

State of Wisconsin

2013

Point Beach - Kewaunee

Environmental Radioactivity Survey



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State of Wisconsin, Department of Health Services

2013

Point Beach – Kewaunee Environmental Monitoring Survey

Executive Summary

Wisconsin Public Health Statutes 254.41 mandates the State of Wisconsin, Department of Health Services 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 2013 and provides a description and results of this environmental monitoring program.

The Wisconsin Department of Health Services' 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 2013, all sample results from the Point Beach – Kewaunee environmental monitoring area were less than state and federal standards or guidelines.

The Wisconsin Department of Health Services' 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 1950's-1960's atmospheric nuclear testing and such radiological incidents as the Chernobyl nuclear reactor incident.
- There were no incidents during 2013, such as the 2011 Japan Fukushima Daiichi incident, that required additional environmental monitoring.
- There is no radioactive problem in types of food consumed in Wisconsin or a health problem for Wisconsin citizens.

The ongoing environmental monitoring programs will continue to provide assurances to the citizens of Wisconsin that the environment surrounding the Point Beach – Kewaunee nuclear power facilities and other monitoring areas will continue to be evaluated.

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State of Wisconsin Department of Health Services

2013

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Introduction

Wisconsin Public Health Statutes 254.41 mandates the Wisconsin (WI) 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 2013 and provides a description and results of this environmental monitoring program.

WI DHS Point Beach - Kewaunee Environmental Monitoring Sampling Program

The WI 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, the 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 the Kewaunee plant and Figure 2 is a map showing the location of environmental sampling sites in relation to the Point Beach plant.

Program Modifications

The following program modifications were implemented for 2013.

Surface water:

- Sampling site PBK-25 was discontinued as the sampling site was no longer accessible.
- Sampling site PBK-29 was implemented in June 2013 to replace PBK-25.

Soil and Vegetation:

- Sampling site PBK-25 was discontinued as the sampling site was no longer accessible.

Laboratory Services and Quality Assurance

The 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 to regularly calibrate the counters and daily performance checks are made between calibrations. In addition, quality control charts are maintained on the counters.

WSLH participates in the Environmental Resource Associates' Proficiency Testing program and has performed satisfactorily over the report period. Proficiency testing results are available from the Wisconsin State Laboratory of Hygiene.

Detection Limits

Detection limits, required by WI DHS, will be expressed as a lower limit of detection (LLD). The required WI 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, and
t	for environmental samples is 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 will be 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 5-15 are "a posteriori" calculations 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 WI DHS LLD indicating that the required WI 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:

<u>Example</u>	<u>Nuclide</u>	<u>Activity reported</u>
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 2013 A sample was unable to be collected.

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	310	1	GA, GB, GI
air iodine	C/W	4, 17, 18	155	1	GI
precipitation	C/BW	1, 4	12	0	GB, H
TLD	G/Q	T1 – T31	122	1	ambient gamma
surface water	G/M	9, 12a, 17	36	0	GA, GB, GI, Sr, H, I
surface water	G/SA	5, 29	4	0	GA, GB, GI, Sr, H
fish	G/SA	10a	10	0	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 (2 sites)	9	1	GA, GB, H
milk	G/M	24, 27, 28	36	0	GI, I, 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

Table 2. WI 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-6	9.2 S	5.1 SSE	Coast Guard station (discontinued August, 2002)
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
PBK-14	0.8 W	4.3 N	Nuclear Road – field east of parking lot

Table 2. WI DHS Point Beach - Kewaunee environmental monitoring sampling sites, continued.

Sample site	Distance and direction (miles)		Location description
	Kewaunee	Point Beach	
PBK-15	1.7 SW	3.5 NNW	Jct of Cty BB and Woodside Road (discontinued July, 1996)
PBK-16	3.9 W	6.0 NW	Bruechert residence (discontinued July, 1996)
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-19	6.2 SW	3.8 W	W. Funk farm (discontinued in January 2009)
PBK-20	3.2 SSW	2.2 NW	L. Engelbrecht farm (discontinued in September, 2003)
PBK-21	3.0 N	7.3 N	D. Stangel farm (left the dairy business in October, 1999)
PBK-22	10.4 SSW	6.7 SW	Bertler's food stand (discontinued in July, 1998)
PBK-23	4.0 WNW	6.4 NW	Jansky farm (discontinued in July, 1998)
PBK-24	2.6 N	6.9 N	L. Struck farm
PBK-25	7.4 S	3.2 SSE	Manitowoc Public School District (discontinued in 2013)
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
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
PBK-T22	1.2 NW	5.3 N	Sandy Bay Road, 0.4 mile W of Hwy 42
PBK-T23	4.9 WSW	5.5 NW	Cty B, S of Tisch Mills
PBK-T24	3.8 NW	7.0 NNW	Jct of Norman Road and Cty G
PBK-T25	3.1 NNW	7.2 N	Woodside Road, 0.2 miles S of Old Settlers Road
PBK-T26	3.0 N	7.3 N	Old Settlers Road, 0.1 mile W of Cemetery Road
PBK-T27	17.4 NNE	21.6 NNE	Algoma, S on Hwy 42
PBK-T28	7.2 NNE	11.4 N	Kewaunee, S 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

Table 3. Missing sample or sample deviation report for 2013.

Sample type	Date	Site	Explanation
Air particulate	06/28/13	17	The air site was not operational for the indicated sampling period.
Air iodine	06/28/13	17	The air site was not operational for the indicated sampling period.
TLD	3 rd quarter	TLD-30	No data, the TLD was lost in the field.
Well water	06/04/13	12d – S	A sample was unable to be collected

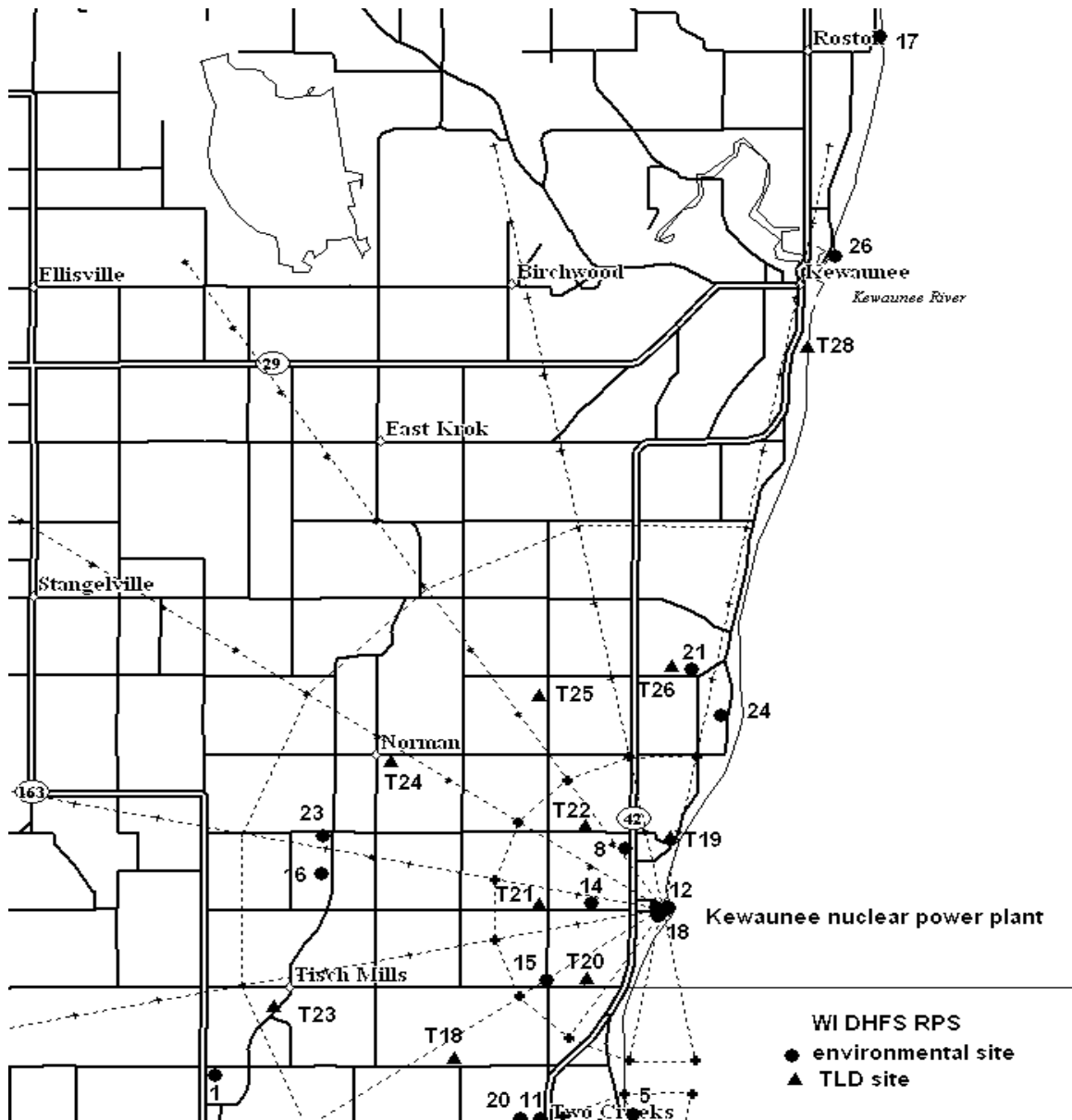


Figure 1. Point Beach - Kewaunee environmental monitoring sampling sites in relation to the Kewaunee plant.

Results and Discussion for the Point Beach – Kewaunee Environmental Monitoring program

Air Particulate

A summary of reported activities by WI DHS for air particulate samples is included in Table 4. Results from the individual sample analyses are listed in Tables 5-6.

From the gross beta activities listed in Table 5, it may be noted that there are no significant differences due to distance from either the Kewaunee or the Point Beach facility. With no significant differences due to distance, an increase in gross beta activity attributable to the Kewaunee or the Point Beach facilities is not evident.

The gamma isotopic analysis of the quarterly air particulate filter composites detected only small amounts of the radioisotopes listed in Table 4. All other radioisotopes were below their respective LLD. Beryllium-7 (^7Be), 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 is detected in air composites from other areas of the state.

Air Iodine

A summary of reported activities by WI DHS for air iodine samples is included in Table 4. Results from the individual sample analyses are listed in Table 5.

Air iodine measurements were all below the LLD of 0.07 pCi/m^3 . Influence by the Kewaunee or the Point Beach nuclear generating facilities on air quality is not evident from air iodine analysis.

Ambient Gamma Radiation – Thermoluminescent dosimeters (TLD)

A summary of reported activities by WI DHS for ambient gamma radiation is included in Table 4. Results from the individual sample analyses are listed in Table 7.

Significant differences in exposure were not noticed at different distances from either the Kewaunee or the Point Beach nuclear facilities for sites PBK-T9 through PBK-T31. Excluding the sites around the perimeter of the Point Beach ISFSI (T1 – T8), the average quarterly exposure from the remaining 23 sites was 13.9 ± 1.8 milliroentgens. The average quarterly exposure for 2013 is at background levels and is comparable to other areas within Wisconsin. Influence by the Kewaunee or the Point Beach nuclear generating facilities on air quality is not evident from ambient gamma radiation analysis.

Precipitation

A summary of reported activities by WI DHS for precipitation samples is included in Table 4. Results from the individual sample analyses are listed in Table 8.

The gross beta activity in precipitation was all within the normal range of activity when compared to previous year's data. Influence by the Kewaunee or the Point Beach nuclear generating facilities on air quality is not evident from precipitation sample analysis.

Fish

A summary of reported activities by WI DHS for fish samples is included in Table 4. Results from the individual sample analyses are listed in Table 9.

The fish samples showed no unusual activities. The reported activities for cesium-137 (^{137}Cs) were also detected in previous years and are probably attributable to residual fallout from previous

atmospheric nuclear weapons testing. Influence by the Kewaunee or the Point Beach nuclear generating facilities is not evident from fish sample analysis.

Shoreline Sediment

A summary of reported activities by WI DHS for shoreline sediment samples is included in Table 4. Results from the individual sample analyses are listed in Table 10.

Analysis of the shoreline samples showed no unusual activities. 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 probably 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. Influence by the Kewaunee or the Point Beach nuclear generating facilities is not evident from shoreline sediment sample analysis.

Surface Water

A summary of reported activities by WI DHS for surface water samples is included in Table 4. Results from the individual sample analyses are listed in Table 11.

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

Well Water

A summary of reported activities by WI DHS for well water samples is included in Table 4. Results from the individual sample analyses are listed in Table 12.

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

Milk

A summary of reported activities by WI DHS for milk samples is included in Table 4. Results from the individual sample analyses are listed in Table 13.

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), attributable to residual fallout from previous atmospheric nuclear weapons testing, were also detected in previous years at similar activity levels. Influence by the Kewaunee or the Point Beach nuclear generating facilities is not evident from milk sample analysis.

Vegetation

A summary of reported activities by WI DHS for vegetation samples is included in Table 4. Results from the individual sample analyses are listed in Table 14.

Analysis of the vegetation samples showed no unusual activities. The gamma isotopic analysis detected only small amounts of naturally occurring potassium-40 (^{40}K) and beryllium-7 (^7Be) listed in

Table 4. Influence by the Kewaunee or the Point Beach nuclear generating facilities is not evident from vegetation sample analysis.

Soil

A summary of reported activities by WI DHS for soil samples is included in Table 4. Results from the individual sample analyses are listed in Table 15.

Analysis of the soil samples showed no unusual activities. 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 probably 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 ISFSI

A summary of reported activities by WI DHS for ambient gamma radiation monitored in the vicinity of the Point Beach Independent Spent Fuel Storage Installation (ISFSI) is included in Table 7.

Ambient gamma exposure levels greater than background, as measured by thermoluminescent dosimeters (TLDs), are apparent at all sites (T1 – T8) that are on the Point Beach ISFSI perimeter fence closest to the ventilated storage casks. 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) was not evident and the ambient gamma exposure levels are consistent with previous years data. The average standard quarterly ambient gamma exposure for 2013 for sites T9 – T31 was 13.9 ± 1.8 milliroentgens and for sites T1 – T8 varied from 16.0 – 61.6 milliroentgens per standard quarter depending on the distance from the storage casks.

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 the Kewaunee nuclear generating facilities are less than the limits as stated in these Federal regulations.

The WI DHS limit for permissible levels of radiation exposure from external sources in unrestricted areas is defined in the Wis. Adm. Code section 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. Adm. Code section DHS 157.23.

References

State of Wisconsin, Wisconsin Administrative Code, DHS 157.23

State of Wisconsin, "FINAL ENVIRONMENTAL IMPACT STATEMENT, Point Beach Nuclear Power Plant 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.

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

Sample type (units)	LLD	Number of samples ^a	Analysis	Range
Air particulate (pCi/m ³)	0.005	311 / 311	gross beta gamma isotopic	0.006 - 0.055
	0.020	24 / 24	Be-7	0.037 – 0.075
	0.002	24 / 0	Mn-54	< 0.0005
	0.002	24 / 0	Co-58	< 0.0006
	0.005	24 / 0	Fe-59	< 0.0011
	0.002	24 / 0	Co-60	< 0.0008
	0.005	24 / 0	Zn-65	< 0.0010
	0.002	24 / 0	Nb-95	< 0.0007
	0.005	24 / 0	Zr-95	< 0.0009
	0.002	24 / 0	Ru-103	< 0.0006
	0.015	24 / 0	Ru-106	< 0.0045
	0.020	24 / 0	I-131	< 0.0020
	0.002	24 / 0	Cs-134	< 0.0006
	0.002	24 / 0	Cs-137	< 0.0007
	0.030	24 / 0	Ba-140	< 0.0040
	0.020	24 / 0	La-140	< 0.0016
	0.002	24 / 0	Ce-141	< 0.0010
0.005	24 / 0	Ce-144	< 0.0033	
Air iodine (pCi/m ³)	0.07	155 / 0	I-131	< 0.066
Surface water (pCi/liter)	3.0	40 / 34	gross beta (sol)	< 1.4 – 3.5
	3.0	40 / 4	gross beta (insol)	< 2.4 – 3.0
	3.0	40 / 17	gross alpha (sol)	< 1.7 – 2.2
	3.0	40 / 5	gross alpha (insol)	< 1.1 – 1.6
	300	16 / 5	H-3	< 260 – 1500
	1.5	12 / 0	I-131	< 0.9
	2.0	16 / 0	Sr-89	< 1.7
	1.0	16 / 6	Sr-90	< 0.4 – 0.5
			gamma isotopic	
	15	40 / 0	Mn-54	< 10
	15	40 / 0	Co-58	< 13
	30	40 / 0	Fe-59	< 26
	15	40 / 0	Co-60	< 15
	30	40 / 0	Zn-65	< 29
	15	40 / 0	Nb-95	< 11
	30	40 / 0	Zr-95	< 21
	15	40 / 0	I-131	< 15
	15	40 / 0	Cs-134	< 11
	15	40 / 0	Cs-137	< 15
60	40 / 0	Ba-140	< 42	
15	40 / 0	La-140	< 15	

Table 4. Sample activity summary for the Point Beach - Kewaunee environmental monitoring program, cont.

Sample type (units)	LLD	Number of samples ^a	Analysis	Range
Fish (pCi/kg wet)	800	10 / 10	gamma isotopic	
			K-40	460 – 3190
	50	10 / 0	Mn-54	< 13
	60	10 / 0	Co-58	< 14
	130	10 / 0	Fe-59	< 40
	70	10 / 0	Co-60	< 14
	130	10 / 0	Zn-65	< 33
	50	10 / 0	Nb-95	< 15
	100	10 / 0	Zr-95	< 24
	50	10 / 0	Cs-134	< 10
	60	10 / 7	Cs-137	< 15 - 71
Shoreline sediment (pCi/kg dry)	6000	7 / 7	gross beta	4100 – 6600
	15000	7 / 0	gross alpha	< 4300
			gamma isotopic	
	800	7 / 7	K-40	5700 – 7600
	60	7 / 0	Mn-54	< 13
	90	7 / 0	Co-58	< 13
	600	7 / 0	Fe-59	< 33
	90	7 / 0	Co-60	< 16
	300	7 / 0	Zn-65	< 32
	100	7 / 0	Nb-95	< 15
	200	7 / 0	Zr-95	< 23
	80	7 / 0	Cs-134	< 11
	80	7 / 3	Cs-137	< 16 – 24
Vegetation (pCi/kg wet)	6000	18 / 0	gross alpha	< 1920
	4000	18 / 18	gross beta	2000 - 5730
			gamma isotopic	
	600	18 / 18	Be-7	250 – 2130
	2000	18 / 18	K-40	2480 – 6190
	90	18 / 0	Mn-54	< 22
	100	18 / 0	Co-58	< 25
	200	18 / 0	Fe-59	< 54
	100	18 / 0	Co-60	< 36
	250	18 / 0	Zn-65	< 57
	100	18 / 0	Nb-95	< 31
	200	18 / 0	Zr-95	< 48
	80	18 / 0	I-131	< 50
	80	18 / 0	Cs-134	< 27
	90	18 / 0	Cs-137	< 35
	350	18 / 0	Ba-140	< 117
100	18 / 0	La-140	< 47	

Table 4. Sample activity summary for the Point Beach - Kewaunee environmental monitoring program, continued.

Sample type (units)	LLD	Number of samples ^a	Analysis	Range
Soil (pCi/kg dry)	6000	18 / 18	gross beta	12200 – 22700
	13000	18 / 17	gross alpha	< 4100 – 11700
			gamma isotopic	
	800	18 / 18	K-40	13100 – 21100
	60	18 / 0	Mn-54	< 25
	90	18 / 0	Co-58	< 23
	600	18 / 0	Fe-59	< 60
	90	18 / 0	Co-60	< 35
	300	18 / 0	Zn-65	< 63
	100	18 / 0	Nb-95	< 30
	250	18 / 0	Zr-95	< 45
	80	18 / 0	Cs-134	< 29
	80	18 / 18	Cs-137	60 - 369
	Milk (pCi/liter)	1.0	36 / 16	Sr-90
1.5		11 / 0	I-131	< 0.8
			gamma isotopic	
500		36 / 36	K-40	1110 – 1610
15		36 / 0	Mn-54	< 14
15		36 / 0	Co-58	< 13
40		36 / 0	Fe-59	< 28
15		36 / 0	Co-60	< 15
40		36 / 0	Zn-65	< 38
15		36 / 0	Nb-95	< 13
40		36 / 0	Zr-95	< 19
15		36 / 0	I-131	< 15
15		36 / 0	Cs-134	< 13
15		36 / 0	Cs-137	< 15
60		36 / 0	Ba-140	< 49
15		36 / 0	La-140	< 14
Well water (pCi/liter)	3.0	9 / 5	gross beta	< 4.6 – 3.8
	5.0	9 / 4	gross alpha	< 2.5 – 3.8
	300 ^b	9 / 0	H-3	< 250
Precipitation (nCi/m ²)	1.5 ^b	12 / 11	gross beta	< 0.13 – 0.58
	300 ^b	12 / 0	H-3	< 36
ambient radiation (mR/Std Qtr)	1.0 ^c	123 / 123	exposure	9.8 – 61.6

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

Table 5. WI 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-1

Collection date	Volume m ³	Air Particulate	Collection date	Volume m ³	Air Particulate
01/02/13	522	0.038 +- 0.003	07/03/13	536	0.009 +- 0.002
01/09/13	529	0.048 +- 0.003	07/10/13	539	0.018 +- 0.002
01/16/13	529	0.023 +- 0.002	07/17/13	539	0.015 +- 0.002
01/23/13	529	0.024 +- 0.002	07/24/13	546	0.013 +- 0.002
01/31/13	600	0.020 +- 0.002	07/31/13	556	0.008 +- 0.002
02/06/13	447	0.033 +- 0.003	08/08/13	556	0.013 +- 0.002
02/13/13	515	0.022 +- 0.002	08/14/13	478	0.013 +- 0.002
02/20/13	498	0.018 +- 0.002	08/21/13	536	0.024 +- 0.003
02/28/13	569	0.009 +- 0.002	08/28/13	542	0.022 +- 0.002
03/06/13	410	0.018 +- 0.003	09/04/13	546	0.021 +- 0.002
03/13/13	495	0.009 +- 0.002	09/11/13	553	0.026 +- 0.003
03/21/13	559	0.023 +- 0.002	09/18/13	553	0.011 +- 0.002
03/28/13	519	0.007 +- 0.002	09/25/13	556	0.013 +- 0.002
1st Qtr			3rd Qtr		
mean +- s.d.		0.022 +- 0.012	mean +- s.d.		0.016 +- 0.006
04/03/13	441	0.013 +- 0.003	10/02/13	563	0.021 +- 0.002
04/10/13	519	0.017 +- 0.002	10/09/13	587	0.012 +- 0.002
04/17/13	475	0.009 +- 0.002	10/16/13	556	0.019 +- 0.002
04/24/13	498	0.015 +- 0.002	10/23/13	580	0.011 +- 0.002
05/01/13	498	0.025 +- 0.003	10/30/13	601	0.009 +- 0.002
05/08/13	508	0.012 +- 0.002	11/06/13	580	0.022 +- 0.002
05/15/13	505	0.015 +- 0.002	11/13/13	594	0.015 +- 0.002
05/22/13	495	0.014 +- 0.002	11/20/13	580	0.020 +- 0.002
05/29/13	441	0.010 +- 0.002	11/27/13	590	0.018 +- 0.002
06/06/13	542	0.012 +- 0.002	12/04/13	583	0.026 +- 0.002
06/12/13	461	0.019 +- 0.003	12/10/13	508	0.030 +- 0.003
06/19/13	539	0.011 +- 0.002	12/18/13	673	0.031 +- 0.002
06/26/13	539	0.016 +- 0.002	12/26/13	673	0.025 +- 0.002
2nd Qtr			4th Qtr		
mean +- s.d.		0.014 +- 0.004	mean +- s.d.		0.020 +- 0.007

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

Measurements in units of pCi/m ³							
Site: PBK-4							
Collection date	Volume m ³	Air particulate	Air iodine	Collection date	Volume m ³	Air particulate	Air iodine
01/09/13	719	0.049 +- 0.003	< 0.009	07/10/13	741	0.014 +- 0.002	< 0.013
01/15/13	479	0.021 +- 0.003	< 0.010	07/15/13	183	0.030 +- 0.006	< 0.066
01/21/13	474	0.029 +- 0.003	< 0.009	07/22/13	581	0.017 +- 0.002	< 0.008
01/26/13	529	0.022 +- 0.002	< 0.010	07/29/13	577	0.007 +- 0.002	< 0.010
02/04/13	537	0.028 +- 0.003	< 0.015	08/05/13	579	0.011 +- 0.002	< 0.009
02/13/13	722	0.022 +- 0.002	< 0.012	08/14/13	664	0.013 +- 0.002	< 0.013
02/18/13	412	0.021 +- 0.003	< 0.014	08/19/13	418	0.019 +- 0.003	< 0.013
02/25/13	548	0.010 +- 0.002	< 0.021	08/27/13	650	0.025 +- 0.002	< 0.014
03/04/13	563	0.014 +- 0.002	< 0.012	09/03/13	588	0.028 +- 0.003	< 0.008
03/13/13	719	0.012 +- 0.002	< 0.011	09/11/13	664	0.024 +- 0.002	< 0.005
03/18/13	403	0.021 +- 0.003	< 0.023	09/16/13	418	0.010 +- 0.003	< 0.028
03/25/13	541	0.012 +- 0.002	< 0.019	09/23/13	573	0.014 +- 0.002	< 0.010
04/01/13	572	0.010 +- 0.002	< 0.008	09/30/13	565	0.049 +- 0.003	< 0.007
1st Qtr				3rd Qtr			
mean +- s.d.		0.021 +- 0.011	< 0.013	mean +- s.d.		0.020 +- 0.011	< .016
04/10/13	730	0.014 +- 0.002	< 0.010	10/09/13	753	0.016 +- 0.002	< 0.011
04/15/13	408	0.009 +- 0.003	< 0.022	10/14/13	417	0.017 +- 0.003	< 0.011
04/22/13	593	0.012 +- 0.002	< 0.015	10/21/13	557	0.014 +- 0.002	< 0.008
04/29/13	566	0.025 +- 0.003	< 0.023	10/28/13	566	0.007 +- 0.002	< 0.010
05/06/13	594	0.014 +- 0.002	< 0.008	11/04/13	547	0.015 +- 0.002	< 0.018
05/15/13	737	0.013 +- 0.002	< 0.009	11/13/13	715	0.020 +- 0.002	< 0.013
05/21/13	496	0.014 +- 0.002	< 0.011	11/18/13	392	0.021 +- 0.003	< 0.027
05/29/13	660	0.009 +- 0.002	< 0.006	11/25/13	535	0.014 +- 0.002	< 0.011
06/03/13	426	0.009 +- 0.002	< 0.015	12/02/13	549	0.027 +- 0.003	< 0.011
06/12/13	754	0.016 +- 0.002	< 0.021	12/11/13	630	0.030 +- 0.002	< 0.010
06/17/13	407	0.014 +- 0.003	< 0.014	12/16/13	345	0.027 +- 0.004	< 0.020
06/24/13	583	0.013 +- 0.002	< 0.010	12/23/13	536	0.021 +- 0.002	< 0.018
07/01/13	606	0.012 +- 0.002	< 0.010	12/30/13	519	0.032 +- 0.003	< 0.014
2nd Qtr				4th Qtr			
mean +- s.d.		0.013 +- 0.004	< 0.013	mean +- s.d.		0.020 +- 0.007	< 0.014

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

Measurements in units of pCi/m³

Site: PBK-7

Collection date	Volume m ³	Air particulate	Collection date	Volume m ³	Air particulate
01/02/13	422	0.037 +- 0.003	07/03/13	397	0.011 +- 0.003
01/09/13	416	0.055 +- 0.004	07/10/13	397	0.021 +- 0.003
01/16/13	419	0.022 +- 0.003	07/17/13	391	0.014 +- 0.003
01/23/13	431	0.027 +- 0.003	07/24/13	387	0.015 +- 0.003
01/31/13	498	0.021 +- 0.002	07/31/13	403	0.006 +- 0.002
02/06/13	372	0.038 +- 0.004	08/07/13	372	0.014 +- 0.003
02/13/13	419	0.022 +- 0.003	08/14/13	394	0.012 +- 0.003
02/20/13	425	0.022 +- 0.003	08/21/13	381	0.030 +- 0.003
02/28/13	485	0.009 +- 0.002	08/28/13	378	0.024 +- 0.003
03/06/13	359	0.016 +- 0.003	09/04/13	372	0.024 +- 0.003
03/13/13	409	0.012 +- 0.002	09/11/13	384	0.024 +- 0.003
03/21/13	466	0.023 +- 0.003	09/18/13	372	0.013 +- 0.003
03/28/13	406	0.008 +- 0.002	09/25/13	391	0.013 +- 0.003
1st Qtr			3rd Qtr		
mean +- s.d.		0.024+- 0.013	mean +- s.d.		0.017 +- 0.007
04/03/13	365	0.015 +- 0.003	10/02/13	430	0.019 +- 0.003
04/10/13	419	0.017 +- 0.003	10/09/13	423	0.014 +- 0.003
04/17/13	400	0.009 +- 0.003	10/16/13	423	0.020 +- 0.003
04/24/13	406	0.017 +- 0.003	10/23/13	426	0.013 +- 0.003
05/01/13	409	0.028 +- 0.003	10/31/13	430	0.012 +- 0.003
05/08/13	413	0.012 +- 0.003	11/06/13	395	0.021 +- 0.003
05/15/13	431	0.015 +- 0.003	11/13/13	426	0.017 +- 0.003
05/22/13	413	0.014 +- 0.003	11/20/13	339	0.027 +- 0.004
05/29/13	406	0.011 +- 0.003	11/27/13	423	0.019 +- 0.003
06/06/13	479	0.012 +- 0.002	12/04/13	402	0.029 +- 0.003
06/12/13	334	0.016 +- 0.003	12/10/13	339	0.036 +- 0.004
06/19/13	403	0.015 +- 0.003	12/18/13	464	0.030 +- 0.003
06/26/13	397	0.015 +- 0.003	12/26/13	464	0.029 +- 0.003
2nd Qtr			4th Qtr		
mean +- s.d.		0.015+- 0.005	mean +- s.d.		0.022 +- 0.008

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

Measurements in units of pCi/m³

Site: PBK-8

Collection date	Volume m ³	Air particulate	Collection date	Volume m ³	Air particulate
01/08/13	650	0.047 +- 0.003	07/09/13	533	0.017 +- 0.002
01/15/13	565	0.030 +- 0.003	07/16/13	533	0.013 +- 0.002
01/22/13	587	0.028 +- 0.002	07/23/13	539	0.015 +- 0.002
01/29/13	587	0.018 +- 0.002	07/30/13	539	0.006 +- 0.002
02/05/13	587	0.033 +- 0.003	08/06/13	536	0.012 +- 0.002
02/12/13	565	0.025 +- 0.002	08/13/13	514	0.013 +- 0.002
02/19/13	577	0.021 +- 0.002	08/20/13	530	0.020 +- 0.002
02/26/13	549	0.010 +- 0.002	08/27/13	546	0.026 +- 0.003
03/05/13	571	0.016 +- 0.002	09/03/13	533	0.022 +- 0.003
03/12/13	574	0.010 +- 0.002	09/10/13	530	0.022 +- 0.003
03/20/13	653	0.022 +- 0.002	09/17/13	533	0.015 +- 0.002
03/25/13	504	0.010 +- 0.002	09/24/13	539	0.014 +- 0.002
04/02/13	590	0.012 +- 0.002	10/01/13	520	0.017 +- 0.002
1st Qtr			3rd Qtr		
mean +- s.d.		0.022 +- 0.011	mean +- s.d.		0.016 +- 0.005
04/09/13	574	0.016 +- 0.002	10/08/13	527	0.013 +- 0.002
04/16/13	561	0.010 +- 0.002	10/15/13	523	0.021 +- 0.003
04/23/13	555	0.015 +- 0.002	10/22/13	527	0.015 +- 0.002
04/30/13	565	0.023 +- 0.002	10/29/13	527	0.009 +- 0.002
05/06/13	479	0.015 +- 0.002	11/05/13	539	0.018 +- 0.002
05/14/13	657	0.013 +- 0.002	11/12/13	504	0.022 +- 0.003
05/21/13	546	0.015 +- 0.002	11/19/13	495	0.024 +- 0.003
05/28/13	552	0.009 +- 0.002	11/26/13	498	0.019 +- 0.003
06/04/13	552	0.008 +- 0.002	12/03/13	533	0.027 +- 0.003
06/11/13	549	0.016 +- 0.002	12/10/13	484	0.032 +- 0.003
06/18/13	565	0.012 +- 0.002	12/17/13	517	0.034 +- 0.003
06/25/13	542	0.015 +- 0.002	12/24/13	488	0.021 +- 0.003
07/02/13	549	0.010 +- 0.002	12/31/13	501	0.041 +- 0.003
2nd Qtr			4th Qtr		
mean +- s.d.		0.014 +- 0.004	mean +- s.d.		0.023 +- 0.009

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

Measurements in units of pCi/m ³							
Site: PBK-17							
Collection date	Volume m ³	Air particulate	Air iodine	Collection date	Volume m ³	Air particulate	Air iodine
01/04/13	550	0.046 +- 0.003	< 0.010	07/05/13	512	0.011 +- 0.002	< 0.012
01/11/13	569	0.034 +- 0.003	< 0.017	07/12/13	515	0.015 +- 0.002	< 0.035
01/17/13	480	0.026 +- 0.003	< 0.010	07/18/13	436	0.016 +- 0.003	< 0.015
01/24/13	567	0.022 +- 0.002	< 0.019	07/26/13	598	0.011 +- 0.002	< 0.010
02/01/13	654	0.019 +- 0.002	< 0.010	08/02/13	516	0.008 +- 0.002	< 0.009
02/08/13	568	0.029 +- 0.003	< 0.009	08/16/13	519	0.012 +- 0.002	< 0.030
02/15/13	571	0.018 +- 0.002	< 0.009	08/23/13	515	0.027 +- 0.003	< 0.028
02/21/13	485	0.013 +- 0.002	< 0.012	08/30/13	515	0.022 +- 0.003	< 0.011
03/01/13	644	0.008 +- 0.002	< 0.015	09/05/13	455	0.013 +- 0.002	< 0.012
03/07/13	496	0.015 +- 0.002	< 0.016	09/12/13	513	0.026 +- 0.003	< 0.013
03/15/13	623	0.014 +- 0.002	< 0.011	09/20/13	605	0.016 +- 0.002	< 0.011
03/22/13	548	0.019 +- 0.002	< 0.021	09/27/13	531	0.010 +- 0.002	< 0.008
03/28/13	471	0.005 +- 0.002	< 0.012	10/04/13	530	0.017 +- 0.002	< 0.028
1st Qtr				3rd Qtr			
mean +- s.d.		0.022 +- 0.011	< 0.013	mean +- s.d.		0.016 +- 0.006	< 0.017
04/05/13	649	0.016 +- 0.002	< 0.013	10/11/13	538	0.015 +- 0.002	< 0.013
04/12/13	533	0.012 +- 0.002	< 0.013	10/18/13	536	0.018 +- 0.002	< 0.023
04/19/13	547	0.006 +- 0.002	< 0.009	10/25/13	552	0.008 +- 0.002	< 0.012
04/26/13	541	0.019 +- 0.002	< 0.019	11/01/13	550	0.010 +- 0.002	< 0.029
05/03/13	550	0.020 +- 0.002	< 0.012	11/08/13	553	0.017 +- 0.002	< 0.034
05/10/13	539	0.012 +- 0.002	< 0.019	11/15/13	559	0.020 +- 0.002	< 0.017
05/17/13	543	0.011 +- 0.002	< 0.011	11/22/13	553	0.021 +- 0.002	< 0.011
05/24/13	544	0.011 +- 0.002	< 0.023	11/27/13	403	0.015 +- 0.003	< 0.043
05/31/13	533	0.010 +- 0.002	< 0.013	12/06/13	718	0.026 +- 0.002	< 0.015
06/07/13	527	0.010 +- 0.002	< 0.010	12/13/13	568	0.032 +- 0.003	< 0.019
06/14/13	525	0.016 +- 0.002	< 0.010	12/20/13	566	0.024 +- 0.002	< 0.008
06/20/13	447	0.009 +- 0.002	< 0.013	12/27/13	568	0.026 +- 0.003	< 0.020
06/28/13 *a	74						
2nd Qtr				4th Qtr			
mean +- s.d.		0.013 +- 0.004	< 0.014	mean +- s.d.		0.020 +- 0.007	< 0.020

*a - The air site was not operational for the indicated sampling period.

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

Measurements in units of pCi/m³

Site: PBK-18

Collection date	Volume m ³	Air particulate	Air iodine	Collection date	Volume m ³	Air particulate	Air iodine
01/09/13	839	0.047 +- 0.002	< 0.008	07/10/13	779	0.015 +- 0.002	< 0.010
01/15/13	552	0.022 +- 0.002	< 0.009	07/15/13	446	0.011 +- 0.002	< 0.025
01/21/13	568	0.026 +- 0.002	< 0.009	07/22/13	602	0.017 +- 0.002	< 0.007
01/28/13	650	0.022 +- 0.002	< 0.014	07/29/13	620	0.007 +- 0.002	< 0.008
02/04/13	657	0.028 +- 0.002	< 0.023	08/05/13	613	0.010 +- 0.002	< 0.008
02/13/13	826	0.022 +- 0.002	< 0.006	08/14/13	792	0.012 +- 0.002	< 0.013
02/18/13	478	0.019 +- 0.002	< 0.013	08/19/13	446	0.020 +- 0.003	< 0.014
02/25/13	645	0.010 +- 0.002	< 0.012	08/27/13	687	0.025 +- 0.002	< 0.009
03/04/13	656	0.014 +- 0.002	< 0.009	09/03/13	616	0.020 +- 0.002	< 0.007
03/13/13	817	0.011 +- 0.001	< 0.010	09/11/13	705	0.021 +- 0.002	< 0.007
03/18/13	467	0.020 +- 0.003	< 0.021	09/16/13	452	0.011 +- 0.002	< 0.023
03/25/13	646	0.013 +- 0.002	< 0.015	09/23/13	617	0.015 +- 0.002	< 0.012
04/01/13	639	0.010 +- 0.002	< 0.009	09/30/13	613	0.027 +- 0.002	< 0.008
1st Qtr				3rd Qtr			
mean +- s.d.		0.020 +- 0.010	< 0.012	mean +- s.d.		0.016 +- 0.006	< 0.012
04/10/13	824	0.017 +- 0.002	< 0.006	10/09/13	797	0.014 +- 0.002	< 0.011
04/15/13	466	0.007 +- 0.002	< 0.017	10/14/13	448	0.017 +- 0.003	< 0.013
04/22/13	666	0.012 +- 0.002	< 0.016	10/21/13	614	0.014 +- 0.002	< 0.008
04/29/13	618	0.023 +- 0.002	< 0.018	10/28/13	653	0.009 +- 0.002	< 0.008
05/06/13	655	0.012 +- 0.002	< 0.008	11/04/13	611	0.015 +- 0.002	< 0.016
05/15/13	805	0.014 +- 0.002	< 0.006	11/13/13	829	0.021 +- 0.002	< 0.010
05/21/13	534	0.011 +- 0.002	< 0.011	11/18/13	428	0.023 +- 0.003	< 0.021
05/29/13	715	0.009 +- 0.002	< 0.007	11/25/13	640	0.016 +- 0.002	< 0.008
06/03/13	457	0.010 +- 0.002	< 0.011	12/02/13	646	0.025 +- 0.002	< 0.013
06/12/13	809	0.015 +- 0.002	< 0.024	12/11/13	823	0.032 +- 0.002	< 0.008
06/17/13	434	0.016 +- 0.003	< 0.020	12/16/13	465	0.027 +- 0.003	< 0.016
06/24/13	617	0.014 +- 0.002	< 0.010	12/23/13	638	0.021 +- 0.002	< 0.013
07/01/13	632	0.012 +- 0.002	< 0.016	12/30/13	638	0.031 +- 0.003	< 0.012
2nd Qtr				4th Qtr			
mean +- s.d.		0.013 +- 0.004	< 0.013	mean +- s.d.		0.020 +- 0.007	< 0.012

Table 6. WI 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	3 rd quarter	4th quarter
Be-7	0.056 +- 0.007	0.065 +- 0.007	0.060 +- 0.001	0.047 +- 0.005
Mn-54	< 0.0005	< 0.0004	< 0.0040	< 0.0040
Co-58	< 0.0005	< 0.0003	< 0.0050	< 0.0005
Fe-59	< 0.0008	< 0.0007	< 0.0010	< 0.0009
Co-60	< 0.0006	< 0.0004	< 0.0006	< 0.0006
Zn-65	< 0.0008	< 0.0007	< 0.0010	< 0.0009
Nb-95	< 0.0006	< 0.0002	< 0.0006	< 0.0006
Zr-95	< 0.0008	< 0.0005	< 0.0007	< 0.0008
Ru-103	< 0.0005	< 0.0003	< 0.0005	< 0.0005
Ru-106	< 0.0039	< 0.0025	< 0.0037	< 0.0034
I-131	< 0.0015	< 0.0008	< 0.0016	< 0.0018
Cs-134	< 0.0005	< 0.0003	< 0.0004	< 0.0004
Cs-137	< 0.0005	< 0.0003	< 0.0006	< 0.0006
Ba-140	< 0.0028	< 0.0020	< 0.0004	< 0.0036
La-140	< 0.0010	< 0.0006	< 0.0014	< 0.0011
Ce-141	< 0.0009	< 0.0005	< 0.0009	< 0.0008
Ce-144	< 0.0027	< 0.0016	< 0.0028	< 0.0025
Site: PBK-4				
Be-7	0.063 +- 0.008	0.061 +- 0.006	0.063 +- 0.005	0.038 +- 0.005
Mn-54	< 0.0004	< 0.0003	< 0.0003	< 0.0003
Co-58	< 0.0005	< 0.0003	< 0.0003	< 0.0003
Fe-59	< 0.0011	< 0.0005	< 0.0009	< 0.0005
Co-60	< 0.0007	< 0.0003	< 0.0006	< 0.0003
Zn-65	< 0.0010	< 0.0005	< 0.0008	< 0.0006
Nb-95	< 0.0007	< 0.0003	< 0.0005	< 0.0003
Zr-95	< 0.0009	< 0.0004	< 0.0008	< 0.0005
Ru-103	< 0.0006	< 0.0003	< 0.0004	< 0.0003
Ru-106	< 0.0040	< 0.0020	< 0.0036	< 0.0024
I-131	< 0.0019	< 0.0008	< 0.0011	< 0.0009
Cs-134	< 0.0004	< 0.0003	< 0.0004	< 0.0004
Cs-137	< 0.0006	< 0.0003	< 0.0005	< 0.0002
Ba-140	< 0.0040	< 0.0017	< 0.0025	< 0.0017
La-140	< 0.0015	< 0.0007	< 0.0010	< 0.0007
Ce-141	< 0.0009	< 0.0004	< 0.0007	< 0.0004
Ce-144	< 0.0029	< 0.0013	< 0.0024	< 0.0012
Site: PBK-7				
Be-7	0.066 +- 0.008	0.075 +- 0.008	0.064 +- 0.008	0.044 +- 0.006
Mn-54	< 0.0005	< 0.0004	< 0.0004	< 0.0004
Co-58	< 0.0006	< 0.0004	< 0.0005	< 0.0005
Fe-59	< 0.0009	< 0.0008	< 0.0008	< 0.0009
Co-60	< 0.0007	< 0.0004	< 0.0007	< 0.0006
Zn-65	< 0.0009	< 0.0008	< 0.0008	< 0.0009
Nb-95	< 0.0007	< 0.0005	< 0.0006	< 0.0005
Zr-95	< 0.0009	< 0.0008	< 0.0009	< 0.0009
Ru-103	< 0.0006	< 0.0004	< 0.0005	< 0.0003
Ru-106	< 0.0045	< 0.0030	< 0.0040	< 0.0037
I-131	< 0.0017	< 0.0012	< 0.0020	< 0.0019
Cs-134	< 0.0005	< 0.0004	< 0.0005	< 0.0004
Cs-137	< 0.0007	< 0.0004	< 0.0006	< 0.0006
Ba-140	< 0.0036	< 0.0018	< 0.0034	< 0.0036
La-140	< 0.0013	< 0.0012	< 0.0011	< 0.0016
Ce-141	< 0.0010	< 0.0006	< 0.0010	< 0.0009
Ce-144	< 0.0033	< 0.0018	< 0.0029	< 0.0026

Radioisotopes other than those reported were not detected.

Table 6. WI DHS gamma isotopic analysis results from the quarterly composites of air particulate filters collected from the Point Beach – Kewaunee environmental monitoring program, continued.

Measurements in units of pCi/m ³				
Site: PBK-8	1st quarter	2nd quarter	3 rd quarter	4th quarter
Be-7	0.066 +- 0.008	0.061 +- 0.006	0.060 +- 0.008	0.037 +- 0.004
Mn-54	< 0.0004	< 0.0003	< 0.0004	< 0.0003
Co-58	< 0.0004	< 0.0003	< 0.0004	< 0.0003
Fe-59	< 0.0011	< 0.0005	< 0.0008	< 0.0008
Co-60	< 0.0006	< 0.0004	< 0.0007	< 0.0003
Zn-65	< 0.0009	< 0.0006	< 0.0008	< 0.0005
Nb-95	< 0.0006	< 0.0002	< 0.0007	< 0.0003
Zr-95	< 0.0008	< 0.0005	< 0.0009	< 0.0005
Ru-103	< 0.0005	< 0.0003	< 0.0005	< 0.0003
Ru-106	< 0.0036	< 0.0023	< 0.0035	< 0.0026
I-131	< 0.0019	< 0.0008	< 0.0018	< 0.0008
Cs-134	< 0.0005	< 0.0003	< 0.0005	< 0.0004
Cs-137	< 0.0006	< 0.0003	< 0.0006	< 0.0004
Ba-140	< 0.0034	< 0.0017	< 0.0036	< 0.0018
La-140	< 0.0015	< 0.0008	< 0.0013	< 0.0006
Ce-141	< 0.0009	< 0.0004	< 0.0009	< 0.0004
Ce-144	< 0.0027	< 0.0013	< 0.0028	< 0.0012
Site: PBK-17				
Be-7	0.046 +- 0.006	0.053 +- 0.007	0.065 +- 0.009	0.046 +- 0.007
Mn-54	< 0.0003	< 0.0004	< 0.0005	< 0.0004
Co-58	< 0.0002	< 0.0004	< 0.0005	< 0.0005
Fe-59	< 0.0007	< 0.0006	< 0.0010	< 0.0009
Co-60	< 0.0003	< 0.0005	< 0.0008	< 0.0006
Zn-65	< 0.0006	< 0.0009	< 0.0009	< 0.0008
Nb-95	< 0.0004	< 0.0004	< 0.0006	< 0.0006
Zr-95	< 0.0005	< 0.0006	< 0.0009	< 0.0008
Ru-103	< 0.0003	< 0.0004	< 0.0006	< 0.0005
Ru-106	< 0.0023	< 0.0027	< 0.0040	< 0.0035
I-131	< 0.0012	< 0.0009	< 0.0016	< 0.0020
Cs-134	< 0.0003	< 0.0004	< 0.0006	< 0.0004
Cs-137	< 0.0002	< 0.0003	< 0.0007	< 0.0005
Ba-140	< 0.0025	< 0.0022	< 0.0029	< 0.0040
La-140	< 0.0010	< 0.0008	< 0.0014	< 0.0014
Ce-141	< 0.0004	< 0.0005	< 0.0010	< 0.0009
Ce-144	< 0.0014	< 0.0019	< 0.0032	< 0.0025
Site: PBK-18				
Be-7	0.056 +- 0.007	0.059 +- 0.006	0.053 +- 0.002	0.041 +- 0.006
Mn-54	< 0.0003	< 0.0002	< 0.0003	< 0.0004
Co-58	< 0.0004	< 0.0003	< 0.0002	< 0.0004
Fe-59	< 0.0003	< 0.0007	< 0.0006	< 0.0007
Co-60	< 0.0004	< 0.0004	< 0.0003	< 0.0005
Zn-65	< 0.0007	< 0.0005	< 0.0006	< 0.0007
Nb-95	< 0.0004	< 0.0003	< 0.0002	< 0.0005
Zr-95	< 0.0006	< 0.0004	< 0.0003	< 0.0008
Ru-103	< 0.0003	< 0.0003	< 0.0003	< 0.0005
Ru-106	< 0.0023	< 0.0024	< 0.0021	< 0.0032
I-131	< 0.0012	< 0.0009	< 0.0007	< 0.0015
Cs-134	< 0.0002	< 0.0003	< 0.0003	< 0.0005
Cs-137	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Ba-140	< 0.0025	< 0.0021	< 0.0016	< 0.0028
La-140	< 0.0013	< 0.0007	< 0.0007	< 0.0011
Ce-141	< 0.0005	< 0.0004	< 0.0003	< 0.0008
Ce-144	< 0.0011	< 0.0013	< 0.0012	< 0.0024

Radioisotopes other than those reported were not detected.

Table 7. WI DHS TLD network for the Point Beach – Kewaunee environmental monitoring program.

Date Placed:	01/04/13	04/02/13	07/02/13	10/01/13
Date Removed:	04/02/13	07/02/13	10/01/13	01/08/14
Days in the Field:	88	91	91	99

Individual quarterly date is reported as: mR / Standard Quarter + 2 sigma counting error.

TLD sites located at the Point Beach ISFSI.

1	31.3 +- 1.1	32.1 +- 2.2	30.7 +- 2.2	31.7 +- 2.8
2	61.6 +- 4.1	55.7 +- 4.1	58.5 +- 4.2	58.5 +- 3.7
3	25.4 +- 1.7	25.9 +- 1.3	25.7 +- 1.5	28.1 +- 2.0
4	21.5 +- 1.4	19.8 +- 0.5	21.9 +- 1.8	21.0 +- 1.0
5	21.0 +- 0.8	16.0 +- 0.9	21.9 +- 0.9	17.6 +- 1.2
6	38.5 +- 0.8	37.7 +- 1.5	39.6 +- 1.6	38.5 +- 2.2
7	45.7 +- 2.5	54.7 +- 2.8	53.5 +- 3.2	55.4 +- 2.5
8	27.6 +- 1.3	26.4 +- 1.9	27.9 +- 1.4	27.5 +- 1.6
Quarterly average +- s.d.	34.1 +- 14.0	33.5 +- 14.9	35.0 +- 14.2	34.8 +- 15.1

TLD sites, excluding sites 1-8, that are located 0 – 2 miles from either the Point Beach or the Kewaunee facility.

9	14.1 +- 0.8	13.5 +- 0.8	16.5 +- 1.2	14.1 +- 1.0
10	12.1 +- 0.6	13.8 +- 0.9	13.9 +- 1.0	14.7 +- 1.0
11	12.7 +- 0.5	12.5 +- 0.7	13.3 +- 0.9	13.6 +- 1.1
12	13.4 +- 0.8	14.0 +- 1.1	16.2 +- 1.1	15.1 +- 1.2
13	12.3 +- 0.9	14.1 +- 0.6	15.4 +- 1.3	14.2 +- 1.1
14	16.2 +- 0.8	17.3 +- 0.8	18.4 +- 0.9	17.1 +- 1.3
19	15.3 +- 0.8	16.1 +- 1.3	17.8 +- 1.0	15.8 +- 1.6
20	12.8 +- 0.7	14.2 +- 0.9	15.5 +- 1.2	14.2 +- 0.9
21	11.2 +- 0.6	15.0 +- 1.0	14.7 +- 1.0	14.9 +- 1.1
22	15.8 +- 1.3	16.5 +- 0.6	18.6 +- 1.2	18.5 +- 1.1
Quarterly average +- s.d.	13.6 +- 1.7	14.7 +- 1.5	16.0 +- 1.8	15.2 +- 1.5

TLD sites that are located 2 – 5 miles from either the Point Beach or the Kewaunee facility.

15	12.1 +- 0.8	13.6 +- 0.8	15.1 +- 1.0	14.2 +- 1.0
16	11.4 +- 1.0	13.0 +- 0.9	12.3 +- 1.3	12.2 +- 0.9
17	12.9 +- 0.6	15.5 +- 0.8	15.3 +- 1.0	14.6 +- 1.1
18	14.0 +- 0.5	17.6 +- 1.3	18.0 +- 0.8	17.7 +- 1.4
23	13.8 +- 0.6	12.9 +- 0.8	17.2 +- 1.1	12.9 +- 0.9
24	11.5 +- 0.8	12.6 +- 0.5	10.4 +- 1.1	12.4 +- 0.9
25	13.5 +- 0.7	16.1 +- 1.1	14.8 +- 0.8	15.5 +- 1.1
26	13.7 +- 0.5	13.1 +- 1.1	15.7 +- 0.8	12.3 +- 1.2
Quarterly average +- s.d.	12.9 +- 1.1	14.3 +- 1.9	14.9 +- 2.5	14.0 +- 1.9

TLD sites that are located greater than 5 miles from either the Point Beach or the Kewaunee facility.

27	9.8 +- 0.6	9.9 +- 0.9	11.0 +- 0.8	10.8 +- 1.1
28	11.9 +- 0.9	12.9 +- 1.4	14.1 +- 1.0	12.6 +- 1.1
29	11.1 +- 0.4	12.1 +- 0.9	12.6 +- 0.7	11.5 +- 0.9
30	13.1 +- 0.4	14.0 +- 1.3	ND	13.7 +- 1.4
31	11.6 +- 1.1	9.9 +- 0.8	13.1 +- 1.0	10.0 +- 0.8
Quarterly average +- s.d.	11.5 +- 1.2	11.8 +- 1.8	12.7 +- 1.3	11.7 +- 1.5

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

Table 8. WI 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
01/23/13	0.36	0.11 +- 0.02	< 2
02/20/13	3.95	0.21 +- 0.07	< 26
03/21/13	3.62	0.53 +- 0.07	< 23
04/17/13	3.32	0.21 +- 0.05	< 18
05/22/13	2.63	0.17 +- 0.04	< 14
06/19/13	2.01	0.17 +- 0.03	< 11
07/31/13	4.36	0.22 +- 0.09	< 24
08/21/13	0.71	0.07 +- 0.02	< 4
09/18/13	1.72	0.12 +- 0.04	< 9
10/23/13	4.39	< 0.13	< 24
11/20/13	6.57	0.58 +- 0.20	< 36
12/18/13	0.68	0.17 +- 0.02	< 4

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

Measurements in units of pCi/kilogram (wet)

Collection date:	03/13/13	02/14/13	04/25/13	06/18/13	06/10/13	06/16/13
Type	lake trout	burbot	drum	brown trout	burbot	rainbow trout
gamma isotopic						
K-40	2730 +- 476	2150 +- 376	2610 +- 501	3190 +- 547	2490 +- 417	2540 +- 430
Mn-54	< 9	< 8	< 12	< 9	< 5	< 6
Co-58	< 8	< 9	< 13	< 10	< 6	< 8
Fe-59	< 16	< 23	< 37	< 25	< 14	< 22
Co-60	< 13	< 11	< 11	< 14	< 6	< 6
Zn-65	< 15	< 16	< 26	< 21	< 12	< 14
Nb-95	< 9	< 12	< 13	< 14	< 6	< 13
Zr-95	< 14	< 17	< 23	< 19	< 9	< 13
Cs-134	< 8	< 7	< 8	< 9	< 4	< 5
Cs-137	30 +- 10	71 +- 11	< 15	35 +- 7	31 +- 5	27 +- 5
Collection date:	07/12/13	09/27/13	10/11/13	10/18/13		
Type	catfish	sucker & burbot	lake trout	brown and rainbow trout		
gamma isotopic						
K-40	2370 +- 480	2500 +- 500	460 +- 160	2910 +- 550		
Mn-54	< 13	< 10	< 11	< 10		
Co-58	< 12	< 12	< 13	< 14		
Fe-59	< 40	< 32	< 21	< 34		
Co-60	< 14	< 12	< 8	< 12		
Zn-65	< 29	< 21	< 21	< 33		
Nb-95	< 12	< 14	< 13	< 15		
Zr-95	< 24	< 18	< 14	< 23		
Cs-134	< 10	< 9	< 9	< 10		
Cs-137	35 +- 10	< 14	< 11	28 +- 8		

Radioisotopes other than those reported were not detected.

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

Measurements in units of pCi/kilogram (dry)

Collection date:	09/18/13	09/17/13	09/18/13
Site:	PBK-5	PBK-10a	PBK-29
gross alpha	< 4100	< 4100	< 4100
gross beta	4500 +- 1100	4800 +- 1100	4500 +- 1100
K-40	5700 +- 1000	6400 +- 1100	7100 +- 1200
Mn-54	< 11	< 12	< 13
Co-58	< 11	< 13	< 10
Fe-59	< 27	< 33	< 31
Co-60	< 12	< 15	< 16
Zn-65	< 26	< 29	< 32
Nb-95	< 10	< 15	< 13
Zr-95	< 15	< 21	< 23
Cs-134	< 8	< 11	< 10
Cs-137	< 12	< 14	< 16

Collection date:	09/17/13	09/17/13	09/17/13	09/18/13
Site:	PBK-12a	PBK-12b	PBK-12c	PBK-26
gross alpha	< 4300	< 3700	< 4300	< 3900
gross beta	4400 +- 1200	4100 +- 1100	5800 +- 1100	6600 +- 1300
K-40	6600 +- 1200	5700 +- 1000	7600 +- 1300	6800 +- 1200
Mn-54	< 11	< 10	< 10	< 10
Co-58	< 10	< 9	< 11	< 9
Fe-59	< 26	< 26	< 28	< 27
Co-60	< 12	< 13	< 11	< 11
Zn-65	< 24	< 27	< 29	< 26
Nb-95	< 11	< 11	< 12	< 10
Zr-95	< 17	< 15	< 16	< 14
Cs-134	< 8	< 8	< 9	< 8
Cs-137	< 14	22 +- 7	19 +- 6	24 +- 7

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

Radioisotopes other than those reported were not detected.

Table 11. WI 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:	01/17/13	02/14/13	03/13/13	04/09/13	05/16/13	06/13/13
gross alpha-sol	< 1.7	< 1.1	< 0.7	1.1 +- 0.7	1.6 +- 0.8	< 1.1
gross beta-sol	3.1 +- 1.2	< 1.4	2.0 +- 0.7	2.2 +- 0.7	3.0 +- 0.8	1.8 +- 0.9
gross alpha-insol	1.3 +- 1.0	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5
gross beta-insol	3.0 +- 1.7	< 1.0	< 1.0	< 1.1	< 1.1	< 0.9
I-131			< 0.1		< 0.2	< 0.3
H-3 *a			< 256			< 210
Sr-89 *a			< 1.1			< 0.6
Sr-90 *a			< 0.3			0.3 +- 0.1
gamma isotopic						
Mn-54	< 8	< 8	< 10	< 9	< 6	< 5
Co-58	< 9	< 7	< 9	< 8	< 8	< 5
Fe-59	< 15	< 12	< 15	< 14	< 15	< 11
Co-60	< 14	< 10	< 13	< 13	< 8	< 6
Zn-65	< 15	< 14	< 20	< 17	< 19	< 13
Nb-95	< 9	< 6	< 9	< 8	< 7	< 8
Zr-95	< 15	< 13	< 20	< 15	< 12	< 9
I-131	< 15	< 10	< 15	< 12	< 6	< 8
Cs-134	< 9	< 8	< 11	< 9	< 7	< 6
Cs-137	< 12	< 9	< 13	< 11	< 6	< 6
Ba-140	< 36	< 28	< 41	< 36	< 28	< 26
La-140	< 11	< 7	< 14	< 14	< 6	< 11
Collection date:	07/17/13	08/15/13	09/12/13	10/16/13	11/14/13	12/05/13
gross alpha-sol	1.4 +- 1.0	< 1.0	< 1.0	< 1.1	< 1.0	< 0.8
gross beta-sol	1.7 +- 0.8	< 1.0	1.9 +- 0.8	< 1.4	2.4 +- 1.0	1.8 +- 0.6
gross alpha-insol	< 0.7	< 0.7	< 0.8	< 0.6	1.5 +- 0.8	< 0.6
gross beta-insol	< 1.2	< 1.0	< 1.1	< 1.3	< 1.2	< 1.1
I-131	< 0.3					
H-3 *a			290 +- 140			< 220
Sr-89 *a			< 0.7			< 0.7
Sr-90 *a			0.4 +- 0.2			< 0.3
gamma isotopic						
Mn-54	< 8	< 9	< 9	< 8	< 9	< 9
Co-58	< 7	< 10	< 8	< 6	< 6	< 11
Fe-59	< 15	< 21	< 13	< 13	< 12	< 17
Co-60	< 2	< 13	< 9	< 5	< 7	< 7
Zn-65	< 17	< 21	< 19	< 17	< 12	< 25
Nb-95	< 7	< 9	< 10	< 7	< 6	< 8
Zr-95	< 15	< 21	< 13	< 13	< 11	< 16
I-131	< 8	< 13	< 11	< 10	< 7	< 9
Cs-134	< 10	< 8	< 10	< 7	< 7	< 10
Cs-137	< 6	< 15	< 8	< 6	< 6	< 11
Ba-140	< 30	< 42	< 37	< 27	< 24	< 42
La-140	< 14	< 10	< 9	< 13	< 9	< 4

*a - Analysis is performed on a quarterly composite.

Radioisotopes other than those reported were not detected.

Table 11. WI DHS analysis results for surface water samples collected for the Point Beach – Kewaunee environmental monitoring program, continued.

Measurements in units of pCi/liter

PBK-12a; Kewaunee effluent channel

Collection date:	01/02/13	02/04/13	03/04/13	04/01/13	05/01/13	06/03/13
gross alpha-sol	< 1.6	< 0.9	< 0.7	1.7 +- 1.0	2.2 +- 0.9	1.5 +- 0.9
gross beta-sol	1.9 +- 1.8	1.0 +- 1.4	1.6 +- 0.7	2.1 +- 0.9	3.4 +- 0.8	2.6 +- 0.8
gross alpha-insol	< 1.1	< 0.6	-0.1 +- 0.3	< 0.5	< 0.6	< 0.6
gross beta-insol	< 2.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.1
I-131			< 0.3		< 0.5	< 0.5
H-3 *			273 +- 159			1500 +- 152
Sr-89 *			< 1.6			< 1.0
Sr-90 *			< 0.3			< 0.3
gamma isotopic						
Mn-54	< 9	< 8	< 6	< 8	< 8	< 6
Co-58	< 8	< 7	< 6	< 7	< 8	< 5
Fe-59	< 14	< 16	< 10	< 16	< 13	< 9
Co-60	< 11	< 10	< 7	< 6	< 13	< 7
Zn-65	< 15	< 20	< 17	< 22	< 15	< 14
Nb-95	< 9	< 7	< 6	< 7	< 9	< 6
Zr-95	< 14	< 11	< 10	< 11	< 13	< 9
I-131	< 14	< 10	< 7	< 9	< 14	< 8
Cs-134	< 8	< 7	< 7	< 8	< 8	< 5
Cs-137	< 11	< 7	< 7	< 7	< 11	< 7
Ba-140	< 34	< 33	< 31	< 28	< 41	< 18
La-140	< 13	< 14	< 11	< 12	< 15	< 7
Collection date:	07/01/13	08/01/13	09/03/13	10/01/13	11/05/13	12/02/13
gross alpha-sol	< 1.0	< 1.1	1.2 +- 1.0	< 1.2	1.1 +- 0.8	< 1.0
gross beta-sol	< 1.0	1.9 +- 1.2	1.2 +- 0.8	3.5 +- 1.0	1.4 +- 0.8	1.5 +- 0.7
gross alpha-insol	< 1.0	< 0.8	< 0.7	1.6 +- 0.8	< 0.6	< 1.0
gross beta-insol	< 1.5	< 1.1	< 1.3	1.7 +- 0.8	< 1.0	< 1.1
I-131	< 0.9		< 0.3			
H-3 *			520 +- 140			350 +- 140
Sr-89 *			< 1.7			< 1.2
Sr-90 *			< 0.3			< 0.4
gamma isotopic						
Mn-54	< 9	< 10	< 8	< 8	< 9	< 7
Co-58	< 9	< 8	< 9	< 9	< 9	< 10
Fe-59	< 14	< 10	< 15	< 12	< 15	< 16
Co-60	< 8	< 9	< 9	< 10	< 9	< 11
Zn-65	< 20	< 17	< 17	< 17	< 22	< 22
Nb-95	< 8	< 8	< 6	< 6	< 11	< 11
Zr-95	< 12	< 13	< 13	< 11	< 14	< 20
I-131	< 10	< 10	< 12	< 8	< 13	< 14
Cs-134	< 8	< 8	< 8	< 8	< 9	< 11
Cs-137	< 7	< 8	< 8	< 7	< 6	< 10
Ba-140	< 34	< 36	< 33	< 28	< 42	< 28
La-140	< 10	< 12	< 14	< 12	< 12	< 13

* - Analysis is performed on a quarterly composite.

Radioisotopes other than those reported were not detected.

Table 11. WI DHS analysis results for surface water samples collected for the Point Beach – Kewaunee environmental monitoring program, continued.

Measurements in units of pCi/liter

PBK-17; Green Bay Water Utility - Rostok

Collection date:	01/07/13	02/04/13	03/04/13	04/01/13	05/06/13	06/03/13
gross alpha-sol	< 1.6	2.0 +- 1.2	< 0.7	< 0.9	1.6 +- 0.7	1.9 +- 1.2
gross beta-sol	2.6 +- 1.2	2.2 +- 0.9	1.5 +- 0.6	1.9 +- 0.8	2.7 +- 0.7	3.0 +- 1.0
gross alpha-insol	< 1.1	< 0.6	< 0.7	< 0.5	< 0.5	< 0.7
gross beta-insol	< 2.4	< 1.1	< 1.1	< 1.1	< 1.0	< 1.2
I-131			< 0.3		< 0.3	< 0.5
H-3 *			< 256			< 211
Sr-89 *			< 1.2			< 0.8
Sr-90 *			0.4 +- 0.2			< 0.2
gamma isotopic						
Mn-54	< 9	< 5	< 9	< 6	< 10	< 5
Co-58	< 9	< 6	< 8	< 7	< 9	< 6
Fe-59	< 19	< 15	< 14	< 15	< 18	< 10
Co-60	< 15	< 8	< 15	< 10	< 13	< 6
Zn-65	< 15	< 19	< 14	< 17	< 21	< 14
Nb-95	< 9	< 8	< 10	< 7	< 11	< 5
Zr-95	< 17	< 8	< 16	< 10	< 16	< 12
I-131	< 12	< 8	< 12	< 8	< 11	< 7
Cs-134	< 10	< 7	< 9	< 7	< 9	< 6
Cs-137	< 11	< 8	< 12	< 8	< 14	< 4
Ba-140	< 38	< 23	< 38	< 25	< 34	< 21
La-140	< 8	< 12	< 12	< 8	< 10	< 6
Collection date:	07/01/13	08/05/13	09/10/13	10/07/13	11/04/13	12/02/13
gross alpha-sol	1.3 +- 0.9	< 0.9	< 1.0	< 0.7	1.2 +- 0.8	< 1.0
gross beta-sol	2.0 +- 1.1	< 1.1	1.3 +- 0.8	< 1.0	1.8 +- 0.8	1.1 +- 0.9
gross alpha-insol	< 0.6	< 0.7	< 0.6	< 0.6	< 0.6	< 0.4
gross beta-insol	< 1.2	< 1.2	< 0.9	< 1.1	< 1.2	< 0.9
I-131						
H-3 *			< 220			< 220
Sr-89 *			< 1.0			< 1.0
Sr-90 *			0.5 +- 0.2			< 0.3
gamma isotopic						
Mn-54	< 9	< 9	< 9	< 9	< 10	< 9
Co-58	< 10	< 9	< 13	< 10	< 10	< 11
Fe-59	< 15	< 13	< 19	< 17	< 14	< 6
Co-60	< 11	< 8	< 12	< 12	< 11	< 12
Zn-65	< 19	< 17	< 29	< 22	< 14	< 19
Nb-95	< 9	< 9	< 10	< 10	< 8	< 8
Zr-95	< 16	< 14	< 19	< 15	< 11	< 11
I-131	< 11	< 9	< 11	< 9	< 9	< 11
Cs-134	< 10	< 9	< 8	< 9	< 10	< 7
Cs-137	< 13	< 7	< 6	< 11	< 10	< 8
Ba-140	< 39	< 34	< 37	< 33	< 31	< 36
La-140	< 11	< 10	< 11	< 14	< 15	< 4

* - Analysis is performed on a quarterly composite.

Radioisotopes other than those reported were not detected.

Table 11. WI DHS analysis results for surface water samples collected for the Point Beach – Kewaunee environmental monitoring program, continued.

Measurements in units of pCi/liter

	PBK-5	PBK-29	PBK-5	PBK-29
Collection date:	06/05/13	06/05/13	09/18/13	09/18/13
gross alpha-sol	1.7 +- 1.1	1.4 +- 1.0	1.9 +- 1.0	1.1 +- 0.8
gross beta-sol	1.3 +- 0.8	2.4 +- 1.0	2.1 +- 1.0	1.5 +- 0.7
gross alpha-insol	< 0.6	< 0.6	1.4 +- 0.8	< 1.0
gross beta-insol	< 1.2	< 1.1	2.6 +- 0.9	1.2 +- 0.8
H-3	< 210	< 210	< 210	< 210
Sr-89	< 0.3	< 0.4	< 0.3	< 0.4
Sr-90	0.3 +- 0.2	0.5 +- 0.2	< 0.3	< 0.4
gamma isotopic				
Mn-54	< 6	< 7	< 10	< 9
Co-58	< 6	< 6	< 8	< 9
Fe-59	< 14	< 11	< 17	< 26
Co-60	< 6	< 6	< 12	< 13
Zn-65	< 12	< 14	< 18	< 13
Nb-95	< 6	< 5	< 9	< 10
Zr-95	< 10	< 7	< 14	< 17
I-131	< 15	< 5	< 10	< 9
Cs-134	< 6	< 6	< 8	< 11
Cs-137	< 6	< 6	< 9	< 11
Ba-140	< 33	< 20	< 24	< 35
La-140	< 13	< 9	< 9	< 11

Radioisotopes other than those reported were not detected.

Table 12. WI 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:	06/04/13	04/09/13	06/04/13	06/04/13	NS
gross alpha	< 1.5	3.8 +- 1.9	3.7 +- 2.3	< 2.5	
gross beta	< 1.2	3.0 +- 1.7	3.0 +- 1.0	1.8 +- 1.2	
H-3	< 210	< 250	< 210	< 210	
	PBK-3	PBK-10	PBK-11	PBK-12d N	PBK-12d S
Collection date:	09/17/13	10/16/13	09/18/13	09/17/13	09/17/13
gross alpha	< 2.5	3.0 +- 1.8	< 2.2	2.8 +- 1.8	< 2.4
gross beta	< 4.6	< 2.1	< 4.3	1.5 +- 1.4	3.8 +- 1.2
H-3	< 210	< 220	< 210	< 210	< 210

NS – A sample was unable to be collected.

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

Measurements in units of pCi/liter

PBK-28; Strutz farm

Collection date:	01/09/13	02/13/13	03/13/13	04/10/13	05/15/13	06/12/13
I-131			< 0.3		< 0.3	< 0.4
Sr-90	< 0.3	< 0.4	< 0.3	0.6 +- 0.3	< 0.5	< 0.3
gamma isotopic						
K-40	1340 +- 220	1610 +- 320	1380 +- 290	1430 +- 300	1330 +- 260	1510 +- 290
Mn-54	< 2	< 9	< 10	< 10	< 7	< 8
Co-58	< 2	< 10	< 9	< 8	< 6	< 6
Fe-59	< 5	< 19	< 18	< 17	< 13	< 15
Co-60	< 2	< 13	< 14	< 13	< 7	< 9
Zn-65	< 4	< 17	< 20	< 20	< 13	< 17
Nb-95	< 3	< 9	< 10	< 9	< 7	< 7
Zr-95	< 4	< 15	< 16	< 17	< 10	< 11
I-131	< 15	< 11	< 15	< 11	< 7	< 9
Cs-134	< 2	< 10	< 9	< 10	< 6	< 6
Cs-137	< 2	< 12	< 12	< 13	< 6	< 6
Ba-140	< 23	< 32	< 43	< 31	< 24	< 30
La-140	< 7	< 12	< 12	< 11	< 6	< 10
Collection date:	07/10/13	08/14/13	09/11/13	10/09/13	11/13/13	12/11/13
I-131		< 0.3				
Sr-90	< 0.3	< 0.3	< 0.3	0.5 +- 0.3	0.4 +- 0.2	< 0.4
gamma isotopic						
K-40	1440 +- 310	1300 +- 300	1440 +- 340	1370 +- 270	1240 +- 310	1320 +- 300
Mn-54	< 7	< 10	< 11	< 11	< 11	< 8
Co-58	< 6	< 6	< 11	< 9	< 10	< 9
Fe-59	< 18	< 19	< 22	< 18	< 25	< 19
Co-60	< 5	< 14	< 10	< 14	< 13	< 12
Zn-65	< 23	< 20	< 20	< 22	< 38	< 27
Nb-95	< 9	< 10	< 13	< 10	< 10	< 11
Zr-95	< 14	< 15	< 18	< 15	< 16	< 15
I-131	< 7	< 8	< 11	< 11	< 8	< 13
Cs-134	< 9	< 9	< 10	< 11	< 8	< 7
Cs-137	< 8	< 10	< 11	< 13	< 6	< 8
Ba-140	< 33	< 33	< 25	< 38	< 32	< 33
La-140	< 11	< 14	< 14	< 13	< 11	< 13

Radioisotopes other than those reported were not detected.

Table 13. WI DHS analysis results for milk samples collected for the Point Beach – Kewaunee environmental monitoring Program, continued.

Measurements in units of pCi/liter

PBK-24; Struck farm

Collection date:	01/09/13	02/13/13	03/13/13	04/10/13	05/15/13	06/12/13
I-131			< 0.3		< 0.4	< 0.6
Sr-90	0.4 +- 0.2	0.5 +- 0.2	0.4 +- 0.2	< 0.3	0.3 +- 0.2	0.5 +- 0.2
gamma isotopic						
K-40	1320 +- 270	1460 +- 300	1510 +- 300	1530 +- 320	1520 +- 290	1310 +- 260
Mn-54	< 7	< 10	< 10	< 9	< 10	< 5
Co-58	< 7	< 9	< 9	< 8	< 8	< 7
Fe-59	< 14	< 18	< 18	< 17	< 18	< 13
Co-60	< 9	< 13	< 15	< 13	< 13	< 8
Zn-65	< 21	< 20	< 19	< 23	< 19	< 15
Nb-95	< 9	< 10	< 9	< 10	< 8	< 6
Zr-95	< 10	< 16	< 17	< 16	< 16	< 10
I-131	< 11	< 11	< 12	< 11	< 12	< 9
Cs-134	< 9	< 8	< 9	< 9	< 8	< 6
Cs-137	< 7	< 12	< 11	< 13	< 12	< 5
Ba-140	< 26	< 35	< 31	< 35	< 30	< 25
La-140	< 8	< 10	< 7	< 10	< 11	< 8
Collection date:	07/10/13	08/14/13	09/11/13	10/09/13	11/13/13	12/11/13
I-131						
Sr-90	< 0.4	0.6 +- 0.3	0.6 +- 0.3	< 0.4	0.7 +- 0.3	0.5 +- 0.3
gamma isotopic						
K-40	1290 +- 320	1530 +- 350	1330 +- 280	1310 +- 270	1280 +- 310	1290 +- 310
Mn-54	< 12	< 11	< 11	< 9	< 9	< 14
Co-58	< 9	< 11	< 13	< 10	< 12	< 12
Fe-59	< 21	< 19	< 19	< 18	< 21	< 28
Co-60	< 15	< 12	< 14	< 13	< 15	< 13
Zn-65	< 22	< 30	< 23	< 23	< 27	< 31
Nb-95	< 10	< 7	< 12	< 12	< 10	< 11
Zr-95	< 14	< 16	< 19	< 16	< 18	< 15
I-131	< 11	< 11	< 13	< 13	< 11	< 9
Cs-134	< 9	< 10	< 11	< 10	< 13	< 10
Cs-137	< 11	< 13	< 14	< 15	< 11	< 6
Ba-140	< 29	< 34	< 40	< 41	< 36	< 49
La-140	< 11	< 13	< 13	< 10	< 4	< 14

Radioisotopes other than those reported were not detected.

Table 13. WI DHS analysis results for milk samples collected for the Point Beach – Kewaunee environmental monitoring Program, continued.

Measurements in units of pCi/liter

PBK-27; R. Barta farm

Collection date:	01/09/13	02/13/13	03/13/13	04/10/13	05/15/13	06/12/13
I-131			< 0.8		< 0.2	< 0.7
Sr-90	< 0.4	< 0.4	0.4 +- 0.2	< 0.3	< 0.4	< 0.3
gamma isotopic						
K-40	1110 +- 260	1490 +- 290	1300 +- 280	1400 +- 280	1270 +- 250	1380 +- 270
Mn-54	< 9	< 5	< 10	< 5	< 6	< 7
Co-58	< 9	< 6	< 8	< 7	< 7	< 7
Fe-59	< 17	< 13	< 16	< 14	< 15	< 17
Co-60	< 13	< 8	< 13	< 8	< 8	< 8
Zn-65	< 22	< 18	< 18	< 16	< 15	< 15
Nb-95	< 10	< 6	< 9	< 6	< 6	< 7
Zr-95	< 16	< 11	< 16	< 11	< 12	< 9
I-131	< 15	< 7	< 11	< 7	< 7	< 10
Cs-134	< 10	< 6	< 8	< 7	< 5	< 6
Cs-137	< 12	< 7	< 12	< 7	< 7	< 6
Ba-140	< 45	< 21	< 37	< 20	< 19	< 27
La-140	< 14	< 8	< 9	< 7	< 7	< 7
Collection date:	07/10/13	08/14/13	09/11/13	10/09/13	11/13/13	12/11/13
I-131		< 0.4				
Sr-90	< 0.8	0.6 +- .3	0.7 +- .3	< 0.3	0.4 +- 0.2	< 0.5
gamma isotopic						
K-40	1310 +- 260	1410 +- 280	1240 +- 250	1260 +- 270	1310 +- 290	1430 +- 300
Mn-54	< 7	< 10	< 9	< 12	< 8	< 7
Co-58	< 7	< 10	< 8	< 11	< 9	< 7
Fe-59	< 12	< 15	< 17	< 20	< 20	< 18
Co-60	< 9	< 13	< 13	< 14	< 10	< 10
Zn-65	< 14	< 17	< 19	< 21	< 22	< 17
Nb-95	< 7	< 8	< 8	< 10	< 9	< 8
Zr-95	< 9	< 16	< 16	< 15	< 12	< 10
I-131	< 6	< 11	< 12	< 12	< 9	< 10
Cs-134	< 7	< 9	< 9	< 10	< 7	< 6
Cs-137	< 6	< 12	< 12	< 13	< 9	< 8
Ba-140	< 19	< 32	< 37	< 42	< 33	< 30
La-140	< 8	< 8	< 12	< 8	< 13	< 14

Radioisotopes other than those reported were not detected.

Table 14. WI 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
Collection date:	06/04/13	06/04/13	06/04/13	06/05/13	06/05/13
gross alpha	< 1200	< 750	< 1210	< 634	< 890
gross beta	5730 +- 450	4530 +- 310	5720 +- 510	3320 +- 320	4580 +- 340
gamma isotopic					
Be-7	1290 +- 80	250 +- 60	660 +- 70	370 +- 60	760 +- 100
K-40	6190 +- 550	4590 +- 790	4680 +- 420	5070 +- 480	4570 +- 800
Mn-54	< 14	< 8	< 11	< 22	< 12
Co-58	< 16	< 9	< 11	< 25	< 12
Fe-59	< 34	< 15	< 17	< 48	< 20
Co-60	< 25	< 9	< 11	< 32	< 9
Zn-65	< 38	< 20	< 32	< 50	< 24
Nb-95	< 17	< 9	< 10	< 23	< 10
Zr-95	< 29	< 17	< 17	< 39	< 18
I-131	< 22	< 12	< 23	< 40	< 14
Cs-134	< 16	< 10	< 8	< 21	< 11
Cs-137	< 22	< 10	< 9	< 29	< 11
Ba-140	< 65	< 39	< 54	< 87	< 40
La-140	< 18	< 12	< 23	< 35	< 6

Site:	PBK-7	PBK-8	PBK-14	PBK-17
Collection date:	06/04/13	06/05/13	06/05/13	06/05/13
gross alpha	< 1330	< 910	< 810	< 1250
gross beta	4790 +- 420	4260 +- 330	3190 +- 290	4750 +- 400
gamma isotopic				
Be-7	540 +- 80	530 +- 50	770 +- 100	760 +- 70
K-40	4680 +- 800	4660 +- 420	4050 +- 700	5540 +- 500
Mn-54	< 9	< 15	< 6	< 18
Co-58	< 9	< 12	< 9	< 16
Fe-59	< 20	< 29	< 17	< 30
Co-60	< 9	< 18	< 10	< 22
Zn-65	< 23	< 34	< 19	< 45
Nb-95	< 13	< 13	< 9	< 16
Zr-95	< 17	< 25	< 12	< 29
I-131	< 16	< 25	< 13	< 30
Cs-134	< 10	< 13	< 9	< 18
Cs-137	< 10	< 17	< 9	< 23
Ba-140	< 41	< 66	< 45	< 86
La-140	< 14	< 10	< 12	< 26

Radioisotopes other than those reported were not detected.

Table 14. WI DHS analysis results for vegetation samples collected for the Point Beach – Kewaunee environmental monitoring Program, continued.

Measurements in units of pCi/kilogram (wet)

Site:	PBK-1	PBK-2	PBK-3	PBK-4	PBK-5
Collection date:	09/18/13	09/17/13	09/17/13	09/17/13	09/18/13
gross alpha	< 1900	< 1920	< 1720	< 1590	< 710
gross beta	2000 +- 400	3690 +- 520	3900 +- 510	3500 +- 410	4920 +- 330
gamma isotopic					
Be-7	1860 +- 220	1150 +- 160	2110 +- 260	2130 +- 230	1770 +- 200
K-40	2480 +- 510	5200 +- 930	4560 +- 890	4360 +- 800	4250 +- 780
Mn-54	< 13	< 15	< 19	< 18	< 18
Co-58	< 12	< 13	< 25	< 16	< 17
Fe-59	< 32	< 28	< 47	< 38	< 36
Co-60	< 15	< 12	< 33	< 23	< 25
Zn-65	< 32	< 29	< 54	< 46	< 48
Nb-95	< 14	< 12	< 24	< 17	< 17
Zr-95	< 19	< 18	< 45	< 31	< 30
I-131	< 14	< 12	< 34	< 31	< 32
Cs-134	< 13	< 11	< 27	< 18	< 15
Cs-137	< 11	< 11	< 35	< 24	< 22
Ba-140	< 54	< 31	< 100	< 82	< 82
La-140	< 19	< 10	< 27	< 21	< 27

Site:	PBK-7	PBK-8	PBK-14	PBK-17
Collection date:	09/17/13	09/18/13	09/18/13	09/18/13
gross alpha	< 1200	< 560	< 1020	< 870
gross beta	4420 +- 490	4740 +- 280	3450 +- 350	3690 +- 290
gamma isotopic				
Be-7	2000 +- 220	970 +- 130	1290 +- 160	1240 +- 200
K-40	4650 +- 850	4940 +- 880	3730 +- 680	3370 +- 700
Mn-54	< 12	< 14	< 15	< 21
Co-58	< 12	< 11	< 13	< 23
Fe-59	< 23	< 30	< 33	< 54
Co-60	< 14	< 17	< 20	< 36
Zn-65	< 36	< 32	< 37	< 57
Nb-95	< 12	< 12	< 15	< 31
Zr-95	< 22	< 18	< 25	< 48
I-131	< 20	< 17	< 25	< 50
Cs-134	< 9	< 10	< 15	< 23
Cs-137	< 14	< 12	< 18	< 32
Ba-140	< 52	< 51	< 69	< 117
La-140	< 19	< 16	< 21	< 47

Radioisotopes other than those reported were not detected.

Table 15. WI 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:	06/04/13	06/04/13	06/04/13	06/05/13	06/05/13
gross alpha	5640 +- 2530	6450 +- 2700	5990 +- 2620	7190 +- 3070	7350 +- 2980
gross beta	12400 +- 1170	18400 +- 1460	18200 +- 1250	13800 +- 1260	14200 +- 1230
gamma isotopic					
K-40	14300 +- 1200	19100 +- 1580	21100 +- 1750	18200 +- 1510	17800 +- 1480
Mn-54	< 19	< 22	< 25	< 20	< 23
Co-58	< 17	< 19	< 21	< 19	< 21
Fe-59	< 49	< 49	< 58	< 41	< 49
Co-60	< 23	< 29	< 31	< 30	< 24
Zn-65	< 46	< 52	< 56	< 48	< 52
Nb-95	< 19	< 23	< 27	< 24	< 26
Zr-95	< 32	< 37	< 44	< 39	< 42
Cs-134	< 16	< 17	< 20	< 19	< 18
Cs-137	144 +- 10	110 +- 9	125 +- 10	154 +- 11	149 +- 10

Site:	PBK-7	PBK-8	PBK-14	PBK-17
Collection date:	06/04/13	06/05/13	06/05/13	06/05/13
gross alpha	6770 +- 3040	9600 +- 3000	11700 +- 3460	5490 +- 2580
gross beta	18100 +- 1360	17400 +- 1280	18800 +- 1390	12200 +- 1180
gamma isotopic				
K-40	20100 +- 1670	18500 +- 1550	19800 +- 1650	13900 +- 1170
Mn-54	< 22	< 23	< 25	< 21
Co-58	< 22	< 23	< 21	< 20
Fe-59	< 50	< 60	< 54	< 52
Co-60	< 29	< 28	< 35	< 30
Zn-65	< 56	< 59	< 63	< 55
Nb-95	< 26	< 25	< 30	< 23
Zr-95	< 36	< 44	< 35	< 39
Cs-134	< 18	< 20	< 23	< 21
Cs-137	117 +- 9	196 +- 12	155 +- 11	369 +- 18

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

Radioisotopes other than those reported were not detected.

Table 15. WI DHS analysis results for soil samples collected for the Point Beach – Kewaunee environmental monitoring Program, continued.

Measurements in units of pCi/kilogram (dry)

Site:	PBK-1	PBK-2	PBK-3	PBK-4	PBK-5
Collection date:	09/18/13	09/17/13	09/17/13	09/17/13	09/18/13
gross alpha	5000 +- 3000	10200 +- 3500	11100 +- 3900	< 4100	7300 +- 3200
gross beta	13400 +- 1300	19200 +- 1500	21100 +- 1500	17500 +- 1400	18300 +- 1600
gamma isotopic					
K-40	13100 +- 2300	20000 +- 3300	20900 +- 3400	18800 +- 3100	19000 +- 3100
Mn-54	< 18	< 24	< 23	< 23	< 24
Co-58	< 17	< 22	< 21	< 19	< 23
Fe-59	< 40	< 51	< 56	< 54	< 57
Co-60	< 15	< 28	< 27	< 30	< 28
Zn-65	< 38	< 56	< 58	< 53	< 55
Nb-95	< 14	< 27	< 27	< 25	< 25
Zr-95	< 26	< 35	< 38	< 44	< 41
Cs-134	< 15	< 18	< 19	< 19	< 21
Cs-137	110 +- 20	150 +- 20	120 +- 20	130 +- 20	150 +- 20

Site:	PBK-7	PBK-8	PBK-14	PBK-17
Collection date:	09/17/13	09/18/13	09/18/13	09/18/13
gross alpha	11300 +- 3400	9500 +- 3700	8500 +- 3500	7100 +- 3600
gross beta	22600 +- 1500	16000 +- 1400	22700 +- 1700	13700 +- 1400
gamma isotopic				
K-40	20300 +- 3500	18700 +- 3200	18100 +- 3100	14500 +- 2400
Mn-54	< 23	< 20	< 21	< 22
Co-58	< 18	< 20	< 21	< 19
Fe-59	< 56	< 51	< 48	< 51
Co-60	< 26	< 28	< 26	< 27
Zn-65	< 48	< 49	< 50	< 61
Nb-95	< 22	< 20	< 20	< 25
Zr-95	< 33	< 31	< 37	< 45
Cs-134	< 18	< 15	< 16	< 29
Cs-137	160 +- 20	60 +- 15	140 +- 20	190 +- 20

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

Radioisotopes other than those reported were not detected.