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RA23-029

10 CFR 50 Appendix I

May 12, 2023

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

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: 2022 Annual Radiological Environmental Operating Report

Enclosed is the Constellation Energy Generation, LLC, 2022 Annual Radiological Environmental Operating Report for LaSalle County Station, submitted in accordance with Technical Specification 5.6.2, "Annual Radiological Environmental Operating Report." The enclosed report contains the results of groundwater monitoring conducted in accordance with Constellation'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 contained within this letter. Should you have any questions concerning this letter, please contact Mr. Daniel Mearhoff, Regulatory Assurance Manager, at (815) 415-2800.

Respectfully,

John Van Fleet
Site Vice President
LaSalle County Station

Enclosures: LaSalle County Station Units 1 and 2 Annual Radiological Environmental Operating Report 1 January through 31 December 2022

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 2022

Prepared By
Teledyne Brown Engineering
Environmental Services

Constellation

LaSalle County Station
Marseilles, IL 61341

May 2023

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Table Of Contents

Appendices

I. Summary and Conclusions

In 2022, the LaSalle Generating Station released to the environment through the radioactive effluent gaseous pathways approximately 899 curies of noble gas, fission, and activation products and approximately 46.4 curies of tritium. There were no liquid effluent releases beyond the site in 2022. The resultant calculated dose due to solid and gaseous radioactive effluents from LAS were well below regulatory limits of 40 CFR 190 and are summarized below:

Calculated Dose to Members of the Public			
	Whole Body	**Thyroid**	**Max Other Organ**
Gaseous [1,2]	1.31E-02	1.12E-01	4.64E-02
Liquid	0.00E+00	0.00E+00	0.00E+00
Sky Shine	7.92E-01	-	-
Total Site Dose	8.05E+01	1.12E-01	4.64E-02
Total with Other Nearby Facility [3]	**8.05E-01**	**1.12E-01**	**4.64E-02**
Limit	**25 mrem**	**75 mrem**	**25 mrem**
% of Limit	**3.22E+00**	**1.49E-01**	**1.86E-01**

[1] Gaseous dose values include organ dose from Noble Gas, Iodine, Tritium, Carbon-14 and particulates with half-lives > 8 days

[2] Individual groups with the highest dose are used:
Total Body: all age groups for Noble Gas and the Child for particulates
Thyroid: the Infant
Max Other Organ: Individual age group sum is lower

[3] Other fuel cycle sources within 5 miles of the site do not exist

This report on the Radiological Environmental Monitoring Program conducted for the LaSalle County Station (LSCS) by Constellation (formerly Exelon) covers the period 1 January 2022 through 31 December 2022. During that time period, 1,308 analyses were performed on 1,227 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.

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 Constellation Energy 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 2022 through 31 December 2022.

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 Constellation 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 2022. 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. 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. 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 an iodine cartridge and a glass fiber particulate filter. 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 four locations (L-42, L-Quad 1, L-Quad 2 and L-Quad 4). The control location was L-42. 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, the type of dosimetry used for the Radiological Environmental Monitoring Program (REMP) was changed. 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 17 locations (L-201, L-202, L-203, L-204, L-205A, L-205B, 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 2022. 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 2022, the LSCS REMP had a sample recovery rate of >99%. Sample anomalies and missed samples are listed in the following tables:

Table D-1 LISTING OF SAMPLE ANOMALIES

Sample Type	Location Code	Collection Date(s)	Reason
AP/AI	L-06	01/06/22 01/12/22	Timer indicates approximately 14.7 hrs. less than expected due to a power outage
AP/AI	L-06	01/20/22	Timer indicates approximately 27 hrs. less than expected due to a power outage. *NOTE: During the 01/20 collection, the cause of time deficiency was determined to be a faulty timer - timer exchanged*
SW	L-21	01/12/22 01/27/22	No sample collected - river frozen
SW	L40	01/12/22 01/20/22 01/27/22 02/03/22 02/18/22	No sample collected - river frozen
AP/AI	L-03 L-05	02/09/22	2 weeks run – Collector unable to access the sampler during 02/03/22 collection due to heavy snow accumulation
AP/AI	L-04	03/24/22	The timer indicates lower reading of 1441.5 hrs. for the 7-day collection period. No power at the station; flow rate estimated based on 03/17 field check; power restored after 2 hrs. *NOTE: During the 03/31 collection, the timer indicated 163.0 hrs. (expected value for the collection period).*

Table D-1 LISTING OF SAMPLE ANOMALIES (cont'd)

Sample Type	Location Code	Collection Date	Reason
AP/AI	L-11A	06/01/22	The timer broke down after 17.3 hrs - the filter appears to be similar color to the other ones. Run time calculated, timer exchanged.
AP/AI	L-03 L-07	07/07/22	The timer indicates lower reading of 159.3 on the 8-day collection period, possibly due to a power outage. *Note: During the 07/13 collection, the L-03 timer indicated expected value of 144.9 hrs.*
AP/AI	L-07	07/13/22	The timer broke down indicating 0 hrs; filter appears to be similar color to others. Timer exchanged.
AP/AI	L-03	08/31/22	Timer displayed 10 hrs. less than expected; timer exchanged *NOTE: During the 09/08 collection the timer indicated expected value of 190.8 hrs.*
AP/AI	L-04	09/22/23	The timer indicates lower value of 119.1 hrs., possibly due to a power outage. *NOTE: During the 09/28 collection, the timer indicated 144.9 hrs (expected value for the 6-day collection period).*
OSLD	L-103-2	09/30/22	Sample missing in the field – premises searched unsuccessfully.
OSLD	L-03-2	12/31/22	Sample missing in the field – premises searched unsuccessfully.
SW	L-21 L-40	12/28/22	No sample collected - river frozen

Table D-2 LISTING OF MISSED SAMPLES

Sample Type	Location Code	Collection Date(s)	Reason
MI	L-42	>04/07/22	Farmer stopped milking cows.
AP/AI	L-03 L-05	02/03/22	Locations inaccessible due to heavy snowfall.
VEG	QUAD 3	July August September	Unable to collect vegetables from the sector – previous location abandoned/sold.

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 2022.

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 23 out of 24 samples with a range of 2.9 to 13.4 pCi/L. (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 4 of 8 samples with a range of 197 - 546 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 1,835 to 3,786 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 two stations and ranged from 1,118 to 1,830 pCi/kg dry. Naturally occurring K-40 was found at all stations and ranged from 8,502 to 17,880 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 8 to 39E–3 pCi/m^3 with a mean of

20E–3 pCi/m^3. The results from the near-site location (Group II) ranged from 9 to 41E–3 pCi/m^3 with a mean of 21E–3 pCi/m^3. The results from the far-field locations (Group III) ranged from 8 to 42E-3 pCi/m^3 with a mean of 22E–3 pCi/m^3. The results from the control location (Group IV) ranged from 10 to 40E–3 pCi/m^3 with a mean of 22E–3 pCi/m^3. Comparison of the 2022 air particulate data with previous years' 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 2022 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 84 to 166E–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

One sample was collected from one location (L-42) during 2022. The following analyses were performed:

Iodine-131

One sample from the location was 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

One sample was analyzed for concentrations of gamma-emitting nuclides (Table C–VII.2, Appendix C). Naturally occurring K-40 activity was found in the sample with a concentration of 770 pCi/L. No other nuclides were detected, and all required LLDs were met.

b. Food Products

Food product samples were collected at four locations (L42, L-Quad 1, L-Quad 2 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-ESE-1, and L-ESE-2). 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-two OSLD locations were established around the site. Results of OSLD measurements are listed in Tables C–IX.1, Appendix C.

All OSLD measurements were below 21 mrem/std. quarter, with a range of 13.0 to 20.5 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 Census

A Land Use Census conducted September 6, 2022, around the LaSalle County Station (LSCS) was performed by Environmental Inc. (Midwest Labs) for Constellation Energy 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 and milk producing animal in each of the sixteen 22 ½ degree sectors around the site within 10 km (6.2 miles). The distance and direction of all locations from the LSCS reactor buildings were positioned using Global Positioning System (GPS) technology. Since there were no milk animals within 10 km of LSCS, beef cows were identified. 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 2022.

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, laboratory, 142 out of 150 analyses performed met the specified acceptance criteria. Eight analyses did not meet the specified acceptance criteria and were addressed through the TBE Corrective Action Program. *NOTE: Two analyses (soil for Tc-99 and U-238) that did not meet acceptance criteria was performed for TBE information and is not on the list of required ICP analyses.* A summary is found below:

1. The Analytics March 2022 AP Ce-141 result was evaluated as *Not Acceptable*. The reported value for Ce-141 was 60.9 pCi and the known result was 42.0 pCi/L (1.45 ratio of reported result vs. known; TBE's internal acceptance range is 0.70 - 1.30). This sample was used as the workgroup duplicate with a result of 45.7 (109% of known) and was also counted on a different detector with a result of 50.9 (121% of known). This was TBE's first failure for AP Ce-141. (NCR 22-04)

2. The MAPEP February 2022 Urine U-234 & U-238 results were evaluated as *Not Acceptable*. TBE's reported values of 0.142 and 0.0254 were above the known upper ranges of 0.0096 and 0.0134 respectively for U-234 and U-238. These spiked values were below TBE's typical MDC for urine client samples. The samples were re-prepped using a larger sample aliquot and counted for 60 hours as opposed to 48 hours. The recount results were 0.00732 for U-234 and 0.0119 for U-238 (both within acceptable range). MAPEP urine samples will be flagged to use a larger sample aliquot and counting time than typical client samples. MAPEP did not include any urine cross-check samples in August. (NCR 22-05)

3. The ERA MRAD September 2022 AP Pu-238 was evaluated as *Not Acceptable*. The reported value was 38.8 pCi and the known result

was 29.9 (acceptance range 22.6 – 36.7). The AP filter was cut in half prior to digestion (shared with Fe-55) but should have been complete digested together and aliquotted afterwards like typical client samples. This is the first failure for AP Pu-238. (NCR 22-19)

4. The ERA October 2022 water Uranium result was evaluated as *Not Acceptable*. The reported value was 10.54 pCi/L and the known was 8.53 (acceptance range 6.60 – 9.88) or 124% of the known (acceptable for TBE QC). The 2-sigma error was 3.2, placing the reported result well within the acceptable range. This sample was used as the workgroup duplicate with a result of 8.2 +/- 2.9 pCi/L (also within the acceptable range). All other QA was reviewed with no anomalies. (NCR 22-20)

5. The Analytics AP Co-60 result was evaluated as *Not Acceptable*. The reported value was 207 pCi and the known was 147 (141% of the known). TBE's internal QC acceptance is 70 - 130%. All QA was reviewed with no anomalies. This sample was used as the workgroup duplicate and counted on a different detector with a result of 167 pCi (114% of the known). This is the first failure for AP Co-60 – average result ratio compared to the known is 109%. (NCR 22-21)

6. The MAPEP August 2022 water Tc-99 result was evaluated as *Not Acceptable*. The reported value was 1.86 +/- 0.414 Bq/L for this "false positive" test. The evaluation of the submitted result to the 3 times the uncertainty indicated a slight positive. This sample was used as the workgroup duplicate with a result of 0.88 +/- 0.374 Bq/L. All QC was reviewed, and no anomalies found. This is the first unacceptable since the resumption of reporting water Tc-99 for the 3rd quarter of 2020. TBE to known ratios have ranged from 94-109% during this time. (NCR 22-22)

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

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APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT ANNUAL SUMMARY

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TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE LASALLE COUNTY STATION, 2022

NAME OF FACILITY:	LASALLE COUNTY STATION			DOCKET NUMBER:	50-373 & 50-374			
LOCATION OF FACILITY:	MARSEILLES, IL			REPORTING PERIOD:	2022			
				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
SURFACE WATER (PCI/LITER)	**GR-B**	24	**4**	7.8 (12/12) *2.9 - 13.4*	7.8 (11/12) *3.9 - 12.2*	7.8 (12/12) *2.9 - 13.4*	L-40 INDICATOR ILLINOIS RIVER - DOWNSTREAM 5.2 MILES NNW OF SITE	0
	H-3	8	**200**	372 (2/4) *197 - 546*	360 (2/4) *200 - 520*	372 (2/4) *197 - 546*	L-40 INDICATOR ILLINOIS RIVER - DOWNSTREAM 5.2 MILES NNW 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, 2022

NAME OF FACILITY:	**LASALLE COUNTY STATION**			**DOCKET NUMBER:**		**50-373 & 50-374**		
LOCATION OF FACILITY:	**MARSEILLES, IL**			**REPORTING PERIOD:**		**2022**		
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*	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
FISH	**GAMMA**	12						
(PCI/KG WET)	*K-40*		*NA*	2897 (8/8) *1993 - 3786*	3146 (4/4) *1835 - 3721*	3146 (4/4) *1835 - 3721*	L-36 CONTROL ILLINOIS RIVER - UPSTREAM 4.3 MILES NE OF SITE	0
	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)	*K-40*		*NA*	11996 (4/4) *8502 - 14450*	17460 (2/2) *17040 - 17880*	17460 (2/2) *17040 - 17880*	L-21 CONTROL ILLINOIS RIVER - UPSTREAM 4.0 MILES NE OF SITE	0
	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 *(E-3 PCI/CU.METER)*	**GR-B**	466	**10**	21.2 (414/414) *8 - 42*	21.5 (52/52) *10 - 40*	22.4 (52/52) *9 - 42*	L-07 INDICATOR SENECA 5.2 MILES NNE OF SITE	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, 2022

NAME OF FACILITY:	**LASALLE COUNTY STATION**			**DOCKET NUMBER:**		**50-373 & 50-374**		
LOCATION OF FACILITY:	**MARSEILLES, IL**			**REPORTING PERIOD:**		**2022**		
				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
AIR PARTICULATE	**GAMMA**	36						
(E-3 PCI/CU.METER)	*Be-7*		*NA*	126 (32/32) *85 - 166*	118 (4/4) *84 - 144*	140 (4/4) *110 - 166*	L-01 INDICATOR NEARSITE 1 1.5 MILES NNW OF SITE	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		**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**	466						
(E-3 PCI/CU.METER)	*I-131*		**70**	<LLD	<LLD	-		0
MILK	**I-131**	1	**1**	NA	<LLD	-		0
(PCI/LITER)								
	GAMMA	1						
	K-40		*NA*	NA	770 (1/1)	770 (1/1)	L-42 CONTROL BIOS FARM 14.2 MILES E OF SITE	0
	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

(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, 2022

NAME OF FACILITY:	LASALLE COUNTY STATION			DOCKET NUMBER:		50-373 & 50-374		
LOCATION OF FACILITY:	MARSEILLES, IL			REPORTING PERIOD:		2022		
				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
FOOD PRODUCTS	**GAMMA**	26						
(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
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**	168	*NA*	17.5	14.9	19.9	L-102 INDICATOR	0
(MILLI-ROENTGEN/QTR.)				(164/164)	(4/4)	(4/4)		
				13.5 - 20.5	*13.0 - 15.8*	*19.2 - 20.5*	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

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TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, LaSalle County Station, 2022

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 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, 2022

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-205A-1 and -2		3.2 miles ESE
L-205B-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, 2022

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

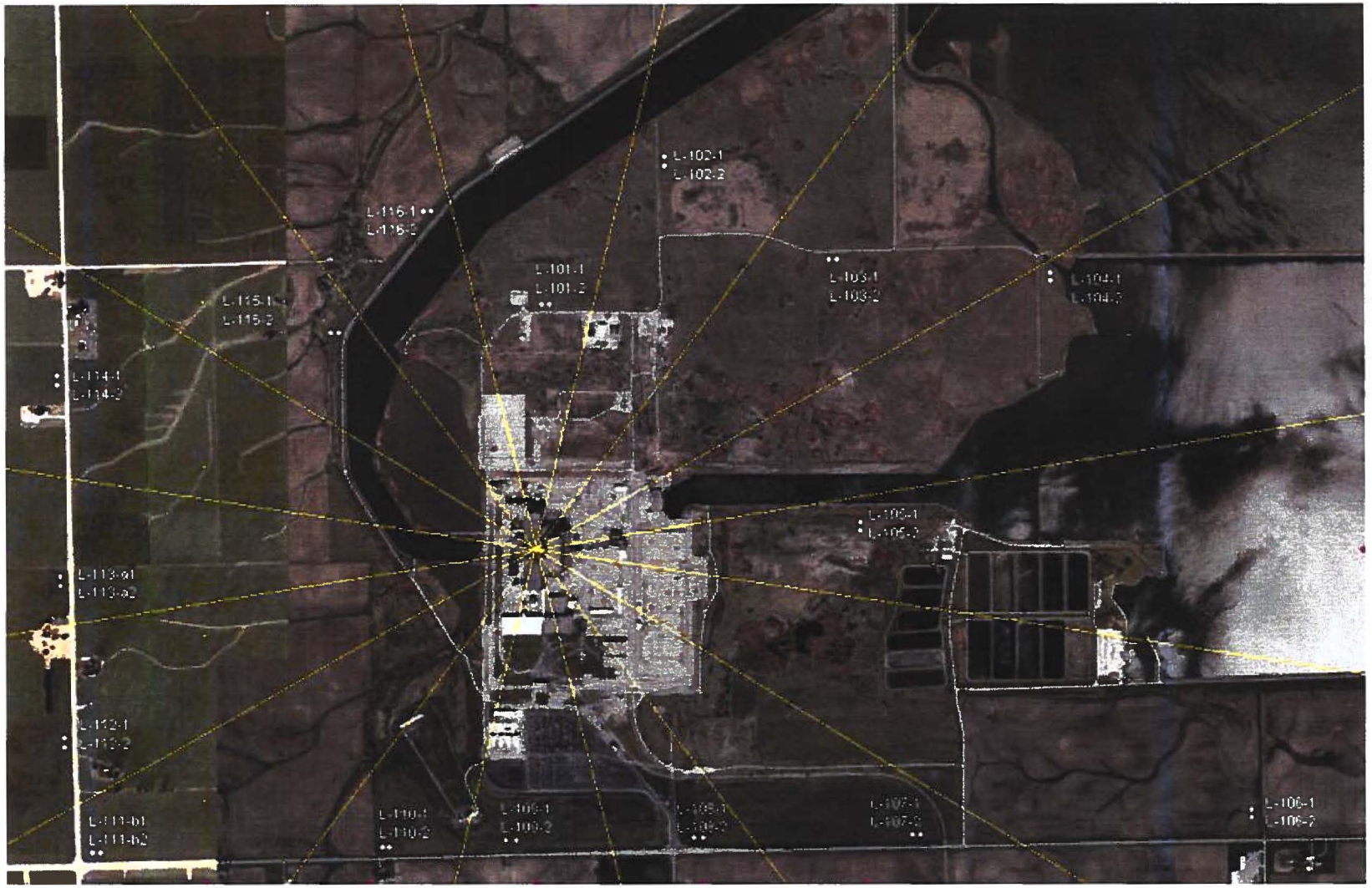

Figure B-1
Inner Ring OSLD Locations
of the LaSalle County Station, 2022

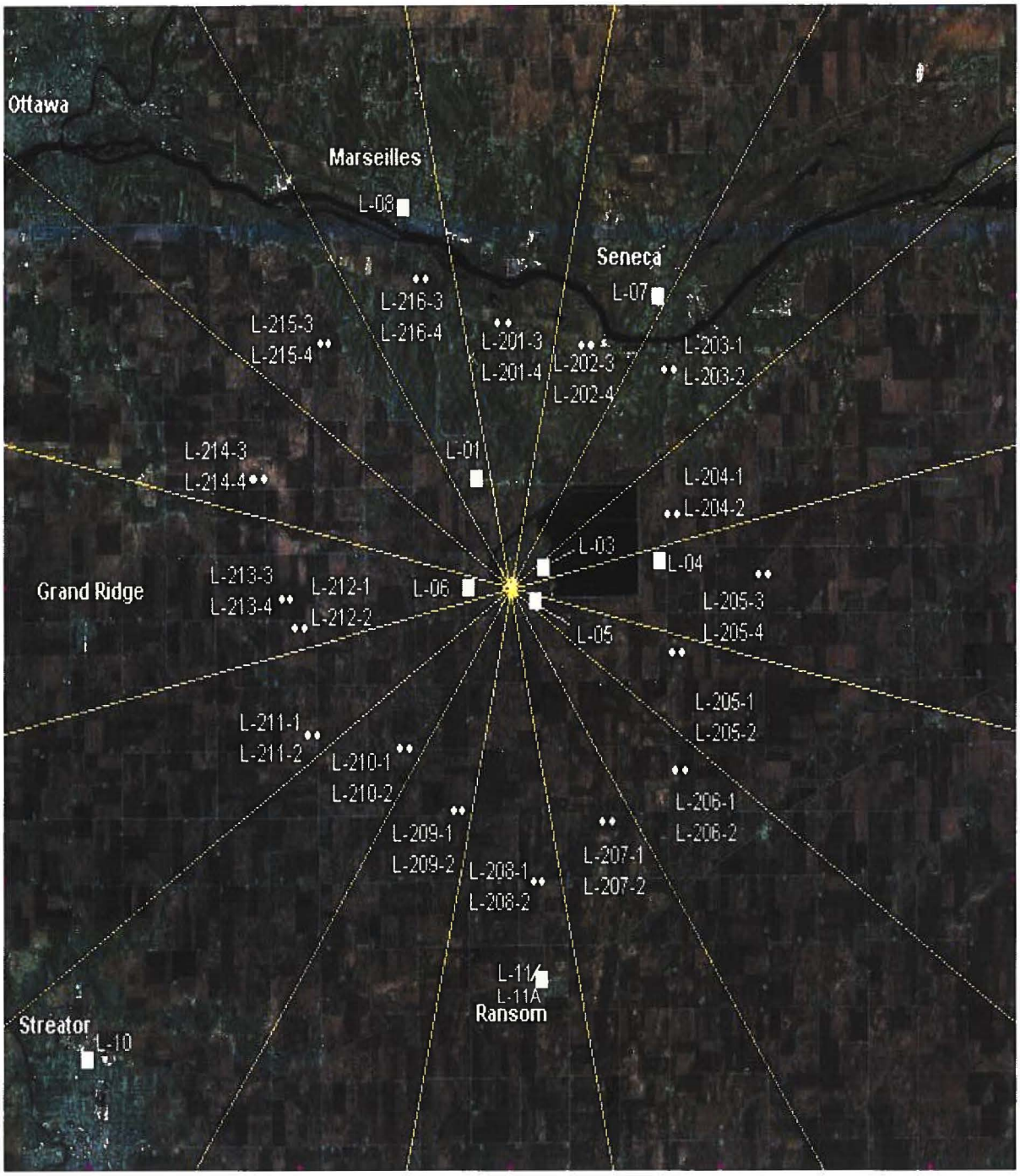

Figure B-2
Outer Ring OSLD Locations and Fixed Air Sampling Locations
of the LaSalle County Station, 2022

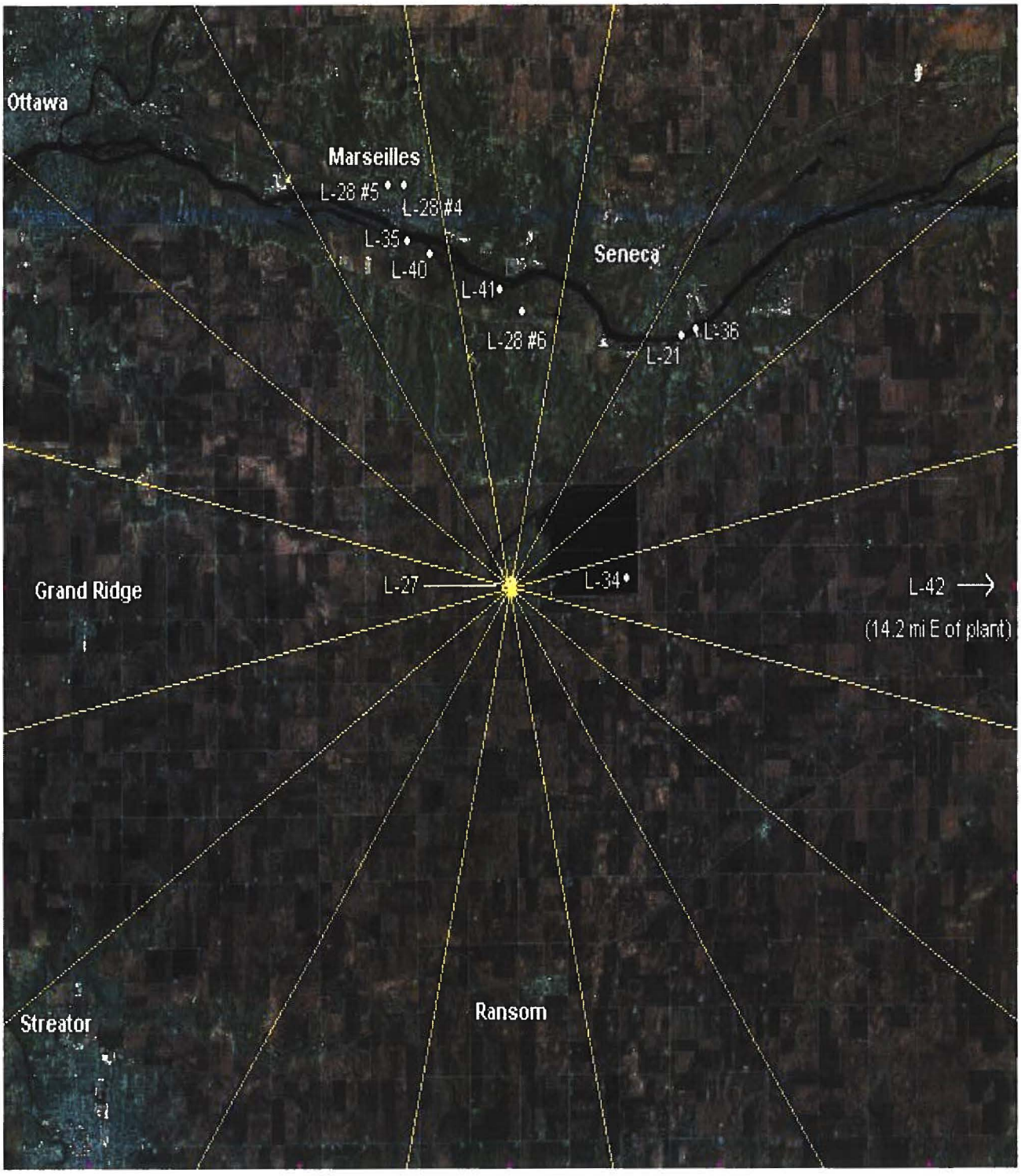

Figure B-3
Ingestion and Waterborne Exposure Pathway Sample Locations
of the LaSalle County Station, 2022

APPENDIX C

DATA TABLES AND FIGURES

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Table C-I.1 CONCENTRATIONS OF GROSS BETA IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2022

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	L-21	L-40
01/06/22 - 01/20/22	4.3 ± 2.1	5.4 ± 2.1
02/03/22 - 02/24/22	10.8 ± 2.7	8.8 ± 2.5
03/02/22 - 03/30/22	6.0 ± 2.5	8.5 ± 2.8
04/07/22 - 04/28/22	4.0 ± 2.5	5.6 ± 2.6
05/04/22 - 05/26/22	3.9 ± 2.1	5.2 ± 2.3
06/01/22 - 06/29/22	6.7 ± 2.6	6.6 ± 2.5
07/07/22 - 07/28/22	< 2.6	2.9 ± 1.9
08/03/22 - 08/31/22	8.4 ± 2.8	7.9 ± 2.8
09/08/22 - 09/28/22	9.3 ± 3.2	8.6 ± 3.3
10/06/22 - 10/27/22	11.0 ± 3.2	13.4 ± 3.4
11/02/22 - 11/30/22	8.7 ± 3.0	11.9 ± 3.3
12/08/22 - 12/22/22	12.2 ± 2.1	8.7 ± 2.0
(1) MEAN ± 2 STD DEV	7.8 ± 5.9	7.8 ± 5.9

Table C-I.2 CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2022

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	L-21	L-40
01/06/22 - 03/30/22	< 186	< 182
04/07/22 - 06/29/22	< 183	< 167
07/07/22 - 09/28/22	200 ± 123	197 ± 123
10/06/22 - 12/22/22	520 ± 133	546 ± 133
(1) MEAN ± 2 STD DEV	360 ± 453	372 ± 494

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

Table C-I.3

CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2022

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
L-21	01/06/22 - 01/20/22	< 2	< 2	< 6	< 2	< 4	< 3	< 5	< 8	< 2	< 2	< 16	< 6
	02/03/22 - 02/24/22	< 3	< 4	< 8	< 3	< 6	< 4	< 6	< 13	< 3	< 4	< 27	< 9
	03/02/22 - 03/30/22	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 11	< 2	< 2	< 19	< 6
	04/07/22 - 04/28/22	< 3	< 4	< 9	< 3	< 7	< 4	< 6	< 14	< 4	< 4	< 31	< 8
	05/04/22 - 05/26/22	< 2	< 2	< 5	< 2	< 4	< 2	< 3	< 7	< 2	< 2	< 15	< 6
	06/01/22 - 06/29/22	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 9	< 2	< 2	< 17	< 6
	07/07/22 - 07/28/22	< 3	< 3	< 6	< 3	< 5	< 3	< 5	< 11	< 3	< 3	< 20	< 6
	08/03/22 - 08/31/22	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 11	< 2	< 2	< 19	< 7
	09/08/22 - 09/28/22	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 8	< 2	< 2	< 16	< 5
	10/06/22 - 10/27/22	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 8	< 2	< 2	< 15	< 4
	11/02/22 - 11/30/22	< 1	< 2	< 4	< 2	< 3	< 2	< 3	< 10	< 2	< 2	< 18	< 6
	12/08/22 - 12/22/22	< 2	< 2	< 6	< 2	< 5	< 3	< 4	< 13	< 2	< 2	< 23	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
L-40	01/06/22 - 01/06/22	< 1	< 1	< 3	< 1	< 2	< 1	< 2	< 8	< 1	< 1	< 13	< 4
	02/09/22 - 02/24/22	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 8	< 3	< 3	< 19	< 6
	03/02/22 - 03/30/22	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 11	< 2	< 2	< 19	< 6
	04/07/22 - 04/28/22	< 3	< 4	< 8	< 2	< 6	< 3	< 7	< 12	< 3	< 4	< 28	< 8
	05/04/22 - 05/26/22	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 9	< 2	< 2	< 18	< 6
	06/01/22 - 06/29/22	< 1	< 2	< 4	< 2	< 3	< 2	< 3	< 9	< 2	< 2	< 16	< 5
	07/07/22 - 07/28/22	< 3	< 3	< 7	< 3	< 5	< 3	< 5	< 10	< 3	< 3	< 21	< 7
	08/03/22 - 08/31/22	< 2	< 2	< 5	< 2	< 4	< 2	< 3	< 12	< 2	< 2	< 20	< 7
	09/08/22 - 09/28/22	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 7	< 2	< 2	< 14	< 4
	10/06/22 - 10/27/22	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 7	< 2	< 2	< 14	< 6
	11/02/22 - 11/30/22	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 12	< 2	< 2	< 19	< 6
	12/08/22 - 12/22/22	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 11	< 2	< 2	< 21	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-II.1 CONCENTRATIONS OF TRITIUM IN GROUND/WELL WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2022

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	L-27	L-28-W4	L-28-W5	L-28-W6
01/12/22 - 01/12/22	< 165		< 194	< 186
04/14/22 - 04/14/22	< 197	< 196		< 199
07/13/22 - 07/13/22	< 191		< 183	< 187
10/12/22 - 10/12/22	< 198	< 184		< 178
MEAN	-	-	-	-

Table C-II.2 **CONCENTRATIONS OF GAMMA EMITTERS IN GROUND/WELL WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2022**

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	01/12/22 - 01/12/22	< 4	< 4	< 8	< 5	< 6	< 5	< 7	< 5	< 4	< 16	< 8
	04/14/22 - 04/14/22	< 7	< 6	< 15	< 5	< 13	< 8	< 13	< 6	< 7	< 35	< 10
	07/13/22 - 07/13/22	< 9	< 5	< 15	< 8	< 14	< 8	< 15	< 9	< 7	< 34	< 11
	10/12/22 - 10/12/22	< 4	< 5	< 9	< 5	< 10	< 5	< 8	< 5	< 5	< 22	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-28-W4	04/14/22 - 04/14/22	< 7	< 6	< 10	< 6	< 10	< 5	< 9	< 7	< 6	< 26	< 10
	10/12/22 - 10/12/22	< 4	< 3	< 9	< 4	< 10	< 4	< 6	< 4	< 4	< 17	< 6
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-28-W5	01/12/22 - 01/12/22	< 6	< 5	< 12	< 6	< 13	< 7	< 11	< 6	< 5	< 27	< 10
	07/13/22 - 07/13/22	< 6	< 7	< 17	< 7	< 12	< 6	< 12	< 7	< 7	< 33	< 4
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-28-W6	01/12/22 - 01/12/22	< 4	< 5	< 10	< 4	< 12	< 5	< 9	< 6	< 5	< 25	< 8
	04/14/22 - 04/14/22	< 6	< 8	< 16	< 8	< 14	< 6	< 10	< 7	< 8	< 31	< 11
	07/13/22 - 07/13/22	< 6	< 7	< 14	< 7	< 13	< 7	< 9	< 7	< 7	< 31	< 12
	10/12/22 - 10/12/22	< 3	< 4	< 9	< 6	< 7	< 4	< 7	< 4	< 4	< 17	< 5
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-III.1

CONCENTRATIONS OF GAMMA EMITTERS IN FISH SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2022

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	05/04/22	< 61	< 75	< 126	< 69	< 86	< 54	< 92	< 63	< 54	< 320	< 63
Largemouth Bass	05/04/22	< 69	< 52	< 138	< 47	< 193	< 90	< 116	< 88	< 74	< 329	< 87
Bluegill	10/14/22	< 78	< 69	< 146	< 71	< 165	< 88	< 101	< 77	< 71	< 342	< 148
Channel Catfish	10/14/22	< 72	< 67	< 154	< 81	< 142	< 66	< 123	< 65	< 65	< 367	< 90
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-35												
Freshwater Drum	05/03/22	< 36	< 48	< 104	< 55	< 94	< 41	< 81	< 54	< 47	< 252	< 81
River Carpsucker	05/03/22	< 74	< 90	< 155	< 69	< 197	< 79	< 141	< 96	< 91	< 418	< 132
Smallmouth Bass	10/14/22	< 74	< 63	< 158	< 73	< 146	< 82	< 148	< 79	< 78	< 356	< 86
Smallmouth Buffalo	10/14/22	< 56	< 54	< 60	< 66	< 117	< 40	< 114	< 57	< 49	< 230	< 91
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-36												
Channel Catfish	05/03/22	< 58	< 45	< 132	< 61	< 112	< 58	< 97	< 40	< 46	< 351	< 96
Freshwater Drum	05/03/22	< 43	< 51	< 90	< 41	< 110	< 40	< 95	< 30	< 43	< 299	< 78
Channel Catfish	10/14/22	< 63	< 68	< 127	< 73	< 134	< 65	< 125	< 65	< 57	< 312	< 115
Smallmouth Buffalo	10/14/22	< 46	< 57	< 113	< 61	< 116	< 57	< 105	< 50	< 70	< 249	< 75
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-IV.1

CONCENTRATIONS OF GAMMA EMITTERS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2022

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	05/17/22	< 68	< 65	< 147	< 75	< 148	< 82	< 125	< 78	< 101	< 332	< 96
	10/29/22	< 71	< 79	< 169	< 100	< 185	< 102	< 126	< 87	< 96	< 302	< 105
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-40	05/17/22	< 51	< 52	< 129	< 75	< 119	< 66	< 108	< 59	< 57	< 300	< 65
	10/29/22	< 98	< 89	< 190	< 85	< 199	< 112	< 136	< 94	< 89	< 355	< 103
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-41	05/03/22	< 53	< 60	< 98	< 63	< 117	< 61	< 110	< 74	< 70	< 304	< 101
	10/14/22	< 51	< 49	< 105	< 66	< 125	< 60	< 96	< 60	< 55	< 240	< 84
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-V.1 **CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2022**

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
12/29/21 - 01/06/22	29 ± 5	39 ± 5	39 ± 5	41 ± 5	28 ± 4	42 ± 5	38 ± 5	37 ± 5	40 ± 5
01/06/22 - 01/12/22	24 ± 5	32 ± 6	31 ± 6	35 ± 7	28 ± 6	27 ± 6	27 ± 5	23 ± 5	24 ± 5
01/12/22 - 01/20/22	21 ± 4	21 ± 4	25 ± 5	22 ± 5	22 ± 5	28 ± 5	27 ± 5	26 ± 5	25 ± 5
01/20/22 - 01/27/22	21 ± 5	24 ± 5	21 ± 5	19 ± 5	24 ± 5	23 ± 5	26 ± 5	21 ± 5	24 ± 5
01/27/22 - 02/03/22	33 ± 4	31 ± 4	28 ± 5	27 ± 5	23 ± 5	28 ± 5	24 ± 5	21 ± 5	21 ± 4
02/03/22 - 02/09/22	*(1)*	*(1)*	36 ± 6	35 ± 6	37 ± 7	30 ± 6	30 ± 6	30 ± 6	35 ± 6
02/09/22 - 02/17/22	19 ± 4	20 ± 4	19 ± 4	18 ± 4	22 ± 4	17 ± 4	21 ± 4	16 ± 4	20 ± 4
02/17/22 - 02/24/22	17 ± 5	21 ± 5	15 ± 4	15 ± 4	18 ± 5	20 ± 5	22 ± 5	16 ± 4	14 ± 4
02/24/22 - 03/02/22	23 ± 6	24 ± 6	22 ± 5	22 ± 5	29 ± 6	30 ± 6	21 ± 5	29 ± 6	28 ± 6
03/02/22 - 03/09/22	20 ± 4	21 ± 5	25 ± 5	20 ± 4	20 ± 4	24 ± 5	22 ± 5	22 ± 5	22 ± 5
03/09/22 - 03/17/22	24 ± 5	18 ± 4	25 ± 5	23 ± 4	17 ± 4	19 ± 4	18 ± 4	22 ± 4	20 ± 4
03/17/22 - 03/24/22	15 ± 4	14 ± 4	12 ± 4	14 ± 4	19 ± 5	13 ± 4	17 ± 5	11 ± 4	15 ± 4
03/24/22 - 03/31/22	16 ± 4	12 ± 4	15 ± 4	14 ± 4	14 ± 4	15 ± 5	13 ± 4	13 ± 4	13 ± 4
03/30/22 - 04/07/22	11 ± 4	10 ± 4	12 ± 4	10 ± 4	12 ± 4	11 ± 3	12 ± 4	9 ± 4	10 ± 4
04/07/22 - 04/14/22	10 ± 4	12 ± 4	11 ± 4	12 ± 4	10 ± 4	11 ± 4	11 ± 4	8 ± 4	11 ± 4
04/14/22 - 04/21/22	13 ± 4	8 ± 4	12 ± 4	9 ± 4	10 ± 4	9 ± 4	13 ± 4	12 ± 4	14 ± 4
04/21/22 - 04/28/22	15 ± 4	12 ± 4	15 ± 4	18 ± 4	15 ± 4	13 ± 4	19 ± 4	17 ± 4	16 ± 4
04/28/22 - 05/04/22	11 ± 4	10 ± 4	18 ± 5	15 ± 5	14 ± 5	13 ± 5	12 ± 5	16 ± 5	13 ± 4
05/04/22 - 05/12/22	20 ± 4	18 ± 4	19 ± 4	18 ± 4	21 ± 4	17 ± 4	20 ± 4	15 ± 4	19 ± 4
05/12/22 - 05/19/22	21 ± 4	22 ± 4	19 ± 4	21 ± 4	18 ± 4	22 ± 4	19 ± 4	20 ± 4	22 ± 4
05/19/22 - 05/26/22	18 ± 4	15 ± 4	16 ± 4	15 ± 4	17 ± 4	15 ± 4	17 ± 4	11 ± 4	16 ± 4
05/26/22 - 06/01/22	17 ± 5	13 ± 4	18 ± 5	14 ± 4	18 ± 5	17 ± 5	18 ± 5	17 ± 5	18 ± 5
06/01/22 - 06/09/22	19 ± 4	14 ± 4	20 ± 4	20 ± 4	18 ± 4	18 ± 4	22 ± 4	18 ± 4	17 ± 4
06/09/22 - 06/16/22	22 ± 5	24 ± 5	22 ± 5	26 ± 5	24 ± 5	26 ± 5	25 ± 5	22 ± 5	22 ± 4
06/16/22 - 06/23/22	12 ± 4	12 ± 4	12 ± 4	14 ± 4	11 ± 4	12 ± 4	13 ± 4	13 ± 4	13 ± 4
06/23/22 - 06/29/22	10 ± 5	8 ± 4	15 ± 5	12 ± 4	12 ± 5	11 ± 5	11 ± 5	11 ± 5	10 ± 4
06/29/22 - 07/07/22	22 ± 5	22 ± 4	25 ± 4	27 ± 4	25 ± 4	30 ± 5	25 ± 4	25 ± 4	22 ± 4
07/07/22 - 07/13/22	16 ± 5	21 ± 5	22 ± 5	18 ± 5	16 ± 5	26 ± 5	17 ± 5	20 ± 5	16 ± 5
07/13/22 - 07/21/22	18 ± 4	17 ± 4	21 ± 4	22 ± 4	23 ± 4	21 ± 4	19 ± 4	22 ± 4	20 ± 4
07/21/22 - 07/28/22	16 ± 4	20 ± 4	20 ± 4	15 ± 4	19 ± 4	22 ± 5	18 ± 4	20 ± 4	19 ± 4
07/28/22 - 08/03/22	14 ± 5	14 ± 5	19 ± 5	16 ± 5	17 ± 5	17 ± 5	13 ± 5	15 ± 5	19 ± 5
08/03/22 - 08/11/22	13 ± 3	16 ± 4	14 ± 3	17 ± 4	15 ± 3	18 ± 4	15 ± 3	15 ± 3	15 ± 3
08/11/22 - 08/18/22	21 ± 4	21 ± 4	24 ± 4	21 ± 4	21 ± 4	24 ± 5	27 ± 5	24 ± 5	19 ± 4
08/18/22 - 08/24/22	18 ± 5	22 ± 5	26 ± 5	21 ± 5	20 ± 5	24 ± 5	21 ± 5	24 ± 5	24 ± 5
08/24/22 - 08/31/22	25 ± 5	22 ± 5	23 ± 5	20 ± 4	27 ± 5	21 ± 5	25 ± 5	22 ± 5	19 ± 4
08/31/22 - 09/08/22	18 ± 4	23 ± 4	22 ± 4	19 ± 4	24 ± 4	23 ± 4	23 ± 4	22 ± 4	25 ± 4
09/08/22 - 09/15/22	21 ± 4	25 ± 5	23 ± 4	20 ± 4	23 ± 4	28 ± 5	24 ± 5	24 ± 5	24 ± 5
09/15/22 - 09/22/22	26 ± 5	26 ± 5	26 ± 5	23 ± 5	38 ± 7	27 ± 5	27 ± 5	25 ± 5	22 ± 5
09/22/22 - 09/28/22	12 ± 4	14 ± 4	18 ± 5	14 ± 4	13 ± 4	15 ± 5	12 ± 4	16 ± 5	16 ± 5
09/28/22 - 10/06/22	12 ± 4	15 ± 4	14 ± 4	15 ± 4	15 ± 4	15 ± 4	14 ± 4	16 ± 4	18 ± 4
10/06/22 - 10/12/22	31 ± 6	28 ± 6	28 ± 6	25 ± 6	28 ± 6	29 ± 6	28 ± 6	31 ± 6	31 ± 6
10/12/22 - 10/20/22	12 ± 4	11 ± 4	11 ± 3	15 ± 4	13 ± 4	12 ± 3	14 ± 4	16 ± 4	13 ± 4
10/20/22 - 10/27/22	27 ± 5	32 ± 5	23 ± 5	29 ± 5	28 ± 5	31 ± 5	31 ± 5	34 ± 5	29 ± 5
10/27/22 - 11/02/22	32 ± 6	33 ± 6	33 ± 6	31 ± 6	42 ± 6	40 ± 6	40 ± 6	42 ± 6	39 ± 6
11/02/22 - 11/10/22	24 ± 4	28 ± 5	29 ± 4	26 ± 4	29 ± 4	30 ± 5	31 ± 5	29 ± 5	30 ± 5
11/10/22 - 11/17/22	9 ± 4	11 ± 4	12 ± 4	10 ± 4	9 ± 3	11 ± 4	14 ± 4	13 ± 4	15 ± 4
11/17/22 - 11/23/22	28 ± 5	31 ± 6	25 ± 5	29 ± 6	34 ± 6	34 ± 6	29 ± 5	25 ± 5	33 ± 6
11/23/22 - 11/30/22	31 ± 5	37 ± 6	34 ± 5	30 ± 5	30 ± 5	37 ± 6	42 ± 6	31 ± 5	36 ± 6
11/30/22 - 12/08/22	31 ± 5	33 ± 5	34 ± 5	30 ± 5	34 ± 5	35 ± 5	19 ± 4	35 ± 5	35 ± 5
12/08/22 - 12/15/22	27 ± 5	25 ± 5	25 ± 5	25 ± 5	23 ± 4	30 ± 5	28 ± 5	27 ± 5	26 ± 5
12/15/22 - 12/22/22	31 ± 5	31 ± 5	33 ± 5	31 ± 5	31 ± 5	34 ± 5	37 ± 5	33 ± 5	33 ± 5
12/22/22 - 12/28/22	22 ± 5	23 ± 5	18 ± 5	22 ± 5	23 ± 5	21 ± 5	20 ± 5	18 ± 5	24 ± 5
(2) MEAN ± 2 STD DEV	20 ± 13	21 ± 16	22 ± 14	21 ± 14	21 ± 15	22 ± 17	22 ± 15	21 ± 15	22 ± 15

(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, 2022

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
12/29/21 - 01/27/22	21	39	26 ± 13	12/29/21 - 01/27/22	19	41	29 ± 17	12/29/21 - 01/27/22	21	42	28 ± 12	12/29/21 - 01/27/22	24	40	28 ± 16
01/27/22 - 03/02/22	17	33	23 ± 11	01/27/22 - 03/02/22	15	36	24 ± 15	01/27/22 - 03/02/22	16	37	24 ± 12	01/27/22 - 03/02/22	14	35	24 ± 16
03/02/22 - 03/31/22	12	24	17 ± 8	03/02/22 - 03/31/22	12	25	18 ± 10	03/02/22 - 03/31/22	11	24	17 ± 8	03/02/22 - 03/31/22	13	22	17 ± 8
03/31/22 - 04/28/22	8	15	11 ± 4	03/31/22 - 04/28/22	9	18	12 ± 5	03/30/22 - 04/28/22	8	19	12 ± 6	03/31/22 - 04/28/22	10	16	13 ± 6
04/28/22 - 06/01/22	10	22	17 ± 8	04/28/22 - 06/01/22	14	21	17 ± 5	04/28/22 - 06/01/22	11	22	17 ± 6	04/28/22 - 06/01/22	13	22	17 ± 7
06/01/22 - 06/29/22	8	24	15 ± 12	06/01/22 - 06/29/22	12	26	18 ± 10	06/01/22 - 06/29/22	11	26	17 ± 11	06/01/22 - 06/29/22	10	22	16 ± 10
06/29/22 - 08/03/22	14	22	18 ± 6	06/29/22 - 08/03/22	15	27	21 ± 7	06/29/22 - 08/03/22	13	30	21 ± 9	06/29/22 - 08/03/22	16	22	19 ± 4
08/03/22 - 08/31/22	13	25	20 ± 8	08/03/22 - 08/31/22	14	26	21 ± 8	08/03/22 - 08/31/22	15	27	22 ± 8	08/03/22 - 08/31/22	15	24	19 ± 7
08/31/22 - 09/28/22	12	26	21 ± 11	08/31/22 - 09/28/22	14	26	21 ± 7	08/31/22 - 09/28/22	12	38	23 ± 13	08/31/22 - 09/28/22	16	25	22 ± 8
09/28/22 - 11/02/22	11	33	23 ± 19	09/28/22 - 11/02/22	11	33	23 ± 16	09/28/22 - 11/02/22	12	42	26 ± 21	09/28/22 - 11/02/22	13	39	26 ± 21
11/02/22 - 11/30/22	9	37	25 ± 20	11/02/22 - 11/30/22	10	34	24 ± 18	11/02/22 - 11/30/22	9	42	27 ± 19	11/02/22 - 11/30/22	15	36	28 ± 19
11/30/22 - 12/28/22	22	33	28 ± 8	11/30/22 - 12/28/22	18	34	27 ± 11	11/30/22 - 12/28/22	18	37	28 ± 13	11/30/22 - 12/28/22	24	35	29 ± 10
12/29/21 - 12/28/22	8	39	20 ± 14	12/29/21 - 12/28/22	9	41	21 ± 14	12/29/21 - 12/28/22	8	42	22 ± 15	12/29/21 - 12/28/22	10	40	22 ± 15

Table C-V.3

CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2022

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	12/29/21 - 03/31/22	< 2	< 4	< 10	< 2	< 4	< 3	< 6	< 2	< 1	< 284	< 130
	03/31/22 - 06/29/22	< 3	< 5	< 12	< 3	< 6	< 5	< 8	< 4	< 3	< 266	< 106
	06/29/22 - 09/28/22	< 3	< 4	< 14	< 4	< 11	< 6	< 8	< 3	< 3	< 321	< 174
	09/28/22 - 12/28/22	< 2	< 4	< 13	< 3	< 7	< 6	< 10	< 2	< 3	< 313	< 56
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-03	12/29/21 - 03/31/22	< 2	< 2	< 8	< 2	< 5	< 3	< 4	< 1	< 1	< 333	< 110
	03/31/22 - 06/29/22	< 4	< 5	< 21	< 3	< 10	< 7	< 11	< 4	< 4	< 297	< 109
	06/29/22 - 09/28/22	< 3	< 5	< 16	< 4	< 7	< 4	< 6	< 2	< 2	< 327	< 129
	09/28/22 - 12/28/22	< 2	< 4	< 11	< 3	< 6	< 4	< 7	< 1	< 2	< 212	< 57
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-04	12/29/21 - 03/31/22	< 3	< 4	< 7	< 2	< 7	< 5	< 7	< 2	< 2	< 286	< 106
	03/31/22 - 06/29/22	< 2	< 3	< 11	< 3	< 6	< 4	< 6	< 2	< 2	< 161	< 72
	06/29/22 - 09/28/22	< 3	< 4	< 14	< 2	< 6	< 4	< 6	< 2	< 2	< 281	< 58
	09/28/22 - 12/28/22	< 2	< 4	< 14	< 2	< 7	< 3	< 6	< 2	< 2	< 194	< 95
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-05	12/29/21 - 03/31/22	< 2	< 4	< 6	< 2	< 7	< 4	< 4	< 2	< 2	< 244	< 151
	03/31/22 - 06/29/22	< 2	< 3	< 10	< 3	< 6	< 4	< 5	< 2	< 2	< 217	< 58
	06/29/22 - 09/28/22	< 2	< 4	< 13	< 3	< 4	< 3	< 7	< 2	< 1	< 247	< 121
	09/28/22 - 12/28/22	< 3	< 5	< 12	< 2	< 7	< 6	< 10	< 3	< 3	< 331	< 98
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-06	12/29/21 - 03/31/22	< 2	< 4	< 14	< 2	< 5	< 4	< 8	< 2	< 2	< 248	< 117
	03/31/22 - 06/29/22	< 2	< 5	< 13	< 2	< 7	< 5	< 8	< 3	< 3	< 265	< 91
	06/29/22 - 09/28/22	< 2	< 3	< 10	< 2	< 6	< 4	< 6	< 2	< 2	< 250	< 77
	09/28/22 - 12/28/22	< 3	< 5	< 15	< 2	< 8	< 5	< 11	< 3	< 3	< 379	< 76
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-V.3

CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2022

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	12/29/21 - 03/30/22	< 2	< 4	< 14	< 3	< 7	< 5	< 8	< 3	< 2	< 368	< 156
	03/30/22 - 06/29/22	< 2	< 4	< 10	< 2	< 6	< 5	< 6	< 2	< 2	< 198	< 50
	06/29/22 - 09/28/22	< 3	< 4	< 13	< 2	< 7	< 4	< 6	< 1	< 3	< 282	< 145
	09/28/22 - 12/28/22	< 2	< 3	< 12	< 2	< 5	< 4	< 5	< 2	< 2	< 215	< 82
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-08	12/29/21 - 03/30/22	< 2	< 4	< 11	< 3	< 3	< 4	< 8	< 2	< 2	< 302	< 161
	03/30/22 - 06/29/22	< 3	< 4	< 22	< 3	< 7	< 6	< 6	< 3	< 4	< 361	< 91
	06/29/22 - 09/28/22	< 2	< 5	< 12	< 2	< 7	< 5	< 9	< 2	< 2	< 257	< 127
	09/28/22 - 12/28/22	< 2	< 3	< 13	< 3	< 6	< 4	< 7	< 2	< 2	< 212	< 129
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-10	12/29/21 - 03/31/22	< 2	< 3	< 9	< 1	< 4	< 3	< 5	< 2	< 2	< 223	< 113
	03/31/22 - 06/29/22	< 2	< 3	< 8	< 2	< 5	< 4	< 6	< 3	< 2	< 208	< 67
	06/29/22 - 09/28/22	< 2	< 3	< 12	< 2	< 6	< 4	< 6	< 2	< 2	< 308	< 71
	09/28/22 - 12/28/22	< 3	< 5	< 15	< 3	< 7	< 5	< 10	< 3	< 2	< 310	< 106
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-11A	12/29/21 - 03/31/22	< 2	< 4	< 11	< 2	< 6	< 2	< 7	< 2	< 2	< 247	< 84
	03/31/22 - 06/29/22	< 3	< 5	< 14	< 2	< 7	< 4	< 9	< 3	< 2	< 265	< 89
	06/29/22 - 09/28/22	< 1	< 3	< 16	< 3	< 6	< 3	< 6	< 2	< 2	< 287	< 135
	09/28/22 - 12/28/22	< 2	< 4	< 9	< 1	< 5	< 3	< 7	< 2	< 2	< 179	< 111
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-VI.1

CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2022

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
12/29/21 - 01/06/22	< 56	< 57	< 54	< 32	< 57	< 35	< 34	< 35	< 33
01/06/22 - 01/12/22	< 23	< 23	< 21	< 12	< 23	< 25	< 24	< 24	< 12
01/12/22 - 01/20/22	< 50	< 50	< 50	< 33	< 51	< 20	< 33	< 32	< 31
01/20/22 - 01/27/22	< 45	< 46	< 46	< 29	< 46	< 30	< 28	< 18	< 29
01/27/22 - 02/03/22	< 8	< 19	< 37	< 38	< 18	< 38	< 38	< 43	< 41
02/03/22 - 02/09/22	*(1)*	*(1)*	< 29	< 26	< 29	< 64	< 60	< 63	< 59
02/09/22 - 02/17/22	< 26	< 41	< 41	< 42	< 41	< 51	< 50	< 50	< 50
02/17/22 - 02/24/22	< *21*	< 35	< 34	< 34	< 34	< 31	< 31	< 31	< 13
02/24/22 - 03/02/22	< 64	< 65	< 63	< 53	< 65	< 27	< 54	< 55	< 54
03/02/22 - 03/09/22	< 52	< 26	< 52	< 50	< 51	< 50	< 51	< 25	< 50
03/09/22 - 03/17/22	< 31	< 31	< 30	< 43	< 30	< 23	< 44	< 44	< 42
03/17/22 - 03/24/22	< 48	< 46	< 44	< 17	< 25	< 33	< 33	< 33	< 31
03/24/22 - 03/31/22	< 19	< 18	< 18	< 12	< 18	< 20	< 19	< 17	< 7
03/30/22 - 04/07/22	< 24	< 49	< 48	< 48	< 47	< 30	< 30	< 32	< 32
04/07/22 - 04/14/22	< 28	< 40	< 40	< 43	< 39	< 23	< 47	< 44	< 45
04/14/22 - 04/21/22	< 34	< 49	< 48	< 48	< 47	< 50	< 49	< 24	< 48
04/21/22 - 04/28/22	< 18	< 37	< 35	< 36	< 35	< 34	< 34	< 21	< 34
04/28/22 - 05/04/22	< 27	< 55	< *56*	< 54	< 55	< 53	< 53	< 45	< 51
05/04/22 - 05/12/22	< 35	< 21	< 34	< 34	< 34	< 42	< 42	< 21	< 41
05/12/22 - 05/19/22	< 23	< 48	< 48	< 48	< 47	< 62	< 62	< 30	< 61
05/19/22 - 05/26/22	< 24	< 48	< 46	< 37	< 45	< 39	< 38	< 23	< 38
05/26/22 - 06/01/22	< 27	< 65	< 63	< 63	< 65	< 66	< 28	< 65	< 64
06/01/22 - 06/09/22	< 55	< 56	< 54	< 54	< 22	< 42	< 43	< 43	< 41
06/09/22 - 06/16/22	< 22	< 46	< 44	< 22	< 44	< 10	< 23	< 23	< 22
06/16/22 - 06/23/22	< 48	< 25	< 47	< 45	< 48	< 23	< 47	< 46	< 45
06/23/22 - 06/29/22	< 39	< 56	< 56	< 60	< 56	< 66	< 67	< 35	< 63
06/29/22 - 07/07/22	< 31	< 50	< 48	< 40	< 47	< 42	< 44	< 41	< 41
07/07/22 - 07/13/22	< 31	< 31	< 30	< 52	< 30	< 24	< 53	< 55	< 54
07/13/22 - 07/21/22	< 40	< 41	< 40	< 50	< 40	< 25	< 50	< 51	< 49
07/21/22 - 07/28/22	< 41	< 59	< 58	< 46	< 58	< 33	< 48	< 48	< 47
07/28/22 - 08/03/22	< 58	< 58	< 59	< 61	< 25	< 61	< 26	< 60	< 59
08/03/22 - 08/11/22	< 40	< 17	< 37	< 39	< 38	< 32	< 32	< 13	< 31
08/11/22 - 08/18/22	< 23	< 11	< 24	< 23	< 24	< 33	< 33	< 33	< 33
08/18/22 - 08/24/22	< 59	< 29	< 59	< 52	< 59	< 54	< 54	< 34	< 53
08/24/22 - 08/31/22	< 43	< 41	< 40	< 17	< 41	< 33	< 69	< 69	< 67
08/31/22 - 09/08/22	< 29	< 12	< 28	< 28	< 28	< 40	< 47	< 47	< 45
09/08/22 - 09/15/22	< 13	< 30	< 28	< 29	< 29	< 50	< 50	< 50	< 48
09/15/22 - 09/22/22	< 33	< 33	< 32	< 32	< 18	< 25	< 58	< 59	< 58
09/22/22 - 09/28/22	< 66	< 66	< 66	< 27	< 66	< 32	< 14	< 32	< 31
09/28/22 - 10/06/22	< 62	< 61	< 25	< 61	< 60	< 62	< 25	< 61	< 61
10/06/22 - 10/12/22	< 48	< 40	< 47	< 47	< 47	< 54	< 54	< 52	< 51
10/12/22 - 10/20/22	< 68	< 69	< 67	< 62	< 69	< 61	< 25	< 63	< 60
10/20/22 - 10/27/22	< 48	< 48	< 46	< 52	< 45	< 54	< 55	< 55	< 26
10/27/22 - 11/02/22	< 48	< 49	< 24	< 48	< 49	< 23	< 48	< 48	< 48
11/02/22 - 11/10/22	< 28	< 12	< 27	< 67	< 28	< 69	< 69	< 29	< 65
11/10/22 - 11/17/22	< 22	< 12	< 22	< 22	< 22	< 23	< 11	< 22	< 22
11/17/22 - 11/23/22	< 49	< 24	< 49	< 50	< 49	< 57	< 56	< 57	< 57
11/23/22 - 11/30/22	< 30	< 32	< 30	< 16	< 30	< 41	< 41	< 41	< 38
11/30/22 - 12/08/22	< 53	< 53	< 53	< 28	< 53	< 53	< 55	< 53	< 53
12/08/22 - 12/15/22	< 49	< 50	< 49	< 49	< 24	< 23	< 46	< 47	< 46
12/15/22 - 12/22/22	< 56	< 30	< 55	< 47	< 56	< 24	< 49	< 49	< 46
12/22/22 - 12/28/22	< 68	< 69	< 35	< 62	< 69	< 65	< 63	< 31	< 62
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, 2022**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CONTROL FARM L-42
04/07/22	< 0.9
MEAN	-

Table C-VII.2 **CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2022**

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	04/07/22	< 8	< 7	< 21	< 8	< 21	< 7	< 13	< 7	< 9	< 53	< 10
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-VIII.1

CONCENTRATIONS OF GAMMA EMITTERS IN FOOD PRODUCT SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2022

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-42													
Pasturage	01/06/22	< 39	< 33	< 61	< 33	< 86	< 39	< 63	< 55	< 36	< 38	< 133	< 42
Pasturage	02/03/22	< 35	< 29	< 86	< 38	< 95	< 32	< 56	< 38	< 38	< 33	< 130	< 30
Pasturage	03/02/22	< 32	< 35	< 69	< 34	< 73	< 34	< 61	< 52	< 40	< 35	< 143	< 37
Pasturage	05/04/22	< 27	< 30	< 57	< 30	< 75	< 32	< 51	< 50	< 36	< 31	< 135	< 32
Pasturage	05/20/22	< 13	< 14	< 35	< 16	< 28	< 14	< 25	< 37	< 15	< 14	< 82	< 17
Pasturage	06/01/22	< 35	< 35	< 93	< 38	< 85	< 33	< 61	< 55	< 42	< 30	< 137	< 55
Pasturage	06/16/22	< 38	< 37	< 88	< 56	< 92	< 34	< 65	< 54	< 47	< 42	< 163	< 49
Pasturage	06/29/22	< 35	< 37	< 82	< 42	< 81	< 34	< 58	< 59	< 37	< 30	< 156	< 52
Pasturage	07/13/22	< 30	< 28	< 58	< 30	< 61	< 30	< 44	< 42	< 31	< 26	< 127	< 35
Pasturage	07/28/22	< 37	< 33	< 69	< 34	< 72	< 35	< 49	< 52	< 35	< 40	< 155	< 43
Pasturage	08/11/22	< 33	< 23	< 54	< 33	< 52	< 34	< 62	< 39	< 27	< 28	< 107	< 29
Pasturage	08/24/22	< 37	< 32	< 66	< 40	< 62	< 35	< 60	< 54	< 34	< 34	< 137	< 50
Pasturage	09/08/22	< 36	< 31	< 80	< 41	< 85	< 38	< 68	< 56	< 42	< 35	< 163	< 47
Pasturage	09/22/22	< 34	< 43	< 67	< 22	< 74	< 31	< 59	< 53	< 34	< 33	< 140	< 32
Pasturage	10/06/22	< 40	< 40	< 87	< 46	< 80	< 37	< 64	< 50	< 39	< 41	< 150	< 48
Pasturage	10/22/22	< 38	< 31	< 79	< 37	< 89	< 36	< 70	< 48	< 54	< 43	< 178	< 41
Pasturage	11/02/22	< 28	< 29	< 59	< 33	< 65	< 27	< 49	< 53	< 33	< 29	< 133	< 35
Pasturage	11/30/22	< 29	< 31	< 64	< 35	< 71	< 39	< 53	< 47	< 26	< 33	< 140	< 39
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
L-QUAD 1													
Cabbage	08/03/22	< 28	< 37	< 66	< 31	< 74	< 39	< 50	< 53	< 34	< 35	< 167	< 50
Potato	08/03/22	< 16	< 16	< 39	< 20	< 41	< 15	< 32	< 25	< 21	< 20	< 75	< 21
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
L-QUAD 2													
Horseradish	07/13/22	< 27	< 29	< 62	< 28	< 72	< 25	< 50	< 53	< 34	< 29	< 132	< 33
Horseradish leaves	07/13/22	< 25	< 30	< 61	< 34	< 72	< 27	< 55	< 40	< 32	< 28	< 123	< 51
Cabbage	07/21/22	< 25	< 34	< 75	< 44	< 64	< 34	< 61	< 37	< 33	< 30	< 132	< 39
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
L-QUAD 4													
Kohlrabi	07/13/22	< 20	< 20	< 51	< 21	< 48	< 20	< 33	< 32	< 25	< 19	< 100	< 26
Cabbage	07/13/22	< 26	< 28	< 75	< 31	< 83	< 34	< 61	< 42	< 38	< 32	< 118	< 34
Carrots	08/11/22	< 27	< 24	< 55	< 28	< 49	< 27	< 46	< 44	< 33	< 27	< 113	< 32
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-VIII.2

CONCENTRATIONS OF GAMMA EMITTERS IN VEGETATION SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2022

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													
Grass	05/19/22	< 29	< 27	< 63	< 30	< 65	< 24	< 48	< 44	< 28	< 31	< 129	< 47
Clover	05/19/22	< 22	< 22	< 48	< 24	< 47	< 22	< 44	< 33	< 22	< 24	< 90	< 27
Mayapple	05/19/22	< 24	< 27	< 51	< 26	< 59	< 25	< 38	< 34	< 25	< 25	< 113	< 30
Milkweed	06/16/22	< 36	< 36	< 74	< 43	< 72	< 38	< 54	< 52	< 40	< 40	< 165	< 60
Clover	06/16/22	< 34	< 51	< 100	< 59	< 105	< 45	< 79	< 56	< 52	< 45	< 204	< 61
Snakeroot	06/16/22	< 31	< 30	< 61	< 38	< 58	< 34	< 52	< 50	< 33	< 32	< 141	< 42
Turnips	07/13/22	< 34	< 30	< 57	< 46	< 75	< 35	< 55	< 55	< 39	< 33	< 143	< 40
Mustard green	07/13/22	< 37	< 28	< 97	< 42	< 120	< 45	< 68	< 53	< 44	< 40	< 163	< 39
Milkweed	07/21/22	< 33	< 35	< 81	< 35	< 68	< 31	< 56	< 52	< 37	< 34	< 161	< 34
Clover	07/21/22	< 17	< 17	< 37	< 21	< 44	< 18	< 33	< 28	< 19	< 18	< 83	< 24
Snakeroot	07/21/22	< 39	< 40	< 86	< 37	< 91	< 39	< 65	< 56	< 43	< 43	< 166	< 56
Radish	07/28/22	< 34	< 31	< 61	< 34	< 57	< 23	< 42	< 43	< 26	< 30	< 115	< 35
Lettuce	07/28/22	< 30	< 31	< 52	< 33	< 60	< 32	< 51	< 46	< 32	< 30	< 142	< 46
Milkweed	08/18/22	< 39	< 33	< 97	< 36	< 98	< 38	< 64	< 50	< 46	< 37	< 155	< 56
Clover	08/18/22	< 46	< 42	< 90	< 42	< 108	< 52	< 79	< 55	< 51	< 44	< 190	< 56
Milkweed	09/15/22	< 44	< 38	< 80	< 48	< 86	< 44	< 78	< 58	< 42	< 40	< 186	< 48
Clover	09/15/22	< 39	< 31	< 89	< 35	< 77	< 33	< 61	< 53	< 42	< 41	< 131	< 32
Grass	09/15/22	< 43	< 46	< 86	< 42	< 101	< 40	< 71	< 53	< 46	< 44	< 174	< 41
Clover	10/20/22	< 38	< 36	< 73	< 41	< 72	< 42	< 59	< 51	< 32	< 35	< 171	< 45
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
L-ESE-1													
Clover	05/19/22	< 21	< 19	< 42	< 19	< 45	< 20	< 34	< 34	< 23	< 20	< 94	< 27
Dandelion	05/19/22	< 37	< 33	< 72	< 35	< 86	< 41	< 69	< 57	< 36	< 34	< 188	< 48
Clover	06/16/22	< 35	< 34	< 71	< 37	< 73	< 38	< 61	< 57	< 37	< 28	< 140	< 48
Dandelion	06/16/22	< 32	< 35	< 74	< 35	< 77	< 39	< 66	< 52	< 38	< 36	< 172	< 44
Clover	07/21/22	< 17	< 17	< 36	< 20	< 39	< 18	< 31	< 25	< 18	< 18	< 80	< 23
Dandelion	07/21/22	< 40	< 32	< 79	< 53	< 86	< 37	< 63	< 44	< 40	< 36	< 164	< 44
Plantain	07/21/22	< 38	< 42	< 91	< 43	< 101	< 38	< 75	< 55	< 44	< 41	< 155	< 49
Plantain	08/18/22	< 34	< 32	< 66	< 35	< 76	< 35	< 63	< 54	< 35	< 35	< 144	< 39
Dandelion	08/18/22	< 34	< 34	< 94	< 46	< 76	< 37	< 56	< 44	< 45	< 37	< 157	< 49
Clover	09/15/22	< 41	< 39	< 79	< 37	< 64	< 38	< 60	< 55	< 36	< 38	< 167	< 43
Dandelion	09/15/22	< 38	< 35	< 91	< 46	< 79	< 32	< 55	< 53	< 34	< 41	< 137	< 40
Clover	10/20/22	< 32	< 32	< 78	< 38	< 76	< 37	< 62	< 50	< 35	< 34	< 158	< 46
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
L-ESE-2													
Dandelion	05/19/22	< 18	< 20	< 42	< 22	< 36	< 19	< 30	< 29	< 23	< 18	< 83	< 29
Plantain	05/19/22	< 20	< 22	< 41	< 27	< 49	< 24	< 39	< 35	< 22	< 21	< 89	< 27
Clover	05/19/22	< 21	< 24	< 52	< 21	< 47	< 21	< 38	< 30	< 21	< 19	< 90	< 21
Dandelion	06/16/22	< 36	< 41	< 95	< 39	< 86	< 35	< 72	< 48	< 41	< 38	< 192	< 44
Plantain	06/16/22	< 47	< 42	< 89	< 37	< 77	< 43	< 75	< 56	< 50	< 40	< 163	< 56
Dandelion	07/21/22	< 18	< 18	< 35	< 21	< 36	< 19	< 27	< 26	< 20	< 19	< 77	< 23
Plantain	07/21/22	< 44	< 32	< 75	< 42	< 72	< 38	< 69	< 49	< 44	< 42	< 157	< 45
Clover	07/21/22	< 18	< 17	< 38	< 22	< 40	< 18	< 33	< 23	< 21	< 19	< 71	< 20
Dandelion	08/18/22	< 29	< 33	< 70	< 34	< 80	< 33	< 51	< 43	< 34	< 34	< 130	< 40
Plantain	08/18/22	< 48	< 34	< 104	< 57	< 100	< 37	< 71	< 47	< 41	< 53	< 172	< 20
Clover	08/18/22	< 40	< 39	< 64	< 43	< 90	< 35	< 61	< 58	< 43	< 38	< 166	< 45
Thistle	09/15/22	< 31	< 29	< 72	< 45	< 69	< 28	< 59	< 46	< 34	< 34	< 144	< 30
Plantain	09/15/22	< 28	< 34	< 42	< 39	< 76	< 37	< 64	< 43	< 42	< 34	< 173	< 36
Clover	09/15/22	< 39	< 46	< 56	< 39	< 103	< 38	< 61	< 41	< 47	< 36	< 184	< 35
Grass	10/20/22	< 35	< 37	< 78	< 33	< 99	< 37	< 74	< 57	< 46	< 43	< 196	< 47
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-IX.1 QUARTERLY DLR RESULTS FOR LASALLE COUNTY STATION, 2022

Location	Location Qtrly Baseline, B_Q (mrem)	B_Q + MDD_Q	2022 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	17.3	17.5	17.8	19.1	71.8	53.1	87.3	ND	No
L-03	11.9	20.6	17.1	16.1	16.6	19.2	68.9	45.3	79.5	ND	No
L-04	12	20.7	15.8	16.7	16.9	17.6	67.0	45.6	79.8	ND	No
L-05	11.7	20.4	16.5	16.0	15.5	17.8	65.8	46.8	81.0	ND	No
L-06	13.2	21.9	16.6	18.4	17.1	17.2	69.2	53.0	87.2	ND	No
L-07	12.9	21.6	17.9	18.2	17.1	16.7	69.8	51.5	85.7	ND	No
L-08	12.5	21.2	15.3	14.9	15.1	16.0	61.3	50.1	84.3	ND	No
L-10	10	18.7	15.8	15.5	15.5	13.0	59.7	39.8	74.0	ND	No
L-101	13.3	22.0	18.4	18.9	17.5	18.6	73.3	50.4	84.6	ND	No
L-102	14.9	23.6	19.2	20.3	*20.5*	19.8	79.8	59.5	93.7	ND	No
L-103	12.3	21.0	16.4	17.5	16.9	17.1	68.0	49.2	83.4	ND	No
L-104	11.6	20.3	16.4	17.8	18.0	16.6	68.7	46.3	80.5	ND	No
L-105	13.3	22.0	18.1	19.7	19.0	19.2	76.0	53.2	87.4	ND	No
L-106	12.3	21.0	16.8	17.5	17.5	18.1	70.0	49.2	83.4	ND	No
L-107	12.8	21.5	18.5	18.3	20.0	20.2	76.9	51.2	85.4	ND	No
L-108	11.1	19.8	20.0	17.0	18.4	18.4	73.8	44.3	78.5	ND	No
L-109	12.9	21.6	16.1	17.8	15.5	16.1	65.4	51.6	85.8	ND	No
L-110	12.4	21.1	18.1	18.2	16.5	18.7	71.4	49.7	83.9	ND	No
L-111B	13.1	21.8	18.0	19.4	19.1	17.1	73.6	52.3	86.5	ND	No
L-112	12.4	21.1	16.6	18.1	18.0	17.5	70.1	49.6	83.8	ND	No
L-113A	13.8	22.5	17.7	19.0	20.2	19.2	76.1	55.2	89.4	ND	No
L-114	13.1	21.8	17.8	17.9	17.3	17.9	70.9	50.0	84.2	ND	No
L-115	11.2	19.9	16.1	16.4	16.5	19.0	68.0	44.8	79.0	ND	No
L-116	11.2	19.9	16.9	16.8	17.4	17.5	68.6	44.8	79.0	ND	No
L-11A	10.3	19.0	17.7	16.8	17.7	17.1	69.2	41.2	75.4	ND	No
L-201	11	19.7	14.0	13.9	14.5	15.4	57.7	43.8	78.0	ND	No
L-202	10.2	18.9	13.5	15.2	15.1	16.7	60.5	40.9	75.1	ND	No
L-203	12.8	21.5	15.8	17.5	16.7	17.2	67.1	51.1	85.3	ND	No
L-204	13.3	22.0	19.0	18.2	16.2	19.4	72.7	50.7	84.9	ND	No
L-205A	12.2	20.9	16.3	16.7	15.7	18.2	66.7	48.8	83.0	ND	No
L-205B	12	20.7	16.3	16.7	15.7	18.2	66.7	45.7	79.9	ND	No
L-206	12.9	21.6	19.0	19.4	16.5	19.2	74.0	51.6	85.8	ND	No
L-207	12.1	20.8	17.3	17.8	17.5	17.4	69.9	48.5	82.7	ND	No
L-208	13.1	21.8	17.8	19.3	16.5	18.6	72.2	44.6	78.8	ND	No
L-209	12.4	21.1	17.3	17.6	17.8	18.4	71.0	47.2	81.4	ND	No
L-210	13.7	22.4	17.4	19.9	20.1	19.7	77.0	51.9	86.1	ND	No
L-211	13.5	22.2	18.2	18.1	18.5	16.6	71.5	54.1	88.3	ND	No
L-212	13.3	22.0	18.1	19.1	17.9	19.4	74.4	50.5	84.7	ND	No
L-213	11.5	20.2	17.2	16.6	17.3	16.8	67.8	41.6	75.8	ND	No
L-214	11.9	20.6	16.4	18.7	15.5	16.9	67.4	47.6	81.8	ND	No
L-215	13.6	22.3	17.9	19.1	16.7	18.9	72.6	54.4	88.6	ND	No
L-216	13.4	22.1	16.7	17.6	18.2	18.6	71.0	53.5	87.7	ND	No

[1] **Baseline background dose (B_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

Table C-IX.1 QUARTERLY OSLD RESULTS FOR LASALLE COUNTY STATION, 2022

RESULTS IN UNITS OF MILLIREM/QUARTER ± 2 STANDARD DEVIATIONS

STATION CODE	MEAN ± 2 S.D.	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC
L-01	17.9 ± 1.6	17.3	17.5	17.8	19.1
L-03	17.2 ± 2.7	17.1	16.1	16.6	19.2
L-04	16.8 ± 1.5	15.8	16.7	16.9	17.6
L-05	16.5 ± 2.0	16.5	16.0	15.5	17.8
L-06	17.3 ± 1.5	16.6	18.4	17.1	17.2
L-07	17.5 ± 1.4	17.9	18.2	17.1	16.7
L-08	15.3 ± 0.9	15.3	14.9	15.1	16.0
L-10	14.9 ± 2.6	15.8	15.5	15.5	13.0
L-11A	17.3 ± 0.9	17.7	16.8	17.7	17.1
L-101	18.3 ± 1.1	18.4	18.9	17.5	18.6
L-102	19.9 ± 1.2	19.2	20.3	20.5	19.8
L-103	17.0 ± 0.9	16.4	17.5	16.9	17.1
L-104	17.2 ± 1.6	16.4	17.8	18.0	16.6
L-105	19.0 ± 1.3	18.1	19.7	19.0	19.2
L-106	17.5 ± 1.0	16.8	17.5	17.5	18.1
L-107	19.2 ± 2.0	18.5	18.3	20.0	20.2
L-108	18.5 ± 2.4	20.0	17.0	18.4	18.4
L-109	16.4 ± 2.0	16.1	17.8	15.5	16.1
L-110	17.8 ± 1.9	18.1	18.2	16.5	18.7
L-111B	18.4 ± 2.1	18.0	19.4	19.1	17.1
L-112	17.5 ± 1.3	16.6	18.1	18.0	17.5
L-113A	19.0 ± 2.1	17.7	19.0	20.2	19.2
L-114	17.7 ± 0.6	17.8	17.9	17.3	17.9
L-115	17.0 ± 2.6	16.1	16.4	16.5	19.0
L-116	17.1 ± 0.7	16.9	16.8	17.4	17.5
L-201	14.4 ± 1.4	14.0	13.9	14.5	15.4
L-202	15.1 ± 2.6	13.5	15.2	15.1	16.7
L-203	16.8 ± 1.5	15.8	17.5	16.7	17.2
L-204	18.2 ± 2.9	19.0	18.2	16.2	19.4
L-205A	16.7 ± 2.1	16.3	16.7	15.7	18.2
L-205B	16.7 ± 2.1	16.3	16.7	15.7	18.2
L-206	18.5 ± 2.7	19.0	19.4	16.5	19.2
L-207	17.5 ± 0.5	17.3	17.8	17.5	17.4
L-208	18.1 ± 2.4	17.8	19.3	16.5	18.6
L-209	17.7 ± 1.0	17.3	17.6	17.8	18.4
L-210	19.3 ± 2.5	17.4	19.9	20.1	19.7
L-211	17.9 ± 1.7	18.2	18.1	18.5	16.6
L-212	18.6 ± 1.5	18.1	19.1	17.9	19.4
L-213	17.0 ± 0.7	17.2	16.6	17.3	16.8
L-214	16.9 ± 2.7	16.4	18.7	15.5	16.9
L-215	18.2 ± 2.2	17.9	19.1	16.7	18.9
L-216	17.7 ± 1.6	16.7	17.6	18.2	18.6

TABLE C-IX.2 MEAN QUARTERLY OSLD RESULTS FOR THE INNER RING, OUTER RING, OTHER AND CONTROL LOCATIONS FOR LASALLE COUNTY STATION, 2022

RESULTS IN UNITS OF MILLIREM/QUARTER ± 2 STANDARD DEVIATIONS OF THE STATION DATA

COLLECTION PERIOD	INNER RING ± 2 S.D.	OUTER RING	OTHER	CONTROL
JAN-MAR	17.6 ± 2.1	16.9 ± 2.9	16.7 ± 1.8	15.8 ± 0
APR-JUN	18.1 ± 2.1	18.1 ± 2.1	16.8 ± 2.5	15.5 ± 0
JUL-SEP	18.0 ± 2.7	18.0 ± 2.7	16.6 ± 1.9	15.5 ± 0
OCT-DEC	18.1 ± 2.2	18.1 ± 2.2	17.6 ± 2.4	14.9 ± 0

Table C-IX.3 SUMMARY OF THE AMBIENT DOSIMETRY PROGRAM FOR LASALLE COUNTY STATION, 2022

RESULTS IN UNITS OF MILLIREM/QUARTER

LOCATION	SAMPLES ANALYZED	PERIOD MINIMUM	PERIOD MAXIMUM	PERIOD MEAN ± 2 S.D.
INNER RING	68	15.5	20.5	17.9 ± 2.4
OUTER RING	68	13.5	20.1	17.4 ± 3.0
OTHER	28	14.9	19.2	16.9 ± 2.2
CONTROL	4	14.1	16.8	14.9 ± 2.6

INNER RING STATIONS - L-101-1, L-101-2, L-102-1, L-102-2, L-103-1, L-103-2, L-104-1, L-104-2, L-105-1, L-105-2, L-106-1, L-106-2, L-107-1, L-107-2, L-108-1, L-108-2, L109-1, L109-2, L110-1, L110-2, L-111B-1, L-111B-2, L-112-1, L-112-2, L113A-1, L-113A-2, L114-1, L-114-2, L-115-1, L-115-2, L-116-1. L-116-2

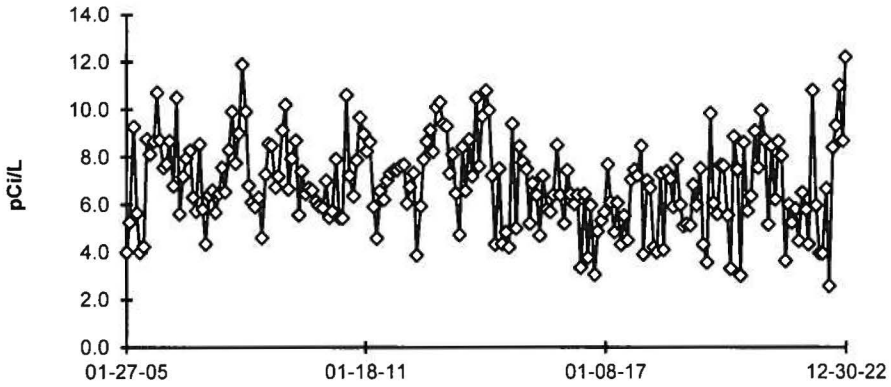
OUTER RING STATIONS - L-201-3, L-201-4, L-202-3, L-202-4, L-203-1, L-203-2, L-204-1, L-204-2, L205-1, L-205-2, L-205-3, L-205-4, L-206-1, L-206-2, L-207-1, L207-2, L208-1, L208-2, L209-1, L209-2, L210-1, L-210-2, L-211-1, L-211-2, L-212-1, L-212-2, L-213-3, L-213-4, L-214-3, L-214-4, L-215-3, L-215-4, L-2016-3, L-216-4

OTHER STATIONS - L-01-1, L-01-2, L-03-1, L-03-2, L-04-1, L-04-2, L-05-1, L-05-2, L-06-1, L-06-2, L-07-1, L-07-2, L-08-1, L-08-2, L-11A-1, L-11A-2

CONTROL STATIONS - L-10-1, L-10-2

FIGURE C-1
Surface Water - Gross Beta - Stations L-21 (C) and L-40 Collected in the Vicinity of LSCS, 2005 - 2022

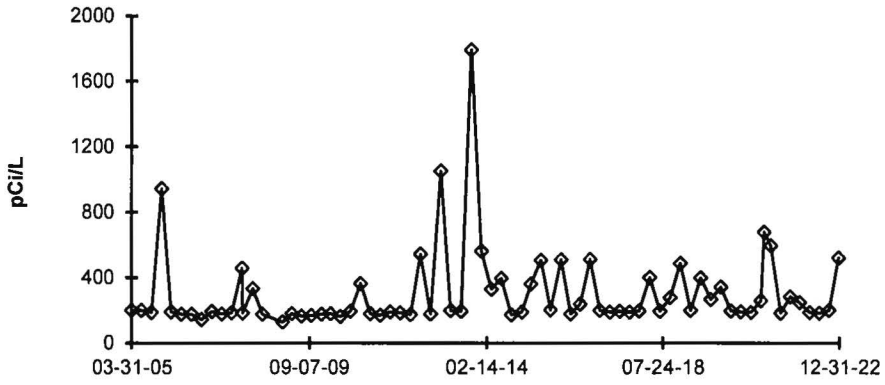
L-21 (C) Illinois River at Seneca



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 - 2022

L-21 Illinois River at Seneca



L-40 Illinois River Downstream

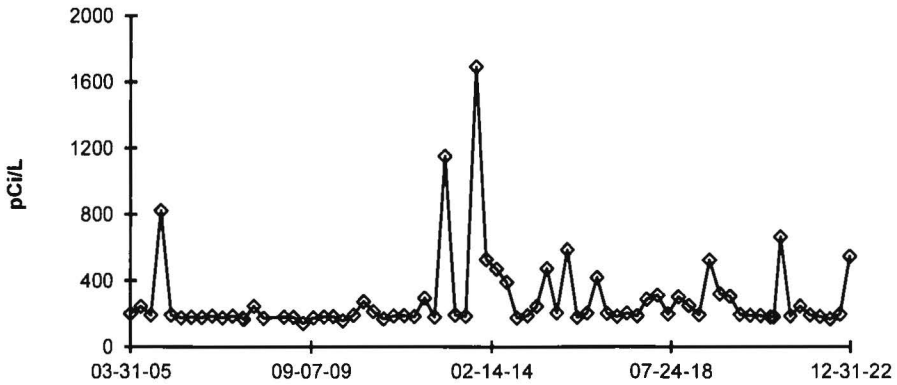
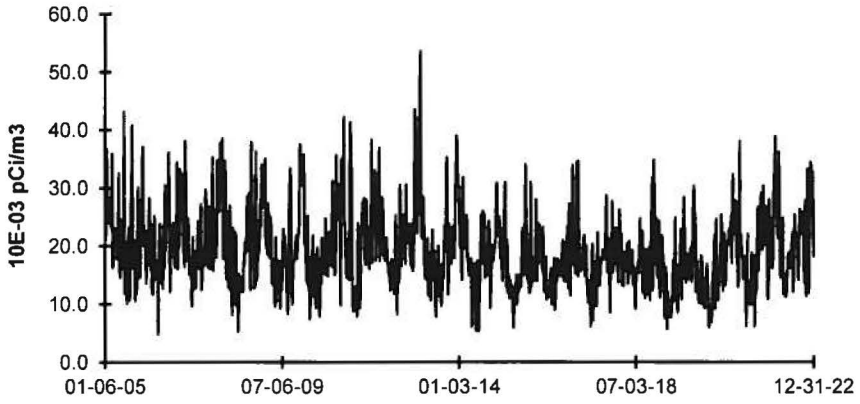


FIGURE C-3
Air Particulate - Gross Beta - Stations L-01 and L-03 Collected in the Vicinity of LSCS, 2005 - 2022

L-01 Nearsite No. 1



L-03 Onsite No. 3

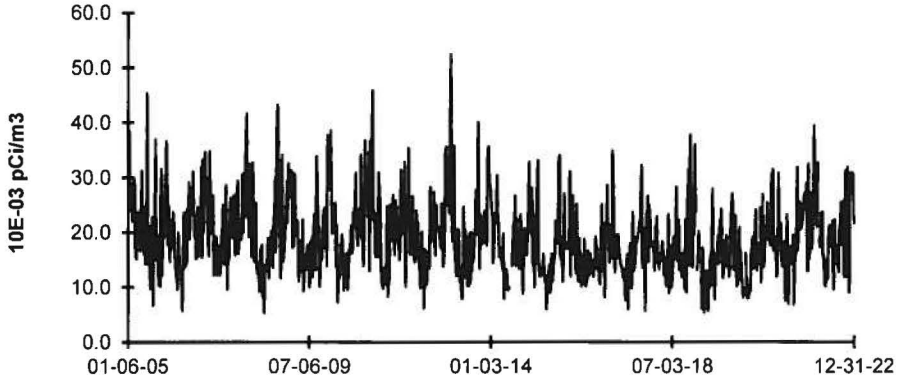
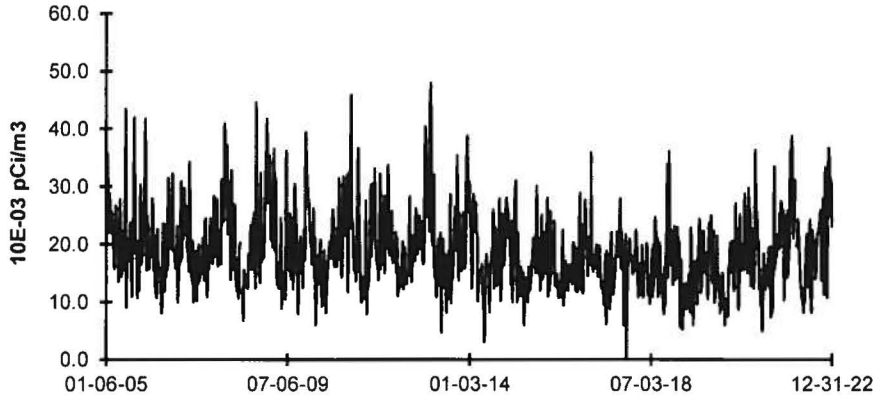


FIGURE C-4
Air Particulate - Gross Beta - Stations L-05 and L-06 Collected in the Vicinity of LSCS, 2005 - 2022

L-05 Onsite No. 5



L-06 Nearsite No. 6

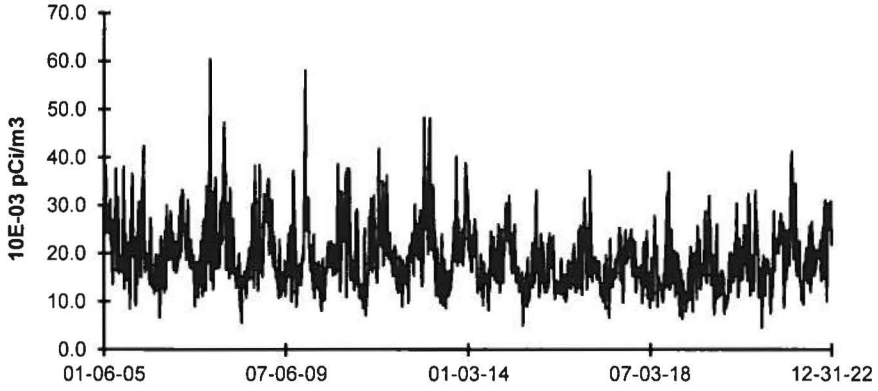


FIGURE C-5
Air Particulate - Gross Beta - Station L-10 (C)
Collected in the Vicinity of LSCS, 2005 - 2022

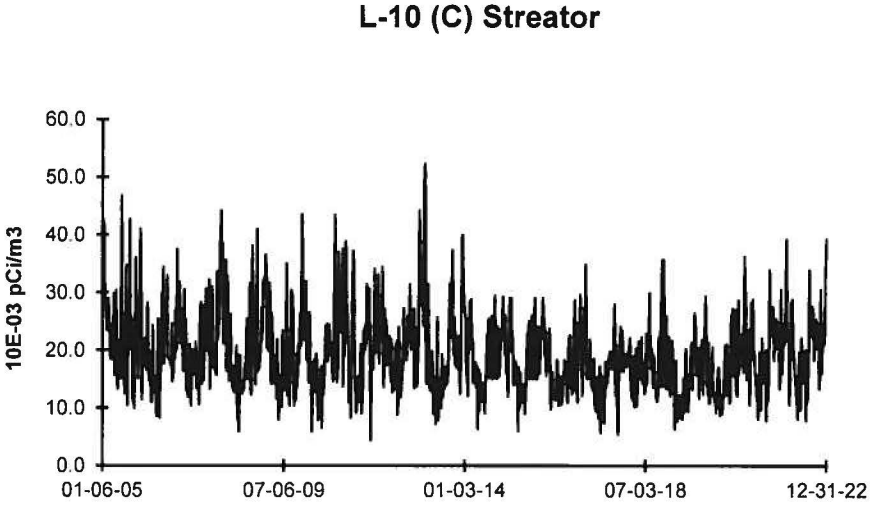
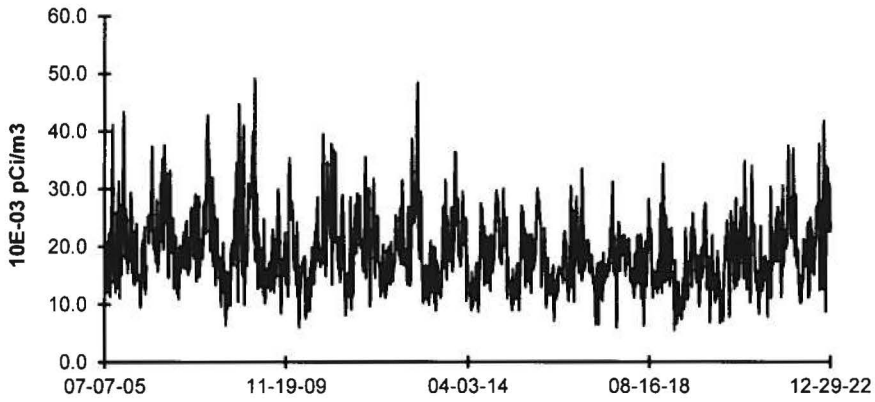


FIGURE C-6
Air Particulate - Gross Beta - Stations L-04 and L-07 Collected in the Vicinity of LSCS, 2005 - 2022

L-04 Rte. 170



L-07 Seneca

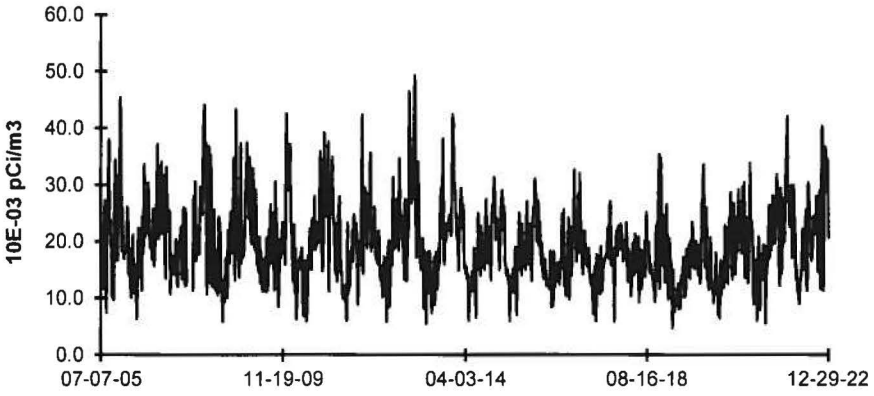
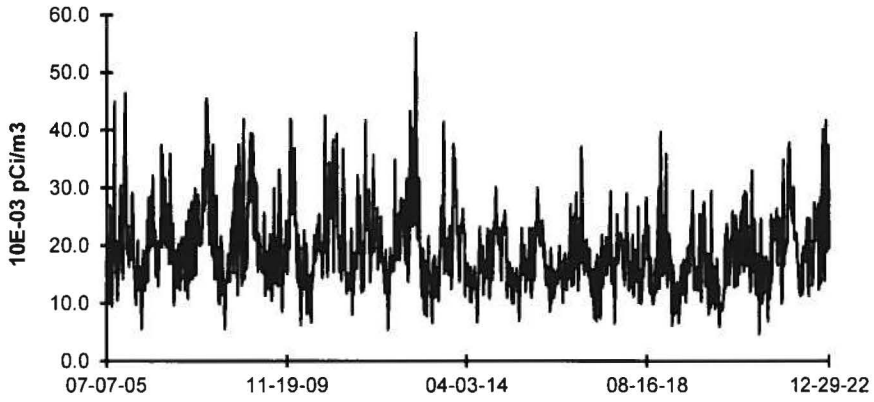
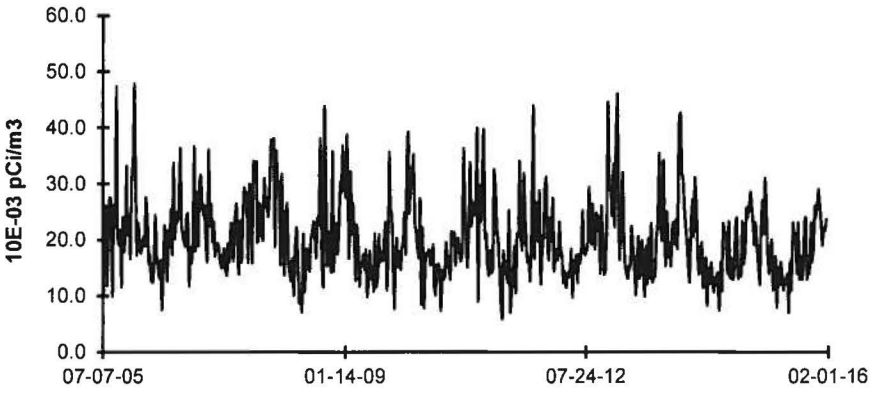


FIGURE C-7
Air Particulate - Gross Beta - Stations L-08 and L-11 Collected in the Vicinity of LSCS, 2005 - 2022

L-08 Marseilles



L-11 Ransom *(1)*



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

APPENDIX D

INTER-LABORATORY COMPARISON PROGRAM

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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 2022	E13706	Milk	Sr-89	pCi/L	80.3	96.8	0.83	A
			Sr-90	pCi/L	12.7	12.6	1.01	A
	E13707	Milk	Ce-141	pCi/L	62.3	65	0.96	A
			Co-58	pCi/L	158	164	0.96	A
			Co-60	pCi/L	286	302	0.95	A
			Cr-51	pCi/L	314	339	0.93	A
			Cs-134	pCi/L	155	182	0.85	A
			Cs-137	pCi/L	210	223	0.94	A
			Fe-59	pCi/L	211	185	1.14	A
			I-131	pCi/L	88.0	96.7	0.91	A
			Mn-54	pCi/L	169	164	1.03	A
			Zn-65	pCi/L	238	246	0.97	A
	E13708	Charcoal	I-131	pCi	79.9	87.1	0.92	A
	E13709	AP	Ce-141	pCi	60.9	42.0	1.45	N(1)
			Co-58	pCi	118	107	1.11	A
			Co-60	pCi	218	196	1.11	A
			Cr-51	pCi	251	221	1.14	A
			Cs-134	pCi	129	118	1.09	A
			Cs-137	pCi	156	145.0	1.07	A
			Fe-59	pCi	124	120.0	1.03	A
			Mn-54	pCi	120	107	1.12	A
			Zn-65	pCi	162	160	1.01	A
	E13710	Soil	Ce-141	pCi/g	0.123	0.103	1.19	A
			Co-58	pCi/g	0.254	0.263	0.97	A
			Co-60	pCi/g	0.493	0.483	1.02	A
			Cr-51	pCi/g	0.603	0.543	1.11	A
			Cs-134	pCi/g	0.268	0.292	0.92	A
			Cs-137	pCi/g	0.399	0.431	0.93	A
			Fe-59	pCi/g	0.320	0.296	1.08	A
			Mn-54	pCi/g	0.263	0.263	1.00	A
			Zn-65	pCi/g	0.407	0.395	1.03	A
	E13711	AP	Sr-89	pCi	83.2	97.4	0.85	A
			Sr-90	pCi	12.7	12.7	1.00	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 22-04***

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 2022	E13712	Milk	Sr-89	pCi/L	71.1	89.1	0.80	A
			Sr-90	pCi/L	12.0	13.6	0.88	A
	E13713	Milk	Ce-141	pCi/L	148	161	0.92	A
			Co-58	pCi/L	178	189	0.94	A
			Co-60	pCi/L	229	260	0.88	A
			Cr-51	pCi/L	486	456	1.07	A
			Cs-134	pCi/L	220	252	0.87	A
			Cs-137	pCi/L	203	222	0.92	A
			Fe-59	pCi/L	174	173	1.01	A
			I-131	pCi/L	75.9	94.2	0.81	A
			Mn-54	pCi/L	269	282	0.95	A
			Zn-65	pCi/L	364	373	0.97	A
	E13714	Charcoal	I-131	pCi	81.4	83.6	0.97	A
	E13715	AP	Ce-141	pCi	102	91	1.12	A
			Co-58	pCi	118	107	1.11	A
			Co-60	pCi	207	147	1.41	N(2)
			Cr-51	pCi	310	257	1.21	W
			Cs-134	pCi	148	142	1.04	A
			Cs-137	pCi	137	125	1.10	A
			Fe-59	pCi	115	98	1.18	A
			Mn-54	pCi	168	159	1.05	A
			Zn-65	pCi	240	211	1.14	A
	E13716	Soil	Ce-141	pCi/g	0.288	0.284	1.01	A
			Co-58	pCi/g	0.320	0.334	0.96	A
			Co-60	pCi/g	0.445	0.459	0.97	A
			Cr-51	pCi/g	0.883	0.805	1.10	A
			Cs-134	pCi/g	0.410	0.446	0.92	A
			Cs-137	pCi/g	0.447	0.465	0.96	A
			Fe-59	pCi/g	0.314	0.305	1.03	A
			Mn-54	pCi/g	0.489	0.499	0.98	A
			Zn-65	pCi/g	0.666	0.660	1.01	A
	E13717	AP	Sr-89	pCi	87.5	98.3	0.89	A
			Sr-90	pCi	12.6	15.0	0.84	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

*(2) See **NCR 22-21***

DOE's Mixed Analyte Performance Evaluation Program (MAPEP)

Table D.2 Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Acceptance Range	Evaluation [b]
February 2022	22-GrF46	AP	Gross Alpha	Bq/sample	0.402	1.20	0.36 - 2.04	A
			Gross Beta	Bq/sample	0.669	0.68	0.341 - 1.022	A
	22-MaS46	Soil	Ni-63	Bq/kg	645	780	546 - 1014	A
			Tc-99	Bq/kg	526	778	545 - 1011	N(3)
	22-MaSU46	Urine	Cs-134	Bq/L	1.67	1.77	1.24 - 2.30	A
			Cs-137	Bq/L	1.50	1.56	1.09 - 2.03	A
			Co-57	Bq/L	4.93	5.39	3.77 - 7.01	A
			Co-60	Bq/L	2.13	2.06	1.44 - 2.68	A
			Mn-54	Bq/L	4.83	5.08	3.56 - 6.60	A
			U-234	Bq/L	0.142	0.0074	0.0052 - 0.0096	N(4)
			U-238	Bq/L	0.0254	0.0103	0.0072 - 0.0134	N(4)
			Zn-65	Bq/L	4.71	4.48	3.14 - 5.82	A
	22-MaW46	Water	Ni-63	Bq/L	28.6	34.0	23.8 - 44.2	A
			Tc-99	Bq/L	8.59	7.90	5.5 - 10.3	A
	22-RdV46	Vegetation	Cs-134	Bq/sample	6.61	7.61	5.33 - 9.89	A
			Cs-137	Bq/sample	1.50	1.52	1.06 - 1.98	A
			Co-57	Bq/sample	5.11	5.09	3.56 - 6.62	A
			Co-60	Bq/sample	0.0162		*(1)*	A
			Mn-54	Bq/sample	2.42	2.59	1.81 - 3.37	A
			Sr-90	Bq/sample	0.684	0.789	0.552 - 1.026	A
			Zn-65	Bq/sample	1.44	1.47	1.03 - 1.91	A
August 2022	22-MaS47	Soil	Ni-63	Bq/kg	14.6		*(1)*	A
			Tc-99	Bq/kg	994	1000	700 - 1300	A
	22-MaW47	Water	Ni-63	Bq/L	24.4	32.9	23.0 - 42.8	A
			Tc-99	Bq/L	1.9		*(1)*	N(5)
	25-RdV47	Vegetation	Cs-134	Bq/sample	0.032		*(1)*	A
			Cs-137	Bq/sample	0.891	1.08	0.758 - 1.408	A
			Co-57	Bq/sample	0.006		*(1)*	A
			Co-60	Bq/sample	4.04	4.62	3.23 - 6.01	A
			Mn-54	Bq/sample	2.01	2.43	1.70 - 3.16	A
			Sr-90	Bq/sample	1.25	1.60	1.12 - 2.08	W
			Zn-65	Bq/sample	6.16	7.49	5.24 - 9.74	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

(1) False positive test

(2) Sensitivity evaluation

(3) Tc-99 soil cross-checks done for TBE information only - not required

*(4) See **NCR 22-05***

*(5) See **NCR 22-22***

ERA Environmental Radioactivity Cross Check Program

Table D.3 **Teledyne Brown Engineering Environmental Services**

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Acceptance Limits	Evaluation [b]
March 2022	MRAD-36	Water	Am-241	pCi/L	68.3	74.6	51.2 - 95.4	A
			Fe-55	pCi/L	797	1140	670 - 1660	A
			Pu-238	pCi/L	146	147	88.4 - 190	A
			Pu-239	pCi/L	69.9	71.9	44.5 - 88.6	A
		Soil	Sr-90	pCi/kg	8050	6720	2090 - 10500	A
		AP	Fe-55	pCi/filter	148	127	46.4 - 203	A
			Pu-238	pCi/filter	29.9	29.6	22.3 - 36.4	A
			Pu-239	pCi/filter	51.6	49.7	37.2 - 60.0	A
			U-234	pCi/filter	59.9	67.3	49.9 - 78.9	A
			U-238	pCi/filter	59.0	66.7	50.4 - 79.6	A
			GR-A	pCi/filter	95.6	94.2	49.2 - 155	A
			GR-B	pCi/filter	71.2	66.8	40.5 - 101	A
April 2022	RAD-129	Water	Ba-133	pCi/L	61.7	62.9	52.3 - 69.2	A
			Cs-134	pCi/L	80.9	81.6	68.8 - 89.8	A
			Cs-137	pCi/L	37.4	36.6	32.1 - 43.3	A
			Co-60	pCi/L	103	97.4	87.7 - 109	A
			Zn-65	pCi/L	318	302	272 - 353	A
			GR-A	pCi/L	26.9	20.8	10.4 - 28.3	A
			GR-B	pCi/L	49.7	51.0	34.7 - 58.1	A
			U-Nat	pCi/L	56.3	68.9	56.3 - 75.8	A
			H-3	pCi/L	17,000	18,100	15,800 - 19,000	A
			Sr-89	pCi/L	65.3	67.9	55.3 - 76.1	A
			Sr-90	pCi/L	42.1	42.7	31.5 - 49.0	A
			I-131	pCi/L	25.7	26.2	21.8 - 30.9	A
September 2022	MRAD-37	Water	Am-241	pCi/L	111	96.2	66.0 - 123	A
			Fe-55	pCi/L	850	926	544 - 1350	A
			Pu-238	pCi/L	62.1	52.6	31.6 - 68.2	A
			Pu-239	pCi/L	139.5	117	72.5 - 144	A
		Soil	Sr-90	pCi/kg	3350	6270	1950 - 9770	A
			U-234	pCi/kg	1684	3350	1570 - 4390	A
			U-238	pCi/kg	1658	3320	1820 - 4460	N(2)
		AP	Fe-55	pCi/filter	71.9	122	44.5 - 195	A
			Pu-238	pCi/filter	38.8	29.9	22.6 - 36.7	N(1)
			Pu-239	pCi/filter	14.5	13.0	9.73 - 15.7	A
			U-234	pCi/filter	78.0	71.5	53.0 - 83.8	A
			U-238	pCi/filter	79.7	70.9	53.5 - 84.6	A
			GR-A	pCi/filter	62.8	55.5	29.0 - 91.4	A
			GR-B	pCi/filter	70.9	64.8	39.3 - 97.9	A
October 2022	RAD-131	Water	Ba-133	pCi/L	76.2	79.4	66.6 - 87.3	A
			Cs-134	pCi/L	28.0	30.5	23.9 - 33.6	A
			Cs-137	pCi/L	202	212	191 - 235	A
			Co-60	pCi/L	52.4	51.4	46.3 - 59.1	A
			Zn-65	pCi/L	216	216	194 - 253	A
			GR-A	pCi/L	19.7	16.9	8.28 - 23.7	A
			GR-B	pCi/L	49.8	53.0	36.1 - 60.0	A
			U-Nat	pCi/L	10.54	8.53	6.60 - 9.88	N(3)
			H-3	pCi/L	13,900	15,100	13,200 - 16,600	A
			Sr-89	pCi/L	59.7	64.5	52.3 - 72.5	A
			Sr-90	pCi/L	32.9	37.3	27.4 - 43.0	A
			I-131	pCi/L	26.9	24.4	20.2 - 28.9	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 22-19***

(2) U soil cross-checks done for TBE information only - not required

*(3) See **NCR 22-20***

APPENDIX E

ERRATA DATA

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There is no errata data for 2022.

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APPENDIX F

ANNUAL RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM REPORT (ARGPPR)

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Docket No: 50-373
50-374

LASALLE COUNTY STATION
UNITS 1 and 2

Annual Radiological
Groundwater Protection Program Report

1 January through 31 December 2022

Prepared By
Teledyne Brown Engineering
Environmental Services

Constellation®

LaSalle County Station
Marseilles, IL 61341

May 2023

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Table Of Contents

Appendices

I. Summary and Conclusions

In 2006, Constellation (formerly 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 six surface water and twenty-seven groundwater well sampling locations. The results for LaSalle's RGPP sampling efforts in 2022 are included in this report.

This is the sixteenth 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 2022. During that time period, 144 analyses were performed on 62 samples from 19 groundwater 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 (Sr-89) and strontium-90 (Sr-90) were not detected in any groundwater samples during 2022.

In the case of tritium, Constellation specified that its laboratories achieve a lower limit of detection (LLD) 100 times lower than that required by federal regulation. The United States Environmental Protection Agency (USEPA) drinking water standard (and the Nuclear Regulatory Commission Reporting Limit) is 20,000 pCi/L.

Tritium levels were detected at concentrations greater than the LLD of 200 pCi/L in 19 of 59 groundwater samples analyzed. The tritium concentrations ranged from <LLD to 5,790 ± 649 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.

Gamma-emitting nuclides and gross alpha analysis in the dissolved and suspended fractions were not performed in 2022.

Hard-to-detect analyses were performed on 6 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 4 samples, affecting 4 of 6 groundwater locations. The U-234 concentrations ranged from 0.44 to 3.28 pCi/L. U-238 was detected in 4 samples, affecting 4 of 6 groundwater locations. The U-238 concentrations ranged from 0.37 to 1.96 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 Constellation, 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 2022.

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. Constellation 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

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, eating food, breathing air, 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 2022. 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
2. Concentrations of strontium in groundwater
3. Concentrations of tritium in groundwater
4. Concentrations of gross alpha (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. Lower Limit of Detection and Minimum Detectable Concentration

   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. Constellation 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. Constellation 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 (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 worldwide 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 sources upstream as measured by the control location.

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 a Constellation-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 19 locations were analyzed for tritium activity. Tritium values ranged from <LLD to 5,790 pCi/L. The highest tritium activity was found at well TW-LS-118S. The well is located predominantly in clay till. 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 12 samples from 12 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 (dissolved and suspended)

Gross alpha in the dissolved and suspended fractions were not analyzed in 2022. (Table B-I.1, Appendix B)

Gamma Emitters

Samples for gamma emitting nuclides were not collected or analyzed in 2022. (Table B-I.2, Appendix B)

Hard-To-Detect

Hard-to-detect analyses were performed on 6 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 4 of 6 samples, affecting 4 of 6 locations. U-234 concentrations ranged from 0.44 to 3.28 pCi/L. U-238 was detected in 4 of 6 samples, affecting 4 of 6 locations. The U-238 concentrations ranged from 0.37 to 1.96 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

No surface water samples were collected in 2022.

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 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

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TABLE A-1 LaSalle County Station Groundwater Monitoring Sample Point List, 2022

Site	Site Type
HP-2	Monitoring Well
HP-5	Monitoring Well
HP-7	Monitoring Well
HP-10	Monitoring Well
MW-LS-104S	Monitoring Well
MW-LS-105S	Monitoring Well
MW-LS-106S	Monitoring Well
MW-LS-107S	Monitoring Well
MW-LS-111S	Monitoring Well
RW-LS-100S	Extraction Well
RW-LS-101S	Extraction Well
TW-LS-114S	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
Oil Separator	

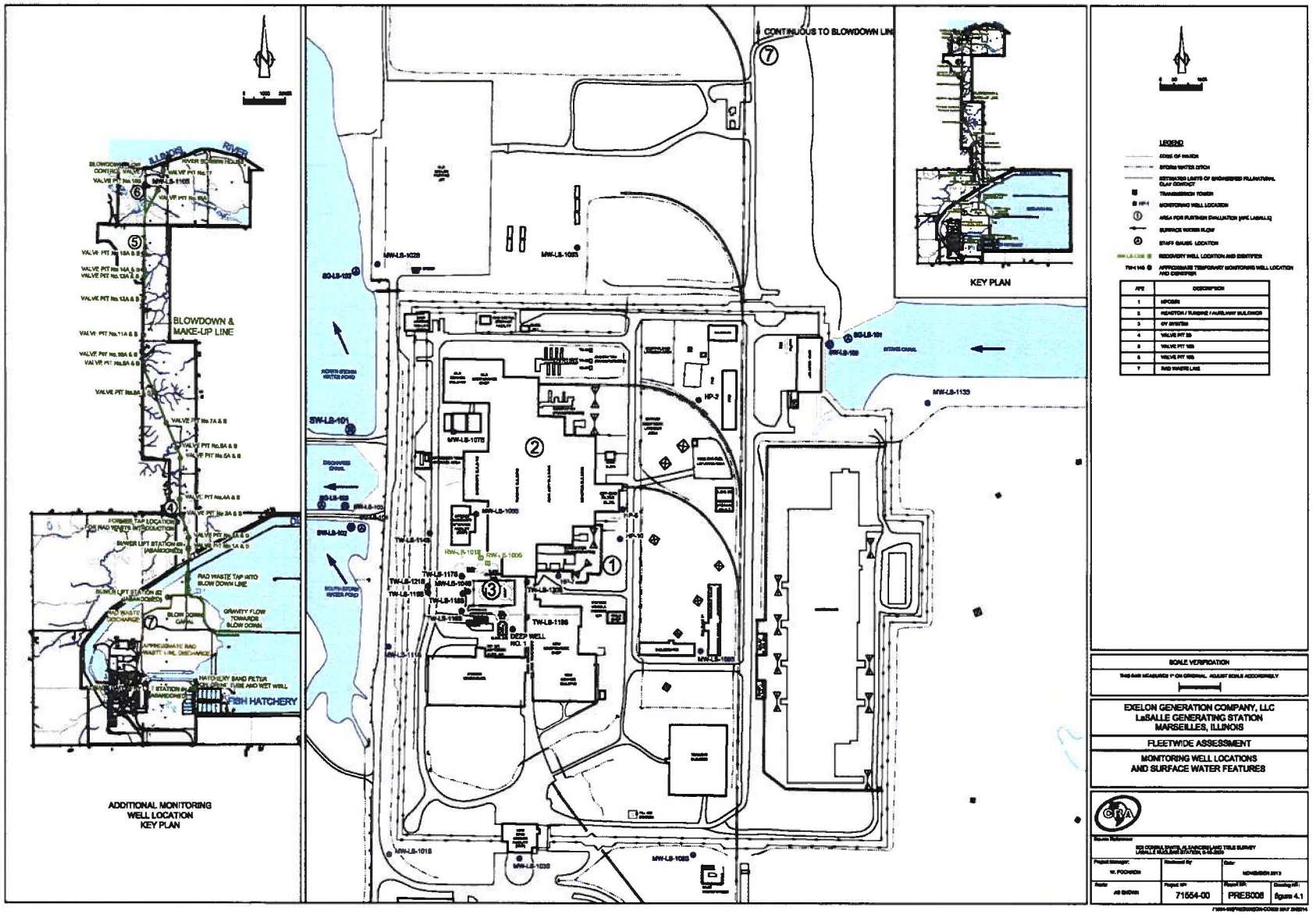

Figure A-1
Ground Water and Surface Water Locations
LaSalle County Station, 2022

APPENDIX B

DATA TABLES

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TABLE B-1.1 CONCENTRATIONS OF TRITIUM AND STRONTIUM IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2022

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE		COLLECTION DATE	H-3	Sr-89	Sr-90
HP-2		03/05/22	< 188		
HP-5		03/05/22	< 193		
HP-7		03/04/22	< 198		
HP-7		06/15/22	< 176	< 8.2	< 0.8
HP-7		08/17/22	< 191		
HP-7		11/09/22	< 187		
HP-10		03/05/22	< 184		
MW-LS-104S		03/05/22	305 ± 134		
MW-LS-104S		06/14/22	719 ± 147	< 9.0	< 0.8
MW-LS-104S		08/16/22	619 ± 139		
MW-LS-104S		11/08/22	842 ± 163		
MW-LS-105S		03/04/22	< 186		
MW-LS-105S		06/14/22	< 191	< 8.7	< 0.6
MW-LS-105S		08/16/22	< 199		
MW-LS-105S		11/10/22	< 180		
MW-LS-106S		03/05/22	< 194		
MW-LS-107S		03/04/22	< 186		
MW-LS-107S		06/14/22	< 182	< 8.0	< 0.9
MW-LS-107S		08/16/22	< 186		
MW-LS-107S		11/09/22	< 180		
MW-LS-111S		03/05/22	< 186		
OIL SEPARATOR		03/05/22	< 194		
OIL SEPARATOR		06/14/22	< 195	< 9.1	< 0.9
OIL SEPARATOR		08/17/22	< 186		
OIL SEPARATOR		11/09/22	< 193		
RW-LS-100S		03/04/22	880 ± 172		
RW-LS-100S		06/14/22	1380 ± 211	< 9.2	< 0.9
RW-LS-100S		08/16/22	810 ± 152		
RW-LS-100S		11/10/22	450 ± 138		
RW-LS-101S		03/04/22	1320 ± 204		
RW-LS-101S		03/04/22	1360 ± 204		
RW-LS-101S	*Duplicate*	03/04/22	1140 ± 177		
RW-LS-101S		06/14/22	443 ± 127	< 6.0	< 0.6
RW-LS-101S		08/16/22	557 ± 134		
RW-LS-101S		11/17/22	1400 ± 215		
TW-LS-114S		03/04/22	< 195		
TW-LS-114S		06/14/22	< 185		
TW-LS-114S		08/16/22	< 188		
TW-LS-114S		11/10/22	< 181		
TW-LS-116S		03/04/22	2910 ± 349		
TW-LS-116S	*Duplicate*	03/04/22	2670 ± 324		
TW-LS-116S		06/14/22	3350 ± 395	< 8.8	< 0.6
TW-LS-116S		08/16/22	3550 ± 417		
TW-LS-116S		11/08/22	3000 ± 372		
TW-LS-117S		03/04/22	< 183		
TW-LS-117S		06/14/22	< 166	< 9.2	< 0.6
TW-LS-117S		08/16/22	< 197		
TW-LS-117S		11/10/22	< 188		
TW-LS-118S		03/04/22	5790 ± 649		
TW-LS-118S		06/14/22	4230 ± 482	< 7.7	< 0.9
TW-LS-118S		08/16/22	3720 ± 439		
TW-LS-118S		11/08/22	2380 ± 311		
TW-LS-119S		03/05/22	< 196		
TW-LS-119S		06/15/22	< 179	< 7.0	< 0.8
TW-LS-119S		08/17/22	< 190		
TW-LS-119S		11/08/22	< 186		
TW-LS-120S		03/04/22	< 195		
TW-LS-120S		06/15/22	< 182	< 6.7	< 0.6
TW-LS-120S		08/17/22	< 193		
TW-LS-120S		11/10/22	< 188		
TW-LS-121S		03/04/22	< 184		
TW-LS-121S		08/16/22	< 192		

TABLE B-I.2

CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2022

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

No samples collected or analyzed for gamma emitters in 2022

TABLE B-I.3 **CONCENTRATIONS OF HARD-TO-DETECTS IN GROUNDWATER SAMPLES COLLECTED AS PART OF THE GROUNDWATER PROTECTION PROGRAM, LASALLE COUNTY STATION, 2022**

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
MW-LS-104S	06/14/22	< 0.13	< 0.03	< 0.03	< 0.04	< 0.04	< 0.13	< 0.09	< 0.07	< 66	< 4.8
MW-LS-107S	06/14/22	< 0.08	< 0.08	< 0.04	< 0.04	< 0.07	3.28 ± 0.69	< 0.05	1.96 ± 0.50		
OIL SEPARATOR	06/14/22	< 0.03	< 0.06	< 0.03	< 0.19	< 0.07	0.67 ± 0.32	< 0.11	0.48 ± 0.26	< 89	< 3.9
RW-LS-100S	06/14/22	< 0.02	< 0.02	< 0.02	< 0.02	< 0.04	< 0.07	< 0.09	< 0.07	< 137	< 4.5
RW-LS-101S	06/14/22	< 0.07	< 0.03	< 0.06	< 0.14	< 0.09	0.44 ± 0.22	< 0.12	0.37 ± 0.20	< 149	< 4.2
TW-LS-118S	06/14/22	< 0.03	< 0.03	< 0.05	< 0.04	< 0.12	1.46 ± 0.41	< 0.05	1.18 ± 0.36	< 72	< 4.2

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