Point Beach-Kewaunee
Environmental Radioactivity Survey

2017

WISCONSIN DEPARTMENT
of HEALTH SERVICES

Division of Public Health
Bureau of Environmental and Occupational Health
Radiation Protection Section

P-00442 (10/2020)

Executive Summary

Wisconsin Stat. § 254.41 mandates the Wisconsin Department of Health Services (DHS) to conduct environmental radiation monitoring around the nuclear power facilities that affect Wisconsin. This environmental monitoring report is for the Point Beach and Kewaunee nuclear generating plants for the calendar year January - December 2017 and provides a description and results of this environmental monitoring program.

The DHS environmental monitoring program consists of the collection of various types of samples from the air, water, and terrestrial exposure pathways, sample analysis, and interpretation of the data. The sampling program included samples of air, precipitation, ambient gamma radiation, surface water, fish, shoreline sediment, soil, milk, well water, and vegetation that are collected from selected locations at planned sampling intervals.

Program Summary

For 2017, all sample results from the Point Beach-Kewaunee environmental monitoring area were less than state and federal standards or guidelines.

The DHS environmental monitoring programs provide an ongoing baseline of radioactivity measurements to assess any Wisconsin health concerns from the operation of nuclear power generating facilities in or near Wisconsin or other radiological incidents that may occur within Wisconsin or worldwide. These monitoring programs show the following:
Environmental radioactivity levels have been trending downward in the time period since the 1950s–1960s atmospheric nuclear testing and such radiological incidents as the Chernobyl nuclear reactor incident of 1986 and Fukushima Daiichi incident in 1986.

- There were no incidents during 2017 that required additional environmental monitoring.
- There is no radioactive problem with sampled types of food consumed in Wisconsin and no health problem related to radioactivity for Wisconsin citizens.

DHS's ongoing environmental monitoring programs will continue to provide assurances to the citizens of Wisconsin that the environment surrounding the Kewaunee Power Station and Point Beach nuclear power facilities will continue to be evaluated.

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Introduction

Wisconsin Stat. § 254.41 mandates the Wisconsin Department of Health Services (DHS) to conduct environmental radiation monitoring around the nuclear power facilities that impact Wisconsin. This environmental monitoring report is for the Point Beach and Kewaunee nuclear generating plants for the calendar year January - December 2017 and provides a description and results of this environmental monitoring program.

DHS Point Beach-Kewaunee Environmental Monitoring Sampling Program

DHS environmental monitoring program consists of the collection of various types of samples from the air, water, and terrestrial exposure pathways. The sampling program included samples of air, precipitation, ambient gamma radiation as measured by thermoluminescent dosimeters (TLD), surface water, fish, shoreline sediment, soil, milk, well water, and vegetation that are collected from selected locations at planned sampling intervals.

Table 1 provides a listing of types of samples collected, collection frequency, sites where samples are collected, number of samples collected, number of samples that were missed or had sample or analysis deviations, and a listing of the required analyses. Table 2 is a listing of sampling sites and includes a description, direction, and distance from the monitored power plants. Table 3 provides an explanation of missing samples or non-routine sample analyses. Figure 1 is a map showing the location of environmental sampling sites in relation to Kewaunee Station and Figure 2 is a map showing the location of environmental sampling sites in relation to the Point Beach power plant.

Program Modifications

There were no program modification implemented for calendar year 2017.

Laboratory Services and Quality Assurance

Analysis of the samples is performed under contract with the Wisconsin State Laboratory of Hygiene (WSLH). WSLH maintains a quality assurance program. Analytical procedures provide for routine replicate analyses to verify methods and instrument operation. Traceable sources are used daily to regularly calibrate instrumentation and conduct performance checks. Instrumentation quality control charts are maintained and available upon written request.

WSLH participates in the Environmental Resource Associates' Proficiency Testing program and has performed satisfactorily over the report period. In addition, WSLH participates in the Multi Analytical Performance Evaluation Program (MAPER) for environmental matrix analysis. Proficiency testing results are available from the Wisconsin State Laboratory of Hygiene.

ATI Environmental Inc. Midwest Laboratory participated in the National Environmental Laboratory Accreditation Conference Standards (2003) for a variety of radiological analyses during the reporting period.

Detection Limits

Detection limits, required by DHS, are expressed as a lower limit of detection (LLD). The required DHS LLD as indicated in Table 4 under the heading "LLD" is an "a priori" estimate of the capability for detecting an activity concentration by a given measurement system, procedure, and type of sample. Counting statistics of the appropriate instrument background are used to compute the LLD for each specific analysis. Using 4.66 times the standard deviation (s_b) of the instrument background, the LLD for each specific analysis is defined at the 95% Confidence Level.

The LLD for each radioisotope listed in Table 4 has been calculated from the following equation:

$$LLD = \frac{4.66\ s_b}{E * V * 2.22 * Y * S * \exp(-dt)}$$

Where:

LLD	is the "a priori" lower limit of detection as defined above, as picocuries per unit mass or volume.
s_b	is the standard deviation of the background counting rate or of the counting rate of blank sample as appropriate, as counts per minute.
E	is the counting efficiency, as counts per disintegration.
V	is the sample size in units of mass or volume.
2.22	is the number of disintegrations per minute per picocurie.
Y	is the fractional radiochemical yield, when applicable.
S	is the self-absorption correction factor.
d	is the radioactive decay constant for the particular radionuclide.
t	is for environmental samples, the elapsed time between sample collection, or end of the sample collection period, and time of counting.

Typical values for E, V, Y and dt have been used to calculate the LLD.

Reporting of Sample Analysis Results

Results for specific analyses are reported as either a “less than” (<) value or an actual activity value. The reporting of results in Table 4 under the heading “Range” and in Tables 5 -16 is an “a posteriori” calculation based on the actual analysis performed using the actual sample values for E, V, Y, and dt. Typically the reported “less than” (<) results are lower than the required Wisconsin DHS LLD indicating that the required DHS LLD has been met.

An actual activity value will be accompanied by an uncertainty term for that analysis. The uncertainty term is a plus or minus counting uncertainty term at the 2 sigma (95%) confidence interval and is printed as (+- or ±).

Examples and explanations of data reporting are:

Example	Nuclide	Activity reported
1	^{137}Cs	< 10 pCi/liter
2	^{137}Cs	15 ± 3 pCi/liter

In example 1 we can be 95% confident that the sample activity, if any, is less than the LLD of 10 pCi/liter. In example 2 we can be 95% confident that the actual sample activity is greater than the LLD for that analysis and is between 12 and 18 pCi/liter.

Table 1 Sample collection summary and required analyses for 2017.

Sample Type	Collection and Frequency	Site Locations	Number of Samples Collected	Number of Sample Deviations	Required Analyses
air particulate	C/W	1, 4, 7, 8, 17, 18	308	1	GA, GB, GI[w]
air iodine	C/W	4, 17, 18	152	4	GI
precipitation	C/BW	1, 4	12	0	GB[x,u], H[x]
TLD	G/Q	T1–T18, T20, T28-T31, T51–T58	124	1	ambient gamma
surface water	G/M	9, 12a, 17	35	1	GA[u,v], GB[u,v], GI, Sr[z], H[z], I[y]
surface water	G/SA	5, 29	4	0	GA[u,v], GB[u,v], GI, Sr, H
fish	G/Q	10a	7	1	GI
shoreline sediment	G/A	5, 10a, 12a, 12b, 12c, 26, 29	7	0	GA, GB, GI
vegetation	G/SA	1, 2, 3, 4, 5, 7, 8, 14, 17	18	0	GA, GB, GI
soil	G/SA	1, 2, 3, 4, 5, 7, 8, 14, 17	18	0	GA, GB, GI
well water	G/SA	3, 10b, 11, 12d N, 12d S	10	0	GA, GB, H
milk	G/M	24, 27, 28	24	0	GI, I[y], Sr

Collection type: C/ = continuous; G/ = grab

Frequency: /W = weekly; /M = monthly; /Q = quarterly; /A = annually; /BW = bi-weekly; /SA = semi-annually

Required analyses: GA = gross alpha; GB = gross beta; GI = gamma isotopic; Sr = strontium; I = iodine; H = tritium

[u] = Soluble

[v] = Insoluble

[w] = A quarterly composite for each site

[x] = One monthly composite from 2 sites

[y] = The procedure is performed six (6) times per year for each sample site

[z] = The procedure is performed for each site on a quarterly composite (3-month composite)

Table 2 Wisconsin DHS Point Beach-Kewaunee environmental monitoring sampling sites.

Sample site	Distance and direction (miles)		Location description
	Kewaunee	Point Beach	
PBK-1	5.7 WSW	5.7 WNW	Francar residence
PBK-2	4.9 S	0.7 SSW	Southwest corner property line - Point Beach
PBK-3	4.3 SSW	1.5 W	Two Creeks Town Hall
PBK-4	3.1 S	1.2 NNW	Residence north property line - Point Beach
PBK-5	2.6 S	1.7 NNW	Two Creeks Park; NW corner of property
PBK-7	7.3 SSW	3.3 SSW	WPSC substation, Cty V
PBK-8	0.8 WNW	4.9 N	P Ihlenfeldt farm
PBK-9	4.7 S	0.5 SSE	Point Beach, meteorological tower
PBK-10a	4.2 S	0.1 E	Point Beach, effluent channel
PBK-10b	4.2 S	0.1 E	Point Beach, entrance
PBK-11	3.1 SSW	2.0 NW	Two Creeks International Harvester
PBK-12a	0.1 E	4.2 N	Kewaunee, effluent channel
PBK-12b	0.1 E	4.2 N	Kewaunee, effluent channel, 500 feet N
PBK-12c	0.1 E	4.2 N	Kewaunee, effluent channel, 500 feet S
PBK-12d	0.1 W	4.2 N	Kewaunee, well sites (North and South)
PBK-14	0.8 W	4.3 N	Nuclear Road – field east of parking lot
PBK-17	11.4 NNE	15.6 N	Green Bay Pumping Station - Rostok
PBK-18	0.1 S	4.1 N	Kewaunee, meteorological tower
PBK-24	2.6 N	6.9 N	L. Struck farm
PBK-26	8.3 NNE	12.6 N	Kewaunee
PBK-27	3.5 SSW	1.7 NW	R. Barta farm
PBK-28	6.0 S	1.8 SSE	Strutz Farms Inc
PBK-29	6.1 SSE	2.1 SSE	Irish Road – at Lake Michigan
PBK-(T1-T8)	4.0 S	0.6 NW	Point Beach ISFSI on outside of perimeter fence
PBK-T9	3.2 S	1.2 NNW	Point Beach north property line, Lakeshore Road
PBK-T10	5.1 S	0.8 SSE	Nuclear Road, 0.6 mile E of Lakeshore Road
PBK-T11	5.1 S	0.9 SSW	Nuclear Road, 0.1 mile E of Lakeshore Road
PBK-T12	5.0 SSW	1.4 WSW	Highway 42, 0.6 mile N of Nuclear Road
PBK-T13	4.0 SSW	1.4 WNW	Highway 42, 0.3 mile N of Tapawingo Road
PBK-T14	3.1 SSW	1.9 NW	Two Creeks Road, 0.1 mile E of Highway 42
PBK-T15	7.6 S	3.3 S	Junction of Lakeshore Road and Ravine Drive
PBK-T16	7.3 SSW	3.3 SW	Cty V, 0.5 mile W of Hwy 42
PBK-T17	5.6 SW	3.8 W	Junction of Saxonbury Road and Tapawingo Road
PBK-T18	3.2 SW	3.3 NW	Zander Road, 0.1 mile W on Tannery Road
PBK-T19	0.7 N	5.0 N	Junction of Sandy Bay Road and Lakeview Road (discontinued in January 2016, relocated renamed to T-51)
PBK-T20	1.4 SW	3.4 NNW	Junction of Cty BB and Ratajcsak Lane
PBK-T21	1.3 W	4.5 NNW	Junction of Nuclear Road and Woodside Road (discontinued in January 2016, relocated renamed to T-52)
PBK-T22	1.2 NW	5.3 N	Sandy Bay Road, 0.4 mile W of Hwy 42 (discontinued in January 2016, relocated renamed to T-53)

Table 2 (continued) Wisconsin DHS Point Beach–Kewaunee environmental monitoring sampling sites.

Sample site	Distance and direction (miles)		Location description
	Kewaunee	Point Beach	
PBK-T23	4.9 WSW	5.5 NW	Cty B, S of Tisch Mills (discontinued in January 2016, relocated renamed to T-54)
PBK-T24	3.8 NW	7.0 NNW	Jct of Norman Road and Cty G (discontinued in January 2016, relocated renamed to T-55)
PBK-T25	3.1 NNW	7.2 N	Woodside Road, 0.2 miles S of Old Settlers Road (discontinued in January 2016, relocated renamed to T-56)
PBK-T26	3.0 N	7.3 N	Old Settlers Road, 0.1 mile W of Cemetery Road (discontinued in January 2016, relocated renamed to T-57)
PBK-T27	17.4 NNE	21.6 NNE	Algoma, S on Hwy 42 (discontinued in January 2016, relocated renamed to T-58)
PBK-T28	7.2 NNE	11.4 N	Kewaunee, South on Hwy 42
PBK-T29	12.4 S	8.1 SSW	Two Rivers, Junction of Hwy 42 and 34th Avenue
PBK-T30	16.0 SSW	11.9 SSW	Manitowoc, Hwy 42, Two Rivers Chamber of Commerce
PBK-T31	8.6 SW	5.6 WSW	Mishicot, Cty V, in front of house #653
PBK-T51-T58	0.1 NNW	4.4 N	KPS ISFSI on the inside of the perimeter fence

Table 3 Missing sample or sample deviation report for 2017.

Sample type	Date	Site	Explanation
TLD	1st quarter	PBK-T51	spike was related to the movement of fuel from the spent fuel pool
TLD	1st quarter	PBK-T52	spike was related to the movement of fuel from the spent fuel pool
TLD	1st quarter	PBK-T53	spike was related to the movement of fuel from the spent fuel pool
TLD	1st quarter	PBK-T54	spike was related to the movement of fuel from the spent fuel pool
TLD	2nd quarter	PBK-29	TLD knocked of pole due to construction, found on ground
Air particulate	03/07/17	PBK-8	Data sheet unavailable
Air Iodine	09/25/17	PBK-4	Data sheet unavailable
Air Iodine	02/17/17	PBK-17	Data sheet unavailable
Air Iodine	02/24/17	PBK-17	Data sheet unavailable
Air Iodine	12/28/17	PBK-17	Data sheet unavailable
Surface water	2/10/17	PBK-9	No sample, the sample site was not accessible
Fish	8/1/17		Combined sample

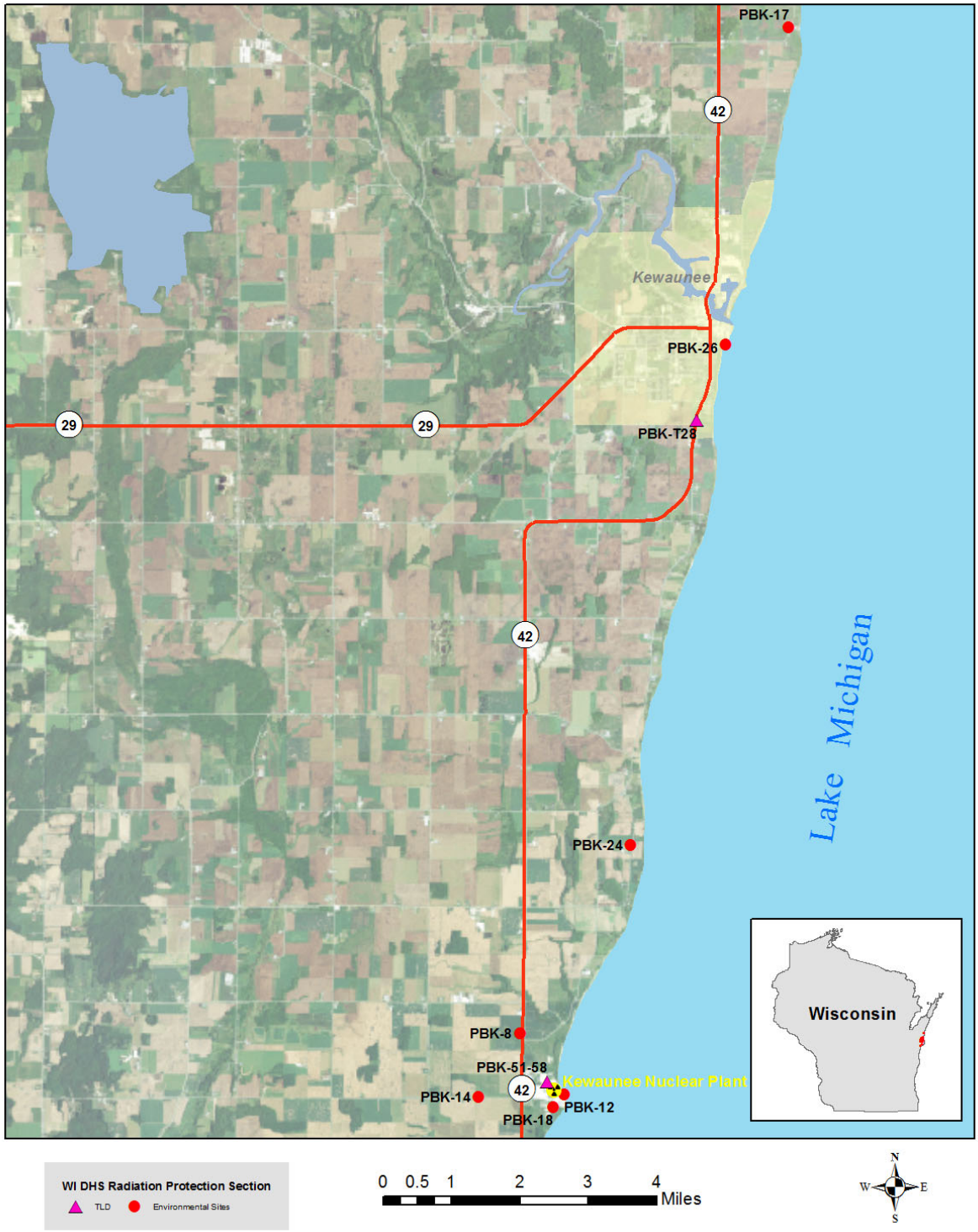


Figure 1 Point Beach-Kewaunee environmental monitoring sampling sites in relation to the Kewaunee plant.

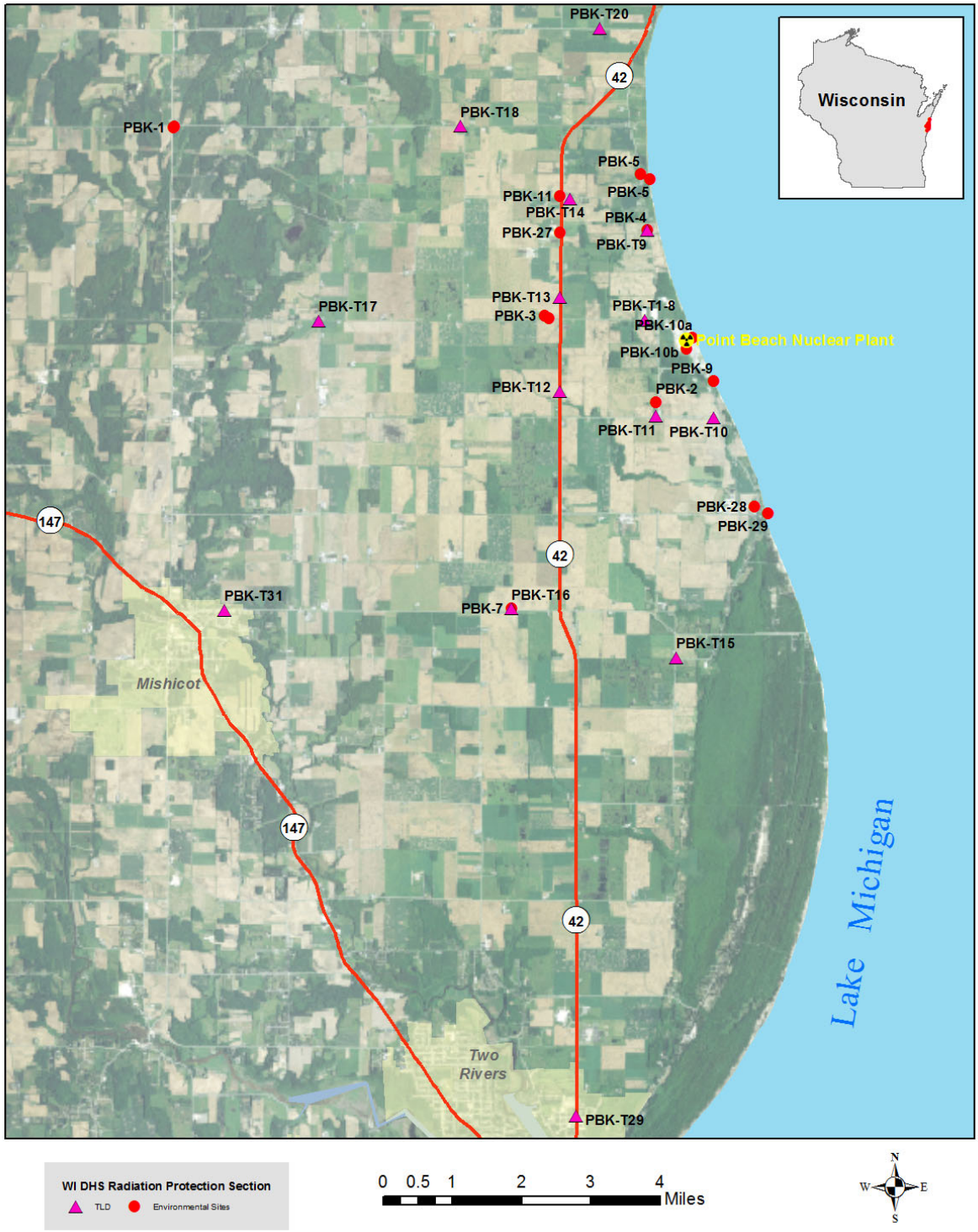


Figure 2 Point Beach-Kewaunee environmental monitoring sampling sites in relation to the Point Beach plant.

Results and Discussion for the Wisconsin DHS Point Beach-Kewaunee Environmental Monitoring program

Air Particulate

Table 4 provides a summary of reported activities by DHS for air particulate samples. Tables 5–6 provide results from the individual sample analyses.

From the gross beta activities listed in Table 4, it may be noted that there were no significant differences due to distance away from either the Kewaunee or the Point Beach facility. Although the gross beta activity was above the LLD, it was similar to previous years; and the increase in gross beta activity could not be attributed to Kewaunee Station or the Point Beach nuclear plant operation.

The gamma isotopic analysis of the quarterly air particulate filter composites detected only background levels of the radioisotopes listed in Table 6. All other radioisotopes were below their respective LLD. Beryllium-7 (^{7}Be), detected in all composites, is a naturally occurring radioisotope that is constantly produced through nuclear reactions between cosmic rays and nuclei in the atmosphere and was detected in air composites from other areas of the state.

Air Iodine

Table 4 provides a summary of reported activities by DHS for air iodine samples. Table 5 provides results from the individual sample analyses.

Nearly all air iodine measurements were below the LLD of 0.07 pCi/m^3. Sample analysis suggests that neither the Kewaunee Station nor the Point Beach nuclear generating facilities influenced air iodine levels during the reporting period.

Ambient Gamma Radiation—Thermoluminescent Dosimeters (TLD)

Table 4 provides a summary of reported activities by DHS for ambient gamma radiation. Table 7 provides results from the individual sample analyses.

Analysis of samples taken at varying distances from either Kewaunee Power Station or Point Beach nuclear facilities did not yield significant differences in exposure for sites PBK-T9 through PBK-T31. Excluding the sites around the perimeter of the Point Beach ISFSI (PBK-T1 – PBK-T8) and Kewaunee Power Stations ISFSI (PBK-51 - PBK-58), the average quarterly exposure from the remaining 15 sites was 14.2 $\pm$ 1.7 milliroentgens. The average quarterly exposure at the Point Beach ISFSI for 2017 was at background levels and was comparable to other areas in Wisconsin. In 2017 there was a substantial increase in exposure readings for 4 TLD around the Kewaunee Station ISFSI. This increase corresponds to the placement of additional spent fuel on the ISFSI pad. Influence by the Kewaunee Station or the Point Beach nuclear generating facilities on air quality is not evident from ambient gamma radiation analysis.

Precipitation

Table 4 provides a summary of reported activities by DHS for precipitation. Table 8 provides results from the individual sample analyses.

The gross beta activity in precipitation was within the normal range of activity when compared to previous years' data. The three spikes in tritium were blow reporting levels, but higher than normal background and previous years' data. These 3 minor increases in tritium are likely due to Point Beach effluent releases.

Fish

Table 4 provides a summary of reported activities by DHS for fish samples. Table 9 provides results from the individual sample analyses. The fish samples showed no unusual activities.

Shoreline Sediment

Table 4 provides a summary of reported activities by DHS for shoreline sediment samples. Table 10 provides results from the individual sample analyses.

Analysis of the shoreline samples showed no unusual activities. All samples indicated naturally occurring potassium-40 (^{40}K). Previous years' reported activities also detected cesium-137 (^{137}Cs), which was probably attributable to residual fallout from previous atmospheric nuclear weapons testing. Samples commonly detect naturally occurring radioisotopes from the uranium-238 (^{238}U) and thorium-232 (^{232}Th) decay series, but they have not been quantified or reported. Sample analysis indicates that neither the Kewaunee Station nor the Point Beach nuclear generating facilities influenced shoreline sediment activity levels.

Surface Water

Table 4 provides a summary of reported activities by DHS for surface water samples. Table 11 provides results from individual sample analyses. During this reporting period, samples were sent to ATI Environmental Inc. Midwest Laboratory as a result of Wisconsin State Lab of Hygiene's inability to analyze strontium and chemically extracted iodine.

From the gamma isotopic analysis, all radioisotopes were below their respective LLD. All reported activities for gross beta, gross alpha, and tritium (^{3}H) were at background levels and were comparable to data from previous years. The surface water samples uniformly show activities well below state or federal standards. Influence by the Kewaunee Station or Point Beach nuclear generating facilities is not evident from surface water sample analysis.

Well Water

Table 4 provides a summary of reported activities by DHS for well water samples. Table 12 results from the individual sample analyses.

The well water samples showed no unusual gross alpha and gross beta activities and all activities for tritium (^{3}H) were less than its LLD. The measured activities were all below state and federal standards. Influence by the Kewaunee Station or Point Beach nuclear generating facilities is not evident from well water sample analysis.

Milk

Table 4 provides a summary of reported activities by DHS for milk samples. Table 13 results from the individual sample analyses. During this reporting period, samples were sent to ATI Environmental Inc. Midwest Laboratory as a result of Wisconsin State Lab of Hygiene's inability to analyze strontium and chemically extracted iodine.

The analysis of milk samples detected no unusual activities. Naturally occurring potassium-40 (^{40}K) was detected in all samples. The detected activities for strontium-90 (^{90}Sr), is attributable to residual fallout from previous atmospheric nuclear weapons testing. Strontium-90 has also been detected in previous years at similar activity levels. Influence by the Kewaunee Station or Point Beach nuclear generating facilities is not evident from milk sample analysis.

Vegetation

Table 4 provides a summary of reported activities by DHS for vegetation samples. Table 14 provides results from the individual sample analyses.

Analysis of the vegetation samples showed no unusual activities, even though gross beta was above the LLD the values were consistent with previous years. The gamma isotopic analysis detected only small amounts of naturally occurring potassium-40 (^{40}K) and beryllium-7 (^{7}Be) listed in Table 4. Influence by the Kewaunee or Point Beach nuclear generating facilities is not evident from vegetation sample analysis.

Soil

Table 4 provides a summary of reported activities by DHS for soil samples. Table 15 provides results from the individual sample analyses.

Analysis of the soil samples showed no unusual activities, even though some gross beta were above the LLD, the values were consistent with previous years. Naturally occurring potassium-40 (^{40}K) was detected in all samples. The reported activities for cesium-137 (^{137}Cs) were also detected in previous years and are attributable to residual fallout from previous atmospheric nuclear weapons testing. Naturally occurring radioisotopes from the uranium-238 (^{238}U) and thorium-232 (^{232}Th) decay series are commonly detected but have not been quantified or reported.

Point Beach Independent Spent Fuel Storage Installation

Table 7 provides a summary of reported activities by DHS for ambient gamma radiation monitored in the vicinity of the Point Beach Independent and Kewaunee Power Station Spent Fuel Storage Installation (ISFSI).

Thermoluminescent dosimeter (TLD) measurements detected ambient gamma exposure levels greater than background at all sites (T1–T8) located on the Point Beach ISFSI perimeter fence closest to the ventilated storage casks. TLD measurements did not detect an increase in ambient gamma exposure levels at sites T9 - T14 (0.8 – 1.9 miles from the Point Beach ISFSI) or at sites T15–T31 (greater than 2 miles from the Point Beach ISFSI). These readings are consistent with previous years' data. In 2017 average standard quarterly ambient gamma exposure for sites T9 –T31 was 14.1 ± 1.1 milliroentgens and for sites T1–T8 was 36.3 ±1.5 milliroentgens per standard quarter depending on the distance from the storage casks.

Kewaunee Station Independent Spent Fuel Storage Installation

Table 7 provides a summary of reported activities by DHS for ambient gamma radiation monitored in the vicinity of the Kewaunee Station Independent Spent Fuel Storage Installation (ISFSI).

Thermoluminescent dosimeter (TLD) measurements did detect ambient gamma exposure above background at sites T51–T58, located on the Kewaunee Station ISFSI perimeter fence. TLD measurements did not detect an increase in ambient gamma exposure levels at sites T9, T18, and T20 (1.4–3.1 miles from the Point Beach ISFSI). In 2017, average standard quarterly ambient gamma exposure for sites T9–T31 was 14.1 ± 1.1 milliroentgens, and for sites T51–T58 was 117.7 ± 38.5 milliroentgens per standard quarter, depending on the distance from the storage casks.

The increase in ambient gamma radiation in the second quarter coincides with the movement of spent nuclear fuel from the cooling pool to the ISFSI.

Dose to an Average Individual

Federal regulations 10 CFR 20, 10 CFR 50 Appendix I, and 40 CFR 190 restrict the annual exposure of the population from all parts of the nuclear fuel cycle, including nuclear power plants. Doses resulting from gaseous and liquid effluent releases from the Point Beach or Kewaunee nuclear generating facilities are less than the limits as stated in these federal regulations.

The DHS limit for permissible levels of radiation exposure from external sources in unrestricted areas is defined in the Wis. Admin. Code § DHS 157.23. Doses resulting from gaseous and liquid effluent releases from the Point Beach or Kewaunee nuclear generating facilities are less than the limits as stated in Wis. Admin. Code § DHS 157.23.

References

Wisconsin Admin. Code § DHS 157.23

State of Wisconsin, "FINAL ENVIRONMENTAL IMPACT STATEMENT, Point Beach Nuclear Power Plant Projects Proposed by Wisconsin Electric Power Company, Temporary Storage of Spent Nuclear Fuel in Dry Casks, PSC Docket 6630-CE-197, Unit 2 Steam Generator Replacement, PSC Docket 6630-CE-209, AUGUST 1994."

U.S. Environmental Protection Agency, Environmental Radiation Requirements for Normal Operations of Activities in the Uranium Fuel Cycle, EPA 520/4-76-016, 40 CFR Part 190, November 1976.

U.S. Nuclear Regulatory Commission, Title 10, Part 20.

U.S. Nuclear Regulatory Commission, Title 10, Part 50, Appendix I.

Sample Activity Summary

Table 4 Sample activity summary for the Wisconsin DHS Point Beach-Kewaunee environmental monitoring.

Sample type (units)	LLD	Number of samples [a]	Analysis	Range
Air particulate (pCi/m^3)	0.005	307 / 294	gross beta	0.006 - 0.034
			gamma isotopic	
	0.030	24 / 0	Barium 140	< 0.0035
	0.020	24 / 24	Beryllium 7	0.036 – 0.094
	0.002	24 / 0	Cerium 141	< 0.0008
	0.005	24 / 1	Cerium 144	< 0.0097
	0.002	24 / 0	Cesium 134	< 0.0004
	0.002	24 / 0	Cesium 137	< 0.0005
	0.002	24 / 0	Cobalt 58	< 0.0004
	0.002	24 / 0	Cobalt 60	< 0.0005
	0.020	24 / 0	Iodine 131	< 0.0020
	0.005	24 / 0	Iron 59	< 0.0016
	0.020	24 / 0	Lanthanum 140	< 0.0016
	0.002	24 / 0	Manganese 54	< 0.0004
	0.002	24 / 0	Niobium 95	< 0.0005
	0.002	24 / 0	Ruthenium 103	< 0.0005
	0.015	24 / 0	Ruthenium 106	< 0.0032
	0.005	24 / 0	Zinc 65	< 0.0008
	0.005	24 / 0	Zirconium 95	< 0.0008
Air iodine (pCi/m^3)	0.07	148 / 2	I-131	< 0.6
Surface water (pCi/liter)	3.0	39 / 0	gross alpha (sol)	< 0.7 – 1.3
	3.0	39 / 0	gross beta (sol)	<0.9 – 2.7
	3.0	39 / 0	gross alpha (insol)	< 0.5 – 0.7
	3.0	39 / 0	gross beta (insol)	< 1.7 – 1.1
	0.5	15 / 2	I-131	< 0.5
	300	16 / 0	H-3	< 198 - 151
	2.0	16 / 0	Sr-89	< 1.5
	1.0	16 / 0	Sr-90	< 0.9 – 0.5
			gamma isotopic	
	15	39 / 0	Mn-54	< 4
	15	39 / 0	Co-58	< 5
	30	39 / 0	Fe-59	< 8
	15	39 / 0	Co-60	< 8
	30	39 / 0	Zn-65	< 15
	15	39 / 0	Nb-95	< 4
	30	39 / 0	Zr-95	< 9
	15	39 / 0	I-131	< 11
	15	39 / 0	Cs-134	< 6
	15	39 / 0	Cs-137	< 5
	60	39 / 0	Ba-140	< 23
	15	39 / 0	La-140	< 6.2 - 2

Table 4 (continued) Sample activity summary for the Wisconsin DHS Point Beach-Kewaunee environmental monitoring program.

Sample type (units)	LLD	Number of samples [a]	Analysis	Range
Fish			**gamma isotopic**	
(pCi/kg wet)	800	7 / 7	K-40	2170 – 3010
	50	7 / 0	Mn-54	< 9
	60	7 / 0	Co-58	< 11
	130	7 / 0	Fe-59	< 31
	70	7 / 0	Co-60	< 10
	130	7 / 0	Zn-65	< 20
	50	7 / 0	Nb-95	< 14
	100	7 / 0	Zr-95	< 20
	50	7 / 0	Cs-134	< 9
	60	7 / 0	Cs-137	< 11 - 22
Shoreline sediment	15000	7 / 0	gross alpha	< 4370
(pCi/kg dry)	6000	7 / 1	gross beta	< 2900 - 7320
			gamma isotopic	
	80	7 / 0	Cs-134	< 15
	80	7 / 0	Cs-137	< 20 - 14
	90	7 / 0	Co-58	< 15
	90	7 / 0	Co-60	< 19
	600	7 / 0	Fe-59	< 70
	60	7 / 0	Mn-54	< 19
	100	7 / 0	Nb-95	< 26
	800	7 / 7	K-40	3650 - 8150
	300	7 / 0	Zn-65	< 41
	200	7 / 0	Zr-95	< 39
Vegetation	5000	18 / 0	gross alpha	< 3750 - 1650
(pCi/kg wet)	4000	18 / 14	gross beta	1860 - 8560
			gamma isotopic	
	600	18 / 14	Be-7	< 202 - 5610
	2000	18 / 18	K-40	3240 - 7710
	90	18 / 0	Mn-54	< 24
	100	18 / 0	Co-58	< 29
	200	18 / 0	Fe-59	< 61
	100	18 / 0	Co-60	< 29
	250	18 / 0	Zn-65	< 63
	100	18 / 0	Nb-95	< 27
	200	18 / 0	Zr-95	< 44
	80	18 / 0	I-131	< 57
	80	18 / 0	Cs-134	< 25
	90	18 / 0	Cs-137	< 26
	350	18 / 0	Ba-140	< 149
	100	18 / 0	La-140	< 38

Table 4 (continued) Sample activity summary for the Wisconsin DHS Point Beach-Kewaunee environmental monitoring program.

Sample type (units)	LLD	Number of samples [a]	Analysis	Range
Soil	15000	18 / 0	gross alpha	< 3850 - 10600
(pCi/kg dry)	6000	18 / 18	gross beta	12000 - 22300
			gamma isotopic	
	80	18 / 0	Cesium 134	< 30
	80	18 / 14	Cesium 137	30 - 194
	90	18 / 0	Cobalt 58	< 54
	90	18 / 0	Cobalt 60	< 44
	600	18 / 0	Iron 59	< 181
	60	18 / 0	Manganese 54	< 44
	100	18 / 0	Niobium 95	< 98
	800	18 / 18	Potassium 40	12800 - 24700
	300	18 / 0	Zinc 65	< 106
	250	18 / 0	Zirconium 95	< 107
Milk	0.5	18 / 2	I-131	< 0.5
(pCi/liter)	1.5	36 / 0	Sr-90	< 0.6 - 1.1
			gamma isotopic	
	500	36 / 36	K-40	1227 -15161
	15	36 / 0	Mn-54	<5
	15	36 / 0	Co-58	<4
	40	36 / 0	Fe-59	<10
	15	36 / 0	Co-60	<5
	40	36 / 0	Zn-65	<10
	15	36 / 0	Nb-95	<9
	40	36 / 0	Zr-95	<8
	15	36 / 0	I-131	<10
	15	36 / 0	Cs-134	<5
	15	36 / 0	Cs-137	<5
	60	36 / 0	Ba-140	<23
	15	36 / 0	La-140	<5
Well water	5.0	10 / 0	gross alpha	< 1.7 – 4.0
(pCi/liter)	3.0	10 / 1	gross beta	< 1.4 – 3.8
	300	10 / 0	H-3	< 213
Precipitation	1.5	12 / 0	gross beta	< 0.2 – 0.74
(nCi/m^2)	300	12 / 0	H-3	< 41.9 – 31.3
Ambient radiation	1.0 c	124 / 124	exposure	11.1 – 369.3
(mR/Std Qtr)				

a - Number of analyses / number of analyses detected above the WI DHS LLD.

b - LLD activities expressed in units of pCi/liter.

c - mR/TLD

d – Samples not analyzed due to laboratory error and delays, see result and discussion section.

Table 5 Wisconsin DHS air particulate gross beta and air iodine (I-131) analysis results from the Point Beach-Kewaunee environmental monitoring program.

Measurements in units of pCi/m^3

Site: PBK-1

Collection End Date	Volume m^3	Air Particulate	Collection date	Volume m^3	Air Particulate
01/04/17		0.024 ± 0.002	07/05/17		0.014 ± 0.002
01/10/17		0.024 ± 0.002	07/12/17		0.018 ± 0.002
01/18/17		0.030 ± 0.002	07/19/17		0.010 ± 0.002
01/25/17		0.023 ± 0.002	07/26/17		0.015 ± 0.002
02/01/17		0.015 ± 0.002	08/02/17		0.018 ± 0.002
02/08/17		0.023 ± 0.002	08/09/17		0.014 ± 0.002
02/15/17		0.021 ± 0.002	08/16/17		0.018 ± 0.002
02/22/17		0.022 ± 0.002	08/23/17		0.021 ± 0.002
03/01/17		0.017 ± 0.002	08/30/17		0.017 ± 0.002
03/08/17		0.019 ± 0.002	09/06/17		0.016 ± 0.002
03/15/17		0.020 ± 0.002	09/13/17		0.015 ± 0.002
03/23/17		0.018 ± 0.002	09/20/17		0.024 ± 0.002
03/30/17		0.014 ± 0.002	09/27/17		0.034 ± 0.002
1st Qtr			**3rd Qtr**		
mean +- s.d.		0.021 ± 0.004	mean +- s.d.		0.018 ± 0.006
04/05/17		0.015 ± 0.002	10/05/17		0.018 ± 0.002
04/12/17		0.012 ± 0.002	10/11/17		0.024 ± 0.002
04/19/17		0.015 ± 0.002	10/18/17		0.018 ± 0.002
04/26/17		0.011 ± 0.002	10/25/17		0.021 ± 0.002
05/04/17		0.012 ± 0.001	11/01/17		0.008 ± 0.001
05/11/17		0.015 ± 0.002	11/08/17		0.018 ± 0.002
05/17/17		0.015 ± 0.002	11/15/17		0.015 ± 0.002
05/24/17		0.012 ± 0.001	11/21/17		0.024 ± 0.002
05/31/17		0.011 ± 0.002	11/29/17		0.025 ± 0.002
06/07/17		0.015 ± 0.002	12/06/17		0.029 ± 0.002
06/14/17		0.021 ± 0.002	12/13/17		0.019 ± 0.002
06/21/17		0.013 ± 0.002	12/20/17		0.019 ± 0.002
06/28/17		0.011 ± 0.002	12/28/17		0.023 ± 0.002
2nd Qtr			**4th Qtr**		
mean +- s.d.		0.013 ± 0.003	mean +- s.d.		0.020 ± 0.005

*a – Laboratory error

*b – Error in recording data in the field

*c = The original data sheet was not returned

*d = Data sheet unavailable

Table 5 (continued) Wisconsin DHS air particulate gross beta and air iodine (I-131) analysis results from the Point Beach-Kewaunee environmental monitoring program.

Measurements in units of pCi/m^3

Site: PBK-4

Collection End Date	Volume m^3	Air particulate	Air iodine	Collection End Date	Volume m^3	Air particulate	Air iodine
01/04/17	439	0.021 ± 0.002	< .0215	07/05/17	529	0.002 ± 0.001	< .0215
01/11/17	414	0.023 ± 0.002	< 0.035	07/12/17	457	0.015 ± 0.002	< 0.035
01/18/17	447	0.026 ± 0.002	< 0.023	07/18/17	397	0.008 ± 0.002	< 0.023
01/23/17	332	0.025 ± 0.003	< 0.057	07/25/17	459	0.015 ± 0.002	< 0.057
01/30/17	474	0.013 ± 0.002	< 0.017	07/31/17	397	0.014 ± 0.002	< 0.017
02/08/17	574	0.020 ± 0.002	< 0.016	08/09/17	591	0.016 ± 0.001	< 0.016
02/13/17	327	0.022 ± 0.002	< 0.024	08/14/17	329	0.019 ± 0.002	< 0.024
02/20/17	424	0.017 ± 0.002	< 0.041	08/21/17	462	0.019 ± 0.002	< 0.041
03/02/17	656	0.016 ± 0.001	< 0.010	08/29/17	524	0.017 ± 0.002	< 0.010
03/08/17	392	0.018 ± 0.002	< 0.030	09/06/17	524	0.015 ± 0.002	< 0.030
03/15/17	449	0.018 ± 0.002	< 0.036	09/13/17	459	0.014 ± 0.002	< 0.036
03/27/17	327	0.017 ± 0.002	< 0.043	09/18/17	324	0.025 ± 0.003	< 0.043
				09/25/17	464	0.026 ± 0.002	< *d
1st Qtr				**3rd Qtr**			
mean +- s.d.		0.020 ± 0.004	< 0.029	mean +- s.d.		0.016 ± 0.006	< 0.025
04/05/17	589	0.012 ± 0.001	< 0.021	10/03/17	521	0.022 ± 0.002	< 0.030
04/12/17	469	0.012 ± 0.002	< 0.0195	10/11/17	529	0.023 ± 0.002	< 0.041
04/17/17	322	0.015 ± 0.002	< 0.0371	10/16/17	324	0.015 ± 0.002	< 0.047
04/24/17	472	0.010 ± 0.002	< 0.0202	10/23/17	454	0.026 ± 0.002	< 0.049
05/02/17	531	0.010 ± 0.001	< 0.0192	11/01/17	581	0.007 ± 0.001	< 0.032
05/10/17	539	0.015 ± 0.002	< 0.0205	11/08/17	454	0.015 ± 0.002	< 0.028
05/15/17	332	0.012 ± 0.002	< 0.0183	11/13/17	322	0.027 ± 0.003	< 0.036
05/22/17	462	0.012 ± 0.002	< 0.0252	11/20/17	442	0.025 ± 0.002	< 0.033
05/30/17	534	0.011 ± 0.001	< 0.018	11/27/17	449	0.022 ± 0.002	< 0.041
06/05/17	397	0.016 ± 0.002	< 0.0234	12/04/17	454	0.024 ± 0.002	< 0.040
06/16/17	726	0.017 ± 0.001	< 0.0335	12/13/17	536	0.021 ± 0.002	< 0.025
06/21/17	329	0.009 ± 0.002	< 0.0447	12/18/17	302	0.015 ± 0.002	< 0.070
06/27/17	394	0.009 ± 0.002	< 0.0159	12/27/17	529	0.021 ± 0.002	< 0.030
2nd Qtr				**4th Qtr**			
mean +- s.d.		0.012 ± 0.002	< 0.024	mean +- s.d.		0.020 ± 0.006	< 0.042

*a – Laboratory error

*b – Error in recording data in the field

*c = The original data sheet was not returned

*d = Data sheet unavailable

Table 5 (continued) Wisconsin DHS air particulate gross beta and air iodine (I-131) analysis results from the Point Beach-Kewaunee environmental monitoring program.

Measurements in units of pCi/m^3

Site: PBK-7

Collection End Date	Volume m^3	Air particulate	Collection End Date	Volume m^3	Air particulate
01/04/17	491	0.026 ± 0.002	07/05/17	444	0.003 ± 0.002
01/10/17	431	0.023 ± 0.002	07/12/17	447	0.004 ± 0.002
01/18/17	563	0.031 ± 0.002	07/19/17	420	0.001 ± 0.002
01/25/17	491	0.022 ± 0.002	07/26/17	436	0.003 ± 0.002
02/01/17	481	0.015 ± 0.002	08/02/17	436	0.002 ± 0.002
02/08/17	484	0.024 ± 0.002	08/09/17	439	0.003 ± 0.002
02/15/17	486	0.020 ± 0.002	08/16/17	428	0.004 ± 0.002
02/22/17	481	0.021 ± 0.002	08/23/17	439	0.003 ± 0.002
03/01/17	468	0.018 ± 0.002	08/30/17	433	0.005 ± 0.002
03/08/17	484	0.019 ± 0.002	09/06/17	441	0.004 ± 0.002
03/15/17	468	0.021 ± 0.002	09/13/17	439	0.006 ± 0.002
03/23/17	476	0.018 ± 0.002	09/20/17	431	0.008 ± 0.003
03/30/17	539	0.012 ± 0.002	09/27/17	425	0.015 ± 0.003
1st Qtr			**3rd Qtr**		
mean +- s.d.		0.021 ± 0.005	mean +- s.d.		0.005 ± 0.004
04/05/17	404	0.015 ± 0.002	10/05/17	494	0.020 ± 0.002
04/12/17	476	0.013 ± 0.002	10/11/17	373	0.027 ± 0.002
04/19/17	470	0.017 ± 0.002	10/18/17	402	0.024 ± 0.002
04/26/17	457	0.011 ± 0.002	10/25/17	367	0.028 ± 0.002
05/04/17	523	0.010 ± 0.001	11/01/17	423	0.007 ± 0.002
05/11/17	462	0.015 ± 0.002	11/08/17	436	0.021 ± 0.002
05/17/17	396	0.014 ± 0.002	11/15/17	474	0.033 ± 0.002
05/24/17	457	0.013 ± 0.002	11/21/17	378	0.028 ± 0.002
05/31/17	462	0.011 ± 0.002	11/29/17	544	0.026 ± 0.002
06/07/17	447	0.015 ± 0.002	12/06/17	482	0.029 ± 0.002
06/14/17	454	0.020 ± 0.002	12/13/17	499	0.021 ± 0.002
06/21/17	428	0.013 ± 0.002	12/20/17	485	0.023 ± 0.002
06/28/17	436	0.010 ± 0.002	12/28/17	578	0.022 ± 0.002
2nd Qtr			**4th Qtr**		
mean +- s.d.		0.013 ± 0.003	mean +- s.d.		0.024 ± 0.006

*a – Laboratory error

*b – Error in recording data in the field

*c = The original data sheet was not returned

*d = Data sheet unavailable

Table 5 (continued) Wisconsin DHS air particulate gross beta and air iodine (I-131) analysis results from the Point Beach-Kewaunee environmental monitoring program,.

Measurements in units of pCi/m^3

Site: PBK-8

Collection End Date	Volume m^3	Air particulate	Collection End Date	Volume m^3	Air particulate
01/03/17		0.028 ± 0.002	07/04/17		0.009 ± 0.001
01/10/17		0.025 ± 0.002	07/11/17		0.011 ± 0.001
01/17/17		0.033 ± 0.002	07/18/17		0.007 ± 0.001
01/24/17		0.017 ± 0.001	07/25/17		0.010 ± 0.001
01/31/17		0.010 ± 0.001	08/01/17		0.010 ± 0.001
02/07/17		0.016 ± 0.001	08/08/17		0.011 ± 0.001
02/14/17		0.015 ± 0.001	08/15/17		0.011 ± 0.001
02/21/17		0.013 ± 0.001	08/22/17		0.016 ± 0.001
02/28/17		0.013 ± 0.001	08/29/17		0.010 ± 0.001
03/07/17		*d ± *d	09/05/17		0.012 ± 0.001
03/14/17		0.012 ± 0.001	09/12/17		0.006 ± 0.001
03/21/17		0.012 ± 0.001	09/19/17		0.019 ± 0.001
03/28/17		0.011 ± 0.001	09/26/17		0.023 ± 0.001
1st Qtr			**3rd Qtr**		
mean +- s.d.		0.017 ± 0.007	mean +- s.d.		0.012 ± 0.005
04/04/17		0.009 ± 0.001	10/03/17		0.014 ± 0.001
04/11/17		0.009 ± 0.001	10/10/17		0.016 ± 0.001
04/18/17		0.010 ± 0.001	10/17/17		0.011 ± 0.001
04/25/17		0.007 ± 0.001	10/24/17		0.017 ± 0.001
05/02/17		0.006 ± 0.001	10/31/17		0.006 ± 0.001
05/09/17		0.010 ± 0.001	11/07/17		0.010 ± 0.001
05/16/17		0.009 ± 0.001	11/14/17		0.031 ± 0.002
05/23/17		0.010 ± 0.001	11/21/17		0.023 ± 0.002
05/30/17		0.008 ± 0.001	11/28/17		0.024 ± 0.002
06/06/17		0.010 ± 0.001	12/05/17		0.024 ± 0.002
06/13/17		0.013 ± 0.001	12/12/17		0.018 ± 0.001
06/20/17		0.009 ± 0.001	12/19/17		0.021 ± 0.001
06/27/17		0.008 ± 0.001	12/26/17		0.018 ± 0.001
2nd Qtr			**4th Qtr**		
mean +- s.d.		0.009 ± 0.002	mean +- s.d.		0.018 ± 0.007

*a – Laboratory error

*b – Error in recording data in the field

*c = The original data sheet was not returned

*d = Data sheet unavailable

Table 5 (continued) Wisconsin DHS air particulate gross beta and air iodine (I-131) analysis results from the Point Beach-Kewaunee environmental monitoring program.

Measurements in units of pCi/m^3

Site: PBK-17

Collection End Date	Volume m^3	Air particulate	Air iodine
01/05/17		0.021 ± 0.004	< 0.596
01/21/17		0.028 ± 0.002	< 0.011
01/28/17		0.014 ± 0.001	< 0.019
02/03/17		0.017 ± 0.001	< 0.025
02/09/17		0.020 ± 0.002	< 0.016
02/17/17		0.019 ± 0.001	< *d
02/24/17		0.017 ± 0.002	< *d
03/02/17		0.015 ± 0.002	< 0.017
03/10/17		0.017 ± 0.001	< 0.038
03/17/17		0.019 ± 0.002	< 0.020
03/23/17		0.015 ± 0.002	< 0.028
03/31/17		0.012 ± 0.001	< 0.031
1st Qtr			
mean +- s.d.		0.018 ± 0.004	< 0.023
04/07/17		0.013 ± 0.001	< 0.019
04/13/17		0.012 ± 0.002	< 0.024
04/20/17		0.011 ± 0.001	< 0.011
04/28/17		0.009 ± 0.001	< 0.023
05/05/17		0.011 ± 0.001	< 0.015
05/11/17		0.015 ± 0.002	< 0.026
05/19/17		0.012 ± 0.001	< 0.022
05/25/17		0.009 ± 0.002	< 0.018
06/02/17		0.011 ± 0.001	< 0.027
06/09/17		0.013 ± 0.002	< 0.037
06/16/17		0.017 ± 0.002	< 0.033
06/22/17		0.008 ± 0.002	< 0.025
06/30/17		0.010 ± 0.001	< 0.023
2nd Qtr			
mean +- s.d.		0.018 ± 0.004	< 0.023
07/06/17		0.013 ± 0.002	< 0.023
07/14/17		0.012 ± 0.001	< 0.018
07/21/17		0.011 ± 0.002	< 0.041
07/28/17		0.015 ± 0.002	< 0.027
08/04/17		0.014 ± 0.002	< 0.018
08/11/17		0.015 ± 0.002	< 0.017
08/18/17		0.013 ± 0.002	< 0.058
08/25/17		0.019 ± 0.002	< 0.058
09/01/17		0.000 ± 0.001	< 0.044
09/08/17		0.011 ± 0.001	< 0.031
09/15/17		0.018 ± 0.002	< 0.073
09/22/17		0.022 ± 0.002	< 0.057
09/29/17		0.032 ± 0.002	< 0.052
3rd Qtr			
mean +- s.d.		0.015 ± 0.007	< 0.040
10/06/17		0.017 ± 0.002	< 0.045
10/12/17		0.022 ± 0.002	< 0.045
10/19/17		0.019 ± 0.002	< 0.024
10/27/17		0.017 ± 0.001	< 0.032
11/03/17		0.008 ± 0.001	< 0.027
11/12/17		0.019 ± 0.002	< 0.023
11/17/17		0.026 ± 0.002	< 0.057
11/22/17		0.025 ± 0.002	< 0.035
12/01/17		0.002 ± 0.000	< 0.019
12/15/17		0.015 ± 0.001	< 0.019
12/21/17		0.021 ± 0.002	< 0.027
12/28/17		0.020 ± 0.002	< *d
4th Qtr			
mean +- s.d.		0.018 ± 0.007	< 0.032

*a – Laboratory error

*b – Error in recording data in the field

*c = The original data sheet was not returned

*d = Data sheet unavailable

Table 5 (continued) Wisconsin DHS air particulate gross beta and air iodine (I-131) analysis results from the Point Beach-Kewaunee environmental monitoring program.

Measurements in units of pCi/m3

Site: PBK-18

Collection End Date	Volume m^3	Air particulate	Air iodine	Collection End Date	Volume m^3	Air particulate	Air iodine
01/04/17		0.023 ± 0.002	< 0.021	07/05/17		0.011 ± 0.001	< 0.023
01/11/17		0.023 ± 0.002	< 0.023	07/12/17		0.016 ± 0.002	< 0.026
01/18/17		0.028 ± 0.002	< 0.022	07/18/17		0.007 ± 0.002	< 0.021
01/23/17		0.026 ± 0.002	< 0.040	07/25/17		0.015 ± 0.002	< 0.011
01/30/17		0.012 ± 0.001	< 0.016	07/31/17		0.014 ± 0.002	< 0.016
02/08/17		0.021 ± 0.001	< 0.015	08/09/17		0.016 ± 0.001	< 0.020
02/13/17		0.024 ± 0.002	< 0.018	08/14/17		0.016 ± 0.002	< 0.009
02/20/17		0.018 ± 0.001	< 0.007	08/21/17		0.019 ± 0.002	< 0.035
03/02/17		0.018 ± 0.001	< 0.016	08/29/17		0.017 ± 0.001	< 0.036
03/08/17		0.020 ± 0.002	< 0.025	09/06/17		0.015 ± 0.001	< 0.037
03/15/17		0.020 ± 0.002	< 0.037	09/18/17		0.026 ± 0.002	< 0.018
03/20/17		0.017 ± 0.002	< 0.037	09/25/17		0.027 ± 0.002	< 0.025
03/27/17		0.016 ± 0.001	< 0.020				<
1st Qtr				**3rd Qtr**			
mean +- s.d.		0.020 ± 0.004	< 0.023	mean +- s.d.		0.017 ± 0.006	< 0.023
04/05/17		0.013 ± 0.001	< 0.023	10/03/17		0.023 ± 0.002	< 0.025
04/12/17		0.013 ± 0.001	< 0.025	10/11/17		0.001 ± 0.001	< 0.039
04/17/17		0.016 ± 0.002	< 0.017	10/16/17		0.015 ± 0.002	< 0.069
04/24/17		0.011 ± 0.001	< 0.016	10/23/17		0.026 ± 0.002	< 0.037
05/02/17		0.009 ± 0.001	< 0.013	11/01/17		0.008 ± 0.001	< 0.018
05/10/17		0.016 ± 0.001	< 0.029	11/08/17		0.014 ± 0.001	< 0.025
05/15/17		0.013 ± 0.002	< 0.019	11/13/17		0.027 ± 0.002	< 0.039
05/22/17		0.013 ± 0.001	< 0.014	11/20/17		0.026 ± 0.002	< 0.026
05/30/17		0.011 ± 0.001	< 0.021	11/27/17		0.024 ± 0.002	< 0.027
06/05/17		0.015 ± 0.002	< 0.031	12/04/17		0.024 ± 0.002	< 0.033
06/16/17		0.016 ± 0.001	< 0.042	12/13/17		0.021 ± 0.001	< 0.022
06/21/17		0.012 ± 0.002	< 0.011	12/18/17		0.017 ± 0.002	< 0.037
06/27/17		0.008 ± 0.002	< 0.019	12/27/18		0.025 ± 0.001	< 0.024
2nd Qtr				**4th Qtr**			
mean +- s.d.		0.013 ± 0.003	< 0.022	mean +- s.d.		0.019 ± 0.008	< 0.043

*a – Laboratory error

*b – Error in recording data in the field

*c = The original data sheet was not returned

*d = Data sheet unavailable

Table 6 Wisconsin DHS gamma isotopic analysis results from the quarterly composites of air particulate filters collected from the Point Beach-Kewaunee environmental monitoring program.

Measurements in units of pCi/m^3

Site: PBK-1	1st quarter	2nd quarter	3rd quarter	4th quarter
Barium 140	< 0.0018	< 0.0015	< 0.0024	< 0.0015
Beryllium 7	0.065 ± 0.0060	0.086 ± 0.0071	0.081 ± 0.0051	0.0450 ± 0.0051
Cerium 141	< 0.0004	< 0.0004	< 0.0005	< 0.0005
Cerium 144	< 0.0011	< 0.0012	< 0.0015	< 0.0013
Cesium 134	< 0.0002	< 0.0003	< 0.0002	< 0.0003
Cesium 137	< 0.0003	< 0.0003	< 0.0002	< 0.0002
Cobalt 58	< 0.0003	< 0.0004	< 0.0002	< 0.0003
Cobalt 60	< 0.0002	< 0.0003	< 0.0002	< 0.0003
Iodine 131	< 0.0007	< 0.0005	< 0.0015	< 0.0013
Iron 59	< 0.0006	< 0.0006	< 0.0005	< 0.0006
Lanthanum 140	< 0.0008	< 0.0005	< 0.0007	< 0.0012
Manganese 54	< 0.0003	< 0.0002	< 0.0002	< 0.0003
Niobium 95	< 0.0003	< 0.0003	< 0.0003	< 0.0004
Ruthenium 103	< 0.0003	< 0.0003	< 0.0003	< 0.0003
Ruthenium 106	< 0.0028	< 0.0027	< 0.0020	< 0.0022
Zinc 65	< 0.0005	< 0.0008	< 0.0005	< 0.0006
Zirconium 95	< 0.0005	< 0.0005	< 0.0004	< 0.0005
Site: PBK-4				
Barium 140	< 0.0026	< 0.0021	< .00207	< 0.0035
Beryllium 7	0.069 ± 0.0060	0.036 ± 0.0071	.0781 ± 0.0051	0.0538 ± 0.0049
Cerium 141	< 0.0007	< 0.0007	< 0.0005	< 0.0008
Cerium 144	< 0.0024	< 0.0023	< 0.0016	< 0.0023
Cesium 134	< 0.0004	< 0.0003	< 0.0002	< 0.0003
Cesium 137	< 0.0005	< 0.0005	< 0.0003	< 0.0004
Cobalt 58	< 0.0004	< 0.0004	< 0.0003	< 0.0004
Cobalt 60	< 0.0005	< 0.0005	< 0.0002	< 0.0004
Iodine 131	< 0.0011	< 0.0009	< 0.0011	< 0.0020
Iron 59	< 0.0008	< 0.0009	< 0.0006	< 0.0007
Lanthanum 140	< 0.0007	< 0.0007	< 0.0006	< 0.0011
Manganese 54	< 0.0004	< 0.0004	< 0.0002	< 0.0003
Niobium 95	< 0.0005	< 0.0004	< 0.0003	< 0.0005
Ruthenium 103	< 0.0005	< 0.0004	< 0.0003	< 0.0005
Ruthenium 106	< 0.0032	< 0.0033	< 0.0023	< 0.0032
Zinc 65	< 0.0008	< 0.0008	< 0.0005	< 0.0007
Zirconium 95	< 0.0008	< 0.0007	< 0.0005	< 0.0007
Site: PBK-7				
Barium 140	< 0.0016	< 0.0016	< 0.0029	< 0.0023
Beryllium 7	0.065 ± 0.0061	0.094 ± 0.0079	0.0931 +- 0.0063	0.0532 ± 0.0059
Cerium 141	< 0.0004	< 0.0004	< 0.0007	< 0.0005
Cerium 144	< 0.0014	< 0.0014	< 0.0022	< 0.0014
Cesium 134	< 0.0003	< 0.0003	< 0.0003	< 0.0003
Cesium 137	< 0.0003	< 0.0003	< 0.0004	< 0.0003
Cobalt 58	< 0.0003	< 0.0003	< 0.0003	< 0.0002
Cobalt 60	< 0.0004	< 0.0003	< 0.0003	< 0.0003
Iodine 131	< 0.0007	< 0.0006	< 0.0016	< 0.0015
Iron 59	< 0.0009	< 0.0007	< 0.0007	< 0.0007
Lanthanum 140	< 0.0008	< 0.0005	< 0.0009	< 0.0007
Manganese 54	< 0.0003	< 0.0003	< 0.0003	< 0.0003
Niobium 95	< 0.0003	< 0.0004	< 0.0004	< 0.0004
Ruthenium 103	< 0.0003	< 0.0004	< 0.0004	< 0.0003
Ruthenium 106	< 0.0028	< 0.0026	< 0.0031	< 0.0030
Zinc 65	< 0.0006	< 0.0006	< 0.0007	< 0.0008
Zirconium 95	< 0.0006	< 0.0006	< 0.0006	< 0.0007

Radioisotopes other than those reported were not detected.

Table 6 (continued) Wisconsin DHS gamma isotopic analysis results from the quarterly composites of air particulate filters collected from the Point Beach-Kewaunee environmental monitoring program.

Measurements in units of pCi/m^3

Site: PBK-8	1st quarter	2nd quarter	3rd quarter	4th quarter
Barium 140	< 0.0015	< 0.0009	< 0.0017	< 0.0029
Beryllium 7	0.047 ± 0.0044	0.063 ± 0.0047	0.0580 +- 0.0037	0.0475 ± 0.0052
Cerium 141	< 0.0003	< 0.0004	< 0.0004	< 0.0004
Cerium 144	< 0.0009	< 0.0013	< 0.0097	< 0.0011
Cesium 134	< 0.0002	< 0.0002	< 0.0001	< 0.0003
Cesium 137	< 0.0002	< 0.0003	< 0.0002	< 0.0003
Cobalt 58	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Cobalt 60	< 0.0002	< 0.0002	< 0.0002	< 0.0004
Iodine 131	< 0.0006	< 0.0005	< 0.0012	< 0.0015
Iron 59	< 0.0006	< 0.0004	< 0.0004	< 0.0007
Lanthanum 140	< 0.0004	< 0.0004	< 0.0005	< 0.0016
Manganese 54	< 0.0002	< 0.0002	< 0.0001	< 0.0003
Niobium 95	< 0.0002	< 0.0003	< 0.0002	< 0.0005
Ruthenium 103	< 0.0002	< 0.0002	< 0.0002	< 0.0003
Ruthenium 106	< 0.0018	< 0.0018	< 0.0013	< 0.0030
Zinc 65	< 0.0004	< 0.0004	< 0.0003	< 0.0005
Zirconium 95	< 0.0005	< 0.0003	< 0.0003	< 0.0006
Site: PBK-17				
Barium 140	< 0.0017	< 0.0014	< 0.0020	< 0.0031
Beryllium 7	0.056 ± 0.0049	0.076 ± 0.0064	0.0670 +- 0.0044	0.0571 ± 0.0062
Cerium 141	< 0.0006	< 0.0003	< 0.0005	< 0.0005
Cerium 144	< 0.0020	< 0.0012	< 0.0014	< 0.0013
Cesium 134	< 0.0003	< 0.0003	< 0.0002	< 0.0004
Cesium 137	< 0.0004	< 0.0004	< 0.0002	< 0.0003
Cobalt 58	< 0.0004	< 0.0003	< 0.0002	< 0.0003
Cobalt 60	< 0.0004	< 0.0003	< 0.0002	< 0.0004
Iodine 131	< 0.0007	< 0.0005	< 0.0011	< 0.0016
Iron 59	< 0.0007	< 0.0005	< 0.0005	< 0.0007
Lanthanum 140	< 0.0004	< 0.0005	< 0.0006	< 0.0008
Manganese 54	< 0.0003	< 0.0002	< 0.0002	< 0.0003
Niobium 95	< 0.0003	< 0.0003	< 0.0003	< 0.0005
Ruthenium 103	< 0.0003	< 0.0003	< 0.0003	< 0.0003
Ruthenium 106	< 0.0032	< 0.0022	< 0.0019	< 0.0029
Zinc 65	< 0.0007	< 0.0007	< 0.0005	< 0.0006
Zirconium 95	< 0.0006	< 0.0005	< 0.0004	< 0.0008
Site: PBK-18				
Barium 140	< 0.0022	< 0.0017	+- 0.0020	< 0.0029
Beryllium 7	0.060 ± 0.0051	0.086 ± 0.0066	0.0793 < 0.0050	0.0554 ± 0.0060
Cerium 141	< 0.0006	< 0.0006	< 0.0005	< 0.0005
Cerium 144	< 0.0018	< 0.0018	< 0.0014	< 0.0014
Cesium 134	< 0.0003	< 0.0003	< 0.0002	< 0.0004
Cesium 137	< 0.0004	< 0.0004	< 0.0002	< 0.0004
Cobalt 58	< 0.0003	< 0.0003	< 0.0002	< 0.0002
Cobalt 60	< 0.0004	< 0.0004	< 0.0002	< 0.0002
Iodine 131	< 0.0011	< 0.0007	< 0.0011	< 0.0018
Iron 59	< 0.0006	< 0.0006	< 0.0005	< 0.0009
Lanthanum 140	< 0.0007	< 0.0005	< 0.0006	< 0.0011
Manganese 54	< 0.0003	< 0.0003	< 0.0002	< 0.0004
Niobium 95	< 0.0004	< 0.0003	< 0.0003	< 0.0004
Ruthenium 103	< 0.0003	< 0.0003	< 0.0003	< 0.0004
Ruthenium 106	< 0.0026	< 0.0027	< 0.0019	< 0.0032
Zinc 65	< 0.0007	< 0.0007	< 0.0005	< 0.0006
Zirconium 95	< 0.0006	< 0.0006	< 0.0004	< 0.0006

Radioisotopes other than those reported were not detected.

Table 7 Wisconsin DHS TLD network for the Point Beach-Kewaunee environmental monitoring program.

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Date Placed:	1/10-11/17	4/11-12/17	7/19-20/17	10/18-19/17
Date Removed:	4/11-12/17	7/19-20/17	10/18-19/17	1/16-17/18
Average Days is the Field:	90-91	99-100	91-92	90-91
Location:	Individual quarterly data is reported as: mR / Standard Quarter +- 2 sigma counting error.			
TLD sites located at the Point Beach ISFSI				
1	29.0 +- 2.7	29.2 +- 2.0	27.7 +- 2.1	31.2 +- 2.3
2	56.2 +- 3.5	57.3 +- 3.3	51.3 +- 4.0	59.4 +- 4.2
3	40.1 +- 3.0	34.0 +- 2.0	42.4 +- 2.7	41.6 +- 1.8
4	21.6 +- 2.0	20.7 +- 1.2	19.6 +- 1.6	22.8 +- 1.1
5	19.6 +- 0.8	19.5 +- 1.3	18.2 +- 0.6	21.3 +- 1.2
6	51.9 +- 2.9	38.0 +- 2.8	48.8 +- 2.2	40.5 +- 3.1
7	54.3 +- 2.4	50.8 +- 2.9	56.0 +- 2.9	55.5 +- 3.5
8	25.8 +- 1.6	24.5 +- 1.6	24.3 +- 2.2	27.1 +- 1.9
Quarterly average +- s.d.	37.3 +- 15.3	34.3 +- 34.3	36.0 +- 1.0	37.4 +- 1.1
TLD sites, excluding sites 1- 8, that are located 0 - 2 miles from either the Point Beach or the Kewaunee facility.				
9	12.5 +- 1.0	11.9 +- 1.2	13.3 +- 1.5	12.8 +- 1.6
10	14.4 +- 0.9	15.5 +- 0.8	14.5 +- 0.8	16.7 +- 1.0
11	13.8 +- 1.2	14.1 +- 1.1	14.0 +- 0.9	15.0 +- 1.3
12	14.0 +- 1.4	14.9 +- 1.2	14.4 +- 1.2	16.3 +- 1.4
13	13.3 +- 1.4	14.8 +- 0.9	13.7 +- 1.4	16.7 +- 0.9
14	14.2 +- 1.3	16.4 +- 1.0	14.6 +- 1.0	17.9 +- 1.7
20	14.5 +- 1.0	12.1 +- 1.1	14.7 +- 1.3	13.7 +- 1.1
Quarterly average +- s.d.	13.8 +- 0.7	14.2 +- 1.7	14.2 +- 0.5	15.6 +- 0.3
TLD sites that are located 2 - 5 miles from either the Point Beach or the Kewaunee facility.				
15	15.3 +- 1.3	15.9 +- 0.9	16.1 +- 1.1	17.1 +- 1.4
16	11.6 +- 1.3	12.1 +- 0.9	11.5 +- 1.3	13.5 +- 1.1
17	15.5 +- 1.3	13.4 +- 1.1	17.4 +- 1.7	17.1 +- 2.2
18	15.6 +- 1.0	14.9 +- 0.6	15.9 +- 0.7	15.4 +- 0.8
Quarterly average +- s.d.	14.5 +- 1.9	14.1 +- 1.7	15.2 +- 2.6	15.8 +- 0.6
TLD sites that are located greater than 5 miles from either the Point Beach or the Kewaunee facility.				
28	13.1 +- 1.3	11.9 +- 0.8	13.2 +- 1.0	13.8 +- 1.1
29	14.1 +- 1.1	11.5 +- 0.6	13.6 +- 0.9	13.0 +- 1.0
30	14.8 +- 1.7	13.2 +- 1.1	15.1 +- 1.8	15.2 +- 1.2
31	11.2 +- 1.2	11.1 +- 0.8	11.6 +- 1.0	12.7 +- 0.9
Quarterly average +- s.d.	13.3 +- 1.6	11.9 +- 0.9	13.4 +- 1.4	13.7 +- 0.1
TLD sites that are located at the Kewaunee Power Station's (KPS) Independent Spent Fuel Installation (ISFSI).				
51	40.3 +- 2.1	35.5 +- 3.0	42.9 +- 2.9	33.2 +- 2.0
52	162.5 +- 6.6	90.8 +- 2.8	85.8 +- 5.1	88.2 +- 5.1
53	123.0 +- 5.7	218.4 +- 6.2	253.4 +- 10.3	232.2 +- 2.2
54	48.4 +- 2.9	266.7 +- 14.5	369.3 +- 19.9	339.8 +- 15.6
55	22.8 +- 2.0	139.4 +- 7.2	198.5 +- 12.2	192.4 +- 4.1
56	28.1 +- 1.0	65.5 +- 3.8	67.4 +- 3.6	65.5 +- 3.4
57	15.5 +- 1.3	21.0 +- 1.7	24.5 +- 1.4	24.8 +- 1.2
58	17.0 +- 1.5	20.0 +- 2.2	17.7 +- 1.5	17.5 +- 1.0
Quarterly average +- s.d.	57.2 +- 55.0	107.2 +- 93.4	132.4 +- 127.8	124.2 +- 4.8

ND - No data; the TLD was lost in the field.

Table 8 Wisconsin DHS analysis results for precipitation samples collected for the Point Beach-Kewaunee environmental monitoring program.

Measurements in units of nCi/m2

monthly composite sample

Collection	Inches	Gross beta	Tritium
01/04/17	3.23	0.19 +- 0.10	< 17.1
02/08/17	1.33	0.26 +- 0.05	8.58 +- 4.4
03/08/17	2.19	0.68 +- 0.09	< 11.5
4/5/20/17	4.81	< 0.15	31.28 +- 15.6
05/04/17	4.41	< 0.12	< 23.1
06/07/17	8.05	0.74 +- 0.21	< 41.9
07/05/17	3.15	< 0.08	< 17.3
08/04/17	2.56	< 0.12	< 14.0
09/07/17	1.40	< 0.03	< 7.6
10/10/17	1.96	< 0.05	11.45 +- 6.1
11/01/17	1.91	0.14 +- 0.04	< 9.6
12/06/17	0.45	0.24 +- 0.02	< 2.2

Table 9 Wisconsin DHS analysis results for fish samples collected for the Point Beach-Kewaunee environmental monitoring program.

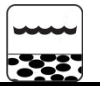
Measurements in units of pCi/kg (wet)

WI DHS data

Collection	01/11/17			02/24/17			05/09/17			08/1/2017		
Type	Brown Trout			White Fish & Brown Trout			Rainbow Trout			Combined Samples		
gamma isotopic												
Cesium 134		<	1.99		<	1.93		<	8.73		<	2.03
Cesium 137	15.3	±	1.65	10.7	±	1.32	13.1	±	4.62	22.3	±	1.64
Cobalt 58		<	4.3		<	4.16		<	11		<	3.14
Cobalt 60		<	2.03		<	2.07		<	9.64		<	2.04
Iron 59		<	18		<	18.2		<	30.5		<	9.06
Manganese 54		<	2.16		<	1.99		<	9.36		<	2.12
Niobium 95		<	13		<	12.1		<	13.9		<	5.74
Potassium 40	3010	±	517	2990	±	513	2610	±	457	2170	±	372
Zinc 65		<	6.18		<	5.82		<	20.2		<	5.39
Zirconium 95		<	8.86		<	8.04		<	19.9		<	5.81

Collection	11/07/2017			11/09/2017			11/11/2017		
Type	Chinook Salmon			Chinook Salmon			Burbot		
gamma isotopic									
Cesium 134		<	3.23		<	3.86		<	4.5
Cesium 137	12.1	±	7.86	21.2	±	2.81	21.5	±	3.72
Cobalt 58		<	6.25		<	7.2		<	7.44
Cobalt 60		<	4.30		<	4.78		<	5.24
Iron 59		<	24.2		<	20.4		<	20.1
Manganese 54		<	4.49		<	4.4		<	4.31
Niobium 95		<	14.2		<	13.8		<	13
Potassium 40	2830	±	462	2830	±	460	2190	±	357
Zinc 65		<	11.5		<	11.1		<	11.6
Zirconium 95		<	11.3		<	13.7		<	13.6

Table 10 Wisconsin DHS analysis results for shoreline sediment samples collected for the Point Beach-Kewaunee environmental monitoring program.



Measurements in units of pCi/kg (dry)

Location	PBK-5			PBK-10a			PBK-29		
Collection date	05/30/17			05/31/17			05/31/17		
gross alpha		<	3920		<	3160		<	3070
gross beta	4900	±	1000	6640	±	1080	5390	±	990
Radioisotopes									
Cesium 134		<	12		<	11.8		<	12.5
Cesium 137		<	17.4		<	19		<	19.9
Cobalt 58		<	21.2		<	20.8		<	22.3
Cobalt 60		<	14.7		<	17.3		<	16.3
Iron 59		<	60.8		<	58.4		<	66.5
Manganese 54		<	13.2		<	16		<	15.9
Niobium 95		<	29.1		<	32.1		<	31.9
Potassium 40	4430	±	788	6720	±	1150	6160	±	1060
Zinc 65		<	30.9		<	40.1		<	39.9
Zirconium 95		<	37.3		<	38.7		<	32.7

Location	PBK-12a			PBK-12b			PBK-12c			PBK-26		
Collection date	05/31/17			05/31/17			05/31/17			05/31/17		
gross alpha		<	3670		<	3490		<	4370		<	4000
gross beta	7320	±	1230	6260	±	1060	2900	±	1010	6810	±	1170
Radioisotopes												
Cs-134		<	11.9		<	9.33		<	14.8		<	12.1
Cs-137		<	20.7		<	13.5		<	20.8	13.6	±	6.06
Co-58		<	24.4		<	15.3		<	19.4		<	22.3
Co-60		<	17.6		<	12		<	18.5		<	17.9
Fe-59		<	70.7		<	39		<	55.6		<	60.9
Mn-54		<	16		<	10.9		<	18.8		<	15.3
Nb-95		<	37.9		<	22.6		<	35		<	30.9
K-40	8150	±	1390	5600	±	933	3650	±	679	6120	±	1060
Zn-65		<	41.4		<	28.5		<	40.7		<	36.9
Zr-95		<	38.6		<	29.5		<	38		<	33.6

Table 11 Wisconsin DHS analysis results for surface water samples collected for the Point Beach-Kewaunee environmental monitoring program.

Measurements in units of pCi/liter

PBK-9; Point Beach meteorological tower

Collection date	01/8/17	02/10/17	03/08/17	04/12/17	05/10/17	06/14/17
gross alpha-sol (DS)	< 0.6	*b	< 0.6	0.7 +- 0.5	1.5 < 0.8	< 0.4
gross beta-sol (DS)	1.4 +- 0.6	*b	2.3 +- 0.4	2.7 +- 0.6	1.7 +- 0.6	< 0.8
gross alpha-insol (SS)	< 0.2	*b	< 0.5	< 0.3	0.7 < 0.4	0.3 +- 0.2
gross beta-insol (SS)	1.1 < 0.6	*b	< 0.9	< 0.9	< 1.7	< 0.8
I-131	< 0.3			< 0.3		< 0.3
H-3 *a	154.0			151 +- 82.0		
Sr-89 *a	< 0.9			< 0.7		
Sr-90 *a	< 0.9			< 0.7		
Gamma isotopic						
Mn-54	< 2.0	*b	< 2.9	< 2.4	< 2.0	< 3.6
Co-58	< 2.8	*b	< 1.5	< 2.5	< 2.0	< 1.4
Fe-59	< 5.8	*b	< 4.7	< 3.6	< 3.1	< 5.9
Co-60	< 1.8	*b	< 2.2	< 2.6	< 2.2	< 2.6
Zn-65	< 3.7	*b	< 3.0	< 5.2	< 2.6	< 5.9
Nb-95	< 2.6	*b	< 2.2	< 2.9	< 3.1	< 2.8
Zr-95	< 3.5	*b	< 3.7	< 5.4	< 5.4	< 4.8
I-131	< 4.7	*b	< 3.4	< 5.5	< 5.2	< 4.2
Cs-134	< 3.0	*b	< 2.7	< 2.9	< 3.3	< 3.5
Cs-137	< 3.1	*b	< 2.6	< 3.3	< 2.7	< 3.2
Ba-140	< 3.7	*b	< 10.5	< 15.7	< 22.0	< 15.1
La-140	< 3.7	*b	< 2.9	< 3.1	< 3.3	< 2.8

Collection date	07/05/17	08/01/17	09/06/17	10/02/17	11/01/17	12/04/17
gross alpha-sol (DS)	< 1.0	+- 0.6	+- 0.4	< 0.5	< 0.5	< 0.4
gross beta-sol (DS)	< 1.0	0.8 +- 0.3	+- 0.4	0.8 +- 0.5	1.0 +- 0.3	1.0 +- 0.3
gross alpha-insol (SS)	< 0.2	< 0.3	+- 0.3	< 0.2	< 0.4	< 0.4
gross beta-insol (SS)	< 0.8	+- 0.8	+- 0.9	< 0.8	< 0.9	< 0.9
I-131		< 0.2		< 0.4		< 0.4
H-3 *a	< 150			< 158.0		
Sr-89 *a	< 0.7			< 0.8		
Sr-90 *a	0.5 +- 0.3			< 0.5		
Gamma isotopic						
Mn-54	< 2.6	< 2.9	< 2.7	< 1.8	< 2.2	< 2.0
Co-58	< 2.9	< 3.6	< 2.1	< 3.2	< 1.6	< 2.2
Fe-59	< 4.1	< 6.9	< 5.2	< 6.0	< 5.4	< 2.8
Co-60	< 1.5	< 3.3	< 2.1	< 1.5	< 2.1	< 1.7
Zn-65	< 3.5	< 4.3	< 2.8	< 4.5	< 3.6	< 3.5
Nb-95	< 2.1	< 2.4	< 4.6	< 2.8	< 2.2	< 2.8
Zr-95	< 4.9	< 6.3	< 4.6	< 3.8	< 4.4	< 4.0
I-131	< 7.1	< 6.7	< 4.9	< 5.7	< 4.2	< 3.6
Cs-134	< 2.8	< 3.3	< 3.3	< 2.7	< 2.9	< 2.3
Cs-137	< 3.4	< 3.1	< 2.7	< 2.4	< 3.6	< 2.9
Ba-140	< 19.7	< 15.8	< 17.1	< 11.3	< 14.6	< 8.9
La-140	< 2.8	< 3.2	< 3.0	< 3.2	< 2.5	< 2.7

*a - The analysis is performed on a quarterly composite.

*b - Sample not collected due to safety concerns

Radioisotopes other than those reported were not detected.

Table 11 (continued) Wisconsin DHS analysis results for surface water samples collected for the Point Beach-Kewaunee environmental monitoring program.

Measurements in units of pCi/liter

PBK-12a (K-001D); Kewaunee effluent channel

Collection date	01/03/17	02/01/17	03/01/17	04/03/17	05/01/17	06/01/17
gross alpha-sol (DS)	*b	< 0.5	< 0.3	< 0.7	+- 0.4	+- 0.4
gross beta-sol (DS)	*b	1.0 < 0.3	0.9 +- 0.3	1.5 +- 0.6	0.7 +- 0.3	0.9 +- 0.3
gross alpha-insol (SS)	*b	< 0.2	< 0.5	< 0.4	0.4 < 0.2	< 0.2
gross beta-insol (SS)	*b	< 0.8	< 0.8	< 1.0	< 0.9	< 0.8
I-131	*b	< 0.3		< 0.2		< 0.4
H-3 *a	*b	< 146.0		+- 198.0		
Sr-89 *a	*b	< 0.6		< 1.0		
Sr-90 *a	*b	< 0.6		< 0.6		
Gamma isotopic						
Mn-54	*b	< 4.3	< 1.5	+- 2.6	< 2.5	< 2.1
Co-58	*b	< 2.7	< 1.5	< 1.3	< 4.5	< 2.4
Fe-59	*b	< 7.8	< 3.1	< 4.3	< 8.3	< 4.6
Co-60	*b	< 4.7	< 1.8	< 2.7	< 2.4	< 1.8
Zn-65	*b	< 7.6	< 3.2	< 2.5	< 4.1	< 4.1
Nb-95	*b	< 3.7	< 2.2	< 3.2	< 3.8	< 2.9
Zr-95	*b	< 7.0	< 5.2	< 4.2	< 5.4	< 4.6
I-131	*b	< 5.0	< 4.2	< 4.5	< 5.1	< 4.9
Cs-134	*b	< 4.4	< 3.1	< 3.3	< 4.0	< 2.9
Cs-137	*b	< 5.0	< 2.9	< 3.5	< 3.6	< 3.0
Ba-140	*b	< 13.1	< 11.7	< 12.2	< 11.3	< 11.6
La-140	*b	< 3.1	< 2.2	< 2.8	< 2.2	< 2.4

Collection date:	07/05/17	08/01/17	09/06/17	10/02/17	11/01/17	12/04/17
gross alpha-sol (DS)	< 1.1	+- 0.4	+- 0.4	< 0.4	< 0.4	< 0.4
gross beta-sol (DS)	1.1 +- 0.5	0.9 +- 0.3	+- 0.4	1.1 ± 0.3	1 < 0.3	0.7 ± 0.3
gross alpha-insol (SS)	+- 0.2	< 0.2	< 0.2	< 0.3	< 0.5	< 0.5
gross beta-insol (SS)	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
I-131		< 0.3		< 0.4		< 0.4
H-3 *a	< 198			< 149		
Sr-89 *a	< 1.0			< 0.9		
Sr-90 *a	< 0.6			< 0..54		
Gamma isotopic						
Mn-54	< 3.7	< 2.3	< 2.6	< 4.0	< 3.3	< 3.1
Co-58	< 1.9	< 1.3	< 1.6	< 2.2	< 2.0	< 1.8
Fe-59	< 4.4	< 3.0	< 6.3	< 5.8	< 5.0	< 5.2
Co-60	+- 2.2	+- 1.1	< 2.3	< 3.4	< 1.1	< 2.5
Zn-65	< 3.9	< 3.0	< 3.7	< 3.1	< 2.4	< 4.3
Nb-95	< 1.8	< 2.0	< 2.9	< 3.5	< 2.8	< 3.2
Zr-95	< 4.2	< 4.4	< 4.0	< 6.3	< 4.0	< 4.2
I-131	< 4.9	< 2.6	< 3.8	< 6.7	< 5.7	< 3.7
Cs-134	< 2.9	< 2.1	< 3.0	< 4.1	< 2.9	< 3.5
Cs-137	< 2.7	< 1.8	< 2.8	< 4.5	< 2.6	< 3.6
Ba-140	< 14.5	< 9	< 8.1	< 22.5	< 10.4	< 9
La-140	< 2.4	< 1.9	< 1.6	2 ± 1.6	< 3.5	< 3.3

*a - The analysis is performed on a quarterly composite.

*b - Sample not collected due to safety concerns

Radioisotopes other than those reported were not detected.

Table 11 (continued) Wisconsin DHS analysis results for surface water samples collected for the Point Beach-Kewaunee environmental monitoring program.

Measurements in units of pCi/liter

PBK-17; Green Bay Water Utility - Rostok

Collection date:	01/03/17	02/06/17	03/14/17	04/03/17	05/01/17	06/05/17
gross alpha-sol (DS)	< 4.0	< 0.5	<0.4	1.3 +- 0.4	0.4 < 0.3	< 0.3
gross beta-sol (DS)	1.2 < 0.3	1.2+- 0.3	1.3 +- 0.3	2.6 +- 0.6	1.6 +- 0.6	< 0.9
gross alpha-insol (SS)	< 0.3	< 0.3	<0.4	<0.5	<0.3	< 0.4
gross beta-insol (SS)	< 0.9	< 0.8	<1.0	<0.9	<0.9	0.9 +- 0.3
I-131		< 0.4		<0.2		< 0.2
H-3 a	< 145			<150		
Sr-89 a	< 0.5			<0.9		
Sr-90 a	< 0.5			<0.5		
Gamma isotopic						
Mn-54	< 1.6	< 1.8	< 2.7	< 2.0	< 3.2	< 1.7
Co-58	< 1.8	< 1.7	< 2.6	< 1.6	< 2.5	< 3.1
Fe-59	< 4.6	< 2.7	< 2.9	< 2.6	< 4.5	< 4.3
Co-60	< 2.4	< 2.0	< 2.0	< 1.8	< 2.6	< 2.0
Zn-65	< 5.4	< 3.2	< 3.8	< 2.2	< 4.5	< 3.8
Nb-95	< 2.2	< 2.2	< 1.9	< 2.6	< 3.6	< 2.1
Zr-95	< 4.8	< 5.2	< 3.7	< 3.1	< 3.6	< 4.9
I-131	< 5.0	< 2.1	< 3.3	< 3.6	< 3.9	< 3.4
Cs-134	< 2.7	< 2.5	< 2.9	< 2.8	< 3.4	< 3.0
Cs-137	< 2.5	< 2.8	< 2.9	< 2.6	< 3.1	< 2.8
Ba-140	< 11.4	< 8.3	< 11.5	< 11.4	< 11.4	< 13.2
La-140	< 2.0	< 2.2	< 2.5	< 2.3	< 1.4	< 2.1

Collection date:	07/10/17	08/07/17	09/05/17	10/02/17	11/06/17	12/04/17
gross alpha-sol (DS)	< 1.1	< 0.3	< 0.4	< 0.4	+- 0.4	< 0.4
gross beta-sol (DS)	+- 0.9	0.7 +- 0.3	1.0 < 0.3	0.6 ± 0.3	0.8 +- 0.3	0.8 ± 0.3
gross alpha-insol (SS)	< 0.3	< 0.4	< 0.2	< 0.2	< 0.2	< 0.3
gross beta-insol (SS)	< 0.8	< 0.8	< 0.8	< 0.8	+- 0.7	< 0.7
I-131		0.5		< 0.3		< 0.4
H-3 a	< 150			< 149		
Sr-89 a	< 0.9			< 1.5		
Sr-90 a	< 0.5			< 0.8		
Gamma isotopic						
Mn-54	< 2.2	< 2.8	< 2.6	< 4.1	< 4.3	< 2.3
Co-58	< 1.5	< 3.1	< 1.6	< 3.6	< 4.5	< 1.9
Fe-59	< 4.8	< 4.2	< 6.3	+- 7.0	< 8.1	< 5.2
Co-60	< 1.7	< 3.5	< 2.3	< 2.4	< 3.0	< 3.2
Zn-65	< 1.7	< 4.7	< 3.7	< 3.9	< 14.8	< 2.0
Nb-95	< 2.3	< 3.6	< 2.9	< 3.8	< 6.3	< 2.7
Zr-95	< 4.0	< 5.6	< 4.0	< 5.8	< 8.8	< 2.9
I-131	< 3.0	< 4.4	< 3.8	< 10.6	< 4.6	< 4.8
Cs-134	< 2.7	< 3.4	< 3.0	< 3.8	< 5.5	< 3.1
Cs-137	< 2.2	< 3.9	< 2.8	< 4.5	< 4.6	< 3.3
Ba-140	< 15.0	< 11.2	< 8.1	< 19.7	< 21.5	< 9.8
La-140	< 2.1	< 2.4	< 1.6	< 3.1	< 6.2	< 1.3

*a - The analysis is performed on a quarterly composite.

*b - Sample not collected due to safety concerns

Radioisotopes other than those reported were not detected.

Table 11 (continued) Wisconsin DHS analysis results for surface water samples collected for the Point Beach-Kewaunee environmental monitoring program.

Measurements in units of pCi/liter

	PBK-5	PBK-29	PBK-5	PBK-29
Collection date:	05/30/17	05/31/17	08/29/17	08/29/27
gross alpha-sol (DS)	< 1.4	< 1.6	2.1 ± 0.8	1.9 ± 0.9
gross beta-sol (DS)	< 3.0	< 2.8	4.9 ± 1.0	4.1 ± 1.1
gross alpha-insol (SS)	< 0.7	< 0.6	< 1.1	0.9 ± 0.7
gross beta-insol (SS)	< 0.8	< 0.8	1.3 ± 0.6	1.7 ± 0.7
H-3	< 206	< 206	< 213	< 213
Sr-89	< 0.3	0.3 < 0.2	< 0.2	< 0.2
Sr-90	0 ± 0.1	< 0.2	0.2 ± 0.1	0.2 ± 0.1
Gamma isotopic				
Mn-54	< 32.0	< 43.8	< 19.4	< 32.8
Co-58	< 6.6	< 9.5	< 3.3	< 6.7
Fe-59	< 8.3	< 9.6	< 3.2	< 6.2
Co-60	< 7.1	< 8.6	< 3.3	< 5.9
Zn-65	< 8.0	< 8.7	< 3.3	< 6.2
Nb-95	< 12.9	< 11.6	< 8.5	< 12.9
Zr-95	< 14.3	< 18.6	< 6.3	< 12.1
I-131	< 8.4	< 11.4	< 6.2	< 12.7
Cs-134	< 6.5	< 8.7	< 3.3	< 6.1
Cs-137	< 6.7	< 8.8	< 3.7	< 6.8
Ba-140	< 13.1	< 18.1	< 7.0	< 13.2
La-140	< 11.0	< 13.0	< 5.9	< 10.9

*a - The analysis is performed on a quarterly composite.
*b - Sample not collected due to safety concerns

Radioisotopes other than those reported were not detected.

Table 12 Wisconsin DHS analysis results for well water samples collected for the Point Beach-Kewaunee environmental monitoring program.

Measurements in units of pCi/liter

	PBK-3	PBK-10	PBK-11	PBK-12d N	PBK-12d S
Collection date:	05/31/17	04/13/17	05/30/17	05/31/17	05/31/17
gross alpha	< 1.0	3.9 +- 1.7	< 1.1	3.2 +- 1.6	3.5 +- 1.6
gross beta	1.9 +- 1.1	2.6 +- 0.8	< 1.7	3.7 +- 1.0	2.2 +- 1.0
H-3	< 206	< 208	< 206	< 206	< 206

	PBK-3	PBK-10	PBK-11	PBK-12d N	PBK-12d S
Collection date:	09/29/16	10/11/16	09/28/16	09/28/16	09/28/16
gross alpha	< 1.2	2.88 ± 1.55	< 1.7	4.04 ± 1.61	4.0 +- 1.6
gross beta	< 1.4	1.26 ± 0.69	< 1.5	3.76 ± 0.96	3.8 +- 1.0
H-3	< 213	< 212	< 213	< 213	< 213

NS – A sample was unable to be collected.

Table 13 Wisconsin DHS analysis results for milk samples collected for the Point Beach-Kewaunee environmental monitoring program.

PBK-28 (E-21); Strutz farm

Collection date:	01/18/17	02/08/17	03/08/17	04/12/17	05/10/17	06/14/17
I-131		< 0.3		< 0.5		< 0.21
Sr-90	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.58
Gamma isotopic						
K-40	1415 +- 1000	1491 +- 98	1340 +- 99	1398 +- 119	1462 +- 120	1504 +- 115
Mn-54	< 3.1	< 1.5	< 1.9	< 4.5	< 3.7	< 4.0
Co-58	< 1.7	< 1.7	< 1.8	< 3.8	< 3.9	< 2.7
Fe-59	< 6.8	< 3.2	< 4.4	< 3.5	< 9.1	< 6.7
Co-60	< 1.7	< 2.2	< 2.2	< 2.8	< 3.6	< 3.0
Zn-65	< 4.8	< 6.5	< 4.8	< 4.2	< 4.8	< 5.9
Nb-95	< 2.9	< 2.0	< 1.8	< 5.0	< 4.1	< 2.7
Zr-95	< 5.2	< 3.1	< 3.0	< 6.4	< 6.7	< 4.1
I-131	< 4.7	< 3.7	< 2.1	< 4.8	< 8.7	< 3.6
Cs-134	< 3.4	< 3.2	< 1.6	< 4.1	< 4.8	< 3.7
Cs-137	< 3.6	< 3.1	< 1.8	< 2.0	< 2.6	< 3.3
Ba-140	< 14.9	< 9.7	< 6.5	< 16.5	< 20.0	< 12.0
La-140	< 2.0	< 1.4	< 1.6	< 1.4	< 2.0	< 1.7

Collection date:	07/12/17	08/09/17	09/13/17	10/11/17	11/08/17	12/13/17
I-131		< 0.4		< 0.2		< 0.4
Sr-90	+- 0.5	< 0.5	1 +- 0.4	< 0.5	< 0.5	< 0.5
gamma isotopic						
K-40	1325 +- 107.0	1487 +- 124	1505 +- 143	1480 +- 123	1444 +- 115	1558 +- 123
Mn-54	< 3.3	< 2.7	< 2.8	< 2.2	< 2.7	< 4.1
Co-58	< 2.7	< 2.4	< 2.6	< 2.1	< 2.4	< 3.4
Fe-59	< 5.9	< 7.7	< 5.7	< 4.6	< 4.8	< 8.2
Co-60	< 3.5	< 4.2	< 2.8	< 2.6	< 2.3	< 4.1
Zn-65	< 4.4	< 6.8	< 7.0	< 5.5	< 4.3	< 9.9
Nb-95	< 1.9	< 3.4	< 2.7	< 2.3	< 3.6	< 3.7
Zr-95	< 7.0	< 3.2	< 4.6	< 3.9	< 3.1	< 6.0
I-131	< 6.8	< 5.5	< 2.9	< 2.3	< 6.0	< 3.1
Cs-134	< 3.4	< 3.8	< 2.5	< 2.3	< 3.3	< 3.9
Cs-137	< 3.8	< 3.0	< 3.3	< 2.5	< 3.7	< 4.3
Ba-140	< 19.5	< 16.5	< 10.9	< 7.8	< 20.6	< 10.9
La-140	< 2.7	< 1.3	< 3.0	< 2.8	< 2.4	< 1.4

Radioisotopes other than those reported were not detected.

Table 13 (continued) Wisconsin DHS analysis results for milk samples collected for the Point Beach-Kewaunee environmental monitoring program.

Measurements in units of pCi/liter

PBK-24; Struck farm

Collection date:	01/18/17	02/08/17	03/08/17	04/12/17	05/10/17	06/14/17
I-131		< 0.2		< 0.2		< 0.2
Sr-90	< 0.6	0.8 +- 0.3	< 0.6	< 0.5	< 0.5	< 0.5
gamma isotopic						
K-40	1304 +- 110.7	1393 +- 107	1481 +- 101	1507 +- 126	15161 +- 126	1363 +- 120
Mn-54	< 1.9	< 3.6	< 2.3	< 3.9	< 2.4	< 2.3
Co-58	< 2.0	< 3.0	< 2.1	< 2.1	< 4.0	< 3.1
Fe-59	< 4.2	< 4.4	< 6.9	< 5.5	< 5.8	< 8.4
Co-60	< 2.6	< 2.6	< 3.0	< 3.5	< 1.9	< 3.3
Zn-65	< 5.0	< 5.8	< 7.2	< 7.1	< 5.2	< 4.5
Nb-95	< 2.5	< 2.6	< 3.1	< 2.7	< 2.9	< 3.9
Zr-95	< 3.2	< 4.6	< 4.3	< 5.6	< 6.5	< 5.7
I-131	< 1.9	< 4.0	< 3.3	< 2.9	< 9.5	< 4.0
Cs-134	< 2.2	< 3.7	< 2.7	< 3.4	< 3.7	< 3.8
Cs-137	< 2.1	< 4.0	< 2.5	< 2.9	< 4.4	< 3.5
Ba-140	< 6.6	< 13.7	< 13.2	< 14.0	< 21.7	< 16.2
La-140	< 2.2	< 2.1	< 2.5	< 1.5	< 2.3	< 1.5

Collection date:	07/12/17	08/12/15	09/13/17	10/11/17	11/09/17	12/14/17
I-131		< 0.5		< 0.2		< 0.3
Sr-90	0.58 +- 0.28	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5
gamma isotopic						
K-40	1455 +- ± 119.1	1380 +- 122.4	1411 +- 111.6	1192 +- 100	1479 +- 126	1272 +- 114
Mn-54	< 3.6	< 2.6	< 1.6	< 3.4	< 2.6	< 3.9
Co-58	< 2.5	< 3.8	< 1.7	< 3.4	< 3.0	< 3.4
Fe-59	< 4.5	< 7.7	< 3.6	< 4.4	< 7.1	< 5.9
Co-60	< 2.6	< 5.3	< 2.3	< 2.0	< 3.3	< 2.9
Zn-65	< 3.9	< 8.6	< 4.1	< 3.8	< 7.4	< 7.2
Nb-95	< 2.3	< 5.0	< 1.9	< 3.2	< 3.7	< 2.4
Zr-95	< 4	< 5.8	< 3.1	< 7.1	< 6.0	< 5.7
I-131	< 7.2	< 5.6	< 1.7	< 4.8	< 5.6	< 3.4
Cs-134	< 3.7	< 4.5	< 1.8	< 3.4	< 4.0	< 3.2
Cs-137	< 3.1	< 4.0	< 2.1	< 3.4	< 3.1	< 3.5
Ba-140	< 23.2	< 19.1	< 6.4	< 12.3	< 13.1	< 4.9
La-140	< 3.7	< 1.9	< 2.1	< 2.1	< 3.6	< 2.0

Radioisotopes other than those reported were not detected.

Table 13 (continued) Wisconsin DHS analysis results for milk samples collected for the Point Beach-Kewaunee environmental monitoring program.

Measurements in units of pCi/liter

PBK-27 (E-40); R. Barta farm

Collection date:	01/18/17	02/08/17	03/08/17	04/12/17	05/10/17	06/14/17
I-131		< 0.3		< 0.2		< 0.2
Sr-90	< 0.54	0.9 < 0.3	0.58 +- 0.3	< 0.5	< 0.5	< 0.5
gamma isotopic						
K-40	1374 +- 105.4	1369 +- 115	1393 +- 98	1475 +- 120	1423 +- 113	1371 +- 122
Mn-54	< 3.4	< 2.5	< 2.9	< 4.1	< 3.0	< 3.6
Co-58	< 1.9	< 2.5	< 2.7	< 2.6	< 3.1	< 1.8
Fe-59	< 6.0	< 4.8	< 4.1	< 5.2	< 7.5	< 8.0
Co-60	< 2.3	< 3.3	< 2.7	< 2.4	< 2.4	< 2.6
Zn-65	< 4.6	< 7.5	< 5.8	< 3.7	< 5.1	< 8.7
Nb-95	< 3.5	< 3.9	< 2.8	< 2.6	< 2.3	< 3.5
Zr-95	< 4.9	< 5.2	< 4.0	< 4.7	< 5.3	< 3.1
I-131	< 4.7	< 3.0	< 3.3	< 4.3	< 6.5	< 4.1
Cs-134	< 3.1	< 4.3	< 3.1	< 4.2	< 3.4	< 4.3
Cs-137	< 3.1	< 4.2	< 3.3	< 2.8	< 3.7	< 4.8
Ba-140	< 12.9	< 11.5	< 10.1	< 14.5	< 12.7	< 12.0
La-140	< 2.4	< 3.2	< 1.7	< 2.6	< 4.1	< 3.0

Collection date:	07/12/17	08/09/17	09/13/17	10/11/17	11/08/17	12/13/17
I-131		< 0.4		< 0.2		< 0.3
Sr-90	0.5 +- 0.3	1.1 < 0.3	0.7 +- 0.4	< 0.5	< 0.6	< 0.5
gamma isotopic						
K-40	1376 +- 70	1380 +- 122	1482 +- 125	1227 +- 105	1374 +- 108	1347 +- 106
Mn-54	< 2.8	< 2.6	< 4.0	< 2.7	< 2.4	< 3.2
Co-58	< 2.7	< 3.8	< 3.6	< 3.4	< 3.4	< 3.3
Fe-59	< 5.9	< 7.7	< 7.3	< 6.6	< 10.0	< 8.0
Co-60	< 2.4	< 5.3	< 1.9	< 1.8	< 1.9	< 3.1
Zn-65	< 3.0	< 8.6	< 4.1	< 4.8	< 5.9	< 5.3
Nb-95	< 2.1	< 5.0	< 4.0	< 3.2	< 4.0	< 3.4
Zr-95	< 5.1	< 5.8	< 7.5	< 6.3	< 5.2	< 4.3
I-131	< 5.2	< 5.6	< 3.3	< 3.4	< 6.2	< 4.2
Cs-134	< 2.9	< 4.5	< 3.3	< 3.3	< 3.7	< 3.1
Cs-137	< 1.6	< 4.0	< 4.2	< 4.1	< 2.6	< 3.0
Ba-140	< 14.7	< 19.1	< 10.0	< 15.2	< 17.1	< 11.2
La-140	< 4.6	< 1.9	< 1.4	< 4.0	< 3.7	< 1.7

Radioisotopes other than those reported were not detected.

Table 14 Wisconsin DHS analysis results for vegetation samples collected for the Point Beach-Kewaunee environmental monitoring program.

Measurements in units of pCi/kilogram (wet)

Site:	PBK-1	PBK-2	PBK-3	PBK-4	PBK-5
ollection date:	05/31/17	05/31/17	05/31/17	06/02/17	06/02/17
gross alpha	< 1210	< 1090	< 853	< 918	< 923
gross beta	6410 +- 444	5120 +- 396	3120 +- 301	5590 +- 354	4220 +- 317
gamma isotopic					
Ba-140	+- 95	< 72	+- 98	+- 102	+- 90
Be-7	1070 +- 143	1020 +- 128	1060 +- 142	383 +- 105	675 +- 139
Cs-134	< 19	< 15	< 19	< 18	< 19
Cs-137	< 25	< 20	< 24	< 20	< 20
Co-58	< 21	< 17	< 19	< 15	< 22
Co-60	< 26	< 21	< 26	< 29	< 23
I-131	< 34	< 30	< 34	< 33	< 37
Fe-59	< 40	< 39	< 42	< 42	< 47
La-140	< 22	< 16	< 30	< 26	< 31
Mn-54	< 21	< 17	< 20	< 22	< 21
Nb-95	< 21	< 17	< 21	< 20	< 23
K-40	7710 +- 1300	6210 +- 1050	5660 +- 979	5630 +- 1030	5430 +- 1000
Zn-65	< 45	< 36	< 49	< 37	< 56
Zr-95	< 30	< 26	< 36	< 34	< 43

Site:	PBK-7	PBK-8	PBK-14	PBK-17
Collection date:	06/02/17	06/02/17	06/02/17	06/02/17
gross alpha	< 1030	+- 773	< 1200	< 890
gross beta	7040 +- 425	5500 +- 282	3680 +- 356	5520 +- 345
gamma isotopic				
Ba-140	< 122	< 41	< 44	< 61
Be-7	1350 +- 198	260 +- 59	535 +- 83	< 202
Cs-134	< 19	< 9	< 9	< 11
Cs-137	< 23	< 10	< 11	< 10
Co-58	< 21	< 9	< 10	< 8
Co-60	< 27	< 11	< 12	< 13
I-131	< 42	< 18	< 21	< 29
Fe-59	< 61	< 22	< 27	< 27
La-140	< 38	< 15	< 15	< 14
Mn-54	< 25	< 7	< 10	< 10
Nb-95	< 27	< 9	< 10	< 15
K-40	6360 +- 1160	4380 +- 789	4430 +- 806	5470 +- 985
Zn-65	< 58	< 21	< 27	< 25
Zr-95	< 34	< 14	< 20	< 17

Radioisotopes other than those reported were not detected.

*a – required detection limit was not met due to laboratory error

Table 14 (continued) Wisconsin DHS analysis results for vegetation samples collected for the Point Beach-Kewaunee environmental monitoring program.

Measurements in units of pCi/kilogram (wet)

Site:	**PBK-1**	**PBK-2**	**PBK-3**	**PBK-4**	**PBK-5**
ollection date:	8/30/2017	8/30/2017	8/29/2017	8/29/2017	8/29/2017
gross alpha	< 2090	1650 +- 1150	< 1300	< 2350	< 1420
gross beta	8560 +- 704	4780 +- 480	3840 +- 373	2800 +- 485	4680 +- 415
gamma isotopic					
Ba-140	< 74.7	< 68.3	< 43.9	< 119	< 149
Be-7	5610 +- 347	4650 +- 287	1560 +- 108	3210 +- 271	2680 +- 302
Cs-134	< 10.2	< 8.74	< 6.61	< 17	< 25.3
Cs-137	< 10	< 8.4	< 6.58	< 17.3	< 25.8
Co-58	< 10.2	< 8.92	< 6.72	< 16.8	< 28.6
Co-60	< 9.99	< 8.81	< 6.51	< 17.5	< 28.1
I-131	< 38.7	< 35.5	< 19.6	< 54.9	< 56.5
Fe-59	< 22.8	< 20.4	< 15.5	< 39.6	< 54.4
La-140	< 20.1	< 18.3	< 11.6	< 32.9	< 37.9
Mn-54	< 9.72	< 8.5	< 6.52	< 16.9	< 23.9
Nb-95	< 11.7	< 10.4	< 7.45	< 20.3	< 24.8
K-40	5010 +- 869	5900 +- 1020	5460 +- 939	3240 +- 606	4420 +- 855
Zn-65	< 23	< 20	< 15.8	< 38.6	< 62.5
Zr-95	< 18.1	< 16.1	< 11.6	< 30	< 43.6

Site:	**PBK-7**	**PBK-8**	**PBK-14**	**PBK-17**
Collection date:	8/29/2017	8/30/2017	8/30/2017	8/30/2017
gross alpha	< 3730	< 938	< 1510	< 877
gross beta	5510 +- 511	7550 +- 376	1860 +- 276	4210 +- 295
gamma isotopic				
Ba-140	< 62.7	< 51.2	< 95.1	< 102
Be-7	4950 +- 305	1190 +- 92.2	1750 +- 164	1130 +- 142
Cs-134	< 9.08	< 7.34	< 13.3	< 16.4
Cs-137	< 8.8	< 6.99	< 12.9	< 15.8
Co-58	< 9.09	< 7.59	< 14.1	< 17.7
Co-60	< 9.04	< 7.17	< 14.2	< 16
I-131	< 31.4	< 24.3	< 44.6	< 49
Fe-59	< 20.4	< 17.2	< 29.4	< 36.1
La-140	< 17.4	< 14.1	< 27.5	< 30.6
Mn-54	< 8.49	< 7.21	< 13.3	< 16.5
Nb-95	< 10.1	< 5.67	< 15.1	< 17.9
K-40	4790 +- 831	6550 +- 1130	4730 +- 837	4520 +- 818
Zn-65	< 19.8	< 17.8	< 32.4	< 40.8
Zr-95	< 15.9	< 12.9	< 23	< 30.5

Radioisotopes other than those reported were not detected.

*a – required detection limit was not met due to laboratory error

Table 15 Wisconsin DHS analysis results for soil samples collected for the Point Beach-Kewaunee environmental monitoring program.

Measurements in units of pCi/kilogram (dry)

Site:	PBK-1	PBK-2	PBK-3	PBK-4	PBK-5
Collection date	05/31/17	05/31/17	05/31/17	05/30/17	05/30/17
gross alpha	6100 +- 3040	6220 +- 3050	6750 +- 3670	6090 +- 2850	15800 +- 4170
gross beta	< 1302	15800 +- 1340	19200 +- 1420	18200 +- 1290	23400 +- 1410
gamma isotopic					
Cs-134	< 21	< 29	< 29	< 22	< 27
Cs-137	72 +- 18	143 +- 26	101 +- 22	89.4 +- 17	< 39
Co-58	< 27	< 45	< 39	< 26	< 38
Co-60	< 25	< 41	< 34	< 26	< 34
Fe-59	< 87	< 104	< 102	< 68	< 111
Mn-54	< 29	< 40	< 38	< 25	< 30
Nb-95	< 42	< 58	< 49	< 36	< 62
K-40	13800 +- 2330	18500 +- 3120	22800 +- 3760	20200 +- 3270	23500 +- 3820
Zn-65	< 72	< 96	< 89	< 64	< 83
Zr-95	< 59	< 73	< 77	< 56	< 73

Site:	PBK-7	PBK-8	PBK-14	PBK-17
Collection date	5/30/2017	5/31/2017	5/31/2017	6/1/2017
gross alpha	< 3730	< 938	< 1510	< 877
gross beta	5510 +- 511	7550 +- 376	1860 +- 276	4210 +- 295
gamma isotopic				
Cs-134	< 62.7	< 51.2	< 95.1	< 102
Cs-137	4950 +- 305	1190 +- 92.2	1750 +- 164	1130 +- 142
Co-58	< 9.08	< 7.34	< 13.3	< 16.4
Co-60	< 8.8	< 6.99	< 12.9	< 15.8
Fe-59	< 9.09	< 7.59	< 14.1	< 17.7
Mn-54	< 9.04	< 7.17	< 14.2	< 16
Nb-95	< 31.4	< 24.3	< 44.6	< 49
K-40	< 20.4	< 17.2	< 29.4	< 36.1
Zn-65	< 17.4	< 14.1	< 27.5	< 30.6
Zr-95	< 8.49	< 7.21	< 13.3	< 16.5

Naturally occurring radioisotopes such as radium-226 (^{226}Ra), bismuth-214 (^{214}Bi), lead-214 (^{214}Pb), actinium-228 (^{228}Ac), bismuth-212 (^{212}Bi), lead-212 (^{212}Pb) from the naturally occurring uranium-238 (^{238}U), and thorium-232 (^{232}Th) decay series are commonly detected but have not been quantified or reported.

Radioisotopes other than those reported were not detected.

Table 15 (continued) Wisconsin DHS analysis results for soil samples collected for the Point Beach- Kewaunee environmental monitoring program.

Measurements in units of pCi/kilogram (dry)

Site:	**PBK-1**	**PBK-2**	**PBK-3**	**PBK-4**	**PBK-5**
Collection date:	09/30/16	8/30/2017	8/29/2017	8/29/2017	8/29/2017
gross alpha	6100 +- 3040	7590 +- 3530	7480 +- 3870	9280 +- 3250	7360 +- 3400
gross beta	12000 +- 1210	16400 +- 1370	21300 +- 1450	17700 +- 1360	15800 +- 1510
gamma isotopic					
Cs-134	< 16	< 13.1	< 21.4	< 15.7	< 16.3
Cs-137	72 +- 13	111 +- 10.2	88.9 +- 13.9	99.2 +- 12.9	29.5 +- 8.42
Co-58	< 34	< 13.2	< 42.3	< 37.2	< 35.3
Co-60	< 19	< 11.7	< 24.6	< 17.2	< 16
Fe-59	< 112	< 34.3	< 140	< 144	< 125
Mn-54	< 17	< 7.42	< 26.4	< 19.7	< 24
Nb-95	< 81	< 18.1	< 97.6	< 98	< 87.6
K-40	12600 +- 2050	19100 +- 3030	22900 +- 3680	15600 +- 2530	19300 +- 3110
Zn-65	< 50	< 33.7	< 66.6	< 47.2	< 45.2
Zr-95	< 67	< 24.3	< 85.4	< 82.8	< 72.4

Site:	**PBK-7**	**PBK-8**	**PBK-14**	**PBK-17**
Collection date:	8/29/2017	8/30/2017	8/30/2017	8/30/2017
gross alpha	6280 +- 3190	4460 +- 2870	6360 +- 3320	< 3850
gross beta	22300 +- 1460	15800 +- 1180	17000 +- 1250	12800 +- 1150
gamma isotopic				
Cs-134	< 20	< 15.8	< 13.1	< 13.4
Cs-137	138 +- 17.2	45.7 +- 9.42	138 +- 13.7	149 +- 14.9
Co-58	< 42.2	< 36.2	< 32.9	< 31.1
Co-60	< 21.5	< 18.5	< 13.8	< 13.8
Fe-59	< 157	< 145	< 131	< 133
Mn-54	< 23.2	< 18.5	< 18.6	< 16.1
Nb-95	< 96.5	< 93.8	< 93.2	< 97.3
K-40	24700 +- 3970	18400 +- 2950	17100 +- 2750	12800 +- 2080
Zn-65	< 59.5	< 46.5	< 44.3	< 37
Zr-95	< 87.2	< 75.3	< 66.7	< 65.5

Naturally occurring radioisotopes such as radium-226 (^{226}Ra), bismuth-214 (^{214}Bi), lead-214 (^{214}Pb), actinium-228 (^{228}Ac), bismuth-212 (^{212}Bi), lead-212 (^{212}Pb) from the naturally occurring uranium-238 (^{238}U), and thorium-232 (^{232}Th) decay series are commonly detected but have not been quantified or reported.

Radioisotopes other than those reported were not detected.

Appendices

Appendix A—Radionuclide Concentration Levels needing review by state radiological coordinator (SRC)

If radioactivity concentrations exceed SRC review levels for a given radionuclide, consult SRC or review and assessment.

Medium	Radionuclide	SRC Review Level [a]
Airborne Particulates or Gas (pCi/m^3)	Gross Beta	1
	I-131 (Charcoal)	0.1
	Cs-134	1
	Cs-137	1
Precipitation (pCi/l)	H-3	1,000
Water (pCi/l)	Gross Alpha	10
	Gross Beta	30
	H-3	10,000
	Mn-54	100
	Fe-59	40
	Co-58	100
	Co-60	30
	Zn-65	30
	Zr-Nb-95	40
	I-131	1
	Cs-134	10
	Cs-137	20
	Ba-La-140	100
	Sr-89	8
	Sr-90	8 [d]
Milk (pCi/l)	I-131	1
	Cs-134	20
	Cs-137	20
	Ba-La-140	100
	Sr-89	10
Grass (Vegetation), Cattle Feed, and Vegetables (pCi/kg wet)	Gross Beta	30,000
	I-131	100
	Cs-134	200
	Cs-137	200
	Sr-89	1,000
	Sr-90	1,000
Eggs (pCi/kg) wet)	Gross Beta	30,000
	Cs-134	200
	Cs-137	200
	Sr-89	1,000
	Sr-90	1,000
Soil, Bottom Sediment (pCi/kg)	Gross Beta	5,000

	Cs-134	5,000
	Cs-137	5,000
	Sr-89	5,000
	Sr-90	5,000
Meat (pCi/kg)	Gross Beta (Flesh, Bones)	10,000
	Cs-134 (Flesh)	1,000
	Cs-137 (Flesh)	2,000
	Sr-89 (Bones)	2,000
	Sr-90 (Bones)	2,000
Fish (pCi/kg wet)	Gross Beta (Flesh, Bones)	10,000
	Mn-54	- -
	Fe-59	- -
	Co-58	- -
	Co-60	- -
	Cs-134 (Flesh)	1,000
	Cs-137 (Flesh)	2,000
	Sr-89 (Bones)	2,000
	Sr-90 (Bones)	2,000
	Zn-65 (Bones)	- -
Thermoluminescent Dosimeter (mR/Std Qtr)	Direct Exposure	

a. Radionuclides will be monitored by Wisconsin Dept. of Health Services, Radiation Protection Sections, Environmental Monitoring program and concentrations above the listed levels will be reported to the Wisconsin state radiological coordinator (SRC) for further review and assessment.

b. For drinking water (well water) samples, this is a 40 CFR Part 141 value. If no drinking water pathway exists, a value of 30,000 pCi/l may be used. (NUREG-1301. Supplement No. 1, page 64, table 3.12-2)

c. If no drinking water pathway exists, a value of 20 pCi/l may be used. (NUREG-1301. Supplement No. 1, page 64, table 3.12-2)

d. Drinking Water values from Prescribed Procedures for Measurement of Radioactivity in Drinking Water, EPA-600/4-80-032, August 1980.

Appendix B—Sample Point Locations

The sample point locations.

Sample Point	Location Description		
PBK-1	Francar residence	44.31286	-87.64382
PBK-1	Francar residence	44.31273	-87.64391
PBK-2	Southwest corner property line - Point Beach	44.27170	-87.54323
PBK-3	Two Creeks Town Hall	44.28455	-87.56638
PBK-3	Two Creeks Town Hall	44.28419	-87.56558
PBK-4	Residence north property line - Point Beach	44.29741	-87.54500
PBK-5	Two Creeks Park; NW corner of property	44.30497	-87.54435
PBK-5	Two Creeks Park; NW corner of property	44.30584	-87.54646
PBK-7	WPSC substation, Cty V	44.24071	-87.57332
PBK-8	P Ihlenfeldt farm	44.35174	-87.54321
PBK-9	Point Beach, meteorological tower	44.27477	-87.53120
PBK-10a	Point Beach, effluent channel	44.28133	-87.53549
PBK-10b	Point Beach, entrance	44.27964	-87.53686
PBK-11	Two Creeks International Harvester	44.30250	-87.56315
PBK-12a	Kewaunee, effluent channel	44.34245	-87.53385
PBK-12b	Kewaunee, effluent channel, 500 feet N	44.34345	-87.53421
PBK-12c	Kewaunee, effluent channel, 500 feet S	44.34152	-87.53314
PBK-12d(1)	Kewaunee , south well	44.34273	-87.53818
PBK-12d(2)	Kewaunee , north well	44.34419	-87.53834
PBK-14	Nuclear Road – field east of parking lot	44.34209	-87.55209
PBK-17	Green Bay Pumping Station - Rostok	44.50379	-87.48515
PBK-17	Green Bay Pumping Station – Rostok	44.50370	-87.48645
PBK-18	Kewaunee, meteorological tower	44.34047	-87.53631
PBK-24	L. Struck Farm	44.37997	-87.51994
PBK-26	Kewaunee	44.45584	-87.49985
PBK-27	Barta Farm	44.29703	-87.56319
PBK-28	Strutz Farm	44.255999	-87.522693
PBK-29	Irish Road – at Lake Michigan	44.25499	-87.51986
PBK-T1-8	Point Beach ISFSI on outside of perimeter fence	44.28533	-87.54587
PBK-T9	Point Beach north property line, Lakeshore Road	44.29741	-87.54495
PBK-T10	Nuclear Road, 0.6 mile E of Lakeshore Road	44.26935	-87.53113
PBK-T11	Nuclear Road, 0.1 mile E of Lakeshore Road	44.26961	-87.54318
PBK-T12	Highway 42, 0.6 mile N of Nuclear Road	44.27331	-87.56329
PBK-T13	Highway 42, 0.3 mile N of Tapawingo Road	44.28735	-87.56325
PBK-T14	Two Creeks Road, 0.1 mile E of Highway 42	44.30216	-87.56109
PBK-T15	Junction of Lakeshore Road and Ravine Drive	44.23341	-87.53894
PBK-T16	Cty V, 0.5 mile W of Hwy 42	44.24072	-87.57332
PBK-T17	Junction of Saxonbury Road and Tapawingo Road	44.28387	-87.61360
Sample Point	Location Description		

PBK-T18	Zander Road, 0.1 mile W on Tannery Road	44.31300	-87.58396
PBK-T20	Junction of Cty BB and Ratajcsak Lane	44.32765	-87.55484
PBK-T28	Kewaunee, South on Hwy 42	44.44445	-87.50591
PBK-T29	Two Rivers, Junction of Hwy 42 and 34th Avenue	44.16469	-87.55987
PBK-T30	Manitowoc, Hwy 42, Two Rivers Chamber of Commerce	44.12039	-87.62514
PBK-T31	Mishicot, Cty V, in front of house #653	44.24052	-87.63330
PBK-51-58	KPS ISFSI on the inside of the perimeter fence	44.34421	-87.53651
PBK-T51	KPS ISFSI on the inside of the perimeter fence	44.34369	-87.53676
PBK-T52	KPS ISFSI on the inside of the perimeter fence	44.34389	-87.53570
PBK-T53	KPS ISFSI on the inside of the perimeter fence	44.34419	-87.53558
PBK-T54	KPS ISFSI on the inside of the perimeter fence	44.34450	-87.53592
PBK-T55	KPS ISFSI on the inside of the perimeter fence	44.34455	-87.53634
PBK-T56	KPS ISFSI on the inside of the perimeter fence	44.34442	-87.53704
PBK-T57	KPS ISFSI on the inside of the perimeter fence	44.34420	-87.53726
PBK-T58	KPS ISFSI on the inside of the perimeter fence	44.34377	-87.53726