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

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

Subject: 2015 Annual Radiological Environmental Operating Report

Enclosed is the Exelon Generation Company, LLC, 2015 Annual Radiological Environmental Operating Report for LaSalle County Station, submitted in accordance with Technical Specifications 5.6.2, "Annual Radiological Environmental Operating Report." The enclosed report contains the results of groundwater monitoring conducted in accordance with Exelon's Radiological Groundwater Protection Program, which is a voluntary program implemented in 2006. This information is being reported in accordance with a nuclear industry initiative.

Should you have any questions concerning this letter, please contact Mr. Guy V. Ford, Regulatory Assurance Manager, at (815) 415-2800.

Respectfully,

William J. Trafton
Site Vice President
LaSalle County Station

Enclosure: LaSalle County Station 2015 Annual Radiological Environmental Operating Report

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 2015

Prepared By

Teledyne Brown Engineering
Environmental Services

LaSalle County Station
Marseilles, IL 61341

May 2016

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I. Summary and Conclusions

This report on the Radiological Environmental Monitoring Program conducted for the LaSalle County Station (LSCS) by Exelon covers the period 1 January 2015 through 31 December 2015. During that time period, 1,435 analyses were performed on 1,382 samples. In assessing all the data gathered for this report and comparing these results with preoperational data, it was concluded that the operation of LSCS had no adverse radiological impact on the environment.

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

Fish (commercially and recreationally important species) and sediment samples were analyzed for concentrations of gamma emitting nuclides. No fission or activation products were detected in fish or sediment.

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

High sensitivity 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 K-40 were consistent with those detected in previous years. No fission or activation products were found.

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

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

II. Introduction

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

A Radiological Environmental Monitoring Program (REMP) for LSCS was initiated in 1982 (the preoperational period for most media covers the periods 1 January 1979 through 26 December 1981 and was summarized in a separate report.). This report covers those analyses performed by Teledyne Brown Engineering (TBE) and Landauer on samples collected during the period 1 January 2015 through 31 December 2015.

A. Objectives of the REMP

The objectives of the REMP are to:

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

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

B. Implementation of the Objectives

The implementation of the objectives is accomplished by:

1. Identifying significant exposure pathways.

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

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

III. Program Description

A. Sample Collection

Samples for the LSCS REMP were collected for Exelon Nuclear by Environmental Inc. (Midwest Labs). This section describes the general

collection methods used by Environmental Inc. (Midwest Labs) to obtain environmental samples for the LSCS REMP in 2015. Sample locations and descriptions can be found in Tables B–1 and B–2, and Figures B–1 through B–4, Appendix B.

Aquatic Environment

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

Atmospheric Environment

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

Terrestrial Environment

The terrestrial environment was evaluated by performing radiological analyses on samples of milk and food product. Samples are typically collected biweekly at one milk location (L-42) from May through October, and monthly from November 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 annually in September at five locations (L-Quad C, L-Quad 1, L-Quad 2, L-Quad 3 and L-Quad 4). The control

location was L-Quad C. Various types of samples were collected and placed in new unused plastic bags, and sent to the laboratory for analysis.

Ambient Gamma Radiation

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

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

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

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

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

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 2015. The analytical procedures used by the laboratories 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. <u>Lower Limit of Detection and Minimum Detectable Concentration</u>

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 and food product 12 nuclides, 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, 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 2015, the LSCS REMP had a sample recovery rate of 98.8%. Sample anomalies and missed samples are listed in the tables below:

Table D-1 LISTING OF SAMPLE ANOMALIES

Sample Type	Location Code	Collection Date	Reason
A/I	L-01	02/05/15	No apparent reason for low reading of 164.2 hours. Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-04	02/05/15	No apparent reason for low reading of 166.1 hours. Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-03	02/13/15	Traffic backup at Security access point; sample collected on following day - 02/13/15 (8 day collection period).
A/I	L-05	02/19/15	No apparent reason for low reading of 158.1 hours. Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-04	04/30/15	No apparent reason for low reading of 143.4 hours. Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-01	05/28/15	Low reading of 165.3 hours possibly due to power outage. Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-04	05/28/15	Low reading of 143.2 hours possibly due to power outage. Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-05	05/28/15	Low reading of 165.2 hours possibly due to power outage. Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-06	05/28/15	Low reading of 165.4 hours possibly due to power outage. Low timer readings of this nature are consistent with weather related power interruptions.

Table D-1 LISTING OF SAMPLE ANOMALIES (continued)

Sample Type	Location Code	Collection Date	Reason
A/I	L-10	05/28/15	Low reading of 86.1 hours possibly due to power outage. Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-03	06/25/15	Low reading of 164.9 hours possibly due to power outage. Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-03	07/09/15	No apparent reason for low reading of 171.7 hours (8 day collection period). Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-04	07/09/15	No apparent reason for low reading of 164.1 hours (8 day collection period). Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-04	08/13/15	Low reading of 164.9 hours due to timer malfunction; timer replaced.
A/I	L-03	09/18/15	Gate broken; unable to access location on 09/17/15. Sample obtained on 09/18/15 (8 day collection period).
A/I	L-01	11/12/15	No power to sampler; wire detached due to storms/high winds.
A/I	L-01	11/25/15	Low reading of 130.0 hours due to recent power restoration.
A/I	L-06	12/03/15	No power to sampler; low reading of 133.3 hours. Electrical connection broken at weatherhead due to storms/high winds.

Table D-2 LISTING OF MISSED SAMPLES

Sample Type	Location Code	Collection Date	Reason
M	L-42	01/07/15	No sample; farmer sold dairy herd.
OSLD	L-208-1	09/01/15	OSLD found missing during monthly visual check.
OSLD	L209-1	09/01/15	OSLD found missing during monthly visual check.
VE	L-Quad-2, 3	09/23/15	After diligent search of quadrants, no root or broad leaf vegetation located.
OSLD	L-112-2	11/04/15	OSLD found missing during monthly visual check.
OSLD	L-114-1	11/04/15	OSLD found missing during monthly visual check.
A/I	L-01	11/19/15	No power to sampler.
M	L-42	12/03/15	Farmer resting herd; no sample available.
OSLD	L-204-1	12/03/15	OSLD found missing during monthly visual check.
OSLD	L-208-2	12/03/15	OSLD found missing during monthly visual check.
A/I	L-06	12/10/15	No power to sampler at initial visit. Power restored to sampler 12/10/15 @ 1700.
OSLD	L-04-1	01/14/16	OSLD not received at the laboratory for analysis.

Each program exception was 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

A new air monitoring location, L-11A, was installed in mid-December of 2014 and was used to collect preliminary data during 2015. Location L-11A will be operational in 2016.

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 all 24 samples with a range of 4.7 to 8.5 pCi/l. Concentrations detected were consistent with those detected in previous years (Figure C–1, Appendix C). The required LLD was met for all samples.

Tritium

Quarterly composites of weekly collections were analyzed for tritium activity (Table C–I.2, Appendix C). Tritium was detected in eight of eight samples. The concentrations ranged from 201 to 585 pCi/l. Concentrations detected were consistent with those detected in previous years (Figure C–2, Appendix C).

Gamma Spectrometry

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

2. Ground/Well Water

Quarterly grab samples were collected at two locations (L-27 and L-28). Wells 4, 5 and 6 are associated with L-28. L-27 and L-28

well 6 could be affected by LaSalle's effluent releases. The following analyses were performed:

Tritium

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

Gamma Spectrometry

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

3. Fish

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

Gamma Spectrometry

The edible portion of fish samples from both locations was analyzed for gamma emitting nuclides (Table C–III.1, Appendix C). Naturally occurring K-40 was found at all stations and ranged from 2,720 to 4,760 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. 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 both locations were analyzed for gamma emitting nuclides (Table C–IV.1, Appendix C). Nuclides detected were naturally occurring K-40. Potassium-40 was found at all stations and ranged from 13,100 to 21,200 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-11) 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 6 to 34 E–3 pCi/m^3 with a mean of 17 E–3 pCi/m^3. The results from the near-site location (Group II) ranged from 6 to 34 E–3 pCi/m^3 with a mean of 17 E–3 pCi/m^3. The results from the far-field locations (Group III) ranged from 5 to 37 E-3 pCi/m^3 with a mean of 18 E–3 pCi/m^3. The results from the control location (Group IV) ranged from 8 to 34 E–3 pCi/m^3 with a mean of 18 E–3 pCi/m^3. Comparison of the 2015 air particulate data with previous years data indicate no effects from the operation of LSCS (Figures C–3 through C-7, Appendix C). In addition, comparisons of the weekly mean values for 2015 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 66 to 192 E–3 pCi/m^3. Naturally occurring K-40 was detected in

one sample with a concentration of 55E–3 pCi/m^3. All other nuclides were less than the MDC.

b. Airborne Iodine

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

2. Terrestrial

a. Milk

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

Iodine-131

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

Gamma Spectrometry

Each milk sample was analyzed for concentrations of gamma emitting nuclides (Table C–VII.2, Appendix C).

Naturally occurring K-40 activity was found in all samples and ranged from 1,090 to 1,500 pCi/l. No other nuclides were detected, and all required LLDs were met..

b. Food Products

Food product samples were collected at five locations (L-Quad C, L-Quad 1, L-Quad 2, L-Quad 3 and L-Quad 4) when available. Four locations, (L-Quad 1, L-Quad 2, L-Quad 3 and L-Quad 4) 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. Ambient Gamma Radiation

Ambient gamma radiation levels were measured utilizing Optically Stimulated Luminescence Dosimeters (OSLD). Forty-one OSLD locations were established around the site. Results of OSLD measurements are listed in Tables C–IX.1 to C–IX.3, Appendix C.

All OSLD measurements were at or below 28.7 mrem/quarter, with a range of 16.3 to 28.7 mrem/quarter. A comparison of the Inner Ring, Outer Ring, and Other data to the Control Location data, indicate that the ambient gamma radiation levels from the Control Location L-10 were comparable.

D. Land Use Survey

A Land Use Survey conducted during the August 2015 growing season around the LaSalle County Station (LSCS) was performed by Environmental Inc. (Midwest Labs) for Exelon Nuclear to comply with Radiological Effluent Control 12.5.2 of the LaSalle's Offsite Dose Calculation Manual. The purpose of the survey was to document the nearest resident, milk producing animal and garden of greater than 500 ft^2 in each of the sixteen 22 ½ degree sectors around the site. The distance and direction of all locations from the LSCS reactor buildings were positioned using Global Positioning System (GPS) technology. There were no changes required to the LSCS REMP as a result of this survey. The results of this survey are summarized below:

Distance in Miles from the LSCS Reactor Buildings			
Sector	Residence Miles	Livestock Miles	Milk Farm Miles
A N	3.9	4.0	-
B NNE	1.6	1.7	-
C NE	2.1	3.5	-
D ENE	3.3	3.8	-
E E	3.2	-	14.2
F ESE	1.4	-	-
G SE	1.7	4.7	-
H SSE	1.8	4.7	-
J S	1.5	4.7	-
K SSW	0.7	-	-
L SW	1.0	5.8	-
M WSW	1.5	-	-
N W	1.5	3.0	-
P WNW	0.9	3.0	-
Q NW	1.8	4.0	-
R NNW	1.7	4.6	-

E. Errata Data

There is no errata data for 2015.

F. Summary of Results – Inter-Laboratory Comparison Program

The primary and secondary laboratories analyzed Performance Evaluation (PE) samples of air particulate, air iodine, milk, soil, vegetation and water matrices (Appendix D). The PE samples, supplied by Analytics Inc., Environmental Resource Associates (ERA) and DOE's 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 laboratory results and Analytics' known value. Since flag values are not assigned by Analytics, TBE-ES evaluates the reported ratios based on internal QC requirements, which are 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, NELAC, state specific 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.

The MAPEP defines three levels of performance: Acceptable (flag = "A"), Acceptable with Warning (flag = "W"), and Not Acceptable (flag = "N"). Performance is considered acceptable when a mean result for the specified analyte is ± 20% of the reference value. Performance is acceptable with warning when a mean result falls in the range from ± 20% to ± 30% of the reference value (i.e., 20% < bias < 30%). If the bias is greater than 30%, the results are deemed not acceptable.

For the TBE laboratory, 129 out of 139 analyses performed met the specified acceptance criteria. Ten analyses (AP - Cr-51, U-234/233, Gr A, Sr-90; Soil Sr-90; Water - Ni-63, Sr-89/90, U natural; Vegetation Sr-90 samples) did not meet the specified acceptance criteria for the following reasons and were addressed through the TBE Corrective Action Program:

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.

1. Teledyne Brown Engineering's Analytics' June 2015 air particulate Cr-51 result of 323 ± 45.5 pCi was higher than the known value of 233 pCi with a ratio of 1.39. The upper ratio of 1.30 (acceptable with warning) was exceeded. The air particulate sample is counted at a distance above the surface of the detector to avoid detector summing which could alter the results. Chromium-51 has the shortest half-life (27.7 days) and the lowest gamma energy (320.08 keV) of this mixed nuclide sample. Additionally, Cr-51 has only one gamma energy and also has a low intensity (9.38 gamma photons produced per 100 disintegrations). This geometry produces a larger error for the Cr-51 and other gamma emitters as any distance from the detector decreases the counting rate and the probability of accurately detecting the nuclide energy. Taking into consideration the uncertainty, the activity of Cr-51 overlaps with the known value at a ratio of 1.19, which would statistically be

considered acceptable. No client samples were affected by this failure. NCR 15-18

2. Teledyne Brown Engineering's MAPEP March 2015 soil Sr-90 result of 286 Total Bq/kg was lower than the known value of 653 Bq/kg, exceeding the lower acceptance range of 487 Bq/kg. The failure was due to incomplete digestion of the sample. Incomplete digestion of samples causes some of the sample to be left behind and is not present in the digested sample utilized for analysis. The procedure has been updated to include a more robust digestion using stirring during the heating phase. The MAPEP September 2014 soil Sr-90 series prior to this study was evaluated as acceptable with a result of 694 and an acceptance range of 601 – 1115 Bq/kg. The MAPEP September 2015 series soil Sr-90 after this study was evaluated as acceptable with a result of 429 and an acceptance range of 298 – 553 Bq/kg. We feel the issue is specific to the March 2015 MAPEP sample. No client samples were affected by this failure. NCR 15-13

3. Teledyne Brown Engineering's MAPEP March 2015 air particulate U-234/233 result of 0.0211 ± 0.0120 Bq/sample was higher than the known value of 0.0155 Bq/sample, exceeding the upper acceptance range of 0.0202 Bq/sample. Although evaluated as a failure, taking into consideration the uncertainty, TBE's result would overlap with the known value, which is statistically considered acceptable. MAPEP spiked the sample with significantly more U-238 activity (a found to known ratio of 0.96) than the normal U-234/233. Due to the extremely low activity, it was difficult to quantify the U-234/233. No client samples were affected by this failure. NCR 15-13

4. Teledyne Brown Engineering's MAPEP March 2015 air particulate gross alpha result of 0.448 Bq/sample was lower than the known value of 1.77 Bq/sample, exceeding the lower acceptance range of 0.53 Bq/sample. The instrument efficiency used for gross alpha is determined using a non-attenuated alpha standard. The MAPEP filter has the alphas embedded in the filter, requiring an attenuated efficiency. When samples contain alpha particles that are embedded in the sample media, due to the size of the alpha particle, some of the alpha particles are absorbed by the media and cannot escape to be counted. When the sample media absorbs the alpha particles this is known as self-absorption or attenuation. The calibration must include a similar configuration/media to correct for the attenuation. In order to correct the low bias, TBE will create an attenuated efficiency for MAPEP air particulate filters. The MAPEP September series air particulate gross alpha result of

0.47 Bq/sample was evaluated as acceptable with a range of 0.24 – 1.53 Bq/sample. Unlike the MAPEP samples, air particulate Gross alpha analyses for power plants are not evaluated as a direct count sample. Power plant air particulate filters for gross alpha go through an acid digestion process prior to counting and the digested material is analyzed. No client samples were affected by this failure. NCR 15-13

5. Teledyne Brown Engineering's MAPEP September water Ni-63 result of 11.8 ± 10.8 Bq/L was higher than the known value of 8.55 Bq/L, exceeding the upper acceptance range of 11.12 Bq/L. The Ni-63 half-life is approximately 100 years. Nickel-63 is considered to be a "soft" or low energy beta emitter, which means that the beta energy is very low. The maximum beta energy for Ni-63 is approximately 65 keV, much lower than other more common nuclides such as Co-60 (maximum beta energy of 1549 keV). The original sample was run with a 10 mL aliquot which was not sufficient for the low level of Ni-63 in the sample. The rerun aliquot of 30 mL produced an acceptable result of 8.81 Bq/L. No client samples were affected by this failure. NCR 15-21

6. Teledyne Brown Engineering's MAPEP September air particulate Sr-90 result of 1.48 Bq/sample was lower than the known value of 2.18 Bq/sample, exceeding the lower acceptance range of 1.53 Bq/sample. In the past, MAPEP has added substances (unusual compounds found in DOE complexes) to various matrices that have resulted in incomplete removal of the isotope of interest for the laboratories analyzing the cross checks. TBE suspects that this may be the cause of this error. Many compounds, if not properly accounted for or removed in the sample matrix, can cause interferences to either indicate lower activity or higher activity. TBE will no longer analyze the air particulate Sr-90 through MAPEP but will participate in the Analytics cross check program to perform both Sr-89 and Sr-90 in the air particulate matrix. No client samples were affected by this failure. NCR 15-21

7. Teledyne Brown Engineering's MAPEP September vegetation Sr-90 result of 0.386 Bq/sample was lower than the known value of 1.30 Bq/sample, exceeding the lower acceptance range of 0.91 Bq/sample. In the past, MAPEP has added substances (unusual compounds found in DOE complexes) to various matrices that have resulted in incomplete removal of the isotope of interest for the laboratories analyzing the cross checks. TBE suspects that this maybe the cause of this error. Many compounds, if not properly accounted for or removed in the sample matrix, can cause interferences to either indicate lower activity or higher activity.

Results from previous performance evaluations were reviewed and shown to be acceptable. No client samples were affected by this failure. NCR 15-21

8. & 9. Teledyne Brown Engineering's ERA May water Sr-89/90 results of 45.2 and 28.0 pCi/L, respectively were lower than the known values of 63.2 and 41.9 pCi/L, respectively, exceeding the lower acceptance limits of 51.1 and 30.8 pCi/L, respectively. The yields were on the high side of the TBE acceptance range, which indicates the present of excess calcium contributed to the yield, resulting in low results. No client samples were affected by these failures. NCR 15-09

10. Teledyne Brown Engineering's ERA November water Uranium natural result of 146.9 pCi/L was higher than the known value of 56.2 pCi/L, exceeding the upper acceptance limit of 62.4 pCi/L. The technician failed to dilute the original sample, but used the entire 12 mL sample. When the results were recalculated without the dilution and using the 12 mL aliquot, the result of 57.16 agreed with the assigned value of 56.2. No client samples were affected by this failure. NCR 15-19

For the EIML laboratory, 90 of 94 analyses met the specified acceptance criteria. Four analyses (Water – Co-57, Fe-55; AP – Co-57; Soil – Sr-90) did not meet the specified acceptance criteria for the following reasons:

1. The Environmental Inc., Midwest Laboratory's MAPEP February 2015 water Co-57 result of 10.2 Bq/L was lower than the known value of 29.9 Bq/L, exceeding the lower control limit of 20.9 Bq/L. The reported value should have been 27.84, which would have been evaluated as acceptable. A data entry error resulted in a non-acceptable result. There was no impact to client samples as a result of this failure.

2. The Environmental Inc., Midwest Laboratory's MAPEP February 2015 AP Co-57 result of 0.04 Bq/sample was lower than the known value of 1.51 Bq/ sample, exceeding the lower control limit of 1.06 Bq/sample. The reported value should have been 1.58 Bq/sample, which would have been evaluated as acceptable. A data entry error resulted in a non-acceptable result. There was no impact to client samples as a result of this failure.

3. The Environmental Inc., Midwest Laboratory's MAPEP August 2015 soil Sr-90 result of 231 Bq/kg was lower than the known value of 425 Bq/kg, exceeding the lower control limit of 298 Bq/kg. The

incomplete separation of calcium from strontium caused a failed low result. The reanalysis result of 352 Bq/kg fell within acceptance criteria. Client samples for the associated time period were evaluated, and no client samples were affected by this issue.

4. The Environmental Inc., Midwest Laboratory's MAPEP August 2015 water Fe-55 result of 4.2 Bq/L was lower than the known value of 13.1 Bq/L, exceeding the lower control limit of 9.2 Bq/L. The known activity was below the routine laboratory detection limits for the available aliquot fraction. There was no impact to client samples as a result of this failure.

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

APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT ANNUAL SUMMARY

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE LASALLE COUNTY STATION, 2015

NAME OF FACILITY: LASALLE				DOCKET NUMBER: 50-373 & 50-374				
LOCATION OF FACILITY: MARSEILLES IL				REPORTING PERIOD: ANNUAL 2015				
				INDICATOR LOCATIONS	CONTROL LOCATION	LOCATION WITH HIGHEST ANNUAL MEAN (M)		
MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SURFACE WATER (PCI/LITER)	GR-B	24	4	6.8 (12/12) (4.7/8.0)	6.3 (12/12) (4.7/8.5)	6.8 (12/12) (4.7/8.0)	L-40 INDICATOR ILLINOIS RIVER - DOWNSTREAM 5.2 MILES NNW OF SITE	0
	H-3	8	200	377 (4/4) (204/585)	394 (4/4) (201/508)	394 (4/4) (201/508)	L-21 CONTROL ILLINOIS RIVER AT SENECA - UPSTREAM 4.0 MILES NE OF SITE	0
	GAMMA	24						
	MN-54		15	<LLD	<LLD	-		0
	CO-58		15	<LLD	<LLD	-		0
	FE-59		30	<LLD	<LLD	-		0
	CO-60		15	<LLD	<LLD	-		0
	ZN-65		30	<LLD	<LLD	-		0

* THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES
FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F)

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				INDICATOR LOCATIONS	CONTROL LOCATION	LOCATION WITH HIGHEST ANNUAL MEAN (M)		
MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SURFACE WATER (PCI/LITER)	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

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
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

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
GROUND WATER (PCI/LITER)	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
FISH (PCI/KG WET)	GAMMA MN-54	12	130	<LLD	<LLD	-		0
	CO-58		130	<LLD	<LLD	-		0

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				INDICATOR LOCATIONS	CONTROL LOCATION	LOCATION WITH HIGHEST ANNUAL MEAN (M)		
MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
FISH (PCI/KG WET)	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

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
FISH (PCI/KG WET)	BA-140		NA	<LLD	<LLD	-		0
	LA-140		NA	<LLD	<LLD	-		0
SEDIMENT (PCI/KG DRY)	GAMMA	6						
	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

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				INDICATOR LOCATIONS	CONTROL LOCATION	LOCATION WITH HIGHEST ANNUAL MEAN (M)		
MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SEDIMENT (PCI/KG DRY)	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	17 (412/414) (5/37)	18 (51/52) (8/34)	19 (52/52) (8/37)	L-07 INDICATOR SENECA 5.2 MILES NNE OF SITE	0

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
AIR PARTICULATE (E-3 PCI/CU.METER)	GAMMA	36						
	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

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
AIR PARTICULATE (E-3 PCI/CU.METER)	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 (E-3 PCI/CU.METER)	GAMMA I-131	466	70	<LLD	<LLD	-		0
Milk (PCI/LITER)	I-131	17	1	<LLD	<LLD	-		0
	GAMMA MN-54	17	NA	NA	<LLD	-		0

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Milk (PCI/LITER)	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

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Milk (PCI/LITER)	CS-137		18	NA	<LLD	-		0
	BA-140		60	NA	<LLD	-		0
	LA-140		15	NA	<LLD	-		0
VEGETATION (PCI/KG WET)	GAMMA	6						
	MN-54		NA	<LLD	<LLD	-		0
	CO-58		NA	<LLD	<LLD	-		0
	FE-59		NA	<LLD	<LLD	-		0
	CO-60		NA	<LLD	<LLD	-		0

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TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE LASALLE COUNTY STATION, 2015

NAME OF FACILITY: LASALLE				DOCKET NUMBER: 50-373 & 50-374				
LOCATION OF FACILITY: MARSEILLES IL				REPORTING PERIOD: ANNUAL 2015				
				INDICATOR LOCATIONS	CONTROL LOCATION	LOCATION WITH HIGHEST ANNUAL MEAN (M)		
MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
VEGETATION (PCI/KG WET)	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

* THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES
FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F)

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE LASALLE COUNTY STATION, 2015

NAME OF FACILITY: LASALLE				DOCKET NUMBER: 50-373 & 50-374				
LOCATION OF FACILITY: MARSEILLES IL				REPORTING PERIOD: ANNUAL 2015				
				INDICATOR LOCATIONS	CONTROL LOCATION	LOCATION WITH HIGHEST ANNUAL MEAN (M)		
MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
DIRECT RADIATION (MILLIREM/QTR.)	OSLD-QUARTERLY	329	NA	23 (321/321) (16.3/28.7)	20.3 (8/8) (17.5/23)	25.9 (4/4) (22.4/28.7)	L-102-2 INDICATOR 0.6 MILES NNE	0

* THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES
FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F)

APPENDIX B

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

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, LaSalle County Station, 2015

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-11	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	Diane Partridge	4.5 miles NE
Quadrant 2	Mike and Gina Welbourne	3.8 miles ESE
Quadrant 3	Michael Olson	1.5 miles WSW
Quadrant 4	Robert Eisers	4.5 miles NW
Control	Eugene Clements	10.0 miles NW

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, LaSalle County Station, 2015

Location	Location Description	Distance & Direction From Site
H. Environmental Dosimetry - OSLD		
Inner Ring		
L-101-1 and -2		0.5 miles N
L-102-1 and -2		0.6 miles NNE
L-103-1 and -2		0.7 miles NE
L-104-1 and -2		0.8 miles ENE
L-105-1 and -2		0.7 miles E
L-106-1 and -2		1.4 miles ESE
L-107-1 and -2		0.8 miles SE
L-108-1 and -2		0.5 miles SSE
L-109-1 and -2		0.6 miles S
L-110-1 and -2		0.6 miles SSW
L-111b-1 and -2		0.8 miles SW
L-112-1 and -2		0.9 miles WSW
L-113a-1 and -2		0.8 miles W
L-114-1 and -2		0.9 miles WNW
L-115-1 and -2		0.7 miles NW
L-116-1 and -2		0.6 miles NNW
Outer Ring		
L-201-3 and -4		4.0 miles N
L-202-3 and -4		3.6 miles NNE
L-203-1 and -2		4.0 miles NE
L-204-1 and -2		3.2 miles ENE
L-205-1 and -2		3.2 miles ESE
L-205-3 and -4		5.1 miles E
L-206-1 and -2		4.3 miles SE
L-207-1 and -2		4.5 miles SSE
L-208-1 and -2		4.5 miles S
L-209-1 and -2		4.0 miles SSW
L-210-1 and -2		3.3 miles SW
L-211-1 and -2		4.5 miles WSW
L-212-1 and -2		4.0 miles W
L-213-3 and -4		4.9 miles W
L-214-3 and -4		5.1 miles WNW
L-215-3 and -4		5.0 miles NW
L-216-3 and -4		5.0 miles NNW
Other		
L-01-1 and -2	Nearsite 1 (indicator)	1.5 miles NNW
L-03-1 and -2	Onsite 3 (indicator)	1.0 miles ENE
L-04-1 and -2	Rte. 170 (indicator)	3.2 miles E
L-05-1 and -2	Onsite 5 (indicator)	0.3 miles ESE
L-06-1 and -2	Nearsite 6 (indicator)	0.4 miles W
L-07-1 and -2	Seneca (indicator)	5.2 miles NNE
L-08-1 and -2	Marseilles (indicator)	6.0 miles NNW
L-11-1 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, 2015

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 Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
Surface Water	Gross Beta	Monthly composite from weekly grab samples.	TBE, TBE-2008 Gross Alpha and/or gross beta activity in various matrices Env. Inc., W(DS)-01 Determination of gross alpha and/or gross beta in water (dissolved solids or total residue)
Surface Water	Tritium	Quarterly composite from weekly grab samples.	TBE, TBE-2011 Tritium analysis in drinking water by liquid scintillation Env. Inc., T-02 Determination of tritium in water (direct method)
Ground/Well Water	Gamma Spectroscopy	Quarterly grab samples.	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
Ground/Well Water	Tritium	Quarterly grab samples.	TBE, TBE-2011 Tritium analysis in drinking water by liquid scintillation Env. Inc., T-02 Determination of tritium in water (direct method)
Fish	Gamma Spectroscopy	Semi-annual samples collected via electroshocking or other techniques	TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
Sediment	Gamma Spectroscopy	Semi-annual grab samples	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
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 Env. Inc., AP-02 Determination of gross alpha and/or gross beta in air particulate filters
Air Particulates	Gamma Spectroscopy	Quarterly composite of each station	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
Air Iodine	Gamma Spectroscopy	Bi-weekly composite of continuous air sampling through charcoal filter	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., I-131-02 Determination of I-131 in charcoal canisters by gamma spectroscopy (batch method)
Milk	I-131	Bi-weekly grab sample when cows are on pasture. Monthly all other times	TBE, TBE-2012 Radioiodine in various matrices Env. Inc., I-131-01 Determination of I-131 in milk by an ion exchange
Milk	Gamma Spectroscopy	Bi-weekly grab sample when cows are on pasture. Monthly all other times	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
Food Products	Gamma Spectroscopy	Annual grab samples.	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
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, 2015

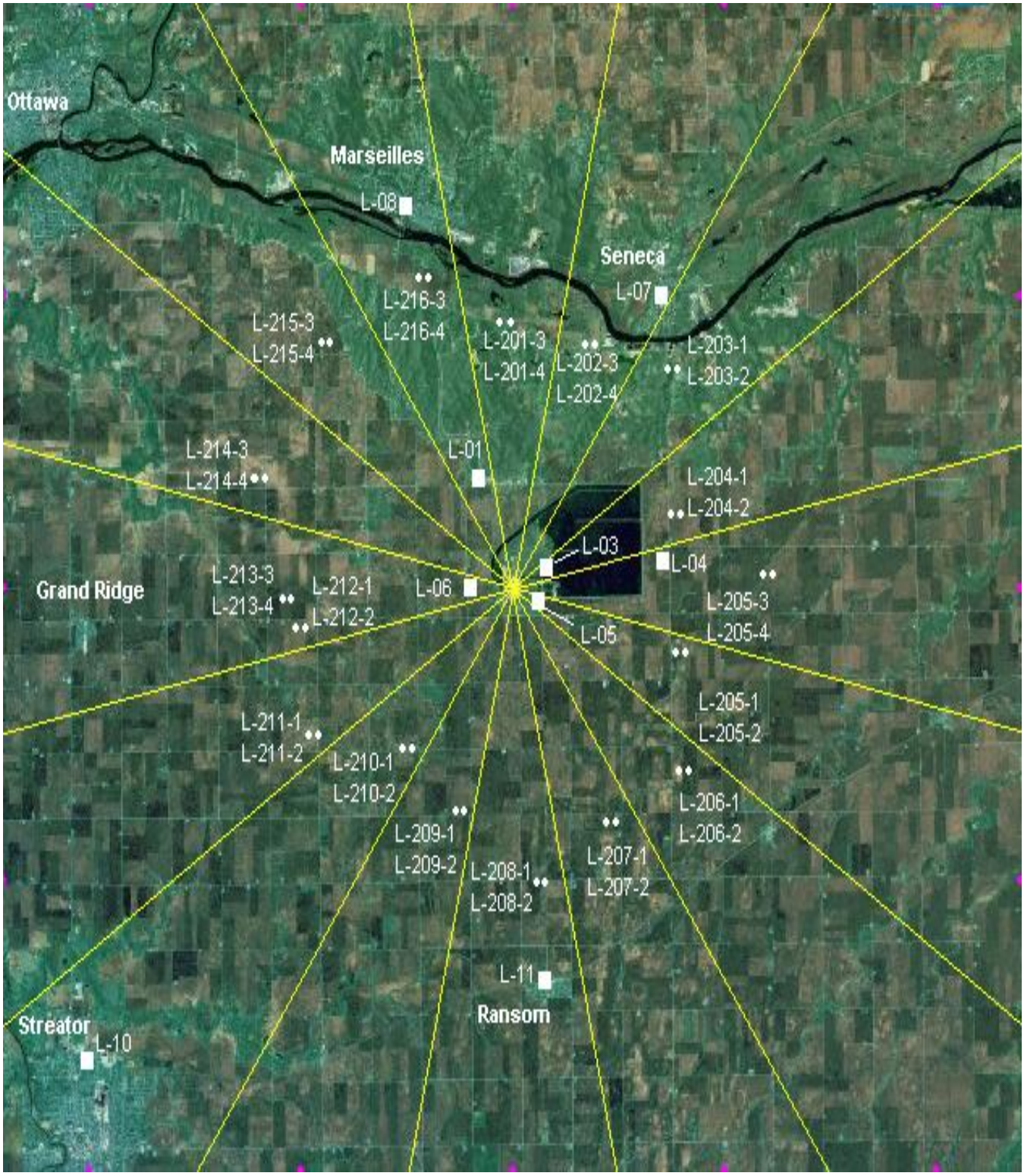


Figure B-2
Outer Ring OSLD Locations and Fixed Air Sampling Locations
of the LaSalle County Station, 2015

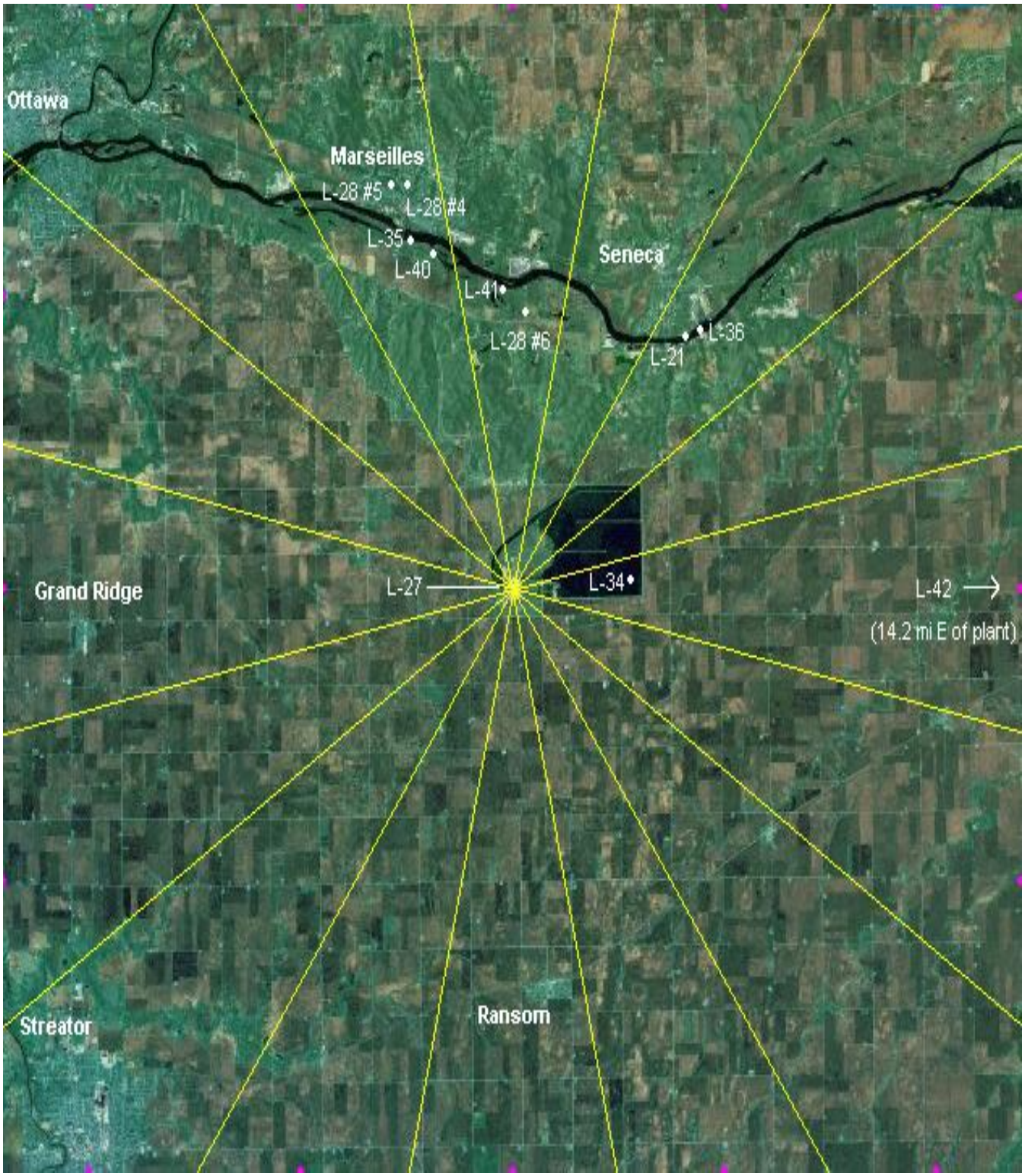


Figure B-3
Ingestion and Waterborne Exposure Pathway Sample Locations
of the LaSalle County Station, 2015

APPENDIX C

DATA TABLES AND FIGURES – PRIMARY LABORATORY

Table C-I.1 **CONCENTRATIONS OF GROSS BETA IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	L-21	L-40
01/07/15 - 01/29/15	7.5 ± 2.3	8.0 ± 2.3
02/05/15 - 02/26/15	5.2 ± 2.3	5.2 ± 2.3
03/05/15 - 03/25/15	6.9 ± 2.2	7.9 ± 2.3
04/01/15 - 04/30/15	6.4 ± 2.1	4.7 ± 2.0
05/07/15 - 05/28/15	4.7 ± 2.2	7.6 ± 2.3
06/04/15 - 06/25/15	7.2 ± 2.1	8.0 ± 2.2
07/01/15 - 07/30/15	5.8 ± 2.0	5.9 ± 2.0
08/06/15 - 08/27/15	5.7 ± 2.2	6.7 ± 2.3
09/03/15 - 09/24/15	6.4 ± 2.0	6.6 ± 2.1
09/30/15 - 10/29/15	8.5 ± 2.4	7.7 ± 2.3
11/04/15 - 11/25/15	6.4 ± 2.4	6.9 ± 2.4
12/03/15 - 12/31/15	5.2 ± 1.9	6.9 ± 2.2
MEAN	6.3 ± 2.2	6.8 ± 2.2

Table C-I.2 **CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	L-21	L-40
01/07/15 - 03/25/15	360 ± 142	244 ± 134
04/01/15 - 06/25/15	505 ± 139	474 ± 144
07/01/15 - 09/24/15	201 ± 133	204 ± 131
09/30/15 - 12/31/15	508 ± 143	585 ± 147
MEAN	394 ± 291	377 ± 366

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES
(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-I.3 **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015**

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	01/07/15 - 01/29/15	< 2	< 2	< 4	< 2	< 3	< 2	< 4	< 14	< 2	< 2	< 23	< 6
	02/05/15 - 02/26/15	< 1	< 2	< 3	< 1	< 3	< 2	< 3	< 9	< 1	< 1	< 15	< 5
	03/05/15 - 03/25/15	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 14	< 2	< 2	< 22	< 7
	04/01/15 - 04/30/15	< 1	< 1	< 3	< 1	< 3	< 1	< 2	< 12	< 1	< 1	< 16	< 5
	05/07/15 - 05/28/15	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 13	< 2	< 2	< 23	< 7
	06/04/15 - 06/25/15	< 2	< 2	< 5	< 2	< 4	< 2	< 3	< 14	< 2	< 2	< 22	< 8
	07/01/15 - 07/30/15	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 13	< 2	< 2	< 20	< 8
	08/06/15 - 08/27/15	< 3	< 4	< 7	< 3	< 5	< 4	< 6	< 15	< 3	< 3	< 30	< 10
	09/03/15 - 09/24/15	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 3	< 1	< 1	< 5	< 2
	09/30/15 - 10/29/15	< 1	< 2	< 3	< 1	< 3	< 2	< 3	< 13	< 1	< 1	< 19	< 5
	11/04/15 - 11/25/15	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 9	< 2	< 2	< 17	< 5
	12/03/15 - 12/31/15	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 11	< 2	< 2	< 18	< 6
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
L-40	01/07/15 - 01/29/15	< 2	< 2	< 6	< 2	< 4	< 3	< 4	< 15	< 2	< 2	< 24	< 8
	02/05/15 - 02/26/15	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 11	< 2	< 2	< 18	< 6
	03/05/15 - 03/25/15	< 2	< 2	< 4	< 1	< 3	< 2	< 3	< 12	< 1	< 2	< 19	< 5
	04/01/15 - 04/30/15	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 12	< 1	< 1	< 19	< 6
	05/07/15 - 05/28/15	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 14	< 2	< 2	< 24	< 7
	06/04/15 - 06/25/15	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 15	< 2	< 2	< 21	< 8
	07/01/15 - 07/30/15	< 2	< 2	< 4	< 1	< 3	< 2	< 3	< 11	< 1	< 2	< 18	< 5
	08/06/15 - 08/27/15	< 4	< 4	< 9	< 4	< 7	< 4	< 7	< 14	< 3	< 4	< 29	< 10
	09/03/15 - 09/24/15	< 1	< 1	< 2	< 1	< 2	< 1	< 2	< 3	< 1	< 1	< 7	< 2
	09/30/15 - 10/29/15	< 1	< 1	< 3	< 1	< 2	< 1	< 2	< 10	< 1	< 1	< 15	< 4
	11/04/15 - 11/25/15	< 1	< 2	< 4	< 2	< 3	< 2	< 3	< 8	< 1	< 2	< 15	< 5
	12/03/15 - 12/31/15	< 1	< 2	< 4	< 2	< 3	< 2	< 3	< 10	< 1	< 2	< 16	< 4
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-II.1 **CONCENTRATIONS OF TRITIUM IN GROUND/WELL WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	L-27	L-28-W4	L-28-W5	L-28-W6
01/07/15 - 01/07/15	< 152		< 156	< 157
04/09/15 - 04/09/15	< 195	< 196		< 192
07/09/15 - 07/09/15	< 190		< 192	< 191
10/06/15 - 10/06/15	< 187	< 199		< 198
MEAN	-	-	-	-

Table C-II.2 **CONCENTRATIONS OF GAMMA EMITTERS IN GROUND/WELL WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015**

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	01/07/15 - 01/07/15	< 5	< 5	< 9	< 5	< 11	< 5	< 9	< 6	< 6	< 27	< 8
	04/09/15 - 04/09/15	< 4	< 4	< 9	< 5	< 7	< 4	< 7	< 4	< 4	< 26	< 9
	07/09/15 - 07/09/15	< 6	< 6	< 15	< 7	< 11	< 7	< 10	< 6	< 7	< 32	< 9
	10/06/15 - 10/06/15	< 6	< 3	< 10	< 5	< 9	< 6	< 5	< 5	< 7	< 31	< 12
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-28-W4	04/09/15 - 04/09/15	< 4	< 5	< 11	< 5	< 10	< 5	< 9	< 5	< 5	< 30	< 9
	10/06/15 - 10/06/15	< 6	< 8	< 11	< 7	< 12	< 8	< 13	< 8	< 8	< 36	< 8
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-28-W5	01/07/15 - 01/07/15	< 5	< 7	< 12	< 6	< 11	< 5	< 10	< 4	< 6	< 28	< 9
	07/09/15 - 07/09/15	< 7	< 6	< 12	< 7	< 13	< 7	< 13	< 6	< 7	< 35	< 12
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-28-W6	01/07/15 - 01/07/15	< 6	< 5	< 9	< 7	< 13	< 6	< 10	< 5	< 5	< 28	< 10
	04/09/15 - 04/09/15	< 3	< 4	< 9	< 4	< 7	< 4	< 7	< 4	< 4	< 25	< 8
	07/09/15 - 07/09/15	< 7	< 7	< 13	< 5	< 13	< 8	< 13	< 7	< 8	< 33	< 10
	10/06/15 - 10/06/15	< 6	< 5	< 10	< 4	< 11	< 6	< 8	< 6	< 5	< 29	< 10
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-III.1 **CONCENTRATIONS OF GAMMA EMITTERS IN FISH SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015**

RESULTS IN UNITS OF PC/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	05/05/15	< 85	< 97	< 210	< 72	< 172	< 104	< 174	< 90	< 80	< 978	< 340
Largemouth Bass	05/05/15	< 106	< 104	< 219	< 80	< 166	< 137	< 151	< 91	< 93	< 805	< 192
Channel Catfish	10/26/15	< 64	< 59	< 135	< 76	< 113	< 66	< 117	< 63	< 57	< 349	< 126
Common Carp	10/26/15	< 75	< 90	< 133	< 71	< 171	< 79	< 177	< 72	< 93	< 494	< 149
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-35												
River Carpsucker	05/05/15	< 60	< 74	< 147	< 59	< 121	< 84	< 117	< 69	< 66	< 732	< 147
Smallmouth Buffalo	05/05/15	< 79	< 71	< 160	< 81	< 151	< 86	< 131	< 79	< 59	< 887	< 227
Channel Catfish	10/26/15	< 34	< 55	< 107	< 75	< 109	< 67	< 89	< 57	< 55	< 340	< 63
Smallmouth Buffalo	10/26/15	< 79	< 56	< 174	< 83	< 166	< 55	< 124	< 64	< 66	< 372	< 130
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-36												
River Carpsucker	05/05/15	< 55	< 61	< 166	< 66	< 138	< 77	< 122	< 58	< 49	< 566	< 214
Smallmouth Buffalo	05/05/15	< 63	< 69	< 198	< 63	< 130	< 93	< 129	< 69	< 51	< 740	< 179
Smallmouth Bass	10/26/15	< 53	< 71	< 120	< 62	< 134	< 70	< 116	< 69	< 73	< 389	< 100
Smallmouth Buffalo	10/26/15	< 45	< 46	< 99	< 53	< 95	< 40	< 78	< 44	< 41	< 251	< 69
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-IV.1 **CONCENTRATIONS OF GAMMA EMITTERS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015**

RESULTS IN UNITS OF PC/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	05/14/15	< 90	< 92	< 256	< 111	< 208	< 103	< 186	< 79	< 120	< 741	< 203
	10/06/15	< 92	< 82	< 187	< 94	< 219	< 108	< 198	< 83	< 115	< 501	< 153
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-40	05/14/15	< 107	< 96	< 261	< 116	< 259	< 143	< 217	< 99	< 149	< 983	< 259
	10/06/15	< 81	< 61	< 173	< 63	< 165	< 88	< 139	< 82	< 99	< 452	< 94
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-41	05/14/15	< 92	< 84	< 172	< 85	< 184	< 100	< 170	< 68	< 107	< 686	< 210
	10/06/15	< 74	< 82	< 167	< 78	< 170	< 73	< 139	< 61	< 76	< 363	< 106
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-V.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015

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

COLLECTION PERIOD	GROUP I				GROUP II			
	L-03		L-05		L-01		L-06	
12/31/14 - 01/07/15	28 ± 5		22 ± 4		25 ± 4		32 ± 5	
01/07/15 - 01/15/15	14 ± 4		13 ± 4		18 ± 4		20 ± 4	
01/15/15 - 01/22/15	23 ± 4		24 ± 5		23 ± 4		24 ± 5	
01/22/15 - 01/29/15	10 ± 4		10 ± 4		17 ± 4		17 ± 4	
01/29/15 - 02/05/15	15 ± 4		15 ± 4		14 ± 4	(1)	16 ± 4	
02/05/15 - 02/12/15	21 ± 4	(1)	21 ± 5		22 ± 5		23 ± 5	
02/12/15 - 02/19/15	28 ± 5		28 ± 5	(1)	24 ± 5		24 ± 5	
02/19/15 - 02/26/15	33 ± 5		31 ± 5		31 ± 5		26 ± 5	
02/26/15 - 03/05/15	16 ± 4		19 ± 4		19 ± 4		18 ± 4	
03/05/15 - 03/12/15	12 ± 4		10 ± 4		13 ± 4		14 ± 4	
03/12/15 - 03/19/15	12 ± 4		22 ± 5		21 ± 5		17 ± 4	
03/19/15 - 03/25/15	12 ± 4		14 ± 5		12 ± 4		15 ± 5	
03/25/15 - 04/01/15	13 ± 4		14 ± 4		15 ± 4		17 ± 4	
04/01/15 - 04/09/15	13 ± 4		11 ± 3		11 ± 3		12 ± 4	
04/09/15 - 04/16/15	16 ± 4		16 ± 4		14 ± 4		13 ± 4	
04/16/15 - 04/23/15	13 ± 4		13 ± 4		12 ± 4		13 ± 4	
04/23/15 - 04/30/15	11 ± 4		11 ± 4		11 ± 4		13 ± 4	
04/30/15 - 05/07/15	12 ± 4		15 ± 4		13 ± 4		16 ± 4	
05/07/15 - 05/14/15	6 ± 4		6 ± 3		6 ± 4		< 5	
05/14/15 - 05/21/15	9 ± 4		12 ± 4		10 ± 4		13 ± 4	
05/21/15 - 05/28/15	11 ± 4		14 ± 4	(1)	13 ± 4	(1)	11 ± 4	(1)
05/28/15 - 06/04/15	13 ± 4		14 ± 4		10 ± 4		12 ± 4	
06/04/15 - 06/11/15	14 ± 4		12 ± 4		15 ± 4		16 ± 4	
06/11/15 - 06/18/15	9 ± 3		10 ± 4		10 ± 3		9 ± 3	
06/18/15 - 06/25/15	11 ± 4	(1)	16 ± 4		15 ± 4		19 ± 4	
06/25/15 - 07/01/15	16 ± 4		13 ± 4		12 ± 4		10 ± 4	
07/01/15 - 07/09/15	11 ± 4	(1)	12 ± 4		13 ± 4		11 ± 3	
07/09/15 - 07/16/15	14 ± 4		14 ± 4		15 ± 4		14 ± 4	
07/16/15 - 07/23/15	15 ± 4		17 ± 4		13 ± 4		13 ± 4	
07/23/15 - 07/30/15	16 ± 4		17 ± 4		17 ± 5		15 ± 4	
07/30/15 - 08/06/15	22 ± 5		21 ± 5		23 ± 5		22 ± 5	
08/06/15 - 08/13/15	18 ± 4		20 ± 4		15 ± 4		13 ± 4	
08/13/15 - 08/20/15	19 ± 5		18 ± 5		16 ± 4		21 ± 5	
08/20/15 - 08/27/15	18 ± 4		15 ± 4		15 ± 4		14 ± 4	
08/27/15 - 09/03/15	33 ± 5		30 ± 5		34 ± 5		28 ± 5	
09/03/15 - 09/10/15	34 ± 6		22 ± 5		29 ± 5		33 ± 6	
09/10/15 - 09/17/15	16 ± 4	(1)	15 ± 4		18 ± 4		16 ± 4	
09/17/15 - 09/24/15	15 ± 4		16 ± 4		14 ± 4		17 ± 4	
09/24/15 - 09/30/15	19 ± 5		21 ± 5		21 ± 5		20 ± 5	
09/30/15 - 10/08/15	11 ± 3		12 ± 3		12 ± 3		11 ± 3	
10/08/15 - 10/15/15	14 ± 4		16 ± 4		12 ± 4		14 ± 4	
10/15/15 - 10/22/15	27 ± 5		25 ± 5		31 ± 5		24 ± 5	
10/22/15 - 10/29/15	17 ± 4		14 ± 4		13 ± 4		18 ± 4	
10/29/15 - 11/04/15	17 ± 5		15 ± 5		15 ± 4		14 ± 5	
11/04/15 - 11/12/15	18 ± 4		22 ± 5		18 ± 4	(1)	22 ± 5	
11/12/15 - 11/19/15	18 ± 4		15 ± 4			(1)	17 ± 4	
11/19/15 - 11/25/15	17 ± 5		18 ± 5		14 ± 5	(1)	12 ± 4	
11/25/15 - 12/03/15	17 ± 4		19 ± 4		17 ± 4		14 ± 5	(1)
12/03/15 - 12/10/15	31 ± 5		28 ± 5		28 ± 5			(1)
12/10/15 - 12/17/15	12 ± 4		11 ± 4		14 ± 4		12 ± 4	
12/17/15 - 12/24/15	22 ± 4		22 ± 4		21 ± 4		22 ± 5	
12/24/15 - 12/31/15	16 ± 4		12 ± 4		17 ± 4		13 ± 4	
MEAN	17 ± 13		17 ± 11		17 ± 12		17 ± 11	

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES
(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-V.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015

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

COLLECTION PERIOD	GROUP III				GROUP IV	
	L-04	L-07	L-08	L-11	L-10	
12/31/14 - 01/07/15	23 ± 4	30 ± 5	29 ± 5	27 ± 5	26 ± 5	
01/07/15 - 01/15/15	16 ± 4	16 ± 4	16 ± 4	16 ± 4	21 ± 4	
01/15/15 - 01/22/15	25 ± 5	28 ± 5	23 ± 4	25 ± 5	23 ± 4	
01/22/15 - 01/29/15	17 ± 4	15 ± 4	14 ± 4	18 ± 4	13 ± 4	
01/29/15 - 02/05/15	20 ± 4 (1)	18 ± 4	14 ± 4	18 ± 4	18 ± 4	
02/05/15 - 02/12/15	26 ± 5	22 ± 5	22 ± 5	22 ± 5	21 ± 5	
02/12/15 - 02/19/15	26 ± 5	26 ± 5	22 ± 5	25 ± 5	28 ± 5	
02/19/15 - 02/26/15	31 ± 5	30 ± 5	27 ± 5	32 ± 5	33 ± 5	
02/26/15 - 03/05/15	23 ± 4	17 ± 4	21 ± 4	19 ± 4	19 ± 4	
03/05/15 - 03/12/15	15 ± 4	15 ± 4	11 ± 4	14 ± 4	15 ± 4	
03/12/15 - 03/19/15	19 ± 4	18 ± 4	16 ± 4	19 ± 4	18 ± 4	
03/19/15 - 03/25/15	13 ± 4	16 ± 5	17 ± 5	19 ± 5	15 ± 5	
03/25/15 - 04/01/15	15 ± 4	16 ± 4	12 ± 4	15 ± 4	15 ± 4	
04/01/15 - 04/09/15	12 ± 4	13 ± 4	10 ± 3	13 ± 4	10 ± 3	
04/09/15 - 04/16/15	14 ± 4	18 ± 4	16 ± 4	17 ± 4	15 ± 4	
04/16/15 - 04/23/15	16 ± 4	11 ± 4	14 ± 4	17 ± 4	12 ± 4	
04/23/15 - 04/30/15	10 ± 4 (1)	9 ± 3	12 ± 4	12 ± 4	14 ± 4	
04/30/15 - 05/07/15	13 ± 4	11 ± 4	13 ± 4	15 ± 4	13 ± 4	
05/07/15 - 05/14/15	8 ± 4	8 ± 4	< 5	5 ± 3	< 5	
05/14/15 - 05/21/15	10 ± 4	12 ± 4	10 ± 4	8 ± 4	11 ± 4	
05/21/15 - 05/28/15	19 ± 5 (1)	16 ± 4	10 ± 4	14 ± 4	22 ± 8	(1)
05/28/15 - 06/04/15	13 ± 4	12 ± 4	18 ± 4	12 ± 4	11 ± 4	
06/04/15 - 06/11/15	17 ± 4	13 ± 4	15 ± 4	18 ± 5	11 ± 4	
06/11/15 - 06/18/15	9 ± 3	11 ± 4	8 ± 3	10 ± 3	11 ± 4	
06/18/15 - 06/25/15	14 ± 4	18 ± 4	13 ± 4	13 ± 4	15 ± 4	
06/25/15 - 07/01/15	12 ± 4	9 ± 4	10 ± 4	14 ± 4	8 ± 4	
07/01/15 - 07/09/15	17 ± 4 (1)	11 ± 4	12 ± 4	14 ± 4	14 ± 4	
07/09/15 - 07/16/15	14 ± 4	11 ± 3	12 ± 4	13 ± 4	16 ± 4	
07/16/15 - 07/23/15	17 ± 4	18 ± 4	13 ± 4	13 ± 4	15 ± 4	
07/23/15 - 07/30/15	16 ± 4	17 ± 4	14 ± 4	17 ± 4	16 ± 4	
07/30/15 - 08/06/15	25 ± 5	21 ± 5	17 ± 4	19 ± 4	23 ± 5	
08/06/15 - 08/13/15	21 ± 5 (1)	17 ± 4	19 ± 4	17 ± 4	19 ± 4	
08/13/15 - 08/20/15	16 ± 4	21 ± 5	17 ± 4	20 ± 4	23 ± 5	
08/20/15 - 08/27/15	15 ± 4	15 ± 4	12 ± 4	14 ± 4	18 ± 4	
08/27/15 - 09/03/15	37 ± 6	37 ± 5	30 ± 5	33 ± 5	33 ± 5	
09/03/15 - 09/10/15	35 ± 6	34 ± 6	32 ± 5	29 ± 5	27 ± 5	
09/10/15 - 09/17/15	15 ± 4	20 ± 4	16 ± 4	19 ± 4	14 ± 4	
09/17/15 - 09/24/15	13 ± 4	20 ± 4	13 ± 4	17 ± 4	14 ± 4	
09/24/15 - 09/30/15	19 ± 5	24 ± 5	22 ± 5	23 ± 5	18 ± 5	
09/30/15 - 10/08/15	12 ± 3	11 ± 3	10 ± 3	14 ± 3	12 ± 3	
10/08/15 - 10/15/15	16 ± 4	16 ± 4	12 ± 4	16 ± 4	13 ± 4	
10/15/15 - 10/22/15	25 ± 5	29 ± 5	26 ± 5	28 ± 5	23 ± 4	
10/22/15 - 10/29/15	16 ± 4	19 ± 5	15 ± 4	18 ± 4	19 ± 4	
10/29/15 - 11/04/15	19 ± 5	16 ± 5	13 ± 4	14 ± 4	17 ± 5	
11/04/15 - 11/12/15	19 ± 4	24 ± 5	20 ± 5	23 ± 5	23 ± 5	
11/12/15 - 11/19/15	21 ± 4	20 ± 4	17 ± 4	17 ± 4	16 ± 4	
11/19/15 - 11/25/15	15 ± 5	18 ± 5	15 ± 5	14 ± 5	15 ± 5	
11/25/15 - 12/03/15	17 ± 4	15 ± 4	17 ± 4	18 ± 4	18 ± 4	
12/03/15 - 12/10/15	35 ± 6	33 ± 6	34 ± 5	31 ± 5	34 ± 5	
12/10/15 - 12/17/15	15 ± 4	12 ± 4	11 ± 4	11 ± 4	11 ± 4	
12/17/15 - 12/24/15	24 ± 5	23 ± 5	25 ± 5	25 ± 5	26 ± 5	
12/24/15 - 12/31/15	12 ± 4	11 ± 4	14 ± 4	14 ± 4	13 ± 4	
MEAN	18 ± 13	19 ± 15	17 ± 12	18 ± 12	18 ± 12	

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES
(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

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, 2015**

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
12/31/14 - 01/29/15	10	28	18 ± 14	12/31/14 - 01/29/15	17	32	22 ± 10	12/31/14 - 01/29/15	14	30	21 ± 11	12/31/14 - 01/29/15	13	26	21 ± 11
01/29/15 - 02/26/15	15	33	24 ± 14	01/29/15 - 02/26/15	14	31	22 ± 11	01/29/15 - 02/26/15	14	32	24 ± 10	01/29/15 - 02/26/15	18	33	25 ± 14
02/26/15 - 04/01/15	10	22	14 ± 7	02/26/15 - 04/01/15	12	21	16 ± 6	02/26/15 - 04/01/15	11	23	16 ± 6	02/26/15 - 04/01/15	15	19	16 ± 4
04/01/15 - 04/30/15	11	16	13 ± 4	04/01/15 - 04/30/15	11	14	12 ± 2	04/01/15 - 04/30/15	9	18	13 ± 5	04/01/15 - 04/30/15	10	15	13 ± 5
04/30/15 - 06/04/15	6	15	11 ± 6	04/30/15 - 06/04/15	6	16	12 ± 5	04/30/15 - 06/04/15	5	19	12 ± 7	04/30/15 - 06/04/15	11	22	14 ± 10
06/04/15 - 07/01/15	9	16	13 ± 5	06/04/15 - 07/01/15	9	19	13 ± 7	06/04/15 - 07/01/15	8	18	13 ± 6	06/04/15 - 07/01/15	8	15	11 ± 5
07/01/15 - 07/30/15	11	17	14 ± 4	07/01/15 - 07/30/15	11	17	14 ± 4	07/01/15 - 07/30/15	11	18	14 ± 5	07/01/15 - 07/30/15	14	16	15 ± 2
07/30/15 - 09/03/15	15	33	21 ± 11	07/30/15 - 09/03/15	13	34	20 ± 14	07/30/15 - 09/03/15	12	41	22 ± 17	07/30/15 - 09/03/15	18	33	23 ± 12
09/03/15 - 09/30/15	15	34	20 ± 13	09/03/15 - 09/30/15	14	33	21 ± 14	09/03/15 - 09/30/15	13	35	22 ± 15	09/03/15 - 09/30/15	14	27	18 ± 13
09/30/15 - 10/29/15	11	27	17 ± 12	09/30/15 - 10/29/15	11	31	17 ± 14	09/30/15 - 10/29/15	10	29	18 ± 12	09/30/15 - 10/29/15	12	23	17 ± 10
10/29/15 - 12/03/15	15	22	18 ± 4	10/29/15 - 12/03/15	12	22	16 ± 6	10/29/15 - 12/03/15	13	24	18 ± 6	10/29/15 - 12/03/15	15	23	18 ± 6
12/03/15 - 12/31/15	11	31	19 ± 15	12/03/15 - 12/31/15	12	28	18 ± 12	12/03/15 - 12/31/15	11	35	21 ± 18	12/03/15 - 12/31/15	11	34	21 ± 21
12/31/14 - 12/31/15	6	34	17 ± 12	12/31/14 - 12/31/15	6	34	17 ± 12	12/31/14 - 12/31/15	5	41	18 ± 13	12/31/14 - 12/31/15	8	34	18 ± 12

Table C-V.3 **CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015**

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	12/31/14 - 04/01/15	< 3	< 4	< 19	< 2	< 6	< 7	< 8	< 3	< 2	< 1714	< 546
	04/01/15 - 07/01/15	< 4	< 9	< 31	< 4	< 10	< 9	< 16	< 4	< 4	< 1369	< 774
	07/01/15 - 09/30/15	< 3	< 4	< 19	< 3	< 6	< 6	< 11	< 3	< 2	< 630	< 373
	09/30/15 - 12/31/15	< 2	< 5	< 14	< 2	< 5	< 5	< 7	< 3	< 3	< 343	< 79
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-03	12/31/14 - 04/01/15	< 2	< 6	< 30	< 4	< 9	< 9	< 12	< 3	< 3	< 2009	< 855
	04/01/15 - 07/01/15	< 3	< 6	< 23	< 4	< 8	< 9	< 12	< 4	< 3	< 1105	< 433
	07/01/15 - 09/30/15	< 4	< 7	< 21	< 4	< 11	< 8	< 10	< 4	< 4	< 822	< 378
	09/30/15 - 12/31/15	< 3	< 5	< 14	< 3	< 8	< 6	< 9	< 3	< 3	< 386	< 223
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-04	12/31/14 - 04/01/15	< 4	< 8	< 30	< 4	< 7	< 9	< 14	< 2	< 3	< 1861	< 983
	04/01/15 - 07/01/15	< 2	< 4	< 13	< 2	< 8	< 5	< 8	< 2	< 2	< 965	< 401
	07/01/15 - 09/30/15	< 5	< 10	< 26	< 3	< 9	< 8	< 15	< 5	< 4	< 867	< 421
	09/30/15 - 12/31/15	< 3	< 5	< 15	< 3	< 6	< 6	< 7	< 3	< 2	< 415	< 132
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-05	12/31/14 - 04/01/15	< 4	< 8	< 19	< 4	< 9	< 8	< 12	< 3	< 2	< 2259	< 1116
	04/01/15 - 07/01/15	< 2	< 5	< 9	< 2	< 6	< 4	< 7	< 2	< 2	< 709	< 321
	07/01/15 - 09/30/15	< 3	< 3	< 12	< 3	< 7	< 5	< 8	< 2	< 2	< 628	< 172
	09/30/15 - 12/31/15	< 5	< 6	< 24	< 4	< 11	< 8	< 16	< 4	< 4	< 569	< 208
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-06	12/31/14 - 04/01/15	< 5	< 10	< 29	< 3	< 14	< 10	< 17	< 5	< 5	< 3465	< 880
	04/01/15 - 07/01/15	< 3	< 6	< 17	< 4	< 7	< 4	< 11	< 3	< 2	< 1070	< 535
	07/01/15 - 09/30/15	< 3	< 5	< 14	< 2	< 6	< 6	< 11	< 3	< 2	< 651	< 186
	09/30/15 - 12/31/15	< 3	< 5	< 14	< 3	< 7	< 6	< 13	< 3	< 3	< 444	< 116
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-V.3 **CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015**

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	12/31/14 - 04/01/15	< 3	< 6	< 32	< 3	< 10	< 8	< 14	< 3	< 2	< 1542	< 806
	04/01/15 - 07/01/15	< 3	< 4	< 27	< 3	< 8	< 7	< 10	< 3	< 2	< 1180	< 491
	07/01/15 - 09/30/15	< 3	< 5	< 15	< 2	< 7	< 6	< 11	< 3	< 2	< 721	< 319
	09/30/15 - 12/31/15	< 3	< 5	< 16	< 3	< 7	< 5	< 10	< 3	< 2	< 280	< 121
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-08	12/31/14 - 04/01/15	< 4	< 6	< 25	< 2	< 8	< 8	< 12	< 3	< 2	< 1723	< 495
	04/01/15 - 07/01/15	< 3	< 6	< 17	< 3	< 7	< 6	< 11	< 3	< 3	< 986	< 291
	07/01/15 - 09/30/15	< 2	< 4	< 12	< 2	< 5	< 3	< 7	< 2	< 2	< 455	< 162
	09/30/15 - 12/31/15	< 4	< 6	< 19	< 3	< 9	< 6	< 9	< 4	< 2	< 579	< 110
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-10	12/31/14 - 04/01/15	< 3	< 7	< 17	< 2	< 6	< 5	< 9	< 3	< 2	< 1532	< 884
	04/01/15 - 07/01/15	< 4	< 7	< 30	< 6	< 13	< 10	< 18	< 4	< 4	< 1629	< 782
	07/01/15 - 09/30/15	< 3	< 7	< 19	< 4	< 8	< 7	< 11	< 4	< 3	< 910	< 215
	09/30/15 - 12/31/15	< 2	< 4	< 11	< 3	< 6	< 4	< 6	< 2	< 2	< 352	< 107
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-11	12/31/14 - 04/01/15	< 4	< 6	< 16	< 4	< 11	< 6	< 8	< 3	< 3	< 1772	< 965
	04/01/15 - 07/01/15	< 2	< 4	< 16	< 2	< 4	< 4	< 8	< 2	< 2	< 818	< 204
	07/01/15 - 09/30/15	< 5	< 9	< 25	< 4	< 11	< 10	< 14	< 4	< 3	< 826	< 373
	09/30/15 - 12/31/15	< 3	< 5	< 12	< 3	< 8	< 6	< 9	< 3	< 2	< 472	< 98
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-VI.1 **CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015**

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-11	L-10
12/31/14 - 01/07/15	< 38	< 38	< 15	< 38	< 38	< 15	< 36	< 36	< 36
01/07/15 - 01/15/15	< 65	< 65	< 65	< 34	< 65	< 31	< 58	< 57	< 61
01/15/15 - 01/22/15	< 58	< 59	< 23	< 58	< 58	< 24	< 56	< 58	< 57
01/22/15 - 01/29/15	< 30	< 30	< 30	< 13	< 30	< 12	< 34	< 33	< 33
01/29/15 - 02/05/15	< 62	< 63	< 10 (1)	< 62	< 62 (1)	< 38	< 20	< 38	< 38
02/05/15 - 02/12/15	< 35 (1)	< 41	< 16	< 41	< 41	< 51	< 51	< 51	< 21
02/12/15 - 02/19/15	< 66	< 62 (1)	< 23	< 59	< 59	< 28	< 67	< 67	< 67
02/19/15 - 02/26/15	< 45	< 45	< 17	< 45	< 45	< 35	< 34	< 14	< 34
02/26/15 - 03/05/15	< 25	< 25	< 10	< 25	< 25	< 12	< 29	< 28	< 28
03/05/15 - 03/12/15	< 67	< 67	< 26	< 67	< 67	< 52	< 52	< 52	< 52
03/12/15 - 03/19/15	< 34	< 34	< 13	< 34	< 33	< 14	< 34	< 34	< 34
03/19/15 - 03/25/15	< 38	< 38	< 21	< 38	< 38	< 21	< 47	< 47	< 47
03/25/15 - 04/01/15	< 35	< 35	< 13	< 34	< 35	< 17	< 39	< 38	< 38
04/01/15 - 04/09/15	< 22	< 42	< 42	< 42	< 41	< 35	< 35	< 35	< 35
04/09/15 - 04/16/15	< 68	< 68	< 68	< 62	< 67	< 62	< 62	< 26	< 62
04/16/15 - 04/23/15	< 50	< 51	< 50	< 50	< 33	< 51	< 62	< 62	< 62
04/23/15 - 04/30/15	< 51	< 51	< 20	< 51	< 60 (1)	< 23	< 53	< 54	< 54
04/30/15 - 05/07/15	< 55	< 21	< 55	< 57	< 55	< 28	< 65	< 65	< 65
05/07/15 - 05/14/15	< 65	< 65	< 67	< 62	< 64	< 63	< 65	< 67	< 67
05/14/15 - 05/21/15	< 41	< 42	< 41	< 25	< 41	< 64	< 64	< 57	< 57
05/21/15 - 05/28/15	< 47	< 63 (1)	< 47 (1)	< 62 (1)	< 54 (1)	< 64	< 62	< 53	< 30 (1)
05/28/15 - 06/04/15	< 59	< 52	< 58	< 51	< 58	< 26	< 62	< 62	< 62
06/04/15 - 06/11/15	< 61	< 51	< 62	< 51	< 61	< 52	< 52	< 68	< 69
06/11/15 - 06/18/15	< 29	< 29	< 29	< 11	< 29	< 13	< 31	< 31	< 31
06/18/15 - 06/25/15	< 58 (1)	< 57	< 24	< 57	< 56	< 36	< 68	< 70	< 70
06/25/15 - 07/01/15	< 51	< 51	< 21	< 51	< 50	< 50	< 19	< 50	< 50
07/01/15 - 07/09/15	< 35 (1)	< 31	< 13	< 31	< 37 (1)	< 13	< 34	< 33	< 33
07/09/15 - 07/16/15	< 65	< 65	< 34	< 65	< 65	< 25	< 46	< 46	< 46
07/16/15 - 07/23/15	< 42	< 42	< 42	< 23	< 42	< 28	< 63	< 63	< 63
07/23/15 - 07/30/15	< 54	< 54	< 55	< 22	< 53	< 54	< 53	< 21	< 53
07/30/15 - 08/06/15	< 67	< 70	< 66	< 25	< 66	< 64	< 64	< 25	< 64
08/06/15 - 08/13/15	< 55	< 55	< 21	< 55	< 64 (1)	< 28	< 64	< 66	< 64
08/13/15 - 08/20/15	< 63	< 65	< 24	< 61	< 63	< 63	< 63	< 26	< 63
08/20/15 - 08/27/15	< 56	< 57	< 21	< 56	< 58	< 27	< 60	< 64	< 62
08/27/15 - 09/03/15	< 62	< 62	< 23	< 62	< 62	< 27	< 63	< 62	< 63
09/03/15 - 09/10/15	< 44	< 44	< 42	< 16	< 43	< 21	< 49	< 50	< 49
09/10/15 - 09/17/15	< 56 (1)	< 63	< 31	< 63	< 60	< 30	< 57	< 56	< 55
09/17/15 - 09/24/15	< 63	< 59	< 57	< 23	< 59	< 45	< 45	< 44	< 18
09/24/15 - 09/30/15	< 66	< 68	< 26	< 68	< 66	< 56	< 54	< 55	< 54
09/30/15 - 10/08/15	< 68	< 68	< 25	< 68	< 68	< 70	< 70	< 67	< 28
10/08/15 - 10/15/15	< 33	< 33	< 12	< 33	< 33	< 50	< 19	< 50	< 48
10/15/15 - 10/22/15	< 57	< 58	< 55	< 57	< 21	< 29	< 51	< 53	< 51
10/22/15 - 10/29/15	< 25	< 62	< 61	< 63	< 63	< 23	< 53	< 52	< 51
10/29/15 - 11/04/15	< 58	< 60	< 22	< 59	< 59	< 64	< 64	< 61	< 26
11/04/15 - 11/12/15	< 53	< 20	< 53 (1)	< 53	< 53	< 27	< 64	< 63	< 64
11/12/15 - 11/19/15	< 58	< 58	(1)	< 57	< 22	< 58	< 69	< 69	< 28
11/19/15 - 11/25/15	< 29	< 29	< 12 (1)	< 29	< 30	< 40	< 17	< 40	< 39
11/25/15 - 12/03/15	< 43	< 16	< 42	< 62 (1)	< 42	< 25	< 60	< 58	< 56
12/03/15 - 12/10/15	< 63	< 63	< 61	(1)	< 63	< 21	< 53	< 52	< 52
12/10/15 - 12/17/15	< 65	< 63	< 34	< 68	< 65	< 29	< 67	< 67	< 65
12/17/15 - 12/24/15	< 23	< 23	< 9	< 23	< 23	< 14	< 31	< 31	< 30
12/24/15 - 12/31/15	< 32	< 32	< 12	< 31	< 32	< 16	< 36	< 35	< 35
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, 2015**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CONTROL FARM L-42
01/07/15	(1)
02/06/15	< 0.5
03/05/15	< 0.5
04/02/15	< 0.4
05/06/15	< 0.6
05/21/15	< 0.7
06/04/15	< 0.9
06/18/15	< 0.7
07/01/15	< 0.8
07/16/15	< 0.3
07/30/15	< 0.6
08/13/15	< 0.8
08/27/15	< 0.6
09/10/15	< 0.6
09/24/15	< 0.4
10/08/15	< 0.7
10/22/15	< 0.3
11/05/15	< 0.5
12/03/15	(1)

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-VII.2 **CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
L-42	01/07/15	(1)										
	02/06/15	< 7	< 6	< 16	< 6	< 16	< 7	< 11	< 7	< 7	< 33	< 10
	03/05/15	< 6	< 5	< 17	< 5	< 14	< 7	< 11	< 6	< 6	< 46	< 10
	04/02/15	< 8	< 9	< 18	< 7	< 17	< 10	< 16	< 8	< 9	< 59	< 9
	05/06/15	< 3	< 3	< 8	< 3	< 7	< 3	< 6	< 3	< 3	< 28	< 9
	05/21/15	< 8	< 8	< 14	< 9	< 18	< 10	< 16	< 7	< 8	< 52	< 12
	06/04/15	< 9	< 7	< 24	< 11	< 22	< 10	< 14	< 7	< 8	< 42	< 14
	06/18/15	< 6	< 9	< 15	< 5	< 16	< 7	< 11	< 6	< 8	< 37	< 13
	07/01/15	< 5	< 5	< 13	< 5	< 13	< 5	< 10	< 4	< 5	< 45	< 11
	07/16/15	< 9	< 7	< 15	< 8	< 14	< 8	< 14	< 7	< 7	< 49	< 11
	07/30/15	< 6	< 6	< 15	< 6	< 14	< 6	< 13	< 6	< 6	< 38	< 15
	08/13/15	< 9	< 9	< 18	< 8	< 20	< 9	< 14	< 9	< 9	< 48	< 13
	08/27/15	< 8	< 7	< 15	< 12	< 26	< 10	< 17	< 6	< 9	< 39	< 11
	09/10/15	< 6	< 6	< 15	< 8	< 15	< 6	< 12	< 5	< 7	< 25	< 9
	09/24/15	< 8	< 6	< 20	< 6	< 20	< 8	< 11	< 8	< 8	< 36	< 12
	10/08/15	< 6	< 6	< 15	< 6	< 14	< 7	< 12	< 6	< 7	< 31	< 6
	10/22/15	< 7	< 7	< 17	< 8	< 15	< 7	< 13	< 7	< 7	< 32	< 5
	11/05/15	< 6	< 7	< 18	< 7	< 16	< 7	< 11	< 5	< 7	< 29	< 7
	12/03/15	(1)										

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-VIII.1 **CONCENTRATIONS OF GAMMA EMITTERS IN FOOD PRODUCT SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015**

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-CONTROL														
Cabbage	09/24/15		< 20	< 20	< 52	< 21	< 50	< 21	< 39	< 51	< 18	< 20	< 127	< 36
Potatoes	09/24/15		< 24	< 35	< 73	< 32	< 75	< 30	< 63	< 55	< 17	< 36	< 178	< 48
	MEAN		-	-	-	-	-	-	-	-	-	-	-	-
L-QUAD 1														
Broccoli	09/23/15		< 21	< 20	< 58	< 22	< 53	< 24	< 34	< 58	< 16	< 20	< 132	< 30
Potatoes	09/23/15		< 27	< 21	< 55	< 26	< 53	< 23	< 33	< 57	< 18	< 24	< 141	< 40
	MEAN		-	-	-	-	-	-	-	-	-	-	-	-
L-QUAD 2														
	09/23/15	(1)												
	09/23/15	(1)												
	MEAN		-	-	-	-	-	-	-	-	-	-	-	-
L-QUAD 3														
	09/23/15	(1)												
	09/23/15	(1)												
	MEAN		-	-	-	-	-	-	-	-	-	-	-	-
L-QUAD 4														
Brussel Sprouts	09/23/15		< 21	< 25	< 52	< 20	< 47	< 26	< 40	< 59	< 19	< 23	< 138	< 34
Horseradish	09/23/15		< 11	< 12	< 26	< 17	< 25	< 13	< 23	< 58	< 9	< 9	< 94	< 27
	MEAN		-	-	-	-	-	-	-	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-IX.1 QUARTERLY OSLD RESULTS FOR LASALLE COUNTY STATION, 2015

RESULTS IN UNITS OF MILLIREM/QUARTER ± 2 STANDARD DEVIATIONS

STATION CODE	MEAN ± 2 S.D.	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC	
L-01-1	24.0 ± 5.1	20.3	24.0	25.7	25.8	
L-01-2	24.0 ± 6.3	19.3	26.0	25.8	24.9	
L-03-1	22.7 ± 3.7	19.9	23.5	23.2	24.0	
L-03-2	22.4 ± 5.0	19.1	22.9	22.5	25.1	
L-04-1	22.0 ± 5.5	19.2	22.0	24.7		(1)
L-04-2	22.0 ± 5.9	18.2	21.5	23.1	25.2	
L-05-1	22.5 ± 2.3	21.2	22.1	24.0	22.5	
L-05-2	22.3 ± 4.3	19.2	23.0	22.9	24.1	
L-06-1	23.7 ± 4.4	20.7	23.7	25.9	24.6	
L-06-2	23.8 ± 6.0	20.3	22.5	27.1	25.3	
L-07-1	22.7 ± 5.2	19.3	22.1	24.5	24.9	
L-07-2	23.5 ± 4.5	20.6	23.2	25.9	24.4	
L-08-1	23.5 ± 4.3	20.4	23.7	24.9	25.1	
L-08-2	23.9 ± 5.2	20.3	24.1	24.4	26.6	
L-10-1	20.5 ± 4.5	17.5	19.9	22.2	22.2	
L-10-2	20.2 ± 4.9	18.1	18.1	21.5	23.0	
L-11-1	21.1 ± 4.2	18.2	20.8	22.1	23.1	
L-11-2	20.2 ± 3.7	18.0	19.9	22.5	20.4	
L-101-1	23.8 ± 4.8	20.2	25.0	25.0	25.1	
L-101-2	24.2 ± 6.7	20.2	22.7	26.8	27.1	
L-102-1	25.2 ± 4.1	23.1	24.3	25.4	27.9	
L-102-2	25.9 ± 5.3	22.4	25.9	26.7	28.7	
L-103-1	22.5 ± 3.7	20.0	22.1	24.1	23.7	
L-103-2	23.1 ± 6.7	18.4	23.0	25.0	26.0	
L-104-1	22.5 ± 2.5	22.4	21.0	22.4	24.1	
L-104-2	21.7 ± 4.3	19.2	21.0	22.2	24.3	
L-105-1	24.0 ± 4.3	21.0	23.8	25.2	25.8	
L-105-2	23.3 ± 4.6	20.3	23.0	23.8	25.9	
L-106-1	24.1 ± 6.4	21.1	22.8	28.6	24.0	
L-106-2	23.0 ± 4.8	19.7	23.0	25.5	23.6	
L-107-1	23.3 ± 4.2	20.3	24.2	23.5	25.1	
L-107-2	21.6 ± 5.6	17.9	21.8	21.8	24.7	
L-108-1	23.8 ± 6.3	19.3	24.0	26.0	26.0	
L-108-2	19.5 ± 4.2	17.1	18.8	22.1	20.0	
L-109-1	22.3 ± 6.8	18.0	21.6	26.0	23.7	
L-109-2	24.2 ± 5.1	20.4	24.8	25.4	26.0	
L-110-1	23.3 ± 6.8	18.6	23.4	24.9	26.4	
L-110-2	22.7 ± 5.9	18.9	21.9	25.1	24.9	
L-112-1	22.5 ± 4.7	19.0	22.8	23.8	24.2	
L-112-2	23.4 ± 7.0	20.1	22.9	27.1		(1)
L-114-1	22.2 ± 6.9	18.3	23.7	24.7		(1)
L-114-2	23.4 ± 3.5	21.3	22.8	24.2	25.4	

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-IX.1 QUARTERLY OSLD RESULTS FOR LASALLE COUNTY STATION, 2015

RESULTS IN UNITS OF MILLIREM/QUARTER ± 2 STANDARD DEVIATIONS

STATION CODE	MEAN ± 2 S.D.	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC	
L-115-1	22.8 ± 4.5	20.1	21.7	24.8	24.5	
L-115-2	20.7 ± 3.9	18.3	20.4	21.2	23.0	
L-116-1	21.8 ± 3.4	19.7	21.2	23.3	23.1	
L-116-2	20.9 ± 3.9	18.3	20.4	22.0	22.7	
L-201-3	19.7 ± 4.7	16.5	19.4	21.0	21.9	
L-201-4	23.0 ± 5.9	19.3	22.0	25.2	25.5	
L-202-3	21.9 ± 5.3	18.4	21.4	22.9	24.7	
L-202-4	19.5 ± 4.3	16.3	19.9	20.7	20.9	
L-203-1	23.7 ± 5.5	19.8	23.7	25.2	25.9	
L-203-2	23.0 ± 6.3	18.7	22.6	25.2	25.5	
L-204-1	22.8 ± 4.9	20.0	24.3	24.1		(1)
L-204-2	25.0 ± 5.5	21.0	26.3	25.3	27.3	
L-205-1	22.5 ± 3.7	20.1	22.4	24.6	22.8	
L-205-2	22.9 ± 6.4	19.0	22.2	26.7	23.7	
L-205-3	21.3 ± 2.9	19.9	20.6	21.5	23.2	
L-205-4	22.5 ± 5.3	19.0	22.8	22.8	25.5	
L-206-1	23.8 ± 7.7	19.3	22.6	24.9	28.4	
L-206-2	22.9 ± 6.3	18.4	23.1	25.1	25.1	
L-207-1	23.4 ± 5.5	20.1	22.2	26.3	24.8	
L-207-2	22.1 ± 3.0	20.0	22.1	22.6	23.5	
L-208-1	23.1 ± 3.8	21.2	25.0	(1)	23.1	
L-208-2	23.3 ± 7.0	19.8	23.3	26.8		(1)
L-209-1	22.7 ± 5.9	19.4	23.7	(1)	25.1	
L-209-2	23.7 ± 5.6	19.7	24.1	24.9	26.1	
L-210-1	23.7 ± 7.3	19.5	21.8	26.9	26.6	
L-210-2	23.6 ± 8.2	17.5	24.7	26.1	26.1	
L-211-1	24.2 ± 5.1	21.8	22.2	26.6	26.2	
L-211-2	24.6 ± 5.3	21.3	23.5	26.9	26.5	
L-212-1	23.7 ± 4.5	20.4	24.6	24.1	25.6	
L-212-2	23.7 ± 5.6	20.4	24.3	22.9	27.1	
L-213-3	22.7 ± 6.4	18.3	22.2	24.7	25.4	
L-213-4	21.6 ± 5.2	18.3	20.9	24.4	22.7	
L-214-3	22.4 ± 5.1	18.9	22.2	24.6	24.0	
L-214-4	21.9 ± 6.8	17.1	22.9	22.4	25.1	
L-215-3	25.0 ± 6.1	21.2	25.9	24.5	28.5	
L-215-4	23.7 ± 4.5	20.8	23.4	26.1	24.5	
L-216-3	24.2 ± 6.1	20.0	23.8	25.8	27.0	
L-216-4	23.3 ± 3.2	21.6	22.4	23.7	25.3	
L-111B-1	23.8 ± 6.4	19.4	23.5	26.7	25.5	
L-111B-2	23.7 ± 5.8	19.5	26.0	24.2	25.2	
L-113A-1	24.4 ± 6.4	20.1	24.2	25.9	27.5	
L-113A-2	23.8 ± 3.9	20.9	24.2	24.8	25.1	

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-IX.2 MEAN QUARTERLY OSLD RESULTS FOR THE INNER RING, OUTER RING, OTHER AND CONTROL LOCATIONS FOR LASALLE COUNTY STATION, 2015

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	19.8 ± 2.8	19.5 ± 2.7	19.6 ± 1.9	17.8 ± 0.8
APR-JUN	22.9 ± 3.3	22.9 ± 3.1	22.8 ± 2.9	19.0 ± 2.5
JUL-SEP	24.6 ± 3.5	24.5 ± 3.4	24.3 ± 3.0	21.9 ± 1.0
OCT-DEC	25.0 ± 3.4	25.1 ± 3.5	24.4 ± 3.0	22.6 ± 1.1

TABLE C-IX.3 SUMMARY OF THE AMBIENT DOSIMETRY PROGRAM FOR LASALLE COUNTY STATION, 2015

RESULTS IN UNITS OF MILLIREM/QUARTER

LOCATION	SAMPLES ANALYZED	PERIOD MINIMUM	PERIOD MAXIMUM	PERIOD MEAN ± 2 S.D.
INNER RING	126	17.1	28.7	23.0 ± 5.2
OUTER RING	132	16.3	28.5	23.0 ± 5.4
OTHER	63	18.0	27.1	22.8 ± 4.7
CONTROL	8	17.5	23.0	20.3 ± 4.4

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, L-109-1, L-109-2, L-110-1, L-110-2, L-111B-1, L-111B-2, L-112-1, L-112-2, L-113A-1, L-113A-2, L-114-1, L-114-2, L-115-1, L-115-2, L-116-1, L-116-2

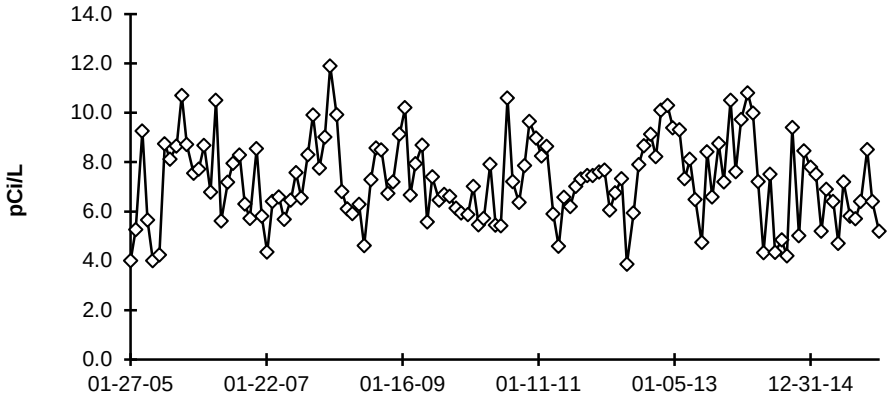
OUTER RING STATIONS - L-201-3, L-201-4, L-202-3, L-202-4, L-203-1, L-203-2, L-204-1, L-204-2, L-205-1, L-205-2, L-205-3, L-205-4, L-206-1, L-206-2, L-207-1, L-207-2, L-208-1, L-208-2, L-209-1, L-209-2, L-210-1, L-210-2, L-211-1, L-211-2, L-212-1, L-212-2, L-213-3, L-213-4, L-214-3, L-214-4, L-215-3, L-215-4, L-216-3, 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-11-1, L-11-2

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 - 2015

L-21 (C) Illinois River at Seneca



L-40 Illinois River Downstream

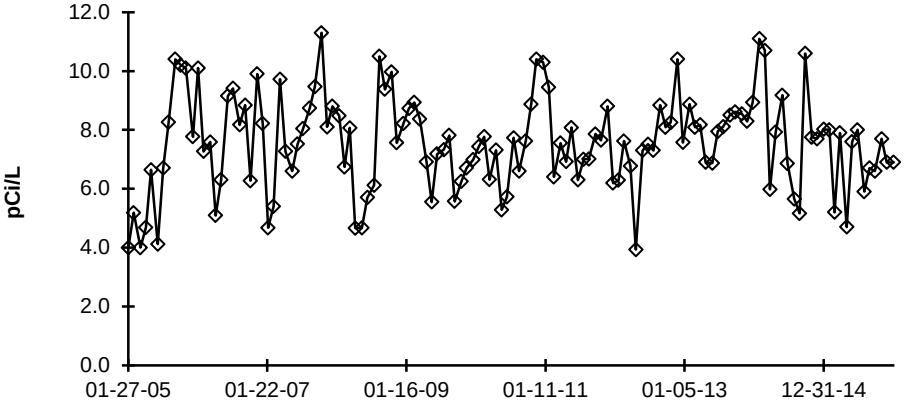
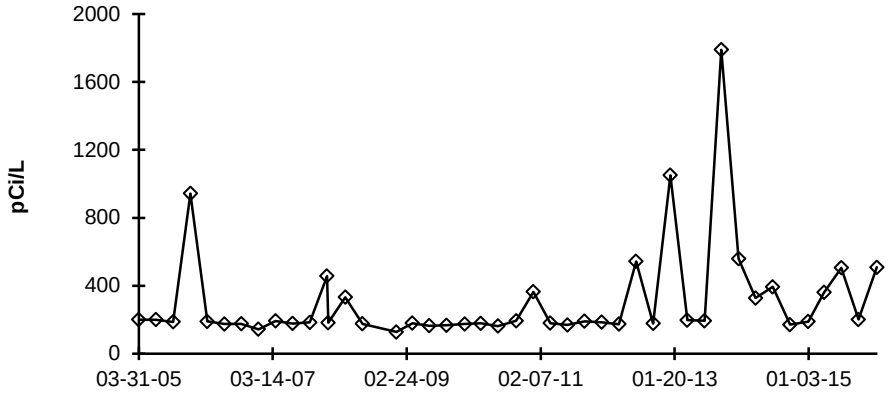


FIGURE C-2
Surface Water - Tritium - Stations L-21 (C) and L-40 Collected in the Vicinity of LSCS, 2005 - 2015

L-21 Illinois River at Seneca



L-40 Illinois River Downstream

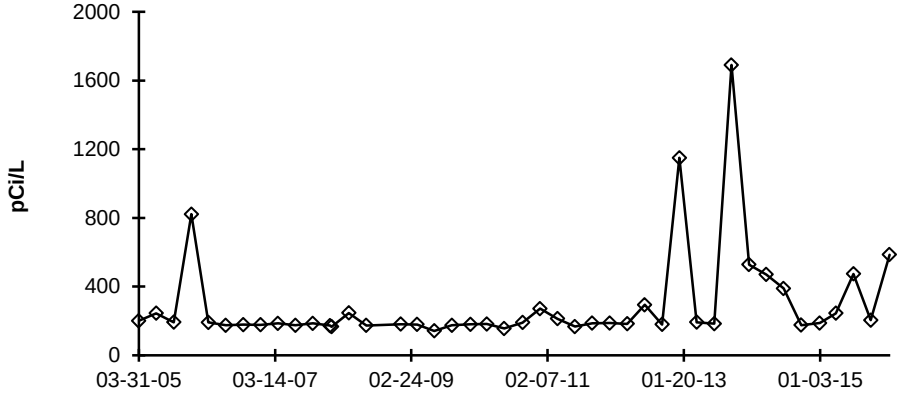
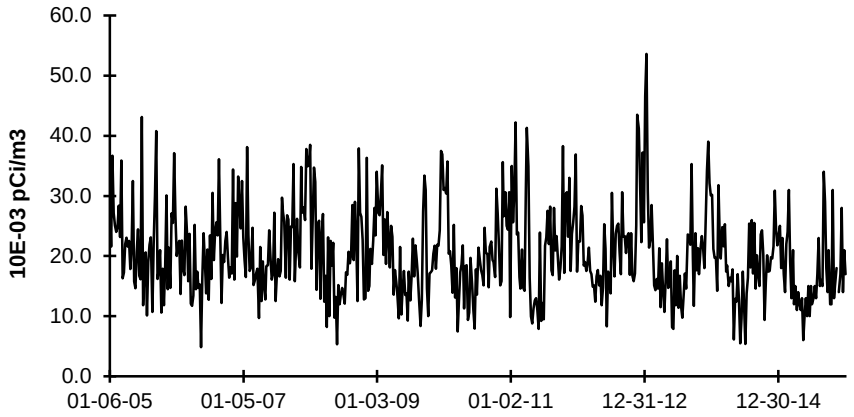


FIGURE C-3
Air Particulate - Gross Beta - Stations L-01 and L-03 Collected in the Vicinity of LSCS, 2005 - 2015

L-01 Nearsite No. 1



L-03 Onsite No. 3

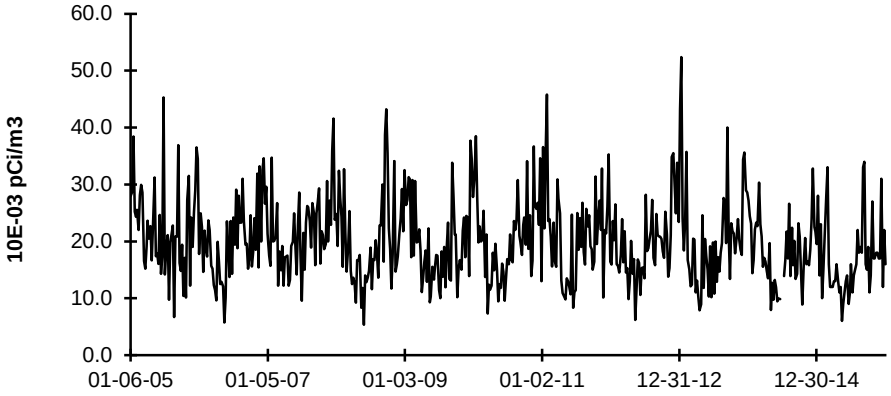
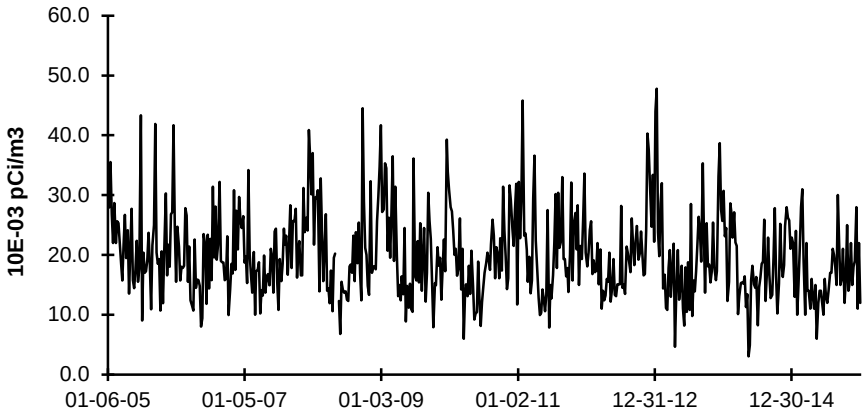


FIGURE C-4
Air Particulate - Gross Beta - Stations L-05 and L-06 Collected in the Vicinity of LSCS, 2005 - 2015

L-05 Onsite No. 5



L-06 Nearsite No. 6

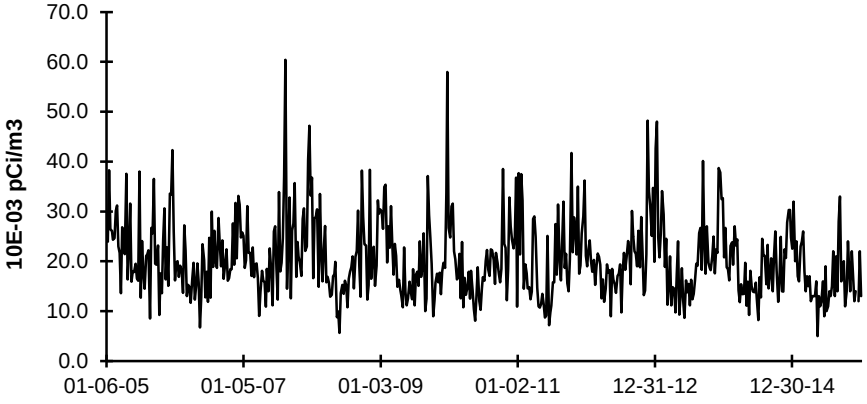


FIGURE C-5
Air Particulate - Gross Beta - Station L-10 (C)
Collected in the Vicinity of LSCS, 2005 - 2015

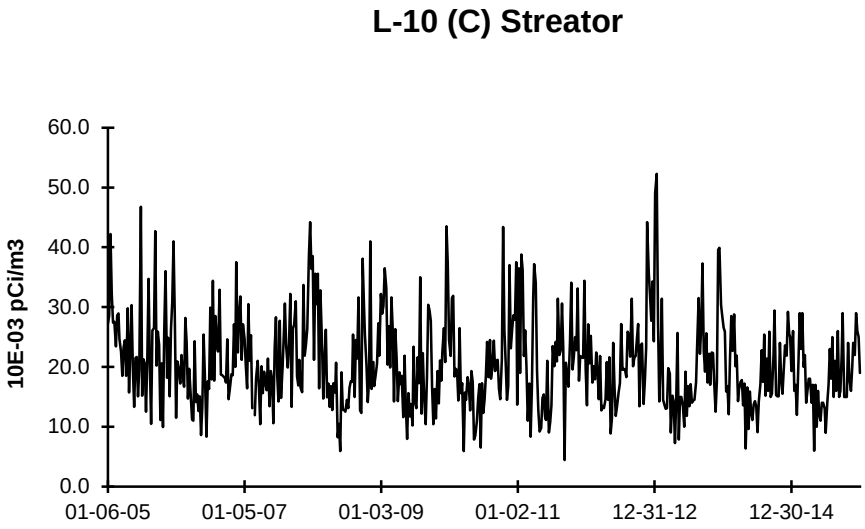
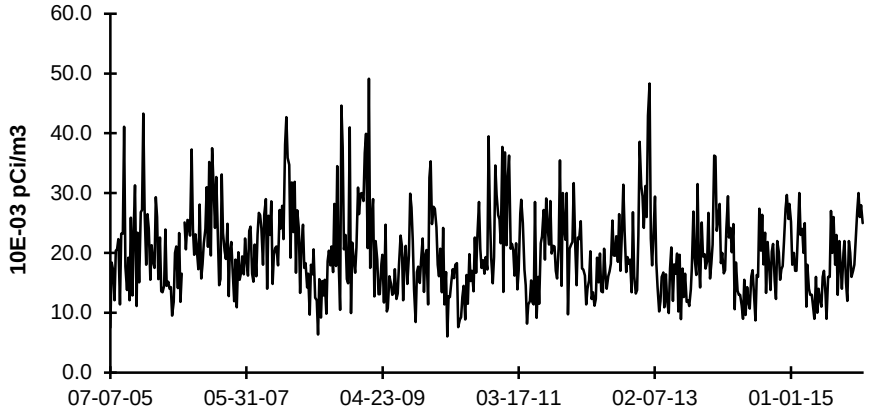


FIGURE C-6
Air Particulate - Gross Beta - Stations L-04 and L-07 Collected in the Vicinity of LSCS, 2005 - 2015

L-04 Rte. 170



L-07 Seneca

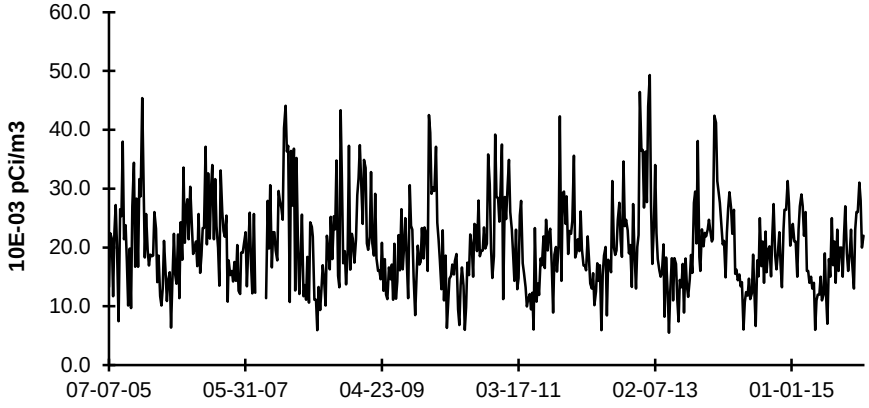
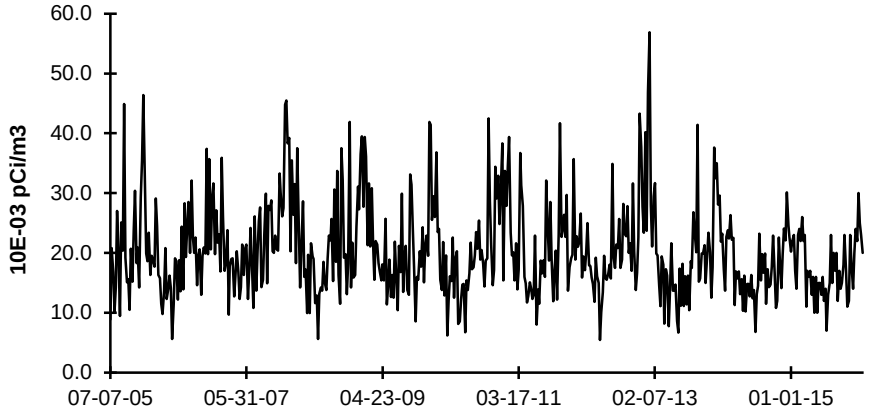
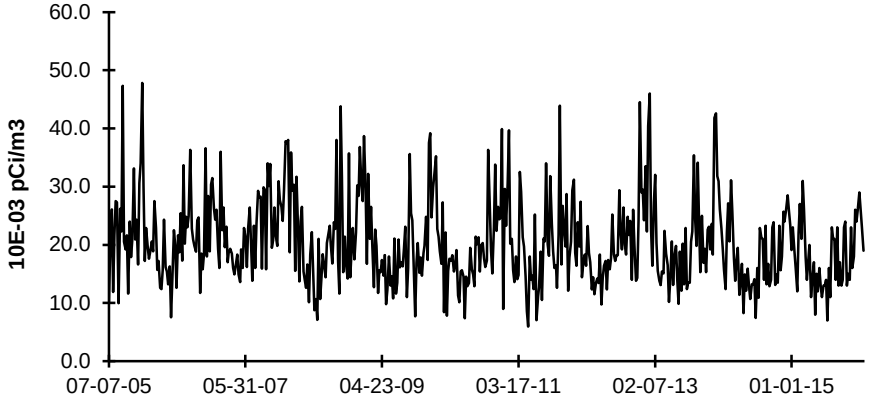


FIGURE C-7
Air Particulate - Gross Beta - Stations L-08 and L-11 Collected in the Vicinity of LSCS, 2005 - 2015

L-08 Marseilles



L-11 Ransom



APPENDIX D

INTER-LABORATORY COMPARISON PROGRAM

TABLE D-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2015
(PAGE 1 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
March 2015	E11181	Milk	Sr-89	pCi/L	88.9	97.2	0.91	A
			Sr-90	pCi/L	12.2	17.4	0.70	W
	E11182	Milk	I-131	pCi/L	61.3	65.1	0.94	A
			Ce-141	pCi/L	104	113	0.92	A
			Cr-51	pCi/L	265	276	0.96	A
			Cs-134	pCi/L	138	154	0.90	A
			Cs-137	pCi/L	205	207	0.99	A
			Co-58	pCi/L	178	183	0.97	A
			Mn-54	pCi/L	187	188	0.99	A
			Fe-59	pCi/L	182	177	1.03	A
			Zn-65	pCi/L	345	351	0.98	A
			Co-60	pCi/L	379	405	0.94	A
	E11184	AP	Ce-141	pCi	107	85.0	1.26	W
			Cr-51	pCi	261	224	1.17	A
			Cs-134	pCi	74.6	77.0	0.97	A
			Cs-137	pCi	99.6	102	0.98	A
			Co-58	pCi	99.8	110	0.91	A
			Mn-54	pCi	99.2	96.9	1.02	A
			Fe-59	pCi	109	119	0.92	A
			Zn-65	pCi	188	183	1.03	A
			Co-60	pCi	200	201	1.00	A
	E11183	Charcoal	I-131	pCi	82.9	85.4	0.97	A
	E11185	Water	Fe-55	pCi/L	1950	1900	1.03	A
June 2015	E11234	Milk	Sr-89	pCi/L	94.9	92.6	1.02	A
			Sr-90	pCi/L	14.3	12.7	1.13	A
	E11238	Milk	I-131	pCi/L	93.2	95.9	0.97	A
			Ce-141	pCi/L	Not provided for this study			
			Cr-51	pCi/L	349	276	1.26	W
			Cs-134	pCi/L	165	163	1.01	A
			Cs-137	pCi/L	143	125	1.14	A
			Co-58	pCi/L	82.0	68.4	1.20	A
			Mn-54	pCi/L	113	101	1.12	A
			Fe-59	pCi/L	184	151	1.22	W
			Zn-65	pCi/L	269	248	1.08	A
			Co-60	pCi/L	208	193	1.08	A
	E11237	AP	Ce-141	pCi	Not provided for this study			
			Cr-51	pCi	323	233	1.39	N (1)
			Cs-134	pCi	139	138	1.01	A
			Cs-137	pCi	111	106	1.05	A
			Co-58	pCi	54.0	57.8	0.93	A
			Mn-54	pCi	96.8	84.9	1.14	A
			Fe-59	pCi	162	128	1.27	W
			Zn-65	pCi	198	210	0.94	A
			Co-60	pCi	178	163	1.09	A
	E11236	Charcoal	I-131	pCi	93.9	80	1.17	A

TABLE D-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2015
(PAGE 2 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
June 2015	E11238	Water	Fe-55	pCi/L	1890	1790	1.06	A
September 2015	E11289	Milk	Sr-89	pCi/L	95.7	99.1	0.97	A
			Sr-90	pCi/L	15.4	16.4	0.94	A
	E11290	Milk	I-131	pCi/L	94.9	99.9	0.95	A
			Ce-141	pCi/L	228	213	1.07	A
			Cr-51	pCi/L	499	538	0.93	A
			Cs-134	pCi/L	208	212	0.98	A
			Cs-137	pCi/L	270	255	1.06	A
			Co-58	pCi/L	275	263	1.05	A
			Mn-54	pCi/L	320	290	1.10	A
			Fe-59	pCi/L	255	226	1.13	A
			Zn-65	pCi/L	392	353	1.11	A
			Co-60	pCi/L	350	330	1.06	A
	E11292	AP	Ce-141	pCi	104	85.1	1.22	W
			Cr-51	pCi	262	215	1.22	W
			Cs-134	pCi	86.1	84.6	1.02	A
			Cs-137	pCi	93	102	0.91	A
			Co-58	pCi	106	105	1.01	A
			Mn-54	pCi	117	116	1.01	A
			Fe-59	pCi	94.8	90.2	1.05	A
			Zn-65	pCi	160	141	1.13	A
			Co-60	pCi	146	132	1.11	A
	E11291	Charcoal	I-131	pCi	85.9	81.7	1.05	A
	E11293	Water	Fe-55	pCi/L	2090	1800	1.16	A
	E11294	Soil	Ce-141	pCi/kg	209	222	0.94	A
			Cr-51	pCi/kg	463	560	0.83	A
			Cs-134	pCi/kg	231	221	1.05	A
			Cs-137	pCi/kg	311	344	0.90	A
			Co-58	pCi/kg	245	274	0.89	A
			Mn-54	pCi/kg	297	302	0.98	A
			Fe-59	pCi/kg	248	235	1.06	A
			Zn-65	pCi/kg	347	368	0.94	A
			Co-60	pCi/kg	328	344	0.95	A
December 2015	E11354	Milk	Sr-89	pCi/L	96.2	86.8	1.11	A
			Sr-90	pCi/L	14.8	12.5	1.18	A
	E11355	Milk	I-131	pCi/L	95.1	91.2	1.04	A
			Ce-141	pCi/L	117	129	0.91	A
			Cr-51	pCi/L	265	281	0.94	A
			Cs-134	pCi/L	153	160	0.96	A
			Cs-137	pCi/L	119	115	1.03	A
			Co-58	pCi/L	107	110	0.97	A
			Mn-54	pCi/L	153	145	1.06	A
			Fe-59	pCi/L	117	108	1.08	A
			Zn-65	pCi/L	261	248	1.05	A
			Co-60	pCi/L	212	213	1.00	A

TABLE D-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2015
(PAGE 3 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
December 2015	E11357	AP	Ce-141	pCi	89.9	84.0	1.07	A
			Cr-51	pCi	215	184	1.17	A
			Cs-134	pCi	103	105	0.98	A
			Cs-137	pCi	76.6	74.8	1.02	A
			Co-58	pCi	76.2	71.9	1.06	A
			Mn-54	pCi	91.4	94.4	0.97	A
			Fe-59	pCi	78.6	70.3	1.12	A
			Zn-65	pCi	173	162	1.07	A
			Co-60	pCi	138	139	0.99	A
	E11422	AP	Sr-89	pCi	98.0	96.9	1.01	A
			Sr-90	pCi	10.0	14.0	0.71	W
	E11356	Charcoal	I-131	pCi	74.9	75.2	1.00	A
	E11358	Water	Fe-55	pCi/L	2160	1710	1.26	W
	E11353	Soil	Ce-141	pCi/kg	252	222	1.14	A
			Cr-51	pCi/kg	485	485	1.00	A
			Cs-134	pCi/kg	319	277	1.15	A
			Cs-137	pCi/kg	292	276	1.06	A
			Co-58	pCi/kg	193	190	1.02	A
			Mn-54	pCi/kg	258	250	1.03	A
			Fe-59	pCi/kg	218	186	1.17	A
			Zn-65	pCi/kg	457	429	1.07	A
			Co-60	pCi/kg	381	368	1.04	A

(1) AP Cr-51 - Cr-51 has the shortest half-life and the weakest gamma energy of the mixed nuclide sample, which produces a large error. Taking into account the error, the lowest value would be 119% of the reference value, which would be considered acceptable. NCR 15-18

(a) Teledyne Brown Engineering reported result.

(b) 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.

(c) Ratio of Teledyne Brown Engineering to Analytics results.

(d) Analytics evaluation based on TBE internal QC limits: A= Acceptable, reported result falls within ratio limits of 0.80-1.20. W-Acceptable with warning, reported result falls within 0.70-0.80 or 1.20-1.30. N = Not Acceptable, reported result falls outside the ratio limits of < 0.70 and > 1.30.

TABLE D-2 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
TELEDYNE BROWN ENGINEERING, 2015
(PAGE 1 OF 1)

Month/Year	Identification Number	Media	Nuclide*	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
March 2015	15-MaW32	Water	Am-241	Bq/L	0.632	0.654	0.458 - 0.850	A
			Ni-63	Bq/L	2.5		(1)	A
			Pu-238	Bq/L	0.0204	0.0089	(2)	A
			Pu-239/240	Bq/L	0.9	0.8	0.582 - 1.082	A
	15-MaS32	Soil	Ni-63	Bq/kg	392	448.0	314 - 582	A
			Sr-90	Bq/kg	286	653	487 - 849	N (3)
	15-RdF32	AP	Sr-90	Bq/sample	-0.0991		(1)	A
			U-234/233	Bq/sample	0.0211	0.0155	0.0109 - 0.0202	N (3)
			U-238	Bq/sample	0.095	0.099	0.069 - 0.129	A
	15-GrF32	AP	Gr-A	Bq/sample	0.448	1.77	0.53 - 3.01	N (3)
			Gr-B	Bq/sample	0.7580	0.75	0.38 - 1.13	A
	15-RdV32	Vegetation	Cs-134	Bq/sample	8.08	7.32	5.12 - 9.52	A
			Cs-137	Bq/sample	11.6	9.18	6.43 - 11.93	W
			Co-57	Bq/sample	-0.0096		(1)	A
			Co-60	Bq/sample	6.53	5.55	3.89 - 7.22	A
			Mn-54	Bq/sample	0.0058		(1)	A
			Sr-90	Bq/sample	0.999	1.08	0.76 - 1.40	A
			Zn-65	Bq/sample	-0.108		(1)	A
September 2015	15-MaW33	Water	Am-241	Bq/L	1.012	1.055	0.739 - 1.372	A
			Ni-63	Bq/L	11.8	8.55	5.99 - 11.12	N (4)
			Pu-238	Bq/L	0.727	0.681	0.477 - 0.885	A
			Pu-239/240	Bq/L	0.830	0.900	0.630 - 1.170	A
	15-MaS33	Soil	Ni-63	Bq/kg	635	682	477 - 887	A
			Sr-90	Bq/kg	429	425	298 - 553	A
	15-RdF33	AP	Sr-90	Bq/sample	1.48	2.18	1.53 - 2.83	N (4)
			U-234/233	Bq/sample	0.143	0.143	0.100 - 0.186	A
			U-238	Bq/sample	0.149	0.148	0.104 - 0.192	A
	15-GrF33	AP	Gr-A	Bq/sample	0.497	0.90	0.27 - 1.53	A
			Gr-B	Bq/sample	1.34	1.56	0.78 - 2.34	A
	15-RdV33	Vegetation	Cs-134	Bq/sample	6.10	5.80	4.06 - 7.54	A
			Cs-137	Bq/sample	0.0002		(1)	A
			Co-57	Bq/sample	8.01	6.62	4.63 - 8.61	W
			Co-60	Bq/sample	4.97	4.56	3.19 - 5.93	A
			Mn-54	Bq/sample	8.33	7.68	5.38 - 9.98	A
			Sr-90	Bq/sample	0.386	1.30	0.91 - 1.69	N (4)
			Zn-65	Bq/sample	6.07	5.46	3.82 - 7.10	A

(1) False positive test.

(2) Sensitivity evaluation.

(3) Soil Sr-90 - incomplete digestion of the sample resulted in low results; AP U-234/233 - extremely low activity was difficult to quantify AP Gr-A - the MAPEP filter has the activity embedded in the filter. To corrected the low bias, TBE will create an attenuated efficiency for MAPEP samples. NCR 15-13

(4) Water Ni-63 extremely low activity was difficult to quantify; AP & Vegetation Sr-90 was lost during separation, possible from substance added by MAPEP NCR 15-21.

(a) Teledyne Brown Engineering reported result.

(b) 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.

(c) DOE/MAPEP evaluation: A=acceptable, W=acceptable with warning, N=not acceptable.

TABLE D-3 ERA ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2015
(PAGE 1 OF 1)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Limits	Evaluation (c)
May 2015	RAD-101	Water	Sr-89	pCi/L	45.2	63.2	51.1 - 71.2	N (1)
			Sr-90	pCi/L	28.0	41.9	30.8 - 48.1	N (1)
			Ba-133	pCi/L	80.6	82.5	63.9 - 90.8	A
			Cs-134	pCi/L	71.7	75.7	61.8 - 83.3	A
			Cs-137	pCi/L	187	189	170 - 210	A
			Co-60	pCi/L	85.7	84.5	76.0 - 95.3	A
			Zn-65	pCi/L	197	203	183 - 238	A
			Gr-A	pCi/L	26.1	42.6	22.1 - 54.0	A
			Gr-B	pCi/L	28.8	32.9	21.3 - 40.6	A
			I-131	pCi/L	23.5	23.8	19.7 - 28.3	A
			U-Nat	pCi/L	6.19	6.59	4.99 - 7.83	A
			H-3	pCi/L	3145	3280	2770 - 3620	A
November 2015	RAD-103	Water	Sr-89	pCi/L	40.9	35.7	26.7 - 42.5	A
			Sr-90	pCi/L	29.3	31.1	22.7 - 36.1	A
			Ba-133	pCi/L	31.5	32.5	25.9 - 36.7	A
			Cs-134	pCi/L	59.65	62.3	50.6 - 68.5	A
			Cs-137	pCi/L	156	157	141 - 175	A
			Co-60	pCi/L	70.6	71.1	64.0 - 80.7	A
			Zn-65	pCi/L	145	126	113 - 149	A
			Gr-A	pCi/L	38.2	51.6	26.9 - 64.7	A
			Gr-B	pCi/L	42.0	36.6	24.1 - 44.2	A
			I-131	pCi/L	24.8	26.3	21.9 - 31.0	A
			U-Nat	pCi/L	146.90	56.2	45.7 - 62.4	N (2)
			H-3	pCi/L	21100	21300	18700 - 23400	A

(1) Yield on the high side of our acceptance range indicates possibility of calcium interference. NCR 15-09

(2) Technician failed to dilute original sample. If dilulted, the result would have been 57.1, which fell within the acceptance limits. NCR 15-19

(a) Teledyne Brown Engineering reported result.

(b) 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.

(c) ERA evaluation: A=acceptable. Reported result falls within the Warning Limits. NA=not acceptable. Reported result falls outside of the Control Limits. CE=check for Error. Reported result falls within the Control Limits and outside of the Warning Limit.

TABLE D-4 **ERA STATISTICAL SUMMARY PROFICIENCY TESTING PROGRAM[a]**
ENVIRONMENTAL, INC., 2015

Lab Code	Date	Analysis	Concentration (pCi/L) Laboratory Result [b]	ERA Result [c]	Control Limits	Acceptance
ERW-1444	04/06/15	Sr-89	59.71 ± 5.44	63.20	51.10 - 71.20	Pass
ERW-1444	04/06/15	Sr-90	43.41 ± 2.43	41.90	30.80 - 48.10	Pass
ERW-1448	04/06/15	Ba-133	77.75 ± 4.69	82.50	69.30 - 90.80	Pass
ERW-1448	04/06/15	Cs-134	68.82 ± 3.08	75.70	61.80 - 83.30	Pass
ERW-1448	04/06/15	Cs-137	- 191.92 ± 5.9	189	- 170.00 - 210.0	Pass
ERW-1448	04/06/15	Co-60	85.05 ± 4.59	84.50	76.00 - 95.30	Pass
ERW-1448	04/06/15	Zn-65	- 195.97 ± 12.0	203	- 183.00 - 238.0	Pass
ERW-1450	04/06/15	Gr. Alpha	34.05 ± 1.90	42.60	22.10 - 54.00	Pass
ERW-1450	04/06/15	G. Beta	26.93 ± 1.12	32.90	21.30 - 40.60	Pass
ERW-1453	04/06/15	I-131	22.47 ± 0.83	23.80	19.70 - 28.30	Pass
ERW-1456	04/06/15	Uranium	5.98 ± 0.31	6.59	4.99 - 7.83	Pass
ERW-1461	04/06/15	H-3	3,254 ± 180	3280	2,770 - 3620	Pass
ERW-5528	10/05/15	Sr-89	34.76 ± 0.06	35.70	26.70 - 42.50	Pass
ERW-5528	10/05/15	Sr-90	29.23 ± 0.06	31.10	22.70 - 36.10	Pass
ERW-5531	10/05/15	Ba-133	30.91 ± 0.53	32.50	25.90 - 36.70	Pass
ERW-5531	10/05/15	Cs-134	57.40 ± 2.57	62.30	50.69 - 68.50	Pass
ERW-5531	10/05/15	Cs-137	- 163.12 ± 4.8	157	- 141.00 - 175.0	Pass
ERW-5531	10/05/15	Co-60	73.41 ± 1.72	71.10	64.00 - 80.70	Pass
ERW-5531	10/05/15	Zn-65	- 138.94 ± 5.7	126	- 113.00 - 149.0	Pass
ERW-5534	10/05/15	Gr. Alpha	29.99 ± 0.08	51.60	26.90 - 64.70	Pass
ERW-5534	10/05/15	G. Beta	27.52 ± 0.04	36.60	24.10 - 44.20	Pass
ERW-5537	10/05/15	I-131	25.54 ± 0.60	26.30	21.90 - 31.00	Pass
ERW-5540	10/05/15	Uranium	53.30 ± 0.55	56.20	45.70 - 62.40	Pass
ERW-5543	10/05/15	H-3	21,260 ± 351	21,300	18,700 - 23400.0	Pass

[a] Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the crosscheck program for proficiency testing in drinking water conducted by Environmental Resources Associates (ERA).

[b] Unless otherwise indicated, the laboratory result is given as the mean ± standard deviation for three determinations.

[c] Results are presented as the known values, expected laboratory precision (1 sigma, 1 determination) and control limits as provided by ERA.

TABLE D-5 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
ENVIRONMENTAL, INC., 2015
(Page 1 of 2)

			Concentration [a]			
Lab Code [b]	Date	Analysis	Laboratory result	Known Activity	Control Limits [c]	Acceptance
MASO-975	02/01/15	Ni-63	341 ± 18	448	314 - 582	Pass
MASO-975	02/01/15	Sr-90	523 ± 12	653	457 - 849	Pass
MASO-975	02/01/15	Cs-134	533 ± 6	678	475 - 881	Pass
MASO-975	02/01/15	Cs-137	0.8 ± 2.5	0.0	NA [c]	Pass
MASO-975	02/01/15	Co-57	0.5 ± 1	0.0	NA [c]	Pass
MASO-975	02/01/15	Co-60	741 ± 8	817	572 - 1062	Pass
MASO-975	02/01/15	Mn-54	1,153 ± 9	1,198	839 - 1557	Pass
MASO-975	02/01/15	Zn-65	892 ± 18	1064	745 - 1383	Pass
MAW-969	02/01/15	Am-241	0.650 ± 0.078	0.654	0.458 - 0.850	Pass
MAW-969	02/01/15	Cs-134	21.09 ± 0.25	23.5	16.5 - 30.6	Pass
MAW-969	02/01/15	Cs-137	19.63 ± 0.34	19.1	13.4 - 24.8	Pass
MAW-969 [d]	02/01/15	Co-57	10.2 ± 0.4	29.9	20.9 - 38.9	Fail
MAW-969	02/01/15	Co-60	0.02 ± 0.05	0.00	NA [c]	Pass
MAW-969	02/01/15	H-3	569 ± 13	563	394 - 732	Pass
MAW-969	02/01/15	Fe-55	6.00 ± 6.60	6.88	4.82 - 8.94	Pass
MAW-969	02/01/15	Mn-54	0.02 ± 0.07	0.00	NA [c]	Pass
MAW-969	02/01/15	Ni-63	2.9 ± 3	0.00	NA [c]	Pass
MAW-969	02/01/15	Zn-65	16.54 ± 0.85	18.3	12.8 - 23.8	Pass
MAW-969	02/01/15	Pu-238	0.02 ± 0.03	0.01	NA [e]	Pass
MAW-969	02/01/15	Pu-239/240	0.81 ± 0.10	0.83	0.58 - 1.08	Pass
MAW-969	02/01/15	Sr-90	9.40 ± 1.30	9.48	6.64 - 12.32	Pass
MAW-950	02/01/15	Gr. Alpha	0.66 ± 0.05	1.07	0.32 - 1.81	Pass
MAW-950	02/01/15	Gr. Beta	2.72 ± 0.06	2.79	1.40 - 4.19	Pass
MAAP-978	02/01/15	Cs-134	1.00 ± 0.04	1.15	0.81 - 1.50	Pass
MAAP-978	02/01/15	Cs-137	0.004 ± 0.023	0.00	NA [c]	Pass
MAAP-978 e	02/01/15	Co-57	0.04 ± 0.04	1.51	1.06 - 1.96	Fail
MAAP-978	02/01/15	Co-60	0.01 ± 0.02	0.00	NA [c]	Pass
MAAP-978	02/01/15	Mn-54	1.11 ± 0.08	1.02	0.71 - 1.33	Pass
MAAP-978	02/01/15	Zn-65	0.83 ± 0.10	0.83	0.58 - 1.08	Pass
MAAP-981	02/01/15	Sr-89	38.12 ± 1.01	47.5	33.3 - 61.8	Pass
MAAP-981	02/01/15	Sr-90	1.22 ± 0.13	1.06	0.74 - 1.38	Pass
MAAP-984	02/01/15	Gr. Alpha	0.59 ± 0.06	1.77	0.53 - 3.01	Pass
MAAP-984	02/01/15	Gr. Beta	0.95 ± 0.07	0.75	0.38 - 1.13	Pass
MAVE-972	02/01/15	Cs-134	6.98 ± 0.13	7.32	5.12 - 9.52	Pass
MAVE-972	02/01/15	Cs-137	9.73 ± 0.21	9.18	6.43 - 11.93	Pass
MAVE-972	02/01/15	Co-57	0.01 ± 0.04	0.00	NA [c]	Pass
MAVE-972	02/01/15	Co-60	3.89 ± 0.20	5.55	3.89 - 7.22	Pass
MAVE-972	02/01/15	Mn-54	0.04 ± 0.07	0.00	NA [c]	Pass
MAVE-972	02/01/15	Zn-65	0.09 ± 0.12	0.00	NA [c]	Pass

TABLE D-5 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
ENVIRONMENTAL, INC., 2015
(Page 2 of 2)

			Concentration [a]			
Lab Code [b]	Date	Analysis	Laboratory result	Known Activity	Control Limits [c]	Acceptance
MASO-4903	08/01/15	Ni-63	556 ± 18	682	477 - 887	Pass
MASO-4903 f	08/01/15	Sr-90	231 ± 7	425	298 - 553	Fail
MASO-4903 f	08/01/15	Sr-90	352 ± 10	425	298 - 553	Pass
MASO-4903	08/01/15	Cs-134	833 ± 10	1,010	707 - 1313	Pass
MASO-4903	08/01/15	Cs-137	808 ± 11	809.00	566 - 1052	Pass
MASO-4903	08/01/15	Co-57	1,052 ± 10	1,180	826 - 1534	Pass
MASO-4903	08/01/15	Co-60	2 ± 2	1.3	NA [e]	Pass
MASO-4903	08/01/15	Mn-54	1,331 ± 13	1,340	938 - 1742	Pass
MASO-4903	08/01/15	Zn-65	686 ± 15	662	463 - 861	Pass
MAW-5007	08/01/15	Cs-134	16.7 ± 0.4	23.1	16.2 - 30	Pass
MAW-5007	08/01/15	Cs-137	-0.36 ± 0.13	0	NA [c]	Pass
MAW-5007	08/01/15	Co-57	21.8 ± 0.4	20.8	14.6 - 27	Pass
MAW-5007	08/01/15	Co-60	17.3 ± 0.3	17.1	12 - 22.2	Pass
MAW-5007	08/01/15	H-3	227.5 ± 8.9	216	151 - 281	Pass
MAW-5007 g	08/01/15	Fe-55	4.2 ± 14.1	13.1	9.2 - 17	Fail
MAW-5007	08/01/15	Mn-54	16.6 ± 0.5	15.6	10.9 - 20.3	Pass
MAW-5007	08/01/15	Ni-63	9.1 ± 2.6	8.55	5.99 - 11.12	Pass
MAW-5007	08/01/15	Zn-65	15.5 ± 0.9	13.9	9.7 - 18.1	Pass
MAW-5007	08/01/15	Sr-90	4.80 ± 0.50	4.80	3.36 - 6.24	Pass
MAW-5007	08/01/15	Gr. Alpha	0.41 ± 0.04	0.43	0.13 - 0.73	Pass
MAW-5007	08/01/15	Gr. Beta	3.45 ± 0.07	3.52	1.76 - 5.28	Pass
MAAP-4911	08/01/15	Sr-89	3.55 ± 0.67	3.98	2.79 - 5.17	Pass
MAAP-4911	08/01/15	Sr-90	0.94 ± 0.16	1.05	0.74 - 1.37	Pass
MAAP-4907	08/01/15	Gr. Alpha	0.30 ± 0.04	0.90	0.27 - 1.53	Pass
MAAP-4907	08/01/15	Gr. Beta	1.85 ± 0.09	1.56	0.78 - 2.34	Pass
MAVE-4901	08/01/15	Cs-134	5.56 ± 0.16	5.80	4.06 - 7.54	Pass
MAVE-4901	08/01/15	Cs-137	-0.02 ± 0.06	0.00	NA [c]	Pass
MAVE-4901	08/01/15	Co-57	7.74 ± 0.18	6.62	4.63 - 8.61	Pass
MAVE-4901	08/01/15	Co-60	4.84 ± 0.15	4.56	3.19 - 5.93	Pass
MAVE-4901	08/01/15	Mn-54	8.25 ± 0.25	7.68	5.38 - 9.98	Pass
MAVE-4901	08/01/15	Zn-65	5.78 ± 0.29	5.46	3.82 - 7.10	Pass

[a] Results are reported in units of Bq/kg (soil), Bq/L (water) or Bq/total sample (filters, vegetation).

[b] Laboratory codes as follows: MAW (water), MAAP (air filter), MASO (soil), MAVE (vegetation).

[c] MAPEP results are presented as the known values and expected laboratory precision (1 sigma, 1 determination) and control limits as defined by the MAPEP. A known value of "zero" indicates an analysis was included in the testing series as a "false positive". MAPEP does not provide control limits.

[d] Lab result was 27.84. Data entry error resulted in a non-acceptable result.

[e] Lab result was 1.58. Data entry error resulted in a non-acceptable result.

f The incomplete separation of calcium from strontium caused a failed low result. The result of reanalysis acceptable.

g The known activity was below the routine laboratory detection limits for the available aliquot fraction.

APPENDIX E

EFFLUENT DATA

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INTRODUCTION

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

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

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

SUMMARY

Gaseous effluents for the period contributed to only a small fraction of the LaSalle County Station Radiological Effluent Controls Limits. Liquid effluents had no contribution to offsite dose, as no liquid batch radioactive discharges were conducted. Calculations of environmental concentrations based on effluent, Illinois River flow, and meteorological data for the period indicate that consumption by the public of radionuclides attributable to LaSalle County Station does not exceed regulatory limits. Radiation exposure from radionuclides released to the atmosphere represented the critical pathway for the period with a maximum individual total dose estimated to be 9.96E-01 rem for the year, where a shielding factor of 0.7 and an occupancy factor of 0.95 are assumed for the nearest resident. The assessment of radiation doses is performed in accordance with the Offsite Dose Calculation Manual (ODCM), specifically, a comparison of preoperational studies with operational controls or with previous environmental surveillance reports and an assessment of the observed impacts of the plant operation on the environment. Control locations are basis for "preoperational data." The results of analysis confirm that the station is operating in compliance with 10CFR50 Appendix I, 10CFR20 and 40CFR190.

1.0 EFFLUENTS

1.1 Gaseous Effluents to the Atmosphere

Measured concentrations of noble gases, radioiodine, and particulate radioactivity released to the atmosphere during the year, are listed in Table 1.1-1. A total of 2.99E+03 curies of fission and activation gases were released with an average release rate of 9.44E+01 µCi/sec.

A total of 5.17E-02 curies of I-131 were released during the year with an average release rate of 1.64E-03 µCi/sec.

A total of 1.75E-02 curies of beta-gamma emitters were released as airborne particulate matter with an average release rate of 5.55E-04 µCi/sec. Alpha-emitting radionuclides were below the lower limit of detection (LLD). Carbon-14 released in 2015 was calculated separately with a total of 3.42E+01 curies released with an average release rate of 1.08E+00 µCi/sec.

A total of 2.36E+01 curies of tritium were released with an average release rate of 7.47E-01 µCi/sec.

1.2 Liquids Released to Illinois River

There were no liquid batch releases in 2015. Continuous release path activity was below applicable Lower Limits of Detection.

2.0 SOLID RADIOACTIVE WASTE

Solid radioactive wastes were shipped by truck to a disposal facility or to a waste processor. For further detail, refer the LaSalle 2015 Annual Radioactive Effluent Release Report (ARERR). This report was submitted to the USNRC by the required date of May 1st, 2016.

3.0 DOSE TO MAN

3.1 Gaseous Effluent Pathways

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

3.1.1 Noble Gases

3.1.1.1 Gamma Dose Rates

Unit 1 and Unit 2 gaseous releases at LaSalle County Station are reported as Unit 1 releases due to a single station vent stack (SVS) release point. Offsite Gamma air and whole body dose rates are shown in Table 3.1-1 and were calculated based on measured release rates, isotopic composition of the noble gases and average meteorological data for the period. Doses based on concurrent meteorological data are shown in Table 3.4-1. Based on measured effluents and meteorological data, the maximum total body dose to an individual would be 1.98E-02 mrem (Table 3.1-1) for the year, with an occupancy factor of 0.95 and a shielding factor of 0.7 included. The maximum total body dose based on measured effluents and concurrent meteorological data would be 2.71E-02 mrem (Table 3.4-1).

The maximum gamma air dose was 2.97E-02 mrad from Table 3.1-1, and the maximum gamma air dose from concurrent meterorological data was 5.10E-03 mrad (Table 3.4-1).

3.1.1.2 Beta Air and Skin Dose Rates

The range of beta particles in air is relatively small (on the order of a few meters or less); consequently, plumes of gaseous effluents may be considered "infinite" for purpose of calculating the dose from beta radiation incident on the skin. However, the actual dose to sensitive skin tissues is difficult to calculate due to the effect of the beta particle energies, thickness of inert skin and clothing covering sensitive tissues. For purposes of this report the skin is taken to have a thickness of 7.0 mg/cm^2 and an occupancy factor of 1.0 is used. The skin dose (from beta and gamma radiation) for the year was 3.35E-02 mrem from Table 3.1-1, and the skin dose from concurrent meteorological data was 5.32E-03 mrem (Table

3.4-1). The maximum offsite beta dose for the year was 1.59E-03 mrad from Table 3.1-1, and the maximum offsite beta dose from concurrent meteorological data was 2.02E-03 mrad (Table 3.4-1).

3.1.2 Radioactive Iodine

The human thyroid exhibits a significant capacity to concentrate ingested or inhaled iodine. The radioiodine, I-131, released during routing operation of the plant, may be made available to man resulting in a dose to the thyroid. The principal pathway of interest for this radionuclide is ingestion of radioiodine in milk.

3.1.2.1 Dose to Thyroid

The hypothetical thyroid dose to a maximum exposed individual living near the station via ingestion of milk was calculated. The radionuclide considered was I-131 and the source of milk was taken to be the nearest dairy farm with the cows pastured from May through October. The maximum thyroid does due to I-131 was 2.55E-01 mrem for the year.

3.2 Liquid Effluent Pathways

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

3.3 Assessment of Dose to Member of Public

During the period January to December 2015, LaSalle County

Station did not exceed these limits as shown in Table 3.1-1 and Table 3.2-1 (based on annual average meteorological data), and as shown in Table 3.3-1:

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

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

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

- The 10CFR20 limit on Total Effective Dose Equivalent to individual members of the public (100 mrem).

4.0 SITE METEOROLOGY

A summary of the site meteorological measurements taken during each calendar quarter of the year is given in Appendix F. The data are presented as cumulative joint frequency distributions of the wind direction for the 375' level and wind speed class by atmospheric stability class determined from the temperature difference between the 375' and 33' levels. Data recovery for these measurements was 98.9% during 2015.

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

APPENDIX E-1

DATA TABLES AND FIGURES

Table 1.1-1

LASALLE COUNTY NUCLEAR POWER STATION
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT (2015)
UNIT 1 AND UNIT 2
DOCKET NUMBERS 50-373 AND 50-374
GASEOUS EFFLUENTS SUMMATION OF ALL RELEASES

A. Fission & Activation Gases	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter4	Est. Total Error %
1. Total Release	Ci	2.78E+02	5.72E+02	1.42E+03	7.16E+02	2.50E+01
2. Average release rate for the period	μCi/sec	3.58E+01	7.28E+01	1.79E+02	9.01E+01	
3. Percent of ODCM limit	%	*	*	*	*	

B. Iodine						
1. Total Iodine – 131	Ci	2.74E-02	7.30E-03	1.15E-02	5.45E-03	1.50E+01
2. Average release rate for the period	μCi/sec	3.52E-03	9.28E-04	1.44E-03	6.86E-04	
3. Percent of ODCM limit	%	*	*	*	*	

C. Particulates						
1. Particulates with half-lives > 8 days	Ci	4.27E-03	5.50E-03	5.47E-03	2.26E-03	3.50E+01
2. Average release rate for the period	μCi/sec	5.49E-04	6.99E-04	6.88E-04	2.84E-04	
3. Percent of ODCM limit	%	*	*	*	*	

D. Tritium						
1. Total Release	Ci	5.45E+00	5.05E+00	7.11E+00	5.95E+00	1.50E+01
2. Average release rate for the period	μCi/sec	7.01E-01	6.43E-01	8.95E-01	7.49E-01	
3. Percent of ODCM limit	%	*	*	*	*	

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

F. Carbon-14					
1. Total Release	Ci	8.55E+00	8.55E+00	8.55E+00	8.55E+00
2. Average release rate for the period	μCi/sec	1.10E+00	1.09E+00	1.07E+00	1.07E+00
3. Percent of ODCM limit	%	*	*	*	*

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

Table 1.2-1

LASALLE COUNTY NUCLEAR POWER STATION
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT (2015)
LIQUID RELEASES
UNIT 1 AND UNIT 2
SUMMATION OF ALL LIQUID RELEASES

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

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

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

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

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

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

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

Table 2.1-1

SOLID RADWASTE ANNUAL REPORT

LaSalle County Station

Table 2.1-1 deliberately deleted. For solid waste disposal detail, refer to the LaSalle County Station 2015 Annual Radiological Effluent Release Report (ARERR).

Table 3.1-1

LASALLE COUNTY NUCLEAR POWER STATION
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT (2015)
RADIOLOGICAL IMPACT ON MAN
MAXIMUM DOSES RESULTING FROM GASEOUS RELEASES AND COMPLIANCE STATUS

Infant Receptor	Quarterly Limit	Units	1st Quarter	% of Limit	2nd Quarter	% of Limit	3rd Quarter	% of Limit	4th Quarter	% of Limit	Annual Limit	% of Limit
Gamma Air	5.00E+00	mRad	3.51E-03	0.07	7.90E-03	0.16	8.89E-03	0.18	9.41E-03	0.19	1.00E+01	0.30
Beta Air	1.00E+01	mRad	1.54E-04	0.002	3.94E-04	0.004	6.31E-04	0.006	4.10E-04	0.004	2.00E+01	0.01
NG Total Body	2.50E+00	mRem	2.34E-03	0.09	5.27E-03	0.21	5.93E-03	0.24	6.28E-03	0.25	5.00E+00	0.40
NG Skin	7.50E+00	mRem	3.94E-03	0.05	8.91E-03	0.12	1.00E-02	0.13	1.06E-02	0.14	1.50E+01	0.22
NNG Organ	7.50E+00	mRem	1.33E-01	1.77	3.69E-02	0.49	5.69E-02	0.76	2.79E-02	0.37	1.50E+01	1.70

Child Receptor	Quarterly Limit	Units	1st Quarter	% of Limit	2nd Quarter	% of Limit	3rd Quarter	% of Limit	4th Quarter	% of Limit	Annual Limit	% of Limit
Gamma Air	5.00E+00	mRad	3.51E-03	0.07	7.90E-03	0.16	8.89E-03	0.18	9.41E-03	0.19	1.00E+01	0.30
Beta Air	1.00E+01	mRad	1.54E-04	0.002	3.94E-04	0.004	6.31E-04	0.006	4.10E-04	0.004	2.00E+01	0.01
NG Total Body	2.50E+00	mRem	2.34E-03	0.09	5.27E-03	0.21	5.93E-03	0.24	6.28E-03	0.25	5.00E+00	0.40
NG Skin	7.50E+00	mRem	3.94E-03	0.05	8.91E-03	0.12	1.00E-02	0.13	1.06E-02	0.14	1.50E+01	0.22
NNG Organ	7.50E+00	mRem	5.49E-02	0.73	1.54E-02	0.21	2.37E-02	0.31	1.16E-02	0.15	1.50E+01	0.70

Teenager Receptor	Quarterly Limit	Units	1st Quarter	% of Limit	2nd Quarter	% of Limit	3rd Quarter	% of Limit	4th Quarter	% of Limit	Annual Limit	% of Limit
Gamma Air	5.00E+00	mRad	3.51E-03	0.07	7.90E-03	0.16	8.89E-03	0.18	9.41E-03	0.19	1.00E+01	0.30
Beta Air	1.00E+01	mRad	1.54E-04	0.002	3.94E-04	0.004	6.31E-04	0.006	4.10E-04	0.004	2.00E+01	0.01
NG Total Body	2.50E+00	mRem	2.34E-03	0.09	5.27E-03	0.21	5.93E-03	0.24	6.28E-03	0.25	5.00E+00	0.40
NG Skin	7.50E+00	mRem	3.94E-03	0.05	8.91E-03	0.12	1.00E-02	0.13	1.06E-02	0.14	1.50E+01	0.22
NNG Organ	7.50E+00	mRem	2.78E-02	0.37	7.75E-03	0.10	1.19E-02	0.16	5.83E-03	0.08	1.50E+01	0.36

Adult Receptor	Quarterly Limit	Units	1st Quarter	% of Limit	2nd Quarter	% of Limit	3rd Quarter	% of Limit	4th Quarter	% of Limit	Annual Limit	% of Limit
Gamma Air	5.00E+00	mRad	3.51E-03	0.07	7.90E-03	0.16	8.89E-03	0.18	9.41E-03	0.19	1.00E+01	0.30
Beta Air	1.00E+01	mRad	1.54E-04	0.002	3.94E-04	0.004	6.31E-04	0.006	4.10E-04	0.004	2.00E+01	0.01
NG Total Body	2.50E+00	mRem	2.34E-03	0.09	5.27E-03	0.21	5.93E-03	0.24	6.28E-03	0.25	5.00E+00	0.40
NG Skin	7.50E+00	mRem	3.94E-03	0.05	8.91E-03	0.12	1.00E-02	0.13	1.06E-02	0.14	1.50E+01	0.22
NNG Organ	7.50E+00	mRem	1.76E-02	0.23	4.91E-03	0.07	7.56E-03	0.10	3.67E-03	0.05	1.50E+01	0.22

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

Table 3.2-1

LASALLE COUNTY NUCLEAR POWER STATION
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT (2015)
RADIOLOGICAL IMPACT ON MAN
MAXIMUM DOSES REUSLTING FROM LIQUID RELEASES AND COMPLIANCE STATUS

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

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

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

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

Table 3.3-1

LASALLE COUNTY NUCLEAR POWER STATION
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT (2015)
RADIOLOGICAL IMPACT ON MAN
MAXIMUM DOSES RESULTING FROM RELEASES AND COMPLIANCE STATUS

10CFR20 / 40CFR190 Compliance

	1st Quarter Dose (mRem)	2nd Quarter Dose (mRem)	3rd Quarter Dose (mRem)	4th Quarter Dose (mRem)	Annual Dose (mRem)	Annual Limit (mRem/yr)	% Annual Limit
Unit 1							
						40CFR190 Compliance	
U1 D^{Ex}	9.92E-02	1.02E-01	1.02E-01	1.05E-01	4.09E-01	25	1.63
						10CFR20 Compliance	
U1 D^{Tot}	2.32E-01	1.39E-01	1.59E-01	1.33E-01	6.63E-01	100	0.66
						40CFR190 Compliance	
Bone	7.33E-03	7.10E-03	7.16E-03	7.00E-03	2.86E-02	25	0.11
Liver	1.97E-03	1.70E-03	1.77E-03	1.58E-03	7.03E-03	25	0.03
Thyroid	1.33E-01	3.69E-02	5.70E-02	2.79E-02	2.55E-01	75	0.34
Kidney	2.03E-03	1.71E-03	1.78E-03	1.60E-03	7.12E-03	25	0.03
Lung	1.55E-03	1.57E-03	1.57E-03	1.50E-03	6.19E-03	25	0.02
GI-LLI	1.58E-03	1.59E-03	1.60E-03	1.51E-03	6.28E-03	25	0.03
Unit 2							
						40CFR190 Compliance	
U2 D^{Ex}	5.29E-02	9.46E-02	8.66E-02	9.89E-02	3.33E-01	25	1.33
						10CFR20 Compliance	
U2 D^{Tot}	5.29E-02	9.46E-02	8.66E-02	9.89E-02	3.33E-01	100	0.33
						40CFR190 Compliance	
Bone	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	25	0.00
Liver	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	25	0.00
Thyroid	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	75	0.00
Kidney	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	25	0.00
Lung	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	25	0.00
GI-LLI	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	25	0.00

Table 3.4-1

LASALLE COUNTY NUCLEAR POWER STATION
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT (2015)
RADIOLOGICAL IMPACT ON MAN
MAXIMUM GAMMA AIR DOSE

5.6 Doses Resulting from Airborne Releases

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

LaSalle County Generating Station:

Dose	*Maximum Value*	*Sector Affected*
gamma air [1]	5.100×10^{-3} mrad	South
beta air [2]	2.020×10^{-3} mrad	South
whole body [3]	2.710×10^{-2} mrem	South
skin [4]	5.320×10^{-3} mrem	South
organ [5] (infant-thyroid)	$1.600 \times 10^{+0}$ mrem	Southwest

Compliance Status

10 CFR 50 Appendix I	Yearly Objective		% of Appendix I
gamma air	10.0	mrad	0.05
beta air	20.0	mrad	0.01
whole body	5.0	mrem	0.54
skin	15.0	mrem	0.04
organ	15.0	mrem	10.7

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

APPENDIX F

METEOROLOGICAL DATA

LaSalle County Generating Station

Period of Record: January - March 2015
Stability Class - Extremely Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	26	5	12	0	0	43
NNE	1	4	3	10	2	0	20
NE	0	1	2	6	0	0	9
ENE	0	1	3	5	0	0	9
E	2	6	4	1	0	0	13
ESE	1	7	8	0	0	0	16
SE	2	1	0	1	0	0	4
SSE	0	4	1	0	2	0	7
S	0	4	3	1	0	0	8
SSW	0	1	1	0	0	0	2
SW	0	2	5	1	1	0	9
WSW	1	4	1	3	1	0	10
W	0	0	4	5	0	0	9
WNW	1	3	9	6	0	0	19
NW	0	5	1	2	0	0	8
NNW	1	9	6	1	3	0	20
Variable	0	0	0	0	0	0	0
Total	9	78	56	54	9	0	206

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

LaSalle County Generating Station

Period of Record: January - March 2015
Stability Class - Moderately Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	2	5	0	0	8
NNE	0	0	2	0	0	0	2
NE	0	0	0	3	0	0	3
ENE	0	0	0	1	0	0	1
E	0	1	0	1	1	0	3
ESE	1	0	0	0	1	0	2
SE	0	0	0	2	0	0	2
SSE	0	0	0	0	0	0	0
S	0	1	1	0	0	0	2
SSW	1	1	0	0	0	0	2
SW	0	0	0	0	0	0	0
WSW	0	0	2	3	0	0	5
W	2	0	1	0	0	0	3
WNW	0	1	0	0	2	0	3
NW	0	0	1	2	0	0	3
NNW	0	0	2	1	1	0	4
Variable	0	0	0	0	0	0	0
Total	4	5	11	18	5	0	43

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

LaSalle County Generating Station

Period of Record: January - March 2015
Stability Class - Slightly Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	2	7	4	0	0	13
NNE	0	2	7	3	0	0	12
NE	0	0	3	0	0	0	3
ENE	0	0	1	6	0	0	7
E	0	0	0	3	1	0	4
ESE	0	0	1	5	1	0	7
SE	0	1	0	2	0	0	3
SSE	0	0	2	0	0	0	2
S	0	1	0	0	0	0	1
SSW	0	0	3	0	0	0	3
SW	0	2	1	2	0	0	5
WSW	1	2	0	1	3	0	7
W	0	3	5	4	0	0	12
WNW	0	1	2	1	0	0	4
NW	0	0	3	5	1	0	9
NNW	0	0	3	5	2	0	10
Variable	0	0	0	0	0	0	0
Total	1	14	38	41	8	0	102

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

LaSalle County Generating Station

Period of Record: January - March 2015
Stability Class - Neutral - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	12	34	16	0	0	63
NNE	0	4	8	3	0	0	15
NE	0	1	3	1	0	0	5
ENE	0	5	7	19	2	0	33
E	1	9	14	15	4	0	43
ESE	2	10	18	6	2	0	38
SE	1	18	3	5	4	0	31
SSE	2	7	4	6	0	0	19
S	2	12	6	4	5	0	29
SSW	2	12	13	9	4	0	40
SW	4	11	20	19	4	0	58
WSW	2	15	25	10	3	1	56
W	0	12	17	17	4	0	50
WNW	2	14	29	39	15	0	99
NW	0	5	12	36	3	1	57
NNW	0	5	26	35	10	5	81
Variable	0	1	0	0	0	0	1
Total	19	153	239	240	60	7	718

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

LaSalle County Generating Station

Period of Record: January - March 2015
Stability Class - Slightly Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	10	14	2	0	0	28
NNE	3	8	0	1	0	0	12
NE	0	1	1	1	0	0	3
ENE	2	4	9	3	0	0	18
E	1	6	14	2	0	0	23
ESE	1	16	14	0	0	0	31
SE	3	16	5	1	0	0	25
SSE	3	9	3	1	11	0	27
S	1	8	11	12	5	0	37
SSW	1	9	19	8	1	0	38
SW	0	7	32	33	4	2	78
WSW	0	7	15	38	2	1	63
W	1	5	20	13	1	1	41
WNW	2	11	13	28	21	3	78
NW	3	7	35	4	0	0	49
NNW	0	10	29	21	3	2	65
Variable	0	0	0	0	0	0	0
Total	23	134	234	168	48	9	616

Hours of calm in this stability class: 1
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: January - March 2015
Stability Class - Moderately Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	0	0	0	0	1
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	1	1	0	0	0	0	2
E	1	3	5	0	0	0	9
ESE	0	13	5	0	0	0	18
SE	1	11	3	0	0	0	15
SSE	6	11	6	1	0	0	24
S	2	7	4	5	0	0	18
SSW	3	14	17	11	0	0	45
SW	3	7	8	12	0	0	30
WSW	1	7	16	16	0	0	40
W	2	14	30	8	0	0	54
WNW	0	5	11	4	7	0	27
NW	2	3	4	0	0	0	9
NNW	1	3	1	0	0	0	5
Variable	0	0	0	0	0	0	0
Total	23	100	110	57	7	0	297

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

LaSalle County Generating Station

Period of Record: January - March 2015
Stability Class - Extremely Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Speed (in mph)

Wind Direction	1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	6	5	0	0	0	11
ESE	0	8	1	0	0	0	9
SE	0	8	2	0	0	0	10
SSE	1	3	3	0	0	0	7
S	0	9	13	0	0	0	22
SSW	0	8	21	5	0	0	34
SW	1	5	4	8	0	0	18
WSW	1	6	2	13	0	0	22
W	0	6	8	0	0	0	14
WNW	0	12	13	0	0	0	25
NW	0	0	0	0	0	0	0
NNW	1	0	0	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	4	71	72	26	0	0	173

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

LaSalle County Generating Station

Period of Record: January - March 2015
Stability Class - Extremely Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

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

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

LaSalle County Generating Station

Period of Record: January - March 2015
Stability Class - Moderately Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Speed (in mph)

Wind Direction	1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	2	4	6	0	12
NNE	0	1	1	0	2	3	7
NE	0	0	0	0	0	3	3
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	2	2	0	4
SE	0	0	0	2	0	0	2
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	1	0	0	1
WSW	0	0	0	0	2	0	2
W	0	0	0	2	2	0	4
WNW	0	0	0	0	1	1	2
NW	0	0	1	0	3	0	4
NNW	0	0	1	1	0	0	2
Variable	0	0	0	0	0	0	0
Total	0	1	5	12	18	7	43

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

LaSalle County Generating Station

Period of Record: January - March 2015
Stability Class - Slightly Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	1	2	4	2	10
NNE	0	2	1	0	0	1	4
NE	0	0	0	0	1	0	1
ENE	0	0	0	1	3	2	6
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	2	0	0	0	2
SSE	0	0	0	0	0	1	1
S	0	0	3	0	0	0	3
SSW	0	0	0	1	0	0	1
SW	0	0	0	1	0	0	1
WSW	0	1	1	0	0	0	2
W	0	0	1	1	0	0	2
WNW	0	0	1	2	1	1	5
NW	0	0	3	1	2	2	8
NNW	0	0	2	1	0	0	3
Variable	0	0	0	0	0	0	0
Total	0	4	15	10	11	9	49

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 2
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: January - March 2015
Stability Class - Neutral - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	7	19	46	22	2	96
NNE	0	7	19	13	9	2	50
NE	0	6	7	8	2	0	23
ENE	0	5	13	8	28	2	56
E	1	3	15	8	14	7	48
ESE	0	6	12	13	8	3	42
SE	1	10	8	11	4	5	39
SSE	1	7	10	1	11	8	38
S	2	12	10	7	12	10	53
SSW	1	10	12	9	11	7	50
SW	0	5	15	28	12	5	65
WSW	1	13	18	24	17	8	81
W	0	13	11	12	16	12	64
WNW	1	8	17	18	25	41	110
NW	0	7	9	38	56	32	142
NNW	0	2	13	35	20	20	90
Variable	0	1	0	0	0	0	1
Total	8	122	208	279	267	164	1048

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 33
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: January - March 2015
Stability Class - Slightly Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	3	1	2	11	9	2	28
NNE	2	5	7	4	4	0	22
NE	0	5	7	4	0	0	16
ENE	1	2	8	2	2	0	15
E	0	4	4	6	6	0	20
ESE	1	3	11	4	2	0	21
SE	1	6	9	12	5	0	33
SSE	0	1	7	2	2	0	12
S	0	3	7	9	4	8	31
SSW	1	5	10	16	6	8	46
SW	1	7	8	22	37	28	103
WSW	0	0	5	10	22	24	61
W	1	4	5	12	29	15	66
WNW	4	3	9	8	15	28	67
NW	1	5	8	12	16	4	46
NNW	0	0	5	15	17	2	39
Variable	0	0	0	0	0	0	0
Total	16	54	112	149	176	119	626

Hours of calm in this stability class: 2
Hours of missing wind measurements in this stability class: 1
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: January - March 2015
Stability Class - Moderately Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	2	2	0	0	5
NNE	1	1	0	0	0	0	2
NE	0	1	0	1	0	0	2
ENE	2	2	0	1	1	0	6
E	2	1	0	3	0	0	6
ESE	0	4	1	2	2	2	11
SE	2	4	3	8	8	0	25
SSE	0	1	1	6	2	3	13
S	1	0	2	4	4	4	15
SSW	1	1	4	4	8	18	36
SW	0	1	9	11	11	14	46
WSW	0	3	3	4	4	13	27
W	0	1	1	2	2	12	18
WNW	0	0	1	9	24	2	36
NW	0	2	7	8	6	0	23
NNW	0	1	0	7	5	0	13
Variable	0	0	0	0	0	0	0
Total	9	24	34	72	77	68	284

Hours of calm in this stability class: 1
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

LaSalle County Generating Station

Period of Record: January - March 2015
Stability Class - Extremely Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	2	0	5	1	0	8
NNE	0	1	3	0	0	0	4
NE	0	1	0	0	0	0	1
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	1	4	0	5
SE	0	0	0	3	1	0	4
SSE	0	0	1	4	1	0	6
S	0	0	0	1	0	0	1
SSW	0	0	0	2	0	0	2
SW	0	1	0	0	1	1	3
WSW	0	2	0	0	4	1	7
W	0	0	0	0	0	2	2
WNW	1	0	0	0	0	0	1
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	1	7	4	16	12	4	44

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

LaSalle County Generating Statio

Period of Record: April - June 2015
Stability Class - Extremely Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Speed (in mph)

Wind Direction	1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	10	0	0	0	10
NNE	0	2	4	0	0	0	6
NE	0	0	11	6	0	0	17
ENE	0	0	2	6	0	0	8
E	0	0	0	0	3	0	3
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	1	0	1
SSE	0	0	0	0	0	2	2
S	0	0	7	10	4	2	23
SSW	0	0	6	14	1	0	21
SW	0	0	4	8	3	0	15
WSW	0	0	1	4	4	1	10
W	0	0	3	10	1	0	14
WNW	0	0	0	11	0	0	11
NW	0	1	0	3	0	0	4
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	3	48	72	17	5	145

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

LaSalle County Generating Statio

Period of Record: April - June 2015
Stability Class - Moderately Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Speed (in mph)

Wind Direction	1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	4	0	0	0	5
NNE	0	3	8	1	0	0	12
NE	0	3	3	1	0	0	7
ENE	0	0	15	7	0	0	22
E	0	0	2	1	3	0	6
ESE	0	0	0	0	0	0	0
SE	0	0	2	4	2	0	8
SSE	0	0	3	0	0	0	3
S	0	1	6	2	0	0	9
SSW	0	0	6	2	2	0	10
SW	0	3	9	4	0	0	16
WSW	0	0	10	4	1	0	15
W	0	3	5	4	2	0	14
WNW	0	3	3	6	1	0	13
NW	0	1	4	7	0	0	12
NNW	0	1	3	0	0	0	4
Variable	0	0	0	0	0	0	0
Total	0	19	83	43	11	0	156

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

LaSalle County Generating Statio

Period of Record: April - June 2015
Stability Class - Slightly Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	5	5	0	0	0	10
NNE	0	0	9	1	0	0	10
NE	0	5	13	5	0	0	23
ENE	0	5	8	6	1	1	21
E	0	4	1	2	1	0	8
ESE	0	3	1	3	1	0	8
SE	0	1	1	3	2	0	7
SSE	0	3	6	1	0	0	10
S	0	0	5	3	1	0	9
SSW	0	2	5	3	0	0	10
SW	0	10	8	7	2	0	27
WSW	0	9	8	10	2	3	32
W	0	3	8	4	0	1	16
WNW	0	2	8	3	1	1	15
NW	0	2	6	8	0	0	16
NNW	0	5	3	3	0	0	11
Variable	0	0	0	0	0	0	0
Total	0	59	95	62	11	6	233

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

LaSalle County Generating Statio

Period of Record: April - June 2015
Stability Class - Neutral - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Speed (in mph)

Wind Direction	1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	25	9	0	0	0	36
NNE	1	22	33	8	0	0	64
NE	0	11	70	18	0	0	99
ENE	0	13	53	25	8	0	99
E	1	7	25	9	0	0	42
ESE	0	3	17	4	1	0	25
SE	0	5	10	3	1	0	19
SSE	2	5	9	13	2	0	31
S	1	8	15	7	2	0	33
SSW	2	4	14	13	3	0	36
SW	1	8	22	13	3	0	47
WSW	3	19	22	13	1	3	61
W	1	9	13	11	8	4	46
WNW	1	5	21	8	8	2	45
NW	4	2	15	9	3	0	33
NNW	1	10	14	14	2	0	41
Variable	1	1	0	0	0	0	2
Total	21	157	362	168	42	9	759

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

LaSalle County Generating Statio

Period of Record: April - June 2015
Stability Class - Slightly Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	4	21	5	0	0	0	30
NNE	0	14	2	0	0	0	16
NE	5	3	6	0	0	0	14
ENE	0	4	13	9	0	0	26
E	0	19	48	8	1	0	76
ESE	0	3	12	0	0	0	15
SE	2	5	10	3	0	0	20
SSE	1	8	10	7	0	0	26
S	2	8	23	11	5	0	49
SSW	2	11	22	10	0	0	45
SW	0	13	23	22	1	0	59
WSW	2	7	14	7	0	0	30
W	0	8	6	6	12	15	47
WNW	0	8	3	6	5	5	27
NW	2	10	9	1	0	0	22
NNW	2	6	6	2	0	0	16
Variable	0	0	1	0	0	0	1
Total	22	148	213	92	24	20	519

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

LaSalle County Generating Statio

Period of Record: April - June 2015
Stability Class - Moderately Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	10	0	0	0	0	10
NNE	0	0	0	0	0	0	0
NE	0	1	0	0	0	0	1
ENE	0	1	0	0	0	0	1
E	0	2	9	1	0	0	12
ESE	2	9	1	0	0	0	12
SE	1	9	6	0	0	0	16
SSE	0	8	4	6	0	0	18
S	0	13	5	8	0	0	26
SSW	0	8	14	0	0	0	22
SW	0	7	9	11	0	0	27
WSW	0	5	12	3	0	0	20
W	0	13	5	0	0	0	18
WNW	2	7	0	0	0	0	9
NW	6	6	0	0	0	0	12
NNW	0	9	2	0	0	0	11
Variable	0	0	0	0	0	0	0
Total	11	108	67	29	0	0	215

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

LaSalle County Generating Statio

Period of Record: April - June 2015
Stability Class - Extremely Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	0	0	0	0	1
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	3	1	0	0	0	4
SE	0	7	3	0	0	0	10
SSE	0	14	3	0	0	0	17
S	1	12	18	1	0	0	32
SSW	0	9	9	5	0	0	23
SW	0	9	6	0	0	0	15
WSW	0	11	12	0	0	0	23
W	0	10	5	0	0	0	15
WNW	0	1	1	0	0	0	2
NW	0	6	2	0	0	0	8
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	1	83	60	6	0	0	150

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

LaSalle County Generating Statio

Period of Record: April - June 2015
Stability Class - Extremely Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Speed (in mph)

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

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

LaSalle County Generating Statio

Period of Record: April - June 2015
Stability Class - Moderately Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Speed (in mph)

Wind Direction	1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	5	0	0	5
NNE	0	0	1	2	0	0	3
NE	0	0	0	4	0	0	4
ENE	0	0	0	1	1	0	2
E	0	0	0	0	0	1	1
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	3	3	1	7
SSW	0	0	0	1	5	1	7
SW	0	0	0	0	4	1	5
WSW	0	0	0	0	2	3	5
W	0	0	0	1	2	1	4
WNW	0	0	0	1	5	0	6
NW	0	0	0	4	1	0	5
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	1	22	23	8	54

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

LaSalle County Generating Statio

Period of Record: April - June 2015
Stability Class - Slightly Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Speed (in mph)

Wind Direction	1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	1	6	0	0	7
NNE	0	0	2	6	2	0	10
NE	0	1	3	6	3	0	13
ENE	0	0	10	3	4	0	17
E	0	0	1	0	0	1	2
ESE	0	0	0	0	0	0	0
SE	0	0	0	2	4	0	6
SSE	0	0	0	0	0	1	1
S	0	0	4	5	2	4	15
SSW	0	0	6	5	2	3	16
SW	0	0	3	3	5	2	13
WSW	0	0	0	4	2	0	6
W	0	0	0	5	3	1	9
WNW	0	0	0	2	4	2	8
NW	0	2	0	1	7	1	11
NNW	0	1	1	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	0	4	31	48	38	15	136

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

LaSalle County Generating Statio

Period of Record: April - June 2015
Stability Class - Neutral - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	7	13	13	1	0	36
NNE	0	8	15	31	12	5	71
NE	0	15	21	75	28	5	144
ENE	1	12	44	50	22	10	139
E	2	5	13	16	9	6	51
ESE	0	2	11	7	10	1	31
SE	0	1	8	10	8	0	27
SSE	1	1	18	9	13	5	47
S	0	1	9	16	8	8	42
SSW	1	2	14	16	23	12	68
SW	0	7	20	28	15	13	83
WSW	1	12	17	37	15	8	90
W	2	8	23	11	10	32	86
WNW	2	6	13	16	6	21	64
NW	3	5	13	32	20	13	86
NNW	1	7	11	16	4	0	39
Variable	1	1	0	0	0	0	2
Total	17	100	263	383	204	139	1106

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

LaSalle County Generating Statio

Period of Record: April - June 2015
Stability Class - Slightly Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	2	4	12	0	0	20
NNE	2	6	5	18	2	0	33
NE	2	3	10	7	2	0	24
ENE	1	6	8	10	6	3	34
E	1	1	9	22	18	8	59
ESE	0	2	13	14	11	3	43
SE	0	2	7	6	10	0	25
SSE	0	1	6	11	6	5	29
S	0	1	8	13	17	25	64
SSW	0	4	5	15	16	19	59
SW	0	5	10	25	19	30	89
WSW	0	2	5	11	14	9	41
W	2	3	4	6	8	16	39
WNW	0	1	7	7	3	14	32
NW	1	1	8	12	5	0	27
NNW	0	0	8	5	4	4	21
Variable	0	0	0	1	0	0	1
Total	11	40	117	195	141	136	640

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

LaSalle County Generating Statio

Period of Record: April - June 2015
Stability Class - Moderately Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Speed (in mph)

Wind Direction	1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	1	3	3	1	8
NNE	1	4	0	1	0	0	6
NE	0	1	3	2	0	0	6
ENE	1	0	3	0	0	0	4
E	0	0	2	0	1	2	5
ESE	1	0	0	1	0	0	2
SE	0	2	2	4	1	0	9
SSE	0	5	3	5	4	0	17
S	0	1	2	13	3	8	27
SSW	0	1	4	7	11	11	34
SW	0	0	3	5	4	1	13
WSW	0	4	7	9	1	1	22
W	0	0	4	8	1	2	15
WNW	1	0	6	4	5	0	16
NW	0	0	2	4	1	1	8
NNW	0	0	1	3	2	0	6
Variable	0	0	0	0	0	0	0
Total	4	18	43	69	37	27	198

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

LaSalle County Generating Statio

Period of Record: April - June 2015
Stability Class - Extremely Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	1	1	0	0	2
S	0	0	1	1	14	1	17
SSW	0	0	1	1	8	1	11
SW	0	0	2	1	0	0	3
WSW	0	0	2	1	0	0	3
W	0	1	0	1	0	0	2
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	1	0	0	1
Variable	0	0	0	0	0	0	0
Total	0	1	7	7	22	2	39

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

LaSalle County Generating Statio

Period of Record: July - September 2015
Stability Class - Extremely Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	1	3	0	0	4
ENE	0	0	2	0	0	0	2
E	0	0	2	0	0	0	2
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	1	0	0	0	1
S	0	0	4	2	0	0	6
SSW	0	1	1	5	0	0	7
SW	0	0	9	4	0	0	13
WSW	0	0	8	3	0	0	11
W	0	0	5	2	0	0	7
WNW	0	0	8	5	0	0	13
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	1	41	24	0	0	66

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

LaSalle County Generating Statio

Period of Record: July - September 2015
Stability Class - Moderately Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	2	13	0	0	0	15
NNE	0	1	3	1	0	0	5
NE	0	1	6	2	0	0	9
ENE	0	0	2	0	0	0	2
E	0	2	3	0	0	0	5
ESE	0	3	4	0	0	0	7
SE	0	2	0	0	0	0	2
SSE	0	5	3	0	0	0	8
S	0	3	6	6	0	0	15
SSW	0	2	6	6	0	0	14
SW	0	5	9	0	0	0	14
WSW	0	1	14	6	1	0	22
W	0	3	11	7	1	0	22
WNW	0	3	8	7	0	0	18
NW	0	1	4	0	0	0	5
NNW	0	1	6	0	0	0	7
Variable	0	0	0	0	0	0	0
Total	0	35	98	35	2	0	170

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

LaSalle County Generating Statio

Period of Record: July - September 2015
Stability Class - Slightly Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Speed (in mph)

Wind Direction	1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	9	4	0	0	0	13
NNE	0	3	5	0	0	0	8
NE	0	7	8	0	0	0	15
ENE	0	7	9	0	0	0	16
E	0	6	3	0	0	0	9
ESE	0	8	5	0	0	0	13
SE	0	6	1	0	0	0	7
SSE	0	6	3	2	0	0	11
S	0	6	4	2	0	0	12
SSW	0	1	5	3	0	0	9
SW	0	6	8	1	0	0	15
WSW	0	3	9	4	0	0	16
W	0	9	13	3	4	0	29
WNW	0	5	9	4	0	0	18
NW	0	0	2	2	0	0	4
NNW	0	2	7	7	0	0	16
Variable	0	1	0	0	0	0	1
Total	0	85	95	28	4	0	212

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

LaSalle County Generating Statio

Period of Record: July - September 2015
Stability Class - Neutral - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	25	18	0	0	0	45
NNE	0	19	18	7	0	0	44
NE	0	18	23	5	1	0	47
ENE	0	10	14	5	0	0	29
E	2	20	17	1	0	0	40
ESE	0	22	3	0	0	0	25
SE	1	24	12	0	0	0	37
SSE	2	12	15	9	0	0	38
S	4	16	16	4	0	0	40
SSW	2	13	24	5	0	0	44
SW	0	19	12	7	0	0	38
WSW	2	10	22	6	0	0	40
W	2	12	9	4	2	0	29
WNW	1	10	15	6	1	0	33
NW	0	8	6	4	0	0	18
NNW	0	17	30	5	0	0	52
Variable	0	0	0	0	0	0	0
Total	18	255	254	68	4	0	599

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

LaSalle County Generating Statio

Period of Record: July - September 2015
Stability Class - Slightly Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	24	14	0	0	0	40
NNE	3	16	9	1	0	0	29
NE	1	8	12	1	0	0	22
ENE	0	7	18	1	0	0	26
E	1	32	23	1	0	0	57
ESE	1	11	3	0	0	0	15
SE	2	12	7	0	0	0	21
SSE	0	13	9	2	0	0	24
S	1	17	24	5	0	0	47
SSW	5	12	18	2	0	0	37
SW	3	9	9	5	0	0	26
WSW	4	17	25	4	0	0	50
W	0	11	8	0	1	0	20
WNW	5	9	8	0	1	0	23
NW	2	8	1	1	0	0	12
NNW	0	16	8	0	0	0	24
Variable	0	0	0	0	0	0	0
Total	30	222	196	23	2	0	473

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

LaSalle County Generating Statio

Period of Record: July - September 2015
Stability Class - Moderately Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	7	0	0	0	0	8
NNE	1	5	0	0	0	0	6
NE	1	1	0	0	0	0	2
ENE	0	1	1	0	0	0	2
E	3	26	14	0	0	0	43
ESE	3	11	0	0	0	0	14
SE	1	19	2	0	0	0	22
SSE	2	14	3	0	0	0	19
S	2	26	9	0	0	0	37
SSW	4	30	21	0	0	0	55
SW	6	19	26	0	0	0	51
WSW	0	15	16	4	0	0	35
W	3	13	18	0	0	0	34
WNW	6	18	2	0	0	0	26
NW	1	9	1	0	0	0	11
NNW	2	4	0	0	0	0	6
Variable	0	1	1	0	0	0	2
Total	36	219	114	4	0	0	373

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

LaSalle County Generating Statio

Period of Record: July - September 2015
Stability Class - Extremely Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	1	0	0	0	0	0	1
ENE	0	1	0	0	0	0	1
E	0	6	2	0	0	0	8
ESE	2	34	1	0	0	0	37
SE	1	24	0	0	0	0	25
SSE	2	25	2	0	0	0	29
S	0	41	8	0	0	0	49
SSW	0	48	14	0	0	0	62
SW	2	24	7	0	0	0	33
WSW	1	13	3	0	0	0	17
W	1	19	6	0	0	0	26
WNW	2	21	0	0	0	0	23
NW	0	1	0	0	0	0	1
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	12	257	43	0	0	0	312

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

LaSalle County Generating Statio

Period of Record: July - September 2015
Stability Class - Extremely Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

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

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

LaSalle County Generating Statio

Period of Record: July - September 2015
Stability Class - Moderately Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Speed (in mph)

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

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

LaSalle County Generating Statio

Period of Record: July - September 2015
Stability Class - Slightly Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	4	5	0	0	9
NNE	0	0	0	1	0	0	1
NE	0	0	0	6	4	0	10
ENE	0	0	0	1	0	0	1
E	0	0	3	0	0	0	3
ESE	0	0	0	0	0	0	0
SE	0	1	0	0	0	0	1
SSE	0	0	1	0	0	0	1
S	0	0	3	2	3	0	8
SSW	0	0	2	0	7	1	10
SW	0	1	9	5	4	0	19
WSW	0	0	3	8	3	0	14
W	0	0	6	0	2	0	8
WNW	0	0	4	9	2	0	15
NW	0	0	2	6	1	0	9
NNW	0	0	0	1	0	0	1
Variable	0	0	0	0	0	0	0
Total	0	2	37	44	26	1	110

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

LaSalle County Generating Statio

Period of Record: July - September 2015
Stability Class - Neutral - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	13	24	24	0	0	61
NNE	1	12	19	19	13	1	65
NE	0	10	27	31	11	4	83
ENE	0	12	21	14	5	0	52
E	0	16	18	8	0	0	42
ESE	0	11	17	5	0	0	33
SE	1	24	22	6	1	0	54
SSE	2	9	20	14	4	1	50
S	3	7	19	18	4	2	53
SSW	1	8	30	18	12	3	72
SW	1	10	28	16	4	4	63
WSW	0	8	19	27	13	1	68
W	1	10	26	19	8	8	72
WNW	1	9	23	13	9	2	57
NW	1	6	6	18	10	2	43
NNW	0	2	25	21	3	0	51
Variable	0	1	0	0	0	0	1
Total	12	168	344	271	97	28	920

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

LaSalle County Generating Statio

Period of Record: July - September 2015
Stability Class - Slightly Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	3	8	16	6	0	33
NNE	3	3	8	18	4	0	36
NE	1	3	7	8	4	1	24
ENE	0	5	8	24	11	0	48
E	0	3	13	34	7	1	58
ESE	1	1	15	17	0	0	34
SE	2	4	10	12	2	0	30
SSE	0	6	10	18	7	2	43
S	1	10	9	20	20	5	65
SSW	0	6	18	10	30	8	72
SW	0	3	11	10	15	6	45
WSW	1	2	15	16	24	0	58
W	1	6	9	15	7	0	38
WNW	1	3	2	12	5	1	24
NW	0	1	4	9	3	1	18
NNW	1	6	10	4	4	0	25
Variable	0	0	0	0	0	0	0
Total	12	65	157	243	149	25	651

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

LaSalle County Generating Statio

Period of Record: July - September 2015
Stability Class - Moderately Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	3	1	1	1	0	7
NNE	0	1	2	0	0	0	3
NE	1	1	0	0	0	0	2
ENE	0	2	0	0	0	0	2
E	1	3	1	5	4	0	14
ESE	0	1	4	13	5	0	23
SE	1	4	3	20	3	0	31
SSE	1	5	8	10	4	0	28
S	1	5	15	15	8	4	48
SSW	1	7	18	22	22	6	76
SW	1	3	13	24	22	0	63
WSW	0	3	11	7	10	5	36
W	0	2	11	7	6	0	26
WNW	0	2	8	11	14	3	38
NW	0	6	7	10	4	0	27
NNW	0	4	2	4	1	0	11
Variable	0	1	1	0	0	0	2
Total	8	53	105	149	104	18	437

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

LaSalle County Generating Statio

Period of Record: July - September 2015
Stability Class - Extremely Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	2	0	0	2
SE	0	0	1	9	0	0	10
SSE	0	0	1	11	0	0	12
S	0	0	0	11	2	1	14
SSW	0	0	2	9	5	3	19
SW	0	0	3	1	3	1	8
WSW	0	0	1	2	0	0	3
W	0	1	2	0	0	0	3
WNW	0	1	2	5	1	1	10
NW	0	0	1	2	0	0	3
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	2	13	52	11	6	84

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

LaSalle County Generating Statio

Period of Record: October - December2015
Stability Class - Extremely Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Speed (in mph)

Wind Direction	1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	1	0	0	1
NE	0	0	0	2	3	0	5
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	4	2	6
SSE	0	0	0	2	4	1	7
S	0	1	0	4	3	0	8
SSW	0	1	0	0	0	0	1
SW	0	0	1	4	3	0	8
WSW	0	0	0	2	0	0	2
W	0	0	0	0	0	0	0
WNW	0	0	0	1	0	0	1
NW	0	0	0	1	0	0	1
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	2	1	17	17	3	40

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 179

LaSalle County Generating Statio

Period of Record: October - December2015
Stability Class - Moderately Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	2	0	0	0	2
NNE	0	0	0	1	0	0	1
NE	0	0	0	6	1	0	7
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	2	0	0	0	2
SE	0	1	0	1	0	0	2
SSE	0	1	0	1	0	0	2
S	0	0	1	0	0	0	1
SSW	0	0	0	4	0	0	4
SW	0	1	3	7	2	0	13
WSW	0	0	1	1	1	0	3
W	0	0	0	0	0	0	0
WNW	0	0	1	1	0	0	2
NW	0	0	5	3	0	0	8
NNW	0	0	2	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	0	3	17	25	4	0	49

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 179

LaSalle County Generating Statio

Period of Record: October - December2015
Stability Class - Slightly Unstable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Speed (in mph)

Wind Direction	1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	3	1	1	0	0	5
NNE	0	2	0	0	0	0	2
NE	0	1	3	2	0	0	6
ENE	0	0	0	0	0	0	0
E	0	0	1	0	0	0	1
ESE	0	0	1	0	0	0	1
SE	0	2	0	0	0	0	2
SSE	0	1	1	1	0	0	3
S	0	3	1	5	1	0	10
SSW	0	0	0	3	1	0	4
SW	0	1	3	7	0	0	11
WSW	0	3	5	1	0	0	9
W	0	2	0	2	0	0	4
WNW	0	0	3	1	0	0	4
NW	0	0	2	2	0	0	4
NNW	0	0	4	0	0	0	4
Variable	0	0	0	0	0	0	0
Total	0	18	25	25	2	0	70

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 179

LaSalle County Generating Statio

Period of Record: October - December2015
Stability Class - Neutral - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Speed (in mph)

Wind Direction	1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	6	20	10	0	0	38
NNE	2	24	38	3	0	0	67
NE	0	22	29	26	6	0	83
ENE	0	4	14	28	10	15	71
E	1	0	5	25	5	0	36
ESE	0	4	3	11	0	0	18
SE	0	4	10	11	4	5	34
SSE	0	8	6	11	4	4	33
S	0	8	17	13	6	0	44
SSW	1	13	16	12	8	1	51
SW	4	15	9	12	4	0	44
WSW	1	10	22	20	7	4	64
W	0	11	45	33	14	3	106
WNW	0	4	27	25	4	0	60
NW	0	2	8	8	4	0	22
NNW	0	6	12	8	1	0	27
Variable	0	0	0	0	0	0	0
Total	11	141	281	256	77	32	798

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 21
Hours of missing stability measurements in all stability classes: 179

LaSalle County Generating Statio

Period of Record: October - December2015
Stability Class - Slightly Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	10	3	0	0	0	13
NNE	0	16	3	1	0	0	20
NE	0	1	2	2	0	0	5
ENE	0	2	5	5	0	0	12
E	0	2	28	9	0	0	39
ESE	0	6	1	1	0	0	8
SE	0	5	11	7	0	3	26
SSE	0	6	13	7	3	12	41
S	2	6	21	18	3	4	54
SSW	0	8	26	43	21	0	98
SW	1	3	12	20	4	2	42
WSW	0	4	18	25	6	1	54
W	2	4	8	15	13	11	53
WNW	1	5	10	3	10	10	39
NW	1	7	12	0	1	0	21
NNW	0	1	10	0	0	0	11
Variable	0	0	0	0	0	0	0
Total	7	86	183	156	61	43	536

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 11
Hours of missing stability measurements in all stability classes: 179

LaSalle County Generating Statio

Period of Record: October - December2015
Stability Class - Moderately Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Speed (in mph)

Wind Direction	1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	2	1	0	0	0	3
NNE	1	0	0	0	0	0	1
NE	1	1	0	0	0	0	2
ENE	1	0	0	0	0	0	1
E	1	7	6	0	0	0	14
ESE	0	1	2	0	0	0	3
SE	0	6	0	0	0	0	6
SSE	1	10	6	4	0	0	21
S	1	7	20	13	0	0	41
SSW	1	6	22	15	0	0	44
SW	1	3	20	9	0	0	33
WSW	1	2	12	15	0	0	30
W	0	8	15	0	2	0	25
WNW	0	27	13	0	4	1	45
NW	0	5	0	0	0	0	5
NNW	0	2	1	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	9	87	118	56	6	1	277

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 7
Hours of missing stability measurements in all stability classes: 179

LaSalle County Generating Statio

Period of Record: October - December2015
Stability Class - Extremely Stable - 200Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	2	3	0	0	0	0	5
ESE	0	14	4	0	0	0	18
SE	1	4	2	0	0	0	7
SSE	3	8	9	5	0	0	25
S	0	9	15	1	0	0	25
SSW	0	3	27	3	0	0	33
SW	1	6	14	8	0	0	29
WSW	2	5	12	1	0	0	20
W	0	14	7	0	0	0	21
WNW	1	25	1	0	0	0	27
NW	1	2	0	0	0	0	3
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	11	93	91	18	0	0	213

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 7
Hours of missing stability measurements in all stability classes: 179

LaSalle County Generating Statio

Period of Record: October - December2015
Stability Class - Extremely Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Speed (in mph)

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

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 179

LaSalle County Generating Statio

Period of Record: October - December2015
Stability Class - Moderately Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

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

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 179

LaSalle County Generating Statio

Period of Record: October - December2015
Stability Class - Slightly Unstable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	1	1
NE	0	0	0	0	1	6	7
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	2	2
S	0	0	0	0	0	3	3
SSW	0	0	0	0	0	0	0
SW	0	0	0	2	4	3	9
WSW	0	0	0	1	1	0	2
W	0	0	0	0	0	0	0
WNW	0	0	0	1	0	0	1
NW	0	0	2	0	2	0	4
NNW	0	0	1	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	0	0	3	4	8	15	30

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 179

LaSalle County Generating Statio

Period of Record: October - December2015
Stability Class - Neutral - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	8	3	13	12	3	39
NNE	0	9	16	32	12	1	70
NE	1	7	26	29	24	27	114
ENE	0	5	9	10	22	9	55
E	0	0	1	7	19	9	36
ESE	0	0	3	6	8	5	22
SE	0	5	1	4	8	9	27
SSE	1	6	14	5	9	26	61
S	1	8	12	7	18	8	54
SSW	0	4	14	13	19	23	73
SW	3	13	17	22	15	8	78
WSW	0	4	11	18	12	8	53
W	0	3	16	30	22	34	105
WNW	0	0	8	31	17	8	64
NW	0	0	1	18	22	7	48
NNW	0	2	2	9	5	1	19
Variable	0	0	0	0	0	0	0
Total	6	74	154	254	244	186	918

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 50
Hours of missing stability measurements in all stability classes: 179

LaSalle County Generating Statio

Period of Record: October - December2015
Stability Class - Slightly Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	5	6	3	14
NNE	0	0	5	8	2	0	15
NE	0	3	5	2	9	2	21
ENE	0	2	6	3	0	1	12
E	0	0	4	4	16	9	33
ESE	0	3	1	1	9	0	14
SE	0	3	3	7	6	5	24
SSE	0	0	6	11	12	20	49
S	0	2	3	9	18	18	50
SSW	1	1	5	21	34	80	142
SW	1	1	4	17	17	19	59
WSW	1	0	7	11	12	16	47
W	0	0	2	6	18	36	62
WNW	0	0	2	13	8	36	59
NW	0	0	4	16	13	1	34
NNW	0	1	2	8	5	0	16
Variable	0	0	0	0	0	0	0
Total	3	16	59	142	185	246	651

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 5
Hours of missing stability measurements in all stability classes: 179

LaSalle County Generating Statio

Period of Record: October - December2015
Stability Class - Moderately Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	1	2	7	2	1	14
NNE	0	1	3	0	1	0	5
NE	0	1	0	0	2	0	3
ENE	0	3	0	0	0	0	3
E	1	4	0	0	0	0	5
ESE	0	1	0	5	2	0	8
SE	1	2	0	2	4	2	11
SSE	0	0	7	3	1	1	12
S	0	0	7	2	3	17	29
SSW	2	0	1	18	16	15	52
SW	0	0	5	5	18	17	45
WSW	0	0	3	4	4	9	20
W	1	0	4	3	7	4	19
WNW	0	0	3	10	10	0	23
NW	0	3	7	19	12	0	41
NNW	0	1	4	8	1	0	14
Variable	0	0	0	0	0	0	0
Total	6	17	46	86	83	66	304

Hours of calm in this stability class: 2
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 179

LaSalle County Generating Statio

Period of Record: October - December2015
Stability Class - Extremely Stable - 375Ft-33Ft Delta-T (F)
Winds Measured at 375 Feet

Wind Speed (in mph)

Wind Direction	1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	0	1	0	0	2
NNE	0	0	1	0	0	0	1
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	1	0	0	0	0	1
ESE	0	0	1	0	3	0	4
SE	0	1	0	2	3	0	6
SSE	0	4	1	1	0	1	7
S	0	0	0	2	1	3	6
SSW	0	0	0	3	3	2	8
SW	0	0	1	5	2	1	9
WSW	0	0	1	0	3	6	10
W	0	1	0	0	2	0	3
WNW	0	1	1	2	0	0	4
NW	0	1	0	0	0	0	1
NNW	0	1	0	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	0	11	6	16	17	13	63

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 179

APPENDIX G

ERRATA DATA

There is no errata data for 2015.

APPENDIX H

ANNUAL RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM REPORT (ARGPPR)

Docket No: 50-373
50-374

LASALLE COUNTY STATION
UNITS 1 and 2

Annual Radiological
Groundwater Protection Program Report

1 January Through 31 December 2015

Prepared By

Teledyne Brown Engineering
Environmental Services

LaSalle County Station
Marseilles, IL 61341

May 2016

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Appendix A Location Designation

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Figure A-1 LaSalle County Station Map of Groundwater Monitoring Sampling Locations, 2015.

Appendix B Data Tables

Tables

Table B-I.1 Concentrations of Tritium, Strontium, Gross Alpha and Gross Beta in Groundwater Samples Collected in the Vicinity of LaSalle County Station, 2015.

Table B-I.2 Concentrations of Gamma Emitters in Groundwater Samples Collected in the Vicinity of LaSalle County Station, 2015.

Table B-I.3 Concentrations of Hard-to-Detects in Groundwater Samples Collected as Part of the Radiological Groundwater Protection Program, LaSalle County Station, 2015.

Table B-II.1 Concentrations of Tritium in Surface Water Samples Collected in the Vicinity of LaSalle County Station, 2015.

Table B-II.2 Concentrations of Gamma Emitters in Surface Water Samples Collected in the Vicinity of LaSalle County Station, 2015.

I. Summary and Conclusions

In 2006, Exelon instituted a comprehensive program to evaluate the impact of station operations on groundwater and surface water in the vicinity of LaSalle County Station. This evaluation involved numerous station personnel and contractor support personnel. Following baseline sampling and subsequent recommendations, LaSalle's Radiological Groundwater Protection Program (RGPP) program now consists of the four surface water and twenty groundwater well sampling locations. The results for LaSalle's RGPP sampling efforts in 2015 are included in this report.

This is the tenth 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 2015. During that time period, 347 analyses were performed on 104 samples from 24 locations (4 surface water and 20 groundwater monitoring locations). The monitoring was conducted by Station personnel.

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

Strontium-89 and Strontium-90 were not detected in any groundwater samples during 2015.

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

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

Tritium was not detected in surface water samples at concentrations greater than the United States Environmental Protection Agency (USEPA) drinking water standard (and the Nuclear Regulatory Commission Reporting Limit) of 20,000 pCi/L. Tritium levels were detected at concentrations greater than the LLD of 200 pCi/L in eight of 16 surface water samples analyzed. The tritium concentrations ranged from <LLD to 1,320 ± 191 pCi/L. Tritium levels were detected at concentrations greater than the LLD of 200 pCi/L in 22 of 89 groundwater samples analyzed. The tritium concentrations ranged from <LLD to 35,400 ± 3,570 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 10CFR50.75(g) report.

Gross alpha and gross beta analyses in the dissolved and suspended fractions were performed on groundwater samples throughout the year in 2015. Gross alpha (dissolved) was not detected at any groundwater locations.

Gross alpha (suspended) was detected in 5 of 18 samples affecting 5 of 12 groundwater locations analyzed. The concentrations ranged from 1.8 to 8.5 pCi/L.

Gross beta (dissolved) was detected in 11 of 18 samples affecting 8 of 12 groundwater locations analyzed. The concentrations ranged from 1.5 to 22.2 pCi/L.

Gross beta (suspended) was detected in 6 of 18 samples affecting 6 of 12 groundwater locations analyzed. The concentrations ranged from 1.6 to 27.5 pCi/L.

Hard-to-detect analyses were performed on 12 of the groundwater sampling locations in accordance with the LaSalle RGPP and to aid in establishing background levels. The analyses included Fe-55, Ni-63, Am-241, Cm-242, Cm-243/244, Pu-238, Pu-239/240, U-234, U-235, and U-238. The isotopes of U-234 and U-238 were detected in eight and seven samples, respectively, affecting 3 of 12 groundwater locations. The U-234 concentrations ranged from 0.16 to 1.08 pCi/L. The U-238 concentrations ranged from 0.19 to 1.04 pCi/L. U-234 and U-238 are commonly found in groundwater at low concentrations due to the naturally occurring Radium (Uranium) Decay Series.

II. Introduction

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

This report covers those analyses performed by Teledyne Brown Engineering (TBE) on samples collected in 2015.

A. Objectives of the RGPP

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

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

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

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

4. Report new leaks, spills, or other detections with potential radiological significance to stakeholders in a timely manner.

5. Regularly assess analytical results to identify adverse trends.

6. Take necessary corrective actions to protect groundwater resources.

B. Implementation of the Objectives

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

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

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

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

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

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

C. Program Description

1. Sample Collection

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

Groundwater and Surface Water

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

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

D. Characteristics of Tritium (H-3)

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

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

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

Tritium has a half-life of approximately 12.3 years. It decays

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

III. Program Description

A. Sample Analysis

This section describes the general analytical methodologies used by TBE to analyze the environmental samples for radioactivity for the LaSalle County Station RGPP in 20145 Sample and analysis and frequency is based upon well location, assessed risk and site hydrogeology as described in the RGPP.

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

1. Concentrations of gamma emitters in groundwater and surface water.

2. Concentrations of strontium in groundwater.

3. Concentrations of tritium in groundwater and surface water.

4. Concentrations of Gross Alpha, Dissolved and Suspended and Gross Beta, Dissolved and Suspended in groundwater.

5. Concentrations of Am-241 in groundwater.

6. Concentrations of Cm-242 and Cm-243/244 in groundwater.

7. Concentrations of Pu-238 and PU-239/240 in groundwater.

8. Concentrations of U-234, U-235 and U-238 in groundwater.

9. Concentrations of Fe-55 in groundwater.

10. Concentrations of Ni-63 in groundwater.

B. Data Interpretation

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

1. 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. Exelon reports the uncertainty of a measurement created by statistical process (counting error) as well as all sources of error (Total Propagated Uncertainty or TPU). Each result has two values calculated. Exelon reports the TPU by following the result with plus or minus ± the estimated sample standard deviation, as TPU, that is obtained by propagating all sources of analytical uncertainty in measurements.

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

C. Background Analysis

A pre-operational radiological environmental monitoring program (pre-operational REMP) was conducted to establish background radioactivity levels prior to operation of the Station. The environmental media sampled and analyzed during the pre-operational REMP were atmospheric radiation, fall-out, domestic water, surface water, precipitation, marine life, and foodstuffs. The results of the monitoring were detailed in the report entitled, Environmental Radiological Monitoring for LaSalle County

Nuclear Power Station, Commonwealth Edison Company, Annual Reports for the years 1979 and 1981. The pre-operational REMP contained analytical results from samples collected from the surface water and groundwater.

1. Background Concentrations of Tritium

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

a. Tritium Production

Tritium is created in the environment from naturally occurring processes both cosmic and subterranean, as well as from anthropogenic (i.e., man-made) sources. In the upper atmosphere, “Cosmogenic” tritium is produced from the bombardment of stable nuclides and combines with oxygen to form tritiated water, which will then enter the hydrologic cycle. Below ground, “lithogenic” tritium is produced by the bombardment of natural lithium present in crystalline rocks by neutrons produced by the radioactive decay of naturally abundant uranium and thorium. Lithogenic production of tritium is usually negligible compared to other sources due to the limited abundance of lithium in rock. The lithogenic tritium is introduced directly to groundwater.

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

b. Precipitation Data

Precipitation samples are routinely collected at stations around the world for the analysis of tritium and other radionuclides. Two publicly available databases that provide tritium concentrations in precipitation are Global Network of Isotopes in Precipitation (GNIP) and USEPA’s RadNet database. GNIP provides tritium precipitation concentration

data for samples collected world wide from 1960 to 2006. RadNet provides tritium precipitation concentration data for samples collected at stations throughout the U.S. from 1960 up to and including 2006. Based on GNIP data for sample stations located in the U.S. Midwest, tritium concentrations peaked around 1963. This peak, which approached 10,000 pCi/L for some stations, coincided with the atmospheric testing of thermonuclear weapons. Tritium concentrations in surface water showed a sharp decline up until 1975 followed by a gradual decline since that time**.** Tritium concentrations in Midwest precipitation have typically been below 100 pCi/L since around 1980. LaSalle's 1979 or 1981 pre-operational REMP showed precipitation tritium concentrations >300 pCi/L. Tritium concentrations in wells may still be above the 200 pCi/L detection limit from the external causes described above. Water from previous years and decades is naturally captured in groundwater, so some well water sources today are affected by the surface water from the 1960s that was elevated in tritium.

Surface Water Data

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

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

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

IV. Results and Discussion

A. Groundwater Results

Groundwater

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

Tritium

Samples from 20 locations were analyzed for tritium activity. Tritium values ranged from <LLD to 35,400 pCi/L at well RW-LS-100S. Based on the hyrogeological study conducted at LaSalle, there is no feasible pathway into a drinking water supply. Based on established aquifer flow paths the location most representative of potential offsite release into groundwater was also less than the detection limit (Table B-I.1, Appendix B).

Strontium

A total of 18 samples from 12 groundwater locations were analyzed for Strontium-89 and Strontium-90. The results were less than the required detection limit of 10 pCi/L for Strontium-89 and less than the required detection limit of 1.0 pCi/liter for Strontium-90 (Table B-I.1, Appendix B).

Gross Alpha and Gross Beta (dissolved and suspended)

Gross alpha and gross beta analyses in the dissolved and suspended fractions were performed on groundwater samples throughout the year in 2015. Gross alpha (dissolved) was not detected at any groundwater locations. Gross alpha (suspended) was detected in 5 of 18 samples affecting 5 of 12 groundwater locations analyzed. The concentrations ranged from 1.8 to 8.5 pCi/L. Gross beta (dissolved) was detected in 11 of 18 samples affecting 8 of 12 groundwater locations analyzed. The concentrations ranged from 1.5 to 22.2 pCi/L. Gross beta (suspended) was detected in 6 of 18 samples affecting 6 of 12 groundwater locations analyzed. The concentrations ranged from 1.6 to 27.5 pCi/L. These concentrations of gross alpha and gross beta, which are slightly above detectable levels, are considered to be background and are not the result of plant effluents (Table B-I.1, Appendix B).

Gamma Emitters

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

Hard-To-Detect

Hard-to-detect analyses were performed on 12 of the groundwater sampling locations in accordance with the LaSalle RGPP and to aid in establishing background levels. The analyses included Fe-55, Ni-63, Am-241, Cm-242, Cm-243/244, Pu-238, Pu-239/240, U-234, U-235, and U-238. The isotopes of U-234 and U-238 were detected in eight and seven samples, respectively, affecting 3 of 11 groundwater locations. The U-234 concentrations ranged from 0.16 to 1.08 pCi/L. The U-238 concentrations ranged from 0.19 to 1.04 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

Surface Water

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

Tritium

Samples from 4 locations were analyzed for tritium activity. Eight (8) of 15 samples from 4 surface water locations indicated activity above the minimum detectable concentration (MDC). The concentrations ranged from 213 to 1,320 pCi/L. Based on the hydrogeological study conducted at LaSalle, there is no feasible pathway into a drinking water supply. Based on established aquifer flow paths, the location most representative of potential offsite release into groundwater was also less than the detection limit. (Table B–II.1, Appendix B).

Strontium

Strontium-89 and strontium-90 analyses were not performed on surface water samples in 2015.

Gross Alpha and Gross Beta (dissolved and suspended)

Gross Alpha and Gross Beta analyses in the dissolved and suspended fractions were not performed on surface water samples in 2015.

Gamma Emitters

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

C. Drinking Water Well Survey

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

D. Summary of Results – Inter-Laboratory Comparison Program

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

E. Leaks, Spills, and Releases

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

F. Trends

Analysis results from samples continue to be trended in order to assess impact to groundwater at LaSalle Station. There were no new leaks identified in the reporting period. Sample data from the plume arising from the historic 2010 U1 CY tank leak is being trended per the LaSalle RGPP. The plume had been dispersing with groundwater flow, and extraction wells have been installed to provide additional control of the plume migration (see Section H.3). 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

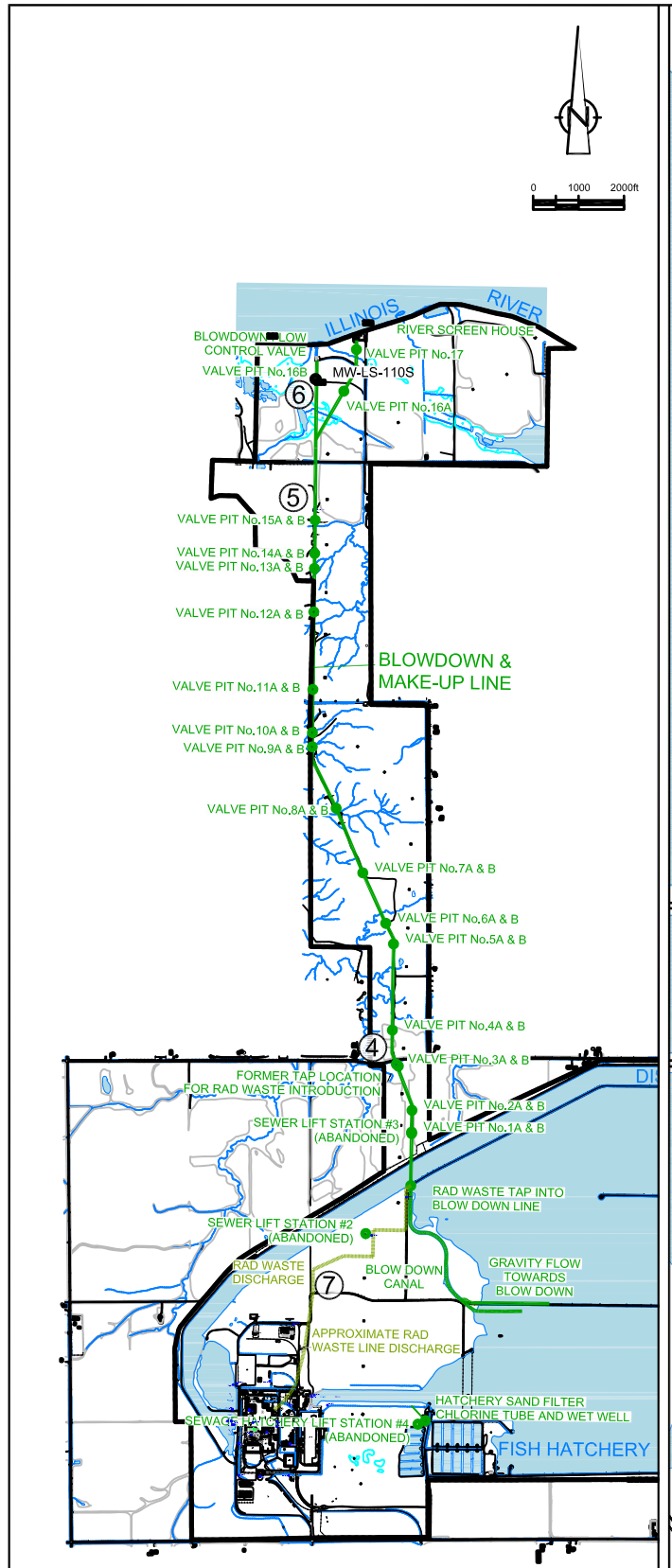
   Two (2) extraction wells (RW-LS-100S and RW-LS-101S) have been installed to control the migration of the tritium plume near U1 CY tank. RW-LS-100S became operational in October 2012. RW-LS-101S became operational in April 2014.

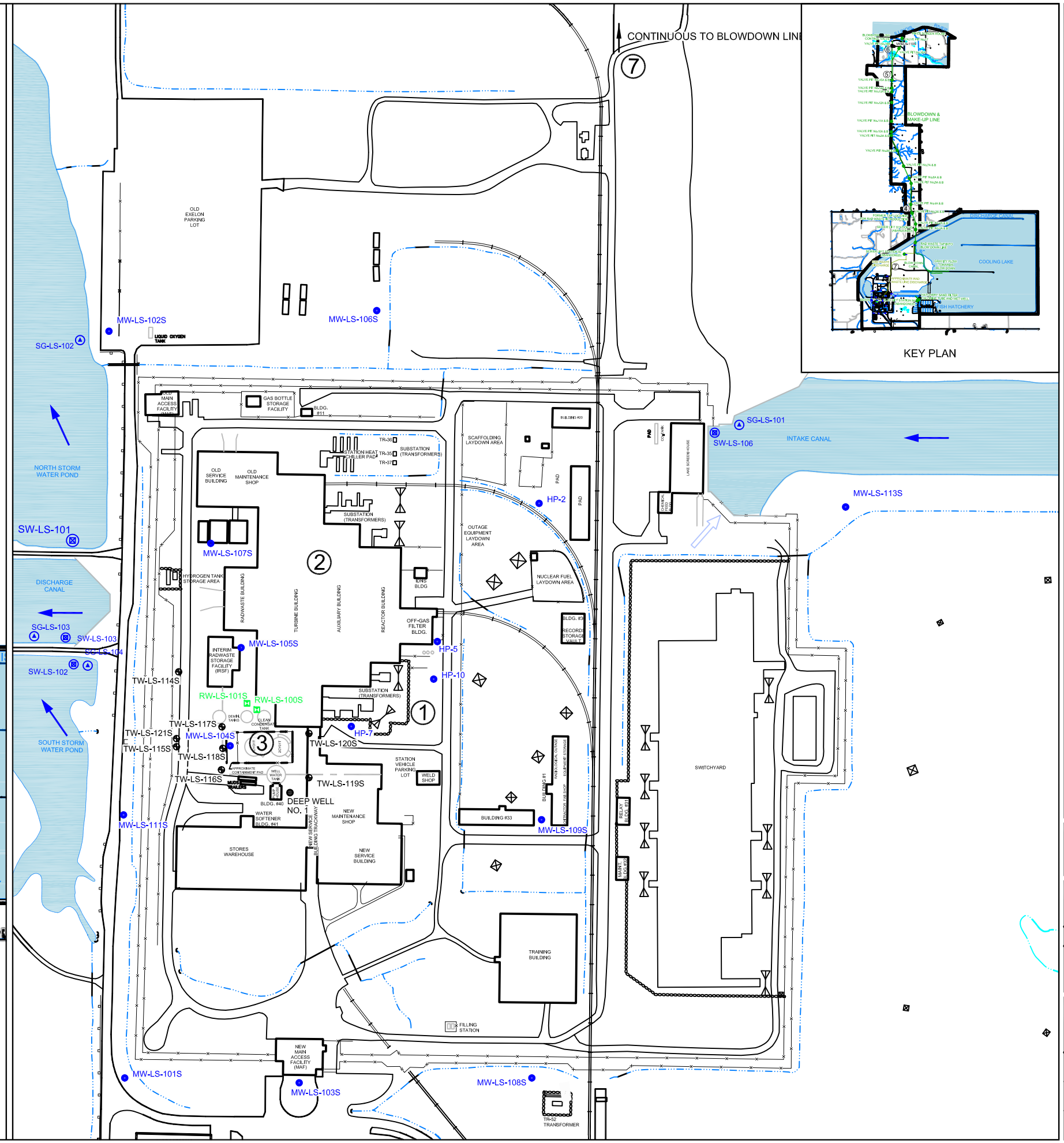
APPENDIX A

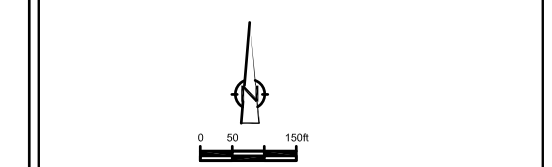
LOCATION DESIGNATION

TABLE A-1 LaSalle County Station Groundwater Monitoring Sample Point List, 2015

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







LEGEND

- EDGE OF WATER
- STORM WATER DITCH
- ESTIMATED LIMITS OF ENGINEERED FILL/NATURAL CLAY CONTACT
- TRANSMISSION TOWER
- HP-1 MONITORING WELL LOCATION
- (1) AREA FOR FURTHER EVALUATION (AFE LASALLE)
- SURFACE WATER FLOW
- STAFF GAUGE LOCATION
- RW-LS-100S RECOVERY WELL LOCATION AND IDENTIFIER
- TW-114S APPROXIMATE TEMPORARY MONITORING WELL LOCATION AND IDENTIFIER

AFE	DESCRIPTION
1	HPCS/RI
2	REACTOR / TURBINE / AUXILIARY BUILDINGS
3	CY SYSTEM
4	VALVE PIT 3B
5	VALVE PIT 15B
6	VALVE PIT 16B
7	RAD WASTE LINE

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

EXELON GENERATION COMPANY, LLC
LaSALLE GENERATING STATION
MARSEILLES, ILLINOIS

FLEETWIDE ASSESSMENT

MONITORING WELL LOCATIONS
AND SURFACE WATER FEATURES

Source Reference:
SDI CONSULTANTS, ALTA/ACSM LAND TITLE SURVEY
LASALLE NUCLEAR STATION, 9-15-2000

Project Manager:	Reviewed By:	Date:	
W. POCHRON		NOVEMBER 2013	
Scale: AS SHOWN	Project N#: 71554-00	Report N#: PRES008	Drawing N#: figure 4.1

71554-00(PRES008)GN-CO002 MAY 29/2014

APPENDIX B

DATA TABLES

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA, AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE		H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)	Gr-B (Dis)	Gr-B (Sus)
HP-10	01/31/15		< 187						
HP-10	06/24/15		< 182	< 6.2	< 0.7	< 1.3	< 0.4	< 1.8	< 1.5
HP-10	08/31/15		< 194						
HP-10	12/03/15		< 184						
HP-2	01/31/15		< 188						
HP-2	06/24/15		< 183	< 6.2	< 0.6	< 1.7	< 1.4	6.0 ± 1.1	2.7 ± 1.3
HP-2	08/31/15		< 194						
HP-2	12/03/15		< 187						
HP-5	01/31/15		< 181						
HP-5	06/24/15		< 183	< 6.7	< 0.6	< 1.2	3.9 ± 1.1	1.8 ± 1.1	< 1.5
HP-5	08/31/15		< 192						
HP-5	12/03/15		< 185						
HP-7	01/31/15		< 186						
HP-7	06/24/15	Original	< 180	< 7.4	< 0.5	< 0.8	7.0 ± 2.5	4.5 ± 0.9	24.7 ± 3.1
HP-7	06/24/15	Recount					8.5 ± 2.7		
HP-7	06/24/15	Rerun							27.5 ± 3.3
HP-7	08/31/15		< 195						
HP-7	12/03/15		< 188						
MW-LS-104S	03/11/15		23800 ± 2410						
MW-LS-104S	06/25/15		20000 ± 2040	< 5.1	< 0.6	< 1.6	< 0.5	< 2.9	< 1.6
MW-LS-104S	08/26/15		12900 ± 1330	< 7.5	< 0.7	< 1.4	< 0.6	< 1.9	< 1.7
MW-LS-104S	12/02/15		12600 ± 1300	< 6.9	< 0.8	< 0.8	< 1.3	< 1.1	< 2.5
MW-LS-105S	01/31/15		< 184						
MW-LS-105S	06/24/15		< 184	< 5.4	< 0.5	< 1.0	3.2 ± 1.3	1.5 ± 0.6	11.7 ± 2.0
MW-LS-105S	08/26/15		< 196						
MW-LS-105S	12/03/15		< 185						
MW-LS-106S	03/12/15		< 184						
MW-LS-106S	06/25/15		< 181						
MW-LS-107S	01/31/15		< 184						
MW-LS-107S	06/24/15		< 183	< 5.2	< 0.4	< 1.8	3.1 ± 1.3	1.8 ± 1.0	8.8 ± 1.8
MW-LS-107S	08/31/15		< 192						
MW-LS-107S	12/03/15		< 186						
MW-LS-111S	03/11/15		< 182						
MW-LS-111S	06/25/15		< 182	< 5.6	< 0.6	< 12.1	1.8 ± 0.8	22.2 ± 4.5	6.2 ± 1.4
MW-LS-111S	08/31/15		< 195						
MW-LS-111S	12/03/15		< 186						
OIL SEPARATOR	03/11/15		981 ± 161						
OIL SEPARATOR	06/24/15		< 179						
OIL SEPARATOR	08/26/15		528 ± 146						
OIL SEPARATOR	12/02/15		< 194						
RW-LS-100S	01/31/15		35400 ± 3570						
RW-LS-100S	06/24/15		9760 ± 1010	< 8.0	< 0.7	< 2.0	< 0.5	6.1 ± 1.3	< 1.6
RW-LS-100S	08/26/15		12300 ± 1270	< 3.0	< 0.7	< 1.6	< 0.6	5.7 ± 1.4	< 1.7
RW-LS-100S	12/03/15		18100 ± 1860	< 6.8	< 0.8	< 1.1	< 0.6	< 1.5	< 1.4
RW-LS-101S	03/11/15		15000 ± 1540						
RW-LS-101S	06/24/15		14200 ± 1460	< 6.5	< 0.5	< 1.7	< 0.5	7.2 ± 1.2	< 1.6
RW-LS-101S	08/26/15		13600 ± 1410	< 2.7	< 0.9	< 1.2	< 0.6	4.8 ± 1.2	< 1.7
RW-LS-101S	12/03/15		9240 ± 972	< 6.4	< 0.8	< 0.9	< 2.0	3.5 ± 0.9	< 2.5
TW-LS-114S	01/31/15		< 186						
TW-LS-114S	06/24/15		< 184						
TW-LS-114S	08/26/15		< 196						
TW-LS-114S	12/03/15		< 183						

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA, AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE		H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)	Gr-B (Dis)	Gr-B (Sus)
TW-LS-115S	01/31/15		< 181						
TW-LS-115S	06/24/15		< 182						
TW-LS-115S	08/26/15		< 194						
TW-LS-115S	12/03/15		< 194						
TW-LS-116S	01/31/15		7820 ± 824						
TW-LS-116S	06/24/15		8480 ± 890						
TW-LS-116S	08/26/15	Original	13000 ± 1350						
TW-LS-116S	08/26/15	Recount	10100 ± 1060						
TW-LS-116S	12/02/15		9160 ± 963	< 7.7	< 0.9	< 0.9	< 0.7	< 1.3	1.6 ± 1.0
TW-LS-117S	01/31/15		< 185						
TW-LS-117S	06/24/15		< 185						
TW-LS-117S	08/26/15		< 197						
TW-LS-117S	12/03/15		< 196						
TW-LS-118S	01/31/15		20000 ± 2040						
TW-LS-118S	06/24/15		15900 ± 1630						
TW-LS-118S	08/26/15	Original	25400 ± 2580						
TW-LS-118S	08/26/15	Recount	25200 ± 2570						
TW-LS-118S	12/02/15		20600 ± 2110	< 7.4	< 0.8	< 0.8	< 1.6	< 1.2	< 2.6
TW-LS-119S	01/31/15		< 186						
TW-LS-119S	06/24/15		< 190						
TW-LS-119S	08/26/15		< 193						
TW-LS-119S	12/03/15		< 191						
TW-LS-120S	01/31/15		< 187						
TW-LS-120S	06/24/15		< 185						
TW-LS-120S	08/26/15		< 193						
TW-LS-120S	12/03/15		< 190						
TW-LS-121S	01/31/15		< 183						
TW-LS-121S	06/24/15		< 179						
TW-LS-121S	08/26/15		< 196						
TW-LS-121S	12/02/15		< 193						

TABLE B-I.2 **CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
HP-10	06/24/15	< 17	< 13	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 13	< 2	< 2	< 20	< 7
HP-2	06/24/15	< 18	< 30	< 2	< 2	< 5	< 2	< 4	< 2	< 3	< 14	< 2	< 2	< 21	< 6
HP-5	06/24/15	< 17	< 32	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 13	< 2	< 2	< 21	< 6
HP-7	06/24/15	< 21	< 17	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 15	< 2	< 2	< 23	< 7
MW-LS-104S	06/25/15	< 25	< 38	< 2	< 3	< 6	< 2	< 5	< 3	< 4	< 15	< 2	< 2	< 26	< 8
MW-LS-104S	08/26/15	< 19	< 38	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 15	< 2	< 2	< 21	< 7
MW-LS-104S	12/02/15	< 17	< 15	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 15	< 1	< 1	< 22	< 6
MW-LS-105S	06/24/15	< 15	< 11	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 12	< 1	< 1	< 17	< 5
MW-LS-106S	06/25/15	< 23	< 43	< 2	< 2	< 6	< 2	< 5	< 3	< 5	< 15	< 2	< 2	< 25	< 9
MW-LS-107S	06/24/15	< 21	< 34	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 15	< 2	< 2	< 24	< 8
MW-LS-111S	06/25/15	< 20	< 18	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 14	< 2	< 2	< 22	< 7
RW-LS-100S	06/24/15	< 20	< 16	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 13	< 2	< 2	< 21	< 7
RW-LS-100S	08/26/15	< 17	< 29	< 2	< 2	< 4	< 1	< 3	< 2	< 3	< 13	< 2	< 2	< 20	< 6
RW-LS-100S	12/03/15	< 17	< 15	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 14	< 1	< 2	< 21	< 6
RW-LS-101S	06/24/15	< 22	< 36	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 13	< 2	< 2	< 21	< 9
RW-LS-101S	08/26/15	< 16	< 11	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 12	< 1	< 1	< 18	< 5
RW-LS-101S	12/03/15	< 17	< 15	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 15	< 1	< 2	< 22	< 7
TW-LS-116S	12/02/15	< 16	< 12	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 15	< 1	< 1	< 21	< 7
TW-LS-118S	12/02/15	< 16	< 12	< 1	< 2	< 3	< 1	< 3	< 2	< 3	< 15	< 1	< 1	< 21	< 6

BOLDED VALUES INDICATE LLD COULD NOT BE MET DUE TO AGE OF SAMPLE AT TIME OF RECEIPT AT THE LABORATORY

TABLE B-I.3 **CONCENTRATIONS OF HARD-TO-DETECTS IN GROUNDWATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, LASALLE COUNTY STATION, 2015**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	Am-241	Cm-242	Cm-243/244	Pu-238	Pu-239/240	U-234	U-235	U-238	Fe-55	Ni-63
HP-10	06/24/15									< 194	< 4
HP-2	06/24/15									< 148	< 5
HP-5	06/24/15									< 177	< 5
HP-7	06/24/15									< 178	< 5
MW-LS-104S	06/25/15	< 0.11	< 0.03	< 0.03	< 0.06	< 0.14	1.08 ± 0.33	< 0.03	1.04 ± 0.32	< 117	< 5
MW-LS-104S	08/26/15	< 0.09	< 0.04	< 0.03	< 0.07	< 0.02	1.00 ± 0.28	< 0.02	0.90 ± 0.26	< 86	< 4
MW-LS-104S	12/02/15	< 0.10	< 0.02	< 0.12	< 0.17	< 0.19	0.92 ± 0.22	< 0.02	1.01 ± 0.23	< 170	< 5
MW-LS-105S	06/24/15									< 114	< 5
MW-LS-107S	06/24/15									< 191	< 4
MW-LS-111S	06/25/15									< 187	< 5
RW-LS-100S	06/24/15	< 0.06	< 0.06	< 0.08	< 0.13	< 0.07	0.16 ± 0.11	< 0.09	< 0.09	< 150	< 4
RW-LS-100S	08/26/15	< 0.09	< 0.02	< 0.07	< 0.16	< 0.05	< 0.02	< 0.02	< 0.04	< 183	< 4
RW-LS-100S	12/03/15	< 0.16	< 0.09	< 0.19	< 0.09	< 0.15	0.38 ± 0.15	< 0.10	0.19 ± 0.11	< 117	< 5
RW-LS-101S	06/24/15	< 0.02	< 0.02	< 0.02	< 0.11	< 0.09	0.30 ± 0.15	< 0.03	0.19 ± 0.12	< 127	< 5
RW-LS-101S	08/26/15	< 0.14	< 0.04	< 0.11	< 0.07	< 0.04	0.41 ± 0.14	< 0.02	0.25 ± 0.11	< 173	< 4
RW-LS-101S	12/03/15	< 0.11	< 0.08	< 0.14	< 0.06	< 0.17	0.46 ± 0.16	< 0.02	0.37 ± 0.14	< 150	< 5
TW-LS-116S	12/02/15									< 162	< 5
TW-LS-118S	12/02/15									< 170	< 5

TABLE B-II.1 **CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3
SW-LS-101	03/12/15	< 189
SW-LS-101	06/25/15	< 191
SW-LS-101	08/31/15	< 196
SW-LS-101	12/03/15	< 187
SW-LS-102	03/11/15	< 185
SW-LS-102	06/25/15	196 ± 125
SW-LS-102	08/31/15	1320 ± 191
SW-LS-102	12/03/15	224 ± 129
SW-LS-103	03/11/15	214 ± 126
SW-LS-103	06/25/15	314 ± 132
SW-LS-103	08/31/15	< 194
SW-LS-103	12/03/15	213 ± 127
SW-LS-106	03/11/15	< 187
SW-LS-106	06/25/15	238 ± 132
SW-LS-106	08/31/15	< 191
SW-LS-106	12/02/15	233 ± 126

TABLE B-II.2 **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER**
SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2015

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
SW-LS-101	06/25/15	< 22	< 47	< 2	< 2	< 5	< 2	< 4	< 2	< 5	< 11	< 2	< 2	< 20	< 4
SW-LS-102	06/25/15	< 32	< 29	< 3	< 3	< 7	< 3	< 6	< 3	< 5	< 13	< 3	< 3	< 27	< 7
SW-LS-103	06/25/15	< 26	< 48	< 3	< 3	< 6	< 2	< 5	< 3	< 5	< 15	< 2	< 2	< 25	< 10
SW-LS-106	06/25/15	< 22	< 33	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 15	< 2	< 2	< 24	< 8