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Dear Recipient:

Enclosed for your information is our radiological environmental monitoring report for calendar year 2007 prepared by the Radiation Protection Section.

Thank you for your interest in this report. If your mailing address is incorrect or if it changes in the future please notify this office so that we may keep our mailing list current. The radiological environmental monitoring reports are also available for your information on our website http://www.dhs.wisconsin.gov/dph_beh/RadiatioP/.

If you desire additional copies or have any questions, please do not hesitate to contact Mr. Don Hendrikse (608) 267-4790 or myself at (608) 267-4792.

A handwritten signature in cursive script that reads "Paul Schmidt".

Paul Schmidt, Chief
Radiation Protection Section

State of Wisconsin

2007

**La Crosse Boiling Water Reactor
Environmental Radioactivity Survey**

**Wisconsin Department of Health Services
Division of Public Health
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State of Wisconsin DHS

2007

LACBWR Environmental Radioactivity Survey

Introduction

Wisconsin Public Health Statutes 254.41 mandates the 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 La Crosse boiling water reactor (LACBWR) for the calendar year January - December ~~2006~~ and provides a description and results of this environmental monitoring program.

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2007

WI DHS LACBWR 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, ambient gamma radiation (TLD), surface water, fish, bottom sediments, soil and vegetation that are collected from selected locations at planned sampling intervals.

Table 1 is a listing of sampling sites and includes a description, direction and distance from the monitored power plant. Table 2 provides a listing of the types of samples collected, sites where samples are collected, the number of samples collected, number of samples that were missed or had noted problems and a listing of the required analyses. Table 3 provides an explanation of missing samples or non-routine sample analyses. Figure 1 is a map showing the location of each environmental sampling site.

Program Modifications

On April 30, 1987, Dairyland Power Cooperative permanently shutdown the LACBWR facility. Their NRC licensee was amended to a possess-but-not-operate status on August 4, 1987 and they are now in the process of decommissioning the LACBWR facility. Since any severe accident involving the stored spent fuel will have little offsite consequences, the WI DHS environmental radioactivity monitoring program was modified in June 1988. These modifications included the elimination of precipitation, shoreline sediment and well water samples as well as a reduction in vegetation, soil and some surface water sampling.

In response to this and considering other funding restrictions the LACBWR environmental monitoring program was reviewed and further modified in 1998, 1999 and 2000. Table 1 is a listing of presently used sampling sites that have been renumbered after eliminating sample sites that have been discontinued. Sampling sites that have been discontinued were last listed as sampling sites in WI DHS's environmental monitoring report for the La Crosse boiling water reactor (LACBWR) for the calendar year of January - December, 1999.

There were no program modifications for 2007.

Laboratory Services and Quality Assurance

The analysis of the samples is performed under contract with the State Laboratory of Hygiene (SLH). SLH 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.

SLH participates in the Environmental Resource Associates' Proficiency Testing program and has performed satisfactorily over the report period. Proficiency testing results are available from the 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 5-11 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. WI DHS LACBWR environmental monitoring sampling sites.

<u>Sample site</u>	<u>Distance and direction (miles)</u>	<u>Location description</u>
LAC-1	15.0 N	La Crosse State Office Building
LAC-2	0.6 N	Lock & Dam #8
LAC-3	0.1 WSW	discharge channel
LAC-4	0.7 SSW	boat launch area
LAC-5	0.6 NNE	Hwy 35 parking lot
LAC-6	0.7 S	boat launch access road
LAC-7	0.8 ENE	Philip Malin farm (discontinued beginning January 2001)
LAC-T1	0.6 N	Lock & Dam #8
LAC-T2	2.0 E	Radio tower, Mound Ridge road
LAC-T3	0.5 SSE	Trailer court, Hwy 35
LAC-T4	15.0 N	La Crosse State Office Building

Table 2. Sample collection summary and required analyses for 2007.

<u>Sample Type</u>	<u>Collection and Frequency</u>	<u>Site locations</u>	<u>Number of Samples Collected</u>	<u>Number of Sample Deviations</u>	<u>Required Analyses</u>
air particulate	BW	1, 2	52	0	GA, GB, GI
TLD	G/Q	T1-T4	15	1	direct exposure
surface water	G/Q	2, 3	8	0	GA, GB, GI, Sr, H
bottom sediment	G/SA	2, 3, 4	6	0	GA, GB, GI
fish	G/Q	3	8	0	GI
vegetation	G/SA	5, 6	4	0	GA, GB, GI
soil	G/SA	5, 6	4	0	GA, GB, GI

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; H = tritium

Table 3. WI DHS missing sample or non-routine analysis report for 2007.

Sample type	Date	Site	Explanation
TLD	4 th quarter	LAC-T2	No data, the TLD was lost in the field.

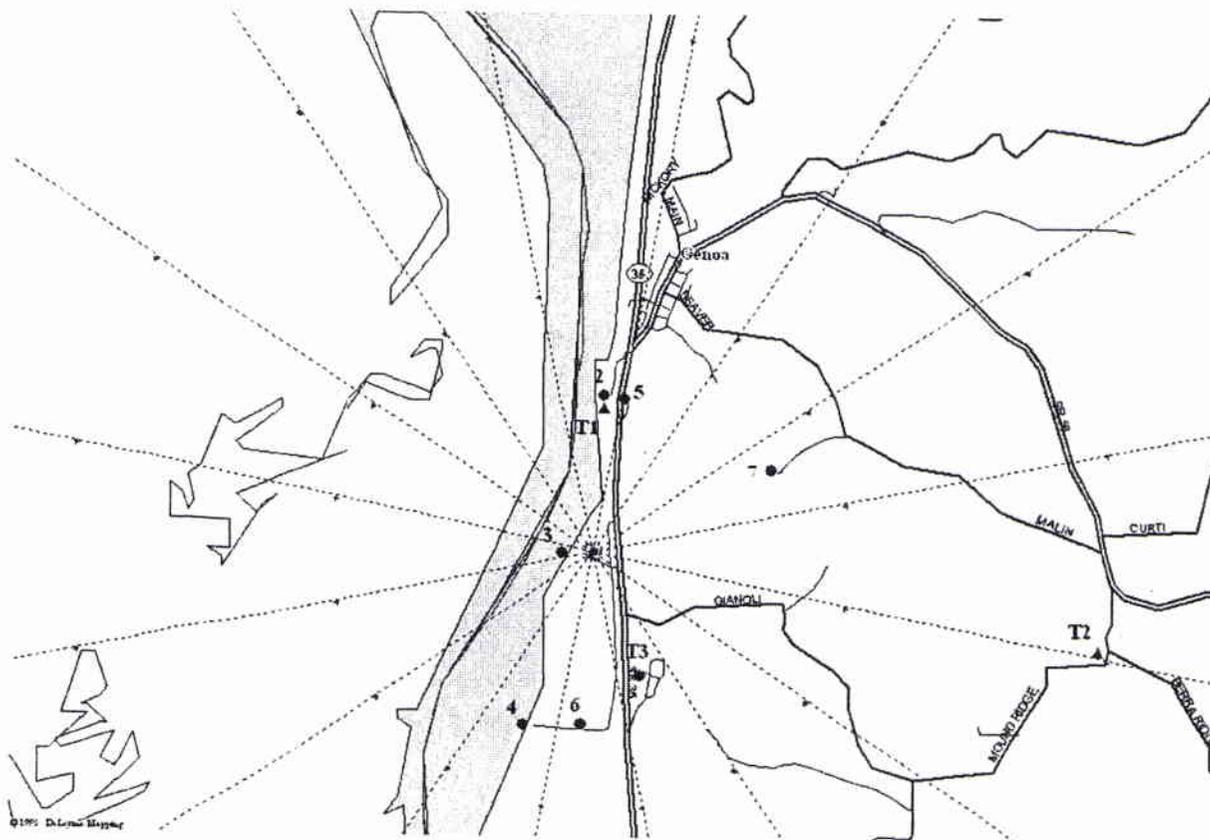


Figure 1. LACBWR environmental monitoring sampling sites.

Results And Discussion

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 and 6.

From the quarterly gross beta activities listed in Table 5 it may be noted that there are no significant differences due to distance from the LACBWR facility. With no significant differences due to distance from the LACBWR facility an increase in gross beta activity attributable to LACBWR 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 lower limit of detection. Naturally occurring beryllium-7 (^7Be), detected in all composites, 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.

Influence by the LACBWR facility on air quality is not evident from air particulate analysis.

Direct Radiation - Thermoluminescent Dosimeters (TLD's)

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

Direct radiation (TLD) data for 2007 from the WI DHS network was comparable for all sites. Significant differences in exposure were not noticed at different distances from the LACBWR facility. The average quarterly exposure from the four sites located within Wisconsin was 14.8 ± 1.7 milliroentgens. The average quarterly exposure for 2007 is at background levels and is comparable to other areas within Wisconsin.

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 8.

The fish samples showed no unusual activities. Naturally occurring potassium-40 (^{40}K) was reported in all samples. All other radioisotopes were below their respective lower limit of detection.

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 9.

The surface water samples showed no unusual activities. All detected activities are at background levels and are comparable to data from previous years. The surface water samples uniformly show activities below state or federal standards.

Bottom sediments

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

The naturally occurring radioisotope potassium-40 (^{40}K) was detected in all samples. The gamma isotopic analysis of the bottom sediment samples taken at site LAC-3 detected small activities for cesium-137 (^{137}Cs). The reported activities for cesium-137 (^{137}Cs) can be attributable to past effluent discharges from the LACBWR facility and have also been detected in previous years. 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) and 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.

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 11.

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.

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 11.

Analysis of the soil samples showed no unusual activities. The naturally occurring radioisotopes potassium-40 (^{40}K) was detected in all samples. The reported activities for cesium-137 (^{137}Cs) were also detected in previous years and are attributable to residual fallout from previous atmospheric nuclear weapons tests. 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) and 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.

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 LACBWR facility are less than the limits as stated in these Federal regulations.

The WI DHS limits for permissible levels of radiation exposure from external sources in unrestricted areas are defined in the Wis. Adm. Code section HFS 157.23. Doses resulting from gaseous and liquid effluent releases from the LACBWR facility are less than the limits as stated in Wis. Adm. Code section HFS 157.23.

References

State of Wisconsin, Wisconsin Administrative Code, HFS 157.23

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 2007 for the WI DHS LACBWR environmental monitoring program.

Sample type (units)	LLD	Number of samples ^a	Analysis	Range
air particulate (pCi/m ³)	0.003	52 / 52	gross beta	0.013 - 0.051
			gamma isotopic	
	0.020	8 / 8	Be-7	0.042 - 0.104
	0.002	8 / 0	Mn-54	< 0.0007
	0.002	8 / 0	Co-58	< 0.0007
	0.005	8 / 0	Fe-59	< 0.0017
	0.002	8 / 0	Co-60	< 0.0008
	0.005	8 / 0	Zn-65	< 0.0016
	0.002	8 / 0	Nb-95	< 0.0007
	0.005	8 / 0	Zr-95	< 0.0014
	0.002	8 / 0	Ru-103	< 0.0007
	0.015	8 / 0	Ru-106	< 0.0039
	0.020	8 / 0	I-131	< 0.0023
	0.002	8 / 0	Cs-134	< 0.0007
	0.002	8 / 0	Cs-137	< 0.0007
	0.030	8 / 0	Ba-140	< 0.0041
	0.020	8 / 0	La-140	< 0.0022
	0.002	8 / 0	Ce-141	< 0.0008
0.005	8 / 0	Ce-144	< 0.0026	
direct exposure (mR/Std Qtr)	1.0 ^c	15 / 15	direct exposure	11.6 - 17.1
surface water (pCi/liter)	2.5	8 / 8	gross beta (sol)	2.7 - 4.1
	2.5	8 / 0	gross beta (insol)	< 2.3
	3.0	8 / 2	gross alpha (sol)	< 3.0 - 3.0
	3.0	8 / 3	gross alpha (insol)	< 2.3 - 1.6
	300	8 / 0	H-3	< 300
	2.0	8 / 0	Sr-89	< 1.1
	1.0	8 / 0	Sr-90	< 0.5
			gamma isotopic	
	10	8 / 0	Mn-54	< 7
	15	8 / 0	Co-58	< 8
	30	8 / 0	Fe-59	< 15
	15	8 / 0	Co-60	< 8
	30	8 / 0	Zn-65	< 19
	15	8 / 0	Nb-95	< 7
	30	8 / 0	Zr-95	< 12
	15	8 / 0	I-131	< 10
	15	8 / 0	Cs-134	< 9
	15	8 / 0	Cs-137	< 7
	60	8 / 0	Ba-140	< 31
	15	8 / 0	La-140	< 12

Table 4. Sample activity summary for 2007 for the WI DHS LACBWR environmental monitoring program.

Sample type (units)	LLD	Number of samples ^a	Analysis	Range
fish (pCi/kg wet)	800	8 / 8	gamma isotopic	
	50	8 / 0	K-40	2880 - 4100
	60	8 / 0	Mn-54	< 39
	130	8 / 0	Co-58	< 41
	60	8 / 0	Fe-59	< 80
	130	8 / 0	Co-60	< 56
	50	8 / 0	Zn-65	< 110
	100	8 / 0	Nb-95	< 50
	50	8 / 0	Zr-95	< 80
	60	8 / 0	Cs-134	< 28
	60	8 / 0	Cs-137	< 37
bottom sediment (pCi/kg dry)	6000	6 / 6	gross beta	6000 - 24000
	13000	6 / 2	gross alpha	< 13000 - 15000
	800	6 / 6	gamma isotopic	
	60	6 / 0	K-40	5500 - 17900
	90	6 / 0	Mn-54	< 54
	600	6 / 0	Co-58	< 60
	90	6 / 0	Fe-59	< 160
	300	6 / 0	Co-60	< 80
	100	6 / 0	Zn-65	< 270
	250	6 / 0	Nb-95	< 80
	80	6 / 0	Zr-95	< 110
	80	6 / 0	Cs-134	< 80
	80	6 / 3	Cs-137	<60 - 880
vegetation (pCi/kg wet)	5000	4 / 0	gross alpha	< 4000
	4000	4 / 4	gross beta	3500 - 7000
	600	4 / 4	gamma isotopic	
	2000	4 / 4	Be-7	1300 - 2500
	90	4 / 0	K-40	3200 - 6100
	100	4 / 0	Mn-54	< 80
	200	4 / 0	Co-58	< 70
	100	4 / 0	Fe-59	< 150
	250	4 / 0	Co-60	< 100
	100	4 / 0	Zn-65	< 180
	200	4 / 0	Nb-95	< 70
	80	4 / 0	Zr-95	< 120
	80	4 / 0	I-131	< 70
	90	4 / 0	Cs-134	< 70
	350	4 / 0	Cs-137	< 80
	100	4 / 0	Ba-140	< 290
100	4 / 0	La-140	< 90	

Table 4. Sample activity summary for 2007 for the WI DHS LACBWR environmental monitoring program.

Sample type (units)	LLD	Number of samples ^a	Analysis	Range
soil (pCi/kg dry)	6000	4 / 4	gross beta	19000 - 49000
	13000	4 / 3	gross alpha	< 13000 - 17000
			gamma isotopic	
	800	4 / 4	K-40	13700 - 37700
	60	4 / 0	Mn-54	< 39
	90	4 / 0	Co-58	< 44
	600	4 / 0	Fe-59	< 130
	90	4 / 0	Co-60	< 48
	300	4 / 0	Zn-65	< 170
	100	4 / 0	Nb-95	< 47
	250	4 / 0	Zr-95	< 70
	80	4 / 0	Cs-134	< 48
	80	4 / 2	Cs-137	< 17 - 233

a - Number of analysis / number of analyses detected above the WI DHS MDC.
b - MDC activities expressed in units of pCi/liter.
c - 1.0 mR / TLD

Table 5. WI DHS air particulate gross beta analysis results from the LACBWR environmental monitoring program.

Measurements in units of pCi/m³

LAC-1, LaCrosse State office building

LAC-2, Lock & Dam #8

collection date	volume m3	gross beta	collection date	volume m3	gross beta
01/15/07	1357	0.013 +- 0.001	01/15/07	606	0.038 +- 0.003
01/29/07	1535	0.018 +- 0.001	01/29/07	972	0.033 +- 0.002
02/12/07	918	0.027 +- 0.002	02/12/07	1082	0.028 +- 0.002
02/27/07	992	0.022 +- 0.002	02/27/07	1124	0.022 +- 0.002
03/12/07	821	0.019 +- 0.002	03/12/07	941	0.020 +- 0.002
03/26/07	853	0.020 +- 0.002	03/26/07	1001	0.020 +- 0.002
1st qtr mean +- s.d.		0.020 +- 0.005	1st qtr mean +- s.d.		0.027 +- 0.008
04/10/07	896	0.013 +- 0.001	04/10/07	1077	0.015 +- 0.001
04/23/07	757	0.019 +- 0.002	04/23/07	931	0.019 +- 0.002
05/08/07	816	0.014 +- 0.002	05/08/07	1045	0.015 +- 0.001
05/22/07	748	0.018 +- 0.002	05/22/07	971	0.016 +- 0.002
06/04/07	694	0.015 +- 0.002	06/04/07	916	0.019 +- 0.002
06/19/07	773	0.022 +- 0.002	06/18/07	915	0.023 +- 0.002
07/02/07	699	0.015 +- 0.002	07/02/07	927	0.016 +- 0.002
2nd qtr mean +- s.d.		0.017 +- 0.003	2nd qtr mean +- s.d.		0.018 +- 0.003
07/16/07	737	0.019 +- 0.002	07/16/07	919	0.021 +- 0.002
07/30/07	710	0.023 +- 0.002	07/30/07	912	0.023 +- 0.002
08/13/07	741	0.027 +- 0.002	08/13/07	908	0.028 +- 0.002
08/27/07	744	0.016 +- 0.002	08/27/07	937	0.018 +- 0.002
09/10/07	718	0.025 +- 0.002	09/10/07	849	0.028 +- 0.002
09/24/07	762	0.022 +- 0.002	09/24/07	929	0.025 +- 0.002
3rd qtr mean +- s.d.		0.022 +- 0.004	3rd qtr mean +- s.d.		0.024 +- 0.004
10/09/07	794	0.020 +- 0.002	10/09/07	958	0.022 +- 0.002
10/22/07	721	0.018 +- 0.002	10/22/07	832	0.020 +- 0.002
11/05/07	792	0.020 +- 0.002	11/05/07	922	0.022 +- 0.002
11/20/07	910	0.025 +- 0.002	11/19/07	949	0.025 +- 0.002
12/03/07	821	0.029 +- 0.002	12/04/07	1018	0.032 +- 0.002
12/17/07	900	0.042 +- 0.002	12/17/07	883	0.045 +- 0.002
12/31/07	940	0.048 +- 0.002	12/31/07	1002	0.051 +- 0.002
4th qtr mean +- s.d.		0.029 +- 0.012	4th qtr mean +- s.d.		0.031 +- 0.012

Table 6. WI DHS gamma isotopic analysis results of quarterly composites of air particulate samples collected for the LACBWR environmental monitoring program.

Measurements in units of pCi/m³

LAC-1, LaCrosse State Office Building

Radioisotope	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Be-7	0.042 +- 0.002	0.104 +- 0.003	0.076 +- 0.003	0.053 +- 0.003
Mn-54	< 0.0003	< 0.0003	< 0.0004	< 0.0005
Co-58	< 0.0004	< 0.0004	< 0.0004	< 0.0003
Fe-59	< 0.0009	< 0.0008	< 0.0014	< 0.0008
Co-60	< 0.0003	< 0.0004	< 0.0006	< 0.0006
Zn-65	< 0.0009	< 0.0007	< 0.0011	< 0.0016
Nb-95	< 0.0004	< 0.0004	< 0.0006	< 0.0005
Zr-95	< 0.0006	< 0.0006	< 0.0007	< 0.0005
Ru-103	< 0.0003	< 0.0004	< 0.0004	< 0.0005
Ru-106	< 0.0031	< 0.0026	< 0.0033	< 0.0039
I-131	< 0.0009	< 0.0017	< 0.0017	< 0.0013
Cs-134	< 0.0003	< 0.0003	< 0.0004	< 0.0005
Cs-137	< 0.0004	< 0.0003	< 0.0004	< 0.0004
Ba-140	< 0.0020	< 0.0029	< 0.0027	< 0.0033
La-140	< 0.0011	< 0.0013	< 0.0022	< 0.0016
Ce-141	< 0.0006	< 0.0005	< 0.0004	< 0.0005
Ce-144	< 0.0016	< 0.0016	< 0.0013	< 0.0013

LAC-2, Lock & Dam #8

Radioisotope	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Be-7	0.050 +- 0.003	0.104 +- 0.003	0.075 +- 0.003	0.051 +- 0.002
Mn-54	< 0.0007	< 0.0004	< 0.0003	< 0.0006
Co-58	< 0.0007	< 0.0005	< 0.0003	< 0.0006
Fe-59	< 0.0002	< 0.0011	< 0.0010	< 0.0017
Co-60	< 0.0008	< 0.0004	< 0.0004	< 0.0005
Zn-65	< 0.0009	< 0.0011	< 0.0008	< 0.0013
Nb-95	< 0.0005	< 0.0006	< 0.0004	< 0.0007
Zr-95	< 0.0014	< 0.0009	< 0.0007	< 0.0010
Ru-103	< 0.0007	< 0.0005	< 0.0003	< 0.0006
Ru-106	< 0.0036	< 0.0037	< 0.0024	< 0.0036
I-131	< 0.0017	< 0.0023	< 0.0012	< 0.0018
Cs-134	< 0.0007	< 0.0004	< 0.0003	< 0.0006
Cs-137	< 0.0007	< 0.0004	< 0.0003	< 0.0005
Ba-140	< 0.0034	< 0.0041	< 0.0024	< 0.0041
La-140	< 0.0014	< 0.0020	< 0.0015	< 0.0018
Ce-141	< 0.0007	< 0.0007	< 0.0003	< 0.0008
Ce-144	< 0.0020	< 0.0022	< 0.0010	< 0.0026

Radioisotopes other than those listed were not detected.

Table 7. WI DHS TLD network for the LACBWR environmental monitoring program.

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Date Placed:	01/09/07	04/10/07	07/10/07	10/09/07
Date Removed:	04/10/07	07/10/07	10/09/07	01/08/08
Days in the Field:	91	91	91	91
Location:	Individual quarterly data is reported as: mR / Standard Quarter +/- combined total uncertainty			
LAC-T1	13.7 +/- 0.9	14.5 +/- 0.4	14.2 +/- 1.1	14.2 +/- 0.6
LAC-T2	11.6 +/- 0.6	12.9 +/- 0.8	12.1 +/- 0.6	ND
LAC-T3	15.5 +/- 0.6	17.1 +/- 0.6	17.0 +/- 0.7	16.4 +/- 0.8
LAC-T4	15.1 +/- 0.8	15.5 +/- 1.0	16.4 +/- 1.1	15.2 +/- 0.9

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

Table 8. WI DHS analysis results of fish samples collected for the LACBWR environmental monitoring program.

Measurements in units of pCi/kg (wet)

Collection date	03/27/07	03/27/07	06/20/07	06/20/07
Type	walleye	carp	carp	bass
Gamma isotopic				
K-40	3300 +/- 200	2900 +/- 200	3400 +/- 200	3400 +/- 300
Mn-54	< 24	< 25	< 26	< 25
Co-58	< 27	< 35	< 20	< 41
Fe-59	< 80	< 70	< 80	< 70
Co-60	< 24	< 31	< 32	< 37
Zn-65	< 40	< 51	< 60	< 70
Nb-95	< 46	< 37	< 42	< 38
Zr-95	< 50	< 53	< 60	< 80
Cs-134	< 22	< 23	< 24	< 25
Cs-137	< 22	< 23	< 24	< 37

Collection date	09/25/07	09/25/07	11/01/07	11/01/07
Type	carp	walleye	carp	walleye
Gamma isotopic				
K-40	2880 +/- 160	4100 +/- 300	3190 +/- 110	4080 +/- 140
Mn-54	< 20	< 39	< 9	< 14
Co-58	< 30	< 30	< 15	< 19
Fe-59	< 70	< 80	< 60	< 80
Co-60	< 22	< 56	< 10	< 12
Zn-65	< 70	< 110	< 29	< 41
Nb-95	< 50	< 36	< 36	< 42
Zr-95	< 45	< 70	< 28	< 37
Cs-134	< 23	< 28	< 7	< 12
Cs-137	< 16	< 32	< 9	< 11

Radioisotopes other than those reported were not detected.

Table 9. WI DHS analysis results of surface water samples collected for the LACBWR environmental monitoring program.

Measurements in units of pCi/liter

LAC-2, Lock & Dam #8				
Collection date	01/09/07	04/10/07	07/10/07	10/09/07
gross alpha-sol	< 1.8	< 1.5	< 1.9	< 1.6
gross beta-sol	3.0 +/- 2.0	4.1 +/- 1.5	3.9 +/- 1.5	2.7 +/- 0.6
gross alpha-insol	< 1.1	< 0.9	1.5 +/- 1.0	< 2.3
gross beta-insol	< 2.5	< 2.0	< 2.0	< 1.6
H-3	< 300	< 300	< 300	< 300
Sr-89	< 0.4	< 0.5	< 1.1	< 1.0
Sr-90	< 0.4	< 0.5	< 0.3	< 0.3
Gamma isotopic				
Mn-54	< 7	< 6	< 7	< 5
Co-58	< 8	< 6	< 7	< 6
Fe-59	< 15	< 11	< 13	< 12
Co-60	< 7	< 6	< 8	< 7
Zn-65	< 15	< 14	< 19	< 16
Nb-95	< 6	< 6	< 7	< 6
Zr-95	< 11	< 10	< 11	< 10
I-131	< 10	< 8	< 9	< 7
Cs-134	< 7	< 6	< 9	< 6
Cs-137	< 7	< 6	< 7	< 6
Ba-140	< 31	< 24	< 28	< 22
La-140	< 10	< 9	< 12	< 10

LAC-3, discharge channel				
Collection date	01/09/07	04/10/07	07/10/07	10/09/07
gross alpha-sol	< 1.8	2.0 +/- 1.4	3.0 +/- 2.0	< 3.0
gross beta-sol	4.0 +/- 2.0	4.1 +/- 1.5	4.0 +/- 1.5	3.2 +/- 0.9
gross alpha-insol	< 1.1	1.6 +/- 0.9	1.5 +/- 1.0	< 2.3
gross beta-insol	< 2.5	< 2.0	< 2.0	< 1.6
H-3	< 300	< 300	< 300	< 300
Sr-89	< 0.4	< 0.5	< 1.1	< 1.0
Sr-90	< 0.3	< 0.5	< 0.4	< 0.3
Gamma isotopic				
Mn-54	< 6	< 6	< 7	< 7
Co-58	< 6	< 5	< 6	< 7
Fe-59	< 10	< 11	< 14	< 14
Co-60	< 6	< 5	< 7	< 7
Zn-65	< 12	< 12	< 15	< 16
Nb-95	< 5	< 5	< 7	< 7
Zr-95	< 9	< 9	< 12	< 12
I-131	< 8	< 6	< 9	< 8
Cs-134	< 5	< 6	< 6	< 8
Cs-137	< 6	< 5	< 7	< 6
Ba-140	< 26	< 20	< 25	< 25
La-140	< 8	< 7	< 11	< 10

Radioisotopes other than those reported were not detected.

Table 10. WI DHS analysis results of bottom sediments collected for the LACBWR environmental monitoring program.

Measurements in units of pCi/kg (dry)						
Collection	06/20/07	06/20/07	06/20/07	09/25/07	09/25/07	09/25/07
Location	upstream LAC-2	discharge LAC-3	downstream LAC-4	upstream LAC-2	discharge LAC-3	downstream LAC-4
Analysis						
gross alpha	< 8000	< 8000	10000 +- 7000	< 13000	< 11000	15000 +- 8000
gross beta	7000 +- 4000	7000 +- 4000	24000 +- 4000	9000 +- 3000	6000 +- 2000	22000 +- 3000
Gamma isotopic						
K-40	8000 +- 500	5500 +- 200	17000 +- 600	6100 +- 400	6600 +- 400	17900 +- 600
Mn-54	< 33	< 26	< 54	< 18	< 33	< 41
Co-58	< 39	< 32	< 53	< 19	< 40	< 60
Fe-59	< 120	< 80	< 150	< 70	< 110	< 160
Co-60	< 80	< 32	< 49	< 17	< 34	< 41
Zn-65	< 160	< 100	< 190	< 59	< 180	< 270
Nb-95	< 70	< 29	< 80	< 41	< 52	< 60
Zr-95	< 80	< 60	< 110	< 43	< 80	< 90
Cs-134	< 80	< 31	< 60	< 18	< 42	< 70
Cs-137	< 38	880 +- 30	90 +- 20	< 21	130 +- 20	< 60

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. WI DHS analysis results for vegetation and soil samples collected for the LACBWR environmental monitoring program.

Measurements in units of pCi/kg (wet)

Collection date	06/04/07	06/04/07	09/17/07	09/17/07
Collection type	vegetation	vegetation	vegetation	vegetation
Location	LAC-5	LAC-6	LAC-5	LAC-6
Analysis				
gross alpha (wet)	< 1800	< 2000	< 3000	< 4000
gross beta (wet)	7000 +- 1200	6900 +- 1500	6900 +- 800	3500 +- 800
Gamma isotopic				
Be-7	1300 +- 200	1700 +- 200	2050 +- 140	2500 +- 200
K-40	5400 +- 500	3500 +- 400	6100 +- 400	3200 +- 300
Mn-54	< 60	< 80	< 38	< 53
Co-58	< 70	< 70	< 40	< 49
Fe-59	< 120	< 150	< 80	< 130
Co-60	< 50	< 100	< 45	< 58
Zn-65	< 140	< 180	< 100	< 110
Nb-95	< 50	< 70	< 45	< 60
Zr-95	< 120	< 120	< 70	< 80
I-131	< 70	< 70	< 55	< 70
Cs-134	< 70	< 60	< 48	< 70
Cs-137	< 80	< 70	< 33	< 38
Ba-140	< 200	< 290	< 160	< 190
La-140	< 70	< 14	< 90	< 80

Collection date	06/04/07	06/04/07	09/17/07	09/17/07
Collection type	soil	soil	soil	soil
Location	LAC-5	LAC-6	LAC-5	LAC-6
analysis				
gross alpha (dry)	10000 +- 8000	10000 +- 7000	< 13000	17000 +- 9000
gross beta (dry)	49000 +- 5000	22000 +- 4000	38000 +- 4000	19000 +- 3000
Gamma isotopic				
K-40	37700 +- 1000	15100 +- 400	34300 +- 1000	13700 +- 400
Mn-54	< 38	< 16	< 39	< 16
Co-58	< 40	< 15	< 44	< 14
Fe-59	< 110	< 36	< 130	< 47
Co-60	< 48	< 16	< 47	< 17
Zn-65	< 120	< 70	< 170	< 44
Nb-95	< 43	< 16	< 47	< 25
Zr-95	< 60	< 25	< 70	< 30
Cs-134	< 38	< 40	< 48	< 18
Cs-137	90 +- 13	< 15	233 +- 16	< 17

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.

Radionuclides other than those reported were not detected.

State of Wisconsin

2007

Prairie Island

Environmental Radioactivity Survey

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State Of Wisconsin DHS

2007

Prairie Island Environmental Radioactivity Survey

Introduction

Wisconsin Public Health Statutes 254.41 mandates the Department of Health Services to conduct environmental radiation monitoring around the nuclear power facilities that impact Wisconsin. This environmental monitoring report is for the Prairie Island nuclear generating plant for the calendar year January - December 2007 and provides a description and results of this environmental monitoring program.

WI DHS Prairie Island 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 (TLD), surface water, fish, soil, milk, well water and vegetation that are collected from selected locations at planned sampling intervals.

Table 1 is a listing of sampling sites and includes a description, direction and distance from the monitored power plant. Table 2 provides a listing of types of samples collected, sites where samples are collected, the number of samples collected, number of samples that were missed and a listing of the required analyses. Table 3 provides an explanation of missing samples or non-routine sample analyses. Figure 1 is a map showing the location of each environmental sampling site.

Program Modifications

There were no program modifications for 2007.

Laboratory Services and Quality Assurance

The analysis of the samples is performed under contract with the State Laboratory of Hygiene (SLH). SLH 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.

SLH participates in the Environmental Resource Associates' Proficiency Testing program and has performed satisfactorily over the report period. Proficiency testing results are available from the 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 5-14 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.

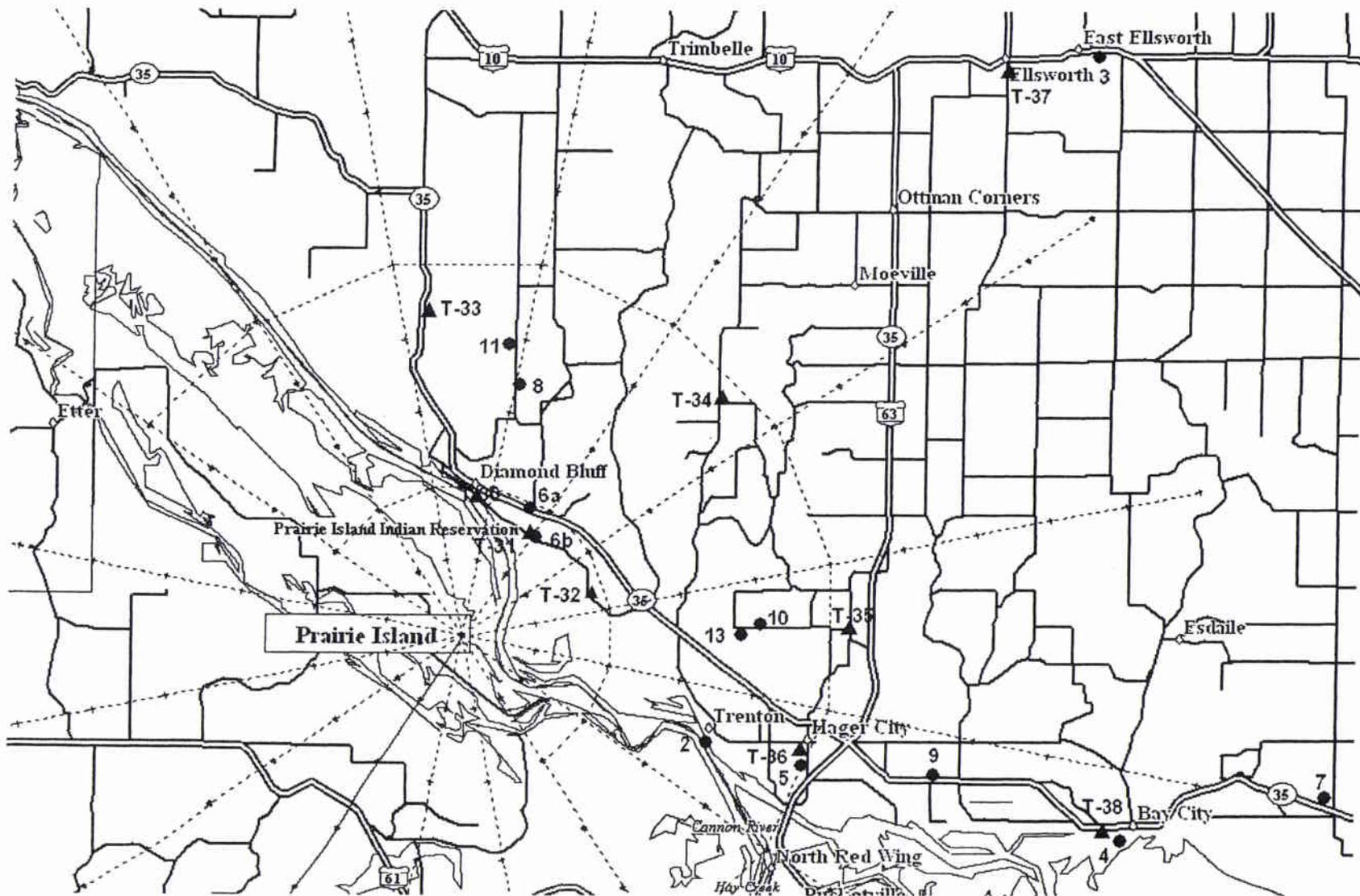


Figure 1. Location of WI DHS environmental monitoring sites for the Prairie Island monitoring program

Table 1. WI DHS Prairie Island environmental monitoring sampling sites.

Sample site	Distance and direction (miles)	Location description
PRI-1a	11.6 NW	Prescott; air site
PRI-1b	11.6 NW	Prescott; harbor area
PRI-2	3.6 ESE	Trenton
PRI-3	10.9 NE	Ellsworth (discontinued 07/01/96)
PRI-4a	8.7 ESE	Bay City park
PRI-4b	8.7 ESE	Bay City, Hwy 35
PRI-5	4.8 ESE	Hager City
PRI-6a	1.9 NNE	Diamond Bluff; Pierce County highway shed
PRI-6b	1.8 NNE	Diamond Bluff cemetery
PRI-7	11.9 E	Junction of Hwy 35 & Cty D (discontinued 07/01/96)
PRI-8	3.4 N	Station 2 - farm
PRI-9	6.6 ESE	Bay City substation on Hwy 35
PRI-10	2.6 NE	Welch farm
PRI-11	4.0 NNE	D. Dosdall farm (discontinued in March, 1995)
PRI-12	11.1 NNW	S. Rohl farm (discontinued in October, 1999)
PRI-13	3.8 E	Christiansen farm
PRI-14	13.8 N	A. Huppert farm (discontinued in February 2004)
PRI-15	13.9 N	R. Peterson farm
PRI-T30	1.9 N	Diamond Bluff
PRI-T31	1.7 NNE	Diamond Bluff
PRI-T32	1.8 ENE	290th Avenue
PRI-T33	4.4 N	Hwy 35, Thomas Killian residence
PRI-T34	4.7 NE	Cty K and 840th Street
PRI-T35	5.2 E	Cty VV and 790th Street
PRI-T36	4.8 ESE	Hager City
PRI-T37	10.3 NE	Ellsworth
PRI-T38	8.9 ESE	Bay City, Hwy 35
PRI-T39	11.6 NW	Prescott

Table 2. Sample collection summary and required analyses for 2007.

Sample Type	Collection and Frequency	Site locations	Number of Samples Collected	Number of Sample Deviations	Required Analyses
air particulate	C/BW	1a, 6a, 9	76	2	GA, GB, GI
air iodine	C/BW	1a, 6a, 9	76	2	GI
precipitation	C/BW	1a, 9	12	0	GB, H
TLD	C/Q	T30 – T39	40	0	direct exposure
surface water	G/SA	1b, 2, 4a	6	0	GA, GB, GI, Sr, H
fish	G/SA	upstream, downstream	4	0	GI
vegetation	G/SA	1b, 4b, 5, 6a, 8, 9	12	0	GA, GB, GI
soil	G/SA	1b, 4b, 5, 6a, 8, 9	12	0	GA, GB, GI
well water	G/SA	4a, 5, 6b	6	0	GA, GB, H
milk	G/M	10, 13, 15	24	1	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 3. WI DHS missing sample report or non-routine analyses for 2007.

Sample type	Date	Site	Explanation
air particulate	10/06/07	6	Due to air site problems, the air site was off for approximately 9 days and 10 hours at the end of the collection period.
air particulate	10/29/07	6	Due to air site problems, the air site was off from approximately 09/27/07 03:00 until 10/29/07 13:35.
air iodine	10/06/07	6	Due to air site problems, the air site was off for approximately 9 days and 10 hours at the end of the collection period.
air iodine	10/29/07	6	Due to air site problems, the air site was off from approximately 09/27/07 03:00 until 10/29/07 13:35.
milk	1 sample	13	Due to chemical analysis problems, one sample for iodine by chemical procedure did not meet the requested WI DHS LLD.

Results And Discussion

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 individual activities or quarterly averages for gross beta activities it may be noted that there are no significant differences between sites at different distances from the Prairie Island facility. With no significant difference with distance from the Prairie Island site, an increase in gross beta activity attributable to the Prairie Island plant operation 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. 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.

Influence by the Prairie Island nuclear generating facility on air quality is not evident from air particulate analysis.

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 for all sites.

Direct Radiation - Thermoluminescent Dosimeters (TLD's)

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

Direct radiation (TLD) data for 2007 from the WI DHS network was comparable for all sites. Significant differences in exposure were not noticed at different distances from the Prairie Island nuclear facility. The average quarterly exposure from the ten sites located within Wisconsin was 15.2 ± 2.0 milliroentgens. The average quarterly exposure for 2007 is at background levels and is comparable to other areas within Wisconsin.

Precipitation

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

The gross beta activity in precipitation was within the normal range of activity when compared to previous years data.

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 9.

The surface water samples showed no unusual activities and are at background levels comparable to previous years. 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. The surface water samples uniformly show activities well below state or federal standards.

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 10.

The fish samples showed no unusual activities. Naturally occurring potassium-40 (^{40}K) was detected in all samples. All other radioisotopes were below their respective LLD.

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 11.

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 activity levels are all below state and federal standards.

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 12.

Analysis of the milk samples showed no unusual activities. Naturally occurring potassium-40 (^{40}K) was detected in all samples. The detected activities for strontium-90 (^{90}Sr) are attributable to residual fallout from previous atmospheric nuclear weapons testing and were also detected in previous years at similar activity levels.

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 Tables 13.

Analysis of the vegetation samples showed no unusual activities. The gamma isotopic analysis detected only small amounts of the naturally occurring radioisotopes beryllium-7 (^7Be) and potassium-40 (^{40}K) listed in Table 4. All other radioisotopes were below their respective LLD.

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 14.

Analysis of the soil samples showed no unusual activities. The gamma isotopic analysis detected only small amounts of the radionuclides listed in Table 4. Potassium-40 (^{40}K) is a naturally occurring radioisotope. The reported activities for cesium-137 (^{137}Cs) were also detected in previous years and are largely attributable to fallout from previous atmospheric nuclear weapons testing. 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) and 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.

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

The WI DHS limits for permissible levels of radiation exposure from external sources in unrestricted areas is defined in the Wis. Adm. Code section HFS 157.23. Doses resulting from gaseous and liquid effluent releases from the Prairie Island nuclear generating facilities are less than the limits as stated in Wis. Adm. Code section HFS 157.23.

References

State of Wisconsin, Wisconsin Administrative Code, HFS 157.23

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 Prairie Island environmental monitoring program for 2007.

Sample type (units)	LLD	Number of samples ^a	Analysis	Range
air particulate (pCi/m ³)	0.005	76 / 76	gross beta	0.012 - 0.052
			gamma isotopic	
	0.020	12 / 12	Be-7	0.042 - 0.084
	0.002	12 / 0	Mn-54	< 0.0007
	0.002	12 / 0	Co-58	< 0.0006
	0.005	12 / 0	Fe-59	< 0.0015
	0.002	12 / 0	Co-60	< 0.0007
	0.005	12 / 0	Zn-65	< 0.0015
	0.002	12 / 0	Nb-95	< 0.0007
	0.005	12 / 0	Zr-95	< 0.0010
	0.002	12 / 0	Ru-103	< 0.0006
	0.015	12 / 0	Ru-106	< 0.0044
	0.020	12 / 0	I-131	< 0.0024
	0.002	12 / 0	Cs-134	< 0.0005
	0.002	12 / 0	Cs-137	< 0.0005
	0.030	12 / 0	Ba-140	< 0.0035
	0.020	12 / 0	La-140	< 0.0023
	0.002	12 / 0	Ce-141	< 0.0008
	0.005	12 / 0	Ce-144	< 0.0026
air iodine (pCi/m ³)	0.07	76 / 0	I-131	< 0.060
surface water (pCi/liter)	3.0	6 / 6	gross beta (sol)	2.3 - 5.8
	3.0	6 / 1	gross beta (insol)	< 2.0 - 2.5
	3.0	6 / 3	gross alpha (sol)	< 2.0 - 4.0
	3.0	6 / 1	gross alpha (insol)	< 0.9 - 1.9
	300	6 / 0	H-3	< 300
	2.0	6 / 0	Sr-89	< 0.6
	1.0	6 / 0	Sr-90	< 0.4
			gamma isotopic	
	15	6 / 0	Mn-54	< 8
	15	6 / 0	Co-58	< 8
	30	6 / 0	Fe-59	< 15
	15	6 / 0	Co-60	< 9
	30	6 / 0	Zn-65	< 22
	15	6 / 0	Nb-95	< 8
	30	6 / 0	Zr-95	< 14
	15	6 / 0	I-131	< 10
	15	6 / 0	Cs-134	< 10
	15	6 / 0	Cs-137	< 8
	60	6 / 0	Ba-140	< 30
	15	6 / 0	La-140	< 12

Table 4. Sample activity summary for the Prairie Island environmental monitoring program for 2007.

Sample type (units)	LLD	Number of samples ^a	Analysis	Range
fish (pCi/kg wet)	800	4 / 4	gamma isotopic	
	50	4 / 0	K-40	2500 - 3600
	60	4 / 0	Mn-54	< 20
	130	4 / 0	Co-58	< 27
	60	4 / 0	Fe-59	< 90
	130	4 / 0	Co-60	< 27
	50	4 / 0	Zn-65	< 100
	100	4 / 0	Nb-95	< 39
	50	4 / 0	Zr-95	< 57
	60	4 / 0	Cs-134	< 24
	60	4 / 0	Cs-137	< 21
precipitation (nCi/m ²)	1.5 ^b	12 / 9	gross beta	< 0.21 - 0.62
	300 ^b	12 / 0	H-3	< 66
well water (pCi/liter)	3.0	6 / 1	gross beta	< 4.0 - 2.5
	3.0	6 / 0	gross alpha	< 3.0
	300	6 / 0	H-3	< 300
vegetation (pCi/kg wet)	5000	12 / 0	gross alpha	< 4000
	4000	12 / 12	gross beta	4300 - 8000
	600	12 / 11	gamma isotopic	
	2000	12 / 12	Be-7	< 430 - 2700
	90	12 / 0	K-40	3900 - 6100
	100	12 / 0	Mn-54	< 80
	200	12 / 0	Co-58	< 60
	100	12 / 0	Fe-59	< 170
	250	12 / 0	Co-60	< 90
	100	12 / 0	Zn-65	< 190
	200	12 / 0	Nb-95	< 60
	80	12 / 0	Zr-95	< 150
	80	12 / 0	I-131	< 80
	90	12 / 0	Cs-134	< 70
	350	12 / 0	Cs-137	< 80
100	12 / 0	Ba-140	< 270	
		12 / 0	La-140	< 90

Table 4. Sample activity summary for the Prairie Island environmental monitoring program for 2007.

Sample type (units)	LLD	Number of samples ^a	Analysis	Range
soil (pCi/kg dry)	6000	12 / 12	gross beta	11000 - 26000
	15000	12 / 2	gross alpha	< 13000 - 11000
			gamma isotopic	
	800	12 / 12	K-40	11000 - 15400
	60	12 / 0	Mn-54	< 51
	90	12 / 0	Co-58	< 51
	600	12 / 0	Fe-59	< 100
	90	12 / 0	Co-60	< 60
	300	12 / 0	Zn-65	< 200
	100	12 / 0	Nb-95	< 52
	250	12 / 0	Zr-95	< 80
	80	12 / 0	Cs-134	< 80
	80	12 / 12	Cs-137	110 - 490
milk (pCi/liter)	1.0	24 / 24	Sr-90	0.5 - 1.5
	0.5	14 / 0	I-131	< 0.7
			gamma isotopic	
	500	24 / 24	K-40	1290 - 1670
	15	24 / 0	Mn-54	< 13
	15	24 / 0	Co-58	< 12
	40	24 / 0	Fe-59	< 26
	15	24 / 0	Co-60	< 14
	40	24 / 0	Zn-65	< 30
	15	24 / 0	Nb-95	< 10
	40	24 / 0	Zr-95	< 20
	15	24 / 0	I-131	< 13
	15	24 / 0	Cs-134	< 11
	15	24 / 0	Cs-137	< 12
	60	24 / 0	Ba-140	< 41
15	24 / 0	La-140	< 15	
direct exposure (mR/Std Qtr)	1.0 ^c	40 / 40	direct exposure	12.2 - 19.2

a - Number of analyses / number of analyses detected above the WI DHS LLD.
b - MDC activities expressed in units of pCi/liter.
c - 1.0 mR/ TLD

Table 5: WI DHS air particulate and air iodine (I-131) analysis results from the Prairie Island environmental monitoring program.

Measurements in units of pCi/m ³							
PRI-1 Prescott				PRI-6 Diamond Bluff			
Collection Date	volume m3	air particulate	air iodine	Collection Date	volume m3	air particulate	air iodine
01/11/07	963	0.024 +- 0.002	< 0.012	01/11/07	1225	0.022 +- 0.001	< 0.012
01/24/07	922	0.026 +- 0.002	< 0.016	01/24/07	1172	0.026 +- 0.002	< 0.005
02/08/07	1077	0.024 +- 0.002	< 0.026	02/08/07	1378	0.021 +- 0.001	< 0.012
02/21/07	925	0.026 +- 0.002	< 0.018	02/21/07	1179	0.025 +- 0.002	< 0.016
03/07/07	984	0.015 +- 0.001	< 0.012	03/07/07	1261	0.014 +- 0.001	< 0.014
03/22/07	1021	0.019 +- 0.002	< 0.019	03/22/07	1307	0.019 +- 0.001	< 0.016
04/06/07	1028	0.014 +- 0.001	< 0.030	04/06/07	1315	0.014 +- 0.001	< 0.021
1st quarter mean +- s.d.		0.021 +- 0.005	< 0.019	1st quarter mean +- s.d.		0.020 +- 0.005	< 0.014
04/19/07	882	0.017 +- 0.002	< 0.032	04/19/07	1135	0.019 +- 0.001	< 0.019
05/04/07	970	0.014 +- 0.001	< 0.028	05/04/07	1261	0.013 +- 0.001	< 0.016
05/20/07	989	0.015 +- 0.001	< 0.018	05/20/07	1304	0.015 +- 0.001	< 0.015
06/03/07	906	0.014 +- 0.001	< 0.014	06/03/07	956	0.015 +- 0.001	< 0.014
06/13/07	620	0.020 +- 0.002	< 0.044	06/13/07	814	0.020 +- 0.002	< 0.022
06/30/07	1010	0.017 +- 0.002	< 0.016	06/30/07	1337	0.017 +- 0.001	< 0.015
2nd quarter mean +- s.d.		0.016 +- 0.002	< 0.025	2nd quarter mean +- s.d.		0.016 +- 0.003	< 0.017
07/15/07	900	0.017 +- 0.002	< 0.021	07/15/07	1236	0.018 +- 0.001	< 0.010
07/25/07	609	0.020 +- 0.002	< 0.027				
08/08/07	833	0.024 +- 0.002	< 0.018	08/08/07	1945	0.021 +- 0.002	< 0.012
08/23/07	928	0.017 +- 0.002	< 0.020	08/23/07	1243	0.017 +- 0.001	< 0.014
09/08/07	974	0.024 +- 0.002	< 0.019	09/08/07	1307	0.024 +- 0.001	< 0.013
09/19/07	713	0.015 +- 0.002	< 0.037	09/19/07	940	0.015 +- 0.001	< 0.024
10/06/07	1,050	0.024 +- 0.002	< 0.015	a 10/06/07	614	0.023 +- 0.002	< 0.029
3rd Qtr mean +- s.d.		0.020 +- 0.004	< 0.022	3rd Qtr mean +- s.d.		0.020 +- 0.004	< 0.017
10/18/07	781	0.012 +- 0.002	< 0.018	b			
11/02/07	977	0.018 +- 0.002	< 0.015	11/02/07	274	0.023 +- 0.004	< 0.060
11/14/07	789	0.021 +- 0.002	< 0.018	11/14/07	813	0.022 +- 0.002	< 0.014
11/30/07	1084	0.022 +- 0.002	< 0.014	11/30/07	1113	0.024 +- 0.002	< 0.015
12/12/07	837	0.036 +- 0.002	< 0.019	12/12/07	857	0.038 +- 0.002	< 0.017
12/28/07	1117	0.052 +- 0.002	< 0.024	12/28/07	1169	0.047 +- 0.002	< 0.019
4th Qtr mean +- s.d.		0.027 +- 0.015	< 0.018	4th Qtr mean +- s.d.		0.031 +- 0.011	< 0.025

a - Due to air site problems, the air site was off for approximately 9 days and 10 hours at the end of the collection period.
 b - Due to air site problems, the air site was off from approximately 09/27/07 03:00 until 10/29/07 13:35.

Table 5: WI DHS air particulate and air iodine (I-131) analysis results from the Prairie Island environmental monitoring program.

Measurements in units of pCi/m³

Bay City substation
PRI-9

Collection Date	volume m3	air particulate	air iodine
01/11/07	1273	0.021 +- 0.001	< 0.009
01/24/07	1221	0.028 +- 0.002	< 0.012
02/08/07	1408	0.024 +- 0.001	< 0.006
02/21/07	1210	0.026 +- 0.002	< 0.015
03/07/07	1296	0.014 +- 0.001	< 0.012
03/22/07	1347	0.020 +- 0.001	< 0.015
04/06/07	1350	0.013 +- 0.001	< 0.014
1st quarter			
mean +- s.d.		0.021 +- 0.006	< 0.012
04/19/07	1165	0.017 +- 0.001	< 0.020
05/04/07	1307	0.013 +- 0.001	< 0.025
05/20/07	1345	0.014 +- 0.001	< 0.016
06/03/07	1236	0.017 +- 0.001	< 0.014
06/13/07	853	0.018 +- 0.002	< 0.018
06/30/07	1381	0.019 +- 0.001	< 0.015
2nd Qtr			
mean +- s.d.		0.016 +- 0.002	< 0.018
07/15/07	1233	0.017 +- 0.001	< 0.013
07/25/07	843	0.020 +- 0.002	< 0.016
08/08/07	1148	0.024 +- 0.002	< 0.008
08/23/07	1267	0.017 +- 0.001	< 0.012
09/08/07	1328	0.024 +- 0.001	< 0.013
09/19/07	969	0.016 +- 0.001	< 0.028
10/06/07	1440	0.024 +- 0.001	< 0.009
3rd Qtr			
mean +- s.d.		0.020 +- 0.004	< 0.014
10/18/07	1059	0.012 +- 0.001	< 0.022
11/02/07	1334	0.018 +- 0.001	< 0.010
11/14/07	1078	0.023 +- 0.002	< 0.013
11/30/07	1466	0.024 +- 0.001	< 0.014
12/12/07	1132	0.036 +- 0.002	< 0.014
12/28/07	1502	0.047 +- 0.002	< 0.013
4th Qtr			
mean +- s.d.		0.027 +- 0.013	< 0.014

Table 6. WI DHS gamma isotopic analysis results from the quarterly composites of air particulate filters collected for the Prairie Island environmental monitoring program.

Measurements in units of pCi/m ³				
	1st quarter	2nd quarter	3rd quarter	4th quarter
Prescott				
PRI-1				
Be-7	0.055 +/- 0.002	0.080 +/- 0.002	0.075 +/- 0.002	0.045 +/- 0.002
Mn-54	< 0.0003	< 0.0002	< 0.0003	< 0.0004
Co-58	< 0.0003	< 0.0002	< 0.0003	< 0.0004
Fe-59	< 0.0006	< 0.0005	< 0.0007	< 0.0009
Co-60	< 0.0003	< 0.0003	< 0.0003	< 0.0005
Zn-65	< 0.0006	< 0.0005	< 0.0007	< 0.0011
Nb-95	< 0.0003	< 0.0002	< 0.0004	< 0.0004
Zr-95	< 0.0005	< 0.0004	< 0.0005	< 0.0006
Ru-103	< 0.0003	< 0.0002	< 0.0003	< 0.0004
Ru-106	< 0.0025	< 0.0019	< 0.0020	< 0.0027
I-131	< 0.0010	< 0.0003	< 0.0017	< 0.0013
Cs-134	< 0.0003	< 0.0002	< 0.0003	< 0.0003
Cs-137	< 0.0003	< 0.0002	< 0.0002	< 0.0003
Ba-140	< 0.0021	< 0.0009	< 0.0027	< 0.0021
La-140	< 0.0007	< 0.0005	< 0.0013	< 0.0018
Ce-141	< 0.0005	< 0.0003	< 0.0004	< 0.0004
Ce-144	< 0.0012	< 0.0012	< 0.0013	< 0.0010
Diamond Bluff				
PRI-6				
Be-7	0.053 +/- 0.002	0.077 +/- 0.004	0.076 +/- 0.003	0.052 +/- 0.002
Mn-54	< 0.0005	< 0.0007	< 0.0003	< 0.0003
Co-58	< 0.0005	< 0.0005	< 0.0002	< 0.0005
Fe-59	< 0.0011	< 0.0013	< 0.0010	< 0.0009
Co-60	< 0.0006	< 0.0007	< 0.0002	< 0.0005
Zn-65	< 0.0010	< 0.0011	< 0.0010	< 0.0012
Nb-95	< 0.0006	< 0.0007	< 0.0004	< 0.0005
Zr-95	< 0.0009	< 0.0010	< 0.0007	< 0.0009
Ru-103	< 0.0005	< 0.0004	< 0.0004	< 0.0003
Ru-106	< 0.0039	< 0.0044	< 0.0024	< 0.0032
I-131	< 0.0023	< 0.0008	< 0.0016	< 0.0014
Cs-134	< 0.0004	< 0.0005	< 0.0003	< 0.0004
Cs-137	< 0.0004	< 0.0005	< 0.0003	< 0.0004
Ba-140	< 0.0033	< 0.0018	< 0.0034	< 0.0031
La-140	< 0.0019	< 0.0013	< 0.0023	< 0.0017
Ce-141	< 0.0007	< 0.0005	< 0.0004	< 0.0004
Ce-144	< 0.0023	< 0.0017	< 0.0010	< 0.0012
Bay City				
PRI-9				
Be-7	0.050 +/- 0.002	0.084 +/- 0.002	0.081 +/- 0.003	0.042 +/- 0.002
Mn-54	< 0.0004	< 0.0001	< 0.0003	< 0.0003
Co-58	< 0.0006	< 0.0001	< 0.0004	< 0.0003
Fe-59	< 0.0015	< 0.0003	< 0.0009	< 0.0008
Co-60	< 0.0006	< 0.0002	< 0.0004	< 0.0003
Zn-65	< 0.0015	< 0.0004	< 0.0009	< 0.0008
Nb-95	< 0.0006	< 0.0002	< 0.0005	< 0.0004
Zr-95	< 0.0008	< 0.0003	< 0.0007	< 0.0006
Ru-103	< 0.0006	< 0.0001	< 0.0004	< 0.0003
Ru-106	< 0.0034	< 0.0013	< 0.0028	< 0.0023
I-131	< 0.0024	< 0.0002	< 0.0021	< 0.0012
Cs-134	< 0.0004	< 0.0002	< 0.0003	< 0.0003
Cs-137	< 0.0004	< 0.0001	< 0.0003	< 0.0003
Ba-140	< 0.0035	< 0.0006	< 0.0035	< 0.0021
La-140	< 0.0016	< 0.0003	< 0.0017	< 0.0013
Ce-141	< 0.0008	< 0.0001	< 0.0006	< 0.0004
Ce-144	< 0.0026	< 0.0005	< 0.0017	< 0.0014

Radioisotopes other than those reported were not detected.

Table 7. WI DHS TLD network for the Prairie Island environmental monitoring program.

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Date Placed:	01/10/07	04/11/07	07/11/07	10/10/07
Date Removed:	04/11/07	07/11/07	10/10/07	01/09/08
Days in the Field:	91	91	91	91
Location:	individual quarterly data is reported as: mR / Standard Quarter +/- 2 sigma counting uncertainty			
TLD sites that are located 0 - 2 miles from the Prairie Island				
30	12.9 +/- 0.7	15.1 +/- 0.5	13.7 +/- 0.6	15.0 +/- 0.6
31	12.8 +/- 0.8	14.6 +/- 0.6	13.3 +/- 0.9	14.5 +/- 0.7
32	13.4 +/- 0.7	12.2 +/- 0.5	14.7 +/- 0.9	12.4 +/- 0.6
Quarterly average +/- s.d.	13.0 +/- 0.3	14.0 +/- 1.6	13.9 +/- 0.7	14.0 +/- 1.4
TLD sites that are located 2 - 5 miles from the Prairie Island				
33	15.9 +/- 0.7	18.5 +/- 1.4	17.2 +/- 0.6	18.2 +/- 0.6
34	16.1 +/- 0.6	19.2 +/- 0.5	17.7 +/- 0.6	18.9 +/- 0.5
35	16.7 +/- 0.7	17.5 +/- 1.6	17.0 +/- 0.8	16.6 +/- 1.1
36	13.3 +/- 0.6	18.7 +/- 1.0	14.3 +/- 0.7	17.6 +/- 0.8
Quarterly average +/- s.d.	15.5 +/- 1.5	18.5 +/- 0.7	16.6 +/- 1.5	17.8 +/- 1.0
TLD sites that are located greater than 5 miles from the Prairie Island facility.				
37	14.1 +/- 1.2	15.9 +/- 0.8	15.3 +/- 1.4	15.7 +/- 0.7
38	13.1 +/- 0.6	13.7 +/- 0.8	13.7 +/- 0.6	14.0 +/- 0.8
39	13.1 +/- 0.9	13.9 +/- 0.7	13.6 +/- 0.9	13.8 +/- 0.9
Quarterly average +/- s.d.	13.4 +/- 0.6	14.5 +/- 1.2	14.2 +/- 1.0	14.5 +/- 1.0

Table 8. WI DHS analysis results for precipitation samples collected from the Prairie Island environmental monitoring program

Measurements expressed as nCi/m²

	Inches	gross beta	tritium
01/24/07	1.52	0.16 +/- 0.05	< 12
02/21/07	0.18	0.05 +/- 0.01	< 1
03/22/07	1.69	0.39 +/- 0.09	< 13
04/19/07	3.46	0.31 +/- 0.12	< 26
05/20/07	0.75	0.10 +/- 0.03	< 6
06/30/07	6.14	0.62 +/- 0.22	< 47
07/25/07	0.86	0.06 +/- 0.03	< 7
08/23/07	8.65	0.46 +/- 0.24	< 66
09/19/07	3.11	< 0.16	< 24
10/18/07	5.51	< 0.21	< 42
11/30/07	0.72	< 0.04	< 5
12/12/07	0.89	0.17 +/- 0.04	< 7

Table 9. WI DHS analysis results of surface water samples collected for the Prairie Island environmental monitoring program.

Measurements in units of pCi/liter

Collection date	06/05/07	06/05/07	06/05/07	09/18/07	09/18/07	09/18/07
Location	PRI-1	PRI-2	PRI-4	PRI-1	PRI-2	PRI-4
analysis						
gross alpha-sol	< 1.2	< 2.0	4.0 +- 2.0	2.4 +- 1.6	< 2.0	3.0 +- 2.0
gross beta-sol	2.8 +- 1.4	5.8 +- 1.6	5.4 +- 1.6	2.3 +- 1.4	3.4 +- 1.5	4.0 +- 1.6
gross alpha-insol	< 0.8	< 0.9	< 0.9	< 0.9	< 0.9	1.9 +- 1.1
gross beta-insol	< 1.9	< 2.0	< 2.0	< 2.0	< 2.0	2.5 +- 1.4
H-3	< 300	< 300	< 300	< 300	< 300	< 300
Sr-89	< 0.6	< 0.6	< 0.6	< 0.5	< 0.4	< 0.4
Sr-90	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.3
gamma isotopic						
Mn-54	< 7	< 6	< 5	< 8	< 6	< 5
Co-58	< 6	< 6	< 7	< 8	< 6	< 6
Fe-59	< 13	< 13	< 11	< 15	< 12	< 10
Co-60	< 7	< 8	< 8	< 9	< 6	< 7
Zn-65	< 16	< 15	< 16	< 22	< 15	< 16
Nb-95	< 7	< 6	< 7	< 8	< 7	< 7
Zr-95	< 12	< 12	< 12	< 14	< 10	< 8
I-131	< 7	< 8	< 8	< 10	< 8	< 6
Cs-134	< 8	< 7	< 7	< 10	< 7	< 6
Cs-137	< 7	< 7	< 7	< 8	< 6	< 6
Ba-140	< 23	< 25	< 26	< 30	< 25	< 21
La-140	< 12	< 10	< 12	< 12	< 9	< 11

Radioisotopes other than those reported were not detected.

Table 10. WI DHS analysis results of fish samples collected for the Prairie Island environmental monitoring program.

Measurements in units of pCi / kg (wet)

Collection date	05/15/07	05/16/07	11/07/07	11/13/07
location type	downstream white bass	upstream white bass	downstream walleye	upstream walleye
Radioisotopes				
K-40	3000 +- 200	2500 +- 200	3500 +- 200	3600 +- 200
Mn-54	< 20	< 18	< 20	< 18
Co-58	< 20	< 27	< 26	< 26
Fe-59	< 70	< 60	< 60	< 90
Co-60	< 26	< 27	< 26	< 26
Zn-65	< 55	< 60	< 100	< 70
Nb-95	< 35	< 32	< 22	< 39
Zr-95	< 54	< 49	< 44	< 57
Cs-134	< 18	< 15	< 24	< 22
Cs-137	< 16	< 21	< 16	< 19

Radioisotopes other than those reported were not detected.

Table 11. WI DHS analysis results of well water samples collected for the Prairie Island environmental monitoring program.

Measurements in units of pCi/liter

Location	PRI-4	PRI-5	PRI-6	PRI-4	PRI-5	PRI-6
Collection date	06/05/07	06/05/07	06/05/07	09/18/07	09/18/07	09/18/07
gross alpha	< 3.0	< 2.0	< 3.0	< 2.0	< 2.0	< 2.4
gross beta	< 1.4	< 0.7	< 1.2	< 4.0	2.5 +- 1.2	< 4.0
H-3	< 300	< 300	< 300	< 300	< 300	< 300

Table 12. WI DHS analysis results of milk samples collected for the Prairie Island environmental monitoring program.

Measurements in units of pCi/liter

Location	PRI-13	PRI-10	PRI-13	PRI-10	PRI-13	PRI-10
Collection date	01/16/07	02/14/07	03/21/07	04/11/07	05/08/07	06/06/07
analysis						
I-131		< 0.4	< 0.4	< 0.2	< 0.3	
Sr-90	1.3 +- 0.2	0.6 +- 0.2	1.0 +- 0.2	0.5 +- 0.2	1.2 +- 0.2	0.7 +- 0.3
gamma isotopic						
K-40	1470 +- 60	1590 +- 60	1420 +- 80	1540 +- 50	1390 +- 70	1490 +- 60
Mn-54	< 7	< 6	< 13	< 5	< 9	< 6
Co-58	< 6	< 5	< 12	< 6	< 10	< 6
Fe-59	< 12	< 13	< 26	< 12	< 18	< 14
Co-60	< 7	< 7	< 14	< 7	< 13	< 8
Zn-65	< 14	< 12	< 30	< 15	< 24	< 17
Nb-95	< 6	< 6	< 10	< 6	< 8	< 6
Zr-95	< 11	< 10	< 20	< 10	< 18	< 11
I-131	< 7	< 6	< 13	< 9	< 10	< 8
Cs-134	< 6	< 6	< 11	< 5	< 9	< 6
Cs-137	< 6	< 5	< 12	< 5	< 9	< 6
Ba-140	< 24	< 19	< 41	< 24	< 32	< 23
La-140	< 8	< 9	< 13	< 9	< 13	< 8

Location	PRI-13	PRI-10	PRI-13	PRI-10	PRI-13	PRI-10
Collection date	07/11/07	08/15/07	09/12/07	10/17/07	11/21/07	12/19/07
analysis						
I-131	< 0.7		< 0.2	< 0.3		
Sr-90	1.0 +- 0.3	0.7 +- 0.2	1.1 +- 0.2	0.6 +- 0.2	1.1 +- 0.3	1.5 +- 0.4
gamma isotopic						
K-40	1450 +- 60	1500 +- 60	1290 +- 60	1530 +- 80	1380 +- 50	1560 +- 50
Mn-54	< 7	< 8	< 6	< 10	< 6	< 5
Co-58	< 7	< 7	< 7	< 10	< 6	< 5
Fe-59	< 19	< 17	< 18	< 18	< 15	< 12
Co-60	< 9	< 8	< 9	< 11	< 7	< 5
Zn-65	< 20	< 20	< 19	< 27	< 18	< 14
Nb-95	< 7	< 7	< 8	< 9	< 7	< 6
Zr-95	< 15	< 13	< 14	< 19	< 11	< 9
I-131	< 10	< 12	< 11	< 11	< 11	< 10
Cs-134	< 8	< 8	< 6	< 11	< 7	< 6
Cs-137	< 8	< 7	< 7	< 10	< 6	< 5
Ba-140	< 31	< 30	< 30	< 40	< 29	< 27
La-140	< 11	< 14	< 15	< 15	< 11	< 9

Radioisotopes other than those reported were not detected.

Table 12. WI DHS analysis results of milk samples collected for the Prairie Island environmental monitoring program.

Measurements in units of pCi/liter

Location	PRI-15	PRI-15	PRI-15	PRI-15	PRI-15	PRI-15
Collection date analysis	01/16/07	02/14/07	03/21/07	04/11/07	05/08/07	06/06/07
I-131		< 0.4	< 0.5	< 0.3	< 0.3	
Sr-90	1.1 +- 0.2	1.1 +- 0.3	0.9 +- 0.2	1.5 +- 0.3	1.4 +- 0.2	0.7 +- 0.2
gamma isotopic						
K-40	1610 +- 60	1520 +- 60	1550 +- 50	1410 +- 60	1670 +- 70	1530 +- 60
Mn-54	< 6	< 6	< 5	< 7	< 9	< 6
Co-58	< 6	< 6	< 5	< 8	< 10	< 6
Fe-59	< 12	< 13	< 11	< 15	< 21	< 14
Co-60	< 7	< 7	< 6	< 8	< 10	< 6
Zn-65	< 12	< 15	< 13	< 16	< 23	< 16
Nb-95	< 5	< 6	< 5	< 7	< 9	< 6
Zr-95	< 9	< 11	< 9	< 13	< 15	< 11
I-131	< 7	< 7	< 6	< 10	< 10	< 8
Cs-134	< 5	< 6	< 5	< 7	< 10	< 6
Cs-137	< 6	< 6	< 6	< 8	< 9	< 6
Ba-140	< 22	< 22	< 20	< 28	< 33	< 23
La-140	< 7	< 8	< 6	< 11	< 13	< 8

Location	PRI-15	PRI-15	PRI-15	PRI-15	PRI-15	PRI-15
Collection date analysis	07/11/07	08/15/07	09/12/07	10/17/07	11/21/07	12/19/07
I-131	< 0.5		< 0.2	< 0.3		
Sr-90	0.8 +- 0.4	0.6 +- 0.2	0.8 +- 0.2	0.9 +- 0.2	1.0 +- 0.2	0.7 +- 0.3
gamma isotopic						
K-40	1500 +- 60	1490 +- 60	1530 +- 80	1470 +- 70	1590 +- 60	1540 +- 50
Mn-54	< 7	< 7	< 9	< 9	< 6	< 4
Co-58	< 8	< 6	< 9	< 8	< 5	< 5
Fe-59	< 16	< 16	< 19	< 22	< 15	< 13
Co-60	< 9	< 7	< 8	< 11	< 7	< 6
Zn-65	< 21	< 18	< 24	< 24	< 15	< 12
Nb-95	< 8	< 7	< 8	< 8	< 7	< 5
Zr-95	< 13	< 11	< 12	< 15	< 9	< 8
I-131	< 8	< 9	< 7	< 8	< 9	< 8
Cs-134	< 10	< 9	< 8	< 8	< 5	< 5
Cs-137	< 7	< 6	< 10	< 8	< 6	< 5
Ba-140	< 27	< 30	< 28	< 32	< 27	< 21
La-140	< 13	< 15	< 15	< 12	< 10	< 8

Radioisotopes other than those reported were not detected.

Table 13. WI DHS analysis results of vegetation samples collected for the Prairie Island environmental monitoring program.

Measurements in units of pCi / kg (wet)

Collection date	06/05/07	06/05/07	06/05/07	06/05/07	06/05/07	06/05/07
Location analysis	PRI-1	PRI-4	PRI-5	PRI-6	PRI-8	PRI-9
gross alpha	< 2000	< 2100	< 1800	< 2000	< 1900	< 2100
gross beta	6900 +- 1300	6400 +- 1300	4800 +- 1100	6900 +- 1400	4400 +- 1100	7800 +- 1400
gamma isotopic						
Be-7	700 +- 200	< 430	600 +- 200	470 +- 130	560 +- 110	770 +- 140
K-40	6100 +- 500	4500 +- 400	5600 +- 500	5900 +- 400	4100 +- 300	4800 +- 400
Mn-54	< 46	< 60	< 70	< 51	< 42	< 54
Co-58	< 37	< 46	< 60	< 49	< 35	< 60
Fe-59	< 90	< 160	< 170	< 80	< 140	< 90
Co-60	< 90	< 8	< 42	< 70	< 31	< 60
Zn-65	< 190	< 140	< 190	< 150	< 110	< 160
Nb-95	< 50	< 37	< 60	< 47	< 42	< 60
Zr-95	< 130	< 70	< 150	< 90	< 90	< 80
I-131	< 60	< 49	< 80	< 60	< 42	< 60
Cs-134	< 60	< 70	< 60	< 49	< 59	< 56
Cs-137	< 70	< 60	< 80	< 40	< 51	< 50
Ba-140	< 270	< 180	< 240	< 160	< 180	< 170
La-140	< 10	< 90	< 60	< 35	< 80	< 80

Collection date	09/18/07	09/18/07	09/18/07	09/18/07	09/18/07	09/18/07
Location analysis	PRI-1	PRI-4	PRI-5	PRI-6	PRI-8	PRI-9
gross alpha	< 3000	< 3000	< 1700	< 2300	< 3000	< 4000
gross beta	5300 +- 700	5500 +- 800	4600 +- 500	4400 +- 700	4300 +- 700	8000 +- 1100
gamma isotopic						
Be-7	1300 +- 100	910 +- 100	710 +- 110	1400 +- 100	1100 +- 200	2700 +- 200
K-40	5300 +- 300	4600 +- 400	4400 +- 400	4300 +- 300	3900 +- 400	4600 +- 400
Mn-54	< 40	< 57	< 60	< 35	< 80	< 54
Co-58	< 53	< 43	< 60	< 39	< 48	< 50
Fe-59	< 120	< 90	< 120	< 70	< 130	< 90
Co-60	< 51	< 70	< 46	< 48	< 51	< 60
Zn-65	< 120	< 140	< 150	< 110	< 180	< 180
Nb-95	< 40	< 60	< 28	< 51	< 51	< 60
Zr-95	< 70	< 80	< 100	< 60	< 80	< 90
I-131	< 46	< 49	< 56	< 46	< 60	< 54
Cs-134	< 45	< 47	< 60	< 39	< 70	< 70
Cs-137	< 39	< 35	< 55	< 40	< 60	< 46
Ba-140	< 130	< 150	< 170	< 150	< 170	< 190
La-140	< 90	< 90	< 70	< 44	< 70	< 70

Radioisotopes other than those reported were not detected.

Table 14. WI DHS analysis results of soil samples collected for the Prairie Island environmental monitoring program.

Measurements in units of pCi / kg (dry)

Collection date	06/05/07	06/05/07	06/05/07	06/05/07	06/05/07	06/05/07
Location analysis	PRI-1	PRI-4	PRI-5	PRI-6	PRI-8	PRI-9
gross alpha	< 8000	< 8000	< 8000	9000 +- 7000	11000 +- 8000	< 8000
gross beta	16000 +- 4000	15000 +- 4000	13000 +- 4000	20000 +- 4000	26000 +- 5000	14000 +- 4000
gamma isotopic						
K-40	14200 +- 400	13500 +- 500	13700 +- 500	15200 +- 600	15400 +- 500	13000 +- 500
Mn-54	< 12	< 46	< 49	< 51	< 29	< 47
Co-58	< 11	< 40	< 43	< 44	< 31	< 51
Fe-59	< 29	< 100	< 90	< 100	< 70	< 90
Co-60	< 13	< 53	< 47	< 60	< 33	< 42
Zn-65	< 40	< 130	< 130	< 200	< 130	< 130
Nb-95	< 13	< 50	< 42	< 52	< 28	< 47
Zr-95	< 22	< 80	< 70	< 70	< 52	< 60
Cs-134	< 17	< 47	< 55	< 60	< 80	< 47
Cs-137	490 +- 11	110 +- 20	170 +- 20	310 +- 20	169 +- 12	220 +- 20

Collection date	09/18/07	09/18/07	09/18/07	09/18/07	09/18/07	09/18/07
Location analysis	PRI-1	PRI-4	PRI-5	PRI-6	PRI-8	PRI-9
gross alpha	< 13000	< 13000	< 11000	< 12000	< 12000	< 10000
gross beta	12000 +- 3000	12000 +- 3000	13000 +- 3000	15000 +- 3000	22000 +- 3000	11000 +- 2000
gamma isotopic						
K-40	11200 +- 300	11000 +- 400	12400 +- 400	13900 +- 500	14300 +- 500	12000 +- 400
Mn-54	< 8	< 14	< 19	< 40	< 21	< 28
Co-58	< 6	< 13	< 14	< 42	< 19	< 29
Fe-59	< 21	< 39	< 39	< 100	< 53	< 90
Co-60	< 8	< 14	< 17	< 50	< 23	< 22
Zn-65	< 20	< 34	< 40	< 150	< 56	< 130
Nb-95	< 11	< 19	< 23	< 42	< 32	< 33
Zr-95	< 14	< 24	< 34	< 70	< 38	< 51
Cs-134	< 8	< 15	< 18	< 60	< 22	< 42
Cs-137	436 +- 11	228 +- 11	151 +- 9	240 +- 20	145 +- 10	195 +- 14

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.

State of Wisconsin

2007

Point Beach - Kewaunee

Environmental Radioactivity Survey

**Wisconsin Department of Health Services
Division of Public Health
Bureau of Environmental and Occupational Health
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State of Wisconsin DHS

2007

Point Beach - Kewaunee Environmental Radioactivity Survey

Introduction

Wisconsin Public Health Statutes 254.41 mandates the 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, 2007 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 (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

There were no program modifications for 2007.

Laboratory Services and Quality Assurance

The analysis of the samples is performed under contract with the State Laboratory of Hygiene (SLH). SLH 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.

SLH participates in the Environmental Resource Associates' Proficiency Testing program and has performed satisfactorily over the report period. Proficiency testing results are available from the 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 2007.

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	311	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	123	1	ambient gamma
surface water	G/M	9, 12a, 17	36	0	GA, GB, GI, Sr, H, I
surface water	G/SA	5, 25	4	0	GA, GB, GI, Sr, H
fish	G/SA	10	12	0	GI
shoreline sediment	G/A	5, 10a, 12a, 12b, 12c, 25, 26	7	0	GA, BG, GI
vegetation	G/SA	1, 2, 3, 4, 5, 7, 8, 14, 17, 25	20	0	GA, GB, GI
soil	G/SA	1, 2, 3, 4, 5, 7, 8, 14, 17, 25	20	0	GA, GB, GI
well water	G/SA	3, 10b, 11, 12d	10	0	GA, GB, H
milk	G/M	19, 24, 27	36	1	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	Trailer on Nuclear Road

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

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
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 Property
PBK-26	8.3 NNE	12.6 N	Kewaunee
PBK-27	3.5 SSW	1.7 NW	R. Barta farm
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 2007.

Sample type	Date	Site	Explanation
air particulate	01/23/07	7	Gross beta data is not available due to adverse sampling conditions. The air vents in the site enclosure were blocked and prevented air flow through the enclosure.
air particulate	04/27/07	17	Due to an electrical problem, the air site was off for approximately 75 hours at the end of the collection period.
air iodine	04/27/07	17	Due to an electrical problem, the air site was off for approximately 75 hours at the end of the collection period.
TLD	1st quarter	27	No data; the TLD was lost in the field.
milk	10/10/07	24	Due to chemical analysis problems, one sample LLD for iodine by chemical procedure was not acceptable

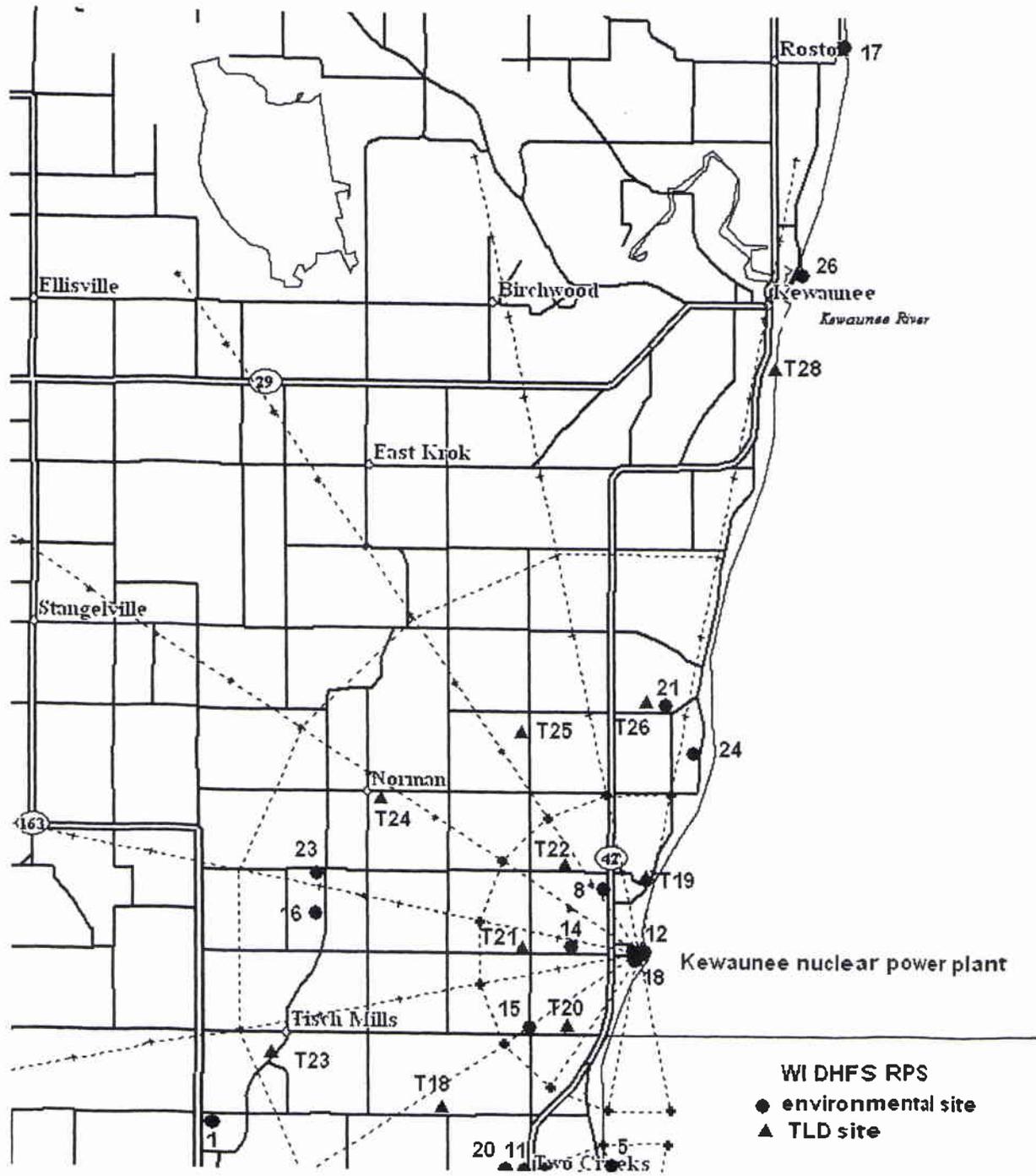


Figure 1. Point Beach - Kewaunee environmental monitoring sampling sites in relation to the Kewaunee plant.

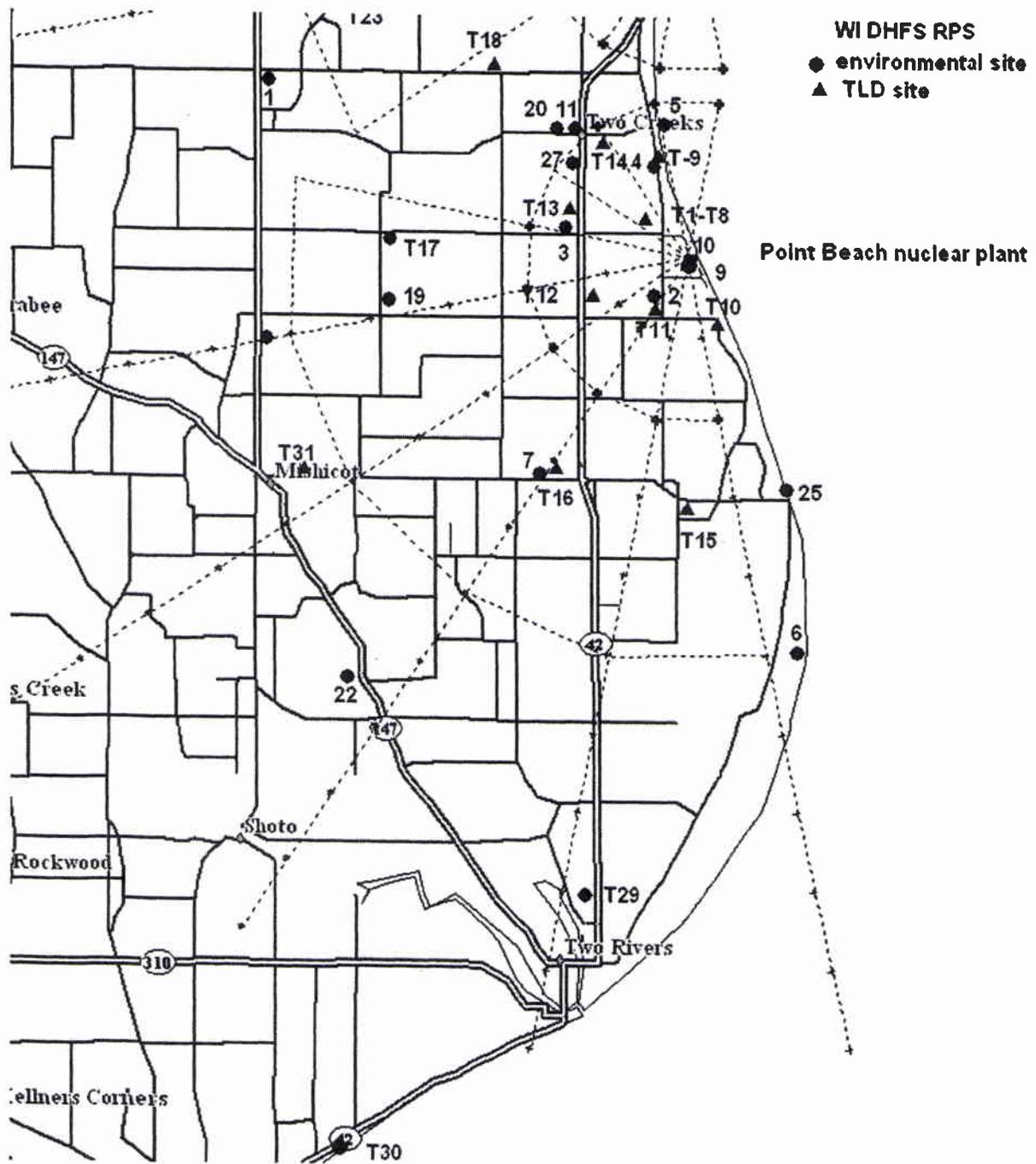


Figure 2. Point Beach - Kewaunee environmental monitoring sampling sites in relation to the Point Beach plant.

Results and Discussion

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.

Influence by the Kewaunee or the Point Beach nuclear facility on air quality is not evident from air particulate analysis.

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 .

Ambient Gamma Radiation (TLD)

A summary of reported activities by WI DHS for direct 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 13.8 ± 1.8 milliroentgens. The average quarterly exposure for 2007 is at background levels and is comparable to other areas within Wisconsin.

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 within the normal range of activity when compared to previous year's data.

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.

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 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.

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.

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.

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 Point Beach facilities is not evident in milk samples.

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 Point Beach facilities in vegetation samples is not evident.

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 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.

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 2007 for sites T9 – T31 was 13.8 ± 1.8 milliroentgens and for sites T1 – T8 varied from 19.4 – 73.2 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 Kewaunee nuclear generating facilities are less than the limits as stated in these Federal regulations.

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

References

State of Wisconsin, Wisconsin Administrative Code, HFS 157.23

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

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

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

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

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	0.007 - 0.057
	0.020	24 / 24	Be-7	0.049 - 0.086
	0.002	24 / 0	Mn-54	< 0.0008
	0.002	24 / 0	Co-58	< 0.0007
	0.005	24 / 0	Fe-59	< 0.0019
	0.002	24 / 0	Co-60	< 0.0010
	0.005	24 / 0	Zn-65	< 0.0027
	0.002	24 / 0	Nb-95	< 0.0011
	0.005	24 / 0	Zr-95	< 0.0022
	0.002	24 / 0	Ru-103	< 0.0006
	0.015	24 / 0	Ru-106	< 0.0051
	0.020	24 / 0	I-131	< 0.0022
	0.002	24 / 0	Cs-134	< 0.0008
	0.002	24 / 0	Cs-137	< 0.0009
	0.030	24 / 0	Ba-140	< 0.0044
	0.020	24 / 0	La-140	< 0.0019
0.002	24 / 0	Ce-141	< 0.0009	
0.005	24 / 0	Ce-144	< 0.0032	
air iodine (pCi/m ³)	0.07	156 / 0	I-131	< 0.054
surface water (pCi/liter)	3.0	40 / 30	gross beta (sol)	< 3.0 - 6.0
	3.0	40 / 2	gross beta (insol)	< 2.5 - 2.1
	3.0	40 / 6	gross alpha (sol)	< 3.0 - 3.0
	3.0	40 / 2	gross alpha (insol)	< 2.1 - 1.4
	300	16 / 0	H-3	< 300
	1.5	21 / 0	I-131	< 1.4
	2.0	16 / 0	Sr-89	< 0.7
	1.0	16 / 3	Sr-90	< 0.4 - 0.7
			gamma isotopic	
	15	40 / 0	Mn-54	< 9
	15	40 / 0	Co-58	< 10
	30	40 / 0	Fe-59	< 20
	15	40 / 0	Co-60	< 10
	30	40 / 0	Zn-65	< 22
	15	40 / 0	Nb-95	< 11
	30	40 / 0	Zr-95	< 17
	15	40 / 0	I-131	< 15
	15	40 / 0	Cs-134	< 10
	15	40 / 0	Cs-137	< 11
60	40 / 0	Ba-140	< 44	
15	40 / 0	La-140	< 15	

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

Sample type (units)	MDC	Number of samples ^a	Analysis	Range
fish (pCi/kg wet)	800	12 / 12	gamma isotopic	
			K-40	2300 - 3800
	50	12 / 0	Mn-54	< 30
	60	12 / 0	Co-58	< 38
	130	12 / 0	Fe-59	< 90
	70	12 / 0	Co-60	< 49
	130	12 / 0	Zn-65	< 80
	50	12 / 0	Nb-95	< 49
	100	12 / 0	Zr-95	< 80
	50	12 / 0	Cs-134	< 35
	60	12 / 10	Cs-137	< 35 - 43
shoreline sediment (pCi/kg dry)	6000	7 / 7	gross beta	4000 - 7000
	15000	7 / 0	gross alpha	< 13000
			gamma isotopic	
	800	7 / 7	K-40	6700 - 13000
	60	7 / 0	Mn-54	< 39
	90	7 / 0	Co-58	< 40
	600	7 / 0	Fe-59	< 130
	90	7 / 0	Co-60	< 60
	300	7 / 0	Zn-65	< 190
	100	7 / 0	Nb-95	< 45
	200	7 / 0	Zr-95	< 90
	80	7 / 0	Cs-134	< 57
	80	7 / 1	Cs-137	< 45 - 29
	vegetation (pCi/kg wet)	6000	20 / 0	gross alpha
4000		20 / 20	gross beta	1700 - 9500
			gamma isotopic	
600		20 / 15	Be-7	< 600 - 3500
2000		20 / 20	K-40	2600 - 7000
90		20 / 0	Mn-54	< 80
100		20 / 0	Co-58	< 70
200		20 / 0	Fe-59	< 180
100		20 / 0	Co-60	< 80
250		20 / 0	Zn-65	< 210
100		20 / 0	Nb-95	< 90
200		20 / 0	Zr-95	< 120
80		20 / 0	I-131	< 80
80		20 / 0	Cs-134	< 70
90		20 / 0	Cs-137	< 70
350		20 / 0	Ba-140	< 280
100		20 / 0	La-140	< 100

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

Sample type (units)	MDC	Number of samples ^a	Analysis	Range
soil (pCi/kg dry)	6000	20 / 20	gross beta	5000 - 33000
	13000	20 / 8	gross alpha	< 13000 - 14000
	800	20 / 20	gamma isotopic	
	60	20 / 0	K-40	6600 - 23700
	90	20 / 0	Mn-54	< 51
	600	20 / 0	Co-58	< 60
	90	20 / 0	Fe-59	< 150
	300	20 / 0	Co-60	< 70
	100	20 / 0	Zn-65	< 240
	250	20 / 0	Nb-95	< 60
	80	20 / 0	Zr-95	< 100
	80	20 / 18	Cs-134	< 80
			Cs-137	< 35 - 450
	milk (pCi/liter)	1.0	36 / 32	Sr-90
0.5		21 / 0	I-131	< 0.6
500		36 / 36	gamma isotopic	
15		36 / 0	K-40	1190 - 1630
15		36 / 0	Mn-54	< 15
40		36 / 0	Co-58	< 12
15		36 / 0	Fe-59	< 27
40		36 / 0	Co-60	< 15
15		36 / 0	Zn-65	< 37
40		36 / 0	Nb-95	< 12
15		36 / 0	Zr-95	< 20
15		36 / 0	I-131	< 13
15		36 / 0	Cs-134	< 14
60		36 / 0	Cs-137	< 13
15		36 / 0	Ba-140	< 44
			La-140	< 15
well water (pCi/liter)	2.5	10 / 5	gross beta	< 2.3 - 6.0
	5.0	10 / 1	gross alpha	< 5.0 - 5.0
	300 ^b	10 / 0	H-3	< 300
precipitation (nCi/m ²)	1.5 ^b	12 / 10	gross beta	< 0.23 - 0.87
	300 ^b	12 / 0	H-3	< 35
ambient radiation (mR/Std Qtr)	1.0 ^c	123 / 123	exposure	10.4 - 73.2

a - Number of analyses / number of analyses detected above the WI DHS MDC.
b - MDC 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 m3	air particulate	collection date	volume m3	air particulate
01/03/07	491	0.021 +- 0.003	07/03/07	646	0.008 +- 0.002
01/10/07	493	0.026 +- 0.003	07/11/07	860	0.019 +- 0.003
01/17/07	497	0.016 +- 0.002	07/18/07	735	0.009 +- 0.002
01/24/07	501	0.032 +- 0.003	07/25/07	743	0.015 +- 0.003
01/31/07	559	0.023 +- 0.002	08/01/07	732	0.024 +- 0.003
02/07/07	572	0.022 +- 0.002	08/08/07	743	0.024 +- 0.003
02/14/07	580	0.018 +- 0.002	08/15/07	728	0.017 +- 0.003
02/20/07	492	0.025 +- 0.003	08/22/07	743	0.010 +- 0.002
02/28/07	643	0.018 +- 0.002	08/29/07	755	0.015 +- 0.003
03/07/07	565	0.013 +- 0.002	09/05/07	716	0.021 +- 0.003
03/14/07	575	0.021 +- 0.002	09/12/07	747	0.016 +- 0.003
03/21/07	560	0.018 +- 0.002	09/19/07	767	0.016 +- 0.003
03/28/07	552	0.013 +- 0.002	09/26/07	755	0.024 +- 0.003
1st Qtr			3rd Qtr		
mean +- s.d.		0.020 +- 0.005	mean +- s.d.		0.017 +- 0.005
04/04/07	550	0.009 +- 0.002	10/03/07	770	0.024 +- 0.003
04/11/07	557	0.013 +- 0.002	10/11/07	848	0.017 +- 0.003
04/19/07	645	0.018 +- 0.002	10/18/07	774	0.017 +- 0.003
04/25/07	483	0.013 +- 0.002	10/25/07	759	0.016 +- 0.003
05/02/07	564	0.012 +- 0.002	10/31/07	650	0.020 +- 0.003
05/10/07	684	0.013 +- 0.002	11/07/07	778	0.013 +- 0.001
05/17/07	720	0.012 +- 0.002	11/15/07	891	0.019 +- 0.003
05/23/07	658	0.016 +- 0.003	11/21/07	665	0.017 +- 0.003
05/30/07	766	0.015 +- 0.003	11/28/07	782	0.022 +- 0.003
06/06/07	751	0.015 +- 0.003	12/05/07	786	0.021 +- 0.003
06/20/07	728	0.022 +- 0.003	12/12/07	786	0.032 +- 0.003
06/13/07	759	0.017 +- 0.003	12/19/07	544	0.057 +- 0.004
06/27/07	735	0.021 +- 0.003	12/26/07	533	0.049 +- 0.004
2nd Qtr			4th Qtr		
mean +- s.d.		0.015 +- 0.004	mean +- s.d.		0.025 +- 0.013

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-4

collection date	volume m3	air particulate	air iodine	collection date	volume m3	air particulate	air iodine
01/02/07	566	0.022 +- 0.002	< 0.019	07/02/07	419	0.010 +- 0.002	< 0.031
01/09/07	618	0.021 +- 0.002	< 0.021	07/11/07	726	0.017 +- 0.002	< 0.015
01/16/07	598	0.015 +- 0.002	< 0.021	07/16/07	407	0.007 +- 0.002	< 0.044
01/22/07	539	0.023 +- 0.003	< 0.025	07/23/07	559	0.014 +- 0.002	< 0.021
01/29/07	614	0.028 +- 0.002	< 0.022	07/31/07	656	0.023 +- 0.002	< 0.015
02/05/07	627	0.023 +- 0.002	< 0.018	08/08/07	644	0.027 +- 0.002	< 0.018
02/14/07	793	0.021 +- 0.002	< 0.013	08/13/07	403	0.017 +- 0.003	< 0.031
02/19/07	433	0.025 +- 0.003	< 0.021	08/20/07	562	0.013 +- 0.002	< 0.024
02/26/07	601	0.018 +- 0.002	< 0.026	08/27/07	566	0.014 +- 0.002	< 0.023
03/05/07	599	0.010 +- 0.002	< 0.021	09/04/07	639	0.021 +- 0.002	< 0.026
03/14/07	785	0.021 +- 0.002	< 0.013	09/12/07	660	0.020 +- 0.002	< 0.012
03/19/07	427	0.018 +- 0.003	< 0.032	09/18/07	475	0.013 +- 0.002	< 0.031
03/26/07	597	0.016 +- 0.002	< 0.024	09/24/07	489	0.029 +- 0.003	< 0.017
1st Qtr mean +- s.d.		0.020 +- 0.005	< 0.021	3rd Qtr mean +- s.d.		0.017 +- 0.006	< 0.024
04/02/07	621	0.013 +- 0.002	< 0.025	10/01/07	567	0.023 +- 0.002	< 0.009
04/11/07	768	0.014 +- 0.002	< 0.025	10/10/07	734	0.022 +- 0.002	< 0.019
04/16/07	421	0.016 +- 0.003	< 0.031	10/15/07	413	0.011 +- 0.003	< 0.032
04/23/07	595	0.017 +- 0.002	< 0.029	10/22/07	574	0.024 +- 0.002	< 0.014
04/30/07	601	0.015 +- 0.002	< 0.035	10/29/07	575	0.015 +- 0.002	< 0.029
05/09/07	762	0.013 +- 0.002	< 0.024	11/05/07	561	0.024 +- 0.003	< 0.027
05/14/07	410	0.012 +- 0.003	< 0.028	11/14/07	704	0.022 +- 0.002	< 0.014
05/21/07	578	0.014 +- 0.002	< 0.027	11/19/07	392	0.014 +- 0.003	< 0.036
05/29/07	674	0.017 +- 0.002	< 0.021	11/23/07	525	0.030 +- 0.003	< 0.034
06/04/07	490	0.023 +- 0.003	< 0.029	12/03/07	496	0.025 +- 0.003	< 0.029
06/13/07	740	0.018 +- 0.002	< 0.019	12/12/07	649	0.030 +- 0.002	< 0.027
06/19/07	487	0.026 +- 0.003	< 0.027	12/19/07	497	0.046 +- 0.003	< 0.038
06/27/07	632	0.020 +- 0.002	< 0.022	12/26/07	495	0.041 +- 0.003	< 0.033
2nd Qtr mean +- s.d.		0.017 +- 0.004	< 0.026	4th Qtr mean +- s.d.		0.025 +- 0.010	< 0.026

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-7

collection date	volume m3	air particulate	collection date	volume m3	air particulate
01/03/07	515	0.019 +- 0.002	07/03/07	345	0.007 +- 0.003
01/10/07	521	0.019 +- 0.002	07/11/07	456	0.021 +- 0.003
01/17/07	533	0.011 +- 0.002	07/18/07	405	0.011 +- 0.003
01/24/07	548	0.028 +- 0.003	07/25/07	394	0.018 +- 0.003
01/31/07	475	0.023 +- 0.003	08/01/07	394	0.024 +- 0.003
02/07/07	505	0.025 +- 0.003	08/08/07	386	0.026 +- 0.003
02/14/07	491	0.022 +- 0.003	08/15/07	386	0.017 +- 0.003
02/20/07	418	0.023 +- 0.003	08/22/07	389	0.010 +- 0.003
02/28/07	545	0.016 +- 0.002	08/29/07	391	0.017 +- 0.003
03/07/07	499	0.011 +- 0.002	09/05/07	399	0.029 +- 0.003
03/14/07	453	0.024 +- 0.003	09/12/07	397	0.020 +- 0.003
03/21/07	467	0.018 +- 0.003	09/19/07	418	0.018 +- 0.003
03/28/07	453	0.013 +- 0.002	09/26/07	405	0.025 +- 0.003
1st Qtr mean +- s.d.			3rd Qtr mean +- s.d.		
0.019 +- 0.005			0.019 +- 0.007		
04/04/07	453	0.010 +- 0.002	10/03/07	402	0.026 +- 0.003
04/11/07	472	0.013 +- 0.002	10/11/07	462	0.018 +- 0.003
04/19/07	526	0.016 +- 0.002	10/18/07	421	0.021 +- 0.003
04/25/07	370	0.016 +- 0.003	10/25/07	424	0.019 +- 0.003
05/02/07	429	0.011 +- 0.002	10/31/07	370	0.024 +- 0.003
05/10/07	510	0.016 +- 0.002	11/07/07	451	0.013 +- 0.003
05/17/07	389	0.015 +- 0.003	11/15/07	521	0.022 +- 0.003
05/23/07	356	0.017 +- 0.003	11/21/07	383	0.022 +- 0.003
05/30/07	421	0.017 +- 0.003	11/28/07	467	0.023 +- 0.003
06/06/07	402	0.016 +- 0.003	12/05/07	478	0.022 +- 0.003
06/13/07	410	0.020 +- 0.003	12/12/07	464	0.035 +- 0.003
06/20/07	383	0.026 +- 0.003	12/19/07	485	0.040 +- 0.003
06/27/07	383	0.021 +- 0.003	12/26/07	480	0.035 +- 0.003
2nd Qtr mean +- s.d.			4th Qtr mean +- s.d.		
0.016 +- 0.004			0.025 +- 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.

Measurements in units of pCi/m³

Site: PBK-8

collection date	volume m3	air particulate	collection date	volume m3	air particulate
01/02/07	612	0.023 +- 0.002	07/03/07	591	0.011 +- 0.002
01/09/07	605	0.023 +- 0.002	07/10/07	570	0.021 +- 0.002
01/16/07	619	0.015 +- 0.002	07/16/07	506	0.009 +- 0.002
01/23/07 a	565		07/23/07	576	0.014 +- 0.002
01/30/07	629	0.026 +- 0.002	07/30/07	568	0.021 +- 0.002
02/06/07	664	0.025 +- 0.002	08/06/07	563	0.024 +- 0.002
02/13/07	699	0.021 +- 0.002	08/14/07	650	0.016 +- 0.002
02/20/07	663	0.021 +- 0.002	08/21/07	574	0.012 +- 0.002
02/27/07	655	0.017 +- 0.002	08/28/07	576	0.013 +- 0.002
03/06/07	655	0.011 +- 0.002	09/05/07	643	0.025 +- 0.002
03/13/07	653	0.021 +- 0.002	09/11/07	491	0.019 +- 0.003
03/20/07	652	0.020 +- 0.002	09/18/07	573	0.011 +- 0.002
03/27/07	642	0.017 +- 0.002	09/26/07	647	0.025 +- 0.002
1st Qtr mean +- s.d.		0.020 +- 0.004	3rd Qtr mean +- s.d.		0.017 +- 0.006
04/03/07	623	0.010 +- 0.002	10/02/07	484	0.025 +- 0.003
04/10/07	660	0.013 +- 0.002	10/09/07	563	0.023 +- 0.002
04/17/07	622	0.018 +- 0.002	10/18/07	730	0.016 +- 0.002
04/24/07	631	0.017 +- 0.002	10/24/07	517	0.024 +- 0.003
05/01/07	615	0.015 +- 0.002	10/30/07	486	0.018 +- 0.003
05/08/07	622	0.015 +- 0.002	11/06/07	595	0.016 +- 0.002
05/15/07	607	0.015 +- 0.002	11/13/08	580	0.022 +- 0.002
05/22/07	616	0.014 +- 0.002	11/20/07	581	0.017 +- 0.002
05/29/07	589	0.019 +- 0.002	11/28/07	661	0.024 +- 0.002
06/05/07	596	0.020 +- 0.002	12/03/07	433	0.024 +- 0.003
06/13/07	672	0.019 +- 0.002	12/11/07	690	0.027 +- 0.002
06/19/07	507	0.027 +- 0.003	12/18/07	633	0.041 +- 0.003
06/26/07	584	0.018 +- 0.002	12/26/07	699	0.041 +- 0.003
2nd Qtr mean +- s.d.		0.017 +- 0.004	4th Qtr mean +- s.d.		0.024 +- 0.008

a - Gross beta data is not available due to adverse sampling conditions. The air vents in the site enclosure were blocked and prevented air flow through the enclosure.

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-17

collection date	volume m3	air particulate	air iodine	collection date	volume m3	air particulate	air iodine
01/05/07	637	0.019 +- 0.002	< 0.021	07/06/07	597	0.011 +- 0.002	< 0.025
01/12/07	642	0.019 +- 0.002	< 0.034	07/13/07	588	0.017 +- 0.002	< 0.019
01/19/07	642	0.015 +- 0.002	< 0.025	07/20/07	597	0.012 +- 0.002	< 0.025
01/26/07	649	0.029 +- 0.002	< 0.015	07/27/07	595	0.020 +- 0.002	< 0.019
02/02/07	645	0.024 +- 0.002	< 0.028	08/03/07	572	0.022 +- 0.002	< 0.027
02/09/07	671	0.020 +- 0.002	< 0.016	08/10/07	601	0.020 +- 0.002	< 0.033
02/16/07	675	0.018 +- 0.002	< 0.007	08/17/07	579	0.017 +- 0.002	< 0.035
02/23/07	635	0.025 +- 0.002	< 0.023	08/24/07	597	0.011 +- 0.002	< 0.040
03/02/07	636	0.011 +- 0.002	< 0.021	08/31/07	608	0.015 +- 0.002	< 0.026
03/09/07	654	0.015 +- 0.002	< 0.023	09/07/07	579	0.031 +- 0.003	< 0.037
03/16/07	625	0.022 +- 0.002	< 0.027	09/14/07	611	0.008 +- 0.002	< 0.032
03/23/07	624	0.016 +- 0.002	< 0.016	09/21/07	622	0.019 +- 0.002	< 0.036
03/30/07	625	0.014 +- 0.002	< 0.033	09/28/07	597	0.020 +- 0.002	< 0.031
1st Qtr mean +- s.d.				3rd Qtr mean +- s.d.			
		0.019 +- 0.005	< 0.022			0.017 +- 0.006	< 0.030
04/06/07	623	0.012 +- 0.002	< 0.029	10/05/07	601	0.022 +- 0.002	< 0.026
04/13/07	645	0.009 +- 0.002	< 0.014	10/12/07	624	0.013 +- 0.002	< 0.023
04/20/07	619	0.018 +- 0.002	< 0.049	10/19/07	602	0.020 +- 0.002	< 0.016
04/27/07 a	354	0.017 +- 0.003	< 0.026	10/26/07	615	0.015 +- 0.002	< 0.027
05/04/07	609	0.014 +- 0.002	< 0.049	11/02/07	627	0.020 +- 0.002	< 0.032
05/11/07	601	0.014 +- 0.002	< 0.023	11/09/07	628	0.015 +- 0.002	< 0.022
05/18/07	604	0.016 +- 0.002	< 0.032	11/16/07	643	0.017 +- 0.002	< 0.029
05/25/07	612	0.021 +- 0.002	< 0.037	11/21/07	437	0.021 +- 0.003	< 0.054
06/01/07	611	0.017 +- 0.002	< 0.026	11/30/07	838	0.026 +- 0.002	< 0.019
06/08/07	586	0.013 +- 0.002	< 0.031	12/07/07	638	0.015 +- 0.002	< 0.030
06/15/07	615	0.020 +- 0.002	< 0.028	12/14/07	657	0.040 +- 0.003	< 0.036
06/22/07	575	0.022 +- 0.002	< 0.028	12/21/07	635	0.039 +- 0.003	< 0.019
06/29/07	599	0.019 +- 0.002	< 0.031	12/28/07	619	0.035 +- 0.003	< 0.020
2nd Qtr mean +- s.d.				4th Qtr mean +- s.d.			
		0.016 +- 0.004	< 0.031			0.023 +- 0.009	< 0.027

a - Due to an electrical problem, the air site was off for approximately 75 hours at the end of the collection period.

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-18

collection date	volume m3	air particulate	air iodine	collection date	volume m3	air particulate	air iodine
01/02/07	558	0.018 +- 0.002	< 0.019	07/02/07	461	0.009 +- 0.002	< 0.019
01/09/07	671	0.021 +- 0.002	< 0.018	07/11/07	798	0.017 +- 0.002	< 0.017
01/16/07	653	0.014 +- 0.002	< 0.023	07/16/07	452	0.008 +- 0.002	< 0.030
01/22/07	583	0.022 +- 0.002	< 0.023	07/23/07	617	0.011 +- 0.002	< 0.011
01/29/07	658	0.026 +- 0.002	< 0.017	07/31/07	721	0.021 +- 0.002	< 0.014
02/05/07	694	0.022 +- 0.002	< 0.017	08/08/07	708	0.022 +- 0.002	< 0.010
02/14/07	872	0.018 +- 0.002	< 0.013	08/13/07	442	0.017 +- 0.003	< 0.021
02/19/07	481	0.022 +- 0.003	< 0.021	08/20/07	619	0.010 +- 0.002	< 0.026
02/26/07	660	0.018 +- 0.002	< 0.027	08/27/07	623	0.013 +- 0.002	< 0.027
03/05/07	656	0.009 +- 0.002	< 0.018	09/04/07	703	0.023 +- 0.002	< 0.018
03/14/07	860	0.020 +- 0.002	< 0.008	09/12/07	724	0.020 +- 0.002	< 0.016
03/19/07	466	0.016 +- 0.003	< 0.039	09/18/07	483	0.014 +- 0.002	< 0.024
03/26/07	653	0.015 +- 0.002	< 0.017	09/24/07	541	0.027 +- 0.003	< 0.024
1st Qtr				3rd Qtr			
mean +- s.d.		0.019 +- 0.004	< 0.020	mean +- s.d.		0.016 +- 0.006	< 0.020
04/02/07	672	0.011 +- 0.002	< 0.027	10/01/07	627	0.021 +- 0.002	< 0.016
04/11/07	837	0.012 +- 0.002	< 0.020	10/10/07	814	0.020 +- 0.002	< 0.012
04/16/07	461	0.014 +- 0.002	< 0.032	10/15/07	454	0.011 +- 0.002	< 0.031
04/23/07	646	0.017 +- 0.002	< 0.035	10/22/07	638	0.022 +- 0.002	< 0.017
04/30/07	654	0.013 +- 0.002	< 0.027	10/29/07	633	0.015 +- 0.002	< 0.026
05/09/07	830	0.012 +- 0.002	< 0.024	11/05/07	642	0.021 +- 0.002	< 0.021
05/14/07	452	0.014 +- 0.002	< 0.020	11/14/07	843	0.019 +- 0.002	< 0.011
05/21/07	629	0.016 +- 0.002	< 0.029	11/19/07	477	0.013 +- 0.002	< 0.028
05/29/07	738	0.017 +- 0.002	< 0.017	11/23/07	663	0.025 +- 0.002	< 0.021
06/04/07	539	0.020 +- 0.002	< 0.020	12/03/07	636	0.025 +- 0.002	< 0.021
06/13/07	817	0.017 +- 0.002	< 0.016	12/12/07	853	0.030 +- 0.002	< 0.018
06/19/07	537	0.025 +- 0.003	< 0.021	12/19/07	661	0.039 +- 0.003	< 0.035
06/27/07	702	0.017 +- 0.002	< 0.017	12/26/07	673	0.036 +- 0.003	< 0.017
2nd Qtr				4th Qtr			
mean +- s.d.		0.016 +- 0.004	< 0.023	mean +- s.d.		0.023 +- 0.008	< 0.021

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/m³

Site: PBK-1	1st quarter	2nd quarter	3rd quarter	4th quarter
Be-7	0.061 +/- 0.002	0.057 +/- 0.004	0.063 +/- 0.002	0.049 +/- 0.002
Mn-54	< 0.0002	< 0.0008	< 0.0003	< 0.0003
Co-58	< 0.0003	< 0.0001	< 0.0003	< 0.0004
Fe-59	< 0.0006	< 0.0019	< 0.0008	< 0.0009
Co-60	< 0.0003	< 0.0009	< 0.0003	< 0.0004
Zn-65	< 0.0006	< 0.0024	< 0.0009	< 0.0011
Nb-95	< 0.0003	< 0.0011	< 0.0004	< 0.0005
Zr-95	< 0.0005	< 0.0022	< 0.0006	< 0.0006
Ru-103	< 0.0003	< 0.0006	< 0.0003	< 0.0004
Ru-106	< 0.0020	< 0.0042	< 0.0024	< 0.0029
I-131	< 0.0008	< 0.0011	< 0.0013	< 0.0017
Cs-134	< 0.0002	< 0.0008	< 0.0003	< 0.0003
Cs-137	< 0.0002	< 0.0009	< 0.0003	< 0.0003
Ba-140	< 0.0016	< 0.0029	< 0.0026	< 0.0036
La-140	< 0.0007	< 0.0016	< 0.0011	< 0.0012
Ce-141	< 0.0004	< 0.0007	< 0.0005	< 0.0006
Ce-144	< 0.0013	< 0.0021	< 0.0015	< 0.0017

Site: PBK-4

Be-7	0.058 +/- 0.003	0.079 +/- 0.003	0.073 +/- 0.002	0.050 +/- 0.002
Mn-54	< 0.0005	< 0.0004	< 0.0002	< 0.0005
Co-58	< 0.0007	< 0.0006	< 0.0003	< 0.0005
Fe-59	< 0.0014	< 0.0011	< 0.0006	< 0.0010
Co-60	< 0.0006	< 0.0006	< 0.0003	< 0.0005
Zn-65	< 0.0013	< 0.0016	< 0.0007	< 0.0011
Nb-95	< 0.0003	< 0.0005	< 0.0003	< 0.0006
Zr-95	< 0.0008	< 0.0010	< 0.0004	< 0.0010
Ru-103	< 0.0005	< 0.0004	< 0.0002	< 0.0005
Ru-106	< 0.0048	< 0.0045	< 0.0017	< 0.0033
I-131	< 0.0011	< 0.0007	< 0.0011	< 0.0021
Cs-134	< 0.0005	< 0.0005	< 0.0002	< 0.0005
Cs-137	< 0.0004	< 0.0004	< 0.0002	< 0.0004
Ba-140	< 0.0030	< 0.0020	< 0.0019	< 0.0038
La-140	< 0.0019	< 0.0005	< 0.0012	< 0.0017
Ce-141	< 0.0005	< 0.0006	< 0.0003	< 0.0007
Ce-144	< 0.0017	< 0.0025	< 0.0007	< 0.0023

Site: PBK-7

Be-7	0.057 +/- 0.003	0.058 +/- 0.002	0.071 +/- 0.003	0.059 +/- 0.003
Mn-54	< 0.0005	< 0.0002	< 0.0005	< 0.0003
Co-58	< 0.0007	< 0.0002	< 0.0005	< 0.0006
Fe-59	< 0.0013	< 0.0004	< 0.0015	< 0.0012
Co-60	< 0.0007	< 0.0002	< 0.0005	< 0.0005
Zn-65	< 0.0013	< 0.0005	< 0.0017	< 0.0015
Nb-95	< 0.0008	< 0.0002	< 0.0007	< 0.0006
Zr-95	< 0.0012	< 0.0004	< 0.0010	< 0.0009
Ru-103	< 0.0006	< 0.0002	< 0.0005	< 0.0004
Ru-106	< 0.0044	< 0.0017	< 0.0041	< 0.0035
I-131	< 0.0017	< 0.0003	< 0.0021	< 0.0018
Cs-134	< 0.0005	< 0.0002	< 0.0006	< 0.0004
Cs-137	< 0.0005	< 0.0002	< 0.0005	< 0.0003
Ba-140	< 0.0038	< 0.0008	< 0.0044	< 0.0043
La-140	< 0.0014	< 0.0005	< 0.0017	< 0.0017
Ce-141	< 0.0009	< 0.0002	< 0.0008	< 0.0004
Ce-144	< 0.0032	< 0.0006	< 0.0026	< 0.0013

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.

Measurements in units of pCi/m³

Site: PBK-8	1st quarter	2nd quarter	3rd quarter	4th quarter
Be-7	0.057 +/- 0.003	0.086 +/- 0.004	0.062 +/- 0.003	0.054 +/- 0.002
Mn-54	< 0.0006	< 0.0004	< 0.0005	< 0.0002
Co-58	< 0.0006	< 0.0006	< 0.0005	< 0.0002
Fe-59	< 0.0012	< 0.0013	< 0.0014	< 0.0005
Co-60	< 0.0005	< 0.0009	< 0.0003	< 0.0003
Zn-65	< 0.0015	< 0.0017	< 0.0010	< 0.0005
Nb-95	< 0.0007	< 0.0007	< 0.0006	< 0.0002
Zr-95	< 0.0010	< 0.0006	< 0.0009	< 0.0004
Ru-103	< 0.0005	< 0.0004	< 0.0004	< 0.0002
Ru-106	< 0.0042	< 0.0040	< 0.0036	< 0.0018
I-131	< 0.0016	< 0.0016	< 0.0015	< 0.0008
Cs-134	< 0.0004	< 0.0006	< 0.0005	< 0.0002
Cs-137	< 0.0005	< 0.0005	< 0.0004	< 0.0002
Ba-140	< 0.0030	< 0.0029	< 0.0030	< 0.0016
La-140	< 0.0012	< 0.0002	< 0.0019	< 0.0010
Ce-141	< 0.0007	< 0.0005	< 0.0005	< 0.0002
Ce-144	< 0.0025	< 0.0017	< 0.0013	< 0.0006

Site: PBK-17

Be-7	0.060 +/- 0.003	0.084 +/- 0.003	0.063 +/- 0.003	0.049 +/- 0.003
Mn-54	< 0.0006	< 0.0005	< 0.0005	< 0.0005
Co-58	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Fe-59	< 0.0011	< 0.0012	< 0.0015	< 0.0014
Co-60	< 0.0007	< 0.0004	< 0.0010	< 0.0003
Zn-65	< 0.0027	< 0.0012	< 0.0016	< 0.0012
Nb-95	< 0.0005	< 0.0005	< 0.0007	< 0.0005
Zr-95	< 0.0009	< 0.0008	< 0.0008	< 0.0008
Ru-103	< 0.0005	< 0.0004	< 0.0005	< 0.0005
Ru-106	< 0.0051	< 0.0041	< 0.0048	< 0.0037
I-131	< 0.0006	< 0.0012	< 0.0018	< 0.0018
Cs-134	< 0.0006	< 0.0004	< 0.0005	< 0.0004
Cs-137	< 0.0005	< 0.0004	< 0.0005	< 0.0003
Ba-140	< 0.0023	< 0.0022	< 0.0037	< 0.0028
La-140	< 0.0014	< 0.0007	< 0.0013	< 0.0011
Ce-141	< 0.0006	< 0.0006	< 0.0006	< 0.0005
Ce-144	< 0.0015	< 0.0024	< 0.0017	< 0.0014

Site: PBK-18

Be-7	0.056 +/- 0.002	0.079 +/- 0.003	0.067 +/- 0.003	0.053 +/- 0.002
Mn-54	< 0.0005	< 0.0003	< 0.0004	< 0.0003
Co-58	< 0.0004	< 0.0005	< 0.0005	< 0.0004
Fe-59	< 0.0006	< 0.0010	< 0.0009	< 0.0007
Co-60	< 0.0006	< 0.0007	< 0.0004	< 0.0003
Zn-65	< 0.0008	< 0.0014	< 0.0012	< 0.0006
Nb-95	< 0.0005	< 0.0005	< 0.0006	< 0.0004
Zr-95	< 0.0007	< 0.0009	< 0.0008	< 0.0007
Ru-103	< 0.0004	< 0.0005	< 0.0005	< 0.0003
Ru-106	< 0.0035	< 0.0051	< 0.0034	< 0.0022
I-131	< 0.0008	< 0.0006	< 0.0022	< 0.0012
Cs-134	< 0.0005	< 0.0005	< 0.0005	< 0.0002
Cs-137	< 0.0005	< 0.0006	< 0.0004	< 0.0003
Ba-140	< 0.0020	< 0.0021	< 0.0039	< 0.0022
La-140	< 0.0007	< 0.0008	< 0.0013	< 0.0014
Ce-141	< 0.0004	< 0.0007	< 0.0007	< 0.0003
Ce-144	< 0.0013	< 0.0032	< 0.0021	< 0.0008

Radioisotopes other than those reported were not detected

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

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Date Placed:	01/04/07	04/04/07	07/06/07	10/03/07
Date Removed:	04/04/07	07/06/07	10/03/07	01/04/08
Days is the Field:	90	93	89	93
individual quarterly data is reported as: mR / Standard Quarter +/- combined total uncertainty				
TLD sites located at the Point Beach ISFSI				
1	31.2 +/- 2.0	32.7 +/- 1.9	29.2 +/- 1.8	32.1 +/- 1.4
2	60.3 +/- 4.1	62.0 +/- 4.2	56.8 +/- 4.3	60.6 +/- 3.0
3	26.8 +/- 1.6	28.7 +/- 1.6	26.5 +/- 1.4	26.9 +/- 1.3
4	21.5 +/- 1.5	24.0 +/- 1.4	21.0 +/- 1.4	22.8 +/- 1.2
5	20.0 +/- 0.6	21.3 +/- 1.0	19.4 +/- 0.6	21.1 +/- 0.9
6	42.5 +/- 1.2	47.8 +/- 3.0	42.3 +/- 1.1	45.9 +/- 2.8
7	67.4 +/- 1.6	73.2 +/- 1.3	68.5 +/- 1.9	70.7 +/- 1.5
8	28.2 +/- 1.5	31.5 +/- 1.4	27.4 +/- 1.4	30.4 +/- 1.0
Quarterly average +/- s.d.	37.2 +/- 17.9	40.2 +/- 18.9	36.4 +/- 17.9	38.8 +/- 18.4
TLD sites, excluding sites 1- 8) that are located 0 - 2 miles from either the Point Beach or the Kewaunee facility.				
9	11.7 +/- 0.8	13.5 +/- 1.1	12.7 +/- 0.9	13.4 +/- 0.9
10	13.5 +/- 0.7	16.1 +/- 1.2	14.3 +/- 0.6	16.0 +/- 0.9
11	12.1 +/- 0.8	14.8 +/- 0.9	13.6 +/- 0.8	14.1 +/- 1.0
12	12.2 +/- 0.7	14.5 +/- 1.0	13.1 +/- 0.6	14.2 +/- 0.9
13	13.0 +/- 0.9	15.1 +/- 0.8	14.1 +/- 0.9	14.8 +/- 0.8
14	12.9 +/- 0.7	15.1 +/- 1.0	13.7 +/- 1.0	14.7 +/- 1.2
19	13.5 +/- 0.6	14.4 +/- 1.2	14.6 +/- 0.6	14.5 +/- 1.1
20	13.0 +/- 0.9	14.3 +/- 0.7	14.1 +/- 0.8	14.4 +/- 0.5
21	12.9 +/- 0.8	15.5 +/- 0.9	14.6 +/- 0.7	15.4 +/- 1.4
22	15.8 +/- 1.3	18.4 +/- 0.6	17.0 +/- 0.8	17.7 +/- 0.6
Quarterly average +/- s.d.	13.1 +/- 1.1	15.2 +/- 1.3	14.2 +/- 1.2	14.9 +/- 1.2
TLD sites that are located 2 - 5 miles from either the Point Beach or the Kewaunee facility.				
15	13.4 +/- 0.9	15.4 +/- 0.8	14.8 +/- 1.1	15.2 +/- 1.1
16	11.3 +/- 1.1	12.2 +/- 0.7	11.1 +/- 1.1	11.9 +/- 0.4
17	14.0 +/- 1.2	14.6 +/- 0.8	14.8 +/- 1.0	13.8 +/- 0.7
18	14.5 +/- 0.7	17.7 +/- 0.7	16.2 +/- 0.5	17.1 +/- 0.5
23	14.1 +/- 0.7	15.6 +/- 0.9	15.4 +/- 0.6	15.1 +/- 0.9
24	11.4 +/- 0.8	12.5 +/- 0.7	12.4 +/- 1.0	12.8 +/- 1.0
25	14.6 +/- 0.8	17.2 +/- 0.7	17.1 +/- 0.7	16.8 +/- 0.6
26	12.8 +/- 1.0	14.6 +/- 1.2	14.4 +/- 0.7	14.3 +/- 1.0
Quarterly average +/- s.d.	13.3 +/- 1.3	15.0 +/- 2.0	14.5 +/- 1.9	14.6 +/- 1.8
TLD sites that are located greater than 5 miles from either the Point Beach or the Kewaunee facility.				
27	ND	10.8 +/- 0.9	12.2 +/- 0.5	11.1 +/- 0.8
28	11.5 +/- 0.6	12.4 +/- 0.9	12.2 +/- 0.6	12.8 +/- 0.6
29	10.6 +/- 0.6	11.4 +/- 0.9	11.3 +/- 0.5	11.3 +/- 0.7
30	12.2 +/- 0.7	13.6 +/- 0.8	13.8 +/- 0.7	13.6 +/- 0.7
31	11.5 +/- 0.7	10.4 +/- 0.9	11.9 +/- 0.7	10.5 +/- 0.8
Quarterly average +/- s.d.	11.5 +/- 0.7	11.7 +/- 1.3	12.3 +/- 0.9	11.9 +/- 1.3
ND - No data; the TLD was lost in the field.				

Table 8. WI DHS analysis results for precipitation samples collected from the Point Beach – Kewaunee environmental monitoring program.

Measurements expressed as nCi/m2

monthly composite sample			
collection	inches	gross beta	Tritium
01/17/07	1.56	< 0.08	< 12
02/20/07	0.45	0.11 +/- 0.02	< 3
03/21/07	3.43	0.87 +/- 0.17	< 26
04/19/07	4.54	< 0.23	< 35
05/10/07	2.46	0.16 +/- 0.08	< 19
06/20/07	2.17	0.31 +/- 0.08	< 17
07/18/07	2.23	0.48 +/- 0.09	< 17
08/22/07	4.48	0.24 +/- 0.14	< 34
09/19/07	2.14	0.21 +/- 0.08	< 16
10/18/07	3.65	0.24 +/- 0.07	< 28
11/21/07	0.33	0.50 +/- 0.03	< 3
12/19/07	1.69	0.43 +/- 0.09	< 13

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

Measurements in units of pCi/kilogram (wet)

Collection date	01/16/07	02/05/07	01/27/07	06/14/07	06/14/07	06/14/07
Type	brown trout	brown trout	drum	lake trout	lake trout	rainbow trout
gamma isotopic						
K-40	3390 +/- 150	3080 +/- 90	2790 +/- 140	2400 +/- 200	2300 +/- 200	3500 +/- 200
Mn-54	< 20	< 5	< 16	< 17	< 13	< 30
Co-58	< 29	< 6	< 28	< 38	< 23	< 26
Fe-59	< 90	< 19	< 80	< 60	< 29	< 60
Co-60	< 14	< 6	< 23	< 31	< 37	< 49
Zn-65	< 56	< 13	< 55	< 80	< 60	< 50
Nb-95	< 47	< 9	< 44	< 29	< 23	< 24
Zr-95	< 41	< 11	< 41	< 80	< 37	< 48
Cs-134	< 14	< 4	< 18	< 28	< 27	< 30
Cs-137	18 +/- 5	23 +/- 2	24 +/- 5	< 35	< 30	33 +/- 9

Collection date	09/11/07	09/11/07	09/11/07	12/11/07	12/11/07	12/11/07
Type	brown trout	brown trout	lake trout	lake trout	lake trout	lake trout
gamma isotopic						
K-40	3400 +/- 200	3500 +/- 200	3000 +/- 200	2810 +/- 150	3000 +/- 200	3800 +/- 200
Mn-54	< 16	< 16	< 22	< 20	< 23	< 22
Co-58	< 22	< 25	< 15	< 23	< 9	< 34
Fe-59	< 47	< 60	< 53	< 90	< 60	< 90
Co-60	< 27	< 36	< 16	< 21	< 25	< 27
Zn-65	< 70	< 48	< 50	< 57	< 80	< 70
Nb-95	< 17	< 18	< 21	< 48	< 27	< 49
Zr-95	< 24	< 33	< 28	< 52	< 50	< 60
Cs-134	< 17	< 20	< 21	< 18	< 35	< 22
Cs-137	24 +/- 6	30 +/- 7	21 +/- 6	43 +/- 6	38 +/- 9	33 +/- 6

Radioisotopes other than those reported were not detected.

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

Measurements in units of pCi/kilogram (dry)

Collection date	09/11/07	09/11/07	09/11/07
Site	PBK-5	PBK-6	PBK-10a
gross alpha	< 8000	< 12000	< 13000
gross beta	7000 +- 2000	4000 +- 2000	6000 +- 2000
gamma isotopic			
K-40	8800 +- 500	7100 +- 400	11400 +- 500
Mn-54	< 36	< 39	< 35
Co-58	< 44	< 38	< 46
Fe-59	< 130	< 80	< 70
Co-60	< 52	< 36	< 60
Zn-65	< 170	< 150	< 190
Nb-95	< 45	< 36	< 40
Zr-95	< 90	< 60	< 60
Cs-134	< 50	< 57	< 43
Cs-137	< 42	< 30	< 40

Collection date	09/12/07	09/12/07	09/12/07	09/12/07
Site	PBK-12a	PBK-12b	PBK-12c	PBK-26
gross alpha	< 11000	< 12000	< 10000	< 10000
gross beta	4000 +- 2000	7000 +- 2000	6000 +- 2000	6000 +- 2000
gamma isotopic				
K-40	7700 +- 300	13000 +- 400	6700 +- 400	10200 +- 400
Mn-54	< 21	< 21	< 36	< 33
Co-58	< 28	< 20	< 16	< 30
Fe-59	< 90	< 70	< 100	< 80
Co-60	< 32	< 27	< 45	< 48
Zn-65	< 100	< 90	< 180	< 100
Nb-95	< 24	< 25	< 26	< 34
Zr-95	< 43	< 44	< 60	< 60
Cs-134	< 35	< 38	< 51	< 36
Cs-137	29 +- 9	< 27	< 36	< 45

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. WI DHS analysis results for surface water samples collected from the Point Beach – Kewaunee environmental monitoring program.

Measurements in units of pCi/liter

PBK-9, Point Beach meteorological tower

Collection date	01/09/07	02/15/07	03/13/07	04/11/07	05/09/07	06/13/07
gross alpha-sol	< 1.4	< 1.4	< 1.4	< 1.3	< 3.0	< 1.3
gross beta-sol	3.6 +- 1.5	2.6 +- 1.4	2.6 +- 1.4	4.7 +- 1.5	2.9 +- 1.1	4.4 +- 1.5
gross alpha-insol	< 0.9	< 0.9	< 0.9	< 0.9	< 2.2	< 0.9
gross beta-insol	< 2.0	< 2.0	< 2.0	< 1.9	1.9 +- 1.0	< 1.9
I-131		< 0.2	< 1.4	< 0.1	< 0.1	
H-3 a			< 300			< 300
Sr-89 a			< 0.6			< 0.6
Sr-90 a			0.7 +- 0.3			< 0.4
Gamma isotopic						
Mn-54	< 7	< 7	< 5	< 6	< 6	< 6
Co-58	< 7	< 7	< 6	< 6	< 6	< 6
Fe-59	< 15	< 17	< 11	< 14	< 12	< 13
Co-60	< 8	< 9	< 5	< 8	< 7	< 7
Zn-65	< 18	< 21	< 11	< 14	< 17	< 14
Nb-95	< 7	< 8	< 5	< 6	< 6	< 7
Zr-95	< 12	< 14	< 9	< 10	< 12	< 11
I-131	< 7	< 13	< 5	< 8	< 10	< 10
Cs-134	< 7	< 7	< 5	< 7	< 7	< 6
Cs-137	< 7	< 9	< 5	< 6	< 6	< 7
Ba-140	< 28	< 34	< 19	< 26	< 28	< 28
La-140	< 11	< 12	< 9	< 11	< 14	< 10

Collection date	07/12/07	08/15/07	09/11/07	10/10/07	11/14/07	12/13/07
gross alpha-sol	< 1.4	< 1.4	< 1.4	< 2.6	< 1.5	< 1.5
gross beta-sol	< 2.1	3.5 +- 1.5	< 2.1	1.7 +- 1.1	3.2 +- 1.4	< 2.1
gross alpha-insol	< 0.8	< 0.8	< 0.9	< 1.9	1.4 +- 1.0	1.2 +- 0.9
gross beta-insol	< 2.0	< 2.0	< 2.0	< 1.6	< 2.0	< 2.0
I-131	< 0.3		< 0.1	< 0.3		
H-3 a			< 300			< 300
Sr-89 a			< 0.5			< 0.5
Sr-90 a			< 0.4			< 0.4
Gamma isotopic						
Mn-54	< 7	< 9	< 5	< 9	< 5	< 5
Co-58	< 7	< 9	< 5	< 9	< 5	< 6
Fe-59	< 14	< 19	< 10	< 20	< 11	< 12
Co-60	< 7	< 10	< 6	< 9	< 6	< 8
Zn-65	< 17	< 22	< 12	< 20	< 14	< 15
Nb-95	< 7	< 9	< 5	< 11	< 5	< 7
Zr-95	< 13	< 15	< 9	< 15	< 9	< 11
I-131	< 10	< 14	< 7	< 15	< 6	< 7
Cs-134	< 7	< 10	< 5	< 10	< 6	< 6
Cs-137	< 7	< 8	< 5	< 9	< 5	< 6
Ba-140	< 28	< 44	< 21	< 43	< 21	< 23
La-140	< 9	< 14	< 8	< 14	< 6	< 11

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 from the Point Beach – Kewaunee environmental monitoring program.

Measurements in units of pCi/liter

PBK-12a, Kewaunee effluent channel

Collection date	01/02/07	02/01/07	03/05/07	04/02/07	05/01/07	06/04/07
gross alpha-sol	1.8 +- 1.5	< 1.3	< 1.5	< 1.3	< 1.4	< 1.3
gross beta-sol	< 3.0	2.5 +- 1.4	2.6 +- 1.4	2.4 +- 1.4	2.8 +- 1.4	5.8 +- 1.5
gross alpha-insol	< 1.0	< 0.9	< 1.0	< 0.9	< 0.8	< 0.8
gross beta-insol	< 2.5	< 2.0	2.1 +- 1.3	< 2.0	< 1.9	< 1.9
I-131		< 0.6	< 1.1	< 0.3	< 0.3	
H-3 a			< 300			
Sr-89 a			< 0.7			< 300
Sr-90 a			0.5 +- 0.3			< 0.6
Gamma isotopic						< 0.4
Mn-54	< 5	< 6	< 6	< 7	< 5	< 6
Co-58	< 6	< 6	< 6	< 6	< 5	< 6
Fe-59	< 12	< 14	< 13	< 11	< 10	< 11
Co-60	< 7	< 8	< 7	< 6	< 5	< 6
Zn-65	< 14	< 15	< 14	< 14	< 11	< 13
Nb-95	< 6	< 7	< 6	< 6	< 5	< 6
Zr-95	< 9	< 11	< 11	< 11	< 9	< 11
I-131	< 7	< 8	< 8	< 7	< 7	< 10
Cs-134	< 5	< 5	< 6	< 6	< 5	< 6
Cs-137	< 5	< 6	< 7	< 7	< 5	< 6
Ba-140	< 23	< 23	< 25	< 26	< 20	< 27
La-140	< 10	< 13	< 9	< 9	< 8	< 10

Collection date	07/02/07	08/01/07	09/04/07	10/01/07	11/01/07	12/03/07
gross alpha-sol	1.9 +- 1.3	< 1.3	< 1.4	2.5 +- 1.5	< 3.0	< 1.5
gross beta-sol	6.0 +- 1.6	2.7 +- 1.4	2.4 +- 1.4	2.6 +- 0.9	1.9 +- 1.1	3.2 +- 1.5
gross alpha-insol	< 0.9	< 0.8	< 0.9	< 2.1	< 1.6	< 1.0
gross beta-insol	< 2.0	< 2.0	< 2.0	< 1.6	< 1.6	< 2.1
I-131	< 0.5		< 0.2	< 0.6		
H-3 a			< 300			
Sr-89 a			< 0.5			< 300
Sr-90 a			< 0.4			< 0.5
Gamma isotopic						< 0.3
Mn-54	< 5	< 6	< 6	< 5	< 5	< 6
Co-58	< 5	< 5	< 6	< 6	< 5	< 5
Fe-59	< 11	< 12	< 13	< 13	< 10	< 13
Co-60	< 6	< 6	< 6	< 5	< 6	< 7
Zn-65	< 11	< 16	< 14	< 13	< 14	< 15
Nb-95	< 5	< 6	< 6	< 6	< 5	< 6
Zr-95	< 9	< 10	< 10	< 9	< 8	< 10
I-131	< 6	< 8	< 10	< 6	< 6	< 6
Cs-134	< 6	< 7	< 6	< 6	< 6	< 6
Cs-137	< 5	< 6	< 6	< 5	< 5	< 6
Ba-140	< 21	< 23	< 27	< 21	< 21	< 20
La-140	< 10	< 8	< 10	< 9	< 8	< 10

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 from the Point Beach – Kewaunee environmental monitoring program.

Measurements in units of pCi/liter

PBK-17, Green Bay Water: Rostok

Collection date	01/08/07	02/06/07	03/06/07	04/09/07	05/07/07	06/04/07
gross alpha-sol	< 1.6	< 1.3	< 1.3	< 1.3	< 1.4	1.5 +- 1.2
gross beta-sol	< 3.0	< 2.1	< 2.1	2.6 +- 1.4	3.1 +- 1.4	2.7 +- 1.4
gross alpha-insol	< 1.0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
gross beta-insol	< 2.5	< 2.0	< 2.0	< 2.0	< 1.9	< 1.9
I-131		< 0.4	< 0.9	< 0.1	< 0.1	
H-3 a			< 300			< 300
Sr-89 a			< 0.7			< 0.7
Sr-90 a			0.5 +- 0.3			< 0.5
Gamma isotopic						
Mn-54	< 5	< 7	< 5	< 9	< 5	< 7
Co-58	< 5	< 8	< 6	< 8	< 6	< 5
Fe-59	< 13	< 15	< 11	< 19	< 11	< 14
Co-60	< 7	< 9	< 7	< 10	< 6	< 8
Zn-65	< 14	< 18	< 14	< 20	< 12	< 17
Nb-95	< 5	< 8	< 6	< 8	< 6	< 7
Zr-95	< 9	< 13	< 10	< 14	< 10	< 10
I-131	< 5	< 10	< 6	< 10	< 6	< 7
Cs-134	< 5	< 8	< 6	< 8	< 6	< 7
Cs-137	< 5	< 9	< 6	< 8	< 6	< 7
Ba-140	< 19	< 30	< 19	< 8	< 6	< 7
La-140	< 10	< 11	< 9	< 32	< 21	< 24
				< 12	< 7	< 9

Collection date	07/02/07	08/06/07	09/10/07	10/01/07	11/13/07	12/03/07
gross alpha-sol	< 1.3	< 1.3	< 1.4	3.0 +- 1.6	< 1.3	< 1.3
gross beta-sol	5.1 +- 1.5	2.5 +- 1.4	2.3 +- 1.4	2.3 +- 0.8	< 2.1	< 2.1
gross alpha-insol	< 0.8	< 0.8	< 0.8	< 2.1	< 1.0	< 1.0
gross beta-insol	< 2.0	< 2.0	< 2.0	< 1.6	< 2.4	< 2.4
I-131	< 0.5		< 0.1	< 0.5		
H-3 a			< 300			< 300
Sr-89 a			< 0.5			< 0.5
Sr-90 a			< 0.4			< 0.3
Gamma isotopic						
Mn-54	< 5	< 7	< 6	< 7	< 6	< 6
Co-58	< 5	< 6	< 6	< 6	< 5	< 5
Fe-59	< 10	< 13	< 12	< 14	< 11	< 10
Co-60	< 5	< 6	< 6	< 7	< 7	< 7
Zn-65	< 12	< 17	< 17	< 15	< 11	< 13
Nb-95	< 5	< 6	< 6	< 6	< 5	< 6
Zr-95	< 9	< 11	< 11	< 11	< 9	< 8
I-131	< 6	< 7	< 7	< 8	< 5	< 5
Cs-134	< 5	< 7	< 7	< 7	< 6	< 5
Cs-137	< 5	< 6	< 6	< 6	< 5	< 6
Ba-140	< 18	< 24	< 23	< 27	< 19	< 17
La-140	< 6	< 9	< 9	< 9	< 8	< 8

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 from the Point Beach – Kewaunee environmental monitoring program.

Measurements in units of pCi/liter				
	PBK-5	PBK-25	PBK-5	PBK-25
Collection date	05/30/07	05/29/07	09/11/07	09/11/07
gross alpha-sol	1.6 +- 1.2	< 1.4	< 1.3	< 1.4
gross beta-sol	3.2 +- 1.4	3.4 +- 1.4	2.3 +- 1.4	< 2.1
gross alpha-insol	< 0.9	< 0.9	< 0.9	< 0.9
gross beta-insol	< 1.9	< 1.9	< 2.0	< 2.0
H-3	< 300	< 300	< 300	< 300
Sr-89	< 0.6	< 0.6	< 0.5	< 0.5
Sr-90	< 0.4	< 0.4	< 0.4	< 0.4
Gamma isotopic				
Mn-54	< 7	< 9	< 5	< 6
Co-58	< 8	< 10	< 6	< 6
Fe-59	< 16	< 19	< 15	< 13
Co-60	< 9	< 10	< 6	< 7
Zn-65	< 19	< 19	< 15	< 17
Nb-95	< 8	< 9	< 6	< 7
Zr-95	< 15	< 17	< 11	< 12
I-131	< 10	< 8	< 7	< 10
Cs-134	< 8	< 10	< 5	< 7
Cs-137	< 8	< 11	< 6	< 6
Ba-140	< 30	< 33	< 21	< 27
La-140	< 12	< 15	< 11	< 10

Radioisotopes other than those reported were not detected.

Table 12. WI DHS analysis results for well water samples collected from the Point Beach – Kewaunee environmental monitoring program.

Measurements in units of pCi/liter					
	PBK-3	PBK-10	PBK-11	PBK-12d N	PBK-12d S
Collection date	05/29/07	04/11/07	05/30/07	05/30/07	05/30/07
gross alpha	< 3.0	< 2.4	< 3.0	< 5.0	5.0 +- 3.0
gross beta	< 1.3	< 1.5	1.2 +- 0.6	2.8 +- 0.7	2.7 +- 0.7
H-3	< 300	< 300	< 300	< 300	< 300
	PBK-3	PBK-10	PBK-11	PBK-12d N	PBK-12d S
Collection date	09/11/07	10/25/07	09/12/07	09/12/07	09/12/07
gross alpha	< 1.6	< 5.0	< 2.0	< 5.0	< 5.0
gross beta	< 2.2	< 1.3	< 2.3	6.0 +- 2.0	5.0 +- 2.0
H-3	< 300	< 300	< 300	< 300	< 300

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

Measurements in units of pCi/liter

PBK-19, Funk farm

Collection date	01/09/07	02/14/07	03/14/07	04/11/07	05/09/07	06/13/07
Analysis						
I-131		< 0.3	< 0.4	< 0.2	< 0.3	
Sr-90	0.5 +- 0.2	0.7 +- 0.2	0.8 +- 0.2	0.8 +- 0.2	0.8 +- 0.2	0.5 +- 0.2
gamma isotopic						
K-40	1420 +- 50	1450 +- 50	1570 +- 90	1440 +- 60	1400 +- 70	1450 +- 50
Mn-54	< 6	< 5	< 11	< 7	< 9	< 5
Co-58	< 6	< 5	< 12	< 8	< 9	< 5
Fe-59	< 13	< 11	< 24	< 19	< 18	< 11
Co-60	< 7	< 6	< 13	< 11	< 11	< 6
Zn-65	< 14	< 13	< 27	< 23	< 21	< 13
Nb-95	< 5	< 5	< 12	< 8	< 8	< 5
Zr-95	< 9	< 8	< 18	< 15	< 16	< 10
I-131	< 6	< 7	< 13	< 9	< 9	< 6
Cs-134	< 6	< 5	< 10	< 8	< 8	< 5
Cs-137	< 6	< 5	< 13	< 8	< 10	< 5
Ba-140	< 22	< 18	< 43	< 36	< 30	< 19
La-140	< 7	< 6	< 15	< 14	< 11	< 7

Collection date	07/11/07	08/08/07	09/12/07	10/10/07	11/14/07	12/12/07
Analysis						
I-131	< 0.4		< 0.2	< 0.4		
Sr-90	0.6 +- 0.3	0.4 +- 0.2	0.9 +- 0.2	0.6 +- 0.2	0.5 +- 0.2	0.9 +- 0.4
gamma isotopic						
K-40	1360 +- 60	1400 +- 50	1390 +- 80	1370 +- 60	1430 +- 70	1450 +- 70
Mn-54	< 7	< 5	< 9	< 7	< 9	< 10
Co-58	< 7	< 5	< 9	< 7	< 8	< 8
Fe-59	< 14	< 11	< 27	< 16	< 18	< 20
Co-60	< 8	< 6	< 12	< 8	< 12	< 11
Zn-65	< 19	< 14	< 29	< 20	< 21	< 25
Nb-95	< 7	< 6	< 9	< 7	< 8	< 9
Zr-95	< 12	< 10	< 16	< 12	< 16	< 15
I-131	< 6	< 6	< 8	< 8	< 7	< 11
Cs-134	< 8	< 6	< 9	< 8	< 9	< 8
Cs-137	< 7	< 5	< 8	< 7	< 8	< 8
Ba-140	< 22	< 20	< 29	< 27	< 26	< 33
La-140	< 9	< 7	< 13	< 10	< 14	< 12

Radioisotopes other than those reported were not detected.

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

Measurements in units of pCi/liter

PBK-27, R. Barta farm

Collection date	01/09/07	02/14/07	03/14/07	04/11/07	05/09/07	06/13/07
Analysis						
I-131		< 0.4	< 0.4	< 0.3	< 0.3	
Sr-90	0.5 +/- 0.2	0.7 +/- 0.2	0.8 +/- 0.3	0.8 +/- 0.3	0.8 +/- 0.2	0.4 +/- 0.2
gamma isotopic						
K-40	1450 +/- 70	1590 +/- 80	1490 +/- 80	1540 +/- 50	1500 +/- 70	1480 +/- 60
Mn-54	< 8	< 9	< 9	< 5	< 8	< 6
Co-58	< 7	< 9	< 9	< 5	< 8	< 6
Fe-59	< 16	< 24	< 22	< 12	< 19	< 12
Co-60	< 9	< 11	< 15	< 6	< 11	< 6
Zn-65	< 25	< 24	< 23	< 14	< 22	< 16
Nb-95	< 8	< 8	< 8	< 5	< 9	< 6
Zr-95	< 14	< 16	< 16	< 9	< 15	< 11
I-131	< 7	< 11	< 9	< 7	< 10	< 7
Cs-134	< 8	< 9	< 10	< 5	< 8	< 6
Cs-137	< 9	< 11	< 10	< 5	< 9	< 6
Ba-140	< 26	< 37	< 34	< 20	< 29	< 19
La-140	< 14	< 9	< 11	< 7	< 9	< 7

Collection date	07/11/07	08/08/07	09/12/07	10/10/07	11/14/07	12/12/07
Analysis						
I-131	< 0.5		< 0.2	< 0.5		
Sr-90	0.7 +/- 0.3	0.4 +/- 0.2	0.8 +/- 0.2	0.8 +/- 0.2	0.7 +/- 0.2	0.7 +/- 0.3
gamma isotopic						
K-40	1390 +/- 80	1440 +/- 50	1530 +/- 70	1370 +/- 60	1550 +/- 70	1500 +/- 50
Mn-54	< 9	< 6	< 9	< 6	< 10	< 6
Co-58	< 9	< 5	< 7	< 7	< 10	< 6
Fe-59	< 27	< 13	< 20	< 14	< 19	< 13
Co-60	< 11	< 7	< 11	< 8	< 11	< 7
Zn-65	< 22	< 16	< 24	< 17	< 25	< 17
Nb-95	< 10	< 6	< 8	< 6	< 11	< 7
Zr-95	< 16	< 9	< 14	< 10	< 17	< 11
I-131	< 9	< 6	< 10	< 5	< 10	< 9
Cs-134	< 10	< 8	< 10	< 6	< 10	< 7
Cs-137	< 10	< 5	< 9	< 6	< 10	< 7
Ba-140	< 33	< 19	< 31	< 20	< 36	< 28
La-140	< 14	< 10	< 11	< 9	< 11	< 10

Radioisotopes other than those reported were not detected.

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

Measurements in units of pCi/liter

PBK-24, L Struck farm

Collection date	01/09/07	02/14/07	03/14/07	04/11/07	05/09/07	06/13/07
Analysis						
I-131		< 0.4	< 0.4	< 0.3	< 0.3	
Sr-90	< 0.3	0.7 +/- 0.2	0.8 +/- 0.3	0.8 +/- 0.2	0.7 +/- 0.2	< 0.4
gamma isotopic						
K-40	1300 +/- 50	1630 +/- 60	1510 +/- 60	1220 +/- 50	1300 +/- 70	1190 +/- 50
Mn-54	< 6	< 6	< 6	< 6	< 9	< 6
Co-58	< 6	< 6	< 5	< 6	< 9	< 6
Fe-59	< 11	< 13	< 13	< 13	< 19	< 16
Co-60	< 6	< 7	< 8	< 7	< 11	< 9
Zn-65	< 14	< 16	< 15	< 14	< 22	< 16
Nb-95	< 6	< 6	< 6	< 5	< 11	< 7
Zr-95	< 10	< 10	< 10	< 10	< 18	< 11
I-131	< 6	< 7	< 5	< 6	< 11	< 6
Cs-134	< 6	< 5	< 6	< 6	< 9	< 7
Cs-137	< 6	< 6	< 6	< 6	< 10	< 6
Ba-140	< 21	< 23	< 17	< 22	< 36	< 23
La-140	< 9	< 8	< 7	< 8	< 14	< 10

Collection date	07/11/07	08/08/07	09/12/07	10/10/07	11/14/07	12/12/07
Analysis						
I-131	< 0.5		< 0.2	< 0.6		
Sr-90	0.7 +/- 0.4	< 0.3	0.6 +/- 0.2	0.5 +/- 0.2	< 0.4	0.7 +/- 0.3
gamma isotopic						
K-40	1370 +/- 70	1450 +/- 80	1530 +/- 90	1460 +/- 80	1560 +/- 80	1290 +/- 50
Mn-54	< 11	< 10	< 15	< 13	< 8	< 5
Co-58	< 11	< 10	< 12	< 12	< 9	< 5
Fe-59	< 24	< 21	< 25	< 23	< 18	< 12
Co-60	< 13	< 12	< 15	< 14	< 7	< 6
Zn-65	< 26	< 37	< 29	< 31	< 23	< 14
Nb-95	< 10	< 11	< 12	< 12	< 10	< 6
Zr-95	< 16	< 18	< 20	< 18	< 13	< 9
I-131	< 10	< 12	< 13	< 13	< 7	< 9
Cs-134	< 10	< 14	< 13	< 12	< 8	< 6
Cs-137	< 10	< 11	< 11	< 10	< 9	< 5
Ba-140	< 37	< 39	< 44	< 44	< 26	< 27
La-140	< 11	< 13	< 14	< 13	< 14	< 10

Radioisotopes other than those reported were not detected.

Table 14. WI DHS analysis results for vegetation samples collected from the Point Beach – Kewaunee environmental monitoring program.

Measurements in units of pCi/kilogram (wet)					
Location	PBK-1	PBK-2	PBK-3	PBK-4	PBK-5
Collection date	05/29/07	05/29/07	05/29/07	05/29/07	05/30/07
Analysis					
gross alpha	< 2000	< 1800	< 2000	< 2000	< 1500
gross beta	7100 +- 1500	7500 +- 1200	5900 +- 1400	7500 +- 1300	7900 +- 1100
gamma isotopic					
Be-7	< 600	240 +- 50	700 +- 200	< 380	< 360
K-40	5200 +- 500	6100 +- 200	4200 +- 500	5300 +- 400	6000 +- 400
Mn-54	< 60	< 27	< 60	< 70	< 33
Co-58	< 50	< 21	< 70	< 42	< 47
Fe-59	< 120	< 54	< 180	< 100	< 120
Co-60	< 80	< 32	< 80	< 49	< 60
Zn-65	< 150	< 70	< 110	< 210	< 130
Nb-95	< 90	< 22	< 60	< 60	< 60
Zr-95	< 100	< 31	< 90	< 70	< 110
I-131	< 80	< 22	< 80	< 60	< 52
Cs-134	< 70	< 23	< 60	< 60	< 60
Cs-137	< 70	< 17	< 36	< 37	< 39
Ba-140	< 200	< 70	< 270	< 110	< 160
La-140	< 60	< 34	< 11	< 90	< 90

Location	PBK-7	PBK-8	PBK-14	PBK-17	PBK-25
Collection date	05/29/07	05/29/07	05/30/07	05/30/07	05/29/07
Analysis					
gross alpha	< 1800	< 2000	< 1700	< 1900	< 3000
gross beta	9500 +- 1300	9000 +- 1400	4400 +- 1000	7700 +- 1300	6100 +- 1500
gamma isotopic					
Be-7	< 420	680 +- 120	< 450	310 +- 100	1200 +- 200
K-40	6100 +- 400	6400 +- 400	5400 +- 500	5600 +- 400	3200 +- 300
Mn-54	< 39	< 46	< 70	< 38	< 60
Co-58	< 52	< 45	< 70	< 70	< 52
Fe-59	< 110	< 130	< 180	< 110	< 110
Co-60	< 33	< 49	< 80	< 70	< 40
Zn-65	< 130	< 140	< 90	< 170	< 150
Nb-95	< 42	< 51	< 80	< 50	< 51
Zr-95	< 80	< 90	< 120	< 120	< 90
I-131	< 60	< 60	< 70	< 60	< 70
Cs-134	< 45	< 55	< 60	< 52	< 60
Cs-137	< 54	< 54	< 60	< 70	< 70
Ba-140	< 190	< 180	< 280	< 230	< 200
La-140	< 60	< 70	< 9	< 80	< 90

Radioisotopes other than those reported were not detected.

Table 14. WI DHS analysis results for vegetation samples collected from the Point Beach – Kewaunee environmental monitoring program.

Measurements in units of pCi/kilogram (wet)

Location	PBK-1	PBK-2	PBK-3	PBK-4	PBK-5
Collection date	09/11/07	09/11/07	09/11/07	09/11/07	09/11/07
Analysis					
gross alpha	< 5000	< 4000	< 2600	< 4000	< 2300
gross beta	7600 +- 1300	7800 +- 1000	5700 +- 800	6400 +- 900	7200 +- 700
gamma isotopic					
Be-7	2210 +- 140	900 +- 60	980 +- 140	1620 +- 160	1200 +- 200
K-40	4900 +- 300	7000 +- 200	5300 +- 400	5500 +- 400	6400 +- 500
Mn-54	< 40	< 19	< 47	< 35	< 80
Co-58	< 41	< 19	< 57	< 42	< 53
Fe-59	< 110	< 49	< 110	< 120	< 110
Co-60	< 38	< 19	< 45	< 55	< 80
Zn-65	< 130	< 49	< 150	< 110	< 170
Nb-95	< 45	< 23	< 60	< 45	< 60
Zr-95	< 80	< 37	< 120	< 90	< 110
I-131	< 80	< 60	< 50	< 33	< 70
Cs-134	< 50	< 21	< 60	< 45	< 70
Cs-137	< 43	< 17	< 70	< 52	< 60
Ba-140	< 200	< 130	< 190	< 130	< 220
La-140	< 90	< 49	< 50	< 59	< 100

Location	PBK-7	PBK-8	PBK-14	PBK-17	PBK-25
Collection date	09/12/07	09/12/07	09/12/07	09/12/07	09/11/07
Analysis					
gross alpha	< 6000	< 2200	< 4000	< 4000	< 6000
gross beta	4100 +- 1200	7200 +- 800	3700 +- 900	4100 +- 900	1700 +- 1100
gamma isotopic					
Be-7	3500 +- 200	550 +- 110	1800 +- 160	1300 +- 200	970 +- 140
K-40	4500 +- 400	6500 +- 400	4700 +- 400	6100 +- 500	2600 +- 300
Mn-54	< 44	< 50	< 46	< 60	< 49
Co-58	< 49	< 46	< 50	< 70	< 46
Fe-59	< 130	< 130	< 120	< 130	< 140
Co-60	< 60	< 49	< 55	< 50	< 70
Zn-65	< 160	< 130	< 150	< 130	< 150
Nb-95	< 50	< 42	< 54	< 60	< 50
Zr-95	< 80	< 70	< 80	< 100	< 90
I-131	< 70	< 46	< 47	< 60	< 55
Cs-134	< 70	< 47	< 49	< 60	< 43
Cs-137	< 47	< 44	< 39	< 48	< 35
Ba-140	< 210	< 150	< 130	< 210	< 150
La-140	< 80	< 70	< 100	< 80	< 90

Radioisotopes other than those reported were not detected.

Table 15. WI DHS analysis results for soil samples collected from the Point Beach – Kewaunee environmental monitoring program.

Measurements in units of pCi/kilogram (dry)

Location	PBK-1	PBK-2	PBK-3	PBK-4	PBK-5
Collection date	05/29/07	05/29/07	05/29/07	05/29/07	05/30/07
Analysis					
gross alpha	8000 +- 6000	8000 +- 7000	11000 +- 7000	8000 +- 6000	< 7000
gross beta	23000 +- 4000	20000 +- 4000	27000 +- 5000	33000 +- 5000	29000 +- 5000
gamma isotopic					
K-40	14900 +- 500	21000 +- 700	22300 +- 700	18300 +- 600	20800 +- 600
Mn-54	< 34	< 43	< 40	< 37	< 37
Co-58	< 37	< 47	< 39	< 49	< 36
Fe-59	< 80	< 120	< 110	< 130	< 100
Co-60	< 35	< 60	< 47	< 43	< 49
Zn-65	< 110	< 190	< 150	< 180	< 180
Nb-95	< 34	< 60	< 38	< 45	< 42
Zr-95	< 47	< 100	< 70	< 80	< 60
Cs-134	< 41	< 60	< 70	< 70	< 60
Cs-137	290 +- 20	140 +- 20	110 +- 10	160 +- 20	140 +- 10

Location	PBK-7	PBK-8	PBK-14	PBK-17	PBK-25
Collection date	05/29/07	05/29/07	05/30/07	05/30/07	05/29/07
Analysis					
gross alpha	14000 +- 8000	< 7000	12000 +- 7000	9000 +- 7000	< 7000
gross beta	30000 +- 5000	28000 +- 5000	25000 +- 4000	21000 +- 4000	10000 +- 4000
gamma isotopic					
K-40	23700 +- 700	20200 +- 600	20900 +- 600	15300 +- 500	6600 +- 400
Mn-54	< 44	< 37	< 43	< 49	< 25
Co-58	< 38	< 43	< 43	< 35	< 29
Fe-59	< 130	< 100	< 110	< 120	< 90
Co-60	< 44	< 44	< 53	< 48	< 42
Zn-65	< 160	< 160	< 170	< 150	< 90
Nb-95	< 45	< 39	< 42	< 39	< 39
Zr-95	< 70	< 60	< 70	< 70	< 60
Cs-134	< 80	< 80	< 80	< 80	< 41
Cs-137	160 +- 20	240 +- 20	204 +- 15	450 +- 20	< 35

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. WI DHS analysis results for soil samples collected from the Point Beach – Kewaunee environmental monitoring program.

Measurements in units of pCi/kilogram (dry)

Location	PBK-1	PBK-2	PBK-3	PBK-4	PBK-5
Collection date	09/11/07	09/11/07	09/11/07	09/11/07	09/11/07
Analysis					
gross alpha	< 13000	< 13000	< 9000	< 10000	11000 +- 6000
gross beta	10000 +- 3000	21000 +- 3000	20000 +- 2000	17000 +- 2000	21000 +- 2000
gamma isotopic					
K-40	15600 +- 700	20200 +- 600	23200 +- 700	19800 +- 600	21300 +- 800
Mn-54	< 51	< 37	< 35	< 34	< 51
Co-58	< 60	< 31	< 32	< 29	< 60
Fe-59	< 110	< 80	< 90	< 80	< 150
Co-60	< 70	< 37	< 41	< 31	< 70
Zn-65	< 210	< 150	< 140	< 140	< 240
Nb-95	< 60	< 38	< 38	< 37	< 51
Zr-95	< 80	< 70	< 60	< 60	< 80
Cs-134	< 47	< 70	< 70	< 60	< 80
Cs-137	280 +- 20	72 +- 12	160 +- 10	160 +- 12	160 +- 20

Location	PBK-7	PBK-8	PBK-14	PBK-17	PBK-26
Collection date	09/12/07	09/12/07	09/12/07	09/12/07	09/11/07
Analysis					
gross alpha	< 10000	< 9000	< 10000	< 12000	< 11000
gross beta	21000 +- 2000	18000 +- 2000	19000 +- 3000	15000 +- 3000	5000 +- 2000
gamma isotopic					
K-40	22900 +- 700	20700 +- 700	21300 +- 600	15000 +- 500	6900 +- 300
Mn-54	< 42	< 46	< 36	< 37	< 33
Co-58	< 48	< 42	< 32	< 35	< 26
Fe-59	< 110	< 150	< 90	< 80	< 70
Co-60	< 49	< 70	< 39	< 48	< 28
Zn-65	< 190	< 200	< 140	< 120	< 120
Nb-95	< 49	< 50	< 39	< 39	< 30
Zr-95	< 80	< 90	< 60	< 51	< 38
Cs-134	< 60	< 70	< 70	< 80	< 52
Cs-137	183 +- 15	250 +- 20	198 +- 14	440 +- 20	< 26

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.

State of Wisconsin

2007

Zion

Environmental Radioactivity Survey

**Wisconsin Department of Health Services
Division of Public Health
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**State of Wisconsin DHS
2007
Zion Environmental Radioactivity Survey**

Introduction

Wisconsin Public Health, Statutes 254.41 mandates the Department of Health Services to conduct environmental radiation monitoring around the nuclear power facilities that impact Wisconsin. This environmental monitoring report is for the Zion nuclear generating plant for the calendar year January - December 2007 and provides a description and results of this environmental monitoring program.

WI DHS Zion 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, ambient gamma radiation (TLD), surface water, soil and vegetation that are collected from selected locations at planned sampling intervals.

Table 1 is a listing of presently used sampling sites that have been renumbered after eliminating sample sites that have been discontinued. Sampling sites that have been discontinued were last listed as sampling sites in WI DHS's environmental monitoring report for the Zion nuclear plant for the calendar year of January - December, 2000. Table 2 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 3 provides an explanation of missing samples or non-routine sample analyses. Figure 1 is a map showing the location of each environmental sampling site.

Program Modifications

In January 1998 ComEd announced that it was permanently closing the Zion nuclear power station and initiated the process of decommissioning the Zion station. In response to this and due to other funding restrictions, the Zion environmental monitoring program was reviewed and modified in 1998 and 2000.

There were no additional program modifications for 2007.

Laboratory Services and Quality Assurance

The analysis of the samples is performed under contract with the State Laboratory of Hygiene (SLH). SLH 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.

SLH participates in the Environmental Resource Associates' Proficiency Testing program and has performed satisfactorily over the report period. Proficiency testing results are available from the 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 5-9 is "a posteriori" calculation based on the actual analysis performed using the actual sample values for E, V, Y and dt. Typically the reported "less than" (<) results are lower than the required 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 \pm). 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. WI DHS Zion environmental monitoring sampling sites.

Sample site	Distance and direction (miles)	Location description
ZI-1	3.8 N	Chiwaukee Prairie.
ZI-2	8.5 NW	Pleasant Prairie, Roger Prange Municipal Center
ZI-3	10.0 N	Water intake - 4700 feet from shore.
ZI-4	5.9 NW	Junction of Highway 31 and County ML.
ZI-T41	4.7 NW	Junction of 122th Street and 39th Avenue
ZI-T42	3.8 N	Chiwaukee Prairie.
ZI-T43	10.1 N	Kenosha Water Utility

Table 2. Sample collection summary and required analyses.

Sample Type	Collection and Frequency	Site locations	Number of Samples Collected	Number of Samples Deviations	Required Analyses
air particulate	C/BW	1,2	47	2	GA, GB, GI
TLD	C/Q	T41 - T43	12	0	direct exposure
surface water	G/SA	3	4	0	GA, GB, Sr, H
vegetation	G/SA	1, 4	4	0	GA, GB, GI
soil	G/SA	1, 4	4	0	GA, GB, GI

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; H = tritium

Table 3. Missing sample report and listing of non-routine analyses.

Sample type	Date	Site	Explanation
air particulate	07/13/07	2	The air site was off for approximately 16 days and 12 hours during the collection period.
air particulate	08/03/07	2	The air site was off for approximately 17 days and 3 hours during the collection period

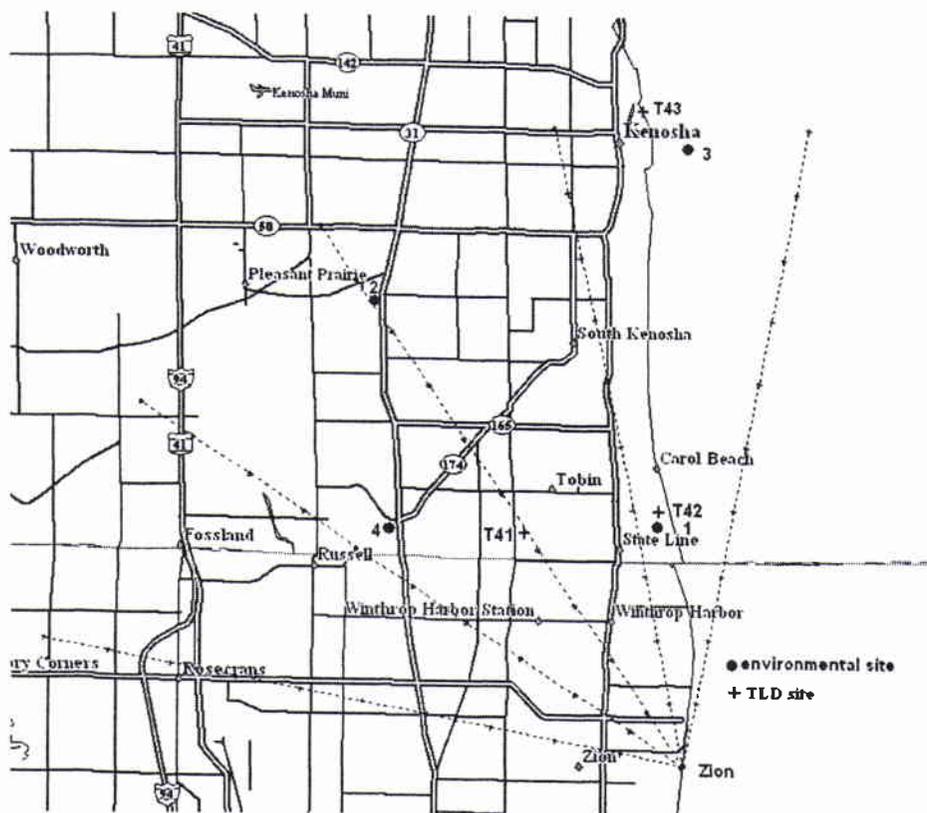


Figure 1. WI DHS environmental monitoring sites for the Zion environmental monitoring program.

Results and Discussion

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 and 6.

From the quarterly gross beta activities listed in Table 5 it may be noted that there are no significant differences due to distance from the Zion nuclear facility. With no significant differences due to distance from the Zion nuclear facility an increase in gross beta activity attributable to the Zion plant operation is not evident.

The gamma isotopic analysis of the quarterly air particulate filter composites detected only small amounts of the radioisotopes listed in Table 6. Beryllium-7 (^7Be), detected in all composites, 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.

Influence by the Zion nuclear facility on air quality is not evident from air particulate analysis.

Ambient Gamma Radiation (TLDs)

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.

Ambient gamma radiation (TLD) data for 2007 from the WI DHS network was comparable for all sites. Significant differences in exposure were not noticed at different distances from the Zion nuclear facility. The average quarterly exposure from the three sites located within Wisconsin was 12.8 ± 1.6 milliroentgens. The average yearly exposure is at background levels and is comparable to other areas within Wisconsin.

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 8.

The surface water samples showed no unusual activities and are at background levels comparable to previous years. From the gamma isotopic analysis, all radioisotopes were below their respective minimum detectable concentration. All reported activities for gross beta, gross alpha and tritium (^3H) are at background levels. The surface water samples uniformly show activities well below state or federal standards.

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 9.

Analysis of the vegetation samples showed no unusual activities. The gamma isotopic analysis detected only small amounts of the naturally occurring radioisotopes beryllium-7 (^7Be) and potassium-40 (^{40}K) listed in Table 4. All other radioisotopes were below their respective minimum detectable concentration.

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 9.

Analysis of the soil samples showed no unusual activities. The gamma isotopic analysis detected only small amounts of the radionuclides listed in Table 4. Potassium-40 (^{40}K) is a naturally occurring radioisotope. The reported activities for cesium-137 (^{137}Cs) were also detected in previous years and are attributable to fallout from previous atmospheric nuclear tests. 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) and 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.

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

The WI DHS limits for permissible levels of radiation exposure from external sources in unrestricted areas is defined in the Wis. Adm. Code section HFS 157.23. Doses resulting from gaseous and liquid effluent releases from the Zion nuclear generating facilities are less than the limits as stated in Wis. Adm. Code section HFS 157.23.

References

State of Wisconsin, Wisconsin Administrative Code, HFS 157.23

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 WI DHS Zion environmental monitoring program for 2007.

Sample type (units)	LLD	Number of samples ^a	Analysis	Range
air particulate (pCi/m ³)	0.005	47 / 47	gross beta	0.010 - 0.051
			gamma isotopic	
	0.020	8 / 8	Be-7	0.059 - 0.091
	0.002	8 / 0	Mn-54	< 0.0005
	0.002	8 / 0	Co-58	< 0.0006
	0.005	8 / 0	Fe-59	< 0.0013
	0.002	8 / 0	Co-60	< 0.0006
	0.005	8 / 0	Zn-65	< 0.0016
	0.002	8 / 0	Nb-95	< 0.0007
	0.005	8 / 0	Zr-95	< 0.0009
	0.002	8 / 0	Ru-103	< 0.0005
	0.015	8 / 0	Ru-106	< 0.0043
	0.020	8 / 0	I-131	< 0.0023
	0.002	8 / 0	Cs-134	< 0.0006
	0.002	8 / 0	Cs-137	< 0.0005
	0.030	8 / 0	Ba-140	< 0.0042
	0.020	8 / 0	La-140	< 0.0021
	0.002	8 / 0	Ce-141	< 0.0008
0.005	8 / 0	Ce-144	< 0.0025	
ambient gamma (mR/Std Qtr)	1.0 ^b	12 / 12	ambient gamma	10.5 - 15.8
vegetation (pCi/kg wet)	5000	4 / 0	gross alpha	< 4000
	4000	4 / 4	gross beta	4300 - 9000
			gamma isotopic	
	600	4 / 4	Be-7	360 - 3800
	2000	4 / 4	K-40	4500 - 5800
	90	4 / 0	Mn-54	< 56
	100	4 / 0	Co-58	< 55
	200	4 / 0	Fe-59	< 120
	100	4 / 0	Co-60	< 80
	250	4 / 0	Zn-65	< 160
	100	4 / 0	Nb-95	< 60
	200	4 / 0	Zr-95	< 120
	80	4 / 0	I-131	< 50
	80	4 / 0	Cs-134	< 60
	90	4 / 0	Cs-137	< 56
	350	4 / 0	Ba-140	< 170
	100	4 / 0	La-140	< 90

Table 4. Sample activity summary for the WI DHS Zion environmental monitoring program for 2007.

Sample type (units)	LLD	Number of samples ^a	Analysis	Range
surface water (pCi/liter)	3.0	4 / 3	gross beta (sol)	< 3.0 – 4.4
	3.0	4 / 0	gross beta (insol)	< 2.5
	3.0	4 / 0	gross alpha (sol)	< 1.6
	3.0	4 / 0	gross alpha (insol)	< 2.1
	300	4 / 0	H-3	< 300
	2.0	4 / 0	Sr-89	< 1.0
	1.0	4 / 0	Sr-90	< 0.4
			gamma isotopic	
	15	4 / 0	Mn-54	< 7
	15	4 / 0	Co-58	< 7
	30	4 / 0	Fe-59	< 15
	15	4 / 0	Co-60	< 8
	30	4 / 0	Zn-65	< 20
	15	4 / 0	Nb-95	< 7
	30	4 / 0	Zr-95	< 11
	15	4 / 0	I-131	< 7
	15	4 / 0	Cs-134	< 8
	15	4 / 0	Cs-137	< 7
	60	4 / 0	Ba-140	< 25
	15	4 / 0	La-140	< 12
soil (pCi/kg dry)	6000	4 / 4	gross beta	9000 - 31000
	10000	4 / 2	gross alpha	<11000 - 16000
			gamma isotopic	
	800	4 / 4	K-40	9100 - 21600
	60	4 / 0	Mn-54	< 41
	90	4 / 0	Co-58	< 35
	600	4 / 0	Fe-59	< 100
	90	4 / 0	Co-60	< 38
	300	4 / 0	Zn-65	< 140
	100	4 / 0	Nb-95	< 38
	250	4 / 0	Zr-95	< 60
	80	4 / 0	Cs-134	< 80
	80	4 / 4	Cs-137	74 - 340

a - Number of analyses / number of analyses detected above the WI DHS LLD.
b - 1.0 mR/TLD.

Table 5: WI DHS air particulate analysis results from the Zion environmental monitoring program.

Measurements in units of pCi/m³

ZI-1, Chiwaukee Prairie

ZI-2, Pleasant Prairie, Roger Prange Municipal Center

collection date	volume m3	gross beta	collection date	volume m3	gross beta
01/08/07	1030	0.028 +- 0.002	01/08/07	1079	0.030 +- 0.002
01/22/07	808	0.022 +- 0.002	01/22/07	888	0.012 +- 0.001
01/22/07	815	0.022 +- 0.002	01/22/07	831	0.013 +- 0.002
01/31/07	568	0.031 +- 0.003	01/31/07	598	0.031 +- 0.003
02/16/07	1016	0.023 +- 0.002	02/16/07	1102	0.026 +- 0.002
02/27/07	680	0.022 +- 0.002	02/27/07	724	0.022 +- 0.002
03/20/07	1255	0.019 +- 0.001	03/20/07	1354	0.018 +- 0.001
1st qtr mean +- s.d.		0.024 +- 0.004	1st qtr mean +- s.d.		0.022 +- 0.008
04/05/07	957	0.015 +- 0.001	04/05/07	1027	0.015 +- 0.001
04/20/07	884	0.018 +- 0.002	04/20/07	974	0.017 +- 0.002
04/30/07	569	0.014 +- 0.002	04/30/07	625	0.010 +- 0.002
06/19/07	2713	0.016 +- 0.001	06/19/07	2952	0.014 +- 0.001
2nd qtr mean +- s.d.		0.016 +- 0.002	2nd qtr mean +- s.d.		0.014 +- 0.003
07/13/07	1251	0.017 +- 0.001	a 07/13/07	447	0.019 +- 0.003
07/20/07	369	0.018 +- 0.003	b 08/03/07	225	0.029 +- 0.005
08/03/07	708	0.027 +- 0.002	08/17/07	782	0.021 +- 0.002
08/17/07	684	0.020 +- 0.002	08/31/07	764	0.017 +- 0.002
08/31/07	682	0.017 +- 0.002	09/14/07	759	0.022 +- 0.002
09/14/07	688	0.025 +- 0.002	09/28/07	638	0.025 +- 0.002
09/28/07	706	0.025 +- 0.002	3rd qtr mean +- s.d.		0.022 +- 0.004
3rd qtr mean +- s.d.		0.021 +- 0.004	10/12/07	755	0.022 +- 0.002
10/12/07	697	0.023 +- 0.002	11/07/07	1517	0.022 +- 0.001
11/07/07	1347	0.024 +- 0.001	11/19/07	746	0.025 +- 0.002
11/19/07	647	0.029 +- 0.002	12/11/07	1336	0.031 +- 0.002
12/11/07	1204	0.031 +- 0.002	12/20/07	589	0.050 +- 0.003
12/20/07	540	0.051 +- 0.003	01/02/08	854	0.040 +- 0.002
01/02/08	782	0.040 +- 0.002	4th qtr mean +- s.d.		0.032 +- 0.011
4th qtr mean +- s.d.		0.033 +- 0.011			

a - The air site was off for approximately 16 days and 12 hours during the collection period.

b - The air site was off for approximately 17 days and 3 hours during the collection period.

Table 6. WI DHS gamma isotopic analysis results from the quarterly composites of air particulate filters collected for the WI DHS Zion environmental monitoring program.

Measurements in units of pCi/m ³				
	1st quarter	2nd quarter	3rd quarter	4th quarter
Chiwaukee Prairie				
ZI-1 (41000)				
Be-7	0.061 +- 0.002	0.091 +- 0.003	0.077 +- 0.003	0.072 +- 0.002
Mn-54	< 0.0005	< 0.0003	< 0.0005	< 0.0003
Co-58	< 0.0006	< 0.0003	< 0.0005	< 0.0003
Fe-59	< 0.0013	< 0.0008	< 0.0013	< 0.0009
Co-60	< 0.0005	< 0.0003	< 0.0005	< 0.0003
Zn-65	< 0.0009	< 0.0007	< 0.0016	< 0.0009
Nb-95	< 0.0006	< 0.0004	< 0.0007	< 0.0004
Zr-95	< 0.0008	< 0.0006	< 0.0009	< 0.0006
Ru-103	< 0.0005	< 0.0003	< 0.0005	< 0.0003
Ru-106	< 0.0041	< 0.0026	< 0.0043	< 0.0022
I-131	< 0.0020	< 0.0014	< 0.0018	< 0.0023
Cs-134	< 0.0004	< 0.0003	< 0.0006	< 0.0003
Cs-137	< 0.0005	< 0.0003	< 0.0005	< 0.0003
Ba-140	< 0.0042	< 0.0024	< 0.0042	< 0.0032
La-140	< 0.0019	< 0.0010	< 0.0019	< 0.0016
Ce-141	< 0.0008	< 0.0005	< 0.0008	< 0.0005
Ce-144	< 0.0021	< 0.0015	< 0.0025	< 0.0014
Pleasant Prairie; Roger Prange Municipal Center				
ZI-2 (43000)				
Be-7	0.059 +- 0.003	0.076 +- 0.002	0.078 +- 0.003	0.069 +- 0.002
Mn-54	< 0.0004	< 0.0001	< 0.0005	< 0.0003
Co-58	< 0.0005	< 0.0002	< 0.0005	< 0.0003
Fe-59	< 0.0011	< 0.0004	< 0.0013	< 0.0009
Co-60	< 0.0006	< 0.0001	< 0.0006	< 0.0003
Zn-65	< 0.0010	< 0.0003	< 0.0014	< 0.0008
Nb-95	< 0.0005	< 0.0002	< 0.0006	< 0.0005
Zr-95	< 0.0006	< 0.0003	< 0.0009	< 0.0006
Ru-103	< 0.0004	< 0.0002	< 0.0005	< 0.0004
Ru-106	< 0.0042	< 0.0011	< 0.0043	< 0.0025
I-131	< 0.0019	< 0.0018	< 0.0017	< 0.0023
Cs-134	< 0.0005	< 0.0001	< 0.0005	< 0.0003
Cs-137	< 0.0004	< 0.0001	< 0.0005	< 0.0003
Ba-140	< 0.0041	< 0.0022	< 0.0036	< 0.0036
La-140	< 0.0021	< 0.0010	< 0.0014	< 0.0012
Ce-141	< 0.0005	< 0.0003	< 0.0007	< 0.0006
Ce-144	< 0.0013	< 0.0007	< 0.0025	< 0.0016

Radioisotopes other than those reported were not detected.

Table 7. WI DHS TLD network for Zion.

			1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Date Placed:			01/03/07	04/03/07	07/05/07	10/02/07
Date Removed:			04/03/07	07/05/07	10/02/07	01/03/08
Days is the Field:			90	93	89	93
Location:			mR / Standard Quarter			
T41	4.7	NW	15.0 +- 0.8	13.6 +- 0.8	15.8 +- 0.8	14.0 +- 0.6
T42	3.8	N	12.5 +- 0.7	12.3 +- 1.2	12.7 +- 0.6	11.7 +- 0.8
T43	10.1	N	12.1 +- 0.9	10.5 +- 0.8	12.1 +- 0.8	10.9 +- 0.6

Table 8. WI DHFS analysis results of surface water samples collected for the WI DHS Zion environmental monitoring program.

Measurements in units of pCi/liter				
ZI-3				
Collection date	01/10/07	05/01/07	07/09/07	10/30/07
gross alpha-sol	< 1.6	< 1.4	< 1.3	< 0.5
gross beta-sol	< 3.0	2.3 +- 1.4	4.4 +- 1.5	1.2 +- 0.2
gross alpha-insol	< 1.0	< 0.8	< 0.8	< 2.1
gross beta-insol	< 2.5	< 2.0	< 2.0	< 1.6
H-3	< 300	< 300	< 300	< 300
Sr-89	< 0.4	< 1.0	< 0.4	< 0.8
Sr-90	< 0.4	< 0.4	< 0.4	< 0.3
Gamma isotopic				
Mn-54	< 7	< 6	< 6	< 7
Co-58	< 7	< 6	< 6	< 6
Fe-59	< 15	< 11	< 14	< 12
Co-60	< 8	< 6	< 6	< 7
Zn-65	< 20	< 14	< 16	< 16
Nb-95	< 7	< 6	< 6	< 7
Zr-95	< 11	< 10	< 9	< 10
I-131	< 7	< 7	< 6	< 7
Cs-134	< 7	< 6	< 7	< 8
Cs-137	< 7	< 6	< 6	< 7
Ba-140	< 24	< 20	< 25	< 25
La-140	< 11	< 8	< 12	< 9

Radioisotopes other than those reported were not detected.

Table 9. WI DHFS analysis results for vegetation and soil samples collected for the WI DHS Zion environmental monitoring program.

Measurements in units of pCi/kilogram (wet)

Collection	05/24/07	05/24/07	10/04/07	10/04/07
Type	vegetation	vegetation	vegetation	vegetation
Location	ZI-1	ZI-4	ZI-1	ZI-4
Analysis				
gross alpha	< 2000	< 3000	< 4000	< 2200
gross beta	8000 +- 1400	9000 +- 2000	4300 +- 900	5000 +- 700
Gamma isotopic				
Be-7	760 +- 130	360 +- 110	3800 +- 200	2900 +- 200
K-40	5800 +- 400	5300 +- 400	4800 +- 400	4500 +- 300
Mn-54	< 52	< 20	< 56	< 48
Co-58	< 35	< 47	< 55	< 52
Fe-59	< 110	< 100	< 120	< 80
Co-60	< 60	< 80	< 70	< 49
Zn-65	< 160	< 150	< 80	< 120
Nb-95	< 60	< 60	< 39	< 47
Zr-95	< 80	< 120	< 70	< 80
I-131	< 48	< 50	< 39	< 48
Cs-134	< 46	< 58	< 42	< 60
Cs-137	< 56	< 42	< 54	< 48
Ba-140	< 150	< 140	< 160	< 170
La-140	< 80	< 50	< 60	< 90

Measurements in units of pCi/kilogram (dry)

Collection	05/24/07	05/24/07	10/04/07	10/04/07
Type	soil	soil	soil	soil
Location	ZI-1	ZI-4	ZI-1	ZI-4
Analysis				
gross alpha	< 7000	14000 +- 8000	16000 +- 10000	< 11000
gross beta	14000 +- 4000	31000 +- 5000	23000 +- 3000	9000 +- 2000
Gamma isotopic				
K-40	9700 +- 400	21600 +- 600	19400 +- 700	9100 +- 400
Mn-54	< 41	< 26	< 34	< 28
Co-58	< 35	< 31	< 29	< 23
Fe-59	< 100	< 90	< 90	< 60
Co-60	< 35	< 38	< 23	< 34
Zn-65	< 100	< 140	< 80	< 60
Nb-95	< 29	< 31	< 38	< 37
Zr-95	< 60	< 52	< 51	< 40
Cs-134	< 42	< 80	< 28	< 20
Cs-137	340 +- 20	74 +- 11	130 +- 10	310 +- 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.