



State of Illinois
Illinois Emergency Management Agency

2018 Radiological Environmental Monitoring Report for Illinois Nuclear Power Stations



IEMA

(This Page Intentionally Left Blank)

Table of Contents

<u>Section Title</u>	<u>Page Number</u>
Executive Summary.....	4
Introduction.....	5
IEMA Radiological Environmental Monitoring Program.....	5
Sampling and Monitoring Activities	6
Water Sampling.....	6
Soil Sampling.....	7
Vegetation Sampling	7
Sediment Sampling.....	7
Fish Sampling.....	7
Air Sampling.....	7
Direct Radiation Monitoring	7
Gaseous Effluent Monitoring System	8
Gamma Detection Network.....	9
General Sampling and Monitoring Information	10
Laboratory Analysis.....	10
Tritium Analysis (Water).....	10
Total Strontium Analysis (Water).....	11
Gross Beta Analysis (Water)	11
Gamma Analysis (Water, Soil, Sediment, Vegetation, and Fish)	11
Gross Alpha/Beta Analysis (Air).....	11
Ambient Gamma Analysis	12
Limits of Detection	12
Background Reference Areas	12
Results at a Glance	12
Braidwood Nuclear Power Station	14
Bryon Nuclear Power Station.....	33
Clinton Nuclear Power Station.....	51
Dresden Nuclear Power Station.....	70
LaSalle Nuclear Power Station.....	88
Quad Cities Nuclear Power Station.....	105
Zion Nuclear Power Station	121
Background Sampling Locations	134
 Appendix A: Radionuclide Abbreviations in this Report.....	 146

Executive Summary

The Illinois Emergency Management Agency (IEMA) is mandated with protecting public health and safety and the environment from the potentially harmful effects of ionizing radiation. In support of that mission, IEMA conducts radiological environmental monitoring around Illinois' six operating nuclear power stations and the Zion Nuclear Power Station (NPS), which ceased operation in 1997 and is currently in the decommissioning process.

IEMA's radiological environmental monitoring program has three primary functions: 1) collection of diverse samples from carefully chosen locations on a routine basis, including simultaneous field surveillance; 2) analyzing samples for radionuclides; and 3) evaluation of test results on both an annual and historical basis.

Federal regulations establish standards for protection of the public against ionizing radiation from activities conducted under U.S. Nuclear Regulatory Commission (US NRC) licenses, such as operation of nuclear power stations. The U.S. Environmental Protection Agency (US EPA) and the Illinois Environmental Protection Agency (IEPA) set drinking water and Class I groundwater standards for several types of radioactive contaminants; the limit for tritium in both drinking water and Class I groundwater, 20,000 picocuries per liter, is used for comparison purposes within this report.

In 2018, 603 environmental samples were collected and analyzed for radioactivity. The samples collected by IEMA included water, sediment, soil, air, vegetation and fish. In addition, 1684 environmental dosimeters (Optically Stimulated Luminescence Dosimeters or OSLs) were strategically deployed around the nuclear power station sites to measure direct radiation. Environmental dosimetry results provide a baseline of ambient gamma radiation levels within a 10-mile radius of each nuclear power station and other background reference locations across the state.

In 2018, all test results for samples collected as part of IEMA's environmental monitoring program for nuclear power stations were below federal and state safety standards and guidelines.

In parallel with environmental monitoring, IEMA operates a state-of-the-art Remote Monitoring System (RMS) at all six operating nuclear power stations. This one-of-a-kind RMS consists of three separate subsystems: the Reactor Data Link (RDL), the Gaseous Effluent Monitoring System (GEMS) and Gamma Detection Network (GDN). The GEMS is used to measure and identify gaseous effluent radioactivity from each nuclear power station effluent stack, and the GDN is capable of measuring direct radiation in the surrounding environment. IEMA's radiological environmental monitoring program independently monitors the environs around each nuclear power station to ensure releases to the environment are not affecting public health and safety. Results from the GDN are provided in this report.

Introduction

With 11 operating reactors at six nuclear power stations, Illinois is home to more commercial nuclear power generation than any other state in the country. Although direct regulatory authority for the operation of U.S. nuclear power stations resides with the U.S. Nuclear Regulatory Commission (US NRC), the Illinois Emergency Management Agency (IEMA) is mandated with protecting public health and safety and the environment from the potentially harmful effects of ionizing radiation. In support of that mission, IEMA conducts radiological environmental monitoring in the environs of each operating nuclear power station. IEMA also maintains a radiological environmental monitoring program at Zion Nuclear Power Station, which ceased operation in 1998 and is currently undergoing decommissioning. Control “background” sample locations are chosen in areas where the samples are not influenced by plant operations. Background locations are collected and analyzed quarterly, and the results are compared to the sample results collected for each nuclear power station. Background environmental samples are taken at Sangchris Lake State Park near Kincaid, Illinois and air monitoring samples are collected in Springfield and Marion, Illinois. Background location information and sample results can be found on pages 135-146.

In addition to “traditional” radiological environmental monitoring, IEMA has a Remote Monitoring System (RMS) around each nuclear power station. IEMA’s RMS is an advanced, integrated computer-based system that continually monitors selected plant operational parameters at each facility and is capable of identifying and measuring the presence of radioactive materials in station effluents and direct radiation in the surrounding environment. This one-of-a-kind system consists of three separate subsystems: the Reactor Data Link (RDL), the Gaseous Effluent Monitoring System (GEMS) and the Gamma Detection Network (GDN).

IEMA has developed software that continually monitors and analyzes data collected through the RMS. Additionally, the software provides notification of unusual occurrences to on-call IEMA personnel.

This report details IEMA’s radiological environmental monitoring program, including data from the RMS, for the period January 2018 through December 2018 for the six operating nuclear power stations in Illinois and the one nuclear power station currently undergoing decommissioning.

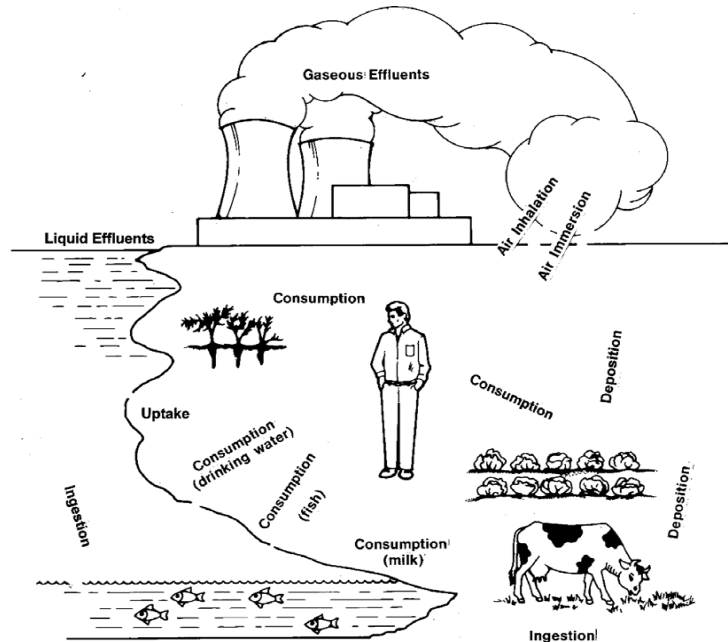
IEMA Radiological Environmental Monitoring Program

The IEMA Radiological Environmental Monitoring Program for Illinois Nuclear Power Stations is designed to evaluate the environs of all Illinois nuclear power stations by monitoring the movement, or lack of movement, of radionuclides, and subsequently determine any potential for public exposure. Critical pathways for potential radiation exposure to the public include direct radiation, airborne, waterborne, aquatic, and ingestion. Figure 1. depicts the different exposure pathways through which people may be exposed to radiation, or may ingest radioactive material. IEMA has strategically identified sampling locations that provide early indication of any potential public health and safety issues regarding Illinois nuclear power station operation. Data from the program is also used to establish a baseline data set that can be used to perform exposure assessments in the event of a significant release from a nuclear power station.

IEMA collects samples from designated sampling locations on a routine basis. These samples are then analyzed for the presence of radionuclides and the results are evaluated on both an annual and historical basis. Sample matrices monitored by IEMA include soil, vegetation and air, as well as

water, sediment, and fish from nearby waterways. Additionally, IEMA deploys an array of radiological environmental dosimeters around each nuclear power station to measure direct radiation from all sources. In 2018, 603 samples were collected and analyzed, and 1684 radiological environmental dosimeters were deployed. A description of IEMA Radiological Environmental Monitoring Program for Illinois Nuclear Power Station's sample collection and analysis follows. Maps containing sample collection and monitoring locations, as well as tables containing sample and monitoring results are included within the site specific information provided in this report.

Figure 1. Radiation Exposure Pathways to Humans



Sampling and Monitoring Activities

Water Sampling

Nuclear power stations require large volumes of water to operate, and sometimes discharge a portion of this water to rivers and lakes. This discharge is regulated by the US NRC and the Illinois Environmental Protection Agency (IEPA). Potentially impacted bodies of water include the Kankakee, Illinois, Rock and Mississippi rivers, Heideke and Clinton Lake. Samples are collected and analyzed from each these bodies of water on a quarterly basis.

Plant operations can also impact groundwater; therefore, IEMA collects samples from potentially impacted wells at or around nuclear power stations. Groundwater samples are also collected and analyzed quarterly.

Water samples are collected to assure that there are no adverse radiological impacts to local water supplies. The Public Water Supply (PWS) limits for radionuclides are based upon the U.S.

Environmental Protection Agency (USEPA) and Illinois Environmental Protection Agency's (IEPA) drinking water standards; IEMA's purpose for sampling private wells and public water supplies is solely to screen for the presence of radionuclides in drinking water.

Soil Sampling

Soil samples are collected during the second and third quarters of the year and analyzed for radionuclides that may have been released into the atmosphere and deposited on the ground downwind from the nuclear power station. Soil is sampled at a depth of six inches to monitor the migration of radionuclides away from the soil surface and at one inch to monitor for deposition of radionuclides on the soil surface.

Vegetation Sampling

Vegetation samples are collected during the second and third quarters of the year and analyzed for radionuclides that may have been released into the atmosphere and deposited on plant tissue or on the ground, and subsequently taken up by the plant via the root system.

Sediment Sampling

Sediment samples are collected during the second and third quarters of the year and analyzed for radionuclides that may have been released from a nuclear power station into a surrounding river or lake. Radionuclides released into surrounding rivers or lakes would be expected to accumulate in sediments downstream of a nuclear power station.

Fish Sampling

Fish are excellent bio-accumulators of radionuclides. Fish samples are collected from rivers and lakes near nuclear power station discharge points during the second and third quarter of the year. Edible portions of the fish are then harvested and submitted for analysis. Both "top-feeders" and "bottom feeders" are collected from each sampling location, and are analyzed separately.

Air Sampling

Due to decommissioning activities at the Zion Nuclear Power Station, which permanently ceased operation in February 1998, IEMA maintains a network of air monitoring stations around the Zion site. Air samples are collected continuously, with the air filters being changed and analyzed weekly.

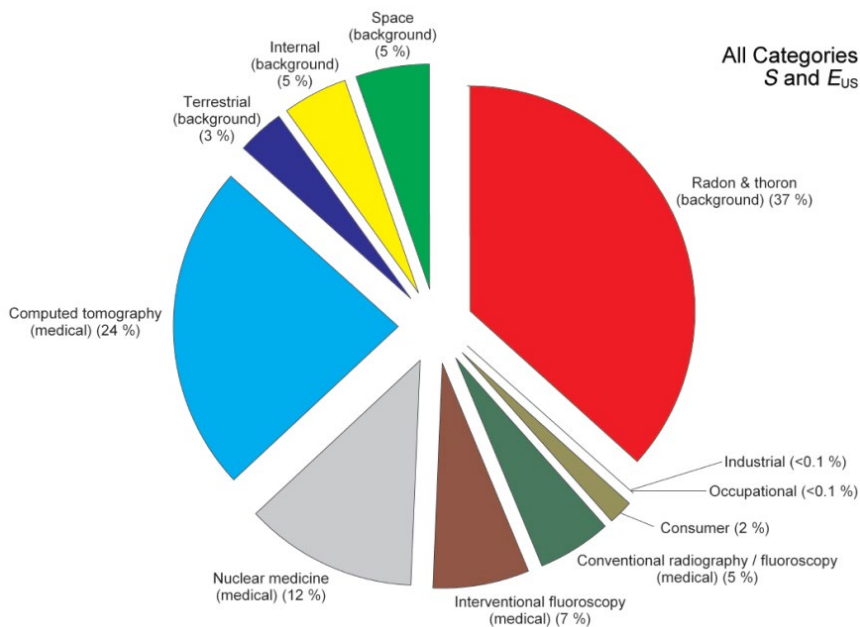
Direct Radiation Monitoring

IEMA maintains a network of 406 environmental dosimeters around the six operating nuclear power stations and the now defunct Zion Nuclear Power Station. Unlike the environmental samples described previously, dosimeters do not provide information about what radionuclides are found in the environment. Instead, the dosimeters are used to monitor for small changes in ambient background levels of gamma radiation around each nuclear power station during normal operations, as well as, to determine the extent and magnitude of radiation dose to the public following a significant release of radioactive materials into the environment or from exposure to large quantities of stored material on-site.

Dosimeters provide a direct measurement of the total dose produced by all sources of gamma radiation, including naturally occurring radionuclides and cosmic rays, integrated over time. The dosimeters are arrayed within a 10-mile radius of each plant and are exchanged and analyzed quarterly by IEMA.

In addition to the quarterly results, the approximate millirem per year an individual would receive at that location has been calculated. Those numbers can be compared to the average radiation exposure to an individual of 620 millirem per year from various sources (according to the 2009 National Council on Radiation Protection’s Report 160, Figure 2.). Approximately 8% (49.6 mR/year) of that exposure is from terrestrial and cosmic radiation (background radiation).

Figure 2. Sources of Radiation Exposure to Man

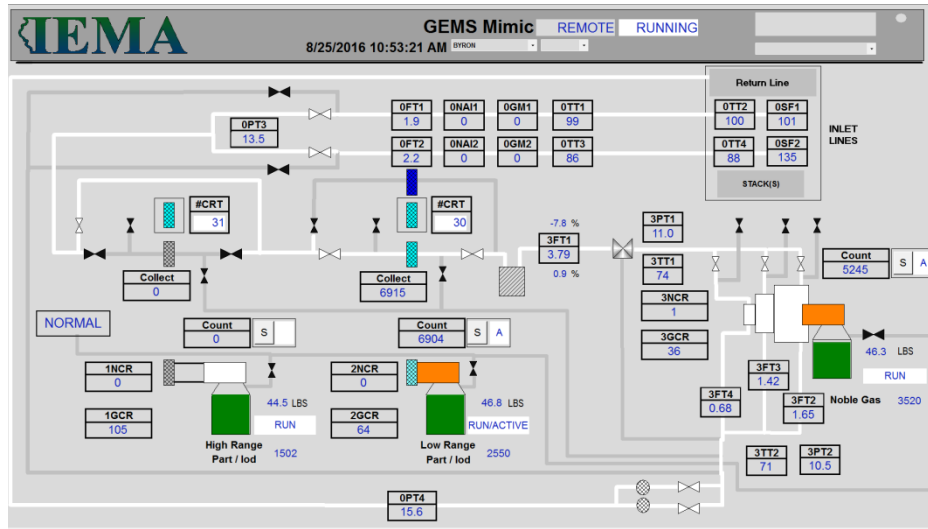


Reprinted with permission of the National Council on Radiation Protection and Measurements. (<http://NCRPpublications.org>)

Gaseous Effluent Monitoring System (GEMS)

IEMA continuously monitors gaseous effluents from all operating nuclear power stations with the GEMS. The GEMS provides automatic, online, continuous sampling of each nuclear power plant effluent stack. The GEMS is capable of measurement and identification of particulates, noble gases and iodines over a wide range of concentration, from background levels to releases under emergency conditions. The GEMS can be controlled remotely during nuclear power plant emergencies to provide flexibility in sampling (Figure 3).

Figure 3. Computer Display of GEMS Data



Gamma Detection Network (GDN)

In addition to placing dosimeters around the nuclear power stations, IEMA manages a GDN. The GDN consists of a network of detectors placed radially around each of the nuclear power station to detect gamma radiation levels in the environment. Each of the 16 detectors for each site is placed approximately two to five miles from the plant. This system is capable of detecting gamma radiation in the range of background levels up to 10 roentgens (R) per hour.

Figure 5 is an analytical display for the Clinton Nuclear Station with meteorological, GDN, and GEMS radiation information. During an incident at one of the plants, the information would be used by health physics experts in IEMA's Radiological Emergency Assessment Center to evaluate environmental impacts of a release.

Figure 5. Display of Gamma Detection Network around Clinton Nuclear Station

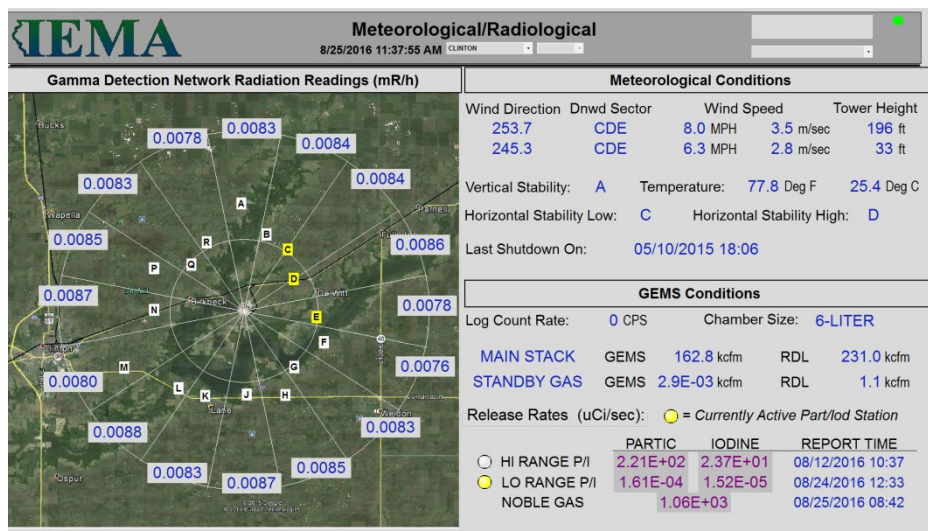


Figure 6. Typical IEMA GDN Field Installation



General Sampling and Monitoring Information

Every effort is made to collect all scheduled environmental samples; however, occasionally samples are unobtainable due to weather conditions, water levels, or obstructed access.

Laboratory Analysis

Soil, sediment, vegetation, water, and air samples were analyzed by the IEMA Radiochemistry Laboratory located in Springfield, IL. The laboratory participates in semi-annual proficiency testing programs through Environmental Resource Associates, an accredited proficiency testing provider, and the Department of Energy (DOE) Radiological and Environmental Science Laboratory's Mixed Analyte Performance Evaluation Program (MAPEP). OSLs are analyzed by IEMA staff using a Landauer - In Light System Auto Reader.

Tritium Analysis (Water)

Tritium is the primary radionuclide released in the effluent stream of nuclear power plants. Liquid effluents from the nuclear power stations are released in accordance with the plant's U.S. NRC operating license to waterways, as per the station's National Pollutant Discharge Elimination System permit, which is issued by the IEPA.

The US EPA drinking water standard (National Primary Drinking Water Regulations: Maximum Contaminant Levels and Maximum Residual Disinfectant Levels, 2000) and the IEPA groundwater standard (Groundwater Quality Standards for Class I: Potable Resource Groundwater, 2013) both

set the limit for tritium in groundwater at 20,000 pCi/L. Drinking Water Standards are regulated by the USEPA and IEPA, IEMA's purpose for sampling private wells and public water supplies is solely to screen for the presence of radionuclides in drinking water.

Tritium emits a low energy beta particle. This beta energy is too low to be detected by ordinary analytical methodologies for evaluating gross beta activity. Therefore, to measure the concentration of tritium, water samples are analyzed using liquid scintillation counting; a technique that is capable of measuring radioactive emissions at very low energies and very low concentrations.

Total Strontium Analysis (Water)

Strontium results are compared to historical data, data collected from the background reference location, and to the U.S. Environmental Protection Agency's (US EPA) drinking water standard (National Primary Drinking Water Regulations: Maximum Contaminant Levels and Maximum Residual Disinfectant Levels, 2000), as well as the Illinois Environmental Protection Agency's (IEPA) groundwater standard (Groundwater Quality Standards for Class I: Potable Resource Groundwater, 2013) which both set a limit for strontium-90 at 8 pCi/L.

Strontium is easily masked by other radionuclides, including those which are naturally occurring. Therefore, samples being analyzed for total strontium undergo preliminary chemical separation so that the strontium may be isolated for analysis. Samples analysis for total strontium is performed using a low-background gas proportional counter.

Gross Beta Analysis (Water)

Water samples are analyzed for radioactivity through gross beta analysis using a gas proportional counter. Since many radionuclides associated with nuclear power production emit beta particles, analysis of water samples for gross beta activity provides a good method of screening for the presence of radioactive materials.

Gamma Analysis (Water, Soil, Sediment, Vegetation, and Fish)

Water, soil, sediment, vegetation, and fish samples are analyzed to determine the concentration of individual radionuclides using a high-purity germanium detector in a process called gamma spectroscopy. Gamma spectroscopy results for all sample types are included within the Power Station specific information provided in this report.

Note- Historically, environmental soil and sediment samples contain Cs-137 concentrations ranging between 0.1 – 0.2 pCi/g as a result of atmospheric nuclear weapons testing.

Gross Alpha/ Gross Beta Analysis (Air)

Air particulate filters are analyzed for airborne radioactivity through gross alpha and beta analysis using a gas proportional counter. Since many radionuclides associated with nuclear power production emit either alpha or beta particles, analysis of air particulate samples for gross alpha/beta activity provides a good method of screening for the presence of radioactive materials.

Ambient Gamma Analysis

OSLs are analyzed by IEMA staff using a Landauer In Light System Auto Reader. Results are expressed as the average milliroentgen (mR) per quarter, and are also calculated to the approximate mR per year that would have been accrued by an individual at that location for an entire year.

Results for environmental dosimeters analyzed during 2018 are included in the site-specific sections of this report.

Limits of Detection

All analytical methods have limitations: amounts that are too small to be detected. The Minimum Detectable Concentration (MDC) is an “a priori” measure of that limitation – an estimate of the lower limit of detection. It is defined as the smallest quantity that an analytical method has 95% likelihood of detecting. For example, the MDC for IEMA’s method for tritium in water is 200 picocuries per liter (pCi/L). Given a sample with a tritium concentration of 200 pCi/L, our laboratory would detect that tritium approximately 95 times out of 100. Samples with less than 200 pCi/L could be detected, but with less certainty. Conversely, samples with more than 200 pCi/L would be more likely to be detected, approaching 100% as concentrations increase. Analytical methods are chosen, in part, on their MDC. As a general rule, methods are chosen such that their MDC is less than 10% of any applicable regulatory limit.

Background Reference Areas

For comparison, samples are collected and analyzed from background reference areas located in Springfield, Marion, and Kincaid, Illinois. Background location information and sample results can be found on pages 135-146.

Results at a Glance

Federal regulations establish standards for protection of the public against ionizing radiation resulting from activities conducted under U.S. NRC licenses, such as operation of nuclear power stations. The U.S. Environmental Protection Agency (US EPA) sets drinking water standards for several types of radioactive contaminants; the limit for tritium in drinking water is used for comparison purposes within this report.

Detectable levels of tritium were found in surface water samples taken near the Braidwood, Dresden, and LaSalle stations. The elevated levels found near all three stations can be attributed to the liquid effluent releases from the Braidwood station. Tritium is a normal part of the effluent stream of nuclear power stations and its presence in nearby surface waters supplies can be expected. The concentrations detected were well below the US EPA limit for tritium in drinking water.

Detectable levels of tritium were also found in ground water samples taken from a well located at the Braidwood station. In 2005, it was discovered that a leak in the line that transported effluents to the Kankakee River had allowed for the unpermitted release of effluents to groundwater. Subsequently, tritium was found in ground water and a pond outside the boundaries of the plant. As a result, IEMA continues to analyze split ground water samples collected by Exelon from two locations on site. Sample MW-4 is taken near the turbine building and sample DS-2 taken from F-ditch. Detectable

levels of tritium were consistently found in the groundwater split samples from location MW-4. The concentrations detected were well below the US EPA limit for tritium in drinking water. Cesium-137 in concentrations greater than the established MDC was seen near all nuclear power stations; however, the concentrations seen were consistent with soil concentrations historically found from atmospheric nuclear weapons testing. Additionally, a gamma spectroscopy result for a deposition soil sample collected on 07/17/2018 near the Zion station indicated the presence of Co-60 at a concentration above the established MDC. This slightly elevated concentration is likely due to the decommissioning activities taking place at the facility. All other gamma spectroscopy radionuclides of interest were below their established MDCs.

Gross Beta and total strontium concentrations above background levels were found at several water sampling locations. These slightly elevated levels of Gross Beta and total strontium can be attributed to the liquid effluent releases from the Nuclear Power Stations.

Ambient gamma results were consistent with historical and background levels for all Nuclear Power Stations.

In 2018, all test results for samples collected as part of IEMA's radiological environmental monitoring program for nuclear power stations were below federal and state safety standards and guidelines.

Braidwood Nuclear Power Station

The Braidwood Nuclear Power Station, consisting of two 3,587 Megawatt (MW) pressurized water reactors (PWR) is owned and operated by Exelon Corporation, and is located in Will County, Illinois. Unit 1 began operation on May 29, 1987 and Unit 2 on March 8, 1988. The site is located in northeastern Illinois, approximately 15 miles south-southwest of Joliet and 60 miles southwest of Chicago, near the Kankakee River.



Liquid effluents from the Braidwood Station are released in controlled batches to the Kankakee River in accordance to release limits governed by the station's license with the NRC and the plant's IEPA National Pollutant Discharge Elimination System permit. In 2018, there were 103 liquid effluent batch releases from the Braidwood station.

Surface water samples taken during this reporting period, from the Kankakee River at the Des Plaines Conservation Area and Wilmington Island Park, were found to contain detectable levels of tritium due to liquid effluent releases from Braidwood Station.

In 2005, it was discovered that a leak in the line that transported effluents to the Kankakee River had allowed for the unpermitted release of effluents to groundwater. Subsequently, tritium was found in ground water and a pond outside the boundaries of the plant. As a result, IEMA continues to analyze split water samples collected by Exelon from two locations on site. One sample is collected from a ground water well (MW-4) located near the turbine building and the other is a surface water sample collected from F-ditch (DS-2). Detectable levels of tritium were consistently found in the groundwater split samples from location MW-4.

All tritium levels detected were below the 20,000 pCi/L drinking water limit set by the USEPA and IEPA.

Maps of the monitoring and sampling locations for the Braidwood NPS provided in this section (Figures 7-9) provide an overview of all sampling and monitoring locations in the vicinity of the Braidwood NPS (yellow star in the center). The second yellow star near the top of Figure 9 represents the Dresden Nuclear Power Station.

Braidwood Sampling and Monitoring Results

Water Sampling Results

Detectable levels of tritium were found in surface water samples taken near the Braidwood and Dresden stations. The elevated levels are attributable to the liquid effluent releases from the Braidwood station. Detectable levels of tritium were also found in ground water samples collected from a well at the Braidwood station. Elevated levels of tritium are known to exist in this well, and are due to the 2005 groundwater tritium leak. All tritium levels were well below the Drinking Water Standards established by the USEPA and IEPA.

Results from total strontium analysis indicated that the established MDC was met at some sampling locations and can be attributed to the liquid effluent releases from the Braidwood station. Although occasionally above the established MDC, all sample results for total strontium remained below the established US EPA and IEPA standards.

Results from Gross Beta analysis indicated that the established MDC was met at some sampling locations and can be attributed to the liquid effluent releases from the Braidwood station.

Gamma spectroscopy results for water samples indicated no concentrations above the established MDCs.

Soil Sampling Results

Gamma spectroscopy results for soil samples indicated no concentrations of reactor-produced radionuclides above background. Cesium-137 in concentrations greater than the established MDC was seen, but was consistent with soil concentrations historically found from atmospheric nuclear weapons testing.

Sediment Sampling Results

Gamma spectroscopy results for sediment samples indicated no concentrations above the established MDC.

Vegetation Sampling Results

Gamma spectroscopy results for vegetation samples indicated no concentrations above the established MDC.

Fish Sampling Results

Gamma spectroscopy results for fish samples indicated no concentrations above the established MDC.

Direct Radiation Monitoring Results

The ambient gamma monitoring results were consistent with results found at the background monitoring locations at Sangchris Lake State Park near Kincaid, IL.

Braidwood Maps of Monitoring and Sampling Locations

Figure 7. OSL and GDN Monitoring Locations- Braidwood

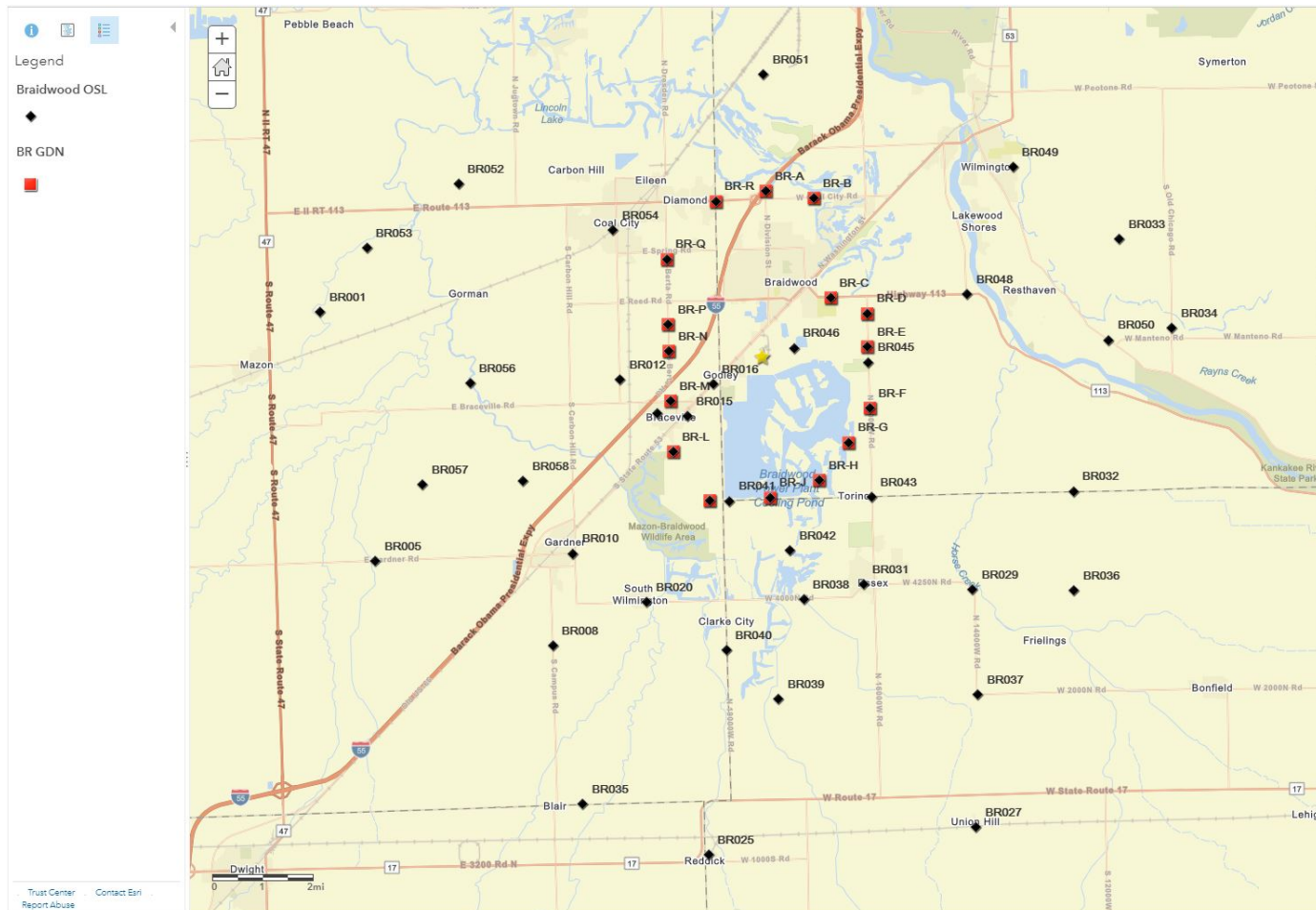


Figure 8. OSL and GDN Monitoring Locations- Braidwood (continued)

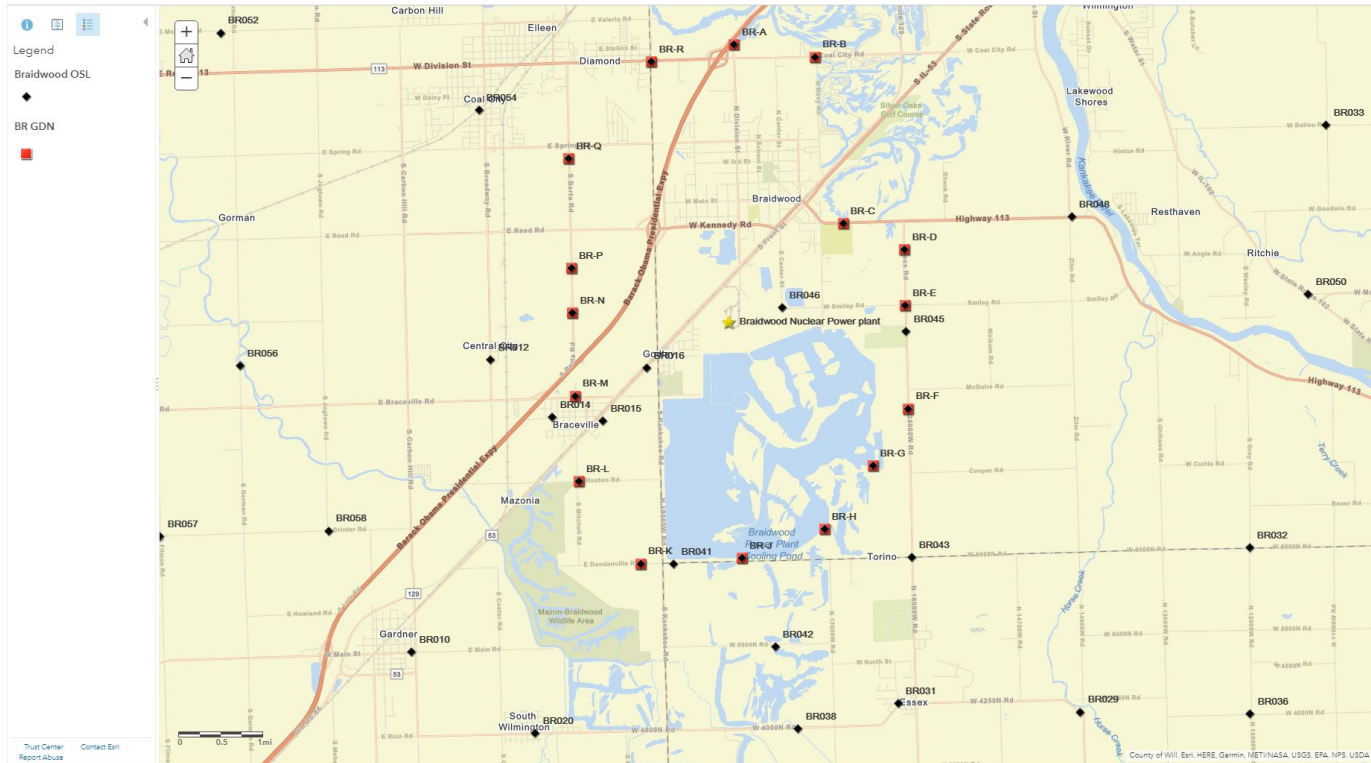
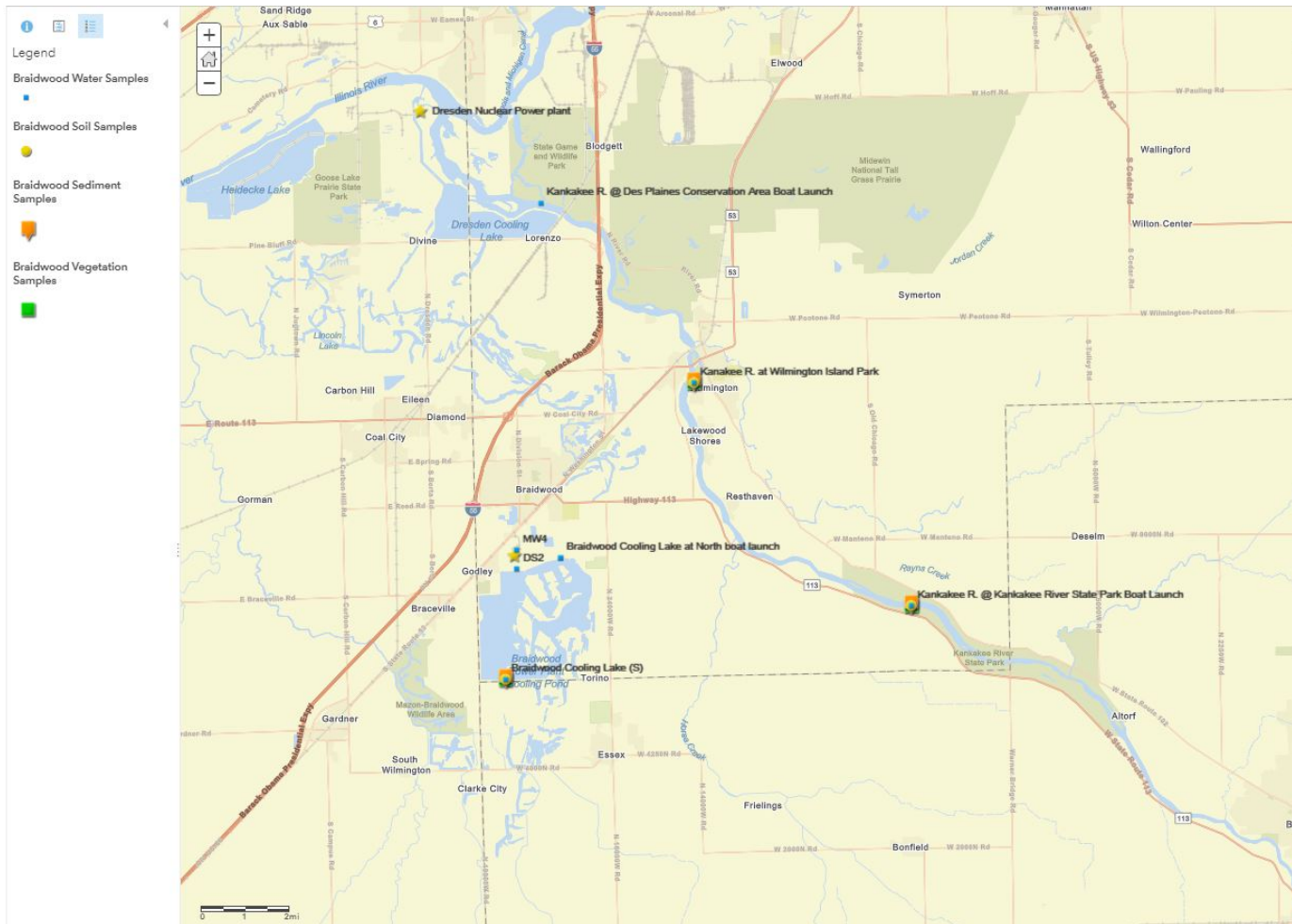


Figure 9. Environmental Sampling Locations – Braidwood

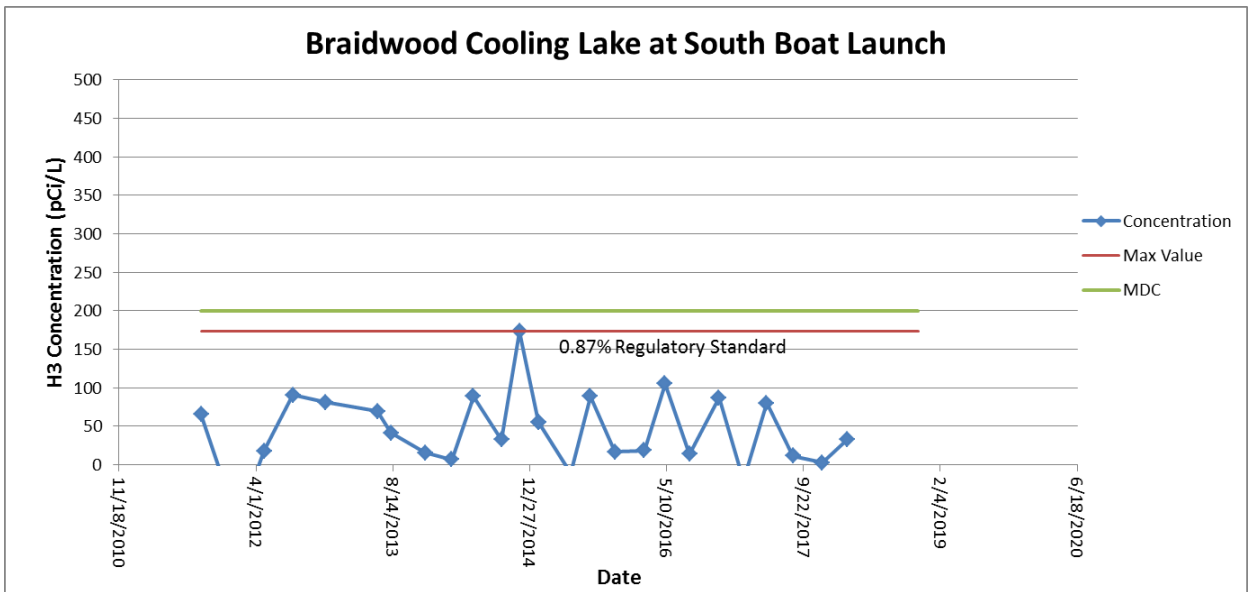
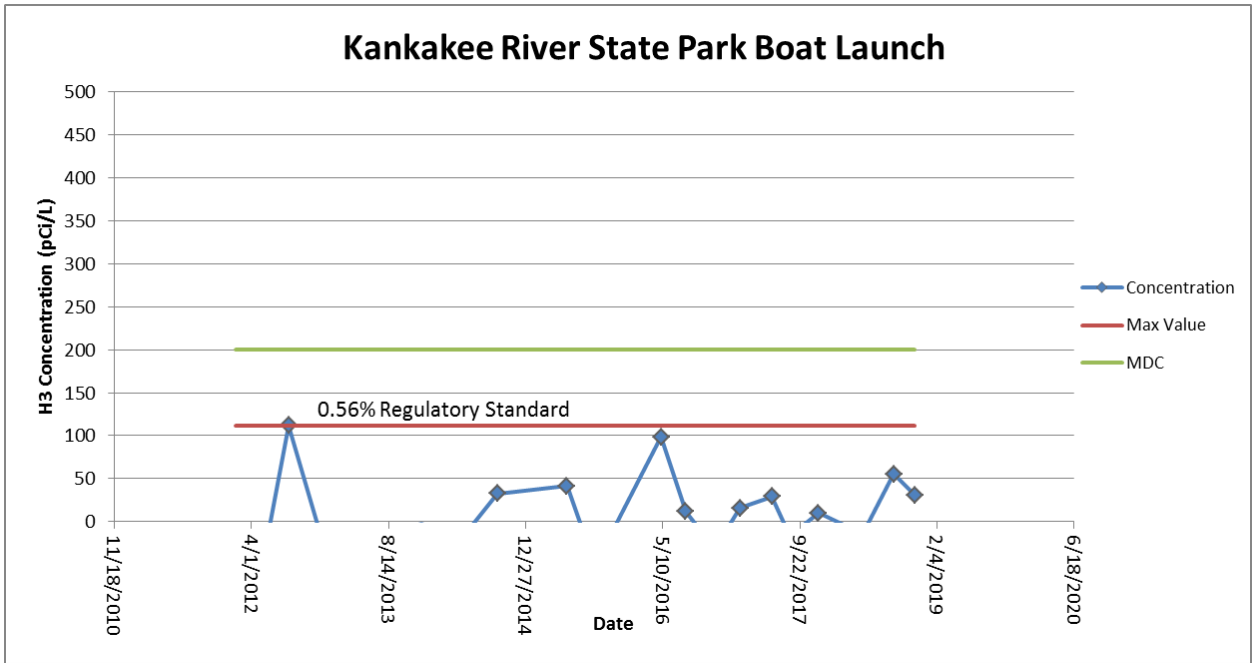


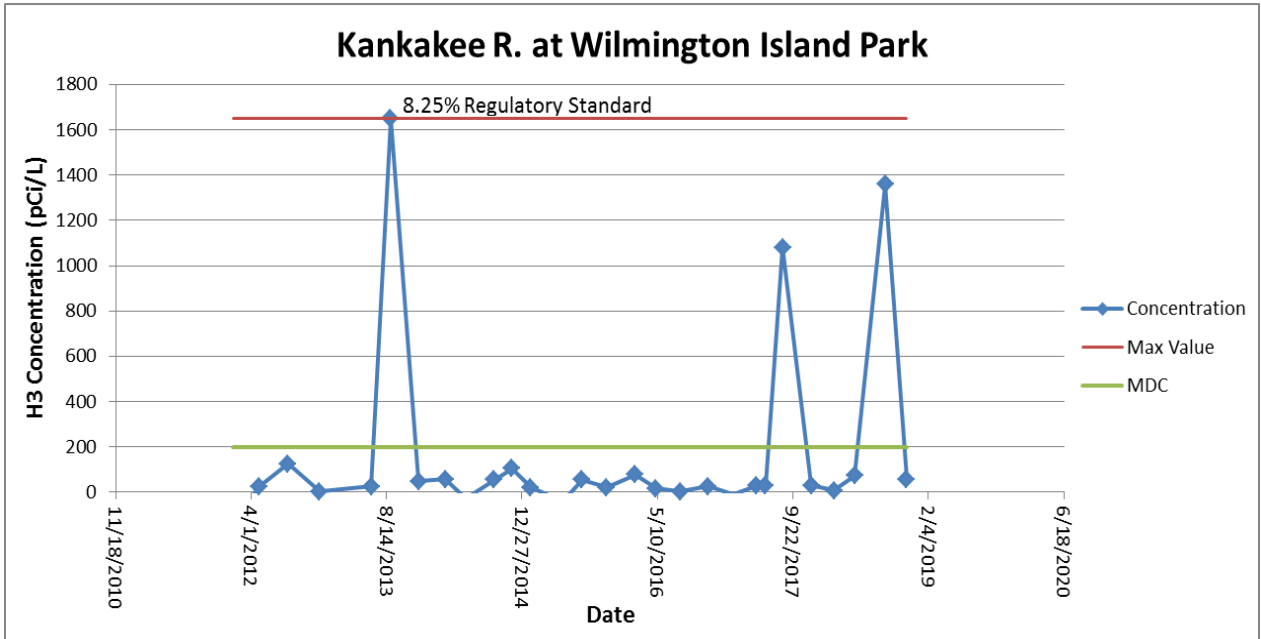
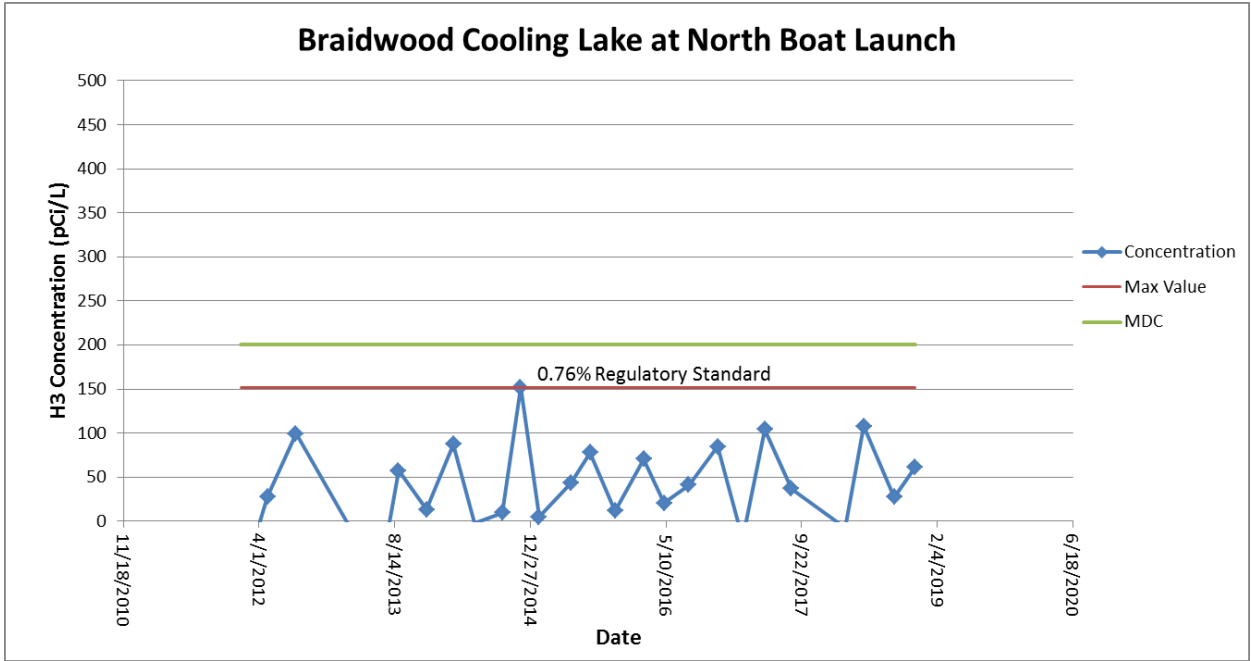
Braidwood Sample Result Tables and Graphs

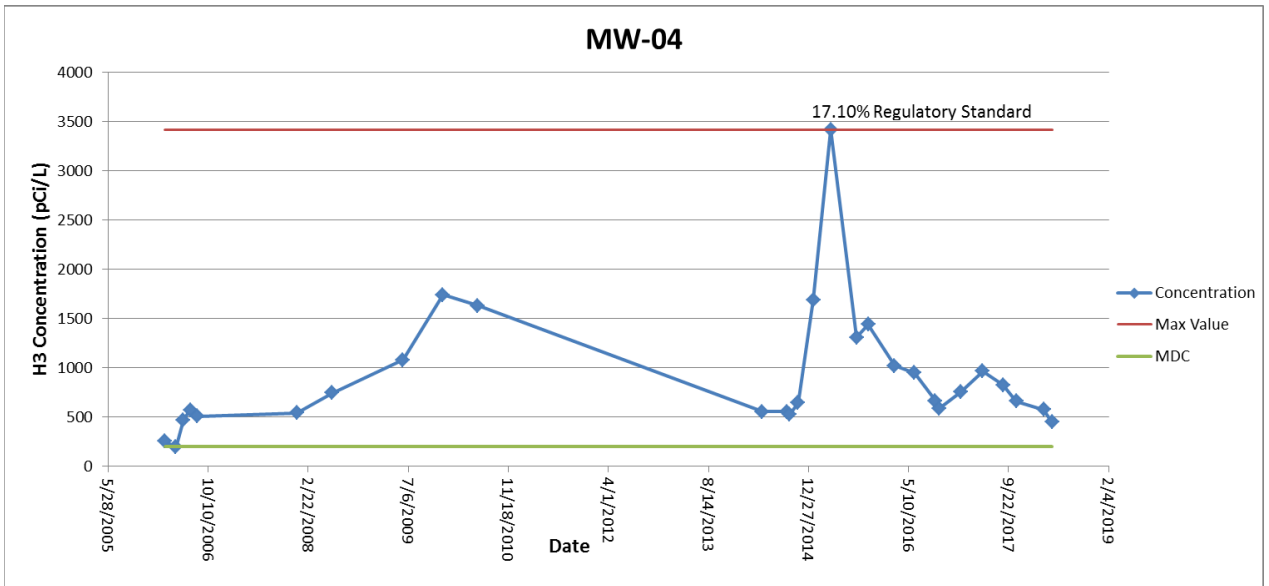
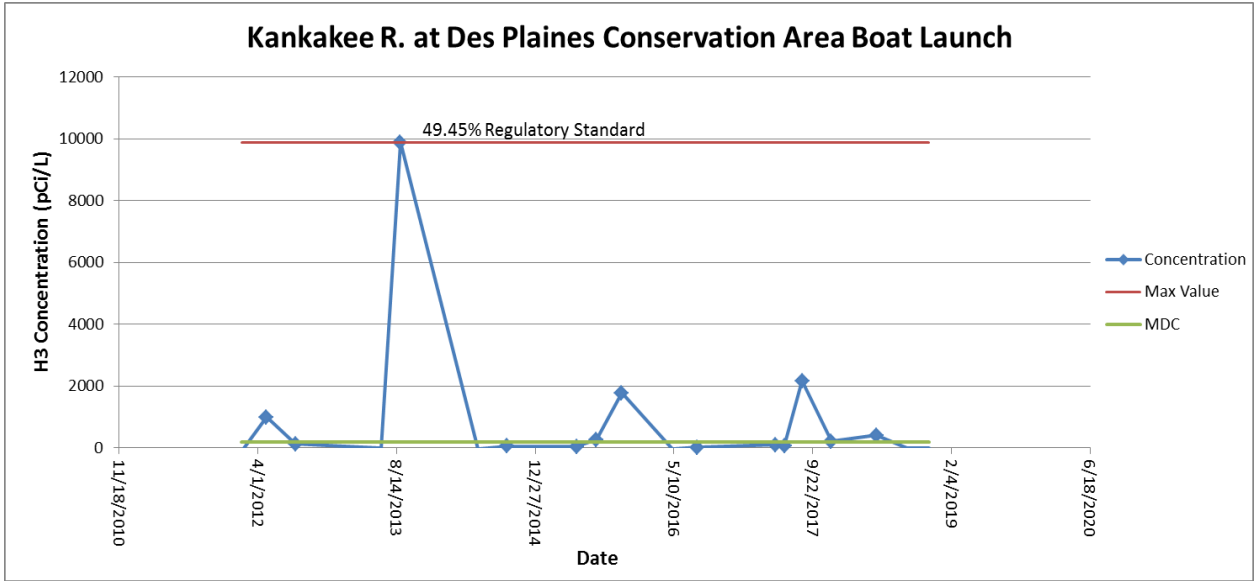
Tritium (H-3) in Water Results - Braidwood Results are in picocuries per liter (pCi/L)

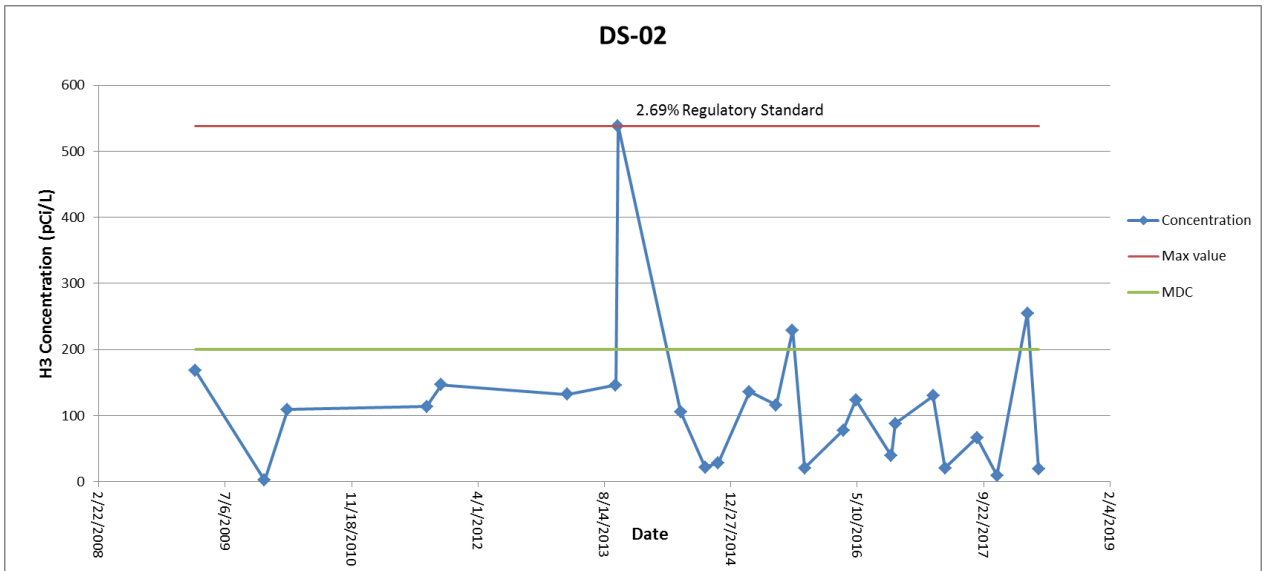
Location Date	H-3	
	Result	MDC
DS-2		
3/14/2018	255	181
4/27/2018	<MDC	181
8/21/2018	<MDC	181
10/12/2018	<MDC	181
MW-4		
3/16/2018	576	181
4/27/2018	446	181
9/19/2018	840	181
10/6/2018	647	181
Braidwood Cooling Lake (N)		
2/28/2018	<MDC	181
5/9/2018	<MDC	181
8/30/2018	<MDC	181
11/15/2018	<MDC	181
Braidwood Cooling Lake (S)		
2/28/2018	<MDC	181
5/9/2018	<MDC	181
8/30/2018	<MDC	181
11/15/2018	<MDC	181
Kankakee R. at Des Plaines Conservation Area Boat Launch		
5/9/2018	406	181
8/30/2018	<MDC	181
11/15/2018	<MDC	181
Kankakee R. at Kankakee R. State Park Boat Launch		
5/9/2018	<MDC	181
8/30/2018	<MDC	181
11/15/2018	<MDC	181
Kankakee R. at Wilmington Island Park		
2/21/2018	<MDC	181
5/9/2018	<MDC	181
8/30/2018	1360	181
11/15/2018	<MDC	181

Trending Graphs for Tritium (H-3) in Water - Braidwood
 (Max value compared to IEPA and USEPA regulatory standard of 20,000 pCi/L)









Total Strontium Results in Water - Braidwood
Results are in picocuries per liter (pCi/L)

Location Date	Strontium	
	Result	MDC
Braidwood Cooling Lake (S)		
5/9/2018	0.6	0.5
Kankakee R. at Des Plaines Conservation Area Boat Launch		
5/9/2018	<MDC	0.5
Kankakee R. at Wilmington Island Park		
5/9/2018	<MDC	0.5

Results for Gross Beta Screening of Water - Braidwood Area
Results are in picocuries per liter (pCi/L)

Location Date	Beta	
	Result	MDC
Braidwood Cooling Lake (N)		
2/28/2018	4.9	3.9
5/9/2018	5.3	3.9
8/30/2018	4.8	3.9
11/15/2018	5.2	3.9
Braidwood Cooling Lake (S)		
2/28/2018	5.1	3.9
5/9/2018	6.7	3.9
8/30/2018	5.6	3.9
11/15/2018	6.3	3.9
Kankakee R. at Des Plaines Conservation Area Boat Launch		
5/9/2018	3.9	3.9
8/30/2018	<MDC	3.9
11/15/2018	4.8	3.9
Kankakee R. at Kankakee R. State Park Boat Launch		
5/9/2018	<MDC	3.9
8/30/2018	<MDC	3.9
11/15/2018	<MDC	3.9
Kankakee R. at Wilmington Island Park		
2/21/2018	<MDC	3.9
5/9/2018	4.3	3.9
8/30/2018	4.3	3.9
11/15/2018	<MDC	3.9

Gamma Spectroscopy Results for Other Radionuclides in Water - Braidwood
Results are in picocuries per liter (pCi/L)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95	
Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC
Braidwood Cooling Lake (N)																								
2/28/2018	<MDC	23.1	<MDC	350	<MDC	3.7	<MDC	4.1	<MDC	3.9	<MDC	3.8	<MDC	7.6	<MDC	8.5	<MDC	3.7	<MDC	4.1	<MDC	7.9	<MDC	6.5
5/9/2018	<MDC	23.1	<MDC	350	<MDC	3.7	<MDC	4.1	<MDC	3.9	<MDC	3.8	<MDC	7.6	<MDC	8.5	<MDC	3.7	<MDC	4.1	<MDC	7.9	<MDC	6.5
8/30/2018	<MDC	23.1	<MDC	350	<MDC	3.7	<MDC	4.1	<MDC	3.9	<MDC	3.8	<MDC	7.6	<MDC	8.5	<MDC	3.7	<MDC	4.1	<MDC	7.9	<MDC	6.5
11/15/2018	<MDC	23.1	<MDC	350	<MDC	3.7	<MDC	4.1	<MDC	3.9	<MDC	3.8	<MDC	7.6	<MDC	8.5	<MDC	3.7	<MDC	4.1	<MDC	7.9	<MDC	6.5
Braidwood Cooling Lake (S)																								
2/28/2018	<MDC	23.1	<MDC	350	<MDC	3.7	<MDC	4.1	<MDC	3.9	<MDC	3.8	<MDC	7.6	<MDC	8.5	<MDC	3.7	<MDC	4.1	<MDC	7.9	<MDC	6.5
5/9/2018	<MDC	23.1	<MDC	350	<MDC	3.7	<MDC	4.1	<MDC	3.9	<MDC	3.8	<MDC	7.6	<MDC	8.5	<MDC	3.7	<MDC	4.1	<MDC	7.9	<MDC	6.5
8/30/2018	<MDC	23.1	<MDC	350	<MDC	3.7	<MDC	4.1	<MDC	3.9	<MDC	3.8	<MDC	7.6	<MDC	8.5	<MDC	3.7	<MDC	4.1	<MDC	7.9	<MDC	6.5
11/15/2018	<MDC	23.1	<MDC	350	<MDC	3.7	<MDC	4.1	<MDC	3.9	<MDC	3.8	<MDC	7.6	<MDC	8.5	<MDC	3.7	<MDC	4.1	<MDC	7.9	<MDC	6.5
Kankakee R. at Des Plaines Conservation Area Boat Launch																								
5/9/2018	<MDC	23.1	<MDC	350	<MDC	3.7	<MDC	4.1	<MDC	3.9	<MDC	3.8	<MDC	7.6	<MDC	8.5	<MDC	3.7	<MDC	4.1	<MDC	7.9	<MDC	6.5
8/30/2018	<MDC	23.1	<MDC	350	<MDC	3.7	<MDC	4.1	<MDC	3.9	<MDC	3.8	<MDC	7.6	<MDC	8.5	<MDC	3.7	<MDC	4.1	<MDC	7.9	<MDC	6.5
11/15/2018	<MDC	23.1	<MDC	350	<MDC	3.7	<MDC	4.1	<MDC	3.9	<MDC	3.8	<MDC	7.6	<MDC	8.5	<MDC	3.7	<MDC	4.1	<MDC	7.9	<MDC	6.5
Kankakee R. at Kankakee R. State Park Boat Launch																								
5/9/2018	<MDC	23.1	<MDC	350	<MDC	3.7	<MDC	4.1	<MDC	3.9	<MDC	3.8	<MDC	7.6	<MDC	8.5	<MDC	3.7	<MDC	4.1	<MDC	7.9	<MDC	6.5
8/30/2018	<MDC	23.1	<MDC	350	<MDC	3.7	<MDC	4.1	<MDC	3.9	<MDC	3.8	<MDC	7.6	<MDC	8.5	<MDC	3.7	<MDC	4.1	<MDC	7.9	<MDC	6.5
11/15/2018	<MDC	23.1	<MDC	350	<MDC	3.7	<MDC	4.1	<MDC	3.9	<MDC	3.8	<MDC	7.6	<MDC	8.5	<MDC	3.7	<MDC	4.1	<MDC	7.9	<MDC	6.5
Kankakee R. at Wilmington Island Park																								
2/21/2018	<MDC	23.1	<MDC	350	<MDC	3.7	<MDC	4.1	<MDC	3.9	<MDC	3.8	<MDC	7.6	<MDC	8.5	<MDC	3.7	<MDC	4.1	<MDC	7.9	<MDC	6.5
5/9/2018	<MDC	23.1	<MDC	350	<MDC	3.7	<MDC	4.1	<MDC	3.9	<MDC	3.8	<MDC	7.6	<MDC	8.5	<MDC	3.7	<MDC	4.1	<MDC	7.9	<MDC	6.5
8/30/2018	<MDC	23.1	<MDC	350	<MDC	3.7	<MDC	4.1	<MDC	3.9	<MDC	3.8	<MDC	7.6	<MDC	8.5	<MDC	3.7	<MDC	4.1	<MDC	7.9	<MDC	6.5
11/15/2018	<MDC	23.1	<MDC	350	<MDC	3.7	<MDC	4.1	<MDC	3.9	<MDC	3.8	<MDC	7.6	<MDC	8.5	<MDC	3.7	<MDC	4.1	<MDC	7.9	<MDC	6.5

Gamma Spectroscopy Results for Radionuclides in Soil (Migration) - Braidwood
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95	
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result
Braidwood Cooling Lake (S)																						
5/9/2018	<MDC	1.16	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	<MDC	0.03	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.08	<MDC	0.10
8/30/2018	<MDC	1.16	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	<MDC	0.03	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.08	<MDC	0.10
Kankakee R. at Kankakee R. State Park Boat Launch																						
5/9/2018	<MDC	1.16	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.05	0.03	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.08	<MDC	0.10
8/30/2018	<MDC	1.16	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.05	0.03	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.08	<MDC	0.10
Kankakee R. at Wilmington Island Park																						
5/9/2018	<MDC	1.16	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	<MDC	0.03	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.08	<MDC	0.10
8/30/2018	<MDC	1.16	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.12	0.03	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.08	<MDC	0.10

Gamma Spectroscopy Results for Radionuclides in Soil (Deposition) - Braidwood
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95	
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result
Braidwood Cooling Lake (S)																						
5/9/2018	<MDC	1.16	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	<MDC	0.03	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.08	<MDC	0.10
8/30/2018	<MDC	1.16	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	<MDC	0.03	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.08	<MDC	0.10
Kankakee R. at Kankakee R. State Park Boat Launch																						
5/9/2018	<MDC	1.16	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.05	0.03	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.08	<MDC	0.10
8/30/2018	<MDC	1.16	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.04	0.03	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.08	<MDC	0.10
Kankakee R. at Wilmington Island Park																						
5/9/2018	<MDC	1.16	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.04	0.03	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.08	<MDC	0.10
8/30/2018	<MDC	1.16	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.11	0.03	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.08	<MDC	0.10

Gamma Spectroscopy Results for Radionuclides in Sediment- Braidwood
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95	
Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC
Braidwood Cooling Lake (N)																						
5/9/2018	<MDC	5.6	<MDC	0.9	<MDC	0.2	<MDC	0.2	<MDC	0.1	<MDC	0.2	<MDC	0.5	<MDC	0.2	<MDC	0.4	<MDC	0.3	<MDC	0.6
8/30/2018	<MDC	5.6	<MDC	0.9	<MDC	0.2	<MDC	0.2	<MDC	0.1	<MDC	0.2	<MDC	0.5	<MDC	0.2	<MDC	0.4	<MDC	0.3	<MDC	0.6
Kankakee R. at Kankakee R. State Park Boat Launch																						
5/9/2018	<MDC	5.6	<MDC	0.9	<MDC	0.2	<MDC	0.2	<MDC	0.1	<MDC	0.2	<MDC	0.5	<MDC	0.2	<MDC	0.4	<MDC	0.3	<MDC	0.6
8/30/2018	<MDC	5.6	<MDC	0.9	<MDC	0.2	<MDC	0.2	<MDC	0.1	<MDC	0.2	<MDC	0.5	<MDC	0.2	<MDC	0.4	<MDC	0.3	<MDC	0.6
Kankakee R. at Wilmington Island Park																						
5/9/2018	<MDC	5.6	<MDC	0.9	<MDC	0.2	<MDC	0.2	<MDC	0.1	<MDC	0.2	<MDC	0.5	<MDC	0.2	<MDC	0.4	<MDC	0.3	<MDC	0.6
8/30/2018	<MDC	5.6	<MDC	0.9	<MDC	0.2	<MDC	0.2	<MDC	0.1	<MDC	0.2	<MDC	0.5	<MDC	0.2	<MDC	0.4	<MDC	0.3	<MDC	0.6

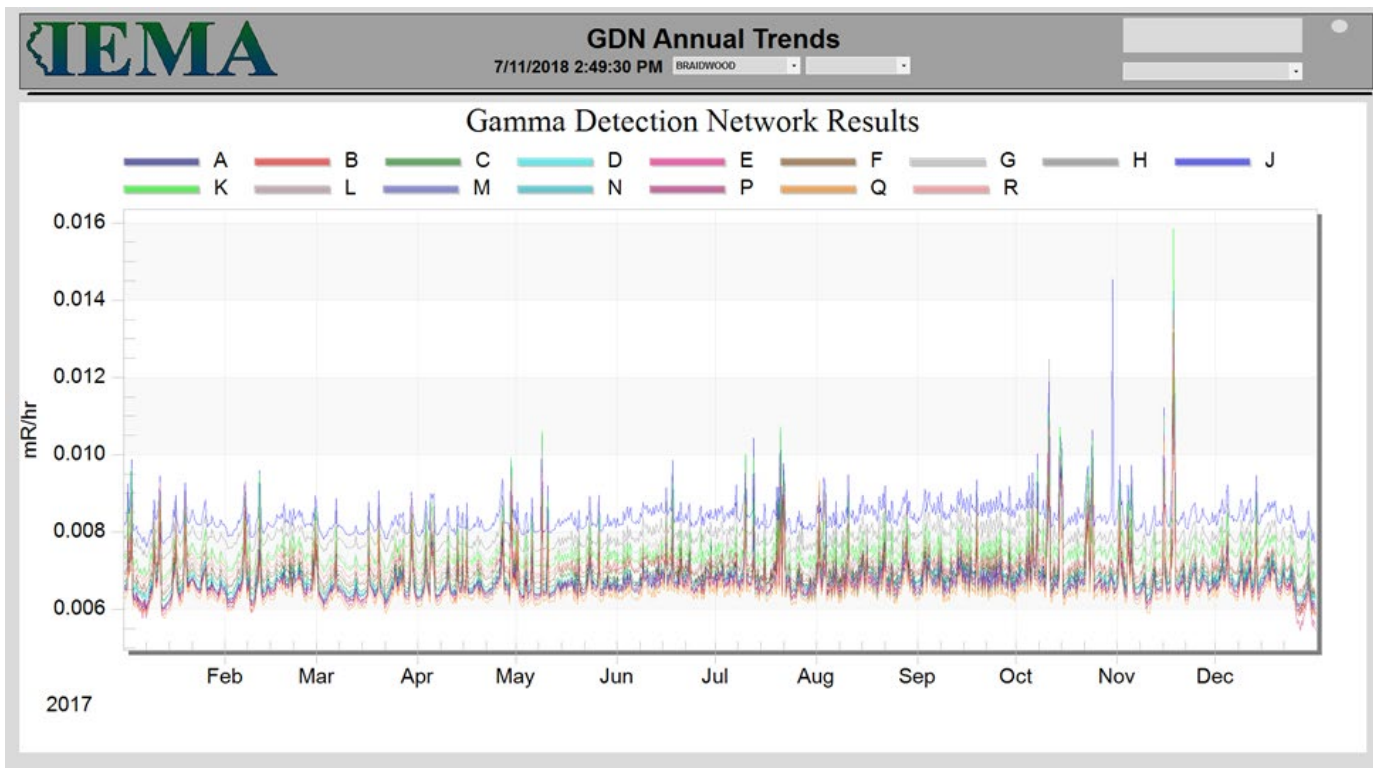
Gamma Spectroscopy Results for Radionuclides in Vegetation - Braidwood
Results are in picocuries per gram (pCi/kg)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95	
Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC
Braidwood Cooling Lake (S)																								
5/9/2018	<MDC	3.7	<MDC	5.2	<MDC	0.2	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.5	<MDC	3.5	<MDC	0.1	<MDC	0.3	<MDC	0.3	<MDC	0.3
8/30/2018	<MDC	3.7	<MDC	5.2	<MDC	0.2	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.5	<MDC	3.5	<MDC	0.1	<MDC	0.3	<MDC	0.3	<MDC	0.3
Kankakee R. at Kankakee R. State Park Boat Launch																								
5/9/2018	<MDC	3.7	<MDC	5.2	<MDC	0.2	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.5	<MDC	3.5	<MDC	0.1	<MDC	0.3	<MDC	0.3	<MDC	0.3
8/30/2018	<MDC	3.7	<MDC	5.2	<MDC	0.2	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.5	<MDC	3.5	<MDC	0.1	<MDC	0.3	<MDC	0.3	<MDC	0.3
Kankakee R. at Wilmington Island Park																								
5/9/2018	<MDC	3.7	<MDC	5.2	<MDC	0.2	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.5	<MDC	3.5	<MDC	0.1	<MDC	0.3	<MDC	0.3	<MDC	0.3
8/30/2018	<MDC	3.7	<MDC	5.2	<MDC	0.2	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.5	<MDC	3.5	<MDC	0.1	<MDC	0.3	<MDC	0.3	<MDC	0.3

Gamma Spectroscopy Results for Radionuclides in Fish - Braidwood
Results are in picocuries per gram (pCi/kg)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95	
Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC
Kanakee River Bottom Feeders																								
8/1/2018	<MDC	1750	<MDC	2600	<MDC	55	<MDC	41	<MDC	41	<MDC	41	<MDC	124	<MDC	2640	<MDC	41	<MDC	92	<MDC	92	<MDC	105
Kanakee River Top Feeders																								
8/1/2018	<MDC	1750	<MDC	2600	<MDC	55	<MDC	41	<MDC	41	<MDC	41	<MDC	124	<MDC	2640	<MDC	41	<MDC	92	<MDC	92	<MDC	105

Braidwood Gamma Detection Network Results- Braidwood
Results are in milliroentgen per hour (mR/hr)



Summary of Ambient Gamma Results - Braidwood

Location	Quarter 1 mR/quarter	Quarter 2 mR/quarter	Quarter 3 mR/quarter	Quarter 4 mR/quarter	Annual Exposure mR/year
BR001	9.9	12.6	10.7	11.6	44.7
BR005	8.7	9.9	9.8	8.9	37.3
BR008	9.9	9.9	10.1	11.4	41.2
BR010	7.5	6.8	8.5	8.6	31.3
BR012	4.7	5.4	6.5	5.5	22.1
BR014	5.6	5.7	6.8	6.0	24.1
BR015	3.0	3.8	5.4	5.3	17.5
BR016	4.7	4.7	6.2	6.3	21.9
BR020	5.4	5.4	5.9	6.7	23.4
BR025	7.3	8.9	9.4	7.8	33.5
BR027	5.3	7.6	5.7	7.6	26.1
BR029	5.8	5.7	7.1	6.7	25.4
BR031	5.3	5.7	6.2	5.3	22.4
BR032	3.7	5.7	6.0	4.8	20.3
BR033	5.7	5.9	7.3	7.5	26.4
BR034	9.5	9.1	9.0	9.6	37.2
BR035	8.8	8.8	10.2	10.8	38.5
BR036	4.7	5.2	5.6		20.6
BR037	6.5	6.6	7.9	6.6	27.6
BR038	7.1	7.5	6.2	6.1	26.9
BR039	7.0	10.7	7.9	9.0	34.7
BR040	9.7	9.9	11.5	8.9	40.1
BR041	5.2	5.7	7.6	5.7	24.3
BR042	6.9	9.0	8.7	7.3	31.9
BR043	5.3	5.0	6.3	5.7	22.4
BR046	3.8325	7.02625	6.0225	4.28875	21.17

Summary of Ambient Gamma Results - Braidwood (continued)

Location	Quarter 1 mR/quarter	Quarter 2 mR/quarter	Quarter 3 mR/quarter	Quarter 4 mR/quarter	Annual Exposure mR/year
BR048	4.6	4.4	5.6	5.8	20.3
BR049	5.0	5.9	5.7	6.2	22.8
BR050	9.7	7.4	8.3	5.8	31.2
BR051	3.4	5.5	4.9	5.3	19.1
BR052	5.2	7.1	6.6		25.2
BR053	8.9	8.5	8.9	8.3	34.5
BR054	5.7	5.2	6.7	4.5	22.0
BR056	6.6	6.1	7.8	6.7	27.2
BR057	8.8	9.3	10.1	8.9	37.0
BR058	8.8	8.8	9.6	8.0	35.1
BR-RSA	4.7	5.2	6.0	4.8	20.7
BR-RSB	4.5	6.8	6.1	5.1	22.4
BR-RSC	4.7	5.5	6.9	5.6	22.7
BR-RSD	5.3	6.8	6.4	5.7	24.2
BR-RSE	5.1	5.8	5.7	6.3	22.9
BR-RSF	3.3	6.8	5.4	4.9	20.3
BR-RSG	4.5	8.3	7.8	5.9	26.6
BR-RSH	6.5	6.8	6.6	7.0	26.9
BR-RSJ	8.0	8.7	8.6	9.4	34.7
BR-RSK	4.4	4.7	6.7	7.0	22.7
BR-RSL	5.2	7.0	5.9	5.7	23.9
BR-RSM	4.8	3.5	5.9	4.3	18.5
BR-RSN	4.6	6.5	6.1	6.8	24.0
BR-RSP	4.4	4.7	6.3	5.6	21.0
BR-RSQ	4.3	7.6	5.7	5.3	22.8
BR-RSR			7.8	6.2	28.1

Blanks in the table indicate that dosimeters were missing at the end of the quarter.
 Annual Exposure column based on averages of all available data.
 Quarter length is estimated to be 91.25 days.

Byron Nuclear Power Station

The Byron Station, consisting of two approximately 1,250 Megawatt PWRs is owned and operated by the Exelon Corporation and located in Ogle County, Illinois. Unit 1 began operation on February 2, 1985, and Unit 2 on January 9, 1987. The site is located approximately three miles southwest of Byron, Illinois and about two miles east of the Rock River.



Liquid effluents from the Byron Station are released to the Rock River in accordance to release limits governed by the station's license with the NRC and the plant's IEPA National Pollutant Discharge Elimination System permit. In 2018, there were 78 liquid effluent batch releases from the Byron station.

Figures 10 through 12 provide an overview of all sampling and monitoring locations in the vicinity of the Byron Nuclear Power Station (yellow star).

Sampling and Monitoring Results

Water Sampling Results

Water sample analysis for tritium, total strontium, and other radionuclides indicated no concentrations above the established MDCs for each analysis type.

Results from Gross Beta analysis indicated that the established MDC was met at some sampling locations. These slightly elevated gross beta results can be attributed to the liquid effluent releases from the Byron station.

Soil Sampling Results

Gamma spectroscopy results for soil samples indicated no concentrations of reactor-produced radionuclides above background. Cesium-137 in concentrations greater than the established MDC was seen, but was consistent with soil concentrations historically found from atmospheric nuclear weapons testing.

Sediment Sampling Results

Gamma spectroscopy results for sediment samples indicated no concentrations of reactor-produced radionuclides above background. Cesium-137 in concentrations greater than the established MDC was seen, but was consistent with soil concentrations historically found from atmospheric nuclear weapons testing.

Vegetation Sampling Results

Gamma spectroscopy results for vegetation samples indicated no concentrations above the established MDC.

Fish Sampling Results

Gamma spectroscopy results for fish samples indicated no concentrations above the established MDC.

Direct Radiation Monitoring Results

The ambient gamma monitoring results were consistent with results found at the background monitoring locations at Sangchris Lake State Park near Kincaid, IL

Byron Maps of Monitoring and Sampling Locations

Figure 10. OSL and GDN Monitoring Locations- Byron

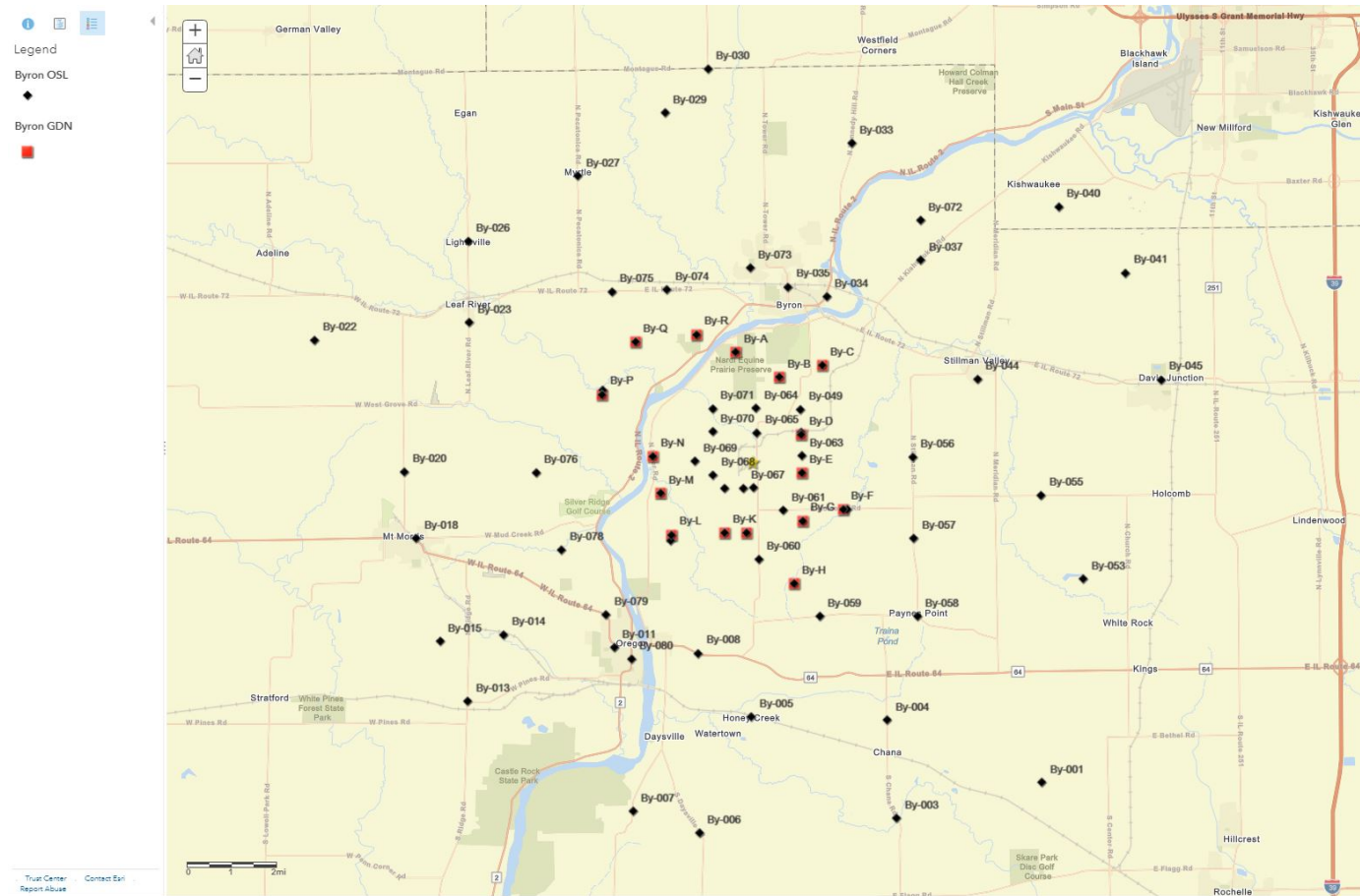


Figure 11. OSL and GDN Monitoring Locations- Byron (continued)

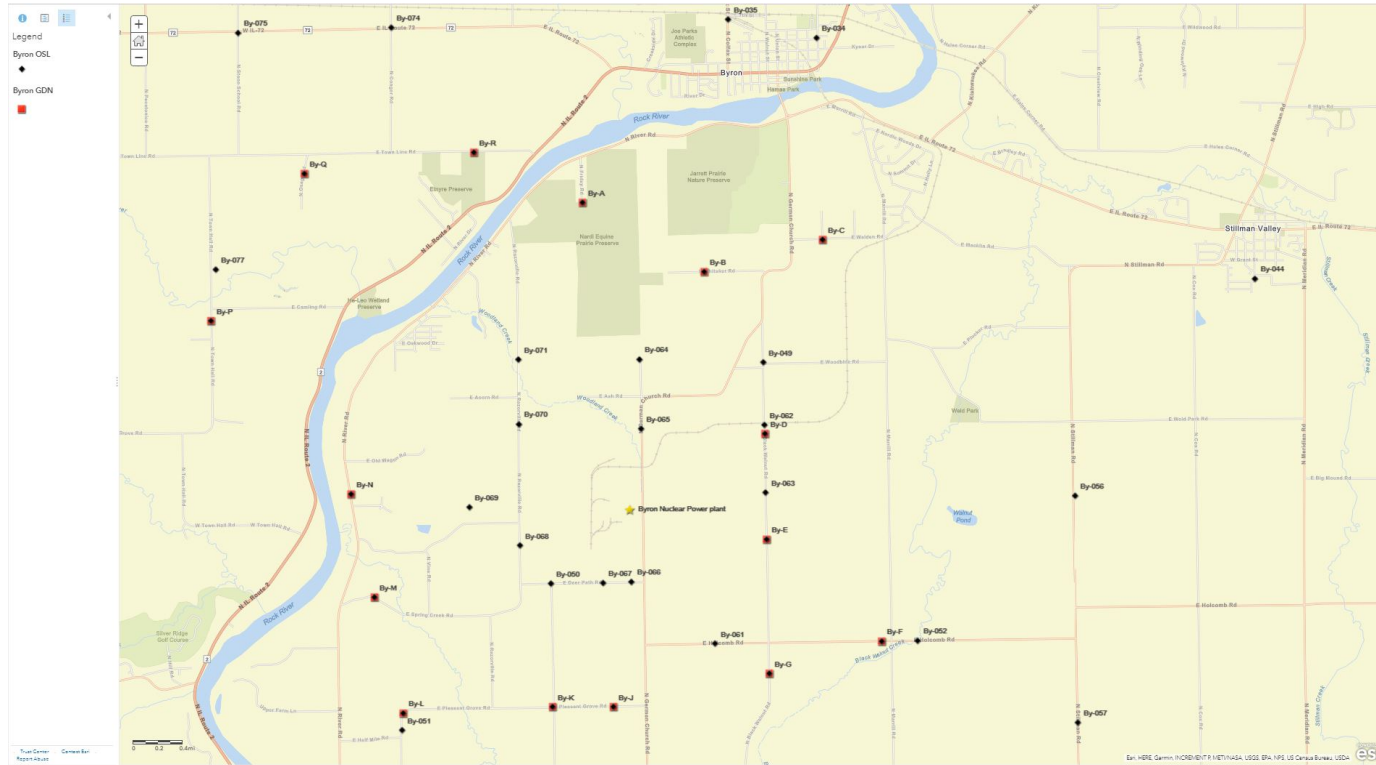
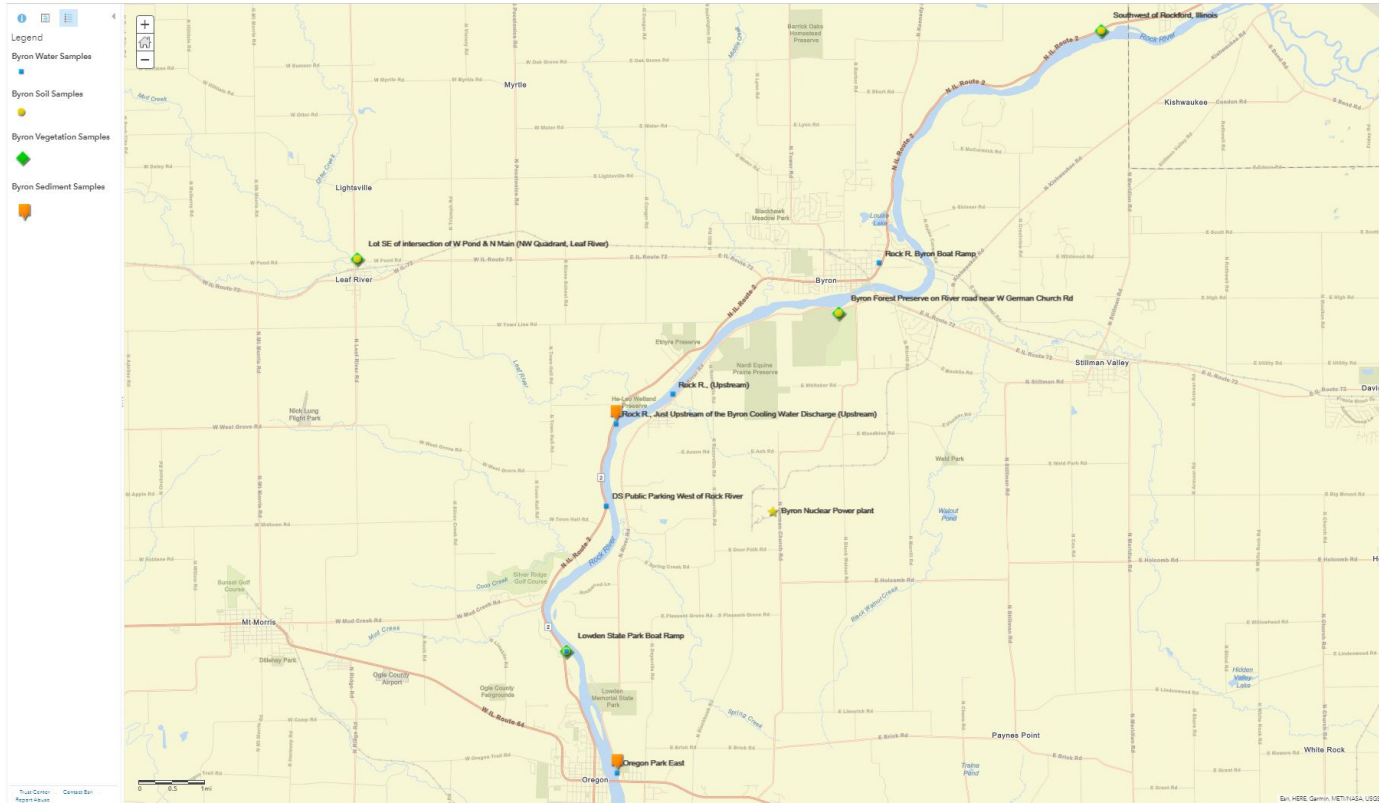


Figure 12. Environmental Sampling Locations- Byron

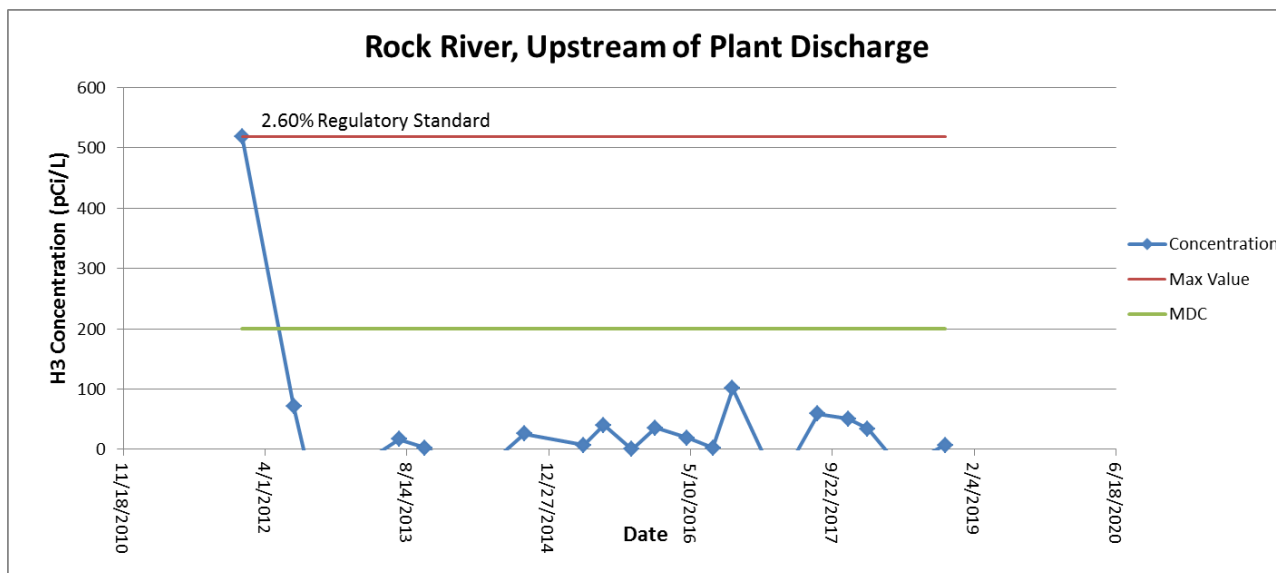
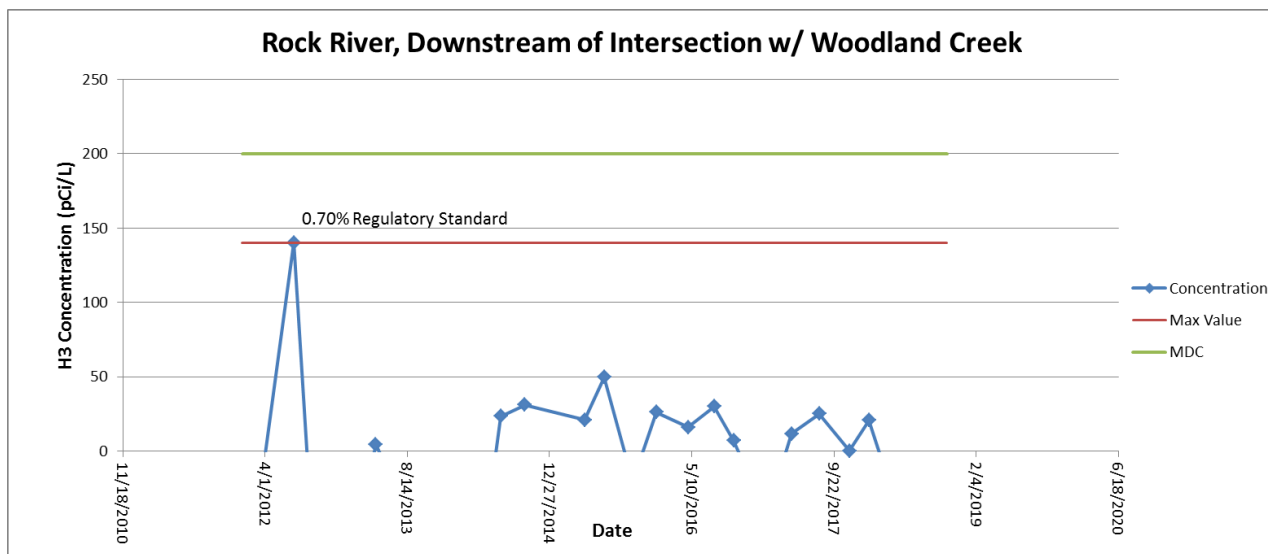


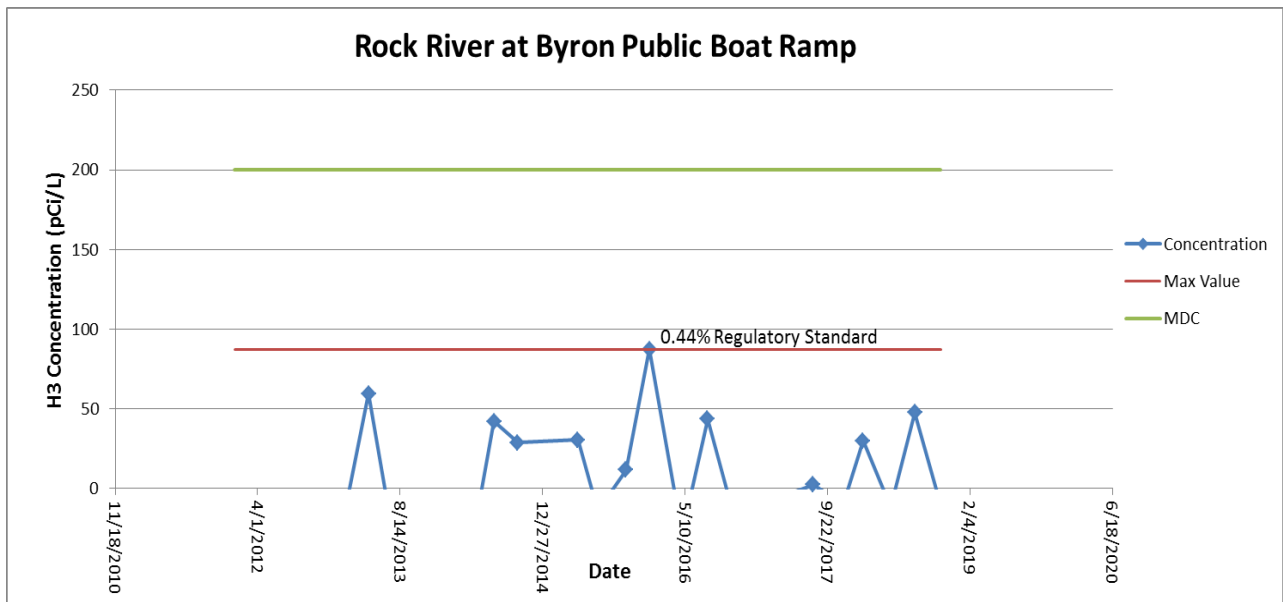
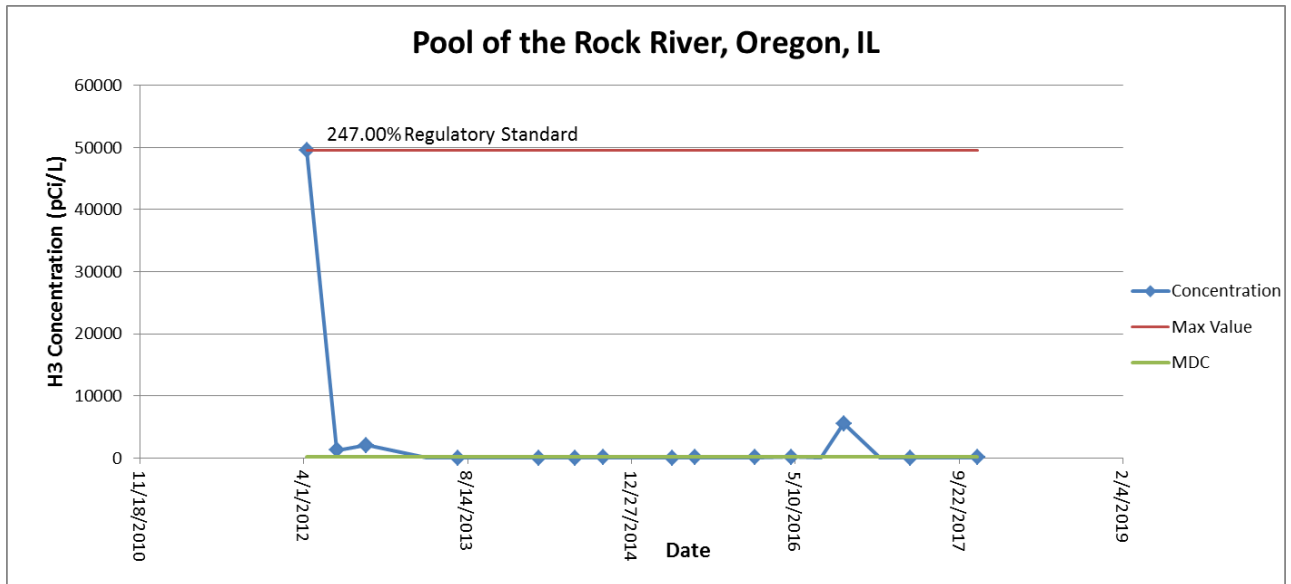
Byron Sample Result Tables and Graphs

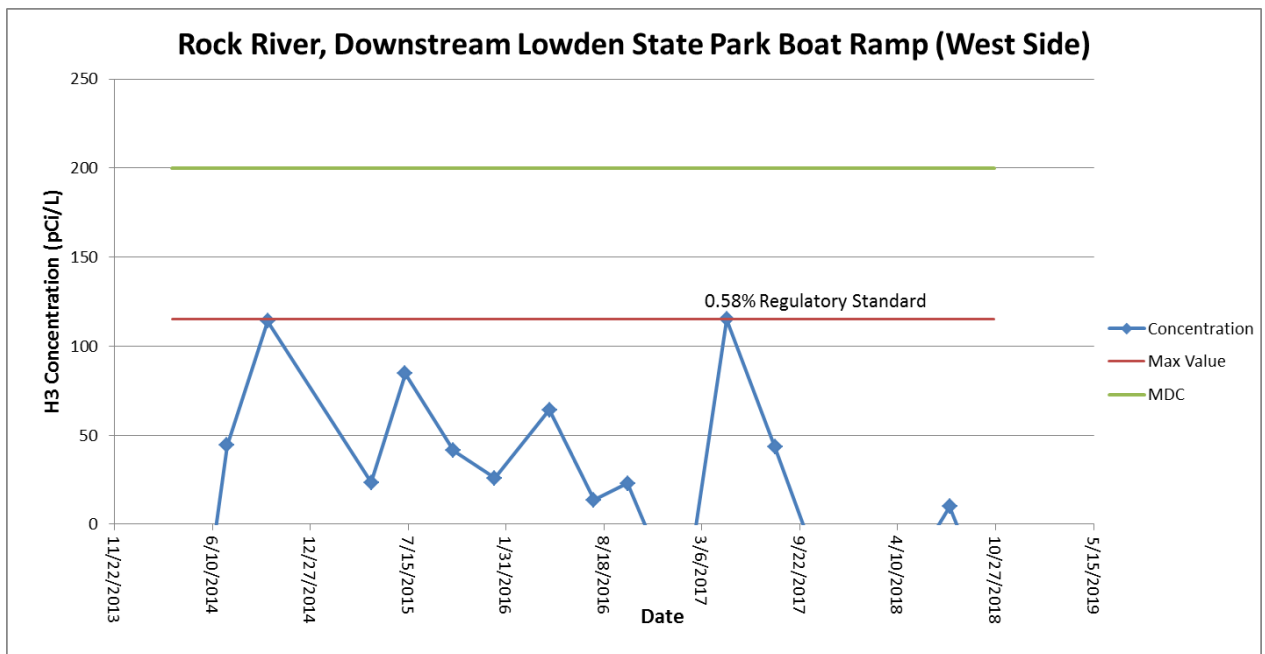
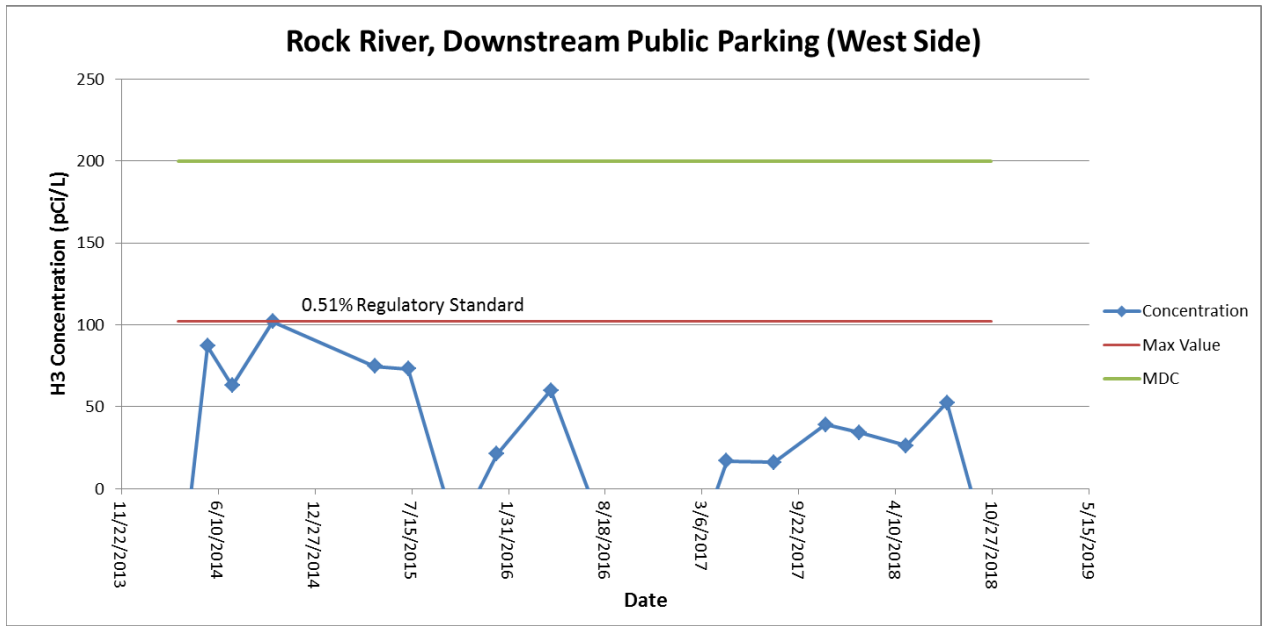
Tritium (H-3) in Water Results - Byron
Results are in picocuries per liter (pCi/L)

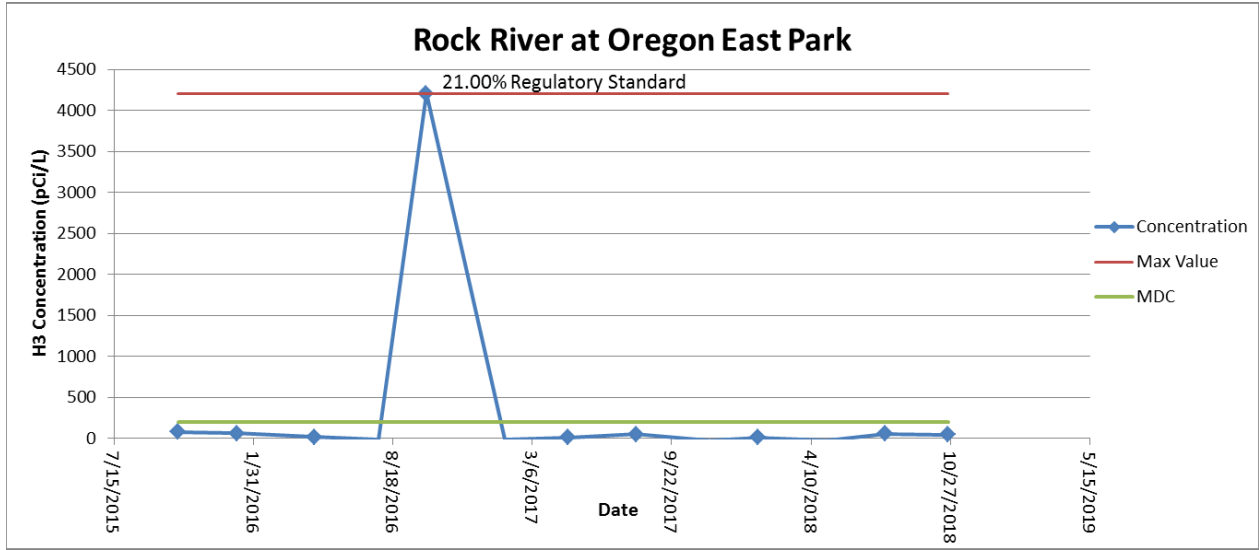
Location Date	H-3	
	Result	MDC
Lowden State Park Boat Ramp		
5/2/2018	<MDC	181
7/25/2018	<MDC	181
10/24/2018	<MDC	181
Oregon Park East		
1/24/2018	<MDC	181
5/2/2018	<MDC	181
7/25/2018	<MDC	181
10/24/2018	<MDC	181
Public Parking W. of Rock R.		
1/24/2018	<MDC	181
5/2/2018	<MDC	181
7/25/2018	<MDC	181
10/24/2018	<MDC	181
Rock R. Byron Boat Ramp		
1/24/2018	<MDC	181
5/2/2018	<MDC	181
7/25/2018	<MDC	181
10/24/2018	<MDC	181
Rock R., UpS of the Byron Cooling Water Discharge		
1/24/2018	<MDC	181
5/2/2018	<MDC	181
7/25/2018	<MDC	181
10/24/2018	<MDC	181
Rock R., DnS of Woodland Creek		
1/24/2018	<MDC	181
5/2/2018	<MDC	181
7/25/2018	<MDC	181
10/24/2018	<MDC	181

Trending Graphs for Tritium (H-3) in Water - Byron
 (Max value compared to IEPA and USEPA regulatory standard of 20,000 pCi/L)









Total Strontium in Water Results - Byron
Results in picocuries per liter (pCi/L)

Location	Strontium	
	Date	Result MDC
Lowden State Park Boat Ramp		
5/2/2018	<MDC	0.5
Public Parking W. of Rock R.		
5/2/2018	<MDC	0.5

Sample Results for Beta Screening of Water - Byron
Results are in picocuries per liter (pCi/L)

Location	Beta	
	Date	Result MDC
Lowden State Park Boat Ramp		
5/2/2018	<MDC	3.7
7/25/2018	<MDC	3.7
10/24/2018	<MDC	3.7
Oregon Park East		
1/24/2018	5.1	3.7
5/2/2018	<MDC	3.7
7/25/2018	<MDC	3.7
10/24/2018	<MDC	3.7
Public Parking W. of Rock R.		
1/24/2018	<MDC	3.7
5/2/2018	<MDC	3.7
7/25/2018	<MDC	3.7
10/24/2018	<MDC	3.7
Rock R. Byron Boat Ramp		
1/24/2018	4.7	3.7
5/2/2018	<MDC	3.7
7/25/2018	4.5	3.7
10/24/2018	5.4	3.7
Rock R., UpS of the Byron Cooling Water Discharge		
1/24/2018	5.5	3.7
5/2/2018	<MDC	3.7
7/25/2018	<MDC	3.7
10/24/2018	<MDC	3.7
Rock R., DnS of Woodland Creek		
1/24/2018	<MDC	3.7
5/2/2018	<MDC	3.7
7/25/2018	4.0	3.7
10/24/2018	4.6	3.7

Gamma Spectroscopy Results for Other Radionuclides in Water - Byron
Results are in picocuries per liter (pCi/L)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95	
Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC
Lowden State Park Boat Ramp																								
5/2/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
7/25/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
10/24/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
Oregon Park East																								
1/24/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
5/2/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
7/25/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
10/24/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
Public Parking W. of Rock R.																								
1/24/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
5/2/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
7/25/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
10/24/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
Rock R. Byron Boat Ramp																								
1/24/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
5/2/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
7/25/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
10/24/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
Rock R., UpS of the Byron Cooling Water Discharge																								
1/24/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
5/2/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
7/25/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
10/24/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
Rock R., DnS of Woodland Creek																								
1/24/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
5/2/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
7/25/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7
10/24/2018	<MDC	23.8	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4.1	<MDC	3.9	<MDC	8.4	<MDC	10.8	<MDC	3.7	<MDC	4.2	<MDC	7.5	<MDC	6.7

Gamma Spectroscopy Results for Radionuclides in Soil (Migration) - Byron
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95	
Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC
Forest preserve on River Rd.																						
5/2/2018	<MDC	0.43	<MDC	0.17	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.16	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08
7/25/2018	<MDC	0.43	<MDC	0.17	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.12	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08
Lot SE of intersection of W Pond & N Main (Leaf River)																						
5/2/2018	<MDC	0.43	<MDC	0.17	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.05	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08
7/25/2018	<MDC	0.43	<MDC	0.17	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.08	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08
Lowden State Park																						
5/2/2018	<MDC	0.43	<MDC	0.17	<MDC	0.03	<MDC	0.03	<MDC	0.02	<MDC	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08
7/25/2018	<MDC	0.43	<MDC	0.17	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.07	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08
Southwest of Rockford																						
5/2/2018	<MDC	0.43	<MDC	0.17	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.20	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08
7/25/2018	<MDC	0.43	<MDC	0.17	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.06	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08

Gamma Spectroscopy Results for Radionuclides in Soil (Deposition) - Byron
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95	
Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC
Forest preserve on River Rd.																						
5/2/2018	<MDC	0.43	<MDC	0.17	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.14	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08
7/25/2018	<MDC	0.43	<MDC	0.17	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.08	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08
Lot SE of intersection of W Pond & N Main (Leaf River)																						
5/2/2018	<MDC	0.43	<MDC	0.17	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.04	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08
7/25/2018	<MDC	0.43	<MDC	0.17	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.05	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08
Lowden State Park																						
5/2/2018	<MDC	0.43	<MDC	0.17	<MDC	0.03	<MDC	0.03	<MDC	0.02	<MDC	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08
7/25/2018	<MDC	0.43	<MDC	0.17	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.05	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08
Southwest of Rockford																						
5/2/2018	<MDC	0.43	<MDC	0.17	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.15	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08
7/25/2018	<MDC	0.43	<MDC	0.17	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.04	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08

Gamma Spectroscopy Results for Radionuclides in Sediment - Byron
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95			
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	
Oregon Park East																								
5/2/2018	<MDC	0.27	<MDC	0.14	<MDC	0.02	<MDC	0.02	<MDC	0.02	<MDC	0.02	<MDC	0.06	<MDC	0.02	<MDC	0.04	<MDC	0.05	<MDC	0.06		
7/25/2018	<MDC	0.27	<MDC	0.14	<MDC	0.02	<MDC	0.02	<MDC	0.02	<MDC	0.02	<MDC	0.06	<MDC	0.02	<MDC	0.04	<MDC	0.05	<MDC	0.06		
Rock R., UpS of the Byron Cooling Water Discharge																								
5/2/2018	<MDC	0.27	<MDC	0.14	<MDC	0.02	<MDC	0.02	<MDC	0.02	0.05	0.02	<MDC	0.06	<MDC	0.02	<MDC	0.04	<MDC	0.05	<MDC	0.06		
7/25/2018	<MDC	0.27	<MDC	0.14	<MDC	0.02	0.02	0.02	<MDC	0.02	0.11	0.02	<MDC	0.06	<MDC	0.02	<MDC	0.04	<MDC	0.05	<MDC	0.06		

Gamma Spectroscopy Results for Radionuclides in Vegetation - Byron
Results are in picocuries per gram (pCi/g)

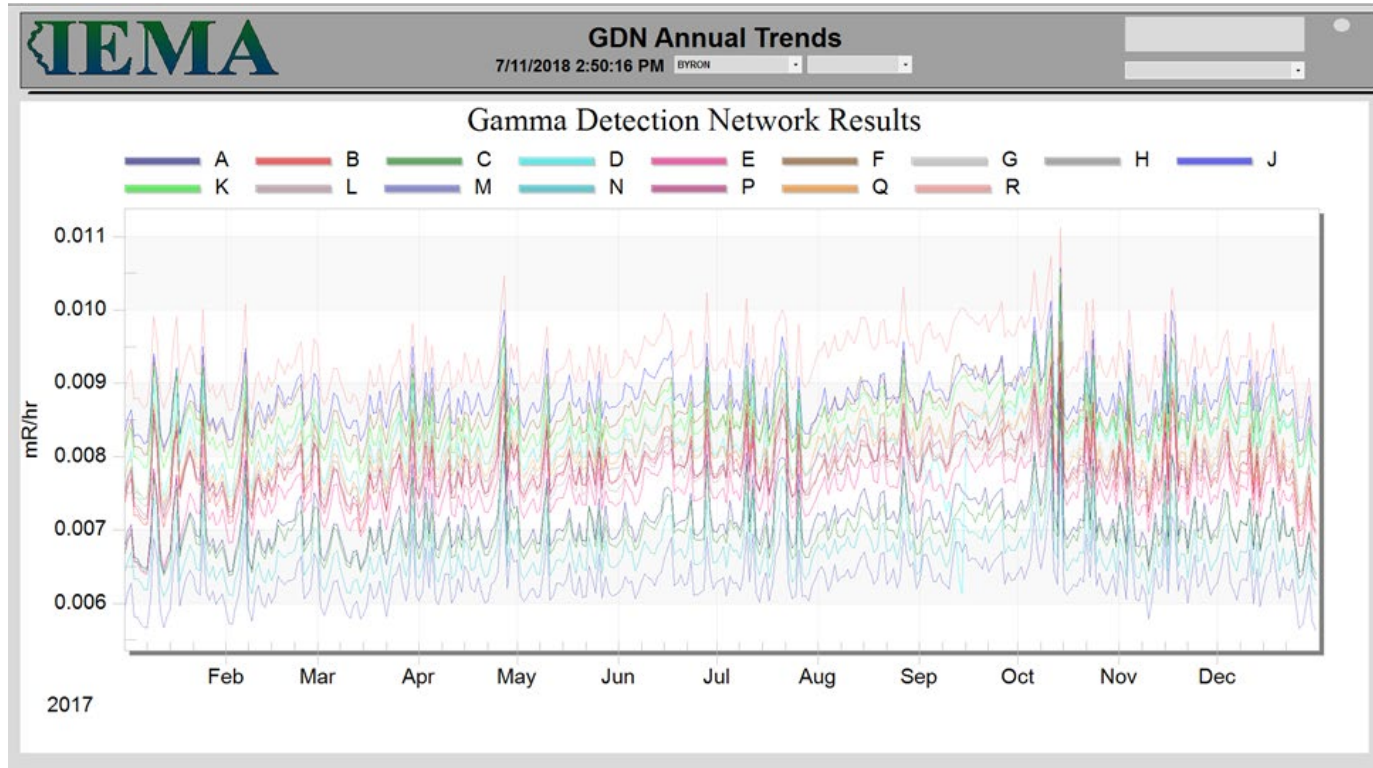
Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95		
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC
Forest preserve on River Rd.																									
5/2/2018	<MDC	3.1	<MDC	12.4	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.5	<MDC	2.6	<MDC	0.2	<MDC	0.3	<MDC	0.3	<MDC	0.4	
7/25/2018	<MDC	3.1	<MDC	12.4	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.5	<MDC	2.6	<MDC	0.2	<MDC	0.3	<MDC	0.3	<MDC	0.4	
Lot SE of intersection of W Pond & N Main (Leaf River)																									
5/2/2018	<MDC	3.1	<MDC	12.4	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.5	<MDC	2.6	<MDC	0.2	<MDC	0.3	<MDC	0.3	<MDC	0.4	
7/25/2018	<MDC	3.1	<MDC	12.4	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.5	<MDC	2.6	<MDC	0.2	<MDC	0.3	<MDC	0.3	<MDC	0.4	
Lowden State Park																									
5/2/2018	<MDC	3.1	<MDC	12.4	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.5	<MDC	2.6	<MDC	0.2	<MDC	0.3	<MDC	0.3	<MDC	0.4	
7/25/2018	<MDC	3.1	<MDC	12.4	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.5	<MDC	2.6	<MDC	0.2	<MDC	0.3	<MDC	0.3	<MDC	0.4	
Southwest of Rockford																									
5/2/2018	<MDC	3.1	<MDC	12.4	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.5	<MDC	2.6	<MDC	0.2	<MDC	0.3	<MDC	0.3	<MDC	0.4	
7/25/2018	<MDC	3.1	<MDC	12.4	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.5	<MDC	2.6	<MDC	0.2	<MDC	0.3	<MDC	0.3	<MDC	0.4	

Gamma Spectroscopy Results for Radionuclides in Fish - Byron
Results are in picocuries per kilogram (pCi/kg)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95			
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	
Rock R. Bottom Feeders																										
5/2/2018	<MDC	410	<MDC	780	<MDC	27.6	<MDC	29.7	<MDC	26.2	<MDC	24.2	<MDC	75	<MDC	263	<MDC	25.1	<MDC	42	<MDC	60	<MDC	56		
Rock R. Top Feeders																										
5/2/2018	<MDC	410	<MDC	780	<MDC	27.6	<MDC	29.7	<MDC	26.2	<MDC	24.2	<MDC	75	<MDC	263	<MDC	25.1	<MDC	42	<MDC	60	<MDC	56		

No fish collected in the third quarter due to flood conditions on the river.

Gamma Detection Network Results - Byron



Summary of Ambient Gamma Results - Byron

Location	Quarter 1 mR/quarter	Quarter 2 mR/quarter	Quarter 3 mR/quarter	Quarter 4 mR/quarter	Annual Exposure mR/year
BY001	7.2	7.3	7.5	6.3	28.3
BY003	6.1	4.6	6.8	6.3	23.7
BY004	6.8	6.3	8.4	6.2	27.7
BY005	5.7	5.3	7.3	6.1	24.4
BY006	7.4	5.7	7.9	6.4	27.4
BY007	5.7	4.5	7.1	7.0	24.3
BY008	6.8	7.3	7.0	5.8	26.9
BY011	7.8	5.9	7.0	6.8	27.6
BY013	10.2	9.0	9.3	7.5	36.0
BY014	5.6	4.8	7.4	6.3	24.1
BY015			10.3	7.6	35.8
BY018	5.7	3.5	6.8	5.4	21.3
BY020	8.8	7.8	10.3	8.8	35.7
BY022	8.3	7.6	9.6	8.7	34.1
BY023	8.1	7.8	8.2	7.8	32.0
BY026	7.9	6.3	7.5	7.5	29.2
BY027		8.8	11.8		41.1
BY029	7.7	6.6	8.9	7.3	30.4
BY030	8.7	7.0	8.7	8.3	32.7
BY033	8.6	7.8	9.8	7.8	34.0
BY034	6.6	7.0	9.1	7.7	30.4
BY035		3.5	5.3	4.7	17.9
BY037			8.1	6.2	28.7
BY040	10.8	7.9	8.2	8.3	35.2
BY041	7.1	6.6	6.8	6.8	27.2
BY044	6.6	5.1	8.8	7.2	27.6
BY045	7.1	7.1	8.0	6.4	28.7
BY049	6.7	5.5	7.7	6.5	26.3
BY050	8.9	7.2	7.8	9.3	33.2
BY051	6.8	6.1	6.6	6.6	26.1
BY052	8.4	8.1	9.3	9.1	34.9
BY053	8.9	7.1	8.1	9.3	33.4
BY055	8.5	7.7	9.7	8.4	34.2
BY056	8.4	6.6	9.1	8.1	32.2
BY057	8.3	6.7	9.0	8.7	32.7
BY058	7.8	7.1	9.9	8.0	32.8
BY059	7.8	7.0	8.6	7.9	31.4

Summary of Ambient Gamma Results - Byron (continued)

Location	Quarter 1 mR/quarter	Quarter 2 mR/quarter	Quarter 3 mR/quarter	Quarter 4 mR/quarter	Annual Exposure mR/year
BY060	9.8	8.3	7.9	8.5	34.5
BY061	11.4	9.0	10.6	10.9	41.9
BY062	8.4	7.2	9.0	9.0	33.7
BY063	8.2	8.0	9.5	7.7	33.4
BY064	11.3	9.6	9.5	10.7	41.1
BY065	7.8	7.5	8.9	9.8	34.0
BY066	8.5	7.2	8.6	7.2	31.5
BY067	8.2	7.8	8.9	7.8	32.8
BY068	8.4		9.0	8.0	33.9
BY069	7.3	8.2	9.2	8.0	32.8
BY070	8.8	7.8	9.0		34.1
BY071	7.5		6.6	6.2	27.0
BY072	11.0	8.0	8.9	8.9	36.7
BY073	9.9	8.5	9.8	8.6	36.7
BY074	7.4	7.0	8.9	7.8	31.1
BY075	9.2	7.5	8.3	8.0	33.0
BY076	6.7	5.8	8.0	6.8	27.3
BY077	7.8	6.7	8.8	6.8	30.0
BY078	9.9	7.5	9.4	6.6	33.4
BY079	6.5	4.2	5.8	6.3	22.8
BY080	6.0	4.7	6.3	6.6	23.6
BY-RSA	7.4	6.3	7.7	7.1	28.5
BY-RSB	8.4	6.7	8.5	6.9	30.5
BY-RSC	6.5	4.5	6.1	5.4	22.4
BY-RSD	8.1	6.8	8.6	8.7	32.1
BY-RSE	8.1	4.9	7.7	7.2	27.9
BY-RSF	8.9	8.9	11.0	8.8	37.6
BY-RSG	8.4	7.3	8.6	6.9	31.2
BY-RSH	7.2	6.8	9.0	7.8	30.8
BY-RSJ	8.0	7.0	9.8	7.9	32.8
BY-RSK	8.4	6.8	8.3	7.7	31.2
BY-RSL	7.6	5.8	8.7	6.9	29.0
BY-RSM	5.9	4.2	5.1	5.2	20.4
BY-RSN	6.3	5.3	5.9	4.8	22.4
BY-RSP	8.2	6.4	9.6	6.8	30.9
BY-RSQ	7.4	7.2	9.1	6.5	30.2
BY-RSR	9.3	10.3	11.4	10.9	41.9

Blanks in the table indicate that dosimeters were missing at the end of the quarter.

Annual Exposure column based on averages of all available data.

Quarter length is estimated to be 91.25 days.

Clinton Nuclear Power Station

The Clinton Nuclear Power Station, consisting of one approximately 1,140 Megawatt boiling water reactor (BWR) is owned and operated by the Exelon Corporation, and is located in Dewitt County, Illinois. The station began operations on February 15, 1987. The site is approximately six miles east of the city of Clinton, Illinois.



Liquid effluents from the Clinton Station are permitted to be released into the eastern arm of Clinton Lake, a 4,900-acre man-made cooling lake, in accordance to release limits governed by the station's license with the NRC and the plant's IEPA National Pollutant Discharge Elimination System permit. No liquid effluents were discharged in 2018.

The outflow from Clinton Lake falls into Salt Creek, a tributary of the Sangamon River.

Figures 13 through 15 provide an overview of all sampling and monitoring locations in the vicinity of the Clinton Nuclear Power Station (yellow star).

Sampling and Monitoring Results

Water Sampling Results

Water sample analysis for tritium, other radionuclides, and gross beta indicated no concentrations above the established MDCs for each analysis type.

Results from total strontium analysis indicated that the established MDC was met at one sampling location. Although above the established MDC, the sample results for total strontium remained well below the established US EPA and IEPA standards.

Soil Sampling Results

Gamma spectroscopy results for soil samples indicated no concentrations of reactor-produced radionuclides above background. Cesium-137 in concentrations greater than the established MDC was seen, but was consistent with soil concentrations historically found from atmospheric nuclear weapons testing.

Sediment Sampling Results

Gamma spectroscopy results for sediment samples indicated no concentrations of reactor-produced radionuclides above background. Cesium-137 in concentrations greater than the established MDC was seen, but was consistent with soil concentrations historically found from atmospheric nuclear weapons testing.

Vegetation Sampling Results

Gamma spectroscopy results for vegetation samples indicated no concentrations above the established MDC.

Fish Sampling Results

Gamma spectroscopy results for fish samples indicated no concentrations above the established MDC.

Direct Radiation Monitoring Results

The ambient gamma monitoring results were consistent with results found at the background monitoring locations at Sangchris Lake State Park near Kincaid, IL.

Clinton Maps of Monitoring and Sampling Locations

Figure 13. OSL and GDN Monitoring Locations- Clinton

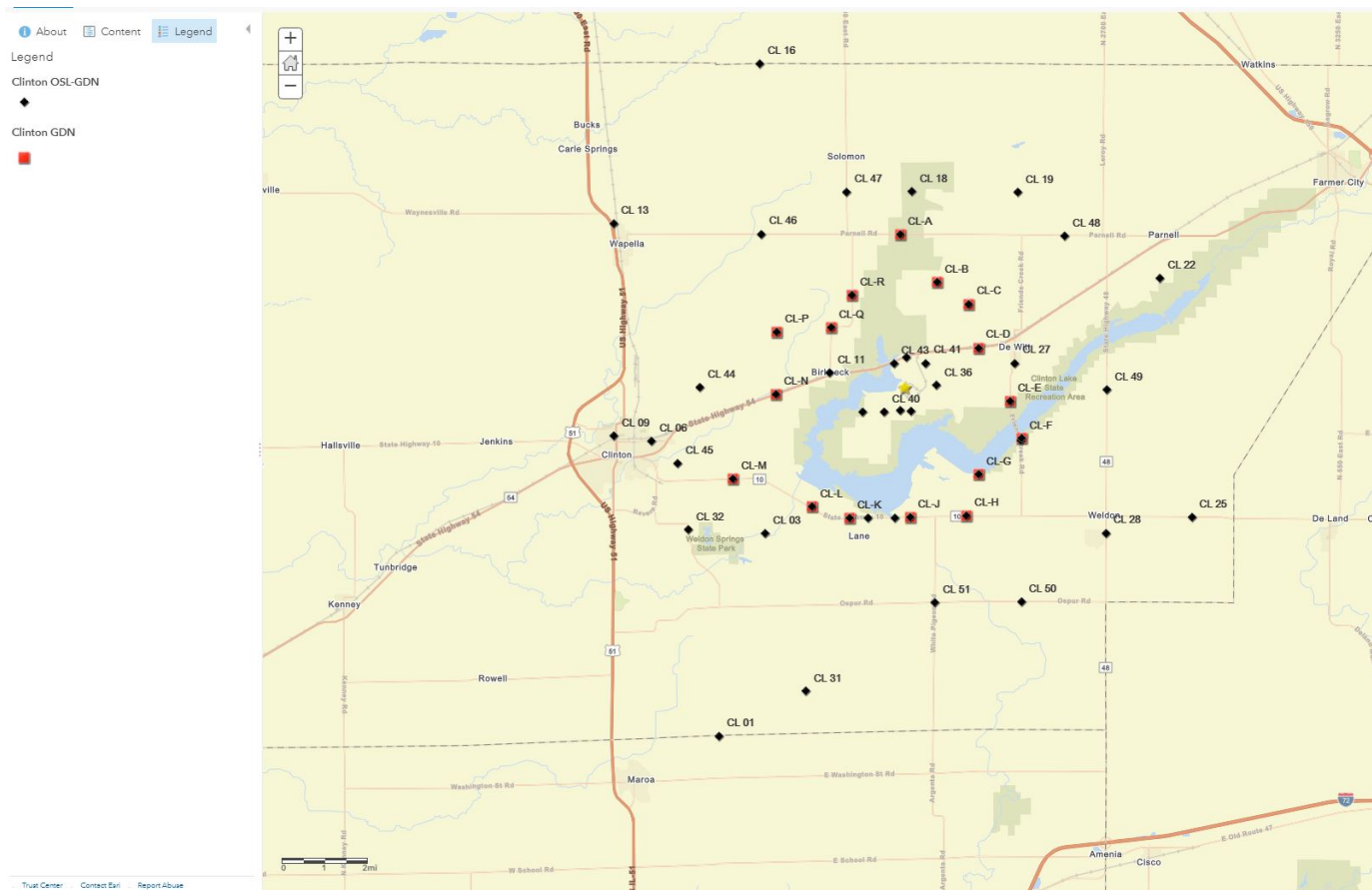


Figure 14. OSL and GDN Monitoring Locations (continued) - Clinton

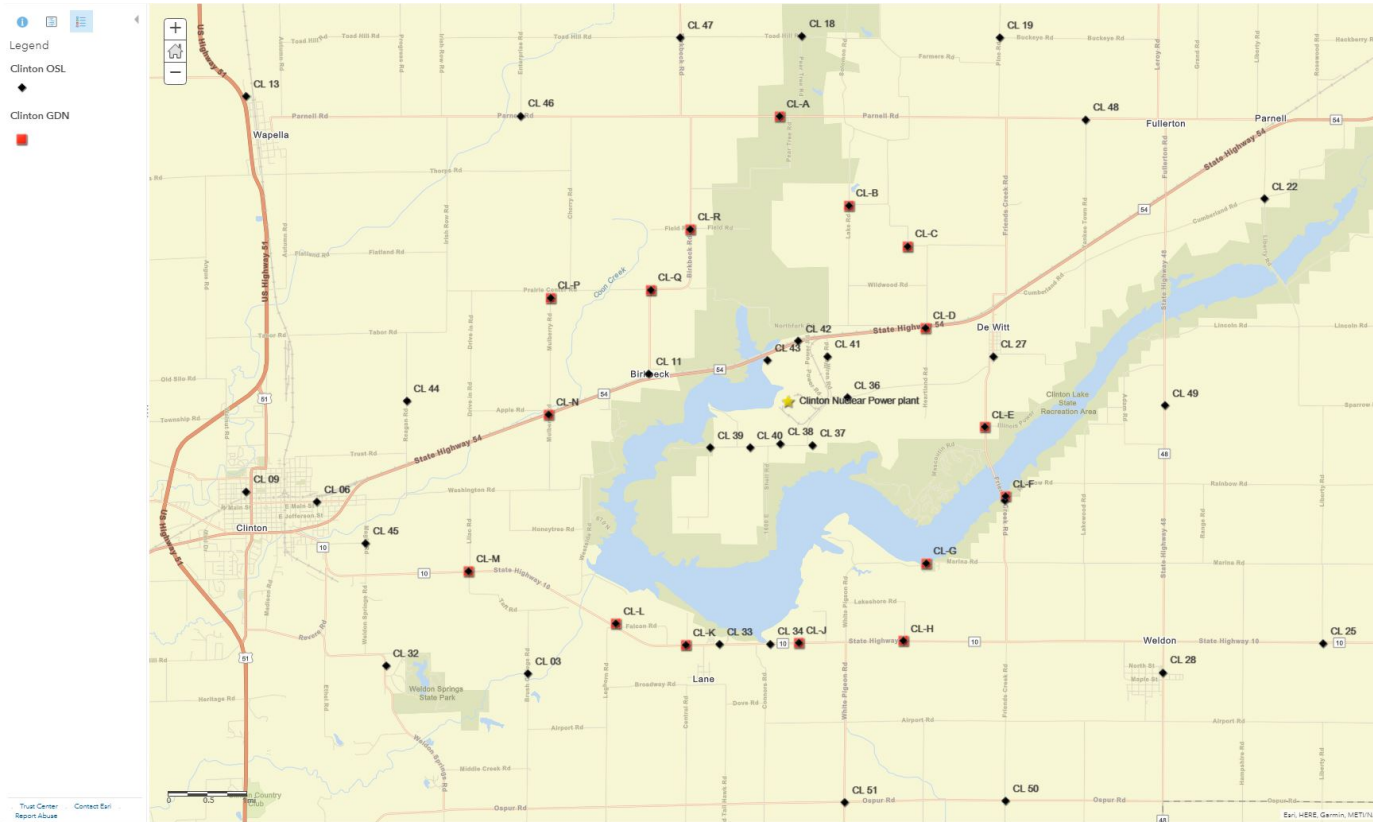
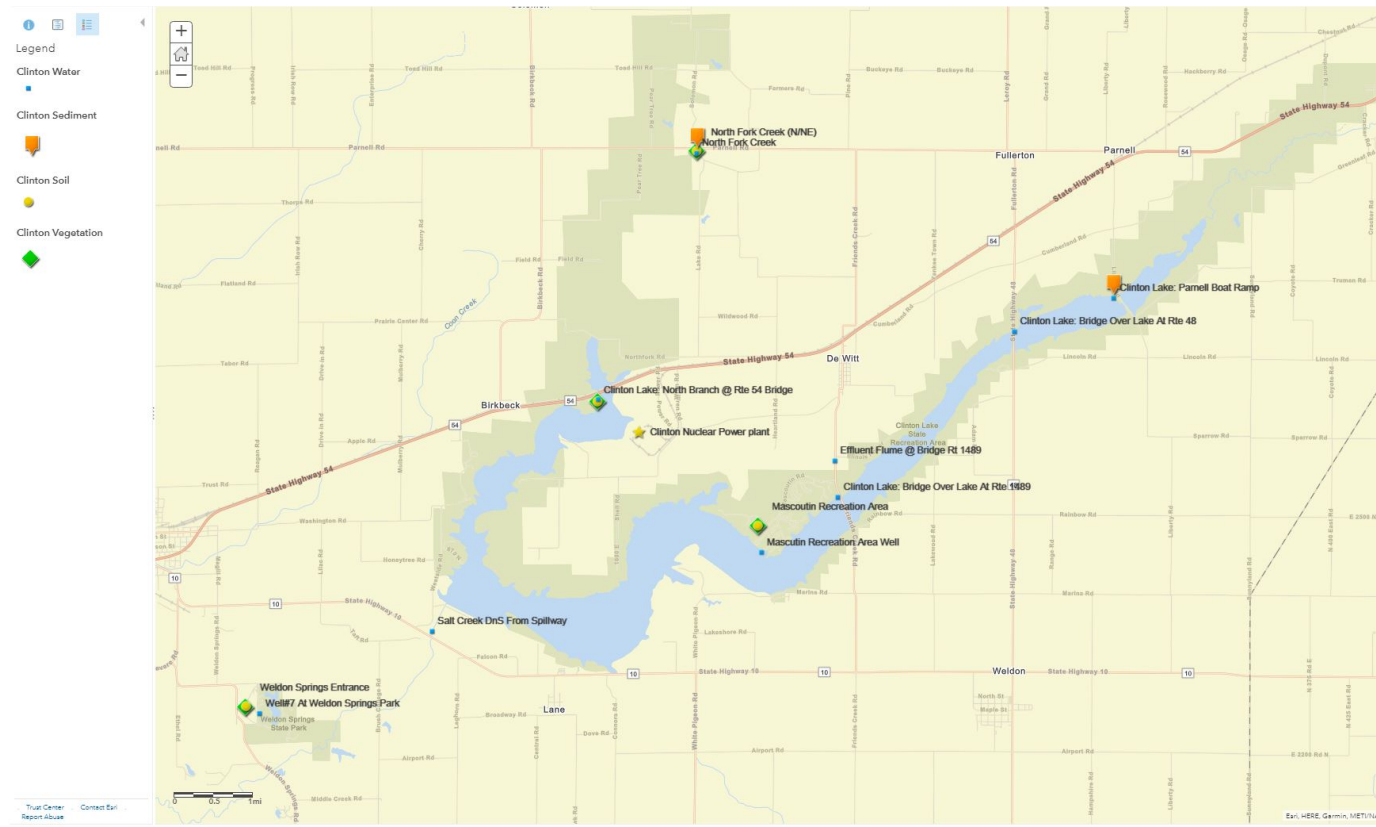


Figure 15. Environmental Sampling Locations - Clinton

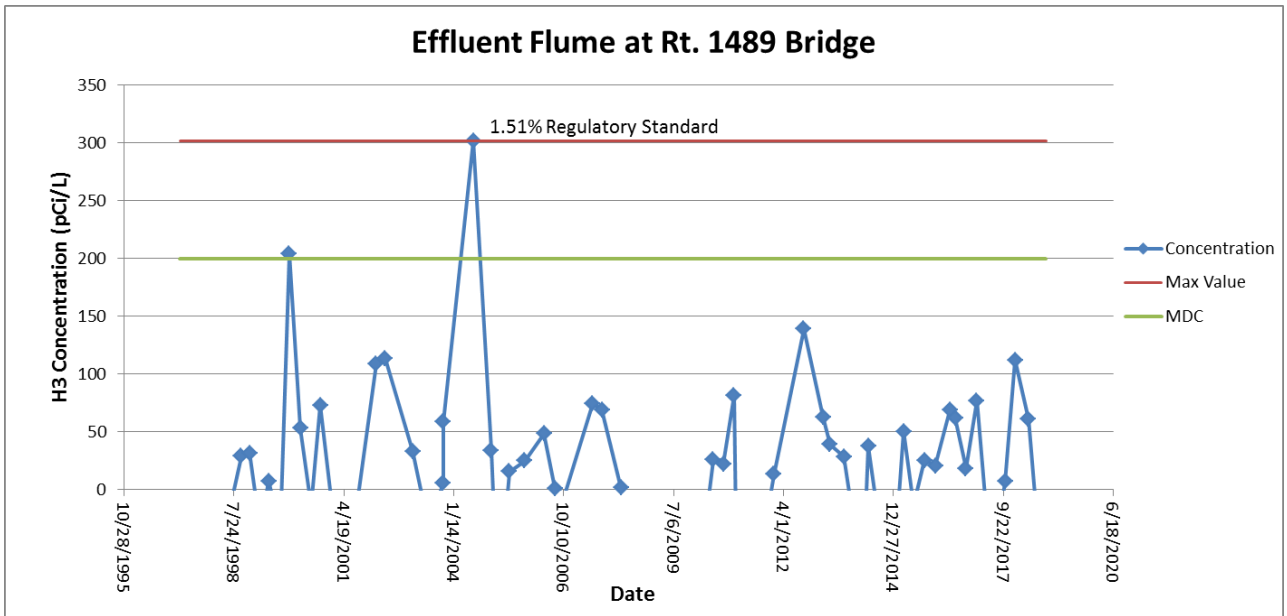
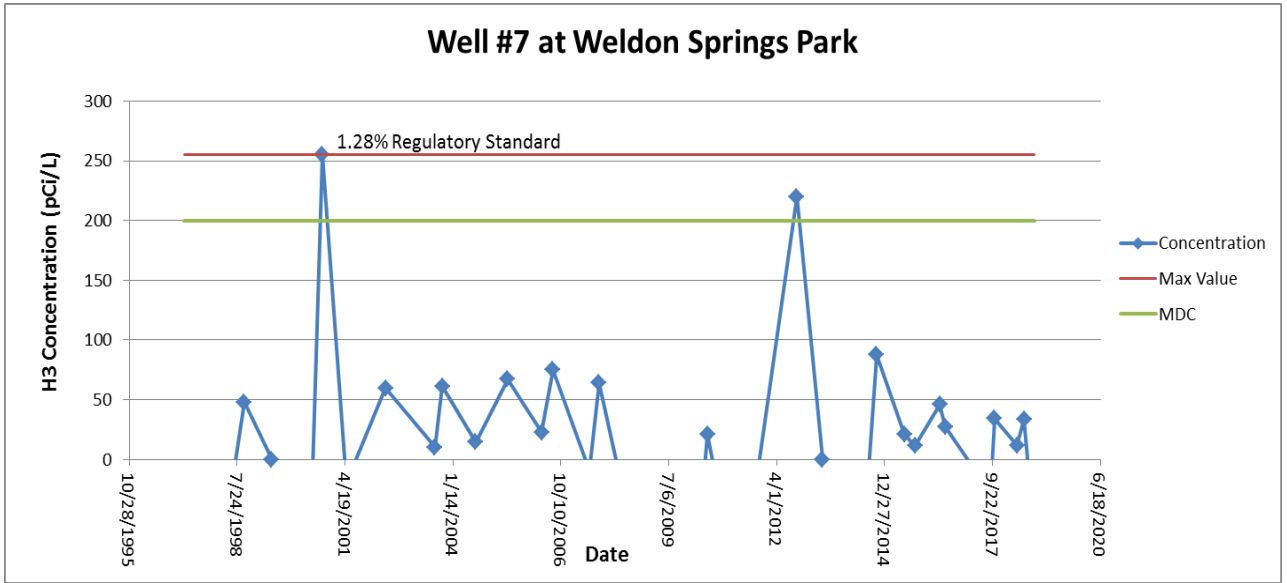


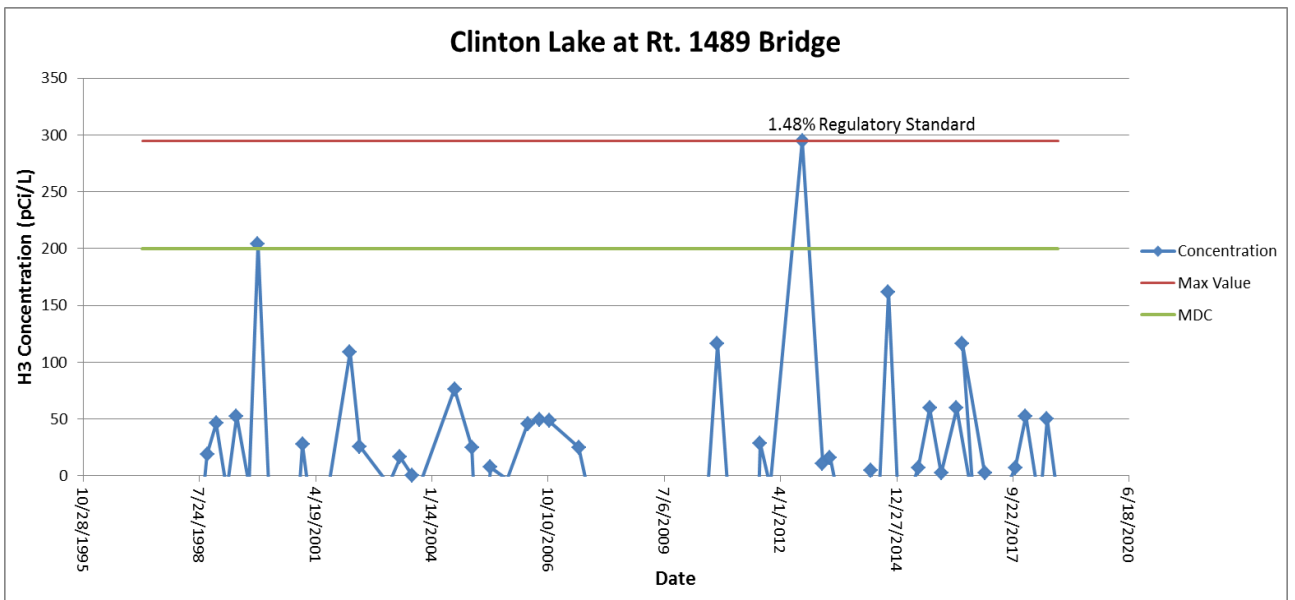
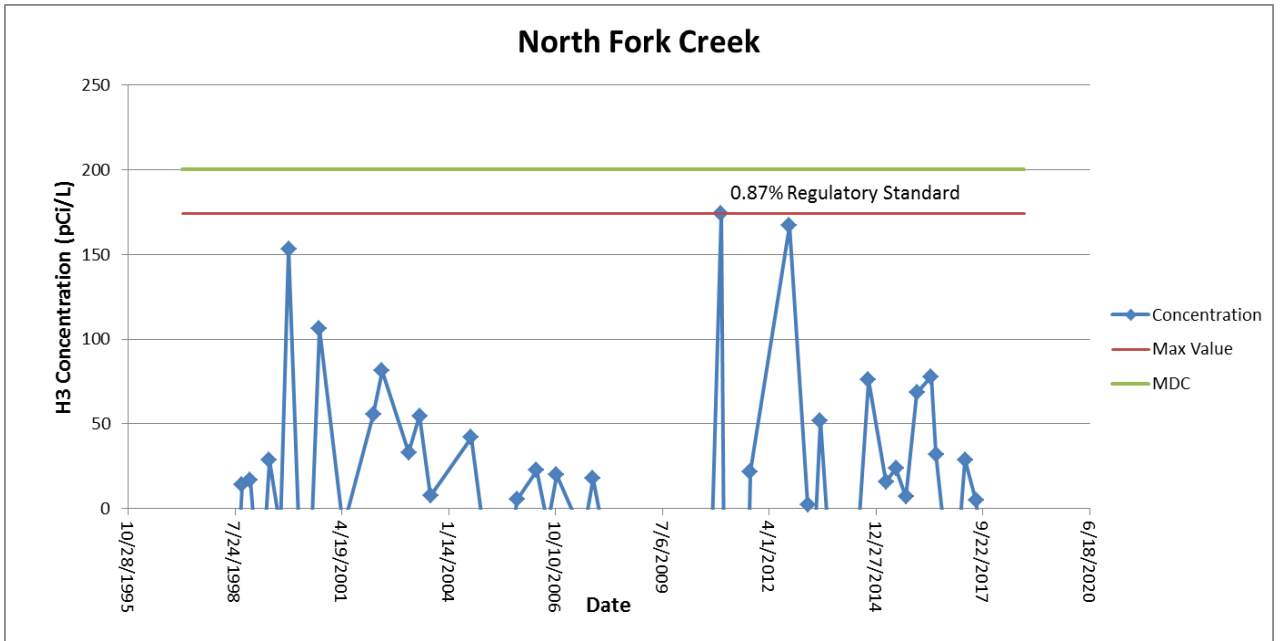
Clinton Sample Result Tables and Graphs

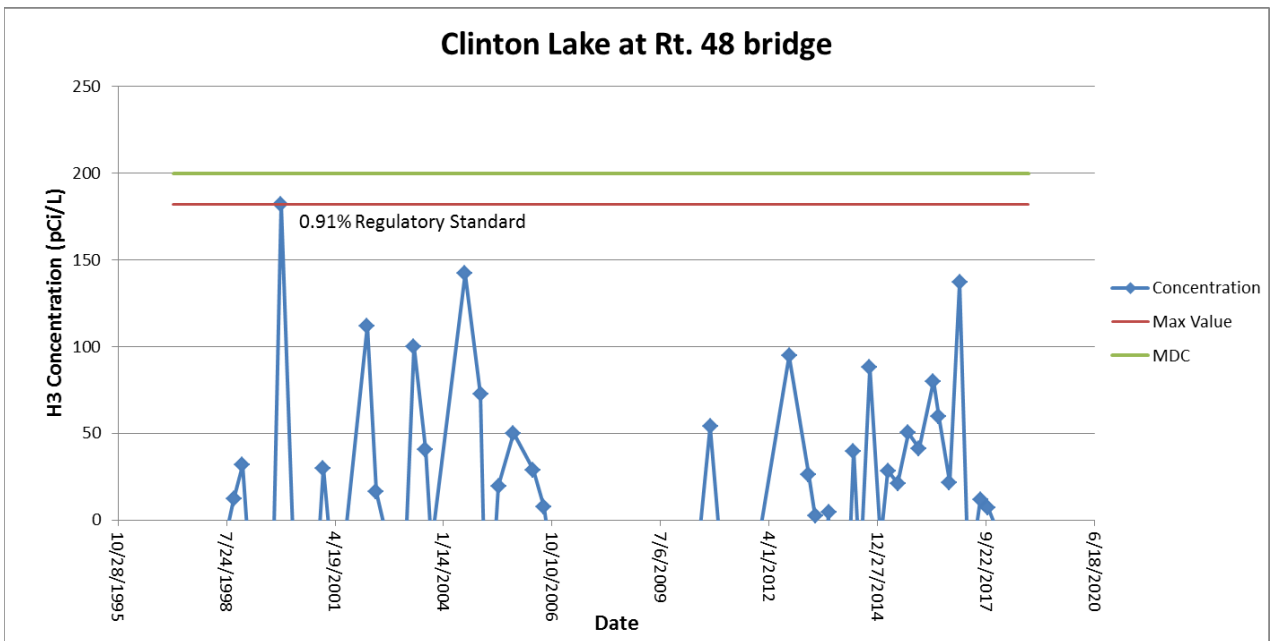
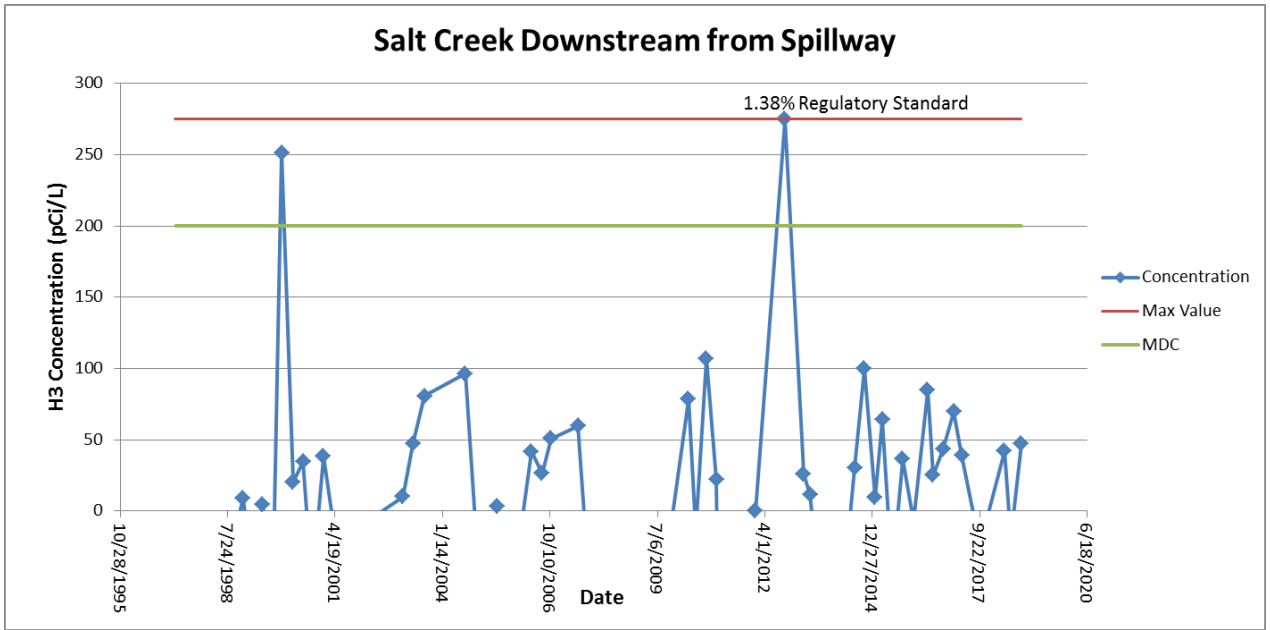
Tritium (H-3) in Water Results– Clinton
Results are in picocuries per liter (pCi/L)

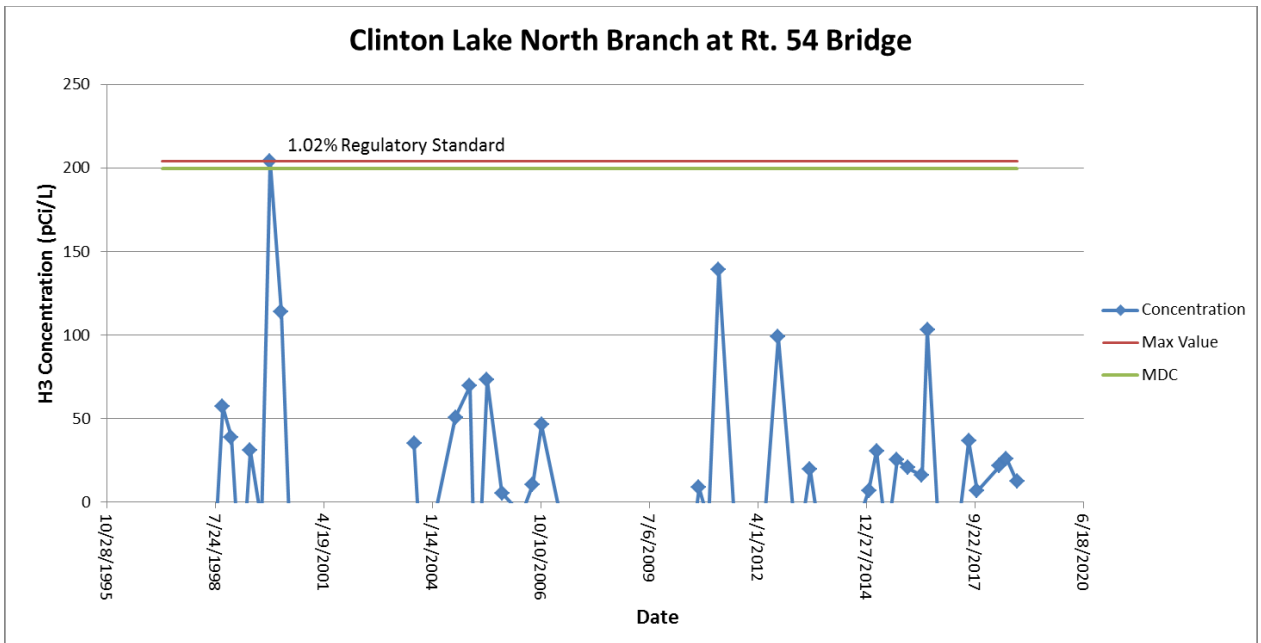
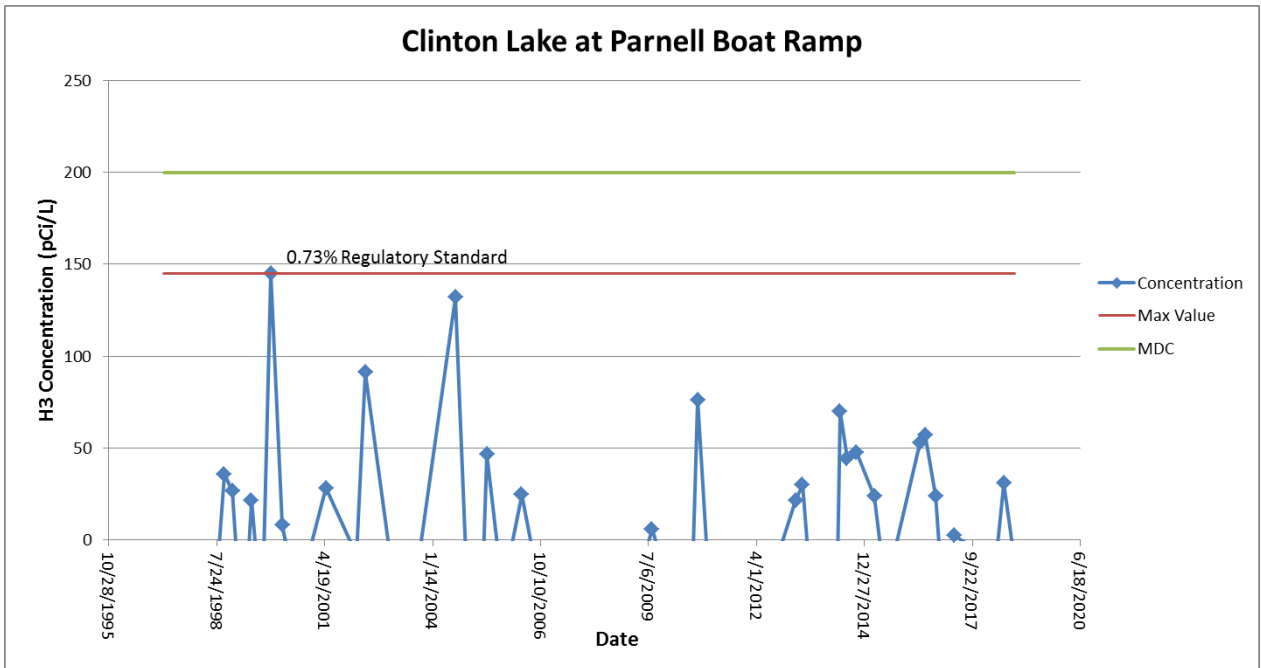
Location	H-3	
Date	Result	MDC
Bridge Over Lake at Rt 1489		
1/9/2018	<MDC	181
5/8/2018	<MDC	181
7/11/2018	<MDC	181
10/16/2018	<MDC	181
Bridge Over Lake at Rt 48		
5/8/2018	<MDC	181
7/11/2018	<MDC	181
10/16/2018	<MDC	181
Effluent Flume at Bridge Rt 1489		
1/9/2018	<MDC	181
5/8/2018	<MDC	181
7/11/2018	<MDC	181
10/16/2018	<MDC	181
Mascutin Recreation Area (Restaurant)		
5/8/2018	<MDC	181
7/11/2018	<MDC	181
North Branch at Rt 54 Bridge		
5/8/2018	<MDC	181
7/11/2018	<MDC	181
10/16/2018	<MDC	181
North Fork Creek		
5/8/2018	<MDC	181
7/11/2018	<MDC	181
10/16/2018	<MDC	181
Parnell Boat Ramp		
5/8/2018	<MDC	181
7/11/2018	<MDC	181
10/16/2018	<MDC	181
Salt Creek DnS from Spillway		
5/8/2018	<MDC	181
7/11/2018	<MDC	181
10/16/2018	<MDC	181
Well #7 at Weldon Springs Park		
5/8/2018	<MDC	181
7/11/2018	<MDC	181
10/16/2018	<MDC	181

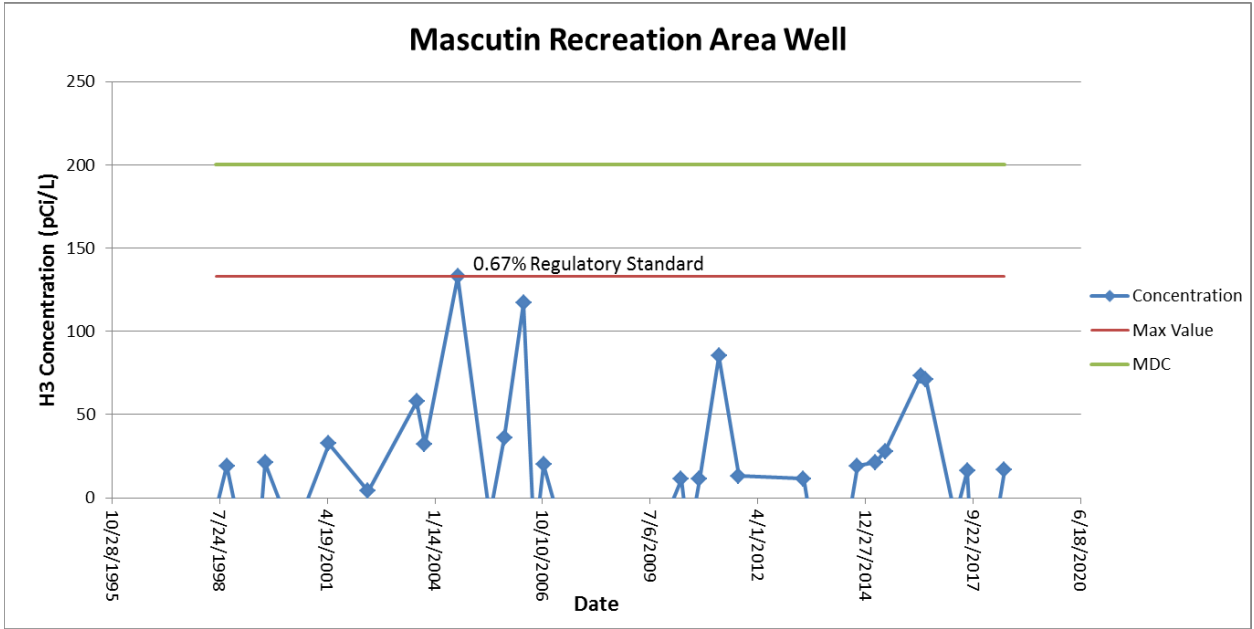
Trending Graphs for Tritium (H-3) in Water - Clinton
 (Max value compared to IEPA and USEPA regulatory standard of 20,000 pCi/L)











Total Strontium in Water Results - Clinton
Results are in picocuries per liter (pCi/L)

Location	Strontium	
	Date	MDC
Effluent Flume at Bridge Rt 1489		
1/9/2018	0.6	0.5
5/8/2018	<MDC	0.5

Beta Screening of Water Results - Clinton
Results are in picocuries per liter (pCi/L)

Location	Beta	
	Date	Result MDC
Bridge Over Lake at Rt 1489		
1/9/2018	<MDC	3.7
5/8/2018	<MDC	3.7
7/11/2018	<MDC	3.7
10/16/2018	<MDC	3.7
Bridge Over Lake at Rt 48		
5/8/2018	<MDC	3.7
7/11/2018	<MDC	3.7
10/16/2018	<MDC	3.7
Effluent Flume at Bridge Rt 1489		
1/9/2018	<MDC	3.7
5/8/2018	<MDC	3.7
7/11/2018	<MDC	3.7
10/16/2018	<MDC	3.7
Mascutin Recreation Area (Restaurant)		
5/8/2018	<MDC	3.7
7/11/2018	<MDC	3.7
North Branch at Rt 54 Bridge		
5/8/2018	<MDC	3.7
7/11/2018	<MDC	3.7
10/16/2018	<MDC	3.7
North Fork Creek		
5/8/2018	<MDC	3.7
7/11/2018	<MDC	3.7
10/16/2018	<MDC	3.7
Parnell Boat Ramp		
5/8/2018	<MDC	3.7
7/11/2018	<MDC	3.7
10/16/2018	<MDC	3.7
Salt Creek DnS from Spillway		
5/8/2018	<MDC	3.7
7/11/2018	<MDC	3.7
10/16/2018	<MDC	3.7
Well #7 at Weldon Springs Park		
5/8/2018	<MDC	3.7
7/11/2018	<MDC	3.7
10/16/2018	<MDC	3.7

Gamma Spectroscopy Results for Other Radionuclides in Water - Clinton
Results are in picocuries per liter (pCi/L)

Location Date	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95	
	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC
Bridge Over Lake at Rt 1489																								
1/9/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
5/8/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
7/11/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
10/16/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
Bridge Over Lake at Rt 48																								
5/8/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
7/11/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
10/16/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
Effluent Flume at Bridge Rt 1489																								
1/9/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
5/8/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
7/11/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
10/16/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
Mascutin Recreation Area (Restaurant)																								
5/8/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
7/11/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
North Branch at Rt 54 Bridge																								
5/8/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
7/11/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
10/16/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
North Fork Creek																								
5/8/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
7/11/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
10/16/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
Parnell Boat Ramp																								
5/8/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
7/11/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
10/16/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
Salt Creek DnS from Spillway																								
5/8/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
7/11/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
10/16/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
Well #7 at Weldon Springs Park																								
5/8/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
7/11/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1
10/16/2018	<MDC	25.9	<MDC	360	<MDC	3.7	<MDC	3.9	<MDC	4	<MDC	3.9	<MDC	9.3	<MDC	11.6	<MDC	3.6	<MDC	4.2	<MDC	7.6	<MDC	7.1

Gamma Spectroscopy Results for Radionuclides in Soil (Migration) - Clinton
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95	
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result
Mascoutin Recreation Area																						
5/8/2018	<MDC	0.92	<MDC	0.19	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.09	0.04	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.07	<MDC	0.09
7/11/2018	<MDC	0.92	<MDC	0.19	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.11	0.04	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.07	<MDC	0.09
North Branch at Rt 54 Bridge																						
5/8/2018	<MDC	0.92	<MDC	0.19	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.05	0.04	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.07	<MDC	0.09
7/11/2018	<MDC	0.92	<MDC	0.19	<MDC	0.04	<MDC	0.03	<MDC	0.03	<MDC	0.04	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.07	<MDC	0.09
North Fork Creek																						
5/8/2018	<MDC	0.92	<MDC	0.19	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.09	0.04	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.07	<MDC	0.09
7/11/2018	<MDC	0.92	<MDC	0.19	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.07	0.04	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.07	<MDC	0.09
Weldon Springs Entrance																						
5/8/2018	<MDC	0.92	<MDC	0.19	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.11	0.04	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.07	<MDC	0.09
7/11/2018	<MDC	0.92	<MDC	0.19	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.07	0.04	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.07	<MDC	0.09

Gamma Spectroscopy Results for Radionuclides in Soil (Migration) - Clinton
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95	
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result
Mascoutin Recreation Area																						
5/8/2018	<MDC	0.92	<MDC	0.19	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.06	0.04	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.07	<MDC	0.09
7/11/2018	<MDC	0.92	<MDC	0.19	<MDC	0.04	<MDC	0.03	<MDC	0.03	<MDC	0.04	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.07	<MDC	0.09
North Branch at Rt 54 Bridge																						
5/8/2018	<MDC	0.92	<MDC	0.19	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.04	0.04	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.07	<MDC	0.09
7/11/2018	<MDC	0.92	<MDC	0.19	<MDC	0.04	<MDC	0.03	<MDC	0.03	<MDC	0.04	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.07	<MDC	0.09
North Fork Creek																						
5/8/2018	<MDC	0.92	<MDC	0.19	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.06	0.04	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.07	<MDC	0.09
7/11/2018	<MDC	0.92	<MDC	0.19	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.07	0.04	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.07	<MDC	0.09
Weldon Springs Entrance																						
5/8/2018	<MDC	0.92	<MDC	0.19	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.08	0.04	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.07	<MDC	0.09
7/11/2018	<MDC	0.92	<MDC	0.19	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.04	0.04	<MDC	0.10	<MDC	0.03	<MDC	0.06	<MDC	0.07	<MDC	0.09

Gamma Spectroscopy Results for Radionuclides in Sediment - Clinton
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95		
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC
North Fork Creek																							
5/8/2018	<MDC	0.47	<MDC	0.13	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.20	0.03	<MDC	0.09	<MDC	0.03	<MDC	0.04	<MDC	0.07	<MDC	0.07	
7/11/2018	<MDC	0.47	<MDC	0.13	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.04	0.03	<MDC	0.09	<MDC	0.03	<MDC	0.04	<MDC	0.07	<MDC	0.07	
Parnell Boat Ramp																							
5/8/2018	<MDC	0.47	<MDC	0.13	<MDC	0.03	<MDC	0.03	<MDC	0.02	<MDC	0.03	<MDC	0.09	<MDC	0.03	<MDC	0.04	<MDC	0.07	<MDC	0.07	
7/11/2018	<MDC	0.47	<MDC	0.13	<MDC	0.03	<MDC	0.03	<MDC	0.02	<MDC	0.03	<MDC	0.09	<MDC	0.03	<MDC	0.04	<MDC	0.07	<MDC	0.07	

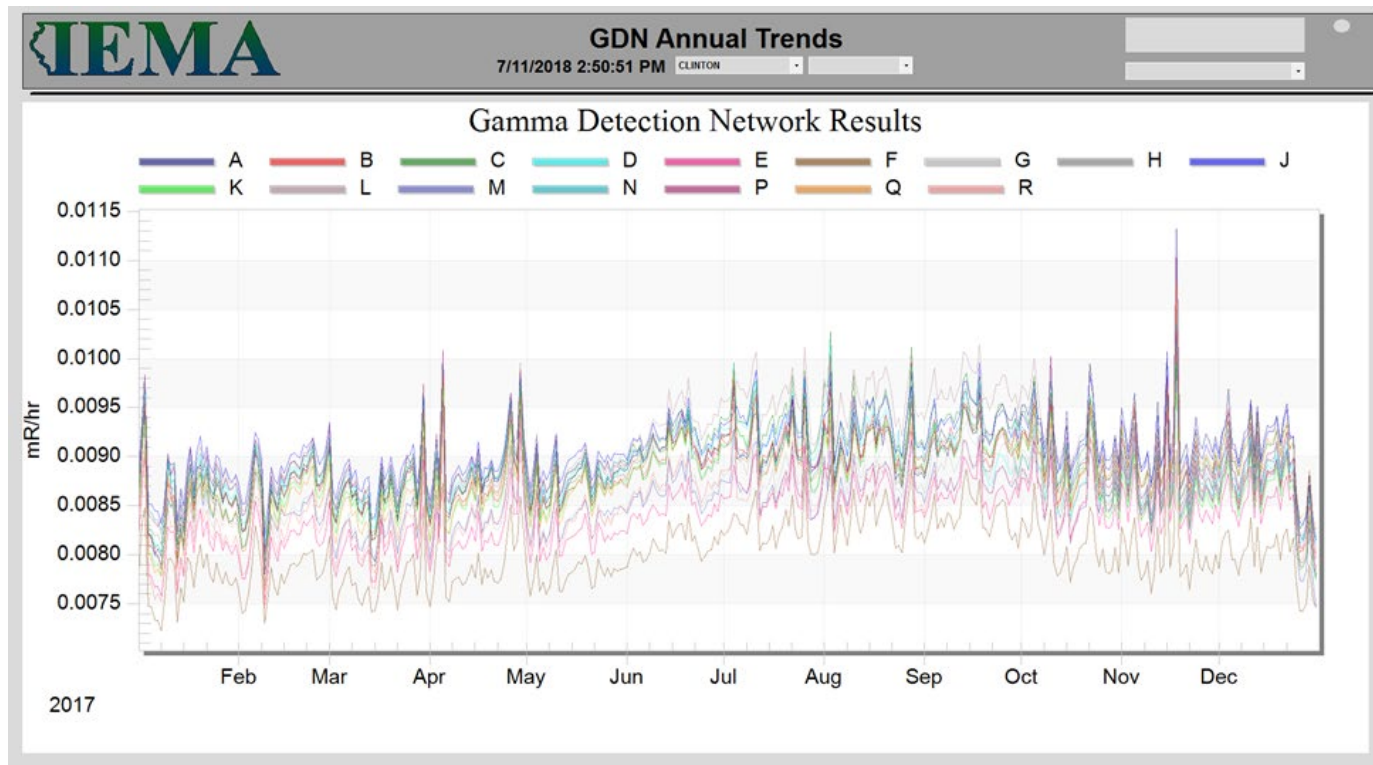
Gamma Spectroscopy Results for Radionuclides in Vegetation- Clinton
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95		
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC
Mascoutin Recreation Area																									
5/8/2018	<MDC	6.9	<MDC	14.0	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.5	<MDC	12.2	<MDC	0.2	<MDC	0.3	<MDC	0.4	<MDC	0.4	
7/11/2018	<MDC	6.9	<MDC	14.0	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.5	<MDC	12.2	<MDC	0.2	<MDC	0.3	<MDC	0.4	<MDC	0.4	
North Branch at Rt 54 Bridge																									
5/8/2018	<MDC	6.9	<MDC	14.0	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.5	<MDC	12.2	<MDC	0.2	<MDC	0.3	<MDC	0.4	<MDC	0.4	
7/11/2018	<MDC	6.9	<MDC	14.0	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.5	<MDC	12.2	<MDC	0.2	<MDC	0.3	<MDC	0.4	<MDC	0.4	
North Fork Creek																									
5/8/2018	<MDC	6.9	<MDC	14.0	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.5	<MDC	12.2	<MDC	0.2	<MDC	0.3	<MDC	0.4	<MDC	0.4	
7/11/2018	<MDC	6.9	<MDC	14.0	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.5	<MDC	12.2	<MDC	0.2	<MDC	0.3	<MDC	0.4	<MDC	0.4	
Weldon Springs Entrance																									
5/8/2018	<MDC	6.9	<MDC	14.0	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.5	<MDC	12.2	<MDC	0.2	<MDC	0.3	<MDC	0.4	<MDC	0.4	
7/11/2018	<MDC	6.9	<MDC	14.0	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.2	<MDC	0.5	<MDC	12.2	<MDC	0.2	<MDC	0.3	<MDC	0.4	<MDC	0.4	

Gamma Spectroscopy Results for Radionuclides in Fish- Clinton
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95			
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	
Clinton Lake Bottom Feeder																										
4/24/2018	<MDC	1650	<MDC	1470	<MDC	29	<MDC	21	<MDC	21.4	<MDC	17.7	<MDC	91	<MDC	3400	<MDC	21	<MDC	57	<MDC	46	<MDC	55		
9/25/2018	<MDC	1650	<MDC	1470	<MDC	29	<MDC	21	<MDC	21.4	<MDC	17.7	<MDC	91	<MDC	3400	<MDC	21	<MDC	57	<MDC	46	<MDC	55		
Clinton Lake Top Feeder																										
4/24/2018	<MDC	1650	<MDC	1470	<MDC	29	<MDC	21	<MDC	21.4	<MDC	17.7	<MDC	91	<MDC	3400	<MDC	21	<MDC	57	<MDC	46	<MDC	55		
9/25/2018	<MDC	1650	<MDC	1470	<MDC	29	<MDC	21	<MDC	21.4	<MDC	17.7	<MDC	91	<MDC	3400	<MDC	21	<MDC	57	<MDC	46	<MDC	55		

Gamma Detection Network Results – Clinton
Results are in milliroentgen per hour (mR/hr)



Summary of Ambient Gamma Results - Clinton

Location	Quarter 1 mR/quarter	Quarter 2 mR/quarter	Quarter 3 mR/quarter	Quarter 4 mR/quarter	Annual Exposure mR/year
CP001	9.9	9.2	9.3	10.0	38.4
CP003	8.3	9.5	9.9	9.4	37.1
CP006	7.6	8.1	8.0	8.1	31.8
CP009	7.9	9.2	8.8	10.0	36.0
CP011	9.7	9.7	9.5	9.9	38.8
CP013	8.3	7.2	6.5	6.8	28.8
CP016	11.6	11.8	10.5	10.8	44.6
CP018	12.3	11.5	11.4	10.7	45.9
CP019	11.6	10.3	9.9	10.6	42.3
CP022	10.6	9.6	11.1	10.8	42.1
CP025	9.8	9.6	10.0	11.9	41.2
CP027	8.4	8.5	8.9	8.1	33.9
CP028	10.9	9.8	11.7	10.3	42.6
CP031	9.0	11.0	10.7	10.4	41.1
CP032	11.0	9.7	10.0	8.2	38.9
CP033	8.2	7.8	8.1	9.4	33.5
CP034	8.8	9.4	9.0		36.3
CP035	9.9	7.2	7.0	8.8	32.9
CP036	10.5		8.7	10.3	39.3
CP037	10.0	10.8	10.9	12.0	43.6
CP038	9.8		6.8	10.0	35.5
CP039	11.0	10.7	11.0	11.0	43.7
CP040	9.7	11.0	10.5	10.0	41.2
CP041	10.2	12.0	11.4	11.4	45.0
CP042	9.0	9.8	9.1	9.9	37.9

Summary of Ambient Gamma Results - Clinton (continued)

Location	Quarter 1 mR/quarter	Quarter 2 mR/quarter	Quarter 3 mR/quarter	Quarter 4 mR/quarter	Annual Exposure mR/year
CP043	10.0	9.1	10.0	11.4	40.6
CP044	9.9	9.7	10.5		40.2
CP045	11.7	9.3	9.1	9.5	39.6
CP046	11.6	12.5	11.2	11.0	46.4
CP047	9.9	11.0	10.5	10.9	42.2
CP048	9.9	8.1	11.4	9.9	39.2
CP049	10.3	9.6	9.9	9.8	39.5
CP050	9.2	10.1	10.1		39.3
CP051	10.3		11.0		42.7
CP-RSA	11.0	9.9	12.0	11.7	44.6
CP-RSB	8.8	8.1	8.8	9.8	35.4
CP-RSC	10.1	11.4	11.1	10.2	42.9
CP-RSD	11.5	8.8	11.1	11.8	43.2
CP-RSE	10.3	9.7	9.9	9.2	39.1
CP-RSF	6.6	6.6	7.8	7.5	28.5
CP-RSG	10.5	7.8	9.0	9.9	37.3
CP-RSH	9.8	10.4	9.7	10.0	39.9
CP-RSJ	8.5	10.0	8.9	9.9	37.3
CP-RSK	9.9	7.4	8.8	9.5	35.5
CP-RSL	11.1	8.3	8.9	9.3	37.6
CP-RSM	10.2	7.8	10.1	9.3	37.4
CP-RSN	10.1	10.9	10.2	10.4	41.6
CP-RSP	10.6	9.3	8.7	10.5	39.1
CP-RSQ	7.6	9.3	9.9	8.4	35.2
CP-RSR	9.6	9.1	9.9	9.1	37.7

Blanks in the table indicate that dosimeters were missing at the end of the quarter.

Annual Exposure column based on averages of all available data.

Quarter length is estimated to be 91.25 days.

Dresden Nuclear Power Station

The Dresden Nuclear Power Station, consisting of one retired reactor and two operating 867 Megawatt BWR is owned and operated by the Exelon Corporation, and is located in Grundy County, Illinois. Dresden 1 was activated in 1960 and retired in 1978. Dresden units 2 and 3 began operations in 1970. The site is located approximately 12 miles southwest of Joliet, Illinois at the confluence of the Des Plaines and Kankakee rivers where they form the Illinois River.



Liquid effluents from the Dresden Station are permitted to be released to the Rock River in accordance to release limits governed by the station's license with the NRC and the plant's IEPA National Pollutant Discharge Elimination System permit. Although there were no liquid batch releases of radioactive effluents discharged during this reporting period, there were some radioactive effluents released from the Dresden sewage treatment plant and storm sewer system as unmonitored liquid releases.

Surface water samples taken from the Illinois River at the Dresden Lock and Dam and at Morris were found to contain detectable levels of tritium due to liquid effluent releases from the Braidwood Station or from the Dresden sewage treatment plant and storm sewer system releases.

All tritium levels detected were below the 20,000 pCi/L drinking water limit set by the USEPA and IEPA.

Figures 16 through 18 provide an overview of all sampling and monitoring locations in the vicinity of the Dresden Nuclear Power Station (yellow star in the middle of the map). The second yellow star near the bottom of Figure 16 is the Braidwood Nuclear Power Station.

Sampling and Monitoring Results

Water Sampling Results

Detectable levels of tritium were found in surface water samples taken near the Braidwood and Dresden stations. The elevated levels are attributable to the liquid effluent releases from the Braidwood station and the radioactive effluents released from the Dresden sewage treatment plant and storm sewer system as unmonitored liquid releases. All tritium levels were well below the Drinking Water Standards established by the USEPA and IEPA.

Results from total strontium analysis indicated that the established MDC was met at one sampling location and can be attributed to the liquid effluent releases from the Braidwood station and the radioactive effluents released from the Dresden sewage treatment plant and storm sewer system as unmonitored liquid releases. Although above the established MDC, the sample result for total strontium remained well below the established US EPA and IEPA standards.

Results from Gross Beta analysis indicated that the established MDC was met at some surface water sampling locations and can be attributed to the liquid effluent releases from the Braidwood station and the radioactive effluents released from the Dresden sewage treatment plant and storm sewer system as unmonitored liquid releases. Gross Beta results for ground water samples collected from a well located at the Dresden Lock and Dam were also above the established MDC. However, due to the presence of dissolved naturally occurring radionuclides; it is not unusual to see elevated Gross Beta results in ground water samples.

Gamma spectroscopy results for water samples indicated no concentrations above the established MDCs.

Soil Sampling Results

Gamma spectroscopy results for soil samples indicated no concentrations of reactor-produced radionuclides above background. Cesium-137 in concentrations greater than the established MDC was seen, but was consistent with soil concentrations historically found from atmospheric nuclear weapons testing.

Sediment Sampling Results

Gamma spectroscopy results for sediment samples indicated no concentrations of reactor-produced radionuclides above background. Cesium-137 in concentrations greater than the established MDC was seen, but was consistent with soil concentrations historically found from atmospheric nuclear weapons testing.

Vegetation Sampling Results

Gamma spectroscopy results for vegetation samples indicated no concentrations above the established MDC.

Fish Sampling Results

Gamma spectroscopy results for fish samples indicated no concentrations above the established MDC.

Direct Radiation Monitoring Results

The ambient gamma monitoring results were consistent with results found at the background monitoring locations at Sangchris Lake State Park near Kincaid, IL.

Dresden Maps of Monitoring and Sampling Locations

Figure 16. OSL and GDN Monitoring Locations - Dresden

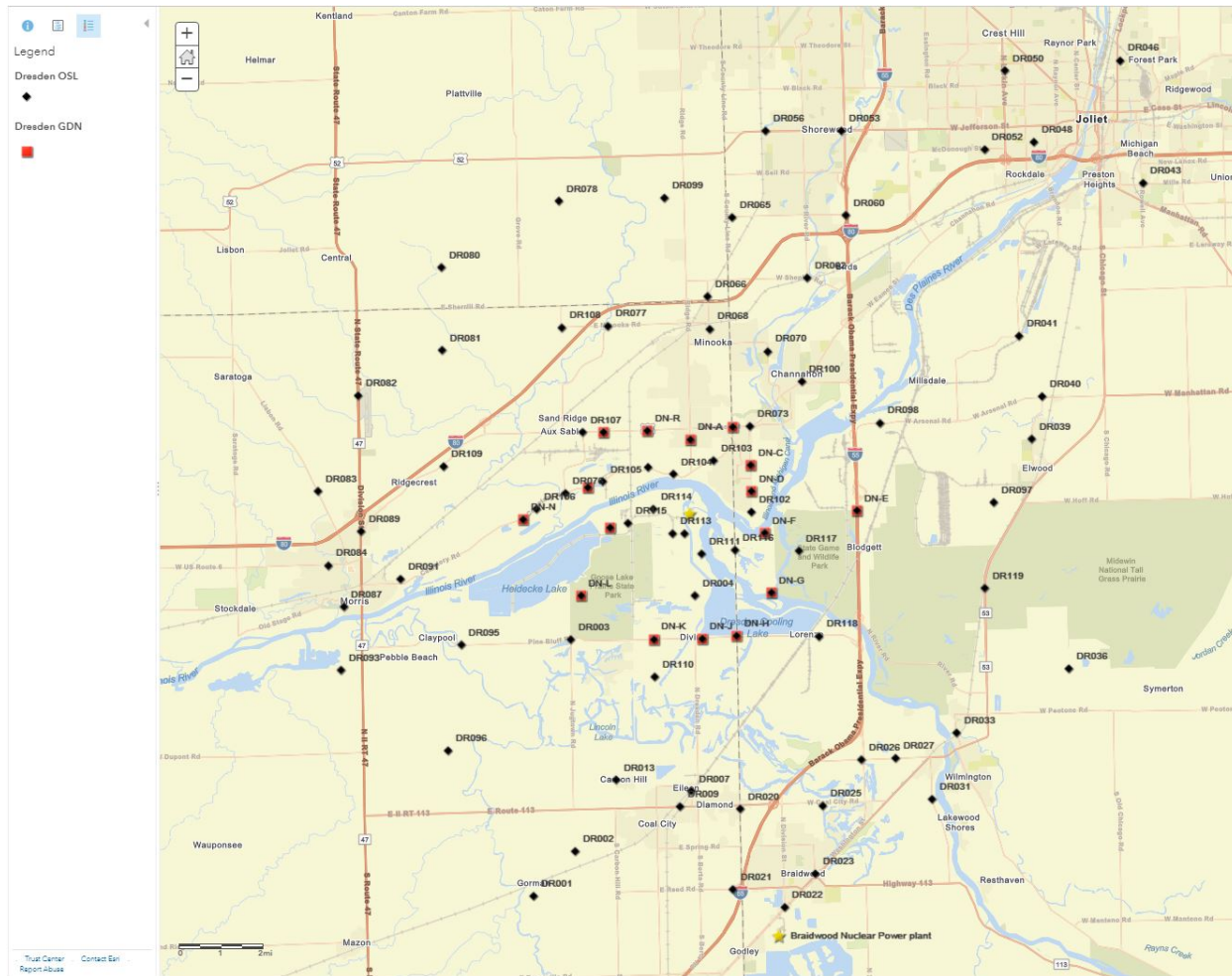


Figure 17. OSL and GDN Monitoring Locations - Dresden (continued)

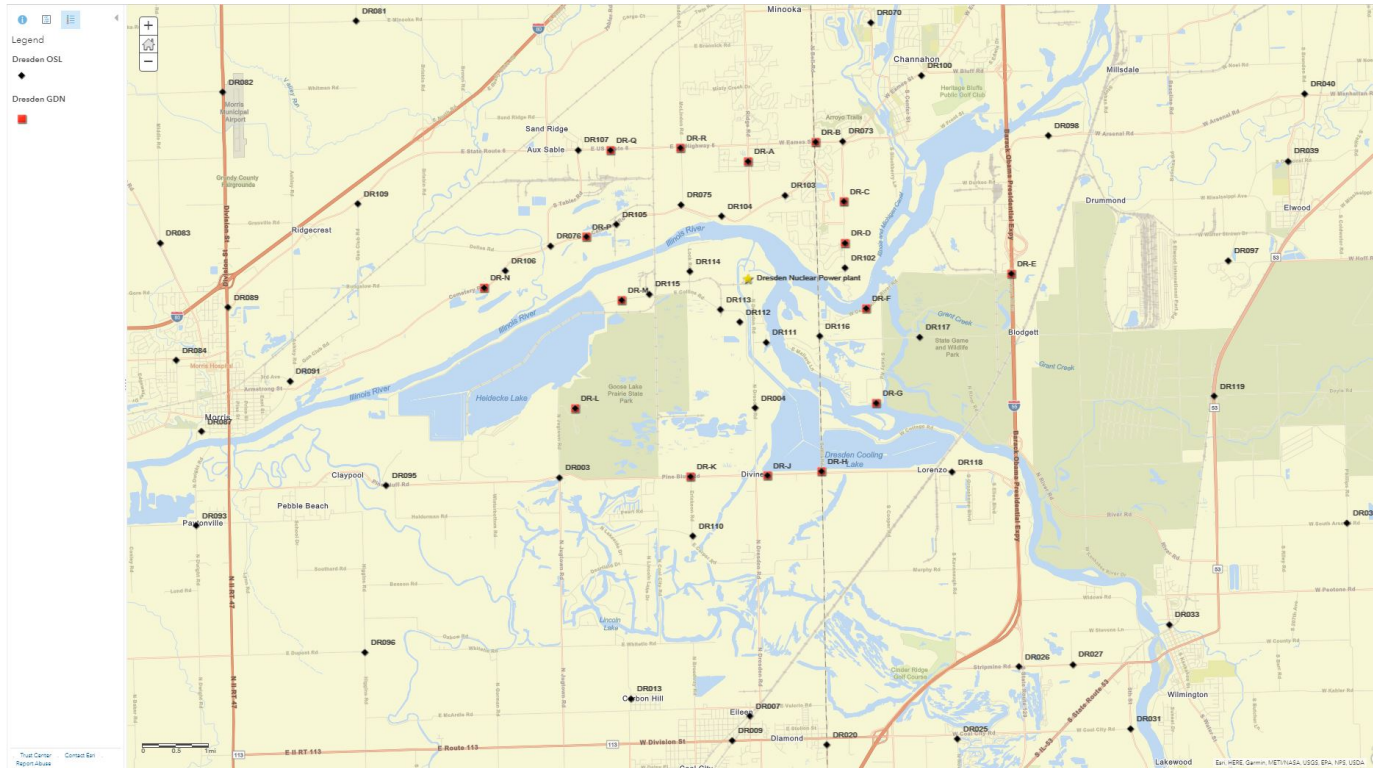


Figure 18. Environmental Sampling Locations - Dresden

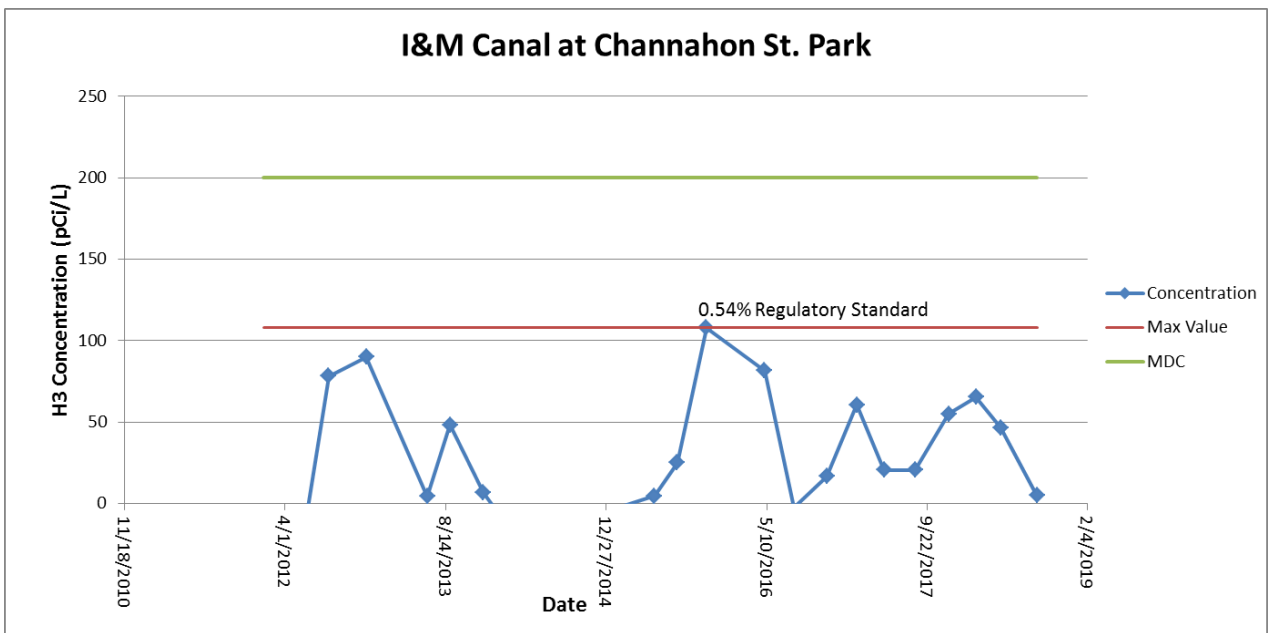
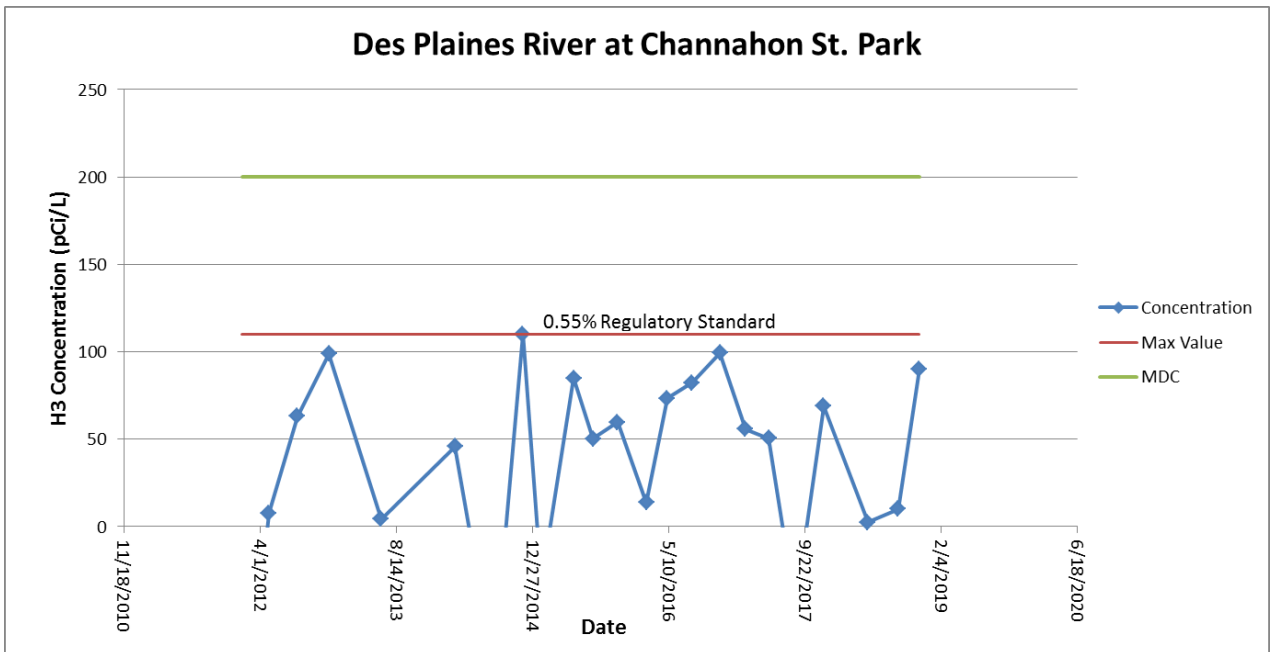


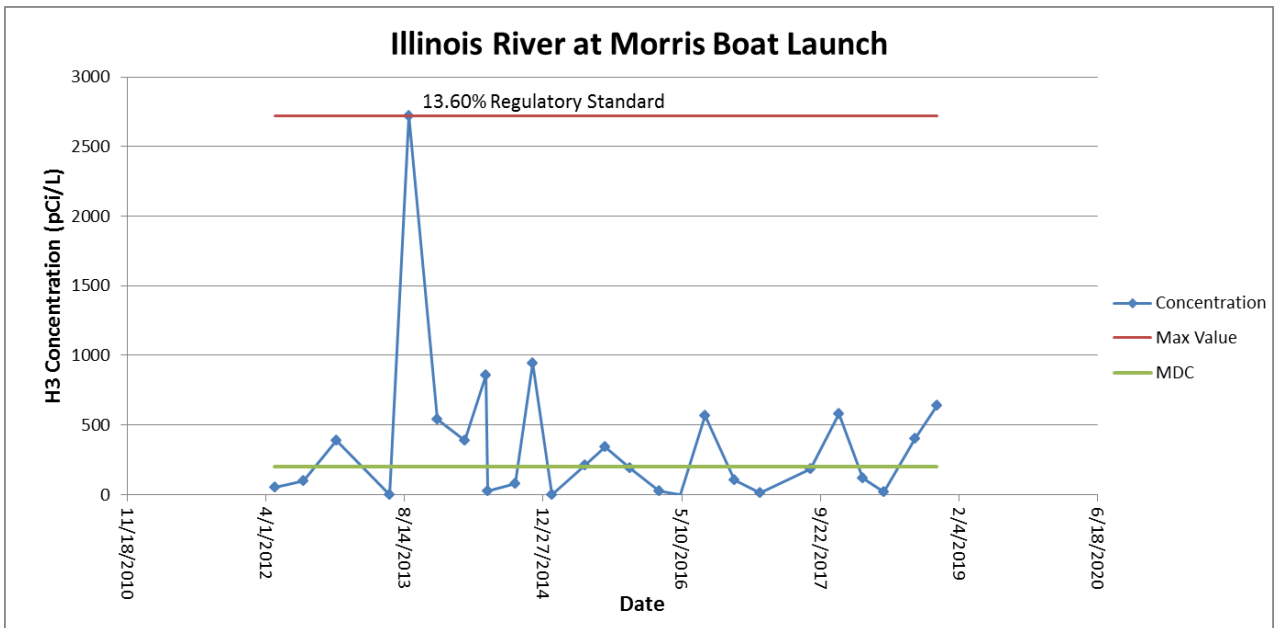
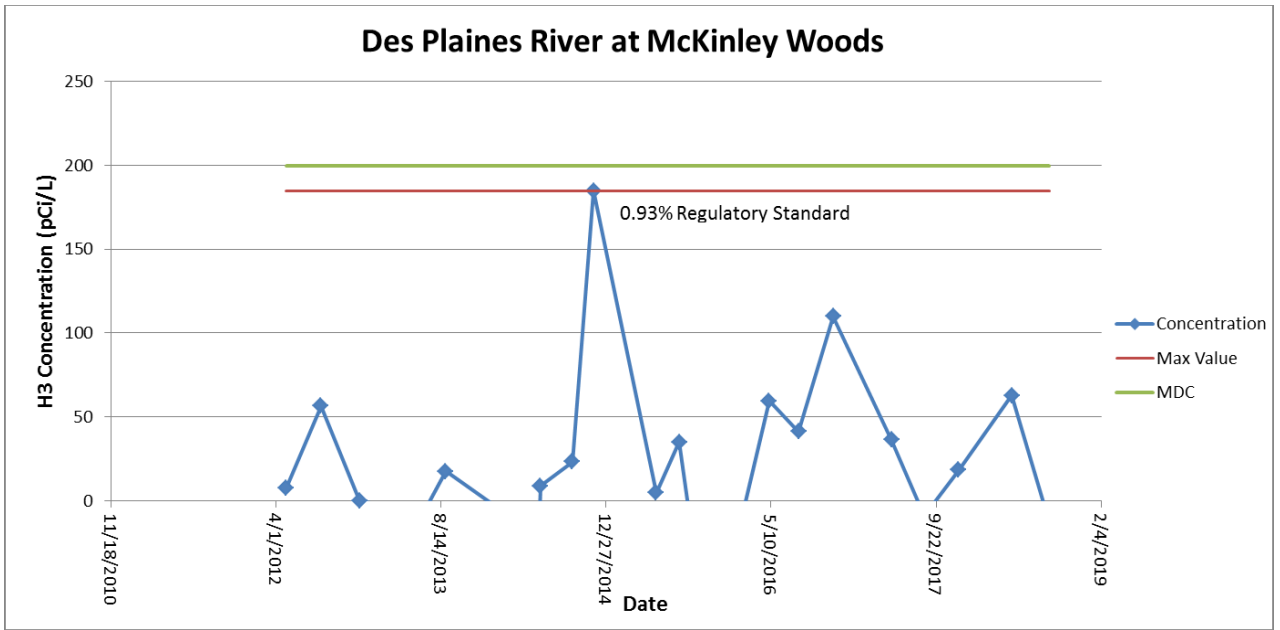
Dresden Sample Result Tables and Graphs

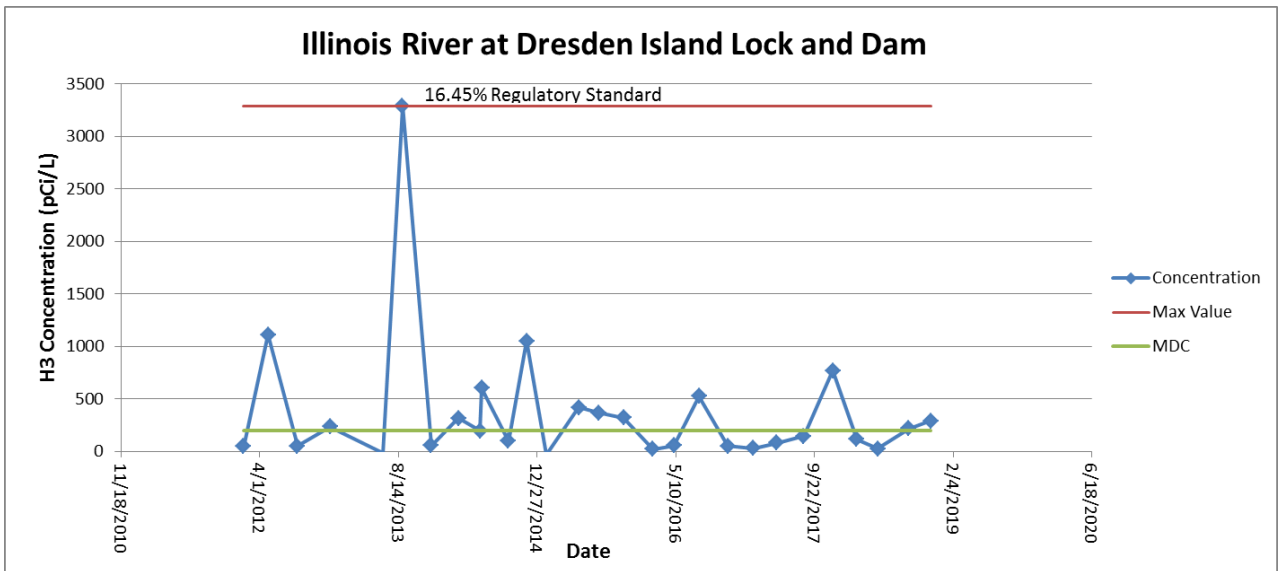
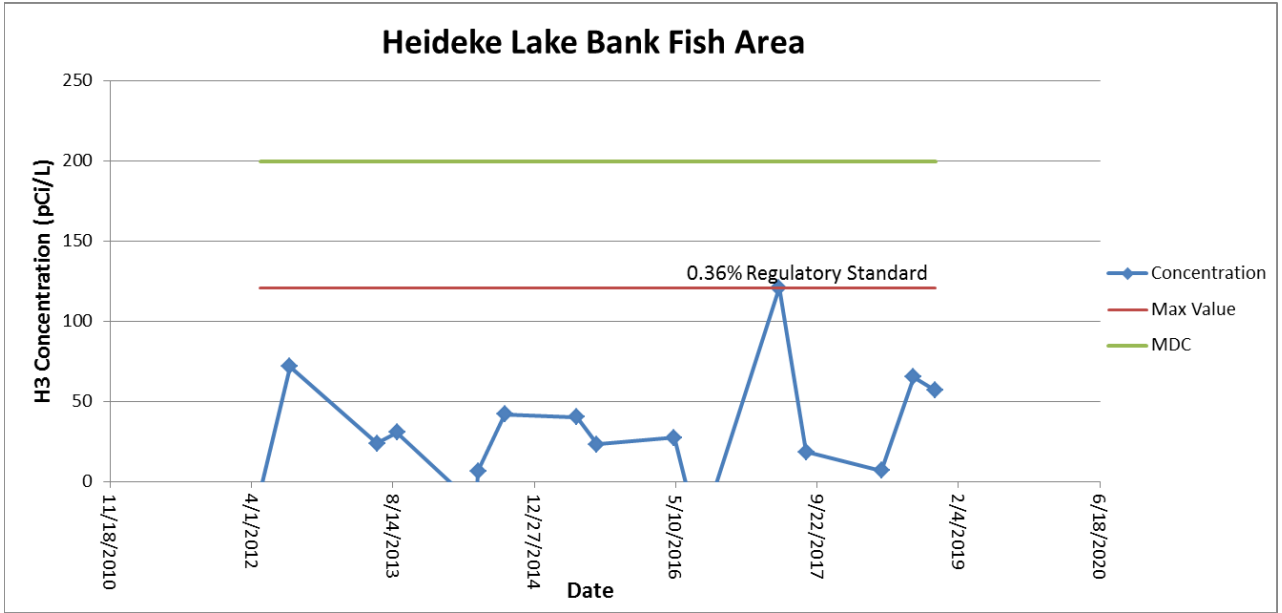
Tritium (H-3) in Water - Dresden
Results are in picocuries per liter (pCi/L)

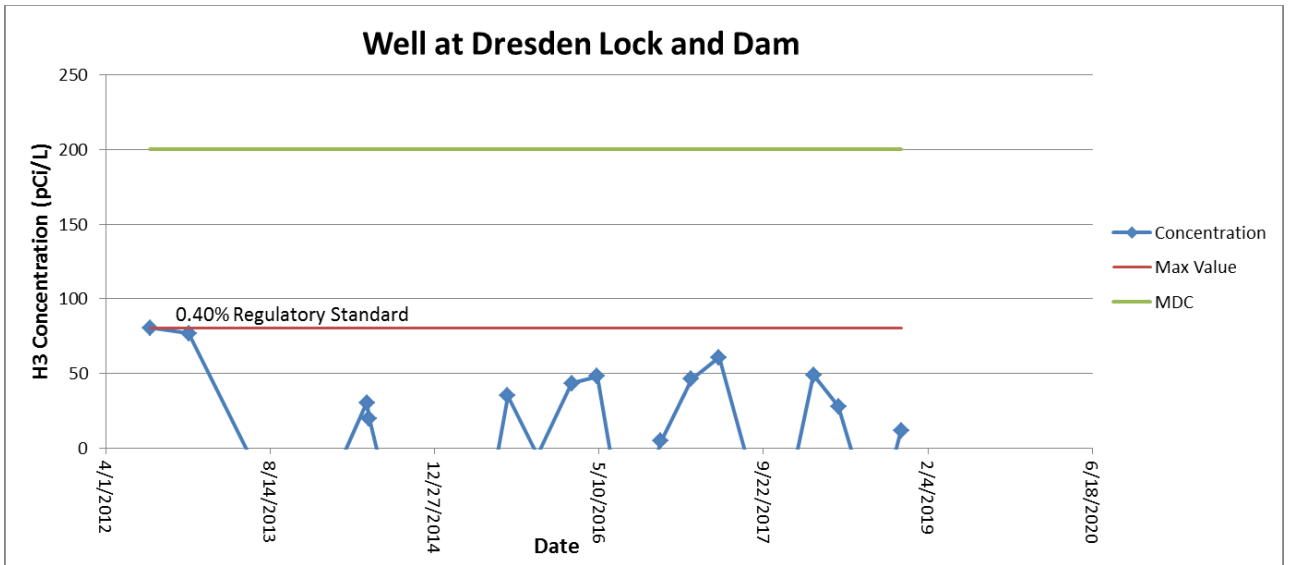
Location	H-3	
Date	Result	MDC
Des Plaines R. at Channahon		
5/9/2018	<MDC	181
8/30/2018	<MDC	181
11/15/2018	<MDC	181
Des Plaines R. at McKinley Woods		
5/9/2018	<MDC	181
8/30/2018	<MDC	181
Heideke Lake		
5/9/2018	<MDC	181
8/29/2018	<MDC	181
11/15/2018	<MDC	181
I & M Canal at Channahon		
2/21/2018	<MDC	181
5/9/2018	<MDC	181
8/30/2018	<MDC	181
Illinois R. at Dresden Lock & Dam		
2/21/2018	<MDC	181
5/9/2018	<MDC	181
8/29/2018	220	181
11/15/2018	293	181
Illinois R. at Morris		
2/21/2018	<MDC	181
5/9/2018	<MDC	181
8/29/2018	404	181
11/15/2018	639	181
Well at Dresden Lock & Dam		
2/21/2018	<MDC	181
5/9/2018	<MDC	181
8/29/2018	<MDC	181
11/15/2018	<MDC	181

Trending Graphs for Tritium (H-3) in Water - Dresden Area
 (Max value compared to IEPA and USEPA regulatory standard of 20,000 pCi/L)









Total Strontium in Water Results - Dresden Area
Results are in picocuries per liter (pCi/L)

Location Date	Strontium	
	Result	MDC
Illinois R. at Dresden Lock & Dam		
5/9/2018	<MDC	0.5
Illinois R. at Morris		
5/9/2018	0.7	0.5

Results for Beta Screening of Water - Dresden
Results are in picocuries per liter (pCi/L)

Location Date	Beta	
	Result	MDC
Des Plaines R. at Channahon		
5/9/2018	4.1	3.9
8/30/2018	5.8	3.9
11/15/2018	4.1	3.9
Des Plaines R. at McKinley Woods		
5/9/2018	5.6	3.9
8/30/2018	6.0	3.9
Heideke Lake		
5/9/2018	<MDC	3.9
8/29/2018	<MDC	3.9
11/15/2018	<MDC	3.9
I & M Canal at Channahon		
2/21/2018	<MDC	3.9
5/9/2018	5.3	3.9
8/30/2018	<MDC	3.9
Illinois R. at Dresden Lock & Dam		
2/21/2018	4.5	3.9
5/9/2018	<MDC	3.9
8/29/2018	4.5	3.9
11/15/2018	4.1	3.9
Illinois R. at Morris		
2/21/2018	4.2	3.9
5/9/2018	<MDC	3.9
8/29/2018	5.6	3.9
11/15/2018	<MDC	3.9
Well at Dresden Lock & Dam		
2/21/2018	15.2	3.9
5/9/2018	16.1	3.9
8/29/2018	18.4	3.9
11/15/2018	12.6	3.9

Gamma Spectroscopy Results for Other Radionuclides in Water - Dresden
Results are in picocuries per liter (pCi/L)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95	
Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC
Des Plaines R. at Channahon																								
5/9/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
8/30/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
11/15/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
Des Plaines R. at McKinley Woods																								
5/9/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
8/30/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
Heideke Lake																								
5/9/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
8/29/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
11/15/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
I & M Canal at Channahon																								
2/21/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
5/9/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
8/30/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
Illinois R. at Dresden Lock & Dam																								
2/21/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
5/9/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
8/29/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
11/15/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
Illinois R. at Morris																								
2/21/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
5/9/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
8/29/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
11/15/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
Well at Dresden Lock & Dam																								
2/21/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
5/9/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
8/29/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6
11/15/2018	<MDC	21.4	<MDC	360	<MDC	3.3	<MDC	3.9	<MDC	3.7	<MDC	3.9	<MDC	7.6	<MDC	9.1	<MDC	3.7	<MDC	4.2	<MDC	8.2	<MDC	6.6

Gamma Spectroscopy Results for Radionuclides in Soil (Migration) - Dresden
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95	
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result
Heideke Lake																						
5/9/2018	<MDC	1.54	<MDC	0.23	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.21	0.04	<MDC	0.14	<MDC	0.04	<MDC	0.09	<MDC	0.09	<MDC	0.12
8/29/2018	<MDC	1.54	<MDC	0.23	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.10	0.04	<MDC	0.14	<MDC	0.04	<MDC	0.09	<MDC	0.09	<MDC	0.12
Minooka Community High School																						
5/9/2018	<MDC	1.54	<MDC	0.23	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.10	0.04	<MDC	0.14	<MDC	0.04	<MDC	0.09	<MDC	0.09	<MDC	0.12
8/30/2018	<MDC	1.54	<MDC	0.23	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.08	0.04	<MDC	0.14	<MDC	0.04	<MDC	0.09	<MDC	0.09	<MDC	0.12

Gamma Spectroscopy Results for Radionuclides in Soil (Deposition) - Dresden
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95	
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result
Heideke Lake																						
5/9/2018	<MDC	1.54	<MDC	0.23	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.19	0.04	<MDC	0.14	<MDC	0.04	<MDC	0.09	<MDC	0.09	<MDC	0.12
8/29/2018	<MDC	1.54	<MDC	0.23	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.06	0.04	<MDC	0.14	<MDC	0.04	<MDC	0.09	<MDC	0.09	<MDC	0.12
Minooka Community High School																						
5/9/2018	<MDC	1.54	<MDC	0.23	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.09	0.04	<MDC	0.14	<MDC	0.04	<MDC	0.09	<MDC	0.09	<MDC	0.12
8/30/2018	<MDC	1.54	<MDC	0.23	<MDC	0.04	<MDC	0.03	<MDC	0.03	<MDC	0.04	<MDC	0.14	<MDC	0.04	<MDC	0.09	<MDC	0.09	<MDC	0.12

Gamma Spectroscopy Results for Radionuclides in Sediment - Dresden
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95	
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result
Des Plaines R. at Channahon																						
5/9/2018	<MDC	0.76	<MDC	0.08	<MDC	0.02	<MDC	0.02	<MDC	0.01	<MDC	0.02	<MDC	0.07	<MDC	0.02	<MDC	0.04	<MDC	0.04	<MDC	0.05
Illinois R. at Dresden Lock & Dam																						
5/9/2018	<MDC	0.76	<MDC	0.08	<MDC	0.02	<MDC	0.02	<MDC	0.01	0.11	0.02	<MDC	0.07	<MDC	0.02	<MDC	0.04	<MDC	0.04	<MDC	0.05

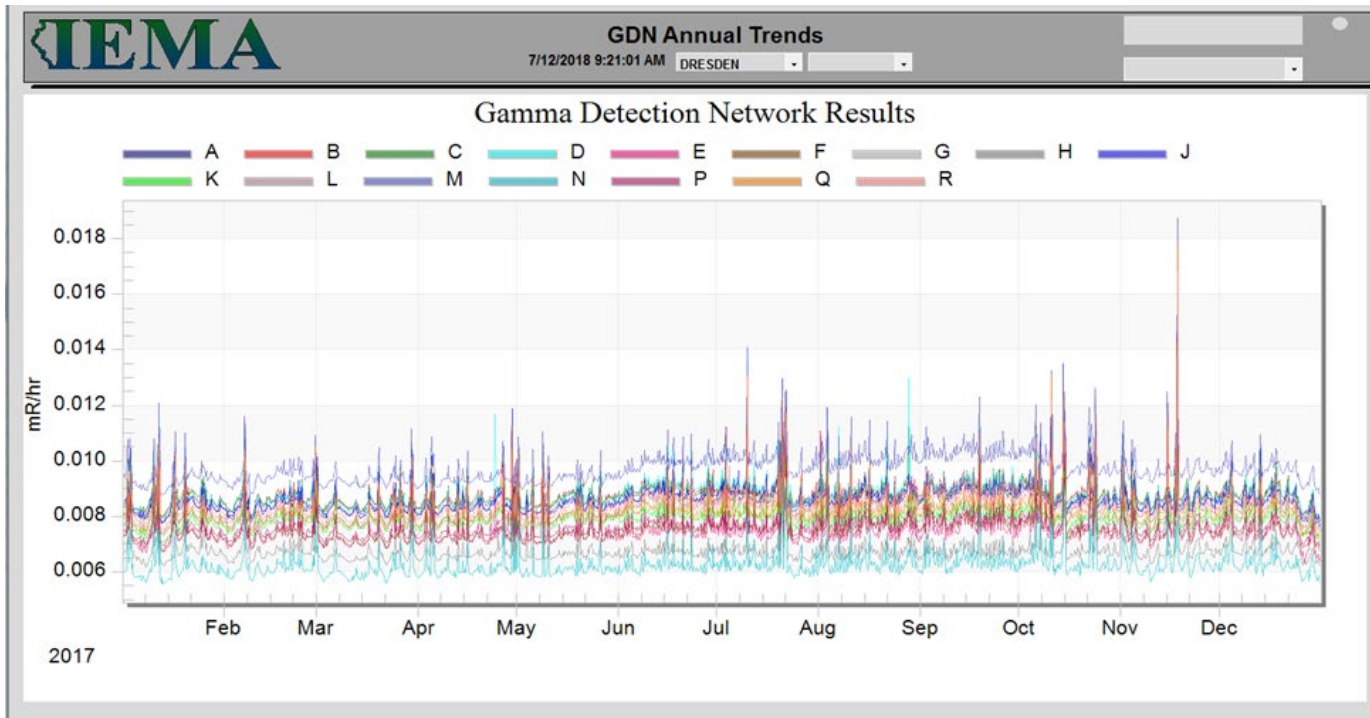
Gamma Spectroscopy Results for Radionuclides in Vegetation - Dresden
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95			
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	
Heideke Lake																										
5/9/2018	<MDC	2.5	<MDC	9.5	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.3	<MDC	2.6	<MDC	0.1	<MDC	0.2	<MDC	0.3	<MDC	0.3	<MDC	0.3
8/29/2018	<MDC	2.5	<MDC	9.5	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.3	<MDC	2.6	<MDC	0.1	<MDC	0.2	<MDC	0.3	<MDC	0.3	<MDC	0.3
Minooka Community High School																										
5/9/2018	<MDC	2.5	<MDC	9.5	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.3	<MDC	2.6	<MDC	0.1	<MDC	0.2	<MDC	0.3	<MDC	0.3	<MDC	0.3
8/30/2018	<MDC	2.5	<MDC	9.5	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.3	<MDC	2.6	<MDC	0.1	<MDC	0.2	<MDC	0.3	<MDC	0.3	<MDC	0.3

Gamma Spectroscopy Results for Radionuclides in Fish - Dresden
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95			
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	
Kanakee River Bottom Feeders																										
8/1/2018	<MDC	1750	<MDC	2600	<MDC	55	<MDC	41	<MDC	41	<MDC	41	<MDC	124	<MDC	2640	<MDC	41	<MDC	92	<MDC	92	<MDC	105	<MDC	105
Kanakee River Top Feeders																										
8/1/2018	<MDC	1750	<MDC	2600	<MDC	55	<MDC	41	<MDC	41	<MDC	41	<MDC	124	<MDC	2640	<MDC	41	<MDC	92	<MDC	92	<MDC	105	<MDC	105

Gamma Detection Network Results – Dresden
Results are in milliroentgen per hr (mR/hr)



Summary of Ambient Gamma Results - Dresden

Location	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual Exposure
	mR/quarter	mR/quarter	mR/quarter	mR/quarter	mR/year
DR001	4.6	4.1	7.0	5.1	20.8
DR002	4.7	4.7	6.1	7.6	23.0
DR003	3.4	4.7	6.8	6.5	21.4
DR004	5.7	8.5	8.1	8.9	31.1
DR007	5.1	6.0	8.3	7.8	27.2
DR013	5.6	7.1	7.2	7.7	27.6
DR021	2.0	5.5	6.8	6.3	20.6
DR022	5.7	6.0		7.8	25.9
DR023	2.8	3.9	4.9	6.7	18.3
DR026	3.1	4.3	6.1	6.0	19.5
DR027	2.8	5.7	6.8	7.8	23.2
DR031	4.3	5.7	6.8	6.5	23.3
DR033		3.3	5.2	4.4	17.2
DR036	5.5	7.2	8.9		28.7
DR039	8.1	9.8	10.7	9.9	38.5
DR040	6.4	6.3	9.7	10.8	33.1
DR041	3.5	6.0	7.2	9.3	26.0
DR043	7.4	7.8			30.5
DR046	3.3	2.6	4.7	5.7	16.2
DR048	7.0	7.5	9.0	8.6	32.1
DR050	3.2	4.9	7.6	6.4	22.1
DR052	7.0	6.7	9.5	8.6	31.8
DR053	2.7	3.9	5.1	5.8	17.6
DR056	7.8	10.0	9.6	8.7	36.1
DR060	5.1	4.1	7.8	7.7	24.6
DR062	6.9	7.8	10.2	9.3	34.3
DR065	7.1	8.9	9.8	10.8	36.5
DR066	4.6		7.9	6.7	25.6
DR068	4.2	6.6	6.9		23.6
DR070	4.6	6.9	8.1	7.4	27.0
DR073	5.8	7.4	7.5	7.8	28.6
DR075		7.8	9.4	8.7	34.6
DR076		3.2	7.7	5.2	21.4
DR077	4.9	5.2	9.8	7.5	27.4
DR078	7.8	7.7		11.1	35.5
DR080	8.2	10.9	11.0	10.3	40.3
DR081	6.2	7.2	9.8	8.3	31.5
DR082				11.1	44.5
DR083	4.5	4.8	8.1	6.6	24.0
DR084	5.5	6.8	6.8	8.9	27.9
DR087	5.4	6.7	7.6	8.0	27.6

Summary of Ambient Gamma Results - Dresden (continued)

Location	Quarter 1 mR/quarter	Quarter 2 mR/quarter	Quarter 3 mR/quarter	Quarter 4 mR/quarter	Annual Exposure mR/year
DR089	5.1	6.2	8.9	7.4	27.6
DR091	4.7	4.8	7.8		23.1
DR093	5.3	7.8	8.0	8.0	29.1
DR095	5.6	6.7	7.8	9.6	29.7
DR096	7.2	6.0		10.3	31.4
DR097	6.6	9.6	9.9	8.9	35.0
DR098	4.0	4.4	7.0	8.4	23.8
DR099	7.0	9.2	11.0	11.0	38.3
DR100	4.3	5.7	9.0	9.1	28.1
DR102	6.7	7.1		11.8	34.1
DR103	7.8	9.9	12.2	13.0	43.1
DR104	8.9	8.2	11.8	12.7	41.5
DR105	2.7	2.8	4.7	6.2	16.5
DR107	4.3	5.3	8.2	7.8	25.6
DR108	5.7	8.6		10.4	32.9
DR109	8.4	8.7	10.3	12.6	40.0
DR110	2.9	3.8	4.4		14.8
DR111	3.4	4.5	6.3	6.8	20.9
DR113	9.5	7.2	10.8	12.0	39.4
DR114	9.2	7.8	11.5	11.8	40.3
DR115	7.2	9.2	10.3	10.0	36.8
DR116	3.8	4.3	6.6	7.6	22.3
DR117	4.7	6.7	8.8	8.8	28.8
DR118		7.2	7.1	5.2	26.0
DR119	6.4	7.1	8.1	8.8	30.4
DR-RSA	6.9	7.2	9.2	7.9	31.3
DR-RSB	7.3	9.2	8.7	11.0	36.1
DR-RSC	7.5	7.2	10.1	8.8	33.6
DR-RSD	7.7	10.4	11.9	11.4	41.3
DR-RSE	5.9	3.9	6.5	8.0	24.4
DR-RSF	4.7	4.8	7.1	6.4	23.0
DR-RSG	6.3	5.5	7.0	6.7	25.5
DR-RSH	5.7	3.7	6.6	6.1	22.0
DR-RSJ	5.4	4.9	7.6	6.8	24.6
DR-RSK	5.6	6.7	6.4	6.1	24.7
DR-RSL	6.8	8.5	7.9	8.2	31.5
DR-RSM	11.2	11.6	11.9	10.4	45.1
DR-RSN	3.7	4.0	5.4	6.0	19.2
DR-RSP	5.2	5.2	7.1	6.9	24.5
DR-RSQ	5.0	4.2	7.1	8.3	24.6
DR-RSR	7.6	6.6	9.1	8.9	32.1

Blanks in the table indicate that dosimeters were missing at the end of the quarter.

Annual Exposure column based on averages of all available data.

Quarter length is estimated to be 91.25 days.

LaSalle Nuclear Power Station

The LaSalle Nuclear Power Station, consisting of two 3,546 Megawatt BWRs is owned and operated by the Exelon Corporation, and is located in LaSalle County, Illinois. Unit 1 began operation on March 16, 1982, and Unit 2 on December 2, 1983. The site is located approximately 75 miles southwest of Chicago, Illinois.



Liquid effluents from the LaSalle Station are released to the LaSalle cooling lake in accordance to release limits governed by the station's license with the NRC and the plant's IEPA National Pollutant Discharge Elimination System permit, and from there to the Illinois River at a point 3.5 miles north of the station. However, the discharge point is approximately 20 miles downriver of the Dresden Nuclear Power Station. Effectively, samples taken downstream of Dresden station are upstream controls for the LaSalle station. No liquid effluents were discharged in 2018.

Figures 19-21 provide an overview of all sampling and monitoring locations in the vicinity of the LaSalle Nuclear Power Station (yellow star).

Sampling and Monitoring Results

Water Sampling Results

Detectable levels of tritium were found in all Illinois River surface water samples taken in October 2018. The elevated levels are attributable to the liquid effluent releases from the Braidwood station or the radioactive effluents released from the Dresden sewage treatment plant and storm sewer system as unmonitored liquid releases. All tritium levels were well below the Drinking Water Standards established by the USEPA and IEPA.

Results from Gross Beta analysis indicated that the established MDC was met at some sampling locations and can be attributed to the liquid effluent releases from the Braidwood station or the radioactive effluents released from the Dresden sewage treatment plant and storm sewer system as unmonitored liquid releases.

Results from total strontium and gamma spectroscopy analysis indicated no concentrations above the established MDCs.

Soil Sampling Results

Gamma spectroscopy results for soil samples indicated no concentrations of reactor-produced radionuclides above background. Cesium-137 in concentrations greater than the established MDC was seen, but was consistent with soil concentrations historically found from atmospheric nuclear weapons testing.

Sediment Sampling Results

Gamma spectroscopy results for sediment samples indicated no concentrations above the established MDC.

Vegetation Sampling Results

Gamma spectroscopy results for vegetation samples indicated no concentrations above the established MDC.

Fish Sampling Results

Gamma spectroscopy results for fish samples indicated no concentrations above the established MDC.

Direct Radiation Monitoring Results

The ambient gamma monitoring results were consistent with results found at the background monitoring locations at Sangchris Lake State Park near Kincaid, IL

LaSalle Maps of Monitoring and Sampling Locations

Figure 19. OSL and GDN Monitoring Locations – LaSalle

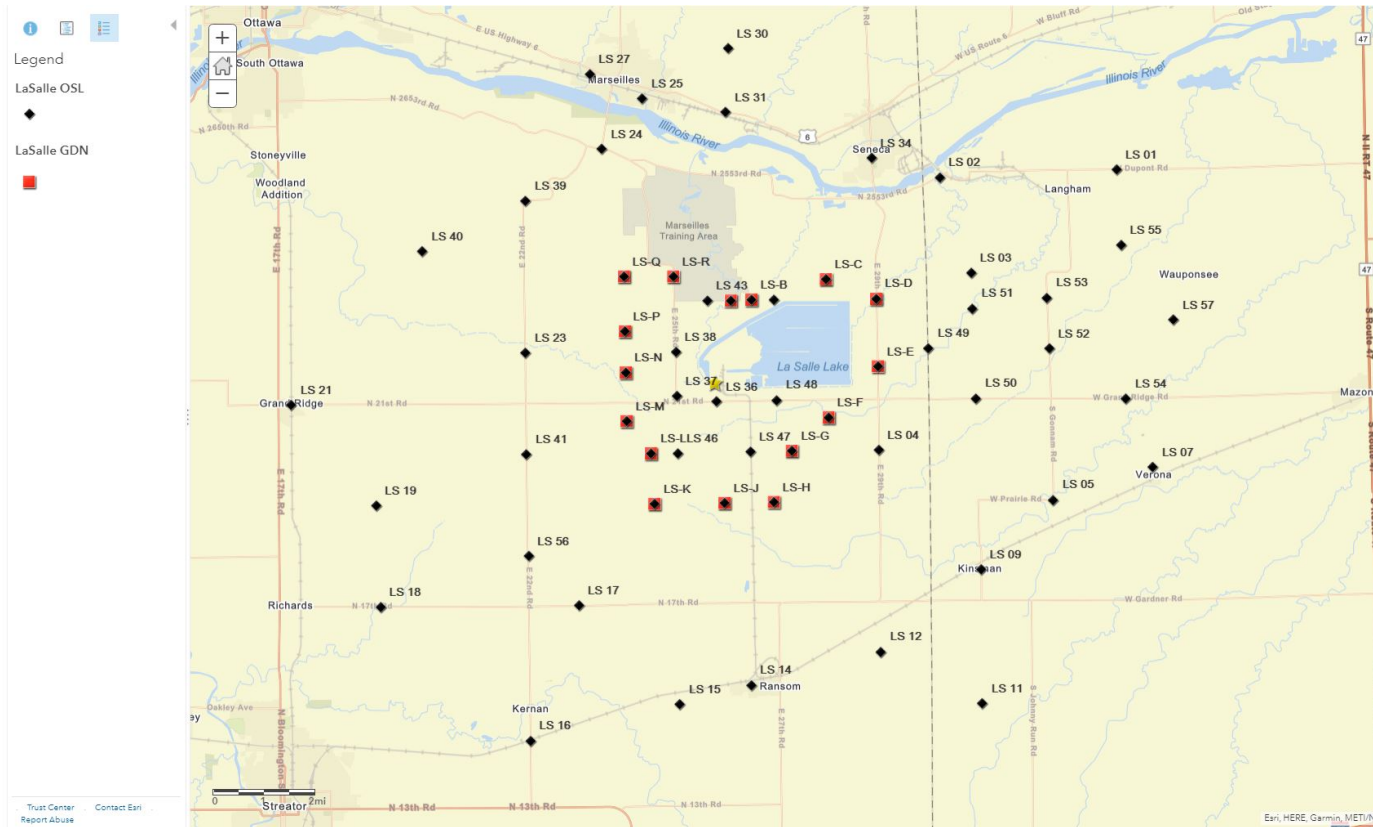


Figure 20. OSL and GDN Monitoring Locations (continued) – LaSalle

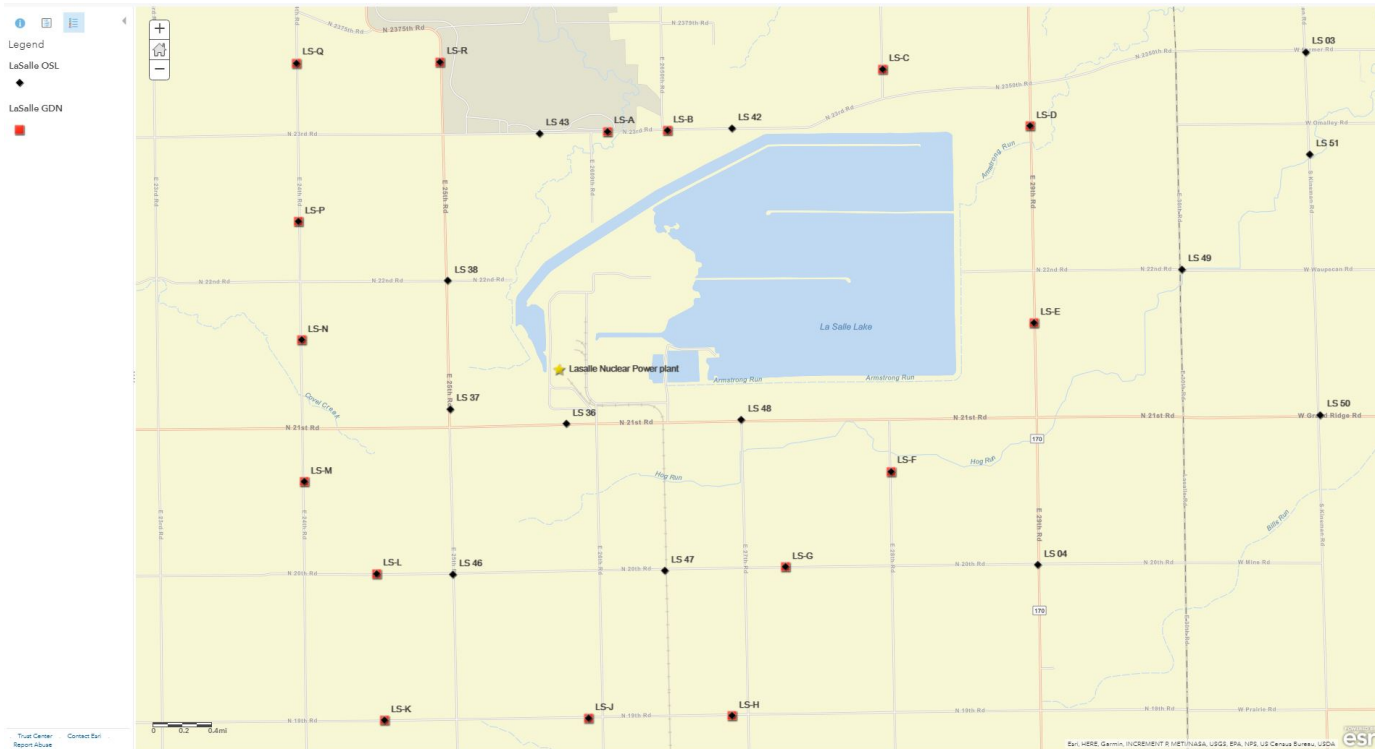
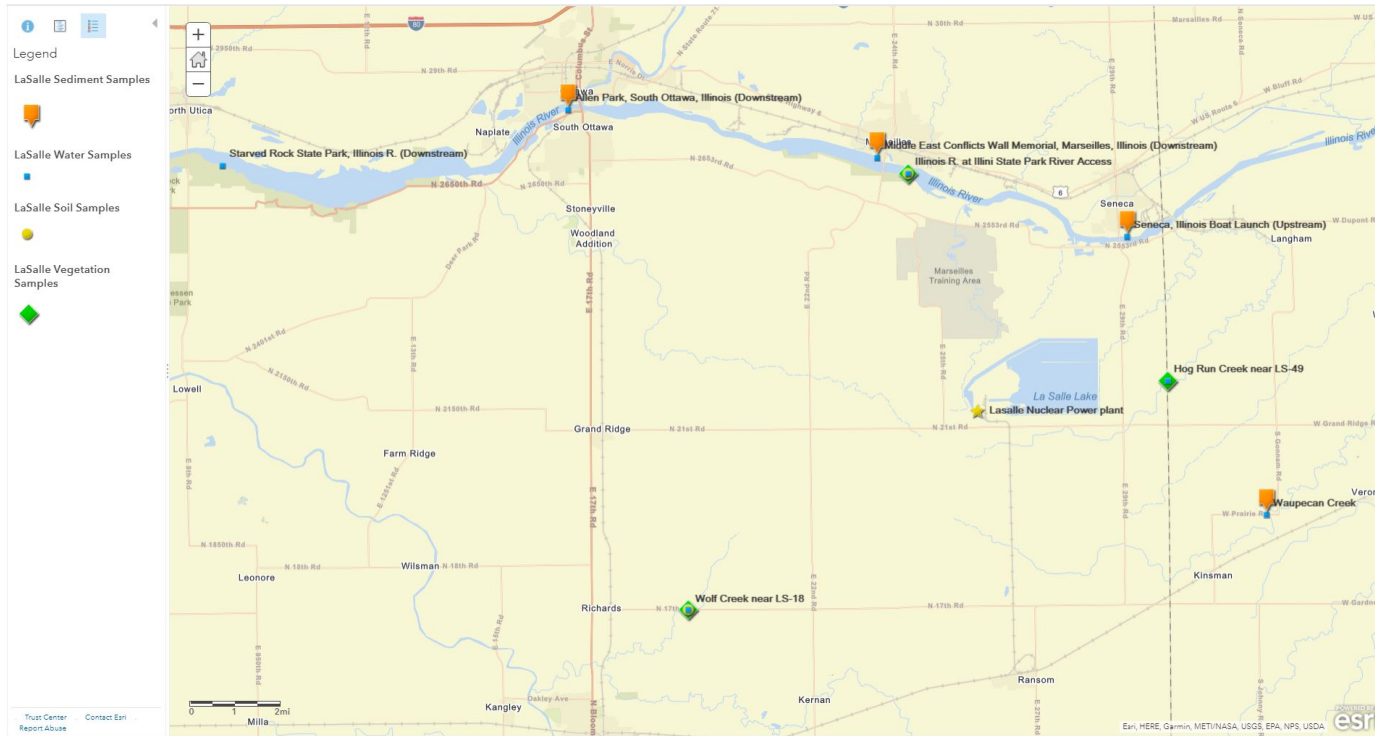


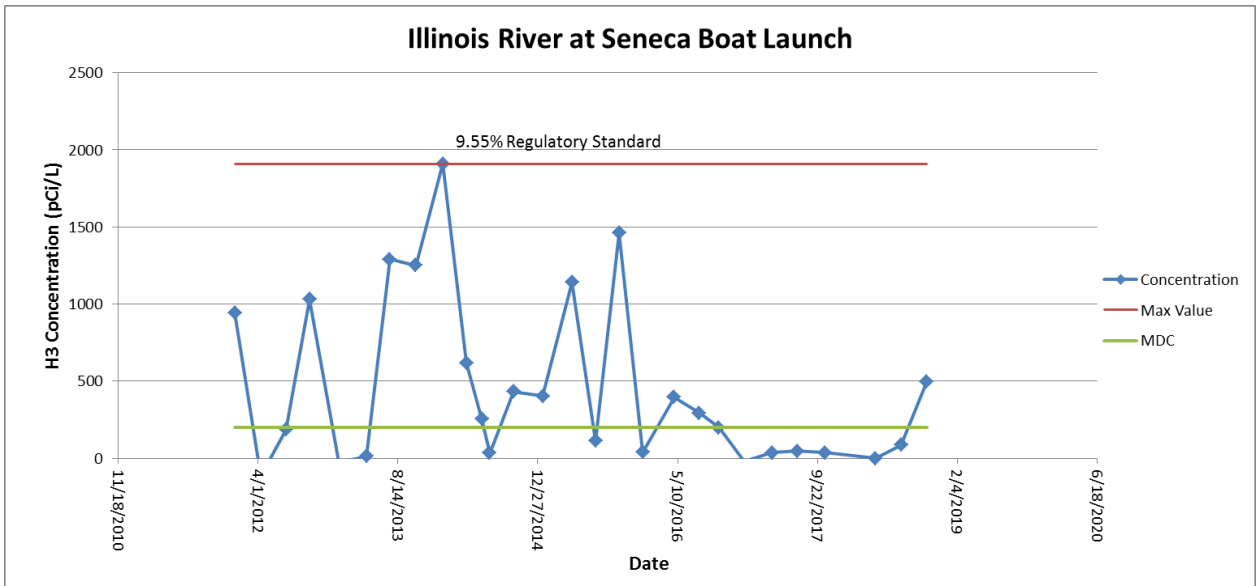
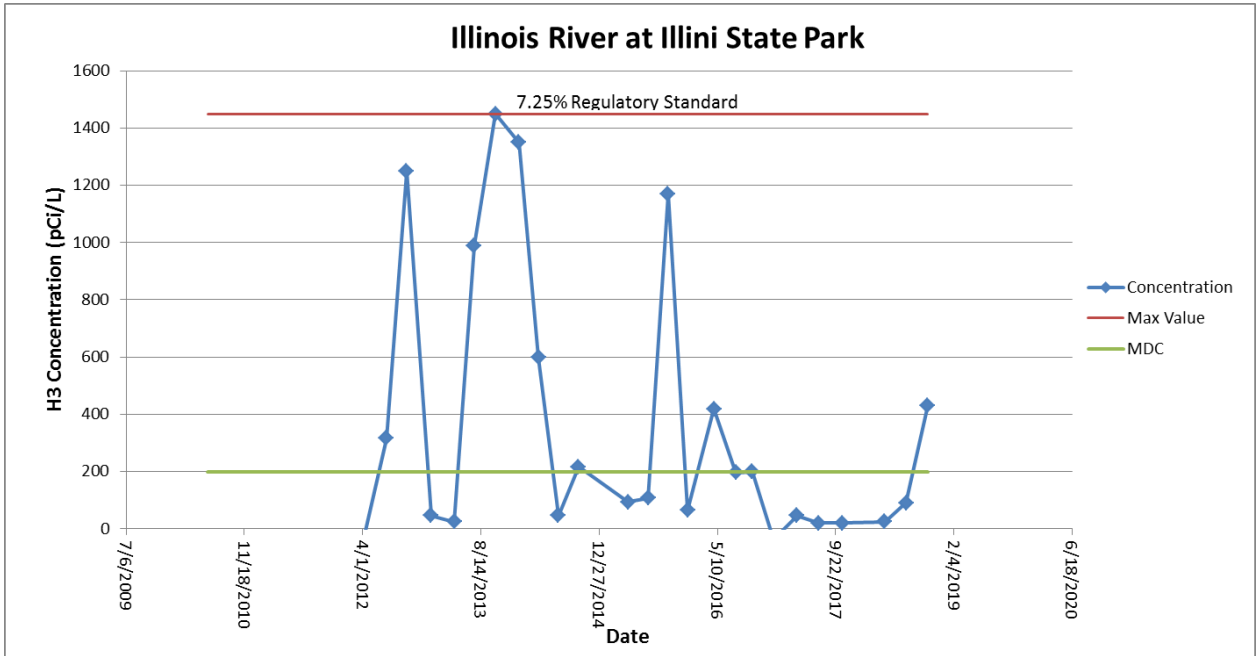
Figure 21. Environmental Sampling Locations - LaSalle

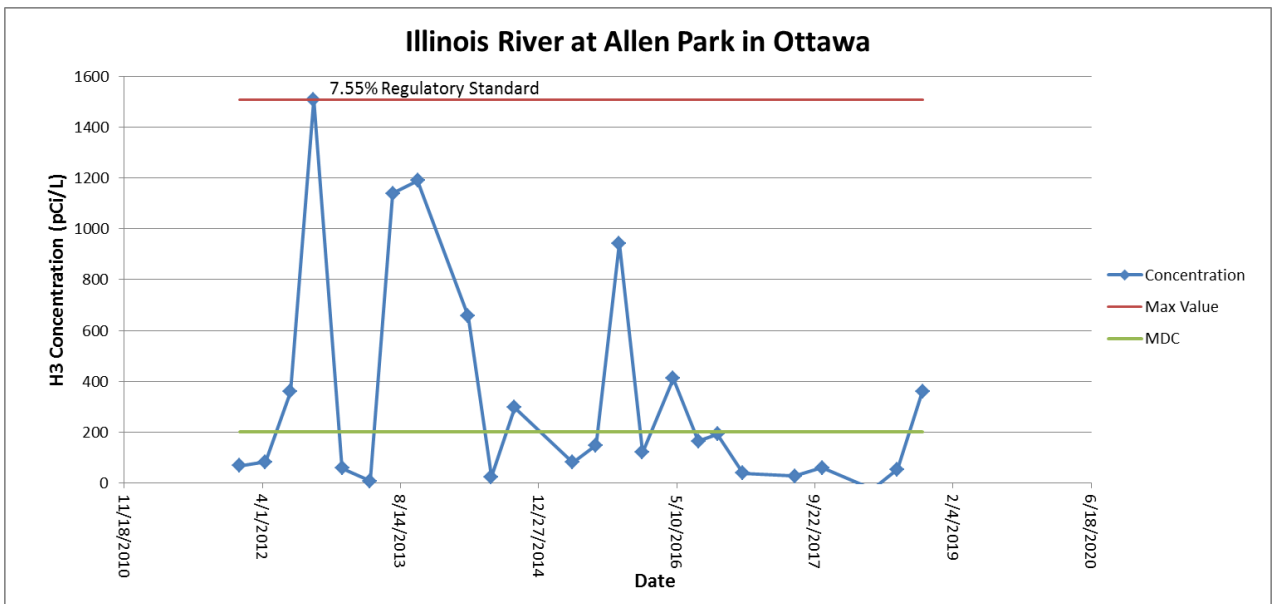
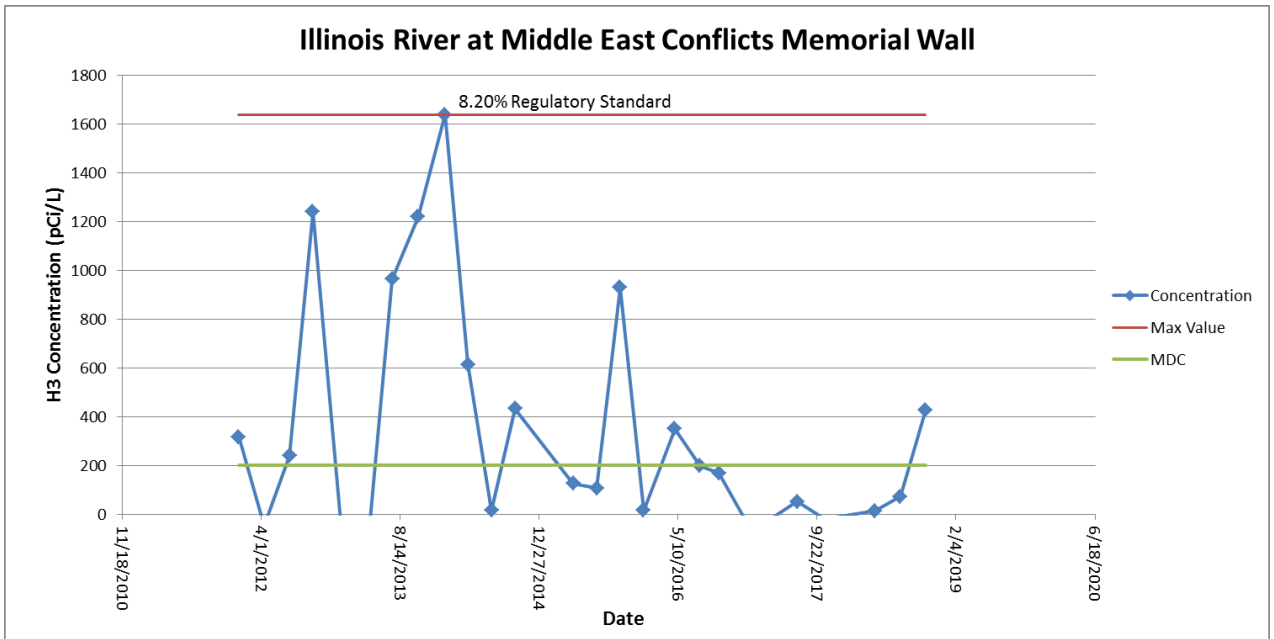


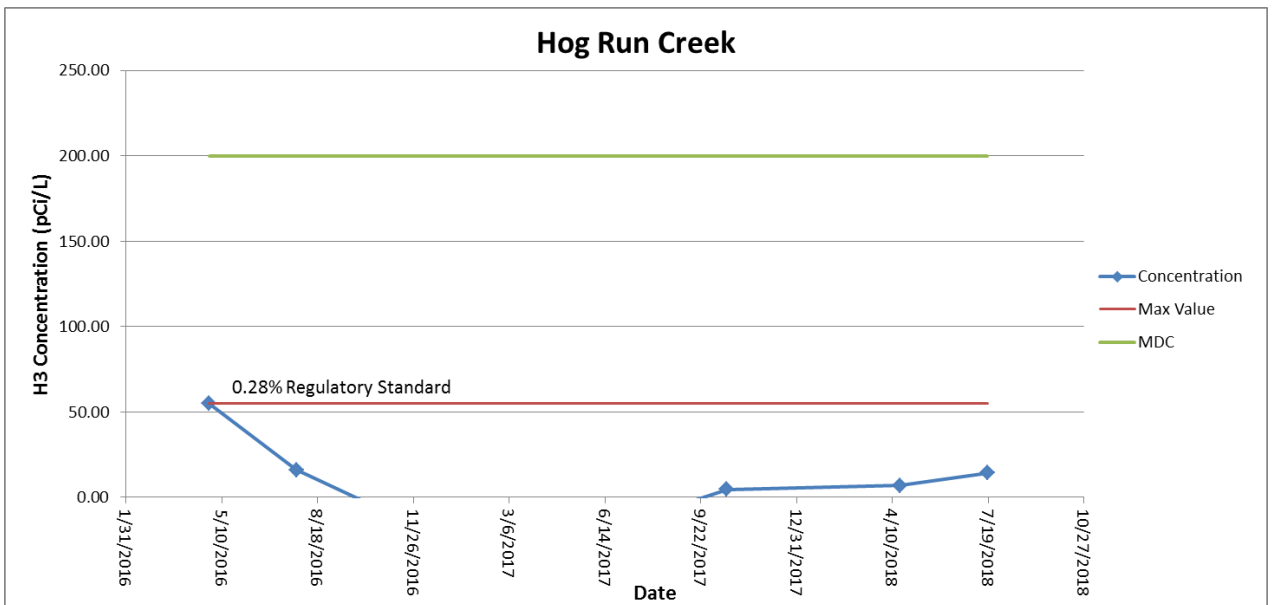
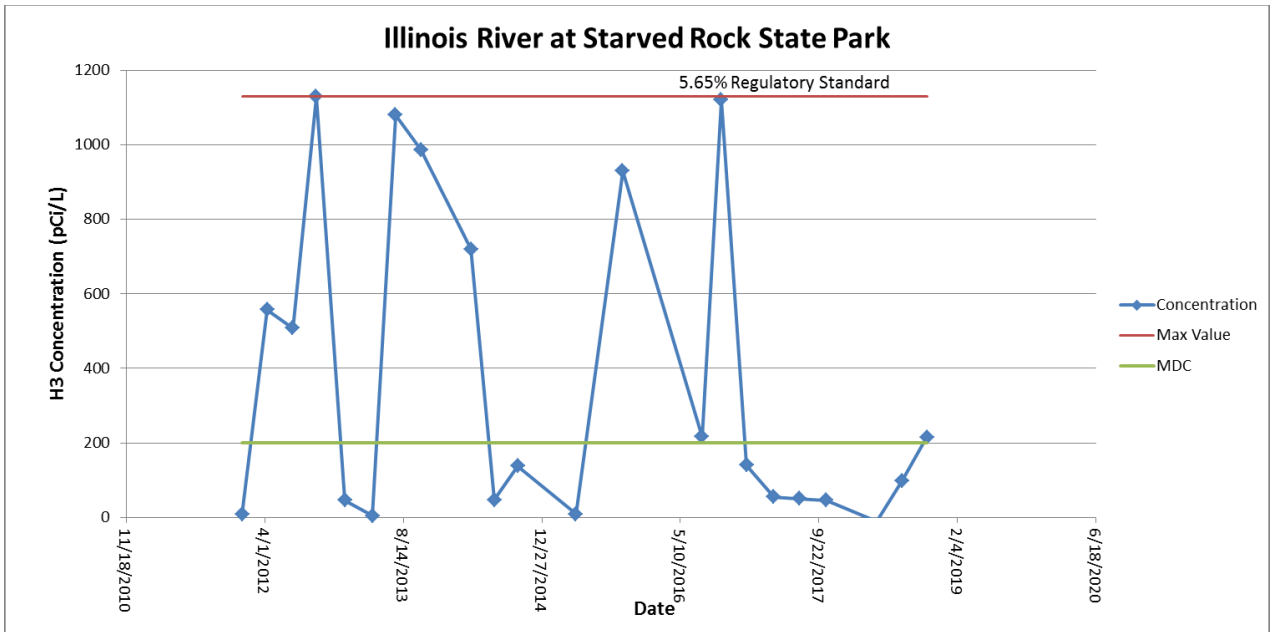
LaSalle Sample Result Tables and Graphs
 Tritium (H-3) in Water Results - LaSalle
 Results are in picocuries per liter (pCi/L)

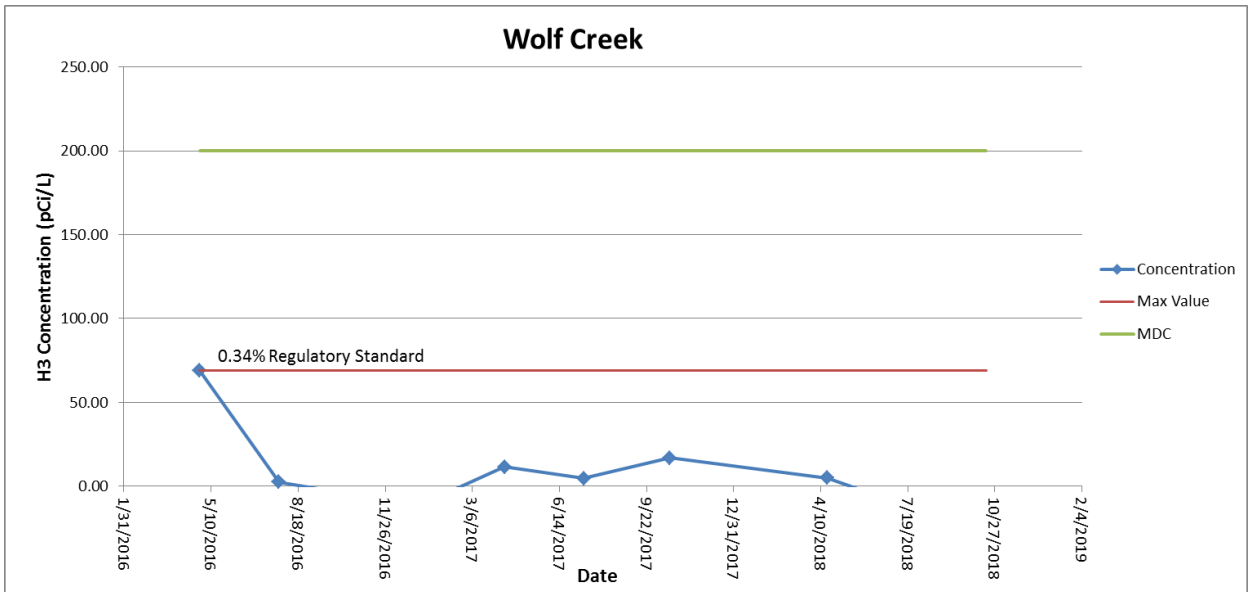
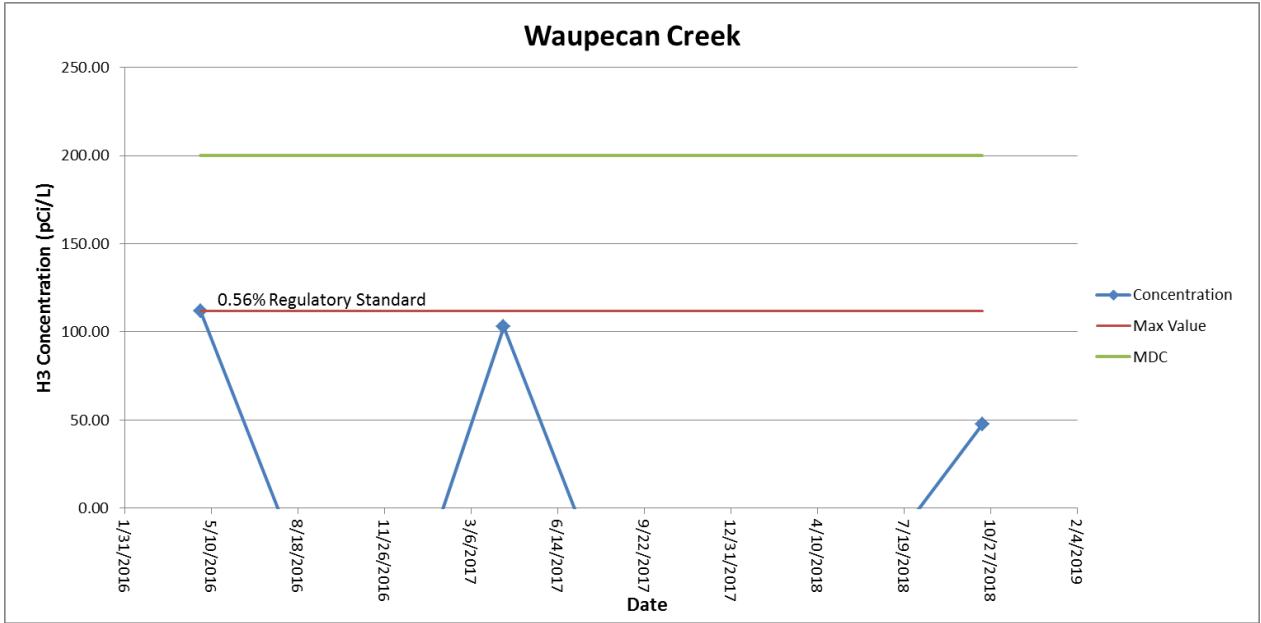
Location	H-3	
Date	Result	MDC
Allen Park, South Ottawa		
4/18/2018	<MDC	181
7/18/2018	<MDC	181
10/17/2018	360	181
Hog Run Creek near LS-49		
4/18/2018	<MDC	181
7/18/2018	<MDC	181
10/17/2018	<MDC	181
Illinois R. at Illini State Park		
4/18/2018	<MDC	181
7/18/2018	<MDC	181
10/17/2018	431	181
Middle East Conflicts Wall Memorial, Marseilles		
4/18/2018	<MDC	181
7/18/2018	<MDC	181
10/17/2018	429	181
Seneca, Illinois Boat Launch		
4/18/2018	<MDC	181
7/18/2018	<MDC	181
10/17/2018	497	181
Starved Rock State Park		
4/18/2018	<MDC	181
7/18/2018	<MDC	181
10/17/2018	215	181
Waupecan Creek near LS-5		
4/18/2018	<MDC	181
7/18/2018	<MDC	181
10/17/2018	<MDC	181
Wolf Creek near LS-18		
4/18/2018	<MDC	181
7/18/2018	<MDC	181
10/17/2018	<MDC	181

Trending Graphs for Tritium (H-3) in Water - LaSalle
 (Max value compared to IEPA and USEPA Class regulatory standard of 20,000 pCi/L)









Total Strontium in Water Results - LaSalle
Results are in picocuries per liter (pCi/L)

Location	Strontium	
Date	Result	MDC
Illinois R. at Illini State Park		
4/18/2018	<MDC	0.44

Results for Beta Screening of Water - LaSalle
Results are in picocuries per liter (pCi/L)

Location Date	Beta	
	Result	MDC
Allen Park, South Ottawa		
4/18/2018	<MDC	3.7
7/18/2018	5.2	3.7
10/17/2018	4.2	3.7
Hog Run Creek near LS-49		
4/18/2018	<MDC	3.7
7/18/2018	<MDC	3.7
10/17/2018	<MDC	3.7
Illinois R. at Illini State Park		
4/18/2018	<MDC	3.7
7/18/2018	4.3	3.7
10/17/2018	<MDC	3.7
Middle East Conflicts Wall Memorial, Marseilles		
4/18/2018	5.4	3.7
7/18/2018	3.8	3.7
10/17/2018	3.7	3.7
Seneca, Illinois Boat Launch		
4/18/2018	4.6	3.7
7/18/2018	5.9	3.7
10/17/2018	3.7	3.7
Starved Rock State Park		
4/18/2018	4.3	3.7
7/18/2018	5.3	3.7
10/17/2018	<MDC	3.7
Waupecan Creek near LS-5		
4/18/2018	<MDC	3.7
7/18/2018	<MDC	3.7
10/17/2018	<MDC	3.7
Wolf Creek near LS-18		
4/18/2018	<MDC	3.7
7/18/2018	<MDC	3.7
10/17/2018	<MDC	3.7

Gamma Spectroscopy Results for Other Radionuclides in Water - LaSalle
Results are in picocuries per liter (pCi/L)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95	
Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC
Allen Park, South Ottawa																								
4/18/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
7/18/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
10/17/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
Hog Run Creek near LS-49																								
4/18/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
7/18/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
10/17/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
Illinois R. at Illini State Park																								
4/18/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
7/18/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
10/17/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
Middle East Conflicts Wall Memorial, Marseilles																								
4/18/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
7/18/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
10/17/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
Seneca, Illinois Boat Launch																								
4/18/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
7/18/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
10/17/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
Starved Rock State Park																								
4/18/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
7/18/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
10/17/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
Waupecan Creek near LS-5																								
4/18/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
7/18/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
10/17/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
Wolf Creek near LS-18																								
4/18/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
7/18/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8
10/17/2018	<MDC	25.3	<MDC	370	<MDC	3.7	<MDC	3.8	<MDC	3.8	<MDC	3.8	<MDC	8.2	<MDC	11.5	<MDC	3.7	<MDC	4.5	<MDC	7.6	<MDC	6.8

Gamma Spectroscopy Results for Radionuclides in Soil (Migration) - LaSalle
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95		
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC
Illini State Park																							
4/18/2018	<MDC	0.50	<MDC	0.19	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.10	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08	
7/18/2018	<MDC	0.50	<MDC	0.19	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.18	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08	
Wolf Creek near LS-18																							
4/18/2018	<MDC	0.50	<MDC	0.19	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.11	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08	
7/18/2018	<MDC	0.50	<MDC	0.19	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.15	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08	

Gamma Spectroscopy Results for Radionuclides in Soil (Migration) - LaSalle
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95		
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC
Illini State Park																							
4/18/2018	<MDC	0.50	<MDC	0.19	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.08	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08	
7/18/2018	<MDC	0.50	<MDC	0.19	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.13	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08	
Wolf Creek near LS-18																							
4/18/2018	<MDC	0.50	<MDC	0.19	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.07	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08	
7/18/2018	<MDC	0.50	<MDC	0.19	<MDC	0.03	<MDC	0.03	<MDC	0.02	0.10	0.04	<MDC	0.08	<MDC	0.03	<MDC	0.05	<MDC	0.07	<MDC	0.08	

Gamma Spectroscopy Results for Radionuclides in Sediment- LaSalle
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95			
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	
Allen Park, South Ottawa																								
4/18/2018	<MDC	0.13	<MDC	0.14	<MDC	0.02	<MDC	0.02	<MDC	0.02	<MDC	0.02	<MDC	0.05	<MDC	0.02	<MDC	0.03	<MDC	0.05	<MDC	0.05	<MDC	0.05
7/18/2018	<MDC	0.13	<MDC	0.14	<MDC	0.02	<MDC	0.02	<MDC	0.02	<MDC	0.02	<MDC	0.05	<MDC	0.02	<MDC	0.03	<MDC	0.05	<MDC	0.05	<MDC	0.05
Middle East Conflicts Wall Memorial, Marseilles																								
7/18/2018	<MDC	0.13	<MDC	0.14	<MDC	0.02	<MDC	0.02	<MDC	0.02	<MDC	0.02	<MDC	0.05	<MDC	0.02	<MDC	0.03	<MDC	0.05	<MDC	0.05	<MDC	0.05
Seneca, Illinois Boat Launch																								
4/18/2018	<MDC	0.13	<MDC	0.14	<MDC	0.02	<MDC	0.02	<MDC	0.02	<MDC	0.02	<MDC	0.05	<MDC	0.02	<MDC	0.03	<MDC	0.05	<MDC	0.05	<MDC	0.05
7/18/2018	<MDC	0.13	<MDC	0.14	<MDC	0.02	<MDC	0.02	<MDC	0.02	<MDC	0.02	<MDC	0.05	<MDC	0.02	<MDC	0.03	<MDC	0.05	<MDC	0.05	<MDC	0.05

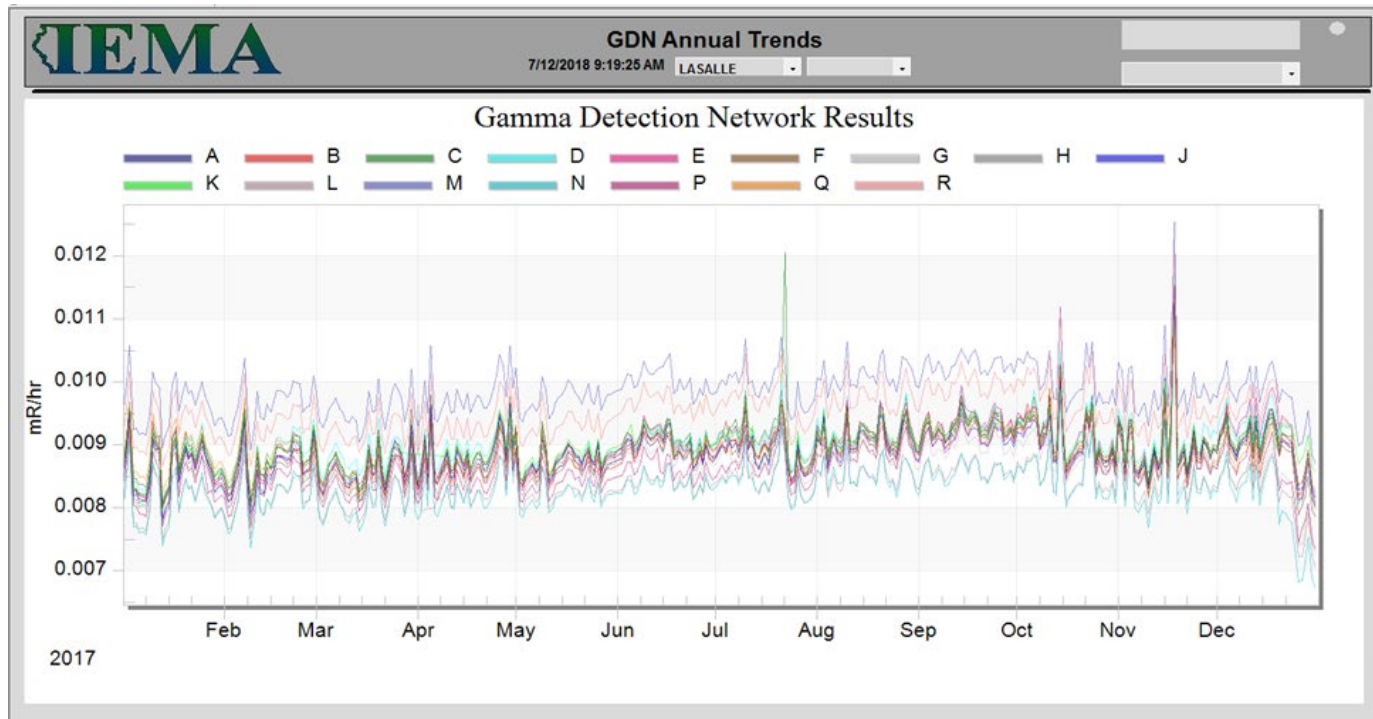
Gamma Spectroscopy Results for Radionuclides in Vegetation - LaSalle
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95			
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	
Hog Run Creek near LS-49																										
4/18/2018	<MDC	0.9	<MDC	2.3	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	0.8	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	0.2	<MDC	0.2
7/18/2018	<MDC	0.9	<MDC	2.3	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	0.8	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	0.2	<MDC	0.2
Illini State Park																										
4/18/2018	<MDC	0.9	<MDC	2.3	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	0.8	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	0.2	<MDC	0.2
7/18/2018	<MDC	0.9	<MDC	2.3	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	0.8	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	0.2	<MDC	0.2
Wolf Creek near LS-18																										
4/18/2018	<MDC	0.9	<MDC	2.3	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	0.8	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	0.2	<MDC	0.2
7/18/2018	<MDC	0.9	<MDC	2.3	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	0.8	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	0.2	<MDC	0.2

Gamma Spectroscopy Results for Radionuclides in Fish - LaSalle
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95			
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	
LaSalle Lake Bottom Feeders																										
10/12/2018	<MDC	710	<MDC	490	<MDC	24.3	<MDC	19.5	<MDC	18.9	<MDC	17.4	<MDC	78	<MDC	810	<MDC	20.8	<MDC	43	<MDC	44	<MDC	49	<MDC	49

Gamma Detection Network Results – LaSalle
Results are in milliroentgen per hour (mR/hr)



Summary of Ambient Gamma Results - LaSalle

Location	Quarter 1 mR/quarter	Quarter 2 mR/quarter	Quarter 3 mR/quarter	Quarter 4 mR/quarter	Annual Exposure mR/year
LS001	9.5	10.6	10.1	9.1	39.3
LS002	9.2	10.2	10.3	11.9	41.6
LS003	9.9	10.1	13.0	9.5	42.5
LS004	9.7	10.4	12.2	10.2	42.5
LS005	8.3	8.3	7.9	9.0	33.6
LS007	9.9	10.4	9.4	8.4	38.1
LS009	6.0	8.0	7.3	6.8	28.1
LS011	8.9	8.0		8.8	34.2
LS012	6.7	7.6	9.4	7.9	31.6
LS014	8.1	8.0	9.6	7.7	33.4
LS015	10.2	10.3	10.4	9.1	40.1
LS016	8.5	7.0	7.6	7.7	30.8
LS017	10.7	10.4	11.1	10.2	42.4
LS018	10.6	10.3	11.1	11.0	43.0
LS019	8.7	9.5	9.9	9.6	37.6
LS021	7.7	7.7	9.1	7.3	31.8
LS023	9.4	9.1	9.9	9.3	37.7
LS024	9.2	9.6	10.9	10.3	40.0
LS025		8.4	11.5	9.2	38.8
LS027		8.5	8.9	8.5	34.6
LS030	10.9	9.7	11.1	10.1	41.8
LS031	7.3	8.5	9.2	7.3	32.3
LS034	6.7	6.3	7.5	6.8	27.2
LS036	8.8		11.6	10.4	41.0
LS037	9.6	10.8	10.6	9.3	40.2
LS038	9.0	10.2	11.6	10.3	41.2
LS039	7.2	8.0	9.5	7.5	32.2
LS040	8.4	9.9	9.9	8.9	37.1
LS041	10.0	9.5	11.1	9.2	39.9
LS042	9.0	11.0	11.0	10.6	41.7

Summary of Ambient Gamma Results - LaSalle (continued)

Location	Quarter 1 mR/quarter	Quarter 2 mR/quarter	Quarter 3 mR/quarter	Quarter 4 mR/quarter	Annual Exposure mR/year
LS043	9.5	10.8	10.7	9.5	40.4
LS046	10.7	8.1	9.4	10.6	38.8
LS047	11.2	10.9	9.3	9.9	41.3
LS048	8.5		8.8	9.4	35.5
LS049	9.8	9.7	10.4	10.4	40.2
LS050	8.0	8.5	9.1	7.8	33.4
LS051	10.8	10.0	12.0	11.3	44.2
LS052	8.4	9.9	8.6	8.4	35.2
LS053	9.1	10.6	10.0	9.7	39.4
LS054	9.9	9.6	8.9		37.7
LS055	10.2		9.6	8.8	38.1
LS056	8.8	7.7	9.6	9.2	35.2
LS057	10.1	9.7	9.0	9.4	38.2
LS-RSA	10.8	9.7	10.0	8.8	39.2
LS-RSB	9.9	8.8	11.3	8.8	38.7
LS-RSC	4.9	9.1	9.3	9.2	32.6
LS-RSD	4.8	7.4	8.5	8.6	29.3
LS-RSE	7.5	7.5	8.8	8.1	31.8
LS-RSF	8.7	9.5	9.7	8.1	36.0
LS-RSG	7.5	9.5	8.3	8.8	34.0
LS-RSH	8.3	9.9	10.0	9.6	37.8
LS-RSJ	9.9	10.0	9.9	9.4	39.2
LS-RSK	10.0	9.9	10.5	10.0	40.4
LS-RSL	7.0	10.1	9.7	9.7	36.5
LS-RSM	11.1	12.7	13.5	11.7	49.0
LS-RSN	7.5	10.3	9.8	8.6	36.1
LS-RSP	9.1	9.6	10.6	9.9	39.2
LS-RSQ	7.2	8.7	7.9	7.5	31.3
LS-RSR	11.2	10.1	12.1	8.9	42.4

Blanks in the table indicate that dosimeters were missing at the end of the quarter.

Annual Exposure column based on averages of all available data.

Quarter length is estimated to be 91.25 days.

Quad Cities Nuclear Power Station

The Quad Cities Nuclear Power Station, consisting of two 2,957 Megawatt BWRs is owned and operated by the Exelon Corporation, and is located in Rock Island County, Illinois. Unit 1 began operations on March 16, 1972 and Unit 2 on December 2, 1973. The site is located near Cordova, Illinois on the Mississippi River.



Liquid effluents from the Quad Cities Station are released to the adjacent Mississippi River in accordance to release limits governed by the station's license with the NRC and the plant's IEPA National Pollutant Discharge Elimination System permit. In 2018, there were 12 liquid effluent batch releases from the Quad Cities station.

On March 28, 2018 it was discovered that a leaking pipe clamp had caused water to collect in a Radwaste (RW) pipe vault and that degraded seams within the vault had allowed water to seep from the vault to the surrounding groundwater. Exelon reported that samples collected from the vault and a nearby monitoring well (QC-GP-18) had concentrations of tritium at approximately 4.5 million pCi/L.

A report of the event was submitted to IEMA, the Illinois Environmental Management Agency (IEPA), and to the Nuclear Regulatory Commission (NRC), and Exelon began the remediation process. An extraction well (RW-1) was installed near the vault to assist in the remediation of the surrounding groundwater. Groundwater pumped from the extraction well was initially routed and processed through the Station's Radwaste System. Between May 2, 2018 and November 24, 2018 when pumps were shut down for the winter season, affected groundwater from wells RW-1 and QC-GP-18 were routed to the Station's Discharge Bay. The Discharge Bay is the Quad Cities Station's final release point for liquid effluent into the Mississippi River. When the remediation process ceased on November 24, 2018, the tritium concentration at well QC-GP-18 was at 27,600 pCi/L.

During the period that the wells were routed to the Discharge Bay, only tritium was detected at levels above the required limit of detection. Excelon reported that an estimated total $3.53\text{E-}01$ Ci of tritium were released into the Mississippi River from this event, which is equivalent to 4.31% of the total tritium released from the Quad Cities Station in 2018.

All tritium levels detected through the IEMA Radiological Environmental Monitoring Program were below the 20,000 pCi/L drinking water limit set by the USEPA and IEPA.

Figures 22-24 provide an overview of all sampling and monitoring locations in the vicinity of the Quad Cities Nuclear Power Station (yellow star).

Sampling and Monitoring Results

Water Sampling Results

Water sample analysis for tritium, total strontium, and other radionuclides indicated no concentrations above the established MDCs for each analysis type.

Results from Gross Beta analysis indicated that the established MDC was met at some sampling locations. These slightly elevated concentrations can be attributed to the liquid effluent batch releases from the Quad Cities station.

Soil Sampling Results

Gamma spectroscopy results for soil samples indicated no concentrations of reactor-produced radionuclides above background. Cesium-137 in concentrations greater than the established MDC was seen, but was consistent with soil concentrations historically found from atmospheric nuclear weapons testing.

Sediment Sampling Results

Gamma spectroscopy results for sediment samples indicated no concentrations above the established MDC.

Vegetation Sampling Results

Gamma spectroscopy results for vegetation samples indicated no concentrations above the established MDC.

Fish Sampling Results

Gamma spectroscopy results for fish samples indicated no concentrations above the established MDC.

Direct Radiation Monitoring Results

The ambient gamma monitoring results were consistent with results found at the background monitoring locations at Sangchris Lake State Park near Kincaid, IL

Maps of Monitoring and Sampling Locations – Quad Cities

Figure 22. OSL and GDN Monitoring Locations - Quad Cities

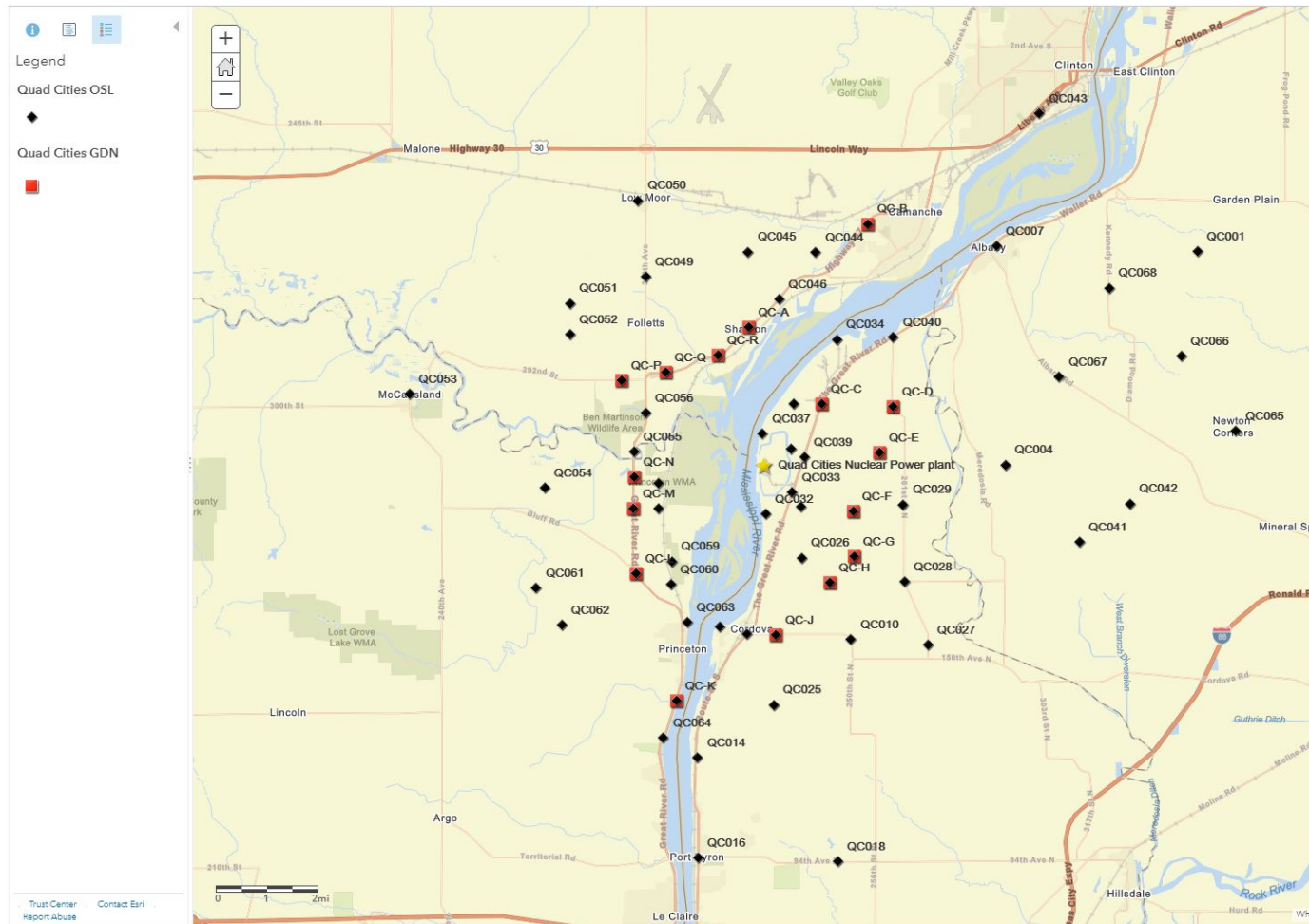
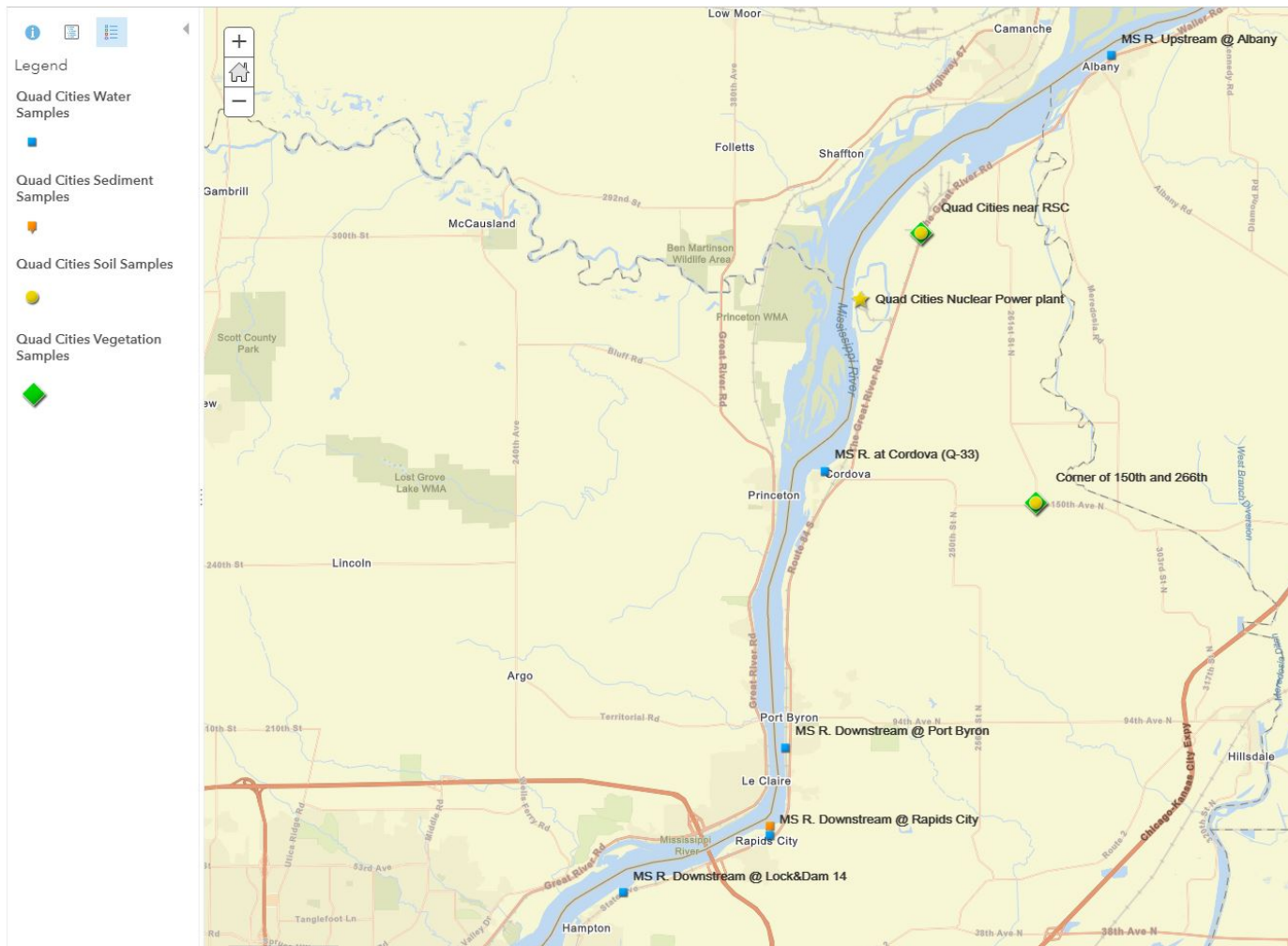


Figure 23. OSL and GDN Monitoring Locations (continued) - Quad Cities



Figure 24. Environmental Sampling Locations – Quad Cities

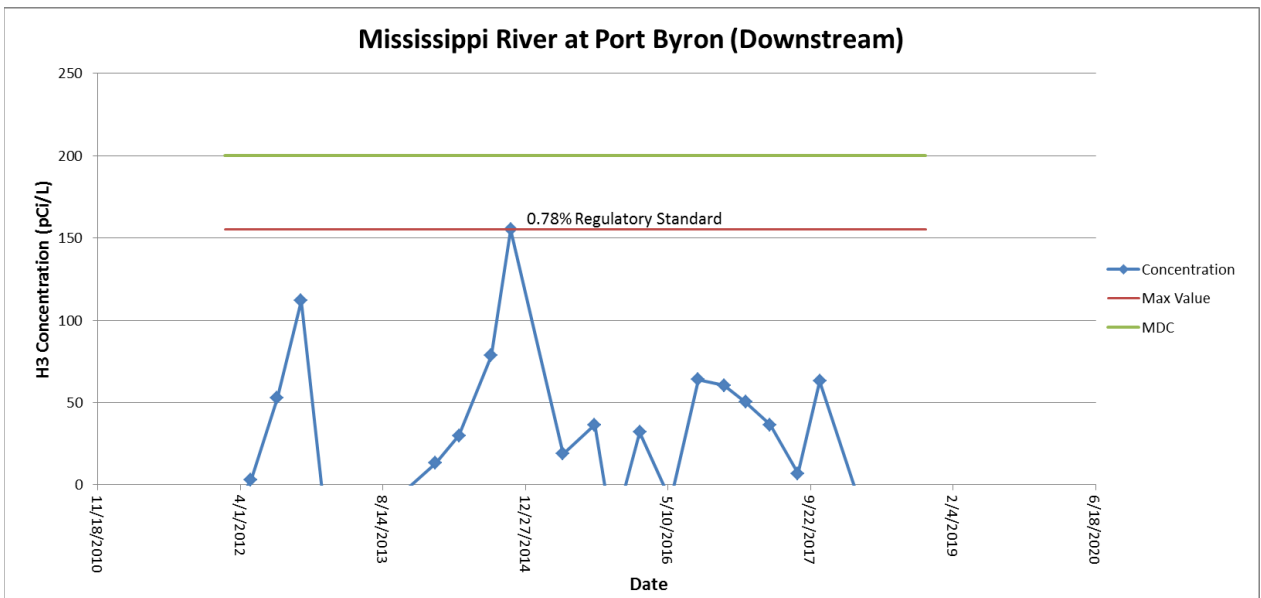
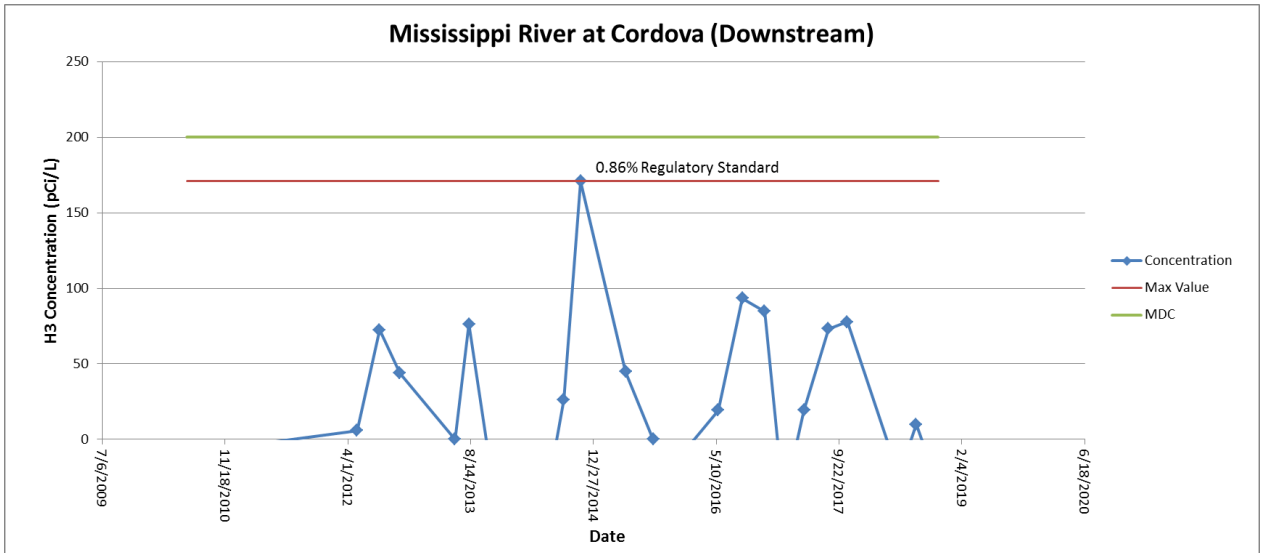


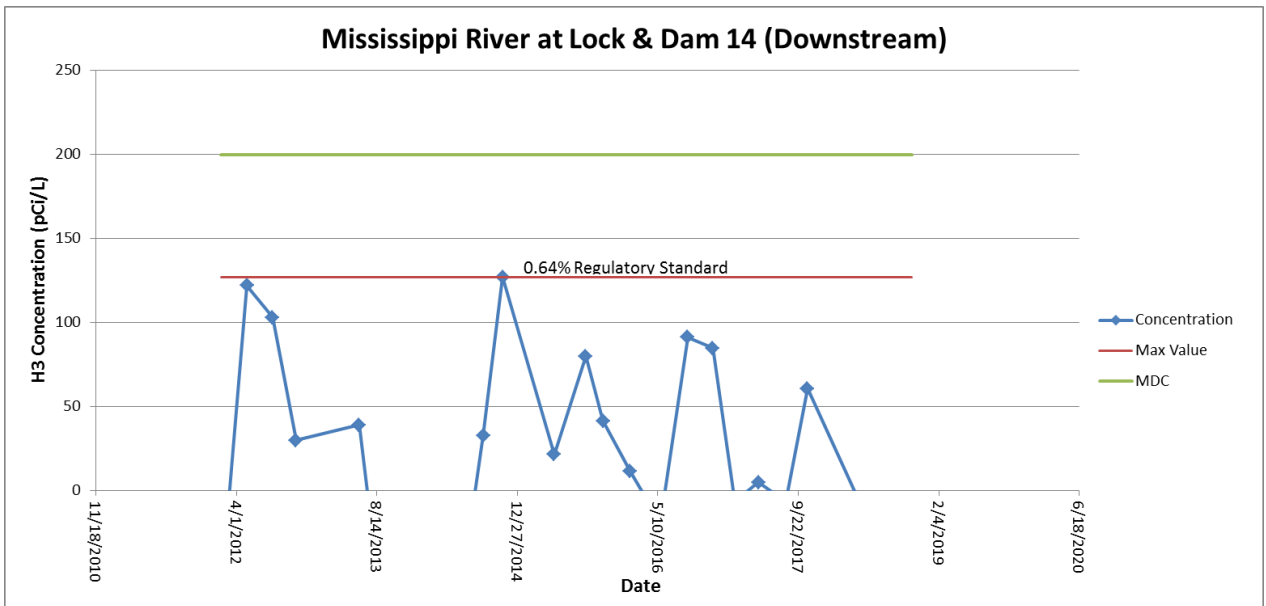
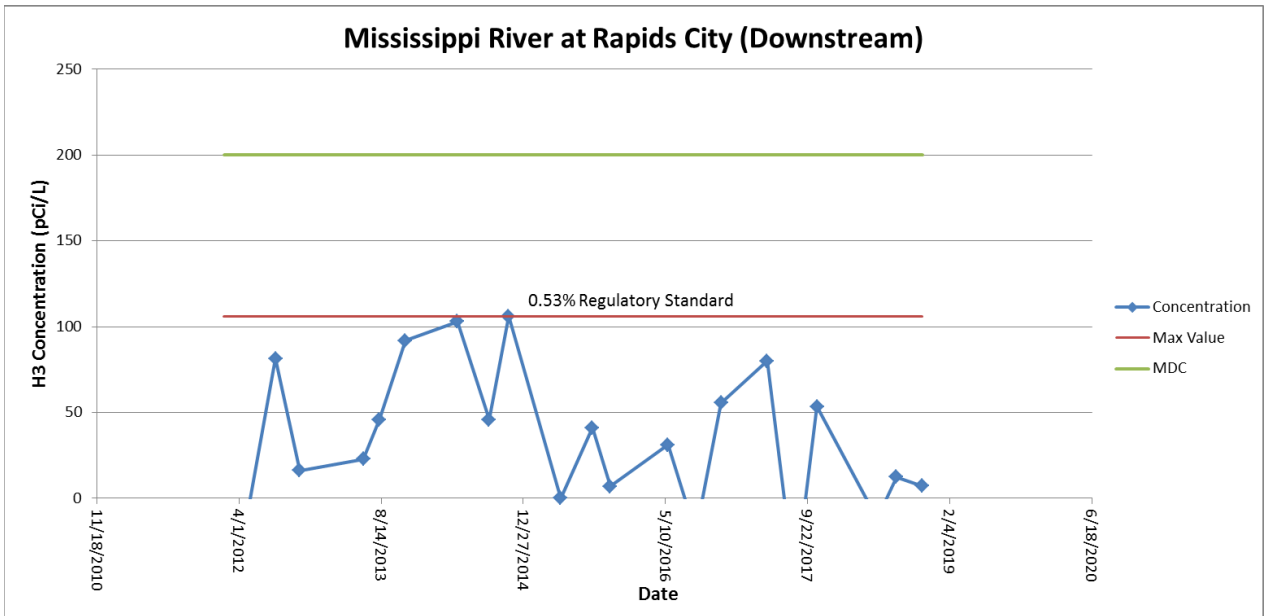
Quad Cities Sample Results

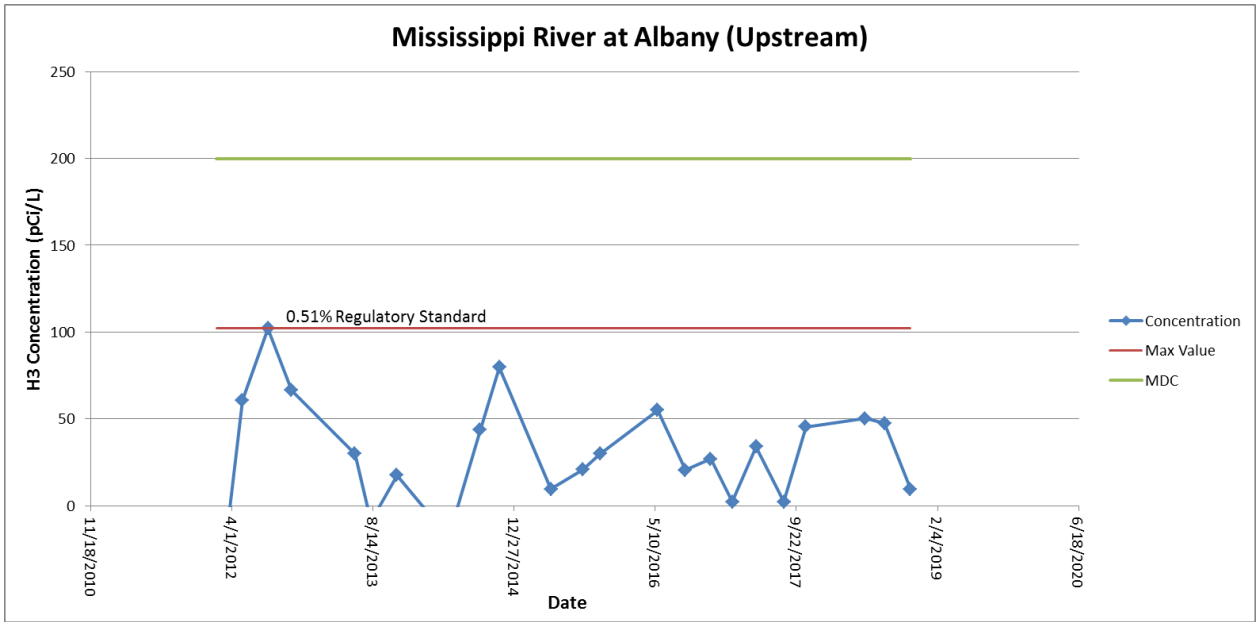
Tritium (H-3) in Water Sample Results - Quad Cities
Results are in picocuries per liter (pCi/L)

Location	H-3	
Date	Result	MDC
Mississippi R. at Albany		
5/24/2018	<MDC	181
8/1/2018	<MDC	181
10/31/2018	<MDC	181
Mississippi R. at Cordova		
5/24/2018	<MDC	181
8/1/2018	<MDC	181
10/31/2018	<MDC	181
Mississippi R. at Lock & Dam 14		
5/24/2018	<MDC	181
8/1/2018	<MDC	181
10/31/2018	<MDC	181
Mississippi R. at Port Byron		
5/24/2018	<MDC	181
8/1/2018	<MDC	181
10/31/2018	<MDC	181
Mississippi R. at Rapid City		
5/24/2018	<MDC	181
8/1/2018	<MDC	181
10/31/2018	<MDC	181

Trending Graphs for Tritium (H-3) in Water - Quad Cities
 (Max value compared to IEPA and USEPA Class regulatory standard of 20,000 pCi/L)







Total Strontium in Water Results - Quad Cities
Results in picocuries per liter (pCi/L)

Location	Strontium	
Date	Result	MDC
Mississippi R. at Cordova		
5/24/2018	<MDC	0.5
Mississippi R. at Rapid City		
5/24/2018	<MDC	0.5

Results for Beta Screening of Water - Quad Cities
Results are in picocuries per liter (pCi/L)

Location	Beta	
Date	Result	MDC
Mississippi R. at Albany		
5/24/2018	<MDC	3.7
8/1/2018	<MDC	3.7
10/31/2018	5.2	3.7
Mississippi R. at Cordova		
5/24/2018	<MDC	3.7
8/1/2018	<MDC	3.7
10/31/2018	4.4	3.7
Mississippi R. at Lock & Dam 14		
5/24/2018	<MDC	3.7
8/1/2018	<MDC	3.7
10/31/2018	<MDC	3.7
Mississippi R. at Port Byron		
5/24/2018	<MDC	3.7
8/1/2018	<MDC	3.7
10/31/2018	<MDC	3.7
Mississippi R. at Rapid City		
5/24/2018	4.6	3.7
8/1/2018	<MDC	3.7
10/31/2018	5.1	3.7

Gamma Spectroscopy Results for Other Radionuclides in Water - Quad Cities
Results are in picocuries per liter (pCi/L)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95	
Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC
Mississippi R. at Albany																								
5/24/2018	<MDC	23	<MDC	350	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	7.7	<MDC	10.9	<MDC	3.7	<MDC	4.3	<MDC	7.8	<MDC	6.3
8/1/2018	<MDC	23	<MDC	350	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	7.7	<MDC	10.9	<MDC	3.7	<MDC	4.3	<MDC	7.8	<MDC	6.3
10/31/2018	<MDC	23	<MDC	350	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	7.7	<MDC	10.9	<MDC	3.7	<MDC	4.3	<MDC	7.8	<MDC	6.3
Mississippi R. at Cordova																								
5/24/2018	<MDC	23	<MDC	350	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	7.7	<MDC	10.9	<MDC	3.7	<MDC	4.3	<MDC	7.8	<MDC	6.3
8/1/2018	<MDC	23	<MDC	350	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	7.7	<MDC	10.9	<MDC	3.7	<MDC	4.3	<MDC	7.8	<MDC	6.3
10/31/2018	<MDC	23	<MDC	350	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	7.7	<MDC	10.9	<MDC	3.7	<MDC	4.3	<MDC	7.8	<MDC	6.3
Mississippi R. at Lock & Dam 14																								
5/24/2018	<MDC	23	<MDC	350	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	7.7	<MDC	10.9	<MDC	3.7	<MDC	4.3	<MDC	7.8	<MDC	6.3
8/1/2018	<MDC	23	<MDC	350	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	7.7	<MDC	10.9	<MDC	3.7	<MDC	4.3	<MDC	7.8	<MDC	6.3
10/31/2018	<MDC	23	<MDC	350	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	7.7	<MDC	10.9	<MDC	3.7	<MDC	4.3	<MDC	7.8	<MDC	6.3
Mississippi R. at Port Byron																								
5/24/2018	<MDC	23	<MDC	350	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	7.7	<MDC	10.9	<MDC	3.7	<MDC	4.3	<MDC	7.8	<MDC	6.3
8/1/2018	<MDC	23	<MDC	350	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	7.7	<MDC	10.9	<MDC	3.7	<MDC	4.3	<MDC	7.8	<MDC	6.3
10/31/2018	<MDC	23	<MDC	350	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	7.7	<MDC	10.9	<MDC	3.7	<MDC	4.3	<MDC	7.8	<MDC	6.3
Mississippi R. at Rapid City																								
5/24/2018	<MDC	23	<MDC	350	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	7.7	<MDC	10.9	<MDC	3.7	<MDC	4.3	<MDC	7.8	<MDC	6.3
8/1/2018	<MDC	23	<MDC	350	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	7.7	<MDC	10.9	<MDC	3.7	<MDC	4.3	<MDC	7.8	<MDC	6.3
10/31/2018	<MDC	23	<MDC	350	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	7.7	<MDC	10.9	<MDC	3.7	<MDC	4.3	<MDC	7.8	<MDC	6.3

Gamma Spectroscopy Results for Radionuclides in Soil (Migration) - Quad Cities
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95	
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result
Corner of 150th and 266th																						
5/24/2018	<MDC	1.67	<MDC	0.15	<MDC	0.03	<MDC	0.02	<MDC	0.02	0.23	0.03	<MDC	0.10	<MDC	0.02	<MDC	0.07	<MDC	0.06	<MDC	0.09
8/1/2018	<MDC	1.67	<MDC	0.15	<MDC	0.03	<MDC	0.02	<MDC	0.02	0.17	0.03	<MDC	0.10	<MDC	0.02	<MDC	0.07	<MDC	0.06	<MDC	0.09
Near RS-C																						
5/24/2018	<MDC	1.67	<MDC	0.15	<MDC	0.03	<MDC	0.02	<MDC	0.02	0.18	0.03	<MDC	0.10	<MDC	0.02	<MDC	0.07	<MDC	0.06	<MDC	0.09
8/1/2018	<MDC	1.67	<MDC	0.15	<MDC	0.03	<MDC	0.02	<MDC	0.02	0.21	0.03	<MDC	0.10	<MDC	0.02	<MDC	0.07	<MDC	0.06	<MDC	0.09

Gamma Spectroscopy Results for Radionuclides in Soil (Deposition) - Quad Cities
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95	
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result
Corner of 150th and 266th																						
5/24/2018	<MDC	1.67	<MDC	0.15	<MDC	0.03	<MDC	0.02	<MDC	0.02	0.19	0.03	<MDC	0.10	<MDC	0.02	<MDC	0.07	<MDC	0.06	<MDC	0.09
8/1/2018	<MDC	1.67	<MDC	0.15	<MDC	0.03	<MDC	0.02	<MDC	0.02	0.18	0.03	<MDC	0.10	<MDC	0.02	<MDC	0.07	<MDC	0.06	<MDC	0.09
Near RS-C																						
5/24/2018	<MDC	1.67	<MDC	0.15	<MDC	0.03	<MDC	0.02	<MDC	0.02	0.39	0.03	<MDC	0.10	<MDC	0.02	<MDC	0.07	<MDC	0.06	<MDC	0.09
8/1/2018	<MDC	1.67	<MDC	0.15	<MDC	0.03	<MDC	0.02	<MDC	0.02	0.37	0.03	<MDC	0.10	<MDC	0.02	<MDC	0.07	<MDC	0.06	<MDC	0.09

Gamma Spectroscopy Results for Radionuclides in Sediment - Quad Cities
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95	
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result
Mississippi R. at Rapid City																						
5/24/2018	<MDC	1.31	<MDC	0.10	<MDC	0.02	<MDC	0.02	<MDC	0.01	<MDC	0.02	<MDC	0.08	<MDC	0.02	<MDC	0.05	<MDC	0.04	<MDC	0.06
8/1/2018	<MDC	1.31	<MDC	0.10	<MDC	0.02	<MDC	0.02	<MDC	0.01	<MDC	0.02	<MDC	0.08	<MDC	0.02	<MDC	0.05	<MDC	0.04	<MDC	0.06

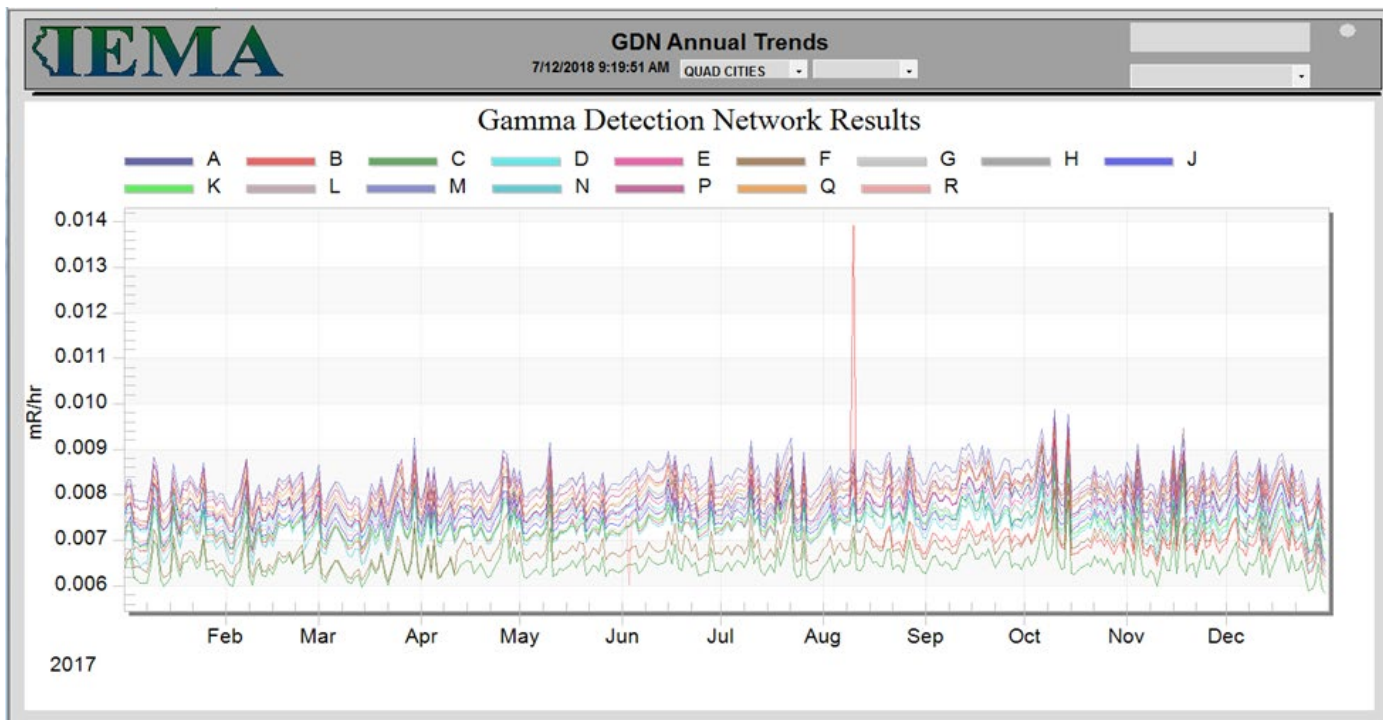
Gamma Spectroscopy Results for Radionuclides in Vegetation- Quad Cities
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95			
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	
Corner of 150th and 266th																										
5/24/2018	<MDC	3.4	<MDC	6.3	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.4	<MDC	4.6	<MDC	0.1	<MDC	0.2	<MDC	0.3	<MDC	0.3	<MDC	0.3
8/1/2018	<MDC	3.4	<MDC	6.3	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.4	<MDC	4.6	<MDC	0.1	<MDC	0.2	<MDC	0.3	<MDC	0.3	<MDC	0.3
Near RS-C																										
5/24/2018	<MDC	3.4	<MDC	6.3	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.4	<MDC	4.6	<MDC	0.1	<MDC	0.2	<MDC	0.3	<MDC	0.3	<MDC	0.3
8/1/2018	<MDC	3.4	<MDC	6.3	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.4	<MDC	4.6	<MDC	0.1	<MDC	0.2	<MDC	0.3	<MDC	0.3	<MDC	0.3

Gamma Spectroscopy Results for Radionuclides in Fish - Quad Cities
Results are in picocuries per kilogram (pCi/kg)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95			
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	
Mississippi R. Bottom Feeder																										
5/24/2018	<MDC	700	<MDC	1790	<MDC	24.4	<MDC	21.4	<MDC	19.1	<MDC	17.4	<MDC	72	<MDC	880	<MDC	20.4	<MDC	42	<MDC	45	<MDC	47	<MDC	47
8/3/2018	<MDC	700	<MDC	1790	<MDC	24.4	<MDC	21.4	<MDC	19.1	<MDC	17.4	<MDC	72	<MDC	880	<MDC	20.4	<MDC	42	<MDC	45	<MDC	47	<MDC	47
Mississippi R. Top Feeder																										
5/24/2018	<MDC	700	<MDC	1790	<MDC	24.4	<MDC	21.4	<MDC	19.1	<MDC	17.4	<MDC	72	<MDC	880	<MDC	20.4	<MDC	42	<MDC	45	<MDC	47	<MDC	47
8/3/2018	<MDC	700	<MDC	1790	<MDC	24.4	<MDC	21.4	<MDC	19.1	<MDC	17.4	<MDC	72	<MDC	880	<MDC	20.4	<MDC	42	<MDC	45	<MDC	47	<MDC	47

Gamma Detection Network Results - Quad Cities
Results are in milliroentgen per hour (mR/hr)



Summary of Ambient Gamma Results - Quad Cities

Location	Quarter 1 mR/quarter	Quarter 2 mR/quarter	Quarter 3 mR/quarter	Quarter 4 mR/quarter	Annual Exposure mR/year
QC001	10.8	8.6	10.0	8.0	37.4
QC004	8.0	8.1	8.7	8.0	32.9
QC007	8.4	7.6	9.0	7.2	32.2
QC010		6.1	8.1	5.7	26.6
QC011	6.5	5.9	6.0	4.5	22.9
QC012	6.8		7.7	5.5	26.5
QC014	6.1	5.6	6.7	5.3	23.6
QC016	5.9	6.2	6.6	5.6	24.3
QC018	9.9	9.0	11.6	9.3	39.9
QC025	9.4	9.3	9.8	8.0	36.5
QC026	8.8	8.4	8.5	7.5	33.1
QC027	8.0	7.6	9.4	7.3	32.3
QC028	6.8	8.6	8.0	5.7	29.1
QC029		8.6	9.1	7.8	33.9
QC031	8.1	6.8	8.0	7.1	30.0
QC032	7.0	7.9	8.1	6.8	29.9
QC033	8.3	5.7	8.0	6.5	28.5
QC034	8.0	7.1	9.0	7.0	31.2
QC036	8.6	8.9	8.2		34.3
QC037	6.8	6.9	6.8	6.6	27.1
QC038	7.7	6.9	9.6		32.2
QC039	6.7	7.4	8.3	6.0	28.4
QC040	8.7	8.3	7.8	7.3	32.0
QC041	6.7	8.4	7.5	6.8	29.3
QC042	7.8	7.4	11.0	8.7	34.9
QC043	7.6	6.6	6.9	7.1	28.2
QC044	9.2	7.8	9.3	8.1	34.5
QC045	8.0	8.2	9.3	7.8	33.3
QC046	8.9	8.9	9.4	6.6	33.8
QC049	8.1		8.6	6.6	31.0
QC050	8.2	8.3		7.5	32.0
QC051	8.1	7.0	9.8	6.8	31.8
QC052	10.1	8.7	11.0	8.3	38.1

Summary of Ambient Gamma Results - Quad Cities (continued)

Location	Quarter 1 mR/quarter	Quarter 2 mR/quarter	Quarter 3 mR/quarter	Quarter 4 mR/quarter	Annual Exposure mR/year
QC053	5.9	6.7	6.4	6.0	25.0
QC054	7.0	8.1	8.9	5.3	29.3
QC055	7.8		6.6	5.8	27.0
QC056	6.6	5.4		6.0	24.0
QC057	6.5	6.8	8.1	5.6	27.0
QC058	8.2	7.6	9.3	7.3	32.4
QC059	6.8	8.5	7.3	6.6	29.1
QC060	8.2	8.8	7.4	6.5	30.8
QC061	7.3	7.4	7.5	7.5	29.7
QC062	10.1	10.3	11.9	8.3	40.6
QC063	8.2	7.7	8.6	6.4	30.8
QC064	7.2	6.8	7.7	6.8	28.4
QC065	8.7	7.3	10.1	7.5	33.6
QC066		9.5	10.1	8.6	37.6
QC067		10.0	10.8	8.5	39.1
QC068	9.9	9.9	10.8	9.1	39.8
QC-RSA	8.2	7.0	8.3	7.0	30.6
QC-RSB	7.4	7.7	10.0	7.2	32.3
QC-RSC	7.5	8.1	8.2	6.5	30.3
QC-RSD	7.1	6.9	6.9		28.0
QC-RSE	8.7	9.7	9.1	7.6	35.0
QC-RSF	6.4	6.5	7.2	6.8	26.9
QC-RSG	7.9	8.5	9.3	6.8	32.5
QC-RSH	8.7	8.4	9.9	7.6	34.6
QC-RSJ	7.5	7.3	8.3	7.2	30.3
QC-RSK	8.5	7.8	8.3	7.4	32.0
QC-RSL	8.9	9.5	10.1	8.2	36.7
QC-RSM	8.1	7.8	10.0	7.4	33.4
QC-RSN	6.8	8.0	7.0	6.7	28.5
QC-RSP		9.9	10.2		40.2
QC-RSQ	7.6	8.4	8.7	6.5	31.1
QC-RSR	7.9	7.7	8.7	6.5	30.8

Blanks in the table indicate that dosimeters were missing at the end of the quarter.
 Annual Exposure column based on averages of all available data.
 Quarter length is estimated to be 91.25 days.

Zion Nuclear Power Station

Zion Nuclear Power Station consisted of two PWRs that were owned and operated by the Exelon Corporation, and located in Lake County, Illinois. The site is located near Zion, Illinois approximately 40 miles north of Chicago, and adjacent to Lake Michigan. The plant ceased operation permanently in February 1998 and was defueled soon thereafter. In September 2010, the facility license was transferred from Exelon to Zion Solutions for the express purpose of expediting the decommissioning of the site. In 2018, the plant continued decommissioning to levels that permit release for unrestricted use. Decommissioning efforts progressed during 2018 and remain on schedule for a 2019 end date. The site continues to store 61 dry casks that store spent nuclear fuel as well as four dry casks that contain greater than Class C waste. These 65 casks are stored on the on-site Independent Spent Fuel Storage Installation (ISFSI), which falls within IEMA's environmental monitoring area for Zion.



Zion Station prior to decommissioning



Zion Station in October 2018

Figures 25 and 26 provide an overview of all sampling and monitoring locations in the vicinity of the Zion Nuclear Power Station (yellow star).

Sampling and Monitoring Results

Water Sampling Results

Water sample analysis for tritium, other radionuclides, and gross beta indicated no concentrations above the established MDCs for each analysis type.

Soil Sampling Results

Gamma spectroscopy results for a deposition soil sample collected on 07/17/2018 indicated the presence of Co-60 at a concentration above the established MDC. This slightly elevated concentration is likely due to the decommissioning activities taking place at the facility. All other soil sample results indicated no concentrations of reactor produced radionuclides above background.

Cesium-137 concentrations greater than the established MDC was also seen, but was consistent with soil concentrations historically found from atmospheric nuclear weapons testing.

Sediment Sampling Results

Gamma spectroscopy results for sediment samples indicated no concentrations above the established MDC.

Vegetation Sampling Results

Gamma spectroscopy results for vegetation samples indicated no concentrations above the established MDC.

Fish Sampling Results

Gamma spectroscopy results for fish samples indicated no concentrations above the established MDC.

Air Sampling Results

Air sampling results indicated elevated concentrations of gross alpha and beta during the week of December 17. The highest concentrations found were approximately twice as high as those found at background sampling locations in Springfield and Marion, IL. The elevated concentrations were likely due to the decommissioning activities taking place during that time at the site. Results from the December 26 analysis indicated that the concentrations had returned to levels consistent with background locations.

Direct Radiation Monitoring Results

The ambient gamma monitoring results were consistent with results found at the background monitoring locations at Sangchris Lake State Park near Kincaid, IL.

Zion Maps of Monitoring and Sampling Locations

Figure 25. GDN, OSL, and Air Monitoring and Sampling Locations – Zion

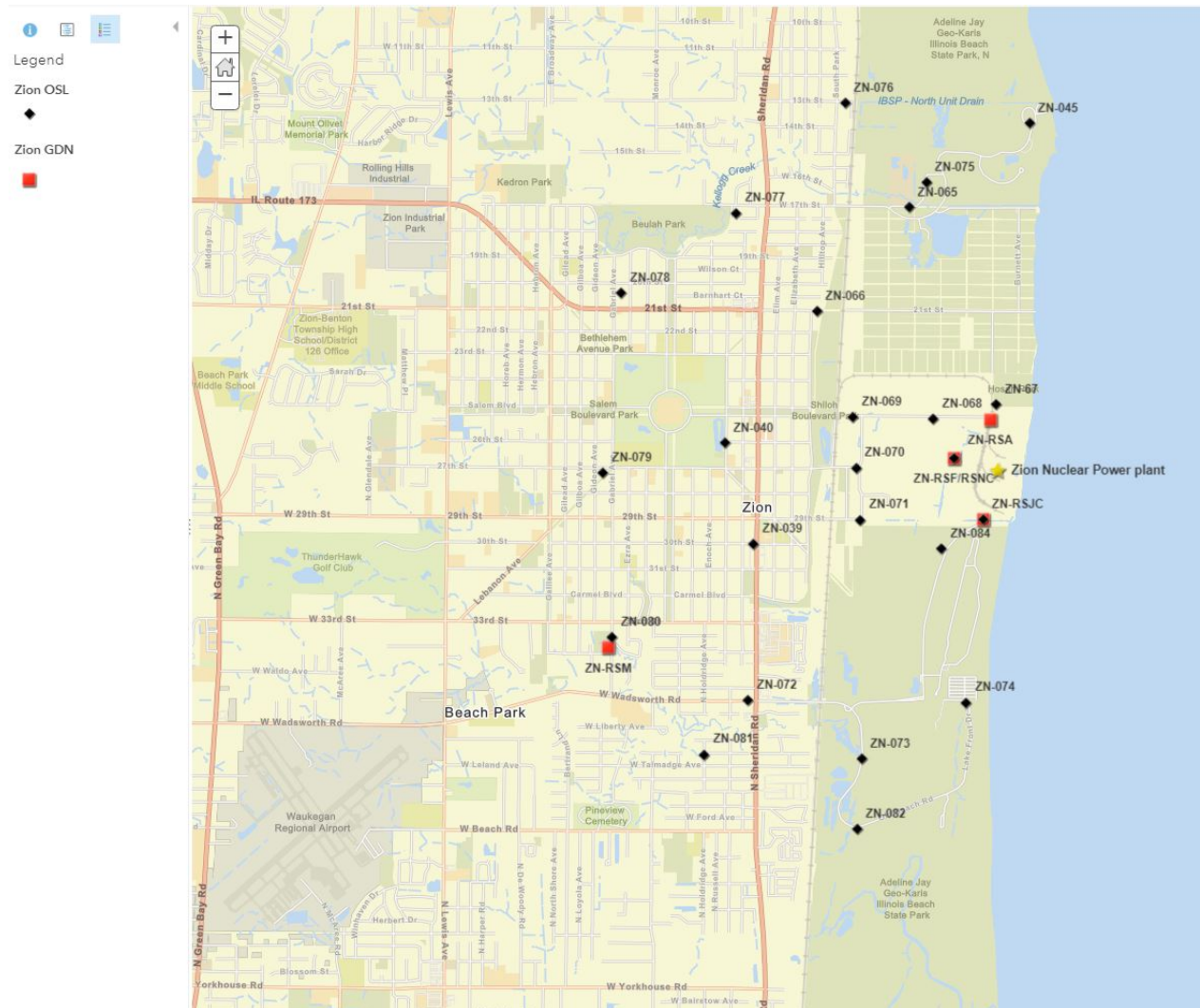
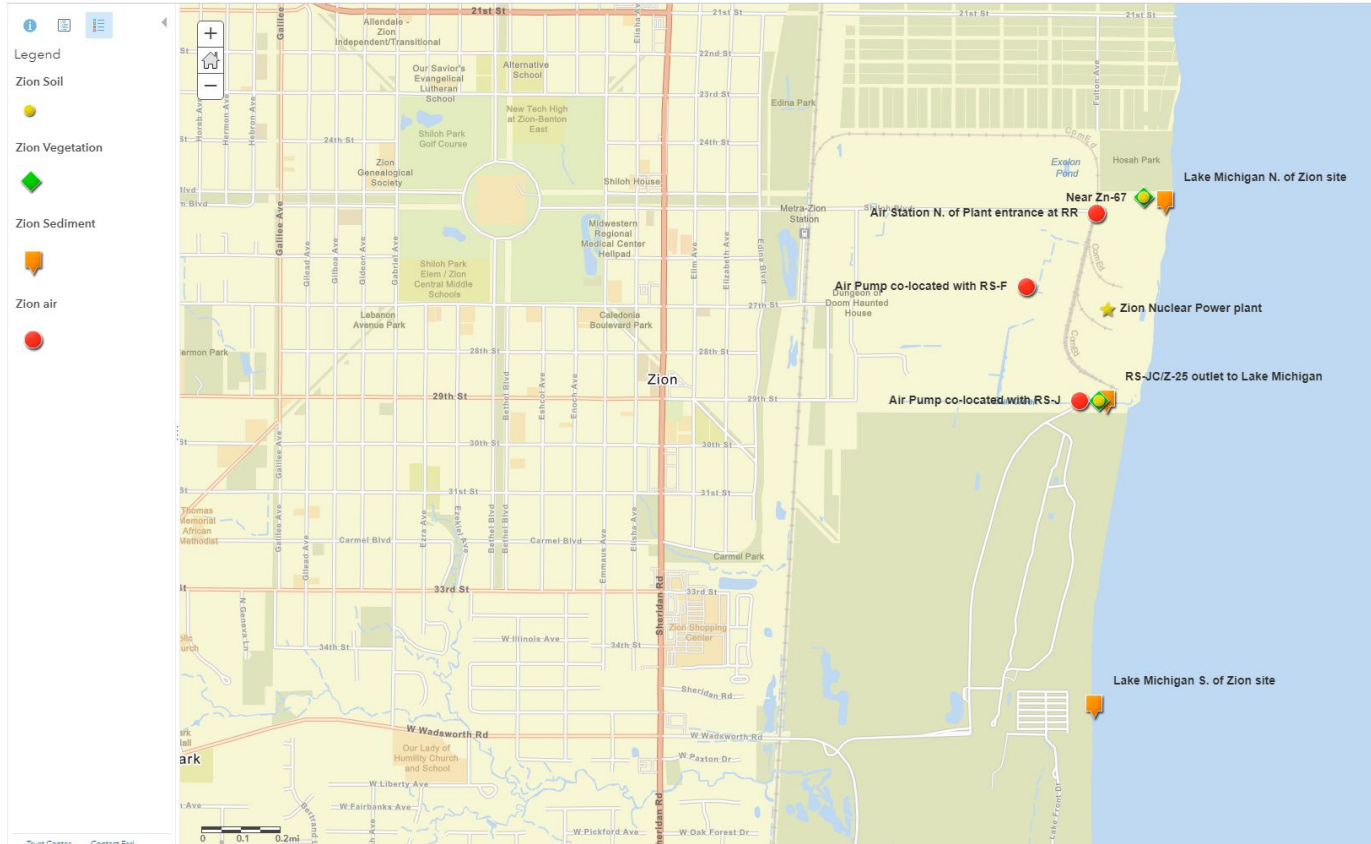


Figure 26. Environmental Sampling Locations – Zion

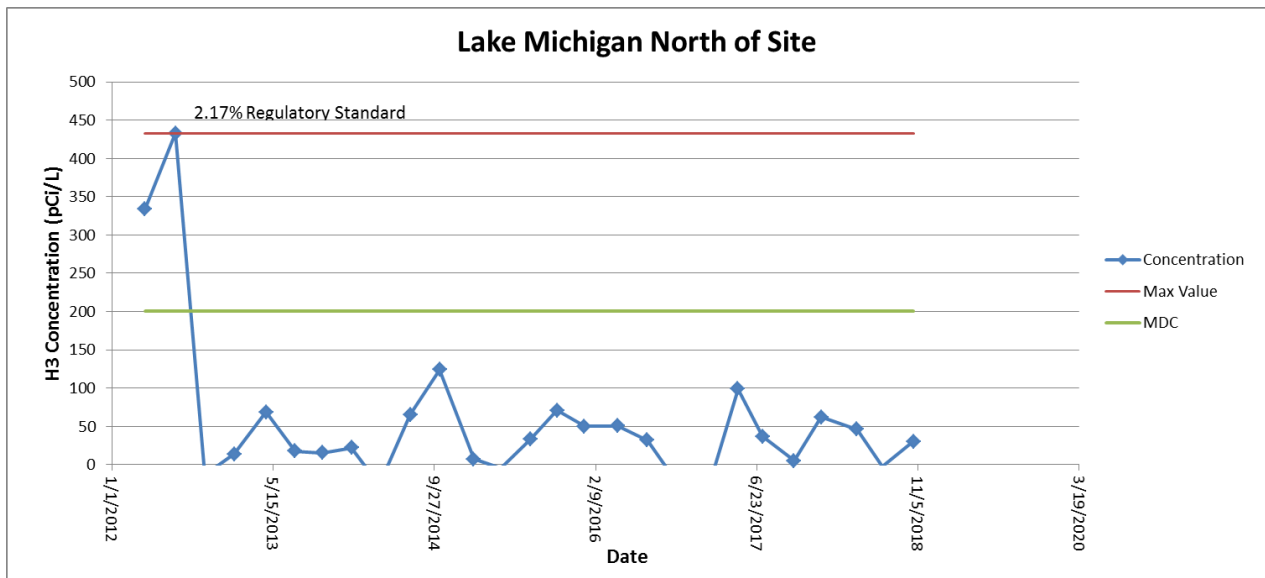
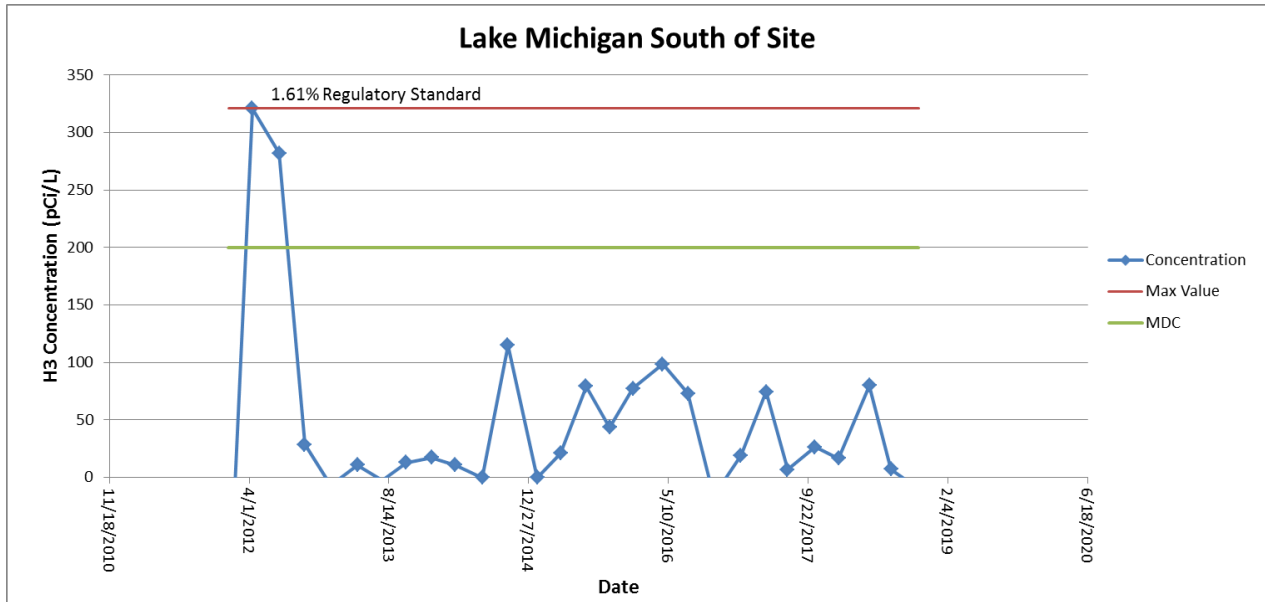


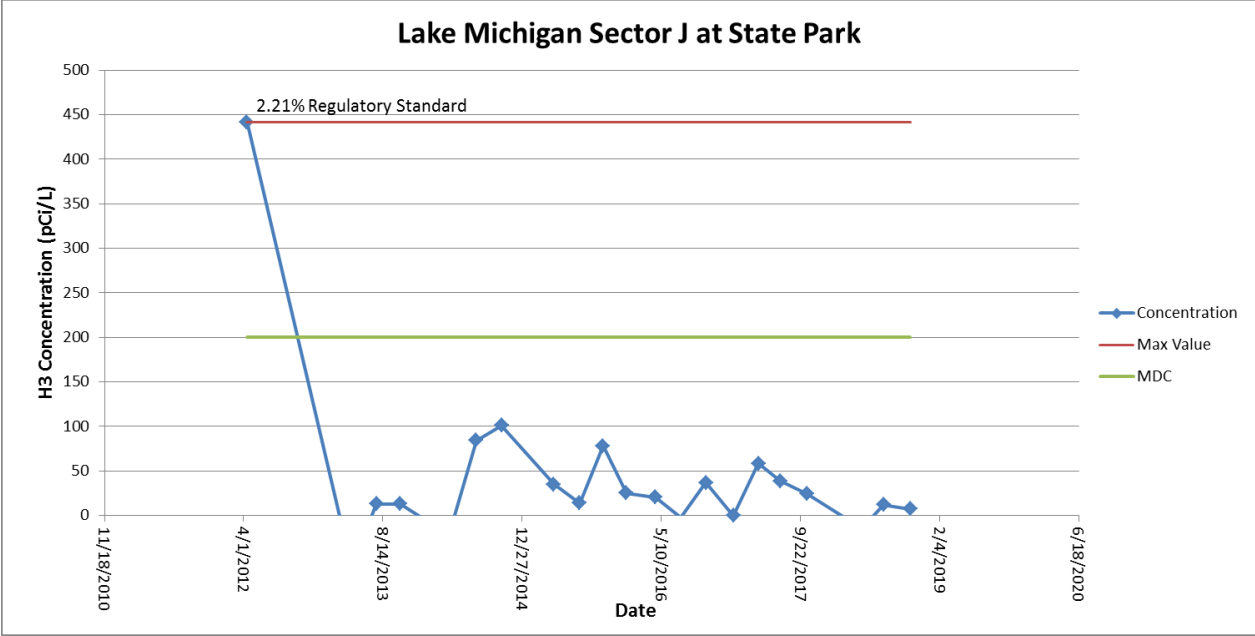
Zion Sample Result Tables and Graphs

Tritium (H-3) in Water Results - Zion Area Results are in picocuries per liter (pCi/L)

Location	H-3	
Date	Result	MDC
Lake Michigan N. of site		
1/9/2018	<MDC	181
4/30/2018	<MDC	181
7/17/2018	<MDC	181
10/22/2018	<MDC	181
Lake Michigan S. of site		
1/9/2018	<MDC	181
4/30/2018	<MDC	181
7/17/2018	<MDC	181
10/22/2018	<MDC	181
Z-25 outlet to Lake Michigan		
4/30/2018	<MDC	181
7/17/2018	<MDC	181
10/22/2018	<MDC	181

Trending Graphs for Tritium (H-3) in Water - Zion
 (Max value compared to IEPA and USEPA regulatory standard of 20,000 pCi/L)





Results for Beta Screening of Water - Zion
 Results are in picocuries per liter (pCi/L)

Location Date	Beta	
	Result	MDC
Lake Michigan N. of site		
1/9/2018	<MDC	3.7
4/30/2018	<MDC	3.7
7/17/2018	<MDC	3.7
10/22/2018	<MDC	3.7
Lake Michigan S. of site		
1/9/2018	<MDC	3.7
4/30/2018	<MDC	3.7
7/17/2018	<MDC	3.7
10/22/2018	<MDC	3.7
Z-25 outlet to Lake Michigan		
4/30/2018	<MDC	3.7
7/17/2018	<MDC	3.7
10/22/2018	<MDC	3.7

Gamma Spectroscopy Results for Other Radionuclides in Water - Zion
Results are in picocuries per liter (pCi/L)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95	
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result
Lake Michigan N. of site																								
1/9/2018	<MDC	23.4	<MDC	370	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	8.2	<MDC	10.5	<MDC	3.7	<MDC	4.3	<MDC	8.4	<MDC	7.2
4/30/2018	<MDC	23.4	<MDC	370	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	8.2	<MDC	10.5	<MDC	3.7	<MDC	4.3	<MDC	8.4	<MDC	7.2
7/17/2018	<MDC	23.4	<MDC	370	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	8.2	<MDC	10.5	<MDC	3.7	<MDC	4.3	<MDC	8.4	<MDC	7.2
10/22/2018	<MDC	23.4	<MDC	370	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	8.2	<MDC	10.5	<MDC	3.7	<MDC	4.3	<MDC	8.4	<MDC	7.2
Lake Michigan S. of site																								
1/9/2018	<MDC	23.4	<MDC	370	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	8.2	<MDC	10.5	<MDC	3.7	<MDC	4.3	<MDC	8.4	<MDC	7.2
4/30/2018	<MDC	23.4	<MDC	370	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	8.2	<MDC	10.5	<MDC	3.7	<MDC	4.3	<MDC	8.4	<MDC	7.2
7/17/2018	<MDC	23.4	<MDC	370	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	8.2	<MDC	10.5	<MDC	3.7	<MDC	4.3	<MDC	8.4	<MDC	7.2
10/22/2018	<MDC	23.4	<MDC	370	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	8.2	<MDC	10.5	<MDC	3.7	<MDC	4.3	<MDC	8.4	<MDC	7.2
Z-25 outlet to Lake Michigan																								
4/30/2018	<MDC	23.4	<MDC	370	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	8.2	<MDC	10.5	<MDC	3.7	<MDC	4.3	<MDC	8.4	<MDC	7.2
7/17/2018	<MDC	23.4	<MDC	370	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	8.2	<MDC	10.5	<MDC	3.7	<MDC	4.3	<MDC	8.4	<MDC	7.2
10/22/2018	<MDC	23.4	<MDC	370	<MDC	3.6	<MDC	3.9	<MDC	3.9	<MDC	3.8	<MDC	8.2	<MDC	10.5	<MDC	3.7	<MDC	4.3	<MDC	8.4	<MDC	7.2

Gamma Spectroscopy Results for Radionuclides in Soil (Migration) - Zion
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95			
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	
Near Zn-67 across road																								
5/8/2018	<MDC	0.96	<MDC	0.11	<MDC	0.02	<MDC	0.03	<MDC	0.02	0.07	0.02	<MDC	0.06	<MDC	0.02	<MDC	0.04	<MDC	0.05	<MDC	0.05		
7/17/2018	<MDC	0.96	<MDC	0.11	<MDC	0.02	<MDC	0.03	<MDC	0.02	0.05	0.02	<MDC	0.06	<MDC	0.02	<MDC	0.04	<MDC	0.05	<MDC	0.05		
Samples Co-Located with RS-JC																								
5/8/2018	<MDC	0.96	<MDC	0.11	<MDC	0.02	<MDC	0.03	<MDC	0.02	0.19	0.02	<MDC	0.06	<MDC	0.02	<MDC	0.04	<MDC	0.05	<MDC	0.05		
7/17/2018	<MDC	0.96	<MDC	0.11	<MDC	0.02	<MDC	0.03	<MDC	0.02	0.20	0.02	<MDC	0.06	<MDC	0.02	<MDC	0.04	<MDC	0.05	<MDC	0.05		

Gamma Spectroscopy Results for Radionuclides in Soil (Deposition) - Zion
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95		
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC
Near Zn-67 across road																							
5/8/2018	<MDC	0.96	<MDC	0.11	<MDC	0.02	<MDC	0.03	<MDC	0.02	0.07	0.02	<MDC	0.06	<MDC	0.02	<MDC	0.04	<MDC	0.05	<MDC	0.05	
7/17/2018	<MDC	0.96	<MDC	0.11	<MDC	0.02	0.06	0.03	<MDC	0.02	0.06	0.02	<MDC	0.06	<MDC	0.02	<MDC	0.04	<MDC	0.05	<MDC	0.05	
Samples Co-Located with RS-JC																							
5/8/2018	<MDC	0.96	<MDC	0.11	<MDC	0.02	<MDC	0.03	<MDC	0.02	0.23	0.02	<MDC	0.06	<MDC	0.02	<MDC	0.04	<MDC	0.05	<MDC	0.05	
7/17/2018	<MDC	0.96	<MDC	0.11	<MDC	0.02	<MDC	0.03	<MDC	0.02	0.15	0.02	<MDC	0.06	<MDC	0.02	<MDC	0.04	<MDC	0.05	<MDC	0.05	

Gamma Spectroscopy Results for Radionuclides in Sediment - Zion
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95		
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC
Lake Michigan N. of site																							
4/30/2018	<MDC	0.12	<MDC	0.10	<MDC	0.02	0.00	0.02	<MDC	0.01	<MDC	0.02	<MDC	0.04	<MDC	0.02	<MDC	0.02	<MDC	0.04	<MDC	0.04	
7/17/2018	<MDC	0.12	<MDC	0.10	<MDC	0.02	0.00	0.02	<MDC	0.01	<MDC	0.02	<MDC	0.04	<MDC	0.02	<MDC	0.02	<MDC	0.04	<MDC	0.04	
Lake Michigan S. of site																							
4/30/2018	<MDC	0.12	<MDC	0.10	<MDC	0.02	0.00	0.02	<MDC	0.01	<MDC	0.02	<MDC	0.04	<MDC	0.02	<MDC	0.02	<MDC	0.04	<MDC	0.04	
7/17/2018	<MDC	0.12	<MDC	0.10	<MDC	0.02	0.00	0.02	<MDC	0.01	<MDC	0.02	<MDC	0.04	<MDC	0.02	<MDC	0.02	<MDC	0.04	<MDC	0.04	
Z-25 outlet to Lake Michigan																							
4/30/2018	<MDC	0.12	<MDC	0.10	<MDC	0.02	0.00	0.02	<MDC	0.01	0.08	0.02	<MDC	0.04	<MDC	0.02	<MDC	0.02	<MDC	0.04	<MDC	0.04	

Gamma Spectroscopy Results for Radionuclides in Vegetation - Zion
Results are in picocuries per gram (pCi/g)

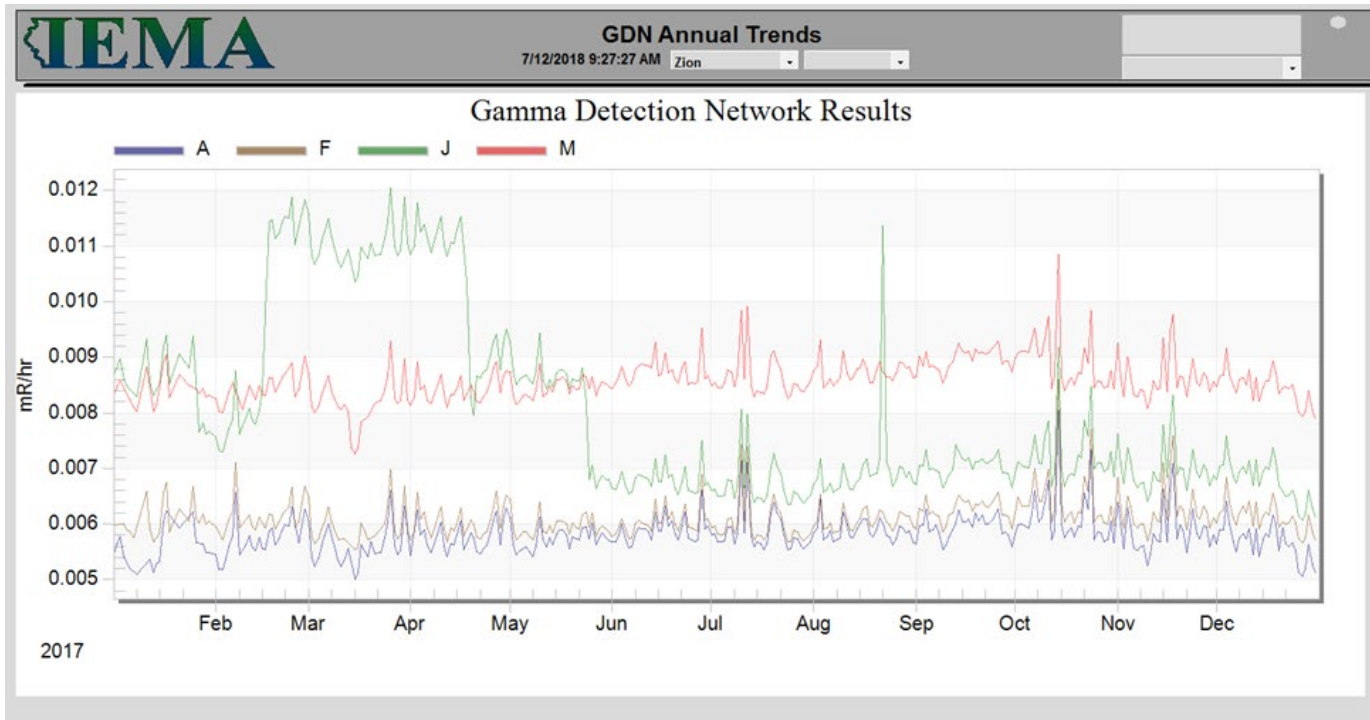
Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95	
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	
Near Zn-67 across road																								
4/30/2018	<MDC	1.3	<MDC	6.4	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	1.0	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	0.2
7/17/2018	<MDC	1.3	<MDC	6.4	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	1.0	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	0.2
Samples Co-Located with RS-JC																								
4/30/2018	<MDC	1.3	<MDC	6.4	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	1.0	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	0.2
7/17/2018	<MDC	1.3	<MDC	6.4	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	1.0	<MDC	0.1	<MDC	0.1	<MDC	0.2	<MDC	0.2

Alpha /Beta Screening Results for Air Samples - Zion
Results are in femtocuries per cubic meter (fCi/m³)

Location					Location					Location							
Date		Alpha		Beta		Date		Alpha		Beta		Date		Alpha		Beta	
		Result	MDC	Result	MDC			Result	MDC	Result	MDC			Result	MDC	Result	MDC
Air Pump co-located with RS-F					Air Pump co-located with RS-J					Air Station N. of Plant entrance at RR							
1/3/2018	5.1	2.9	31.9	4.2	1/3/2018	4.6	2.9	34.0	4.2	1/3/2018	4.6	2.9	32.4	4.2			
1/9/2018	4.1	2.9	36.5	4.2	1/9/2018	5.1	2.9	36.9	4.2	1/9/2018	4.3	2.9	38.1	4.2			
1/16/2018	3.2	2.9	25.5	4.2	1/16/2018	3.5	2.9	27.9	4.2	1/16/2018	3.3	2.9	23.8	4.2			
1/23/2018	3.0	2.9	34.6	4.2	1/23/2018	4.0	2.9	35.5	4.2	1/23/2018	3.6	2.9	32.8	4.2			
1/30/2018	<MDC	2.9	24.5	4.2	1/30/2018	3.2	2.9	26.0	4.2	1/30/2018	<MDC	2.9	30.0	4.2			
2/6/2018	<MDC	2.9	23.3	4.2	2/6/2018	3.0	2.9	26.7	4.2	2/6/2018	<MDC	2.9	24.2	4.2			
2/13/2018	<MDC	2.9	34.8	4.2	2/13/2018	3.4	2.9	39.2	4.2	2/13/2018	<MDC	2.9	38.1	4.2			
2/21/2018	<MDC	2.9	31.2	4.2	2/21/2018	<MDC	2.9	30.6	4.2	2/21/2018	3.9	2.9	31.8	4.2			
2/27/2018	<MDC	2.9	24.7	4.2	2/27/2018	<MDC	2.9	24.8	4.2	2/27/2018	<MDC	2.9	24.8	4.2			
3/6/2018	5.5	2.9	27.2	4.2	3/6/2018	4.0	2.9	31.1	4.2	3/6/2018	4.1	2.9	30.8	4.2			
3/12/2018	<MDC	2.9	16.8	4.2	3/12/2018	<MDC	2.9	15.4	4.2	3/12/2018	<MDC	2.9	14.1	4.2			
3/20/2018	5.4	2.9	29.4	4.2	3/20/2018	6.3	2.9	33.3	4.2	3/20/2018	4.4	2.9	28.0	4.2			
4/3/2018	<MDC	2.9	19.0	4.2	4/3/2018	<MDC	2.9	21.0	4.2	4/3/2018	<MDC	2.9	19.0	4.2			
4/10/2018	3.5	2.9	26.5	4.2	4/10/2018	3.9	2.9	29.8	4.2	4/10/2018	4.2	2.9	26.8	4.2			
4/17/2018	<MDC	2.9	18.2	4.2	4/17/2018	<MDC	2.9	16.4	4.2	4/17/2018	<MDC	2.9	15.3	4.2			
4/24/2018	<MDC	2.9	18.9	4.2	4/24/2018	<MDC	2.9	21.8	4.2	4/24/2018	<MDC	2.9	20.0	4.2			
4/30/2018	<MDC	2.9	16.0	4.2	4/30/2018	<MDC	2.9	15.1	4.2	4/30/2018	<MDC	2.9	15.6	4.2			
5/8/2018	<MDC	2.9	22.7	4.2	5/8/2018	3.1	2.9	24.0	4.2	5/8/2018	<MDC	2.9	24.9	4.2			
5/15/2018	<MDC	2.9	18.1	4.2	5/15/2018	<MDC	2.9	19.4	4.2	5/15/2018	<MDC	2.9	18.7	4.2			
5/21/2018	<MDC	2.9	13.7	4.2	5/21/2018	<MDC	2.9	13.3	4.2	5/21/2018	<MDC	2.9	13.4	4.2			
5/29/2018	<MDC	2.9	22.0	4.2	5/29/2018	<MDC	2.9	26.5	4.2	5/29/2018	<MDC	2.9	25.3	4.2			
6/5/2018	<MDC	2.9	16.1	4.2	6/5/2018	<MDC	2.9	19.2	4.2	6/5/2018	<MDC	2.9	18.6	4.2			
6/12/2018	<MDC	2.9	17.1	4.2	6/12/2018	<MDC	2.9	17.2	4.2	6/12/2018	<MDC	2.9	15.6	4.2			
6/26/2018	<MDC	2.9	20.6	4.2	6/26/2018	<MDC	2.9	23.3	4.2	6/26/2018	<MDC	2.9	21.4	4.2			
7/3/2018	<MDC	2.9	23.4	4.2	7/3/2018	<MDC	2.9	24.8	4.2	7/3/2018	<MDC	2.9	26.3	4.2			
7/10/2018	<MDC	2.9	23.7	4.2	7/10/2018	<MDC	2.9	22.1	4.2	7/10/2018	<MDC	2.9	22.5	4.2			
7/17/2018	<MDC	2.9	21.7	4.2	7/17/2018	<MDC	2.9	24.4	4.2	7/17/2018	<MDC	2.9	26.3	4.2			
7/24/2018	<MDC	2.9	18.7	4.2	7/24/2018	<MDC	2.9	19.3	4.2	7/24/2018	<MDC	2.9	17.8	4.2			
7/31/2018	<MDC	2.9	26.1	4.2	7/31/2018	<MDC	2.9	25.0	4.2	7/31/2018	<MDC	2.9	24.9	4.2			
8/7/2018	<MDC	2.9	38.2	4.2	8/7/2018	3.2	2.9	39.8	4.2	8/7/2018	<MDC	2.9	38.8	4.2			
8/15/2018	<MDC	2.9	27.3	4.2	8/15/2018	<MDC	2.9	31.4	4.2	8/15/2018	<MDC	2.9	31.5	4.2			
8/22/2018	<MDC	2.9	28.8	4.2	8/22/2018	<MDC	2.9	31.2	4.2	8/22/2018	<MDC	2.9	32.9	4.2			
9/5/2018	3.2	2.9	25.7	4.2	9/5/2018	4.4	2.9	26.1	4.2	9/5/2018	<MDC	2.9	23.3	4.2			
9/11/2018	<MDC	2.9	16.3	4.2	9/11/2018	<MDC	2.9	16.0	4.2	9/11/2018	<MDC	2.9	16.0	4.2			
9/18/2018	<MDC	2.9	23.1	4.2	9/18/2018	<MDC	2.9	24.4	4.2	9/18/2018	<MDC	2.9	22.7	4.2			
9/25/2018	<MDC	2.9	19.7	4.2	9/25/2018	<MDC	2.9	23.0	4.2	9/25/2018	3.2	2.9	21.7	4.2			
10/2/2018	<MDC	2.9	21.7	4.2	10/2/2018	3.0	2.9	23.1	4.2	10/2/2018	<MDC	2.9	19.0	4.2			
10/9/2018	3.1	2.9	19.8	4.2	10/9/2018	<MDC	2.9	19.3	4.2	10/9/2018	3.7	2.9	18.9	4.2			
10/16/2018	<MDC	2.9	22.7	4.2	10/16/2018	3.0	2.9	20.8	4.2	10/16/2018	<MDC	2.9	23.0	4.2			
10/22/2018	<MDC	2.9	18.1	4.2	10/22/2018	<MDC	2.9	21.5	4.2	10/22/2018	<MDC	2.9	18.4	4.2			
11/7/2018	<MDC	2.9	18.5	4.2	11/7/2018	<MDC	2.9	21.4	4.2	11/7/2018	<MDC	2.9	13.7	4.2			
11/14/2018	<MDC	2.9	23.2	4.2	11/14/2018	4.3	2.9	23.5	4.2	11/14/2018	<MDC	2.9	19.4	4.2			
11/20/2018	3.1	2.9	29.0	4.2	11/20/2018	<MDC	2.9	30.1	4.2	11/20/2018	3.5	2.9	29.6	4.2			
11/27/2018	<MDC	2.9	35.6	4.2	11/27/2018	3.1	2.9	35.0	4.2	11/27/2018	<MDC	2.9	36.1	4.2			
12/4/2018	<MDC	2.9	19.8	4.2	12/4/2018	<MDC	2.9	25.4	4.2	12/4/2018	<MDC	2.9	22.5	4.2			
12/11/2018	<MDC	2.9	41.4	4.2	12/11/2018	<MDC	2.9	47.5	4.2	12/11/2018	<MDC	2.9	43.1	4.2			
12/17/2018	8.5	2.9	66.8	4.2	12/17/2018	6.4	2.9	67.3	4.2	12/17/2018	6.6	2.9	62.6	4.2			
12/26/2018	<MDC	2.9	31.8	4.2	12/26/2018	4.1	2.9	31.6	4.2	12/26/2018	3.1	2.9	28.9	4.2			

Blanks in the table are from samples not collected due to difficulty maintaining consistent power to the air sampling unit or equipment malfunction.

Gamma Detection Network Results – Zion
Results are in milliroentgen per hour (mR/hr)



Summary of Ambient Gamma Results - Zion

Location	Quarter 1 mR/quarter	Quarter 2 mR/quarter	Quarter 3 mR/quarter	Quarter 4 mR/quarter	Annual Exposure mR/year
ZN039	5.7	5.3	5.8		22.4
ZN040	5.9		7.7	5.7	25.7
ZN045	5.2	4.1	4.6	5.8	19.7
ZN065	5.7	5.7	6.4	6.9	24.8
ZN066	8.1	8.1	8.4	9.9	34.5
ZN067	4.4	4.0	4.2	4.7	17.2
ZN068	6.9	5.7	7.3		26.5
ZN069	5.7	5.6	7.2		24.7
ZN070	5.3	3.9	5.5	6.8	21.4
ZN071	7.3	7.3	8.5	9.6	32.7
ZN072	5.7	5.0	6.3	5.7	22.7
ZN073	3.5	4.8	5.3		18.1
ZN074	3.7	5.2	5.6	4.7	19.3
ZN075	7.2	7.8	8.9	8.9	32.9
ZN076	8.0	6.8	6.7	8.0	29.6
ZN077	6.9	7.9	7.7	8.2	30.8
ZN078	6.3	7.4	8.5	7.4	29.6
ZN079	6.4	7.7	8.0	7.8	29.9
ZN080	7.5	6.2	8.9	7.4	29.9
ZN081	7.5	6.9	8.5	8.5	31.4
ZN082	4.9	4.8	4.7	5.5	20.0
ZN084	4.9	4.2	6.5	5.9	21.5
ZN-RSJC	4.0	5.8	4.2	5.7	19.8
ZN-RSNC	4.2	4.3	4.7	5.5	18.6

Blanks in the table indicate that dosimeters were missing at the end of the quarter.

Annual Exposure column based on averages of all available data.

Quarter length is estimated to be 91.25 days.

Background Sampling Locations

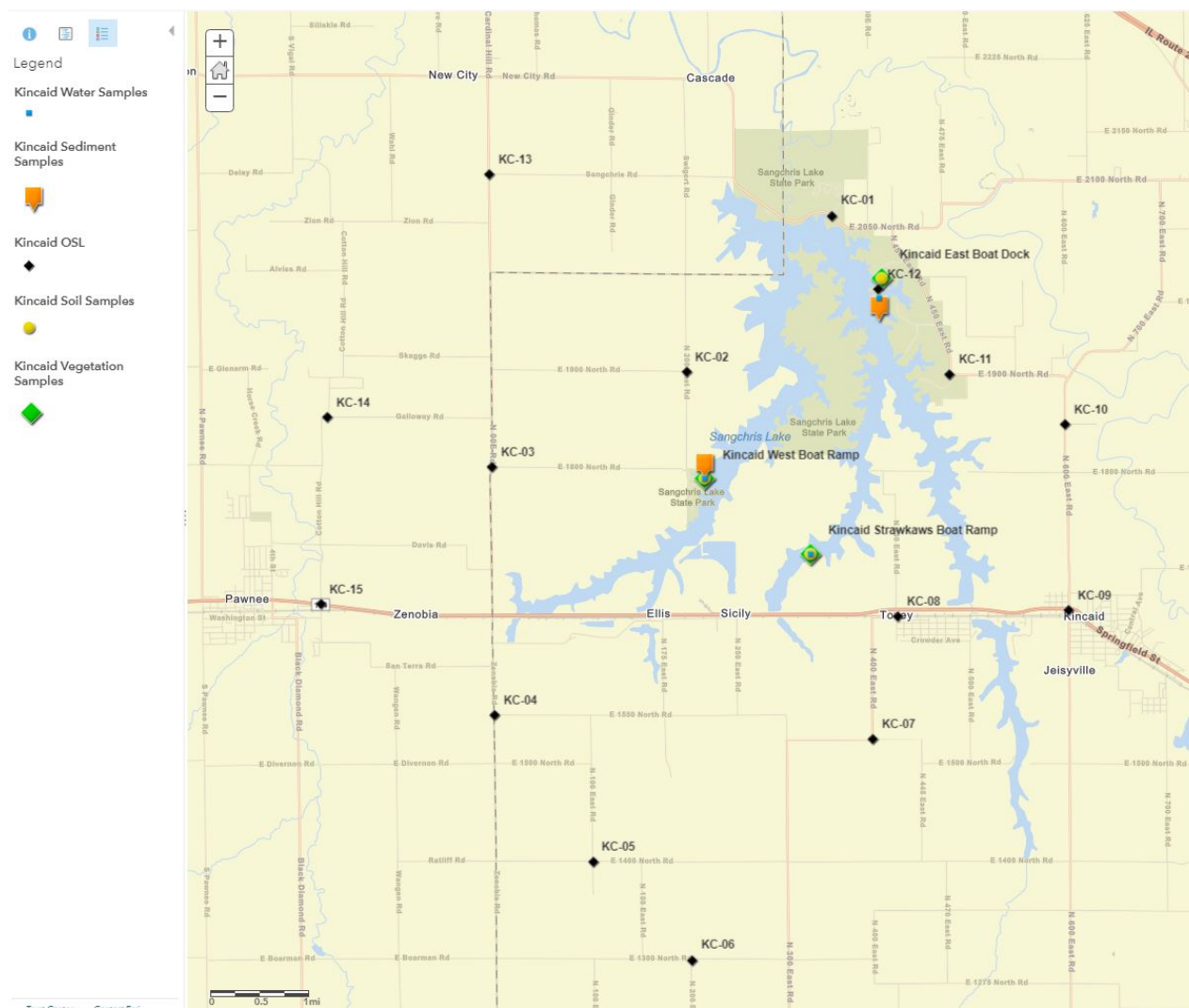
IEMA has established the environs of Sangchris Lake State Park, a cooling lake for a coal-fired power station near Kincaid, IL, as a Background Sampling Location. To establish “background” radiation levels, water, soil, sediment, vegetation, and fish samples are collected and analyzed utilizing the same procedures and methodologies used for Nuclear Power Station samples. In addition, there is an array of environmental dosimeters around the power plant, similar to what can be found around each nuclear power station.

IEMA routinely collects air samples around the Zion facility; therefore, background sampling locations for air samples have also been established. Continuous air sampling stations are located in Springfield and Marion, IL. Consistent with the procedure for the Zion site, samples are collected and analyzed weekly.

Figure 27 is an overview of all sampling and monitoring locations in the vicinity of Sangchris Lake State Park. Tables and graphs containing the analytical results for the 2018 background environmental monitoring locations can be found on pages 135-143.

Sangchris Lake State Park Maps of Monitoring and Sampling Locations

Figure 27. Monitoring and Sampling Locations - Sangchris Lake State Park

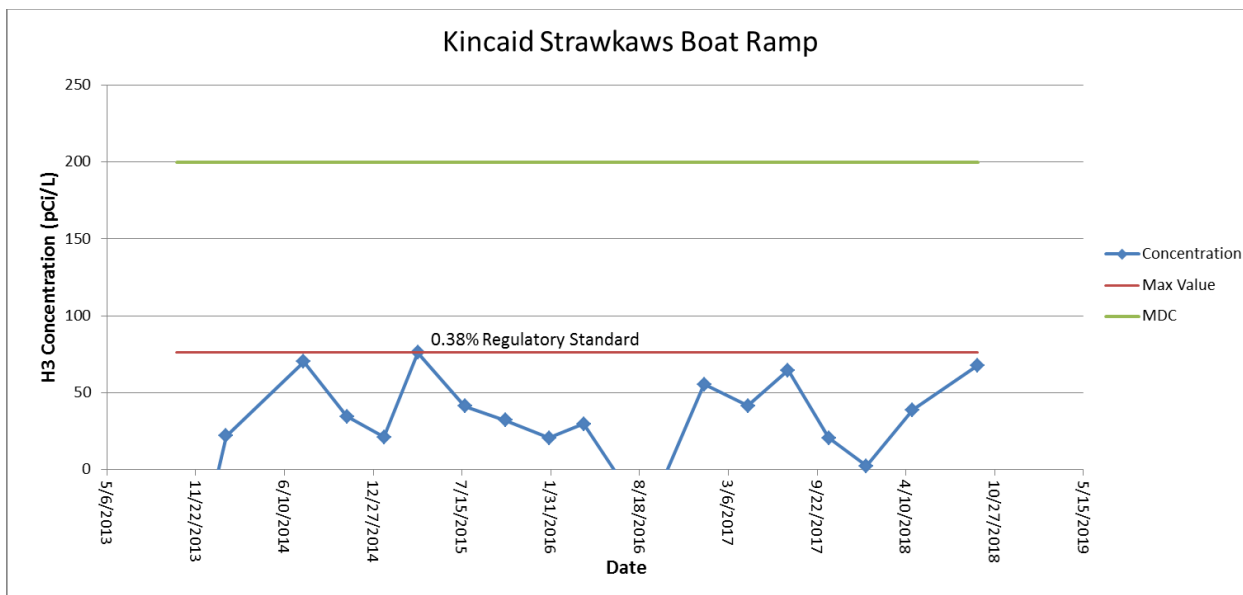
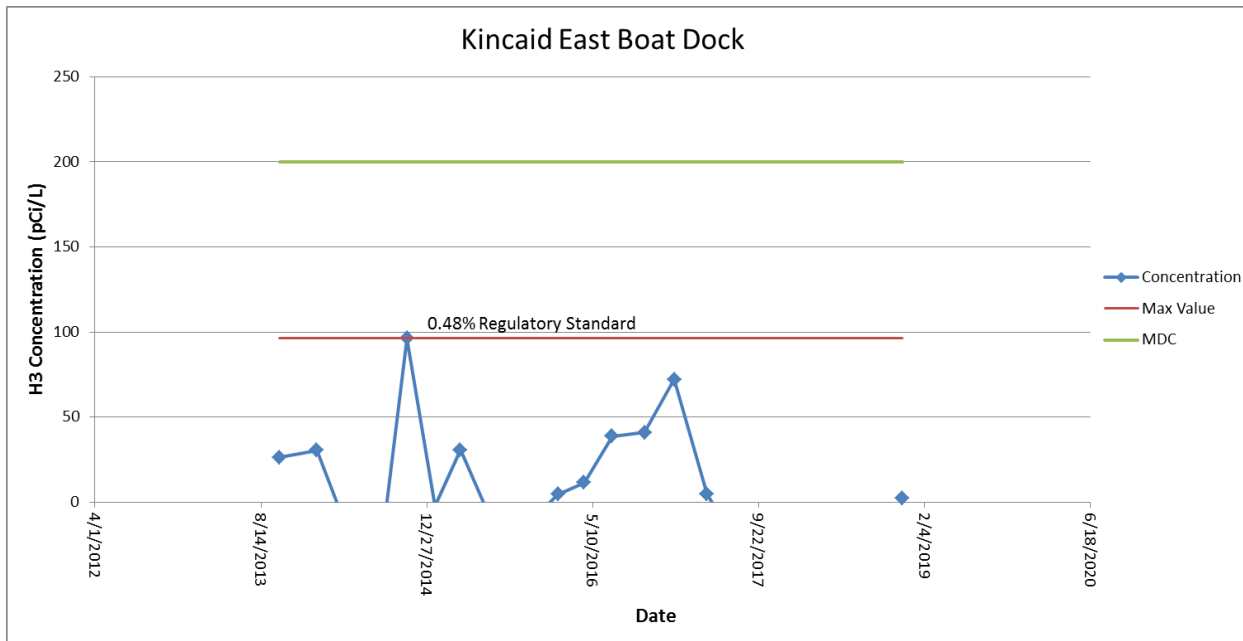


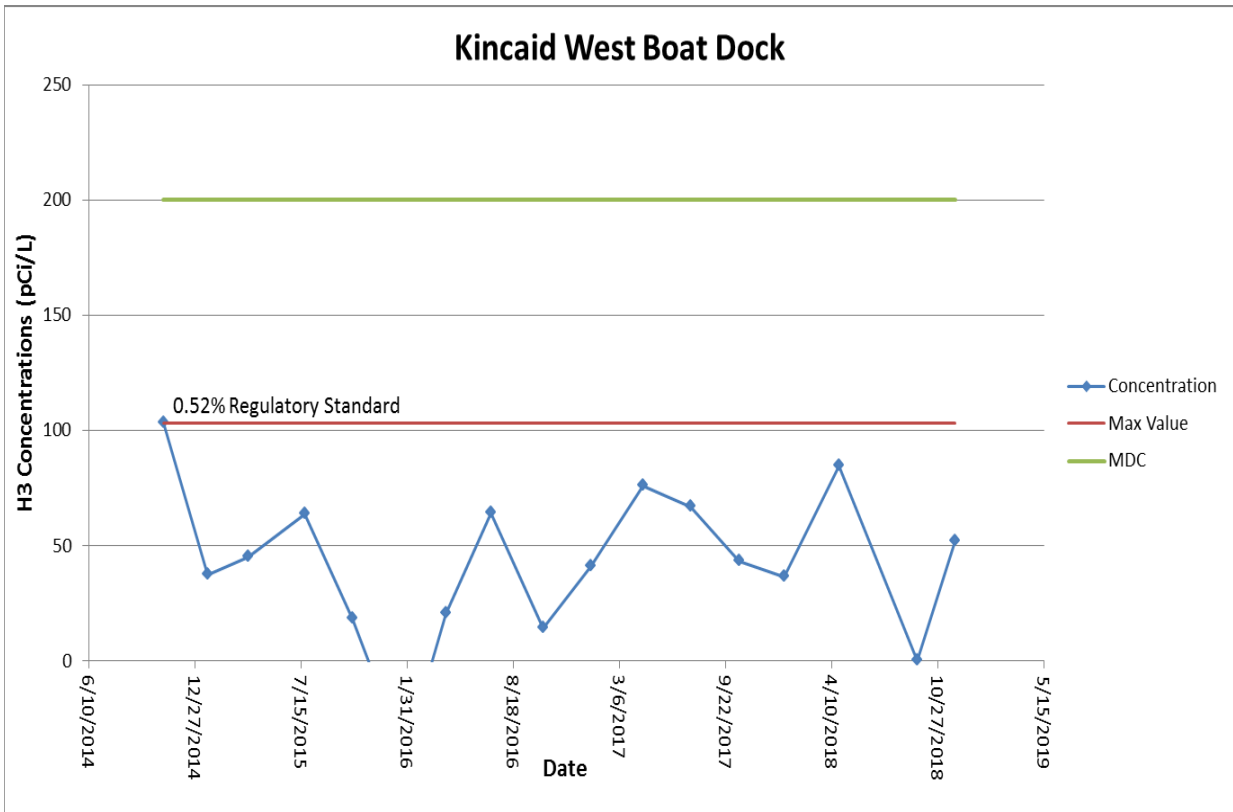
Sangchris Lake State Park Result Tables and Graphs

Tritium (H-3) in Water Results - Sangchris Lake State Park
Results are in picocuries per liter (pCi/L)

Location	H-3	
Date	Result	MDC
East Boat Ramp		
1/11/2018	<MDC	181
4/25/2018	<MDC	181
9/19/2018	<MDC	181
11/29/2018	<MDC	181
Strawkaws Boat Ramp		
1/11/2018	<MDC	181
4/25/2018	<MDC	181
9/19/2018	<MDC	181
West Boat Ramp		
1/11/2018	<MDC	181
4/25/2018	<MDC	181
9/19/2018	<MDC	181
11/29/2018	<MDC	181

Trending Graphs for Tritium (H-3) in Water - Sangchris Lake State Park
 (Max value compared to IEPA and USEPA regulatory standard of 20,000 pCi/L)





Results for Total Strontium in Water - Sangchris Lake State Park
Results are in picocuries per liter (pCi/L)

Location	Strontium	
Date	Result	MDC
East Boat Ramp		
11/29/2018	<MDC	0.5
West Boat Ramp		
11/29/2018	<MDC	0.5

Results for Beta Screening of Water - Sangchris Lake State Park
Results are in picocuries per liter (pCi/L)

Location	Beta	
Date	Result	MDC
East Boat Ramp		
1/11/2018	<MDC	3.9
4/25/2018	<MDC	3.9
9/19/2018	<MDC	3.9
11/29/2018	<MDC	3.9
Strawkaws Boat Ramp		
1/11/2018	4.5	3.9
4/25/2018	<MDC	3.9
9/19/2018	<MDC	3.9
West Boat Ramp		
1/11/2018	<MDC	3.9
4/25/2018	4.7	3.9
9/19/2018	<MDC	3.9
11/29/2018	<MDC	3.9

Gamma Spectroscopy Results for Other Radionuclides in Water - Sangchris Lake State Park
Results are in picocuries per liter (pCi/L)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95	
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result
East Boat Ramp																								
1/11/2018	<MDC	21.8	<MDC	27.4	<MDC	3.8	<MDC	3.9	<MDC	3.7	<MDC	3.6	<MDC	7.6	<MDC	9.8	<MDC	3.5	<MDC	4	<MDC	8	<MDC	6.4
4/25/2018	<MDC	21.8	<MDC	27.4	<MDC	3.8	<MDC	3.9	<MDC	3.7	<MDC	3.6	<MDC	7.6	<MDC	9.8	<MDC	3.5	<MDC	4	<MDC	8	<MDC	6.4
9/19/2018	<MDC	21.8	<MDC	27.4	<MDC	3.8	<MDC	3.9	<MDC	3.7	<MDC	3.6	<MDC	7.6	<MDC	9.8	<MDC	3.5	<MDC	4	<MDC	8	<MDC	6.4
11/29/2018	<MDC	21.8	<MDC	27.4	<MDC	3.8	<MDC	3.9	<MDC	3.7	<MDC	3.6	<MDC	7.6	<MDC	9.8	<MDC	3.5	<MDC	4	<MDC	8	<MDC	6.4
Strawkaws Boat Ramp																								
1/11/2018	<MDC	21.8	<MDC	27.4	<MDC	3.8	<MDC	3.9	<MDC	3.7	<MDC	3.6	<MDC	7.6	<MDC	9.8	<MDC	3.5	<MDC	4	<MDC	8	<MDC	6.4
4/25/2018	<MDC	21.8	<MDC	27.4	<MDC	3.8	<MDC	3.9	<MDC	3.7	<MDC	3.6	<MDC	7.6	<MDC	9.8	<MDC	3.5	<MDC	4	<MDC	8	<MDC	6.4
9/19/2018	<MDC	21.8	<MDC	27.4	<MDC	3.8	<MDC	3.9	<MDC	3.7	<MDC	3.6	<MDC	7.6	<MDC	9.8	<MDC	3.5	<MDC	4	<MDC	8	<MDC	6.4
West Boat Ramp																								
1/11/2018	<MDC	21.8	<MDC	27.4	<MDC	3.8	<MDC	3.9	<MDC	3.7	<MDC	3.6	<MDC	7.6	<MDC	9.8	<MDC	3.5	<MDC	4	<MDC	8	<MDC	6.4
4/25/2018	<MDC	21.8	<MDC	27.4	<MDC	3.8	<MDC	3.9	<MDC	3.7	<MDC	3.6	<MDC	7.6	<MDC	9.8	<MDC	3.5	<MDC	4	<MDC	8	<MDC	6.4
9/19/2018	<MDC	21.8	<MDC	27.4	<MDC	3.8	<MDC	3.9	<MDC	3.7	<MDC	3.6	<MDC	7.6	<MDC	9.8	<MDC	3.5	<MDC	4	<MDC	8	<MDC	6.4
11/29/2018	<MDC	21.8	<MDC	27.4	<MDC	3.8	<MDC	3.9	<MDC	3.7	<MDC	3.6	<MDC	7.6	<MDC	9.8	<MDC	3.5	<MDC	4	<MDC	8	<MDC	6.4

Gamma Spectroscopy Results for Radionuclides in Soil (Migration) - Sangchris Lake State Park
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95	
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result
East Boat Ramp																						
4/25/2018	<MDC	0.37	<MDC	0.20	<MDC	0.04	<MDC	0.03	0.05	0.03	0.06	0.04	<MDC	0.08	<MDC	0.04	<MDC	0.05	<MDC	0.07	<MDC	0.08
9/19/2018	<MDC	0.37	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.07	0.04	<MDC	0.08	<MDC	0.04	<MDC	0.05	<MDC	0.07	<MDC	0.08
Strawkaws Boat Ramp																						
4/25/2018	<MDC	0.37	<MDC	0.20	<MDC	0.04	<MDC	0.03	0.05	0.03	0.10	0.04	<MDC	0.08	<MDC	0.04	<MDC	0.05	<MDC	0.07	<MDC	0.08
9/19/2018	<MDC	0.37	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.07	0.04	<MDC	0.08	<MDC	0.04	<MDC	0.05	<MDC	0.07	<MDC	0.08
West Boat Ramp																						
4/25/2018	<MDC	0.37	<MDC	0.20	<MDC	0.04	<MDC	0.03	0.05	0.03	0.12	0.04	<MDC	0.08	<MDC	0.04	<MDC	0.05	<MDC	0.07	<MDC	0.08
9/19/2018	<MDC	0.37	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.07	0.04	<MDC	0.08	<MDC	0.04	<MDC	0.05	<MDC	0.07	<MDC	0.08

Gamma Spectroscopy Results for Radionuclides in Soil (Deposition) - Sangchris Lake State Park
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		Mn-54		Nb-95		Zn-65		Zr-95	
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result
East Boat Ramp																						
4/25/2018	<MDC	0.37	<MDC	0.20	<MDC	0.04	<MDC	0.03	0.03	0.03	0.04	0.04	<MDC	0.08	<MDC	0.04	<MDC	0.05	<MDC	0.07	<MDC	0.08
9/19/2018	<MDC	0.37	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.07	0.04	<MDC	0.08	<MDC	0.04	<MDC	0.05	<MDC	0.07	<MDC	0.08
Strawkaws Boat Ramp																						
4/25/2018	<MDC	0.37	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.07	0.04	<MDC	0.08	<MDC	0.04	<MDC	0.05	<MDC	0.07	<MDC	0.08
9/19/2018	<MDC	0.37	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.07	0.04	<MDC	0.08	<MDC	0.04	<MDC	0.05	<MDC	0.07	<MDC	0.08
West Boat Ramp																						
4/25/2018	<MDC	0.37	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.07	0.04	<MDC	0.08	<MDC	0.04	<MDC	0.05	<MDC	0.07	<MDC	0.08
9/19/2018	<MDC	0.37	<MDC	0.20	<MDC	0.04	<MDC	0.03	<MDC	0.03	0.04	0.04	<MDC	0.08	<MDC	0.04	<MDC	0.05	<MDC	0.07	<MDC	0.08

Gamma Spectroscopy Results for Radionuclides in Sediment - Sangchris Lake State Park
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95	
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	
East Boat Ramp																								
4/25/2018	<MDC	0.06	<MDC	0.04	<MDC	0.01	<MDC	0.01	0.04	0.01	0.02	0.01	<MDC	0.02	<MDC	0.02	<MDC	0.01	<MDC	0.01	<MDC	0.02	<MDC	0.01
West Boat Ramp																								
9/26/2018	<MDC	0.06	<MDC	0.04	<MDC	0.01	<MDC	0.01	<MDC	0.01	0.04	0.01	<MDC	0.02			0.01	0.01	<MDC	0.01	<MDC	0.02	<MDC	0.01

Gamma Spectroscopy Results for Radionuclides in Vegetation - Sangchris Lake State Park
Results are in picocuries per gram (pCi/g)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95	
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	
East Boat Ramp																								
4/25/2018	<MDC	11.4	<MDC	0.6	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.4	<MDC	26.8	<MDC	0.1	<MDC	0.3	<MDC	0.3	<MDC	0.3
9/19/2018	<MDC	11.4	<MDC	0.6	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.4	<MDC	26.8	<MDC	0.1	<MDC	0.3	<MDC	0.3	<MDC	0.3
Strawkaws Boat Ramp																								
4/25/2018	<MDC	11.4	<MDC	0.6	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.4	<MDC	26.8	<MDC	0.1	<MDC	0.3	<MDC	0.3	<MDC	0.3
9/19/2018	<MDC	11.4	<MDC	0.6	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.4	<MDC	26.8	<MDC	0.1	<MDC	0.3	<MDC	0.3	<MDC	0.3
West Boat Ramp																								
4/25/2018	<MDC	11.4	<MDC	0.6	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.4	<MDC	26.8	<MDC	0.1	<MDC	0.3	<MDC	0.3	<MDC	0.3
9/19/2018	<MDC	11.4	<MDC	0.6	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.1	<MDC	0.4	<MDC	26.8	<MDC	0.1	<MDC	0.3	<MDC	0.3	<MDC	0.3

Gamma Spectroscopy Results for Radionuclides in Fish - Sangchris Lake State Park
Results are in picocuries per kilogram (pCi/kg)

Location	Ba-140		Ce-144		Co-58		Co-60		Cs-134		Cs-137		Fe-59		I-131		Mn-54		Nb-95		Zn-65		Zr-95	
	Date	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	Result	MDC	
Sangchris Lake Bottom Feeders																								
4/12/2018	<MDC	1000	<MDC	142	<MDC	25	<MDC	20	<MDC	19	<MDC	17.8	<MDC	73	<MDC	1520	<MDC	18.8	<MDC	48	<MDC	40	<MDC	54
10/5/2018	<MDC	1000	<MDC	142	<MDC	25	<MDC	20	<MDC	19	<MDC	17.8	<MDC	73	<MDC	1520	<MDC	18.8	<MDC	48	<MDC	40	<MDC	54
Sangchris Lake Top Feeders																								
4/12/2018	<MDC	1000	<MDC	142	<MDC	25	<MDC	20	<MDC	19	<MDC	17.8	<MDC	73	<MDC	1520	<MDC	18.8	<MDC	48	<MDC	40	<MDC	54
10/5/2018	<MDC	1000	<MDC	142	<MDC	25	<MDC	20	<MDC	19	<MDC	17.8	<MDC	73	<MDC	1520	<MDC	18.8	<MDC	48	<MDC	40	<MDC	54

Alpha / Beta Screening Results for Air Samples - Springfield
Results are in picocuries per liter (pCi/L)

Location	Alpha		Beta		Location	Alpha		Beta			
	Date	Result	MDC	Result		MDC	Date	Result	MDC	Result	MDC
Knotts Street Air Sampler					Knotts Street Air Sampler						
	1/3/2018	6.0	3.4	40.9	4.8		7/3/2018	<MDC	3.4	19.5	4.8
	1/18/2018	4.5	3.4	37.8	4.8		7/10/2018	3.6	3.4	29.3	4.8
	1/22/2018	6.0	3.4	39.3	4.8		7/17/2018	<MDC	3.4	29.1	4.8
	1/29/2018	<MDC	3.4	26.6	4.8		7/23/2018	<MDC	3.4	28.5	4.8
	2/5/2018	<MDC	3.4	25.9	4.8		7/31/2018	<MDC	3.4	27.8	4.8
	2/13/2018	3.5	3.4	38.7	4.8		8/6/2018	4.2	3.4	47.0	4.8
	2/20/2018	4.0	3.4	33.5	4.8		8/21/2018	<MDC	3.4	31.5	4.8
	2/26/2018	<MDC	3.4	14.6	4.8		8/28/2018	<MDC	3.4	42.9	4.8
	3/5/2018	4.4	3.4	26.2	4.8		9/5/2018	<MDC	3.4	21.0	4.8
	3/12/2018	3.6	3.4	25.0	4.8		9/11/2018	<MDC	3.4	18.6	4.8
	3/19/2018	4.6	3.4	30.3	4.8		9/17/2018	<MDC	3.4	27.4	4.8
	3/27/2018	<MDC	3.4	20.8	4.8		9/25/2018	<MDC	3.4	30.6	4.8
	4/2/2018	3.6	3.4	27.8	4.8		10/1/2018	4.4	3.4	29.9	4.8
	4/9/2018	<MDC	3.4	21.2	4.8		10/9/2018	<MDC	3.4	24.4	4.8
	4/17/2018	4.3	3.4	22.1	4.8		10/15/2018	<MDC	3.4	17.1	4.8
	4/25/2018	<MDC	3.4	22.4	4.8		10/23/2018	<MDC	3.4	24.9	4.8
	5/1/2018	<MDC	3.4	20.2	4.8		10/31/2018	<MDC	3.4	23.3	4.8
	5/8/2018	<MDC	3.4	28.0	4.8		11/5/2018	<MDC	3.4	24.6	4.8
	5/14/2018	<MDC	3.4	37.4	4.8		11/13/2018	<MDC	3.4	21.9	4.8
	5/21/2018	<MDC	3.4	32.3	4.8		11/19/2018	<MDC	3.4	31.6	4.8
	5/29/2018	<MDC	3.4	32.4	4.8		11/27/2018	4.0	3.4	38.6	4.8
	6/5/2018	<MDC	3.4	22.6	4.8		12/3/2018	<MDC	3.4	28.5	4.8
	6/11/2018	<MDC	3.4	34.0	4.8		12/11/2018	<MDC	3.4	26.4	4.8
	6/18/2018	<MDC	3.4	31.6	4.8		12/19/2018	<MDC	3.4	36.4	4.8

Alpha / Beta Screening Results for Air Samples - Marion
Results are in picocuries per liter (pCi/L)

Location	Alpha		Beta		
	Date	Result	MDC	Result	MDC
Marion Office					
1/3/2018	5.9	3.8	37.2	5.1	
1/9/2018	6.7	3.8	48.4	5.1	
1/23/2018	<MDC	3.8	21.8	5.1	
1/30/2018	<MDC	3.8	32.4	5.1	
2/6/2018	<MDC	3.8	26.5	5.1	
2/14/2018	4.5	3.8	30.3	5.1	
2/20/2018	4.0	3.8	30.7	5.1	
3/1/2018	<MDC	3.8	19.1	5.1	
3/20/2018	4.1	3.8	25.6	5.1	
3/27/2018	<MDC	3.8	23.4	5.1	
4/3/2018	<MDC	3.8	20.0	5.1	
4/11/2018	<MDC	3.8	29.8	5.1	
4/18/2018	<MDC	3.8	20.1	5.1	
4/23/2018	<MDC	3.8	17.8	5.1	
5/1/2018	<MDC	3.8	19.7	5.1	
5/8/2018	<MDC	3.8	26.3	5.1	
5/15/2018	4.0	3.8	36.5	5.1	
5/22/2018	<MDC	3.8	26.1	5.1	
5/29/2018	<MDC	3.8	28.0	5.1	
6/5/2018	<MDC	3.8	21.7	5.1	
6/12/2018	<MDC	3.8	39.7	5.1	
6/19/2018	<MDC	3.8	39.1	5.1	
6/26/2018	<MDC	3.81	19.61	5.12	

Location	Alpha		Beta		
	Date	Result	MDC	Result	MDC
Marion Office					
7/3/2018 ^a					
7/11/2018	<MDC	3.8	13.1	5.1	
7/18/2018	<MDC	3.8	34.6	5.1	
7/25/2018	<MDC	3.8	36.4	5.1	
7/31/2018	<MDC	3.8	30.9	5.1	
8/8/2018	<MDC	3.8	40.8	5.1	
8/15/2018	<MDC	3.8	39.0	5.1	
8/22/2018	<MDC	3.8	31.5	5.1	
8/27/2018	<MDC	3.8	48.6	5.1	
9/11/2018	<MDC	3.8	17.2	5.1	
9/19/2018 ^b					
9/26/2018	<MDC	3.8	25.2	5.1	
10/2/2018	<MDC	3.8	34.7	5.1	
10/9/2018	3.9	3.8	32.7	5.1	
10/17/2018	<MDC	3.8	17.2	5.1	
10/22/2018	<MDC	3.8	20.5	5.1	
10/29/2018	<MDC	3.8	25.7	5.1	
11/8/2018	<MDC	3.8	27.6	5.1	
11/14/2018	<MDC	3.8	30.2	5.1	
11/21/2018	4.5	3.8	37.4	5.1	
11/29/2018	5.0	3.8	39.9	5.1	
12/5/2018	<MDC	3.8	18.9	5.1	
12/10/2018	<MDC	3.8	39.4	5.1	
12/19/2018	<MDC	3.8	25.9	5.1	

a) Building struck by lightning, lost power

b) Lost power at pump, no data saved

Summary of Ambient Gamma Results - Sangchris Lake State Park

Location	Quarter 1 mR/quarter	Quarter 2 mR/quarter	Quarter 3 mR/quarter	Quarter 4 mR/quarter	Annual Exposure mR/year
KC-01	11.1	11.1	10.6	10.6	43.4
KC-02	11.1	10.3	10.0	9.1	40.6
KC-03	9.8	8.3	10.5	7.5	36.0
KC-04	9.4	9.9	9.7	9.1	38.1
KC-05	10.5	8.5	11.5	9.5	40.0
KC-06	9.8	9.8	10.4	9.3	39.2
KC-07	8.9	8.9	11.6	7.2	36.6
KC-08	9.9	8.8	8.5	9.0	36.1
KC-09	9.6	8.9	10.2	9.5	38.2
KC-10	8.9	10.1	11.4	9.3	39.7
KC-11		11.1	10.6	11.0	43.6
KC-12	10.0	10.1	11.1	9.3	40.6
KC-13		11.0	10.2	8.2	39.3
KC-14	10.4	8.6	9.8	8.7	37.4
KC-15	11.3	11.5	9.9	9.7	42.3

Blanks in the table indicate that dosimeters were missing at the end of the quarter.

Annual Exposure column based on averages of all available data.

Quarter length is estimated to be 91.25 days.

Appendix A
Radionuclide Abbreviations in this Report

Ba-140 Barium-140
Ce-144 Cerium-144
Co-58 Cobalt-58
Co-60 Cobalt-60
Cs-134 Cesium-134
Cs-137 Cesium-137
Fe-59 Iron-59
I-131 Iodine-131
Mn-54 Manganese-54
Nb-95 Niobium-95
Zn-65 Zinc-65
Zr-95 Zirconium-95

Illinois Emergency Management Agency
1035 Outer Park Drive
Springfield, IL 62704

www.iema.illinois.gov
