units = pCi/L

Gamma isotopic analysis

Location	S-1		S-3		S-7		S-8	
Collection Date	10-03-19		10-03-19		10-03-19		10-03-19	
Lab Code	EW- 3697	MDC	NF ^a	MDC	NF ^a	MDC	NF ^a	MDC
Be-7	7.1 ± 13.4	< 33.7	-		-		-	
Mn-54	0.5 ± 1.8	< 3.1	-		-		-	
Fe-59	0.8 ± 2.5	< 4.5	-		-		-	
Co-58	1.3 ± 1.8	< 2.8	-		-		-	
Co-60	1.7 ± 1.7	< 2.1	-		-		-	
Zn-65	1.6 ± 2.6	< 3.2	-		-		-	
Zr-Nb-95	0.8 ± 1.8	< 2.8	-		-		-	
Cs-134	1.0 ± 1.6	< 3.2	-		-		-	
Cs-137	0.4 ± 2.0	< 3.2	-		-		-	
Ba-La-140	-2.2 ± 2.0	< 4.0	-		-		-	
Location	S-9		S-10		S-12		S-13	
Collection Date	10-03-19		10-03-19		10-03-19		10-03-19	
Lab Code	NF ^a		NF ^a		NF ^a		NF ^a	
Be-7	-		-		-		-	
Mn-54	-		-		-		-	
Fe-59	-		-		-		-	
Co-58	-		-		-		-	
Co-60	-		-		-		-	
Zn-65	-		-		-		-	
Zr-Nb-95	-		-		-		-	
Cs-134	-		-		-		-	
Cs-137	-		-		-		-	
Ba-La-140	-		-		-		-	
Location	S-1		S-3		S-7		S-8	
Collection Date	11-07-19		11-07-19		11-07-19		11-07-19	
Lab Code	EW- 4256		EW- 4257		NF ^a		NF ^a	
Be-7	-3.3 ± 19.1	< 43.2	15.1 ± 13.1	< 44.8	-		-	
Mn-54	0.6 ± 2.0	< 3.4	0.5 ± 1.9	< 3.1	-		-	
Fe-59	-0.7 ± 3.1	< 4.6	2.5 ± 2.7	< 6.6	-		-	
Co-58	-0.2 ± 1.8	< 2.7	1.1 ± 1.7	< 3.4	-		-	
Co-60	0.1 ± 1.8	< 1.4	0.8 ± 1.9	< 1.7	-		-	
Zn-65	0.2 ± 4.6	< 7.1	-2.6 ± 3.3	< 5.9	-		-	
Zr-Nb-95	-0.3 ± 2.1	< 5.7	-1.2 ± 2.0	< 4.2	-		-	
Cs-134	0.2 ± 2.1	< 4.0	-0.6 ± 1.8	< 3.1	-		-	
Cs-137	1.2 ± 2.2	< 4.2	-0.6 ± 2.0	< 2.6	-		-	
Ba-La-140	-5.0 ± 1.8	< 9.2	3.9 ± 2.2	< 14.0	-		-	

^a "NF" = No flow.

POINT BEACH NUCLEAR PLANT

Beach Drains (cont.)

Units: = pCi/L

Gamma isotopic analysis

Location	S-9	S-10	S-12	S-13	
Collection Date	11-07-19	11-07-19	11-07-19	11-07-19	
Lab Code	NF ^a	NF ^a	NF ^a	NF ^a	MDC
Be-7	-	-	-	-	
Mn-54	-	-	-	-	
Fe-59	-	-	-	-	
Co-58	-	-	-	-	
Co-60	-	-	-	-	
Zn-65	-	-	-	-	
Zr-Nb-95	-	-	-	-	
Cs-134	-	-	-	-	
Cs-137	-	-	-	-	
Ba-La-140	-	-	-	-	
Location	S-1	S-3	S-7	S-8	
Collection Date	12-05-19	12-05-19	12-05-19	12-05-19	
Lab Code	EW- 4621	EW- 4623	NF ^a	NF ^a	
Be-7	-2.1 ± 14.9	< 35.7	14.1 ± 23.2	< 52.3	-
Mn-54	-1.1 ± 1.9	< 2.2	1.8 ± 2.6	< 4.6	-
Fe-59	-1.3 ± 3.3	< 4.0	1.0 ± 4.9	< 8.7	-
Co-58	2.2 ± 1.6	< 2.8	-0.8 ± 2.4	< 3.7	-
Co-60	1.1 ± 1.7	< 2.8	3.9 ± 3.3	< 4.3	-
Zn-65	3.2 ± 3.8	< 7.4	-7.7 ± 6.7	< 11.7	-
Zr-Nb-95	-2.2 ± 1.8	< 3.1	-4.4 ± 3.1	< 6.5	-
Cs-134	0.7 ± 1.7	< 3.1	-1.6 ± 2.6	< 5.0	-
Cs-137	0.2 ± 2.0	< 3.2	0.6 ± 2.8	< 4.1	-
Ba-La-140	-5.8 ± 5.7	< 5.3	-0.2 ± 3.2	< 4.9	-
Location	S-9	S-10	S-12	S-13	
Collection Date	12-05-19	12-05-19	12-05-19	12-05-19	
Lab Code	NF ^a	NF ^a	EW- 4624	NF ^a	
Be-7	-	-	3.4 ± 18.3	< 39.2	
Mn-54	-	-	1.8 ± 1.9	< 3.7	
Fe-59	-	-	4.4 ± 3.7	< 8.0	
Co-58	-	-	-0.9 ± 2.0	< 2.9	
Co-60	-	-	-1.5 ± 1.7	< 2.4	
Zn-65	-	-	0.8 ± 4.6	< 5.9	
Zr-Nb-95	-	-	0.3 ± 2.1	< 5.4	
Cs-134	-	-	-0.3 ± 2.0	< 4.3	
Cs-137	-	-	1.7 ± 2.2	< 4.0	
Ba-La-140	-	-	-0.4 ± 2.3	< 6.3	

POINT BEACH NUCLEAR PLANT

Table 13. Groundwater Tritium Monitoring Program
(Quarterly Collections)
Units = pCi/L

Quarterly Wells							
GW-05 (WH 6 Well)				GW-06 (SBCC Well)			
Collection Date	Lab Code	Tritium	MDC	Collection Date	Lab Code	Tritium	MDC
01-15-19	EW- 150	-7 ± 82	< 177	01-15-19	EW- 151	-34 ± 80	< 177
04-09-19	EW- 1193	7 ± 71	< 152	04-09-19	EW- 1194	1 ± 71	< 152
07-30-19	EW- 2829	44 ± 73	< 152	07-30-19	EW- 2830	25 ± 72	< 152
10-08-19	EW- 3717	57 ± 74	< 151	10-08-19	EW- 3718	-8 ± 70	< 151
Mean ± s.d.		25 ± 30		Mean ± s.d.		-4 ± 24	
GW-11 (MW-1)				GW-12 (MW-2)			
Collection Date	Lab Code	Tritium	MDC	Collection Date	Lab Code	Tritium	MDC
01-15-19		NS ^a		01-15-19		NS ^a	
03-19-19	EW- 925	91 ± 78	< 156	03-19-19	EW- 926	-18 ± 72	< 156
05-14-19	EW- 1705	94 ± 77	< 150	05-14-19	EW- 1707	7 ± 72	< 150
07-30-19	EW- 2966	153 ± 84	< 153	07-30-19	EW- 2967	-19 ± 75	< 153
11-19-19	EW- 4463	93 ± 78	< 156	11-19-19	EW- 4464	55 ± 76	< 156
Mean ± s.d.		108 ± 30		Mean ± s.d.		6 ± 35	
GW-13 (MW-6)				GW-14A (MW-05A)			
Collection Date	Lab Code	Tritium	MDC	Collection Date	Lab Code	Tritium	MDC
01-15-19		NS ^a		01-15-19		NS ^a	
03-19-19	EW- 927	-11 ± 72	< 156	03-19-19	EW- 928	20 ± 74	< 156
05-14-19	EW- 1708	65 ± 75	< 150	05-14-19	EW- 1709	160 ± 81	< 150
07-30-19	EW- 2968	157 ± 85	< 153	07-30-19	EW- 2969	178 ± 86	< 153
11-19-19	EW- 4466	84 ± 77	< 156	11-19-19	EW- 4467	142 ± 80	< 156
Mean ± s.d.		74 ± 69		Mean ± s.d.		125 ± 71	
GW-15A (MW-4)				GW-15B (MW-4)			
Collection Date	Lab Code	Tritium	MDC	Collection Date	Lab Code	Tritium	MDC
01-15-19		NS ^a		01-15-19		NS ^a	
03-19-19	EW- 929	18 ± 74	< 156	03-19-19	EW- 930	91 ± 78	< 156
05-14-19	EW- 1710	90 ± 77	< 150	05-14-19	EW- 1711	124 ± 79	< 150
07-30-19	EW- 2970	200 ± 87	< 153	07-30-19	EW- 2972	162 ± 85	< 153
11-19-19	EW- 4468	175 ± 82	< 156	11-19-19	EW- 4469	133 ± 80	< 156
Mean ± s.d.		121 ± 83		Mean ± s.d.		127 ± 29	
GW-16A (MW-3)				GW-16B (MW-3)			
Collection Date	Lab Code	Tritium	MDC	Collection Date	Lab Code	Tritium	MDC
01-15-19		NS ^a		01-15-19		NS ^a	
03-19-19		NS ^a		03-19-19		NS ^a	
05-14-19	EW- 1712	202 ± 83	< 150	05-14-19		NS ^a	
07-30-19	EW- 2973	144 ± 84	< 153	07-30-19		NS ^a	
11-19-19	EW- 4470	304 ± 89	< 156	11-19-19		NS ^a	
Mean ± s.d.		217 ± 81					

^a "NS" = No sample.

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Table 13. Groundwater Tritium Monitoring Program
(Quarterly Collections)
Units = pCi/L

Quarterly Wells (cont.)			
Sample ID		GW-18 (WH 7 Well)	
Collection Date	Lab Code	Tritium	MDC
01-15-19	EWV- 152	21 ± 83	< 177
04-09-19	EWV- 1195	29 ± 72	< 152
07-30-19	EWV- 2831	25 ± 72	< 152
10-08-19	EWV- 3719	31 ± 72	< 151
Mean ± s.d.		26 ± 4	

Façade Wells							
Sample ID				GW-09 1Z-361A			
Collection Date	Lab Code	Tritium	MDC	Collection Date	Lab Code	Tritium	MDC
01-15-19	EWV- 371	125 ± 84	< 156	01-15-19	EWV- 372	33 ± 79	< 156
04-03-19	EWV- 1063	199 ± 86	< 153	04-03-19	EWV- 1064	104 ± 81	< 153
04-23-19	EWV- 1405	137 ± 80	< 150	04-23-19	EWV- 1406	69 ± 76	< 150
05-31-19		NS ^a		05-31-19		NS ^a	
07-11-19	EWV- 2760	187 ± 90	< 162	07-11-19	EWV- 2761	39 ± 83	< 162
10-23-19	EWV- 4459	254 ± 89	< 157	10-23-19	EWV- 4460	152 ± 84	< 157
Mean ± s.d.				Mean ± s.d.			

Sample ID				GW-10 2Z-361A			
Collection Date	Lab Code	Tritium	MDC	Collection Date	Lab Code	Tritium	MDC
01-15-19	EWV- 373	-7 ± 77	< 156	01-15-19	EWV- 374	-13 ± 76	< 156
04-03-19	EWV- 1065	-7 ± 82	< 156	04-03-19	EWV- 1066	77 ± 86	< 156
04-23-19	EWV- 1407	-30 ± 70	< 150	04-23-19	EWV- 1408	143 ± 80	< 150
05-31-19	EWV- 2183	-83 ± 64	< 150	05-31-19		NS ^a	
07-11-19	EWV- 2762	-13 ± 80	< 162	07-11-19	EWV- 2763	95 ± 86	< 162
10-23-19	EWV- 4461	31 ± 77	< 157	10-23-19	EWV- 4462	134 ± 83	< 157
Mean ± s.d.				Mean ± s.d.			

(Annual Collections)
Units = pCi/L

Bogs							
Sample ID				GW-07 (North Bog)			
Collection Date	Lab Code	Tritium	MDC	Collection Date	Lab Code	Tritium	MDC
05-16-19	EWV- 1722	7 ± 72	< 149	05-16-19	EWV- 1723	200 ± 83	< 149

^a "NS" = No sample.

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Table 13. Groundwater Tritium Monitoring Program

Units = pCi/L

Manholes

MH Z-065A				MH Z-065B			
Sample ID	Lab Code	Tritium	MDC (pCi/L)	Sample ID	Lab Code	Tritium	MDC (pCi/L)
Collection Date				Collection Date			
05-02-19		NS ^a		05-02-19		NS ^a	
09-16-19	EW- 3725	225 ± 83	< 152	09-16-19	EW- 3726	218 ± 83	< 152
Mean ± s.d.				Mean ± s.d.			
MH Z-065C				MH Z-065D			
Sample ID	Lab Code	Tritium	MDC (pCi/L)	Sample ID	Lab Code	Tritium	MDC (pCi/L)
Collection Date				Collection Date			
05-02-19		NS ^a		05-02-19		NS ^a	
09-16-19		NS ^a		09-16-19		NS ^a	
Mean ± s.d.				Mean ± s.d.			
MH Z-066A				MH Z-066B			
Sample ID	Lab Code	Tritium	MDC (pCi/L)	Sample ID	Lab Code	Tritium	MDC (pCi/L)
Collection Date				Collection Date			
05-02-19	EW- 1600	231 ± 85	< 154	05-02-19	EW- 1601	59 ± 76	< 154
09-18-19	EW- 3727	174 ± 80	< 152	09-18-19	EW- 3728	119 ± 77	< 152
Mean ± s.d.				Mean ± s.d.			
		203 ± 40				89 ± 42	
MH Z-066C				MH Z-066D			
Sample ID	Lab Code	Tritium	MDC (pCi/L)	Sample ID	Lab Code	Tritium	MDC (pCi/L)
Collection Date				Collection Date			
05-02-19	EW- 1602	97 ± 78	< 154	05-02-19	EW- 1603	311 ± 89	< 154
09-18-19	EW- 3729	135 ± 78	< 152	09-18-19	EW- 3730	256 ± 85	< 152
Mean ± s.d.				Mean ± s.d.			
		116 ± 26				283 ± 40	
MH Z-067A				MH Z-067B			
Sample ID	Lab Code	Tritium	MDC (pCi/L)	Sample ID	Lab Code	Tritium	MDC (pCi/L)
Collection Date				Collection Date			
05-02-19	EW- 1604	261 ± 86	< 154	05-02-19	EW- 1605	267 ± 87	< 154
09-18-19	EW- 3732	231 ± 84	< 152	09-18-19	EW- 3733	128 ± 78	< 152
Mean ± s.d.				Mean ± s.d.			
		246 ± 21				197 ± 98	

^a "NS" = No sample; not sent.

Manholes (cont.)

MH Z-067C				MH Z-067D				
Sample ID	Collection Date	Lab Code	Tritium	MDC (pCi/L)	Collection Date	Lab Code	Tritium	MDC (pCi/L)
	05-02-19	EW- 1606	288 ± 88	< 154	05-02-19	EW- 1607	110 ± 79	< 154
	09-18-19	EW- 3734	168 ± 80	< 152		EW- 3735	205 ± 82	< 152
Mean ± s.d.		228 ± 85			Mean ± s.d.		158 ± 67	
MH Z-068				MH-1				
Sample ID	Collection Date	Lab Code	Tritium	MDC (pCi/L)	Collection Date	Lab Code	Tritium	MDC (pCi/L)
	05-02-19	EW- 1608	229 ± 85	< 154	05-02-19		NS ^a	
	09-18-19	EW- 3736	141 ± 79	< 152	09-18-19		NS ^a	
Mean ± s.d.		185 ± 62			Mean ± s.d.			
MH-4				MH-6				
Sample ID	Collection Date	Lab Code	Tritium	MDC (pCi/L)	Collection Date	Lab Code	Tritium	MDC (pCi/L)
	05-02-19		NS ^a		05-02-19		NS ^a	
	09-18-19		NS ^a		09-18-19		NS ^a	
Mean ± s.d.					Mean ± s.d.			
MH-7				MH-8				
Sample ID	Collection Date	Lab Code	Tritium	MDC (pCi/L)	Collection Date	Lab Code	Tritium	MDC (pCi/L)
	05-02-19		NS ^a		05-02-19		NS ^a	
	09-18-19		NS ^a		09-18-19		NS ^a	
Mean ± s.d.					Mean ± s.d.			
MH-16				MH-2				
Sample ID	Collection Date	Lab Code	Tritium	MDC (pCi/L)	Collection Date	Lab Code	Tritium	MDC (pCi/L)
	05-02-19		NS ^a		05-02-19		NS ^a	
	09-18-19		NS ^a		09-18-19		NS ^a	
Mean ± s.d.					Mean ± s.d.			
MH-5A				MH-9				
Sample ID	Collection Date	Lab Code	Tritium	MDC (pCi/L)	Collection Date	Lab Code	Tritium	MDC (pCi/L)
	05-02-19		NS ^a		05-02-19		NS ^a	
	09-18-19		NS ^a		09-18-19		NS ^a	
Mean ± s.d.					Mean ± s.d.			

^a "NS" = No sample; not sent.

POINT BEACH NUCLEAR PLANT

Table 14. Radioactivity in vegetation samples
Collection: Annual

Sample Description and Concentration (pCi/g wet)							
Location	E-F1A	MDC	E-F1B	MDC	E-F2	MDC	
Collection Date	09-04-19		09-04-19		09-04-19		
Lab Code	EVE- 3305		EVE- 3306		EVE- 3307		Req. LLD
Type	Hay		Hay		Soybeans		
Be-7	1.303 ± 0.175	-	1.11 ± 0.24	-	1.19 ± 0.23	-	-
K-40	5.27 ± 0.40	-	5.42 ± 0.51	-	4.02 ± 0.39	-	-
I-131	-0.009 ± 0.006	< 0.014	-0.020 ± 0.010	< 0.021	-0.006 ± 0.010	< 0.032	0.060
Cs-134	-0.004 ± 0.006	< 0.011	0.003 ± 0.009	< 0.018	0.001 ± 0.008	< 0.016	0.060
Cs-137	0.001 ± 0.007	< 0.009	0.009 ± 0.010	< 0.018	0.000 ± 0.010	< 0.017	0.080
Other (Co-60)	0.002 ± 0.006	< 0.010	-0.003 ± 0.009	< 0.008	-0.003 ± 0.008	< 0.009	0.060
Location	E-F3	MDC	E-F4	MDC	E-F5	MDC	
Collection Date	09-04-19		09-04-19		09-04-19		
Lab Code	EVE- 3308		EVE- 3309		EVE- 3311		Req. LLD
Type	Soybeans		Corn		Corn/Grass/Hay		
Be-7	1.14 ± 0.23	-	0.063 ± 0.057	< 0.110	1.596 ± 0.223	-	-
K-40	3.27 ± 0.43	-	1.72 ± 0.25	-	4.33 ± 0.43	-	-
I-131	0.007 ± 0.010	< 0.035	-0.014 ± 0.007	< 0.015	0.016 ± 0.008	< 0.030	0.060
Cs-134	0.003 ± 0.009	< 0.018	0.005 ± 0.006	< 0.011	0.000 ± 0.007	< 0.015	0.060
Cs-137	0.007 ± 0.010	< 0.020	0.002 ± 0.007	< 0.012	0.007 ± 0.010	< 0.015	0.080
Other (Co-60)	0.002 ± 0.013	< 0.010	-0.001 ± 0.004	< 0.003	-0.004 ± 0.009	< 0.008	0.060
Location	E-F6	MDC	E-F7	MDC	E-F8	MDC	
Collection Date	09-04-19		09-04-19		09-04-19		
Lab Code	EVE- 3312		EVE- 3313		EVE- 3314		Req. LLD
Type	NS ^a		Corn		Corn/Grass/Hay		
Be-7			0.100 ± 0.055	< 0.111	1.24 ± 0.20	-	-
K-40			2.10 ± 0.25	-	2.53 ± 0.36	-	-
I-131			0.006 ± 0.005	< 0.012	0.003 ± 0.007	< 0.021	0.060
Cs-134			-0.003 ± 0.006	< 0.011	0.006 ± 0.009	< 0.017	0.060
Cs-137			0.000 ± 0.007	< 0.008	0.001 ± 0.009	< 0.014	0.080
Other (Co-60)			0.000 ± 0.006	< 0.011	0.003 ± 0.009	< 0.013	0.060

^a "NS" - no sample; see table 2.0 for Listing of Missed Samples.

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Table 14. Radioactivity in vegetation samples
Collection: Annual

Sample Description and Concentration (pCi/g wet)			
MDC			
Location	E-F9		
Collection Date	09-04-19		
Lab Code	EVE- 3315		
Type	Corn		
			Req. LLD
			-
			0.25
Be-7	0.124 ± 0.088	< 0.19	-
K-40	2.84 ± 0.42	-	-
I-131	-0.022 ± 0.010	< 0.026	0.060
Cs-134	-0.006 ± 0.011	< 0.021	0.060
Cs-137	-0.003 ± 0.011	< 0.011	0.080
Other (Co-60)	0.001 ± 0.012	< 0.013	0.060
Be-7 Annual Mean ± s.d. 0.87 ± 0.60			
K-40 Annual Mean ± s.d. 3.50 ± 1.34			
I-131 Annual Mean ± s.d. -0.004 ± 0.013			
Cs-134 Annual Mean ± s.d. 0.000 ± 0.004			
Cs-137 Annual Mean ± s.d. 0.003 ± 0.004			
Co-60 Annual Mean ± s.d. 0.000 ± 0.003			

APPENDIX A

INTERLABORATORY AND INTRALABORATORY COMPARISON PROGRAM RESULTS

NOTE: Appendix A is updated four times a year. The complete appendix is included in March, June, September and December monthly progress reports only.

October, 2018 through September, 2019

Appendix A

Interlaboratory/ Intralaboratory Comparison Program Results

Environmental, Inc., Midwest Laboratory has participated in interlaboratory comparison (crosscheck) programs since the formulation of its quality control program in December 1971. These programs are operated by agencies which supply environmental type samples containing concentrations of radionuclides known to the issuing agency but not to participant laboratories. The purpose of such a program is to provide an independent check on a laboratory's analytical procedures and to alert it of any possible problems.

Participant laboratories measure the concentration of specified radionuclides and report them to the issuing agency. Several months later, the agency reports the known values to the participant laboratories and specifies control limits. Results consistently higher or lower than the known values or outside the control limits indicate a need to check the instruments or procedures used.

Results in Table A-1 were obtained through participation in the RAD PT Study Proficiency Testing Program administered by Environmental Resource Associates, serving as a replacement for studies conducted previously by the U.S. EPA Environmental Monitoring Systems Laboratory, Las Vegas, Nevada.

Table A-2 lists results for thermoluminescent dosimeters (TLDs), via irradiation and evaluation by the University of Wisconsin-Madison Radiation Calibration Laboratory at the University of Wisconsin Medical Radiation Research Center.

Table A-3 lists results of the analyses on in-house "spiked" samples for the past twelve months. All samples are prepared using NIST traceable sources. Data for previous years available upon request.

Table A-4 lists results of the analyses on in-house "blank" samples for the past twelve months. Data for previous years available upon request.

Table A-5 lists analytical results from the in-house "duplicate" program for the past twelve months. Acceptance is based on the difference of the results being less than the sum of the errors. Complete analytical data for duplicate analyses is available upon request.

The results in Table A-6 were obtained through participation in the Mixed Analyte Performance Evaluation Program.

Results in Table A-7 were obtained through participation in the MRAD PT Study Proficiency Testing Program administered by Environmental Resource Associates, serving as a replacement for studies conducted previously by the Environmental Measurement Laboratory Quality Assessment Program (EML).

Attachment A lists the laboratory acceptance criteria for various analyses.

Out-of-limit results are explained directly below the result.

Attachment A

ACCEPTANCE CRITERIA FOR "SPIKED" SAMPLES

Analysis	Ratio of lab result to known value.
Gamma Emitters	0.8 to 1.2
Strontium-89, Strontium-90	0.8 to 1.2
Potassium-40	0.8 to 1.2
Gross alpha	0.5 to 1.5
Gross beta	0.8 to 1.2
Tritium	0.8 to 1.2
Radium-226, Radium-228	0.7 to 1.3
Plutonium	0.8 to 1.2
Iodine-129, Iodine-131	0.8 to 1.2
Nickel-63, Technetium-99, Uranium-238	0.7 to 1.3
Iron-55	0.8 to 1.2
Other Analyses	0.8 to 1.2

TABLE A-1. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)^a.
RAD study

Lab Code	Date	Analysis	Concentration (pCi/L)			Acceptance
			Laboratory Result	ERA Result	Control Limits	
ERW-71	1/7/2019	Ba-133	97.9 ± 4.5	99.5	84.1 - 109	Pass
ERW-71	1/7/2019	Cs-134	45.4 ± 3.1	49.1	39.5 - 54.0	Pass
ERW-71	1/7/2019	Cs-137	129 ± 6	125	112 - 140	Pass
ERW-71	1/7/2019	Co-60	98.1 ± 4.1	96.4	86.8 - 108	Pass
ERW-71	1/7/2019	Zn-65	80.4 ± 7.8	77.4	69.5 ± 93.2	Pass
ERW-73	1/7/2019	Gr. Alpha	22.2 ± 1.6	21.8	10.9 - 29.5	Pass
ERW-73	1/7/2019	Gr. Beta	46.4 ± 1.4	55.7	38.1 - 62.6	Pass
ERW-75	1/7/2019	Ra-226	7.19 ± 0.30	7.37	5.55 ± 8.72	Pass
ERW-75	1/7/2019	Ra-228	4.02 ± 0.70	4.28	2.48 - 5.89	Pass
ERW-75	1/7/2019	Uranium	50.2 ± 2.9	68.2	55.7 - 75.0	Fail ^b
ERW-77	1/7/2019	H-3	2,129 ± 158	2,110	1,740 - 2,340	Pass
ERW-397	2/11/2019	I-131	27.2 ± 1.0	25.9	25.1 - 30.6	Pass
ERW-1141	4/8/2019	Ra-226	7.58 ± 0.53	7.15	5.39 - 8.48	Pass
ERW-1141	4/8/2019	Ra-228	2.64 ± 0.79	2.94	1.54 - 4.35	Pass
ERW-1141	4/8/2019	Uranium	67.0 ± 0.9	55.9	45.6 - 61.5	Fail ^c
ERW-2471	7/8/2019	Ba-133	66.5 ± 4.0	66.9	55.8 - 73.6	Pass
ERW-2471	7/8/2019	Cs-134	29.6 ± 2.6	32.0	25.1 - 35.2	Pass
ERW-2471	7/8/2019	Cs-137	21.3 ± 3.6	21.4	17.6 - 26.7	Pass
ERW-2471	7/8/2019	Co-60	99.9 ± 4.4	95.1	85.6 - 107.0	Pass
ERW-2471	7/8/2019	Zn-65	43.7 ± 6.2	41.2	35.3 - 51.4	Pass
ERW-2473	7/8/2019	Gr. Alpha	41.7 ± 2.1	70.6	37.1 - 87.1	Pass
ERW-2473	7/8/2019	Gr. Beta	57.0 ± 1.6	63.9	44.2 - 70.5	Pass
ERW-2477	7/8/2019	Ra-226	16.2 ± 0.5	18.5	13.8 - 21.1	Pass
ERW-2477	7/8/2019	Ra-228	6.2 ± 0.8	8.2	5.2 - 10.3	Pass
ERW-2477	7/8/2019	Uranium	63.8 ± 3.6	68.3	55.8 - 75.1	Pass
ERW-2479	7/8/2019	H-3	8,630 ± 200	16,700	14,600 - 18,400	Fail ^d
ERW-2475	7/8/2019	I-131	33.6 ± 1.3	29.6	24.6 - 34.6	Pass

^a Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the crosscheck program for proficiency testing in drinking water conducted by Environmental Resource Associates (ERA).

^b In order to get to the root cause of the above "Fail" resolution the U-232 tracer was standardized using a known concentration of NIST U-238 solution. A duplicate analysis was performed and the results obtained were well within the acceptance range (Known value for Total Uranium=68.2 pCi/L, acceptance range of (55.7-75 pCi/L). The results obtained were 63.3 pCi/L and 66.0 pCi/L respectively.

^c The standardized U-232 value utilized on ERA sample ERW-75 (see footnote "b" above) was found to be estimated high due to interferences in the U-238 solution causing the ERW-1141 Uranium PT failure above. After performing U-isotopic chemistry on the NIST-Uranium solution to remove interferences a more accurate U-232 tracer concentration was obtained. The subsequent ERA PT study was acceptable. See ERW-2477 Uranium result above.

^d H-3 analysis was performed using the ERA provided blank sample. Pairing the ERA supplied blank and the lab routine blank with standard vials created confusion and resulted in the standard total count time being mistalled by half. The resulting batch efficiency was overstated by a factor of two and the reported ERA results were understated by half. The result of reanalysis, (17,400 pCi/L), is within the control limits for the study.

TABLE A-2. Thermoluminescent Dosimetry, (TLD, CaSO₄: Dy Cards).^a

mrem						
Lab Code	Irradiation		Delivered	Reported ^b	Performance ^c	
	Date	Description	Dose	Dose	Quotient (P)	
<u>Environmental, Inc.</u>		Group 1				
2018-1	11/15/2018	Spike 1	97.0	81.6	-0.16	
2018-1	11/15/2018	Spike 2	97.0	88.5	-0.09	
2018-1	11/15/2018	Spike 3	97.0	87.9	-0.09	
2018-1	11/15/2018	Spike 4	97.0	85.6	-0.12	
2018-1	11/15/2018	Spike 5	97.0	86.5	-0.11	
2018-1	11/15/2018	Spike 6	97.0	89.0	-0.08	
2018-1	11/15/2018	Spike 7	97.0	85.1	-0.12	
2018-1	11/15/2018	Spike 8	97.0	90.6	-0.07	
2018-1	11/15/2018	Spike 9	97.0	91.3	-0.06	
2018-1	11/15/2018	Spike 10	97.0	84.5	-0.13	
2018-1	11/15/2018	Spike 11	97.0	90.8	-0.06	
2018-1	11/15/2018	Spike 12	97.0	93.8	-0.03	
2018-1	11/15/2018	Spike 13	97.0	85.3	-0.12	
2018-1	11/15/2018	Spike 14	97.0	85.5	-0.12	
2018-1	11/15/2018	Spike 15	97.0	86.9	-0.10	
2018-1	11/15/2018	Spike 16	97.0	88.6	-0.09	
2018-1	11/15/2018	Spike 17	97.0	83.1	-0.14	
2018-1	11/15/2018	Spike 18	97.0	85.4	-0.12	
2018-1	11/15/2018	Spike 19	97.0	83.3	-0.14	
2018-1	11/15/2018	Spike 20	97.0	85.5	-0.12	
Mean (Spike 1-20)				86.9	-0.10	Pass ^d
Standard Deviation (Spike 1-20)				3.1	0.03	Pass ^d

a TLD's were irradiated by the University of Wisconsin-Madison Radiation Calibration Laboratory following ANSI N13.37 protocol from a known air kerma rate. TLD's were read and the results were submitted by Environmental Inc. to the University of Wisconsin-Madison Radiation Calibration Laboratory for comparison to the delivered dose.

b Reported dose was converted from exposure (R) to Air Kerma (cGy) using a conversion of 0.876. Conversion from air kerma to ambient dose equivalent for Cs-137 at the reference dose point $H^*(10)K_a = 1.20$. mrem/cGy = 1000.

c Performance Quotient (P) is calculated as ((reported dose - conventionally true value) ÷ conventionally true value) where the conventionally true value is the delivered dose.

d Acceptance is achieved when neither the absolute value of mean of the P values, nor the standard deviation of the P values exceed 0.15.

TABLE A-2. Thermoluminescent Dosimetry, (TLD, CaSO₄: Dy Cards).^a

			mrem			
Lab Code	Irradiation		Delivered	Reported ^b	Performance ^c	
	Date	Description	Dose	Dose	Quotient (P)	
<u>Environmental, Inc.</u>		Group 2				
2018-2	11/15/2018	Spike 21	143.0	130.3	-0.09	
2018-2	11/15/2018	Spike 22	143.0	128.1	-0.10	
2018-2	11/15/2018	Spike 23	143.0	134.4	-0.06	
2018-2	11/15/2018	Spike 24	143.0	129.0	-0.10	
2018-2	11/15/2018	Spike 25	143.0	132.5	-0.07	
2018-2	11/15/2018	Spike 26	143.0	126.1	-0.12	
2018-2	11/15/2018	Spike 27	143.0	126.2	-0.12	
2018-2	11/15/2018	Spike 28	143.0	122.4	-0.14	
2018-2	11/15/2018	Spike 29	143.0	118.8	-0.17	
2018-2	11/15/2018	Spike 30	143.0	123.2	-0.14	
2018-2	11/15/2018	Spike 31	143.0	137.2	-0.04	
2018-2	11/15/2018	Spike 32	143.0	144.4	0.01	
2018-2	11/15/2018	Spike 33	143.0	137.8	-0.04	
2018-2	11/15/2018	Spike 34	143.0	140.2	-0.02	
2018-2	11/15/2018	Spike 35	143.0	143.8	0.01	
2018-2	11/15/2018	Spike 36	143.0	146.7	0.03	
2018-2	11/15/2018	Spike 37	143.0	150.0	0.05	
2018-2	11/15/2018	Spike 38	143.0	126.1	-0.12	
2018-2	11/15/2018	Spike 39	143.0	136.2	-0.05	
2018-2	11/15/2018	Spike 40	143.0	144.8	0.01	
Mean (Spike 21-40)				133.9	-0.06	Pass ^d
Standard Deviation (Spike 21-40)				9.0	0.06	Pass ^d

a TLD's were irradiated by the University of Wisconsin-Madison Radiation Calibration Laboratory following ANSI N13.37 protocol from a known air kerma rate. TLD's were read and the results were submitted by Environmental Inc. to the University of Wisconsin-Madison Radiation Calibration Laboratory for comparison to the delivered dose.

b Reported dose was converted from exposure (R) to Air Kerma (cGy) using a conversion of 0.876. Conversion from air kerma to ambient dose equivalent for Cs-137 at the reference dose point $H^*(10)K_a = 1.20$. mrem/cGy = 1000.

c Performance Quotient (P) is calculated as ((reported dose - conventionally true value) ÷ conventionally true value) where the conventionally true value is the delivered dose.

d Acceptance is achieved when neither the absolute value of mean of the P values, nor the standard deviation of the P values exceed 0.15.

TABLE A-3. In-House "Spiked" Samples

Lab Code ^b	Date	Analysis	Concentration ^a				Ratio Lab/Known
			Laboratory results 2s, n=1 ^c	Known Activity	Control Limits ^d	Acceptance	
SPW-3991	10/1/2018	H-3	15,614 ± 369	16,507	13,206 - 19,808	Pass	0.95
SPW-4105	10/5/2018	H-3	15,669 ± 370	16,507	13,206 - 19,808	Pass	0.95
W-101118	4/29/2016	Cs-134	33.5 ± 3.1	36.2	29.0 - 43.4	Pass	0.92
W-101118	4/29/2016	Cs-137	79.7 ± 3.2	71.9	57.5 - 86.3	Pass	1.11
SPW-4205	10/12/2018	H-3	15,821 ± 372	16,507	13,206 - 19,808	Pass	0.96
SPW-4274	10/17/2018	H-3	15,575 ± 369	16,507	11,555 - 21,459	Pass	0.94
SPW-4596	10/31/2018	H-3	15,650 ± 369	16,507	13,206 - 19,808	Pass	0.95
SPW-4682	11/1/2018	H-3	15,742 ± 371	16,507	13,206 - 19,808	Pass	0.95
SPW-4684	11/1/2018	Sr-90	19.1 ± 1.2	17.9	14.3 - 21.5	Pass	1.07
SPW-4790	11/9/2018	H-3	15,887 ± 373	16,507	13,206 - 19,808	Pass	0.96
SPW-4839	11/13/2018	Ni-63	381 ± 43	465	326 - 605	Pass	0.82
SPW-4863	11/16/2018	H-3	15,610 ± 370	16,507	13,206 - 19,808	Pass	0.95
W-111618	4/29/2016	Cs-134	38.0 ± 12.4	36.2	25.3 - 47.1	Pass	1.05
W-111618	4/29/2016	Cs-137	83.8 ± 13.8	71.9	57.5 - 86.3	Pass	1.17
SPW-5049	11/30/2018	H-3	15,370 ± 366	16,507	13,206 - 19,808	Pass	0.93
SPW-5148	12/7/2018	H-3	15,522 ± 368	16,507	13,206 - 19,808	Pass	0.94
W-121118	4/29/2016	Cs-134	39.4 ± 7.9	36.2	29.0 - 43.4	Pass	1.09
W-121118	4/29/2016	Cs-137	78.5 ± 7.7	71.9	57.5 - 86.3	Pass	1.09
W-121218	4/29/2016	Cs-134	42.0 ± 13.8	36.2	25.3 - 47.1	Pass	1.16
W-121218	4/29/2016	Cs-137	79.2 ± 13.1	71.9	57.5 - 86.3	Pass	1.10
W-121318	4/29/2016	Cs-134	35.1 ± 7.8	36.2	25.3 - 47.1	Pass	0.97
W-121318	4/29/2016	Cs-137	77.5 ± 8.4	71.9	50.3 - 93.5	Pass	1.08
SPW-5279	12/14/2018	H-3	15,686 ± 370	16,507	13,206 - 19,808	Pass	0.95
W-121418	4/29/2016	Cs-134	34.5 ± 8.2	36.2	29.0 - 43.4	Pass	0.95
W-121418	4/29/2016	Cs-137	82.7 ± 8.0	71.9	57.5 - 86.3	Pass	1.15
W-121718	4/29/2016	Cs-134	34.9 ± 10.5	36.2	29.0 - 43.4	Pass	0.96
W-121718	4/29/2016	Cs-137	80.3 ± 8.1	71.9	57.5 - 86.3	Pass	1.12
SPW-5351	12/19/2018	H-3	15,855 ± 375	16,507	13,206 - 19,808	Pass	0.96
SPW-5404	12/31/2018	H-3	15,179 ± 365	16,507	13,206 - 19,808	Pass	0.92
SPW-5450	12/31/2018	Gr. Alpha	56.5 ± 2.6	72.4	36.2 - 108.6	Pass	0.78
SPW-5450	12/31/2018	Gr. Beta	45.1 ± 1.4	54.8	43.8 - 65.8	Pass	0.82
SPW-5615	12/31/2018	Fe-55	831.0 ± 43.5	732.6	586.0 - 879.1	Pass	1.13
SPW-5619	12/31/2018	Tc-99	99.0 ± 1.7	107.8	86.2 - 129.4	Pass	0.92
SPW-61	11/5/2018	Ra-226	13.4 ± 0.4	12.3	8.6 - 16.0	Pass	1.09
SPW-118	1/14/2019	H-3	15,463 ± 369	16,507	13,206 - 19,808	Pass	0.94
SPW-178	1/16/2019	Ra-228	17.7 ± 2.1	15.1	10.58 - 19.66	Pass	1.17
SPW-199	1/18/2019	Sr-90	17.6 ± 1.2	17.9	14.3 - 21.5	Pass	0.98
SPW-250	1/24/2019	Ni-63	356.3 ± 44.5	465	326 - 605	Pass	0.77
SPW-256	1/15/2019	Ra-226	12.0 ± 0.4	12.3	8.6 - 16.0	Pass	0.98
SPW-271	3/18/2019	H-3	22,035 ± 450	21,700	17,360 - 26,040	Pass	1.02
SPW-281	1/25/2019	Ra-226	11.6 ± 0.4	12.3	8.6 - 16.0	Pass	0.94
W-012119	4/29/2016	Cs-134	37.3 ± 10.6	36.2	29.0 - 43.4	Pass	1.03
W-012119	4/29/2016	Cs-137	82.7 ± 8.0	71.9	57.5 - 86.3	Pass	1.15
W-012319	4/29/2016	Cs-134	33.4 ± 10.1	36.2	25.3 - 47.1	Pass	0.92
W-012319	4/29/2016	Cs-137	79.1 ± 9.6	71.9	57.5 - 86.3	Pass	1.10
W-012519	4/29/2016	Cs-134	35.0 ± 7.7	36.2	29.0 - 43.4	Pass	0.97
W-012519	4/29/2016	Cs-137	79.2 ± 7.9	71.9	57.5 - 86.3	Pass	1.10
W-012919	4/29/2016	Cs-134	32.3 ± 8.3	36.2	29.0 - 43.4	Pass	0.89
W-012919	4/29/2016	Cs-137	82.3 ± 8.3	71.9	57.5 - 86.3	Pass	1.14

TABLE A-3. In-House "Spiked" Samples

Lab Code ^b	Date	Analysis	Concentration ^a		Control Limits ^d	Acceptance	Ratio Lab/Known
			Laboratory results 2s, n=1 ^c	Known Activity			
SPW-370	3/19/2019	H-3	21,689 ± 444	21,700	17,360 - 26,040	Pass	1.00
SPW-400	1/31/2019	Ra-226	11.6 ± 0.4	12.3	8.6 - 16.0	Pass	0.95
SPW-461	2/12/2019	Ra-226	11.1 ± 0.4	12.3	8.6 - 16.0	Pass	0.90
W-020619	4/26/2016	Cs-134	35.0 ± 14.9	36.2	29.0 - 43.4	Pass	0.97
W-020619	4/29/2016	Cs-137	72.8 ± 8.9	71.9	57.5 - 86.3	Pass	1.01
W-020819	4/26/2016	Cs-134	36.7 ± 8.6	36.2	29.0 - 43.4	Pass	1.01
W-020819	4/29/2016	Cs-137	76.7 ± 8.7	71.9	57.5 - 86.3	Pass	1.07
SPW-568	2/21/2019	Ra-226	10.3 ± 0.3	12.3	8.6 - 16.0	Pass	0.84
W-021319	4/29/2016	Cs-134	37.7 ± 11.5	36.2	29.0 - 43.4	Pass	1.04
W-021319	4/26/2016	Cs-137	75.8 ± 9.6	71.9	57.5 - 86.3	Pass	1.05
SPW-469	3/19/2019	H-3	21,696 ± 447	21,700	17,360 - 26,040	Pass	1.00
SPW-600	3/6/2019	H-3	20,710 ± 425	21,700	17,360 - 26,040	Pass	0.95
SPW-837	3/21/2019	Ra-228	11.7 ± 1.5	15.1	10.58 - 19.66	Pass	0.78
SPW-709	3/19/2019	H-3	20,369 ± 421	21,700	17,360 - 26,040	Pass	0.94
SPW-818	3/19/2019	H-3	20,457 ± 424	21,700	17,360 - 26,040	Pass	0.94
SPW-844	3/22/2019	U-234	15.1 ± 0.5	13.6	9.5 - 17.7	Pass	1.11
SPW-844	3/22/2019	U-238	15.3 ± 0.5	13.1	9.2 - 17.0	Pass	1.17
SPW-934	3/19/2019	H-3	20,487 ± 421	21,700	17,360 - 26,040	Pass	0.94
SPW-1061	3/1/2019	Ra-226	10.6 ± 0.3	12.3	8.6 - 16.0	Pass	0.86
SPW-1091	4/10/2019	H-3	20,323 ± 421	21,700	17,360 - 26,040	Pass	0.94
SPW-1093	4/8/2019	Ra-228	14.9 ± 1.9	15.1	10.6 - 19.6	Pass	0.98
SPW-1267	4/16/2019	H-3	20,302 ± 421	21,700	17,360 - 26,040	Pass	0.94
SPW-1339	4/18/2019	H-3	19,924 ± 417	21,700	17,360 - 26,040	Pass	0.92
SPW-1403 ^e	4/25/2019	Gr. Alpha	56.7 ± 2.6	72.4	36.2 - 108.6	Pass	0.78
SPW-1403 ^e	4/25/2019	Gr. Beta	43.2 ± 1.4	54.8	43.8 - 65.8	Fail	0.79
SPW-1427	4/26/2019	H-3	20,119 ± 418	21,700	15,190 - 28,210	Pass	0.93
SPW-1537	5/6/2019	Sr-90	19.9 ± 1.2	17.9	14.3 - 21.5	Pass	1.11
W-050719	4/29/2016	Cs-134	38.5 ± 9.0	36.2	29.0 - 43.4	Pass	1.06
W-050719	4/26/2016	Cs-137	85.2 ± 8.5	71.9	57.5 - 86.3	Pass	1.18
SPW-1582	5/9/2019	H-3	20,492 ± 423	21,700	15,190 - 28,210	Pass	0.94
W-050919	4/29/2016	Cs-134	37.4 ± 8.9	36.2	29.0 - 43.4	Pass	1.03
W-050919	4/26/2016	Cs-137	81.5 ± 7.8	71.9	57.5 - 86.3	Pass	1.13
SPW-1596	5/8/2019	Ra-228	14.1 ± 1.7	15.1	10.6 - 19.6	Pass	0.94
W-051419	4/29/2016	Cs-134	36.2 ± 11.7	36.2	29.0 - 43.4	Pass	1.00
W-051419	4/26/2016	Cs-137	75.8 ± 10.0	71.9	57.5 - 86.3	Pass	1.05
SPW-1676	5/17/2019	H-3	20,233 ± 420	21,700	15,190 - 28,210	Pass	0.93
SPW-1799	5/20/2019	H-3	20,428 ± 422	21,700	15,190 - 28,210	Pass	0.94
SPW-1858	5/28/2019	H-3	20,367 ± 522	21,700	15,190 - 28,210	Pass	0.94
SPW-1890	5/30/2019	H-3	20,206 ± 419	21,700	15,190 - 28,210	Pass	0.93
SPW-2014	5/31/2019	Ra-226	11.9 ± 0.3	12.3	8.6 - 16.0	Pass	0.97
SPW-2030	6/12/2019	Ni-63	377 ± 45	464.8	325 - 604	Pass	0.81
SPW-2093	6/18/2019	H-3	20,158 ± 418	21,700	15,190 - 28,210	Pass	0.93
W-062419	4/29/2016	Cs-134	33.0 ± 12.4	36.2	29.0 - 43.4	Pass	0.91
W-062419	4/26/2016	Cs-137	66.0 ± 10.4	71.9	57.5 - 86.3	Pass	0.92
SPW-2338	6/26/2019	H-3	20,032 ± 417	21,700	15,190 - 28,210	Pass	0.92

TABLE A-3. In-House "Spiked" Samples

Lab Code ^b	Date	Analysis	Concentration ^a				Ratio Lab/Known
			Laboratory results 2s, n=1 ^c	Known Activity	Control Limits ^d	Acceptance	
W-072619	4/29/2016	Cs-134	36.3 ± 9.2	36.2	29.0 - 43.4	Pass	1.00
W-072619	4/26/2016	Cs-137	79.7 ± 7.6	71.9	57.5 - 86.3	Pass	1.11
SPW-3188	7/30/2019	Ra-226	11.9 ± 0.3	12.3	8.6 - 16.0	Pass	0.97
SPW-2925	8/6/2019	Sr-90	10.7 ± 1.0				
SPW-2947	8/9/2019	H-3	20,128 ± 425	21,700	15,190 - 28,210	Pass	0.93
SPW-3003	8/14/2019	H-3	20,588 ± 435	21,700	15,190 - 28,210	Pass	0.95
W-081519	4/26/2019	Cs-134	36.2 ± 9.2	36.2	29.0 - 43.4	Pass	1.00
W-081519	4/26/2019	Cs-137	78.1 ± 8.4	71.9	57.5 - 86.3	Pass	1.09
W-082119	4/26/2019	Cs-134	32.8 ± 9.1	36.2	29.0 - 43.4	Pass	0.91
W-082119	4/26/2019	Cs-137	79.1 ± 7.9	71.9	57.5 - 86.3	Pass	1.10
SPW-3151	8/26/2019	H-3	20,329 ± 428	21,700	15,190 - 28,210	Pass	0.94
W-082619	4/26/2019	Cs-134	33.3 ± 17.8	36.2	29.0 - 43.4	Pass	0.92
W-082619	4/26/2019	Cs-137	82.6 ± 13.2	71.9	57.5 - 86.3	Pass	1.15
W-082719	4/26/2019	Cs-134	33.9 ± 7.0	36.2	29.0 - 43.4	Pass	0.94
W-082719	4/26/2019	Cs-137	81.4 ± 6.0	71.9	57.5 - 86.3	Pass	1.13
SPW-3359	8/30/2019	Gr. Alpha	54.2 ± 0.3	72.4	36.2 - 108.6	Pass	0.75
SPW-3359	8/30/2019	Gr. Beta	59.7 ± 0.2	54.8	43.8 - 65.8	Pass	1.09
SPW-3323	9/6/2019	Ra-228	12.7 ± 1.8	15.1	10.6 - 19.6	Pass	0.84
W-091019	4/26/2019	Cs-134	31.0 ± 11.3	36.2	29.0 - 43.4	Pass	0.86
W-091019	4/26/2019	Cs-137	80.5 ± 10.0	71.9	57.5 - 86.3	Pass	1.12
SPW-3349	9/10/2019	H-3	19,851 ± 422	21,700	15,190 - 28,210	Pass	0.91
SPW-3410	9/13/2019	H-3	20,267 ± 431	21,700	15,190 - 28,210	Pass	0.93
W-091719	4/26/2019	Cs-134	39.3 ± 12.6	36.2	29.0 - 43.4	Pass	1.09
W-091719	4/26/2019	Cs-137	81.1 ± 9.9	71.9	57.5 - 86.3	Pass	1.13
SPW-3450	9/17/2019	H-3	20,036 ± 427	21,700	15,190 - 28,210	Pass	0.92
W-091919	9/19/2019	Cs-134	40.0 ± 10.7	36.2	29.0 - 43.4	Pass	1.10
W-091919	9/19/2019	Cs-137	71.0 ± 8.7	71.9	57.5 - 86.3	Pass	0.99
SPW-3569	8/28/2019	Ra-226	11.9 ± 0.3	12.3	8.6 - 16.0	Pass	0.97
SPW-3571	9/27/2019	H-3	21,026 ± 440	21,700	15,190 - 28,210	Pass	0.97

^a Liquid sample results are reported in pCi/Liter, air filters (pCi/m³), charcoal (pCi/charcoal canister), and solid samples (pCi/kg).

^b Laboratory codes : W & SPW (Water), MI (milk), AP (air filter), SO (soil), VE (vegetation), CH (charcoal canister), F (fish), U (urine).

^c Results are based on single determinations.

^d Control limits are listed in Attachment A of this report.

^e The LCS sample was prepared from an Environmental Resource Associates (ERA) sample of known activity. While the analysis did satisfy the acceptance criteria of the ERA study from which it was sourced, it did not satisfy EIML's internal LCS acceptance criteria. All of the original solution had been consumed in the analysis. Subsequent gross alpha and beta PT and LCS sample results were acceptable.

NOTE: For fish, gelatin is used for the spike matrix. For vegetation, cabbage is used for the spike matrix.

TABLE A-4. In-House "Blank" Samples

Lab Code ^b	Sample Type	Date	Analysis ^c	Concentration ^a		Acceptance Criteria (4.66 σ)
				Laboratory results (4.66σ)		
				LLD	Activity ^d	
SPW-3990	Water	10/1/2018	H-3	153	-6 ± 71	200
SPW-4105	Water	10/5/2018	H-3	150	7 ± 71	200
SPW-4565	Water	10/11/2018	Ra-228	0.86	-0.26 ± 0.36	2
SPW-4205	Water	10/12/2018	H-3	154	-9 ± 71	200
SPW-4273	Water	10/17/2018	H-3	153	67 ± 76	200
SPW-4595	Water	10/30/2018	H-3	150	75 ± 74	200
SPW-4681	Water	11/1/2018	H-3	152	19 ± 72	200
SPW-4683	Water	11/1/2018	Sr-89	0.64	0.25 ± 0.45	5
SPW-4683	Water	11/1/2018	Sr-90	0.51	-0.10 ± 0.22	1
SPW-4789	Water	11/9/2018	H-3	148	27 ± 73	200
SPW-4799	Water	11/9/2018	I-131	0.43	-0.01 ± 0.20	1
SPW-4838	Water	11/13/2018	Ni-63	62	34 ± 38	200
SPW-4862	Water	11/16/2018	H-3	154	15 ± 77	200
SPW-5028	Water	11/19/2018	Ra-226	0.04	-0.14 ± 0.03	2
SPW-5028	Water	11/19/2018	Ra-228	0.96	-0.11 ± 0.43	2
SPW-5048	Water	11/30/2018	H-3	151	-6 ± 69	200
SPW-5147	Water	12/7/2018	H-3	151	14 ± 71	200
SPW-5278	Water	12/14/2018	H-3	153	83 ± 76	200
SPW-5350	Water	12/19/2018	H-3	153	71 ± 75	200
SPW-5403	Water	12/31/2018	H-3	156	51 ± 75	200
SPW-5614	Water	12/31/2018	Fe-55	612	-68 ± 368	1000
SPW-5618	Water	12/31/2018	Tc-99	11	7 ± 7	100
SPW-34	Water	1/7/2019	I-131	0.36	0.13 ± 0.18	1
SPW-60	Water	11/5/2019	Ra-226	0.03	0.15 ± 0.03	2
SPW-119	Water	1/14/2019	H-3	148	42 ± 80	200
SPW-177	Water	1/16/2019	Ra-228	0.93	-0.10 ± 0.42	2
SPW-198	Water	1/18/2019	Sr-89	0.67	0.25 ± 0.50	5
SPW-198	Water	1/18/2019	Sr-90	0.67	-0.16 ± 0.29	1
SPW-249	Water	1/24/2019	Ni-63	67	31 ± 41	200
SPW-255	Water	1/15/2019	Ra-226	0.04	0.16 ± 0.03	2
SPW-280	Water	1/25/2019	Ra-226	0.06	-0.09 ± 0.14	2
SPW-399	Water	1/31/2019	Ra-226	0.03	0.15 ± 0.03	2
SPW-460	Water	2/12/2019	Ra-226	0.03	0.15 ± 0.02	2
SPW-567	Water	2/21/2019	Ra-226	0.03	0.13 ± 0.02	2
SPW-844	Water	3/22/2019	U-234	0.19	0.04 ± 0.14	1
SPW-844	Water	3/22/2019	U-238	0.19	0.00 ± 0.11	1
SPW-836	Water	3/21/2019	Ra-228	0.74	0.53 ± 0.41	2
SPW-1060	Water	3/31/2019	Ra-226	0.04	-0.02 ± 0.03	2

^a Liquid sample results are reported in pCi/Liter, air filters (pCi/m³), charcoal (pCi/charcoal canister), and solid samples (pCi/g).

^b Laboratory codes : W & SPW (Water), MI (milk), AP (air filter), SO (soil), VE (vegetation), CH (charcoal canister), F (fish), U (urine).

^c I-131(G); iodine-131 as analyzed by gamma spectroscopy.

^d Activity reported is a net activity result.

TABLE A-4. In-House "Blank" Samples

Lab Code ^b	Sample Type	Date	Analysis ^c	Concentration ^a		Acceptance Criteria (4.66 σ)
				Laboratory results (4.66σ)		
				LLD	Activity ^d	
SPW-1090	Water	4/10/2019	H-3	155	-14 ± 72	200
SPW-1092	Water	4/8/2019	Ra-228	0.82	0.75 ± 0.46	2
SPW-1266	Water	4/16/2019	H-3	152	67 ± 74	200
SPW-1338	Water	4/18/2019	H-3	152	66 ± 79	200
SPW-1386	Water	4/8/2019	Ra-226	0.03	0.09 ± 0.03	2
SPW-1426	Water	4/26/2019	H-3	156	34 ± 75	200
SPW-1536	Water	5/6/2019	Sr-89	0.66	-0.07 ± 0.45	5
SPW-1536	Water	5/6/2019	Sr-90	0.59	-0.10 ± 0.26	1
SPW-1581	Water	5/9/2019	H-3	147	73 ± 77	200
SPW-1644	Water	4/22/2019	Ra-226	0.02	0.15 ± 0.02	2
SPW-1675	Water	5/17/2019	H-3	154	-30 ± 71	200
SPW-1798	Water	5/20/2019	H-3	149	24 ± 73	200
SPW-1857	Water	5/28/2019	H-3	150	54 ± 74	200
SPW-1889	Water	5/30/2019	H-3	152	45 ± 73	200
SPW-2013	Water	5/31/2019	Ra-226	0.01	0.13 ± 0.02	2
SPW-2029	Water	6/12/2019	Ni-63	66	10 ± 40	200
SPW-2092	Water	6/18/2019	H-3	154	-42 ± 70	200
SPW-2237	Water	6/26/2019	H-3	150	-9 ± 69	200
SPW-2107	Water	6/18/2019	I-131	0.16	0.04 ± 0.09	1
SPW-2152	Water	6/19/2019	I-131	0.16	0.04 ± 0.09	1
SPW-3187	Water	7/30/2019	Ra-226	0.02	0.17 ± 0.02	2
SPW-2924	Water	8/6/2019	Sr-89	0.71	-0.06 ± 0.57	5
SPW-2924	Water	8/6/2019	Sr-90	0.59	0.08 ± 0.28	1
SPW-2946	Water	8/9/2019	H-3	152	33 ± 72	200
SPW-3002	Water	8/14/2019	H-3	152	-22 ± 74	200
SPW-3150	Water	8/26/2019	H-3	151	115 ± 77	200
SPW-3358	Water	8/30/2019	Gr. Alpha	0.44	-0.08 ± 0.30	2
SPW-3358	Water	8/30/2019	Gr. Beta	0.72	-0.31 ± 0.49	4
SPW-3568	Water	8/28/2019	Ra-226	0.03	0.16 ± 0.03	2
SPW-3348	Water	9/10/2019	H-3	150	107 ± 76	200
SPW-3409	Water	9/13/2019	H-3	154	133 ± 79	200
SPW-3449	Water	9/17/2019	H-3	147	102 ± 79	200
SPW-3570	Water	9/27/2019	H-3	151	70 ± 77	200

^a Liquid sample results are reported in pCi/Liter, air filters (pCi/m³), charcoal (pCi/charcoal canister), and solid samples (pCi/g).

^b Laboratory codes : W & SPW (Water), MI (milk), AP (air filter), SO (soil), VE (vegetation), CH (charcoal canister), F (fish), U (urine).

^c I-131(G); iodine-131 as analyzed by gamma spectroscopy.

^d Activity reported is a net activity result.

TABLE A-5. In-House "Duplicate" Samples

Lab Code ^b	Date	Analysis	Concentration ^a		Averaged Result	Acceptance
			First Result	Second Result		
DW-90173,90174	10/24/2018	Ra-226	1.13 ± 0.15	1.38 ± 0.17	1.26 ± 0.11	Pass
DW-90173,90174	10/24/2018	Ra-228	5.09 ± 0.84	6.59 ± 0.89	5.84 ± 0.61	Pass
SW-4782,4783	11/7/2018	H-3	192 ± 82	238 ± 84	215 ± 59	Pass
WW-4959,4960	11/13/2018	H-3	330 ± 88	286 ± 86	308 ± 61	Pass
SG-4850,4851	11/14/2018	Pb-214	15.0 ± 0.4	14.7 ± 0.4	14.9 ± 0.3	Pass
SG-4850,4851	11/14/2018	Ac-228	17.5 ± 0.7	16.7 ± 0.6	17.1 ± 0.5	Pass
VE-4917,4918	11/20/2018	K-40	4.54 ± 0.45	4.05 ± 0.46	4.30 ± 0.32	Pass
VE-4917,4918	11/20/2018	Be-7	9.42 ± 0.45	9.42 ± 0.46	9.42 ± 0.32	Pass
SO-5024,5025	11/14/2018	K-40	6.60 ± 0.54	6.26 ± 0.58	6.43 ± 0.40	Pass
SG-5046,5047	11/21/2018	K-40	8.65 ± 1.18	9.12 ± 1.02	8.88 ± 0.78	Pass
SG-5046,5047	11/21/2018	Cs-137	0.18 ± 0.06	0.10 ± 0.05	0.14 ± 0.04	Pass
SG-5046,5047	11/21/2018	Gr. Alpha	22.8 ± 5.6	17.5 ± 4.8	20.2 ± 3.7	Pass
SG-5046,5047	11/21/2018	Gr. Beta	31.8 ± 3.5	26.8 ± 3.1	29.3 ± 2.4	Pass
SG-6286,6287	12/1/2018	Pb-214	11.3 ± 0.4	10.7 ± 0.5	11.0 ± 0.3	Pass
SG-6286,6287	12/1/2018	Ac-228	13.5 ± 0.9	13.2 ± 1.0	13.4 ± 0.7	Pass
SWU-5132,5133	12/4/2018	H-3	159 ± 82	204 ± 80	181 ± 57	Pass
SWU-5132,5133	12/4/2018	Gr. Beta	1.32 ± 0.56	1.33 ± 0.57	1.32 ± 0.40	Pass
AP-5499,5500	1/2/2019	Fe-55	941 ± 220	1027 ± 226	984 ± 158	Pass
AP-5499,5500	1/2/2019	Sr-89	20.2 ± 7.3	14.9 ± 5.7	17.5 ± 4.7	Pass
AP-5499,5500	1/2/2019	Ni-63	12.1 ± 8.5	15.6 ± 8.5	13.8 ± 6.0	Pass
CF-20,21	1/2/2019	Gr. Beta	10.0 ± 0.2	10.7 ± 0.2	10.3 ± 0.2	Pass
CF-20,21	1/2/2019	Sr-90	0.005 ± 0.002	0.005 ± 0.002	0.005 ± 0.001	Pass
CF-20,21	1/2/2019	Be-7	0.27 ± 0.09	0.29 ± 0.08	0.28 ± 0.06	Pass
CF-20,21	1/2/2019	K-40	6.69 ± 0.34	6.83 ± 0.34	6.76 ± 0.24	Pass
SG-211,212	1/21/2019	Ra-226	7.94 ± 1.15	8.50 ± 1.11	9.79 ± 0.19	Pass
SG-211,212	1/21/2019	Ac-228	4.46 ± 0.37	4.63 ± 0.43	4.55 ± 0.28	Pass
WW-324,325	2/4/2019	Gr. Alpha	0.68 ± 0.44	0.49 ± 0.46	0.59 ± 0.32	Pass
WW-324,325	2/4/2019	Gr. Beta	1.80 ± 0.55	2.95 ± 0.63	2.37 ± 0.42	Pass
W-345,346	2/4/2019	H-3	245 ± 84	277 ± 85	261 ± 60	Pass
WW-797,798	3/5/2019	H-3	165 ± 80	222 ± 83	193 ± 58	Pass
WW-648,649	3/8/2019	H-3	587 ± 101	630 ± 102	608 ± 72	Pass
SW-713,714	3/14/2019	H-3	326 ± 90	254 ± 86	290 ± 62	Pass
AP-1241,1242	4/2/2019	Be-7	0.097 ± 0.018	0.108 ± 0.020	0.103 ± 0.013	Pass
AP-1285,1286	4/3/2019	Be-7	0.080 ± 0.014	0.078 ± 0.012	0.079 ± 0.009	Pass
AP-1306,1307	4/3/2019	Be-7	0.085 ± 0.009	0.096 ± 0.011	0.090 ± 0.007	Pass
AP-1327,1328	4/3/2019	Be-7	0.078 ± 0.010	0.079 ± 0.011	0.078 ± 0.007	Pass
AP-1327,1328	4/3/2019	K-40	0.012 ± 0.007	0.021 ± 0.010	0.017 ± 0.006	Pass
AP-2119,2120	4/3/2019	Be-7	0.276 ± 0.098	0.265 ± 0.116	0.270 ± 0.076	Pass

TABLE A-5. In-House "Duplicate" Samples

Lab Code ^b	Date	Analysis	Concentration ^a		Averaged Result	Acceptance
			First Result	Second Result		
AP-2225,2226	4/3/2019	Be-7	0.231 ± 0.128	0.208 ± 0.123	0.220 ± 0.089	Pass
CF-820,821	4/3/2019	K-40	6.39 ± 0.30	6.63 ± 0.37	6.51 ± 0.24	Pass
WW-648,649	4/5/2019	H-3	587 ± 101	630 ± 102	608 ± 72	Pass
WW-1043,1044	4/5/2019	H-3	666 ± 121	662 ± 121	664 ± 86	Pass
SW-1087,1088	4/8/2019	H-3	9,997 ± 300	10,330 ± 305	10,164 ± 214	Pass
WW-1198,1199	4/9/2019	H-3	562 ± 99	640 ± 102	601 ± 71	Pass
LW-1503,1504	4/25/2019	Gr. Beta	1.09 ± 0.55	1.46 ± 0.57	1.27 ± 0.39	Pass
WW-1789,1790	5/7/2019	H-3	366 ± 90	400 ± 92	383 ± 64	Pass
SG-2269,2270	5/7/2019	Pb-214	39.1 ± 0.5	40.3 ± 0.5	39.7 ± 0.4	Pass
SG-2269,2270	5/7/2019	Ac-228	53.2 ± 1.0	57.1 ± 1.0	55.2 ± 0.7	Pass
DW-10049,10050	5/7/2019	Ra-226	1.31 ± 0.13	1.66 ± 0.15	1.49 ± 0.10	Pass
DW-10049,10050	5/7/2019	Ra-228	1.24 ± 0.52	1.33 ± 0.53	1.29 ± 0.37	Pass
WW-1690A,B	5/8/2019	H-3	325 ± 89	303 ± 93	314 ± 64	Pass
S-1812,1813	5/16/2019	K-40	21.95 ± 0.92	23.26 ± 0.95	22.61 ± 0.66	Pass
S-1812,1813	5/16/2019	Cs-137	0.05 ± 0.03	0.07 ± 0.04	0.06 ± 0.02	Pass
DW-10053,10054	5/22/2019	Gr. Alpha	0.93 ± 0.63	1.14 ± 0.72	1.04 ± 0.48	Pass
DW-10053,10054	5/22/2019	Gr. Beta	1.43 ± 0.62	1.13 ± 0.59	1.28 ± 0.43	Pass
W-2053,2054	5/29/2019	H-3	1572 ± 135	1470 ± 131	1521 ± 94	Pass
G-1989,1990	6/3/2019	Be-7	0.80 ± 0.18	0.72 ± 0.15	0.76 ± 0.12	Pass
G-1989,1990	6/3/2019	K-40	6.15 ± 0.51	5.98 ± 0.46	6.065 ± 0.34	Pass
G-1989,1990	6/3/2019	Gr. Beta	7.24 ± 0.19	7.00 ± 0.19	7.12 ± 0.13	Pass
WW-2204,2205	6/6/2019	H-3	3861 ± 194	3722 ± 191	3792 ± 136	Pass
S-2031,2032	6/10/2019	Pb-214	5.16 ± 0.19	4.75 ± 0.22	4.96 ± 0.15	Pass
S-2031,2032	6/10/2019	Ac-228	3.81 ± 0.31	3.63 ± 0.33	3.72 ± 0.23	Pass
S-2010,2011	6/10/2019	Pb-214	1.48 ± 0.10	1.05 ± 0.11	1.27 ± 0.07	Pass
F-2140,2141	6/12/2019	K-40	1.01 ± 0.28	1.39 ± 0.32	1.20 ± 0.21	Pass
S-2162,2163	6/12/2019	Pb-214	0.65 ± 0.06	0.54 ± 0.05	0.60 ± 0.04	Pass
S-2162,2163	6/12/2019	Ac-228	0.46 ± 0.10	0.44 ± 0.08	0.45 ± 0.07	Pass
S-2162,2163	6/12/2019	K-40	4.22 ± 0.49	3.81 ± 0.41	4.02 ± 0.32	Pass
S-2162,2163	6/12/2019	Tl-208	0.09 ± 0.02	0.10 ± 0.02	0.09 ± 0.01	Pass
S-2162,2163	6/12/2019	Pb-212	0.34 ± 0.03	0.26 ± 0.03	0.30 ± 0.02	Pass
SWT-2355,2356	6/25/2019	Gr. Beta	1.12 ± 0.57	1.24 ± 0.56	1.18 ± 0.40	Pass
AP-2689,2690	6/28/2019	Be-7	0.089 ± 0.020	0.075 ± 0.018	0.082 ± 0.013	Pass
AP-2710,2711	7/1/2019	Be-7	0.091 ± 0.010	0.097 ± 0.010	0.094 ± 0.007	Pass
AP-2731,2732	7/2/2019	Be-7	0.073 ± 0.013	0.072 ± 0.011	0.072 ± 0.009	Pass
DW-10062,10063	7/5/2019	Ra-226	4.10 ± 0.30	4.03 ± 0.30	4.07 ± 0.21	Pass
DW-10062,10063	7/5/2019	Ra-228	1.95 ± 0.60	2.31 ± 0.62	2.13 ± 0.43	Pass
AP-70818,70819	7/8/2019	Gr. Beta	0.021 ± 0.004	0.023 ± 0.004	0.022 ± 0.003	Pass
XW-2459,2460	7/10/2019	H-3	304 ± 92	234 ± 89	269 ± 64	Pass
VE-2516,2517	7/10/2019	Be-7	0.63 ± 0.16	0.52 ± 0.19	0.58 ± 0.12	Pass

TABLE A-5. In-House "Duplicate" Samples

Lab Code ^b	Date	Analysis	Concentration ^a		Averaged Result	Acceptance
			First Result	Second Result		
VE-2516,2517	7/10/2019	K-40	6.50 ± 0.47	6.81 ± 0.54	6.66 ± 0.36	Pass
AP-71518A,B	7/15/2019	Gr. Beta	0.022 ± 0.004	0.025 ± 0.004	0.023 ± 0.003	Pass
VE-2668,2669	7/16/2019	K-40	3.84 ± 0.27	3.74 ± 0.26	3.79 ± 0.19	Pass
DW-10076,10077	7/16/2019	Gr. Alpha	3.01 ± 0.92	4.13 ± 0.91	3.57 ± 0.65	Pass
DW-10073,10074	7/16/2019	Ra-226	1.57 ± 0.18	1.51 ± 0.21	1.54 ± 0.14	Pass
DW-10073,10074	7/16/2019	Ra-228	1.29 ± 0.56	1.48 ± 0.57	1.385 ± 0.40	Pass
AP-72218A,B	7/22/2019	Gr. Beta	0.013 ± 0.004	0.016 ± 0.004	0.015 ± 0.003	Pass
G-2752,2753	7/23/2019	K-40	4.53 ± 0.42	4.47 ± 0.46	4.50 ± 0.31	Pass
G-2752,2753	7/23/2019	Be-7	1.98 ± 0.29	1.96 ± 0.29	1.97 ± 0.20	Pass
AP-2800,2801	7/25/2019	Be-7	0.208 ± 0.090	0.321 ± 0.147	0.264 ± 0.086	Pass
AP-72918A,B	7/29/2019	Gr. Beta	0.026 ± 0.005	0.025 ± 0.005	0.025 ± 0.003	Pass
VE-2840,2841	7/31/2019	K-40	3.94 ± 0.38	3.99 ± 0.47	3.96 ± 0.30	Pass
AP-2903,2904	8/1/2019	Be-7	0.198 ± 0.102	0.228 ± 0.102	0.213 ± 0.072	Pass
P-2882,2983	8/1/2019	H-3	265 ± 85	327 ± 88	296 ± 61	Pass
SG-2926,2927	8/5/2019	Pb-214	9.07 ± 0.39	8.82 ± 0.39	8.95 ± 0.28	Pass
SG-2926,2927	8/5/2019	Ac-228	9.00 ± 0.76	8.58 ± 0.72	8.79 ± 0.52	Pass
AV-2993,2994	8/9/2019	Gr. Beta	1.22 ± 0.19	1.28 ± 0.21	1.25 ± 0.14	Pass
AV-2993,2994	8/9/2019	K-40	3.12 ± 0.36	3.14 ± 0.35	3.13 ± 0.25	Pass
DW-10088,10089	8/9/2019	Ra-228	0.60 ± 0.50	1.20 ± 0.50	0.90 ± 0.35	Pass
DW-10088,10089	8/9/2019	Ra-226	1.40 ± 0.20	0.94 ± 0.20	1.17 ± 0.14	Pass
VE-3016,3017	8/12/2019	Be-7	0.39 ± 0.12	0.47 ± 0.28	0.43 ± 0.15	Pass
VE-3016,3017	8/12/2019	K-40	6.13 ± 0.41	6.24 ± 0.64	6.18 ± 0.38	Pass
G-3600,3601	8/12/2019	Be-7	4.42 ± 0.33	4.35 ± 0.27	4.39 ± 0.21	Pass
WW-3100,3101	8/14/2019	H-3	480 ± 96	401 ± 92	441 ± 66	Pass
MI-3211,3212	8/27/2019	K-40	1862 ± 131	1923 ± 136	1893 ± 94	Pass
MI-3211,3212	8/27/2019	Sr-90	0.90 ± 0.33	0.56 ± 0.29	0.73 ± 0.22	Pass
LW-3512,3513	8/30/2019	Gr. Beta	0.79 ± 0.50	1.39 ± 0.58	1.09 ± 0.38	Pass
F-3379,3380	9/3/2019	K-40	2.98 ± 0.40	3.04 ± 0.37	3.01 ± 0.27	Pass
P-3278,3279	9/3/2019	H-3	1110 ± 123	1076 ± 121	1093 ± 86	Pass
VE-3309,3310	9/4/2019	K-40	2.23 ± 0.26	1.72 ± 0.25	1.98 ± 0.18	Pass
DW-10100,10101	9/5/2019	Ra-226	0.50 ± 0.11	0.57 ± 0.12	0.54 ± 0.08	Pass
DW-10100,10101	9/5/2019	Ra-228	3.38 ± 0.82	2.54 ± 1.03	2.96 ± 0.66	Pass
VE-3400,3401	9/10/2019	Be-7	1.68 ± 0.22	1.45 ± 0.41	1.57 ± 0.24	Pass
VE-3400,3401	9/12/2019	K-40	4.63 ± 0.42	5.09 ± 0.41	4.86 ± 0.30	Pass
VE-3488,3489	9/17/2019	K-40	22.9 ± 0.8	24.1 ± 1.4	23.5 ± 0.8	Pass
VE-3488,3489	9/17/2019	Be-7	4.33 ± 0.35	4.09 ± 0.50	4.21 ± 0.31	Pass
WW-3467,3468	9/18/2019	H-3	211 ± 85	209 ± 85	210 ± 60	Pass
WW-3730,3731	9/18/2019	H-3	229 ± 83	256 ± 85	242 ± 59	Pass
AP-3533,3534	9/19/2019	Be-7	0.217 ± 0.093	0.261 ± 0.112	0.239 ± 0.073	Pass
WW-3554,3555	9/23/2019	Gr. Beta	1.62 ± 1.10	1.93 ± 1.07	1.77 ± 0.77	Pass

TABLE A-5. In-House "Duplicate" Samples

Lab Code ^b	Date	Analysis	Concentration ^a		Averaged Result	Acceptance
			First Result	Second Result		
DW-10111,10112	9/23/2019	Gr. Alpha	1.72 ± 0.73	1.41 ± 0.68	1.57 ± 0.50	Pass
DW-10115,10116	9/25/2019	Ra-228	3.65 ± 0.80	2.76 ± 0.68	3.21 ± 0.52	Pass
DW-10115,10116	9/25/2019	Ra-226	2.99 ± 0.23	2.74 ± 0.25	2.87 ± 0.17	Pass
G-3600,3601	9/26/2019	K-40	5.19 ± 0.46	5.48 ± 0.41	5.33 ± 0.31	Pass
AP-3921,3922	10/1/2019	Be-7	0.074 ± 0.011	0.070 ± 0.012	0.072 ± 0.008	Pass
AP-3986,3987	10/2/2019	Be-7	0.060 ± 0.009	0.066 ± 0.011	0.063 ± 0.007	Pass
WW-3793,3794	10/8/2019	Gr. Beta	3.75 ± 1.18	4.34 1.20	4.05 ± 0.84	Pass

Note: Duplicate analyses are performed on every twentieth sample received in-house. Results are not listed for those analyses with activities that measure below the LLD.

^a Results are reported in units of pCi/L, except for air filters (pCi/Filter or pCi/m³), food products, vegetation, soil and sediment (pCi/g).

^b Laboratory codes: AP (Air Particulate), AV (Aquatic Vegetation), BS (Bottom Sediment), CF (Cattle Feed), CH (Charcoal Canister), DW (Drinking Water), E (Egg), F (Fish), G (Grass), LW (Lake Water), P (Precipitation), PM (Powdered Milk), S, (Solid), SG (Sludge), SO (Soil), SS (Shoreline Sediment), SW (Surface Water), SWT (Surface Water Treated), SWU (Surface Water Untreated), VE (Vegetation), W Water (Water), WW (Well Water).

TABLE A-6. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP).

Lab Code ^b	Reference Date	Analysis	Laboratory result	Concentration ^a		Acceptance
				Known Activity	Control Limits ^c	
MASO-3638	8/1/2018	Cs-134	688.7 ± 26.2	781	547 - 1015	Pass
MASO-3638	8/1/2018	Cs-137	605.9 ± 22.7	572	400 - 744	Pass
MASO-3638	8/1/2018	Co-57	976.7 ± 37.6	958	671 - 1245	Pass
MASO-3638	8/1/2018	Co-60	604.5 ± 24.9	608	426 - 790	Pass
MASO-3638	8/1/2018	Mn-54	5.2 ± 5.2	0	NA ^c	Pass
MASO-3638	8/1/2018	K-40	630 ± 31	566	396 - 736	Pass
MASO-3638	8/1/2018	Zn-65	556.4 ± 26.8	500	350 - 650	Pass
MAAP-3636	8/1/2018	Cs-134	0.37 ± 0.04	0.444	0.311 - 0.577	Pass
MAAP-3636	8/1/2018	Cs-137	0.34 ± 0.05	0.345	0.242 - 0.449	Pass
MAAP-3636	8/1/2018	Co-57	0.56 ± 0.04	0.592	0.414 - 0.770	Pass
MAAP-3636	8/1/2018	Co-60	0.28 ± 0.03	0.294	0.206 - 0.382	Pass
MAAP-3636	8/1/2018	Mn-54	0.26 ± 0.05	0.266	0.186 - 0.346	Pass
MAAP-3636	8/1/2018	Zn-65	0.22 ± 0.07	0.201	NA ^d	Pass
MAVE-3640	8/1/2018	Cs-134	1.87 ± 0.10	1.94	1.36 - 2.52	Pass
MAVE-3640	8/1/2018	Cs-137	2.69 ± 0.15	2.36	1.65 - 3.07	Pass
MAVE-3640	8/1/2018	Co-57	3.90 ± 0.12	3.31	2.32 - 4.30	Pass
MAVE-3640	8/1/2018	Co-60	1.76 ± 0.09	1.68	1.18 - 2.18	Pass
MAVE-3640	8/1/2018	Mn-54	2.91 ± 0.16	2.53	1.77 - 3.29	Pass
MAVE-3640	8/1/2018	Zn-65	1.53 ± 0.21	1.37	0.96 - 1.78	Pass
MAW-3480	8/1/2018	H-3	336.0 ± 10.7	338	237 - 439	Pass
MAW-3480	8/1/2018	Cs-134	7.86 ± 0.31	8.7	6.1 - 11.3	Pass
MAW-3480	8/1/2018	Cs-137	7.55 ± 0.33	6.9	4.8 - 9.0	Pass
MAW-3480	8/1/2018	Co-57	15.67 ± 0.36	14.9	10.4 - 19.4	Pass
MAW-3480	8/1/2018	Co-60	0.12 ± 0.12	0	NA ^c	Pass
MAW-3480	8/1/2018	Mn-54	13.38 ± 0.44	12.5	8.8 - 16.3	Pass
MAW-3480	8/1/2018	Zn-65	7.80 ± 0.53	7.53	5.27 - 9.79	Pass
MAW-3634	8/1/2018	I-129	1.32 ± 0.08	1.62	1.13 - 2.11	Pass
MAAP-609	2/1/2019	Gross Alpha	0.16 ± 0.03	0.528	0.158 - 0.898	Pass
MAAP-609	2/1/2019	Gross Beta	1.09 ± 0.07	0.948	0.474 - 1.422	Pass
MAW-550	2/1/2019	Gross Alpha	0.73 ± 0.06	0.84	0.25 - 1.43	Pass
MAW-550	2/1/2019	Gross Beta	2.26 ± 0.06	2.33	1.17 - 3.50	Pass
MASO-605	2/1/2019	Am-241	38.89 ± 5.92	49.9	34.9 ± 64.9	Pass
MASO-605	2/1/2019	Cs-134	0.45 ± 2.52	0.0	NA ^c	Pass
MASO-605	2/1/2019	Cs-137	1273.1 ± 13.0	1164	815 - 1513	Pass
MASO-605	2/1/2019	Co-57	0.46 ± 1.1	0.0	NA ^c	Pass
MASO-605	2/1/2019	Co-60	857.96 ± 8.52	855.0	599 - 1112	Pass
MASO-605	2/1/2019	Mn-54	1,138.0 ± 13.5	1027	719 - 1335	Pass
MASO-605	2/1/2019	Zn-65	730.92 ± 16.48	668	468 - 868	Pass
MASO-605	2/1/2019	K-40	676 ± 47	585	410 - 761	Pass
MASO-605	2/1/2019	Sr-90	0.0007 ± 0.0007	0.000	NA ^c	Pass

TABLE A-6. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP).

Lab Code ^b	Reference Date	Analysis	Laboratory result	Concentration ^a		Acceptance
				Known Activity	Control Limits ^c	
MASO-605	2/1/2019	Pu-238	78.15 ± 6.11	71.0	49.7 - 92.3	Pass
MASO-605	2/1/2019	Pu-239/240	65.00 ± 5.4	59.8	41.9 - 77.7	Pass
MASO-605	2/1/2019	U-234	65 ± 13	56	39 - 73	Pass
MASO-605	2/1/2019	U-238	237 ± 23	205	144 - 267	Pass
MAW-613	2/1/2019	Am-241	0.46 ± 0.03	0.582	0.407 - 0.757	Pass
MAW-613	2/1/2019	Cs-134	5.49 ± 0.18	5.99	4.19 - 7.79	Pass
MAW-613	2/1/2019	Cs-137	0.089 ± 0.080	0	NA ^c	Pass
MAW-613	2/1/2019	Co-57	10.87 ± 0.24	10.00	7.0 - 13.0	Pass
MAW-613	2/1/2019	Co-60	6.78 ± 0.19	6.7	4.7 - 8.7	Pass
MAW-613	2/1/2019	Mn-54	8.98 ± 0.17	8.4	5.9 - 10.9	Pass
MAW-613	2/1/2019	Zn-65	0.096 ± 0.141	0	NA ^c	Pass
MAW-613	2/1/2019	Fe-55	0.004 ± 4.00	0	NA ^c	Pass
MAW-613	2/1/2019	Ni-63	5.54 ± 1.52	5.8	4.1 - 7.5	Pass
MAW-613	2/1/2019	Sr-90	6.02 ± 0.53	6.35	4.45 ± 8.26	Pass
MAW-613	2/1/2019	Pu-238	0.315 ± 0.088	0.451	0.316 - 0.586	Fail ^e
MAW-613	2/1/2019	Pu-239/240	0.07 ± 0.07	0.005	NA ^d	Pass
MAW-613	2/1/2019	U-234	0.96 ± 0.07	0.800	0.56 ± 1.04	Pass
MAW-613	2/1/2019	U-238	0.94 ± 0.07	0.810	0.57 ± 1.05	Pass
MAAP-611	2/1/2019	Cs-134	0.185 ± 0.025	0.216	0.151 - 0.281	Pass
MAAP-611	2/1/2019	Cs-137	0.288 ± 0.045	0.290	0.203 - 0.377	Pass
MAAP-611	2/1/2019	Co-57	0.369 ± 0.033	0.411	0.288 - 0.534	Pass
MAAP-611	2/1/2019	Co-60	0.333 ± 0.045	0.340	0.238 - 0.442	Pass
MAAP-611	2/1/2019	Mn-54	0.546 ± 0.058	0.547	0.383 - 0.711	Pass
MAAP-611	2/1/2019	Zn-65	0.025 ± 0.0348	0	NA ^c	Pass
MAAP-611	2/1/2019	Sr-90	1.34 ± 0.13	0.662	0.463 - 0.861	Fail ^f
MAAP-611	2/1/2019	U-234/233	4.14 ± 0.97	0.106	0.074 - 0.138	Fail ^f
MAAP-611	2/1/2019	U-238	3.89 ± 0.94	0.110	0.077 - 0.143	Fail ^f
MAVE-607	2/1/2019	Cs-134	2.33 ± 0.10	2.44	1.71 - 3.17	Pass
MAVE-607	2/1/2019	Cs-137	2.62 ± 0.13	2.30	1.61 - 2.99	Pass
MAVE-607	2/1/2019	Co-57	2.39 ± 0.11	2.07	1.45 - 2.69	Pass
MAVE-607	2/1/2019	Co-60	0.046 ± 0.04	0	NA ^c	Pass
MAVE-607	2/1/2019	Mn-54	0.031 ± 0.04	0	NA ^c	Pass
MAVE-607	2/1/2019	Sr-90	0.013 ± 0.022	0	NA ^c	Pass
MAW-601	2/1/2019	I-129	0.56 ± 0.08	0.616	0.431 - 0.801	Pass

^a Results are reported in units of Bq/kg (soil), Bq/L (water) or Bq/total sample (filters, vegetation).

^b Laboratory codes as follows: MAW (water), MAAP (air filter), MASO (soil) and MAVE (vegetation).

^c MAPEP results are presented as the known values and expected laboratory precision (1 sigma, 1 determination) and control limits as defined by the MAPEP. A known value of "zero" indicates an analysis was included in the testing series as a "false positive". MAPEP does not provide control limits.

^d Provided in the series for "sensitivity evaluation". MAPEP does not provide control limits.

^e An investigation is in progress to determine the reason for the failure of the Pu-239 study.

^f An erroneous volume conversion caused some incorrect values to be submitted. If the conversion had been performed properly the results in Bq/sample would have been (Sr-90: 0.671 ± 0.066) and (U-234: 0.153 ± 0.036) and (U-238: 0.144 ± 0.035).

This result had been included in the Uranium investigation. See footnote "C" on Table A-1.

TABLE A-7. Interlaboratory Comparison Crosscheck Program, Environmental Resource Associates (ERA)^a.

Lab Code ^b	Date	Analysis	MRAD-30 Study			
			Concentration ^a			
			Laboratory Result	ERA Value ^c	Control Limits ^d	Acceptance
ERAP-846	3/18/2019	Am-241	19.1	18.7	13.3 - 24.9	Pass
ERAP-846	3/18/2019	Cs-134	612	721	468 - 884	Pass
ERAP-846	3/18/2019	Cs-137	679	634	521 - 832	Pass
ERAP-846	3/18/2019	Co-60	93.7	93.8	79.7 - 119	Pass
ERAP-846	3/18/2019	Fe-55	612	718	262 - 1150	Pass
ERAP-846	3/18/2019	Mn-54	< 0.5	< 50.0	0.00 - 50.0	Pass
ERAP-846	3/18/2019	Zn-65	1500	1380	1130 - 2110	Pass
ERAP-846	3/18/2019	Pu-238	34.0	33.8	25.5 - 41.5	Pass
ERAP-846	3/18/2019	Pu-239	64.9	67.0	50.1 - 80.8	Pass
ERAP-846	3/18/2019	Sr-90	199	181	114 - 246	Pass
ERAP-846	3/18/2019	U-234 ^e	29.0	18.2	13.5 - 21.3	Fail
ERAP-846	3/18/2019	U-238 ^e	28.6	18.1	13.7 - 21.6	Fail
ERAP-848	3/18/2019	Gross Alpha	48.4	50.3	26.3 - 82.9	Pass
ERAP-848	3/18/2019	Gross Beta	95.5	78.6	47.7 - 119	Pass

^a Results obtained by Environmental, Inc., Midwest Laboratory (EIML) as a participant in the crosscheck program for proficiency testing administered by Environmental Resource Associates, serving as a replacement for studies conducted previously by the Environmental Measurements Laboratory Quality Assessment Program (EML).

^b Laboratory code ERAP (air filter). Results are reported in units of (pCi/Filter).

^c The ERA Assigned values for the air filter standards are equal to 100% of the parameter present in the standard as determined by the gravimetric and/or volumetric measurements made during standard preparation as applicable. The acceptance limits are established per the guidelines contained in the Department of Energy (DOE)

^d The acceptance limits are established per the guidelines contained in the Department of Energy (DOE) report EML-56 Analysis of Environmental Measurements Laboratory (EML) Quality Assessment Program (QAP) Data Determination of Operational Criteria and Control Limits for Performance Evaluation Purposes or ERA's SOP for the generation of Performance Acceptance Limits.

^e Failure due to an over-estimated U-232 tracer value. Tracer has been re-standardized. (See footnote "c" on Table A-1.

APPENDIX B

DATA REPORTING CONVENTIONS

Data Reporting Conventions

- 1.0. All activities, except gross alpha and gross beta, are decay corrected to collection time or the end of the collection period.

2.0. Single Measurements

Each single measurement is reported as follows: $x \pm s$
where: x = value of the measurement;
 $s = 2\sigma$ counting uncertainty (corresponding to the 95% confidence level).

In cases where the activity is less than the lower limit of detection L , it is reported as: $< L$,
where L = the lower limit of detection based on 4.66σ uncertainty for a background sample.

3.0. Duplicate analyses

If duplicate analyses are reported, the convention is as follows:

- 3.1. Individual results: For two analysis results; $x_1 \pm s_1$ and $x_2 \pm s_2$
Reported result: $x \pm s$; where $x = (1/2)(x_1 + x_2)$ and $s = (1/2)\sqrt{s_1^2 + s_2^2}$
- 3.2. Individual results: $< L_1, < L_2$ Reported result: $< L$, where L = lower of L_1 and L_2
- 3.3. Individual results: $x \pm s, < L$ Reported result: $x \pm s$ if $x \geq L$; $< L$ otherwise.

4.0. Computation of Averages and Standard Deviations

- 4.1 Averages and standard deviations listed in the tables are computed from all of the individual measurements over the period averaged; for example, an annual standard deviation would not be the average of quarterly standard deviations. The average $\bar{x}$ and standard deviation "s" of a set of n numbers $x_1, x_2, \dots, x_n$ are defined as follows:

$$\bar{x} = \frac{1}{n} \sum x \qquad s = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$$

- 4.2 Values below the highest lower limit of detection are not included in the average.
- 4.3 If all values in the averaging group are less than the highest LLD, the highest LLD is reported.
- 4.4 If all but one of the values are less than the highest LLD, the single value x and associated two sigma error is reported.
- 4.5 In rounding off, the following rules are followed:
- 4.5.1. If the number following those to be retained is less than 5, the number is dropped, and the retained numbers are kept unchanged. As an example, 11.443 is rounded off to 11.44.
- 4.5.2. If the number following those to be retained is equal to or greater than 5, the number is dropped and the last retained number is raised by 1. As an example, 11.445 is rounded off to 11.45.

POINT BEACH NUCLEAR PLANT

APPENDIX C

Sampling Program and Locations

POINT BEACH NUCLEAR PLANT

Sample Type	Locations		Collection Type (and Frequency) ^b	Analysis (and Frequency) ^b
	No.	Codes (and Type) ^a		
Airborne Filters	6	E-1-4, 8, 20	Weekly	GB, GS, on QC for each location
Airborne Iodine	6	E-1-4, 8, 20	Weekly	I-131
Ambient Radiation (TLD's)	34	E-1-9, 12, 14, 15, 16b, 178, 18, 20, 22-25, 26b, 27-32	Quarterly	Ambient Gamma
Lake Water	5	E-1, 5, 6, 33	Monthly	GB, GS, I-131 on MC H-3, Sr-89-90 on QC
Well Water	1	E-10	Quarterly	GB, GS, H-3, Sr-89-90, I-131
Vegetation (Grasses)	8	E-1-4, 6, 9, 20	3x / year as available	GS
Shoreline Silt	5	E-1, 5, 6, 12, 33	1x / year	GS
Soil	8	E-1-4, 6, 8, 9, 20	1x / year	GS
Milk	3	E-11, 40, 21	Monthly	GS, I-131, Sr-89-90
Algae	2	E-5, 12	1x / year as available	GS
Fish	1	E-13	Quarterly as available	GS (in edible portions)
Vegetation (Crops)	10	E-F1a, -F1b, -F2, -F3, -F4, -F5, -F6, -F7, -F8, -F9	Annual	GS

^a Locations codes are defined in Table 2. Control Stations are indicated by (C). All other stations are indicators.

^b Analysis type is coded as follows: GB = gross beta, GA = gross alpha, GS = gamma spectroscopy, H-3 = tritium, Sr-89 = strontium-89, Sr-90 = strontium-90, I-131 = iodine-131. Analysis frequency is coded as follows: MC = monthly composite, QC = quarterly composite.

POINT BEACH NUCLEAR PLANT

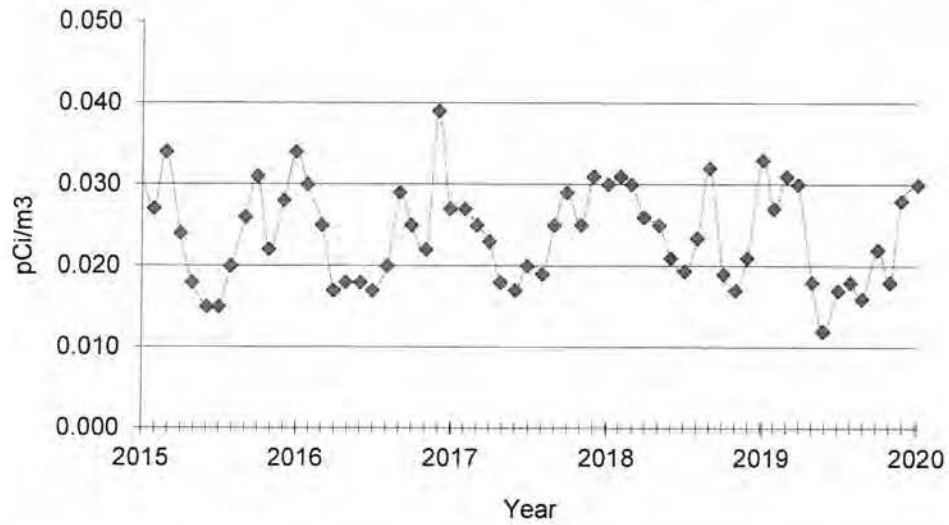
APPENDIX D

Graphs of Data Trends

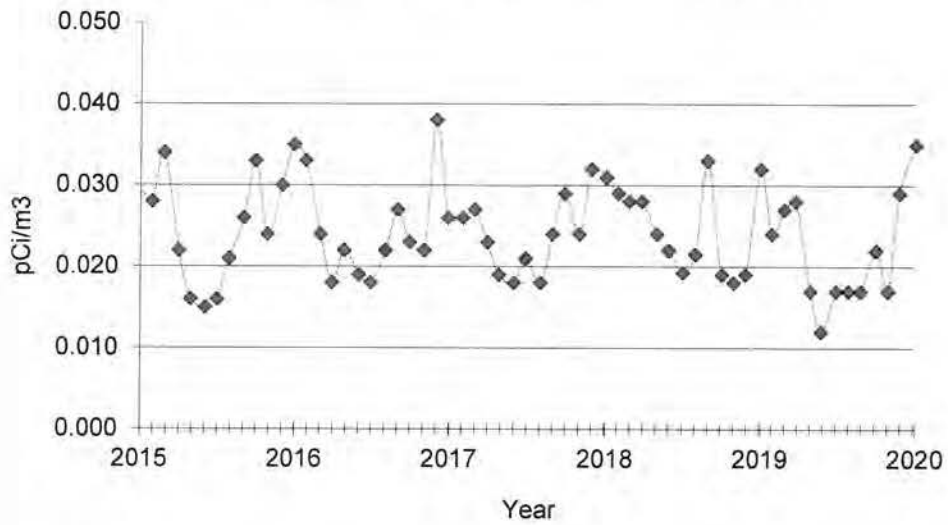
POINT BEACH

Air Particulates - Gross Beta

Location E-1, monthly averages 2015-2019



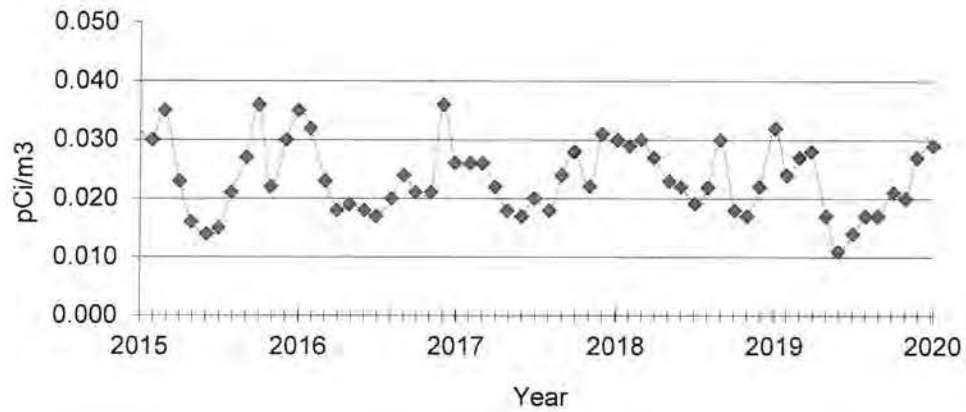
Location E-2, monthly averages 2015-2019



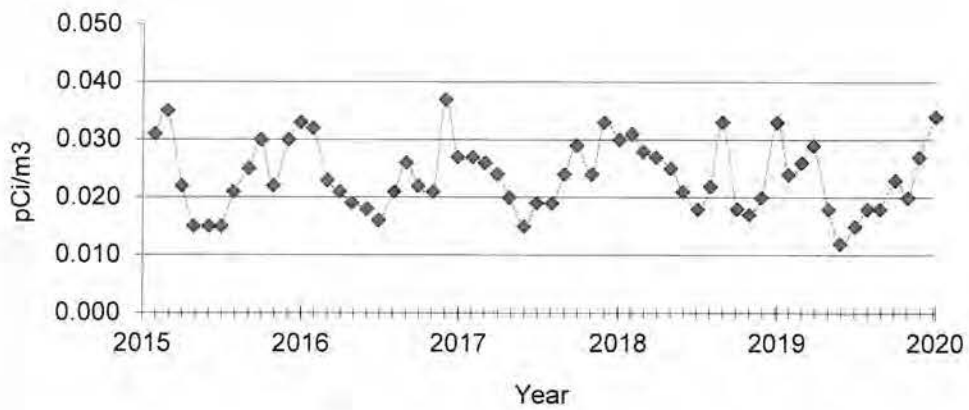
POINT BEACH

Air Particulates - Gross Beta

Location E-3, monthly averages 2015-2019



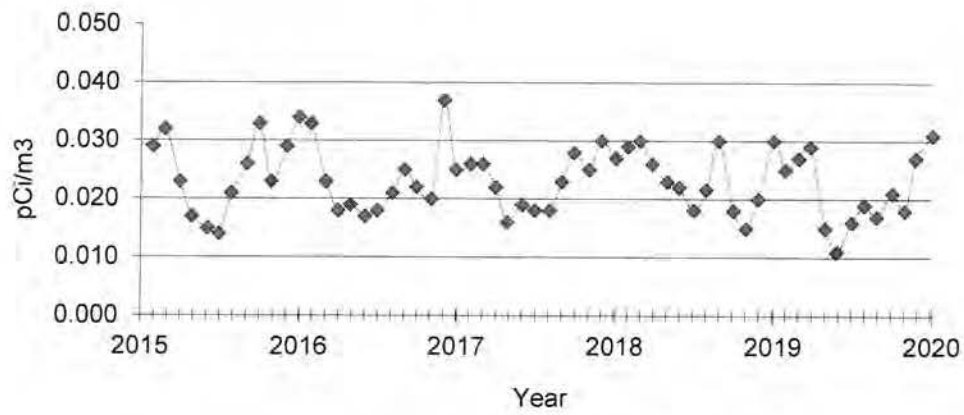
Location E-4, monthly averages 2015-2019



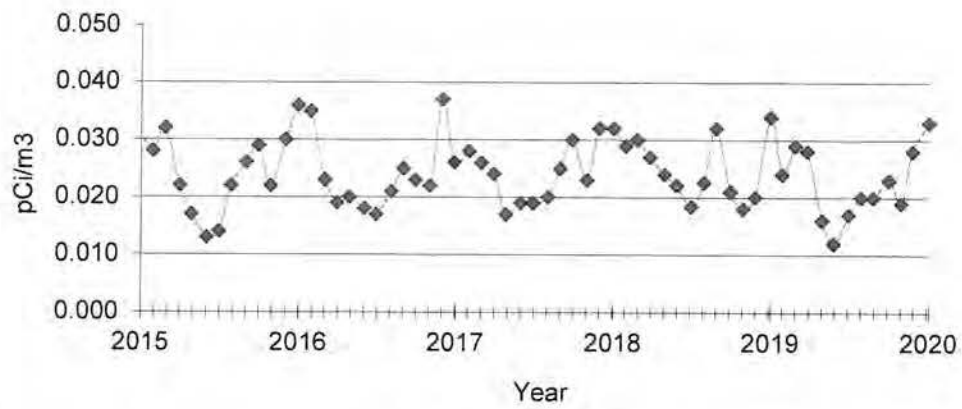
POINT BEACH

Air Particulates - Gross Beta

Location E-8, monthly averages 2015-2019



Location E-20, monthly averages 2015-2019



POINT BEACH NUCLEAR PLANT

APPENDIX E
Supplemental Analyses

POINT BEACH NUCLEAR PLANT

Facade Wells

Units: = pCi/L

Gamma isotopic analysis

Location	GW-09 1Z-361A		GW-09 1Z-361B		GW-10 2Z-361A		GW-10 2Z-361B	
Collection Date	01-15-19		01-15-19		01-15-19		01-15-19	
Lab Code	EWV- 371	MDC	EWV- 372	MDC	EWV- 373	MDC	EWV- 374	MDC
Be-7	3.9 ± 9.8	< 23.2	2.3 ± 10.1	< 17.3	-0.6 ± 10.3	< 32.7	-1.1 ± 10.4	< 28.5
Mn-54	1.1 ± 1.3	< 2.4	0.3 ± 1.3	< 2.5	-0.3 ± 1.3	< 2.7	1.4 ± 1.3	< 2.6
Fe-59	1.0 ± 2.4	< 6.3	-0.8 ± 2.4	< 6.4	1.2 ± 2.1	< 5.8	0.3 ± 2.3	< 6.2
Co-58	-1.5 ± 1.2	< 2.4	-0.5 ± 1.3	< 2.9	0.4 ± 1.3	< 3.2	0.1 ± 1.3	< 1.9
Co-60	0.9 ± 1.4	< 2.6	-1.6 ± 1.4	< 1.8	-0.7 ± 1.4	< 2.5	0.7 ± 1.4	< 2.4
Zn-65	0.9 ± 2.3	< 4.3	1.5 ± 2.5	< 5.1	0.0 ± 2.4	< 5.1	-3.6 ± 2.5	< 4.5
Zr-Nb-95	-1.4 ± 1.3	< 4.5	1.5 ± 1.3	< 3.7	-2.0 ± 1.2	< 3.0	-2.1 ± 1.4	< 4.4
Cs-134	0.2 ± 1.3	< 2.4	-0.1 ± 1.2	< 2.3	-0.5 ± 1.3	< 2.3	-0.4 ± 1.3	< 2.4
Cs-137	1.2 ± 1.4	< 2.9	0.8 ± 1.5	< 2.5	1.7 ± 1.4	< 2.4	-0.1 ± 1.5	< 2.8
Ba-La-140	0.4 ± 1.4	< 8.8	-1.1 ± 1.5	< 5.5	-6.8 ± 1.4	< 7.7	0.5 ± 1.5	< 13.2

Location	GW-09 1Z-361A		GW-09 1Z-361B		GW-10 2Z-361A		GW-10 2Z-361B	
Collection Date	04-03-19		04-03-19		04-03-19		04-03-19	
Lab Code	EWV- 1063	MDC	EWV- 1064	MDC	EWV- 1065		EWV- 1066	MDC
Fe-55	-233.9 ± 316	< 542	-142 ± 330	< 555	165 ± 337	< 542	9 ± 351	< 578
Ni-63	-8.2 ± 3.1	< 71.2	-6.5 ± 43	< 71.4	995 ± 56.5	< 69	2.6 ± 43	< 71
Sr-89	-4.085 ± 3.2	< 4.2	0.17 ± 3.2	< 3.8	1.93 ± 2.6	< 3.5	0.95 ± 2.4	< 3.1
Sr-90	0.24 ± 1.3	< 2.6	0.44 ± 1.3	< 2.6	-0.48 ± 1.0	< 2.3	-0.28 ± 1.0	< 2.2
Tc-99	-6.52 ± 6.8	< 11.4	-5.32 ± 6.8	< 11.4	1.14 ± 7.0	< 11.4	-6.58 ± 6.8	< 11.4
Be-7	-2.2 ± 10.6	< 26.3	4.2 ± 16.8	< 40.0	-20.6 ± 19.2	< 24.8	2.3 ± 10.2	< 24.7
Mn-54	-1.2 ± 1.3	< 2.0	0.8 ± 2.0	< 3.3	29.9 ± 6.4	< 6.0	-0.8 ± 1.3	< 2.5
Fe-59	0.2 ± 2.3	< 4.1	-2.5 ± 3.6	< 7.1	-7.0 ± 5.4	< 7.7	-0.1 ± 2.3	< 5.0
Co-58	-0.4 ± 1.3	< 2.2	-1.8 ± 1.7	< 2.5	289.7 ± 9.5	< 6.2	-0.3 ± 1.3	< 2.5
Co-60	-0.1 ± 1.4	< 2.7	1.7 ± 2.1	< 3.7	394.2 ± 7.6	< 4.3	1.7 ± 1.4	< 3.0
Zn-65	1.2 ± 2.4	< 4.7	0.6 ± 3.8	< 6.8	-5.7 ± 6.1	< 10.4	-2.4 ± 2.7	< 4.7
Zr-Nb-95	-1.6 ± 1.3	< 3.1	-1.1 ± 1.9	< 4.2	-6.9 ± 2.3	< 5.5	-1.9 ± 1.5	< 3.3
Cs-134	-1.0 ± 1.3	< 2.4	-1.5 ± 1.8	< 3.8	-0.2 ± 2.3	< 4.8	-0.6 ± 1.3	< 2.4
Cs-137	0.9 ± 1.5	< 2.5	-0.4 ± 2.0	< 2.9	-0.9 ± 2.6	< 4.4	1.5 ± 1.5	< 2.8
Ba-La-140	-3.5 ± 1.5	< 4.2	-5.9 ± 2.2	< 3.3	-2.8 ± 2.0	< 3.8	-1.0 ± 1.5	< 4.9

Location	GW-09 1Z-361A		GW-09 1Z-361B		GW-10 2Z-361A		GW-10 2Z-361B	
Collection Date	04-03-19		04-03-19		04-03-19		04-03-19	
Lab Code	EWV- 1063R ^a	MDC	EWV- 1064R ^a	MDC	EWV- 1065R ^a	MDC	EWV- 1067 ^b	MDC
Be-7	1.6 ± 13.2	< 27.7	15.3 ± 10.4	< 28.1	-7.9 ± 17.9	< 43.6	-0.6 ± 10.7	< 29.0
Mn-54	0.2 ± 1.4	< 2.9	-0.1 ± 1.4	< 3.4	18.2 ± 6.2	< 5.8	0.8 ± 1.4	< 2.4
Fe-59	-0.1 ± 2.8	< 4.8	-0.4 ± 2.6	< 6.5	-5.2 ± 4.5	< 6.7	-0.7 ± 2.4	< 5.7
Co-58	0.5 ± 1.3	< 3.5	-1.0 ± 1.2	< 1.9	182.9 ± 7.9	< 5.5	-0.8 ± 1.3	< 2.9
Co-60	1.2 ± 1.6	< 3.0	-0.3 ± 1.4	< 2.6	247.6 ± 6.3	< 4.4	1.6 ± 1.4	< 2.8
Zn-65	-0.1 ± 3.1	< 5.7	-2.7 ± 2.6	< 4.4	1.6 ± 5.2	< 10.0	-2.6 ± 2.8	< 5.9
Zr-Nb-95	-1.6 ± 1.5	< 3.4	0.4 ± 1.4	< 3.1	-2.7 ± 2.0	< 6.3	-1.6 ± 1.5	< 3.8
Cs-134	-1.5 ± 1.4	< 3.0	0.0 ± 1.3	< 2.5	-1.1 ± 2.1	< 4.4	-1.9 ± 1.4	< 2.6
Cs-137	0.6 ± 1.6	< 2.6	2.0 ± 1.5	< 2.8	-0.9 ± 2.3	< 3.7	0.7 ± 1.6	< 2.2
Ba-La-140	1.2 ± 1.6	< 7.0	-1.9 ± 1.6	< 9.8	1.1 ± 1.8	< 10.1	0.5 ± 1.5	< 5.1

^a Samples recounted per station request. HTD analyses pending.

^b Laboratory duplicate.

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Location	GW-09 1Z-361A			GW-09 1Z-361B			GW-10 2Z-361A			GW-10 2Z-361B		
Collection Date	04-23-19			04-23-19			04-23-19			04-23-19		
Lab Code	EWV- 1405	MDC		EWV- 1406	MDC		EWV- 1407	MDC		EWV- 1408	MDC	
Fe-55	17 ± 323	< 530		-41 ± 376	< 623		0 ± 322	< 530		64 ± 347	< 566	
Ni-63	18 ± 42	< 69		21 ± 42	< 68		14 ± 40	< 66		15 ± 40	< 65	
Sr-89	0.54 ± 3.5	< 4.4		0.06 ± 4.6	< 5.9		1.96 ± 3.4	< 4.5		1.53 ± 2.9	< 3.9	
Sr-90	0.12 ± 1.1	< 2.4		0.22 ± 1.5	< 3.2		-0.64 ± 1.1	< 2.6		-0.72 ± 0.9	< 2.3	
Tc-99	-7.65 ± 6.8	< 11.4		-9.86 ± 6.7	< 11.4		-8.73 ± 6.7	< 11.4		-4.60 ± 6.8	< 11.4	
Be-7	3.6 ± 12.2	< 19.7		2.9 ± 10.6	< 22.1		13.4 ± 10.2	< 19.3		-4.6 ± 13.0	< 16.2	
Mn-54	0.3 ± 1.3	< 2.6		1.0 ± 1.3	< 2.1		-0.4 ± 1.3	< 2.6		0.4 ± 1.6	< 2.2	
Fe-59	-0.2 ± 2.7	< 5.7		0.0 ± 2.3	< 3.9		-1.3 ± 2.3	< 3.0		-0.3 ± 3.3	< 4.0	
Co-58	0.9 ± 1.3	< 2.3		-0.5 ± 1.2	< 2.5		-0.2 ± 1.3	< 2.3		-0.3 ± 1.5	< 1.8	
Co-60	-0.2 ± 1.4	< 2.5		0.6 ± 1.4	< 1.9		0.4 ± 1.4	< 2.6		-0.7 ± 1.8	< 2.3	
Zn-65	-2.1 ± 3.2	< 5.3		1.7 ± 2.4	< 4.1		-2.6 ± 2.5	< 4.0		3.3 ± 3.1	< 4.0	
Zr-Nb-95	-0.4 ± 1.4	< 2.5		0.0 ± 1.4	< 2.7		0.3 ± 1.4	< 2.6		-3.1 ± 1.5	< 1.7	
Cs-134	-0.4 ± 1.4	< 3.0		0.8 ± 1.3	< 2.5		-0.1 ± 1.4	< 2.5		-0.4 ± 1.4	< 2.8	
Cs-137	0.5 ± 1.4	< 2.3		0.0 ± 1.4	< 2.1		2.1 ± 1.5	< 3.0		1.2 ± 1.8	< 2.2	
Ba-La-140	-0.2 ± 1.6	< 2.7		-0.3 ± 1.3	< 1.6		-0.3 ± 1.4	< 2.2		-0.1 ± 1.9	< 2.7	
Location	GW-10 2Z-361A			GW-09 1Z-361A			GW-09 1Z-361B			GW-10 2Z-361A		
Collection Date	05-31-19			07-11-19			07-11-19			07-11-19		
Lab Code	EW- 2183	MDC		EW- 2760	MDC		EW- 2761	MDC		EWV- 2762	MDC	
Be-7	14.5 ± 12.5	< 29.1		-5.0 ± 10.1	< 24.2		-3.8 ± 12.2	< 24.2		1.2 ± 10.2	< 21.9	
Mn-54	-0.7 ± 1.3	< 2.9		0.1 ± 1.3	< 2.3		-0.3 ± 1.2	< 1.6		1.7 ± 1.2	< 2.7	
Fe-59	-0.2 ± 2.5	< 6.9		-2.1 ± 2.3	< 5.5		-0.4 ± 2.5	< 4.2		0.3 ± 2.3	< 5.6	
Co-58	0.2 ± 1.3	< 3.1		0.1 ± 1.2	< 2.8		0.1 ± 1.2	< 1.6		-0.2 ± 1.1	< 2.1	
Co-60	0.1 ± 1.4	< 2.0		0.5 ± 1.2	< 2.3		1.4 ± 1.4	< 2.4		0.5 ± 1.4	< 2.2	
Zn-65	-3.1 ± 2.8	< 3.2		-0.5 ± 2.7	< 5.2		0.1 ± 2.9	< 4.5		0.7 ± 2.3	< 4.0	
Zr-Nb-95	-1.0 ± 1.3	< 2.8		0.9 ± 1.3	< 2.6		0.2 ± 1.3	< 2.3		-1.8 ± 1.3	< 2.0	
Cs-134	0.6 ± 1.3	< 2.7		0.4 ± 1.3	< 2.6		-1.1 ± 1.3	< 2.6		0.8 ± 1.3	< 2.4	
Cs-137	-0.8 ± 1.4	< 2.3		0.1 ± 1.5	< 2.4		-0.2 ± 1.4	< 2.1		1.4 ± 1.4	< 2.4	
Ba-La-140	-0.9 ± 1.6	< 7.2		-0.6 ± 1.4	< 5.6		-5.3 ± 1.6	< 4.1		-2.3 ± 1.6	< 6.1	
Location	GW-10 2Z-361B			GW-09 1Z-361A			GW-09 1Z-361B			GW-10 2Z-361A		
Collection Date	07-11-19			10-23-19			10-23-19			10-23-19		
Lab Code	EWV- 2763	MDC		EWV- 4459	MDC		EWV- 4460	MDC		EWV- 4461	MDC	
Be-7	-21.4 ± 13.5	< 17.6		-1.7 ± 13.8	< 37.3		-19.2 ± 13.0	< 27.7		-6.0 ± 10.8	< 32.9	
Mn-54	0.0 ± 1.6	< 2.6		0.8 ± 1.4	< 2.8		0.3 ± 1.3	< 2.7		-1.2 ± 1.3	< 1.7	
Fe-59	-1.0 ± 3.1	< 3.8		2.3 ± 2.9	< 8.1		0.2 ± 2.7	< 6.8		0.2 ± 2.4	< 7.0	
Co-58	-0.4 ± 1.5	< 1.9		0.2 ± 1.3	< 3.0		0.5 ± 1.3	< 3.3		-0.8 ± 1.3	< 2.7	
Co-60	1.5 ± 1.6	< 2.2		-0.1 ± 1.5	< 2.6		0.5 ± 1.3	< 2.5		-0.3 ± 1.5	< 2.8	
Zn-65	4.6 ± 3.2	< 4.2		-1.2 ± 2.9	< 4.1		-1.9 ± 3.0	< 5.6		1.4 ± 2.5	< 5.3	
Zr-Nb-95	0.6 ± 1.6	< 2.4		-4.2 ± 1.5	< 5.3		-1.2 ± 1.5	< 5.1		-3.6 ± 1.5	< 5.0	
Cs-134	-0.3 ± 1.4	< 3.3		-2.1 ± 1.5	< 3.1		-1.0 ± 1.4	< 2.7		-0.8 ± 1.4	< 2.5	
Cs-137	-1.0 ± 1.9	< 2.1		0.0 ± 1.7	< 2.5		-0.8 ± 1.5	< 2.8		1.0 ± 1.5	< 2.7	
Ba-La-140	-4.0 ± 1.9	< 4.5		-7.0 ± 1.6	< 13.5		-3.2 ± 1.5	< 12.8		-7.5 ± 1.5	< 10.7	

POINT BEACH NUCLEAR PLANT

Location	GW-10 2Z-361B	
Collection Date	10-23-19	
Lab Code	EW- 4462	MDC
Be-7	-5.4 ± 10.3	< 28.3
Mn-54	-0.3 ± 1.3	< 2.2
Fe-59	-0.6 ± 2.3	< 5.8
Co-58	0.9 ± 1.2	< 3.5
Co-60	-0.9 ± 1.3	< 1.4
Zn-65	0.7 ± 2.6	< 5.5
Zr-Nb-95	-0.4 ± 1.4	< 4.3
Cs-134	0.4 ± 1.3	< 2.4
Cs-137	1.5 ± 1.5	< 3.0
Ba-La-140	-1.8 ± 1.5	< 9.2

POINT BEACH NUCLEAR PLANT

Supplemental Analyses

Units: = pCi/L

Gamma isotopic analysis

Location	GW-04		U2FSSDS		GW-04	
Collection Date	01-15-19		01-31-19		02-21-19	
Lab Code	EW- 156	MDC	EW- 637	MDC	EW- 481	MDC
Be-7	7.1 ± 13.4	< 34.2	-14.0 ± 12.2	< 27.9	-1.9 ± 14.8	< 26.4
Mn-54	0.7 ± 1.7	< 2.9	0.4 ± 1.2	< 2.7	0.1 ± 1.7	< 2.2
Fe-59	-3.3 ± 3.1	< 4.5	-0.8 ± 2.7	< 5.4	-0.9 ± 2.9	< 4.4
Co-58	-0.3 ± 1.8	< 1.9	0.0 ± 1.3	< 3.8	-1.6 ± 1.6	< 1.8
Co-60	-1.1 ± 1.9	< 2.3	-0.4 ± 1.3	< 2.4	0.1 ± 1.8	< 2.9
Zn-65	-1.7 ± 3.1	< 2.8	-3.6 ± 3.0	< 5.7	0.3 ± 3.5	< 6.4
Zr-Nb-95	-1.3 ± 2.0	< 2.0	0.4 ± 1.4	< 6.3	-0.3 ± 1.8	< 2.7
Cs-134	-0.4 ± 1.7	< 3.2	-0.7 ± 1.3	< 2.6	1.9 ± 1.7	< 3.3
Cs-137	-1.6 ± 2.2	< 2.7	0.1 ± 1.5	< 2.2	0.0 ± 2.2	< 3.0
Ba-La-140	-1.3 ± 5.7	< 3.9	-1.7 ± 1.5	< 19.9 ^a	-1.5 ± 1.6	< 2.2
Location	U2FSSDS		E-04		U2FSSDS	
Collection Date	02-28-19		03-27-19		03-31-19	
Lab Code	EW- 638	MDC	EW- 919	MDC	EW- 1051	MDC
Be-7	10.5 ± 11.1	< 28.9	5.3 ± 12.3	< 27.4	-0.5 ± 13.4	< 23.7
Mn-54	0.2 ± 1.4	< 2.3	0.2 ± 1.7	< 2.7	-0.3 ± 1.4	< 3.3
Fe-59	1.7 ± 2.5	< 5.9	0.9 ± 2.7	< 4.7	-5.5 ± 3.0	< 4.9
Co-58	1.0 ± 1.4	< 2.4	-0.8 ± 1.8	< 2.4	2.0 ± 1.3	< 3.0
Co-60	1.2 ± 1.4	< 3.1	0.2 ± 2.1	< 2.1	0.1 ± 1.4	< 2.6
Zn-65	-0.8 ± 2.8	< 6.0	-2.4 ± 3.2	< 4.3	0.3 ± 3.2	< 5.8
Zr-Nb-95	1.0 ± 1.5	< 3.4	-0.3 ± 2.0	< 3.0	0.6 ± 1.5	< 3.8
Cs-134	0.2 ± 1.5	< 2.6	0.6 ± 1.7	< 2.9	-0.4 ± 1.4	< 2.9
Cs-137	-1.0 ± 1.6	< 2.5	-1.0 ± 1.7	< 2.2	2.4 ± 1.6	< 3.1
Ba-La-140	-1.5 ± 1.5	< 4.4	-1.8 ± 1.6	< 2.8	-4.0 ± 1.5	< 4.8
Location	GW-15A,B		GW-04		U2FSSDS	
Collection Date	03-19-19		04-16-19		04-30-19	
Lab Code	EW- 932	MDC	EW- 1336	MDC	EW- 1704	MDC
Be-7	-6.5 ± 9.1	< 30.0	-4.3 ± 13.5	< 29.5	-1.1 ± 12.2	< 30.4
Mn-54	1.0 ± 1.2	< 2.0	1.7 ± 1.7	< 3.3	0.4 ± 1.3	< 3.2
Fe-59	-1.0 ± 2.1	< 4.7	-3.9 ± 3.2	< 4.2	-1.7 ± 2.5	< 4.3
Co-58	0.1 ± 1.2	< 2.9	1.2 ± 1.6	< 3.1	-0.4 ± 1.3	< 2.6
Co-60	-0.2 ± 1.3	< 2.0	-0.1 ± 1.6	< 2.4	0.4 ± 1.3	< 2.8
Zn-65	-1.6 ± 2.3	< 5.3	0.9 ± 3.6	< 5.8	-2.9 ± 2.8	< 5.7
Zr-Nb-95	1.1 ± 1.2	< 3.9	-1.7 ± 1.9	< 2.2	-0.4 ± 1.4	< 3.2
Cs-134	-0.2 ± 1.2	< 2.2	0.4 ± 1.7	< 3.0	0.1 ± 1.4	< 2.8
Cs-137	1.1 ± 1.3	< 2.7	0.2 ± 2.3	< 4.2	1.2 ± 1.4	< 2.4
Ba-La-140	-0.3 ± 1.3	< 13.8	0.3 ± 1.9	< 5.6	-4.8 ± 4.9	< 6.7

^a LLD not met due to small sample size and late arrival.

POINT BEACH NUCLEAR PLANT

Supplemental Analyses

Units: = pCi/L

Gamma isotopic analysis

Location	GW-15A,B		GW-04		U2FSSDS	
Collection Date	05-14-19		05-16-19		06-04-19	
Lab Code	EW- 1713	MDC	EW- 1721	MDC	EW- 2053	MDC
Be-7	5.8 ± 16.0	< 35.6	24.8 ± 21.9	< 41.7	1.7 ± 12.4	< 31.9
Mn-54	0.0 ± 1.9	< 4.1	1.2 ± 2.5	< 3.2	0.0 ± 1.4	< 2.7
Fe-59	-4.3 ± 3.6	< 4.6	-1.0 ± 4.1	< 5.6	1.6 ± 2.6	< 6.0
Co-58	-0.1 ± 2.0	< 3.0	-0.5 ± 2.0	< 4.1	-0.3 ± 1.3	< 2.4
Co-60	-0.1 ± 1.8	< 4.2	1.1 ± 1.7	< 2.2	-0.8 ± 1.2	< 1.9
Zn-65	2.8 ± 3.3	< 5.9	-4.5 ± 4.9	< 2.1	-0.7 ± 3.0	< 4.4
Zr-Nb-95	-0.3 ± 1.9	< 3.4	-4.1 ± 2.6	< 3.5	-1.6 ± 1.3	< 2.8
Cs-134	-0.3 ± 2.1	< 3.8	1.5 ± 2.4	< 4.8	-0.7 ± 1.3	< 2.9
Cs-137	1.6 ± 2.3	< 4.4	0.9 ± 2.9	< 5.4	-0.4 ± 1.5	< 1.9
Ba-La-140	1.8 ± 2.5	< 7.6	5.7 ± 2.9	< 7.7	-5.5 ± 5.0	< 4.8
Location	GW-04		U2FSSDS		GW-04	
Collection Date	06-20-19		06-30-19		07-18-19	
Lab Code	EW- 2214	MDC	EW- 2631	MDC	EW- 2628	MDC
Be-7	0.9 ± 13.8	< 33.7	-1.1 ± 13.6	< 33.7	19.9 ± 21.2	< 55.6
Mn-54	-1.8 ± 1.8	< 2.2	1.0 ± 1.4	< 3.3	0.3 ± 1.9	< 2.2
Fe-59	-0.2 ± 2.6	< 2.4	-1.6 ± 2.6	< 4.1	0.5 ± 4.2	< 5.9
Co-58	-0.3 ± 1.6	< 2.0	-0.8 ± 1.4	< 3.4	-0.8 ± 1.9	< 3.8
Co-60	0.2 ± 1.6	< 1.8	-0.7 ± 1.4	< 2.5	0.3 ± 2.1	< 3.4
Zn-65	-2.6 ± 3.6	< 5.6	0.6 ± 2.9	< 4.0	1.2 ± 4.5	< 6.1
Zr-Nb-95	-3.1 ± 1.8	< 2.2	0.4 ± 1.5	< 3.7	-0.6 ± 2.0	< 5.0
Cs-134	0.7 ± 1.8	< 3.0	-0.8 ± 1.4	< 2.9	1.8 ± 2.1	< 4.0
Cs-137	1.0 ± 1.8	< 3.7	1.8 ± 1.6	< 2.4	0.8 ± 2.2	< 2.2
Ba-La-140	4.9 ± 6.0	< 3.3	-0.4 ± 1.5	< 4.6	-0.9 ± 2.5	< 10.1
Location	U2FSSDS		GW-15A,B		U2FSSDS	
Collection Date	07-31-19		07-30-19		08-31-19	
Lab Code	EW- 2964	MDC	EW- 2974	MDC	EW- 3395	MDC
Be-7	16.0 ± 22.9	< 41.6	1.3 ± 11.7	< 28.7	-2.3 ± 10.6	< 19.1
Mn-54	3.7 ± 2.7	< 4.8	0.6 ± 1.4	< 2.9	1.5 ± 1.4	< 3.0
Fe-59	-1.0 ± 4.6	< 8.2	-3.3 ± 2.6	< 5.1	-1.4 ± 2.4	< 5.1
Co-58	-0.3 ± 2.4	< 4.5	-0.1 ± 1.4	< 3.1	-0.8 ± 1.3	< 2.8
Co-60	-0.1 ± 2.9	< 4.6	0.9 ± 1.5	< 2.6	-0.4 ± 1.4	< 2.2
Zn-65	-1.7 ± 5.7	< 9.0	-0.3 ± 2.9	< 5.4	1.4 ± 2.4	< 5.2
Zr-Nb-95	0.8 ± 2.4	< 3.2	0.2 ± 1.6	< 4.6	-0.6 ± 1.4	< 3.3
Cs-134	0.6 ± 2.4	< 5.0	0.0 ± 1.5	< 2.8	0.5 ± 1.3	< 2.5
Cs-137	2.2 ± 2.9	< 5.4	-0.4 ± 1.8	< 2.9	-0.7 ± 1.5	< 2.6
Ba-La-140	-3.0 ± 2.8	< 5.8	-4.0 ± 1.6	< 4.6	-2.4 ± 1.5	< 3.8

POINT BEACH NUCLEAR PLANT

Supplemental Analyses

Units: = pCi/L

Gamma isotopic analysis

Location	GW-04		GW-04		U2FSSDS	
Collection Date	08-29-19		09-18-19		09-30-19	
Lab Code	EW- 3234	MDC	EW- 3470	MDC	EW- 3684	MDC
Be-7	2.9 ± 11.8	< 24.8	1.1 ± 13.9	< 39.6	12.0 ± 28.0	< 53.3
Mn-54	2.1 ± 1.6	< 3.0	0.6 ± 1.5	< 2.5	0.3 ± 3.1	< 4.3
Fe-59	1.2 ± 2.4	< 3.4	1.5 ± 3.3	< 5.9	-5.4 ± 5.4	< 7.2
Co-58	1.4 ± 1.7	< 2.7	0.4 ± 1.4	< 2.2	-0.4 ± 3.2	< 3.4
Co-60	-0.4 ± 1.6	< 2.0	-1.3 ± 1.7	< 1.9	0.4 ± 3.7	< 5.2
Zn-65	-0.8 ± 2.5	< 3.2	-0.9 ± 2.8	< 4.8	-3.3 ± 5.9	< 8.0
Zr-Nb-95	-0.7 ± 1.7	< 2.7	-2.1 ± 1.9	< 2.3	-2.7 ± 3.8	< 4.6
Cs-134	-0.1 ± 1.5	< 3.0	1.1 ± 1.4	< 2.5	-0.4 ± 3.3	< 5.2
Cs-137	-0.3 ± 1.7	< 2.7	1.3 ± 2.0	< 3.7	2.8 ± 3.7	< 6.0
Ba-La-140	0.8 ± 1.4	< 3.0	-1.1 ± 2.0	< 5.7	-5.9 ± 4.7	< 5.2
Location	GW-04		U2FSSDS		GW-04	
Collection Date	10-18-19		10-31-19		11-20-19	
Lab Code	EW- 3992	MDC	EW- 4613	MDC	EW- 4481	MDC
Fe-55			11.8 ± 449.1	< 738.9		
Ni-63			19.5 ± 39.5	< 64.6		
Sr-89			4.0 ± 4.5	< 7.6		
Sr-90			-2.1 ± 1.3	< 3.3		
Tc-99			0 ± 3.3	< 5.5		
Be-7	-7.7 ± 14.9	< 34.0	-0.2 ± 17.3	< 38.9	6.3 ± 14.0	< 30.4
Mn-54	-0.4 ± 1.8	< 1.9	0.6 ± 2.0	< 3.6	-0.5 ± 1.8	< 3.1
Fe-59	-2.8 ± 2.4	< 2.0	-1.6 ± 3.7	< 14.3	0.9 ± 3.1	< 5.2
Co-58	0.9 ± 1.7	< 2.9	-0.4 ± 1.8	< 5.1	1.0 ± 1.8	< 2.6
Co-60	0.9 ± 1.8	< 1.8	0.5 ± 2.2	< 4.6	0.4 ± 2.0	< 2.4
Zn-65	-0.2 ± 3.3	< 2.5	-3.4 ± 3.9	< 5.8	-3.7 ± 4.0	< 7.5
Zr-Nb-95	-0.1 ± 2.3	< 5.2	-0.1 ± 1.9	< 8.4	-1.0 ± 1.7	< 2.5
Cs-134	-0.2 ± 1.7	< 3.0	-0.9 ± 1.8	< 3.9	1.4 ± 1.7	< 3.0
Cs-137	-1.0 ± 2.0	< 3.0	0.3 ± 2.1	< 3.9	0.2 ± 2.2	< 2.6
Ba-La-140	-3.0 ± 6.4	< 6.5	-17.7 ± 2.3	< 13.9	-2.1 ± 1.8	< 5.9
Location	GW-15A,B		U2FSSDS		GW-04	
Collection Date	11-19-19		11-26-19		12-19-19	
Lab Code	EW- 4473	MDC	EW- 4614	MDC	EW- 4825	MDC
Fe-55			-290.9 ± 408.9	< 699.4		
Ni-63			-5.8 ± 95.9	< 158.1		
Sr-89			1.4 ± 3.0	< 4.2		
Sr-90			-1.3 ± 1.3	< 3.2		
Tc-99			0.0 ± 3.3	< 5.5		
Be-7	-25.0 ± 19.5	< 36.6	12.9 ± 12.8	< 17.0	-2.3 ± 14.4	< 20.9
Mn-54	0.3 ± 2.0	< 4.1	0.1 ± 1.6	< 2.2	-0.2 ± 1.6	< 2.5
Fe-59	-3.6 ± 4.3	< 9.5	3.9 ± 3.0	< 4.9	-2.5 ± 3.3	< 3.9
Co-58	1.9 ± 1.9	< 3.8	1.5 ± 1.5	< 2.2	-0.8 ± 1.4	< 1.7
Co-60	-0.5 ± 2.2	< 3.3	0.4 ± 1.6	< 2.2	0.3 ± 1.6	< 2.7
Zn-65	-3.7 ± 4.6	< 7.3	0.4 ± 3.3	< 3.9	-0.5 ± 3.0	< 2.8
Zr-Nb-95	-3.6 ± 2.1	< 5.6	0.2 ± 1.6	< 2.7	-3.6 ± 2.3	< 3.1
Cs-134	-1.3 ± 2.1	< 4.2	1.6 ± 1.5	< 3.3	-0.7 ± 1.9	< 3.5
Cs-137	1.7 ± 2.2	< 4.4	0.4 ± 1.8	< 2.1	0.4 ± 1.8	< 2.6
Ba-La-140	-3.5 ± 2.2	< 7.5	-2.7 ± 1.8	< 5.6	-1.1 ± 2.2	< 5.3

POINT BEACH NUCLEAR PLANT

Location	U2FSSDS	
Collection Date	12-31-19	
Lab Code	EW- 4997	MDC
Be-7	-7.5 ± 22.5	< 41.0
Mn-54	1.2 ± 2.9	< 5.0
Fe-59	-2.1 ± 5.3	< 12.4
Co-58	0.7 ± 2.7	< 3.8
Co-60	1.2 ± 2.8	< 2.9
Zn-65	-4.9 ± 6.0	< 8.6
Zr-Nb-95	2.8 ± 3.4	< 7.8
Cs-134	3.0 ± 2.9	< 5.8
Cs-137	0.7 ± 3.4	< 4.5
Ba-La-140	0.4 ± 3.3	< 7.9

POINT BEACH NUCLEAR PLANT

APPENDIX F

Special Analyses

POINT BEACH NUCLEAR PLANT

Additional Analyses

Lake water samples

Units = pCi/L

Location	E-01		E-01		E-01	
Collection Date	04-09-19		05-08-19		06-12-19	
Lab Code	ELW- 1188	MDC	ELW- 1577	MDC	ELW- 2102	MDC
Tritium	114 ± 92	< 162	109 ± 91	< 161	2041 ± 165	< 160
Location	E-06		E-06		E-06	
Collection Date	04-09-19		05-08-19		06-13-19	
Lab Code	ELW- 1190	MDC	ELW- 1579	MDC	ELW- 2104	MDC
Tritium	102 ± 91	< 162	111 ± 91	< 161	202 ± 95	< 160
Location	E-01					
Collection Date	07-10-19					
Lab Code	ELW- 2466	MDC				
Tritium	-8 ± 73	< 159				
Location	E-033		E-033		E-033	
Collection Date	10-07-19		11-13-19		12-12-19	
Lab Code	ELW- 3711	MDC	ELW- 4347	MDC	ELW- 4693	MDC
Tritium	1282 ± 147	< 163	7 ± 99	< 162	59 ± 101	< 162
Location	E-001		E-005		E-006	
Collection Date	10-07-19		10-07-19		10-07-19	
Lab Code	ELW- 3707	MDC	ELW- 3708	MDC	ELW- 3709	MDC
Tritium	-58 ± 71	< 160	50 ± 77	< 160	-27 ± 73	< 160
Location	U2FSSD		U2FSSD			
Collection Date	10-31-19		11-26-19			
Lab Code	EW- 4613	MDC	EW- 4614	MDC		
Tritium recount	8873 ± 291	< 152	10165 ± 309	< 151		
Tritium reanalysis	8957 ± 292	< 152	10587 ± 315	< 151		