

Environmental Monitoring Report

2023 DATA

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Environmental Monitoring Report

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Program Summary

The Minnesota Department of Health (MDH) maintains an environmental monitoring program for radioactivity around the two nuclear power generating plants in the state. The program is designed to provide an independent evaluation of the impact of the nuclear power generating plants to the environment and the public over a period of time. Data collected provides the public with reliable data regarding the environmental impact of the nuclear power generating plants, and establish trends. Annual reports are generated and available for public review. Sample data not included in the annual reports is available through the MDH Radioactive Materials Unit.

Monitoring for radioactivity began in Minnesota in response to nuclear weapons testing. A baseline for certain radionuclides has been established and current environmental monitoring continues to validate the natural background levels in Minnesota. Throughout the years, MDH's environmental monitoring program has transformed. Careful analysis of potential risks and data collected has led MDH to make alterations in its sampling program from time to time. Some collection points and sample mediums have been discontinued while others have been added.

The major components of MDH's environmental monitoring program are sample collection, data analysis, and interpretation. Samples collected around the Monticello and Prairie Island nuclear generating plants include air, surface water, and milk. Ambient gamma radiation doses are monitored through the use of optically stimulated luminescence dosimeters. Well water and community water samples are collected near the Prairie Island plant only.

Air Monitoring

Continuous air monitoring allows MDH to determine the level of radioactive contamination that could expose the public through inhalation. Air sampler particulate filters and cartridges are collected weekly or every other week and analyzed for radioactive particulates in the air.

In 2023, air samples were collected from three locations in Minnesota: one at each of the nuclear power generating plants and one in downtown St. Paul. The air samplers at the nuclear power generating plants are located downwind of the plants, based on predominant wind directions.

The location of the Prairie Island air sampler is near Lock and Dam No. 3, downstream from the Prairie Island Nuclear Generating Plant. The air sampler at Monticello is located near the Monticello Xcel Training Center, downstream from the Monticello Nuclear Power Generating Plant.

The St. Paul air sampler is located on the roof of the Freeman Building at 625 Robert Street North in St. Paul and is used as a standard for comparison.

Air sampler locations are shown in [Image 1](#) (Monticello) and [Image 2](#) (Prairie Island).

Air sample results for gross alpha, gross beta, and naturally occurring Beryllium-7 and Potassium-40 are shown in [Table 2 \(Monticello\)](#), [Table 3 \(Prairie Island\)](#), and [Table 4 \(St. Paul\)](#).

Data Analysis

Data collected from the Prairie Island and Monticello air samplers are compared to data from the St. Paul sampler and historical data.

Gross alpha and gross beta levels were similar at all three locations and similar to air sample results from previous years.

Whenever applicable, naturally occurring Beryllium-7 and Potassium-40 are tracked as a means of quality control for accuracy of lab data. It is expected that these levels will remain somewhat constant throughout time.

Surface Water Monitoring

MDH samples the river water downstream from both power plants and compares the results to the historical data for changes that may have occurred due to releases from the power plant. MDH also compares the results to the EPA Safe Drinking Water Act (SDWA) standards for comparison, but these are not samples used by community water systems to show compliance with the SDWA.

Water sample locations are shown in [Image 1](#) (Monticello) and [Image 2](#) (Prairie Island).

Water sample results for gross alpha, gross beta, and select radionuclides of interest are shown in [Table 5](#) (Monticello) and [Table 6](#) (Prairie Island).

Data Analysis

The radiological component of the SDWA limits gross alpha particles to 15 pCi/L (including combined Radium 226 and Radium 228 at 5 pCi/L), and beta/photon emitters to doses equivalent to 4 mrem per year. For tritium the limit is 20,000 pCi/L, for Strontium 90 the limit is 8 pCi/L, and for Strontium 89 the limit is 20 pCi/L.

Gross alpha values for 2023 were below 3.0 pCi/L at both locations. Tritium values were below 561 pCi/L at both locations. Strontium-89 and Strontium-90 were both less than 2 pCi/L at both locations.

Milk Monitoring

Milk samples are collected monthly from a farm located near each power plant. Radiation contamination that may have been deposited in the fields and consumed by cows would be concentrated and forwarded to the milk. Since there are no standards for milk, except for emergency situations, sample analysis is compared to historical data and reviewed for trends.

Milk sampling locations are shown in [Image 1](#) (Monticello) and [Image 2](#) (Prairie Island). Milk sample results for select radionuclides of interest are shown in [Table 7](#) (Monticello) and [Table 8](#) (Prairie Island).

Data Analysis

There are no specific standards for milk samples, except for emergency situations, so samples are compared to historical data. Strontium-89 and Strontium-90 have consistently been below the detection limit, and the results for Potassium-40, a naturally occurring radionuclide, remain consistent.

Ambient Gamma Radiation Monitoring

Ambient gamma radiation levels are measured around the power plants by using optically stimulated luminescence dosimeters (OSLDs). MDH has placed OSLDs beyond the plant's boundaries to estimate the dose a member of the public would receive if they were to be at that location continuously throughout the monitoring period. OSLDs are changed and analyzed quarterly. In 2006, MDH transferred the analysis of the dosimeters from an internal evaluation to Mirion Technologies (formerly Global Dosimetry), a processor approved by the National Voluntary Laboratory Accreditation Program. These results are compared to historical data and MDH regulatory limits.

OSLD locations are shown in [Image 3](#) (Monticello) and [Image 4](#) (Prairie Island).

Ambient Gamma radiation level results are shown in [Table 9](#) (Monticello) and [Table 10](#) (Prairie Island).

Data Analysis

Control badges are kept in St. Paul for the monitoring period, and the control badge readings are subtracted out by the processor to compensate for background radiation and radiation picked up during transit to and from the processor. Most of the badge results were below minimum threshold in which an actual reading can be measured with statistical accuracy. The results that were above that threshold were below the MDH regulatory dose limit for members of the public of 100 mrem in a year.

Well Water and Community Water Monitoring

Well water is periodically reviewed since radioactivity may seep through the soil and enter the water table. The collection point was selected to be a private farm located close to the Prairie Island nuclear power plant. Community water samples are collected at Prairie Island as part of the EPA RADNET system. These samples are sent into EPA RADNET for analysis and not part of this report. MDH does collect samples at the same time to represent the community water supply at Prairie Island for analysis by the MDH laboratory, which are included in this report. These samples are collected quarterly and are compared to historical data and the EPA Safe Drinking Water Act standards but are not compliance samples for the community water system with the SDWA.

The well water and community water sample locations are shown in [Image 2](#). Community water samples are collected from the Dakota Station at Prairie Island. Well water sample results for gross alpha, gross beta, and select radionuclides of interest are shown in [Table 11](#). Community water sample results are shown in [Table 12](#).

Data Analysis

Well water and community water data are analyzed similar to surface water. The radiological component of the SDWA limits gross alpha particles to 15 pCi/L (including combined Radium 226 and Radium 228 at 5 pCi/L), and beta/photon emitters to doses equivalent to 4 mrem per year. For Tritium the limit is 20,000 pCi/L.

Gross alpha values for 2023 were below 8 pCi/L, and Tritium values were below 350 pCi/L.

Precipitation Monitoring

As part of the EPA RADNET program, MDH also collects precipitation samples at the air sampling location in St. Paul. These samples are collected when enough precipitation is in the collection bucket to fill an analysis container. Samples are split, one going to EPA RADNET and one to MDH's Public Health Lab. Data collected is compared to the EPA Safe Drinking Water Act standards for reference and historical data.

Precipitation sample results for gross alpha, gross beta, and select radionuclides of interest are shown in [Table 13](#).

Data Analysis

Precipitation data is analyzed similar to surface water. The radiological component of the SDWA limits gross alpha particles to 15 pCi/L (including combined Radium 226 and Radium 228 at 5 pCi/L), and beta/photon emitters to doses equivalent to 4 mrem per year. For tritium the limit is 20,000 pCi/L, for Strontium 90 the limit is 8 pCi/L, and for Strontium 89 the limit is 20 pCi/L.

Gross alpha values for 2023 were below 3.0 pCi/L. Tritium values were below 350 pCi/L. Strontium-89 and Strontium-90 were both less than 2 pCi/L.

Program Modifications

Sampling change in response to tritium spill

The routine sampling frequency for downstream river water samples at both nuclear power plants is normally on a quarterly basis. March 8, 2023, MDH started collecting a surface water "grab sample" from the Mississippi River downstream from the Monticello Nuclear Generating Plant at the Montissippi Regional Park. The samples were submitted to the Public Health Lab for tritium analysis in a priority turnaround time. Samples were collected weekly from March 8, 2023, through August 21, 2023, and monthly thereafter through December 2023. Results are reflected in [Table 5](#).

Sampling Sites/OSLD Locations

Image 1: Monticello Environmental Sampling Sites

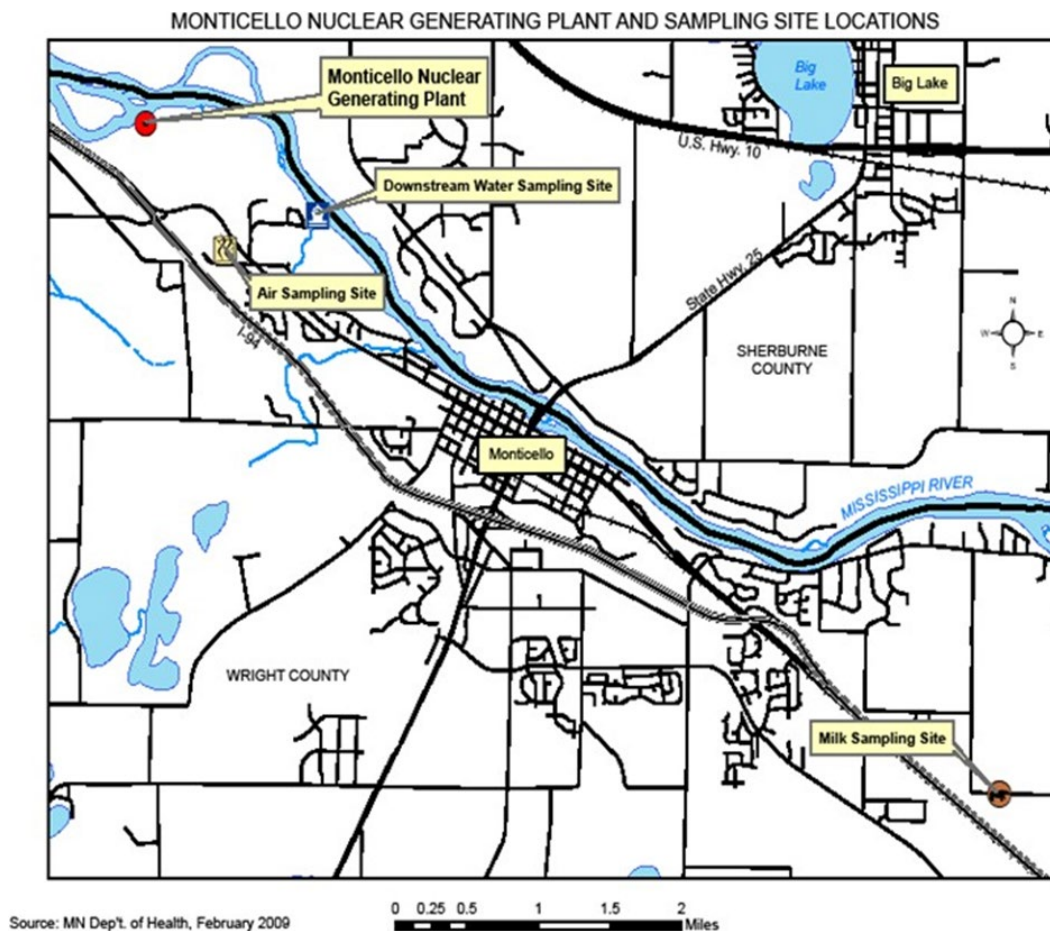
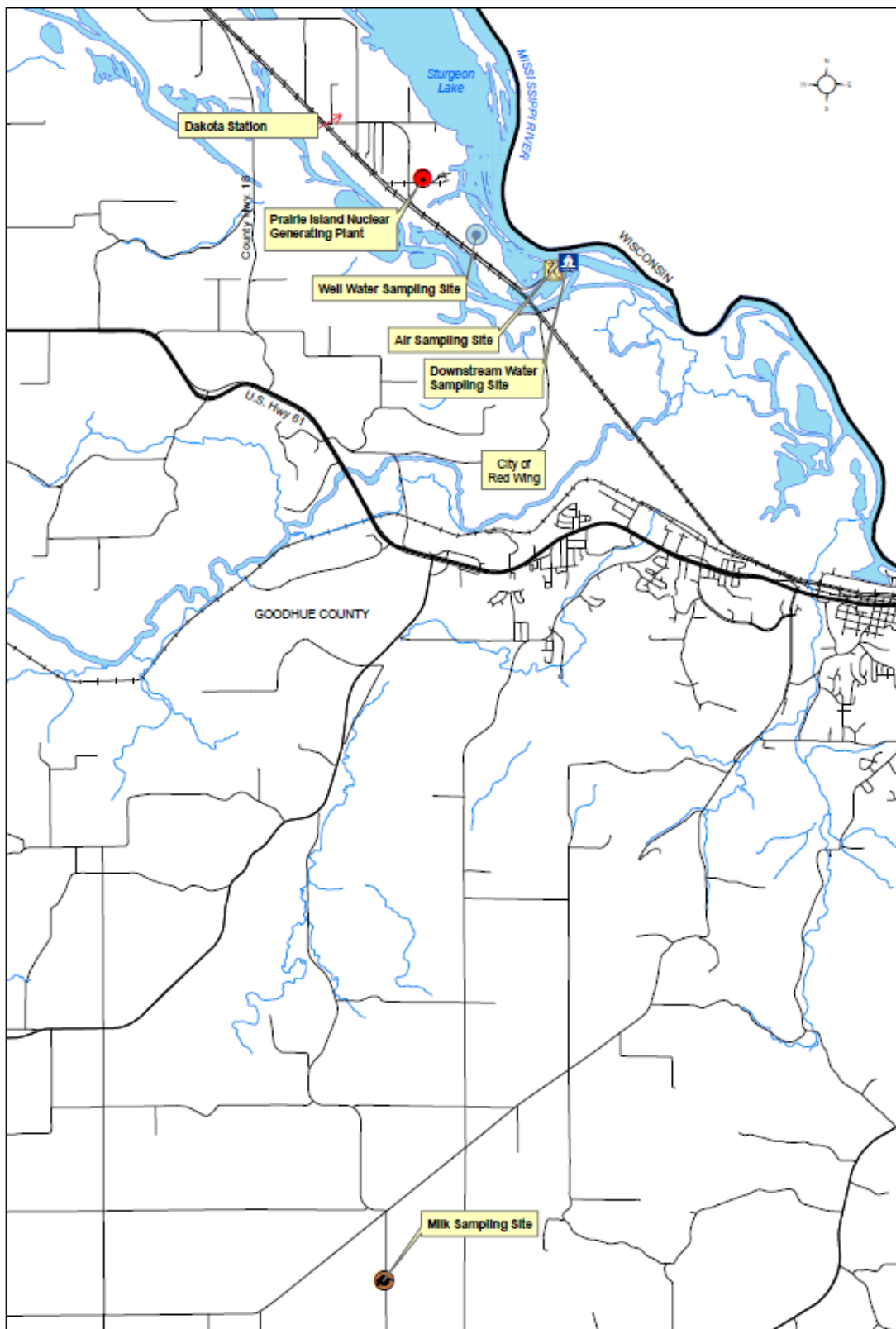


Image 2: Prairie Island Environmental Sampling Sites



Source: MN Dept. of Health, June, 2021

0 0.25 0.5 1 1.5 2 Miles

Image 3: Monticello OSLD Locations

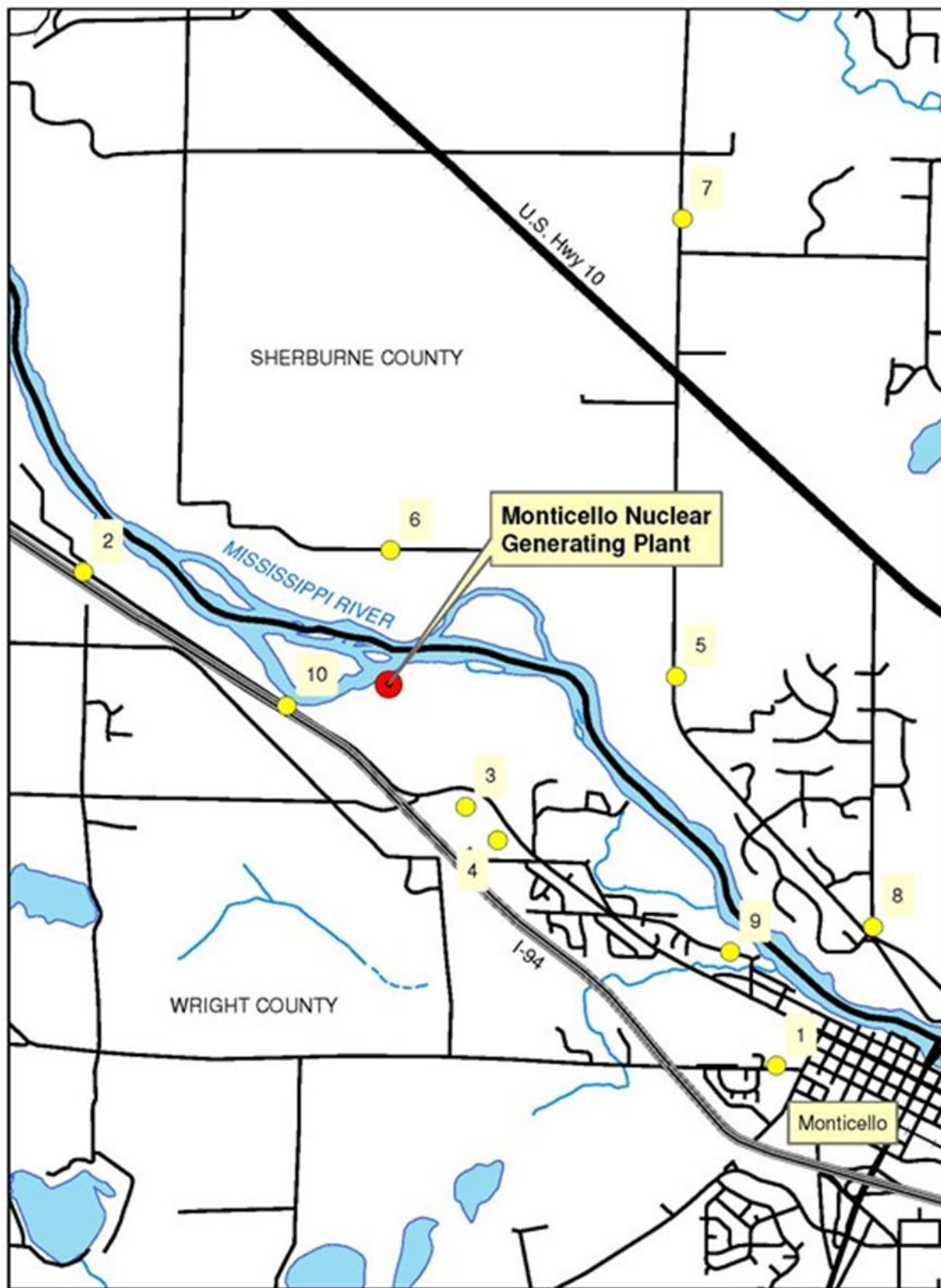
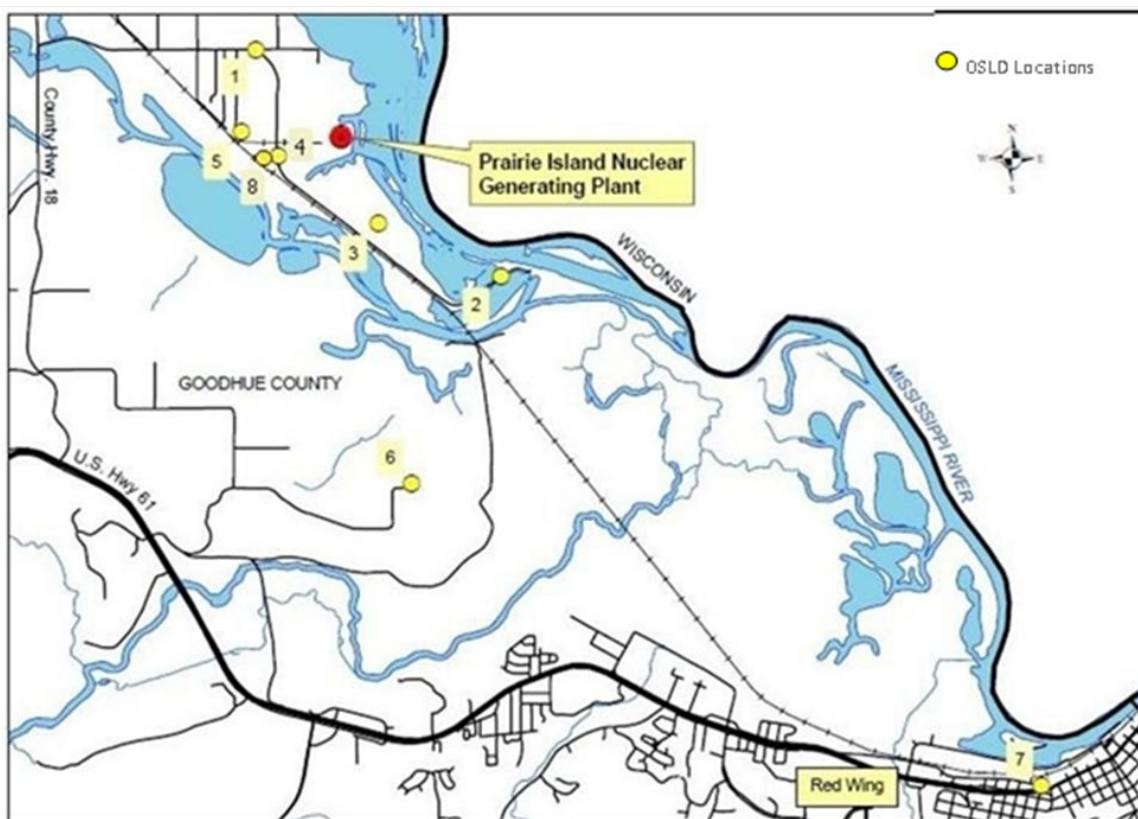


Image 4: Prairie Island OSLD Locations



Tables

Table 1: Sample Summary for 2023

Sample Type	Collection and Frequency	Number of Samples Collected	Analyses Performed
Air	C, W & BW	104	GA, GB, GI, Sr, I
Surface Water	G, Q	54	GA, GB, GI, Sr, H
Well Water	G, Q	4	GA, GB, GI, Sr, H
Community Water	G, Q	4	GA, GB, GI, Sr, H
Milk	G, M	24	GI, Sr, I
OSLD	C, Q	69	Direct exposure
Precipitation	C	19	GA, GB, GI, Sr, H

Collection type: C = continuous; G = grab
 Frequency: W = weekly; M = monthly; Q = quarterly; A = annually; BW = bi-weekly
 Analyses performed: GA = gross alpha; GB = gross beta; GI = gamma isotopic; Sr = strontium; I = iodine; H = tritium

Table 2: 2023 Air Sampling Results for Monticello Nuclear Generating Plant

Results and Detection Limits in pCi/m³

Date Collected	Gross Alpha	Gross Beta	Be-7	K-40
01/09/23	0.00200	0.0394	<300	<6.0
01/23/23	0.00227	0.0421	<300	<6.0
02/08/23	0.00335	0.0310	<300	<6.0
02/21/23	0.00182	0.0182	<300	<6.0
03/08/23	0.00196	0.0195	<300	<6.0
03/21/23	0.00216	0.0201	<300	<6.0
04/04/23	0.00341	0.0250	<300	<6.0

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Date Collected	Gross Alpha	Gross Beta	Be-7	K-40
04/19/23	0.00201	0.00219	<300	<6.0
05/03/23	0.00190	0.0340	<300	<6.0
05/16/23	0.00530	0.0131	<300	<6.0
05/30/23	0.00244	0.0164	<300	<6.0
06/27/23	0.00438	0.0145	<300	<6.0
07/12/23	0.00299	0.0169	<300	<6.0
07/20/23	0.00300	0.0105	<300	<6.0
07/24/23	0.16600	0.2180	<300	<6.0
08/09/23	0.00286	0.0209	<300	<6.0
08/23/23	0.00232	0.0202	<300	<6.0
09/05/23	0.00624	0.0102	<300	<6.0
09/20/23	0.00134	0.0153	<300	<6.0
10/04/23	0.00335	0.0324	<300	<6.0
10/17/23	0.00616	0.0173	<300	<6.0
11/01/23	0.00374	0.0226	<300	<6.0
11/14/23	0.00393	0.0277	<300	<6.0
11/30/23	0.00267	0.0234	<300	<6.0
12/12/23	0.00168	0.0265	<300	<6.0
12/26/23	0.00236	0.0344	<300	<6.0

Table 3: 2023 Air Sampling Results for Prairie Island Nuclear Generating Plant

Results and Detection Limits in pCi/m3

Date Collected	Gross Alpha	Gross Beta	Be-7	K-40
01/09/23	0.00223	0.0326	<300	<6.0
02/08/23	0.00331	0.0348	<300	<6.0
02/21/23	0.00116	0.0195	<300	<6.0
03/08/23	0.00208	0.0188	<300	<6.0
03/21/23	0.00154	0.0196	<300	<6.0
04/04/23	0.00462	0.0252	<300	<6.0
04/19/23	0.00177	0.0194	<300	<6.0
05/03/23	0.00176	0.0286	<300	<6.0
05/16/23	0.00186	0.0379	<300	<6.0
05/30/23	0.00277	0.0171	<300	<6.0
06/14/23	0.00163	0.0372	<300	<6.0
06/27/23	0.00630	0.0200	<300	<6.0
07/12/23	0.00302	0.0155	<300	<6.0
07/20/23	0.00240	0.0101	<300	<6.0
07/24/23	0.16600	0.2170	<300	<6.0
08/09/23	0.00252	0.0203	<300	<6.0
08/23/23	0.00254	0.0200	<300	<6.0
09/05/23	0.00855	0.0319	<300	<6.0
09/20/23	0.00125	0.0182	<300	<6.0

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Date Collected	Gross Alpha	Gross Beta	Be-7	K-40
10/04/23	0.00304	0.0298	<300	<6.0
10/17/23	0.00348	0.0123	<300	<6.0
11/01/23	0.00378	0.0204	<300	<6.0
11/14/23	0.00324	0.0326	<300	<6.0
11/30/23	0.00257	0.0208	<300	<6.0
12/12/23	0.00179	0.0249	<300	<6.0
12/26/23	0.00239	0.0310	<300	<6.0

Table 4: 2023 Air Sampling Results for St. Paul

Results and Detection Limits in pCi/m3

Date Collected	Gross Alpha	Gross Beta	Be-7	K-40
01/03/23	0.00222	0.0400	<300	<6.0
01/09/23	0.00203	0.0302	<300	<6.0
01/17/23	0.00380	0.0628	<300	<6.0
01/25/23	0.00171	0.0154	<300	<6.0
01/31/23	0.00416	0.0237	<300	<6.0
02/07/23	0.00376	0.0397	<300	<6.0
02/15/23	<0.00117	0.0171	<300	<6.0
02/28/23	<0.00075	0.0087	<300	<6.0
03/07/23	0.00415	0.0415	<300	<6.0
03/15/23	0.00285	0.0172	<300	<6.0
03/21/23	<0.00159	0.0194	<300	<6.0

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Date Collected	Gross Alpha	Gross Beta	Be-7	K-40
03/28/23	0.00261	0.0255	<300	<6.0
04/04/23	0.00262	0.0237	<300	<6.0
04/11/23	0.00212	0.0019	<300	<6.0
04/18/23	<0.00119	0.0014	<300	<6.0
04/24/23	<0.00180	0.0100	<300	<6.0
05/03/23	0.0256	0.0455	<300	<6.0
05/09/23	0.00645	0.0204	<300	<6.0
05/16/23	0.0252	0.0583	<300	<6.0
05/23/23	0.00304	0.00945	<300	<6.0
05/30/23	0.00218	0.0185	<300	<6.0
06/05/23	0.00315	0.0220	<300	<6.0
06/13/23	0.00519	0.0184	<300	<6.0
06/20/23	0.0114	0.0225	<300	<6.0
06/27/23	0.00633	0.0225	<300	<6.0
07/05/23	0.00472	0.0178	<300	<6.0
07/11/23	<0.00176	0.0135	<300	<6.0
07/18/23	0.0364	0.0532	<300	<6.0
07/24/23	0.0482	0.0726	<300	<6.0
07/31/23	0.00328	0.0194	<300	<6.0
08/07/23	0.00299	0.0222	<300	<6.0
08/14/23	0.00245	0.00888	<300	<6.0

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Date Collected	Gross Alpha	Gross Beta	Be-7	K-40
08/22/23	0.00221	0.0176	<300	<6.0
08/30/23	0.00316	0.0285	<300	<6.0
09/05/23	0.0112	0.0335	<300	<6.0
09/11/23	<0.00157	0.0126	<300	<6.0
09/19/23	0.00170	0.0191	<300	<6.0
09/27/23	0.00201	0.0319	<300	<6.0
10/03/23	0.00276	0.0344	<300	<6.0
10/10/23	<0.00153	0.0133	<300	<6.0
10/16/23	<0.00170	0.00761	<300	<6.0
10/23/23	0.00405	0.0191	<300	<6.0
10/31/23	0.00143	0.0207	<300	<6.0
11/07/23	0.00455	0.0408	<300	<6.0
11/13/23	<0.00177	0.0126	<300	<6.0
11/21/23	<0.00149	0.0232	<300	<6.0
11/30/23	0.00162	0.0190	<300	<6.0
12/06/23	<0.00161	0.0284	<300	<6.0
12/15/23	<0.00108	0.0192	<300	<6.0
12/19/23	<0.00238	0.0207	<300	<6.0
12/29/23	0.00143	0.0248	<300	<6.0

Table 5: 2023 Surface Water Results for Monticello Nuclear Generating Plant

Results and Detection Limits in pCi/L

Date Collected	Gross Alpha	Gross Beta	Tritium	Sr-89 ¹	Sr-90 ¹	K-40
01/09/23	<3.0	<4.0	<350	<2.0	<2.0	<40
02/08/23	<3.0	<4.0	<350	<2.0	<2.0	<40
03/08/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
03/15/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
03/21/23	<3.0	<4.0	<350	<2.0	<2.0	<40
03/28/23	<3.0	<4.0	<350	<2.0	<2.0	<40
04/04/23	<3.0	<4.0	NT ²	<2.0	<2.0	<40
04/04/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
04/11/23	<3.0	<4.0	NT ²	<2.0	<2.0	<40
04/11/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
04/19/23	<3.0	<4.0	NT ²	<2.0	<2.0	<40
04/19/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
04/24/23	<3.0	4.1	NT ²	<2.0	<2.0	<40
04/24/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
05/03/23	<3.0	<4.0	NT ²	<2.0	<2.0	<40
05/03/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
05/09/23	<3.0	<4.0	NT ²	<2.0	<2.0	<40
05/09/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
05/16/23	<3.0	<4.0	NT ²	<2.0	<2.0	<40

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Date Collected	Gross Alpha	Gross Beta	Tritium	Sr-89 ¹	Sr-90 ¹	K-40
05/16/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
05/23/23	<3.0	<4.0	NT ²	<2.0	<2.0	<40
05/23/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
05/30/23	<3.0	<4.0	NT ²	<2.0	<2.0	<40
05/30/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
06/05/23	<3.0	<4.0	NT ²	<2.0	<2.0	<40
06/05/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
06/14/23	<3.0	<4.0	NT ²	<2.0	<2.0	<40
06/14/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
06/20/23	<3.0	<4.0	NT ²	<2.0	<2.0	<40
06/20/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
06/27/23	<3.0	<4.0	NT ²	<2.0	<2.0	<40
06/27/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
07/12/23	<3.0	<4.0	<350	<2.0	<2.0	<40
07/14/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
07/17/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
07/19/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
07/20/23	<3.0	<4.0	<350	<2.0	<2.0	<40
07/24/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
07/26/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
07/31/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²

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Date Collected	Gross Alpha	Gross Beta	Tritium	Sr-89 ¹	Sr-90 ¹	K-40
08/02/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
08/07/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
08/09/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
08/14/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
08/16/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
08/21/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
09/05/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
10/04/23	<3.0	<4.0	<350	<2.0	<2.0	86.6
11/21/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²
12/12/23	NT ²	NT ²	<350	NT ²	NT ²	NT ²

¹Sr-89 and Sr-90 were below the required detection limit of 2 pCi/L (§ 141.25)

²NT-Not Tested

Table 6: 2023 Surface Water Results for Prairie Island Nuclear Generating Plant

Results and Detection Limits in pCi/L

Date Collected	Gross Alpha	Gross Beta	Tritium	Sr-89 ¹	Sr-90 ¹	K-40
01/09/23	<3.0	<4.0	<350	<2.0	<2.0	<40
04/04/23	<3.0	4.1	561	<2.0	<2.0	<40
07/20/23	<3.0	<4.0	<350	<2.0	<2.0	<40
10/04/23	<3.0	<4.0	<350	<2.0	<2.0	<40

¹Sr-89 and Sr-90 were below the required detection limit of 2 pCi/L (§ 141.25)

Table 7: 2023 Milk Analysis Results for Monticello Nuclear Generating Plant

Results and Detection Limits in pCi/L

Date Collected	Sr-89 ¹	Sr-90 ¹	K-40
01/09/23	<2.0	<2.0	1430
02/08/23	<2.0	<2.0	1500
03/08/23	<2.0	<2.0	1550
04/19/23	<2.0	<2.0	1390
05/03/23	<2.0	<2.0	1380
06/14/23	<2.0	<2.0	1310
07/20/23	<2.0	<2.0	1370
08/09/23	<2.0	<2.0	1400
09/20/23	<2.0	<2.0	1460
10/04/23	<2.0	<2.0	1390
11/14/23	<2.0	<2.0	1570
12/12/23	<2.0	<2.0	1400

¹Sr-89 and Sr-90 were below the required detection limit of 2 pCi/L (\$ 141.25)

Table 8: 2023 Milk Analysis Results for Prairie Island Nuclear Generating Plant

Results and Detection Limits in pCi/L

Date Collected	Sr-89 ¹	Sr-90 ¹	K-40
01/09/23	<2.0	<2.0	1420
02/08/23	<2.0	<2.0	1380

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Date Collected	Sr-89 ¹	Sr-90 ¹	K-40
03/08/23	<2.0	<2.0	1420
04/19/23	<2.0	<2.0	1600
05/03/23	<2.0	<2.0	1460
06/14/23	<2.0	<2.0	1440
07/20/23	<2.0	<2.0	1390
08/09/23	<2.0	<2.0	1380
09/05/23	<2.0	<2.0	1290
10/04/23	<2.0	<2.0	1440
11/14/23	<2.0	<2.0	1320
12/12/23	<2.0	<2.0	1420

¹Sr-89 and Sr-90 were below the required detection limit of 2 pCi/L (§ 141.25)

Table 9: 2023 OSLD Results for Monticello Nuclear Generating Plant

Results in mrem

Location	Number on Image 3	1st Qtr ¹	2nd Qtr	3rd Qtr	4th Qtr	Average
Control						
City Office	1	*	*	*	*	*
CR75 Acacia	2	*	*	*	*	*
CR75 NE of RR Track	3	*	*	*	*	*
XCEL Training Center	4	*	*	13	14	6.75
East Pole 410 (433)	5	*	Lost ²	*	*	*

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Location	Number on Image 3	1st Qtr ¹	2nd Qtr	3rd Qtr	4th Qtr	Average
North Pole 434 (485)	6	Lost ¹	*	*	*	*
Olson Farm	7	*	*	11	12	5.75
CR 50/CR11	8	*	*	14	*	*
CR 75 - Monticello	10	*	*	*	13	3.25
River Street	9	*	*	10	Lost ³	2.5

¹ 1stth quarter the OSLD badge on pole 485 was lost during a pole exchange by Xcel. Pole 485 is now 434.

² 2nd quarter the OSLD badge on pole 433 was lost during a pole exchange by Xcel. Pole 433 is now 410.

³4th quarter the OSLD badge located on River Street was missing.

Table 10: 2023 OSLD Results for Prairie Island Nuclear Generating Plant

Results in mrem

Location	Number on Image 4	1st Qtr ¹	2nd Qtr	3rd Qtr	4th Qtr	Average
Control						
Sturgeon Lake Rd	1	*	*	*	*	*
Lock & Dam 3	2	*	*	*	*	*
Suter Farm	3	*	16	*	*	4.00
ISFSI Wakonade	4	*	17	*	*	4.25
Tower	5	*	*	*	16	4.00
Gustafson Farm	6	*	*	*	*	*
Red Wing	7	*	*	*	*	*

2023 ENVIRONMENTAL MONITORING REPORT

Location	Number on Image 4	1st Qtr ¹	2nd Qtr	3rd Qtr	4th Qtr	Average
Training Center	8	*	*	*	*	*

*Dosimeter reading is a below minimum threshold in which an actual reading can be measured with statistical accuracy.

Table 11: 2023 Well Water Analysis Results - City of Welch

Results and Detection Limits in pCi/L

Date Collected	Gross Alpha	Gross Beta	Tritium	K-40
01/09/23	<3.0	<4.0	<350	<40
04/04/23	<3.0	<4.0	<350	<40
07/20/23	<3.0	<4.0	<350	<40
10/04/23	<3.0	<4.0	<350	<40

Table 12: 2023 Community Water Analysis Results - City of Welch

Results and Detection Limits in pCi/L

Date Collected	Gross Alpha	Gross Beta	Tritium	K-40
01/09/23	8.0	5.3	<350	<40
04/04/23	4.5	5.6	<350	<40
07/20/23	6.0	4.5	<350	<40
10/04/23	7.9	<4.0	<350	<40

Table 13: 2023 Precipitation Water Results for St. Paul

Results and Detection Limits in pCi/L

Date Collected	Gross Alpha	Gross Beta	Tritium	Sr-89 ¹	Sr-90 ¹	K-40
01/09/23	<3.0	<4.0	<350	<2.0	<2.0	<40.0
01/17/23	<3.0	5.7	<350	<2.0	<2.0	<40.0

2023 ENVIRONMENTAL MONITORING REPORT

Date Collected	Gross Alpha	Gross Beta	Tritium	Sr-89 ¹	Sr-90 ¹	K-40
02/16/23	<3.0	<4.0	<350	<2.0	<2.0	<40.0
02/28/23	<3.0	<4.0	<350	<2.0	<2.0	<40.0
03/15/23	<3.0	<4.0	<350	<2.0	<2.0	<40.0
03/16/23	<3.0	<4.0	<350	<2.0	<2.0	<40.0
04/04/23	<3.0	<4.0	<350	<2.0	<2.0	<40.0
04/18/23	<3.0	8.6	<350	<2.0	<2.0	<40.0
04/24/23	<3.0	4.1	<350	<2.0	<2.0	<40.0
05/09/23	<3.0	<4.0	<350	<2.0	<2.0	<40.0
05/16/23	<3.0	<4.0	<350	<2.0	<2.0	<40.0
06/27/23	<3.0	<4.0	<350	<2.0	<2.0	<40.0
07/31/23	<3.0	<4.0	<350	<2.0	<2.0	<40.0
08/14/23	<3.0	<4.0	<350	<2.0	<2.0	<40.0
09/27/23	<3.0	<4.0	<350	<2.0	<2.0	86.1
10/03/23	<3.0	<4.0	<350	<2.0	<2.0	<40.0
10/16/23	<3.0	<4.0	<350	<2.0	<2.0	<40.0
10/25/23	<3.0	5.7	<350	<2.0	<2.0	<40.0
12/29/23	<3.0	4.9	<350	<2.0	<2.0	58.5

¹Sr-89 and Sr-90 were below the required detection limit of 2 pCi/L (§ 141.25)