Exelon Generation

LaSalle County Station
2601 North 21st Road
Marseilles, IL 61341
815-415-2000 Telephone
www.exeloncorp.com

RA20-026

10 CFR 50 Appendix I

May 13, 2020

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

LaSalle County Station, Units 1 and 2
Renewed Facility Operating License Nos. NPF-11 and NPF-18
NRC Docket Nos. 50-373 and 50-374

Subject: 2019 Annual Radiological Environmental Operating Report

Enclosed is the Exelon Generation Company, LLC, 2019 Annual Radiological Environmental Operating Report for LaSalle County Station, submitted in accordance with Technical Specifications 5.6.2, "Annual Radiological Environmental Operating Report." The enclosed report contains the results of groundwater monitoring conducted in accordance with Exelon's Radiological Groundwater Protection Program, which is a voluntary program implemented in 2006. This information is being reported in accordance with a nuclear industry initiative.

There are no regulatory commitments in this letter. Should you have any questions concerning this report, please contact Mr. Daniel Mearhoff, Regulatory Assurance Manager, at (815) 415-2800.

Respectfully,

John J. Washko
Site Vice President
LaSalle County Station

Enclosure: LaSalle County Station Units 1 and 2 Annual Radiological Environmental Operating Report 1 January through 31 December 2019

cc: Regional Administrator - NRC Region III
NRC Senior Resident Inspector - LaSalle County Station

Docket No: 50-373
50-374

LASALLE COUNTY STATION
UNITS 1 and 2

Annual Radiological
Environmental Operating Report

1 January through 31 December 2019

Prepared By
Teledyne Brown Engineering
Environmental Services

LaSalle County Station
Marseilles, IL 61341

May 2020

Intentionally left blank

Table Of Contents

Appendices

I. Summary and Conclusions

This report on the Radiological Environmental Monitoring Program conducted for the LaSalle County Station (LSCS) by Exelon covers the period 1 January 2019 through 31 December 2019. During that time period, 1,323 analyses were performed on 1,225 samples. In assessing all the data gathered for this report and comparing these results with preoperational data, it was concluded that the operation of LSCS had no adverse radiological impact on the environment.

Surface water samples were analyzed for concentrations of gross beta, tritium and gamma-emitting nuclides. Ground/well water samples were analyzed for concentrations of tritium and gamma-emitting nuclides. No fission or activation products were detected. Gross beta and tritium activities detected were consistent with those detected in previous years.

Commercially and recreationally important fish species were sampled and analyzed for concentrations of gamma-emitting nuclides. No fission or activation products were detected in fish.

Sediment samples were analyzed for concentrations of gamma-emitting nuclides. No fission or activation products were detected.

Air particulate samples were analyzed for concentrations of gross beta and gamma-emitting nuclides. No fission or activation products were detected.

High sensitivity Iodine-131 (I-131) analyses were performed on weekly air samples. All results were less than the minimum detectable activity for I-131.

Cow milk samples were analyzed for concentrations of I-131 and gamma-emitting nuclides. All I-131 results were below the minimum detectable activity. Concentrations of naturally-occurring Potassium-40 (K-40) were consistent with those detected in previous years. No fission or activation products were found. All nuclides were below the minimum detectable activity.

Food product samples were analyzed for concentrations of gamma-emitting nuclides. No fission or activation products were detected.

Vegetation samples were analyzed for concentrations of gamma-emitting nuclides. No fission or activation products were detected.

Environmental gamma radiation measurements were performed quarterly using Optically Stimulated Luminescence Dosimeters (OSLD) for the Radiological Environmental Monitoring Program (REMP). The results from the environmental gamma radiation monitoring program were consistent with those detected in previous years.

II. Introduction

The LaSalle County Station (LSCS), consists of two boiling water reactors, each rated for 3,546 MWt. Both units are owned and operated by Exelon Corporation and are located in LaSalle County, Illinois. Unit 1 went critical on 16 March 1982. Unit 2 went critical on 02 December 1983. The site is located in northern Illinois, approximately 75 miles southwest of Chicago, Illinois.

A Radiological Environmental Monitoring Program (REMP) for LSCS was initiated in 1982 (the preoperational period for most media covers the periods 1 January 1979 through 26 December 1981 and was summarized in a separate report.). This report covers those analyses performed by Teledyne Brown Engineering (TBE) and Landauer on samples collected during the period 1 January 2019 through 31 December 2019.

A. Objectives of the REMP

The objectives of the REMP are to:

1. Provide data on measurable levels of radiation and radioactive materials in the site environs.

2. Evaluate the relationship between quantities of radioactive material released from the plant and resultant radiation doses to individuals from principal pathways of exposure.

B. Implementation of the Objectives

The implementation of the objectives is accomplished by:

1. Identifying significant exposure pathways.

2. Establishing baseline radiological data of media within those pathways.

3. Continuously monitoring those media before and during Station operation to assess Station radiological effects (if any) on man and the environment.

III. Program Description

A. Sample Collection

Samples for the LSCS REMP were collected for Exelon Nuclear by Environmental Inc. (Midwest Labs). This section describes the general collection methods used by Environmental Inc. (Midwest Labs) to obtain environmental samples for the LSCS REMP in 2019. Sample locations and descriptions can be found in Tables B–1 and B–2, and Figures B–1 through B–3, Appendix B.

Aquatic Environment

The aquatic environment was evaluated by performing radiological analyses on samples of surface water, ground/well water, fish, and sediment. Two gallon water samples were collected weekly from two surface water locations (L-21 and L-40) and composited for monthly and quarterly required analyses. Control location was L-21. Two ground/well water locations (L-27 and L-28) were also grab sampled quarterly. All samples were collected via grab sample. The samples were then transferred to new unused plastic containers. Both the grab container and the sample containers were rinsed with source water prior to actual sample collection. Fish samples were collected semiannually at three locations, L-34, L-35 and L-36 (Control). Sediment samples composed of recently deposited substrate were collected at three locations semiannually, L-21 (Control), L-40 and L-41.

Atmospheric Environment

The atmospheric environment was evaluated by performing radiological analyses on samples of airborne particulate and iodine. Airborne particulate and iodine samples were collected and analyzed weekly at nine locations (L-01, L-03, L-04, L-05, L-06, L-07, L-08, L-10, and L-11A). The control location was L-10. Airborne particulate and iodine samples were obtained at each location, using a vacuum pump to pull air through a glass fiber particulate filter and iodine cartridge. The pumps were run continuously and sampled air at the rate of approximately one cubic foot per minute. The particulate filters and iodine cartridges were replaced weekly and sent to the laboratory for analysis.

Terrestrial Environment

The terrestrial environment was evaluated by performing radiological analyses on samples of milk and food product. Samples are typically collected biweekly at one milk location (L-42) from May through September, and monthly from December through April. The control location was L-42. All samples, when available, were collected in new unused two gallon plastic bottles from the bulk tank at each location, preserved with sodium

bisulfite, and shipped promptly to the laboratory.

Food products were collected during the growing season at five locations (L-Quad Control, L-Quad 1, L-Quad 2, L-Quad 3 and L-Quad 4). The control location was L-Quad Control. Various types of samples were collected and placed in new unused plastic bags, and sent to the laboratory for analysis.

Vegetation samples were collected monthly during the growing season from May through October at three locations (L-Veg C, L-ESE1, and L-ESE2). The control location was L-Veg C and was located in the lowest deposition sector (ENE sector) surrounding LaSalle. Various vegetation samples were also collected in the highest deposition sector (ESE sector) surrounding LaSalle. The samples were collected and placed in new unused plastic bags and sent to the laboratory for analysis.

Ambient Gamma Radiation

Beginning in the first quarter of 2012, Exelon changed the type of dosimetry used for the Radiological Environmental Monitoring Program (REMP). Optically Stimulated Luminescent Dosimetry (OSLD) were deployed and Thermo-luminescent Dosimetry (TLD) were discontinued. This change may cause step changes in readings, up or down, depending on site characteristics. However, the relative comparison to control locations remains valid. OSLD technology is different than that used in a TLD but has the same purpose (to measure direct radiation).

Each location consisted of 2 OSLD sets. The OSLDs were exchanged quarterly and sent to Landauer for analysis. The OSLD locations were placed on and around the LSCS site as follows:

An inner ring consisting of 16 locations (L-101, L-102, L-103, L-104, L-105, L-106, L-107, L-108, L-109, L-110, L-111B, L-112, L-113A, L-114, L-115 and L-116) near and within the site perimeter representing fence post doses (i.e., at locations where the doses will be potentially greater than maximum annual off–site doses from LSCS releases).

An outer ring consisting of 16 locations (L-201, L-202, L-203, L-204, L-205, L-206, L-207, L-208, L-209, L-210, L-211, L-212, L-213, L-214, L-215 and L-216) extending to approximately 5 miles from the site designed to measure possible exposures to nearby population.

An other set consisting of eight locations (L-01, L-03, L-04, L-05, L-06, L-07, L-08, and L-11A).

The balance of one location (L-10) representing the control area.

The specific OSLD locations were determined by the following criteria:

1. The presence of relatively dense population;

2. Site meteorological data taking into account distance and elevation for each of the sixteen 22 ½ degree sectors around the site, where estimated annual dose from LSCS, if any, would be most significant;

3. On hills free from local obstructions and within sight of the vents (where practical);

4. And near the closest dwelling to the vents in the prevailing downwind direction.

(Two OSLDs were placed at each location approximately six feet above ground level.)

B. Sample Analysis

This section describes the general analytical methodologies used by Environmental Inc. (Midwest Labs) and TBE to collect and analyze, respectively, the environmental samples for radioactivity for the LSCS REMP in 2019. The analytical procedures used by the laboratory are listed in Table B-2.

In order to achieve the stated objectives, the current program includes the following analyses:

1. Concentrations of beta emitters in surface water and air particulates

2. Concentrations of gamma emitters in ground/well and surface water, air particulates, milk, fish, sediment and vegetation

3. Concentrations of tritium in ground/well and surface water

4. Concentrations of I-131 in air and milk

5. Ambient gamma radiation levels at various site environs

C. Data Interpretation

The radiological and direct radiation data collected prior to LaSalle County Station becoming operational were used as a baseline with which these operational data were compared. For the purpose of this report, LaSalle County Station was considered operational at initial criticality. In addition, data were compared to previous years' operational data for consistency

and trending. Several factors were important in the interpretation of the data:

1. Lower Limit of Detection and Minimum Detectable Concentration

   The lower limit of detection (LLD) is defined as the smallest concentration of radioactive material in a sample that would yield a net count (above background) that would be detected with only a 5% probability of falsely concluding that a blank observation represents a "real" signal. The LLD is intended as a before the fact (a priori) estimate of a system (including instrumentation, procedure and sample type) and not as an after the fact (a posteriori) criteria for the presence of activity. All analyses were designed to achieve the required LSCS detection capabilities for environmental sample analysis.

   The minimum detectable concentration (MDC) is defined above with the exception that the measurement is an after the fact estimate of the presence of activity.

2. Net Activity Calculation and Reporting of Results

   Net activity for a sample was calculated by subtracting background activity from the sample activity. Since the REMP measures extremely small changes in radioactivity in the environment, background variations may result in sample activity being lower than the background activity effecting a negative number. An MDC was reported in all cases where positive activity was not detected.

   Gamma spectroscopy results for each type of sample were grouped as follows:

   For surface water, food products, and vegetation:
   12 nuclides including Mn-54, Co-58, Fe-59, Co-60, Zn-65, Zr-95, Nb-95, I-131, Cs-134, Cs-137, Ba-140, and La-140 were reported.

   For ground/well water, fish, sediment, air particulate and milk:
   11 nuclides including Mn-54, Co-58, Fe-59, Co-60, Zn-65, Zr-95, Nb-95, Cs-134, Cs-137, Ba-140, and La-140 were reported.

   Means and standard deviations of the results were calculated. The standard deviations represent the variability of measured results for different samples rather than single analysis uncertainty.

D. Program Exceptions

For 2019, the LSCS REMP had a sample recovery rate of 98.5%. Sample anomalies and missed samples are listed in the tables below:

Table D-1 LISTING OF SAMPLE ANOMALIES

Sample Type	Location Code	Collection Date	Reason
AP/AI	L-03	01/17/19	No apparent reason for lower reading of 172.5 hrs (8 days run).
AP/AI	L-03	01/24/19	Low reading of 65.4 hrs possibly caused either by a power failure or a faulty timer. Timer will be replaced during the next exchange. NOTE: Sample indicated a low value of 201.2 hrs on 13 days run; timer replaced on 02/08/19.
ALL SAMPLES		02/01/19	Collection of all samples rescheduled from 01/31/19 to 02/01/19 due to extreme cold.
AP/AI	L-01	02/01/19	Lower reading of 161.7 hrs (8 days run) caused possibly by a power outage due to the extremely cold temperatures. NOTE: On 02/06/19, timer indicated 120.2 hrs; normal for 5 days run.
AP/AI	L-08	02/01/19	Lower reading of 127.3 hrs (8 days run) caused possibly by a power outage due to the extremely cold temperatures. NOTE: On 02/06/19, timer indicated 119.9 hrs; normal for 5 days run.
AP/AI	L-03	02/06/19	Due to heavy snow, sample collected on 02/06/19 instead of scheduled 02/01/19.
AP/AI	L-08	02/14/19	Lower reading of 152.8 hrs on 8 day period due to pump failure. Pump replaced.
AP/AI	L-11A	02/14/19	Lower reading of 177.8 hrs on 8 day period due possibly to a power failure. NOTE: On 02/21/19, the timer indicated 167.9 hrs; normal for 7 days run.
AP/AI	L-04	03/21/19	Low reading of 46.5 hrs due to recent power restoration.
AP/AI	L-01	08/22/19	The times indicate approximately 7 hrs less than the normal value for the 7 days' run. Possible power outage. NOTE: On 08/29/19, the timer indicated 168.6 hrs; normal time for the 7 days collection period.
AP/AI	L-06	10/31/19	Timer indicated 14.7 hrs less than the expected 192 hrs; possible power failure due to wintry conditions.
AP/AI	L-06	11/06/19	Lower reading of 109.9 hrs during a 6 days period possibly due to a power failure. Timer seems to operate correctly.
AP/AI	L-06	11/14/19	Lower reading of 120.1 hrs during the 8 day collection period. Timer exchanged.

Table D-2 LISTING OF MISSED SAMPLES

Sample Type	Location Code	Collection Date	Reason
SW	L-21 L-40	02/01/19	No sample; water frozen
SW	L-40	02/06/19 03/06/19	No sample; water frozen
AP/AI	L-04	03/14/19	No power at the station. Plant informed by collector.
AI	L-05	07/10/19	Iodine cartridge missing in field.
VE	CONTROL	3rd Qtr 2019	Vegetables not collected due to lack of suitable crops caused by the very rainy Spring and Summer.
MI	L-42	09/19/19 10/02/19 10/17/19 10/31/19 11/14/19	Milk not available. Cows not milked due to the owner's injury.

Each program exception has been reviewed to understand the causes of the program exception. Occasional equipment breakdowns and power outages were unavoidable.

The overall sample recovery rate indicates that the appropriate procedures and equipment are in place to assure reliable program implementation.

E. Program Changes

There were no program changes in 2019.

IV. Results and Discussion

A. Aquatic Environment

1. Surface Water

Samples were taken weekly and composited monthly at two locations (L-21 and L-40). Of these locations only L-40 located downstream, could be affected by LaSalle's effluent releases. The following analyses were performed:

Gross Beta

Samples from all locations were analyzed for concentrations of gross beta (Table C–I.1, Appendix C). Gross beta was detected in 24 out of 24 samples with a range of 3.6 to 10.0 pCi/L. Concentrations detected were consistent with those detected in previous years (Figure C–1, Appendix C). The required LLD was met for all samples.

Tritium

Quarterly composites of weekly collections were analyzed for tritium activity (Table C–I.2, Appendix C). Tritium was detected in 6 of 8 samples. The concentrations ranged from 265 to 523 pCi/L. Concentrations detected were consistent with those detected in previous years (Figure C–2, Appendix C).

Gamma Spectrometry

Samples from both locations were analyzed for gamma-emitting nuclides (Table C–I.3, Appendix C). No nuclides were detected, and all required LLDs were met.

2. Ground/Well Water

Quarterly grab samples were collected at two locations (L-27 and L-28). Wells 4, 5 and 6 are associated with L-28. L-27 and L-28 Well 6 could be affected by LaSalle's effluent releases. The following analyses were performed:

Tritium

Quarterly grab samples from the locations were analyzed for tritium activity (Table C–II.1, Appendix C). No tritium was detected and the contractually-required 200 pCi/L LLDs were met.

Gamma Spectrometry

Samples from all locations were analyzed for gamma-emitting nuclides (Table C–II.2, Appendix C). No nuclides were detected, and all required LLDs were met.

3. Fish

Fish samples were collected at three locations (L-34, L-35 and L-36) semiannually. Locations L-34 and L-35 could be affected by LaSalle's effluent releases. The following analysis was performed:
Gamma Spectrometry

The edible portion of fish samples from both locations was analyzed for gamma-emitting nuclides (Table C–III.1, Appendix C). Naturally-occurring K-40 was found at all stations and ranged from 2,185 to 4,328 pCi/kg wet. No fission or activation products were found.

4. Sediment

Aquatic sediment samples were collected at three locations (L-21, L-40 and L-41) semiannually. Location L-21 is located upstream and is not affected by LaSalle's liquid effluent releases. Locations L-40 and L-41, located downstream, could be affected by LaSalle's effluent releases. The following analysis was performed:

Gamma Spectrometry

Sediment samples from the three locations were analyzed for gamma-emitting nuclides (Table C–IV.1, Appendix C). Naturally- occurring Be-7 was found at all stations with concentrations ranging from 1,118 to 4,482 pCi/L. Naturally- occurring K-40 was found at all stations and ranged from 8,784 to 18,600 pCi/kg dry. No fission or activation products were found.

B. Atmospheric Environment

1. Airborne

a. Air Particulates

Continuous air particulate samples were collected from nine locations on a weekly basis. The nine locations were separated into four groups: Group I (onsite) represents locations within the LSCS site boundary (L-03 and L-05), Group II (near-site) represents the locations near the LSCS site (L-01 and L-06),

Group III (far-field) represents the locations at an intermediate distance from LSCS (L-04, L-07, L-08, and L-11A) and Group IV (control) represents the control location at a remote distance (L-10). The following analyses were performed:

Gross Beta

Weekly samples were analyzed for concentrations of beta emitters (Table C–V.1 and C–V.2, Appendix C). Detectable gross beta activity was observed at all locations. Comparison of results among the four groups aid in determining the effects, if any, resulting from the operation of LSCS. The results from the onsite locations (Group I) ranged from 5 to 36E–3 pCi/m^3 with a mean of 16E–3 pCi/m^3. The results from the near-site location (Group II) ranged from 6 to 32E–3 pCi/m^3 with a mean of 16E–3 pCi/m^3. The results from the far-field locations (Group III) ranged from 6 to 36E-3 pCi/m^3 with a mean of 16E–3 pCi/m^3. The results from the control location (Group IV) ranged from 6 to 29E–3 pCi/m^3 with a mean of 16E–3 pCi/m^3. Comparison of the 2019 air particulate data with previous year's data indicate no effects from the operation of LSCS (Figures C–3 through C-8, Appendix C). In addition, comparisons of the weekly mean values for 2019 indicate no notable differences among the four groups.

Gamma Spectrometry

Weekly samples were composited quarterly and analyzed for gamma-emitting nuclides (Table C–V.3, Appendix C). Naturally-occurring Be-7, due to cosmic ray activity, was detected in 36 of 36 samples. These values ranged from 69 to 189 E–3 pCi/m^3. All other nuclides were less than the MDC.

b. Airborne Iodine

Continuous air samples were collected from ten locations (L-01, L-03, L-04, L-05, L-06, L-07, L-08, L-10, and L-11A) and analyzed weekly for I-131 (Table C–VI.1, Appendix C). No I-131 was detected.

2. Terrestrial

a. Milk

Samples were collected from one location (L-42) biweekly May through October and monthly December through April. The following analyses were performed:

Iodine-131

Milk samples from the location were analyzed for concentrations of I-131 (Table C–VII.1, Appendix C). I-131 was not detected, and the required LLDs were met.

Gamma Spectrometry

Milk samples were analyzed for concentrations of gamma-emitting nuclides (Table C–VII.2, Appendix C). Naturally-occurring K-40 activity was found in all milk samples and ranged from 888 to 1,274 pCi/l. No other nuclides were detected, and all required LLDs were met.

b. Food Products

Food product samples were collected at four locations (L-Quad 1, L-Quad 2, L-Quad 3 and L-Quad 4) when available. All locations could be affected by LaSalle's effluent releases. The following analysis was performed:

Gamma Spectrometry

Samples from all available locations were analyzed for gamma-emitting nuclides (Table C–VIII.1, Appendix C). No nuclides were detected, and all required LLDs were met.

c. Vegetation

Vegetation samples were collected monthly during the growing season from May through October at three locations (L-Veg C, L-ESE1, and L-ESE2). The control location was L-Veg C and was located in the lowest deposition sector (ENE sector) surrounding LaSalle. Various vegetation samples were also collected in the highest deposition sector (ESE sector) surrounding LaSalle. The following analyses were performed:

Gamma Spectrometry

Samples from all available locations were analyzed for gamma-emitting nuclides (Table C-VIII.2, Appendix C). No nuclides were detected, and all required LLDs were met.

C. Ambient Gamma Radiation

Ambient gamma radiation levels were measured utilizing Optically

Stimulated Luminescence Dosimeters (OSLD). Forty-one OSLD locations were established around the site. Results of OSLD measurements are listed in Tables C–IX.1, Appendix C.

All OSLD measurements were at or below 25 mrem/quarter, with a range of 6.0 to 25.0 mrem/quarter. A comparison of the Normalized Annual Dose to the Baseline Background and Minimum Differential Dose indicates that there is no evidence of dose which could be attributed to facility-related direct radiation.

D. Land Use Survey

A Land Use Survey conducted August 28, 2019, around the LaSalle County Station (LSCS) was performed by Environmental Inc. (Midwest Labs) for Exelon Nuclear to comply with Radiological Effluent Control 12.5.2 of the LaSalle's Offsite Dose Calculation Manual. The purpose of the survey was to document the nearest resident, milk producing animal and garden of greater than 500 ft^2 in each of the sixteen 22 ½ degree sectors around the site. The distance and direction of all locations from the LSCS reactor buildings were positioned using Global Positioning System (GPS) technology. There were no changes required to the LSCS REMP as a result of this survey. The results of this survey are summarized below:

Distance in Miles from the LSCS Reactor Buildings				
Sector		Residence Miles	Livestock Miles	Milk Farm Miles
A	N	3.9	4.0	-
B	NNE	1.6	1.7	-
C	NE	2.1	3.5	-
D	ENE	3.3	4.6	-
E	E	3.2	-	14.2
F	ESE	1.4	-	-
G	SE	1.7	5.1	-
H	SSE	1.8	4.7	-
J	S	1.5	1.5	-
K	SSW	0.7	-	-
L	SW	1.0	5.8	-
M	WSW	1.5	-	-
N	W	1.7	3.0	-
P	WNW	0.9	3.0	-
Q	NW	1.7	3.3	-
R	NNW	1.7	4.5	-

E. Errata Data

There is no errata data for 2019.

F. Summary of Results – Inter-Laboratory Comparison Program

The TBE Laboratory analyzed Performance Evaluation (PE) samples of air particulate, air iodine, milk, soil, vegetation, and water matrices for various analytes. The PE samples supplied by Analytics Inc., Environmental Resource Associates (ERA) and Department of Energy (DOE) Mixed Analyte Performance Evaluation Program (MAPEP), were evaluated against the following pre-set acceptance criteria:

1. Analytics Evaluation Criteria

   Analytics' evaluation report provides a ratio of TBE's result and Analytics' known value. Since flag values are not assigned by Analytics, TBE evaluates the reported ratios based on internal QC requirements based on the DOE MAPEP criteria.

2. ERA Evaluation Criteria

   ERA's evaluation report provides an acceptance range for control and warning limits with associated flag values. ERA's acceptance limits are established per the USEPA, National Environmental Laboratory Accreditation Conference (NELAC), state-specific Performance Testing (PT) program requirements or ERA's SOP for the Generation of Performance Acceptance Limits, as applicable. The acceptance limits are either determined by a regression equation specific to each analyte or a fixed percentage limit promulgated under the appropriate regulatory document.

3. DOE Evaluation Criteria

   MAPEP's evaluation report provides an acceptance range with associated flag values. MAPEP defines three levels of performance:

   - Acceptable (flag = "A") - result within ± 20% of the reference value
   - Acceptable with Warning (flag = "W") - result falls in the ± 20% to ± 30% of the reference value
   - Not Acceptable (flag = "N") - bias is greater than 30% of the reference value

   Note: The Department of Energy (DOE) Mixed Analyte Performance Evaluation Program (MAPEP) samples are created to mimic conditions found at DOE sites which do not resemble typical environmental samples obtained at commercial nuclear power facilities.

For the TBE laboratory, 119 out of 129 analyses performed met the specified acceptance criteria. Ten analyses did not meet the specified acceptance criteria for the following reasons and were addressed through the TBE Corrective Action Program. A summary is found below:

1. The ERA April 2019 water Cs-134 result was evaluated as *Not Acceptable*. The reported value was 15.2 pCi/L (error 2.82 pCi/L) and the known result was 12.1 pCi/L (acceptance range of 8.39 - 14.4 pCi/L). With the error, the reported result overlaps the acceptable range. This sample was run as the workgroup duplicate on a different detector with a result of 10.7 pCi/L (within acceptable range). (NCR 19-10)

2. The ERA April 2019 water Sr-89 result was evaluated as *Not Acceptable*. The reported value was 44.9 pCi/L and the known result was 33.3 pCi/L (acceptance range of 24.5 - 40.1 pCi/L). The sample was only counted for 15 minutes instead of 200 minutes. The sample was re-prepped in duplicate and counted for 200 minutes with results of 30.7 ± 5.37 pCi/L and 33.0 ± 8.71 pCi/L. This was the 1st "high" failure for Sr-89 in 5 years. (NCR 19-11)

3. The MAPEP February 2019 soil Sr-90 result was not submitted and therefore evaluated as *Not Acceptable*. The sample was run in duplicate, with results of -1.32 ± 4.09 Bq/kg (<6.87) and -1.030 ± 3.55 Bq/kg (<5.97). The known result was a false positive test (no significant activity). TBE did not submit a result because it appeared that the results may not be accurate. TBE analyzed a substitute soil Sr-90 sample from another vendor, with a result within the acceptable range. (NCR 19-12)

4. The MAPEP February 2019 water Am-241 result was evaluated as *Not Acceptable*. The reported value was 0.764 ± 0.00725 Bq/L with a known result of 0.582 Bq/L (acceptable range 0.407 - 0.757 Bq/L). TBE's result falls within the upper acceptable range with the error. It appeared that a non-radiological interference was added and lead to an increased mass and higher result. (NCR 19-13)

5. The MAPEP February 2019 vegetation Sr-90 result was evaluated as *Not Acceptable*. The reported result was -0.1060 ± 0.0328 Bq/kg and the known result was a false positive test (no significant activity). TBE's result was correct in that there was no activity. MAPEP's evaluation was a "statistical failure" at 3 standard deviations. (NCR 19-14)

6. The ERA October 2019 water Gross Alpha result was evaluated as

Not Acceptable. TBE's reported result was 40.5 ± 10.3 pCi/L and the known result was 27.6 pCi/L (ratio of TBE to known result at 135%). With the associated error, the result falls within the acceptable range (14.0 - 36.3 pCi/L). The sample was run as the workgroup duplicate on a different detector with a result of 30.8 ± 9.17 pCi/L (within the acceptable range). This was the first failure for drinking water Gr-A since 2012. (NCR 19-23)

7. The ERA October 2019 water Sr-90 result was evaluated as *Not Acceptable*. TBE's reported result was 32.5 ± 2.12 pCi/L and the known result was 26.5 pCi/L (ratio of TBE to known result at 123%). With the associated error, the result falls within the acceptable range (19.2 - 30.9 pCi/L). The sample was run as the workgroup duplicate on a different detector with a result of 20.0 ± 1.91 pCi/L (within the acceptable range). Both TBE results are within internal QC limits. A substitute "quick response" sample was analyzed with an acceptable result of 18.6 pCi/L (known range of 13.2 - 22.1 pCi/L). (NCR 19-24)

8. The MAPEP August 2019 soil Ni-63 result of 436 ± 22.8 Bq/kg was evaluated as Not Acceptable. The known result was 629 Bq/kg (acceptable range 440 - 818 Bq/sample). With the associated error, the TBE result falls within the lower acceptance range. All associated QC was acceptable. No reason for failure could be found. This is the first failure for soil Ni-63 since 2012. (NCR 19-25).

9. The MAPEP August 2019 water Am-241 result was not reported and therefore evaluated as *Not Acceptable*. Initial review of the results showed a large peak where Am-241 should be (same as the February, 2019 sample results). It is believed that Th-228 was intentionally added as an interference. The sample was re-prepped and analyzed using a smaller sample aliquot. The unusual large peak (Th-228) was seen again and also this time a smaller peak (Am-241). The result was 436 ± 22.8 Bq/L (acceptable range 0.365 ± 0.679 Bq/L). Th-228 is not a typical nuclide requested by clients, so there is no analytical purpose to take samples through an additional separation step. TBE will pursue using another vendor for Am-241 water cross-checks that more closely reflects actual customer samples. (NCR 19-26)

10. The Analytics September 2019 soil Cr-51 sample was evaluated as *Not Acceptable*. TBE's reported result of 0.765 ± 0.135 pCi/g exceeded the upper acceptance range (140% of the known result of 0.547 pCi/g). The TBE result was within the acceptable range (0.63 - 0.90 pCi/g) with the associated error. The Cr-51 result is very close to TBE's normal detection limit. In order to get a reportable result, the sample must be counted for 15 hours (10x

longer than client samples). There is no client or regulatory requirement for this nuclide and TBE will remove Cr-51 from the reported gamma nuclides going forward. (NCR 19-27)

The Inter-Laboratory Comparison Program provides evidence of "in control" counting systems and methods, and that the laboratories are producing accurate and reliable data.

Intentionally left blank

APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT ANNUAL SUMMARY

Intentionally left blank

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE LASALLE COUNTY STATION, 2019

NAME OF FACILITY:	LASALLE COUNTY STATION			DOCKET NUMBER:	50-373 & 50-374			
LOCATION OF FACILITY:	MARSEILLES, IL			REPORTING PERIOD:	2019			
						LOCATION WITH HIGHEST ANNUAL MEAN (M)		
MEDIUM OR PATHWAY SAMPLED *(UNIT OF MEASUREMENT)*	TYPES OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) *RANGE*	CONTROL LOCATION MEAN (M) (F) *RANGE*	MEAN (M) (F) *RANGE*	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SURFACE WATER (PCI/LITER)	**GR-B**	24	**4**	6.8 (12/12) *3.6 - 9.8*	6.3 (12/12) *4.0 - 10.0*	6.8 (12/12) *4.0 - 10.0*	L-40 INDICATOR ILLINOIS RIVER - DOWNSTREAM 5.2 MILES NNW OF SITE	0
	H-3	8	**200**	383 (3/4) *305 - 523*	334 (3/4) *265 - 397*	383 (3/4) *305 - 523*	L-40 INDICATOR ILLINOIS RIVER - DOWNSTREAM 4.0 MILES NE OF SITE	0
	GAMMA	24						
	MN-54		**15**	<LLD	<LLD	-		0
	CO-58		**15**	<LLD	<LLD	-		0
	FE-59		**30**	<LLD	<LLD	-		0
	CO-60		**15**	<LLD	<LLD	-		0
	ZN-65		**30**	<LLD	<LLD	-		0
	NB-95		**15**	<LLD	<LLD	-		0
	ZR-95		**30**	<LLD	<LLD	-		0
	I-131		**15**	<LLD	<LLD	-		0
	CS-134		**15**	<LLD	<LLD	-		0
	CS-137		**18**	<LLD	<LLD	-		0
	BA-140		**60**	<LLD	<LLD	-		0
	LA-140		**15**	<LLD	<LLD	-		0
GROUND WATER *(PCI/LITER)*	**H-3**	12	**200**	<LLD	<LLD	-		0
	GAMMA	12						
	MN-54		**15**	<LLD	<LLD	-		0
	CO-58		**15**	<LLD	<LLD	-		0
	FE-59		**30**	<LLD	<LLD	-		0
	CO-60		**15**	<LLD	<LLD	-		0
	ZN-65		**30**	<LLD	<LLD	-		0
	NB-95		**15**	<LLD	<LLD	-		0
	ZR-95		**30**	<LLD	<LLD	-		0
	CS-134		**15**	<LLD	<LLD	-		0
	CS-137		**18**	<LLD	<LLD	-		0
	BA-140		**60**	<LLD	<LLD	-		0
	LA-140		**15**	<LLD	<LLD	-		0

(M) The Mean Values are calculated using the positive values (values ≥ MDC). (F) Fraction of detectable measurement are indicated in parentheses.

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE LASALLE COUNTY STATION, 2019

NAME OF FACILITY:	LASALLE COUNTY STATION			DOCKET NUMBER:		50-373 & 50-374		
LOCATION OF FACILITY:	MARSEILLES, IL			REPORTING PERIOD:		2019		
				INDICATOR	CONTROL	LOCATION WITH HIGHEST ANNUAL MEAN (M)		
MEDIUM OR PATHWAY SAMPLED *(UNIT OF MEASUREMENT)*	TYPES OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	LOCATIONS MEAN (M) (F) *RANGE*	LOCATION MEAN (M) (F) *RANGE*	MEAN (M) (F) *RANGE*	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
FISH	**GAMMA**	12						
(PCI/KG WET)	*MN-54*		**130**	<LLD	<LLD	-		0
	CO-58		**130**	<LLD	<LLD	-		0
	FE-59		**260**	<LLD	<LLD	-		0
	CO-60		**130**	<LLD	<LLD	-		0
	ZN-65		**260**	<LLD	<LLD	-		0
	NB-95		*NA*	<LLD	<LLD	-		0
	ZR-95		*NA*	<LLD	<LLD	-		0
	CS-134		**130**	<LLD	<LLD	-		0
	CS-137		**150**	<LLD	<LLD	-		0
	BA-140		*NA*	<LLD	<LLD	-		0
	LA-140		*NA*	<LLD	<LLD	-		0
SEDIMENT	**GAMMA**	6						
(PCI/KG DRY)	*MN-54*		*NA*	<LLD	<LLD	-		0
	CO-58		*NA*	<LLD	<LLD	-		0
	FE-59		*NA*	<LLD	<LLD	-		0
	CO-60		*NA*	<LLD	<LLD	-		0
	ZN-65		*NA*	<LLD	<LLD	-		0
	NB-95		*NA*	<LLD	<LLD	-		0
	ZR-95		*NA*	<LLD	<LLD	-		0
	CS-134		**150**	<LLD	<LLD	-		0
	CS-137		**180**	<LLD	<LLD	-		0
	BA-140		*NA*	<LLD	<LLD	-		0
	LA-140		*NA*	<LLD	<LLD	-		0
AIR PARTICULATE	**GR-B**	466	**10**	16	15.9	16.6	L-08 INDICATOR	0
(E-3 PCI/CU.METER)				(413/414)	(52/52)	(52/52)	MARSEILLES	
				5 - 36	*6 - 29*	*6 - 36*	6.0 MILES NNW OF SITE	
AIR PARTICULATE	**GAMMA**	36						
(E-3 PCI/CU.METER)	*MN-54*		*NA*	<LLD	<LLD	-		0

(M) The Mean Values are calculated using the positive values (values ≥ MDC). (F) Fraction of detectable measurement are indicated in parentheses.

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE LASALLE COUNTY STATION, 2019

NAME OF FACILITY:	LASALLE COUNTY STATION			DOCKET NUMBER:	50-373 & 50-374		
LOCATION OF FACILITY:	MARSEILLES, IL			REPORTING PERIOD:	2019		

MEDIUM OR PATHWAY SAMPLED *(UNIT OF MEASUREMENT)*	TYPES OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) *RANGE*	CONTROL LOCATION MEAN (M) (F) *RANGE*	LOCATION WITH HIGHEST ANNUAL MEAN (M) MEAN (M) (F) *RANGE*	LOCATION WITH HIGHEST ANNUAL MEAN (M) STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	CO-58		*NA*	<LLD	<LLD	-		0
	FE-59		*NA*	<LLD	<LLD	-		0
	CO-60		*NA*	<LLD	<LLD	-		0
	ZN-65		*NA*	<LLD	<LLD	-		0
	NB-95		*NA*	<LLD	<LLD	-		0
	ZR-95		*NA*	<LLD	<LLD	-		0
	CS-134		50	<LLD	<LLD	-		0
	CS-137		60	<LLD	<LLD	-		0
	BA-140		*NA*	<LLD	<LLD	-		0
	LA-140		*NA*	<LLD	<LLD	-		0
AIR IODINE	**GAMMA**	465						
(E-3 PCI/CU.METER)	*I-131*		70	<LLD	<LLD	-		0
MILK	**I-131**	15	1	NA	<LLD	-		0
(PCI/LITER)								
	GAMMA	15						
	MN-54		*NA*	NA	<LLD	-		0
	CO-58		*NA*	NA	<LLD	-		0
	FE-59		*NA*	NA	<LLD	-		0
	CO-60		*NA*	NA	<LLD	-		0
	ZN-65		*NA*	NA	<LLD	-		0
	NB-95		*NA*	NA	<LLD	-		0
	ZR-95		*NA*	NA	<LLD	-		0
	CS-134		15	NA	<LLD	-		0
	CS-137		18	NA	<LLD	-		0
	BA-140		60	NA	<LLD	-		0
	LA-140		15	NA	<LLD	-		0
FOOD PRODUCTS	**GAMMA**	10						
(PCI/KG WET)	*MN-54*		*NA*	<LLD	<LLD	-		0

(M) The Mean Values are calculated using the positive values (values ≥ MDC). (F) Fraction of detectable measurement are indicated in parentheses.

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE LASALLE COUNTY STATION, 2019

NAME OF FACILITY:	LASALLE COUNTY STATION			DOCKET NUMBER:	50-373 & 50-374			
LOCATION OF FACILITY:	MARSEILLES, IL			REPORTING PERIOD:	2019			
						LOCATION WITH HIGHEST ANNUAL MEAN (M)		
MEDIUM OR PATHWAY SAMPLED *(UNIT OF MEASUREMENT)*	TYPES OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) *RANGE*	CONTROL LOCATION MEAN (M) (F) *RANGE*	MEAN (M) (F) *RANGE*	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	CO-58		*NA*	<LLD	<LLD	-		0
	FE-59		*NA*	<LLD	<LLD	-		0
	CO-60		*NA*	<LLD	<LLD	-		0
	ZN-65		*NA*	<LLD	<LLD	-		0
	NB-95		*NA*	<LLD	<LLD	-		0
	ZR-95		*NA*	<LLD	<LLD	-		0
	I-131		**60**	<LLD	<LLD	-		0
	CS-134		**60**	<LLD	<LLD	-		0
	CS-137		**80**	<LLD	<LLD	-		0
	BA-140		*NA*	<LLD	<LLD	-		0
	LA-140		*NA*	<LLD	<LLD	-		0
VEGETATION	**GAMMA**	46						
(PCI/KG WET)	*MN-54*		*NA*	<LLD	<LLD	-		0
	CO-58		*NA*	<LLD	<LLD	-		0
	FE-59		*NA*	<LLD	<LLD	-		0
	CO-60		*NA*	<LLD	<LLD	-		0
	ZN-65		*NA*	<LLD	<LLD	-		0
	NB-95		*NA*	<LLD	<LLD	-		0
	ZR-95		*NA*	<LLD	<LLD	-		0
	I-131		**60**	<LLD	<LLD	-		0
	CS-134		**60**	<LLD	<LLD	-		0
	CS-137		**80**	<LLD	<LLD	-		0
	BA-140		*NA*	<LLD	<LLD	-		0
	LA-140		*NA*	<LLD	<LLD	-		0
DIRECT RADIATION	**OSLD-QUARTERLY**	167	*NA*	61.9	14.3	19.2	L-102 INDICATOR	0
(MILLI-ROENTGEN/QTR.)				(163/163)	(4/4)	(4/4)		
				6.0 - 25.0	*8.9 - 17.8*	*13.0 - 25.0*	0.6 MILES NNE	

(M) The Mean Values are calculated using the positive values (values ≥ MDC). (F) Fraction of detectable measurement are indicated in parentheses.

APPENDIX B

LOCATION DESIGNATION, DISTANCE & DIRECTION, AND SAMPLE COLLECTION & ANALYTICAL METHODS

Intentionally left blank

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, LaSalle County Station, 2019

Location	Location Description	Distance & Direction From Site
A. Surface Water		
L-21	Illinois River at Seneca, Upstream (control)	4.0 miles NE
L-40	Illinois River, Downstream (indicator)	5.2 miles NNW
B. Ground/Well Water		
L-27	LSCS Onsite Well (indicator)	0 miles at station
L-28-W4	Marseilles Well (control)	7.0 miles NNW
L-28-W5	Marseilles Well (control)	6.7 miles NNW
L-28-W6	Marseilles Well (indicator)	4.1 miles N
C. Milk - bi-weekly / monthly		
L-42	Biros Farm (control)	14.2 miles E
D. Air Particulates / Air Iodine		
L-01	Nearsite 1 (indicator)	1.5 miles NNW
L-03	Onsite 3 (indicator)	1.0 miles ENE
L-04	Rte. 170 (indicator)	3.2 miles E
L-05	Onsite 5 (indicator)	0.3 miles ESE
L-06	Nearsite 6 (indicator)	0.4 miles W
L-07	Seneca (indicator)	5.2 miles NNE
L-08	Marseilles (indicator)	6.0 miles NNW
L-10	Streator (control)	13.5 miles SW
L-11A	Ransom (indicator)	6.0 miles S
E. Fish		
L-34	LaSalle Cooling Lake (indicator)	2.0 miles E
L-35	Marseilles Pool of Illinois River, Downstream (indicator)	6.5 miles NNW
L-36	Illinois River, Upstream of Discharge (control)	4.3 miles NE
F. Sediment		
L-21	Illinois River at Seneca, Upstream (control)	4.0 miles NE
L-40	Illinois River, Downstream (indicator)	5.2 miles NNW
L-41	Illinois River, Downstream (indicator)	4.6 miles N
G. Food Products		
Quadrant 1	171 Valley View, Seneca IL	5.2 miles NE
Quadrant 1	281 E. Lincoln, Seneca IL	5.1 miles NE
Quadrant 2	106 W. Thomas, Ransom, IL	6.0 miles S
Quadrant 2	205 W. Plumb, Ransom IL	5.3 miles S
Quadrant 3	1814 E. 25th Rd., Ransom IL	3.5 miles SW
Quadrant 4	2507 N. 2553 Rd., Marseilles IL	4.3 miles NNW
Control	Biros Farm	14.2 miles E
H. Vegetation		
L-Veg C	Control	9.5 miles ENE
L-ESE 1	Indicator	1.5 miles ESE
L-ESE 2	Indicator	6.0 miles ESE

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, LaSalle County Station, 2019

Location	Location Description	Distance & Direction From Site
I. Environmental Dosimetry - OSLD		
Inner Ring		
L-101-1 and -2		0.5 miles N
L-102-1 and -2		0.6 miles NNE
L-103-1 and -2		0.7 miles NE
L-104-1 and -2		0.8 miles ENE
L-105-1 and -2		0.7 miles E
L-106-1 and -2		1.4 miles ESE
L-107-1 and -2		0.8 miles SE
L-108-1 and -2		0.5 miles SSE
L-109-1 and -2		0.6 miles S
L-110-1 and -2		0.6 miles SSW
L-111b-1 and -2		0.8 miles SW
L-112-1 and -2		0.9 miles WSW
L-113a-1 and -2		0.8 miles W
L-114-1 and -2		0.9 miles WNW
L-115-1 and -2		0.7 miles NW
L-116-1 and -2		0.6 miles NNW
Outer Ring		
L-201-3 and -4		4.0 miles N
L-202-3 and -4		3.6 miles NNE
L-203-1 and -2		4.0 miles NE
L-204-1 and -2		3.2 miles ENE
L-205-1 and -2		3.2 miles ESE
L-205-3 and -4		5.1 miles E
L-206-1 and -2		4.3 miles SE
L-207-1 and -2		4.5 miles SSE
L-208-1 and -2		4.5 miles S
L-209-1 and -2		4.0 miles SSW
L-210-1 and -2		3.3 miles SW
L-211-1 and -2		4.5 miles WSW
L-212-1 and -2		4.0 miles W
L-213-3 and -4		4.9 miles W
L-214-3 and -4		5.1 miles WNW
L-215-3 and -4		5.0 miles NW
L-216-3 and -4		5.0 miles NNW
Other		
L-01-1 and -2	Nearsite 1 (indicator)	1.5 miles NNW
L-03-1 and -2	Onsite 3 (indicator)	1.0 miles ENE
L-04-1 and -2	Rte. 170 (indicator)	3.2 miles E
L-05-1 and -2	Onsite 5 (indicator)	0.3 miles ESE
L-06-1 and -2	Nearsite 6 (indicator)	0.4 miles W
L-07-1 and -2	Seneca (indicator)	5.2 miles NNE
L-08-1 and -2	Marseilles (indicator)	6.0 miles NNW
L-11A-1 and -2	Ransom (indicator)	6.0 miles S
Control and Special Interest		
L-10-1 and -2	Streator	13.5 miles SW

TABLE B-2: Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, LaSalle County Station, 2019

Sample Medium	Analysis	Sampling Method	Analytical Procedure Number
Surface Water	Gamma Spectroscopy	Monthly composite from weekly grab samples.	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
Surface Water	Gross Beta	Monthly composite from weekly grab samples.	TBE, TBE-2008 Gross Alpha and/or Gross Beta Activity in Various Matrices
Surface Water	Tritium	Quarterly composite from weekly grab samples.	TBE, TBE-2011 Tritium Analysis in Drinking Water by Liquid Scintillation
Ground/Well Water	Gamma Spectroscopy	Quarterly grab samples.	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
Ground/Well Water	Tritium	Quarterly grab samples.	TBE, TBE-2011 Tritium Analysis in Drinking Water by Liquid Scintillation
Fish	Gamma Spectroscopy	Semi-annual samples collected via electroshocking or other techniques	TBE-2007 Gamma-Emitting Radioisotope Analysis
Sediment	Gamma Spectroscopy	Semi-annual grab samples	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
Air Particulates	Gross Beta	One-week composite of continuous air sampling through glass fiber filter paper	TBE, TBE-2008 Gross Alpha and/or Gross Beta Activity in Various Matrices
Air Particulates	Gamma Spectroscopy	Quarterly composite of each station	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
Air Iodine	Gamma Spectroscopy	Bi-weekly composite of continuous air sampling through charcoal filter	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
Milk	I-131	Bi-weekly grab sample when cows are on pasture. Monthly all other times	TBE, TBE-2012 Radioiodine in Various Matrices
Milk	Gamma Spectroscopy	Bi-weekly grab sample when cows are on pasture. Monthly all other times	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
Food Products	Gamma Spectroscopy	Annual grab samples.	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
Vegetation	Gamma Spectroscopy	Monthly grab samples during growing season	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
OSLD	Optically Stimulated Luminescence Dosimetry	Quarterly OSLDs comprised of two Al_2O_3:C Landauer Incorporated elements.	Landauer Incorporated

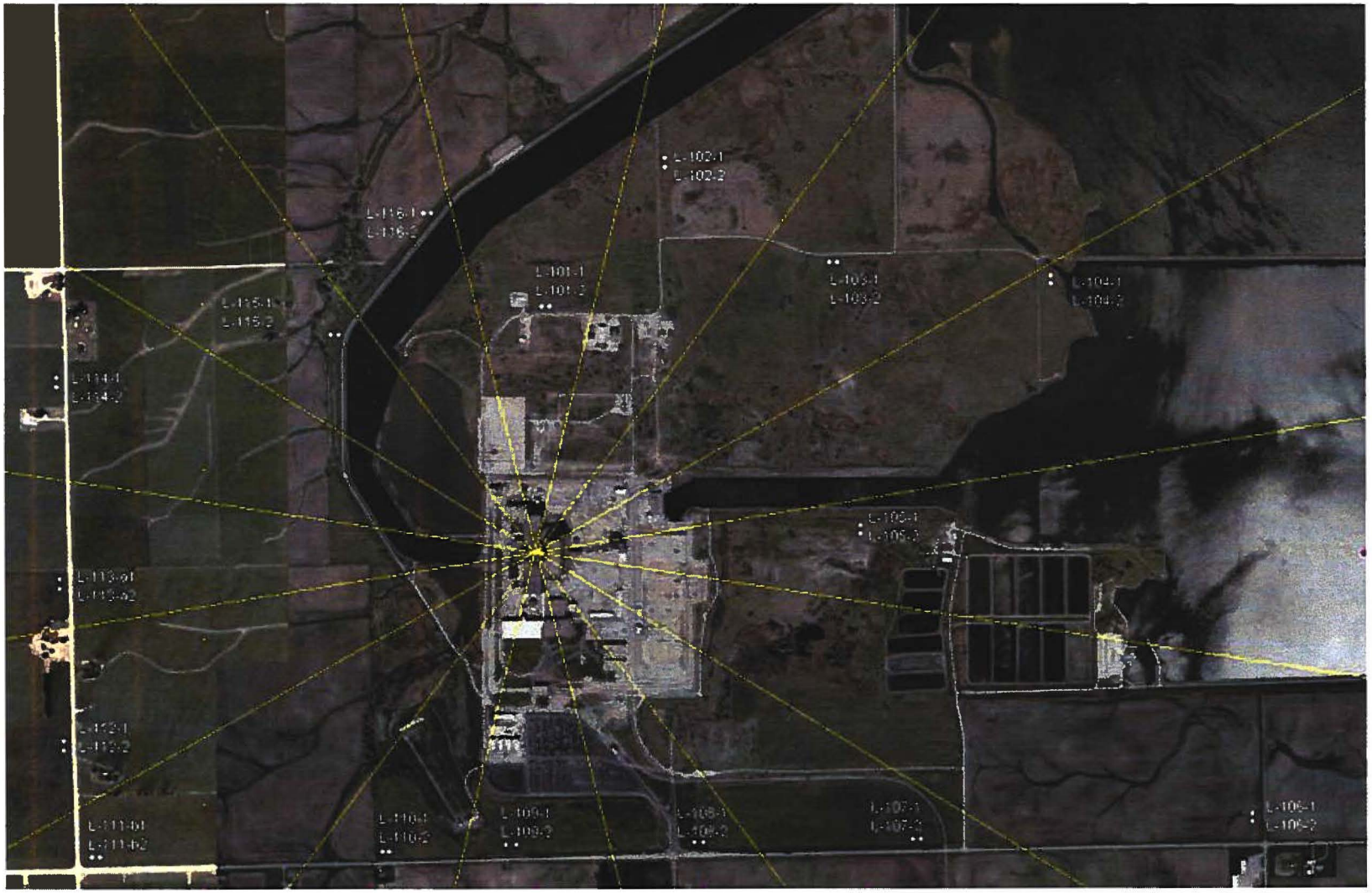


Figure B-1
Inner Ring OSLD Locations
of the LaSalle County Station, 2019

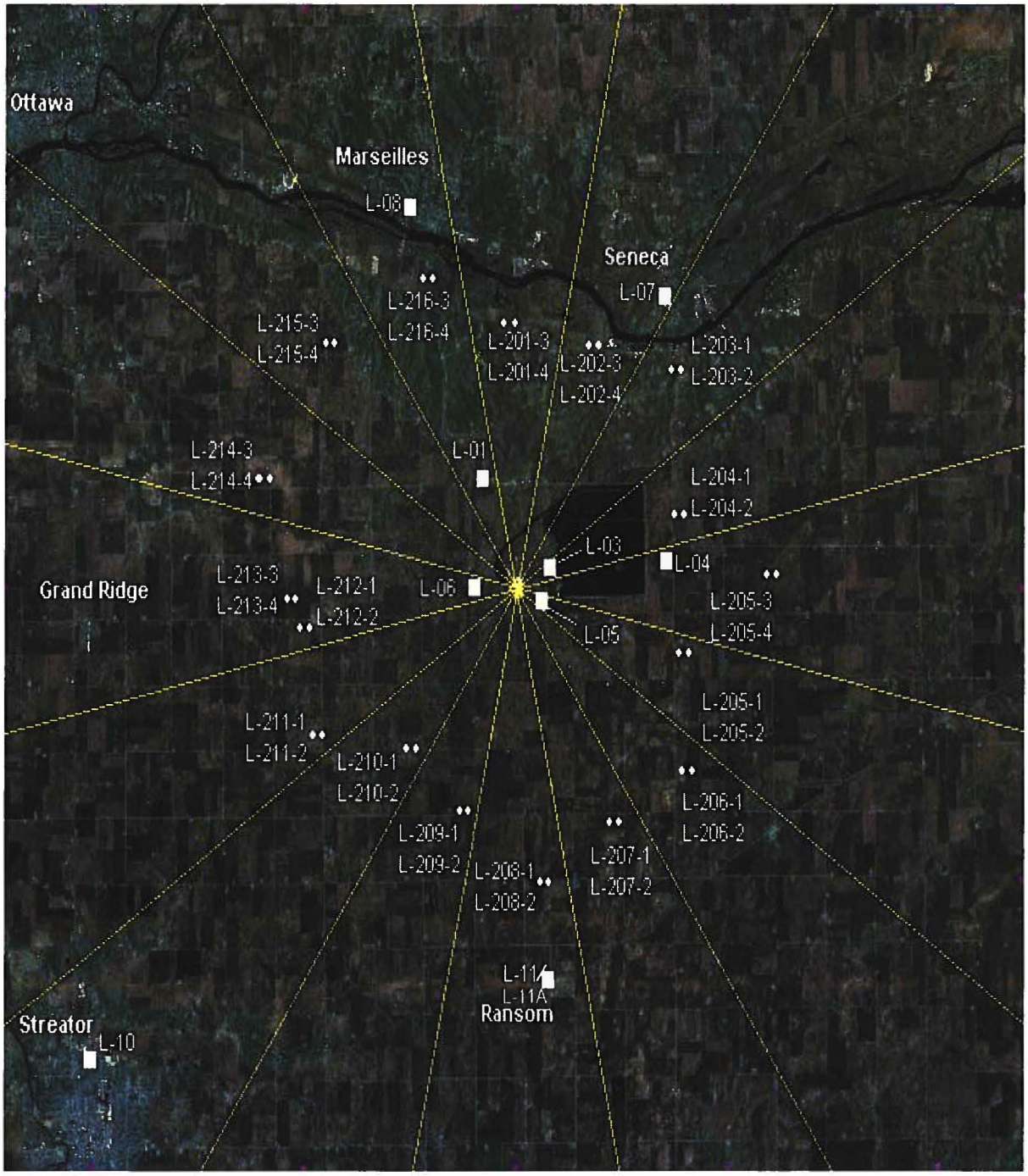


Figure B-2
Outer Ring OSLD Locations and Fixed Air Sampling Locations
of the LaSalle County Station, 2019

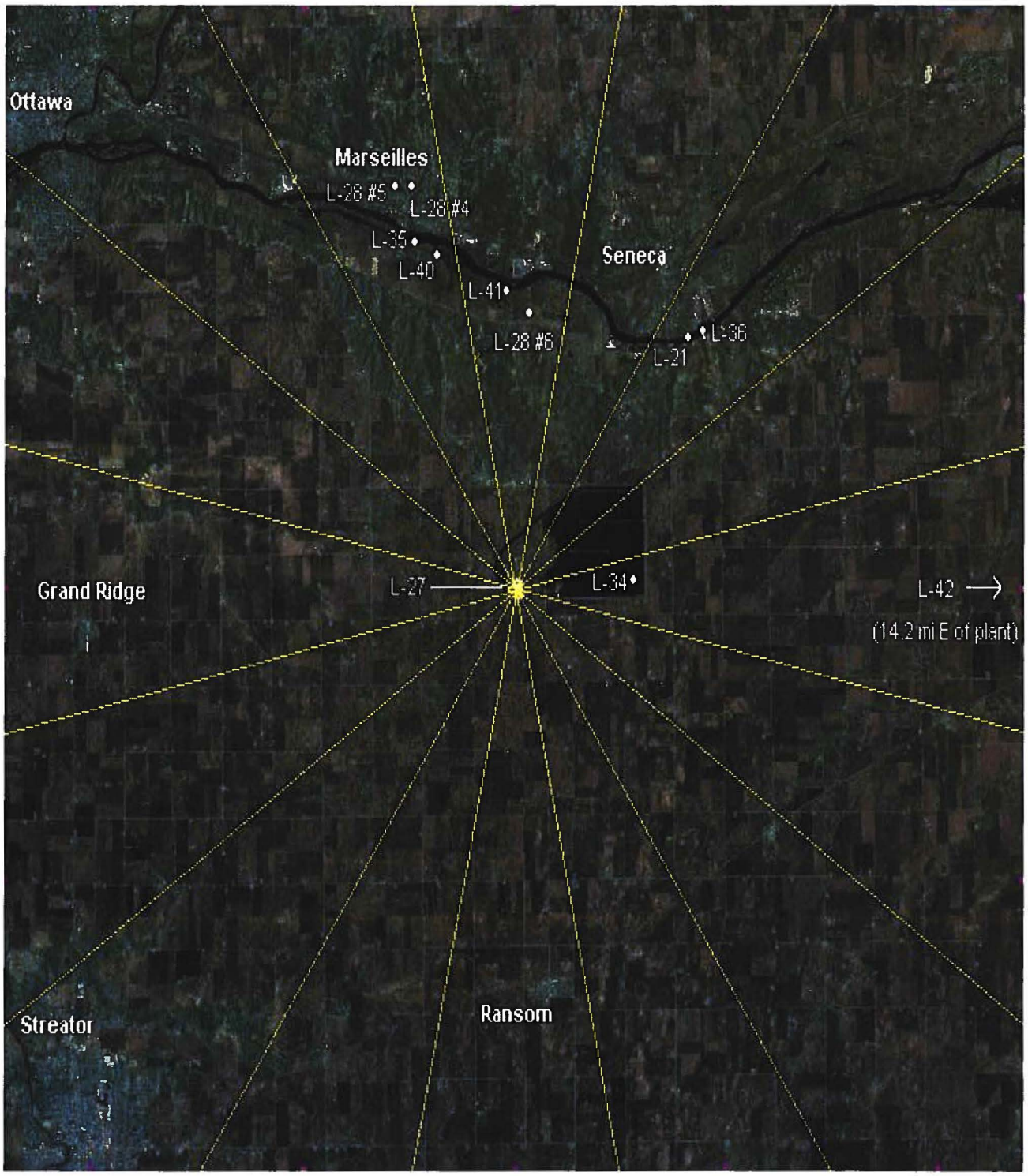


Figure B-3
Ingestion and Waterborne Exposure Pathway Sample Locations
of the LaSalle County Station, 2019

APPENDIX C

DATA TABLES AND FIGURES

Intentionally left blank

Table C-I.1 CONCENTRATIONS OF GROSS BETA IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	L-21	L-40
01/03/19 - 01/24/19	5.2 ± 2.1	6.5 ± 2.2
02/06/19 - 02/28/19	5.1 ± 2.2	5.1 ± 2.2
03/06/19 - 03/27/19	6.8 ± 2.3	6.1 ± 2.2
04/04/19 - 04/25/19	6.0 ± 2.2	7.3 ± 2.3
05/01/19 - 05/30/19	7.5 ± 2.6	6.9 ± 2.5
06/05/19 - 06/26/19	4.3 ± 2.1	4.0 ± 2.1
07/02/19 - 07/31/19	3.6 ± 1.9	5.2 ± 2.1
08/08/19 - 08/29/19	9.8 ± 2.6	8.6 ± 2.6
09/04/19 - 09/26/19	6.1 ± 2.0	6.9 ± 2.1
10/02/19 - 10/31/19	5.6 ± 2.1	6.4 ± 2.1
11/06/19 - 11/29/19	7.7 ± 2.3	8.5 ± 2.4
12/05/19 - 12/26/19	7.6 ± 2.4	10.0 ± 2.5
(1) MEAN ± 2 STD DEV	6.3 ± 3.4	6.8 ± 3.3

Table C-I.2 CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	L-21	L-40
01/03/19 - 03/27/19	< 200	< 193
04/04/19 - 06/26/19	397 ± 140	523 ± 139
07/02/19 - 09/26/19	265 ± 125	321 ± 125
10/02/19 - 12/26/19	341 ± 130	305 ± 131
(1) MEAN ± 2 STD DEV	334 ± 133	383 ± 243

(1) THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES (VALUES ≥ MDC)

Table C-I.3

CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
	01/03/19 - 01/24/19	< 2	< 2	< 5	< 2	< 3	< 2	< 3	< 12	< 2	< 1	< 18	< 6
	02/06/19 - 02/28/19	< 2	< 2	< 5	< 2	< 4	< 3	< 4	< 9	< 2	< 2	< 19	< 7
	03/06/19 - 03/27/19	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 7	< 2	< 2	< 15	< 5
	04/04/19 - 04/25/19	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 11	< 3	< 3	< 22	< 8
	05/01/19 - 05/30/19	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 9	< 2	< 2	< 16	< 5
	06/05/19 - 06/26/19	< 1	< 2	< 4	< 2	< 3	< 2	< 3	< 9	< 2	< 2	< 16	< 5
	07/02/19 - 07/31/19	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 10	< 2	< 2	< 17	< 5
	08/08/19 - 08/29/19	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 7	< 2	< 2	< 14	< 5
	09/04/19 - 09/26/19	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 6	< 2	< 2	< 12	< 4
	10/02/19 - 10/31/19	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 9	< 2	< 2	< 16	< 5
	11/06/19 - 11/29/19	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 7	< 2	< 2	< 15	< 6
	12/05/19 - 12/26/19	< 1	< 2	< 4	< 2	< 3	< 2	< 3	< 6	< 2	< 2	< 12	< 4
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
L-40	01/03/19 - 01/24/19	< 2	< 2	< 5	< 2	< 4	< 2	< 3	< 12	< 2	< 2	< 19	< 7
	02/14/19 - 02/28/19	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 10	< 3	< 3	< 20	< 6
	03/14/19 - 03/27/19	< 4	< 5	< 11	< 4	< 10	< 5	< 8	< 14	< 4	< 4	< 26	< 9
	04/04/19 - 04/25/19	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 11	< 3	< 3	< 22	< 8
	05/01/19 - 05/30/19	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 9	< 2	< 2	< 16	< 6
	06/05/19 - 06/26/19	< 1	< 2	< 4	< 2	< 3	< 2	< 3	< 8	< 2	< 2	< 15	< 5
	07/02/19 - 07/31/19	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 9	< 2	< 1	< 16	< 6
	08/08/19 - 08/29/19	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 7	< 2	< 2	< 14	< 5
	09/04/19 - 09/26/19	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 7	< 2	< 2	< 14	< 5
	10/02/19 - 10/31/19	< 1	< 2	< 4	< 2	< 3	< 2	< 3	< 9	< 2	< 2	< 15	< 5
	11/06/19 - 11/29/19	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 7	< 2	< 2	< 15	< 5
	12/05/19 - 12/26/19	< 1	< 1	< 3	< 1	< 3	< 2	< 3	< 5	< 1	< 1	< 10	< 3
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-II.1 CONCENTRATIONS OF TRITIUM IN GROUND/WELL WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	L-27	L-28-W4	L-28-W5	L-28-W6
01/09/19 - 01/09/19	< 190		< 190	< 189
04/10/19 - 04/10/19	< 188	< 187		< 183
07/10/19 - 07/10/19	< 199		< 195	< 193
10/09/19 - 10/09/19	< 195	< 188		< 192
MEAN	-	-	-	-

Table C-II.2 **CONCENTRATIONS OF GAMMA EMITTERS IN GROUND/WELL WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
L-27	01/09/19 - 01/09/19	< 8	< 8	< 12	< 6	< 13	< 8	< 12	< 8	< 7	< 29	< 12
	04/10/19 - 04/10/19	< 3	< 4	< 9	< 5	< 9	< 5	< 7	< 4	< 4	< 16	< 8
	07/10/19 - 07/10/19	< 4	< 4	< 10	< 4	< 9	< 5	< 8	< 5	< 4	< 24	< 8
	10/09/19 - 10/09/19	< 8	< 7	< 15	< 11	< 13	< 9	< 12	< 9	< 8	< 33	< 12
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-28-W4	04/10/19 - 04/10/19	< 4	< 3	< 7	< 5	< 8	< 4	< 7	< 5	< 4	< 20	< 6
	10/09/19 - 10/09/19	< 6	< 6	< 16	< 7	< 13	< 9	< 11	< 7	< 8	< 31	< 12
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-28-W5	01/09/19 - 01/09/19	< 5	< 5	< 10	< 6	< 10	< 6	< 9	< 7	< 6	< 29	< 8
	07/10/19 - 07/10/19	< 4	< 4	< 8	< 3	< 7	< 4	< 7	< 4	< 3	< 23	< 6
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-28-W6	01/09/19 - 01/09/19	< 7	< 6	< 11	< 7	< 12	< 8	< 11	< 6	< 6	< 28	< 11
	04/10/19 - 04/10/19	< 4	< 4	< 9	< 5	< 8	< 4	< 6	< 4	< 4	< 20	< 6
	07/10/19 - 07/10/19	< 4	< 4	< 8	< 4	< 9	< 4	< 7	< 5	< 4	< 20	< 9
	10/09/19 - 10/09/19	< 7	< 7	< 13	< 8	< 15	< 9	< 12	< 8	< 8	< 37	< 12
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-III.1

CONCENTRATIONS OF GAMMA EMITTERS IN FISH SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
L-34												
Common Carp	05/23/19	< 52	< 58	< 132	< 48	< 102	< 62	< 105	< 50	< 65	< 435	< 170
Largemouth Bass	05/23/19	< 66	< 58	< 128	< 53	< 138	< 67	< 111	< 83	< 56	< 387	< 129
Bluegill	10/15/19	< 45	< 47	< 89	< 53	< 99	< 50	< 94	< 49	< 45	< 234	< 77
Common Carp	10/15/19	< 85	< 77	< 159	< 80	< 187	< 85	< 151	< 87	< 82	< 407	< 116
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-35												
Channel Catfish	05/23/19	< 40	< 46	< 101	< 53	< 76	< 46	< 73	< 36	< 35	< 292	< 92
Freshwater Drum	05/23/19	< 69	< 77	< 140	< 80	< 148	< 95	< 119	< 84	< 83	< 508	< 137
Freshwater Drum	10/16/19	< 54	< 55	< 101	< 48	< 120	< 52	< 88	< 56	< 52	< 230	< 72
Smallmouth Bass	10/16/19	< 41	< 40	< 136	< 40	< 92	< 49	< 82	< 50	< 41	< 158	< 64
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-36												
Freshwater Drum	05/23/19	< 59	< 63	< 146	< 62	< 145	< 63	< 105	< 72	< 57	< 394	< 106
Smallmouth Buffalo	05/23/19	< 53	< 57	< 132	< 70	< 98	< 67	< 104	< 56	< 48	< 326	< 128
Freshwater Drum	10/16/19	< 41	< 45	< 105	< 41	< 91	< 48	< 80	< 49	< 45	< 175	< 57
4 Smallmouth Buffalo	10/16/19	< 52	< 54	< 107	< 66	< 103	< 62	< 92	< 56	< 57	< 215	< 75
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-IV.1

CONCENTRATIONS OF GAMMA EMITTERS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019

RESULTS IN UNITS OF PCI/KG DRY ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
L-21	06/11/19	< 69	< 66	< 151	< 73	< 168	< 79	< 114	< 85	< 88	< 315	< 109
	10/15/19	< 133	< 96	< 232	< 77	< 235	< 124	< 155	< 134	< 140	< 493	< 140
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-40	05/29/19	< 101	< 117	< 288	< 117	< 216	< 120	< 224	< 113	< 115	< 673	< 254
	10/15/19	< 95	< 85	< 176	< 104	< 145	< 101	< 172	< 109	< 109	< 389	< 153
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-41	06/11/19	< 39	< 37	< 89	< 37	< 87	< 36	< 62	< 39	< 41	< 194	< 61
	10/15/19	< 62	< 48	< 127	< 61	< 106	< 63	< 98	< 69	< 66	< 266	< 101
	MEAN	-	-	-	-	-	-	-	-	-	-	-

(1) THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES (VALUES ≥ MDC)

Table C-V.1 **CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019**

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

COLLECTION	GROUP I		GROUP II		GROUP III				GROUP IV
PERIOD	L-03	L-05	L-01	L-06	L-04	L-07	L-08	L-11A	L-10
01/03/19 - 01/09/19	24 ± 5	22 ± 5	25 ± 5	25 ± 5	25 ± 5	25 ± 5	25 ± 5	23 ± 5	26 ± 5
01/09/19 - 01/17/19	20 ± 4(1)	13 ± 4	15 ± 4	14 ± 4	14 ± 4	13 ± 4	16 ± 4	17 ± 4	13 ± 4
01/17/19 - 01/24/19	36 ± 10(1)	14 ± 4	15 ± 4	15 ± 4	17 ± 4	16 ± 4	15 ± 4	16 ± 4	15 ± 4
01/24/19 - 02/01/19	*(1)*	23 ± 4	24 ± 5(1)	21 ± 4	23 ± 4	27 ± 4	36 ± 6(1)	25 ± 4	22 ± 4
02/01/19 - 02/06/19	24 ± 4(1)	15 ± 5	13 ± 5	17 ± 5	18 ± 6	17 ± 5	19 ± 5	17 ± 5	14 ± 5
02/06/19 - 02/14/19	13 ± 4	14 ± 4	11 ± 3	11 ± 3	13 ± 3	11 ± 3	13 ± 4(1)	12 ± 4(1)	12 ± 3
02/14/19 - 02/21/19	16 ± 4	15 ± 4	14 ± 4	14 ± 4	16 ± 4	10 ± 4	18 ± 5	15 ± 4	15 ± 4
02/21/19 - 02/28/19	20 ± 4	23 ± 5	22 ± 4	20 ± 4	23 ± 4	21 ± 4	22 ± 4	23 ± 4	22 ± 4
02/28/19 - 03/06/19	15 ± 4	17 ± 4	19 ± 4	20 ± 4	17 ± 4	17 ± 4	18 ± 4	17 ± 4	19 ± 4
03/06/19 - 03/14/19	15 ± 4	20 ± 4	17 ± 4	19 ± 4	*(1)*	17 ± 4	18 ± 4	18 ± 4	16 ± 4
03/14/19 - 03/21/19	15 ± 4	14 ± 4	14 ± 4	10 ± 3	16 ± 10(1)	12 ± 3	12 ± 3	13 ± 4	12 ± 4
03/21/19 - 03/27/19	6 ± 4	6 ± 4	8 ± 4	7 ± 4	6 ± 3	< 5	6 ± 4	8 ± 4	6 ± 4
03/27/19 - 04/04/19	17 ± 4	17 ± 4	16 ± 4	17 ± 4	18 ± 4	15 ± 4	17 ± 4	17 ± 4	18 ± 4
04/04/19 - 04/10/19	12 ± 4	10 ± 4	15 ± 4	13 ± 4	8 ± 4	9 ± 4	11 ± 4	11 ± 4	12 ± 4
04/10/19 - 04/18/19	5 ± 3	5 ± 3	6 ± 3	6 ± 3	7 ± 3	8 ± 4	8 ± 4	8 ± 4	8 ± 3
04/18/19 - 04/25/19	11 ± 4	12 ± 4	12 ± 4	14 ± 4	8 ± 3	11 ± 3	13 ± 4	8 ± 3	11 ± 4
04/25/19 - 05/01/19	10 ± 4	10 ± 4	10 ± 4	13 ± 4	14 ± 4	9 ± 4	9 ± 4	12 ± 4	10 ± 4
05/01/19 - 05/09/19	13 ± 3	13 ± 4	10 ± 3	12 ± 3	9 ± 3	11 ± 3	14 ± 4	12 ± 4	12 ± 3
05/09/19 - 05/16/19	11 ± 4	9 ± 4	9 ± 4	11 ± 4	11 ± 4	13 ± 4	10 ± 4	9 ± 4	8 ± 4
05/16/19 - 05/23/19	6 ± 3	9 ± 3	8 ± 3	8 ± 3	8 ± 3	8 ± 3	7 ± 3	14 ± 4	8 ± 3
05/23/19 - 05/30/19	11 ± 3	11 ± 3	9 ± 3	11 ± 3	7 ± 3	12 ± 3	10 ± 3	7 ± 3	10 ± 3
05/30/19 - 06/05/19	12 ± 4	12 ± 4	12 ± 4	10 ± 4	10 ± 4	8 ± 4	11 ± 4	11 ± 4	8 ± 4
06/05/19 - 06/13/19	16 ± 4	15 ± 4	18 ± 4	17 ± 4	14 ± 4	14 ± 4	17 ± 4	13 ± 4	15 ± 4
06/13/19 - 06/20/19	10 ± 4	10 ± 4	11 ± 4	10 ± 4	9 ± 4	14 ± 4	12 ± 4	9 ± 4	14 ± 4
06/20/19 - 06/26/19	16 ± 5	8 ± 4	12 ± 4	11 ± 4	14 ± 5	13 ± 4	12 ± 4	11 ± 4	9 ± 4
06/26/19 - 07/02/19	28 ± 6	23 ± 5	25 ± 5	21 ± 5	23 ± 5	17 ± 5	18 ± 5	22 ± 5	20 ± 5
07/02/19 - 07/10/19	13 ± 4	14 ± 4	11 ± 4	14 ± 4	16 ± 4	10 ± 4	12 ± 4	11 ± 4	14 ± 4
07/10/19 - 07/17/19	13 ± 4	13 ± 4	10 ± 4	16 ± 4	13 ± 4	16 ± 4	13 ± 4	12 ± 4	15 ± 4
07/17/19 - 07/24/19	8 ± 3	6 ± 3	9 ± 4	8 ± 3	11 ± 4	11 ± 4	10 ± 4	7 ± 3	9 ± 4
07/24/19 - 07/31/19	16 ± 4	15 ± 4	16 ± 4	20 ± 5	17 ± 4	19 ± 5	17 ± 4	17 ± 4	16 ± 4
07/31/19 - 08/08/19	15 ± 4	17 ± 4	17 ± 4	18 ± 4	15 ± 4	15 ± 4	20 ± 4	18 ± 4	15 ± 4
08/08/19 - 08/15/19	16 ± 4	16 ± 4	14 ± 4	15 ± 4	17 ± 4	14 ± 4	19 ± 4	15 ± 4	19 ± 4
08/15/19 - 08/22/19	19 ± 4	15 ± 4	23 ± 5(1)	20 ± 4	23 ± 4	19 ± 4	20 ± 4	19 ± 4	21 ± 4
08/22/19 - 08/29/19	14 ± 4	10 ± 3	11 ± 4	11 ± 4	13 ± 4	14 ± 4	15 ± 4	13 ± 4	13 ± 4
08/29/19 - 09/04/19	22 ± 5	17 ± 4	21 ± 5	26 ± 5	26 ± 5	20 ± 5	24 ± 5	21 ± 5	21 ± 5
09/04/19 - 09/12/19	16 ± 4	20 ± 4	21 ± 4	17 ± 4	19 ± 4	16 ± 4	24 ± 4	22 ± 4	19 ± 4
09/12/19 - 09/19/19	24 ± 5	24 ± 5	28 ± 5	23 ± 5	23 ± 5	23 ± 5	30 ± 5	19 ± 4	26 ± 5
09/19/19 - 09/26/19	20 ± 5	22 ± 4	23 ± 5	23 ± 5	19 ± 4	21 ± 5	22 ± 5	22 ± 5	24 ± 5
09/26/19 - 10/02/19	12 ± 4	12 ± 4	15 ± 4	13 ± 4	16 ± 5	15 ± 5	12 ± 4	17 ± 5	16 ± 4
10/02/19 - 10/09/19	13 ± 4	13 ± 4	14 ± 4	14 ± 4	14 ± 4	15 ± 4	13 ± 4	15 ± 4	16 ± 4
10/09/19 - 10/17/19	14 ± 4	16 ± 4	17 ± 4	17 ± 4	14 ± 4	16 ± 4	16 ± 4	16 ± 4	16 ± 4
10/17/19 - 10/23/19	18 ± 5	22 ± 5	19 ± 5	17 ± 5	18 ± 5	20 ± 5	15 ± 5	19 ± 5	20 ± 5
10/23/19 - 10/31/19	14 ± 4	15 ± 4	14 ± 4	16 ± 4(1)	10 ± 3	18 ± 4	12 ± 3	16 ± 4	12 ± 3
10/31/19 - 11/06/19	19 ± 5	17 ± 4	14 ± 4	20 ± 6(1)	12 ± 4	15 ± 4	15 ± 4	15 ± 5	16 ± 4
11/06/19 - 11/14/19	15 ± 4	15 ± 4	16 ± 4	29 ± 4(1)	16 ± 4	14 ± 4	15 ± 4	14 ± 4	18 ± 4
11/14/19 - 11/21/19	16 ± 4	19 ± 4	20 ± 4	15 ± 4	20 ± 4	19 ± 4	25 ± 5	21 ± 5	22 ± 4
11/21/19 - 11/29/19	12 ± 3	13 ± 3	14 ± 3	14 ± 3	15 ± 4	13 ± 3	19 ± 4	15 ± 4	16 ± 4
11/29/19 - 12/05/19	14 ± 4	11 ± 4	15 ± 4	16 ± 4	16 ± 4	15 ± 4	10 ± 4	14 ± 4	12 ± 4
12/05/19 - 12/12/19	22 ± 5	24 ± 5	25 ± 5	24 ± 5	24 ± 5	27 ± 5	23 ± 5	28 ± 5	22 ± 4
12/12/19 - 12/19/19	25 ± 5	24 ± 5	30 ± 5	32 ± 5	27 ± 5	26 ± 5	26 ± 5	28 ± 5	23 ± 4
12/19/19 - 12/26/19	27 ± 5	21 ± 5	25 ± 5	27 ± 5	27 ± 5	34 ± 5	28 ± 5	28 ± 5	29 ± 5
12/26/19 - 01/02/20	23 ± 4	25 ± 4	26 ± 5	25 ± 5	22 ± 4	23 ± 4	23 ± 5	24 ± 4	22 ± 4
(2) MEAN ± 2 STD DEV	16 ± 12	15 ± 10	16 ± 12	16 ± 11	16 ± 11	16 ± 11	17 ± 12	16 ± 11	16 ± 11

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

(2) THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES (VALUES ≥ MDC)

Table C-V.2

MONTHLY AND YEARLY MEAN VALUES OF GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

GROUP I - ONSITE LOCATIONS				GROUP II - NEAR-SITE LOCATIONS				GROUP III - FAR-FIELD LOCATIONS				GROUP IV - CONTROL LOCATION			
COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD	COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD	COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD	COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD
01/03/19 - 02/06/19	13	36	22 ± 14	01/03/19 - 02/01/19	14	25	19 ± 10	01/03/19 - 02/01/19	13	36	21 ± 12	01/03/19 - 02/01/19	13	26	19 ± 12
02/01/19 - 02/28/19	13	23	16 ± 7	02/01/19 - 02/28/19	11	22	15 ± 8	02/01/19 - 02/28/19	10	23	17 ± 8	02/01/19 - 02/28/19	12	22	16 ± 8
02/28/19 - 04/04/19	6	20	14 ± 10	02/28/19 - 04/04/19	7	20	15 ± 10	02/28/19 - 04/04/19	6	18	14 ± 8	02/28/19 - 04/04/19	6	19	14 ± 10
04/04/19 - 05/01/19	5	12	9 ± 5	04/04/19 - 05/01/19	6	15	11 ± 7	04/04/19 - 05/01/19	7	14	10 ± 4	04/04/19 - 05/01/19	8	12	10 ± 4
05/01/19 - 05/30/19	6	13	10 ± 5	05/01/19 - 05/30/19	8	12	10 ± 3	05/01/19 - 05/30/19	7	14	10 ± 5	05/01/19 - 05/30/19	8	12	10 ± 4
05/30/19 - 07/02/19	8	28	15 ± 12	05/30/19 - 07/02/19	10	25	15 ± 11	05/30/19 - 07/02/19	8	23	14 ± 8	05/30/19 - 07/02/19	8	20	13 ± 10
07/02/19 - 07/31/19	6	16	12 ± 7	07/02/19 - 07/31/19	8	20	13 ± 8	07/02/19 - 07/31/19	7	19	13 ± 7	07/02/19 - 07/31/19	9	16	13 ± 5
07/31/19 - 08/29/19	10	19	15 ± 6	07/31/19 - 08/29/19	11	23	16 ± 9	07/31/19 - 08/29/19	13	23	17 ± 6	07/31/19 - 08/29/19	13	21	17 ± 7
08/29/19 - 10/02/19	12	24	19 ± 9	08/29/19 - 10/02/19	13	28	21 ± 10	08/29/19 - 10/02/19	12	30	20 ± 8	08/29/19 - 10/02/19	16	26	21 ± 8
10/02/19 - 10/31/19	13	22	16 ± 6	10/02/19 - 10/31/19	14	19	16 ± 3	10/02/19 - 10/31/19	10	20	16 ± 5	10/02/19 - 10/31/19	12	20	16 ± 7
10/31/19 - 11/29/19	12	19	16 ± 5	10/31/19 - 11/29/19	14	29	18 ± 10	10/31/19 - 11/29/19	12	25	16 ± 7	10/31/19 - 11/29/19	16	22	18 ± 5
11/29/19 - 01/02/20	11	27	21 ± 11	11/29/19 - 01/02/20	15	32	24 ± 11	11/29/19 - 01/02/20	10	34	24 ± 12	11/29/19 - 01/02/20	12	29	22 ± 12
01/03/19 - 01/02/20	5	36	16 ± 11	01/03/19 - 01/02/20	6	32	16 ± 12	01/03/19 - 01/02/20	6	36	16 ± 11	01/03/19 - 01/02/20	6	29	16 ± 11

Table C-V.3

CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
L-01	01/03/19 - 04/04/19	< 3	< 5	< 15	< 3	< 8	< 4	< 8	< 3	< 3	< 309	< 131
	04/04/19 - 07/02/19	< 2	< 4	< 8	< 2	< 4	< 4	< 3	< 3	< 2	< 228	< 103
	07/02/19 - 10/02/19	< 3	< 4	< 8	< 3	< 8	< 3	< 7	< 3	< 3	< 190	< 95
	10/02/19 - 01/02/20	< 1	< 3	< 7	< 1	< 4	< 2	< 4	< 1	< 1	< 83	< 42
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-03	01/03/19 - 04/04/19	< 2	< 3	< 11	< 2	< 6	< 3	< 6	< 3	< 2	< 154	< 62
	04/04/19 - 07/02/19	< 2	< 4	< 10	< 3	< 7	< 4	< 8	< 3	< 2	< 227	< 139
	07/02/19 - 10/02/19	< 2	< 3	< 8	< 3	< 3	< 3	< 6	< 2	< 2	< 133	< 58
	10/02/19 - 01/02/20	< 3	< 4	< 11	< 2	< 6	< 5	< 6	< 2	< 2	< 183	< 76
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-04	01/03/19 - 04/04/19	< 2	< 5	< 11	< 2	< 8	< 4	< 7	< 3	< 2	< 236	< 65
	04/04/19 - 07/02/19	< 3	< 7	< 15	< 3	< 8	< 6	< 12	< 4	< 3	< 346	< 85
	07/02/19 - 10/02/19	< 2	< 3	< 9	< 2	< 5	< 3	< 5	< 2	< 2	< 152	< 76
	10/02/19 - 01/02/20	< 3	< 4	< 11	< 2	< 6	< 4	< 6	< 2	< 2	< 172	< 69
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-05	01/03/19 - 04/04/19	< 2	< 4	< 10	< 1	< 5	< 4	< 6	< 2	< 1	< 169	< 56
	04/04/19 - 07/02/19	< 3	< 4	< 4	< 2	< 4	< 5	< 6	< 2	< 2	< 199	< 96
	07/02/19 - 10/02/19	< 3	< 3	< 11	< 3	< 6	< 5	< 8	< 3	< 3	< 198	< 75
	10/02/19 - 01/02/20	< 4	< 5	< 17	< 3	< 8	< 6	< 10	< 4	< 3	< 211	< 85
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-06	01/03/19 - 04/04/19	< 3	< 3	< 12	< 2	< 6	< 3	< 7	< 2	< 2	< 196	< 73
	04/04/19 - 07/02/19	< 1	< 4	< 11	< 3	< 7	< 5	< 6	< 2	< 2	< 245	< 80
	07/02/19 - 10/02/19	< 3	< 4	< 10	< 2	< 8	< 4	< 6	< 2	< 2	< 217	< 74
	10/02/19 - 01/02/20	< 2	< 4	< 8	< 2	< 5	< 4	< 5	< 2	< 2	< 165	< 81
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-V.3

CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
L-07	01/03/19 - 04/04/19	< 2	< 4	< 12	< 2	< 7	< 4	< 9	< 3	< 2	< 183	< 62
	04/04/19 - 07/02/19	< 3	< 3	< 12	< 2	< 5	< 3	< 7	< 3	< 2	< 213	< 54
	07/02/19 - 10/02/19	< 2	< 3	< 9	< 2	< 5	< 4	< 6	< 2	< 2	< 123	< 69
	10/02/19 - 01/02/20	< 2	< 3	< 9	< 2	< 5	< 3	< 4	< 2	< 2	< 131	< 91
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-08	01/03/19 - 04/04/19	< 3	< 5	< 16	< 2	< 6	< 5	< 7	< 3	< 3	< 217	< 113
	04/04/19 - 07/02/19	< 3	< 3	< 11	< 1	< 6	< 4	< 7	< 2	< 2	< 201	< 106
	07/02/19 - 10/02/19	< 2	< 2	< 7	< 2	< 5	< 3	< 5	< 2	< 2	< 114	< 57
	10/02/19 - 01/02/20	< 3	< 4	< 11	< 3	< 7	< 3	< 7	< 2	< 3	< 210	< 84
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-10	01/03/19 - 04/04/19	< 2	< 4	< 16	< 2	< 7	< 4	< 9	< 3	< 3	< 281	< 90
	04/04/19 - 07/02/19	< 3	< 5	< 15	< 3	< 8	< 6	< 9	< 3	< 3	< 345	< 119
	07/02/19 - 10/02/19	< 2	< 4	< 11	< 3	< 6	< 4	< 6	< 2	< 2	< 167	< 79
	10/02/19 - 01/02/20	< 2	< 4	< 8	< 2	< 6	< 4	< 6	< 2	< 2	< 188	< 64
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-11A	01/03/19 - 04/04/19	< 2	< 3	< 10	< 1	< 3	< 4	< 6	< 3	< 2	< 224	< 41
	04/04/19 - 07/02/19	< 2	< 3	< 13	< 2	< 4	< 4	< 7	< 3	< 2	< 209	< 112
	07/02/19 - 10/02/19	< 3	< 4	< 11	< 3	< 5	< 3	< 5	< 2	< 2	< 122	< 44
	10/02/19 - 01/02/20	< 4	< 5	< 16	< 4	< 9	< 6	< 11	< 4	< 3	< 290	< 119
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-VI.1 **CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019**

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

COLLECTION	GROUP I		GROUP II		GROUP III				GROUP IV
PERIOD	L-03	L-05	L-01	L-06	L-04	L-07	L-08	L-11A	L-10
01/03/19 - 01/09/19	< 67	< 66	< 64	< 38	< 64	< 47	< 47	< 46	< 48
01/09/19 - 01/17/19	< 68(1)	< 60	< 61	< 34	< 62	< 43	< 43	< 43	< 44
01/17/19 - 01/24/19	< 69(1)	< 38	< 38	< 37	< 37	< 47	< 48	< 48	< 47
01/24/19 - 02/01/19	*(1)*	< 37	< 41(1)	< 35	< 36	< 33	< 51(1)	< 35	< 35
02/01/19 - 02/06/19	< 52(1)	< 59	< 51	< 58	< 62	< 64	< 60	< 63	< 65
02/06/19 - 02/14/19	< 40	< 41	< 40	< 23	< 33	< 55	< 68(1)	< 58(1)	< 54
02/14/19 - 02/21/19	< 43	< 44	< 43	< 31	< 45	< 37	< 40	< 40	< 38
02/21/19 - 02/28/19	< 47	< 48	< 47	< 37	< 46	< 45	< 46	< 45	< 46
02/28/19 - 03/06/19	< 61	< 62	< 52	< 42	< 61	< 53	< 54	< 52	< 52
03/06/19 - 03/14/19	< 63	< 63	< 25	< 62	*(1)*	< 65	< 66	< 65	< 66
03/14/19 - 03/21/19	< 22	< 23	< 23	< 22	< 68(1)	< 31	< 32	< 27	< 33
03/21/19 - 03/27/19	< 59	< 59	< 60	< 59	< 24	< 51	< 51	< 53	< 51
03/27/19 - 04/04/19	< 44	< 45	< 36	< 43	< 42	< 58	< 59	< 59	< 57
04/04/19 - 04/10/19	< 42	< 43	< 18	< 41	< 42	< 26	< 26	< 27	< 26
04/10/19 - 04/18/19	< 56	< 56	< 57	< 41	< 23	< 42	< 43	< 41	< 34
04/18/19 - 04/25/19	< 21	< 22	< 22	< 34	< 22	< 14	< 35	< 37	< 35
04/25/19 - 05/01/19	< 33	< 34	< 14	< 32	< 33	< 26	< 27	< 25	< 24
05/01/19 - 05/09/19	< 53	< 56	< 54	< 39	< 53	< 40	< 41	< 42	< 34
05/09/19 - 05/16/19	< 40	< 41	< 35	< 39	< 40	< 59	< 61	< 64	< 60
05/16/19 - 05/23/19	< 36	< 35	< 36	< 15	< 35	< 23	< 24	< 23	< 19
05/23/19 - 05/30/19	< 20	< 21	< 21	< 18	< 20	< 28	< 29	< 12	< 28
05/30/19 - 06/05/19	< 61	< 62	< 27	< 63	< 62	< 41	< 43	< 44	< 42
06/05/19 - 06/13/19	< 41	< 40	< 42	< 38	< 40	< 15	< 38	< 38	< 37
06/13/19 - 06/20/19	< 21	< 21	< 18	< 21	< 21	< 29	< 28	< 12	< 27
06/20/19 - 06/26/19	< 39	< 38	< 40	< 45	< 40	< 47	< 45	< 38	< 44
06/26/19 - 07/02/19	< 27	< 26	< 26	< 27	< 11	< 21	< 21	< 21	< 21
07/02/19 - 07/10/19	< 23	*(1)*	< 23	< 27	< 23	< 28	< 28	< 28	< 11
07/10/19 - 07/17/19	< 37	< 43	< 42	< 42	< 42	< 51	< 49	< 50	< 49
07/17/19 - 07/24/19	< 32	< 31	< 32	< 34	< 32	< 34	< 35	< 30	< 33
07/24/19 - 07/31/19	< 22	< 21	< 22	< 34	< 21	< 36	< 35	< 15	< 33
07/31/19 - 08/08/19	< 35	< 34	< 35	< 35	< 28	< 33	< 33	< 34	< 32
08/08/19 - 08/15/19	< 37	< 38	< 38	< 38	< 31	< 21	< 21	< 21	< 20
08/15/19 - 08/22/19	< 37	< 34	< 31(1)	< 37	< 35	< 52	< 51	< 52	< 49
08/22/19 - 08/29/19	< 31	< 30	< 31	< 13	< 30	< 23	< 22	< 23	< 22
08/29/19 - 09/04/19	< 55	< 54	< 55	< 46	< 55	< 40	< 47	< 47	< 45
09/04/19 - 09/12/19	< 36	< 35	< 36	< 34	< 35	< 35	< 33	< 36	< 14
09/12/19 - 09/19/19	< 21	< 21	< 21	< 27	< 21	< 27	< 27	< 27	< 11
09/19/19 - 09/26/19	< 20	< 8	< 20	< 20	< 20	< 45	< 44	< 45	< 43
09/26/19 - 10/02/19	< 52	< 51	< 54	< 55	< 48	< 28	< 28	< 28	< 27
10/02/19 - 10/09/19	< 21	< 21	< 21	< 21	< 9	< 26	< 26	< 26	< 24
10/09/19 - 10/17/19	< 38	< 15	< 38	< 39	< 38	< 29	< 29	< 30	< 28
10/17/19 - 10/23/19	< 60	< 58	< 60	< 44	< 61	< 44	< 44	< 45	< 35
10/23/19 - 10/31/19	< 29	< 29	< 28	< 18(1)	< 28	< 20	< 20	< 21	< 18
10/31/19 - 11/06/19	< 36	< 28	< 38	< 34(1)	< 38	< 47	< 47	< 49	< 47
11/06/19 - 11/14/19	< 12	< 12	< 12	< 17(1)	< 12	< 35	< 35	< 37	< 34
11/14/19 - 11/21/19	< 44	< 44	< 44	< 33	< 45	< 33	< 33	< 34	< 26
11/21/19 - 11/29/19	< 43	< 42	< 43	< 35	< 43	< 44	< 44	< 46	< 43
11/29/19 - 12/05/19	< 65	< 64	< 66	< 49	< 29	< 50	< 50	< 53	< 42
12/05/19 - 12/12/19	< 36	< 35	< 35	< 54	< 34	< 54	< 54	< 57	< 21
12/12/19 - 12/19/19	< 61	< 59	< 60	< 48	< 60	< 50	< 50	< 44	< 47
12/19/19 - 12/26/19	< 54	< 23	< 53	< 55	< 55	< 31	< 36	< 36	< 35
12/26/19 - 01/02/20	< 37	< 36	< 38	< 32	< 38	< 44	< 46	< 43	< 43
MEAN	-	-	-	-	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-VII.1 CONCENTRATIONS OF I-131 IN MILK SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CONTROL FARM L-42
01/03/19	< 0.5
02/06/19	< 0.9
03/06/19	< 0.8
04/04/19	< 0.7
05/01/19	< 0.8
05/16/19	< 0.4
05/30/19	< 0.8
06/13/19	< 0.9
06/26/19	< 0.9
07/10/19	< 0.8
07/24/19	< 0.5
08/08/19	< 0.8
08/22/19	< 0.5
09/04/19	< 0.9
09/19/19	*(1)*
10/02/19	*(1)*
10/17/19	*(1)*
10/31/19	*(1)*
11/14/19	*(1)*
12/05/19	< 0.6
MEAN	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-VII.2 **CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
L-42	01/03/19	< 7	< 8	< 16	< 8	< 17	< 8	< 9	< 7	< 7	< 35	< 8
	02/06/19	< 7	< 7	< 14	< 8	< 18	< 8	< 14	< 9	< 8	< 37	< 9
	03/06/19	< 5	< 6	< 13	< 6	< 11	< 5	< 10	< 6	< 6	< 20	< 7
	04/04/19	< 8	< 9	< 21	< 9	< 14	< 9	< 14	< 9	< 8	< 37	< 11
	05/01/19	< 6	< 6	< 14	< 5	< 14	< 7	< 11	< 6	< 6	< 32	< 8
	05/16/19	< 8	< 9	< 18	< 11	< 17	< 8	< 14	< 9	< 8	< 40	< 10
	05/30/19	< 8	< 8	< 15	< 10	< 17	< 9	< 12	< 7	< 8	< 37	< 12
	06/13/19	< 5	< 5	< 13	< 7	< 13	< 6	< 10	< 6	< 6	< 24	< 6
	06/26/19	< 7	< 8	< 13	< 7	< 17	< 8	< 11	< 8	< 8	< 35	< 13
	07/10/19	< 8	< 9	< 16	< 9	< 19	< 8	< 14	< 7	< 8	< 43	< 7
	07/24/19	< 8	< 7	< 19	< 7	< 20	< 7	< 14	< 8	< 7	< 30	< 9
	08/08/19	< 10	< 8	< 19	< 9	< 16	< 8	< 14	< 10	< 9	< 37	< 9
	08/22/19	< 8	< 8	< 13	< 9	< 19	< 7	< 14	< 10	< 9	< 33	< 13
	09/04/19	< 8	< 9	< 21	< 10	< 18	< 8	< 13	< 9	< 9	< 36	< 11
	09/19/19 (1)											
	10/02/19 (1)											
	10/17/19 (1)											
	10/31/19 (1)											
	11/14/19 (1)											
	12/05/19	< 9	< 10	< 24	< 12	< 20	< 9	< 17	< 9	< 9	< 39	< 14
	MEAN	-	-	-	-	-	-	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-VIII.1

CONCENTRATIONS OF GAMMA EMITTERS IN FOOD PRODUCT SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
L-QUAD 1													
Broccoli	07/31/19	< 32	< 35	< 80	< 34	< 94	< 35	< 64	< 52	< 37	< 33	< 166	< 44
Onions	07/31/19	< 24	< 23	< 50	< 27	< 49	< 23	< 41	< 37	< 26	< 24	< 108	< 36
Red beets	08/08/19	< 13	< 13	< 25	< 13	< 27	< 14	< 22	< 21	< 14	< 14	< 62	< 16
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
L-QUAD 2													
Red cabbage	08/08/19	< 34	< 33	< 78	< 35	< 81	< 28	< 66	< 51	< 43	< 41	< 153	< 30
Horseradish Root	08/15/19	< 33	< 31	< 65	< 36	< 78	< 30	< 60	< 47	< 38	< 30	< 142	< 34
Potatoes	08/22/19	< 37	< 34	< 82	< 37	< 71	< 42	< 65	< 53	< 43	< 44	< 154	< 42
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
L-QUAD 3													
Zucchini	08/29/19	< 14	< 15	< 36	< 13	< 39	< 17	< 28	< 28	< 18	< 15	< 69	< 20
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
L-QUAD 4													
Cabbage	07/02/19	< 26	< 24	< 53	< 21	< 58	< 21	< 37	< 39	< 28	< 24	< 134	< 29
Green onions	07/02/19	< 29	< 26	< 54	< 22	< 67	< 32	< 49	< 56	< 30	< 24	< 151	< 44
Carrots	07/24/19	< 34	< 34	< 64	< 47	< 74	< 26	< 55	< 43	< 25	< 35	< 147	< 48
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-VIII.2

CONCENTRATIONS OF GAMMA EMITTERS IN VEGETATION SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
L-VEG C													
Clover	05/23/19	< 12	< 13	< 31	< 12	< 27	< 14	< 23	< 54	< 13	< 12	< 103	< 31
Grass	05/23/19	< 15	< 16	< 38	< 18	< 33	< 17	< 30	< 57	< 16	< 15	< 124	< 36
Milkweed	05/23/19	< 14	< 14	< 32	< 12	< 31	< 16	< 25	< 56	< 15	< 13	< 120	< 30
Milkweed	06/20/19	< 47	< 38	< 78	< 52	< 103	< 41	< 75	< 57	< 47	< 57	< 192	< 41
Clover	06/20/19	< 34	< 24	< 60	< 40	< 69	< 31	< 53	< 46	< 34	< 29	< 127	< 36
Yellow Sweet Clover	06/20/19	< 27	< 26	< 52	< 27	< 51	< 26	< 45	< 42	< 29	< 28	< 127	< 29
Grass	07/17/19	< 23	< 29	< 64	< 29	< 67	< 29	< 47	< 37	< 28	< 32	< 130	< 40
Yellow Sweet Clover/Red Clover	07/17/19	< 36	< 36	< 66	< 34	< 87	< 36	< 60	< 50	< 38	< 30	< 147	< 51
Yellow Mullein	07/17/19	< 14	< 13	< 28	< 14	< 27	< 15	< 24	< 23	< 15	< 15	< 62	< 19
Clover	08/15/19	< 24	< 24	< 48	< 26	< 46	< 25	< 39	< 36	< 26	< 25	< 107	< 33
Grass	08/15/19	< 29	< 29	< 59	< 31	< 62	< 30	< 51	< 43	< 32	< 30	< 134	< 35
Milkweed	08/15/19	< 18	< 17	< 38	< 19	< 38	< 17	< 29	< 25	< 19	< 18	< 75	< 21
Clover	09/26/19	< 19	< 19	< 41	< 21	< 44	< 20	< 35	< 32	< 22	< 20	< 87	< 27
Grass	09/26/19	< 32	< 29	< 61	< 37	< 68	< 34	< 52	< 46	< 35	< 33	< 135	< 41
Milkweed	09/26/19	< 41	< 43	< 103	< 45	< 112	< 50	< 81	< 56	< 41	< 44	< 172	< 39
Clover	10/17/19	< 24	< 23	< 48	< 24	< 57	< 24	< 41	< 37	< 25	< 25	< 105	< 28
Dock Plant	10/17/19	< 20	< 20	< 40	< 21	< 42	< 21	< 35	< 29	< 22	< 21	< 92	< 26
Milkweed	10/17/19	< 24	< 23	< 47	< 23	< 53	< 23	< 41	< 35	< 26	< 25	< 105	< 30
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
L-ESE-1													
Dandelion	05/23/19	< 12	< 15	< 32	< 14	< 31	< 14	< 25	< 56	< 14	< 12	< 103	< 30
Grass	05/23/19	< 18	< 18	< 41	< 19	< 37	< 18	< 31	< 47	< 20	< 18	< 111	< 34
Dandelion	06/20/19	< 31	< 28	< 55	< 41	< 67	< 29	< 52	< 47	< 36	< 34	< 126	< 34
Grass	06/20/19	< 32	< 30	< 64	< 36	< 77	< 35	< 51	< 51	< 38	< 31	< 154	< 36
Bulrush	07/17/19	< 12	< 13	< 26	< 13	< 27	< 13	< 22	< 21	< 14	< 13	< 58	< 16
Grass	07/17/19	< 35	< 35	< 69	< 18	< 63	< 31	< 44	< 52	< 36	< 35	< 147	< 45
Dandelions	08/15/19	< 26	< 25	< 47	< 25	< 53	< 27	< 42	< 38	< 27	< 27	< 112	< 30
Grass	08/15/19	< 25	< 25	< 51	< 31	< 58	< 28	< 46	< 36	< 27	< 29	< 109	< 35
Dandelion	09/26/19	< 34	< 29	< 66	< 33	< 79	< 36	< 48	< 48	< 39	< 37	< 146	< 50
Grass	09/26/19	< 18	< 17	< 39	< 20	< 39	< 18	< 31	< 28	< 20	< 18	< 83	< 26
Clover	10/17/19	< 19	< 19	< 40	< 21	< 40	< 19	< 32	< 28	< 21	< 20	< 82	< 26
Dandelions	10/17/19	< 37	< 36	< 88	< 45	< 87	< 36	< 61	< 51	< 39	< 40	< 165	< 45
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
L-ESE-2													
Dandelion	05/23/19	< 13	< 15	< 37	< 17	< 32	< 14	< 26	< 55	< 15	< 14	< 119	< 32
Field Pennygrass	05/23/19	< 15	< 16	< 37	< 16	< 35	< 17	< 27	< 38	< 18	< 16	< 95	< 26
Grass	05/23/19	< 14	< 16	< 35	< 14	< 33	< 15	< 25	< 58	< 15	< 14	< 125	< 38
Clover	06/20/19	< 34	< 32	< 70	< 34	< 70	< 37	< 59	< 53	< 36	< 35	< 151	< 49
Grass	06/20/19	< 30	< 31	< 63	< 33	< 72	< 33	< 48	< 48	< 35	< 34	< 144	< 46
Common Tansy/Plantain	07/17/19	< 29	< 25	< 63	< 29	< 61	< 26	< 65	< 55	< 34	< 35	< 161	< 36
Grass	07/17/19	< 12	< 11	< 26	< 13	< 25	< 12	< 20	< 20	< 13	< 12	< 53	< 13
Red Clover	07/17/19	< 11	< 11	< 26	< 12	< 26	< 12	< 21	< 20	< 13	< 13	< 55	< 12
Clover	08/15/19	< 28	< 27	< 54	< 24	< 51	< 29	< 49	< 47	< 31	< 32	< 130	< 36
Plantain	08/15/19	< 25	< 26	< 50	< 24	< 51	< 27	< 46	< 39	< 27	< 26	< 122	< 34
clover	09/26/19	< 45	< 42	< 81	< 45	< 95	< 48	< 72	< 55	< 40	< 38	< 166	< 64
dandelion	09/26/19	< 36	< 37	< 76	< 36	< 65	< 37	< 69	< 54	< 47	< 38	< 173	< 44
plantain	09/26/19	< 38	< 37	< 87	< 40	< 82	< 46	< 65	< 58	< 44	< 41	< 183	< 56
Dandelions	10/17/19	< 32	< 27	< 66	< 36	< 63	< 33	< 55	< 45	< 35	< 30	< 130	< 41
Dock plant	10/17/19	< 18	< 19	< 40	< 20	< 41	< 20	< 34	< 28	< 22	< 20	< 82	< 24
Plantain	10/17/19	< 19	< 18	< 40	< 23	< 39	< 18	< 31	< 25	< 21	< 20	< 81	< 24
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-IX.1 QUARTERLY DLR RESULTS FOR LASALLE COUNTY STATION, 2019

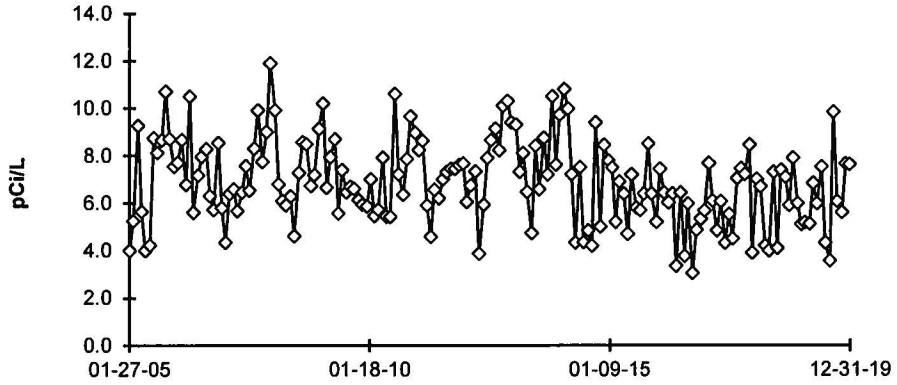
Location	Location Qtrly Baseline, B_Q (mrem)	B_Q + MDD_Q	2019 Normalized Net Dose, M_{QX} (mrem/std. Qtr.)				Normalized Annual Dose, M_A (mrem/yr)	B_A[1]	B_A + MDD_A[2]	Annual Facility Dose, F_A (mrem)	Annual Facility Dose, F_A >10 mrem
			1	2	3	4					
L-01	13.3	22.0	10.7	15.9	21.6	20.6	68.8	53.1	87.3	ND	No
L-03	11.9	20.6	10.7	14.6	19.1	17.6	61.9	45.3	79.5	ND	No
L-04	12	20.7	11.9	15.3	19.3	20.1	66.6	45.6	79.8	ND	No
L-05	11.7	20.4	10.4	15.8	19.5	20.4	66.0	46.8	81.0	ND	No
L-06	13.2	21.9	11.4	16.1	19.5	19.4	66.3	53.0	87.2	ND	No
L-07	12.9	21.6	11.2	15.6	20.0	20.7	67.5	51.5	85.7	ND	No
L-08	12.5	21.2	10.9	15.1	18.6	19.4	64.0	50.1	84.3	ND	No
L-10	10	18.7	8.9	13.1	17.8	17.6	57.3	39.8	74.0	ND	No
L-101	13.3	22.0	11.3	16.1	20.3	21.3	69.0	50.4	84.6	ND	No
L-102	14.9	23.6	13.0	14.9	25.0	23.8	76.7	59.5	93.7	ND	No
L-103	12.3	21.0	12.6	15.3	20.6	20.3	68.8	49.2	83.4	ND	No
L-104	11.6	20.3	10.6	15.7	19.2	18.8	64.2	46.3	80.5	ND	No
L-105	13.3	22.0	11.2	15.9	21.7	21.7	70.5	53.2	87.4	ND	No
L-106	12.3	21.0	11.0	15.3	20.3	20.4	67.1	49.2	83.4	ND	No
L-107	12.8	21.5	11.3	16.7	22.7	21.6	72.3	51.2	85.4	ND	No
L-108	11.1	19.8	11.9	16.1	22.6	22.0	72.6	44.3	78.5	ND	No
L-109	12.9	21.6	11.1	16.5	20.2	19.7	67.4	51.6	85.8	ND	No
L-110	12.4	21.1	12.2	13.3	21.3	21.0	67.8	49.7	83.9	ND	No
L-111B	13.1	21.8	11.6	15.7	21.6	21.3	70.1	52.3	86.5	ND	No
L-112	12.4	21.1	9.8	14.4	19.8	21.0	64.9	49.6	83.8	ND	No
L-113A	13.8	22.5	12.5	16.7	23.3	22.6	75.1	55.2	89.4	ND	No
L-114	13.1	21.8	12.2	16.0	21.4	20.9	70.5	50.0	84.2	ND	No
L-115	11.2	19.9	11.8	15.3	21.5	19.2	67.8	44.8	79.0	ND	No
L-116	11.2	19.9	10.2	14.2	18.4	20.1	62.8	44.8	79.0	ND	No
L-11A	10.3	19.0	9.3	6.0	20.4	6.4	42.2	41.2	75.4	ND	No
L-201	11	19.7	7.0	12.7	16.3	17.1	53.2	43.8	78.0	ND	No
L-202	10.2	18.9	7.8	13.0	18.0	18.5	57.3	40.9	75.1	ND	No
L-203	12.8	21.5	10.6	16.3	20.6	21.0	68.5	51.1	85.3	ND	No
L-204	13.3	22.0	11.8	16.2	22.4	21.1	71.6	50.7	84.9	ND	No
L-205	12.2	20.9	10.8	17.1	20.8	20.2	68.8	48.8	83.0	ND	No
L-205	12	20.7	9.5	16.1	19.7	19.6	65.0	45.7	79.9	ND	No
L-206	12.9	21.6	12.2	17.0	22.3	19.4	70.9	51.6	85.8	ND	No
L-207	12.1	20.8	11.3	15.4	19.7	20.0	66.4	48.5	82.7	ND	No
L-208	13.1	21.8	11.1	16.7	21.1	20.6	69.5	44.6	78.8	ND	No
L-209	12.4	21.1	11.6	17.0	21.5	20.0	70.1	47.2	81.4	ND	No
L-210	13.7	22.4	12.1	18.3	23.1	20.8	74.2	51.9	86.1	ND	No
L-211	13.5	22.2	11.8	17.1	21.2	22.4	72.5	54.1	88.3	ND	No
L-212	13.3	22.0	12.0	17.3	21.0	21.0	71.3	50.5	84.7	ND	No
L-213	11.5	20.2	10.2	15.2	20.2	19.9	65.5	41.6	75.8	ND	No
L-214	11.9	20.6	11.8	16.9	20.1	19.1	67.9	47.6	81.8	ND	No
L-215	13.6	22.3	12.1	17.0	21.2	22.3	72.6	54.4	88.6	ND	No
L-216	13.4	22.1	12.1	16.4	21.1	20.6	70.3	53.5	87.7	ND	No

[1] **Baseline background dose (BB_A):** The estimated mean background radiation dose at each field monitoring location annually based on historical measurements, excluding any dose contribution from the monitored facility

[2] **Minimum differential dose (MDD_A):** The smallest amount of facility related dose at each monitored location annually above the baseline background dose that can be reliably detected by an environmental dosimetry system

FIGURE C-1
Surface Water - Gross Beta - Stations L-21 (C) and L-40 Collected in the Vicinity of LSCS, 2005 - 2019

L-21 (C) Illinois River at Seneca



L-40 Illinois River Downstream

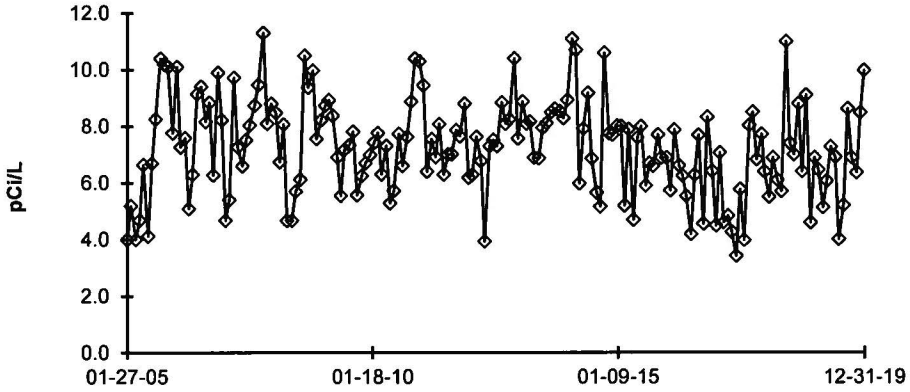
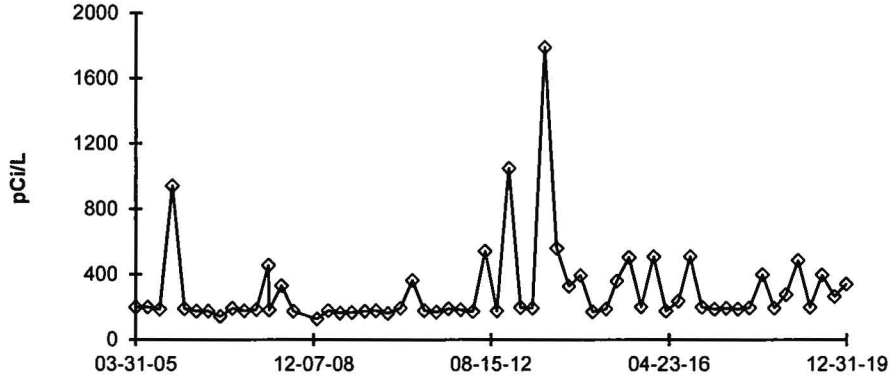


FIGURE C-2
Surface Water - Tritium - Stations L-21 (C) and L-40 Collected in the Vicinity of LSCS, 2005 - 2019

L-21 Illinois River at Seneca



L-40 Illinois River Downstream

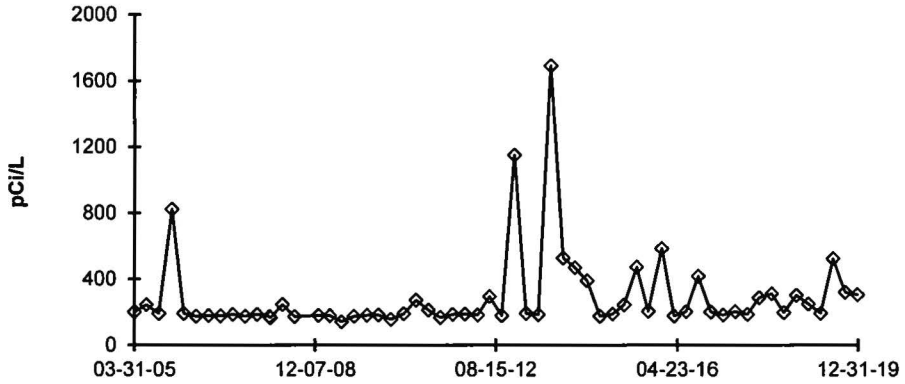
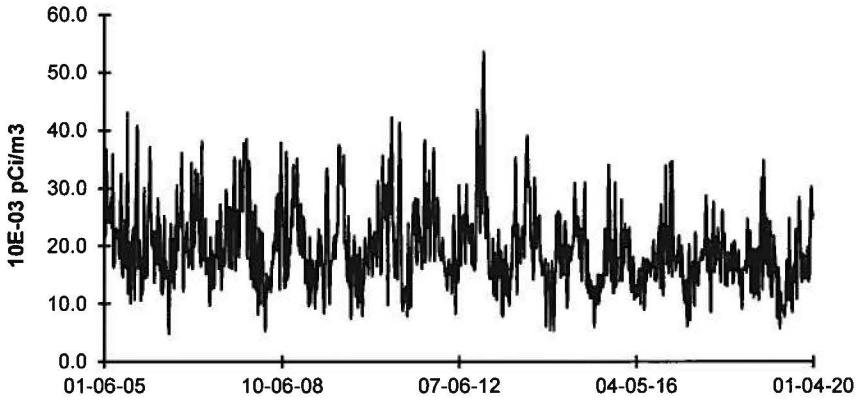


FIGURE C-3
Air Particulate - Gross Beta - Stations L-01 and L-03 Collected in the Vicinity of LSCS, 2005 - 2019

L-01 Nearsite No. 1



L-03 Onsite No. 3

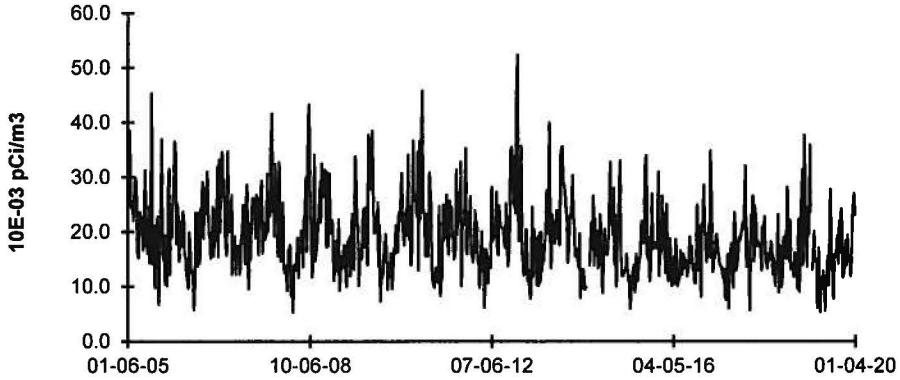
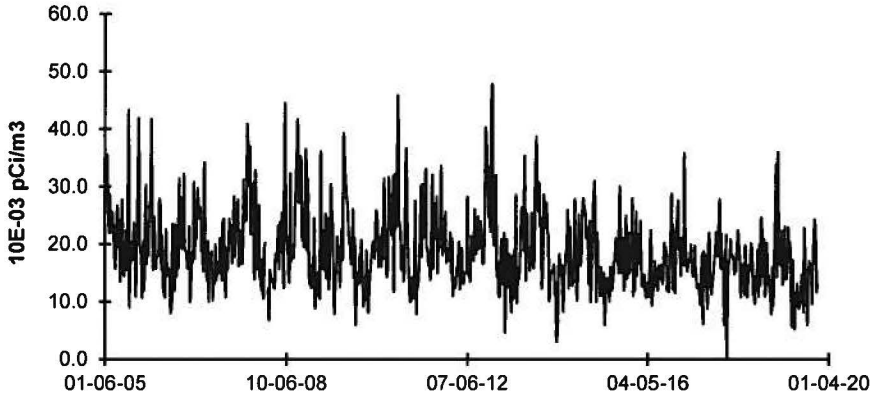


FIGURE C-4
Air Particulate - Gross Beta - Stations L-05 and L-06 Collected in the Vicinity of LSCS, 2005 - 2019

L-05 Onsite No. 5



L-06 Nearsite No. 6

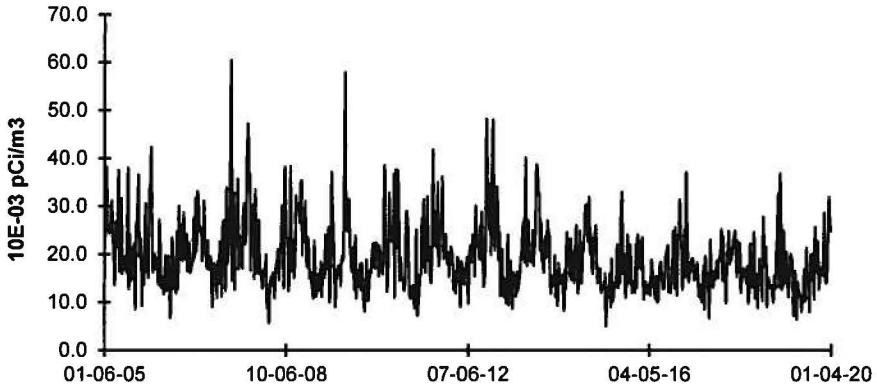


FIGURE C-5
Air Particulate - Gross Beta - Station L-10 (C) Collected in the Vicinity of LSCS, 2005 - 2019

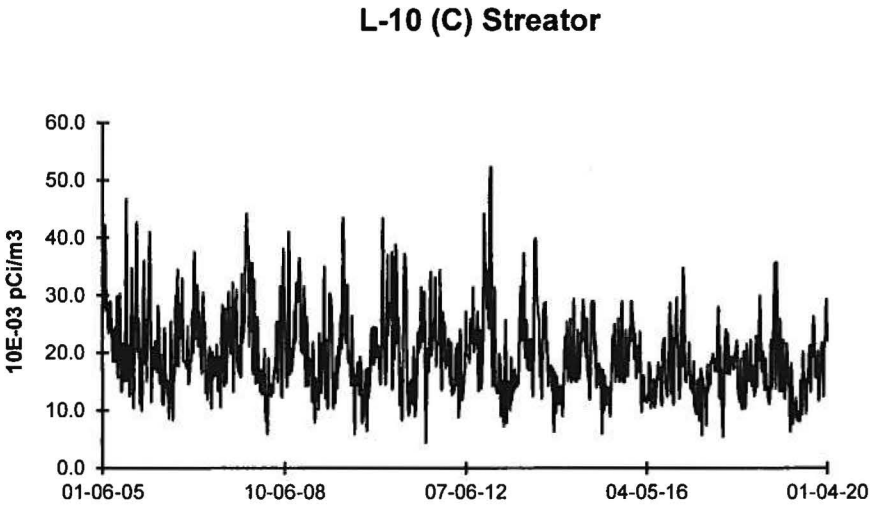
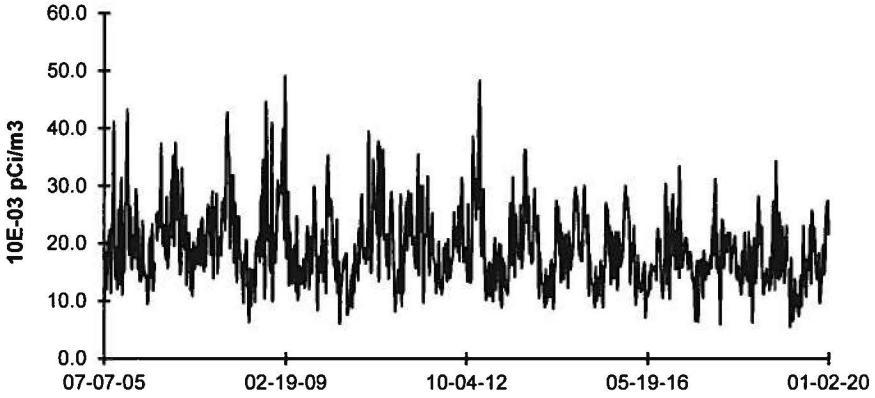


FIGURE C-6
Air Particulate - Gross Beta - Stations L-04 and L-07 Collected in the Vicinity of LSCS, 2005 - 2019

L-04 Rte. 170



L-07 Seneca

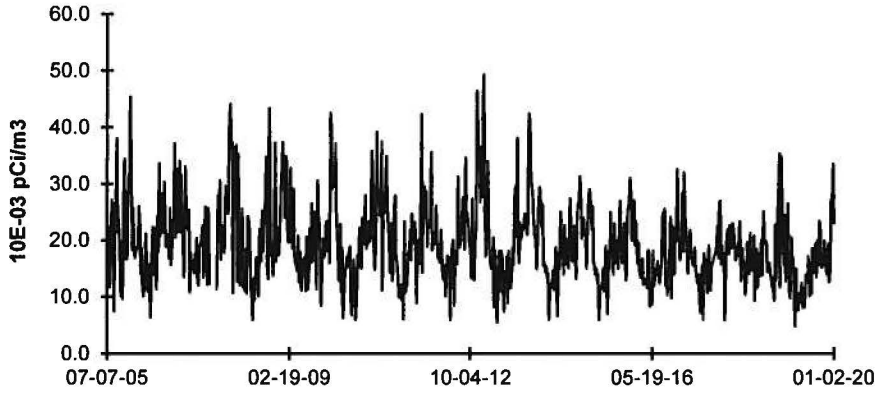
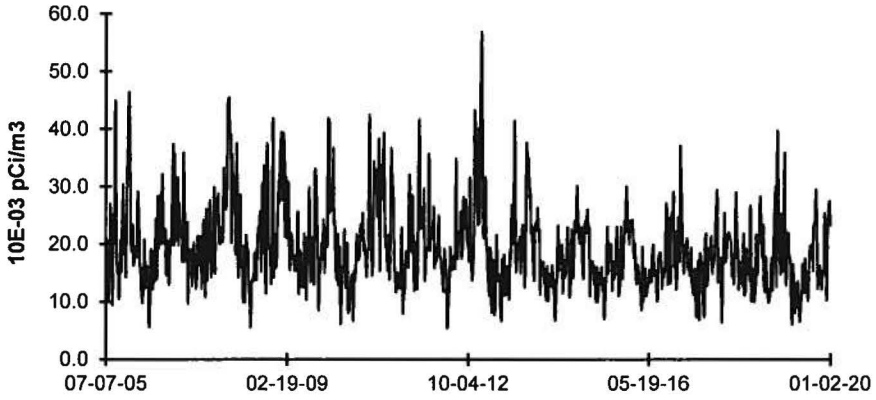
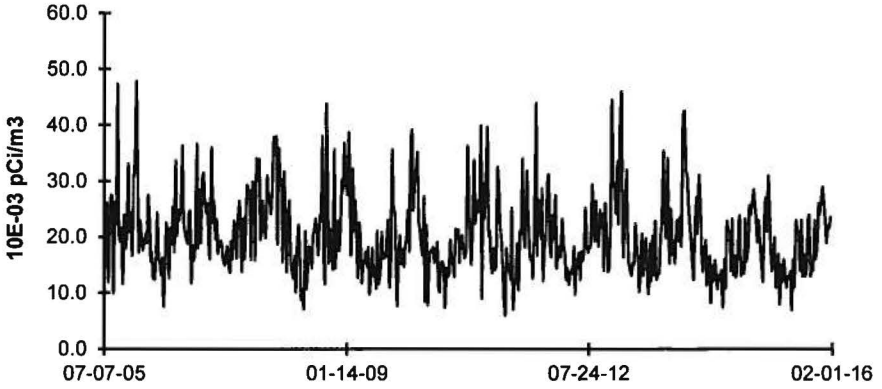


FIGURE C-7
Air Particulate - Gross Beta - Stations L-08 and L-11 Collected in the Vicinity of LSCS, 2005 - 2019

L-08 Marseilles

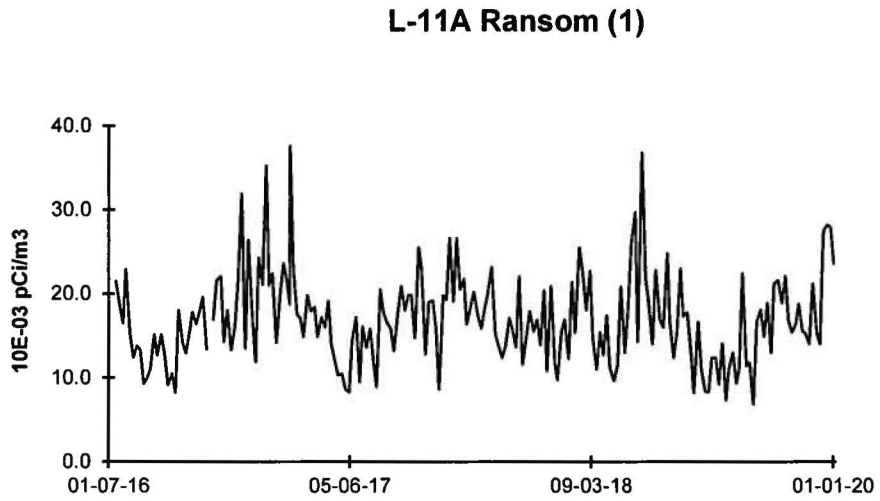


L-11 Ransom *(1)*



(1) Air monitoring station L-11 was retired on 01/21/16

FIGURE C-8
Air Particulate - Gross Beta - Station L-11A
Collected in the Vicinity of LSCS, 2016 - 2019



(1) Air monitoring station L-11A was placed in service on 01/14/16

APPENDIX D

INTER-LABORATORY COMPARISON PROGRAM

Table D.1 **Analytics Environmental Radioactivity Cross Check Program**
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [(a)]	Ratio of TBE to Analytics Result	Evaluation [(b)]
March 2019	E12468A	Milk	Sr-89	pCi/L	87.1	96	0.91	A
			Sr-90	pCi/L	12.6	12.6	1.00	A
	E12469A	Milk	Ce-141	pCi/L	113	117	0.97	A
			Co-58	pCi/L	153	143	1.07	A
			Co-60	pCi/L	289	299	0.97	A
			Cr-51	pCi/L	233	293	0.80	A
			Cs-134	pCi/L	147	160	0.92	A
			Cs-137	pCi/L	193	196	0.98	A
			Fe-59	pCi/L	153	159	0.96	A
			I-131	pCi/L	91.5	89.5	1.02	A
			Mn-54	pCi/L	149	143	1.04	A
			Zn-65	pCi/L	209	220	0.95	A
	E12470	Charcoal	I-131	pCi	77.5	75.2	1.03	A
	E12471	AP	Ce-141	pCi	60.7	70.2	0.87	A
			Co-58	pCi	87.9	85.8	1.02	A
			Co-60	pCi	175	179	0.98	A
			Cr-51	pCi	165	176	0.94	A
			Cs-134	pCi	91.2	95.9	0.95	A
			Cs-137	pCi	120	118	1.02	A
			Fe-59	pCi	108	95.3	1.13	A
			Mn-54	pCi	94.2	85.7	1.10	A
			Zn-65	pCi	102	132	0.77	W
	E12472	Water	Fe-55	pCi/L	2230	1920	1.16	A
	E12473	Soil	Ce-141	pCi/g	0.189	0.183	1.03	A
			Co-58	pCi/g	0.209	0.224	0.93	A
			Co-60	pCi/g	0.481	0.466	1.03	A
			Cr-51	pCi/g	0.522	0.457	1.14	A
			Cs-134	pCi/g	0.218	0.250	0.87	A
			Cs-137	pCi/g	0.370	0.381	0.97	A
			Fe-59	pCi/g	0.263	0.248	1.06	A
			Mn-54	pCi/g	0.248	0.223	1.11	A
			Zn-65	pCi/g	0.371	0.344	1.08	A
	E12474	AP	Sr-89	pCi	88.3	95.2	0.93	A
			Sr-90	pCi	11.7	12.5	0.94	A
August 2019	E12562	Soil	Sr-90	pCi/g	4.710	6.710	0.70	W

(a) The Analytics known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation

(b) Analytics evaluation based on TBE internal QC limits:

A = Acceptable - reported result falls within ratio limits of 0.80-1.20

W = Acceptable with warning - reported result falls within 0.70-0.80 or 1.20-1.30

N = Not Acceptable - reported result falls outside the ratio limits of < 0.70 and > 1.30

Table D.1 **Analytics Environmental Radioactivity Cross Check Program**
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Ratio of TBE to Analytics Result	Evaluation [b]
September 2019	E12475	Milk	Sr-89	pCi/L	70.0	93.9	0.75	W
			Sr-90	pCi/L	12.0	12.9	0.93	A
	E12476	Milk	Ce-141	pCi/L	150	167	0.90	A
			Co-58	pCi/L	170	175	0.97	A
			Co-60	pCi/L	211	211	1.00	A
			Cr-51	pCi/L	323	331	0.98	A
			Cs-134	pCi/L	180	207	0.87	A
			Cs-137	pCi/L	147	151	0.97	A
			Fe-59	pCi/L	156	148	1.05	A
			I-131	pCi/L	81.1	92.1	0.88	A
			Mn-54	pCi/L	160	154	1.04	A
			Zn-65	pCi/L	303	293	1.03	A
	E12477	Charcoal	I-131	pCi	95.9	95.1	1.01	A
	E12478	AP	Ce-141	pCi	129	138	0.93	A
			Co-58	pCi	128	145	0.88	A
			Co-60	pCi	181	174	1.04	A
			Cr-51	pCi	292	274	1.07	A
			Cs-134	pCi	166	171	0.97	A
			Cs-137	pCi	115	125	0.92	A
			Fe-59	pCi	119	123	0.97	A
			Mn-54	pCi	129	128	1.01	A
			Zn-65	pCi	230	242	0.95	A
	E12479	Water	Fe-55	pCi/L	1810	1850	0.98	A
	E12480	Soil	Ce-141	pCi/g	0.305	0.276	1.10	A
			Co-58	pCi/g	0.270	0.289	0.93	A
			Co-60	pCi/g	0.358	0.348	1.03	A
			Cr-51	pCi/g	0.765	0.547	1.40	N[1]
			Cs-134	pCi/g	0.327	0.343	0.95	A
			Cs-137	pCi/g	0.308	0.321	0.96	A
			Fe-59	pCi/g	0.257	0.245	1.05	A
			Mn-54	pCi/g	0.274	0.255	1.07	A
			Zn-65	pCi/g	0.536	0.485	1.11	A
	E12481	AP	Sr-89	pCi	95.9	91.9	1.04	A
			Sr-90	pCi	12.3	12.6	0.97	A
	E12563	Soil	Sr-90	pCi/g	0.392	0.360	1.09	A

(a) The Analytics known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation

(b) Analytics evaluation based on TBE internal QC limits:

A = Acceptable - reported result falls within ratio limits of 0.80-1.20

W = Acceptable with warning - reported result falls within 0.70-0.80 or 1.20-1.30

N = Not Acceptable - reported result falls outside the ratio limits of < 0.70 and > 1.30

*(1) See **NCR 19-27***

Table D.2 **A.2 DOE's Mixed Analyte Performance Evaluation Program (MAPEP)**
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Acceptance Range	Evaluation [b]
February 2019	19-GrF40	AP	Gross Alpha	Bq/sample	0.184	0.528	0.158 - 0.898	A
			Gross Beta	Bq/sample	0.785	0.948	0.474 - 1.422	A
	19-MaS40	Soil	Ni-63	Bq/kg	420	519.0	363 - 675	A
			Sr-90	Bq/kg			*(1)*	NR(3)
	19-MaW40	Water	Am-241	Bq/L	0.764	0.582	0.407 - 0.757	N(4)
			Ni-63	Bq/L	4.72	5.8	4.1 - 7.5	A
			Pu-238	Bq/L	0.443	0.451	0.316 - 0.586	A
			Pu-239/240	Bq/L	-0.00161	0.0045	*(2)*	A
	19-RdF40	AP	U-234/233	Bq/sample	0.1138	0.106	0.074 - 0.138	A
			U-238	Bq/sample	0.107	0.110	0.077 - 0.143	A
	19-RdV40	Vegetation	Cs-134	Bq/sample	2.14	2.44	1.71 - 3.17	A
			Cs-137	Bq/sample	2.22	2.30	1.61 - 2.99	A
			Co-57	Bq/sample	2.16	2.07	1.45 - 2.69	A
			Co-60	Bq/sample	0.02382		*(1)*	A
			Mn-54	Bq/sample	-0.03607		*(1)*	A
			Sr-90	Bq/sample	-0.1060		*(1)*	N(5)
			Zn-65	Bq/sample	1.35	1.71	1.20 - 2.22	W
August 2019	19-GrF41	AP	Gross Alpha	Bq/sample	0.192	0.528	0.158 - 0.898	W
			Gross Beta	Bq/sample	0.722	0.937	0.469 - 1.406	A
	19-MaS41	Soil	Ni-63	Bq/kg	436	629	440 - 818	N(6)
			Sr-90	Bq/kg	444	572	400 - 744	W
	19-MaW41	Water	Am-241	Bq/L				NR(7)
			Ni-63	Bq/L	7.28	9.7	6.8 - 12.6	W
			Pu-238	Bq/L	0.0207	0.0063	*(2)*	A
			Pu-239/240	Bq/L	0.741	0.727	0.509 - 0.945	A
	19-RdF41	AP	U-234/233	Bq/sample	0.0966	0.093	0.065 - 0.121	A
			U-238	Bq/sample	0.0852	0.096	0.067-0.125	A
	19-RdV41	Vegetation	Cs-134	Bq/sample	0.0197		*(1)*	A
			Cs-137	Bq/sample	3.21	3.28	2.30 - 4.26	A
			Co-57	Bq/sample	4.62	4.57	3.20 - 5.94	A
			Co-60	Bq/sample	4.88	5.30	3.71 - 6.89	A
			Mn-54	Bq/sample	4.54	4.49	3.14 - 5.84	A
			Sr-90	Bq/sample	0.889	1.00	0.70 - 1.30	A
			Zn-65	Bq/sample	2.78	2.85	2.00 - 3.71	A

(a) The MAPEP known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation

(b) DOE/MAPEP evaluation:
A = Acceptable - reported result falls within ratio limits of 0.80-1.20
W = Acceptable with warning - reported result falls within 0.70-0.80 or 1.20-1.30
N = Not Acceptable - reported result falls outside the ratio limits of < 0.70 and > 1.30
NR = Not Reported

(1) False positive test
(2) Sensitivity evaluation
*(3) NR (Not Reported) See **NCR 19-12***
*(4) See **NCR 19-13***
*(5) See **NCR 19-14***
*(6) See **NCR 19-25***
*(7) NR (Not Reported) See **NCR 19-26***

Table D.3 **ERA Environmental Radioactivity Cross Check Program**
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Acceptance Limits	Evaluation [b]
April 2019	Rad-117	Water	Ba-133	pCi/L	26.3	24.1	18.6 - 27.8	A
			Cs-134	pCi/L	15.2	12.1	8.39 - 14.4	N(1)
			Cs-137	pCi/L	33.6	33.1	28.8 - 39.4	A
			Co-60	pCi/L	11.9	11.5	8.67 - 15.5	A
			Zn-65	pCi/L	87.1	89.2	80.3 - 107	A
			GR-A	pCi/L	19	19.3	9.56 - 26.5	A
			GR-B	pCi/L	20.2	29.9	19.1 - 37.7	A
			U-Nat	pCi/L	55.5	55.9	45.6 - 61.5	A
			H-3	pCi/L	21500	21400	18700 - 23500	A
			Sr-89	pCi/L	44.9	33.3	24.5 - 40.1	N(2)
			Sr-90	pCi/L	24.5	26.3	19.0 - 30.7	A
			I-131	pCi/L	28.9	28.4	23.6 - 33.3	A
October 2019	Rad-119	Water	Ba-133	pCi/L	42.7	43.8	35.7 - 48.8	A
			Cs-134	pCi/L	53.5	55.9	45.2 - 61.5	A
			Cs-137	pCi/L	77.7	78.7	70.8 - 89.2	A
			Co-60	pCi/L	51.5	53.4	48.1 - 61.3	A
			Zn-65	pCi/L	36.6	34.0	28.5 - 43.1	A
			GR-A	pCi/L	40.5	27.6	14.0 - 36.3	N(3)
			GR-B	pCi/L	36.3	39.8	26.4 - 47.3	A
			U-Nat	pCi/L	27.66	28.0	22.6 - 31.1	A
			H-3	pCi/L	22800	23400	20500 - 25700	A
			Sr-89	pCi/L	47.1	45.5	35.4 - 52.7	A
			Sr-90	pCi/L	32.5	26.5	19.2 - 30.9	N(4)
			I-131	pCi/L	26.0	23.9	19.8 - 28.4	A
December 2019	QR 120419D	Water	Sr-90	pCi/L	20.1	18.6	13.2 - 22.1	A

(a) The ERA known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.

(b) ERA evaluation:
A = Acceptable - Reported value falls within the Acceptance Limits
N = Not Acceptable - Reported value falls outside of the Acceptance Limits

*(1) See **NCR 19-10***
*(2) See **NCR 19-11***
*(3) See **NCR 19-23***
*(4) See **NCR 19-24***

APPENDIX E

EFFLUENT DATA

Intentionally left blank

TABLE OF CONTENTS

Table of Contents (cont.)

INTRODUCTION

LaSalle County Station, a two-unit BWR, is located near Marseilles, Illinois in LaSalle County, 3.5 miles south of the Illinois River. Both units are rated at 3546 MWt. Unit 1 loaded fuel in March 1982. Unit 2 loaded fuel in late December 1983. The Station is designed to keep releases to the environment at levels below those specified in the regulations.

Liquid effluents, although no longer batch released from LaSalle County Station, were designed to be released to the Illinois River in controlled batches after radioassay of each batch. Gaseous effluents are released to the atmosphere after delay allowing time for short-lived (noble) gases to decay. Releases to the atmosphere are sampled and analyzed on a routine basis. The gaseous effluent samples are analyzed for particulate, iodine, noble gas, and tritium activity. The particulate and iodine sample results are obtained from continuously collected composite samples. The noble gas and tritium sample results are obtained from routine grab samples. The results of effluent analyses are summarized on a monthly basis and reported to the Nuclear Regulatory Commission as required per Technical Specifications. Airborne concentrations of noble gases, tritium, I-131, and particulate radioactivity in offsite areas are calculated using effluent and meteorological data.

Environmental monitoring is conducted by sampling at indicator and control (background) locations in the vicinity of LaSalle County Station to measure changes in radiation or radioactivity levels that may be attributable to station operations. If significant changes attributable to LaSalle County Station are measured, these changes are correlated with effluent releases. External gamma radiation exposure from noble gases and internal dose from I-131 in milk are the critical pathways at this site; however, an environmental monitoring program is conducted which also includes these and many other pathways which are less significant in terms of radiation protection.

SUMMARY

Gaseous effluents for the period contributed to only a small fraction of the LaSalle County Station Radiological Effluent Controls Limits. Liquid effluents had no contribution to offsite dose, as no liquid batch radioactive discharges were conducted. Calculations of environmental concentrations based on effluent, Illinois River flow, and meteorological data for the period indicate that consumption by the public of radionuclides attributable to LaSalle County Station does not exceed regulatory limits. Radiation exposure from radionuclides released to the atmosphere represented the critical pathway for the period with a maximum individual total dose estimated to be 1.80E-03 mrem for the year, where a shielding factor of 0.7 and an occupancy factor of 0.95 are assumed for the nearest resident. The assessment of radiation doses is performed in accordance with the Offsite Dose Calculation Manual (ODCM), specifically, a comparison of preoperational studies with operational controls or with previous environmental surveillance reports and an assessment of the observed impacts of the plant operation on the environment. Control locations are basis for "preoperational data." The results of analysis confirm that the station is operating in compliance with 10 CFR 50 Appendix I, 10 CFR 20 and 40 CFR 190.

1.0 EFFLUENTS

1.1 Gaseous Effluents to the Atmosphere

Measured concentrations of noble gases, radioiodine, and particulate radioactivity released to the atmosphere during the year, are listed in Table 1.1-1. A total of 2.95E+02 curies of fission and activation gases were released with an average release rate of 9.36E+00 µCi/sec.

A total of 2.19E-02 curies of I-131 were released during the year with an average release rate of 7.00E-04 µCi/sec.

A total of 9.55E-03 curies of beta-gamma emitters were released as airborne particulate matter with an average release rate of 3.03E-04 µCi/sec. Alpha-emitting radionuclides were below the lower limit of detection (LLD). Carbon-14 released in 2019 was calculated separately with a total of 3.48E+01 curies released with an average release rate of 1.10E+00 µCi/sec.

A total of 7.15E+01 curies of tritium were released with an average release rate of 2.28E+00 µCi/sec.

1.2 Liquids Released to Illinois River

There were no liquid batch releases in 2019. Continuous release path activity was below applicable Lower Limits of Detection.

2.0 SOLID RADIOACTIVE WASTE

Solid radioactive wastes were shipped by truck to a disposal facility or to a waste processor. For further detail, refer the LaSalle 2019 Annual Radioactive Effluent Release Report (ARERR). This report was submitted to the USNRC by the required date of May 1st, 2020.

3.0 DOSE TO MAN

3.1 Gaseous Effluent Pathways

Table 3.1-1 summarizes the doses resulting from releases of airborne radioactivity via the different exposure pathways.

3.1.1 Noble Gases

3.1.1.1 Gamma Dose Rates

Unit 1 and Unit 2 gaseous releases at LaSalle County

Station are reported as Unit 1 releases due to a single station vent stack (SVS) release point. Offsite Gamma air and whole body dose rates are shown in Table 3.1-1 and were calculated based on measured release rates, isotopic composition of the noble gases and average meteorological data for the period. Doses based on concurrent meteorological data are shown in Table 3.4-1. Based on measured effluents and meteorological data, the maximum total body dose to an individual would be 1.80E-03 mrem (Table 3.1-1) for the year, with an occupancy factor of 0.95 and a shielding factor of 0.7 included. The maximum total body dose based on measured effluents and concurrent meteorological data would be 1.61E-02 mrem (Table 3.4-1).

The maximum gamma air dose was 2.70E-03 mrad from Table 3.1-1, and the maximum gamma air dose from concurrent meteorological data was 3.54E-04 mrad (Table 3.4-1).

3.1.1.2 Beta Air and Skin Dose Rates

The range of beta particles in air is relatively small (on the order of a few meters or less); consequently, plumes of gaseous effluents may be considered "infinite" for purpose of calculating the dose from beta radiation incident on the skin. However, the actual dose to sensitive skin tissues is difficult to calculate due to the effect of the beta particle energies, thickness of inert skin and clothing covering sensitive tissues. For purposes of this report the skin is taken to have a thickness of 7.0 mg/cm^2 and an occupancy factor of 1.0 is used. The skin dose (from beta and gamma radiation) for the year was 3.06E-03 mrem from Table 3.1-1, and the skin dose from concurrent meteorological data was 4.00E-04 mrem (Table 3.4-1).

The maximum offsite beta dose for the year was 1.77E-04 mrad from Table 3.1-1, and the maximum offsite beta dose from concurrent meteorological data was 1.65E-04 mrad (Table 3.4-1).

3.1.2 Radioactive Iodine

The human thyroid exhibits a significant capacity to concentrate ingested or inhaled iodine. The radioiodine, I-131, released during routing operation of the plant, may be made available to man

resulting in a dose to the thyroid. The principal pathway of interest for this radionuclide is ingestion of radioiodine in milk.

3.1.2.1 Dose to Thyroid

The hypothetical thyroid dose to a maximum exposed individual living near the station via ingestion of milk was calculated. The radionuclide considered was I-131 and the source of milk was taken to be the nearest dairy farm with the cows pastured from May through October. The maximum thyroid dose due to I-131 was 1.11E-01 mrem for the year.

3.2 Liquid Effluent Pathways

The three principal pathways through the aquatic environment for potential doses to man from liquid waste are ingestion of potable water, eating aquatic foods, and exposure while on the shoreline. Not all of these pathways are significant or applicable at a given time but a reasonable approximation of the dose can be made by adjusting the dose formula for season of the year or type and degree of use of the aquatic environment. NRC developed equations* were used to calculate the doses to the whole body, lower gastro-intestinal tracts, thyroid, bone and skin; specific parameters for use in the equations are given in the Offsite Dose Calculation Manual. The maximum whole body dose was 0.00E+00 mrem and organ dose was 0.00E+00 for the year mrem (Table 3.2-1).

3.3 Assessment of Dose to Member of Public

During the period January to December 2019, LaSalle County Station did not exceed these limits as shown in Table 3.1-1 and Table 3.2-1 (based on annual average meteorological data), and as shown in Table 3.3-1:

- The Radiological Effluent Technical Standards (RETS) limits on dose or dose commitment to an individual due to radioactive materials in liquid effluents from each reactor unit (1.5 mrem to the whole body or 5 mrem to any organ during any calendar year; 3 mrem to the whole body or 10 mrem to any organ during the calendar year).

- The RETS limits on air dose in noble gases released in gaseous effluents to a member of the public from each reactor unit (5 mrad for gamma radiation or 10 mrad for beta radiation during any calendar quarter; 10 mrad for gamma radiation or 20 mrad for

beta radiation during a calendar year).

- The RETS limits on dose to a member of the public due to iodine-131, iodine-133, tritium and radionuclides in particulate form with half-lives greater than eight days in gaseous effluents released from each reactor unit (7.5 mrem to any organ during any calendar quarter; 15 mrem to any organ during any calendar year).

- The 10 CFR 20 limit on Total Effective Dose Equivalent to individual members of the public (100 mrem).

4.0 SITE METEOROLOGY

A summary of the site meteorological measurements taken during each calendar quarter of the year is given in Appendix F. The data are presented as cumulative joint frequency distributions of the wind direction for the 375' level and wind speed class by atmospheric stability class determined from the temperature difference between the 375' and 33' levels. Data recovery for these measurements was 99.5% during 2019.

---

*Nuclear Regulatory Commission, Regulatory Guide 1.109 (Rev. 1)

APPENDIX E-1

DATA TABLES AND FIGURES

Intentionally left blank

Table 1.1-1

LASALLE COUNTY NUCLEAR POWER STATION
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT (2019)
UNIT 1 AND UNIT 2
DOCKET NUMBERS 50-373 AND 50-374
GASEOUS EFFLUENTS SUMMATION OF ALL RELEASES

A. Fission & Activation Gases	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter4	Est. Total Error %
1. Total Release	Ci	1.06E+02	8.09E+01	4.39E+01	6.37E+01	2.50E+01
2. Average release rate for the period	µCi/sec	1.36E+01	1.03E+01	5.52E+00	8.01E+00	
3. Percent of ODCM limit	%	*	*	*	*	
B. Iodine						
1. Total Iodine – 131	Ci	1.64E-02	1.83E-03	1.90E-03	1.74E-03	1.50E+01
2. Average release rate for the period	µCi/sec	2.11E-03	2.32E-04	2.39E-04	2.19E-04	
3. Percent of ODCM limit	%	*	*	*	*	
C. Particulates						
1. Particulates with half-lives > 8 days	Ci	3.03E-03	2.27E-03	3.68E-03	5.65E-04	3.50E+01
2. Average release rate for the period	µCi/sec	3.90E-04	2.88E-04	4.62E-04	7.10E-05	
3. Percent of ODCM limit	%	*	*	*	*	
D. Tritium						
1. Total Release	Ci	3.71E+01	1.02E+01	1.07E+01	1.35E+01	1.50E+01
2. Average release rate for the period	µCi/sec	4.78E-00	1.29E-00	1.34E-00	1.70E-00	
3. Percent of ODCM limit	%	*	*	*	*	
E. Gross Alpha						
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	N/A
2. Average release rate for the period	µCi/sec	<LLD	<LLD	<LLD	<LLD	
3. Percent of ODCM limit	%	*	*	*	*	
F. Carbon-14						
1. Total Release	Ci	8.69E+00	8.69E+00	8.69E+00	8.68E+00	
2. Average release rate for the period	µCi/sec	1.12E+00	1.11E+00	1.09E+00	1.09E+00	
3. Percent of ODCM limit	%	*	*	*	*	

"*" This information is contained in the Radiological Impact on Man section of the report.
"<" Indicates activity of sample is less than LLD given in µCi/ml

The LaSalle County Nuclear Power Station maximum expected annual dose from Carbon-14 has been calculated using the maximum gross thermal capacity at full power operation. The resultant bounding doses are based upon site specific assumptions of source term.

Table 1.2-1

LASALLE COUNTY NUCLEAR POWER STATION
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT (2019)
LIQUID RELEASES
UNIT 1 AND UNIT 2
SUMMATION OF ALL LIQUID RELEASES

A. Fission & Activation Products	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter4	Est. Total Error %
1. Total Release (not including tritium, gases & alpha)	Ci	<LLD	<LLD	<LLD	<LLD	N/A
2. Average diluted concentration during period	µCi/mL	<LLD	<LLD	<LLD	<LLD	
3. Percent of applicable limit	%	*	*	*	*	

B. Tritium						
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	N/A
2. Average diluted concentration during period	µCi/mL	<LLD	<LLD	<LLD	<LLD	
3. Percent of applicable limit	%	*	*	*	*	

C. Dissolved & Entrained Gases						
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	N/A
2. Average diluted concentration during period	µCi/mL	<LLD	<LLD	<LLD	<LLD	
3. Percent of applicable limit	%	*	*	*	*	

D. Gross Alpha Activity						
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	N/A
2. Average release rate for the period	µCi/mL	<LLD	<LLD	<LLD	<LLD	
3. Percent of ODCM limit	%	*	*	*	*	

E. Volume of Waste Released (prior to dilution)	Liters	0.00E+00	0.00E+00	0.00E+00	0.00E+00

F. Volume of Dilution Water Used During Period	Liters	0.00E+00	0.00E+00	0.00E+00	0.00E+00

"*" This information is contained in the Radiological Impact on Man section of the report.
"<" Indicates activity of sample is less than LLD given in µCi/ml

Table 2.1-1

LASALLE COUNTY NUCLEAR POWER STATION
SOLID WASTE ANNUAL REPORT (2019)

Table 2.1-1 deliberately deleted. For solid waste disposal detail, refer to the LaSalle County Station 2019 Annual Radiological Effluent Release Report (ARERR).

Table 3.1-1

LASALLE COUNTY NUCLEAR POWER STATION
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT (2019)
RADIOLOGICAL IMPACT ON MAN
MAXIMUM DOSES RESULTING FROM GASEOUS RELEASES AND COMPLIANCE STATUS

Infant Receptor	Quarterly Limit	Units	1st Quarter	% of Limit	2nd Quarter	% of Limit	3rd Quarter	% of Limit	4th Quarter	% of Limit	Annual Limit	% of Limit
Gamma Air	5.00E+00	mRad	8.91E-04	0.018	1.27E-03	0.025	1.71E-04	0.003	3.66E-04	0.007	1.00E+01	0.027
Beta Air	1.00E+01	mRad	6.74E-05	0.001	5.22E-05	0.001	2.27E-05	0.000	3.50E-05	0.000	2.00E+01	0.001
NG Total Body	2.50E+00	mRem	5.95E-04	0.024	8.46E-04	0.034	1.14E-04	0.005	2.45E-04	0.010	5.00E+00	0.036
NG Skin	7.50E+00	mRem	1.02E-03	0.014	1.42E-03	0.019	2.00E-04	0.003	4.22E-04	0.056	1.50E+01	0.020
NNG Organ	7.50E+00	mRem	7.94E-02	1.059	1.05E-02	0.140	1.09E-02	0.146	1.00E-02	0.133	1.50E+01	0.739

Child Receptor	Quarterly Limit	Units	1st Quarter	% of Limit	2nd Quarter	% of Limit	3rd Quarter	% of Limit	4th Quarter	% of Limit	Annual Limit	% of Limit
Gamma Air	5.00E+00	mRad	8.91E-04	0.018	1.27E-03	0.025	1.71E-04	0.003	3.66E-04	0.007	1.00E+01	0.027
Beta Air	1.00E+01	mRad	6.74E-05	0.001	5.22E-05	0.001	2.27E-05	0.000	3.50E-05	0.000	2.00E+01	0.001
NG Total Body	2.50E+00	mRem	5.95E-04	0.024	8.46E-04	0.034	1.14E-04	0.005	2.45E-04	0.010	5.00E+00	0.036
NG Skin	7.50E+00	mRem	1.02E-03	0.014	1.42E-03	0.019	2.00E-04	0.003	4.22E-04	0.056	1.50E+01	0.020
NNG Organ	7.50E+00	mRem	3.29E-02	0.439	4.52E-03	0.060	4.71E-03	0.063	4.25E-03	0.057	1.50E+01	0.309

Teenager Receptor	Quarterly Limit	Units	1st Quarter	% of Limit	2nd Quarter	% of Limit	3rd Quarter	% of Limit	4th Quarter	% of Limit	Annual Limit	% of Limit
Gamma Air	5.00E+00	mRad	8.91E-04	0.018	1.27E-03	0.025	1.71E-04	0.003	3.66E-04	0.007	1.00E+01	0.027
Beta Air	1.00E+01	mRad	6.74E-05	0.001	5.22E-05	0.001	2.27E-05	0.000	3.50E-05	0.000	2.00E+01	0.001
NG Total Body	2.50E+00	mRem	5.95E-04	0.024	8.46E-04	0.034	1.14E-04	0.005	2.45E-04	0.010	5.00E+00	0.036
NG Skin	7.50E+00	mRem	1.02E-03	0.014	1.42E-03	0.019	2.00E-04	0.003	4.22E-04	0.056	1.50E+01	0.020
NNG Organ	7.50E+00	mRem	1.09E-02	0.146	4.71E-03	0.063	2.39E-03	0.032	1.54E-03	0.021	1.50E+01	0.130

Adult Receptor	Quarterly Limit	Units	1st Quarter	% of Limit	2nd Quarter	% of Limit	3rd Quarter	% of Limit	4th Quarter	% of Limit	Annual Limit	% of Limit
Gamma Air	5.00E+00	mRad	8.91E-04	0.018	1.27E-03	0.025	1.71E-04	0.003	3.66E-04	0.007	1.00E+01	0.027
Beta Air	1.00E+01	mRad	6.74E-05	0.001	5.22E-05	0.001	2.27E-05	0.000	3.50E-05	0.000	2.00E+01	0.001
NG Total Body	2.50E+00	mRem	5.95E-04	0.024	8.46E-04	0.034	1.14E-04	0.005	2.45E-04	0.010	5.00E+00	0.036
NG Skin	7.50E+00	mRem	1.02E-03	0.014	1.42E-03	0.019	2.00E-04	0.003	4.22E-04	0.056	1.50E+01	0.020
NNG Organ	7.50E+00	mRem	1.00E-02	0.133	4.25E-03	0.057	2.10E-03	0.028	1.32E-03	0.018	1.50E+01	0.118

The LaSalle County Nuclear Power Station maximum expected annual dose from Carbon-14 has been calculated using the maximum gross thermal capacity at full power operation. The resultant bounding doses are based upon site specific assumptions of source term.

Table 3.2-1

LASALLE COUNTY NUCLEAR POWER STATION
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT (2019)
RADIOLOGICAL IMPACT ON MAN
MAXIMUM DOSES RESULTING FROM LIQUID RELEASES AND COMPLIANCE STATUS

Infant Receptor	Quarterly Limit	Units	1st Quarter	% of Limit	2nd Quarter	% of Limit	3rd Quarter	% of Limit	4th Quarter	% of Limit	Annual Limit	% of Limit
10CFR50 Appendix I compliance												
Total Body	1.50E+00	mRem	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	0.00	3.00E+00	0.00
Organ	5.00E+00	mRem	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	0.00	1.00E+01	0.00
40CFR141 compliance (nearest public drinking water)												
Total Body		mRem	0.00E+00		0.00E+00		0.00E+00		0.00E+00		4.00E+00	0.00
Organ		mRem	0.00E+00		0.00E+00		0.00E+00		0.00E+00		4.00E+00	0.00

Child Receptor	Quarterly Limit	Units	1st Quarter	% of Limit	2nd Quarter	% of Limit	3rd Quarter	% of Limit	4th Quarter	% of Limit	Annual Limit	% of Limit
10CFR50 Appendix I compliance												
Total Body	1.50E+00	mRem	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	0.00	3.00E+00	0.00
Organ	5.00E+00	mRem	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	0.00	1.00E+01	0.00
40CFR141 compliance (nearest public drinking water)												
Total Body		mRem	0.00E+00		0.00E+00		0.00E+00		0.00E+00		4.00E+00	0.00
Organ		mRem	0.00E+00		0.00E+00		0.00E+00		0.00E+00		4.00E+00	0.00

Teenager Receptor	Quarterly Limit	Units	1st Quarter	% of Limit	2nd Quarter	% of Limit	3rd Quarter	% of Limit	4th Quarter	% of Limit	Annual Limit	% of Limit
10CFR50 Appendix I compliance												
Total Body	1.50E+00	mRem	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	0.00	3.00E+00	0.00
Organ	5.00E+00	mRem	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	0.00	1.00E+01	0.00
40CFR141 compliance (nearest public drinking water)												
Total Body		mRem	0.00E+00		0.00E+00		0.00E+00		0.00E+00		4.00E+00	0.00
Organ		mRem	0.00E+00		0.00E+00		0.00E+00		0.00E+00		4.00E+00	0.00

Adult Receptor	Quarterly Limit	Units	1st Quarter	% of Limit	2nd Quarter	% of Limit	3rd Quarter	% of Limit	4th Quarter	% of Limit	Annual Limit	% of Limit
10CFR50 Appendix I compliance												
Total Body	1.50E+00	mRem	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	0.00	3.00E+00	0.00
Organ	5.00E+00	mRem	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	0.00	1.00E+01	0.00
40CFR141 compliance (nearest public drinking water)												
Total Body		mRem	0.00E+00		0.00E+00		0.00E+00		0.00E+00		4.00E+00	0.00
Organ		mRem	0.00E+00		0.00E+00		0.00E+00		0.00E+00		4.00E+00	0.00

Table 3.3-1

LASALLE COUNTY NUCLEAR POWER STATION
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT (2019)
RADIOLOGICAL IMPACT ON MAN
MAXIMUM DOSES RESULTING FROM RELEASES AND COMPLIANCE STATUS

10CFR20 / 40CFR190 Compliance

	1st Quarter Dose (mRem)	2nd Quarter Dose (mRem)	3rd Quarter Dose (mRem)	4th Quarter Dose (mRem)	Annual Dose (mRem)	Annual Limit (mRem/yr)	% Annual Limit
Unit 1							
						40CFR190 Compliance	
U1 D^{Ex}	1.04E-01	1.07E-01	9.74E-02	9.74E-02	4.05E-01	25	1.62
						10CFR20 Compliance	
U1 D^{Tot}	1.83E-01	1.17E-01	1.08E-01	1.07E-01	5.16E-01	100	0.52
						40CFR190 Compliance	
Bone	7.33E-03	7.17E-03	7.21E-03	7.07E-03	2.88E-02	25	0.12
Liver	1.90E-03	1.70E-03	1.74E-03	1.57E-03	6.91E-03	25	0.03
Thyroid	7.94E-02	1.05E-02	1.09E-02	1.00E-02	1.11E-01	75	0.15
Kidney	1.92E-03	1.68E-03	1.71E-03	1.57E-03	6.88E-03	25	0.03
Lung	1.63E-03	1.63E-03	1.65E-03	1.54E-03	6.44E-03	25	0.03
GI-LLI	1.67E-03	1.67E-03	1.70E-03	1.54E-03	6.30E-03	25	0.03
Unit 2							
						40CFR190 Compliance	
U2 D^{Ex}	7.09E-02	9.73E-02	9.62E-02	9.90E-02	3.63E-01	25	1.45
						10CFR20 Compliance	
U2 D^{Tot}	7.09E-02	9.73E-02	9.62E-02	9.90E-02	3.63E-01	100	0.36
						40CFR190 Compliance	
Bone	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	25	0.00
Liver	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	25	0.00
Thyroid	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	75	0.00
Kidney	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	25	0.00
Lung	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	25	0.00
GI-LLI	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	25	0.00

Table 3.4-1

LASALLE COUNTY NUCLEAR POWER STATION
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT (2019)
RADIOLOGICAL IMPACT ON MAN
MAXIMUM DOSES RESULTING FROM AIRBORNE RELEASES
BASED ON CONCURRENT METEROLOGICAL DATA

Doses Resulting From Airborne Releases

The following are the maximum annual calculated cumulative offsite doses resulting from LaSalle County Station airborne releases:

LaSalle County Generating Station:

Dose	*Maximum Value*	*Sector Affected*
gamma air [1]	3.540 E-04 mrad	East
beta air [2]	1.650 E-04 mrad	East
whole body [3]	1.610 E-02 mrem	East
skin [4]	4.000 E-04 mrem	East
organ [5] (infant-thyroid)	4.270 E-01 mrem	East-Southeast

Compliance Status

10 CFR 50 Appendix I	**Yearly Objective**	**% of Appendix I**
gamma air	10.0 mrad	0.00
beta air	20.0 mrad	0.00
whole body	5.0 mrem	0.32
skin	15.0 mrem	0.00
organ	15.0 mrem	2.85

(1) Gamma Air Dose – GASPAR II, NUREG-0597
(2) Beta Air Dose – GASPAR II, NUREG-0597
(3) Whole Body Dose – GASPAR II, NUREG-0597
(4) Skin Dose – GASPAR II, NUREG-0597
(5) Inhalation and Food Pathways Dose – GASPAR II, NUREG-0597

Intentionally left blank

APPENDIX F

METEOROLOGICAL DATA

Intentionally left blank

LaSalle County Generating Station

Period of Record: January - March 2019
Stability Class - Extremely Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	2	0	0	2
SSW	0	0	0	1	0	0	1
SW	0	0	0	0	0	0	0
WSW	0	0	0	1	0	0	1
W	0	0	0	1	0	0	1
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	0	5	0	0	5

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 7

LaSalle County Generating Station

Period of Record: January - March 2019
Stability Class - Moderately Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	3	1	0	0	4
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	1	1	0	0	2
ESE	0	0	2	0	0	0	2
SE	0	1	0	0	0	0	1
SSE	0	1	1	0	0	0	2
S	0	0	1	1	0	0	2
SSW	0	0	1	2	0	0	3
SW	0	0	0	0	0	0	0
WSW	0	0	0	4	0	0	4
W	0	0	1	3	0	0	4
WNW	0	0	0	1	0	0	1
NW	0	0	0	1	0	0	1
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	2	10	14	0	0	26

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 7

LaSalle County Generating Station

Period of Record: January - March 2019
Stability Class - Slightly Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	2	1	0	0	3
NNE	0	0	1	1	0	0	2
NE	0	0	0	1	0	0	1
ENE	0	0	0	1	0	0	1
E	0	0	3	1	0	0	4
ESE	0	0	5	0	0	0	5
SE	0	0	0	0	0	0	0
SSE	0	0	3	0	0	0	3
S	0	0	1	0	0	0	1
SSW	0	2	1	0	0	0	3
SW	0	1	0	0	0	0	1
WSW	0	0	0	2	1	0	3
W	0	0	2	5	0	2	9
WNW	0	0	11	4	3	0	18
NW	0	0	1	1	0	0	2
NNW	0	0	0	2	0	0	2
Variable	0	0	0	0	0	0	0
Total	0	3	30	19	4	2	58

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 7

LaSalle County Generating Station

Period of Record: January - March 2019
Stability Class - Neutral - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	20	14	8	3	0	47
NNE	1	19	19	12	2	0	53
NE	0	11	14	9	0	0	34
ENE	0	3	31	27	4	0	65
E	0	10	42	39	10	1	102
ESE	0	10	17	15	6	0	48
SE	0	6	4	3	0	0	13
SSE	1	7	4	5	0	0	17
S	1	1	4	2	1	0	9
SSW	1	2	4	0	1	0	8
SW	0	5	12	3	0	1	21
WSW	0	6	10	18	7	3	44
W	0	6	26	32	16	6	86
WNW	0	10	48	40	27	3	128
NW	1	4	24	14	6	0	49
NNW	1	22	65	45	4	0	137
Variable	0	0	0	0	0	0	0
Total	8	142	338	272	87	14	861

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 7

LaSalle County Generating Station

Period of Record: January - March 2019
Stability Class - Slightly Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	32	16	0	0	0	49
NNE	0	12	8	5	0	0	25
NE	1	3	10	8	2	0	24
ENE	0	13	16	9	13	0	51
E	1	14	33	19	2	0	69
ESE	1	13	17	5	8	1	45
SE	4	8	14	11	11	1	49
SSE	1	9	10	14	6	5	45
S	2	6	7	12	10	1	38
SSW	2	4	2	11	5	0	24
SW	2	7	14	11	1	0	35
WSW	0	7	15	37	8	10	77
W	1	8	27	24	37	48	145
WNW	1	18	36	29	15	18	117
NW	1	5	10	4	0	0	20
NNW	0	14	9	3	0	0	26
Variable	0	0	0	0	0	0	0
Total	18	173	244	202	118	84	839

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 7

LaSalle County Generating Station

Period of Record: January - March 2019
Stability Class - Moderately Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	8	1	0	0	0	10
NNE	0	0	1	0	0	0	1
NE	0	1	2	0	0	0	3
ENE	1	4	5	3	0	0	13
E	1	4	12	2	0	0	19
ESE	1	4	0	1	0	0	6
SE	0	7	2	4	0	0	13
SSE	0	6	9	4	0	0	19
S	2	5	9	5	0	0	21
SSW	0	6	6	7	0	0	19
SW	0	3	10	11	0	0	24
WSW	2	1	9	4	1	0	17
W	1	11	9	7	4	1	33
WNW	0	12	5	1	1	4	23
NW	1	4	2	0	0	0	7
NNW	1	4	1	0	0	0	6
Variable	0	0	0	0	0	0	0
Total	11	80	83	49	6	5	234

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 7

LaSalle County Generating Station

Period of Record: January - March 2019
Stability Class - Extremely Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	0	0	0	0	1
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	1	0	0	0	0	0	1
E	0	0	0	0	0	0	0
ESE	0	4	0	0	0	0	4
SE	0	12	3	0	0	0	15
SSE	0	14	7	0	0	0	21
S	0	5	12	5	0	0	22
SSW	0	2	12	14	0	0	28
SW	0	6	2	2	0	0	10
WSW	0	4	1	0	0	0	5
W	0	5	7	0	0	0	12
WNW	2	3	1	0	0	0	6
NW	1	3	0	0	0	0	4
NNW	0	1	0	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	4	60	45	21	0	0	130

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 7

LaSalle County Generating Station

Period of Record: January - March 2019
Stability Class - Extremely Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 7

LaSalle County Generating Station

Period of Record: January - March 2019
Stability Class - Moderately Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	1	0	1
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	1

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 1
Hours of missing stability measurements in all stability classes: 7

LaSalle County Generating Station

Period of Record: January - March 2019
Stability Class - Slightly Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	4	1	0	5
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	4	0	0	0	4
SE	0	0	0	1	0	0	1
SSE	0	0	3	0	0	0	3
S	0	0	0	1	0	0	1
SSW	0	0	0	2	0	0	2
SW	0	0	0	0	0	0	0
WSW	0	0	0	2	2	0	4
W	0	0	0	0	2	0	2
WNW	0	0	0	1	0	1	2
NW	0	0	0	2	0	0	2
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	7	13	5	1	26

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 4
Hours of missing stability measurements in all stability classes: 7

LaSalle County Generating Station

Period of Record: January - March 2019
Stability Class - Neutral - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	12	30	43	18	13	116
NNE	2	13	18	10	6	10	59
NE	0	7	15	20	17	9	68
ENE	0	5	26	27	27	19	104
E	1	8	23	40	37	12	121
ESE	0	12	33	35	22	17	119
SE	1	3	12	11	1	5	33
SSE	0	5	6	11	4	4	30
S	2	2	3	4	5	7	23
SSW	1	5	5	4	2	3	20
SW	1	7	11	8	6	2	35
WSW	0	2	7	22	22	19	72
W	0	0	13	17	37	59	126
WNW	1	6	23	55	51	60	196
NW	2	11	26	43	29	28	139
NNW	0	10	18	53	23	4	108
Variable	0	0	0	0	0	0	0
Total	11	108	269	403	307	271	1369

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 40
Hours of missing stability measurements in all stability classes: 7

LaSalle County Generating Station

Period of Record: January - March 2019
Stability Class - Slightly Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	2	3	4	2	0	11
NNE	0	2	9	8	2	0	21
NE	0	3	7	3	9	0	22
ENE	1	4	4	5	3	0	17
E	0	1	3	11	8	6	29
ESE	1	0	8	7	4	6	26
SE	0	5	15	3	0	10	33
SSE	0	0	5	2	3	20	30
S	0	1	7	17	6	21	52
SSW	0	2	2	3	3	11	21
SW	0	0	4	4	2	16	26
WSW	0	0	3	3	16	8	30
W	2	1	9	9	12	18	51
WNW	0	1	7	23	9	54	94
NW	1	2	11	14	6	4	38
NNW	0	1	3	1	2	0	7
Variable	0	0	0	0	0	0	0
Total	5	25	100	117	87	174	508

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 14
Hours of missing stability measurements in all stability classes: 7

LaSalle County Generating Station

Period of Record: January - March 2019
Stability Class - Moderately Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	1	0	0	0	2
NNE	0	0	0	0	2	0	2
NE	0	0	0	0	1	0	1
ENE	1	0	3	0	0	0	4
E	0	1	0	0	0	0	1
ESE	1	1	0	2	3	0	7
SE	1	1	1	9	1	0	13
SSE	0	0	2	14	0	2	18
S	0	0	4	4	2	0	10
SSW	0	1	3	5	11	12	32
SW	0	0	2	3	8	16	29
WSW	0	0	9	2	2	0	13
W	0	0	3	1	3	0	7
WNW	1	1	1	3	5	0	11
NW	0	0	0	9	2	0	11
NNW	1	0	0	2	1	0	4
Variable	0	0	0	0	0	0	0
Total	5	6	29	54	41	30	165

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 7

LaSalle County Generating Station

Period of Record: January - March 2019
Stability Class - Extremely Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	1	0	0	1
S	0	0	0	4	4	2	10
SSW	0	0	0	0	0	10	10
SW	0	0	0	0	0	2	2
WSW	0	0	0	1	0	0	1
W	0	0	0	0	1	0	1
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	0	6	5	14	25

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 7

LaSalle County Generating Station

Period of Record: April - June 2019
Stability Class - Extremely Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	1	0	0	1
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	1	3	2	0	6
SSW	0	0	0	4	3	0	7
SW	0	0	0	0	7	5	12
WSW	0	0	0	0	0	1	1
W	0	0	0	1	0	0	1
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	1	9	12	6	28

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: April - June 2019
Stability Class - Moderately Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	1	0	0	1
NNE	0	0	0	1	3	0	4
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	4	3	0	7
SE	0	0	0	0	0	0	0
SSE	0	0	1	2	0	0	3
S	0	0	1	1	2	0	4
SSW	0	0	2	7	1	0	10
SW	0	0	1	3	1	0	5
WSW	0	0	3	5	0	1	9
W	0	1	2	5	0	0	8
WNW	0	0	2	3	1	0	6
NW	0	0	0	1	0	0	1
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	1	12	33	11	1	58

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: April - June 2019
Stability Class - Slightly Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	3	6	0	0	9
NNE	0	0	0	2	0	0	2
NE	0	2	2	1	0	0	5
ENE	0	0	2	2	0	0	4
E	0	0	2	12	1	0	15
ESE	0	0	1	1	2	0	4
SE	0	0	0	1	0	0	1
SSE	0	0	1	1	0	0	2
S	0	1	3	3	2	0	9
SSW	0	5	5	5	4	0	19
SW	0	6	7	7	3	1	24
WSW	0	7	5	6	1	0	19
W	0	7	6	6	1	0	20
WNW	0	3	4	1	1	0	9
NW	0	1	4	4	3	0	12
NNW	0	0	2	6	4	0	12
Variable	0	0	0	0	0	0	0
Total	0	32	47	64	22	1	166

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: April - June 2019
Stability Class - Neutral - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	4	47	22	19	0	0	92
NNE	3	36	39	10	2	0	90
NE	0	12	48	36	1	1	98
ENE	1	24	31	57	17	15	145
E	1	10	24	37	19	2	93
ESE	1	5	11	4	3	0	24
SE	2	2	10	9	1	0	24
SSE	0	2	4	4	0	1	11
S	1	3	6	5	3	0	18
SSW	2	9	11	25	6	0	53
SW	1	14	26	17	7	1	66
WSW	0	11	17	16	1	1	46
W	2	14	19	23	5	0	63
WNW	2	19	23	21	2	0	67
NW	0	13	26	17	3	0	59
NNW	1	14	42	24	16	2	99
Variable	0	0	0	0	0	0	0
Total	21	235	359	324	86	23	1048

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: April - June 2019
Stability Class - Slightly Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	4	13	4	7	0	0	28
NNE	0	8	3	2	0	0	13
NE	3	8	6	0	0	0	17
ENE	1	6	31	7	0	0	45
E	0	22	30	5	1	1	59
ESE	1	9	15	4	2	0	31
SE	0	8	8	4	0	0	20
SSE	5	5	9	7	1	0	27
S	1	4	13	20	1	0	39
SSW	0	10	14	23	1	0	48
SW	0	4	15	20	0	0	39
WSW	1	7	23	23	1	0	55
W	4	6	8	8	0	0	26
WNW	2	8	11	5	0	0	26
NW	1	8	6	1	0	0	16
NNW	3	8	2	0	0	0	13
Variable	0	0	0	0	0	0	0
Total	26	134	198	136	7	1	502

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: April - June 2019
Stability Class - Moderately Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	2	0	0	0	0	3
NNE	0	1	0	0	0	0	1
NE	3	0	0	0	0	0	3
ENE	1	2	1	0	0	0	4
E	0	18	4	0	0	0	22
ESE	7	17	2	0	0	0	26
SE	3	10	4	0	0	0	17
SSE	4	5	9	6	0	0	24
S	1	6	10	8	0	0	25
SSW	0	9	16	10	0	0	35
SW	1	8	15	4	0	0	28
WSW	1	7	20	7	0	0	35
W	1	9	11	0	0	0	21
WNW	1	10	4	0	0	0	15
NW	2	1	0	0	0	0	3
NNW	1	2	0	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	27	107	96	35	0	0	265

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: April - June 2019
Stability Class - Extremely Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	1	0	0	0	0	1
ESE	2	8	0	0	0	0	10
SE	0	5	6	0	0	0	11
SSE	0	3	5	3	0	0	11
S	4	10	3	1	0	0	18
SSW	0	3	15	0	0	0	18
SW	0	9	7	2	0	0	18
WSW	2	9	1	1	0	0	13
W	0	6	1	1	0	0	8
WNW	0	4	1	0	0	0	5
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	8	58	39	8	0	0	113

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: April - June 2019
Stability Class - Extremely Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: April - June 2019
Stability Class - Moderately Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	2	1	3
SW	0	0	0	0	1	6	7
WSW	0	0	0	0	0	2	2
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	1	1
Variable	0	0	0	0	0	0	0
Total	0	0	0	0	3	10	13

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: April - June 2019
Stability Class - Slightly Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	1	5	0	6
NNE	0	0	0	0	0	4	4
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	1	0	1
ESE	0	0	0	2	0	1	3
SE	0	0	0	0	0	0	0
SSE	0	0	1	0	0	0	1
S	0	0	0	4	1	2	7
SSW	0	0	1	0	7	0	8
SW	0	0	0	0	0	4	4
WSW	0	0	0	2	0	1	3
W	0	0	0	2	0	0	2
WNW	0	0	0	1	0	0	1
NW	0	0	0	0	0	0	0
NNW	0	0	0	1	0	1	2
Variable	0	0	0	0	0	0	0
Total	0	0	2	13	14	13	42

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: April - June 2019
Stability Class - Neutral - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	19	27	30	17	7	102
NNE	1	16	35	17	11	7	87
NE	0	12	29	45	36	4	126
ENE	1	14	16	40	62	28	161
E	1	0	11	20	24	38	94
ESE	1	6	7	17	11	11	53
SE	0	2	1	10	5	1	19
SSE	1	1	2	6	3	3	16
S	0	5	6	9	12	7	39
SSW	2	7	17	16	20	19	81
SW	2	9	30	21	21	9	92
WSW	1	10	14	23	18	8	74
W	0	10	20	24	20	8	82
WNW	1	12	19	22	16	5	75
NW	0	13	15	33	17	16	94
NNW	0	9	24	19	16	20	88
Variable	0	0	0	0	0	0	0
Total	13	145	273	352	309	191	1283

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: April - June 2019
Stability Class - Slightly Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	2	8	2	7	4	24
NNE	1	3	9	3	4	0	20
NE	1	6	8	3	0	1	19
ENE	0	3	14	10	9	0	36
E	1	1	11	36	9	7	65
ESE	0	1	5	23	9	1	39
SE	4	3	5	17	4	5	38
SSE	0	3	6	2	4	2	17
S	1	3	2	12	12	23	53
SSW	0	4	4	9	18	35	70
SW	2	0	7	13	20	14	56
WSW	0	2	7	17	31	13	70
W	1	2	4	13	18	9	47
WNW	1	1	6	7	10	3	28
NW	1	1	6	19	4	2	33
NNW	0	5	4	5	1	0	15
Variable	0	0	0	0	0	0	0
Total	14	40	106	191	160	119	630

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: April - June 2019
Stability Class - Moderately Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	1	2	0	0	3
NNE	0	1	0	0	0	0	1
NE	0	0	0	0	0	0	0
ENE	0	1	0	0	0	0	1
E	0	0	0	1	0	0	1
ESE	1	3	7	3	0	0	14
SE	1	2	8	7	1	0	19
SSE	3	0	5	4	8	3	23
S	1	3	3	2	4	12	25
SSW	1	2	1	6	0	1	11
SW	0	0	6	11	7	0	24
WSW	0	3	3	2	1	4	13
W	1	3	3	10	2	7	26
WNW	0	1	5	5	0	0	11
NW	0	0	5	5	5	0	15
NNW	0	1	0	2	0	0	3
Variable	0	0	0	0	0	0	0
Total	8	20	47	60	28	27	190

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: April - June 2019
Stability Class - Extremely Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	1	0	0	0	1
SSE	0	0	0	0	2	0	2
S	0	0	1	1	0	0	2
SSW	0	0	2	2	1	0	5
SW	0	2	4	1	1	3	11
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	1	0	0	0	0	1
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	3	8	4	4	3	22

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: July - September 2019
Stability Class - Extremely Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	1	0	0	0	1
ENE	0	0	1	0	0	0	1
E	0	0	3	0	0	0	3
ESE	0	0	1	1	0	0	2
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	1	0	0	0	1
SSW	0	0	3	1	0	0	4
SW	0	0	5	9	1	0	15
WSW	0	0	4	1	0	0	5
W	0	0	13	3	1	0	17
WNW	0	0	3	3	0	0	6
NW	0	0	2	0	0	0	2
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	37	18	2	0	57

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

LaSalle County Generating Station

Period of Record: July - September 2019
Stability Class - Moderately Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	1	0	0	0	1
NNE	0	0	1	0	0	0	1
NE	0	0	0	0	0	0	0
ENE	0	0	3	0	0	0	3
E	0	0	3	2	0	0	5
ESE	0	0	1	1	0	0	2
SE	0	0	0	0	0	0	0
SSE	0	0	0	1	0	0	1
S	0	1	2	1	0	0	4
SSW	0	0	6	1	1	0	8
SW	0	0	6	13	0	0	19
WSW	0	5	10	5	2	0	22
W	0	3	22	5	2	0	32
WNW	0	4	10	0	0	0	14
NW	0	2	2	0	0	0	4
NNW	0	0	1	2	0	0	3
Variable	0	0	0	0	0	0	0
Total	0	15	68	31	5	0	119

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

LaSalle County Generating Station

Period of Record: July - September 2019
Stability Class - Slightly Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	4	0	0	0	5
NNE	0	2	4	0	0	0	6
NE	0	4	4	0	0	0	8
ENE	0	1	1	0	0	0	2
E	0	4	5	2	0	0	11
ESE	0	7	4	0	0	0	11
SE	0	6	1	0	0	0	7
SSE	0	3	0	0	0	0	3
S	0	3	1	0	1	0	5
SSW	0	1	6	2	1	0	10
SW	0	3	7	18	0	0	28
WSW	0	5	11	1	0	0	17
W	0	7	11	4	2	0	24
WNW	0	7	10	0	0	0	17
NW	0	6	4	3	0	0	13
NNW	0	2	3	2	0	0	7
Variable	0	0	0	0	0	0	0
Total	0	62	76	32	4	0	174

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

LaSalle County Generating Station

Period of Record: July - September 2019
Stability Class - Neutral - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	28	19	2	0	0	51
NNE	5	27	16	0	0	0	48
NE	2	23	29	7	0	0	61
ENE	1	16	22	12	0	0	51
E	1	11	37	3	0	0	52
ESE	2	12	14	0	0	0	28
SE	3	11	12	0	0	0	26
SSE	1	12	12	1	0	0	26
S	1	6	15	6	0	0	28
SSW	1	10	20	18	2	0	51
SW	1	10	23	23	0	0	57
WSW	0	8	23	10	0	0	41
W	5	15	12	5	1	0	38
WNW	1	12	23	2	0	0	38
NW	4	14	18	1	0	0	37
NNW	2	23	32	6	1	0	64
Variable	0	0	0	0	0	0	0
Total	32	238	327	96	4	0	697

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

LaSalle County Generating Station

Period of Record: July - September 2019
Stability Class - Slightly Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	3	41	2	0	0	0	46
NNE	3	24	4	0	0	0	31
NE	2	9	14	0	0	0	25
ENE	3	11	22	0	0	0	36
E	0	29	32	3	0	0	64
ESE	2	8	4	0	0	0	14
SE	4	7	5	1	0	0	17
SSE	2	13	10	5	0	0	30
S	6	10	31	9	0	0	56
SSW	1	15	46	10	0	0	72
SW	5	5	40	9	0	0	59
WSW	5	16	21	0	0	0	42
W	0	16	9	2	0	0	27
WNW	2	13	21	1	0	0	37
NW	4	17	7	0	0	0	28
NNW	4	24	3	1	0	0	32
Variable	0	0	0	0	0	0	0
Total	46	258	271	41	0	0	616

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

LaSalle County Generating Station

Period of Record: July - September 2019
Stability Class - Moderately Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	17	0	0	0	0	17
NNE	2	5	0	0	0	0	7
NE	0	2	0	0	0	0	2
ENE	3	1	0	0	0	0	4
E	1	26	6	0	0	0	33
ESE	0	10	0	0	0	0	10
SE	1	13	1	0	0	0	15
SSE	2	9	1	0	0	0	12
S	1	25	19	0	0	0	45
SSW	3	22	17	0	0	0	42
SW	1	12	10	0	0	0	23
WSW	4	17	17	0	0	0	38
W	5	16	10	0	0	0	31
WNW	2	19	1	0	0	0	22
NW	0	2	0	0	0	0	2
NNW	4	12	0	0	0	0	16
Variable	0	0	0	0	0	0	0
Total	29	208	82	0	0	0	319

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

LaSalle County Generating Station

Period of Record: July - September 2019
Stability Class - Extremely Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	10	2	0	0	0	12
ESE	0	25	0	0	0	0	25
SE	0	30	0	0	0	0	30
SSE	0	13	2	0	0	0	15
S	1	33	6	0	0	0	40
SSW	1	30	7	0	0	0	38
SW	0	22	5	0	0	0	27
WSW	0	9	5	0	0	0	14
W	2	11	0	0	0	0	13
WNW	3	9	0	0	0	0	12
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	7	192	27	0	0	0	226

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

LaSalle County Generating Station

Period of Record: July - September 2019
Stability Class - Extremely Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

LaSalle County Generating Station

Period of Record: July - September 2019
Stability Class - Moderately Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	1	0	0	1
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	1	0	1
W	0	0	0	1	0	0	1
WNW	0	0	0	1	0	0	1
NW	0	0	0	1	0	0	1
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	0	4	1	0	5

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

LaSalle County Generating Station

Period of Record: July - September 2019
Stability Class - Slightly Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	2	0	0	2
NNE	0	0	0	1	0	0	1
NE	0	0	0	0	0	0	0
ENE	0	0	0	2	0	0	2
E	0	0	2	2	0	0	4
ESE	0	0	0	3	1	0	4
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	1	0	1
SSW	0	0	1	2	1	0	4
SW	0	0	0	7	5	2	14
WSW	0	0	1	4	0	0	5
W	0	1	8	8	1	1	19
WNW	0	1	6	8	1	0	16
NW	0	0	5	3	0	0	8
NNW	0	0	0	0	2	0	2
Variable	0	0	0	0	0	0	0
Total	0	2	23	42	12	3	82

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

LaSalle County Generating Station

Period of Record: July - September 2019
Stability Class - Neutral - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	12	39	21	3	0	77
NNE	1	14	20	9	1	0	45
NE	0	14	19	26	13	0	72
ENE	0	12	19	26	11	0	68
E	3	6	27	24	5	0	65
ESE	1	16	19	7	1	0	44
SE	1	12	9	4	1	0	27
SSE	3	12	15	3	2	0	35
S	1	4	13	12	4	1	35
SSW	0	6	18	19	13	8	64
SW	1	6	7	50	36	3	103
WSW	2	8	25	39	9	0	83
W	0	13	23	32	11	7	86
WNW	2	17	20	15	1	0	55
NW	2	12	37	17	8	0	76
NNW	2	11	20	7	6	0	46
Variable	0	0	0	0	0	0	0
Total	21	175	330	311	125	19	981

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

LaSalle County Generating Station

Period of Record: July - September 2019
Stability Class - Slightly Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	4	9	18	8	0	40
NNE	0	3	13	22	0	0	38
NE	0	6	20	14	3	0	43
ENE	2	4	13	24	2	0	45
E	0	5	17	26	13	0	61
ESE	3	4	6	21	7	0	41
SE	0	2	9	5	2	0	18
SSE	0	3	5	6	2	1	17
S	2	3	11	7	7	15	45
SSW	2	5	12	29	40	23	111
SW	2	3	6	30	49	2	92
WSW	0	4	14	17	21	0	56
W	3	4	7	18	11	1	44
WNW	3	10	9	16	5	0	43
NW	2	5	7	9	10	0	33
NNW	0	6	12	11	9	0	38
Variable	0	0	0	0	0	0	0
Total	20	71	170	273	189	42	765

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

LaSalle County Generating Station

Period of Record: July - September 2019
Stability Class - Moderately Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	2	5	5	1	0	13
NNE	2	0	0	2	0	0	4
NE	2	1	1	0	0	0	4
ENE	1	2	3	2	0	0	8
E	0	1	0	1	1	0	3
ESE	0	0	2	12	10	0	24
SE	0	1	6	19	5	0	31
SSE	0	1	10	11	3	1	26
S	0	5	8	18	3	2	36
SSW	0	3	11	21	13	5	53
SW	1	1	7	13	9	0	31
WSW	0	3	6	14	3	0	26
W	0	4	6	17	8	4	39
WNW	1	2	5	6	1	0	15
NW	1	0	8	2	0	0	11
NNW	1	0	8	3	1	0	13
Variable	0	0	0	0	0	0	0
Total	9	26	86	146	58	12	337

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

LaSalle County Generating Station

Period of Record: July - September 2019
Stability Class - Extremely Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	1	0	0	1
SSE	0	0	0	9	0	0	9
S	0	0	0	2	4	0	6
SSW	0	0	0	1	0	0	1
SW	0	0	0	4	3	0	7
WSW	0	1	2	4	0	0	7
W	0	0	0	4	0	0	4
WNW	0	0	0	1	0	0	1
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	2	0	2
Variable	0	0	0	0	0	0	0
Total	0	1	2	26	9	0	38

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

LaSalle County Generating Station

Period of Record: October - December 2019
Stability Class - Extremely Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: October - December 2019
Stability Class - Moderately Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	1	0	0	1
SSW	0	0	0	0	0	0	0
SW	0	0	0	1	4	0	5
WSW	0	0	0	1	0	0	1
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	0	3	4	0	7

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: October - December 2019
Stability Class - Slightly Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	1	0	0	0	1
E	0	0	0	0	0	0	0
ESE	0	0	1	1	0	0	2
SE	0	0	0	0	0	0	0
SSE	0	0	2	1	0	0	3
S	0	1	3	0	0	0	4
SSW	0	0	0	2	0	0	2
SW	0	0	1	5	2	0	8
WSW	0	1	3	3	2	0	9
W	0	0	0	0	1	0	1
WNW	0	0	0	1	0	0	1
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	2	11	13	5	0	31

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: October - December 2019
Stability Class - Neutral - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	31	48	30	0	0	109
NNE	1	13	16	7	0	0	37
NE	1	3	2	2	0	0	8
ENE	0	5	10	11	0	0	26
E	0	12	15	10	3	1	41
ESE	0	6	7	7	5	1	26
SE	1	4	11	3	0	0	19
SSE	2	5	16	9	0	0	32
S	2	7	22	15	4	0	50
SSW	1	9	26	15	6	1	58
SW	0	11	32	24	4	1	72
WSW	0	14	10	27	15	16	82
W	3	20	34	46	19	1	123
WNW	2	29	47	65	27	0	170
NW	2	21	31	29	4	0	87
NNW	1	24	37	56	15	0	133
Variable	0	0	0	0	0	0	0
Total	16	214	364	356	102	21	1073

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: October - December 2019
Stability Class - Slightly Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	17	2	0	0	0	21
NNE	0	1	0	0	0	0	1
NE	3	3	0	0	0	0	6
ENE	2	2	10	0	0	0	14
E	2	8	14	4	0	0	28
ESE	1	5	8	8	3	0	25
SE	4	5	9	5	5	0	28
SSE	2	6	12	6	5	0	31
S	1	10	23	25	4	0	63
SSW	0	11	26	31	8	0	76
SW	4	4	27	15	7	1	58
WSW	2	17	28	14	3	1	65
W	1	14	18	19	2	11	65
WNW	8	11	14	3	3	2	41
NW	0	5	3	3	0	0	11
NNW	0	9	11	1	0	0	21
Variable	0	0	0	0	0	0	0
Total	32	128	205	134	40	15	554

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: October - December 2019
Stability Class - Moderately Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	2	0	0	0	0	2
NNE	1	1	0	0	0	0	2
NE	0	0	0	0	0	0	0
ENE	1	3	0	0	0	0	4
E	1	19	15	0	0	0	35
ESE	1	17	5	0	0	0	23
SE	2	18	6	0	0	0	26
SSE	1	5	12	3	0	0	21
S	1	7	24	5	0	0	37
SSW	1	7	25	6	0	0	39
SW	1	5	24	3	0	0	33
WSW	1	7	26	6	0	0	40
W	3	20	17	1	0	0	41
WNW	1	11	6	0	0	0	18
NW	0	1	1	0	0	0	2
NNW	0	1	0	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	15	124	161	24	0	0	324

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: October - December 2019
Stability Class - Extremely Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	1	0	0	0	0	0	1
E	0	9	7	0	0	0	16
ESE	0	15	3	0	0	0	18
SE	3	27	4	0	0	0	34
SSE	1	19	9	0	0	0	29
S	0	8	11	2	0	0	21
SSW	0	18	31	4	0	0	53
SW	0	8	12	4	0	0	24
WSW	1	7	5	1	0	0	14
W	0	2	1	0	0	0	3
WNW	0	2	0	0	0	0	2
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	6	115	83	11	0	0	215

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: October - December 2019
Stability Class - Extremely Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: October - December 2019
Stability Class - Moderately Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: October - December 2019
Stability Class - Slightly Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	1	2	3
WSW	0	0	0	0	1	0	1
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	0	0	2	2	4

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: October - December 2019
Stability Class - Neutral - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	13	23	25	31	7	99
NNE	1	8	29	15	1	4	58
NE	0	3	8	5	2	2	20
ENE	0	1	7	9	10	0	27
E	1	8	5	5	9	6	34
ESE	0	5	5	10	8	7	35
SE	0	5	2	11	4	0	22
SSE	1	3	5	17	2	2	30
S	1	2	18	19	16	8	64
SSW	0	5	13	18	19	11	66
SW	0	3	21	39	17	18	98
WSW	1	9	14	20	20	24	88
W	1	2	16	23	41	32	115
WNW	0	17	29	46	44	27	163
NW	0	10	36	41	47	10	144
NNW	0	22	18	34	27	13	114
Variable	0	0	0	0	0	0	0
Total	6	116	249	337	298	171	1177

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: October - December 2019
Stability Class - Slightly Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	6	5	7	0	19
NNE	0	4	9	4	0	0	17
NE	0	6	6	2	0	0	14
ENE	1	1	2	5	1	0	10
E	1	3	4	7	15	0	30
ESE	2	3	3	7	9	4	28
SE	0	3	2	7	8	11	31
SSE	0	3	1	7	6	10	27
S	0	2	10	8	16	14	50
SSW	4	3	6	19	22	43	97
SW	0	6	5	11	29	19	70
WSW	0	4	3	20	19	15	61
W	0	7	8	23	24	13	75
WNW	1	6	13	12	11	28	71
NW	3	2	7	19	7	1	39
NNW	1	1	8	8	6	0	24
Variable	0	0	0	0	0	0	0
Total	13	55	93	164	180	158	663

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: October - December 2019
Stability Class - Moderately Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	1	0	0	0	2
NNE	0	0	0	0	0	0	0
NE	1	1	0	0	0	0	2
ENE	0	1	0	0	0	0	1
E	1	3	3	3	1	0	11
ESE	0	1	3	6	4	1	15
SE	0	0	10	12	10	1	33
SSE	0	3	3	9	6	3	24
S	0	3	7	12	11	13	46
SSW	0	3	2	7	7	11	30
SW	0	3	1	9	24	17	54
WSW	0	0	6	15	3	8	32
W	0	1	4	8	6	1	20
WNW	2	0	1	15	1	0	19
NW	0	1	0	2	1	0	4
NNW	0	0	0	1	0	0	1
Variable	0	0	0	0	0	0	0
Total	4	21	41	99	74	55	294

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: October - December 2019
Stability Class - Extremely Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	1	0	0	0	0	0	1
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	1	0	0	0	1
SE	0	0	3	3	2	0	8
SSE	0	0	3	12	3	3	21
S	0	0	0	3	1	1	5
SSW	0	0	2	0	0	1	3
SW	0	0	7	6	3	8	24
WSW	0	0	0	1	0	1	2
W	0	0	0	0	0	0	0
WNW	0	0	0	1	0	0	1
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	1	0	16	26	9	14	66

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

APPENDIX G

ERRATA DATA

Intentionally left blank

There is no errata data for 2019.

Intentionally left blank

APPENDIX H

ANNUAL RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM REPORT (ARGPPR)

Intentionally left blank

Docket No: 50-373
50-374

LASALLE COUNTY STATION
UNITS 1 and 2

Annual Radiological
Groundwater Protection Program Report

1 January through 31 December 2019

Prepared By
Teledyne Brown Engineering
Environmental Services

Exelon Generation®

LaSalle County Station
Marseilles, IL 61341

May 2020

Table Of Contents

Appendices

I. Summary and Conclusions

In 2006, Exelon instituted a comprehensive program to evaluate the impact of station operations on groundwater and surface water in the vicinity of LaSalle County Station. This evaluation involved numerous station personnel and contractor support personnel. Following baseline sampling and subsequent recommendations, LaSalle's Radiological Groundwater Protection Program (RGPP) program now consists of the four surface water and twenty groundwater well sampling locations. The results for LaSalle's RGPP sampling efforts in 2019 are included in this report.

This is the twelfth in a series of annual reports on the status of the RGPP conducted at LaSalle County Station. This report covers groundwater and surface water samples, collected from the environment, both on and off station property in 2019. During that time period, 325 analyses were performed on 94 samples from 26 locations (6 surface water and 20 groundwater monitoring locations). The monitoring was conducted by station personnel.

In assessing all the data gathered for this report, it was concluded that the operation of LaSalle County Station had no adverse radiological impact on the environment, and there are no known active releases into the groundwater at LaSalle County Station.

Strontium-89 and Strontium-90 were not detected in any groundwater samples during 2019.

No gamma-emitting radionuclides attributable to licensed plant operations were detected in any of the groundwater or surface water samples.

In the case of tritium, Exelon specified that its laboratories achieve a lower limit of detection (LLD) 100 times lower than that required by federal regulation.

Tritium was not detected in surface water samples at concentrations greater than the United States Environmental Protection Agency (USEPA) drinking water standard (and the Nuclear Regulatory Commission Reporting Limit) of 20,000 pCi/L. Tritium levels were detected at concentrations greater than the LLD of 200 pCi/L in 8 of 16 surface water samples analyzed. The tritium concentrations ranged from <LLD to 395 ± 136 pCi/L. Tritium levels were detected at concentrations greater than the LLD of 200 pCi/L in 21 of 78 groundwater samples analyzed. The tritium concentrations ranged from <LLD to 5,490 ± 604 pCi/L. The elevated tritium levels (>200 pCi/L) being observed in groundwater are associated with the U1 CY tank leak that occurred in the June/July 2010 timeframe, as documented in the Station's 10 CFR 50.75(g) report.

Gross alpha and gross beta analyses in the dissolved and suspended fractions were performed on groundwater samples throughout the year in 2019. Gross alpha (dissolved) was detected in 3 of 16 samples affecting 3 of 12 groundwater

locations analyzed. The concentrations ranged from 0.7 to 15.0 pCi/L. Gross alpha (suspended) was detected in 6 of 16 samples affecting 6 of 12 groundwater locations analyzed. The concentrations ranged from 1.4 to 5.3 pCi/L.

Gross beta (dissolved) was detected in 11 of 16 samples affecting 9 of 12 groundwater locations analyzed. The concentrations ranged from 1.5 to 10.7 pCi/L. Gross beta (suspended) was detected in 6 of 16 samples affecting 6 of 12 groundwater locations analyzed. The concentrations ranged from 3.0 to 20.4 pCi/L.

Hard-to-detect analyses were performed on 12 of the groundwater sampling locations in accordance with the LaSalle RGPP and to aid in establishing background levels. The analyses included Fe-55, Ni-63, Am-241, Cm-242, Cm-243/244, Pu-238, Pu-239/240, U-234, U-235, and U-238. The isotopes of U-234 and U-238 were detected in 6 samples of each, affecting 2 of 12 groundwater locations. The U-234 concentrations ranged from 0.32 to 0.99 pCi/L. The U-238 concentrations ranged from 0.14 to 0.98 pCi/L. U-234 and U-238 are commonly found in groundwater at low concentrations due to the naturally-occurring Radium (Uranium) Decay Series.

II. Introduction

The LaSalle County Station (LSCS), consisting of two boiling water reactors, each rated for 3,546 MWt, owned and operated by Exelon Corporation, is located in LaSalle County, Illinois. Unit 1 went critical on March 16, 1982. Unit 2 went critical on December 2, 1983. The site is located in northern Illinois, approximately 75 miles southwest of Chicago, Illinois.

This report covers those analyses performed by Teledyne Brown Engineering (TBE) on samples collected in 2019.

A. Objectives of the RGPP

The long-term objectives of the RGPP are as follows:

1. Identify suitable locations to monitor and evaluate potential impacts from station operations before significant radiological impact to the environment and potential drinking water sources.

2. Understand the local hydrogeologic regime in the vicinity of the station and maintain up-to-date knowledge of flow patterns on the surface and shallow subsurface.

3. Perform routine water sampling and radiological analysis of water from selected locations.

4. Report new leaks, spills, or other detections with potential radiological

significance to stakeholders in a timely manner.

5. Regularly assess analytical results to identify adverse trends.

6. Take necessary corrective actions to protect groundwater resources.

B. Implementation of the Objectives

The objectives identified have been implemented at LaSalle County Station as discussed below:

1. Exelon and its consultant identified locations as described in the 2006 Phase 1 study. Phase 1 studies were conducted by Conestoga Rovers and Associates (CRA) and the results and conclusions were made available to state and federal regulators.

2. The LaSalle County Station reports describe the local hydrogeologic regime. Periodically, the flow patterns on the surface and shallow subsurface are updated based on ongoing measurements.

3. LaSalle County Station will continue to perform routine sampling and radiological analysis of water from selected locations.

4. LaSalle County Station has implemented procedures to identify and report new leaks, spills, or other detections with potential radiological significance in a timely manner.

5. LaSalle County Station staff and consulting hydrogeologist assess analytical results on an ongoing basis to identify adverse trends.

C. Program Description

1. Sample Collection

Sample locations can be found in Figure A–1, Appendix A.

Groundwater and Surface Water

Samples of water are collected, managed, transported and analyzed in accordance with approved procedures following EPA methods. Both groundwater and surface samples water are collected. Sample locations, sample collection frequencies and analytical frequencies are controlled in accordance with approved station procedures. Contractor and/or station personnel are trained in the collection, preservation management, and shipment of samples, as well as in documentation of sampling events. Analytical laboratories are subject to internal quality assurance programs, industry cross-check programs, as well as nuclear industry audits. Station personnel

review and evaluate all analytical data deliverables as data are received.

Analytical data results are reviewed by both station personnel and an independent hydrogeologist for adverse trends or changes to hydrogeologic conditions.

D. Characteristics of Tritium (H-3)

Tritium (chemical symbol H-3) is a radioactive isotope of hydrogen. The most common form of tritium is tritium oxide, which is also called "tritiated water." The chemical properties of tritium are essentially those of ordinary hydrogen.

Tritiated water behaves the same as ordinary water in both the environment and the body. Tritium can be taken into the body by drinking water, breathing air, eating food, or absorption through skin. Once tritium enters the body, it disperses quickly and is uniformly distributed throughout the body. Tritium is excreted primarily through urine with a clearance rate characterized by an effective biological half-life of about 14 days. Within one month or so after ingestion, essentially all tritium is cleared. Organically bound tritium (tritium that is incorporated in organic compounds) can remain in the body for a longer period.

Tritium is produced naturally in the upper atmosphere when cosmic rays strike air molecules. Tritium is also produced during nuclear weapons explosions, as a by-product in reactors producing electricity, and in special production reactors, where the isotopes lithium-7 and/or boron-10 are activated to produce tritium. Like normal water, tritiated water is colorless and odorless. Tritiated water behaves chemically and physically like non-tritiated water in the subsurface, and therefore tritiated water will travel at the same velocity as the average groundwater velocity.

Tritium has a half-life of approximately 12.3 years. It decays spontaneously to helium^{-3} (3He). This radioactive decay releases a beta particle (low-energy electron). The radioactive decay of tritium is the source of the health risk from exposure to tritium. Tritium is one of the least dangerous radionuclides because it emits very weak radiation and leaves the body relatively quickly. Since tritium is almost always found as water, it goes directly into soft tissues and organs. The associated dose to these tissues is generally uniform and is dependent on the water content of the specific tissue.

III. Program Description

A. Sample Analysis

This section describes the general analytical methodologies used by TBE to analyze the environmental samples for radioactivity for the LaSalle County Station RGPP in 2019. Sample and analysis and frequency is based upon well location, assessed risk and site hydrogeology as described in the RGPP.

In order to achieve the stated objectives, the current program includes the following analyses:

1. Concentrations of gamma emitters in groundwater and surface water
2. Concentrations of strontium in groundwater
3. Concentrations of tritium in groundwater and surface water
4. Concentrations of gross alpha (dissolved and suspended) and gross beta (dissolved and suspended) in groundwater
5. Concentrations of Am-241 in groundwater
6. Concentrations of Cm-242 and Cm-243/244 in groundwater
7. Concentrations of Pu-238 and PU-239/240 in groundwater
8. Concentrations of U-234, U-235 and U-238 in groundwater
9. Concentrations of Fe-55 in groundwater
10. Concentrations of Ni-63 in groundwater

B. Data Interpretation

The radiological data collected prior to LaSalle County Station becoming operational were used as a baseline with which these operational data were compared. For the purpose of this report, LaSalle County Station was considered operational at initial criticality. Several factors were important in the interpretation of the data:

1. <u>Lower Limit of Detection and Minimum Detectable Concentration</u>

   The lower limit of detection (LLD) is specified by federal regulation as a minimum sensitivity value that must be achieved routinely by the analytical parameter.

2. Laboratory Measurements Uncertainty

The estimated uncertainty in measurement of tritium in environmental samples is frequently on the order of 50% of the measurement value.

Statistically, the exact value of a measurement is expressed as a range with a stated level of confidence. The convention is to report results with a 95% level of confidence. The uncertainty comes from calibration standards, sample volume or weight measurements, sampling uncertainty and other factors. Exelon reports the uncertainty of a measurement created by statistical process (counting error) as well as all sources of error (Total Propagated Uncertainty or TPU). Each result has two values calculated. Exelon reports the TPU by following the result with plus or minus ± the estimated sample standard deviation, as TPU, that is obtained by propagating all sources of analytical uncertainty in measurements.

Analytical uncertainties are reported at the 95% confidence level in this report for reporting consistency with the AREOR.

C. Background Analysis

A pre-operational radiological environmental monitoring program (pre-operational REMP) was conducted to establish background radioactivity levels prior to operation of the Station. The environmental media sampled and analyzed during the pre-operational REMP were atmospheric radiation, fall-out, domestic water, surface water, precipitation, marine life, and foodstuffs. The results of the monitoring were detailed in the report entitled, Environmental Radiological Monitoring for LaSalle County Nuclear Power Station, Commonwealth Edison Company, Annual Reports for the years 1979 and 1981. The pre-operational REMP contained analytical results from samples collected from the surface water and groundwater.

1. Background Concentrations of Tritium

The purpose of the following discussion is to summarize background measurements of tritium in various media performed by others. Additional detail may be found by consulting references (CRA 2006).

a. Tritium Production

Tritium is created in the environment from naturally occurring processes both cosmic and subterranean, as well as from anthropogenic (i.e., man-made) sources. In the upper atmosphere, "Cosmogenic" tritium is produced from the bombardment of stable nuclides and combines with oxygen to

form tritiated water, which will then enter the hydrologic cycle. Below ground, "lithogenic" tritium is produced by the bombardment of natural lithium present in crystalline rocks by neutrons produced by the radioactive decay of naturally abundant uranium and thorium. Lithogenic production of tritium is usually negligible compared to other sources due to the limited abundance of lithium in rock. The lithogenic tritium is introduced directly to groundwater.

A major anthropogenic source of tritium and strontium-90 comes from the former atmospheric testing of thermonuclear weapons. Levels of tritium in precipitation increased significantly during the 1950s and early 1960s, and later with additional testing, resulting in the release of significant amounts of tritium to the atmosphere. The Canadian heavy water nuclear power reactors, other commercial power reactors, nuclear research and weapons production continue to influence tritium concentrations in the environment.

b. Precipitation Data

Precipitation samples are routinely collected at stations around the world for the analysis of tritium and other radionuclides. Two publicly available databases that provide tritium concentrations in precipitation are Global Network of Isotopes in Precipitation (GNIP) and USEPA's RadNet database. GNIP provides tritium precipitation concentration data for samples collected world wide from 1960 to 2006. RadNet provides tritium precipitation concentration data for samples collected at stations throughout the U.S. from 1960 up to and including 2006. Based on GNIP data for sample stations located in the U.S. Midwest, tritium concentrations peaked around 1963. This peak, which approached 10,000 pCi/L for some stations, coincided with the atmospheric testing of thermonuclear weapons.

Tritium concentrations in surface water showed a sharp decline up until 1975 followed by a gradual decline since that time. Tritium concentrations in Midwest precipitation have typically been below 100 pCi/L since around 1980. LaSalle's 1979 or 1981 pre-operational REMP showed precipitation tritium concentrations >300 pCi/L. Tritium concentrations in wells may still be above the 200 pCi/L detection limit from the external causes described above. Water from previous years and decades is naturally captured in groundwater, so some well water sources today are affected by the surface water from the 1960s that was elevated in tritium.

c. Surface Water Data

Tritium concentrations are routinely measured in large surface water bodies, including Lake Michigan and the Mississippi River. Illinois surface water data were typically less than 100 pCi/L. Illinois River H-3 results have shown >200 pCi/L, as evidenced in LaSalle's REMP program sample results. This is attributable to releases from Braidwood and Dresden upstream.

The USEPA RadNet surface water data typically has a reported 'Combined Standard Uncertainty' of 35 to 50 pCi/L. According to USEPA, this corresponds to a ± 70 to 100 pCi/L 95% confidence bound on each given measurement. Therefore, the typical background data provided may be subject to measurement uncertainty of approximately ± 70 to 100 pCi/L.

The radio-analytical laboratory is counting tritium results to an Exelon specified LLD of 200 pCi/L. Typically, the lowest positive measurement will be reported within a range of 40 – 240 pCi/L or 140 ± 100 pCi/L. Clearly, these sample results cannot be distinguished as different from background at this concentration.

IV. Results and Discussion

A. Groundwater Results

Samples were collected from onsite wells throughout the year in accordance with the station radiological groundwater protection program. Analytical results and anomalies are discussed below.

Tritium

Samples from 20 locations were analyzed for tritium activity. Tritium values ranged from <LLD to 5,490 pCi/L. The highest tritium activity was found at well TW-LS-116S. Based on the hydrogeological study conducted at LaSalle, there is no feasible pathway into a drinking water supply. Based on established aquifer flow paths the location most representative of potential offsite release into groundwater was also less than the detection limit (Table B-I.1, Appendix B).

Strontium

A total of 18 samples from 15 groundwater locations were analyzed for Sr-89 and Sr-90. The results were less than the required detection limit of 10 pCi/L for Sr-89 and less than the required detection limit of 1.0 pCi/liter for Sr-90 (Table B-I.1, Appendix B).

Gross Alpha and Gross Beta (dissolved and suspended)

Gross alpha and gross beta analyses in the dissolved and suspended fractions were performed on groundwater samples throughout the year in 2019. Gross alpha (dissolved) was detected in 3 of 16 samples affecting 3 of 12 groundwater locations analyzed. The concentrations ranged from 0.7 to 15.0 pCi/L. Gross alpha (suspended) was detected in 6 of 16 samples affecting 6 of 12 groundwater locations analyzed. The concentrations ranged from 1.4 to 5.3 pCi/L.

Gross beta (dissolved) was detected in 11 of 16 samples affecting 9 of 12 groundwater locations analyzed. The concentrations ranged from 1.5 to 10.7 pCi/L. Gross beta (suspended) was detected in 6 of 16 samples affecting 6 of 12 groundwater locations analyzed. The concentrations ranged from 3.0 to 20.4 pCi/L.

These concentrations of gross alpha and gross beta, which are slightly above detectable levels, are considered to be background and are not the result of plant effluents (Table B-I.1, Appendix B).

Gamma Emitters

No gamma emitting nuclides were detected in any of the samples analyzed (Table B-I.2, Appendix B).

Hard-To-Detect

Hard-to-detect analyses were performed on 12 of the groundwater sampling locations in accordance with the LaSalle RGPP and to aid in establishing background levels. The analyses included Fe-55, Ni-63, Am-241, Cm-242, Cm-243/244, Pu-238, Pu-239/240, U-234, U-235, and U-238. U-234 was detected in 6 of 9 samples, affecting 2 of 12 groundwater locations. The concentrations ranged from 0.32 to 0.99 pCi/L. U-238 was detected in 6 of 9 samples, affecting 2 of 12 groundwater locations. The concentrations ranged from 0.14 to 0.98 pCi/L. U-234 and U-238 are commonly found in groundwater at low concentrations due to the naturally occurring Radium (Uranium) Decay Series. The concentrations of U-234 and U-238 discussed above are considered to be background and are not the result of plant effluents (Table B-1.3, Appendix B).

All other hard-to-detect nuclides were not detected at concentrations greater than their respective minimum detectable concentrations.

B. Surface Water Results

Samples were collected from on and off-site surface water locations throughout the year in accordance with the station radiological groundwater protection program. Analytical results and anomalies are

discussed below.

Tritium

Samples from 6 locations were analyzed for tritium activity. Eight (8) of 18 samples from 5 surface water locations indicated activity above the minimum detectable concentration (MDC). The concentrations ranged from <181 to 395 pCi/L. Based on the hydrogeological study conducted at LaSalle, there is no feasible pathway into a drinking water supply. Based on established aquifer flow paths, the location most representative of potential offsite release into groundwater was also less than the detection limit. (Table B–II.1, Appendix B).

Strontium

Sr-89 and Sr-90 analyses were not performed on surface water samples in 2019.

Gross Alpha and Gross Beta (dissolved and suspended)

Gross Alpha and Gross Beta analyses in the dissolved and suspended fractions were not performed on surface water samples in 2019.

Gamma Emitters

No gamma-emitting nuclides were detected at concentrations greater than their respective minimum detectable concentrations. (Table B-II.2, Appendix B).

C. Drinking Water Well Survey

A drinking water well survey was conducted during the summer 2006 by CRA (CRA 2006) around the LaSalle County Station. This survey concluded that no residents in the vicinity of the plant utilize the shallow water aquifer as a drinking water supply. Site hydrological studies of aquifer flow and permeation rates from the shallow aquifer to the deep aquifer concluded that there is no feasible dose receptor via a ground water pathway at LaSalle.

D. Summary of Results – Inter-Laboratory Comparison Program

Inter-Laboratory Comparison Program results for TBE and Environmental Inc. (Midwest Labs) are presented in the AREOR.

E. Leaks, Spills, and Releases

There were no new leaks identified at LaSalle Station during the reporting period.

F. Trends

Analysis results from samples continue to be trended in order to assess impact to groundwater at LaSalle Station. There were no new leaks identified in the reporting period. Sample data from the plume arising from the historic 2010 U1 CY tank leak is being trended per the LaSalle RGPP. The plume had been dispersing with groundwater flow, and extraction wells have been installed to provide additional control of the plume migration (see Section H.3. below). Currently, no tritium has migrated offsite, and tritium migration offsite is not expected.

G. Investigations

No new investigations were carried out during the reporting period.

H. Actions Taken

1. Compensatory Actions

   No compensatory actions were taken during the reporting period.

2. Installation of Monitoring Wells

   No new monitoring wells have been installed during the reporting period.

3. Actions to Recover/Reverse Plumes

   Two (2) extraction wells (RW-LS-100S and RW-LS-101S) were installed to control the migration of the tritium plume near U1 CY tank. RW-LS-100S became operational in October 2012. RW-LS-101S became operational in April 2014.

APPENDIX A

LOCATION DESIGNATION

Intentionally left blank

TABLE A-1 LaSalle County Station Groundwater Monitoring Sample Point List, 2019

Site	Site Type
SW-LS-101	Surface Water
SW-LS-102	Surface Water
SW-LS-103	Surface Water
SW-LS-106	Surface Water
MW-LS-101S	Monitoring Well
MW-LS-102S	Monitoring Well
MW-LS-103S	Monitoring Well
MW-LS-104S	Monitoring Well
MW-LS-105S	Monitoring Well
MW-LS-106S	Monitoring Well
MW-LS-107S	Monitoring Well
MW-LS-108S	Monitoring Well
MW-LS-109S	Monitoring Well
MW-LS-110S	Monitoring Well
MW-LS-111S	Monitoring Well
MW-LS-112S	Monitoring Well
MW-LS-113S	Monitoring Well
HP-2	Monitoring Well
HP-5	Monitoring Well
HP-7	Monitoring Well
HP-10	Monitoring Well
RW-LS-100S	Extraction Well
RW-LS-101S	Extraction Well
TW-LS-114S	Monitoring Well
TW-LS-115S	Monitoring Well
TW-LS-116S	Monitoring Well
TW-LS-117S	Monitoring Well
TW-LS-118S	Monitoring Well
TW-LS-119S	Monitoring Well
TW-LS-120S	Monitoring Well
TW-LS-121S	Monitoring Well

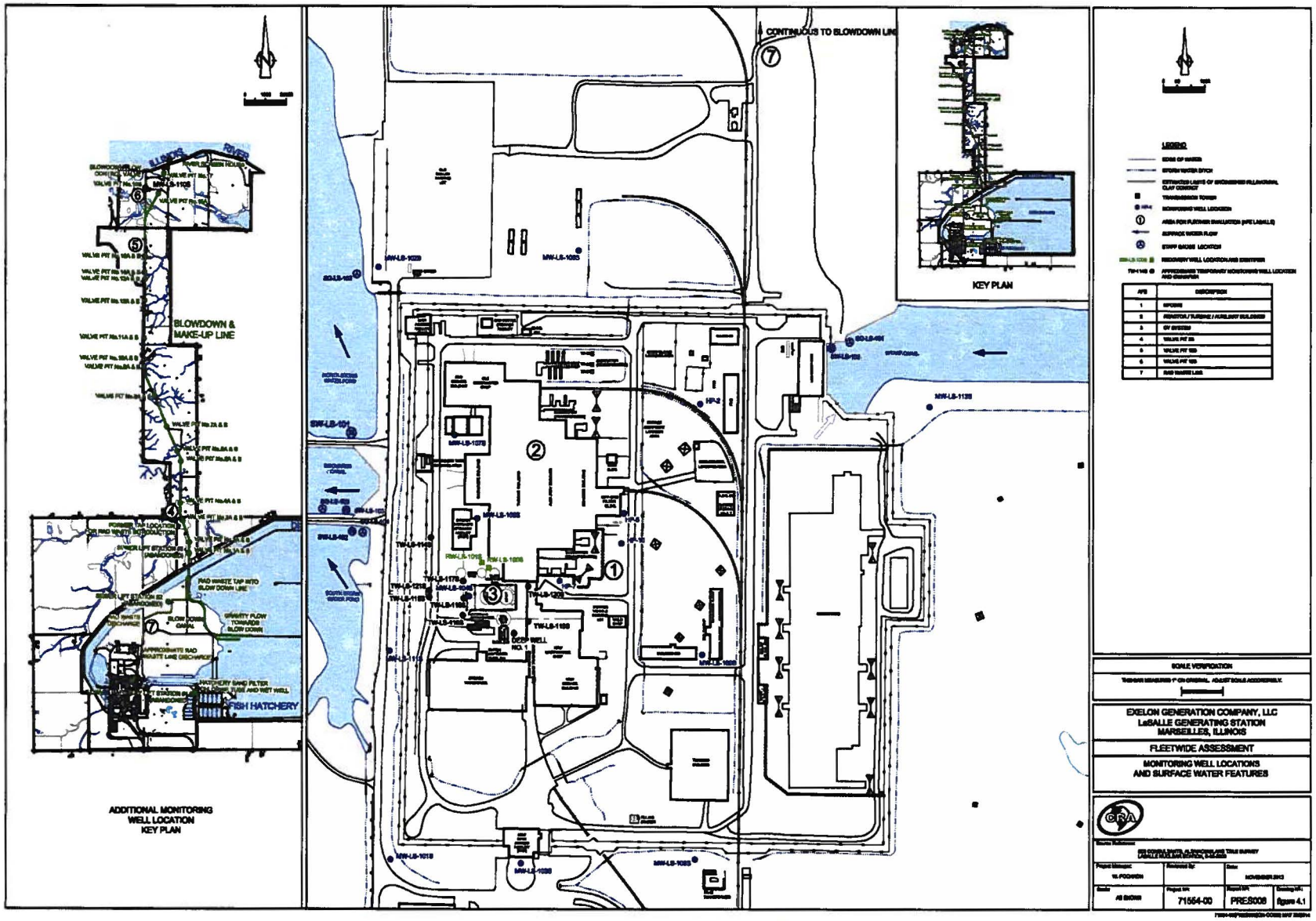


Figure A-1
Ground Water and Surface Water Locations
LaSalle County Station, 2019

APPENDIX B

DATA TABLES

Intentionally left blank

TABLE B-I.1 CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA, AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)	Gr-B (Dis)	Gr-B (Sus)
HP-2	03/18/19	< 185						
HP-2	06/06/19	< 188	< 8.4	< 0.7	< 1.1	< 1.2	5.2 ± 1.1	< 2.1
HP-2	09/04/19	< 193						
HP-2	11/11/19	< 193						
HP-5	03/18/19	< 182						
HP-5	06/06/19	< 182	< 7.5	< 0.9	< 1.0	2.7 ± 1.1	5.2 ± 1.2	3.0 ± 1.1
HP-5	09/04/19	< 192						
HP-5	11/11/19	< 192						
HP-7	03/18/19	< 189						
HP-7	06/07/19	< 198	< 7.2	< 0.7	< 0.7	2.1 ± 1.2	3.6 ± 0.9	3.5 ± 1.2
HP-7	09/04/19	< 186						
HP-7	11/11/19	< 192						
HP-10	03/18/19	< 188						
HP-10	06/06/19	< 197	< 6.2	< 0.8	< 0.9	2.3 ± 1.4	< 1.4	3.2 ± 1.4
HP-10	09/04/19	< 191						
HP-10	11/11/19	< 189						
MW-LS-104S	03/18/19	2560 ± 314						
MW-LS-104S	06/06/19	1610 ± 232	< 7.8	< 0.9	< 1.0	< 1.1	< 1.4	< 1.5
MW-LS-104S	09/04/19	2940 ± 361	< 9.5	< 0.8	< 0.9	< 1.1	< 1.3	< 1.6
MW-LS-104S	11/15/19	1690 ± 231	< 2.8	< 0.9	< 1.0	< 1.2	< 1.4	< 1.5
MW-LS-105S	03/18/19	< 191						
MW-LS-105S	06/06/19	< 188	< 8.5	< 0.8	0.7 ± 0.4	5.3 ± 2.2	< 1.0	20.4 ± 2.6
MW-LS-105S	09/04/19	< 195						
MW-LS-105S	11/15/19	< 191						
MW-LS-106S	03/19/19	< 183						
MW-LS-106S	06/06/19	< 182						
MW-LS-107S	03/18/19	< 189						
MW-LS-107S	06/06/19	< 188	< 7.9	< 0.6	7.9 ± 5.0	2.6 ± 0.7	4.9 ± 2.5	3.2 ± 1.0
MW-LS-107S	09/04/19	< 194						
MW-LS-107S	11/11/19	< 192						
MW-LS-111S	03/19/19	< 186						
MW-LS-111S	06/06/19	< 187	< 5.6	< 0.9	15.0 ± 4.6	1.4 ± 0.7	10.7 ± 3.0	6.7 ± 1.5
MW-LS-111S	09/04/19	< 191						
MW-LS-111S	11/12/19	< 193						
OIL SEPARATOR	03/18/19	266 ± 128						
OIL SEPARATOR	06/06/19	< 197						
OIL SEPARATOR	09/04/19	< 193						
OIL SEPARATOR	11/12/19	< 167						
RW-LS-100S	03/18/19	318 ± 127						
RW-LS-100S	06/04/19	1370 ± 213	< 7.3	< 1.0				
RW-LS-100S	09/04/19	1310 ± 202	< 7.7	< 0.7	< 0.9	< 1.1	3.2 ± 1.0	< 1.6
RW-LS-100S	11/11/19	814 ± 151	< 7.6	< 0.9	< 1.1	< 1.2	4.4 ± 1.0	< 1.5
RW-LS-101S	03/18/19	1580 ± 229						
RW-LS-101S	06/04/19	2170 ± 284	< 8.1	< 0.8				
RW-LS-101S	09/04/19	2230 ± 285	< 7.8	< 0.7	< 0.8	< 1.1	5.0 ± 1.0	< 1.6
RW-LS-101S	11/11/19	2820 ± 341	< 1.6	< 0.8	< 1.1	< 1.2	5.3 ± 1.0	< 1.5
TW-LS-114S	03/18/19	< 187						
TW-LS-114S	06/06/19	< 196						
TW-LS-114S	09/04/19	< 190						
TW-LS-114S	11/11/19	< 194						
TW-LS-115S	03/19/19	< 190						
TW-LS-115S	06/06/19	< 199						

TABLE B-I.1 CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA, AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)	Gr-B (Dis)	Gr-B (Sus)
TW-LS-115S	09/04/19	< 192						
TW-LS-115S	11/11/19	< 173						
TW-LS-116S	03/18/19	4460 ± 508						
TW-LS-116S	06/06/19	5050 ± 567						
TW-LS-116S	09/04/19	5490 ± 604						
TW-LS-116S	11/11/19	3970 ± 453	< 3.2	< 0.8	< 1.0	< 1.2	1.5 ± 0.8	< 1.5
TW-LS-117S	03/18/19	< 188						
TW-LS-117S	06/06/19	< 199						
TW-LS-117S	09/04/19	< 192						
TW-LS-117S	11/11/19	< 175						
TW-LS-118S	03/18/19	4260 ± 487						
TW-LS-118S	06/06/19	4230 ± 487						
TW-LS-118S	09/04/19	3710 ± 431						
TW-LS-118S	11/11/19	3350 ± 392	< 3.4	< 0.8	< 1.0	< 1.2	7.9 ± 1.0	< 1.5
TW-LS-119S	03/18/19	< 187						
TW-LS-119S	06/06/19	< 198						
TW-LS-119S	09/04/19	< 189						
TW-LS-119S	11/11/19	< 175						
TW-LS-120S	03/18/19	< 184						
TW-LS-120S	06/06/19	< 195						
TW-LS-120S	09/04/19	< 192						
TW-LS-120S	11/11/19	< 173						
TW-LS-121S	03/18/19	< 183						
TW-LS-121S	06/06/19	< 194						
TW-LS-121S	09/04/19	< 194						
TW-LS-121S	11/11/19	< 177						

TABLE B-I.2

CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
HP-2	06/06/19	< 15	< 12	< 1	< 1	< 3	< 1	< 3	< 1	< 3	< 7	< 2	< 2	< 12	< 4
HP-5	06/06/19	< 15	< 16	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 7	< 2	< 2	< 15	< 5
HP-7	06/07/19	< 16	< 16	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 6	< 2	< 2	< 13	< 5
HP-10	06/06/19	< 15	< 14	< 1	< 2	< 4	< 2	< 3	< 2	< 3	< 7	< 2	< 2	< 13	< 4
MW-LS-104S	06/06/19	< 16	< 28	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 7	< 2	< 2	< 14	< 5
MW-LS-104S	09/04/19	< 18	< 18	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 10	< 2	< 2	< 18	< 6
MW-LS-104S	11/15/19	< 55	< 80	< 5	< 6	< 12	< 7	< 15	< 6	< 8	< 11	< 6	< 5	< 33	< 13
MW-LS-105S	06/06/19	< 16	< 14	< 1	< 2	< 4	< 2	< 3	< 2	< 3	< 7	< 2	< 2	< 14	< 5
MW-LS-106S	06/06/19	< 16	< 17	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 7	< 2	< 2	< 15	< 6
MW-LS-107S	06/06/19	< 17	< 27	< 2	< 2	< 5	< 2	< 3	< 2	< 3	< 8	< 2	< 2	< 15	< 5
MW-LS-111S	06/06/19	< 17	< 13	< 2	< 2	< 4	< 1	< 3	< 2	< 3	< 9	< 2	< 2	< 15	< 5
RW-LS-100S	06/04/19	< 16	< 14	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 8	< 2	< 2	< 14	< 4
RW-LS-100S	09/04/19	< 17	< 16	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 9	< 2	< 2	< 16	< 5
RW-LS-100S	11/11/19	< 26	< 28	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 9	< 3	< 3	< 21	< 6
RW-LS-101S	06/04/19	< 17	< 32	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 8	< 2	< 2	< 15	< 5
RW-LS-101S	09/04/19	< 17	< 34	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 9	< 2	< 2	< 16	< 5
RW-LS-101S	11/11/19	< 26	< 59	< 3	< 3	< 7	< 3	< 6	< 3	< 6	< 10	< 3	< 3	< 21	< 6
TW-LS-116S	11/11/19	< 32	< 28	< 3	< 3	< 7	< 3	< 6	< 4	< 6	< 10	< 3	< 3	< 23	< 7
TW-LS-118S	11/11/19	< 31	< 52	< 3	< 3	< 8	< 4	< 7	< 3	< 5	< 10	< 3	< 3	< 22	< 8

TABLE B-I.3 CONCENTRATIONS OF HARD-TO-DETECTS IN GROUNDWATER SAMPLES COLLECTED AS PART OF THE GROUNDWATER PROTECTION PROGRAM, LASALLE COUNTY STATION, 2019

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	Am-241	Cm-242	Cm-243/244	Pu-238	Pu-239/240	U-234	U-235	U-238	Fe-55	Ni-63
HP-2	06/06/19									< 100	< 4.0
HP-5	06/06/19									< 73	< 4.0
HP-7	06/07/19									< 76	< 3.8
HP-10	06/06/19									< 118	< 3.8
MW-LS-104S	06/06/19	< 0.07	< 0.02	< 0.04	< 0.16	< 0.13	0.99 ± 0.25	< 0.07	0.77 ± 0.22	< 44	< 4.2
MW-LS-104S	09/04/19	< 0.12	< 0.03	< 0.15	< 0.10	< 0.09	0.98 ± 0.25	< 0.10	0.98 ± 0.25	< 73	< 4.4
MW-LS-104S	11/15/19	< 0.13	< 0.05	< 0.13	< 0.17	< 0.12	0.59 ± 0.17	< 0.02	0.66 ± 0.18	< 66	< 4.0
MW-LS-105S	06/06/19									< 48	< 3.9
MW-LS-107S	06/06/19									< 116	< 3.5
MW-LS-111S	06/06/19									< 178	< 4.4
RW-LS-100S	06/04/19	< 0.08	< 0.02	< 0.06	< 0.07	< 0.07	< 0.02	< 0.02	< 0.09	< 68	< 3.8
RW-LS-100S	09/04/19	< 0.11	< 0.03	< 0.10	< 0.16	< 0.17	< 0.15	< 0.06	< 0.13	< 58	< 4.5
RW-LS-100S	11/11/19	< 0.03	< 0.03	< 0.12	< 0.08	< 0.16	< 0.12	< 0.08	< 0.08	< 45	< 3.9
RW-LS-101S	06/04/19	< 0.07	< 0.02	< 0.02	< 0.09	< 0.13	0.32 ± 0.13	< 0.06	0.21 ± 0.11	< 84	< 4.0
RW-LS-101S	09/04/19	< 0.07	< 0.02	< 0.02	< 0.11	< 0.07	0.37 ± 0.15	< 0.04	0.14 ± 0.09	< 141	< 4.2
RW-LS-101S	11/11/19	< 0.11	< 0.02	< 0.09	< 0.11	< 0.20	0.34 ± 0.15	< 0.06	0.39 ± 0.16	< 140	< 4.4
TW-LS-116S	11/11/19									< 72	< 4.0
TW-LS-118S	11/11/19									< 75	< 4.2

TABLE B-II.1 CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3
SW-LS-101	03/19/19	231 ± 126
SW-LS-101	06/06/19	< 186
SW-LS-101	11/12/19	< 194
SW-LS-101S	09/04/19	< 190
SW-LS-102	03/19/19	< 187
SW-LS-102	06/06/19	< 186
SW-LS-102	09/04/19	253 ± 129
SW-LS-102	11/12/19	< 193
SW-LS-103	03/19/19	395 ± 136
SW-LS-103	06/06/19	< 181
SW-LS-103	09/04/19	211 ± 126
SW-LS-103	11/12/19	245 ± 125
SW-LS-106	03/18/19	260 ± 129
SW-LS-106	06/07/19	< 185
SW-LS-106	11/14/19	254 ± 128
SW-LS-106S	09/04/19	209 ± 127

TABLE B-II.2

CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2019

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
SW-LS-101	06/06/19	< 16	< 15	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 8	< 2	< 2	< 14	< 5
SW-LS-102	06/06/19	< 20	< 17	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 10	< 2	< 2	< 17	< 5
SW-LS-103	06/06/19	< 16	< 29	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 7	< 2	< 2	< 15	< 5
SW-LS-106	06/07/19	< 20	< 19	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 9	< 2	< 2	< 17	< 5