State of Wisconsin

2014

Point Beach - Kewaunee

Environmental Radioactivity Survey

Wisconsin Department of Health Services
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State of Wisconsin, Department of Health Services

2014

Point Beach – Kewaunee Environmental Monitoring Survey

Executive Summary

Wisconsin Stat. § 254.41 mandates the State of Wisconsin, Department of Health Services 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 2014 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 2014, 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 2014, such as the 2011 Japan Fukushima Daiichi incident, 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.

The Department's 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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Introduction

Wisconsin Stat. § 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 2014 and provides a description and results of this environmental monitoring program.

WI DHS Point Beach - Kewaunee Environmental Monitoring Sampling Program

The Wisconsin 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 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 2014.

- There were no modifications for the collection period (January1 through December 31) 2014.

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.

Detection Limits

Detection limits, required by Wisconsin DHS, will be 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, 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 is an “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 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 $\pm$). Examples and explanations of data reporting are:

Example	Nuclide	Activity reported
1	^{137}Cs	< 10 pCi/liter
2	^{137}Cs	15 $\pm$ 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 2014.

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	312	2	GA, GB, GI
air iodine	C/W	4, 17, 18	156	1	GI
precipitation	C/BW	1, 4	12	0	GB, H
TLD	G/Q	T1 – T31	122	2	ambient gamma
surface water	G/M	9, 12a, 17	36	8	GA, GB, GI, Sr, H, I
surface water	G/SA	5, 29	4	2	GA, GB, GI, Sr, H
fish	G/Q	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 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-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. Wisconsin 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	09/12/14	17	Error by field technician recording data
Air particulate	09/19/14	17	Error by field technician recording data
Air iodine	10/16/14	17	laboratory error during analysis
TLD	2nd quarter	TLD-13	No data, the TLD was lost in the field.
TLD	1st quarter	TLD-28	No data, the TLD was lost in the field.
Surface Water	01/05/14	9	Sample not collected due to safety concerns
Surface Water	2/13/14	9	Laboratory delay in analysis of I-131, results not reported
Surface Water	4/16/14	9	Laboratory delay in analysis of I-131, results not reported
Surface Water	6/12/14	9	Laboratory delay in analysis of I-131, results not reported
Surface Water	7/10/14	9	Laboratory delay in analysis of I-131, results not reported
Surface Water	09/17/14	9	Laboratory delay in analysis of I-131, results not reported
Surface Water	10/26/14	9	There was a laboratory quality issue with Sr-89, results not reported
Surface Water	10/26/14	9	There was a laboratory quality issue with Sr-90, results not reported
Surface Water	11/12/14	9	Did not meet detection limit, I-131
Surface Water	04/01/14	12a	Laboratory delay in analysis of I-131, results not reported
Surface Water	06/02/14	12a	Laboratory delay in analysis of I-131, results not reported
Surface Water	10/01/14	12a	Laboratory quality issue with the sample Sr-89
Surface Water	10/01/14	12a	Laboratory quality issue with the sample Sr-90
Surface Water	12/01/14	12a	There was a laboratory quality issue I-131, high background
Surface Water	02/03/14	17	Did not meet detection limit, I-131
Surface Water	05/05/14	17	Laboratory delay in analysis of I-131, results not reported
Surface Water	10/07/14	17	Laboratory quality issue with the sample Sr-89
Surface Water	10/07/14	17	Laboratory quality issue with the sample Sr-90
Surface Water	11/03/14	17	Did not meet detection limit, I-131
Surface Water	10/29/14	5	There was a laboratory quality issue with Sr-89, results not reported
Surface Water	10/29/14	5	There was a laboratory quality issue with Sr-90, results not reported
Surface Water	10/29/14	29	There was a laboratory quality issue with Sr-89, results not reported
Surface Water	10/29/14	29	There was a laboratory quality issue with Sr-90, results not reported
Milk	02/12/14	28	Laboratory delay in analysis of I-131
Milk	04/09/14	28	Laboratory delay in analysis of I-131, results not reported
Milk	06/11/14	28	Laboratory delay in analysis of I-131, results not reported
Milk	07/09/14	28	There was a laboratory quality issue

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

Sample type	Date	Site	Explanation
Milk	09/10/14	28	There was a laboratory quality issue
Milk	11/12/14	28	Laboratory delay in analysis of Sr-90, results not reported
Milk	12/10/14	28	Laboratory delay in analysis of Sr-90, results not reported
Milk	02/12/14	24	Laboratory delay in analysis of I-131
Milk	04/09/14	24	Laboratory delay in analysis of I-131, results not reported
Milk	06/11/14	24	Laboratory delay in analysis of I-131, results not reported
Milk	07/09/14	24	There was a laboratory quality issue
Milk	10/08/14	24	Matrix quality control issue, sample did not meet quality control
Milk	11/12/14	24	Laboratory delay in analysis of Sr-90, results not reported
Milk	11/12/14	24	Did not meet detection limit, I-131
Milk	12/10/14	24	Laboratory delay in analysis of Sr-90, results not reported
Milk	02/12/14	24	Laboratory delay in analysis of I-131, detection limit not met
Milk	04/09/14	27	Laboratory delay in analysis of I-131, results not reported
Milk	06/11/14	27	Laboratory delay in analysis of I-131, results not reported
Milk	07/09/14	27	Unacceptable high background Sr-90
Milk	08/13/14	27	Unacceptable high background Sr-90
Milk	10/08/14	27	Quality issue with the sample Sr-90
Milk	11/12/14	27	Detection limit was not met I-131
Milk	11/12/14	27	Laboratory delay in analysis of Sr-90, results not reported
Milk	12/10/14	27	Laboratory delay in analysis of Sr-90, results not reported
Vegetation	06/17/14	1	Did not meet detection limit, I-131
Vegetation	06/17/14	5	Did not meet detection limit, I-131

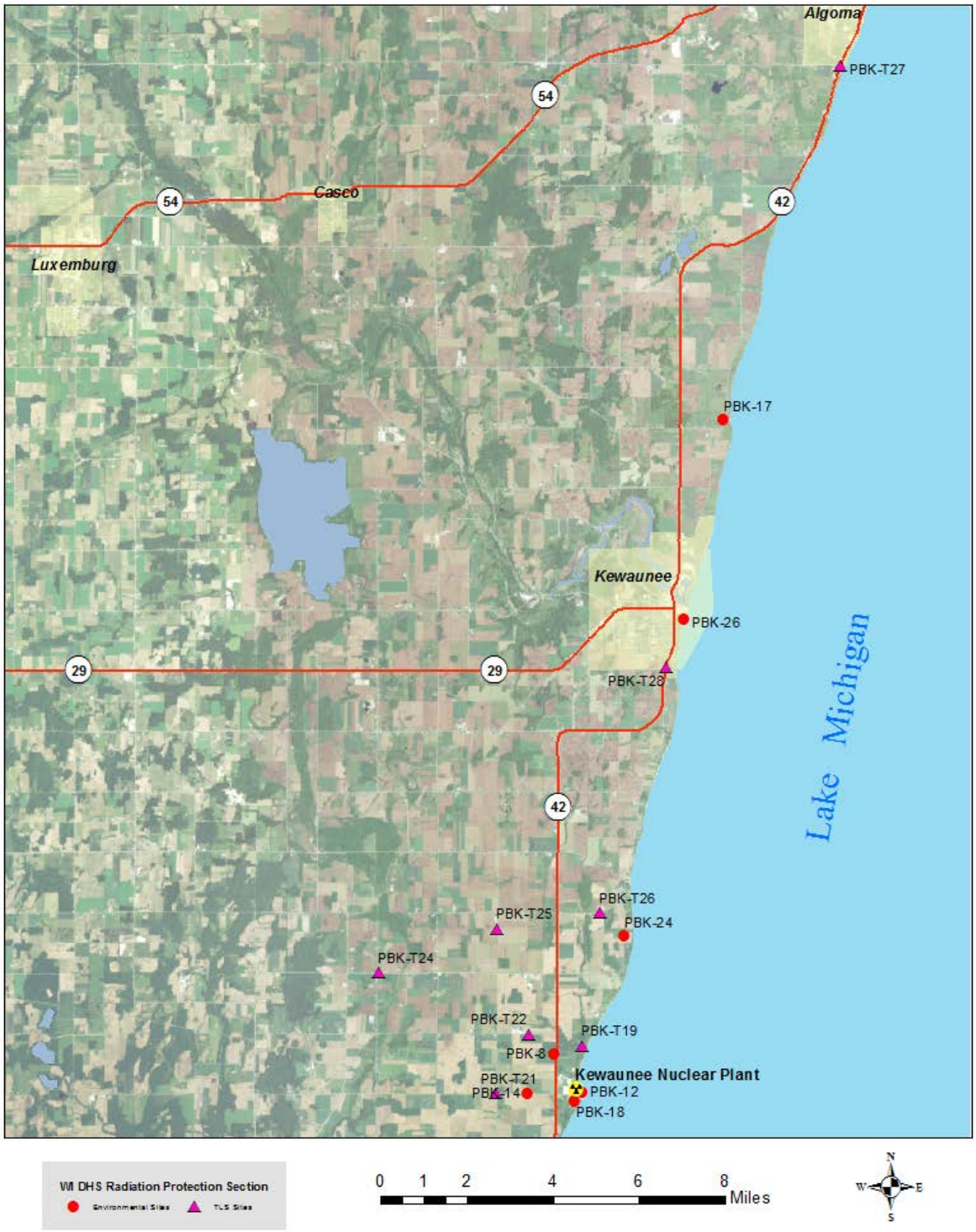

Figure 1 Point Beach - Kewaunee environmental monitoring sampling sites in relation to the Kewaunee plant.

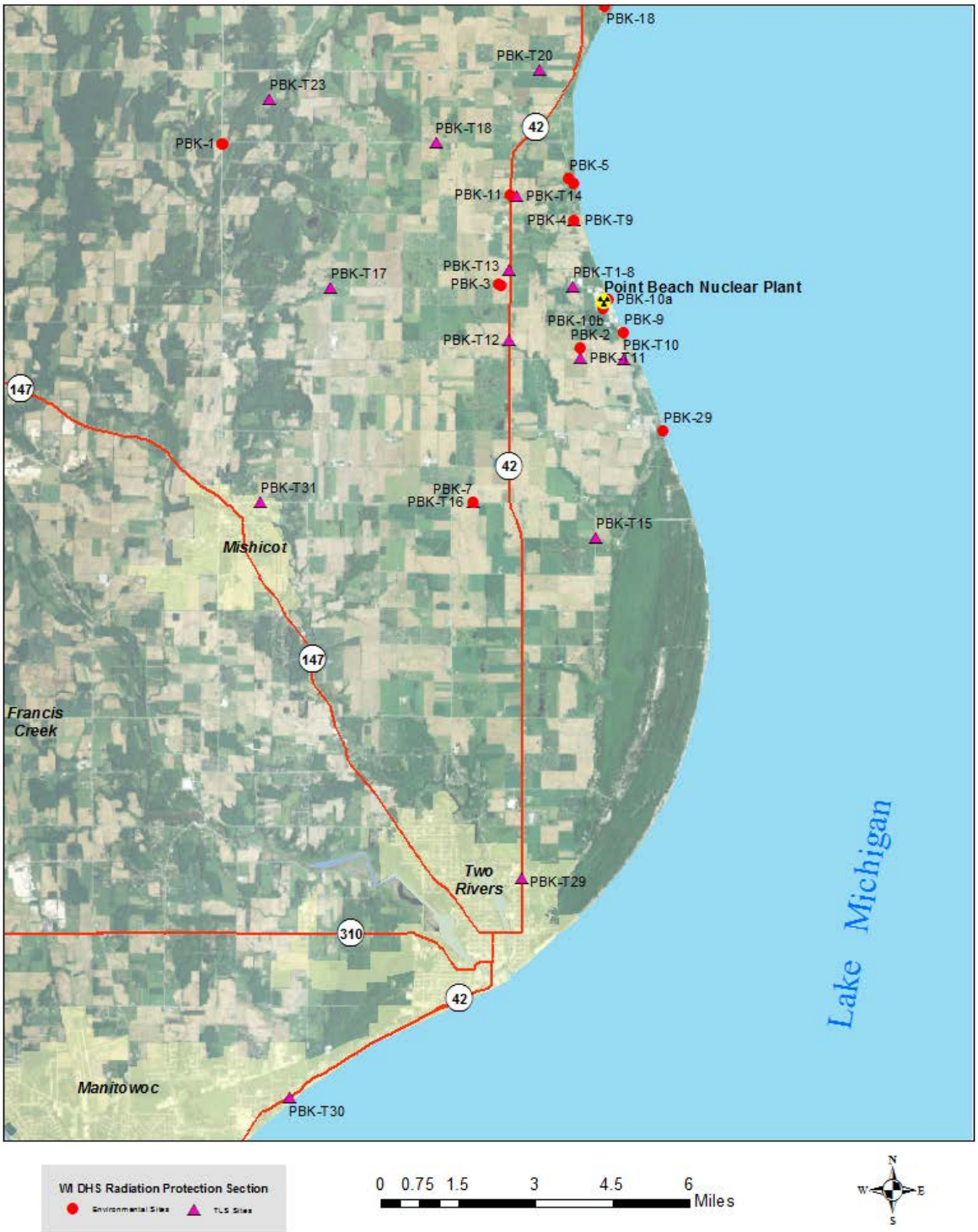

Figure 2 Point Beach - Kewaunee environmental monitoring sampling sites in relation to the Point Beach plant.

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

Air Particulate

A summary of reported activities by Wisconsin 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 (^{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 is detected in air composites from other areas of the state.

Air Iodine

A summary of reported activities by Wisconsin 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 Wisconsin 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 13.7 $\pm$ 1.9 milliroentgens. The average quarterly exposure for 2013 is at background levels and is comparable to other areas in 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 Wisconsin 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 Wisconsin 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 Wisconsin 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 Wisconsin 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 except for one sample where iodine-131 (^{131}I) was slightly elevated. There were 5 surface water samples with levels of detection above the 0.5 pCi/L resulting from laboratory errors in analysis. In addition, there were 8 samples that were not analyzed for iodine-131 (^{131}I) and 6 samples were not analyzed for Strontium-90 (^{90}Sr) due to laboratory delays. All reported activities for gross beta; gross alpha and tritium (^{3}H) 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 Wisconsin 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 (^{3}H) 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 Wisconsin 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. However, there were 6 milk samples with levels of detection above 0.5 pCi/L due to laboratory errors. In addition, there were 6 samples that were not analyzed for iodine-131 (^{131}I) and 8 samples that were not analyzed for strontium-90 (^{90}Sr) due to laboratory delays. 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 Wisconsin 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 (^{7}Be) 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 Wisconsin 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 Wisconsin 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 2014 for sites T9 – T31 was 13.7 $\pm$ 1.9 milliroentgens and for sites T1 – T8 varied from 18.6 – 52.9 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 Wisconsin 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, ch. 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.

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	311 / 311	gross beta	0.006 - 0.043
			gamma isotopic	
	0.020	24 / 23	Be-7	0.007 – 0.099
	0.002	24 / 0	Mn-54	< 0.0005
	0.002	24 / 0	Co-58	< 0.0005
	0.005	24 / 0	Fe-59	< 0.0012
	0.002	24 / 0	Co-60	< 0.0007
	0.005	24 / 0	Zn-65	< 0.0012
	0.002	24 / 0	Nb-95	< 0.0006
	0.005	24 / 0	Zr-95	< 0.0009
	0.002	24 / 0	Ru-103	< 0.0006
	0.015	24 / 0	Ru-106	< 0.0044
	0.020	24 / 0	I-131	< 0.0020
	0.002	24 / 0	Cs-134	< 0.0006
	0.002	24 / 0	Cs-137	< 0.0006
	0.030	24 / 0	Ba-140	< 0.0037
	0.020	24 / 0	La-140	< 0.0015
	0.002	24 / 0	Ce-141	< 0.0010
	0.005	24 / 0	Ce-144	< 0.0032
Air iodine (pCi/m^3)	0.07	155 / 0	I-131	< 0.054
Surface water	3.0	39 / 0	gross alpha (sol)	< 1.6 – 2.5
(pCi/liter)	3.0	39 / 2	gross beta (sol)	< 2.0 – 5.0
	3.0	39 /0	gross alpha (insol)	< 1.3 – 0.6
	3.0	39 / 1	gross beta (insol)	< 8.4
	300	16 / 0	H-3	< 220
	1.5	6 / 4	I-131	< 2.4
	2.0	11 / 2	Sr-89	< 3.2
	1.0	11 / 0	Sr-90	< 0.3 – 0.4
			gamma isotopic	
	15	38 / 0	Mn-54	< 10
	15	38 / 0	Co-58	< 12
	30	38 / 0	Fe-59	< 23
	15	38 / 0	Co-60	< 14
	30	38 / 0	Zn-65	< 26
	15	38 / 0	Nb-95	< 12
	30	38 / 0	Zr-95	< 19
	15	38 / 1	I-131	< 16
	15	38 / 0	Cs-134	< 11
	15	38 / 0	Cs-137	< 14
	60	38 / 0	Ba-140	< 50
	15	38 / 0	La-140	< 15

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

Sample type (units)	LLD	Number of samples [a]	Analysis	Range
Fish			gamma isotopic	
(pCi/kg wet)	800	6 / 6	K-40	1090 – 3500
	50	6 / 0	Mn-54	< 8
	60	6 / 0	Co-58	< 9
	130	6 / 0	Fe-59	< 28
	70	6 / 0	Co-60	< 13
	130	6 / 0	Zn-65	< 23
	50	6 / 0	Nb-95	< 20
	100	6/ 0	Zr-95	< 19
	50	6 / 0	Cs-134	< 8
	60	6 / 0	Cs-137	< 8 - 43
Shoreline sediment	6000	7 / 1	gross alpha	< 4070 - 7300
(pCi/kg dry)	15000	7 / 0	gross beta	2900 - 5150
			gamma isotopic	
	800	7 / 7	K-40	2430 – 6700
	60	7 / 0	Mn-54	< 23
	90	7 / 0	Co-58	< 22
	600	7 / 0	Fe-59	< 46
	90	7 / 0	Co-60	< 27
	300	7 / 0	Zn-65	< 44
	100	7 / 0	Nb-95	< 40
	200	7 / 0	Zr-95	< 44
	80	7 / 0	Cs-134	< 21
	80	7 / 3	Cs-137	< 33 – 23
Vegetation	6000	18 / 18	gross alpha	< 2560 - 3390
(pCi/kg wet)	4000	18 / 18	gross beta	< 631- 7200
			gamma isotopic	
	600	18 / 13	Be-7	233 – 8720
	2000	18 / 18	K-40	2480 – 6190
	90	18 / 0	Mn-54	< 31
	100	18 / 0	Co-58	< 59
	200	18 / 0	Fe-59	< 95
	100	18 / 0	Co-60	< 47
	250	18 / 0	Zn-65	< 67
	100	18 / 0	Nb-95	< 40
	200	18 / 0	Zr-95	< 82
	80	18 / 4	I-131	< 83
	80	18 / 0	Cs-134	< 31
	90	18 / 0	Cs-137	< 140
	350	18 / 0	Ba-140	< 219
	100	18 / 0	La-140	< 89

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

Sample type (units)	LLD	Number of samples [a]	Analysis	Range
Soil	6000	18 / 9	gross alpha	<4000 – 9800
(pCi/kg dry)	13000	18 / 14	gross beta	1500 – 30700
			gamma isotopic	
	800	18 / 18	K-40	1760 – 20900
	60	18 / 0	Mn-54	< 44
	90	18 / 0	Co-58	< 39
	600	18 / 0	Fe-59	< 116
	90	18 / 0	Co-60	< 56
	300	18 / 0	Zn-65	< 6116
	100	18 / 0	Nb-95	< 53
	250	18 / 0	Zr-95	< 72
	80	18 / 0	Cs-134	< 36
	80	18 / 13	Cs-137	< 25 - 231
Milk	0.5	12 / 6 d	I-131	< 3.1
(pCi/liter)	1.5	36 / 8 d	Sr-90	< 0.7 – 0.8
			gamma isotopic	
	500	36 / 36	K-40	1240 – 1690
	15	36 / 0	Mn-54	< 13
	15	36 / 0	Co-58	< 13
	40	36 / 0	Fe-59	< 27
	15	36 / 0	Co-60	< 15
	40	36 / 0	Zn-65	< 30
	15	36 / 0	Nb-95	< 13
	40	36 / 0	Zr-95	< 18
	15	36 / 0	I-131	< 15
	15	36 / 0	Cs-134	< 12
	15	36 / 0	Cs-137	< 15
	60	36 / 0	Ba-140	< 47
	15	36 / 0	La-140	< 16
Well water	5.0	10 / 1	gross alpha	< 2.5 – 5.1
(pCi/liter)	3.0	10 / 0	gross beta	< 1.4 – 2.6
	300 [b]	10 / 0	H-3	< 220
Precipitation	1.5 [b]	12 / 0	gross beta	< 0.24– 0.74
(nCi/m^2)	300 [b]	12 / 0	H-3	< 48
ambient radiation (mR/Std Qtr)	1.0 [c]	122 / 122	exposure	8.4 – 62.8

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

Measurements in units of pCi/m^3

Site: PBK-1

Collection date	Volume m^3	Air Particulate	Collection date	Volume m^3	Air Particulate
01/02/14	583	0.032 ± 0.003	07/02/14	532	0.017 ± 0.002
01/08/14	498	0.026 ± 0.003	07/09/14	515	0.012 ± 0.002
01/16/14	662	0.021 ± 0.002	07/16/14	505	0.013 ± 0.002
01/22/14	494	0.016 ± 0.002	07/23/14	532	0.024 ± 0.003
01/30/14	656	0.015 ± 0.002	07/30/14	556	0.013 ± 0.002
02/05/14	498	0.021 ± 0.003	08/06/14	542	0.018 ± 0.002
02/12/14	577	0.018 ± 0.002	08/13/14	546	0.016 ± 0.002
02/19/14	570	0.025 ± 0.003	08/20/14	539	0.012 ± 0.002
02/26/14	577	0.026 ± 0.003	08/27/14	539	0.015 ± 0.002
03/05/14	573	0.025 ± 0.002	09/03/14	532	0.017 ± 0.002
03/12/14	570	0.023 ± 0.002	09/09/14	481	0.020 ± 0.003
03/19/14	577	0.013 ± 0.002	09/17/14	611	0.015 ± 0.002
03/27/14	649	0.021 ± 0.002	09/24/14	546	0.019 ± 0.002
01/02/14	583	0.032 ± 0.003	07/02/14	532	0.017 ± 0.002
1st Qtr			3rd Qtr		
mean +- s.d.		0.022 ± 0.005	mean +- s.d.		0.016 ± 0.003
04/02/14	487	0.018 ± 0.003	10/01/14	546	0.021 ± 0.002
04/09/14	573	0.020 ± 0.002	10/08/14	549	0.014 ± 0.002
04/16/14	566	0.014 ± 0.002	10/15/14	542	0.013 ± 0.002
04/23/14	570	0.017 ± 0.002	10/23/14	625	0.009 ± 0.002
04/30/14	563	0.013 ± 0.002	10/29/14	467	0.021 ± 0.003
05/07/14	546	0.007 ± 0.002	11/05/14	559	0.015 ± 0.002
05/15/14	621	0.013 ± 0.002	11/13/14	514	0.010 ± 0.002
05/21/14	467	0.019 ± 0.003	11/18/14	497	0.020 ± 0.003
05/28/14	539	0.015 ± 0.002	11/26/14	632	0.019 ± 0.002
06/04/14	539	0.012 ± 0.002	12/03/14	563	0.028 ± 0.003
06/11/14	539	0.012 ± 0.002	12/10/14	563	0.032 ± 0.003
06/18/14	535	0.014 ± 0.002	12/17/14	552	0.029 ± 0.003
06/25/14	539	0.009 ± 0.002	12/23/14	469	0.023 ± 0.003
2nd Qtr			4th Qtr		
mean +- s.d.		0.014 ± 0.004	mean +- s.d.		0.020 ± 0.007

Table 5. Wisconsin 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
01/08/14	594	0.027 ± 0.002	< 0.007	07/09/14	729	0.011 ± 0.002	< 0.013
01/13/14	376	0.017 ± 0.003	< 0.009	07/14/14	408	0.013 ± 0.003	< 0.024
01/20/14	524	0.021 ± 0.002	< 0.008	07/21/14	570	0.013 ± 0.002	< 0.009
01/27/14	473	0.014 ± 0.002	< 0.018	07/28/14	569	0.018 ± 0.002	< 0.018
02/03/14	475	0.021 ± 0.003	< 0.047	08/04/14	566	0.018 ± 0.002	< 0.013
02/12/14	629	0.020 ± 0.002	< 0.008	08/13/14	724	0.013 ± 0.002	< 0.128
02/17/14	358	0.027 ± 0.004	< 0.028	08/18/14	403	0.011 ± 0.003	< 0.238
02/24/14	514	0.025 ± 0.003	< 0.013	08/25/14	567	0.017 ± 0.002	< 0.022
03/03/14	468	0.033 ± 0.003	< 0.010	09/02/14	645	0.015 ± 0.002	< 0.021
03/12/14	703	0.021 ± 0.002	< 0.011	09/10/14	643	0.019 ± 0.002	< 0.011
03/17/14	382	0.014 ± 0.003	< 0.011	09/15/14	393	0.009 ± 0.003	< 0.020
03/24/14	570	0.018 ± 0.002	< 0.013	09/22/14	542	0.021 ± 0.002	< 0.013
03/31/14	546	0.023 ± 0.003	< 0.010	09/29/14	552	0.026 ± 0.003	< 0.031
1st Qtr				3rd Qtr			
mean +- s.d.		0.022 ± 0.005	< 0.015	mean +- s.d.		0.016 ± 0.005	< 0.043
04/09/14	720	0.019 ± 0.002	< 0.004	10/08/14	690	0.013 ± 0.002	< 0.008
04/14/14	397	0.011 ± 0.003	< 0.020	10/13/14	379	0.013 ± 0.003	< 0.019
04/21/14	627	0.024 ± 0.002	< 0.008	10/20/14	536	0.008 ± 0.002	< 0.021
04/28/14	556	0.015 ± 0.002	< 0.009	10/27/14	534	0.015 ± 0.002	< 0.014
05/05/14	564	0.008 ± 0.002	< 0.014	11/03/14	519	0.014 ± 0.002	< 0.033
05/14/14	726	0.013 ± 0.002	< 0.011	11/12/14	676	0.014 ± 0.002	< 0.011
05/19/14	403	0.013 ± 0.003	< 0.011	11/17/14	356	0.019 ± 0.003.	< 0.028
05/27/14	658	0.015 ± 0.002	< 0.014	11/24/14	494	0.021 ± 0.003	< 0.025
06/02/14	493	0.010 ± 0.002	< 0.013	12/01/14	505	0.021 ± 0.003	< 0.020
06/11/14	722	0.011 ± 0.002	< 0.011	12/10/14	670	0.028 ± 0.002	< 0.017
06/16/14	407	0.010 ± 0.003	< 0.011	12/16/14	460	0.029 ± 0.003	< 0.025
06/23/14	571	0.008 ± 0.002	< 0.021	12/22/14	450	0.017 ± 0.003	< 0.029
06/30/14	573	0.013 ± 0.002	< 0.021	12/29/14	540	0.021 ± 0.002	< 0.024
2nd Qtr				4th Qtr			
mean +- s.d.		0.013 ± 0.004	< 0.013	mean +- s.d.		0.018 ± 0.006	< 0.021

Table 5. Wisconsin 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-7

Collection date	Volume m^3	Air particulate	Collection date	Volume m^3	Air particulate
01/02/14	416	0.035 ± 0.003	07/02/14	290	0.017 ± 0.004
01/08/14	363	0.028 ± 0.004	07/09/14	321	0.014 ± 0.003
01/16/14	461	0.023 ± 0.003	07/16/14	363	0.014 ± 0.003
01/22/14	332	0.019 ± 0.003	07/23/14	356	0.030 ± 0.004
01/30/14	454	0.016 ± 0.003	07/30/14	367	0.016 ± 0.003
02/05/14	349	0.023 ± 0.003	08/06/14	353	0.023 ± 0.003
02/12/14	402	0.018 ± 0.003	08/13/14	279	0.025 ± 0.004
02/19/14	363	0.030 ± 0.004	08/20/14	276	0.017 ± 0.004
02/26/14	377	0.031 ± 0.004	08/27/14	331	0.021 ± 0.004
03/05/14	409	0.032 ± 0.003	09/03/14	331	0.020 ± 0.003
03/12/14	388	0.024 ± 0.003	09/09/14	283	0.024 ± 0.004
03/19/14	402	0.018 ± 0.003	09/17/14	378	0.018 ± 0.003
03/27/14	433	0.024 ± 0.003	09/24/14	331	0.026 ± 0.004
1st Qtr			3rd Qtr		
mean +- s.d.		0.025 ± 0.006	mean +- s.d.		0.020 ± 0.005
04/02/14	328	0.022 ± 0.004	10/01/14	220	0.039 ± 0.006
04/09/14	398	0.021 ± 0.003	10/08/14	136	0.043 ± 0.008
04/16/14	381	0.014 ± 0.003	10/15/14	234	0.022 ± 0.005
04/23/14	395	0.021 ± 0.003	10/23/14	267	0.016 ± 0.003
04/30/14	398	0.016 ± 0.003	10/29/14	240	0.024 ± 0.004
05/07/14	402	0.007 ± 0.002	11/05/14	551	0.013 ± 0.002
05/15/14	436	0.015 ± 0.003	11/13/14	631	0.011 ± 0.002
05/21/14	339	0.024 ± 0.004	11/18/14	403	0.019 ± 0.003
05/28/14	388	0.016 ± 0.003	11/26/14	648	0.018 ± 0.002
06/04/14	374	0.013 ± 0.003	12/03/14	558	0.024 ± 0.002
06/11/14	381	0.014 ± 0.003	12/10/14	563	0.031 ± 0.003
06/18/14	353	0.014 ± 0.003	12/17/14	551	0.026 ± 0.003
06/25/14	363	0.010 ± 0.003	12/23/14	478	0.023 ± 0.003
			12/30/14	553	0.021 0.002
2nd Qtr			4th Qtr		
mean +- s.d.		0.016 ± 0.005	mean +- s.d.		0.024 ± 0.009

Table 5. Wisconsin 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-8

Collection date	Volume m^3	Air particulate	Collection date	Volume m^3	Air particulate
01/07/14	485	0.024 ± 0.003	07/08/14	466	0.014 ± 0.002
01/14/14	495	0.023 ± 0.003	07/15/14	488	0.012 ± 0.002
01/21/14	482	0.020 ± 0.003	07/22/14	450	0.023 ± 0.003
01/28/14	501	0.017 ± 0.002	07/29/14	476	0.017 ± 0.003
02/04/14	517	0.017 ± 0.002	08/05/14	463	0.021 ± 0.003
02/11/14	536	0.018 ± 0.002	08/12/14	473	0.018 ± 0.003
02/18/14	490	0.026 ± 0.003	08/19/14	460	0.011 ± 0.002
02/25/14	490	0.028 ± 0.004	08/26/14	460	0.020 ± 0.003
03/04/14	527	0.030 ± 0.003	09/02/14	454	0.015 ± 0.003
03/11/14	507	0.025 ± 0.003	09/09/14	463	0.022 ± 0.003
03/18/14	501	0.018 ± 0.002	09/16/14	473	0.016 ± 0.003
03/25/14	488	0.023 ± 0.003	09/23/14	469	0.022 ± 0.003
04/01/14	476	0.021 ± 0.003	09/30/14	469	0.025 ± 0.003
1st Qtr mean +- s.d.		0.022 ± 0.004	3rd Qtr mean +- s.d.		0.018 ± 0.004
04/08/14	482	0.021 ± 0.003	10/07/14	482	0.014 ± 0.002
04/15/14	476	0.014 ± 0.002	10/14/14	473	0.015 ± 0.002
04/22/14	476	0.025 ± 0.003	10/21/14	479	0.009 ± 0.002
04/29/14	473	0.016 ± 0.003	10/28/14	466	0.019 ± 0.003
05/06/14	485	0.007 ± 0.002	11/04/14	568	0.014 ± 0.002
05/13/14	479	0.017 ± 0.003	11/11/14	571	0.016 ± 0.002
05/20/14	482	0.014 ± 0.002	11/18/14	584	0.016 ± 0.002
05/27/14	488	0.017 ± 0.002	11/25/14	622	0.019 ± 0.002
06/03/14	495	0.012 ± 0.002	12/02/14	587	0.030 ± 0.003
06/10/14	485	0.012 ± 0.002	12/09/14	596	0.037 ± 0.003
06/17/14	492	0.014 ± 0.003	12/16/14	577	0.036 ± 0.003
06/24/14	479	0.010 ± 0.002	12/23/14	568	0.022 ± 0.002
07/01/14	479	0.017 ± 0.003	12/30/14	580	0.023 ± 0.002
2nd Qtr mean +- s.d.		0.015 ± 0.005	4th Qtr mean +- s.d.		0.021 ± 0.009

Table 5. Wisconsin 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
01/03/14	566	0.024	±	0.002	< 0.021	07/03/14	451	0.011	±	0.002	< 0.015
01/09/14	503	0.023	±	0.003	< 0.019	07/10/14	537	0.013	±	0.002	< 0.017
01/17/14	633	0.020	±	0.002	< 0.014	07/17/14	520	0.011	±	0.002	< 0.011
01/23/14	481	0.017	±	0.003	< 0.010	07/25/14	605	0.021	±	0.002	< 0.027
01/30/14	591	0.015	±	0.002	< 0.010	08/01/14	522	0.015	±	0.002	< 0.022
02/07/14	639	0.017	±	0.002	< 0.013	08/07/14	456	0.020	±	0.003	< 0.027
02/14/14	577	0.023	±	0.002	< 0.022	08/15/14	592	0.015	±	0.002	< 0.027
02/21/14	564	0.019	±	0.002	< 0.011	08/22/14	531	0.013	±	0.002	< 0.026
02/28/14	560	0.030	±	0.003	< 0.012	08/29/14	516	0.018	±	0.002	< 0.059
03/07/14	558	0.025	±	0.003	< 0.017	09/05/14	525	0.019	±	0.002	< 0.031
03/14/14	554	0.022	±	0.002	< 0.010	09/12/14	***b**	***b**	±	***b**	< ***b**
03/20/14	480	0.013	±	0.002	< 0.019	09/19/14	***b**	***b**	±	***b**	< ***b**
03/28/14	646	0.022	±	0.002	< 0.061	09/26/14	532	0.023	±	0.003	< 0.019
1st Qtr						3rd Qtr					
mean +- s.d.		0.021	±	0.005	< 0.018	mean +- s.d.		0.016	±	0.004	< 0.016
04/04/14	548	0.019	±	0.002	< 0.019	10/02/14	455	0.018	±	0.003	< 0.038
04/11/14	558	0.017	±	0.002	< 0.023	10/10/14	616	0.013	±	0.002	< 0.010
04/17/14	462	0.014	±	0.003	< 0.010	10/16/14	452	0.010	±	0.002	< ***a**
04/25/14	619	0.015	±	0.002	< 0.010	10/24/14	610	0.010	±	0.002	< 0.023
05/02/14	537	0.010	±	0.002	< 0.020	10/30/14	462	0.019	±	0.003	< 0.054
05/09/14	546	0.011	±	0.002	< 0.022	11/07/14	632	0.014	±	0.002	< 0.019
05/16/14	540	0.011	±	0.002	< 0.015	11/14/14	560	0.012	±	0.002	< 0.020
05/22/14	454	0.019	±	0.003	< 0.016	11/21/14	565	0.022	±	0.002	< 0.029
05/29/14	529	0.011	±	0.002	< 0.012	11/26/14	398	0.023	±	0.003	< 0.024
06/06/14	605	0.009	±	0.002	< 0.026	12/05/14	728	0.030	±	0.002	< 0.019
06/13/14	531	0.011	±	0.002	< 0.017	12/12/14	678	0.028	±	0.003	< 0.012
06/20/14	531	0.012	±	0.002	< 0.025	12/19/14	552	0.024	±	0.003	< 0.015
06/27/15	524	0.009	±	0.002	< 0.026	12/26/14	554	0.022	±	0.002	< 0.009
07/03/14	451	0.011		0.002	< 0.015	10/24/14	455	0.018		0.003	0.038
2nd Qtr						4th Qtr					
mean +- s.d.		0.013	±	0.004	< 0.018	mean +- s.d.		0.019	±	0.007	< 0.023

*a – Laboratory error

*b – Error in recording data in the field

Table 5. Wisconsin 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
01/08/14	840	0.026 ± 0.002	< 0.006
01/13/14	460	0.017 ± 0.003	< 0.020
01/20/14	642	0.020 ± 0.002	< 0.008
01/27/14	654	0.013 ± 0.002	< 0.011
02/03/14	657	0.016 ± 0.002	< 0.019
02/12/14	843	0.019 ± 0.002	< 0.012
02/17/14	442	0.025 ± 0.003	< 0.025
02/24/14	650	0.022 ± 0.002	< 0.007
03/03/14	655	0.031 ± 0.002	< 0.010
03/12/14	827	0.021 ± 0.002	< 0.008
03/17/14	459	0.016 ± 0.003	< 0.011
03/24/14	664	0.018 ± 0.002	< 0.008
03/31/14	639	0.021 ± 0.002	< 0.008
1st Qtr mean +- s.d.		0.020 ± 0.005	< 0.012
04/09/14	824	0.019 ± 0.002	< 0.005
04/14/14	447	0.010 ± 0.002	< 0.017
04/21/14	627	0.019 ± 0.002	< 0.007
04/28/14	633	0.011 ± 0.002	< 0.011
05/05/14	633	0.006 ± 0.002	< 0.007
05/14/14	807	0.012 ± 0.002	< 0.008
05/19/14	450	0.012 ± 0.002	< 0.016
05/27/14	716	0.016 ± 0.002	< 0.020
06/02/14	533	0.010 ± 0.002	< 0.009
06/11/14	779	0.009 ± 0.002	< 0.009
06/16/14	441	0.011 ± 0.002	< 0.015
06/23/14	613	0.010 ± 0.002	< 0.017
06/30/14	610	0.014 ± 0.002	< 0.018
2nd Qtr mean +- s.d.		0.012 ± 0.004	< 0.012
07/09/14	780	0.011 ± 0.002	< 0.013
07/14/14	436	0.012 ± 0.002	< 0.011
07/21/14	610	0.015 ± 0.002	< 0.007
07/28/14	605	0.018 ± 0.002	< 0.018
08/04/14	608	0.019 ± 0.002	< 0.013
08/13/14	774	0.013 ± 0.002	< 0.011
08/18/14	433	0.010 ± 0.002	< 0.023
08/25/14	603	0.015 ± 0.002	< 0.020
09/02/14	692	0.013 ± 0.002	< 0.016
09/10/14	692	0.018 ± 0.002	< 0.019
09/15/14	445	0.009 ± 0.002	< 0.023
09/22/14	610	0.022 ± 0.002	< 0.011
09/29/14	607	0.022 ± 0.002	< 0.030
3rd Qtr mean +- s.d.		0.015 ± 0.004	< 0.017
10/08/14	798	0.012 ± 0.002	< 0.005
10/13/14	438	0.014 ± 0.003	< 0.017
10/20/14	621	0.007 ± 0.002	< 0.022
10/27/14	620	0.012 ± 0.002	< 0.016
11/03/14	773	0.015 ± 0.002	< 0.030
11/12/14	842	0.013 ± 0.002	< 0.011
11/17/14	479	0.019 ± 0.003	< 0.021
11/24/14	672	0.020 ± 0.002	< 0.020
12/01/14	670	0.021 ± 0.002	< 0.013
12/10/14	854	0.028 ± 0.002	< 0.012
12/16/14	569	0.030 ± 0.003	< 0.017
12/22/14	571	0.019 ± 0.002	< 0.022
12/29/14	668	0.022 ± 0.002	< 0.020
4th Qtr mean +- s.d.		0.018 ± 0.007	< 0.017

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

	1st quarter	2nd quarter	3rd quarter	4th quarter
Site: PBK-1				
Be-7	0.044 +- 0.005	0.070 +- 0.007	0.064 +- 0.004	0.047 +- 0.005
Mn-54	< 0.0003	< 0.0005	< 0.0002	< 0.0004
Co-58	< 0.0002	< 0.0004	< 0.0002	< 0.0003
Fe-59	< 0.0007	< 0.0012	< 0.0004	< 0.0008
Co-60	< 0.0003	< 0.0007	< 0.0002	< 0.0005
Zn-65	< 0.0005	< 0.0011	< 0.0004	< 0.0008
Nb-95	< 0.0004	< 0.0006	< 0.0003	< 0.0004
Zr-95	< 0.0005	< 0.0008	< 0.0003	< 0.0007
Ru-103	< 0.0003	< 0.0006	< 0.0002	< 0.0004
Ru-106	< 0.0026	< 0.0040	< 0.0015	< 0.0033
I-131	< 0.0013	< 0.0014	< 0.0018	< 0.0013
Cs-134	< 0.0003	< 0.0005	< 0.0002	< 0.0004
Cs-137	< 0.0002	< 0.0006	< 0.0002	< 0.0004
Ba-140	< 0.0021	< 0.0030	< 0.0025	< 0.0026
La-140	< 0.0011	< 0.0015	< 0.0009	< 0.0010
Ce-141	< 0.0005	< 0.0009	< 0.0004	< 0.0007
Ce-144				
Site: PBK-4				
Be-7	0.052 +- 0.006	0.058 +- 0.006	0.056 +- 0.005	0.041 +- 0.005
Mn-54	< 0.0005	< 0.0003	< 0.0002	< 0.0003
Co-58	< 0.0005 .	< 0.0003	< 0.0003	< 0.0003
Fe-59	< 0.0009	< 0.0006	< 0.0007	< 0.0007
Co-60	< 0.0007	< 0.0004	< 0.0003	< 0.0004
Zn-65	< 0.0012	< 0.0011	< 0.0005	< 0.0007
Nb-95	< 0.0006	< 0.0004	< 0.0003	< 0.0004
Zr-95	< 0.0009	< 0.0004	< 0.0005	< 0.0007
Ru-103	< 0.0006	< 0.0002	< 0.0004	< 0.0004
Ru-106	< 0.0039	< 0.0024	< 0.0023	< 0.0031
I-131	< 0.0015	< 0.0005	< 0.0020	< 0.0013
Cs-134	< 0.0006	< 0.0003	< 0.0003	< 0.0003
Cs-137	< 0.0005	< 0.0003	< 0.0004	< 0.0003
Ba-140	< 0.0031	< 0.0010	< 0.0030	< 0.0021
La-140	< 0.0012	< 0.0006	< 0.0012	< 0.0010
Ce-141	< 0.0010	< 0.0004	< 0.0006	< 0.0005
Ce-144	< 0.0032	< 0.0014	< 0.0016	< 0.0014
Site: PBK-7				
Be-7	0.058 +- 0.007	0.070 +- 0.007	0.099 +- 0.006	0.007 +- 0.001
Mn-54	< 0.0004	< 0.0005	< 0.0002	< 0.0000
Co-58	< 0.0004	< 0.0005	< 0.0002	< 0.0000
Fe-59	< 0.0010	< 0.0010	< 0.0004	< 0.0001
Co-60	< 0.0005	< 0.0007	< 0.0002	< 0.0000
Zn-65	< 0.0010	< 0.0009	< 0.0003	< 0.0001
Nb-95	< 0.0006	< 0.0005	< 0.0002	< 0.0000
Zr-95	< 0.0007	< 0.0008	< 0.0003	< 0.0001
Ru-103	< 0.0005	< 0.0005	< 0.0002	< 0.0000
Ru-106	< 0.0032	< 0.0044	< 0.0012	< 0.0003
I-131	< 0.0016	< 0.0017	< 0.0020	< 0.0003
Cs-134	< 0.0004	< 0.0005	< 0.0002	< 0.0000
Cs-137	< 0.0004	< 0.0006	< 0.0004	< 0.0000
Ba-140	< 0.0037	< 0.0034	< 0.0025	< 0.0004
La-140	< 0.0011	< 0.0012	< 0.0009	< 0.0002
Ce-141	< 0.0007	< 0.0010	< 0.0004	< 0.0001
Ce-144	< 0.0019	< 0.0031	< 0.0010	< 0.0001

Radioisotopes other than those reported were not detected.

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, continued.

Measurements in units of pCi/m^3

Site: PBK-8	1st quarter	2nd quarter	3rd quarter	4th quarter
Be-7	0.058 +- 0.006	0.070 +- 0.001	0.061 +- 0.004	0.047 +- 0.005
Mn-54	< 0.0003	< 0.0004	< 0.0001	< 0.0004
Co-58	< 0.0003	< 0.0004	< 0.0002	< 0.0004
Fe-59	< 0.0009	< 0.0009	< 0.0004	< 0.0008
Co-60	< 0.0005	< 0.0005	< 0.0002	< 0.0005
Zn-65	< 0.0007	< 0.0010	< 0.0003	< 0.0008
Nb-95	< 0.0005	< 0.0004	< 0.0002	< 0.0004
Zr-95	< 0.0007	< 0.0006	< 0.0003	< 0.0008
Ru-103	< 0.0004	< 0.0003	< 0.0002	< 0.0004
Ru-106	< 0.0030	< 0.0031	< 0.0012	< 0.0038
I-131	< 0.0020	< 0.0012	< 0.0019	< 0.0016
Cs-134	< 0.0004	< 0.0004	< 0.0001	< 0.0004
Cs-137	< 0.0005	< 0.0003	< 0.0003	< 0.0005
Ba-140	< 0.0034	< 0.0025	< 0.0025	< 0.0031
La-140	< 0.0014	< 0.0012	< 0.0008	< 0.0012
Ce-141	< 0.0008	< 0.0005	< 0.0004	< 0.0008
Ce-144	< 0.0023	< 0.0015	< 0.0010	< 0.0024
Site: PBK-17				
Be-7	0.044 +- 0.005	0.058 +- 0.006	0.039 +- 0.002	0.043 +- 0.005
Mn-54	< 0.0003	< 0.0003	< 0.0000	< 0.0003
Co-58	< 0.0003	< 0.0004	< 0.0001	< 0.0002
Fe-59	< 0.0006	< 0.0004	< 0.0001	< 0.0007
Co-60	< 0.0003	< 0.0003	< 0.0001	< 0.0004
Zn-65	< 0.0006	< 0.0006	< 0.0001	< 0.0006
Nb-95	< 0.0004	< 0.0004	< 0.0001	< 0.0004
Zr-95	< 0.0005	< 0.0005	< 0.0001	< 0.0006
Ru-103	< 0.0002	< 0.0003	< 0.0001	< 0.0004
Ru-106	< 0.0025	< 0.0024	< 0.0004	< 0.0028
I-131	< 0.0012	< 0.0007	< 0.0016	< 0.0018
Cs-134	< 0.0003	< 0.0003	< 0.0001	< 0.0004
Cs-137	< 0.0003	< 0.0004	< 0.0000	< 0.0004
Ba-140	< 0.0017	< 0.0019	< 0.0014	< 0.0029
La-140	< 0.0012	< 0.0006	< 0.0006	< 0.0013
Ce-141	< 0.0004	< 0.0004	< 0.0001	< 0.0005
Ce-144	< 0.0014	< 0.0014	< 0.0002	< 0.0013
Site: PBK-18				
Be-7	0.048 +- 0.004	0.063 +- 0.006	0.058 +- 0.007	0.038 +- 0.004
Mn-54	< 0.0003	< 0.0004	< 0.0001	< 0.0002
Co-58	< 0.0003	< 0.0004	< 0.0001	< 0.0003
Fe-59	< 0.0004	< 0.0008	< 0.0002	< 0.0006
Co-60	< 0.0003	< 0.0006	< 0.0001	< 0.0003
Zn-65	< 0.0005	< 0.0009	< 0.0002	< 0.0005
Nb-95	< 0.0003	< 0.0005	< 0.0002	< 0.0004
Zr-95	< 0.0005	< 0.0007	< 0.0002	< 0.0005
Ru-103	< 0.0003	< 0.0005	< 0.0002	< 0.0004
Ru-106	< 0.0021	< 0.0033	< 0.0008	< 0.0026
I-131	< 0.0006	< 0.0010	< 0.0019	< 0.0016
Cs-134	< 0.0003	< 0.0004	< 0.0001	< 0.0003
Cs-137	< 0.0002	< 0.0005	< 0.0001	< 0.0003
Ba-140	< 0.0013	< 0.0025	< 0.0022	< 0.0027
La-140	< 0.0005	< 0.0007	< 0.0008	< 0.0012
Ce-141	< 0.0004	< 0.0007	< 0.0003	< 0.0004
Ce-144	< 0.0011	< 0.0025	< 0.0006	< 0.0013

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:	01/09/14	04/30/14	07/09/14	10/14/14
Date Removed:	04/30/14	07/09/14	10/14/14	01/06/15
Days in the Field:	111	70	97	84

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

TLD sites located at the Point Beach ISFSI.

1	26.4 +- 1.9	26.2 +- 2.6	22.4 +- 1.6	30.5 +- 2.3
2	54.8 +- 2.8	48.8 +- 3.6	45.1 +- 3.0	62.8 +- 2.9
3	26.2 +- 1.3	23.2 +- 1.7	22.6 +- 1.7	28.2 +- 1.5
4	19.6 +- 1.9	17.3 +- 1.1	17.4 +- 1.2	20.5 +- 0.7
5	21.6 +- 0.6	13.5 +- 1.4	19.5 +- 0.5	19.6 +- 1.0
6	39.0 +- 1.0	33.3 +- 2.4	35.4 +- 1.4	38.7 +- 2.0
7	50.9 +- 2.1	51.2 +- 3.2	48.5 +- 2.1	59.2 +- 2.9
8	26.9 +- 1.1	23.2 +- 2.2	25.2 +- 1.5	28.4 +- 2.1
Quarterly average +- s.d.	33.2 +- 13.5	29.6 +- 13.9	29.5 +- 12.0	36.0 +- 16.6

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

9	14.2 +- 1.0	13.6 +- 1.2	16.3 +- 1.1	15.4 +- 0.9
10	12.3 +- 0.6	12.2 +- 1.5	12.9 +- 0.6	17.9 +- 1.4
11	11.1 +- 0.5	10.6 +- 1.4	12.1 +- 0.6	16.6 +- 0.7
12	13.8 +- 0.9	13.2 +- 1.4	16.6 +- 0.9	16.6 +- 1.1
13	10.4 +- 0.8	ND	13.0 +- 0.8	14.2 +- 0.9
14	15.9 +- 0.6	15.6 +- 1.4	16.4 +- 0.8	18.3 +- 1.1
19	14.7 +- 0.4	15.0 +- 1.9	15.6 +- 1.0	17.3 +- 1.5
20	12.1 +- 0.5	13.0 +- 1.2	14.1 +- 0.5	15.2 +- 0.8
21	10.7 +- 0.5	13.3 +- 1.5	13.5 +- 0.5	15.5 +- 0.8
22	14.8 +- 0.9	19.8 +- 1.0	16.4 +- 0.6	21.1 +- 0.8
Quarterly average +- s.d.	13.0 +- 1.9	14.0 +- 2.6	14.7 +- 1.7	16.8 +- 2.0

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

15	14.6 +- 0.7	11.4 +- 1.2	15.0 +- 0.6	18.7 1.0
16	11.5 +- 1.1	10.6 +- 1.3	10.6 +- 0.9	12.5 0.9
17	12.3 +- 0.6	13.0 +- 1.3	12.7 +- 0.5	15.1 0.8
18	12.8 +- 0.3	20.4 +- 1.8	14.5 +- 0.5	21.7 1.4
23	14.0 +- 0.8	10.6 +- 1.3	14.9 +- 0.7	18.0 0.7
24	9.3 +- 0.6	11.5 +- 1.3	9.8 +- 0.5	13.5 0.9
25	12.2 +- 0.9	14.4 +- 1.4	13.2 +- 0.6	16.4 0.9
26	13.8 +- 0.8	10.8 +- 1.8	13.9 +- 0.5	13.2 0.8
Quarterly average +- s.d.	12.6 +- 1.7	12.8 +- 3.3	13.1 +- 2.0	16.1 +- 3.2

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

27	9.7 +- 0.4	14.0 +- 1.9	9.1 +- 0.4	14.2 1.2
28	ND	11.8 +- 1.9	13.0 +- 0.7	13.1 1.1
29	11.9 +- 0.4	10.3 +- 1.5	11.4 +- 0.4	11.6 0.9
30	12.6 +- 0.7	12.4 +- 1.8	12.8 +- 0.7	16.2 1.4
31	11.8 +- 0.7	8.4 +- 1.4	11.8 +- 0.9	12.4 1.0
Quarterly average +- s.d.	11.5 +- 1.3	11.4 +- 2.1	11.6 +- 1.6	13.5 +- 1.8

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
01/16/14	**0.44**	0.03 +- 0.01	< 2.4
02/19/14	**0.86**	0.04 +- 0.02	< 4.7
03/19/14	**0.38**	0.02 +- 0.01	< 2.1
04/23/14	**4.78**	0.74 +- 0.13	< 26.7
06/18/14	**8.59**	< 0.24	< 48.0
07/16/14	**1.31**	< 0.04	< 7.2
08/20/14	**3.35**	0.30 +- 0.08	< 18.1
09/24/14	**2.41**	0.07 < 0.04	< 13.0
10/23/14	**4.04**	0.15 +- 0.07	< 21.7
11/18/14	**1.37**	0.14 +- 0.03	< 7.3
12/12/14	**1.26**	0.05 +- 0.03	< 6.7
01/16/14	**0.44**	0.03 +- 0.01	< 2.4

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

Measurements in units of pCi/kilogram (wet)

Collection date:	01/30/14	03/12/14	03/14/14	06/14/14
Type	* a	*b	brown trout	brown trout
gamma isotopic				
K-40	2650 +- 470	3010 +- 490	1090 +- 190	3500 +- 600
Mn-54	< 8	< 6	< 3	< 7
Co-58	< 9	< 7	< 6	< 9
Fe-59	< 18	< 23	< 20	< 22
Co-60	< 9	< 7	< 4	< 13
Zn-65	< 18	< 13	< 8	< 23
Nb-95	< 8	< 14	< 12	< 11
Zr-95	< 13	< 15	< 11	< 17
Cs-134	< 6	< 5	< 3	< 7
Cs-137	26 +- 6	43 +- 5	7 +- 2	30 +- 6

Collection date:	07/01/14	09/01/14
Type	*c	*d
gamma isotopic		
K-40	2680 +- 446	3360 +- 537
Mn-54	< 6	< 4
Co-58	< 8	< 7
Fe-59	< 28	< 23
Co-60	< 8	< 5
Zn-65	< 16	< 9
Nb-95	< 14	< 20
Zr-95	< 19	< 13
Cs-134	< 8	< 4
Cs-137	+- 8	18 +- 4

Radioisotopes other than those reported were not detected.

*a - One sample from three separate samples of lake trout, small mouth bass and perch.

*b - One sample from three separate samples of catfish, small mouth bass and perch.

*c - One sample from five separate samples of Salmon, Brown Trout, Lake Trout, Burbot, Burbot

*d - One Sample from Coho Salmon and Lake Trout

Table 10 Wisconsin 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:	06/17/14	06/18/14	06/18/14
Site:	PBK-5	PBK-10a	PBK-29
gross alpha	< 3500	< 3700	< 3730
gross beta	3500 +- 1000	2900 +- 1200	5150 +- 1090
K-40	6700 +- 1200	4700 +- 800	6310 +- 1090
Mn-54	< 16	< 18	< 17
Co-58	< 19	< 14	< 16
Fe-59	< 43	< 35	< 46
Co-60	< 19	< 19	< 16
Zn-65	< 40	< 27	< 36
Nb-95	< 21	< 20	< 21
Zr-95	< 32	< 24	< 32
Cs-134	< 18	< 16	< 15
Cs-137	< 23	< 21	< 22

Collection date:	06/17/14	06/17/14	06/17/14	06/17/14
Site:	PBK-12a	PBK-12b	PBK-12c	PBK-26
gross alpha	7300 +- 3100	< 3650	4410 +- 2660	< 4070
gross beta	4590 +- 994	3880 +- 1020	3890 +- 1170	3700 +- 1120
K-40	4200 +- 800	5600 +- 1000	2430 +- 473	4730 +- 838
Mn-54	< 23	< 19	< 23	< 15
Co-58	< 18	< 18	< 22	< 16
Fe-59	< 42	< 37	< 41	< 43
Co-60	< 22	< 26	< 27	< 21
Zn-65	< 36	< 39	< 44	< 35
Nb-95	< 24	< 26	< 40	< 24
Zr-95	< 38	< 36	< 44	< 30
Cs-134	< 17	< 16	< 21	< 14
Cs-137	23 +- 9	18 +- 9	< 33	< 23

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 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:	January	02/13/14	03/19/14	04/16/14	05/14/14	06/12/14
gross alpha-sol		< 1.0	2.5 ± 1.6	< 1.4	1.9 ± 1.3	2.1 ± 1.0
gross beta-sol		1.8 +- 0.9	5.0 ± 1.1	2.0 ± 0.8	< 1.8	4.6 ± 1.2
gross alpha-insol		< 0.6	< 0.6	< 0.6	< 0.7	< 0.6
gross beta-insol		< 1.2	< 1.1	< 1.1	< 1.7	< 1.1
I-131		*e		*e		*e
H-3 *a			< 216			< 220
Sr-89 *a			< 1.38			< 1.4
Sr-90 *a			0.1 ± 0.1			< 0.2
gamma isotopic						
Mn-54		< 9	< 10	< 6	< 10	< 9
Co-58		< 8	< 9	< 6	< 8	< 9
Fe-59		< 16	< 16	< 17	< 17	< 16
Co-60		< 12	< 12	< 6	< 14	< 13
Zn-65		< 19	< 20	< 13	< 18	< 22
Nb-95		< 9	< 9	< 6	< 10	< 10
Zr-95		< 15	< 17	< 14	< 16	< 17
I-131		< 15	< 13	< 8	< 12	< 12
Cs-134		< 10	< 11	< 7	< 10	< 11
Cs-137		< 9	< 13	< 8	< 12	< 13
Ba-140		< 36	< 39	< 23	< 39	< 38
La-140		< 14	< 14	< 13	< 12	< 12

Collection date:	07/10/14	08/14/14	09/17/14	10/26/04	11/12/14	12/17/14
gross alpha-sol	< 1.0	< 0.9	< 0.8	< 1.0	< 0.9	1.9 ± 1.2
gross beta-sol	1.4 ± 0.9	1.5 ± 0.8	1.1 ± 0.7	1.2 ± 0.8	2.0 ± 0.8	2.2 ± 0.9
gross alpha-insol	< 0.5	0.1 ± 0.5	< 0.6	< 0.9	< 0.1	< 0.7
gross beta-insol	< 1.1	< 1.1	< 1.2	< 1.3	< 1.3	< 1.2
I-131	*e		*e		< 1.1 ***c**	
H-3 *a	< 214			< 210		
Sr-89 *a	< 0.66			***b**		
Sr-90 *a	< 0.26			***b**		
gamma isotopic						
Mn-54	< 9	< 7	< 10	< 8	< 2	< 10 *d
Co-58	< 8	< 6	< 9	< 7	< 2	< 8
Fe-59	< 15	< 11	< 12	< 19	< 5	< 18
Co-60	< 8	< 8	< 13	< 11	< 3	< 12
Zn-65	< 13	< 18	< 23	< 16	< 6	< 17
Nb-95	< 9	< 8	< 12	< 8	< 3	< 9
Zr-95	< 12	< 14	< 19	< 12	< 4	< 18
I-131	< 8	< 12	< 14	< 11	< 3	< 15
Cs-134	< 9	< 7	< 12	< 8	< 3	< 9
Cs-137	< 8	< 8	< 14	< 8	< 3	< 11
Ba-140	< 34	< 34	< 46	< 36	< 10	< 41
La-140	< 13	< 8	< 15 *d	< 14	< 4	< 12

*a - Analysis is performed on a quarterly composite.

*b - There was a laboratory quality issue with the sample

*c - The detection limit of 0.5 pCi/L was not met

*d - The detection limit was not met

Radioisotopes other than those reported were not detected.

*e – Laboratory Error in analysis, conducted 6 time a year

Table 11. Wisconsin 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 (K-001D); Kewaunee effluent channel

Collection date:	01/02/14	02/03/14	03/03/14	04/01/14	05/01/14	06/02/14
gross alpha-sol	< 0.8	< 1.0	< 1.0	< 1.5	< 1.0	< 0.9
gross beta-sol	< 1.0	1.5 ± 0.9	2.7 ± 1.0	2.3 ± 0.9	< 1.7	3.0 ± 1.0
gross alpha-insol	< 0.5	< 0.6	< 0.6	< 0.6	< 0.6	< 0.5
gross beta-insol	< 1.0	< 1.1	< 1.0	< 1.1	< 1.0	< 1.1
I-131		< 1.1*b		*e		*e
H-3 *			< 218			< 220
Sr-89 *			< 3.2			< 1.8
Sr-90 *			0.3 +- 0.1			0.3 ± 0.2
gamma isotopic						
Mn-54	< 7	< 8		< 10	< 7	< 9
Co-58	< 6	< 4		< 9	< 6	< 8
Fe-59	< 13	< 13		< 18	< 12	< 12
Co-60	< 9	< 10		< 13	< 7	< 7
Zn-65	< 16	< 14		< 21	< 14	< 24
Nb-95	< 7	< 7		< 11	< 8	< 10
Zr-95	< 12	< 12		< 15	< 11	< 12
I-131	< 10	< 9		< 11	< 13	< 12
Cs-134	< 7	< 9		< 10	< 8	< 7
Cs-137	< 9	< 7		< 8	< 8	< 7
Ba-140	< 38	< 23		< 29	< 41	< 38
La-140	< 11	< 12		< 12	< 14	< 14

Collection date:	07/01/14	08/04/14	09/02/14	10/01/14	11/03/14	12/01/14
gross alpha-sol	< 0.9	< 0.9	< 0.9	< 0.9	< 0.5	< 1.1
gross beta-sol	1.4 ± 0.9	< 1.1	2.3 ± 0.8	< 1.3	< 0.9	1.3 ± 0.8
gross alpha-insol	< 0.6	< 0.6	< 0.6	< 0.5	< 0.8	< 0.5
gross beta-insol	< 1.1	< 1.3	< 1.3	< 1.3	< 8.4	< 1.2
I-131				< 0.13	< 2.4 *b	< 0.27 ***b**
H-3 *	< 215			< 211	c	
Sr-89 *	< 0.57			b	b	
Sr-90 *	0.37 ± 0.15			b	b	
gamma isotopic						
Mn-54	< 9	< 9	< 9	< 6	< 8	< 8
Co-58	< 9	< 8	< 7	< 6	< 8	< 7
Fe-59	< 19	< 17	< 16	< 12	< 20	< 17
Co-60	< 10	< 11	< 11	< 6	< 10	< 10
Zn-65	< 21	< 17	< 16	< 11	< 25	< 18
Nb-95	< 9	< 9	< 9	< 6	< 9	< 8
Zr-95	< 13	< 17	< 16	< 11	< 12	< 15
I-131	< 13	< 14	< 16 *c	< 13	< 15	< 10
Cs-134	< 8	< 10	< 9	< 6	< 9	< 9
Cs-137	< 10	< 13	< 12	< 6	< 8	< 9
Ba-140	< 41	< 43	< 39	< 34	< 36	< 38
La-140	< 10	< 15	< 13	< 12	< 13	< 14

*a - Analysis is performed on a quarterly composite.

*b - There was a laboratory quality issue with the sample

*c - The detection limit of 0.5 pCi/L was not met

*d - The detection limit was not met

Radioisotopes other than those reported were not detected.

*e – Laboratory Error in analysis, conducted 6 time a year

Table 11. Wisconsin 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:	01/13/14	02/03/14	03/03/14	04/07/14	05/05/14	06/02/14
gross alpha-sol	< 0.9	1.0 ± 0.8	1.3 ± 0.8	< 0.8	< 1.0	1.6 ± 0.9
gross beta-sol	1.5 ± 0.8	1.7 ± 0.8	2.4 ± 0.8	1.2 ± 0.7	< 2.0	1.5 ± 0.8
gross alpha-insol	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
gross beta-insol	< 1.1	< 1.3	< 1.3	< 1.2	< 0.8	< 1.1
I-131		< 1.6*c	< 0.1		*e	
H-3 *			< 220			< 220
Sr-89 *			< 2.6			< 1.4
Sr-90 *			< 0.2			0.3 ± 0.2
gamma isotopic						
Mn-54	< 9	< 9	< 10	< 10	< 7	< 9
Co-58	< 8	< 8	< 11	< 12	< 6	< 9
Fe-59	< 23	< 6	< 19	< 22	< 10	< 23
Co-60	< 12	< 3	< 10	< 12	< 8	< 13
Zn-65	< 25	< 12	< 17	< 26	< 14	< 26
Nb-95	< 10	< 9	< 11	< 11	< 8	< 9
Zr-95	< 16	< 15	< 19	< 16	< 11	< 3
I-131	< 11	< 9	< 10	< 11	< 7	< 12
Cs-134	< 11	< 8	< 7	< 11	< 10	< 11
Cs-137	< 6	< 10	< 11	< 7	< 8	< 9
Ba-140	< 29	< 27	< 38	< 50	< 27	< 27
La-140	< 14	< 15	< 13	< 12	< 8	< 11

Collection date:	07/07/14	08/04/14	09/08/14	10/07/14	11/03/14	12/01/14
gross alpha-sol	< 0.9	0.8 ± 0.7	< 1.0	< 1.0	< 0.6	< 0.8
gross beta-sol	1.18 ± 0.8	1.5 ± 0.8	2.1 ± 0.9	< 1.2	< 1.2	1.7 ± 0.9
gross alpha-insol	< 0.5	0.6 ± 0.5	< 0.6	< 0.7	< 1.3	< 0.5
gross beta-insol	< 1.1	< 1.1	< 1.1	< 1.1	< 1.3	< 1.1
I-131				< 0.15	< 3.22 *b	< 0.35
H-3 *	< 214			< 211		
Sr-89 *	< 0.6			< b		
Sr-90 *	< 0.27			< b		
gamma isotopic						
Mn-54	< 9	< 10	< 6	< 6	< 10	< 9
Co-58	< 12	< 8	< 6	< 6	< 10	< 7
Fe-59	< 22	< 17	< 12	< 12	< 21	< 14
Co-60	< 12	< 12	< 7	< 5	< 13	< 11
Zn-65	< 26	< 18	< 13	< 10	< 22	< 16
Nb-95	< 11	< 9	< 6	< 5	< 10	< 8
Zr-95	< 1	< 14	< 10	< 10	< 17	< 14
I-131	< 13	< 12	< 7	< 9	< 10	< 9
Cs-134	< 11	< 10	< 7	< 5	< 11	< 8
Cs-137	< 11	< 13	< 7	< 6	< 10	< 10
Ba-140	< 37	< 38	< 24	< 26	< 40	< 30
La-140	< 11	< 12	< 7	< 7	< 4	< 9

*a - Analysis is performed on a quarterly composite.

*b - There was a laboratory quality issue with the sample

*c - The detection limit of 0.5 pCi/L was not met

*d - The detection limit was not met

Radioisotopes other than those reported were not detected.

*e – Laboratory Error in analysis, conducted 6 time a year

Table 11. Wisconsin 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:	06/17/14	06/18/14	10/29/14	10/29/14
gross alpha-sol	1.8 +- 0.9	1.4 +- 0.9	< 1.1	< 1.14
gross beta-sol	1.8 +- 0.8	2.0 +- 0.8	1.3 +- 1.2	2.2 +- 0.76
gross alpha-insol	< 0.6	< 0.8	< 0.7	< 0.66
gross beta-insol	< 1.1	< 1.2	< 1.2	< 1.58
H-3	< 220	< 217	< 210	< 210
Sr-89	< 0.4	< 0.4	b	b
Sr-90	< 0.2	< 0.2	b	b
gamma isotopic				
Mn-54	< 6	< 8.8	< 10	< 8.34
Co-58	< 10	< 8.3	< 11	< 7.25
Fe-59	< 13	< 16.3	< 18	< 17
Co-60	< 10	< 9.6	< 13	< 11.9
Zn-65	< 24	< 20.5	< 20	< 21
Nb-95	< 10	< 7.9	< 11	< 7.47
Zr-95	< 14	< 13.7	< 19	< 12.3
I-131	< 8	< 11.8	< 10	< 7.41
Cs-134	< 9	< 7.9	< 11	< 8.81
Cs-137	< 5	< 7.5	< 10	< 7.96
Ba-140	< 32	< 39.1	< 35	< 31.3
La-140	< 14	< 14.2	< 13	< 12.4

*a - Analysis is performed on a quarterly composite. *b - There was a laboratory quality issue with the sample
*c - The detection limit of 0.5 pCi/L was not met *d - The detection limit was not met

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:	07/17/14	04/16/14	06/17/14	06/17/14	06/17/14
gross alpha	< 0.9	< 2.5	1.7 +- 1.2	4.3 +- 1.7	3.0 +- 1.7
gross beta	< 0.9	2.5 +- 1.5	< 1.0	1.7 +- 0.9	2.6 +- 0.9
H-3	< 220	< 220	< 220	< 220	< 220

	PBK-3	PBK-10	PBK-11	PBK-12d N	PBK-12d S
Collection date:	10/29/14	10/15/14	10/29/14	10/28/14	10/28/14
gross alpha	< 1.8	3.36 +- 1.7	< 1.6	3.4 +- 1.7	5.1 +- 1.8
gross beta	< 1.1	< 1.38	< 1.1	2.0 +- 1.0	1.5 +- 0.9
H-3	< 210	< 210	< 210	< 210	< 210

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.

Measurements in units of pCi/liter

PBK-28 (E-21); Strutz farm

Collection date:	01/08/14	02/12/14	03/12/14	04/09/14	05/14/14	06/11/14
I-131		< 0.7 *c		*e		*e
Sr-90	< 0.4	0.4 +- 0.2	< 0.3	0.3 +- 0.2	< 0.3	0.4 +- 0.2
gamma isotopic						
K-40	1440 +- 290	1410 +- 270	1340 +- 284	1270 +- 310	1360 +- 330	1580 +- 300
Mn-54	< 10	< 7	< 11	< 13	< 11	< 10
Co-58	< 10	< 7	< 9	< 9	< 9	< 9
Fe-59	< 21	< 16	< 20	< 25	< 26	< 20
Co-60	< 14	< 7	< 10	< 14	< 13	< 15
Zn-65	< 23	< 15	< 24	< 30	< 26	< 25
Nb-95	< 9	< 6	< 12	< 11	< 12	< 11
Zr-95	< 18	< 12	< 15	< 18	< 18	< 18
I-131	< 12	< 11	< 15	< 11	< 13	< 11
Cs-134	< 10	< 6	< 7	< 8	< 12	< 10
Cs-137	< 13	< 7	< 6	< 9	< 8	< 14
Ba-140	< 31	< 30	< 39	< 43	< 31	< 37
La-140	< 10	< 10	< 12	< 12	< 4	< 11

Collection date:	07/09/14	08/13/14	09/10/14	10/08/14	11/12/14	12/10/14 *d
I-131				< 0.2	< 3.14 *c	< 0.3
Sr-90	< 0.3*b	0.3 +- 0.2	< 0.7 *b	< 0.5	*e	*e
gamma isotopic						
K-40	1340 +- 321	1350 +- 253	1480 +- 280	1470 +- 265	1350 +- 275	1250 +- 236
Mn-54	< 11	< 8	< 11	< 6	< 8	< 8
Co-58	< 9	< 8	< 10	< 5	< 8	< 7
Fe-59	< 18	< 18	< 20	< 12	< 17	< 12
Co-60	< 14	< 11	< 15	< 7	< 9	< 9
Zn-65	< 27	< 17	< 20	< 14	< 21	< 16
Nb-95	< 13	< 9	< 8	< 7	< 9	< 8
Zr-95	< 17	< 15	< 18	< 10	< 13	< 14
I-131	< 11	< 14	< 12	< 7	< 8	< 14
Cs-134	< 11	< 9	< 10	< 7	< 10	< 8
Cs-137	< 11	< 10	< 13	< 7	< 10	< 6
Ba-140	< 36	< 39	< 37	< 27	< 30	< 40
La-140	< 15	< 9	< 12	< 8	< 11	< 14

Radioisotopes other than those reported were not detected.

*a – Detection limit not met due to laboratory error

*b - There was a quality issue with the sample

*c - The detection limit of 0.5 pCi/L was not met

*d – There was an unacceptable high background

*e – laboratory error, data not reported

Table 13. Wisconsin 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:	01/08/14	02/12/14	03/12/14	04/09/14	05/14/14	06/11/14
I-131		< 0.7 *c		*e		*e
Sr-90	0.4 +- 0.2	0.6 +- 0.2	< 0.3	< 0.3	0.8 +- 0.2	0.4 +- 0.0
gamma isotopic						
K-40	1360 +- 280	1300 +- 260	1600 +- 320	1250 +- 250	1620 +- 330	1400 +- 320
Mn-54	< 11	< 9	< 11	< 9	< 11	< 11
Co-58	< 9	< 6	< 12	< 7	< 7	< 7
Fe-59	< 20	< 17	< 22	< 17	< 18	< 17
Co-60	< 15	< 10	< 14	< 13	< 9	< 12
Zn-65	< 23	< 18	< 30	< 20	< 22	< 17
Nb-95	< 11	< 9	< 11	< 10	< 10	< 11
Zr-95	< 16	< 11	< 18	< 16	< 16	< 14
I-131	< 14	< 12	< 15	< 12	< 9	< 10
Cs-134	< 10	< 7	< 12	< 9	< 8	< 9
Cs-137	< 13	< 7	< 14	< 11	< 7	< 11
Ba-140	< 40	< 28	< 44	< 33	< 28	< 32
La-140	< 10	< 13	< 16	< 10	< 13	< 14

Collection date:	07/09/14	08/13/14	09/10/14	10/08/14	11/12/14	12/10/14
I-131				0.22 +- 0.1	< 1.29 **c**	< 0.2
Sr-90	< 0.3 *b	< 0.3	0.6 +- 0.3	0.59 +- 0.35 *b	*e	*e
gamma isotopic						
K-40	1440 +- 284	1330 +- 246	1490 +- 299	1270 +- 246	1240 +- 258	1440 +- 270
Mn-54	< 10	< 8	< 11	< 7	< 8	< 6
Co-58	< 9	< 8	< 10	< 6	< 8	< 6
Fe-59	< 24	< 16	< 18	< 11	< 16	< 15
Co-60	< 13	< 12	< 14	< 9	< 10	< 8
Zn-65	< 22	< 16	< 26	< 17	< 21	< 13
Nb-95	< 11	< 8	< 11	< 8	< 8	< 7
Zr-95	< 17	< 13	< 17	< 11	< 11	< 11
I-131	< 15	< 14	< 12	< 9	< 9	< 12
Cs-134	< 10	< 8	< 11	< 10	< 10	< 8
Cs-137	< 13	< 10	< 13	< 6	< 9	< 8
Ba-140	< 47	< 42	< 40	< 31	< 32	< 32
La-140	< 14	< 12	< 10	< 9	< 12	< 12

Radioisotopes other than those reported were not detected.

*a – Detection limit not met due to laboratory error

*b - There was a quality issue with the sample

*c - The detection limit of 0.5 pCi/L was not met

*d – There was an unacceptable high background

*e – laboratory error, data not reported

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

Measurements in units of pCi/liter

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

Collection date:	01/08/14	02/12/14	03/12/14	04/09/14	05/14/14	06/11/14
I-131		< 0.8		*e		*e
Sr-90	< 0.3	0.5 +- 0.2	< 0.3	< 0.3	0.3 +- 0.2	0.21 +- 0.1
gamma isotopic						
K-40	1530 +- 350	1460 +- 260	1430 +- 290	1690 +- 380	1300 +- 270	1520 +- 348
Mn-54	< 12	< 8	< 9	< 11	< 10	< 11
Co-58	< 8	< 7	< 9	< 13	< 9	< 10
Fe-59	< 22	< 15	< 17	< 23	< 22	< 27
Co-60	< 15	< 9	< 10	< 14	< 14	< 15
Zn-65	< 27	< 15	< 20	< 24	< 23	< 22
Nb-95	< 13	< 7	< 9	< 13	< 10	< 12
Zr-95	< 17	< 11	< 15	< 16	< 18	< 18
I-131	< 11	< 14	< 10	< 11	< 13	< 9
Cs-134	< 11	< 7	< 8	< 12	< 11	< 10
Cs-137	< 7	< 9	< 8	< 8	< 14	< 8
Ba-140	< 36	< 37	< 35	< 43	< 44	< 43
La-140	< 11	< 11	< 14	< 4	< 12	< 11

Collection date:	07/09/14	08/13/14	09/10/14	10/08/14	11/12/14	12/10/14
I-131				< 0.2	< 1.96 ***c**	< 0.3
Sr-90	*d	< 0.4 *d	< 0.3	*b	*e	*e
gamma isotopic						
K-40	1310 +- 266	1470 +- 216	1310 +- 273	1380 +- 263	1300 +- 269	1390 +- 264
Mn-54	< 11	< 6	< 12	< 7	< 10	< 8
Co-58	< 10	< 7	< 9	< 6	< 11	< 7
Fe-59	< 21	< 14	< 24	< 14	< 17	< 13
Co-60	< 15	< 9	< 15	< 7	< 13	< 9
Zn-65	< 25	< 14	< 21	< 19	< 22	< 17
Nb-95	< 10	< 6	< 12	< 10	< 11	< 9
Zr-95	< 18	< 12	< 18	< 12	< 18	< 14
I-131	< 13	< 11	< 14	< 14	< 13	< 14
Cs-134	< 10	< 6	< 11	< 9	< 11	< 9
Cs-137	< 15 *a	< 9	< 15	< 8	< 14	< 9
Ba-140	< 44	< 28	< 43	< 41	< 43	< 29
La-140	< 10	< 10	< 10	< 11	< 13	< 12

Radioisotopes other than those reported were not detected.

*a – Detection limit not met due to laboratory error

*b - There was a quality issue with the sample

*c - The detection limit of 0.5 pCi/L was not met

*d – There was an unacceptable high background

*e – laboratory error, data not reported

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**
Collection date:	06/17/14	06/18/14	06/17/14	06/18/14	06/17/14
gross alpha	< 1140	< 620	< 1070	< 640	< 730
gross beta	7200 +- 400	2300 +- 200	5300 +- 400	3300 +- 300	5700 +- 300
gamma isotopic					
Be-7	600 +- 130	710 +- 140	930 +- 190	420 +- 110	260 +- 110
K-40	4800 +- 900	4100 +- 800	5300 +- 1000	5200 +- 1000	5700 +- 1000
Mn-54	< 24	< 17	< 15	< 16	< 24
Co-58	< 24	< 17	< 25	< 14	< 21
Fe-59	< 59	< 44	< 49	< 41	< 46
Co-60	< 31	< 20	< 23	< 21	< 27
Zn-65	< 47	< 48	< 47	< 39	< 48
Nb-95	< 24	< 21	< 28	< 21	< 27
Zr-95	< 40	< 37	< 40	< 22	< 49
I-131	< 82 *a	< 47	< 68	< 25	< 82 *a
Cs-134	< 23	< 15	< 18	< 14	< 22
Cs-137	< 29	< 14	< 20	< 18	< 28
Ba-140	< 140	< 110	< 120	< 66	< 160
La-140	< 55	< 41	< 45	< 7	< 67

Site:	**PBK-7**	**PBK-8**	**PBK-14**	**PBK-17**	
Collection date:	06/18/14	06/17/14	06/1714	06/17/14	
gross alpha	< 770	< 383	< 739	< 560	< 770
gross beta	< 300	3390 +- 184	4430 +- 288	3800 +- 701	< 300
gamma isotopic					
Be-7	760 +- 140	378 96	757 +- 160	233 +- 76	760 +- 140
K-40	5000 +- 900	4440 807	4150 +- 814	3750 +- 701	5000 +- 900
Mn-54	< 17	19	< 29	< 14	< 17
Co-58	< 16	15	< 27	< 14	< 16
Fe-59	< 35	38	< 53	< 26	< 35
Co-60	< 24	23	< 34	< 17	< 24
Zn-65	< 44	37	< 65	< 32	< 44
Nb-95	< 22	23	< 32	< 15	< 22
Zr-95	< 34	34	< 47	< 20	< 34
I-131	< 28	44	< 58	< 22	< 28
Cs-134	< 17	20	< 29	< 13	< 17
Cs-137	< 15	21	< 33	< 11	< 15
Ba-140	< 80	112	< 156	< 60	< 80
La-140	< 24	25	< 56	< 24	< 24

Radioisotopes other than those reported were not detected.

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

Table 14. Wisconsin 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:	10/28/14	10/28/14	10/29/14	10/29/14	10/29/14
gross alpha	3390 +- 1790	< 2560	< 969	< 2090	< 1020
gross beta	4180 +- 673	4390 +- 604	6720 +- 403	3680 +- 564	6870 +- 487
gamma isotopic					
Be-7	8720 +- 505	5100 +- 391	3450 +- 308	5840 +- 518	3900 +- 366
K-40	3400 +- 644	5300 +- 918	8260 +- 1400	5360 +- 1000	6820 +- 1200
Mn-54	< 20	< 20	< 20	< 23	< 21
Co-58	< 20	< 20	< 24	< 25	< 21
Fe-59	< 53	< 45	< 50	< 60	< 46
Co-60	< 23	< 27	< 30	< 27	< 21
Zn-65	< 47	< 42	< 46	< 50	< 46
Nb-95	< 24	< 25	< 24	< 32	< 23
Zr-95	< 36	< 40	< 42	< 45	< 39
I-131	< 71	< 83 *a	< 78	< 77	< 56
Cs-134	< 21	< 20	< 21	< 23	< 19
Cs-137	< 20	< 25	< 26	< 21	< 19
Ba-140	< 158	< 163	< 176	< 175	< 140
La-140	< 52	< 51	< 49	< 34	< 27

Site:	**PBK-7**	**PBK-8**	**PBK-14**	**PBK-17**
Collection date:	10/29/14	10/29/14	10/28/14	10/29/14
gross alpha	< 1640	< 2480	< 1440	< 1210
gross beta	< 631	5920 +- 628	2490 +- 413	3630 +- 435
gamma isotopic				
Be-7	3800 +- 388	6210 +- 449	2440 +- 304	3610 +- 331
K-40	4710 +- 960	6220 +- 1060	4290 +- 873	4740 +- 854
Mn-54	< 31	< 22	< 27	< 24
Co-58	< 30	< 22	< 30	< 27
Fe-59	< 95	< 46	< 59	< 53
Co-60	< 43	< 28	< 32	< 33
Zn-65	< 64	< 43	< 67	< 48
Nb-95	< 30	< 26	< 27	< 29
Zr-95	< 36	< 40	< 44	< 41
I-131	< 80	< 76	< 78	< 82 *a
Cs-134	< 31	< 21	< 25	< 24
Cs-137	< 27	< 27	< 22	< 28
Ba-140	< 219	< 150	< 142	< 154
La-140	< 89	< 52	< 64	< 56

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:	06/17/14	06/12/14	06/17/14	06/18/14	06/17/14
gross alpha	5900 +- 2800	5400 +- 2900	7700 +- 3100	4900 +- 2800	4600 +- 2700
gross beta	12400 +- 1399	19500 +- 1600	14600 +- 1300	15600 +- 1400	15500 +- 1500
gamma isotopic					
K-40	14200 +- 2400	20900 +- 3500	19999 +- 3300	16600 +- 2800	17000 +- 2900
Mn-54	< 19	< 41	< 36	< 29	< 32
Co-58	< 25	< 32	< 29	< 28	< 28
Fe-59	< 61	< 78	< 77	< 64	< 77
Co-60	< 27	< 40-	< 41	< 32	< 40
Zn-65	< 57	< 77	< 80	< 68	< 74
Nb-95	< 30	< 47	< 41	< 32	< 34
Zr-95	< 44	< 65	< 64	< 50	< 52
Cs-134	< 22	< 34	< 30	< 25	< 25
Cs-137	150 +- 30	170 +- 30	150 30	90 20	130 30

Site:	**PBK-7**	**PBK-8**	**PBK-14**	**PBK-17**	
Collection date:	06/18/14	06/17/14	06/17/14	06/17/14	
gross alpha	9800 +- 3400	< 383	< 4000	< 4000	9800 +- 3400
gross beta	18000 +- 1500	3390 +- 184	< 1500	13000 +- 1350	18000 +- 1500
gamma isotopic					
K-40	19000 +- 3200	4440 +- 807	1760 +- 405	14200 +- 2400	19000 +- 3200
Mn-54	< 32	< 19	< 22	< 29	< 32
Co-58	< 31	< 15	< 17	< 26	< 31
Fe-59	< 84	< 38	< 43	< 71	< 84
Co-60	< 42	< 23	< 12	< 29	< 42
Zn-65	< 75	< 37	< 41	< 73	< 75
Nb-95	< 35	< 23	< 28	< 38	< 35
Zr-95	< 57	< 34	< 23	< 63	< 57
Cs-134	< 25	< 20	< 20	< 26	< 25
Cs-137	120 +- 20	< 21	< 25	73 +- 20	120 +- 20

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. Wisconsin 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:	10/28/14	10/28/14	10/29/14	10/29/14	10/29/14
gross alpha	6080 +- 3030	7820 +- 3190	6630 +- 3010	4430 +- 2960	9310 +- 3670
gross beta	17000 +- 1400	30700 +- 1790	19900 +- 1770	17500 +- 1380	21400 +- 1432
gamma isotopic					
K-40	13600 +- 2290	19400 +- 3250	16300 +- 2760	16700 +- 2840	17900 +- 3000
Mn-54	< 29	< 44	< 35	< 25	< 39
Co-58	< 29	< 37	< 37	< 36	< 32
Fe-59	< 70	< 101	< 94	< 85	< 89
Co-60	< 32	< 56	< 48	< 35	< 32
Zn-65	< 59	< 116	< 95	< 72	< 85
Nb-95	< 31	< 50	< 45	< 39	< 53
Zr-95	< 49	< 65	<	< 59	< 68
Cs-134	< 25	< 36	< 34	< 31	< 29
Cs-137	231 +- 31	121 +- 31	34 +- 17	95 +- 23	118 +- 27

Site:	**PBK-7**	**PBK-8**	**PBK-14**	**PBK-17**
Collection date:	10/29/14	10/29/14	10/28/14	10/29/14
gross alpha	5500 +- 2930	6040 +- 3120	7320 +- 3560	6230 +- 3130
gross beta	23300 +- 1470	20400 +- 1480	15300 +- 1850	15500 +- 1350
gamma isotopic				
K-40	20900 +- 3530	17100 +- 2900	17200 +- 2920	12600 +- 2180
Mn-54	< 35	< 32	< 34	< 30
Co-58	< 39	< 35	< 32	< 26
Fe-59	< 116	< 92	< 96	< 97
Co-60	< 44	< 32	< 42	< 33
Zn-65	< 95	< 85	< 90	< 75
Nb-95	< 53	< 51	< 52	< 45
Zr-95	< 72	< 69	< 63	< 59
Cs-134	< 36	< 30	< 30	< 28
Cs-137	111 +- 27	52 +- 18	111 +- 26	160 +- 28

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.