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MONTHLY
PROGRESS REPORT

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

DAVIS-BESSE NUCLEAR POWER STATION
OAK HARBOR, OHIO

Reporting Period: January-December, 2018

Prepared and Submitted by
ENVIRONMENTAL, INC.,
MIDWEST LABORATORY

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1.0 INTRODUCTION

The following constitutes the current 2018 Monthly Progress Report for the Radiological Environmental Monitoring Program conducted at the Davis-Besse Nuclear Power Station in Oak Harbor, Ohio. Results of completed analyses are presented in the attached tables.

All activities, except gross alpha and gross beta, are decay corrected to the time of collection.

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

2.0 LISTING OF MISSED SAMPLES

Sample Type	Location	Expected Collection Date	Reason
TLD	T-155	04-13-18	TLD missing in field.
TLD	T-69	10-08-18	TLD missing in field
Apples	T-209	10-24-18	No sample available.
Vegetation	T-37	10-31-18	No sample available.
Vegetation	T-227	10-31-18	No sample available.
AP/AI	T-9	11-06-18	Low reading of 46m^3 due to pump problem.
AP/AI	T-27	12-11-18	Low reading of 85m3 due to pump problem.
AP/AI	T-11	12-26-18	Low reading of 56m^3 due to pump problem.
TLD	T-69	01-04-19	Annual, missing in field.
TLD	T-142	01-04-19	Annual, missing in field.
TLD	T-155	01-04-19	Annual, missing in field.

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3.0 DATA TABULATIONS

Table 1. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131[a].
Location: T-1
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-09-18	280	0.032 ± 0.004	07-10-18	286	0.027 ± 0.004
01-16-18	278	0.027 ± 0.004	07-17-18	300	0.029 ± 0.004
01-23-18	285	0.041 ± 0.005	07-23-18	247	0.017 ± 0.004
01-30-18	286	0.024 ± 0.003	07-31-18	324	0.027 ± 0.004
02-06-18	286	0.028 ± 0.004	08-07-18	285	0.037 ± 0.004
02-13-18	285	0.039 ± 0.005	08-14-18	286	0.028 ± 0.004
02-20-18	285	0.037 ± 0.004	08-21-18	285	0.035 ± 0.004
02-27-18	286	0.023 ± 0.003	08-28-18	285	0.039 ± 0.004
03-06-18	286	0.036 ± 0.004	09-04-18	295	0.016 ± 0.003
03-13-18	284	0.015 ± 0.003	09-11-18	283	0.013 ± 0.004
03-20-18	285	0.034 ± 0.004	09-18-18	278	0.018 ± 0.003
03-27-18	286	0.020 ± 0.004	09-25-18	271	0.020 ± 0.004
04-03-18	286	0.022 ± 0.004	10-02-18	283	0.023 ± 0.004
1st Quarter Mean ± s.d.		0.029 ± 0.008	3rd Quarter Mean ± s.d.		0.025 ± 0.008
04-10-18	287	0.027 ± 0.004	10-09-18	291	0.021 ± 0.004
04-17-18	286	0.019 ± 0.004	10-16-18	302	0.018 ± 0.003
04-24-18	285	0.021 ± 0.004	10-23-18	274	0.024 ± 0.004
05-01-18	286	0.022 ± 0.004	10-30-18	263	0.017 ± 0.004
05-08-18	286	0.024 ± 0.004	11-06-18	266	0.022 ± 0.004
05-15-18	285	0.020 ± 0.004	11-13-18	231	0.032 ± 0.005
05-22-18	286	0.018 ± 0.004	11-20-18	265	0.030 ± 0.004
05-29-18	286	0.031 ± 0.004	11-27-18	285	0.034 ± 0.004
06-05-18	286	0.019 ± 0.004	12-04-18	281	0.023 ± 0.004
06-12-18	285	0.016 ± 0.004	12-11-18	264	0.038 ± 0.005
06-19-18	286	0.028 ± 0.004	12-18-18	310	0.052 ± 0.005
06-26-18	287	0.017 ± 0.003	12-26-18	313	0.031 ± 0.004
07-03-18	285	0.033 ± 0.004	01-02-19	282	0.025 ± 0.004
2nd Quarter Mean ± s.d.		0.023 ± 0.005	4th Quarter Mean ± s.d.		0.028 ± 0.010
			Cumulative Average		0.026

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.

Table 2. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131[a].
Location: T-2
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-09-18	286	0.031 ± 0.004	07-10-18	331	0.026 ± 0.004
01-16-18	287	0.022 ± 0.004	07-17-18	288	0.029 ± 0.004
01-23-18	285	0.036 ± 0.004	07-23-18	249	0.022 ± 0.004
01-30-18	286	0.025 ± 0.003	07-30-18	286	0.024 ± 0.004
02-06-18	287	0.028 ± 0.004	08-07-18	326	0.052 ± 0.005
02-13-18	286	0.038 ± 0.004	08-14-18	286	0.024 ± 0.004
02-20-18	286	0.036 ± 0.004	08-21-18	285	0.028 ± 0.004
02-27-18	288	0.020 ± 0.003	08-27-18	244	0.025 ± 0.004
03-06-18	289	0.036 ± 0.004	09-04-18	351	0.017 ± 0.003
03-13-18	287	0.015 ± 0.003	09-11-18	283	0.009 ± 0.003
03-20-18	288	0.032 ± 0.004	09-18-18	249	0.015 ± 0.004
03-27-18	288	0.021 ± 0.004	09-25-18	281	0.019 ± 0.003
04-03-18	288	0.022 ± 0.004	10-02-18	283	0.022 ± 0.004
1st Quarter Mean ± s.d.		0.028 ± 0.008	3rd Quarter Mean ± s.d.		0.024 ± 0.010
04-10-18	289	0.028 ± 0.004	10-09-18	284	0.021 ± 0.004
04-17-18	289	0.020 ± 0.004	10-16-18	279	0.016 ± 0.004
04-24-18	288	0.023 ± 0.004	10-23-18	298	0.021 ± 0.004
05-01-18	288	0.021 ± 0.004	10-30-18	284	0.015 ± 0.003
05-08-18	288	0.026 ± 0.004	11-06-18	294	0.023 ± 0.004
05-15-18	288	0.020 ± 0.004	11-13-18	282	0.019 ± 0.004
05-22-18	288	0.014 ± 0.004	11-20-18	289	0.028 ± 0.004
05-29-18	283	0.031 ± 0.004	11-27-18	294	0.033 ± 0.004
06-05-18	288	0.015 ± 0.003	12-04-18	297	0.021 ± 0.004
06-12-18	288	0.017 ± 0.004	12-11-18	291	0.029 ± 0.004
06-19-18	288	0.022 ± 0.004	12-18-18	312	0.048 ± 0.005
06-26-18	289	0.017 ± 0.003	12-26-18	304	0.030 ± 0.004
07-03-18	245	0.031 ± 0.004	01-02-19	284	0.022 ± 0.004
2nd Quarter Mean ± s.d.		0.022 ± 0.006	4th Quarter Mean ± s.d.		0.025 ± 0.009
			Cumulative Average		0.025

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.

Table 3. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131[a].
Location: T-3
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-09-18	289	0.028 ± 0.004	07-10-18	326	0.026 ± 0.004
01-16-18	290	0.022 ± 0.004	07-17-18	284	0.032 ± 0.004
01-23-18	288	0.032 ± 0.004	07-23-18	246	0.024 ± 0.004
01-30-18	289	0.023 ± 0.003	07-30-18	282	0.027 ± 0.004
02-06-18	290	0.026 ± 0.003	08-07-18	326	0.046 ± 0.004
02-13-18	289	0.037 ± 0.004	08-14-18	286	0.026 ± 0.004
02-20-18	289	0.037 ± 0.004	08-21-18	284	0.037 ± 0.004
02-27-18	289	0.024 ± 0.003	08-27-18	244	0.035 ± 0.005
03-06-18	290	0.033 ± 0.004	09-04-18	359	0.018 ± 0.003
03-13-18	283	0.017 ± 0.004	09-11-18	283	0.012 ± 0.003
03-20-18	284	0.034 ± 0.004	09-18-18	240	0.018 ± 0.004
03-27-18	284	0.019 ± 0.004	09-25-18	238	0.024 ± 0.004
04-03-18	284	0.026 ± 0.004	10-02-18	283	0.022 ± 0.004
1st Quarter Mean ± s.d.		0.028 ± 0.007	3rd Quarter Mean ± s.d.		0.027 ± 0.009
04-10-18	285	0.023 ± 0.004	10-09-18	294	0.020 ± 0.004
04-17-18	284	0.017 ± 0.003	10-16-18	283	0.020 ± 0.004
04-24-18	284	0.020 ± 0.004	10-23-18	287	0.019 ± 0.004
05-01-18	284	0.022 ± 0.004	10-30-18	250	0.016 ± 0.004
05-08-18	284	0.025 ± 0.004	11-06-18	273	0.022 ± 0.004
05-15-18	284	0.021 ± 0.004	11-13-18	270	0.019 ± 0.004
05-22-18	284	0.018 ± 0.004	11-20-18	296	0.028 ± 0.004
05-29-18	284	0.032 ± 0.004	11-27-18	277	0.039 ± 0.005
06-05-18	284	0.017 ± 0.003	12-04-18	324	0.024 ± 0.004
06-12-18	284	0.015 ± 0.003	12-11-18	279	0.037 ± 0.004
06-19-18	284	0.031 ± 0.004	12-18-18	289	0.048 ± 0.005
06-26-18	285	0.018 ± 0.003	12-26-18	308	0.029 ± 0.004
07-03-18	242	0.033 ± 0.005	01-02-19	299	0.025 ± 0.004
2nd Quarter Mean ± s.d.		0.022 ± 0.006	4th Quarter Mean ± s.d.		0.027 ± 0.009
			Cumulative Average		0.026

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.

Table 4. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131[a].
Location: I-4
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-09-18	278	0.033 ± 0.004	07-10-18	328	0.019 ± 0.003
01-16-18	280	0.025 ± 0.004	07-17-18	314	0.022 ± 0.004
01-23-18	278	0.035 ± 0.004	07-23-18	247	0.007 ± 0.003
01-30-18	279	0.026 ± 0.004	07-30-18	283	0.012 ± 0.003
02-06-18	289	0.027 ± 0.004	08-07-18	326	0.043 ± 0.004
02-13-18	288	0.036 ± 0.004	08-14-18	286	0.012 ± 0.003
02-20-18	288	0.042 ± 0.004	08-21-18	284	0.014 ± 0.003
02-27-18	288	0.021 ± 0.003	08-27-18	244	0.033 ± 0.005
03-06-18	289	0.034 ± 0.004	09-04-18	203	0.012 ± 0.004
03-13-18	287	0.015 ± 0.003	09-11-18	195	0.015 ± 0.005 [d]
03-20-18	288	0.036 ± 0.004	09-18-18	242	0.019 ± 0.004
03-27-18	288	0.009 ± 0.003 [b]	09-25-18	239	0.021 ± 0.004
04-03-18	284	0.023 ± 0.004	10-02-18	244	0.027 ± 0.005
1st Quarter Mean ± s.d.		0.028 ± 0.009	3rd Quarter Mean ± s.d.		0.020 ± 0.010
04-10-18	286	0.027 ± 0.004	10-09-18	356	0.016 ± 0.003
04-17-18	286	0.020 ± 0.004	10-16-18	204	0.015 ± 0.004
04-24-18	285	0.023 ± 0.004	10-23-18	220	0.016 ± 0.004
05-01-18	286	0.024 ± 0.004	10-30-18	384	0.013 ± 0.003
05-08-18	129	0.029 ± 0.007 [c]	11-06-18	274	0.013 ± 0.003
05-15-18	285	0.017 ± 0.004	11-13-18	265	0.020 ± 0.004
05-22-18	328	0.013 ± 0.003	11-20-18	285	0.024 ± 0.004
05-29-18	286	0.020 ± 0.004	11-27-18	315	0.025 ± 0.004
06-05-18	285	0.014 ± 0.003	12-04-18	283	0.020 ± 0.004
06-12-18	285	0.007 ± 0.003	12-11-18	248	0.039 ± 0.005
06-19-18	285	0.011 ± 0.003	12-18-18	265	0.065 ± 0.006
06-26-18	286	0.014 ± 0.003	12-26-18	334	0.033 ± 0.004
07-03-18	243	0.028 ± 0.004	01-02-19	288	0.025 ± 0.004
2nd Quarter Mean ± s.d.		0.019 ± 0.007	4th Quarter Mean ± s.d.		0.025 ± 0.014
			Cumulative Average		0.023

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.
[b] Filter light.
[c] Low volume due to pump stopage; timer reading = 75.7 hours.

Table 5. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131[a].
Location: T-7
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-09-18	289	0.027 ± 0.004	07-10-18	329	0.023 ± 0.003
01-16-18	290	0.024 ± 0.004	07-17-18	289	0.028 ± 0.004
01-23-18	288	0.032 ± 0.004	07-23-18	249	0.020 ± 0.004
01-30-18	290	0.025 ± 0.003	07-30-18	289	0.027 ± 0.004
02-06-18	289	0.024 ± 0.003	08-07-18	329	0.043 ± 0.004
02-13-18	289	0.035 ± 0.004	08-14-18	289	0.028 ± 0.004
02-20-18	284	0.037 ± 0.004	08-21-18	289	0.033 ± 0.004
02-27-18	284	0.027 ± 0.004	08-27-18	249	0.029 ± 0.004
03-06-18	284	0.034 ± 0.004	09-04-18	373	0.017 ± 0.003
03-13-18	290	0.018 ± 0.004	09-11-18	96	0.015 ± 0.009 [b]
03-20-18	276	0.037 ± 0.005	09-18-18	285	0.014 ± 0.003
03-27-18	284	0.019 ± 0.004	09-25-18	277	0.018 ± 0.003
04-03-18	288	0.018 ± 0.004	10-02-18	312	0.020 ± 0.004
1st Quarter Mean ± s.d.		0.027 ± 0.007	3rd Quarter Mean ± s.d.		0.024 ± 0.008
04-10-18	291	0.023 ± 0.004	10-09-18	294	0.015 ± 0.003
04-17-18	288	0.018 ± 0.004	10-16-18	271	0.014 ± 0.004
04-24-18	289	0.020 ± 0.004	10-23-18	266	0.016 ± 0.004
05-01-18	290	0.020 ± 0.004	10-30-18	263	0.010 ± 0.003
05-08-18	288	0.024 ± 0.004	11-06-18	267	0.018 ± 0.004
05-15-18	289	0.019 ± 0.004	11-13-18	266	0.016 ± 0.004
05-22-18	288	0.019 ± 0.004	11-20-18	275	0.022 ± 0.004
05-29-18	290	0.033 ± 0.004	11-27-18	265	0.030 ± 0.004
06-05-18	289	0.020 ± 0.004	12-04-18	262	0.021 ± 0.004
06-12-18	289	0.018 ± 0.004	12-11-18	276	0.026 ± 0.004
06-19-18	289	0.026 ± 0.004	12-18-18	295	0.035 ± 0.004
06-26-18	289	0.019 ± 0.003	12-26-18	309	0.021 ± 0.004
07-03-18	248	0.033 ± 0.005	01-02-19	277	0.022 ± 0.004
2nd Quarter Mean ± s.d.		0.022 ± 0.005	4th Quarter Mean ± s.d.		0.020 ± 0.007
			Cumulative Average		0.024

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.
[b] Low volume due to pump stoppage

Table 6. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131[a].
Location: T-8
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-09-18	296	0.038 ± 0.004	07-10-18	325	0.022 ± 0.003
01-16-18	280	0.025 ± 0.004	07-17-18	228	0.039 ± 0.005
01-23-18	277	0.039 ± 0.005	07-23-18	246	0.026 ± 0.004
01-30-18	288	0.027 ± 0.004	07-30-18	286	0.032 ± 0.004
02-06-18	287	0.033 ± 0.004	08-07-18	331	0.054 ± 0.005
02-13-18	286	0.037 ± 0.004	08-14-18	250	0.029 ± 0.005
02-20-18	293	0.037 ± 0.004	08-21-18	291	0.019 ± 0.003
02-27-18	282	0.022 ± 0.003	08-27-18	240	0.024 ± 0.004
03-06-18	293	0.033 ± 0.004	09-04-18	275	0.016 ± 0.004
03-13-18	286	0.016 ± 0.003	09-11-18	283	0.010 ± 0.003
03-20-18	280	0.029 ± 0.004	09-18-18	274	0.013 ± 0.003
03-27-18	287	0.022 ± 0.004	09-25-18	214	0.019 ± 0.004
04-03-18	286	0.021 ± 0.004	10-02-18	312	0.019 ± 0.004
1st Quarter Mean ± s.d.		0.029 ± 0.008	3rd Quarter Mean ± s.d.		0.025 ± 0.012
04-10-18	289	0.022 ± 0.004	10-09-18	296	0.015 ± 0.003
04-17-18	286	0.016 ± 0.003	10-16-18	245	0.017 ± 0.004
04-24-18	287	0.019 ± 0.004	10-23-18	334	0.023 ± 0.003
05-01-18	294	0.020 ± 0.004	10-30-18	285	0.017 ± 0.004
05-08-18	279	0.026 ± 0.004	11-06-18	297	0.020 ± 0.004
05-15-18	286	0.017 ± 0.004	11-13-18	296	0.020 ± 0.004
05-22-18	285	0.013 ± 0.004	11-20-18	281	0.030 ± 0.004
05-29-18	286	0.028 ± 0.004	11-27-18	281	0.025 ± 0.004
06-05-18	285	0.016 ± 0.003	12-04-18	236	0.027 ± 0.005
06-12-18	285	0.014 ± 0.003	12-11-18	249	0.039 ± 0.005
06-19-18	286	0.021 ± 0.004	12-18-18	340	0.051 ± 0.004
06-26-18	292	0.017 ± 0.003	12-26-18	325	0.033 ± 0.004
07-03-18	239	0.033 ± 0.005	01-02-19	244	0.034 ± 0.005
2nd Quarter Mean ± s.d.		0.020 ± 0.006	4th Quarter Mean ± s.d.		0.027 ± 0.010
			Cumulative Average		0.025

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.

Table 7. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131[a].
Location: T-9 (C)
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-09-18	284	0.033 ± 0.004	07-10-18	316	0.028 ± 0.004
01-16-18	283	0.027 ± 0.004	07-17-18	314	0.029 ± 0.004
01-23-18	288	0.036 ± 0.004	07-23-18	248	0.022 ± 0.004
01-30-18	287	0.021 ± 0.003	07-30-18	293	0.024 ± 0.004
02-06-18	286	0.028 ± 0.004	08-07-18	322	0.045 ± 0.004
02-13-18	276	0.036 ± 0.005	08-14-18	286	0.032 ± 0.004
02-20-18	291	0.040 ± 0.004	08-21-18	278	0.030 ± 0.004
02-27-18	291	0.024 ± 0.003	08-27-18	255	0.033 ± 0.004
03-06-18	284	0.039 ± 0.004	09-04-18	332	0.022 ± 0.003
03-13-18	289	0.019 ± 0.004	09-11-18	283	0.017 ± 0.004
03-20-18	276	0.033 ± 0.004	09-18-18	276	0.017 ± 0.003
03-27-18	298	0.022 ± 0.004	09-25-18	283	0.020 ± 0.003
04-03-18	276	0.020 ± 0.004	10-02-18	312	0.024 ± 0.004
1st Quarter Mean ± s.d.		0.029 ± 0.007	3rd Quarter Mean ± s.d.		0.026 ± 0.008
04-10-18	298	0.023 ± 0.004	10-09-18	297	0.022 ± 0.004
04-17-18	288	0.019 ± 0.004	10-16-18	292	0.017 ± 0.003
04-24-18	286	0.019 ± 0.004	10-23-18	294	0.021 ± 0.004
05-01-18	289	0.023 ± 0.004	10-30-18	286	0.015 ± 0.003
05-08-18	277	0.022 ± 0.004	11-06-18	46	0.044 ± 0.019 [b]
05-15-18	299	0.018 ± 0.003	11-13-18	483	0.021 ± 0.003
05-22-18	276	0.017 ± 0.004	11-20-18	264	0.027 ± 0.004
05-29-18	299	0.032 ± 0.004	11-27-18	280	0.036 ± 0.004
06-05-18	287	0.016 ± 0.003	12-04-18	297	0.022 ± 0.004
06-12-18	275	0.022 ± 0.004	12-11-18	296	0.036 ± 0.004
06-19-18	286	0.030 ± 0.004	12-18-18	280	0.043 ± 0.005
06-26-18	296	0.022 ± 0.004	12-26-18	295	0.051 ± 0.005
07-03-18	244	0.036 ± 0.005	01-02-19	267	0.021 ± 0.004
2nd Quarter Mean ± s.d.		0.023 ± 0.006	4th Quarter Mean ± s.d.		0.029 ± 0.012
			Cumulative Average		0.027

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.
[b] Low volume due to pump failure

Table 8. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131[a].
Location: T-11 (C)
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-09-18	266	0.031 ± 0.005	07-10-18	283	0.030 ± 0.004
01-16-18	281	0.026 ± 0.004	07-17-18	357	0.032 ± 0.004
01-23-18	284	0.046 ± 0.005	07-23-18	246	0.018 ± 0.004
01-30-18	284	0.024 ± 0.003	07-31-18	325	0.026 ± 0.004
02-06-18	284	0.022 ± 0.003	08-07-18	287	0.043 ± 0.005
02-13-18	284	0.034 ± 0.004	08-14-18	288	0.024 ± 0.004
02-20-18	284	0.034 ± 0.004	08-21-18	288	0.033 ± 0.004
02-27-18	284	0.022 ± 0.003	08-28-18	288	0.036 ± 0.004
03-06-18	284	0.035 ± 0.004	09-04-18	288	0.021 ± 0.004
03-13-18	282	0.015 ± 0.003	09-11-18	283	0.018 ± 0.004
03-20-18	284	0.036 ± 0.004	09-18-18	246	0.022 ± 0.004
03-27-18	284	0.025 ± 0.004	09-25-18	287	0.025 ± 0.004
04-03-18	284	0.021 ± 0.004	10-02-18	312	0.024 ± 0.004
1st Quarter Mean ± s.d.		0.029 ± 0.008	3rd Quarter Mean ± s.d.		0.027 ± 0.007
04-10-18	285	0.030 ± 0.004	10-09-18	342	0.019 ± 0.003
04-17-18	284	0.020 ± 0.004	10-16-18	255	0.018 ± 0.004
04-24-18	283	0.021 ± 0.004	10-23-18	280	0.020 ± 0.004
05-01-18	284	0.020 ± 0.004	10-30-18	268	0.011 ± 0.003
05-08-18	284	0.025 ± 0.004	11-06-18	258	0.019 ± 0.004
05-15-18	284	0.019 ± 0.004	11-13-18	263	0.021 ± 0.004
05-22-18	284	0.016 ± 0.004	11-20-18	307	0.026 ± 0.004
05-29-18	284	0.035 ± 0.004	11-27-18	255	0.035 ± 0.005
06-05-18	285	0.020 ± 0.004	12-04-18	280	0.023 ± 0.004
06-12-18	286	0.019 ± 0.004	12-11-18	392	0.031 ± 0.003
06-19-18	285	0.026 ± 0.004	12-18-18	241	0.050 ± 0.005
06-26-18	94	0.023 ± 0.009 [b]	12-26-18	56	0.016 ± 0.015 [c]
07-03-18	268	0.040 ± 0.005	01-02-19	254	0.029 ± 0.005
2nd Quarter Mean ± s.d.		0.024 ± 0.007	4th Quarter Mean ± s.d.		0.024 ± 0.010
			Cumulative Average		0.026

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.
[b] Low volume due to the power outage.
[c] Low volume due to pump failure. I-131 < 0.078 pCi/m3

Table 9. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131[a].
Location: 1-12 (C)
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-09-18	285	0.029 ± 0.004	07-10-18	327	0.027 ± 0.004
01-16-18	289	0.025 ± 0.004	07-17-18	315	0.027 ± 0.004
01-23-18	282	0.034 ± 0.004	07-23-18	247	0.017 ± 0.004
01-30-18	286	0.021 ± 0.003	07-30-18	284	0.022 ± 0.004
02-06-18	286	0.028 ± 0.004	08-07-18	327	0.038 ± 0.004
02-13-18	286	0.036 ± 0.004	08-14-18	286	0.025 ± 0.004
02-20-18	287	0.034 ± 0.004	08-21-18	284	0.027 ± 0.004
02-27-18	284	0.020 ± 0.003	08-27-18	244	0.033 ± 0.005
03-06-18	290	0.032 ± 0.004	09-04-18	338	0.022 ± 0.003
03-13-18	283	0.017 ± 0.004	09-11-18	283	0.012 ± 0.003
03-20-18	284	0.033 ± 0.004	09-18-18	465	0.014 ± 0.002
03-27-18	285	0.016 ± 0.003	09-25-18	299	0.017 ± 0.003
04-03-18	288	0.022 ± 0.004	10-02-18	283	0.021 ± 0.004
1st Quarter Mean ± s.d.		0.027 ± 0.007	3rd Quarter Mean ± s.d.		0.023 ± 0.007
04-10-18	289	0.025 ± 0.004	10-09-18	301	0.017 ± 0.003
04-17-18	288	0.015 ± 0.003	10-16-18	278	0.016 ± 0.004
04-24-18	288	0.018 ± 0.004	10-23-18	280	0.017 ± 0.004
05-01-18	289	0.024 ± 0.004	10-30-18	268	0.009 ± 0.003
05-08-18	287	0.025 ± 0.004	11-06-18	260	0.016 ± 0.004
05-15-18	288	0.019 ± 0.004	11-13-18	249	0.018 ± 0.004
05-22-18	288	0.016 ± 0.004	11-20-18	252	0.023 ± 0.004
05-29-18	288	0.034 ± 0.004	11-27-18	248	0.025 ± 0.004
06-05-18	288	0.019 ± 0.004	12-04-18	248	0.023 ± 0.004
06-12-18	288	0.019 ± 0.004	12-11-18	258	0.031 ± 0.004
06-19-18	288	0.024 ± 0.004	12-18-18	283	0.042 ± 0.005
06-26-18	291	0.018 ± 0.003	12-26-18	345	0.034 ± 0.004
07-03-18	244	0.034 ± 0.005	01-02-19	284	0.019 ± 0.004
2nd Quarter Mean ± s.d.		0.022 ± 0.006	4th Quarter Mean ± s.d.		0.022 ± 0.009
			Cumulative Average		0.024

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.

Table 10. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131[a].
Location: T-27 (C)
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-09-18	278	0.036 ± 0.005	07-10-18	327	0.025 ± 0.004
01-16-18	292	0.029 ± 0.004	07-17-18	257	0.030 ± 0.004
01-23-18	280	0.039 ± 0.005	07-23-18	247	0.026 ± 0.004
01-30-18	284	0.027 ± 0.004	07-30-18	283	0.029 ± 0.004
02-06-18	281	0.029 ± 0.004	08-07-18	328	0.048 ± 0.004
02-13-18	281	0.037 ± 0.004	08-14-18	286	0.025 ± 0.004
02-20-18	281	0.033 ± 0.004	08-21-18	118	0.051 ± 0.009
02-27-18	279	0.023 ± 0.003	08-27-18	244	0.040 ± 0.005
03-06-18	284	0.034 ± 0.004	09-04-18	384	0.022 ± 0.003
03-13-18	278	0.013 ± 0.003	09-11-18	283	0.021 ± 0.004
03-20-18	278	0.049 ± 0.005	09-18-18	323	0.018 ± 0.003
03-27-18	280	0.022 ± 0.004	09-25-18	356	0.022 ± 0.003
04-03-18	280	0.026 ± 0.004	10-02-18	269	0.034 ± 0.005
1st Quarter Mean ± s.d.		0.031 ± 0.009	3rd Quarter Mean ± s.d.		0.030 ± 0.010
04-10-18	281	0.026 ± 0.004	10-09-18	271	0.025 ± 0.004
04-17-18	280	0.020 ± 0.004	10-16-18	277	0.018 ± 0.004
04-24-18	280	0.021 ± 0.004	10-23-18	277	0.022 ± 0.004
05-01-18	287	0.028 ± 0.004	10-30-18	277	0.017 ± 0.004
05-08-18	298	0.022 ± 0.004	11-06-18	293	0.025 ± 0.004
05-15-18	285	0.018 ± 0.004	11-13-18	331	0.025 ± 0.004
05-22-18	285	0.019 ± 0.004	11-20-18	287	0.026 ± 0.004
05-29-18	286	0.032 ± 0.004	11-27-18	291	0.028 ± 0.004
06-05-18	285	0.016 ± 0.003	12-04-18	282	0.022 ± 0.004
06-12-18	285	0.019 ± 0.004	12-11-18	85	0.024 ± 0.010 [c]
06-19-18	81	0.012 ± 0.010 [b]	12-18-18	294	0.047 ± 0.005
06-26-18	288	0.018 ± 0.003	12-26-18	346	0.023 ± 0.003
07-03-18	241	0.032 ± 0.005	01-02-19	312	0.024 ± 0.004
2nd Quarter Mean ± s.d.		0.022 ± 0.006	4th Quarter Mean ± s.d.		0.025 ± 0.007
			Cumulative Average		0.027

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.
[b] No reason given for the low volume.

Table 11-1. Airborne particulate data,gross beta analyses, monthly averages, minima and maxima.

January

Location	Average	Minima	Maxima
T-9	0.029	0.021	0.036
T-11	0.032	0.024	0.046
T-12	0.027	0.021	0.034
T-27	0.033	0.027	0.039
Controls	0.030	0.021	0.046
T-1	0.031	0.024	0.041
T-2	0.029	0.022	0.036
T-3	0.026	0.022	0.032
T-4	0.030	0.025	0.035
T-7	0.027	0.024	0.032
T-8	0.032	0.025	0.039
Indicators	0.029	0.022	0.041

February

Location	Average	Minima	Maxima
T-9	0.032	0.024	0.040
T-11	0.028	0.022	0.034
T-12	0.030	0.020	0.036
T-27	0.031	0.023	0.037
Controls	0.030	0.020	0.040
T-1	0.032	0.023	0.039
T-2	0.031	0.020	0.038
T-3	0.031	0.024	0.037
T-4	0.032	0.021	0.042
T-7	0.031	0.024	0.037
T-8	0.032	0.022	0.037
Indicators	0.032	0.020	0.042

March

Location	Average	Minima	Maxima
T-9	0.027	0.019	0.039
T-11	0.026	0.015	0.036
T-12	0.024	0.016	0.033
T-27	0.029	0.013	0.049
Controls	0.027	0.013	0.049
T-1	0.025	0.015	0.036
T-2	0.025	0.015	0.036
T-3	0.026	0.017	0.034
T-4	0.023	0.009	0.036
T-7	0.025	0.018	0.037
T-8	0.024	0.016	0.033
Indicators	0.025	0.009	0.037

April

Location	Average	Minima	Maxima
T-9	0.021	0.019	0.023
T-11	0.023	0.020	0.030
T-12	0.021	0.015	0.025
T-27	0.024	0.020	0.028
Controls	0.022	0.015	0.030
T-1	0.022	0.019	0.027
T-2	0.023	0.020	0.028
T-3	0.021	0.017	0.023
T-4	0.024	0.020	0.027
T-7	0.020	0.018	0.023
T-8	0.019	0.016	0.022
Indicators	0.022	0.016	0.028

May

Location	Average	Minima	Maxima
T-9	0.022	0.017	0.032
T-11	0.024	0.016	0.035
T-12	0.024	0.016	0.034
T-27	0.023	0.018	0.032
Controls	0.023	0.016	0.035
T-1	0.023	0.018	0.031
T-2	0.023	0.014	0.031
T-3	0.024	0.018	0.032
T-4	0.020	0.013	0.029
T-7	0.024	0.019	0.033
T-8	0.021	0.013	0.028
Indicators	0.023	0.013	0.033

June

Location	Average	Minima	Maxima
T-9	0.025	0.016	0.036
T-11	0.026	0.019	0.040
T-12	0.023	0.018	0.034
T-27	0.019	0.012	0.032
Controls	0.023	0.012	0.040
T-1	0.023	0.016	0.033
T-2	0.020	0.015	0.031
T-3	0.023	0.015	0.033
T-4	0.015	0.007	0.028
T-7	0.023	0.018	0.033
T-8	0.020	0.014	0.033
Indicators	0.021	0.007	0.033

Note: Unless otherwise specified, samples collected on the first, second or third day of the month are grouped with data from the previous month.

Table 11-1. Airborne particulate data,gross beta analyses, monthly averages, minima and maxima.

July			
Location	Average	Minima	Maxima
T-9	0.026	0.022	0.029
T-11	0.027	0.018	0.032
T-12	0.023	0.017	0.027
T-27	0.028	0.025	0.030
Controls	0.026	0.017	0.032
T-1	0.025	0.017	0.029
T-2	0.025	0.022	0.029
T-3	0.027	0.024	0.032
T-4	0.015	0.007	0.022
T-7	0.025	0.020	0.028
T-8	0.030	0.022	0.039
Indicators	0.025	0.007	0.039

October			
Location	Average	Minima	Maxima
T-9	0.019	0.015	0.022
T-11	0.017	0.011	0.020
T-12	0.015	0.009	0.017
T-27	0.021	0.017	0.025
Controls	0.018	0.009	0.025
T-1	0.020	0.017	0.024
T-2	0.018	0.015	0.021
T-3	0.019	0.016	0.020
T-4	0.015	0.013	0.016
T-7	0.014	0.010	0.016
T-8	0.018	0.015	0.023
Indicators	0.017	0.010	0.024

August			
Location	Average	Minima	Maxima
T-9	0.035	0.030	0.045
T-11	0.034	0.024	0.043
T-12	0.031	0.025	0.038
T-27	0.041	0.025	0.051
Controls	0.035	0.024	0.051
T-1	0.035	0.028	0.039
T-2	0.032	0.024	0.052
T-3	0.036	0.026	0.046
T-4	0.026	0.012	0.043
T-7	0.033	0.028	0.043
T-8	0.032	0.019	0.054
Indicators	0.032	0.012	0.054

November			
Location	Average	Minima	Maxima
T-9	0.032	0.021	0.044
T-11	0.025	0.019	0.035
T-12	0.021	0.016	0.025
T-27	0.026	0.025	0.028
Controls	0.026	0.016	0.044
T-1	0.030	0.022	0.034
T-2	0.026	0.019	0.033
T-3	0.027	0.019	0.039
T-4	0.021	0.013	0.025
T-7	0.022	0.016	0.030
T-8	0.024	0.020	0.030
Indicators	0.025	0.013	0.039

September			
Location	Average	Minima	Maxima
T-9	0.020	0.017	0.024
T-11	0.022	0.018	0.025
T-12	0.017	0.012	0.022
T-27	0.023	0.018	0.034
Controls	0.021	0.012	0.034
T-1	0.018	0.013	0.023
T-2	0.016	0.009	0.022
T-3	0.019	0.012	0.024
T-4	0.019	0.012	0.027
T-7	0.017	0.014	0.020
T-8	0.015	0.010	0.019
Indicators	0.017	0.009	0.027

December			
Location	Average	Minima	Maxima
T-9	0.035	0.021	0.051
T-11	0.030	0.016	0.050
T-12	0.030	0.019	0.042
T-27	0.028	0.022	0.047
Controls	0.031	0.016	0.051
T-1	0.034	0.023	0.052
T-2	0.030	0.021	0.048
T-3	0.033	0.024	0.048
T-4	0.036	0.020	0.065
T-7	0.025	0.021	0.035
T-8	0.037	0.027	0.051
Indicators	0.033	0.020	0.065

Note: Unless otherwise specified, samples collected on the first, second or third day of the month are grouped with data from the previous month.

Table 12. Airborne particulates, analyses for strontium-89, strontium-90 and gamma-emitting isotopes.
Collection: Quarterly Composite
Units: pCi/m^3

Location	T-1			
Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Lab Code	TAP- 1283	TAP- 2897	TAP- 4355	TAP- 5523
Volume (m^3)	3698	3716	3708	3627
Sr-89	< 0.0006	< 0.0006	< 0.0007	< 0.0005
Sr-90	< 0.0004	< 0.0004	< 0.0004	< 0.0004
Be-7	0.080 ± 0.013	0.099 ± 0.018	0.077 ± 0.013	0.068 ± 0.015
K-40	< 0.021	< 0.021	< 0.024	< 0.025
Nb-95	< 0.0007	< 0.0013	< 0.0011	< 0.0007
Zr-95	< 0.0011	< 0.0012	< 0.0016	< 0.0016
Ru-103	< 0.0010	< 0.0010	< 0.0006	< 0.0007
Ru-106	< 0.0053	< 0.0063	< 0.0084	< 0.0086
Cs-134	< 0.0007	< 0.0008	< 0.0009	< 0.0010
Cs-137	< 0.0007	< 0.0007	< 0.0008	< 0.0007
Ce-141	< 0.0015	< 0.0016	< 0.0012	< 0.0016
Ce-144	< 0.0031	< 0.0052	< 0.0037	< 0.0058

Location	T-2			
Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Lab Code	TAP- 1284	TAP- 2898	TAP- 4356	TAP- 5524
Volume (m^3)	3731	3699	3742	3792
Sr-89	< 0.0005	< 0.0007	< 0.0006	< 0.0005
Sr-90	< 0.0004	< 0.0004	< 0.0003	< 0.0004
Be-7	0.073 ± 0.013	0.106 ± 0.017	0.054 ± 0.013	0.065 ± 0.012
K-40	< 0.015	< 0.024	< 0.024	< 0.020
Nb-95	< 0.0009	< 0.0014	< 0.0012	< 0.0003
Zr-95	< 0.0008	< 0.0019	< 0.0015	< 0.0013
Ru-103	< 0.0004	< 0.0016	< 0.0006	< 0.0006
Ru-106	< 0.0045	< 0.0090	< 0.0074	< 0.0043
Cs-134	< 0.0006	< 0.0011	< 0.0010	< 0.0009
Cs-137	< 0.0006	< 0.0009	< 0.0010	< 0.0007
Ce-141	< 0.0008	< 0.0023	< 0.0013	< 0.0009
Ce-144	< 0.0031	< 0.0043	< 0.0036	< 0.0042

Table 12. Airborne particulates, analyses for strontium-89, strontium-90 and gamma-emitting isotopes.
Collection: Quarterly Composite
Units: pCi/m^3

Location	T-3			
Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Lab Code	TAP- 1285	TAP- 2899	TAP- 4357	TAP- 5525
Volume (m^3)	3738	3652	3681	3729
Sr-89	< 0.0005	< 0.0006	< 0.0006	< 0.0004
Sr-90	< 0.0003	< 0.0003	< 0.0004	< 0.0004
Be-7	0.070 ± 0.015	0.099 ± 0.014	0.067 ± 0.012	0.066 ± 0.012
K-40	< 0.024	< 0.019	< 0.024	< 0.016
Nb-95	< 0.0022	< 0.0008	< 0.0009	< 0.0007
Zr-95	< 0.0011	< 0.0017	< 0.0019	< 0.0012
Ru-103	< 0.0008	< 0.0008	< 0.0003	< 0.0007
Ru-106	< 0.0078	< 0.0064	< 0.0055	< 0.0048
Cs-134	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Cs-137	< 0.0005	< 0.0009	< 0.0007	< 0.0008
Ce-141	< 0.0025	< 0.0018	< 0.0012	< 0.0012
Ce-144	< 0.0039	< 0.0047	< 0.0036	< 0.0044

Location	T-4			
Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Lab Code	TAP- 1286	TAP- 2900	TAP- 4358	TAP- 5526
Volume (m^3)	3704	3555	3435	3721
Sr-89	< 0.0004	< 0.0006	< 0.0006	< 0.0004
Sr-90	< 0.0003	< 0.0004	< 0.0003	< 0.0003
Be-7	0.075 ± 0.013	0.061 ± 0.012	0.073 ± 0.017	0.069 ± 0.016
K-40	< 0.022	< 0.015	< 0.025	< 0.021
Nb-95	< 0.0007	< 0.0008	< 0.0012	< 0.0013
Zr-95	< 0.0012	< 0.0011	< 0.0020	< 0.0016
Ru-103	< 0.0006	< 0.0007	< 0.0009	< 0.0012
Ru-106	< 0.0056	< 0.0052	< 0.0099	< 0.0091
Cs-134	< 0.0008	< 0.0007	< 0.0010	< 0.0012
Cs-137	< 0.0007	< 0.0005	< 0.0006	< 0.0005
Ce-141	< 0.0013	< 0.0011	< 0.0011	< 0.0019
Ce-144	< 0.0049	< 0.0036	< 0.0063	< 0.0054

Table 12. Airborne particulates, analyses for strontium-89, strontium-90 and gamma-emitting isotopes.
Collection: Quarterly Composite
Units: pCi/m^3

Location	T-7			
Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Lab Code	TAP- 1287	TAP- 2901	TAP- 4359	TAP- 5527
Volume (m^3)	3725	3717	3655	3586
Sr-89	< 0.0005	< 0.0005	< 0.0005	< 0.0004
Sr-90	< 0.0003	< 0.0004	< 0.0003	< 0.0004
Be-7	0.076 ± 0.013	0.11 ± 0.017	0.074 ± 0.013	0.047 ± 0.013
K-40	< 0.015	< 0.018	< 0.024	< 0.027
Nb-95	< 0.0006	< 0.0012	< 0.0014	< 0.0020
Zr-95	< 0.0012	< 0.0014	< 0.0013	< 0.0021
Ru-103	< 0.0008	< 0.0011	< 0.0007	< 0.0011
Ru-106	< 0.0039	< 0.0084	< 0.0068	< 0.0112
Cs-134	< 0.0006	< 0.0009	< 0.0009	< 0.0012
Cs-137	< 0.0006	< 0.0008	< 0.0009	< 0.0013
Ce-141	< 0.0012	< 0.0009	< 0.0013	< 0.0024
Ce-144	< 0.0029	< 0.0046	< 0.0039	< 0.0047

Location	T-8			
Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Lab Code	TAP- 1288	TAP- 2902	TAP- 4360	TAP- 5528
Volume (m^3)	3721	3679	3555	3709
Sr-89	< 0.0006	< 0.0006	< 0.0007	< 0.0004
Sr-90	< 0.0004	< 0.0004	< 0.0004	< 0.0004
Be-7	0.087 ± 0.016	0.098 ± 0.017	0.070 ± 0.014	0.084 ± 0.013
K-40	< 0.026	< 0.022	< 0.025	< 0.021
Nb-95	< 0.0012	< 0.0008	< 0.0015	< 0.0010
Zr-95	< 0.0015	< 0.0014	< 0.0018	< 0.0012
Ru-103	< 0.0007	< 0.0011	< 0.0007	< 0.0006
Ru-106	< 0.0096	< 0.0051	< 0.0074	< 0.0033
Cs-134	< 0.0012	< 0.0009	< 0.0010	< 0.0008
Cs-137	< 0.0006	< 0.0008	< 0.0005	< 0.0006
Ce-141	< 0.0014	< 0.0020	< 0.0011	< 0.0012
Ce-144	< 0.0053	< 0.0050	< 0.0040	< 0.0037

Table 12. Airborne particulates, analyses for strontium-89, strontium-90 and gamma-emitting isotopes.
Collection: Quarterly Composite
Units: pCi/m^3

Location	T-9 (C)			
Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Lab Code	TAP- 1289	TAP- 2903	TAP- 4361	TAP- 5529
Volume (m^3)	3709	3700	3798	3677
Sr-89	< 0.0006	< 0.0007	< 0.0006	< 0.0005
Sr-90	< 0.0004	< 0.0004	< 0.0003	< 0.0004
Be-7	0.082 ± 0.015	0.105 ± 0.016	0.077 ± 0.013	0.072 ± 0.013
K-40	< 0.025	< 0.024	< 0.022	< 0.017
Nb-95	< 0.0011	< 0.0005	< 0.0011	< 0.0007
Zr-95	< 0.0014	< 0.0012	< 0.0015	< 0.0007
Ru-103	< 0.0011	< 0.0009	< 0.0008	< 0.0006
Ru-106	< 0.0067	< 0.0056	< 0.0069	< 0.0067
Cs-134	< 0.0011	< 0.0008	< 0.0011	< 0.0008
Cs-137	< 0.0009	< 0.0008	< 0.0007	< 0.0008
Ce-141	< 0.0013	< 0.0011	< 0.0013	< 0.0013
Ce-144	< 0.0041	< 0.0044	< 0.0035	< 0.0032

Location	T-11 (C)			
Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Lab Code	TAP- 1290	TAP- 2904	TAP- 4362	TAP- 5530
Volume (m^3)	3669	3490	3778	3451
Sr-89	< 0.0005	< 0.0006	< 0.0006	< 0.0005
Sr-90	< 0.0003	< 0.0004	< 0.0004	< 0.0005
Be-7	0.090 ± 0.013	0.096 ± 0.014	0.070 ± 0.014	0.057 ± 0.013
K-40	< 0.022	< 0.016	< 0.023	< 0.023
Nb-95	< 0.0003	< 0.0010	< 0.0011	< 0.0007
Zr-95	< 0.0010	< 0.0015	< 0.0014	< 0.0015
Ru-103	< 0.0009	< 0.0008	< 0.0009	< 0.0011
Ru-106	< 0.0073	< 0.0050	< 0.0073	< 0.0099
Cs-134	< 0.0008	< 0.0008	< 0.0010	< 0.0009
Cs-137	< 0.0006	< 0.0008	< 0.0006	< 0.0012
Ce-141	< 0.0009	< 0.0013	< 0.0010	< 0.0010
Ce-144	< 0.0031	< 0.0031	< 0.0035	< 0.0050

Table 12. Airborne particulates, analyses for strontium-89, strontium-90 and gamma-emitting isotopes.
Collection: Quarterly Composite
Units: pCi/m^3

Location	T-12 (C)			
Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Lab Code	TAP- 1291	TAP- 2905	TAP- 4363	TAP- 5531
Volume (m^3)	3715	3704	3982	3554
Sr-89	< 0.0005	< 0.0005	< 0.0006	< 0.0004
Sr-90	< 0.0003	< 0.0003	< 0.0003	< 0.0003
Be-7	0.076 ± 0.012	0.101 ± 0.016	0.063 ± 0.012	0.047 ± 0.013
K-40	< 0.015	< 0.026	< 0.021	< 0.024
Nb-95	< 0.0008	< 0.0010	< 0.0010	< 0.0009
Zr-95	< 0.0012	< 0.0010	< 0.0012	< 0.0013
Ru-103	< 0.0006	< 0.0010	< 0.0007	< 0.0013
Ru-106	< 0.0033	< 0.0067	< 0.0070	< 0.0063
Cs-134	< 0.0007	< 0.0009	< 0.0010	< 0.0009
Cs-137	< 0.0006	< 0.0006	< 0.0006	< 0.0011
Ce-141	< 0.0013	< 0.0013	< 0.0011	< 0.0018
Ce-144	< 0.0026	< 0.0045	< 0.0038	< 0.0054

Location	T-27 (C)			
Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Lab Code	TAP- 1292	TAP- 2906	TAP- 4364	TAP- 5532
Volume (m^3)	3656	3462	3705	3623
Sr-89	< 0.0005	< 0.0005	< 0.0005	< 0.0004
Sr-90	< 0.0004	< 0.0003	< 0.0004	< 0.0004
Be-7	0.088 ± 0.014	0.11 ± 0.021	0.078 ± 0.015	0.051 ± 0.015
K-40	< 0.030	< 0.022	< 0.024	< 0.023
Nb-95	< 0.0008	< 0.0015	< 0.0009	< 0.0008
Zr-95	< 0.0008	< 0.0014	< 0.0016	< 0.0013
Ru-103	< 0.0007	< 0.0016	< 0.0008	< 0.0010
Ru-106	< 0.0068	< 0.0077	< 0.0059	< 0.0065
Cs-134	< 0.0009	< 0.0013	< 0.0009	< 0.0010
Cs-137	< 0.0006	< 0.0008	< 0.0007	< 0.0008
Ce-141	< 0.0015	< 0.0023	< 0.0011	< 0.0017
Ce-144	< 0.0038	< 0.0056	< 0.0037	< 0.0039

Table 13. Area monitors (TLD), Quarterly.
Units: mR/91 days

Indicator	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
T-1	11.2 ± 1.0	9.4 ± 1.2	11.9 ± 1.1	11.4 ± 0.9
T-2	10.9 ± 0.7	10.3 ± 1.0	11.3 ± 1.1	12.9 ± 1.1
T-3	10.9 ± 1.1	9.2 ± 1.4	11.3 ± 1.5	11.7 ± 1.1
T-4	11.3 ± 0.7	11.4 ± 1.0	12.1 ± 1.1	13.9 ± 1.0
T-5	12.6 ± 0.5	12.8 ± 1.1	13.5 ± 1.0	14.8 ± 1.1
T-6	9.2 ± 0.8	8.8 ± 1.0	10.7 ± 1.4	11.0 ± 0.9
T-7	14.4 ± 0.6	14.2 ± 1.2	15.0 ± 0.9	16.5 ± 0.8
T-8	20.7 ± 1.0	20.4 ± 1.6	24.4 ± 1.6	23.4 ± 1.8
T-10	12.8 ± 0.8	14.0 ± 1.1	13.4 ± 1.2	16.1 ± 0.9
T-38	11.9 ± 0.7	9.9 ± 1.1	12.5 ± 1.7	12.4 ± 1.6
T-39	11.5 ± 1.4	8.3 ± 1.0	11.7 ± 1.8	10.0 ± 0.8
T-40	13.0 ± 0.6	12.8 ± 1.2	13.8 ± 1.0	14.9 ± 1.1
T-41	10.9 ± 0.7	7.3 ± 1.0	11.4 ± 1.1	8.4 ± 0.8
T-42	10.2 ± 1.0	9.5 ± 1.1	11.5 ± 1.5	11.4 ± 1.0
T-43	13.9 ± 1.7	13.1 ± 1.0	14.9 ± 2.3	14.8 ± 0.9
T-44	17.5 ± 1.2	19.1 ± 1.5	20.2 ± 1.5	20.3 ± 1.1
T-45	15.8 ± 0.5	15.9 ± 1.5	19.1 ± 1.1	18.3 ± 2.0
T-46	10.6 ± 0.9	10.5 ± 1.2	11.4 ± 1.1	12.8 ± 1.1
T-47	9.4 ± 0.9	7.6 ± 1.2	10.8 ± 1.4	9.3 ± 1.0
T-48	10.4 ± 0.7	9.7 ± 1.1	11.1 ± 1.2	11.6 ± 1.0
T-49	9.5 ± 0.7	8.8 ± 1.1	10.2 ± 1.4	10.8 ± 1.6
T-50	14.2 ± 0.7	14.7 ± 1.3	15.0 ± 0.9	15.6 ± 1.1
T-51	15.9 ± 1.2	13.8 ± 1.6	16.6 ± 1.4	14.2 ± 1.4
T-52	15.9 ± 2.0	18.2 ± 1.3	17.7 ± 2.3	18.9 ± 1.0
T-53	17.5 ± 0.7	16.8 ± 2.6	18.7 ± 1.1	17.1 ± 2.2
T-54	16.7 ± 1.0	16.1 ± 1.7	17.7 ± 1.5	17.2 ± 1.5
T-55	13.4 ± 1.5	13.2 ± 1.7	13.3 ± 1.5	14.5 ± 1.6
T-60	10.3 ± 1.0	11.4 ± 1.1	12.5 ± 1.3	11.9 ± 1.5
T-62	7.8 ± 0.5	8.5 ± 1.0	9.9 ± 0.9	9.3 ± 1.0
T-65	9.2 ± 0.8	9.7 ± 1.1	11.2 ± 0.9	14.0 ± 1.2
T-66	16.1 ± 0.7	16.4 ± 1.5	19.6 ± 0.8	17.7 ± 1.4
T-67	15.2 ± 0.5	16.8 ± 1.1	17.8 ± 0.9	17.4 ± 1.2
T-68	13.6 ± 1.6	12.2 ± 1.0	16.2 ± 1.7	13.3 ± 0.8
T-69	13.1 ± 0.7	15.3 ± 1.5	ND[a]	20.7 ± 0.9
T-71	11.8 ± 0.4	14.5 ± 1.1	14.6 ± 0.7	16.1 ± 1.1
T-73	10.6 ± 1.0	11.0 ± 1.2	11.6 ± 1.1	11.9 ± 1.1
T-74	12.5 ± 0.8	12.6 ± 1.4	13.6 ± 0.8	13.4 ± 1.5
T-75	10.1 ± 0.6	10.0 ± 0.9	10.5 ± 0.6	10.7 ± 0.8
T-76	10.7 ± 0.7	10.0 ± 1.1	10.6 ± 0.8	10.8 ± 0.9
T-91	16.6 ± 0.7	15.1 ± 1.4	17.5 ± 1.1	17.3 ± 1.3
T-92	10.1 ± 0.8	10.7 ± 1.0	10.7 ± 0.4	12.4 ± 0.8

Table 13. Area monitors (TLD), Quarterly.
Units: mR/91 days

Indicator	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
T-93	12.9 ± 0.7	12.7 ± 1.3	13.6 ± 0.6	14.4 ± 1.5
T-94	14.4 ± 0.7	14.3 ± 1.5	15.4 ± 0.8	17.5 ± 1.4
T-112	11.4 ± 0.4	13.2 ± 1.3	10.6 ± 0.6	14.1 ± 1.1
T-121	15.9 ± 1.2	18.6 ± 1.3	16.7 ± 1.2	19.6 ± 1.3
T-122	12.6 ± 1.2	14.6 ± 1.2	12.2 ± 1.0	15.1 ± 0.9
T-123	15.3 ± 0.7	15.9 ± 1.1	14.2 ± 0.7	16.3 ± 0.9
T-125	16.6 ± 0.7	15.5 ± 1.3	16.2 ± 0.6	15.0 ± 0.9
T-126	12.0 ± 0.6	14.5 ± 1.7	12.1 ± 0.8	13.9 ± 1.2
T-127	16.6 ± 1.8	17.8 ± 1.9	15.6 ± 1.1	16.7 ± 1.3
T-128	16.6 ± 1.5	17.2 ± 1.1	15.6 ± 1.2	16.4 ± 0.9
T-142	10.3 ± 0.4	10.3 ± 1.1	7.7 ± 0.8	10.5 ± 1.0
T-150	12.4 ± 0.9	12.5 ± 1.6	11.3 ± 1.0	12.6 ± 1.2
T-151	19.5 ± 1.6	17.7 ± 1.5	19.0 ± 1.6	17.8 ± 1.2
T-153	21.7 ± 0.6	18.0 ± 1.1	22.3 ± 1.2	17.4 ± 0.8
T-154	16.3 ± 0.9	19.1 ± 1.5	16.0 ± 0.5	18.4 ± 1.4
T-201	13.0 ± 0.8	14.0 ± 0.7	13.4 ± 0.6	15.9 ± 0.8
T-202	13.5 ± 1.0	11.3 ± 1.1	13.6 ± 1.0	13.2 ± 1.0
T-203	16.2 ± 1.4	15.8 ± 1.4	15.5 ± 0.5	17.9 ± 1.4
T-204	14.8 ± 0.9	13.9 ± 1.0	14.0 ± 0.7	17.0 ± 1.3
T-205	12.8 ± 0.8	11.6 ± 0.9	12.6 ± 0.6	12.1 ± 0.7
T-206	10.8 ± 0.9	10.0 ± 0.7	11.8 ± 0.9	12.8 ± 0.7
T-207	10.4 ± 0.8	8.5 ± 0.6	11.7 ± 0.8	10.0 ± 0.9
T-208	8.5 ± 0.9	9.2 ± 0.7	8.8 ± 0.8	10.6 ± 1.0
T-211	10.0 ± 0.8	7.9 ± 1.0	10.7 ± 1.2	8.1 ± 0.9
T-212	8.3 ± 0.7	7.7 ± 1.0	8.5 ± 0.8	10.6 ± 1.2
T-213	14.8 ± 1.1	15.7 ± 1.2	15.1 ± 0.9	16.0 ± 1.1
T-214	16.4 ± 1.0	19.4 ± 1.3	18.2 ± 0.8	18.6 ± 1.0
T-215	16.4 ± 0.8	18.3 ± 1.5	17.8 ± 0.8	17.6 ± 1.3
T-216	15.3 ± 1.3	14.0 ± 1.1	17.8 ± 1.4	13.6 ± 1.1
T-217	17.6 ± 1.3	17.3 ± 1.6	18.2 ± 1.8	16.3 ± 1.6
T-218	21.3 ± 1.3	21.1 ± 2.2	22.5 ± 1.4	19.2 ± 1.6
T-219	14.9 ± 1.2	13.2 ± 1.6	14.7 ± 1.4	12.4 ± 1.4
T-220	18.7 ± 0.9	18.6 ± 1.4	21.1 ± 1.4	17.7 ± 1.5
T-222	11.8 ± 1.0	12.3 ± 1.1	12.5 ± 1.3	12.2 ± 1.2
T-223	15.4 ± 1.1	14.2 ± 1.4	16.0 ± 1.4	10.3 ± 0.8
T-224	10.8 ± 0.9	11.2 ± 1.0	10.8 ± 0.9	12.9 ± 1.1
Mean ± s.d.	13.5 ± 3.2	13.3 ± 3.5	14.2 ± 3.5	14.4 ± 3.2

Table 13. Area monitors (TLD), Quarterly.
Units: mR/91 days

	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Control				
T-9	13.1 ± 1.0	11.9 ± 1.2	13.8 ± 1.4	13.6 ± 0.9
T-11	13.1 ± 0.7	11.3 ± 1.2	12.9 ± 0.9	13.4 ± 1.0
T-12	15.1 ± 0.7	14.4 ± 1.4	16.7 ± 1.3	16.6 ± 1.4
T-24	17.1 ± 1.0	17.0 ± 1.1	17.8 ± 1.3	18.7 ± 0.8
T-27	18.1 ± 1.8	17.3 ± 1.6	19.0 ± 2.2	18.7 ± 1.2
Mean ± s.d.	15.3 ± 2.3	14.4 ± 2.8	16.0 ± 2.6	16.2 ± 2.6
T-95	13.8 ± 1.1	12.8 ± 1.1	15.6 ± 1.0	14.3 ± 1.0
T-100	13.2 ± 1.6	13.3 ± 1.4	15.9 ± 1.5	14.4 ± 1.0
T-111	14.2 ± 1.3	15.2 ± 1.1	13.2 ± 1.6	16.0 ± 1.0
T-124	18.2 ± 0.9	19.3 ± 1.5	17.1 ± 1.4	18.9 ± 1.1
T-155	ND[a]	15.5 ± 1.9	14.4 ± 1.0	15.4 ± 1.6
T-221	19.1 ± 1.1	17.0 ± 1.3	22.3 ± 1.2	18.5 ± 1.1
Mean ± s.d.	15.7 ± 2.7	15.5 ± 2.4	16.4 ± 3.2	16.3 ± 2.0
QC				
T-80	9.7 ± 1.1	8.8 ± 1.0	8.5 ± 1.3	9.6 ± 0.9
T-81	16.0 ± 1.0	16.1 ± 1.0	17.1 ± 1.5	18.2 ± 0.8
T-82	9.9 ± 0.7	9.1 ± 1.1	9.0 ± 0.8	11.3 ± 1.1
T-83	9.4 ± 0.8	8.4 ± 1.4	10.0 ± 1.0	10.2 ± 1.3
T-84	11.1 ± 0.7	10.0 ± 0.9	11.8 ± 1.2	12.5 ± 0.8
T-85	10.8 ± 1.1	10.8 ± 1.2	11.5 ± 1.1	13.1 ± 1.2
T-86	15.5 ± 0.8	14.9 ± 1.1	17.8 ± 2.0	17.4 ± 1.0
T-88	13.5 ± 1.5	14.8 ± 1.1	13.7 ± 1.5	16.3 ± 0.9
T-89	12.0 ± 0.6	12.9 ± 1.1	13.7 ± 0.6	14.3 ± 0.9
T-113	12.6 ± 1.0	14.3 ± 1.6	12.5 ± 0.7	14.3 ± 1.1
T-114	19.3 ± 0.9	18.7 ± 1.5	18.0 ± 0.9	18.6 ± 1.2
T-115	16.6 ± 0.9	17.4 ± 1.1	16.2 ± 1.2	18.1 ± 1.2
T-116	19.5 ± 2.0	16.9 ± 1.4	19.1 ± 1.1	17.3 ± 1.2
T-117	10.2 ± 0.8	11.2 ± 1.3	10.3 ± 0.8	14.4 ± 1.5
T-118	14.3 ± 0.8	13.5 ± 0.9	14.8 ± 0.8	17.9 ± 0.9
T-119	11.0 ± 1.0	12.8 ± 1.9	8.9 ± 0.4	13.1 ± 1.1
T-120	12.1 ± 0.5	8.6 ± 1.2	13.0 ± 0.6	9.4 ± 1.1
T-200	9.1 ± 0.9	11.0 ± 0.7	9.7 ± 0.9	12.9 ± 0.8
Mean ± s.d.	12.9 ± 3.3	12.8 ± 3.2	13.1 ± 3.4	14.4 ± 3.1
Shield				
T-87	5.1 ± 0.5	4.9 ± 1.2	4.9 ± 0.6	6.8 ± 1.1

[a] ND = No Data, TLD missing in the field.

Table 14. Area monitors (TLD), Annual.
Units: mR/365 days

Indicator	2018
T-1	39.0 ± 2.1
T-2	41.8 ± 1.9
T-3	40.2 ± 2.8
T-4	41.7 ± 1.6
T-5	46.7 ± 2.0
T-6	36.2 ± 1.7
T-7	54.2 ± 2.2
T-8	70.1 ± 5.3
T-10	55.3 ± 1.9
T-38	38.5 ± 2.0
T-39	39.0 ± 1.6
T-40	48.7 ± 3.0
T-41	34.3 ± 1.8
T-42	41.6 ± 2.4
T-43	49.2 ± 2.8
T-44	70.8 ± 4.6
T-45	64.7 ± 2.1
T-46	43.6 ± 2.7
T-47	34.9 ± 1.9
T-48	40.1 ± 1.8
T-49	34.0 ± 1.8
T-50	51.0 ± 2.2
T-51	56.9 ± 2.6
T-52	67.6 ± 1.8
T-53	56.0 ± 2.9
T-54	60.3 ± 3.5
T-55	48.9 ± 3.4
T-60	46.3 ± 2.1
T-62	44.6 ± 1.6
T-65	48.2 ± 3.2
T-66	63.0 ± 3.4
T-67	67.4 ± 2.5
T-68	64.0 ± 2.2
T-69	ND[a]
T-71	71.2 ± 3.5
T-73	46.5 ± 2.0
T-74	63.9 ± 2.5
T-75	44.1 ± 1.4
T-76	49.8 ± 2.8
T-91	54.4 ± 2.6
T-92	45.3 ± 1.3

[a] ND = No Data, TLD lost in the field.

Table 14. Area monitors (TLD), Annual.
Units: mR/365 days

Indicator	2018
T-93	48.1 ± 1.3
T-94	55.5 ± 1.1
T-112	58.3 ± 2.8
T-121	76.1 ± 3.7
T-122	53.9 ± 2.6
T-123	59.1 ± 2.7
T-125	57.5 ± 3.1
T-126	53.0 ± 2.2
T-127	66.1 ± 2.8
T-128	71.8 ± 2.0
T-142	ND[a]
T-150	46.7 ± 1.3
T-151	67.4 ± 4.9
T-153	63.1 ± 2.3
T-154	69.9 ± 2.7
T-201	47.8 ± 4.0
T-202	45.6 ± 3.1
T-203	55.3 ± 5.8
T-204	41.8 ± 3.9
T-205	39.3 ± 3.3
T-206	33.8 ± 3.3
T-207	34.4 ± 3.2
T-208	34.2 ± 3.3
T-211	35.4 ± 2.3
T-212	37.9 ± 1.8
T-213	65.7 ± 4.3
T-214	66.0 ± 3.1
T-215	66.4 ± 3.1
T-216	59.8 ± 2.6
T-217	71.1 ± 2.6
T-218	73.1 ± 3.3
T-219	58.6 ± 5.2
T-220	70.3 ± 3.5
T-222	53.3 ± 2.5
T-223	56.3 ± 3.7
T-224	47.3 ± 2.1
Mean ± s.d.	52.7 ± 11.9

[a] ND = No Data, TLD lost in the field.

Table 14. Area monitors (TLD), Annual.

Units: mR/365 days

Control	2018
T-9	49.0 ± 2.3
T-11	44.9 ± 3.8
T-12	54.3 ± 3.2
T-24	62.6 ± 3.0
T-27	63.7 ± 1.8
Mean ± s.d.	54.9 ± 8.2
T-95	53.0 ± 1.6
T-100	54.1 ± 1.3
T-111	62.1 ± 2.4
T-124	63.6 ± 3.5
T-155	ND[a]
T-221	65.1 ± 2.7
Mean ± s.d.	59.6 ± 5.6
QC	
T-80	37.5 ± 1.8
T-81	79.1 ± 2.3
T-82	36.7 ± 2.3
T-83	37.8 ± 3.1
T-84	46.8 ± 3.6
T-85	50.1 ± 0.9
T-86	62.0 ± 4.6
T-88	51.0 ± 2.4
T-89	61.3 ± 1.9
T-113	62.2 ± 2.1
T-114	71.6 ± 2.4
T-115	70.7 ± 3.7
T-116	65.4 ± 3.0
T-117	48.4 ± 1.9
T-118	56.0 ± 3.6
T-119	51.8 ± 2.3
T-120	40.0 ± 1.7
T-200	45.3 ± 4.0
Mean ± s.d.	54.1 ± 12.7
Shield	
T-87	26.9 ± 1.9

Table 15. Milk, analyses for strontium-89, strontium-90, iodine-131, gamma emitting isotopes, calcium and stable potassium.
Monthly collections, location T-24 Units: pCi/L

Date Collected	01-31-18	02-28-18	04-04-18	05-02-18
Lab Code	TMI- 310	TMI- 668	TMI- 1034	TMI- 1609
I-131	< 0.2	< 0.3	< 0.2	< 0.4
Sr-89	< 0.7	< 0.6	< 0.6	< 0.5
Sr-90	< 0.8	< 0.6	< 0.6	< 0.5
K-40	1377 ± 116	1328 ± 119	1401 ± 114	1393 ± 105
Cs-134	< 3.4	< 3.6	< 3.8	< 3.5
Cs-137	< 2.3	< 4.2	< 3.8	< 2.3
Ba-La-140	< 2.3	< 2.5	< 2.4	< 3.2
Ca (g/L)	0.94	1.01	0.90	0.83
Sr-90/g Ca	< 0.85	< 0.59	< 0.67	< 0.60
K (g/L)	1.68 ± 0.14	1.62 ± 0.15	1.71 ± 0.14	1.70 ± 0.13
Cs-137/g K	< 1.37	< 2.59	< 2.22	< 1.35

Date Collected	05-30-18	07-03-18	07-31-18	08-28-18
Lab Code	TMI- 2068	TMI- 2487	TMI- 3052	TMI- 3498
I-131	< 0.3	< 0.3	< 0.3	< 0.4
Sr-89	< 0.5	< 0.5	< 0.6	< 0.5
Sr-90	0.6 ± 0.3	0.7 ± 0.3	0.6 ± 0.3	0.5 ± 0.3
K-40	1375 ± 132	1448 ± 110	1338 ± 116	1340 ± 118
Cs-134	< 5.3	< 3.1	< 3.6	< 3.7
Cs-137	< 5.3	< 3.2	< 4.3	< 3.5
Ba-La-140	< 3.6	< 2.0	< 4.2	< 1.5
Ca (g/L)	1.02	0.94	0.94	1.03
Sr-90/g Ca	0.59	0.74	0.64	0.49
K (g/L)	1.68 ± 0.16	1.77 ± 0.13	1.63 ± 0.14	1.63 ± 0.14
Cs-137/g K	< 3.15	< 1.81	< 2.64	< 2.15

Date Collected	09-26-18	10-31-18	12-05-18	01-03-19
Lab Code	TMI- 3946	TMI- 4693	TMI- 5121	TMI- 5422
I-131	< 0.3	< 0.5	< 0.3	< 0.4
Sr-89	< 0.6	< 0.6	< 0.5	< 0.7
Sr-90	< 0.5	< 0.5	< 0.6	< 0.7
K-40	1355 ± 123	1439 ± 126	1398 ± 122	1292 ± 121
Cs-134	< 3.8	< 4.5	< 4.8	< 4.1
Cs-137	< 5.1	< 4.4	< 4.2	< 3.9
Ba-La-140	< 4.0	< 1.6	< 6.5	< 3.9
Ca (g/L)	1.06	0.95	1.04	0.95
Sr-90/g Ca	< 0.47	< 0.53	< 0.58	< 0.74
K (g/L)	1.65 ± 0.15	1.75 ± 0.15	1.70 ± 0.15	1.58 ± 0.15
Cs-137/g K	< 3.09	< 2.51	< 2.47	< 2.47

Table 16. Ground water samples, analyses for gross beta, tritium, strontium-89, strontium-90 and gamma-emitting isotopes.
Collection: Quarterly
Units: pCi/L

Period	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	
Location			T-27A (C)		
Lab Code	TWW- 311	TWW- 2094	TWW- 3526	TWW- 5140	Req. LLD
Date Collected	01-23-18	05-09-18	08-09-18	11-14-18	
Gross beta	< 3.7	< 3.8	< 3.7	< 4.0	4.0
H-3	< 330	< 330	< 330	< 330	330
Sr-89	< 0.6	< 0.7	< 0.6	< 0.8	
Sr-90	< 0.5	< 0.5	< 0.4	< 0.5	
Mn-54	< 1.9	< 2.5	< 1.8	< 3.1	15
Fe-59	< 5.1	< 7.8	< 5.6	< 7.6	30
Co-58	< 2.0	< 2.7	< 1.8	< 5.1	15
Co-60	< 2.2	< 1.8	< 2.0	< 2.9	15
Zn-65	< 1.3	< 4.0	< 5.0	< 9.1	30
Zr-Nb-95	< 3.0	< 3.2	< 5.1	< 6.8	15
Cs-134	< 2.7	< 3.5	< 3.2	< 4.5	15
Cs-137	< 2.1	< 2.4	< 3.1	< 4.5	18
Ba-La-140	< 2.2	< 7.9	< 4.2	< 6.9	15

Location		
	T-225 (I)	
Lab Code	TWW- 313	Req. LLD
Date Collected	01-23-18	
Gross beta	1.9 ± 0.7	4.0
H-3	< 330	330
Sr-89	< 0.6	
Sr-90	< 0.4	
Mn-54	< 2.1	15
Fe-59	< 4.3	30
Co-58	< 2.6	15
Co-60	< 2.4	15
Zn-65	< 5.0	30
Zr-Nb-95	< 3.4	15
Cs-134	< 3.5	15
Cs-137	< 2.9	18
Ba-La-140	< 2.6	15

Table 16. Ground water samples, analyses for gross beta, tritium, strontium-89, strontium-90 and gamma-emitting isotopes.
Collection: Quarterly
Units: pCi/L

Period	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	
Location			T-141 (QC)		
Lab Code	TWW- 312				Req. LLD
Date Collected	01-23-18				
Gross beta	1.7 ± 0.6				4.0
H-3	< 330				330
Sr-89	< 0.8				
Sr-90	< 0.6				
Mn-54	< 2.6				15
Fe-59	< 3.4				30
Co-58	< 1.4				15
Co-60	< 2.2				15
Zn-65	< 3.9				30
Zr-Nb-95	< 3.1				15
Cs-134	< 2.6				15
Cs-137	< 3.7				18
Ba-La-140	< 5.4				15

[a] "ND" = No data; see Table 2.0, Listing of Missed Samples.

Table 19. Green leafy vegetables, analyses for strontium-89, strontium-90, iodine-131 and other gamma-emitting isotopes.
Collection: Monthly, in season Units: pCi/g wet

Location	T-17 (I)		
Lab Code	TVE- 3522	TVE- 3965	TVE- 4708
Date Collected	08-28-18	09-25-18	10-31-18
Sample Type	Cabbage	Cabbage	Cabbage
Sr-89	< 0.018	< 0.014	< 0.007
Sr-90	< 0.009	< 0.011	< 0.006
I-131	< 0.008	< 0.033	< 0.015
K-40	2.63 ± 0.20	2.52 ± 0.24	2.78 ± 0.28
Nb-95	< 0.008	< 0.011	< 0.010
Zr-95	< 0.009	< 0.015	< 0.013
Cs-134	< 0.006	< 0.008	< 0.010
Cs-137	< 0.007	< 0.011	< 0.011
Ce-141	< 0.010	< 0.013	< 0.012
Ce-144	< 0.039	< 0.056	< 0.054

Location	T-19 (I) 19C			
Lab Code	TVE- 3057	TVE- 3524	TVE- 3966	TVE- 4709
Date Collected	07-31-18	08-28-18	09-25-18	10-31-18
Sample Type	Kale	Cabbage	Cabbage	Cabbage
Sr-89	< 0.025	< 0.006	< 0.014	< 0.006
Sr-90	< 0.014	< 0.003	< 0.013	< 0.004
I-131	< 0.029	< 0.008	< 0.021	< 0.021
K-40	4.15 ± 0.34	1.85 ± 0.18	2.92 ± 0.25	2.57 ± 0.30
Nb-95	< 0.013	< 0.004	< 0.012	< 0.016
Zr-95	< 0.017	< 0.005	< 0.019	< 0.015
Cs-134	< 0.013	< 0.007	< 0.009	< 0.014
Cs-137	< 0.010	< 0.005	< 0.006	< 0.010
Ce-141	< 0.023	< 0.014	< 0.022	< 0.035
Ce-144	< 0.068	< 0.038	< 0.069	< 0.098

Location	T-19 (I) 19K		
Lab Code	TVE- 3591	TVE- 3967	TVE- 4706
Date Collected	08-28-18	09-25-18	10-31-18
Sample Type	Kale	Kale	Kale
Sr-89	< 0.020	< 0.015	< 0.017
Sr-90	< 0.011	< 0.013	< 0.012
I-131	< 0.014	< 0.051	< 0.021
K-40	3.55 ± 0.24	3.56 ± 0.32	3.45 ± 0.35
Nb-95	< 0.007	< 0.015	< 0.013
Zr-95	< 0.014	< 0.019	< 0.017
Cs-134	< 0.009	< 0.014	< 0.013
Cs-137	< 0.008	< 0.012	< 0.015
Ce-141	< 0.014	< 0.025	< 0.013
Ce-144	< 0.050	< 0.113	< 0.060

Table 19. Green leafy vegetables, analyses for strontium-89, strontium-90, iodine-131 and other gamma-emitting isotopes.
Collection: Monthly, in season Units: pCi/g wet

Location	T-30			
Lab Code	TVE- 3058	TVE- 3592	TVE- 3968	TVE- 4707
Date Collected	07-30-18	08-27-18	09-26-18	10-31-18
Sample Type	Kale	Kale	Kale	Kale
Sr-89	< 0.017	< 0.021	< 0.015	< 0.019
Sr-90	< 0.009	< 0.010	< 0.012	< 0.013
I-131	< 0.011	< 0.017	< 0.015	< 0.026
K-40	3.51 ± 0.19	4.56 ± 0.29	3.92 ± 0.20	4.12 ± 0.35
Nb-95	< 0.006	< 0.006	< 0.005	< 0.011
Zr-95	< 0.008	< 0.008	< 0.011	< 0.015
Cs-134	< 0.006	< 0.008	< 0.006	< 0.012
Cs-137	< 0.006	< 0.009	< 0.007	< 0.011
Ce-141	< 0.011	< 0.011	< 0.010	< 0.019
Ce-144	< 0.036	< 0.061	< 0.051	< 0.102

Location	T-37 (C)			
Lab Code	TVE- 3059	TVE- 3593	TVE- 3969	
Date Collected	07-30-18	08-27-18	09-26-18	10-31-18
Sample Type	Cabbage	Cabbage	Cabbage	Ns*
Sr-89	< 0.005	< 0.008	< 0.003	
Sr-90	< 0.003	< 0.004	< 0.003	
I-131	< 0.016	< 0.009	< 0.016	
K-40	2.21 ± 0.21	2.32 ± 0.19	1.53 ± 0.17	
Nb-95	< 0.013	< 0.005	< 0.005	
Zr-95	< 0.016	< 0.007	< 0.013	
Cs-134	< 0.009	< 0.006	< 0.007	
Cs-137	< 0.006	< 0.008	< 0.006	
Ce-141	< 0.021	< 0.008	< 0.012	
Ce-144	< 0.049	< 0.038	< 0.042	

Table 19. Green leafy vegetables, analyses for strontium-89, strontium-90, iodine-131 and other gamma-emitting isotopes.
Collection: Monthly, in season Units: pCi/g wet

Location	T-227 (I)		
Lab Code	TVE- 3525	TVE- 3970	
Date Collected	08-28-18	09-25-18	10-31-18
Sample Type	Cabbage	Cabbage	Ns*
Sr-89	< 0.015	< 0.008	
Sr-90	< 0.007	< 0.007	
I-131	< 0.020	< 0.024	
K-40	2.41 ± 0.20	2.82 ± 0.22	
Nb-95	< 0.005	< 0.009	
Zr-95	< 0.008	< 0.014	
Cs-134	< 0.007	< 0.007	
Cs-137	< 0.008	< 0.009	
Ce-141	< 0.019	< 0.016	
Ce-144	< 0.072	< 0.048	

*No sample

Table 20. Fruit, analyses for strontium-89, strontium-90, iodine-131 and other gamma-emitting isotopes.
Collection: Monthly, in season
Units: pCi/g wet

Location	T-8 (I)	T-25 (I)
Lab Code	TVE- 4710	TVE- 4711
Date Collected	10-24-18	10-24-18
Sample Type	Apples	Apples
Sr-89	< 0.007	< 0.006
Sr-90	< 0.004	< 0.004
I-131	< 0.013	< 0.013
K-40	1.41 ± 0.16	1.54 ± 0.17
Nb-95	< 0.006	< 0.008
Zr-95	< 0.012	< 0.009
Cs-134	< 0.007	< 0.007
Cs-137	< 0.007	< 0.007
Ce-141	< 0.009	< 0.014
Ce-144	< 0.048	< 0.037

Location	T-209 (C)
Lab Code	
Date Collected	10-24-18
Sample Type	Ns[a]
Sr-89	
Sr-90	
I-131	
K-40	
Nb-95	
Zr-95	
Cs-134	
Cs-137	
Ce-141	
Ce-144	

[a] No sample available

Table 22. Soil samples, analyses for gamma-emitting isotopes.
Collection: Annual
Units: pCi/g dry

Location	T-1	T-2	T-3	T-4
Lab Code	TSO- 1632	TSO- 1633	TSO- 1634	TSO- 1636
Date Collected	04-25-18	04-25-18	04-25-18	04-25-18
Be-7	< 0.34	< 0.28	< 0.31	< 0.30
K-40	7.32 ± 0.67	8.45 ± 0.67	6.36 ± 0.56	4.54 ± 0.52
Mn-54	< 0.021	< 0.022	< 0.024	< 0.025
Nb-95	< 0.032	< 0.064	< 0.043	< 0.028
Zr-95	< 0.040	< 0.042	< 0.030	< 0.052
Ru-103	< 0.040	< 0.037	< 0.018	< 0.038
Ru-106	< 0.165	< 0.281	< 0.195	< 0.207
Cs-134	< 0.026	< 0.023	< 0.020	< 0.017
Cs-137	< 0.029	0.14 ± 0.038	< 0.027	< 0.020
Ce-141	< 0.066	< 0.102	< 0.072	< 0.066
Ce-144	< 0.142	< 0.228	< 0.150	< 0.179

Location	T-7	T-8
Lab Code	TSO- 1637	TSO- 1638
Date Collected	04-25-18	04-25-18
Be-7	1.03 ± 0.41	0.94 ± 0.37
K-40	14.18 ± 0.83	21.93 ± 0.92
Mn-54	< 0.036	< 0.027
Nb-95	< 0.067	< 0.055
Zr-95	< 0.035	< 0.044
Ru-103	< 0.046	< 0.027
Ru-106	< 0.174	< 0.150
Cs-134	< 0.023	< 0.023
Cs-137	0.051 ± 0.021	0.083 ± 0.029
Ce-141	< 0.079	< 0.085
Ce-144	< 0.190	< 0.132

Location	T-9	T-11	T-12	T-27
Lab Code	TSO- 1639	TSO- 1640	TSO- 1641	TSO- 1642
Date Collected	04-25-18	04-25-18	04-25-18	04-25-18
Be-7	1.13 ± 0.43	0.90 ± 0.34	0.68 ± 0.24	< 0.38
K-40	17.67 ± 1.01	18.37 ± 0.80	17.00 ± 0.72	22.14 ± 0.99
Mn-54	< 0.040	< 0.025	< 0.028	< 0.035
Nb-95	< 0.046	< 0.054	< 0.038	< 0.079
Zr-95	< 0.079	< 0.050	< 0.060	< 0.051
Ru-103	< 0.041	< 0.044	< 0.019	< 0.043
Ru-106	< 0.157	< 0.231	< 0.128	< 0.319
Cs-134	< 0.026	< 0.019	< 0.016	< 0.028
Cs-137	0.20 ± 0.034	0.081 ± 0.031	0.042 ± 0.019	0.13 ± 0.036
Ce-141	< 0.106	< 0.088	< 0.073	< 0.086
Ce-144	< 0.226	< 0.193	< 0.145	< 0.212

Table 23. Treated surface water samples, analyses for gross beta.
Collection: Monthly composites of weekly grab samples
Units. pCi/L

T-11 (C)			T-12 (C)		
Lab Code	Date Collected	Gross Beta	Lab Code	Date Collected	Gross Beta
TSWT- 314	01-30-18	< 0.8	TSWT- 315	01-30-18	1.4 ± 0.6
TSWT- 701	02-27-18	1.2 ± 0.6	TSWT- 702	02-27-18	1.2 ± 0.6
TSWT- 1054	04-03-18	1.1 ± 0.6	TSWT- 1055	04-03-18	2.6 ± 0.6
TSWT- 1621	05-01-18	1.0 ± 0.5	TSWT- 1622	05-01-18	1.5 ± 0.6
TSWT- 2082	05-29-18	0.9 ± 0.5	TSWT- 2083	05-29-18	1.4 ± 0.5
TSWT- 2500	07-02-18	1.7 ± 0.6	TSWT- 2501	07-02-18	1.4 ± 0.6
TSWT- 3053	07-30-18	1.3 ± 0.6	TSWT- 3054	07-30-18	1.2 ± 0.5
TSWT- 3499	08-27-18	< 0.9	TSWT- 3500	08-27-18	< 0.8
TSWT- 3973	09-25-18	< 0.9	TSWT- 3974	09-25-18	< 0.9
TSWT- 4702	10-30-18	1.1 ± 0.5	TSWT- 4703	10-30-18	< 0.8
TSWT- 5128	12-04-18	1.1 ± 0.5	TSWT- 5129	12-04-18	1.1 ± 0.5
TSWT- 5423	01-02-19	1.4 ± 0.6	TSWT- 5424	01-02-19	1.5 ± 0.6

T-22			T-143 (QC)		
TSWT- 316	01-30-18	< 0.9	TSWT- 317	01-30-18	1.0 ± 0.5
TSWT- 703	02-27-18	1.4 ± 0.6	TSWT- 704	02-27-18	1.7 ± 0.6
TSWT- 1056	04-03-18	1.5 ± 0.6	TSWT- 1057	04-03-18	1.5 ± 0.6
TSWT- 1623	05-01-18	1.0 ± 0.5	TSWT- 1624	05-01-18	1.0 ± 0.6
TSWT- 2084	05-29-18	1.6 ± 0.6	TSWT- 2085	05-29-18	1.0 ± 0.5
TSWT- 2502	07-02-18	1.4 ± 0.6	TSWT- 2503	07-02-18	1.9 ± 0.6
TSWT- 3055	07-31-18	1.7 ± 0.6	TSWT- 3056	07-30-18	1.1 ± 0.6
TSWT- 3501	08-27-18	1.4 ± 0.6	TSWT- 3503	08-27-18	1.1 ± 0.5
TSWT- 3975	09-25-18	< 0.8	TSWT- 3976	09-25-18	1.1 ± 0.5
TSWT- 4704	10-30-18	1.5 ± 0.6	TSWT- 4705	10-30-18	< 0.9
TSWT- 5130	12-04-18	< 0.8	TSWT- 5131	12-04-18	1.6 ± 0.6
TSWT- 5425	01-02-19	1.2 ± 0.6	TSWT- 5426	01-02-19	1.4 ± 0.5

Table 24. Treated surface water samples, analyses for tritium, strontium-89, strontium-90 and gamma-emitting isotopes.
Collection: Quarterly composites of weekly grab samples
Units: pCi/L

Location	T-11 (C)				
Period Lab Code	1st Qtr. TSWT- 1230	2nd Qtr. TSWT- 2514	3rd Qtr. TSWT- 4084	4th Qtr. TSWT- 5434	Req. LLD
H-3	< 330	< 330	< 330	< 330	330
Sr-89	< 0.8	< 0.7	< 0.7	< 0.6	
Sr-90	< 0.5	< 0.6	< 0.5	< 0.5	
Mn-54	< 2.4	< 2.3	< 3.1	< 3.6	15
Fe-59	< 3.3	< 5.2	< 8.5	< 5.6	30
Co-58	< 3.0	< 2.4	< 2.3	< 2.4	15
Co-60	< 1.6	< 2.0	< 2.3	< 2.5	15
Zn-65	< 5.0	< 3.5	< 2.7	< 4.2	30
Zr-Nb-95	< 3.5	< 2.1	< 3.3	< 3.1	15
Cs-134	< 3.2	< 2.9	< 4.7	< 4.2	10
Cs-137	< 2.2	< 2.4	< 3.6	< 2.3	18
Ba-La-140	< 5.2	< 2.7	< 4.3	< 3.4	15

Location	T-12 (C)				
Period Lab Code	1st Qtr. TSWT- 1231	2nd Qtr. TSWT- 2515	3rd Qtr. TSWT- 4085	4th Qtr. TSWT- 5436	Req. LLD
H-3	< 330	< 330	< 330	< 330	330
Sr-89	< 0.9	< 0.6	< 0.9	< 0.6	
Sr-90	< 0.6	< 0.5	< 0.7	< 0.5	
Mn-54	< 2.1	< 3.2	< 3.5	< 3.4	15
Fe-59	< 5.4	< 6.3	< 3.4	< 4.2	30
Co-58	< 2.2	< 3.3	< 1.4	< 1.8	15
Co-60	< 1.9	< 3.2	< 3.6	< 2.8	15
Zn-65	< 2.9	< 4.5	< 4.9	< 5.1	30
Zr-Nb-95	< 3.6	< 2.7	< 4.0	< 4.3	15
Cs-134	< 3.1	< 3.7	< 4.2	< 3.6	10
Cs-137	< 3.0	< 2.9	< 3.1	< 1.1	18
Ba-La-140	< 4.2	< 3.3	< 2.4	< 4.9	15

Table 24. Treated surface water samples, analyses for tritium, strontium-89, strontium-90 and gamma-emitting isotopes.
Collection: Quarterly composites of weekly grab samples.
Units: pCi/L

Location	T-22				
Period Lab Code	1st Qtr. TSWT- 1232	2nd Qtr. TSWT- 2516	3rd Qtr. TSWT- 4086	4th Qtr. TSWT- 5437	Req. LLD
H-3	< 330	< 330	< 330	< 330	330
Sr-89	< 0.7	< 0.5	< 0.6	< 0.6	
Sr-90	< 0.5	< 0.5	< 0.5	< 0.5	
Mn-54	< 2.9	< 2.0	< 3.1	< 2.7	15
Fe-59	< 3.1	< 1.6	< 5.2	< 4.5	30
Co-58	< 2.1	< 1.2	< 3.1	< 1.5	15
Co-60	< 1.8	< 1.7	< 1.3	< 1.6	15
Zn-65	< 4.7	< 2.8	< 3.5	< 2.4	30
Zr-Nb-95	< 3.2	< 2.9	< 4.7	< 2.6	15
Cs-134	< 2.8	< 2.4	< 3.4	< 2.6	10
Cs-137	< 3.1	< 3.3	< 4.3	< 3.0	18
Ba-La-140	< 8.7	< 1.9	< 7.4	< 3.3	15

Table 25. Untreated surface water, analyses for gross beta, tritium and gamma emitting isotopes.
Location: T-3
Collection: Monthly composites of weekly grab samples
Units: pCi/L

Lab Code	TSWU- 318	TSWU- 706	TSWU- 1064	TSWU- 1625	
Date Collected	01-30-18	02-27-18	04-03-18	05-01-18	Req. LLD
Gross beta	3.0 ± 1.1	1.9 ± 1.0	3.1 ± 0.7	1.8 ± 0.6	4.0
H-3	< 330	< 330	< 330	< 330	330
Mn-54	< 2.3	< 3.3	< 2.3	< 2.6	15
Fe-59	< 5.1	< 3.3	< 3.9	< 4.5	30
Co-58	< 1.8	< 1.8	< 2.9	< 2.8	15
Co-60	< 1.7	< 2.9	< 1.6	< 2.6	15
Zn-65	< 5.7	< 5.8	< 3.6	< 4.5	30
Zr-Nb-95	< 1.9	< 3.7	< 1.8	< 3.2	15
Cs-134	< 2.5	< 3.7	< 2.6	< 3.7	10
Cs-137	< 2.2	< 2.3	< 3.6	< 1.9	18
Ba-La-140	< 1.8	< 2.5	< 1.2	< 2.3	15

Lab Code	TSWU- 2086	TSWU- 2493	TSWU- 3044	TSWU- 3504	
Date Collected	05-29-18	07-02-18	07-30-18	08-27-18	Req. LLD
Gross beta	2.1 ± 0.6	2.0 ± 0.6	1.5 ± 0.6	1.7 ± 0.6	4.0
H-3	< 330	< 330	< 330	< 330	330
Mn-54	< 4.0	< 2.6	< 4.2	< 3.3	15
Fe-59	< 7.1	< 5.1	< 5.4	< 5.6	30
Co-58	< 3.4	< 1.9	< 2.4	< 2.4	15
Co-60	< 4.0	< 1.8	< 3.7	< 1.7	15
Zn-65	< 9.5	< 3.4	< 3.8	< 3.3	30
Zr-Nb-95	< 4.3	< 2.6	< 4.3	< 4.9	15
Cs-134	< 4.7	< 2.3	< 4.2	< 3.3	10
Cs-137	< 5.1	< 2.4	< 4.8	< 2.6	18
Ba-La-140	< 3.6	< 2.6	< 4.0	< 2.0	15

Lab Code	TSWU- 3977	TSWU- 4694	TSWU- 5132	TSWU- 5427	
Date Collected	09-25-18	10-30-18	12-04-18	01-02-19	Req. LLD
Gross beta	1.6 ± 0.6	1.9 ± 0.6	1.3 ± 0.6	2.4 ± 0.7	4.0
H-3	< 330	< 330	< 330	< 330	330
Mn-54	< 3.9	< 3.0	< 2.5	< 3.4	15
Fe-59	< 9.5	< 6.4	< 5.1	< 6.6	30
Co-58	< 2.2	< 3.1	< 1.7	< 2.1	15
Co-60	< 3.4	< 2.0	< 2.8	< 1.5	15
Zn-65	< 8.3	< 2.9	< 5.6	< 5.1	30
Zr-Nb-95	< 4.1	< 4.9	< 4.0	< 3.1	15
Cs-134	< 4.8	< 3.3	< 3.4	< 2.7	10
Cs-137	< 5.3	< 4.1	< 2.5	< 2.7	18
Ba-La-140	< 4.2	< 3.0	< 3.9	< 1.6	15

Table 25. Untreated surface water, analyses for gross beta, tritium and gamma emitting isotopes.
Location: T-11 (C)
Collection: Monthly composites of weekly grab samples
Units: pCi/L

Lab Code	TSWU- 320	TSWU- 708	TSWU- 1066	TSWU- 1627	
Date Collected	01-30-18	02-27-18	04-03-18	05-01-18	Req. LLD
Gross beta	1.8 ± 1.0	< 1.6	2.1 ± 0.6	1.8 ± 0.6	4.0
H-3	< 330	< 330	< 330	< 330	330
Mn-54	< 2.4	< 2.6	< 2.5	< 5.0	15
Fe-59	< 3.3	< 4.7	< 4.2	< 6.3	30
Co-58	< 1.6	< 1.7	< 2.6	< 3.3	15
Co-60	< 2.0	< 2.7	< 1.9	< 2.6	15
Zn-65	< 3.9	< 3.3	< 3.0	< 6.9	30
Zr-Nb-95	< 2.2	< 2.1	< 3.4	< 3.7	15
Cs-134	< 3.2	< 3.0	< 3.3	< 3.7	10
Cs-137	< 2.8	< 2.1	< 3.0	< 1.9	18
Ba-La-140	< 2.3	< 2.3	< 1.8	< 1.5	15

Lab Code	TSWU- 2088	TSWU- 2495	TSWU- 3047	TSWU- 3506	
Date Collected	05-29-18	07-03-18	07-31-18	08-28-18	Req. LLD
Gross beta	1.0 ± 0.5	0.9 ± 0.5	1.4 ± 0.5	1.3 ± 0.6	4.0
H-3	< 330	< 330	< 330	< 330	330
Mn-54	< 4.0	< 5.6	< 1.8	< 2.0	15
Fe-59	< 8.8	< 4.4	< 5.6	< 5.6	30
Co-58	< 1.8	< 3.7	< 3.0	< 2.8	15
Co-60	< 2.9	< 4.4	< 1.2	< 2.0	15
Zn-65	< 3.3	< 9.3	< 4.9	< 5.3	30
Zr-Nb-95	< 3.8	< 6.6	< 1.9	< 5.6	15
Cs-134	< 4.5	< 5.1	< 2.7	< 3.6	10
Cs-137	< 2.7	< 3.6	< 3.0	< 3.3	18
Ba-La-140	< 4.7	< 3.6	< 3.6	< 2.7	15

Lab Code	TSWU- 3979	TSWU- 4697	TSWU- 5135	TSWU- 5429	
Date Collected	09-25-18	10-30-18	12-04-18	01-02-19	Req. LLD
Gross beta	< 0.9	1.0 ± 0.5	2.0 ± 1.0	2.1 ± 0.6	4.0
H-3	< 330	< 330	< 330	< 330	330
Mn-54	< 3.7	< 2.1	< 3.0	< 3.1	15
Fe-59	< 7.8	< 4.2	< 5.8	< 6.9	30
Co-58	< 3.5	< 2.6	< 1.8	< 1.8	15
Co-60	< 5.8	< 2.1	< 2.3	< 3.5	15
Zn-65	< 11.0	< 1.7	< 5.5	< 6.5	30
Zr-Nb-95	< 7.7	< 2.2	< 3.4	< 5.3	15
Cs-134	< 6.5	< 2.9	< 3.4	< 4.0	10
Cs-137	< 4.6	< 2.0	< 3.1	< 3.3	18
Ba-La-140	< 9.4	< 5.2	< 5.0	< 2.4	15

Table 25. Untreated surface water, analyses for gross beta, tritium and gamma emitting isotopes.
Location: T-12 (C)
Collection: Monthly composites of weekly grab samples
Units: pCi/L

Lab Code	TSWU- 321	TSWU- 709	TSWU- 1067	TSWU- 1628	
Date Collected	01-30-18	02-27-18	04-03-18	05-01-18	Req. LLD
Gross beta	2.4 ± 0.6	2.3 ± 0.7	1.7 ± 0.6	1.6 ± 0.6	4.0
H-3	< 330	< 330	< 330	< 330	330
Mn-54	< 2.6	< 2.0	< 3.0	< 2.8	15
Fe-59	< 2.8	< 2.5	< 7.6	< 4.4	30
Co-58	< 1.6	< 2.0	< 3.7	< 2.2	15
Co-60	< 2.8	< 3.3	< 3.0	< 1.9	15
Zn-65	< 2.8	< 6.2	< 9.1	< 1.8	30
Zr-Nb-95	< 2.1	< 3.8	< 3.3	< 2.1	15
Cs-134	< 2.9	< 3.1	< 4.7	< 2.9	10
Cs-137	< 2.8	< 2.7	< 3.9	< 2.9	18
Ba-La-140	< 2.3	< 2.7	< 5.3	< 3.5	15

Lab Code	TSWU- 2089	TSWU- 2496	TSWU- 3048	TSWU- 3507	
Date Collected	05-29-18	07-02-18	07-30-18	08-27-18	Req. LLD
Gross beta	2.1 ± 0.6	2.5 ± 0.6	1.1 ± 0.6	1.8 ± 0.6	4.0
H-3	< 330	< 330	< 330	< 330	330
Mn-54	< 3.8	< 3.4	< 2.3	< 1.9	15
Fe-59	< 6.8	< 5.6	< 3.4	< 6.3	30
Co-58	< 4.9	< 2.6	< 1.9	< 2.8	15
Co-60	< 3.7	< 4.1	< 1.9	< 0.7	15
Zn-65	< 3.6	< 6.6	< 5.1	< 3.1	30
Zr-Nb-95	< 5.4	< 3.8	< 3.4	< 2.9	15
Cs-134	< 4.6	< 5.3	< 3.0	< 2.8	10
Cs-137	< 2.7	< 4.5	< 3.0	< 3.2	18
Ba-La-140	< 3.9	< 6.5	< 4.9	< 3.1	15

Lab Code	TSWU- 3980	TSWU- 4698	TSWU- 5136	TSWU- 5430	
Date Collected	09-25-18	10-30-18	12-04-18	01-02-19	Req. LLD
Gross beta	2.2 ± 0.6	2.5 ± 0.7	1.4 ± 0.6	3.4 ± 0.7	4.0
H-3	< 330	< 330	< 330	< 330	330
Mn-54	< 3.5	< 1.5	< 1.9	< 2.6	15
Fe-59	< 6.3	< 5.2	< 3.8	< 3.3	30
Co-58	< 3.2	< 2.5	< 2.0	< 2.4	15
Co-60	< 2.5	< 2.8	< 2.5	< 1.8	15
Zn-65	< 6.3	< 5.3	< 3.0	< 5.1	30
Zr-Nb-95	< 4.4	< 2.8	< 3.1	< 2.2	15
Cs-134	< 4.6	< 3.3	< 3.2	< 3.1	10
Cs-137	< 5.0	< 3.5	< 2.8	< 3.3	18
Ba-La-140	< 4.5	< 4.4	< 5.6	< 2.5	15

Table 25. Untreated surface water, analyses for gross beta, tritium and gamma emitting isotopes.
Location: T-22
Collection: Monthly composites of weekly grab samples
Units: pCi/L

Lab Code	TSWU- 324	TSWU- 711	TSWU- 1069	TSWU- 1630	
Date Collected	01-30-18	02-27-18	04-03-18	05-01-18	Req. LLD
Gross beta	1.1 ± 0.5	1.9 ± 0.6	2.1 ± 0.6	1.4 ± 0.6	4.0
H-3	975 ± 129 *	< 330	< 330	< 330	330
Mn-54	< 2.7	< 2.0	< 2.6	< 2.1	15
Fe-59	< 5.0	< 4.1	< 5.6	< 2.9	30
Co-58	< 1.1	< 1.9	< 1.9	< 2.8	15
Co-60	< 2.6	< 1.9	< 2.0	< 2.5	15
Zn-65	< 2.9	< 3.2	< 3.1	< 2.6	30
Zr-Nb-95	< 3.2	< 1.5	< 2.7	< 2.3	15
Cs-134	< 2.8	< 2.8	< 3.3	< 3.0	10
Cs-137	< 3.1	< 1.5	< 3.1	< 3.9	18
Ba-La-140	< 2.4	< 1.8	< 5.2	< 2.5	15

Lab Code	TSWU- 2091	TSWU- 2498	TSWU- 3050	TSWU- 3509	
Date Collected	05-29-18	07-03-18	07-31-18	08-28-18	Req. LLD
Gross beta	1.3 ± 0.6	2.0 ± 0.6	1.7 ± 0.6	1.2 ± 0.6	4.0
H-3	< 330	< 330	< 330	< 330	330
Mn-54	< 3.6	< 2.8	< 1.9	< 2.4	15
Fe-59	< 10.3	< 3.9	< 4.7	< 5.3	30
Co-58	< 3.5	< 2.6	< 3.0	< 2.7	15
Co-60	< 3.1	< 2.0	< 2.2	< 1.3	15
Zn-65	< 2.9	< 4.0	< 5.8	< 5.7	30
Zr-Nb-95	< 4.8	< 2.9	< 3.2	< 2.5	15
Cs-134	< 4.4	< 2.6	< 3.1	< 2.7	10
Cs-137	< 5.4	< 2.5	< 2.5	< 3.1	18
Ba-La-140	< 2.7	< 3.9	< 7.7	< 2.4	15

Lab Code	TSWU- 3983	TSWU- 4700	TSWU- 5138	TSWU- 5432	
Date Collected	09-25-18	10-30-18	12-04-18	01-02-19	Req. LLD
Gross beta	1.1 ± 0.5	1.3 ± 0.6	2.1 ± 0.6	3.7 ± 0.8	4.0
H-3	< 330	< 330	< 330	< 330	330
Mn-54	< 2.2	< 2.5	< 6.5	< 5.4	15
Fe-59	< 6.4	< 3.6	< 13.8	< 8.0	30
Co-58	< 2.0	< 1.7	< 5.1	< 4.3	15
Co-60	< 2.1	< 1.3	< 3.6	< 4.0	15
Zn-65	< 3.6	< 3.9	< 15.5	< 12.2	30
Zr-Nb-95	< 3.6	< 3.2	< 10.1	< 7.6	15
Cs-134	< 3.1	< 3.3	< 7.4	< 5.7	10
Cs-137	< 3.0	< 3.2	< 5.9	< 6.1	18
Ba-La-140	< 2.6	< 4.3	< 7.1	< 7.6	15

* Tritium reanalyzed with a result of 975±129 pCi/L.

Table 25. Untreated surface water, analyses for gross beta, tritium and gamma emitting isotopes.
Location: T-145 (QC)
Collection: Monthly composites of weekly grab samples
Units: pCi/L

Lab Code	TSWU- 325	TSWU- 712	TSWU- 1070	TSWU- 1631	
Date Collected	01-30-18	02-27-18	04-03-18	05-01-18	Req. LLD
Gross beta	1.7 ± 0.6	2.0 ± 1.0	2.4 ± 0.6	1.6 ± 0.6	4.0
H-3	< 330	< 330	< 330	< 330	330
Mn-54	< 3.1	< 2.0	< 2.8	< 3.4	15
Fe-59	< 4.4	< 4.2	< 5.2	< 8.3	30
Co-58	< 3.2	< 2.7	< 3.3	< 2.8	15
Co-60	< 2.0	< 2.3	< 4.4	< 2.6	15
Zn-65	< 4.2	< 1.8	< 4.6	< 3.9	30
Zr-Nb-95	< 2.3	< 1.5	< 5.1	< 2.3	15
Cs-134	< 2.8	< 3.8	< 4.0	< 4.2	10
Cs-137	< 2.4	< 2.9	< 2.5	< 2.5	18
Ba-La-140	< 1.5	< 3.9	< 3.4	< 2.0	15

Lab Code	TSWU- 2092	TSWU- 2499	TSWU- 3051	TSWU- 3510	
Date Collected	05-29-18	07-02-18	07-31-18	08-28-18	Req. LLD
Gross beta	< 1.6	3.0 ± 0.7	< 0.9	1.5 ± 0.6	4.0
H-3	< 330	< 330	< 330	< 330	330
Mn-54	< 3.7	< 3.5	< 1.8	< 1.8	15
Fe-59	< 8.3	< 9.3	< 6.0	< 5.3	30
Co-58	< 3.5	< 2.2	< 1.9	< 3.0	15
Co-60	< 4.2	< 2.9	< 3.4	< 1.3	15
Zn-65	< 5.0	< 6.4	< 6.7	< 3.2	30
Zr-Nb-95	< 5.2	< 4.5	< 3.1	< 2.8	15
Cs-134	< 4.2	< 3.9	< 3.6	< 2.7	10
Cs-137	< 3.3	< 3.4	< 2.5	< 3.4	18
Ba-La-140	< 2.5	< 3.5	< 6.0	< 5.7	15

Lab Code	TSWU- 3984	TSWU- 4701	TSWU- 5139	TSWU- 5433	
Date Collected	09-25-18	10-30-18	12-04-18	01-02-19	Req. LLD
Gross beta	1.9 ± 0.6	1.0 ± 0.5	1.9 ± 1.0	2.9 ± 0.7	4.0
H-3	< 330	< 330	< 330	< 330	330
Mn-54	< 4.4	< 2.1	< 2.4	< 2.9	15
Fe-59	< 9.1	< 4.7	< 4.1	< 4.3	30
Co-58	< 3.1	< 3.2	< 2.3	< 1.4	15
Co-60	< 2.6	< 2.3	< 3.1	< 2.3	15
Zn-65	< 2.5	< 2.7	< 3.9	< 3.6	30
Zr-Nb-95	< 3.0	< 4.1	< 4.0	< 3.0	15
Cs-134	< 4.4	< 3.5	< 3.4	< 4.2	10
Cs-137	< 4.4	< 4.0	< 3.5	< 5.0	18
Ba-La-140	< 4.4	< 4.7	< 7.4	< 1.7	15

Table 26. Untreated surface water samples, analyses for strontium-89 and strontium-90.
Collection: Quarterly composites of weekly grab samples
Units: pCi/L

Location	T-3			
Period	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Lab Code	TSWU- 1317	TSWU- 2551	TSWU- 4180	TSWU- 5477
Sr-89	< 0.7	< 0.6	< 0.9	< 0.5
Sr-90	< 0.4	< 0.6	< 0.5	0.8 ± 0.3
Location	**T-11 (C)**			
Period	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Lab Code	TSWU- 1318	TSWU- 2552	TSWU- 4181	TSWU- 5478
Sr-89	< 0.7	< 0.7	< 0.6	< 0.6
Sr-90	< 0.5	< 0.6	< 0.5	< 0.5
Location	**T-12 (C)**			
Period	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Lab Code	TSWU- 1319	TSWU- 2553	TSWU- 4182	TSWU- 5480
Sr-89	< 0.8	< 0.5	< 0.7	< 0.5
Sr-90	< 0.5	< 0.5	< 0.5	< 0.4
Location	**T-22**			
Period	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Lab Code	TSWU- 1320	TSWU- 2554	TSWU- 4183	TSWU- 5481
Sr-89	< 0.8	< 0.6	< 0.7	< 0.6
Sr-90	< 0.5	< 0.5	< 0.6	< 0.6

Table 27. Fish samples, analyses for gross beta and gamma-emitting isotopes.
Collection: Annually
Units: pCi/g wet

Location	T-33 (Lake Erie, 1.5 mi. NE of Station)	
Lab Code	TF- 3947	TF- 3948
Date Collected	09-04-18	09-04-18
Sample Type	Walleye	Whitefish
Gross Beta	1.62 ± 0.04	1.35 ± 0.04
K-40	1.40 ± 0.30	1.89 ± 0.30
Mn-54	< 0.016	< 0.010
Fe-59	< 0.063	< 0.018
Co-58	< 0.020	< 0.015
Co-60	< 0.009	< 0.008
Zn-65	< 0.015	< 0.020
Cs-134	< 0.021	< 0.014
Cs-137	< 0.013	< 0.015

Location	T-35	
Lab Code	TF- 3949	TF- 3950
Date Collected	09-04-18	09-04-18
Sample Type	Walleye	Whitefish
Gross Beta	2.30 ± 0.06	0.58 ± 0.02
K-40	1.70 ± 0.38	0.43 ± 0.23
Mn-54	< 0.018	< 0.013
Fe-59	< 0.059	< 0.059
Co-58	< 0.024	< 0.016
Co-60	< 0.013	< 0.010
Zn-65	< 0.034	< 0.015
Cs-134	< 0.016	< 0.014
Cs-137	< 0.013	< 0.013

Table 28. Shoreline sediment samples, analyses for gamma-emitting isotopes.
Collection: Semiannually
Units: pCi/g dry

Location	T-3	T-4	T-4P	T-27B	T-132
Lab Code	TSS- 1611	TSS- 1613	TSS- 1614	TSS- 1615	TSS- 1616
Date Collected	04-18-18	04-18-18	04-18-18	04-18-18	04-18-18
K-40	8.93 ± 0.56	12.66 ± 0.80	20.79 ± 0.96	11.06 ± 0.57	12.25 ± 0.62
Mn-54	< 0.022	< 0.027	< 0.041	< 0.013	< 0.018
Co-58	< 0.017	< 0.019	< 0.044	< 0.018	< 0.030
Co-60	< 0.020	< 0.017	< 0.028	< 0.015	< 0.015
Cs-134	< 0.014	< 0.018	< 0.021	< 0.011	< 0.016
Cs-137	< 0.018	0.058 ± 0.030	0.10 ± 0.038	< 0.018	< 0.022
Lab Code	TSS- 4424	TSS- 4425	TSS- 4426	TSS- 4427	TSS- 4428
Date Collected	10-10-18	10-10-18	10-10-18	10-10-18	10-10-18
K-40	9.64 ± 0.53	12.54 ± 0.67	14.88 ± 0.74	9.10 ± 0.46	9.87 ± 0.50
Mn-54	< 0.017	< 0.024	< 0.022	< 0.013	< 0.014
Co-58	< 0.028	< 0.033	< 0.023	< 0.015	< 0.016
Co-60	< 0.010	< 0.009	< 0.021	< 0.010	< 0.009
Cs-134	< 0.015	< 0.017	< 0.018	< 0.010	< 0.010
Cs-137	< 0.015	< 0.021	< 0.025	< 0.011	< 0.016

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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.

January, 2018 through December, 2018

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.

Table A-1 lists results that 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. Acceptance criteria is detailed on Attachment A page A2. Data for previous years is 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 is available upon request.

Table A-5 lists analytical results from the in-house "duplicate" program for the past twelve months. The precision acceptance limit is ±25% of the mean for Sr-89,90, Gross Alpha and Gross Beta or the 2-sigma uncertainty overlaps the mean value. For all other analytes the precision acceptance limit is ±20% of the mean or the 2-sigma uncertainty overlaps the mean value.
Complete analytical data for duplicate analyses is available upon request.

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

Table A-7 lists results that 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).

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	Reference Date	Analysis	Concentration (pCi/L) Laboratory Result	ERA Result	Control Limits	Acceptance
ERW-52	1/8/2018	Sr-89	61.6 ± 5.8	65.2	52.9 - 73.2	Pass
ERW-52	1/8/2018	Sr-90	39.7 ± 2.3	39.2	28.2 - 45.1	Pass
ERW-54	1/8/2018	Ba-133	89.7 ± 4.7	95.1	80.2 - 105	Pass
ERW-54	1/8/2018	Cs-134	62.1 ± 5.4	65.6	53.4 - 72.2	Pass
ERW-54	1/8/2018	Cs-137	111.2 ± 6.1	112	101 - 126	Pass
ERW-54	1/8/2018	Co-60	115.8 ± 4.7	114.0	103.0 - 128.0	Pass
ERW-54	1/8/2018	Zn-65	292.2 ± 14.0	277.0	249 - 324	Pass
ERW-52	1/8/2018	Gr. Alpha	70.1 ± 3.0	72.4	38.1 - 89.2	Pass
ERW-52	1/8/2018	Gr. Beta	47.4 ± 1.4	54.8	37.5 - 61.7	Pass
ERW-58	1/8/2018	I-131	25.3 ± 1.0	28.1	23.4 - 33.0	Pass
ERW-61	1/8/2018	Ra-226	12.4 ± 0.4	14.20	10.60 - 16.30	Pass
ERW-60	1/8/2018	Ra-228	4.9 ± 0.8	4.21	2.43 - 5.81	Pass
ERW-60	1/8/2018	Uranium	52.2 ± 0.9	58.6	47.8 - 64.5	Pass
ERW-62	1/8/2018	H-3	21,780 ± 437	21,200	18,600 - 23,300	Pass
ERW-2555	7/9/2018	Sr-89	62.8 ± 4.0	62.7	50.7 - 70.6	Pass
ERW-2555	7/9/2018	Sr-90	40.1 ± 1.3	40.1	29.5 - 46.1	Pass
ERW-2557	7/9/2018	Ba-133	23.1 ± 2.3	25.6	19.9 - 29	Pass
ERW-2557	7/9/2018	Cs-134	15.2 ± 1.7	15.7	11.4 - 18.2	Pass
ERW-2557	7/9/2018	Cs-137	22.3 ± 4.9	192	173 - 213	Fail[b]
ERW-2557	7/9/2018	Co-60	110.4 ± 3.7	119.0	107 - 133	Pass
ERW-2557	7/9/2018	Zn-65	189.5 ± 7.5	177.0	159 - 208	Pass
ERW-2559	7/9/2018	Gr. Alpha	13.5 ± 0.7	16.0	7.79 - 22.6	Pass
ERW-2559	7/9/2018	Gr. Beta	41.1 ± 0.9	49.0	33.2 - 56.1	Pass
ERW-2561	7/9/2018	I-131	24.9 ± 0.9	28.1	23.4 - 33.0	Pass
ERW-2563	7/9/2018	Ra-226	9.0 ± 0.3	9.08	6.81 - 10.6	Pass
ERW-2563	7/9/2018	Ra-228	3.2 ± 0.4	2.28	1.07 - 3.60	Pass
ERW-2563	7/9/2018	Uranium	38.2 ± 1.4	51.8	42.2 - 57.1	Fail[c]
ERW-2565	7/9/2018	H-3	21,039 ± 302	20,400	17,900 - 22,400	Pass
ERW-3832[b]	10/7/2016	Ba-133	57.0 ± 3.1	54.9	45 - 61	Pass
ERW-3832[b]	10/7/2016	Cs-134	79.2 ± 3.0	81.8	67 - 90	Pass
ERW-3832[b]	10/7/2016	Cs-137	222.4 ± 4.5	210	189 - 233	Pass
ERW-3832[b]	10/7/2016	Co-60	67.7 ± 3.5	64.5	58 - 73	Pass
ERW-3832[b]	10/7/2016	Zn-65	274.1 ± 3.0	245	220 - 287	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 A transcription error caused the Cs-137 result submitted to be understated by a factor of 10.
The actual result obtained was slightly higher than the acceptance criteria for the study.
A "Quick Response" proficiency test was analyzed to help determine the cause of the high result. (See ERW-3832 above)
No definitive cause for the previous high Cs-137 result was determined.

c An investigation is underway to determine the reason for the unacceptable Uranium PT result.

TABLE A-2. Thermoluminescent Dosimetry, (TLD, $CaSO_4$: Dy Cards). [a]

Lab Code	Irradiation Date	Description	Delivered Dose (mrem)	Reported [b] Dose (mrem)	Performance [c] Quotient (P)	
Environmental, Inc.		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 - conventially true value) ÷ conventially true value) where the conventially 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, $CaSO_4$: Dy Cards). [a]

Lab Code	Irradiation Date	Description	Delivered Dose (mrem)	Reported [b] Dose (mrem)	Performance [c] Quotient (P)	
Environmental, Inc.		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 - conventially true value) ÷ conventially true value) where the conventially 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	Concentration [a] Analysis	Laboratory results 2s, n=1 [c]	Known Activity	Control Limits [d]	Acceptance	Ratio Lab/Known
SPW-1749	4/21/2016	Fe-55	1,576 ± 81	1,482	1,186 - 1,778	Pass	1.06
SPW-95	1/11/2018	H-3	16,457 ± 381	16,507	13,206 - 19,808	Pass	1.00
SPW-109	1/12/2018	Sr-90	18.9 ± 1.7	17.9	14.3 - 21.5	Pass	1.06
SPW-175	1/19/2018	H-3	16,261 ± 382	16,507	13,206 - 19,808	Pass	0.99
SPW-210	1/23/2018	H-3	16,461 ± 382	16,507	13,206 - 19,808	Pass	1.00
SPW-212	1/10/2018	Ra-226	12.9 ± 0.4	12.3	8.6 - 16.0	Pass	1.05
SPW-272	1/30/2018	H-3	16,807 ± 384	16,507	13,206 - 19,808	Pass	1.01
W-013118	4/29/2016	Cs-134	33.9 ± 7.4	36.2	29.0 - 43.4	Pass	0.94
W-013118	4/29/2016	Cs-137	80.0 ± 7.9	71.9	57.5 - 86.3	Pass	1.11
SPW-330	2/1/2018	Ni-63	168 ± 2	198	139 - 258	Pass	0.85
SPW-338	2/2/2018	H-3	16,512 ± 381	16,507	13,206 - 19,808	Pass	1.00
SPW-384	2/6/2018	H-3	16,429 ± 380	16,507	13,206 - 19,808	Pass	1.00
W-020618	4/29/2016	Cs-134	39.0 ± 12.0	36.2	29.0 - 43.4	Pass	1.08
W-020618	4/29/2016	Cs-137	81.0 ± 15.7	71.9	57.5 - 86.3	Pass	1.13
SPW-461	2/13/2018	H-3	16,799 ± 385	16,507	13,206 - 19,808	Pass	1.02
SPW-516	2/19/2018	H-3	16,323 ± 382	16,507	13,206 - 19,808	Pass	0.99
SPW-556	2/8/2018	Ra-226	12.2 ± 0.3	12.3	8.6 - 16.0	Pass	0.99
SPW-582	2/22/2018	H-3	16,200 ± 380	16,507	13,206 - 19,808	Pass	0.98
SPW-609	2/23/2018	H-3	16,467 ± 383	16,507	13,206 - 19,808	Pass	1.00
SPW-650	2/21/2018	Ra-226	11.8 ± 0.5	12.3	8.6 - 16.0	Pass	0.96
SPW-666	2/28/2018	Gr. Alpha	67.1 ± 2.8	72.4	36.2 - 108.6	Pass	0.93
SPW-666	2/28/2018	Gr. Beta	48.1 ± 1.4	54.6	43.8 - 65.8	Pass	0.88
W-022818	4/29/2016	Cs-134	32.7 ± 8.5	36.2	29.0 - 43.4	Pass	0.90
W-022818	4/29/2016	Cs-137	73.8 ± 9.3	71.9	57.5 - 86.3	Pass	1.03
SPW-748	3/6/2018	H-3	16,209 ± 381	16,507	13,206 - 19,808	Pass	0.98
SPW-787	3/8/2018	H-3	16,934 ± 388	16,507	13,206 - 19,808	Pass	1.03
W-030718	4/29/2016	Cs-134	33.4 ± 7.9	36.2	29.0 - 43.4	Pass	0.92
W-030718	4/29/2016	Cs-137	78.9 ± 9.6	71.9	57.5 - 86.3	Pass	1.10
SPW-885	3/15/2018	H-3	16,475 ± 384	16,507	13,206 - 19,808	Pass	1.00
SPW-931	3/20/2018	H-3	16,467 ± 384	16,507	13,206 - 19,808	Pass	1.00
SPW-957	3/12/2018	Ra-226	11.4 ± 0.4	12.3	8.6 - 16.0	Pass	0.93
SPW-969	3/23/2018	Ni-63	260 ± 12	329	230 - 428	Pass	0.79
W-031418	4/29/2016	Cs-134	36.9 ± 11.2	36.2	29.0 - 43.4	Pass	1.02
W-031418	4/29/2016	Cs-137	82.3 ± 15.5	71.9	57.5 - 86.3	Pass	1.14
SPW-985	3/27/2018	H-3	16,544 ± 386	16,507	13,206 - 19,808	Pass	1.00
SPW-1037	4/4/2018	H-3	16,298 ± 384	16,507	13,206 - 19,808	Pass	0.99
SPW-1149	4/12/2018	H-3	16,361 ± 383	16,507	13,206 - 19,808	Pass	0.99
SPW-1200	4/13/2018	U-238	44.2 ± 2.3	41.7	29.2 - 54.2	Pass	1.06
SPW-1426	4/20/2018	H-3	16,573 ± 390	16,507	13,206 - 19,808	Pass	1.00
SPW-1454	4/24/2018	H-3	16,495 ± 384	16,507	13,206 - 19,808	Pass	1.00
SPW-1493	4/26/2018	Ra-228	4.59 ± 1.10	4.21	2.95 - 5.47	Pass	1.09
SPW-1516	4/27/2018	H-3	16,483 ± 382	16,507	13,206 - 19,808	Pass	1.00
SPW-1522	4/27/2018	Tc-99	105 ± 2	108	75 - 140	Pass	0.98
W-050118	4/29/2016	Cs-134	35.2 ± 9.9	36.2	29.0 - 43.4	Pass	0.97
W-050118	4/29/2016	Cs-137	82.4 ± 7.7	71.9	57.5 - 86.3	Pass	1.15

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

Lab Code [b]	Date	Concentration [a] Analysis	Laboratory results 2s, n=1 [c]	Known Activity	Control Limits [d]	Acceptance	Ratio Lab/Known
SPW-1573	5/2/2018	Gr. Alpha	25.2 ± 0.5	20.1	10.1 - 30.2	Pass	1.25
SPW-1573	5/2/2018	Gr. Beta	28.2 ± 0.3	27.5	22.0 - 33.0	Pass	1.03
SPW-1618	5/3/2018	H-3	14,834 ± 366	16,507	13,206 - 19,808	Pass	0.90
W-050318	4/29/2016	Cs-134	32.9 ± 7.6	36.2	29.0 - 43.4	Pass	0.91
W-050318	4/29/2016	Cs-137	83.1 ± 8.5	71.9	57.5 - 86.3	Pass	1.16
SPW-1644	5/4/2018	Sr-90	20.0 ± 1.3	17.9	14.3 - 21.5	Pass	1.12
W-050718	4/29/2018	Cs-134	42.4 ± 8.5	36.2	29.0 - 43.4	Pass	1.17
W-050718	4/29/2018	Cs-137	80.6 ± 13.6	71.9	57.5 - 86.3	Pass	1.12
SPW-1695	5/8/2018	H-3	16,450 ± 384	16,507	13,206 - 19,808	Pass	1.00
W-050818	4/29/2016	Cs-134	32.3 ± 6.9	36.2	29.0 - 43.4	Pass	0.89
W-050818	4/29/2016	Cs-137	73.0 ± 8.2	71.9	57.5 - 86.3	Pass	1.02
SPW-1780	5/11/2018	H-3	16,784 ± 388	16,507	13,206 - 19,808	Pass	1.02
W-051518	4/29/2016	Cs-134	33.0 ± 6.7	36.2	29.0 - 43.4	Pass	0.91
W-051518	4/29/2016	Cs-137	76.0 ± 7.4	71.9	57.5 - 86.3	Pass	1.06
W-051718	4/29/2016	Cs-134	35.1 ± 5.7	36.2	29.0 - 43.4	Pass	0.97
W-051718	4/29/2016	Cs-137	73.7 ± 6.7	71.9	57.5 - 86.3	Pass	1.03
SPW-1897	5/18/2018	H-3	16,650 ± 387	16,507	13,206 - 19,808	Pass	1.01
SPW-1899	5/18/2018	H-3	16,754 ± 365	16,507	13,206 - 19,808	Pass	1.01
W-052418	4/29/2016	Cs-134	33.9 ± 6.2	36.2	29.0 - 43.4	Pass	0.94
W-052418	4/29/2016	Cs-137	78.8 ± 7.4	71.9	57.5 - 86.3	Pass	1.10
SPW-1994	5/24/2018	H-3	16,488 ± 384	16,507	13,206 - 19,808	Pass	1.00
W-053118	4/29/2016	Cs-134	38.9 ± 9.5	36.2	29.0 - 43.4	Pass	1.07
W-053118	4/29/2016	Cs-137	74.0 ± 7.5	71.9	57.5 - 86.3	Pass	1.03
SPW-2042	5/31/2018	H-3	16,901 ± 390	16,507	13,206 - 19,808	Pass	1.02
W-060518	4/29/2016	Cs-134	33.0 ± 10.1	36.2	29.0 - 43.4	Pass	0.91
W-060518	4/29/2016	Cs-137	83.3 ± 8.7	71.9	57.5 - 86.3	Pass	1.16
SPW-2186	6/6/2018	H-3	16,551 ± 385	16,507	13,206 - 19,808	Pass	1.00
SPW-2914	6/19/2018	Ra-226	12.7 ± 0.4	12.3	8.6 - 16.0	Pass	1.03
SPW-2437	6/27/2018	Sr-90	18.0 ± 1.1	17.9	14.3 - 21.5	Pass	1.00
SPW-2447	6/29/2018	H-3	16,595 ± 387	16,507	13,206 - 19,808	Pass	1.01
W-070518	4/29/2016	Cs-134	38.9 ± 8.1	36.2	29.0 - 43.4	Pass	1.08
W-070518	4/29/2016	Cs-137	73.4 ± 9.4	71.9	57.5 - 86.3	Pass	1.02
SPW-2546	7/10/2018	H-3	15,949 ± 373	16,507	13,206 - 19,808	Pass	0.97
W-071218	4/29/2016	Cs-134	33.1 ± 7.7	36.2	29.0 - 43.4	Pass	0.91
W-071218	4/29/2016	Cs-137	74.5 ± 7.7	71.9	57.5 - 86.3	Pass	1.04
SPW-2706	7/16/2018	H-3	15,474.7 ± 366.6	16,507	13,206 - 19,808	Pass	0.94
SPW-2772	7/19/2018	H-3	15,994.0 ± 374.0	16,507	13,206 - 19,808	Pass	0.97
SPW-2811	7/20/2018	Gr. Alpha	21.1 ± 0.4	20.1	10.1 - 30.2	Pass	1.05
SPW-2811	7/20/2018	Gr. Beta	26.9 ± 0.3	27.5	22.0 - 33.0	Pass	0.98
W-072118	4/29/2016	Cs-134	33.6 ± 7.3	36.2	29.0 - 43.4	Pass	0.93
W-072118	4/29/2016	Cs-137	80.3 ± 7.9	71.9	57.5 - 86.3	Pass	1.12
SPW-3689	7/23/2018	Ra-226	12.7 ± 0.3	12.3	8.6 - 16.0	Pass	1.03
W-072718	2/1/2017	U-234	26.6 ± 3.4	31.4	22.0 - 40.8	Pass	0.85
W-072718	2/1/2017	U-238	24.1 ± 3.2	32.4	22.7 - 42.1	Pass	0.74
SPW-3018	7/31/2018	H-3	16,166 ± 376	16,507	13,206 - 19,808	Pass	0.98
SPW-3154	8/6/2018	H-3	15,686 ± 370	16,507	13,206 - 19,808	Pass	0.95
W-081218	4/29/2016	Cs-134	38.6 ± 11.5	36.2	29.0 - 43.4	Pass	1.07
W-081218	4/29/2016	Cs-137	83.7 ± 13.4	71.9	57.5 - 86.3	Pass	1.16

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

Lab Code [b]	Date	Analysis	Concentration [a] Laboratory results 2s, n=1 [c]	Known Activity	Control Limits [d]	Acceptance	Ratio Lab/Known
SPW-3278	8/16/2018	H-3	15,587 ± 370	16,507	13,206 - 19,808	Pass	0.94
SPW-3378	8/23/2018	Ni-63	378 ± 44	465	325 - 604	Pass	0.81
SPW-3420	8/23/2018	H-3	15,536 ± 368	16,507	13,206 - 19,808	Pass	0.94
SPW-3691	8/23/2018	Ra-226	15.5 ± 0.4	12.3	8.6 - 16.0	Pass	1.26
SPW-3477	8/27/2018	Ra-228	11.3 ± 1.6	15.1	10.6 - 19.7	Pass	0.75
W-082818	4/29/2016	Cs-134	33.0 ± 2.7	36.2	29.0 - 43.4	Pass	0.91
W-082818	4/29/2016	Cs-137	80.7 ± 3.0	71.9	57.5 - 86.3	Pass	1.12
SPW-3648	9/7/2018	H-3	15,876 ± 371	16,507	13,206 - 19,808	Pass	0.96
SPW-4755	9/7/2018	Ra-226	11.2 ± 0.3	12.3	8.6 - 16.0	Pass	0.91
W-091118	4/29/2016	Cs-134	35.3 ± 2.7	36.2	29.0 - 43.4	Pass	0.98
W-091118	4/29/2016	Cs-137	80.7 ± 3.2	71.9	57.5 - 86.3	Pass	1.12
SPW-3843	9/18/2018	H-3	15,759 ± 372	16,507	13,206 - 19,808	Pass	0.95
W-092818	4/29/2016	Cs-134	36.1 ± 10.0	36.2	29.0 - 43.4	Pass	1.00
W-092818	4/29/2016	Cs-137	73.6 ± 9.9	71.9	57.5 - 86.3	Pass	1.02
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	13,206 - 19,808	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	29.0 - 43.4	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	29.0 - 43.4	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	29.0 - 43.4	Pass	0.97
W-121318	4/29/2016	Cs-137	77.5 ± 8.4	71.9	57.5 - 86.3	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

[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 (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.

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	Sample Type	Date	Analysis[b]	Concentration [a]		
				Laboratory results (4.66σ)		Acceptance
				LLD	Activity[c]	Criteria (4.66 σ)
SPW-94	Water	1/11/2018	H-3	154	1 ± 74	200
SPW-108	Water	1/12/2018	Sr-89	0.63	0.41 ± 0.53	5
SPW-108	Water	1/12/2018	Sr-90	0.55	0.05 ± 0.26	1
SPW-174	Water	1/19/2018	H-3	152	23 ± 73	200
SPW-209	Water	1/23/2018	H-3	154	78 ± 78	200
SPW-211	Water	1/10/2018	Ra-226	0.03	0.19 ± 0.03	2
SPW-213	Water	1/23/2018	I-131	0.23	-0.05 ± 0.13	1
SPW-271	Water	1/30/2018	H-3	156	- 36 ± 77	200
SPW-329	Water	2/1/2018	Ni-63	74	-13 ± 45	200
SPW-337	Water	2/2/2018	H-3	154	-16 ± 71	200
SPW-385	Water	2/6/2018	H-3	150	-19 ± 71	200
SPW-461	Water	2/13/2018	H-3	156	56 ± 80	200
SPW-515	Water	2/19/2018	H-3	153	-1 ± 80	200
SPW-555	Water	2/8/2018	Ra-226	0.04	0.14 ± 0.03	2
SPW-581	Water	2/22/2018	H-3	156	43 ± 77	200
SPW-608	Water	2/23/2018	H-3	151	58 ± 75	200
SPW-649	Water	2/21/2018	Ra-226	0.04	0.17 ± 0.03	2
SPW-665	Water	2/28/2018	Gr. Alpha	0.43	0.70 ± 0.36	2
SPW-665	Water	2/28/2018	Gr. Beta	0.68	0.86 ± 0.51	4
SPW-747	Water	3/6/2018	H-3	154	11 ± 82	200
SPW-786	Water	3/8/2018	H-3	156	62 ± 76	200
SPW-865	Water	3/14/2018	I-131	0.18	0.07 ± 0.10	1
SPW-930	Water	3/20/2018	H-3	155	44 ± 84	200
SPW-956	Water	3/12/2018	Ra-226	0.03	0.18 ± 0.03	2
SPW-984	Water	3/27/2018	H-3	153	32 ± 82	200
SPW-1036	Water	4/4/2018	H-3	162	14 ± 77	200
SPW-1148	Water	4/12/2018	H-3	159	-15 ± 73	200
SPW-1202	Water	4/13/2018	U-234	0.15	0.00 ± 0.09	1
SPW-1202	Water	4/13/2018	U-238	0.15	0.06 ± 0.13	1
SPW-1425	Water	4/20/2018	H-3	159	45 ± 98	200
SPW-1453	Water	4/24/2018	H-3	155	43 ± 77	200
SPW-1492	Water	4/26/2018	Ra-228	0.68	0.25 ± 0.35	2
SPW-1517	Water	4/27/2018	H-3	150	54 ± 75	200
SPW-1521	Water	4/27/2018	Tc-99	5.38	2.64 ± 3.31	10
SPW-1572	Water	5/2/2018	Gr. Alpha	0.41	-0.23 ± 0.26	2
SPW-1572	Water	5/2/2018	Gr. Beta	0.69	-0.28 ± 0.47	4
SPW-1617	Water	5/3/2018	H-3	155	-113 ± 68	200
SPW-1643	Water	5/4/2018	Sr-89	0.66	0.36 ± 0.50	5
SPW-1643	Water	5/4/2018	Sr-90	0.57	-0.07 ± 0.25	1

[a] Liquid sample results are reported in pCi/Liter, air filters (pCi/m^3), charcoal (pCi/charcoal canister), and solid samples (pCi/g).

[b] I-131(G); iodine-131 as analyzed by gamma spectroscopy.

[c] Activity reported is a net activity result.

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

Lab Code	Sample Type	Date	Analysis[b]	Concentration [a]		
				Laboratory results (4.66σ)		Acceptance
				LLD	Activity[c]	Criteria (4.66 σ)
SPW-1694	Water	5/8/2018	H-3	157	86 ± 80	200
SPW-1779	Water	5/11/2018	H-3	156	11 ± 74	200
SPW-1895	Water	5/17/2018	I-131	0.12	0.00 ± 0.08	1
SPW-1896	Water	5/18/2018	H-3	155	46 ± 75	200
SPW-1898	Water	5/18/2018	H-3	186	2 ± 92	200
SPW-1993	Water	5/24/2018	H-3	158	103 ± 79	200
SPW-2041	Water	5/31/2018	H-3	156	115 ± 81	200
SPW-2185	Water	6/6/2018	H-3	150	29 ± 74	200
SPW-2383	Water	6/6/2018	Ra-226	0.03	0.20 ± 0.02	2
SPW-2264	Water	6/11/2018	Gr. Alpha	0.39	-0.02 ± 0.27	2
SPW-2264	Water	6/11/2018	Gr. Beta	0.73	-0.35 ± 0.50	4
SPW-2913	Water	6/19/2018	Ra-226	0.02	0.18 ± 0.02	2
SPW-2436	Water	6/27/2018	Sr-89	0.66	0.00 ± 0.46	5
SPW-2436	Water	6/27/2018	Sr-90	0.61	-0.10 ± 0.27	1
SPW-2447	Water	6/29/2018	H-3	160	-6 ± 79	200
SPW-2545	Water	7/10/2018	H-3	154	20 ± 74	200
SPW-2705	Water	7/16/2018	H-3	153	15 ± 73	200
SPW-2771	Water	7/19/2018	H-3	156	-27 ± 71	200
SPW-2810	Water	7/20/2018	Gr. Alpha	0.42	-0.09 ± 0.29	2
SPW-2810	Water	7/20/2018	Gr. Beta	0.70	0.31 ± 0.50	4
SPW-3688	Water	7/23/2018	Ra-226	0.02	0.21 ± 0.02	2
SPW-3017	Water	7/31/2018	H-3	157	-5 ± 74	200
SPW-3153	Water	8/6/2018	H-3	152	13 ± 72	200
SPW-3377	Water	8/23/2018	Ni-63	66	18 ± 40	200
SPW-3446	Water	8/27/2018	H-3	151	-15 ± 69	200
SPW-3476	Water	8/27/2018	Ra-228	0.77	0.05 ± 0.36	2
SPW-3648	Water	9/7/2018	H-3	148	89 ± 75	200
SPW-4754	Water	9/7/2018	Ra-226	0.03	0.13 ± 0.08	2
SPW-3842	Water	9/19/2018	H-3	156	29 ± 74	200
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-4789	Water	11/9/2018	H-3	148	27 ± 73	200
SPW-4862	Water	11/16/2018	H-3	154	15 ± 77	200
SPW-5048	Water	11/30/2018	H-3	151	-6 ± 69	200

[a] Liquid sample results are reported in pCi/Liter, air filters (pCi/m^3), charcoal (pCi/charcoal canister), and solid samples (pCi/g).

[b] I-131(G): Iodine-131 as analyzed by gamma spectroscopy.

[c] Activity reported is a net activity result.

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

Lab Code	Sample Type	Date	Analysis[b]	Concentration [a]		
				Laboratory results (4.66σ)		Acceptance Criteria (4.66 σ)
				LLD	Activity[c]	
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-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-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-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

[a] Liquid sample results are reported in pCi/Liter, air filters (pCi/m^3), charcoal (pCi/charcoal canister), and solid samples (pCi/g).

[b] I-131(G); Iodine-131 as analyzed by gamma spectroscopy.

[c] Activity reported is a net activity result.

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

			Concentration [a]			
Lab Code	Date	Analysis	First Result	Second Result	Averaged Result	Acceptance
AP-010218	1/2/2018	Gr. Beta	0.048 ± 0.004	0.057 ± 0.004	0.052 ± 0.003	Pass
AP-010218	1/2/2018	Be-7	0.073 ± 0.008	0.073 ± 0.007	0.073 ± 0.005	Pass
AP-010318	1/3/2018	Gr. Beta	0.039 ± 0.005	0.034 ± 0.005	0.037 ± 0.003	Pass
AP-6846,6847	1/3/2018	Be-7	0.058 ± 0.010	0.062 ± 0.010	0.060 ± 0.007	Pass
AP-010318	1/3/2018	Be-7	0.059 ± 0.009	0.059 ± 0.007	0.059 ± 0.006	Pass
AP-010818	1/8/2018	Gr. Beta	0.053 ± 0.007	0.055 ± 0.007	0.054 ± 0.005	Pass
WW-164,165	1/11/2018	Gr. Beta	21.9 ± 2.2	20.4 ± 2.1	21.1 ± 1.5	Pass
WW-189,190	1/11/2018	H-3	501 ± 100	498 ± 100	499 ± 71	Pass
AP-011518	1/15/2018	Gr. Beta	0.032 ± 0.005	0.033 ± 0.005	0.032 ± 0.003	Pass
AP-012318	1/23/2018	Gr. Beta	0.031 ± 0.005	0.032 ± 0.005	0.031 ± 0.003	Pass
LW-280,281	1/25/2018	Gr. Beta	1.10 ± 0.52	1.19 ± 0.55	1.15 ± 0.38	Pass
AP-013018	1/30/2018	Gr. Beta	0.024 ± 0.005	0.023 ± 0.005	0.024 ± 0.003	Pass
SG-301,302	1/30/2018	Ac-228	3.01 ± 0.49	3.11 ± 0.71	3.06 ± 0.43	Pass
SG-301,302	1/30/2018	Pb-214	2.47 ± 0.31	2.22 ± 0.35	2.34 ± 0.23	Pass
SG-301,302	1/30/2018	K-40	7.44 ± 1.93	6.52 ± 2.25	6.98 ± 1.48	Pass
SWU-322,323	1/30/2018	Gr. Beta	1.48 ± 1.10	3.06 ± 1.31	2.27 ± 0.85	Pass
P-391,392	2/2/2018	H-3	428 ± 94	332 ± 89	380 ± 65	Pass
S-433,434	2/7/2018	Pb-214	0.16 ± 0.04	0.13 ± 0.05	0.15 ± 0.03	Pass
S-433,434	2/7/2018	Ac-228	0.24 ± 0.06	0.26 ± 0.07	0.25 ± 0.05	Pass
S-433,434	2/7/2018	K-40	6.45 ± 0.58	6.50 ± 0.59	6.48 ± 0.41	Pass
AP-454,455	2/8/2018	Be-7	0.233 ± 0.102	0.271 ± 0.111	0.252 ± 0.075	Pass
AP-021218	2/12/2018	Gr. Beta	0.037 ± 0.005	0.035 ± 0.005	0.036 ± 0.004	Pass
CF-477,478	2/12/2018	Be-7	0.31 ± 0.17	0.21 ± 0.08	0.26 ± 0.09	Pass
AP-021918	2/19/2018	Gr. Beta	0.036 ± 0.005	0.033 ± 0.008	0.035 ± 0.005	Pass
AP-022118	2/21/2018	Gr. Beta	0.030 ± 0.003	0.025 ± 0.003	0.028 ± 0.002	Pass
SWU-704,705	2/27/2018	Gr. Beta	2.50 ± 0.65	1.72 ± 0.58	2.11 ± 0.44	Pass
W-849,850	2/28/2018	H-3	567 ± 105	730 ± 112	649 ± 77	Pass
AP-030518	3/5/2018	Gr. Beta	0.024 ± 0.005	0.025 ± 0.005	0.024 ± 0.004	Pass
DW-90026,90027	3/7/2018	Gr. Alpha	55.4 ± 2.5	60.3 ± 2.6	57.8 ± 1.8	Pass
DW-90026,90027	3/7/2018	Gr. Beta	28.0 ± 1.2	27.4 ± 1.2	27.7 ± 0.8	Pass
S-800,801	3/8/2018	Ra-226	1.06 ± 0.15	1.17 ± 0.17	1.12 ± 0.11	Pass
S-800,801	3/8/2018	Ra-228	1.08 ± 0.19	1.05 ± 0.20	1.07 ± 0.14	Pass
S-800,801	3/8/2018	K-40	15.5 ± 1.3	15.7 ± 1.4	15.6 ± 0.9	Pass
SG-863,864	3/8/2018	Ra-226	5.56 ± 0.28	5.92 ± 0.27	5.74 ± 0.19	Pass
SG-863,864	3/8/2018	Ra-228	7.77 ± 0.44	8.19 ± 0.53	7.98 ± 0.34	Pass
SG-863,864	3/8/2018	K-40	10.75 ± 1.29	12.28 ± 1.39	11.52 ± 0.95	Pass
WW-842,843	3/9/2018	H-3	415 ± 99	423 ± 99	419 ± 70	Pass
AP-030918	3/9/2018	Gr. Beta	0.027 ± 0.004	0.021 ± 0.004	0.024 ± 0.003	Pass
AP-031318	3/13/2018	Gr. Beta	0.030 ± 0.004	0.031 ± 0.004	0.031 ± 0.003	Pass
AP-031318	3/13/2018	Gr. Beta	0.026 ± 0.005	0.024 ± 0.005	0.025 ± 0.003	Pass
WW-934,935	3/13/2018	H-3	266 ± 95	294 ± 96	280 ± 68	Pass
S-972,973	3/20/2018	K-40	23.1 ± 3.3	19.8 ± 2.5	21.4 ± 2.1	Pass

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

Lab Code	Date	Analysis	Concentration [a] First Result	Second Result	Averaged Result	Acceptance
AP-032018	3/20/2018	Gr. Beta	0.021 ± 0.005	0.023 ± 0.005	0.022 ± 0.004	Pass
WW-1016,1017	3/22/2018	H-3	716 ± 110	790 ± 113	753 ± 79	Pass
SW-995,996	3/26/2018	H-3	14,538 ± 364	14,647 ± 365	14,593 ± 258	Pass
WW-1900,1901	3/30/2018	H-3	863 ± 123	865 ± 123	864 ± 87	Pass
AP-1299,1300	4/3/2018	Be-7	0.075 ± 0.017	0.073 ± 0.014	0.074 ± 0.011	Pass
SG-1470,1471	4/3/2018	Pb-214	1.45 ± 0.14	1.39 ± 0.12	1.42 ± 0.09	Pass
SG-1470,1471	4/3/2018	Ac-228	2.39 ± 0.31	2.55 ± 0.31	2.47 ± 0.22	Pass
WW-1123,1124	4/5/2018	H-3	11,266 ± 319	11,175 ± 320	11,220 ± 226	Pass
DW-90035,90036	4/6/2018	Ra-226	1.04 ± 0.13	0.88 ± 0.14	0.96 ± 0.10	Pass
DW-90035,90036	4/6/2018	Ra-228	0.84 ± 0.13	1.08 ± 0.42	0.96 ± 0.22	Pass
AP-041018	4/10/2018	Gr. Beta	0.023 ± 0.004	0.019 ± 0.004	0.021 ± 0.003	Pass
SS-1611,1612	4/18/2018	K-40	10.01 ± 0.54	8.93 ± 0.56	9.47 ± 0.39	Pass
SW-1427,1428	4/18/2018	H-3	180 ± 84	114 ± 81	147 ± 58	Pass
WW-1494,1495	4/20/2018	H-3	326 ± 84	270 ± 89	298 ± 61	Pass
AP-042518	4/25/2018	Gr. Beta	0.028 ± 0.004	0.023 ± 0.004	0.026 ± 0.003	Pass
SO-1634,1635	4/25/2018	K-40	5.72 ± 0.51	6.36 ± 0.56	6.04 ± 0.38	Pass
BS-1546,1547	4/26/2018	K-40	8.35 ± 0.53	8.54 ± 0.57	8.44 ± 0.39	Pass
AP-042618	4/26/2018	Gr. Beta	0.023 ± 0.004	0.021 ± 0.004	0.022 ± 0.003	Pass
DW-90043,90044	4/27/2018	Gr. Alpha	11.9 ± 1.1	11.3 ± 1.1	11.6 ± 0.8	Pass
AP-050118	5/1/2018	Gr. Beta	0.020 ± 0.006	0.022 ± 0.006	0.021 ± 0.004	Pass
AP-050218	5/2/2018	Gr. Beta	0.020 ± 0.002	0.019 ± 0.002	0.020 ± 0.002	Pass
F-2333,2334	5/2/2018	Cs-137	2.53 ± 0.34	2.51 ± 0.32	2.52 ± 0.24	Pass
DW-90048,90049	5/2/2018	Ra-226	0.18 ± 0.11	0.14 ± 0.08	0.16 ± 0.07	Pass
DW-90048,90049	5/2/2018	Ra-228	0.86 ± 0.60	0.78 ± 0.60	0.82 ± 0.42	Pass
WW-1833,1834	5/8/2018	H-3	182 ± 83	304 ± 98	243 ± 64	Pass
SG-1747,1748	5/8/2018	Pb-214	13.0 ± 0.6	13.0 ± 0.6	13.0 ± 0.4	Pass
SG-1747,1748	5/8/2018	Ac-228	21.0 ± 1.2	21.1 ± 1.4	21.0 ± 0.9	Pass
AP-050818	5/8/2018	Gr. Beta	0.027 ± 0.005	0.025 ± 0.004	0.026 ± 0.003	Pass
F-1812,1813	5/9/2018	K-40	4.30 ± 0.47	3.40 ± 0.47	3.85 ± 0.33	Pass
SG-1767,1768	5/9/2018	Pb-214	0.96 ± 0.24	0.72 ± 0.24	0.84 ± 0.17	Pass
SG-1767,1768	5/9/2018	Ac-228	1.28 ± 0.34	1.15 ± 0.37	1.22 ± 0.25	Pass
AP-051418	5/14/2018	Gr. Beta	0.038 ± 0.006	0.033 ± 0.005	0.036 ± 0.004	Pass
DW-90061,90062	5/17/2018	Ra-226	1.53 ± 0.13	1.78 ± 0.15	1.66 ± 0.10	Pass
DW-90061,90062	5/17/2018	Ra-228	0.82 ± 0.45	0.87 ± 0.44	0.85 ± 0.31	Pass
F-2201,2202	5/18/2018	K-40	2.73 ± 0.40	2.68 ± 0.45	2.71 ± 0.30	Pass
AP-051818	5/18/2018	Gr. Beta	0.020 ± 0.004	0.026 ± 0.004	0.023 ± 0.003	Pass
WW-2050,2051	5/22/2018	H-3	28,404 ± 502	28,666 ± 504	28,535 ± 356	Pass
AP-052218	5/22/2018	Gr. Beta	0.024 ± 0.004	0.021 ± 0.004	0.023 ± 0.003	Pass
AP-052918	5/29/2018	Gr. Beta	0.028 ± 0.004	0.024 ± 0.004	0.026 ± 0.003	Pass
AP-052918	5/29/2018	Gr. Beta	0.023 ± 0.005	0.025 ± 0.005	0.024 ± 0.003	Pass

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

			Concentration [a]			
Lab Code	Date	Analysis	First Result	Second Result	Averaged Result	Acceptance
G-2133,2134	6/4/2018	Be-7	0.55 ± 0.64	0.32 ± 0.16	0.43 ± 0.33	Pass
G-2133,2134	6/4/2018	K-40	7.12 ± 0.64	6.53 ± 0.58	6.82 ± 0.43	Pass
WW-2270,2271	6/8/2018	H-3	90 ± 84	71 ± 83	80 ± 59	Pass
VE-2312,2313	6/11/2018	K-40	6.06 ± 0.17	5.50 ± 0.46	5.78 ± 0.24	Pass
AP-2375,2376	6/14/2018	Be-7	0.310 ± 0.134	0.240 ± 0.100	0.275 ± 0.084	Pass
AP-2893,2894	6/27/2018	Be-7	0.111 ± 0.016	0.111 ± 0.016	0.111 ± 0.011	Pass
SG-24511,2512	7/2/2018	Gr. Alpha	19.60 ± 3.08	19.55 ± 3.06	19.58 ± 2.17	Pass
SG-2469,2470	7/2/2018	Pb-214	9.16 ± 0.48	9.46 ± 0.37	9.31 ± 0.30	Pass
SG-2469,2470	7/2/2018	Ac-228	9.94 ± 0.87	10.00 ± 0.64	9.97 ± 0.54	Pass
SG-2511,2512	7/2/2018	Pb-214	4.46 ± 0.31	4.57 ± 0.34	4.52 ± 0.23	Pass
SG-2511,2512	7/2/2018	Ac-228	6.15 ± 0.57	5.83 ± 0.66	5.99 ± 0.44	Pass
VE-2610,2611	7/9/2018	K-40	6.52 ± 0.75	5.92 ± 0.75	6.22 ± 0.53	Pass
F-2851,2852	7/11/2018	K-40	2.93 ± 0.38	2.83 ± 0.32	2.88 ± 0.25	Pass
AP-071218	7/12/2018	Gr. Beta	0.021 ± 0.003	0.024 ± 0.004	0.023 ± 0.002	Pass
AP-2721,2722	7/12/2018	Be-7	0.204 ± 0.100	0.275 ± 0.127	0.240 ± 0.081	Pass
WW-2742,2743	7/12/2018	H-3	253 ± 86	278 ± 97	265 ± 65	Pass
DW-90123,90124	7/24/2018	Ra-226	0.97 ± 0.18	1.06 ± 0.12	1.02 ± 0.11	Pass
DW-90123,90124	7/24/2018	Ra-228	3.61 ± 0.74	4.05 ± 0.80	3.83 ± 0.54	Pass
G-3000,3001	7/24/2018	Be-7	3.29 ± 0.25	3.24 ± 0.26	3.26 ± 0.18	Pass
G-3000,3001	7/24/2018	K-40	4.98 ± 0.40	5.06 ± 0.41	5.02 ± 0.29	Pass
S-2916,2917	7/24/2018	Pb-214	1.00 ± 0.51	0.94 ± 0.53	0.97 ± 0.37	Pass
S-2916,2917	7/24/2018	Ac-228	0.98 ± 0.11	0.98 ± 0.09	0.98 ± 0.07	Pass
AP-073018	7/30/2018	Gr. Beta	0.029 ± 0.004	0.022 ± 0.004	0.026 ± 0.003	Pass
DW-90133,90134	8/7/2018	Ra-228	2.34 ± 0.68	3.28 ± 0.73	2.81 ± 0.50	Pass
DW-90138,90139	8/10/2018	Gr. Alpha	4.02 ± 0.68	3.87 ± 0.66	3.95 ± 0.51	Pass
VE-3281,3282	8/14/2018	K-40	11.40 ± 0.831	11.39 ± 0.524	11.39 ± 0.491	Pass
VE-3323,3324	8/14/2018	K-40	3.41 ± 0.227	3.67 ± 0.262	3.54 ± 0.173	Pass
VE-3323,3324	8/14/2018	Be-7	0.25 ± 0.069	0.33 ± 0.092	0.29 ± 0.058	Pass
AP-081518	8/15/2018	Gr. Beta	0.022 ± 0.003	0.028 ± 0.003	0.025 ± 0.002	Pass
PM-3365,3366	8/16/2018	K-40	14.77 ± 0.76	14.19 ± 0.69	14.48 ± 0.51	Pass
S-3478,3479	8/27/2018	Pb-214	0.70 ± 0.05	0.70 ± 0.05	0.70 ± 0.04	Pass
S-3478,3479	8/27/2018	Ac-228	0.84 ± 0.11	0.89 ± 0.08	0.87 ± 0.07	Pass
SWT-3501,3502	8/27/2018	Gr. Beta	0.64 ± 0.48	1.42 ± 0.56	1.03 ± 0.37	Pass
VE-3522,3523	8/28/2018	K-40	2.51 ± 0.20	2.63 ± 0.20	2.57 ± 0.14	Pass
WW-3745,3746	8/31/2018	H-3	1035 ± 119	1056 ± 99	1045 ± 77	Pass
S-3542,3543	8/30/2018	K-40	6.10 ± 0.72	5.69 ± 0.63	5.90 ± 0.48	Pass
W-3703,3704	9/11/2018	Gr. Alpha	0.71 ± 0.80	1.03 ± 0.81	0.87 ± 0.57	Pass
W-3703,3704	9/11/2018	Gr. Beta	1.67 ± 1.08	0.53 ± 1.00	1.10 ± 0.74	Pass
SG-3796,3797	9/14/2018	Gr. Alpha	42.3 ± 3.6	50.9 ± 3.8	46.6 ± 2.6	Pass

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

			Concentration [a]			
Lab Code	Date	Analysis	First Result	Second Result	Averaged Result	Acceptance
SG-3796,3797	9/14/2018	Gr. Beta	43.9 ± 1.9	44.1 ± 1.8	44.0 ± 1.3	Pass
SG-3796,3797	9/14/2018	Pb-214	10.4 ± 0.6	14.2 ± 0.5	12.3 ± 0.4	Pass
SG-3796,3797	9/14/2018	Ac-228	15.8 ± 1.2	15.7 ± 1.2	15.8 ± 0.8	Pass
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
SG-5046,5047	11/21/2018	K-40	8.65 ± 1.18	9.12 ± 1.02	8.88 ± 0.32	Pass
SG-5046,5047	11/21/2018	Cs-137	0.18 ± 0.06	0.10 ± 0.05	0.14 ± 0.78	Pass
SG-5046,5047	11/21/2018	Gr. Alpha	22.8 ± 5.6	17.5 ± 4.8	20.2 ± 0.0	Pass
SG-5046,5047	11/21/2018	Gr. Beta	31.8 ± 3.5	26.8 ± 3.1	29.3 ± 3.7	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
XAP-5499,5500	1/2/2019	Fe-55	941 ± 220	1027 ± 226	984 ± 158	Pass
XAP-5499,5500	1/2/2019	Sr-89	20.2 ± 7.3	14.9 ± 5.7	17.5 ± 4.7	Pass
XAP-5499,5500	1/2/2019	Ni-63	12.1 ± 8.5	15.6 ± 8.5	13.8 ± 6.0	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).

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

			Concentration [a]			
Lab Code [b]	Reference Date	Analysis	Laboratory result	Known Activity	Control Limits [c]	Acceptance
MASO-765	2/1/2018	Am-241	1.57 ± 4.46	0	NA [c]	Pass
MASO-765	2/1/2018	Cs-137	4.69 ± 2.59	4.6	NA [d]	Pass
MASO-765	2/1/2018	Co-57	886 ± 7	826	578 - 1074	Pass
MASO-765	2/1/2018	Co-60	579 ± 7	560	392 - 728	Pass
MASO-765	2/1/2018	Mn-54	1135 ± 15	1010	707 - 1313	Pass
MASO-765	2/1/2018	K-40	653 ± 47	577	404 - 750	Pass
MASO-765	2/1/2018	Zn-65	1096 ± 19	960	672 - 1248	Pass
MASO-765	2/1/2018	Pu-238	54.4 ± 5.6	45.2	31.6 - 58.8	Pass
MASO-765	2/1/2018	Pu-239/240	58.9 ± 5.6	50.8	35.6 - 66.0	Pass
MASO-765	2/1/2018	Sr-90	1.07 ± 1.15	0	NA [c]	Pass
MAAP-769	2/1/2018	Am-241	0.070 ± 0.021	0.067	0.047 - 0.087	Pass
MAAP-769	2/1/2018	Cs-134	0.55 ± 0.04	0.675	0.473 - 0.878	Pass
MAAP-769	2/1/2018	Cs-137	0.01 ± 0.01	0	NA [c]	Pass
MAAP-769	2/1/2018	Co-57	1.08 ± 0.04	1.18	0.83 - 1.53	Pass
MAAP-769	2/1/2018	Co-60	0.01 ± 0.01	0	NA [c]	Pass
MAAP-769	2/1/2018	Mn-54	1.01 ± 0.05	1.03	0.72 - 1.34	Pass
MAAP-769	2/1/2018	Zn-65	1.37 ± 0.11	1.33	0.93 - 1.73	Pass
MAAP-769	2/1/2018	Pu-238	0.042 ± 0.017	0.0445	0.0312 - 0.0579	Pass
MAAP-769	2/1/2018	Pu-239/240	-0.001 ± 0.006	0	NA [c]	Pass
MAAP-769	2/1/2018	Sr-90	1.12 ± 0.13	1.01	0.71 - 1.31	Pass
MAAP-769	2/1/2018	U-234/233	0.117 ± 0.023	0.124	0.087 - 0.161	Pass
MAAP-769	2/1/2018	U-238	0.126 ± 0.023	0.128	0.090 - 0.166	Pass
MAVE-767	2/1/2018	Cs-134	3.03 ± 0.10	3.23	2.26 - 4.20	Pass
MAVE-767	2/1/2018	Cs-137	3.86 ± 0.05	3.67	2.57 - 4.77	Pass
MAVE-767	2/1/2018	Co-57	4.86 ± 0.09	4.42	3.09 - 5.75	Pass
MAVE-767	2/1/2018	Co-60	2.24 ± 0.06	2.29	1.60 - 2.98	Pass
MAVE-767	2/1/2018	Mn-54	2.75 ± 0.08	2.66	1.86 - 3.46	Pass
MAVE-767	2/1/2018	Zn-65	0.02 ± 0.05	0	NA [c]	Pass
MAW-656	2/1/2018	I-129	1.66 ± 0.07	1.93	1.35 - 2.51	Pass
MAW-662	2/1/2018	Am-241	0.581 ± 0.050	0.709	0.496 - 0.922	Pass
MAW-662	2/1/2018	Cs-134	9.35 ± 0.38	10.2	7.1 - 13.3	Pass
MAW-662	2/1/2018	Cs-137	13.0 ± 0.2	12.2	8.5 - 15.9	Pass
MAW-662	2/1/2018	Co-57	0.003 ± 0.039	0	NA [c]	Pass
MAW-662	2/1/2018	Co-60	11.73 ± 0.19	11.5	8.1 - 15.0	Pass
MAW-662	2/1/2018	Mn-54	0.060 ± 0.019	0	NA [c]	Pass
MAW-662	2/1/2018	Zn-65	15.85 ± 0.27	14.3	10.0 - 18.6	Pass
MAW-662	2/1/2018	Fe-55	10.7 ± 11.7	11.1	7.80 - 14.40	Pass
MAW-662	2/1/2018	Ni-63*	11.0 ± 1.4	14.0	9.8 - 18.2	Warning
MAW-662	2/1/2018	Ni-63*	12.9 ± 1.7	14.0	9.8 - 18.2	Pass
MAW-662	2/1/2018	H-3	-0.3 ± 3.0	0	NA [c]	Pass
MAW-662	2/1/2018	Pu-238	0.02 ± 0.01	0.023	NA [d]	Pass
MAW-662	2/1/2018	Pu-239/240	0.585 ± 0.056	0.600	0.420 - 0.780	Pass
MAW-662	2/1/2018	Ra-226[f]	0.340 ± 0.040	0.257	0.180 - 0.334	Fail
MAW-662	2/1/2018	Ra-226[f]	0.297 ± 0.048	0.257	0.180 - 0.334	Pass

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

			Concentration [a]			
Lab Code [b]	Reference Date	Analysis	Laboratory result	Known Activity	Control Limits [c]	Acceptance
MAW-662	2/1/2018	Sr-90	9.92 ± 0.75	11.4	8.0 - 14.8	Pass
MAW-662	2/1/2018	Tc-99	4.9 ± 0.4	4.37	3.06 - 5.68	Pass
MAW-662	2/1/2018	U-233/234	0.404 ± 0.041	0.430	0.301 - 0.559	Pass
MAW-662	2/1/2018	U-238	0.396 ± 0.041	0.437	0.306 - 0.568	Pass
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 [e]	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	0.58 ± 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 [e]	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

[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] The lab was in the "warning zone" on this study(biased low). The sample was rerun applying an aggressive oxidation technique to remove a complexing agent that is utilized in the early steps of the procedure. Reanalysis was acceptable with this enhanced technique.

[f] An investigation was performed to determine reason for the failure of the Ra-226 result. A backup solution was reanalyzed with acceptable results. The current study as well as a past study were reanalyzed with acceptable results. No conclusion has been currently drawn from the results of this investigation.

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

MRAD-28 Study

Lab Code [b]	Date	Analysis	Concentration [a] Laboratory Result	ERA Result	Control Limits [c]	Acceptance
ERAP-942	3/19/2018	Am-241[d]	24.6	7.86	5.61 - 10.5	Fail
ERAP-942	3/19/2018	Am-241[d]	7.30	7.86	5.61 - 10.5	Pass
ERAP-942	3/19/2018	Cs-134	174	204	132 - 250	Pass
ERAP-942	3/19/2018	Cs-137	969	865	710 - 1130	Pass
ERAP-942	3/19/2018	Co-60	672	665	565 - 845	Pass
ERAP-942	3/19/2018	Fe-55	701	771	281 - 1230	Pass
ERAP-942	3/19/2018	Mn-54	< 50	< 50.0	0.00 - 50.0	Pass
ERAP-942	3/19/2018	Zn-65	594	668	548 - 1020	Pass
ERAP-942	3/19/2018	Pu-238	56.8	55.6	42.0 - 68.3	Pass
ERAP-942	3/19/2018	Pu-239	54.4	52.3	39.1 - 63.1	Pass
ERAP-942	3/19/2018	Sr-90	113	124	78.4 - 169	Pass
ERAP-942	3/19/2018	U-234	22.8	24.6	18.2 - 28.8	Pass
ERAP-942	3/19/2019	U-238	22.7	24.4	18.4 - 29.1	Pass
ERAP-944	3/19/2018	Gross Alpha	49.1	43.4	22.7 - 71.5	Pass
ERAP-944	3/19/2018	Gross Beta	44.8	52.0	31.5 - 78.6	Pass
ERSO-946	3/19/2018	Ac-228	1,480	1,240	818 - 1560	Pass
ERSO-946	3/19/2018	Am-241	48	74.7	40.3 - 106	Pass
ERSO-946	3/19/2018	Bi-212[e]	1,980	1,240	355 - 1,850	Fail
ERSO-946	3/19/2018	Bi-212[e]	11,220	1,240	355 - 1,850	Pass
ERSO-946	3/19/2018	Bi-214	2,180	1,760	845 - 2,620	Pass
ERSO-946	3/19/2018	Cs-134	5,230	5,330	3,640 - 6,370	Pass
ERSO-946	3/19/2018	Cs-137	4,820	4,210	3,180 - 5,320	Pass
ERSO-946	3/19/2018	Co-60	8,390	8,060	6,350 - 9,950	Pass
ERSO-946	3/19/2018	K-40[e]	14,100	10,600	7,300 - 12,700	Fail
ERSO-946	3/19/2018	K-40[e]	12160	10,600	7,300 - 12,700	Pass
ERSO-946	3/19/2018	Mn-54	< 1000	< 1000	0 - 1,000	Pass
ERSO-946	3/19/2018	Pb-212	1,140	1,240	865 - 1,570	Pass
ERSO-946	3/19/2018	Pb-214	2330	1850	777 - 2910	Pass
ERSO-946	3/19/2018	Pu-238	1,830	1,470	733 - 2230	Pass
ERSO-946	3/19/2018	Pu-239	1,520	1,330	725 - 1910	Pass
ERSO-946	3/19/2018	Sr-90	3,500	4,500	1,400 - 7,010	Pass
ERSO-946	3/19/2018	Th-234	1,800	1,800	680 - 3,080	Pass
ERSO-946	3/19/2018	U-234	1,610	1,620	853 - 2,380	Pass
ERSO-946	3/19/2018	U-238	1,800	1,800	988 - 2,420	Pass
ERSO-946	3/19/2018	Zn-65	2,440	1,990	1,590 - 2,710	Pass
ERW-952	3/19/2018	Gr. Alpha	25.3	29.0	10.6 - 40.0	Pass
ERW-952	3/19/2018	Gr. Beta	61.3	73.1	36.6 - 101	Pass
ERW-954	3/19/2018	H-3	22,300	21,700	16,400 - 26,400	Pass

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

MRAD-28 Study

Lab Code [b]	Date	Analysis	Concentration [a] Laboratory Result	ERA Result	Control Limits [c]	Acceptance
ERVE-948	3/19/2018	Am-241	3,800	3,880	2,400 - 5,480	Pass
ERVE-948	3/19/2018	Cm-244	2,490	2,630	1,480 - 3,270	Pass
ERVE-948	3/19/2018	Co-60	579	491	385 - 642	Pass
ERVE-948	3/19/2018	Cs-134	2,090	1,950	1,290 - 2,600	Pass
ERVE-948	3/19/2018	Cs-137	2,640	2,160	1,660 - 2,910	Pass
ERVE-948	3/19/2018	K-40	34,000	30,900	23,200 - 39,100	Pass
ERVE-948	3/19/2018	Mn-54	< 300	< 300	0.00 - 300	Pass
ERVE-948	3/19/2018	Zn-65	3,080	2,400	1,790 - 3,560	Pass
ERVE-948	3/19/2018	Pu-238	2,400	2,020	1,400 - 2,600	Pass
ERVE-948	3/19/2018	Pu-239	5,140	4,160	2,880 - 5,270	Pass
ERVE-948	3/19/2018	Sr-90	3,570	3,330	1,880 - 4340	Pass
ERVE-948	3/19/2018	U-233/234	4,130	4,050	2,850 - 5,170	Pass
ERVE-948	3/19/2018	U-238	4,190	4,010	2,830 - 5,020	Pass
ERW-950	3/19/2018	Am-241	72.5	103	70.7 - 132	Pass
ERW-950	3/19/2018	Co-60	1,550	1,480	1,280 - 1,700	Pass
ERW-950	3/19/2018	Cs-134	1,280	1,330	1,000 - 1460	Pass
ERW-950	3/19/2018	Cs-137	343	328	281 - 373	Pass
ERW-950	3/19/2018	Mn-54	< 100	< 100	0.00 - 100	Pass
ERW-950	3/19/2018	Pu-238	59.8	66.1	39.7 - 85.6	Pass
ERW-950	3/19/2018	Pu-239	84.8	91.8	56.8 - 113	Pass
ERW-950	3/19/2018	U-234	111	132	100 - 151	Pass
ERW-950	3/19/2018	U-238	113	131	102 - 154	Pass
ERW-950	3/19/2018	Zn-65	1450	1300	1160 - 1640	Pass
ERW-950	3/19/2018	Fe-55	533	445	261 - 647	Pass
ERW-950	3/19/2018	Sr-90	754	781	562 - 965	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 codes as follows: ERW (water), ERAP (air filter), ERSO (soil), ERVE (vegetation). Results are reported in units of pCi/L, except for air filters (pCi/Filter), vegetation and soil (pCi/kg).

[c] Results are presented as the known values, expected laboratory precision (2 sigma, 1 determination) and control limits as provided by ERA.

[d] Reported result was higher than ERA's upper acceptance limit. An investigation was initiated. The sample was run with a pre-treatment technique. Rerunning the analysis with this pre-treatment gave a result of 7.30 pCi/total. Going forward all samples for Am-241 will be analyzed utilizing this pre-treatment.

[e] The ERA results for K-40 and Bi-212 were outside the acceptable limits. The sample analysis was rerun utilizing a different library with acceptable results. The gamma software vendor will be consulted for the differences between the two libraries. In the meantime EIML will occasionally be counting a standard with known activity to ensure reported values are within the laboratory's acceptance criteria.

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 $x_1, x_2 \ldots x_n$ 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.