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10 CFR 50 Appendix I

RA15-024

May 13, 2015

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: 2014 Annual Radiological Environmental Operating Report

Enclosed is the Exelon Generation Company, LLC, LaSalle County Station 2014 Annual Radiological Environmental Operating Report, submitted in accordance with Technical Specification 5.6.2, "Annual Radiological Environmental Operating Report." This report contains the results of the Radiological Environmental and Meteorological Monitoring Programs. This report is enclosed as an attachment.

In addition, this attachment 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,

Peter J. Karaba
Site Vice President
LaSalle County Station

Attachment

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 2014

Prepared By

Teledyne Brown Engineering
Environmental Services

Exelon Generation.

LaSalle County Station
Marseilles, IL 61341

May 2015

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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 2014 through 31 December 2014. During that time period, 1,407 analyses were performed on 1,393 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. Cs-137 was detected in both samples at control location L-21. Occasionally Cs-137 is detected at very low levels (just above LLD) and is not distinguishable from background levels.

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 not analyzed in 2014 for concentrations of I-131 and gamma emitting nuclides as this dairy herd was sold prior to the first sample in 2014.

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). 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 were deployed and Thermo-luminescent Dosimetry (TLD) were discontinued. OSLD technology is different than that used in a TLD but has the same purpose (to measure direct radiation).

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 2014 through 31 December 2014.

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 2014. 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 TBE and Environmental Inc. (Midwest Labs) to analyze the environmental samples for radioactivity for the LSCS REMP in 2014. 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 2014, the LSCS REMP had a sample recovery rate of 97.8%. Sample anomalies and missed samples are listed in the tables below:

Table D-1 <u>LISTING OF SAMPLE ANOMALIES</u>

Sample Type	Location Code	Collection Date	Reason
A/I	L-03	01/30/14	No apparent reason for low reading of 161.0 hours. Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-03	02/19/14	No apparent reason for low reading of 142.1 hours. Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-03	02/27/14	No apparent reason for low reading of 176.0 hours (eight-day run time). Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-08	02/27/14	No apparent reason for low reading of 188.4 hours (eight-day run time). Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-05	06/05/14	No apparent reason for low reading of 90.1 hours. Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-03	06/19/14	Low reading of 70.2 hours due to power outage at sampler; Station notified. Flowrate estimated at 60CFH for the particulate sample only. The iodine sample did not meet the required lower limit of detection due to low run time from the power outage.
A/I	L-05	06/25/14	No apparent reason for low reading of 139.0 hours. Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-10	07/03/14	No apparent reason for low reading of 112.6 hours. Low timer readings of this nature are consistent with weather related power interruptions.

Table D-1 LISTING OF SAMPLE ANOMALIES

Sample Type	Location Code	Collection Date	Reason
A/I	L-11	07/03/14	No apparent reason for low reading of 178.5 hours (eight-day run time). Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-04	08/07/14	No apparent reason for low reading of 155.5 hours. Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-04	10/16/14	No apparent reason for low reading of 165.2 hours. Low timer readings of this nature are consistent with weather related power interruptions.
A/I	L-07	12/18/14	No apparent reason for low reading of 159.2 hours. Low timer readings of this nature are consistent with weather related power interruptions.

Table D-2 LISTING OF MISSED SAMPLES

Sample Type	Location Code	Collection Date	Reason
M	L-42	01/01/14 - 12/31/14	No samples; farmer sold dairy herd.
SW	L-21	02/06/14	No sample; water frozen
SW	L-40	02/06/14	No sample; water frozen
A/I	L-03	06/19/14	No iodine sample due to low run time from power outage. Iodine sample did not meet the required lower limit of detection.
A/I	L-03	06/25/14	No power to sampler.
A/I	L-03	07/03/14	Power restored to sampler. No sample due to recent power restoration.

Table D-2 LISTING OF MISSED SAMPLES

Sample Type	Location Code	Collection Date	Reason
OSLD	L-208-1, L-208-2, L-209-2, L-210-1	10/01/14	OSLDs found missing during quarterly exchange; collector placed new 4th quarter OSLDs.
OSLD	L-216-4	01/07/15	OSLD found missing during quarterly exchange due to utility pole replacement; collector placed new 1st quarter OSLD.

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 is currently collecting preliminary data, but is not operational at this time.

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 4.2 to 11.1 pCi/l. Concentrations detected were consistent with those detected in previous years

(Figure C–1, Appendix C). The required LLD was met.

Tritium

Quarterly composites of weekly collections were analyzed for tritium activity (Table C–I.2, Appendix C). Tritium was detected in four of eight samples. The concentrations ranged from 327 to 470 pCi/l. Concentrations detected were consistent with those detected in previous years (Figure C–2, Appendix C). The 2000 pCi/L OCDM and contractually required 200 pCi/L LLDs were met.

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 2000 pCi/L OCDM and 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 2,096 to 4,664 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 13,040 to 19,110 pCi/kg dry. Cesium-137 was detected in two samples. The concentration ranged from 146 to 166 pCi/L. No LaSalle 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 control location 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 3 to 33 E–3 pCi/m^3 with a mean of 18 E–3 pCi/m^3. The results from the near site location (Group II) ranged from 5 to 32 E–3 pCi/m^3 with a mean of 19 E–3 pCi/m^3. The results from the far field locations (Group III) ranged from 6 to 31 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 6 to 29 E–3 pCi/m^3 with a mean of 18 E–3 pCi/m^3. Comparison of the 2014 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 2014 indicate no notable differences among the four groups.

<u>Gamma Spectrometry</u>

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 34 of 36 samples. These values ranged from 66 to 155 E–3 pCi/m^3. Naturally occurring K-40 was detected in two samples. The concentration ranged from 28 to 31E–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 are typically collected from one location (L-42) biweekly May through October and monthly November through April. The following analyses are typically performed:

<u>Iodine-131</u>

Milk samples from the location are typically analyzed for concentrations of I-131 (Table C–VII.1, Appendix C). I-131 was not analyzed in 2014.

<u>Gamma Spectrometry</u>

Milk samples are typically analyzed for concentrations of gamma emitting nuclides (Table C–VII.2, Appendix C).

Naturally occurring K-40 activity is typically found in all samples. Gamma emitting nuclides were not analyzed in 2014.

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:

<u>Gamma Spectrometry</u>

Samples from all 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 30 mrem/quarter, with a range of 16.2 to 30.0 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 2014 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	-	-
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 2014.

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.

In reviewing our environmental inter-laboratory crosscheck programs, we identified 1) duplication of efforts on some matrices and isotopes and 2) that we are performing crosscheck samples on some matrices and isotopes that we do not perform for clients. Since the DOE MAPEP is designed to evaluate the ability of analytical facilities to correctly analyze for radiological constituents representative of those at DOE sites, the needed changes were made to the MAPEP program. Therefore, the following isotopes were removed from the MAPEP program:

Soil – gamma – will be provided by Analytics twice per year, starting in 2015. For 2014, one soil gamma is provided by MAPEP, the 2nd soil gamma is provided by Analytics.

AP – gamma – is currently provided by Analytics.

Water – gamma, H-3, Sr-90, uranium, gross alpha and gross beta currently provided by ERA.

MAPEP evaluates non-reported (NR) analyses as failed if they were reported in the previous series.

For the TBE laboratory, 163 out of 169 analyses performed met the specified acceptance criteria. Six analyses (Ni-63, K-40 and I-131 in water, and two Sr-90s and one Gross Alpha in AP samples) did not meet the specified acceptance criteria for the following reasons:

1. Teledyne Brown Engineering's MAPEP March 2014 Ni-63 in water result of 32.7 ± 1.69 Bq/L was overlooked when reporting the data

but would have passed the acceptance range of 23.9 – 44.2 Bq/L. No client samples were affected by this failure. NCR 14-04

2. Teledyne Brown Engineering's MAPEP March 2014 K-40 in water result of 1.63 ± 2.49 Bq/L was overlooked when reporting the data but would have passed the false positive test. No client samples were affected by this failure. NCR 14-04

3. Teledyne Brown Engineering's ERA November 2014 I-131 in water result of 15.8 pCi/L was lower than the known value of 20.3 pCi/L, failing below the lower acceptance limit of 16.8. The result was evaluated as failed with a found to known ratio of 0.778. No cause could be found for the slightly low result. All ERA I-131 evaluations since 2004 have been acceptable. No client samples were affected by this failure. NCR 14-08

4. Teledyne Brown Engineering's MAPEP March 2014 Sr-90 in AP result of 0.822 Bq/sample was lower than the known value of 1.18 Bq/sample, falling below the lower acceptance limit of 0.83 Bq/sample. The rerun result was still low, but fell within the lower acceptance range of 0.836. The rerun result was statistically the same number as the original result. No cause could be found for the slightly low results. No client samples were affected by this failure. NCR 14-04

5. Teledyne Brown Engineering's MAPEP September 2014 Sr-90 in AP result of 0.310 Bq/sample was lower than the known value of 0.703 Bq/sample. The gravimetric yield of 117% was very high (we normally see yields of 60% to 70%) and could account for the low activity. No client samples were affected by this failure. NCR 14-09

6. Teledyne Brown Engineering's MAPEP September 2014 Gr-Alpha in AP result of 0.153 Bq/sample was lower than the known value of 0.53 Bq/sample. The AP sample was counted on the wrong side. The AP was flipped over and recounted with acceptable results. No client samples were affected by this failure. NCR 14-09

For the EIML laboratory, 85 of 90 analyses met the specified acceptance criteria. Five analyses (Water – Pu-238, Pu-239, Fe-55; AP – Co-57; Soil – Cs134) did not meet the specified acceptance criteria for the following reasons:

1. Environmental Inc., Midwest Laboratory's MAPEP February 2014 water Pu-238 result of 1.28 Bq/L was higher than the known value of 0.83 Bq/L, exceeding the upper control limit of 1.08 Bq/L. The high bias on the plutonium was traced to contamination from a newly purchased standard. The result of the reanalysis with the

new tracer was 0.68 Bq/L, which fell within the acceptance criteria. Client samples for the associated time period were evaluated, and no client samples were affected by the issue.

2. Environmental Inc., Midwest Laboratory's MAPEP February 2014 water Pu-239/240 result of 0.91 Bq/L was higher than the known value of 0.68 Bq/L, exceeding the upper control limit of 0.88 Bq/L. The high bias on the plutonium was traced to contamination from a newly purchased standard. The result of reanalysis with the new tracer was 0.66 Bq/L, which fell within the acceptance criteria. Client samples for the associated time period were evaluated, and no client samples were affected by the issue.

3. Environmental Inc., Midwest Laboratory's MAPEP February 2014 AP Co-57 result of 1.60 ± 0.05 Bq/total sample failed the false positive test. Interference from the Eu-152 resulted in the misidentification of Co-57. The failure was specific to the MAPEP sample. Therefore, there was no impact to client samples as a result of this issue.

4. Environmental Inc., Midwest Laboratory's MAPEP February 2014 soil Cs-134 result of 6.10 ± 1.80 Bq/kg failed the false positive test. Long sample counting time lead to interference from naturally occurring Bi-214 in the sample matrix with a close spectral energy. The failure was specific to the MAPEP sample. Therefore, there was no impact to client samples as a result of this issue.

5. Environmental Inc., Midwest Laboratory's MAPEP August 2014 water Fe-55 result of 55.10 ± 14.80 Bq/L was higher than the known value of 31.50 Bq/L, exceeding the upper control limit of 41.00 Bq/L. The result of the reanalysis of Fe-55 was 32.63 ± 16.30 Bq/L, which fell within the acceptance criteria. Client samples for the associated time period were evaluated, and no client samples were affected by the issue.

The Inter-Laboratory Comparison Program provides evidence of "in control" counting systems and methods, and that the laboratories are 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, 2014

NAME OF FACILITY: LASALLE **DOCKET NUMBER:** 50-373 & 50-374 2014
LOCATION OF FACILITY: MARSEILLES IL **REPORTING PERIOD:** ANNUAL

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) RANGE	CONTROL LOCATION MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M): MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M): STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SURFACE WATER (PCI/LITER)	GR-B	24	4	8.1 (12/12) (5.2/11.1)	7.0 (12/12) (4.2/10.8)	8.1 (12/12) (5.2/11.1)	L-40 INDICATOR ILLINOIS RIVER - DOWNSTREAM 5.2 MILES NNW OF SITE	0
	H-3	8	200	430 (2/4) (389/470)	360 (2/4) (327/393)	430 (2/4) (389/470)	L-40 INDICATOR ILLINOIS RIVER - DOWNSTREAM 5.2 MILES NNW OF SITE	0
	GAMMA	24						
	MN-54		15	<LLD	<LLD	-		0
	CO-58		15	<LLD	<LLD	-		0
	FE-59		30	<LLD	<LLD	-		0
	CO-60		15	<LLD	<LLD	-		0
	ZN-65		30	<LLD	<LLD	-		0
	NB-95		15	<LLD	<LLD	-		0

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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, 2014

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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)	INDICATOR LOCATIONS MEAN (M) (F) RANGE	CONTROL LOCATION MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M): MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M): STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SURFACE WATER (PCI/LITER)	ZR-95		30	<LLD	<LLD	-		0
	I-131		15	<LLD	<LLD	-		0
	CS-134		15	<LLD	<LLD	-		0
	CS-137		18	<LLD	<LLD	-		0
	BA-140		60	<LLD	<LLD	-		0
	LA-140		15	<LLD	<LLD	-		0
GROUND WATER (PCI/LITER)	H-3	12	200	<LLD	<LLD	-		0
	GAMMA	12						
	MN-54		15	<LLD	<LLD	-		0

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DOCKET NUMBER: 50-373 & 50-374 2014
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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)	INDICATOR LOCATIONS MEAN (M) (F) RANGE	CONTROL LOCATION MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M): MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M): STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
GROUND WATER (PCI/LITER)	CO-58		15	<LLD	<LLD	-		0
	FE-59		30	<LLD	<LLD	-		0
	CO-60		15	<LLD	<LLD	-		0
	ZN-65		30	<LLD	<LLD	-		0
	NB-95		15	<LLD	<LLD	-		0
	ZR-95		30	<LLD	<LLD	-		0
	CS-134		15	<LLD	<LLD	-		0
	CS-137		18	<LLD	<LLD	-		0
	BA-140		60	<LLD	<LLD	-		0

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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)	INDICATOR LOCATIONS MEAN (M) (F) RANGE	CONTROL LOCATION MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M): MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M): STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
GROUND WATER (PCI/LITER)	LA-140		15	<LLD	<LLD	-		0
FISH (PCI/KG WET)	GAMMA	12						
	MN-54		130	<LLD	<LLD	-		0
	CO-58		130	<LLD	<LLD	-		0
	FE-59		260	<LLD	<LLD	-		0
	CO-60		130	<LLD	<LLD	-		0
	ZN-65		260	<LLD	<LLD	-		0
	NB-95		NA	<LLD	<LLD	-		0
	ZR-95		NA	<LLD	<LLD	-		0

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TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE LASALLE COUNTY STATION, 2014

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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)	INDICATOR LOCATIONS MEAN (M) (F) RANGE	CONTROL LOCATION MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M): MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M): STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
FISH (PCI/KG WET)	CS-134		130	<LLD	<LLD	-		0
	CS-137		150	<LLD	<LLD	-		0
	BA-140		NA	<LLD	<LLD	-		0
	LA-140		NA	<LLD	<LLD	-		0
SEDIMENT (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

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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)	INDICATOR LOCATIONS MEAN (M) (F) RANGE	CONTROL LOCATION MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M): MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M): STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SEDIMENT (PCI/KG DRY)	ZN-65		NA	<LLD	<LLD	-		0
	NB-95		NA	<LLD	<LLD	-		0
	ZR-95		NA	<LLD	<LLD	-		0
	CS-134		150	<LLD	<LLD	-		0
	CS-137		180	<LLD	156 (2/2) (146/166)	156 (2/2) (146/166)	L-21 CONTROL ILLINOIS RIVER AT SENECA - UPSTREAM 4.0 MILES NE OF SITE	0
	BA-140		NA	<LLD	<LLD	-		0
	LA-140		NA	<LLD	<LLD	-		0
AIR PARTICULATE (E-3 PCI/CU.METER)	GR-B	466	10	18 (412/414) (3/33)	18 (52/52) (6/29)	19 (52/52) (6/31)	L-07 INDICATOR SENECA 5.2 MILES NNE OF SITE	0

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DOCKET NUMBER: 50-373 & 50-374 2014
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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
	CS-134		50	<LLD	<LLD	-		0

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AIR PARTICULATE (E-3 PCI/CU.METER)	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	466						
	I-131		70	<LLD	<LLD	-		0
VEGETATION (PCI/KG WET)	GAMMA	10						
	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, 2014

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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

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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)	INDICATOR LOCATIONS MEAN (M) (F) RANGE	CONTROL LOCATION MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M) MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M) STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
DIRECT RADIATION (MILLIREM/QTR.)	OSLD-QUARTERLY	331	NA	23.5 (323/323) (16.2/30.0)	21.5 (8/8) (17.9/25.2)	26.4 (4/4) (20.9/30)	L-102-1 INDICATOR 0.6 MILES NNE	0

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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, 2014

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, 2014

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, 2014

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

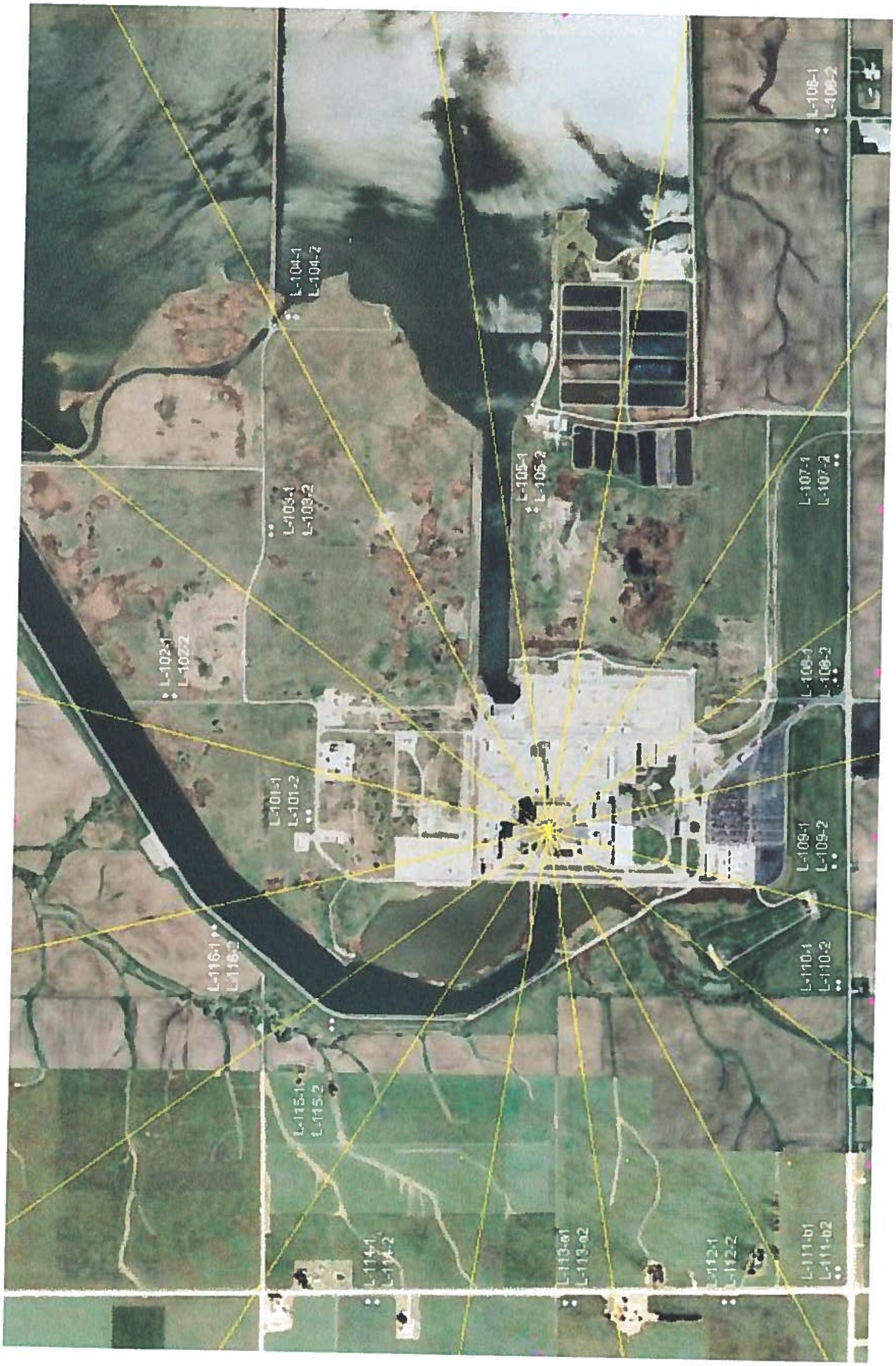


Figure B-1
Inner Ring OSLD Locations
of the LaSalle County Station, 2014

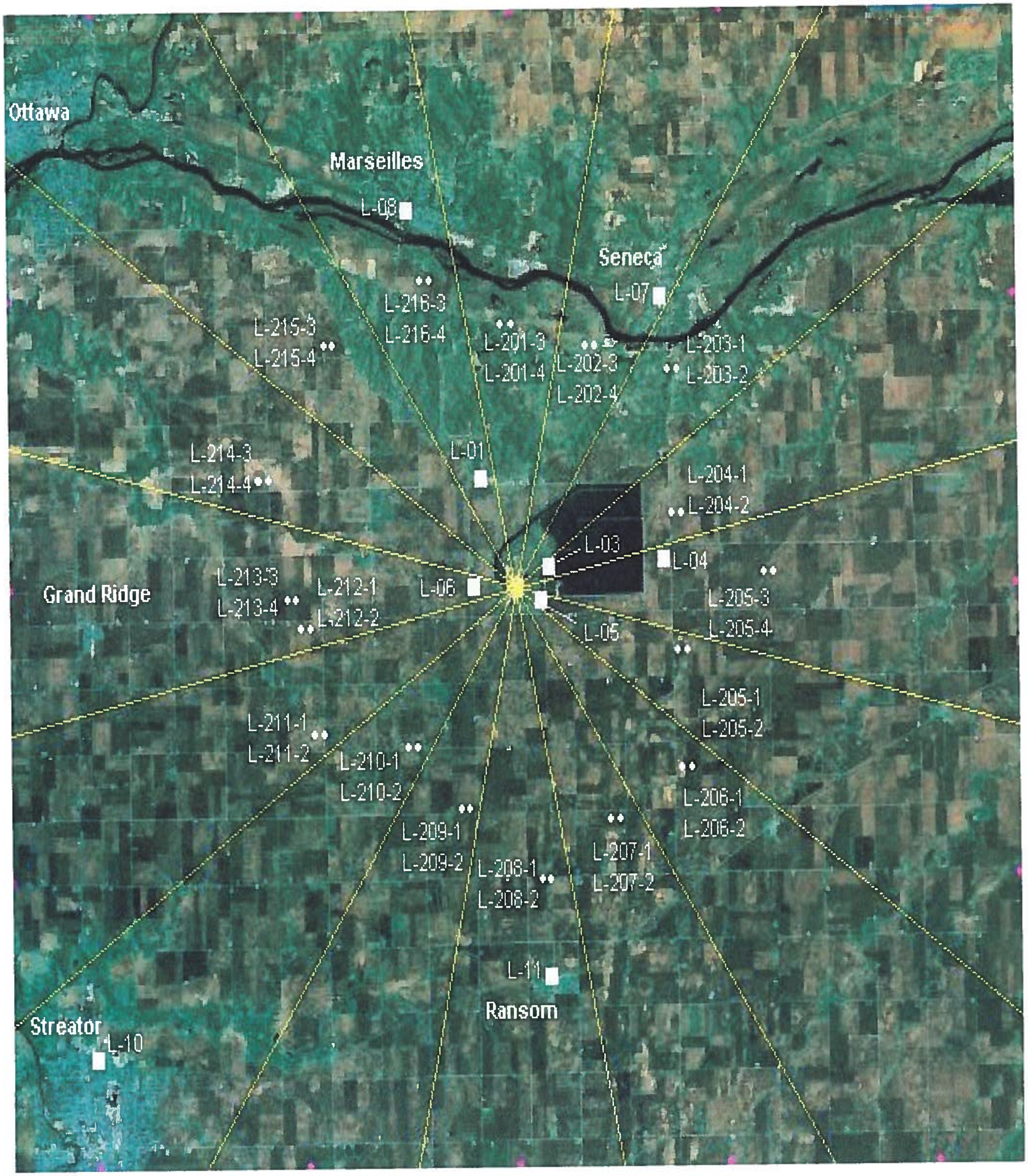


Figure B-2
Outer Ring OSLD Locations and Fixed Air Sampling Locations
of the LaSalle County Station, 2014

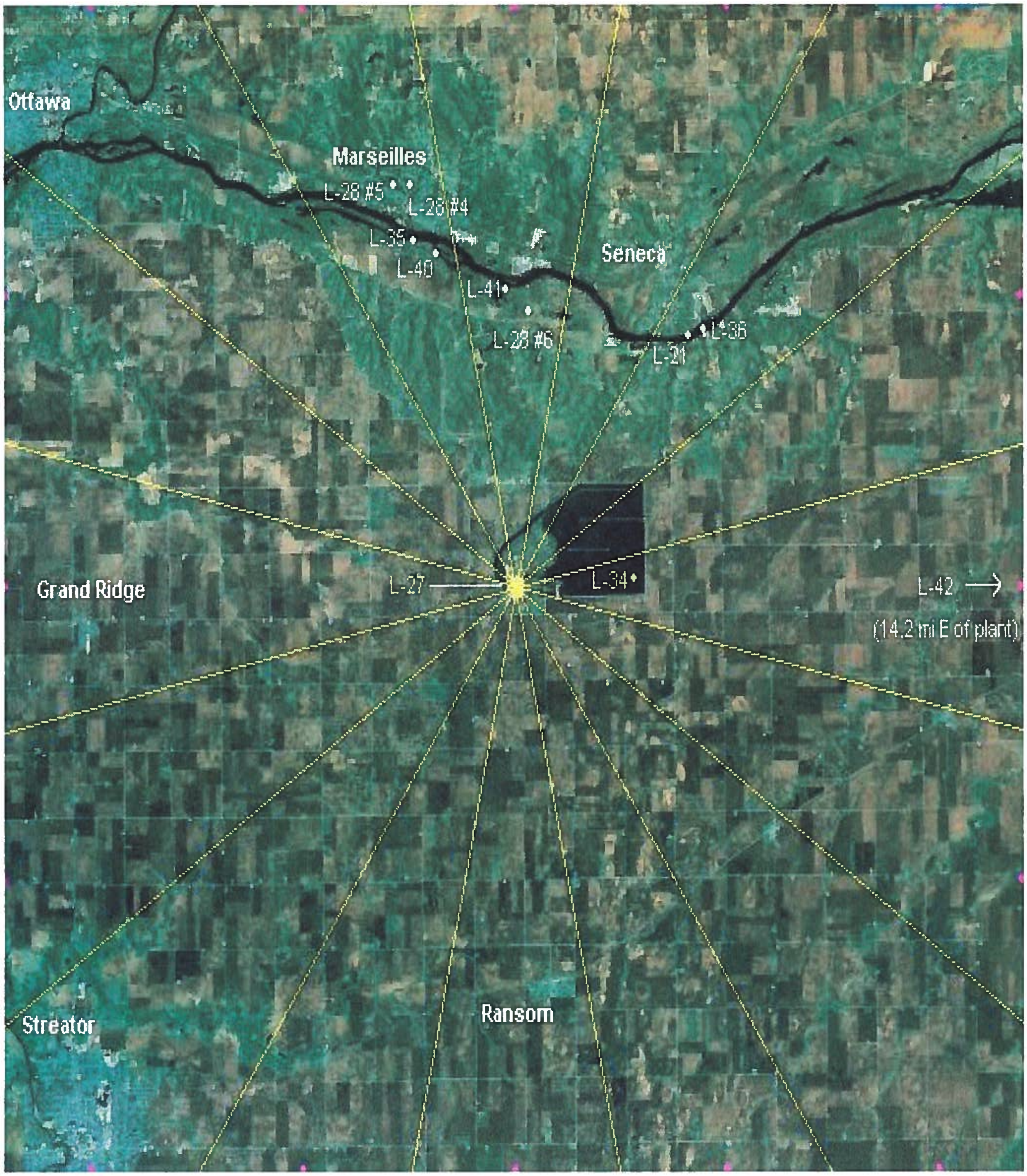


Figure B-3
Ingestion and Waterborne Exposure Pathway Sample Locations
of the LaSalle County Station, 2014

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, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	L-21		L-40	
01/02/14 - 01/30/14	10.8 ± 3.1		11.1 ± 3.1	
02/13/14 - 02/27/14	10.0 ± 2.4	(1)	10.7 ± 2.5	(1)
03/06/14 - 03/26/14	7.2 ± 2.2		6.0 ± 2.1	
04/03/14 - 04/24/14	4.3 ± 2.2		7.9 ± 2.6	
05/01/14 - 05/29/14	7.5 ± 2.6		9.2 ± 2.9	
06/05/14 - 06/25/14	4.3 ± 2.3		6.9 ± 2.7	
07/03/14 - 07/31/14	4.8 ± 2.1		5.7 ± 2.3	
08/07/14 - 08/27/14	4.2 ± 2.2		5.2 ± 2.3	
09/03/14 - 09/25/14	9.4 ± 2.8		10.6 ± 3.1	
10/01/14 - 10/30/14	5.0 ± 2.2		7.8 ± 2.6	
11/06/14 - 11/26/14	8.5 ± 2.5		7.7 ± 2.4	
12/04/14 - 12/31/14	7.8 ± 2.3		8.0 ± 2.4	
MEAN	7.0 ± 4.8		8.1 ± 4.0	

Table C-I.2 **CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	L-21		L-40	
01/02/14 - 03/26/14	327 ± 136	(1)	470 ± 146	(1)
04/03/14 - 06/25/14	393 ± 142		389 ± 139	
07/03/14 - 09/25/14	< 171		< 175	
10/01/14 - 12/31/14	< 188		< 187	
MEAN	360 ± 93		430 ± 115	

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, 2014**

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

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-II.1 **CONCENTRATIONS OF TRITIUM IN GROUND/WELL WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	L-27	L-28-W4	L-28-W5	L-28-W6
01/09/14 - 01/09/14	< 172	< 172	-	< 174
04/10/14 - 04/10/14	< 157	-	< 161	< 161
07/10/14 - 07/10/14	< 175	< 174	-	< 177
10/09/14 - 10/09/14	< 188	-	< 194	< 190
MEAN	-	-	-	-

Table C-II.2

CONCENTRATIONS OF GAMMA EMITTERS IN GROUND/WELL WATER SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2014

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
L-27	01/09/14 - 01/09/14	< 5	< 4	< 10	< 4	< 11	< 5	< 9	< 4	< 5	< 32	< 12
	04/10/14 - 04/10/14	< 3	< 3	< 8	< 3	< 7	< 3	< 6	< 3	< 3	< 24	< 7
	07/10/14 - 07/10/14	< 4	< 5	< 9	< 4	< 8	< 5	< 9	< 4	< 5	< 21	< 5
	10/09/14 - 10/09/14	< 5	< 6	< 11	< 6	< 10	< 6	< 11	< 6	< 7	< 36	< 10
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-28-W4	01/09/14 - 01/09/14	< 4	< 4	< 10	< 5	< 9	< 5	< 8	< 4	< 5	< 32	< 9
	07/10/14 - 07/10/14	< 4	< 4	< 8	< 4	< 7	< 5	< 8	< 5	< 5	< 24	< 6
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-28-W5	04/10/14 - 04/10/14	< 5	< 5	< 11	< 5	< 9	< 5	< 9	< 5	< 5	< 34	< 9
	10/09/14 - 10/09/14	< 5	< 4	< 12	< 6	< 11	< 6	< 9	< 6	< 6	< 38	< 11
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-28-W6	01/09/14 - 01/09/14	< 5	< 6	< 8	< 6	< 9	< 5	< 8	< 4	< 5	< 33	< 9
	04/10/14 - 04/10/14	< 4	< 5	< 10	< 5	< 9	< 4	< 8	< 4	< 5	< 31	< 9
	07/10/14 - 07/10/14	< 4	< 4	< 9	< 3	< 7	< 4	< 7	< 3	< 4	< 20	< 6
	10/09/14 - 10/09/14	< 5	< 6	< 10	< 6	< 11	< 5	< 8	< 4	< 5	< 25	< 11
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-III.1

CONCENTRATIONS OF GAMMA EMITTERS IN FISH SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2014

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												
Channel Catfish	05/06/14	< 60	< 68	< 171	< 65	< 117	< 68	< 116	< 57	< 46	< 926	< 334
Common Carp	05/06/14	< 49	< 65	< 130	< 52	< 109	< 65	< 105	< 50	< 43	< 856	< 250
Channel Catfish	10/08/14	< 18	< 19	< 47	< 17	< 37	< 21	< 37	< 18	< 19	< 169	< 44
Common Carp	10/08/14	< 24	< 27	< 59	< 22	< 49	< 31	< 49	< 26	< 26	< 243	< 57
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-35												
Quillback	05/06/14	< 59	< 71	< 151	< 48	< 104	< 64	< 121	< 60	< 50	< 862	< 243
Smallmouth Buffalo	05/06/14	< 39	< 36	< 106	< 54	< 75	< 40	< 80	< 35	< 36	< 565	< 203
Freshwater Drum	10/08/14	< 21	< 22	< 47	< 19	< 45	< 26	< 39	< 22	< 22	< 186	< 52
Smallmouth Buffalo	10/08/14	< 27	< 24	< 56	< 30	< 45	< 28	< 48	< 21	< 24	< 231	< 62
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-36												
Largemouth Bass	05/06/14	< 62	< 76	< 168	< 64	< 137	< 84	< 150	< 60	< 61	< 1197	< 297
Smallmouth Buffalo	05/06/14	< 66	< 93	< 206	< 65	< 156	< 92	< 133	< 76	< 75	< 1336	< 290
Freshwater Drum	10/08/14	< 24	< 26	< 56	< 21	< 51	< 29	< 49	< 26	< 25	< 239	< 59
Smallmouth Buffalo	10/08/14	< 22	< 22	< 58	< 26	< 44	< 23	< 47	< 20	< 24	< 222	< 70
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-IV.1 **CONCENTRATIONS OF GAMMA EMITTERS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2014**

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	05/01/14	< 92	< 90	< 223	< 102	< 173	< 95	< 157	< 68	146 ± 85	< 696	< 195
	10/01/14	< 113	< 127	< 313	< 127	< 214	< 140	< 204	< 108	166 ± 95	< 1115	< 328
	MEAN	-	-	-	-	-	-	-	-	156 ± 29	-	-
L-40	06/05/14	< 52	< 62	< 138	< 91	< 137	< 69	< 105	< 53	< 88	< 290	< 91
	10/01/14	< 82	< 89	< 219	< 79	< 231	< 108	< 183	< 85	< 111	< 859	< 238
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-41	05/01/14	< 43	< 52	< 139	< 42	< 92	< 51	< 84	< 38	< 48	< 396	< 124
	10/01/14	< 43	< 49	< 125	< 34	< 91	< 54	< 83	< 35	< 52	< 417	< 113
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-V.1 **CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2014**

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	
01/02/14 - 01/09/14	24 ± 5		23 ± 5		21 ± 5		27 ± 5	
01/09/14 - 01/16/14	23 ± 5		25 ± 5		20 ± 5		19 ± 4	
01/16/14 - 01/23/14	14 ± 4		12 ± 4		20 ± 5		18 ± 5	
01/23/14 - 01/30/14	17 ± 4	(1)	16 ± 4		14 ± 4		16 ± 4	
01/30/14 - 02/06/14	22 ± 5		29 ± 5		32 ± 5		23 ± 5	
02/06/14 - 02/13/14	23 ± 5		27 ± 5		23 ± 4		24 ± 5	
02/13/14 - 02/19/14	23 ± 5	(1)	23 ± 5		20 ± 5		19 ± 5	
02/19/14 - 02/27/14	30 ± 5	(1)	27 ± 5		25 ± 4		27 ± 5	
02/27/14 - 03/06/14	23 ± 5		22 ± 5		22 ± 5		23 ± 5	
03/06/14 - 03/13/14	21 ± 4		22 ± 4		25 ± 5		24 ± 5	
03/13/14 - 03/20/14	16 ± 4		10 ± 4		17 ± 4		14 ± 4	
03/20/14 - 03/26/14	17 ± 5		13 ± 4		18 ± 5		12 ± 4	
03/26/14 - 04/03/14	16 ± 4		15 ± 4		15 ± 4		15 ± 4	
04/03/14 - 04/10/14	15 ± 4		15 ± 4		16 ± 4		13 ± 4	
04/10/14 - 04/17/14	14 ± 4		15 ± 4		16 ± 4		14 ± 4	
04/17/14 - 04/24/14	20 ± 4		16 ± 4		18 ± 4		20 ± 4	
04/24/14 - 05/01/14	8 ± 3		11 ± 4		6 ± 3		11 ± 4	
05/01/14 - 05/08/14	13 ± 3		13 ± 3		13 ± 3		16 ± 4	
05/08/14 - 05/15/14	10 ± 4		3 ± 2		12 ± 4		9 ± 4	
05/15/14 - 05/22/14	13 ± 4		< 5		17 ± 4		18 ± 4	
05/22/14 - 05/29/14	12 ± 4		16 ± 4		13 ± 4		15 ± 4	
05/29/14 - 06/05/14	9 ± 4		18 ± 7	(1)	5 ± 2		14 ± 4	
06/05/14 - 06/12/14	10 ± 4		15 ± 4		10 ± 4		14 ± 4	
06/12/14 - 06/19/14	10 ± 5	(1)	15 ± 4		17 ± 4		16 ± 4	
06/19/14 - 06/25/14	(1)		16 ± 5	(1)	13 ± 4		13 ± 4	
06/25/14 - 07/03/14	(1)		8 ± 4		< 5		8 ± 4	
07/03/14 - 07/10/14	14 ± 4		15 ± 4		14 ± 4		17 ± 4	
07/10/14 - 07/17/14	17 ± 4		16 ± 4		16 ± 4		13 ± 4	
07/17/14 - 07/24/14	22 ± 5		19 ± 4		25 ± 5		25 ± 5	
07/24/14 - 07/31/14	17 ± 4		19 ± 4		18 ± 4		21 ± 4	
07/31/14 - 08/07/14	27 ± 5		26 ± 5		26 ± 5		21 ± 5	
08/07/14 - 08/14/14	14 ± 4		12 ± 4		17 ± 5		15 ± 5	
08/14/14 - 08/21/14	22 ± 5		18 ± 4		26 ± 5		23 ± 5	
08/21/14 - 08/27/14	16 ± 5		23 ± 5		15 ± 5		15 ± 5	
08/27/14 - 09/03/14	20 ± 5		17 ± 4		20 ± 5		17 ± 4	
09/03/14 - 09/10/14	13 ± 4		13 ± 4		17 ± 5		21 ± 5	
09/10/14 - 09/18/14	14 ± 4		13 ± 4		15 ± 4		14 ± 4	
09/18/14 - 09/25/14	23 ± 5		20 ± 5		24 ± 5		21 ± 5	
09/25/14 - 10/01/14	21 ± 5		28 ± 5		24 ± 5		26 ± 5	
10/01/14 - 10/09/14	15 ± 4		16 ± 4		20 ± 4		18 ± 4	
10/09/14 - 10/16/14	9 ± 4		10 ± 4		9 ± 4		12 ± 4	
10/16/14 - 10/23/14	17 ± 4		15 ± 4		16 ± 4		16 ± 4	
10/23/14 - 10/30/14	21 ± 5		25 ± 5		20 ± 4		25 ± 5	
10/30/14 - 11/06/14	16 ± 4		19 ± 4		17 ± 4		14 ± 4	
11/06/14 - 11/13/14	17 ± 4		16 ± 4		18 ± 4		14 ± 4	
11/13/14 - 11/20/14	16 ± 4		18 ± 4		20 ± 4		22 ± 5	
11/20/14 - 11/26/14	19 ± 5		25 ± 5		20 ± 5		21 ± 5	
11/26/14 - 12/04/14	24 ± 4		28 ± 5		22 ± 4		28 ± 5	
12/04/14 - 12/11/14	33 ± 5		26 ± 5		31 ± 5		30 ± 5	
12/11/14 - 12/18/14	23 ± 5		26 ± 5		24 ± 5		30 ± 5	
12/18/14 - 12/24/14	22 ± 5		21 ± 5		22 ± 5		25 ± 5	
12/24/14 - 12/31/14	20 ± 4		23 ± 4		24 ± 4		23 ± 4	
MEAN	18 ± 11		18 ± 12		19 ± 11		19 ± 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, 2014**

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

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

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, 2014**

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

GROUP I - NEAR-SITE LOCATIONS				GROUP II - FAR-FIELD LOCATIONS				GROUP III - FAR-FIELD LOCATIONS				GROUP IV - CONTROL LOCATION			
COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD	COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD	COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD	COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD
01/02/14 - 01/30/14	12	25	19 ± 10	01/02/14 - 01/30/14	14	27	19 ± 7	01/02/14 - 01/30/14	12	24	19 ± 7	01/02/14 - 01/30/14	12	26	18 ± 12
01/30/14 - 02/27/14	22	30	25 ± 6	01/30/14 - 02/27/14	19	32	24 ± 8	01/30/14 - 02/27/14	21	31	25 ± 6	01/30/14 - 02/27/14	21	29	25 ± 8
02/27/14 - 04/03/14	10	23	18 ± 9	02/27/14 - 04/03/14	12	25	19 ± 9	02/27/14 - 04/03/14	11	26	18 ± 9	02/27/14 - 04/03/14	14	22	18 ± 6
04/03/14 - 05/01/14	8	20	14 ± 7	04/03/14 - 05/01/14	6	20	14 ± 9	04/03/14 - 05/01/14	6	17	13 ± 6	04/03/14 - 05/01/14	6	18	14 ± 11
05/01/14 - 05/29/14	3	16	11 ± 8	05/01/14 - 05/29/14	9	18	14 ± 6	05/01/14 - 05/29/14	10	16	13 ± 4	05/01/14 - 05/29/14	10	17	14 ± 7
05/29/14 - 07/03/14	8	18	13 ± 8	05/29/14 - 07/03/14	5	17	12 ± 8	05/29/14 - 07/03/14	7	19	12 ± 7	05/29/14 - 07/03/14	9	14	12 ± 4
07/03/14 - 07/31/14	14	22	17 ± 5	07/03/14 - 07/31/14	13	25	19 ± 9	07/03/14 - 07/31/14	11	27	18 ± 9	07/03/14 - 07/31/14	14	23	18 ± 7
07/31/14 - 09/03/14	12	27	19 ± 10	07/31/14 - 09/03/14	15	26	19 ± 9	07/31/14 - 09/03/14	12	26	18 ± 8	07/31/14 - 09/03/14	15	26	21 ± 10
09/03/14 - 10/01/14	13	28	18 ± 11	09/03/14 - 10/01/14	14	26	20 ± 9	09/03/14 - 10/01/14	13	27	19 ± 9	09/03/14 - 10/01/14	15	29	20 ± 14
10/01/14 - 10/30/14	9	25	16 ± 10	10/01/14 - 10/30/14	9	25	17 ± 10	10/01/14 - 10/30/14	11	23	17 ± 8	10/01/14 - 10/30/14	15	24	17 ± 9
10/30/14 - 12/04/14	16	28	20 ± 9	10/30/14 - 12/04/14	14	28	19 ± 8	10/30/14 - 12/04/14	13	27	21 ± 9	10/30/14 - 12/04/14	16	24	20 ± 6
12/04/14 - 12/31/14	20	33	24 ± 8	12/04/14 - 12/31/14	22	31	26 ± 8	12/04/14 - 12/31/14	19	31	25 ± 8	12/04/14 - 12/31/14	19	29	25 ± 8
01/02/14 - 12/31/14	3	33	18 ± 11	01/02/14 - 12/31/14	5	32	19 ± 11	01/02/14 - 12/31/14	6	31	18 ± 11	01/02/14 - 12/31/14	6	29	18 ± 11

Table C-V.3 **CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2014**

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

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
L-01	01/02/14 - 04/03/14	< 1	< 4	< 9	< 2	< 4	< 3	< 6	< 2	< 1	< 288	< 106
	04/03/14 - 07/03/14	< 4	< 8	< 30	< 3	< 8	< 8	< 16	< 3	< 3	< 3258	< 1283
	07/03/14 - 10/01/14	< 4	< 8	< 28	< 3	< 11	< 11	< 17	< 4	< 2	< 1988	< 670
	10/01/14 - 12/31/14	< 4	< 7	< 23	< 4	< 10	< 8	< 14	< 4	< 3	< 841	< 329
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-03	01/02/14 - 04/03/14	< 2	< 4	< 14	< 2	< 8	< 4	< 8	< 2	< 2	< 445	< 175
	04/03/14 - 07/03/14	< 4	< 6	< 25	< 4	< 10	< 7	< 10	< 4	< 3	< 1406	< 538
	07/03/14 - 10/01/14	< 3	< 7	< 21	< 2	< 8	< 6	< 10	< 2	< 3	< 1369	< 822
	10/01/14 - 12/31/14	< 3	< 8	< 19	< 4	< 11	< 7	< 15	< 4	< 4	< 813	< 377
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-04	01/02/14 - 04/03/14	< 2	< 3	< 11	< 2	< 6	< 5	< 6	< 2	< 2	< 503	< 154
	04/03/14 - 07/03/14	< 2	< 5	< 18	< 3	< 5	< 6	< 9	< 3	< 3	< 930	< 319
	07/03/14 - 10/01/14	< 4	< 8	< 20	< 4	< 10	< 10	< 16	< 4	< 4	< 2236	< 517
	10/01/14 - 12/31/14	< 3	< 3	< 9	< 3	< 5	< 5	< 9	< 2	< 2	< 671	< 119
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-05	01/02/14 - 04/03/14	< 2	< 4	< 15	< 2	< 3	< 5	< 9	< 2	< 2	< 468	< 189
	04/03/14 - 07/03/14	< 3	< 7	< 21	< 5	< 8	< 7	< 17	< 3	< 4	< 1389	< 674
	07/03/14 - 10/01/14	< 3	< 4	< 8	< 3	< 8	< 6	< 9	< 2	< 2	< 872	< 438
	10/01/14 - 12/31/14	< 4	< 7	< 24	< 3	< 8	< 7	< 14	< 4	< 3	< 947	< 249
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-06	01/02/14 - 04/03/14	< 2	< 3	< 16	< 3	< 6	< 5	< 8	< 2	< 3	< 508	< 192
	04/03/14 - 07/03/14	< 3	< 7	< 24	< 3	< 7	< 6	< 12	< 3	< 2	< 973	< 433
	07/03/14 - 10/01/14	< 2	< 5	< 15	< 2	< 6	< 5	< 7	< 2	< 2	< 801	< 385
	10/01/14 - 12/31/14	< 2	< 2	< 7	< 2	< 3	< 3	< 5	< 1	< 1	< 279	< 79
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-V.3 CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2014

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

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
L-07	01/02/14 - 04/03/14	< 3	< 5	< 16	< 1	< 7	< 6	< 12	< 3	< 3	< 593	< 194
	04/03/14 - 07/03/14	< 4	< 5	< 15	< 3	< 7	< 6	< 12	< 4	< 3	< 1242	< 545
	07/03/14 - 10/01/14	< 3	< 3	< 27	< 2	< 7	< 6	< 12	< 3	< 2	< 1514	< 487
	10/01/14 - 12/31/14	< 2	< 3	< 10	< 3	< 3	< 3	< 4	< 1	< 1	< 332	< 122
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-08	01/02/14 - 04/03/14	< 3	< 5	< 17	< 3	< 8	< 7	< 13	< 4	< 3	< 559	< 259
	04/03/14 - 07/03/14	< 3	< 7	< 24	< 3	< 10	< 7	< 12	< 3	< 3	< 1575	< 356
	07/03/14 - 10/01/14	< 3	< 5	< 19	< 3	< 7	< 6	< 9	< 3	< 2	< 1101	< 350
	10/01/14 - 12/31/14	< 2	< 2	< 14	< 2	< 5	< 3	< 5	< 2	< 1	< 570	< 197
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-10	01/02/14 - 04/03/14	< 3	< 6	< 19	< 3	< 7	< 6	< 11	< 3	< 3	< 527	< 180
	04/03/14 - 07/03/14	< 2	< 5	< 20	< 2	< 6	< 5	< 8	< 2	< 2	< 1022	< 342
	07/03/14 - 10/01/14	< 5	< 11	< 27	< 4	< 11	< 11	< 17	< 4	< 4	< 1915	< 834
	10/01/14 - 12/31/14	< 3	< 5	< 16	< 2	< 6	< 5	< 7	< 2	< 2	< 594	< 124
	MEAN	-	-	-	-	-	-	-	-	-	-	-
L-11	01/02/14 - 04/03/14	< 2	< 3	< 15	< 3	< 5	< 5	< 6	< 2	< 2	< 448	< 87
	04/03/14 - 07/03/14	< 2	< 4	< 14	< 2	< 5	< 5	< 9	< 2	< 2	< 664	< 111
	07/03/14 - 10/01/14	< 3	< 4	< 15	< 2	< 5	< 5	< 8	< 2	< 2	< 1203	< 451
	10/01/14 - 12/31/14	< 2	< 3	< 14	< 2	< 5	< 4	< 7	< 2	< 2	< 489	< 189
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-VI.1 CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF LASALLE COUNTY STATION, 2014

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
01/02/14 - 01/09/14	< 27	< 27	< 27	< 32	< 27	< 32	< 32	< 13	< 32
01/09/14 - 01/16/14	< 23	< 23	< 23	< 18	< 23	< 18	< 11	< 19	< 19
01/16/14 - 01/23/14	< 27	< 27	< 26	< 16	< 26	< 49	< 49	< 49	< 49
01/23/14 - 01/30/14	< 70 (1)	< 65	< 67	< 69	< 67	< 69	< 69	< 69	< 24
01/30/14 - 02/06/14	< 50	< 50	< 50	< 55	< 50	< 56	< 54	< 22	< 56
02/06/14 - 02/13/14	< 65	< 65	< 37	< 64	< 65	< 61	< 61	< 25	< 61
02/13/14 - 02/19/14	< 61 (1)	< 52	< 21	< 51	< 60	< 66	< 65	< 55	< 56
02/19/14 - 02/27/14	< 41 (1)	< 43	< 22	< 43	< 38	< 49	< 49 (1)	< 55	< 55
02/27/14 - 03/06/14	< 30	< 30	< 18	< 30	< 30	< 33	< 33	< 33	< 33
03/06/14 - 03/13/14	< 25	< 58	< 59	< 58	< 59	< 49	< 49	< 48	< 49
03/13/14 - 03/20/14	< 55	< 55	< 21	< 54	< 54	< 64	< 61	< 63	< 61
03/20/14 - 03/26/14	< 65	< 55	< 50	< 55	< 38	< 65	< 67	< 59	< 57
03/26/14 - 04/03/14	< 25	< 67	< 25	< 67	< 59	< 47	< 47	< 53	< 54
04/03/14 - 04/10/14	< 64	< 27	< 64	< 64	< 63	< 66	< 66	< 65	< 66
04/10/14 - 04/17/14	< 34	< 34	< 34	< 37	< 35	< 38	< 38	< 16	< 38
04/17/14 - 04/24/14	< 67	< 69	< 69	< 27	< 69	< 66	< 65	< 65	< 65
04/24/14 - 05/01/14	< 34	< 35	< 34	< 38	< 34	< 38	< 38	< 21	< 38
05/01/14 - 05/08/14	< 54	< 53	< 53	< 52	< 53	< 22	< 53	< 52	< 52
05/08/14 - 05/15/14	< 32	< 32	< 32	< 12	< 32	< 36	< 36	< 36	< 36
05/15/14 - 05/22/14	< 67	< 66	< 66	< 52	< 66	< 53	< 32	< 53	< 53
05/22/14 - 05/29/14	< 68	< 66	< 35	< 68	< 68	< 55	< 55	< 57	< 57
05/29/14 - 06/05/14	< 36	< 66 (1)	< 36	< 41	< 36	< 42	< 41	< 41	< 17
06/05/14 - 06/12/14	< 35	< 35	< 15	< 35	< 35	< 32	< 32	< 32	< 32
06/12/14 - 06/19/14	(1)	< 56	< 55	< 34	< 55	< 35	< 34	< 14	< 34
06/19/14 - 06/25/14	(1)	< 54 (1)	< 51	< 51	< 51	< 58	< 56	< 55	< 55
06/25/14 - 07/03/14	(1)	< 33	< 13	< 33	< 32	< 39	< 39	< 41 (1)	< 66 (1)
07/03/14 - 07/10/14	< 31	< 31	< 31	< 25	< 31	< 26	< 25	< 11	< 27
07/10/14 - 07/17/14	< 69	< 69	< 27	< 69	< 69	< 70	< 69	< 69	< 70
07/17/14 - 07/24/14	< 44	< 44	< 44	< 44	< 44	< 43	< 43	< 43	< 43
07/24/14 - 07/31/14	< 13	< 34	< 34	< 34	< 34	< 37	< 37	< 36	< 36
07/31/14 - 08/07/14	< 57	< 58	< 57	< 22	< 62 (1)	< 64	< 63	< 63	< 63
08/07/14 - 08/14/14	< 21	< 21	< 21	< 21	< 9	< 32	< 32	< 32	< 32
08/14/14 - 08/21/14	< 55	< 55	< 21	< 55	< 55	< 57	< 57	< 56	< 56
08/21/14 - 08/27/14	< 24	< 63	< 63	< 63	< 63	< 62	< 62	< 62	< 62
08/27/14 - 09/03/14	< 66	< 66	< 66	< 26	< 66	< 69	< 69	< 69	< 69
09/03/14 - 09/10/14	< 66	< 66	< 66	< 28	< 66	< 68	< 67	< 67	< 67
09/10/14 - 09/18/14	< 50	< 50	< 21	< 50	< 50	< 66	< 66	< 65	< 66
09/18/14 - 09/25/14	< 49	< 49	< 48	< 62	< 48	< 26	< 62	< 63	< 62
09/25/14 - 10/01/14	< 50	< 51	< 21	< 50	< 50	< 55	< 53	< 53	< 53
10/01/14 - 10/09/14	< 36	< 36	< 36	< 32	< 36	< 33	< 18	< 33	< 33
10/09/14 - 10/16/14	< 67	< 68	< 26	< 67	< 68 (1)	< 69	< 69	< 70	< 70
10/16/14 - 10/23/14	< 28	< 28	< 28	< 43	< 28	< 44	< 44	< 44	< 18
10/23/14 - 10/30/14	< 30	< 30	< 30	< 23	< 30	< 24	< 24	< 9	< 24
10/30/14 - 11/06/14	< 33	< 33	< 33	< 32	< 32	< 33	< 32	< 18	< 32
11/06/14 - 11/13/14	< 29	< 29	< 11	< 29	< 29	< 32	< 32	< 32	< 32
11/13/14 - 11/20/14	< 63	< 61	< 25	< 63	< 63	< 67	< 67	< 67	< 67
11/20/14 - 11/26/14	< 44	< 44	< 44	< 18	< 43	< 43	< 40	< 43	< 43
11/26/14 - 12/04/14	< 17	< 43	< 43	< 43	< 43	< 48	< 49	< 49	< 49
12/04/14 - 12/11/14	< 55	< 55	< 28	< 55	< 55	< 43	< 43	< 42	< 42
12/11/14 - 12/18/14	< 62	< 63	< 62	< 62	< 24	< 27 (1)	< 61	< 61	< 61
12/18/14 - 12/24/14	< 46	< 46	< 48	< 21	< 46	< 15	< 44	< 42	< 42
12/24/14 - 12/31/14	< 35	< 15	< 35	< 35	< 35	< 15	< 26	< 27	< 27
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, 2014**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CONTROL FARM L-42

(1) Samples were not available in 2014

(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, 2014**

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

(1) Samples were not available in 2014

(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, 2014**

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													
Beets/kohlrabi	09/17/14	< 11	< 11	< 33	< 11	< 27	< 13	< 21	< 34	< 9	< 12	< 76	< 21
Kohlrabi leaves	09/17/14	< 9	< 10	< 22	< 9	< 21	< 11	< 18	< 29	< 9	< 9	< 67	< 20
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
L-QUAD 1													
Potatoes	09/17/14	< 12	< 13	< 31	< 14	< 26	< 14	< 26	< 43	< 12	< 14	< 93	< 18
Swiss chard	09/17/14	< 10	< 11	< 29	< 11	< 27	< 13	< 22	< 34	< 9	< 12	< 85	< 26
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
L-QUAD 2													
Beet greens	09/17/14	< 17	< 20	< 48	< 16	< 41	< 19	< 31	< 57	< 18	< 16	< 134	< 31
Beets	09/17/14	< 19	< 16	< 48	< 19	< 41	< 18	< 35	< 50	< 15	< 19	< 108	< 33
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
L-QUAD 3													
Beets	09/17/14	< 12	< 11	< 25	< 12	< 22	< 12	< 20	< 36	< 9	< 11	< 78	< 20
Swiss chard	09/17/14	< 10	< 13	< 28	< 13	< 32	< 13	< 20	< 35	< 10	< 12	< 77	< 25
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
L-QUAD 4													
Beets	09/17/14	< 11	< 11	< 29	< 11	< 28	< 11	< 23	< 32	< 10	< 11	< 68	< 16
Kale	09/17/14	< 14	< 14	< 35	< 14	< 38	< 14	< 27	< 41	< 13	< 12	< 91	< 28
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-IX.1 QUARTERLY OSLD RESULTS FOR LASALLE COUNTY STATION, 2014

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	23.7 ± 4.5	20.5	25.3	25.3	23.8
L-01-2	23.1 ± 7.2	18.3	26.8	24.4	23.0
L-03-1	23.0 ± 3.6	20.6	23.0	25.0	23.2
L-03-2	22.7 ± 4.6	19.3	24.3	23.3	24.0
L-04-1	23.0 ± 7.0	17.8	24.4	25.2	24.7
L-04-2	22.2 ± 6.3	17.5	22.9	24.4	23.8
L-05-1	22.8 ± 7.5	17.2	24.6	24.3	25.1
L-05-2	22.8 ± 4.3	20.0	22.4	23.7	25.1
L-06-1	24.4 ± 6.9	19.5	25.4	27.7	24.9
L-06-2	24.4 ± 4.4	21.7	23.5	26.8	25.4
L-07-1	24.8 ± 8.6	19.2	24.7	29.6	25.7
L-07-2	23.5 ± 6.0	19.2	24.5	26.1	24.2
L-08-1	23.2 ± 4.6	19.8	24.4	24.7	23.9
L-08-2	23.4 ± 6.4	18.7	23.8	25.0	25.9
L-10-1	21.6 ± 5.0	18.0	21.9	23.4	23.1
L-10-2	21.4 ± 6.1	17.9	20.6	21.8	25.2
L-11-1	21.9 ± 6.6	17.0	22.9	24.1	23.6
L-11-2	21.0 ± 3.2	18.7	21.5	22.2	21.7
L-101-1	24.6 ± 2.3	22.9	25.1	24.6	25.6
L-101-2	23.3 ± 7.0	18.2	24.2	26.2	24.7
L-102-1	26.4 ± 7.8	20.9	26.5	28.1	30.0
L-102-2	26.4 ± 6.0	22.7	25.1	28.7	29.0
L-103-1	23.4 ± 5.4	20.0	23.1	26.5	24.1
L-103-2	24.0 ± 6.1	19.5	24.6	25.7	26.1
L-104-1	22.7 ± 4.0	19.7	23.8	23.8	23.6
L-104-2	22.1 ± 5.4	18.5	21.6	23.3	24.8
L-105-1	24.6 ± 7.4	19.2	25.2	26.5	27.5
L-105-2	24.0 ± 6.3	19.3	25.2	25.4	26.1
L-106-1	23.5 ± 6.5	18.7	24.2	25.6	25.4
L-106-2	22.4 ± 5.7	19.0	21.0	25.0	24.4
L-107-1	24.4 ± 4.4	21.6	23.7	26.7	25.4
L-107-2	23.6 ± 3.5	21.3	23.8	25.5	23.9
L-108-1	24.9 ± 8.0	18.9	26.1	27.4	27.1
L-108-2	20.5 ± 4.5	17.3	20.7	21.7	22.4
L-109-1	23.4 ± 7.2	18.6	23.2	27.3	24.4
L-109-2	25.5 ± 6.6	21.2	25.7	29.3	25.7
L-110-1	23.2 ± 7.3	17.8	24.2	24.9	25.8
L-110-2	22.6 ± 7.9	16.9	22.9	25.4	25.2
L-112-1	21.9 ± 6.2	17.4	22.3	23.5	24.4
L-112-2	23.8 ± 5.6	20.0	23.9	26.7	24.4
L-114-1	24.5 ± 6.1	20.3	24.3	26.1	27.3
L-114-2	25.3 ± 4.5	22.0	26.7	26.8	25.7

Table C-IX.1 QUARTERLY OSLD RESULTS FOR LASALLE COUNTY STATION, 2014

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	22.7 ± 6.5	18.3	22.5	23.8	26.0
L-115-2	21.3 ± 5.7	17.2	23.3	21.4	23.1
L-116-1	21.7 ± 2.5	20.2	21.2	22.6	22.8
L-116-2	23.2 ± 4.7	19.8	24.1	24.0	25.0
L-201-3	21.0 ± 4.4	17.8	22.5	21.6	22.2
L-201-4	24.3 ± 7.2	19.0	25.7	27.0	25.5
L-202-3	21.9 ± 7.8	16.7	23.0	26.1	21.9
L-202-4	20.5 ± 5.2	17.2	20.0	23.4	21.3
L-203-1	23.6 ± 4.8	20.1	25.3	25.0	23.8
L-203-2	24.0 ± 6.1	19.8	23.7	26.7	25.8
L-204-1	24.3 ± 8.0	18.7	24.3	27.6	26.6
L-204-2	24.5 ± 7.2	19.1	26.2	26.1	26.5
L-205-1	23.7 ± 4.7	20.2	24.3	25.3	24.9
L-205-2	23.9 ± 6.3	20.4	22.1	27.0	26.1
L-205-3	25.1 ± 6.5	21.3	23.9	28.9	26.4
L-205-4	23.5 ± 5.4	19.7	25.4	23.4	25.4
L-206-1	24.6 ± 6.9	20.1	23.8	27.7	26.9
L-206-2	23.2 ± 9.4	16.2	24.7	25.9	25.9
L-207-1	22.0 ± 6.5	17.3	23.2	22.8	24.7
L-207-2	23.3 ± 7.5	18.8	22.9	23.4	28.0
L-208-1	22.6 ± 8.3	18.4	22.6	(1)	26.7
L-208-2	23.9 ± 8.7	19.4	24.1	(1)	28.1
L-209-1	23.0 ± 6.1	18.6	23.5	25.6	24.4
L-209-2	21.9 ± 6.6	18.3	22.8	(1)	24.7
L-210-1	24.0 ± 6.1	20.5	25.6	(1)	25.9
L-210-2	24.7 ± 7.5	19.1	27.0	26.7	26.0
L-211-1	25.3 ± 7.0	20.3	25.4	28.0	27.5
L-211-2	24.7 ± 8.4	18.7	25.0	26.8	28.2
L-212-1	24.7 ± 4.6	21.7	24.0	26.8	26.1
L-212-2	24.4 ± 4.3	23.3	23.1	27.6	23.6
L-213-3	22.8 ± 5.3	19.0	24.2	24.9	22.9
L-213-4	23.0 ± 9.0	17.3	23.3	28.3	23.1
L-214-3	23.0 ± 6.7	18.0	24.1	24.9	24.9
L-214-4	22.5 ± 7.5	17.3	24.6	25.7	22.2
L-215-3	24.6 ± 7.8	18.8	26.9	27.0	25.5
L-215-4	25.2 ± 4.8	21.8	25.2	27.3	26.4
L-216-3	24.4 ± 7.1	19.1	25.3	26.5	26.6
L-216-4	23.9 ± 8.8	18.9	25.7	27.1	(1)
L-111B-1	24.3 ± 5.4	20.7	24.2	25.2	27.1
L-111B-2	23.2 ± 5.1	19.6	23.7	25.6	23.8
L-113A-1	25.1 ± 7.7	20.8	23.1	27.0	29.4
L-113A-2	23.9 ± 5.8	19.8	24.2	25.4	26.3

(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, 2014

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	19.6 ± 3.1	19.1 ± 3.1	19.1 ± 2.6	18.0 ± 0.1
APR-JUN	23.9 ± 3.0	24.2 ± 2.9	24.0 ± 2.6	21.3 ± 1.8
JUL-SEP	25.5 ± 3.7	26.0 ± 3.5	25.1 ± 3.6	22.6 ± 2.3
OCT-DEC	25.5 ± 3.6	25.3 ± 3.7	24.3 ± 2.2	24.2 ± 3.0

TABLE C-IX.3 SUMMARY OF THE AMBIENT DOSIMETRY PROGRAM FOR LASALLE COUNTY STATION, 2014

RESULTS IN UNITS OF MILLIREM/QUARTER

LOCATION	SAMPLES ANALYZED	PERIOD MINIMUM	PERIOD MAXIMUM	PERIOD MEAN ± 2 S.D.
INNER RING	128	16.9	30.0	23.6 ± 5.9
OUTER RING	131	16.2	28.9	23.6 ± 6.3
OTHER	64	17.0	29.6	23.1 ± 5.5
CONTROL	8	17.9	25.2	21.5 ± 5.1

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

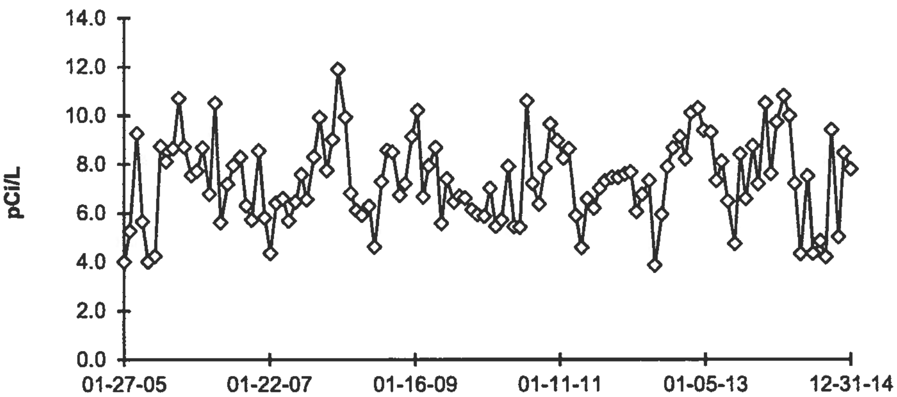
OUTER RING STATIONS - L-201-3, L-201-4, L-202-3, L-202-4, L-203-1, L-203-2, L-204-1, L-204-2, L-205-1, L-205-2, L-205-3, L-205-4, L-206-1, L-206-2, L-207-1, L-207-2, L-208-1, L-208-2, L-209-1, L-209-2, L-210-1, L-210-2, L-211-1, L-211-2, L-212-1, L-212-2, L-213-3, L-213-4, L-214-3, L-214-4, L-215-3, 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 - 2014

L-21 (C) Illinois River at Seneca



L-40 Illinois River Downstream

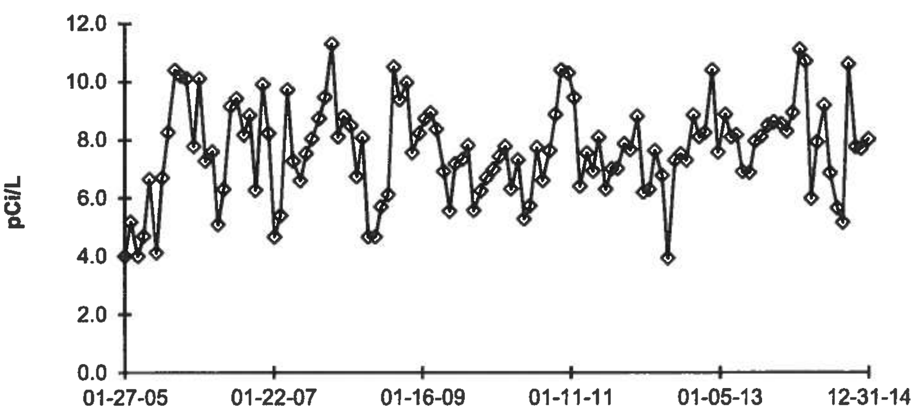
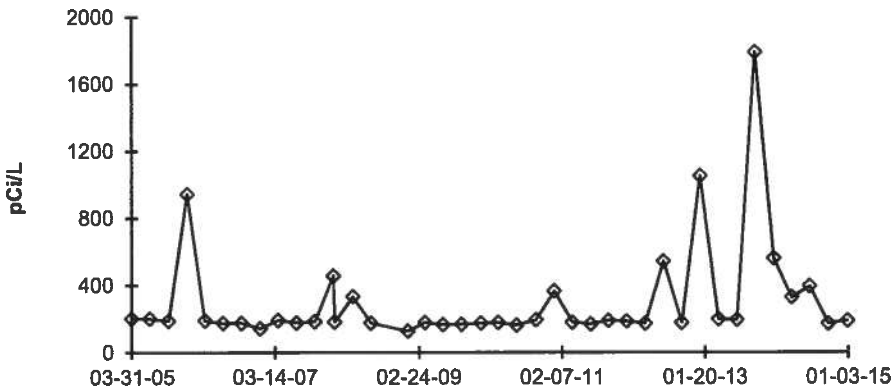


FIGURE C-2
Surface Water - Tritium - Stations L-21 (C) and L-40
Collected in the Vicinity of LSCS, 2005 - 2014

L-21 Illinois River at Seneca



L-40 Illinois River Downstream

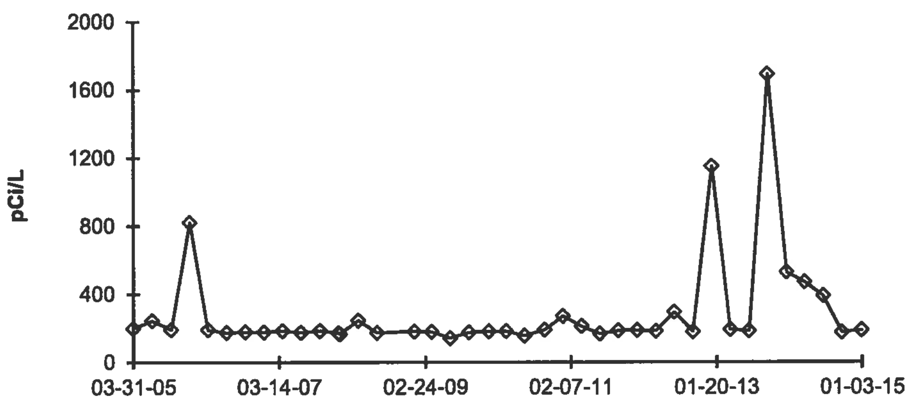
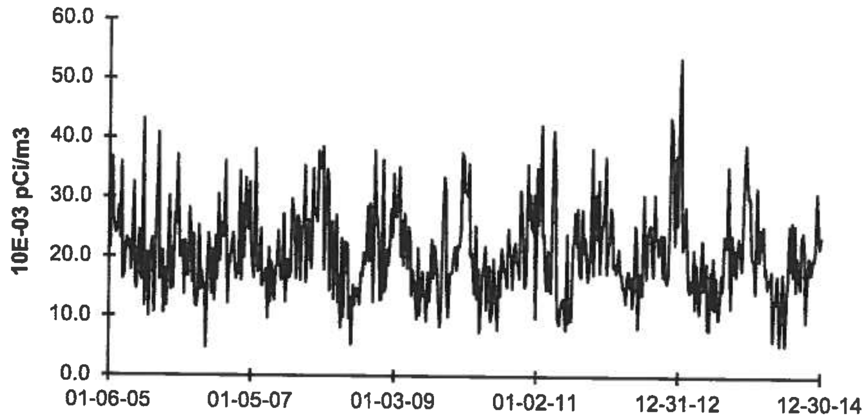


FIGURE C-3
Air Particulate - Gross Beta - Stations L-01 and L-03
Collected in the Vicinity of LSCS, 2005 - 2014

L-01 Nearsite No. 1



L-03 Onsite No. 3

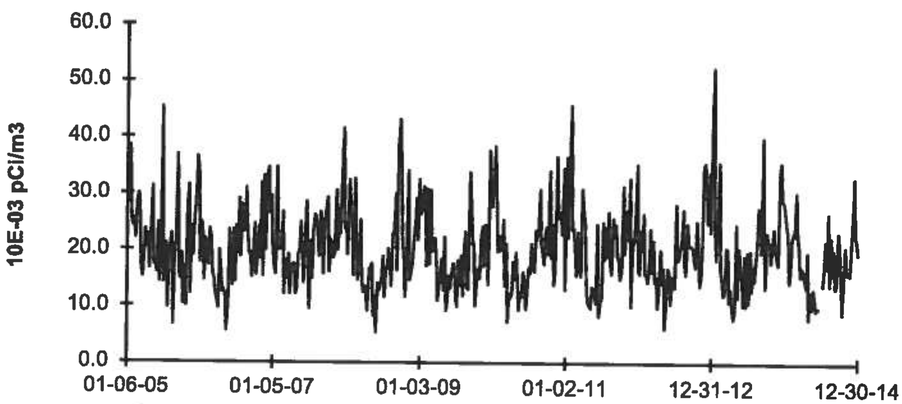
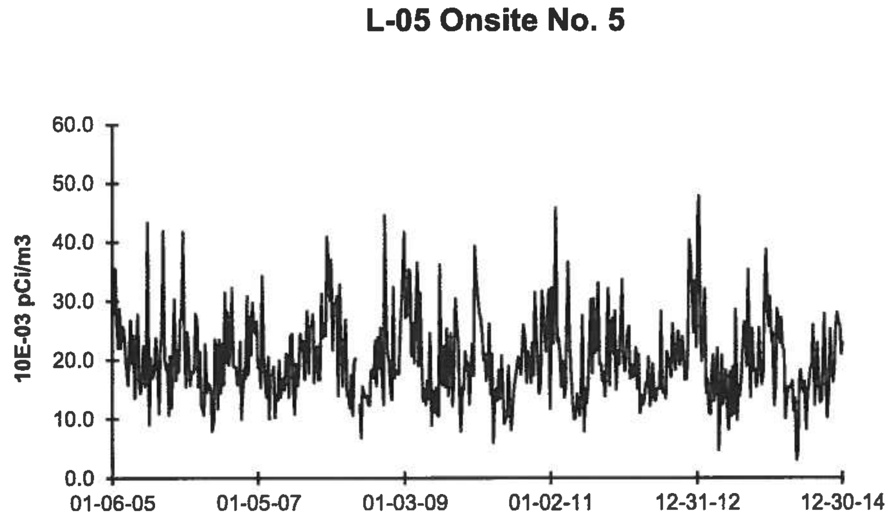


FIGURE C-4
Air Particulate - Gross Beta - Stations L-05 and L-06
Collected in the Vicinity of LSCS, 2005 - 2014



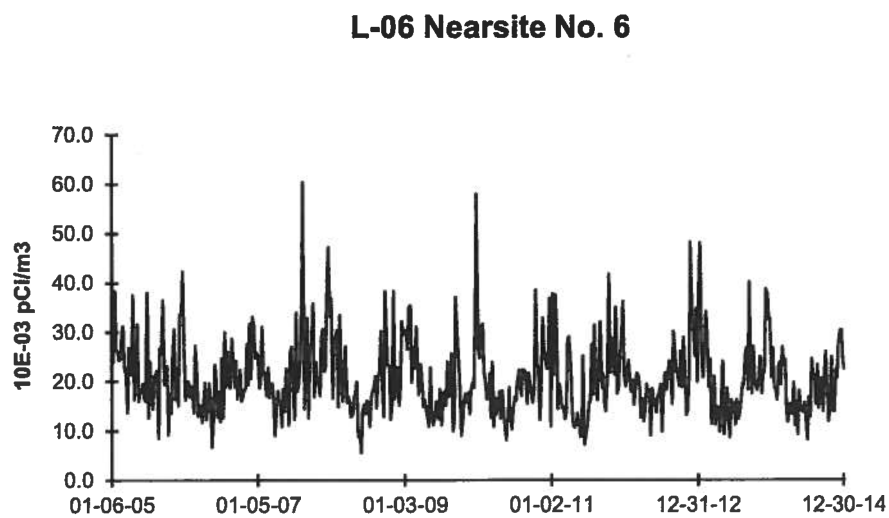


FIGURE C-5
Air Particulate - Gross Beta - Station L-10 (C) Collected in the Vicinity of LSCS, 2005 - 2014

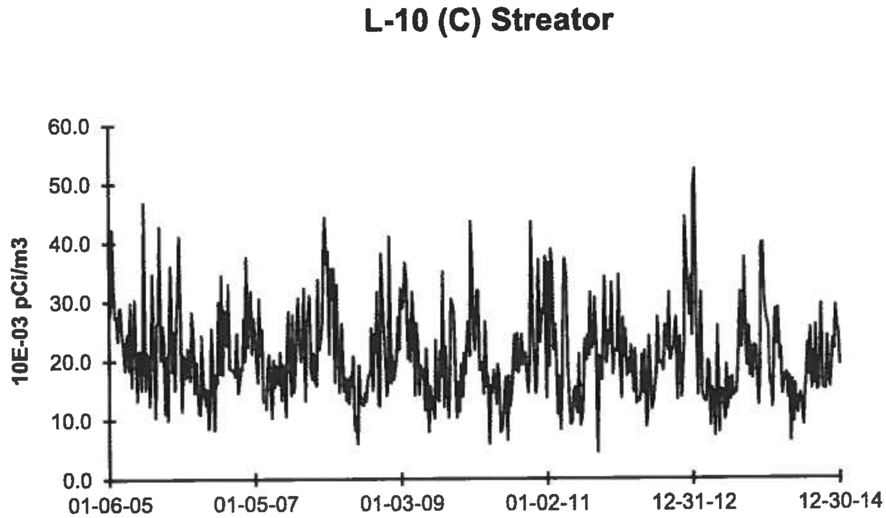
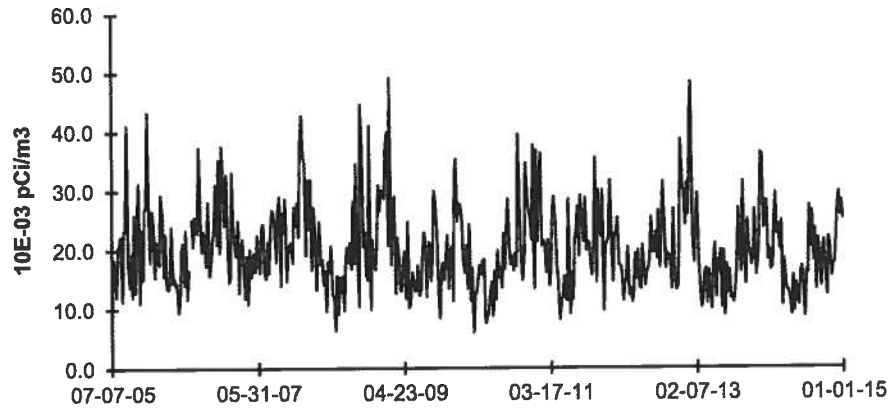


FIGURE C-6
Air Particulate - Gross Beta - Stations L-04 and L-07 Collected in the Vicinity of LSCS, 2005 - 2014

L-04 Rte. 170



L-07 Seneca

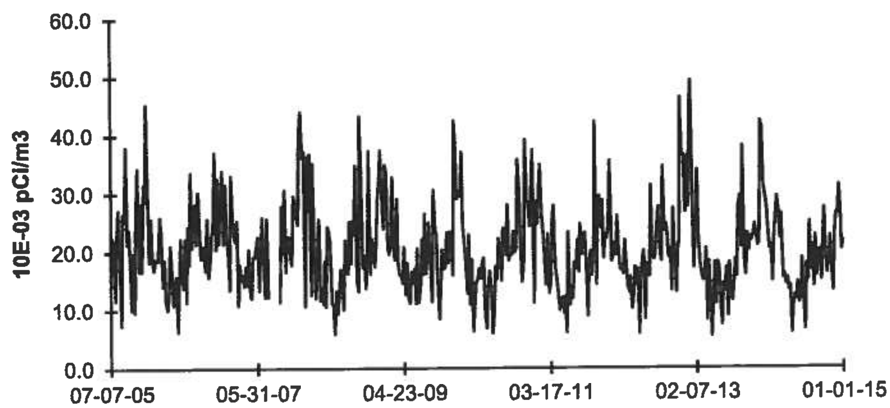
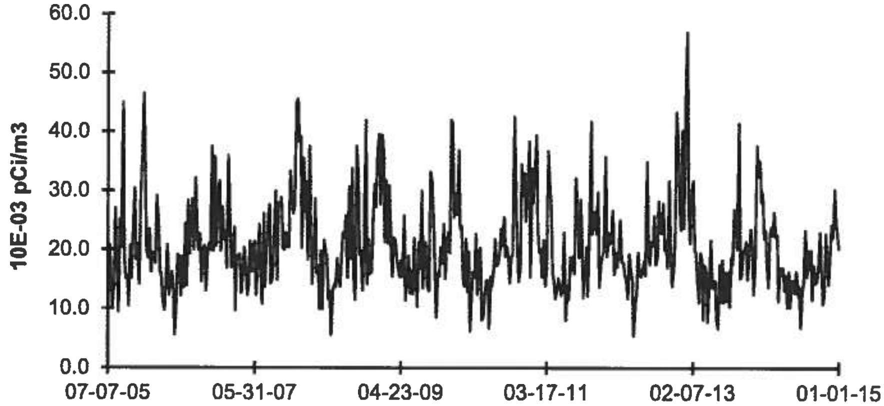
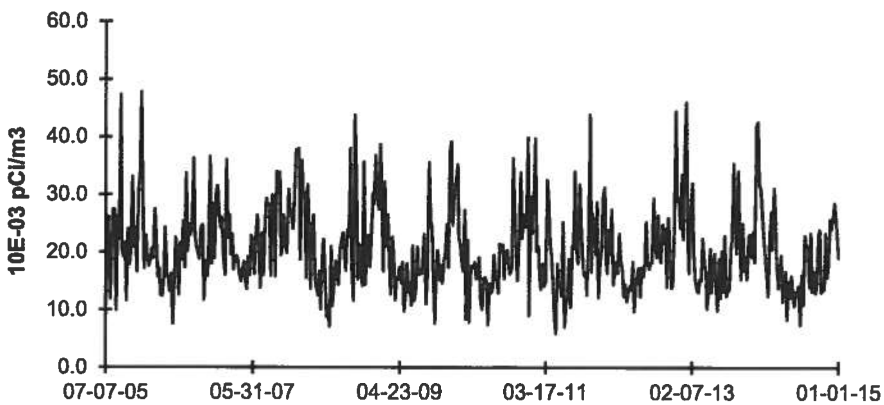


FIGURE C-7
Air Particulate - Gross Beta - Stations L-08 and L-11
Collected in the Vicinity of LSCS, 2005 - 2014

L-08 Marseilles



L-11 Ransom



APPENDIX D

INTER-LABORATORY COMPARISON PROGRAM

TABLE D-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2014
(PAGE 1 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
March 2014	E10854	Milk	Sr-89	pCi/L	95.1	91.7	1.04	A
			Sr-90	pCi/L	10.9	15.1	0.72	W
	E10855	Milk	I-131	pCi/L	96.6	98.5	0.98	A
			Ce-141	pCi/L	112	119	0.94	A
			Cr-51	pCi/L	449	491	0.91	A
			Cs-134	pCi/L	186	210	0.89	A
			Cs-137	pCi/L	250	253	0.99	A
			Co-58	pCi/L	248	268	0.93	A
			Mn-54	pCi/L	292	297	0.98	A
			Fe-59	pCi/L	230	219	1.05	A
			Zn-65	pCi/L	312	323	0.97	A
			Co-60	pCi/L	321	337	0.95	A
	E10857	AP	Ce-141	pCi	53.0	53.9	0.98	A
			Cr-51	pCi	232	223	1.04	A
			Cs-134	pCi	100	95.3	1.05	A
			Cs-137	pCi	122	115	1.06	A
			Co-58	pCi	122	121	1.01	A
			Mn-54	pCi	135	135	1.00	A
			Fe-59	pCi	111	99.3	1.12	A
			Zn-65	pCi	140	147	0.95	A
			Co-60	pCi	187	153	1.22	W
	E10856	Charcoal	I-131	pCi	74.1	76.4	0.97	A
	E10858	Water	Fe-55	pCi/L	2090	1760	1.19	A
June 2014	E10913	Milk	Sr-89	pCi/L	85.9	91.3	0.94	A
			Sr-90	pCi/L	13.8	14.5	0.95	A
	E10914	Milk	I-131	pCi/L	86.5	90.9	0.95	A
			Ce-141	pCi/L	111	124	0.90	A
			Cr-51	pCi/L	255	253	1.01	A
			Cs-134	pCi/L	147	162	0.91	A
			Cs-137	pCi/L	123	120	1.03	A
			Co-58	pCi/L	105	112	0.94	A
			Mn-54	pCi/L	155	156	0.99	A
			Fe-59	pCi/L	106	102	1.04	A
			Zn-65	pCi/L	251	252	1.00	A
			Co-60	pCi/L	218	224	0.97	A
	E10916	AP	Ce-141	pCi	95.1	92.6	1.03	A
			Cr-51	pCi	215	190	1.13	A
			Cs-134	pCi	122	122	1.00	A
			Cs-137	pCi	95.1	89.8	1.06	A
			Co-58	pCi	88.7	84.1	1.05	A
			Mn-54	pCi	115	116	0.99	A
			Fe-59	pCi	72.6	76.7	0.95	A
			Zn-65	pCi	193	189	1.02	A
			Co-60	pCi	179	168	1.07	A
	E10915	Charcoal	I-131	pCi	85.6	85.2	1.00	A
	E10917	Water	Fe-55	pCi/L	1680	1810	0.93	A

TABLE D-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2014
(PAGE 2 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
September 2014	E10946	Milk	Sr-89	pCi/L	90.7	96.9	0.94	A
			Sr-90	pCi/L	14.0	16.4	0.85	A
	E10947	Milk	I-131	pCi/L	92.0	97.6	0.94	A
			Ce-141	pCi/L	117	126	0.93	A
			Cr-51	pCi/L	281	288	0.98	A
			Cs-134	pCi/L	141	158	0.89	A
			Cs-137	pCi/L	186	193	0.96	A
			Co-58	pCi/L	137	143	0.96	A
			Mn-54	pCi/L	138	142	0.97	A
			Fe-59	pCi/L	162	158	1.03	A
			Zn-65	pCi/L	75.2	73.0	1.03	A
			Co-60	pCi/L	286	297	0.96	A
	E10949	AP	Ce-141	pCi	97.8	82.1	1.19	A
			Cr-51	pCi	212	188	1.13	A
			Cs-134	pCi	106	103	1.03	A
			Cs-137	pCi	131	126	1.04	A
			Co-58	pCi	85.7	93.0	0.92	A
			Mn-54	pCi	92.8	92.3	1.01	A
			Fe-59	pCi	113	103	1.10	A
			Zn-65	pCi	53.2	47.5	1.12	A
			Co-60	pCi	202	193	1.05	A
	E10948	Charcoal	I-131	pCi	83.9	89.8	0.93	A
	E10950	Water	Fe-55	pCi/L	2010	1720	1.17	A
	E10951	Soil	Ce-141	pCi/g	0.208	0.186	1.12	A
			Cr-51	pCi/g	0.398	0.425	0.94	A
			Cs-134	pCi/g	0.216	0.233	0.93	A
			Cs-137	pCi/g	0.398	0.365	1.09	A
			Co-58	pCi/g	0.197	0.211	0.93	A
			Mn-54	pCi/g	0.242	0.209	1.16	A
			Fe-59	pCi/g	0.238	0.233	1.02	A
			Zn-65	pCi/g	0.117	0.108	1.08	A
			Co-60	pCi/g	0.447	0.438	1.02	A
December 2014	E11078	Milk	Sr-89	pCi/L	85.7	95.7	0.90	A
			Sr-90	pCi/L	12.9	15.6	0.83	A
	E11079	Milk	I-131	pCi/L	85.9	95.1	0.90	A
			Ce-141	pCi/L	205	219	0.94	A
			Cr-51	pCi/L	402	406	0.99	A
			Cs-134	pCi/L	156	164	0.95	A
			Cs-137	pCi/L	194	198	0.98	A
			Co-58	pCi/L	122	130	0.94	A
			Mn-54	pCi/L	220	225	0.98	A
			Fe-59	pCi/L	183	175	1.05	A
			Zn-65	pCi/L	287	297	0.97	A
			Co-60	pCi/L	224	235	0.95	A

TABLE D-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2014
(PAGE 3 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
December 2014	E11081	AP	Ce-141	pCi	96.4	102	0.95	A
			Cr-51	pCi	171	190	0.90	A
			Cs-134	pCi	73.1	76.9	0.95	A
			Cs-137	pCi	99.0	92.6	1.07	A
			Co-58	pCi	57.5	60.8	0.95	A
			Mn-54	pCi	107	105	1.02	A
			Fe-59	pCi	74.2	81.6	0.91	A
			Zn-65	pCi	144	139	1.04	A
			Co-60	pCi	114	110	1.04	A
	E11080	Charcoal	I-131	pCi	93.5	98.2	0.95	A
	E11082	Water	Fe-55	pCi/L	1760	1970	0.89	A

(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 ERA ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM

TELEDYNE BROWN ENGINEERING, 2014

(PAGE 1 OF 1)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Limits	Evaluation (c)
May 2014	RAD-97	Water	Sr-89	pCi/L	38.25	36.7	27.5 - 43.6	A
			Sr-90	pCi/L	24.65	26.5	19.2 - 30.9	A
			Ba-133	pCi/L	89.1	87.9	74.0 - 96.7	A
			Cs-134	pCi/L	45.55	44.3	35.5 - 48.7	A
			Cs-137	pCi/L	91.15	89.1	80.2 - 101	A
			Co-60	pCi/L	65.10	64.2	57.8 - 73.1	A
			Zn-65	pCi/L	244	235	212 - 275	A
			Gr-A	pCi/L	45.65	61.0	31.9 - 75.8	A
			Gr-B	pCi/L	27.95	33.0	21.4 - 40.7	A
			I-131	pCi/L	23.75	25.7	21.3 - 30.3	A
			U-Nat	pCi/L	9.61	10.2	7.95 - 11.8	A
			H-3	pCi/L	8435	8770	7610 - 9650	A
	MRAD-20	Filter	Gr-A	pCi/filter	28.0	46.0	15.4 - 71.4	A
November 2014	RAD-99	Water	Sr-89	pCi/L	30.4	31.4	22.8 - 38.1	A
			Sr-90	pCi/L	18.6	21.8	15.6 - 25.7	A
			Ba-133	pCi/L	46.8	49.1	40.3 - 54.5	A
			Cs-134	pCi/L	88.0	89.8	73.7 - 98.8	A
			Cs-137	pCi/L	99.0	98.8	88.9 - 111	A
			Co-60	pCi/L	92.5	92.1	82.9 - 104	A
			Zn-65	pCi/L	325	310	279 - 362	A
			Gr-A	pCi/L	29.9	37.6	19.4 - 48.1	A
			Gr-B	pCi/L	27.5	27.4	17.3 - 35.3	A
			I-131	pCi/L	15.8	20.3	16.8 - 24.4	N (1)
			U-Nat	pCi/L	5.74	5.80	4.34 - 6.96	A
			H-3	pCi/L	6255	6880	5940 - 7570	A
	MRAD-21	Filter	Gr-A	pCi/filter	27.3	36.9	12.4 - 57.3	A

*(1) The **Iodine-131** was evaluated as failed with a ratio of 0.778. No cause could be found for the slightly low activity. TBE would evaluate this as acceptable with warning. A rerun was not possible due to I-131 decay. All other ERA Iodine-131 evaluations since 2004 have been acceptable. NCR 14-08*

(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-3 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
TELEDYNE BROWN ENGINEERING, 2014
(PAGE 1 OF 2)

Month/Year	Identification Number	Media	Nuclide*	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
March 2014	14-MaW30	Water	Am-241	Bq/L	0.764	0.720	0.504 - 0.936	A
			Cs-134	Bq/L	20.7	23.1	16.2 - 30 0	A
			Cs-137	Bq/L	28.0	28.9	20.2 - 37.6	A
			Co-57	Bq/L	26.5	27.5	19.3 - 35.8	A
			Co-60	Bq/L	15.6	16.0	11.2 - 20.8	A
			H-3**	Bq/L	NR	321	225 - 417	N (3)
			Mn-54	Bq/L	13.5	13.9	9.7 - 18.1	A
			Ni-63	Bq/L	NR	34.0	23.8 - 44.2	N (3)
			Pu-238	Bq/L	0.911	0.828	0.580 - 1.076	
			Pu-239/240	Bq/L	0.751	0.676	0.473 - 0.879	
			K-40	Bq/L	NR		(1)	N (3)
			Sr-90**	Bq/L	NR	8.51	5.96 - 11.06	N (3)
			U-234/233**	Bq/L	NR	0.225	0.158 - 0.293	N (3)
			U-238**	Bq/L	NR	1.45	1.02 - 1.89	N (3)
			Zn-65	Bq/L	-0.201		(1)	A
	14-MaS30	Soil	Cs-134	Bq/kg	2.02		(1)	A
			Cs-137	Bq/kg	1300	1238	867 - 1609	A
			Co-57	Bq/kg	1069	966	676 - 1256	A
			Co-60	Bq/kg	1.32	1.22	(2)	A
			Mn-54	Bq/kg	1510	1430	1001 - 1859	A
			K-40	Bq/kg	669	622	435 - 809	A
			Sr-90	Bq/kg	4.14		(1)	A
			Zn-65	Bq/kg	763	695	487 - 904	A
	14-RdF30	AP	Cs-134**	Bq/sample	NR	1.91	1.34 - 2.48	N (3)
			Cs-137**	Bq/sample	NR	1.76	1.23 - 2.29	N (3)
			Co-57**	Bq/sample	NR		(1)	N (3)
			Co-60**	Bq/sample	NR	1.39	0.97 - 1.81	N (3)
			Mn-54**	Bq/sample	NR		(1)	N (3)
			Sr-90	Bq/sample	0.8220	1.18	0.83 - 1.53	N (3)
			Zn-65**	Bq/sample	NR		(1)	N (3)
	14-GrF30	AP	Gr-A	Bq/sample	0.606	1.77	0.53 - 3.01	A
			Gr-B	Bq/sample	0.7507	0.77	0.39 - 1.16	A
	14-RdV30	Vegetation	Cs-134	Bq/sample	5.96	6.04	4.23 - 7.85	A
			Cs-137	Bq/sample	5.06	4.74	3.32 - 6.16	A
			Co-57	Bq/sample	11.8	10.1	7.1 - 13.1	A
			Co-60	Bq/sample	7.34	6.93	4.85 - 9.01	A
			Mn-54	Bq/sample	8.95	8.62	6.03 - 11.21	A
			Sr-90	Bq/sample	1.23	1.46	1.02 - 1.90	A
			Zn-65	Bq/sample	8.91	7.86	5.50 - 10.22	A

TABLE D-3 **DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)**
TELEDYNE BROWN ENGINEERING, 2014
(PAGE 2 OF 2)

Month/Year	Identification Number	Media	Nuclide*	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
September 2014	14-MaW31	Water	Am-241	Bq/L	0.705	0.88	0.62 - 1.14	A
			Cs-134***	Bq/L	NR		(1)	N (4)
			Cs-137***	Bq/L	NR	18.4	12.9 - 23.9	N (4)
			Co-57***	Bq/L	NR	24.7	17.3 - 32.1	N (4)
			Co-60***	Bq/L	NR	12.4	8.7 - 16.1	N (4)
			Mn-54***	Bq/L	NR	14.0	9.8 - 18.2	N (4)
			Ni-63	Bq/L	24.07	24.6	17.2 - 32.0	A
			Pu-238	Bq/L	0.591	0.618	0.433 - 0.803	A
			Pu-239/240	Bq/L	0.0153	0.0048	(2)	A
			K-40***	Bq/L	NR	161	113 - 209	N (4)
			Zn-65***	Bq/L	NR	10.9	7.6 - 14.2	N (4)
	14-MaS31	Soil	Cs-134***	Bq/kg	NR	622	435 - 809	N (4)
			Cs-137***	Bq/kg	NR		(1)	N (4)
			Co-57***	Bq/kg	NR	1116	781 - 1451	N (4)
			Co-60***	Bq/kg	NR	779	545 - 1013	N (4)
			Mn-54***	Bq/kg	NR	1009	706 - 1312	N (4)
			K-40***	Bq/kg	NR	824	577 - 1071	N (4)
			Sr-90	Bq/kg	694	858	601 - 1115	A
			Zn-65***	Bq/kg	NR	541	379 - 703	N (4)
	14-RdF31	AP	Sr-90	Bq/sample	0.310	0.703	0.492 - 0.914	N (4)
	14-GrF31	AP	Gr-A	Bq/sample	0.153	0.53	0.16 - 0.90	N (4)
			Gr-B	Bq/sample	0.977	1.06	0.53 - 1.59	A
September 2014	14-RdV31	Vegetation	Cs-134	Bq/sample	7.31	7.38	5.17 - 9.59	A
			Cs-137	Bq/sample	8.93	8.14	5.70 - 10.58	A
			Co-57	Bq/sample	10.8	9.2	6.4 - 12.0	A
			Co-60	Bq/sample	6.31	6.11	4.28 - 7.94	A
			Mn-54	Bq/sample	7.76	7.10	4.97 - 9.23	A
			Sr-90	Bq/sample	0.738	0.85	0.60 - 1.11	A
			Zn-65	Bq/sample	7.16	6.42	4.49 - 8.35	A

* The MAPEP cross check isotope list has been reduced due to duplication of effort or analysis not being performed for clients.

** These nuclides are no longer part of the TBE cross check program due to duplication of effort or analysis not being performed for clients. MAPEP evaluates non-reported analyses as failed if they were reported in the previous series.

*** All future gamma cross check samples for these isotopes will be provided by Analytics.

(1) False positive test.

(2) Sensitivity evaluation.

*(3) **Water, Ni-63** overlooked when reporting, but the result of 32.7 +- 1.69 would have passed the acceptance criteria. NCR 14-04*
__Water__, the non-detected __K-40__ was overlooked when reporting, but would have passed the false positive test. NCR 14-04
__AP, Sr-90__ rerun was within the low range of the acceptqance criteria. The original and rerun results were statistically the same. No cause could be identified for the slightly low Sr-90 activity. NCR 14-04
For non reported (NR) analyses, MAPEP evaluates as failed if they were reported in the previous series. NCR 14-04

*(4) **AP, Sr-90** gravimetric yield was very high at 117%. Could indicate larger than normal amounts of calcium in the AP. A second fuming HNO_3 separation would be required to remove the excess calcium. NCR 14-09*
__AP, Gr-Alpha__ was counted on the wrong side. When flipped over and recounted the results were acceptable. NCR 14-09
For non reported (NR) analyses, MAPEP evaluates as failed if they were reported in the previous series. NCR 14-09

(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-4

ERA STATISTICAL SUMMARY PROFICIENCY TESTING PROGRAM[a]
ENVIRONMENTAL, INC., 2014
(Page 1 of 1)

Lab Code	Date	Concentration (pCi/L)				
		Analysis	Laboratory Result b	ERA Result c	Control Limits	Acceptance
ERW-1384	4/7/2014	Sr-89	40.29 ± 5.76	36.70	27.50 - 43.60	Pass
ERW-1384	4/7/2014	Sr-90	24.08 ± 2.35	26.50	19.20 - 30.90	Pass
ERW-1385	4/7/2014	Ba-133	78.23 ± 3.93	87.90	74.00 - 96.70	Pass
ERW-1385	4/7/2014	Co-60	62.75 ± 3.53	64.20	57.80 - 73.10	Pass
ERW-1385	4/7/2014	Cs-134	44.97 ± 3.99	44.30	35.50 - 48.70	Pass
ERW-1385	4/7/2014	Cs-137	88.54 ± 4.93	89.10	80.20 - 101.00	Pass
ERW-1385	4/7/2014	Zn-65	249.1 ± 10.44	235.0	212.0 - 275.0	Pass
ERW-1388	4/7/2014	Gr. Alpha	56.70 ± 2.47	61.00	31.90 - 75.80	Pass
ERW-1388	4/7/2014	Gr. Beta	32.10 ± 1.20	33.00	21.40 - 40.70	Pass
ERW-1391	4/7/2014	I-131	25.52 ± 1.12	25.70	21.30 - 30.30	Pass
ERW-1394	4/7/2014	Uranium	10.76 ± 0.74	10.20	7.95 - 11.80	Pass
ERW-1397	4/7/2014	H-3	8982 ± 279	8770	7610 - 9650	Pass
ERW-5382	10/6/2014	Sr-89	29.40 ± 5.32	31.40	22.80 - 38.10	Pass
ERW-5382	10/6/2014	Sr-90	19.19 ± 1.85	21.80	15.60 - 25.70	Pass
ERW-5385	10/6/2014	Ba-133	43.54 ± 4.54	49.10	40.30 - 54.50	Pass
ERW-5385	10/6/2014	Cs-134	81.95 ± 7.49	89.80	73.70 - 98.80	Pass
ERW-5385	10/6/2014	Cs-137	95.76 ± 5.50	98.80	88.90 - 111.00	Pass
ERW-5385	10/6/2014	Co-60	90.25 ± 2.77	92.10	82.90 - 104.00	Pass
ERW-5385	10/6/2014	Zn-65	327.4 ± 23.3	310.00	279.0 - 362.0	Pass
ERW-5388	10/6/2014	Gr. Alpha	30.88 ± 8.05	37.60	19.40 - 46.10	Pass
ERW-5388	10/6/2014	G. Beta	20.47 ± 4.75	27.40	17.30 - 35.30	Pass
ERW-5392	10/6/2014	I-131	19.58 ± 2.35	20.30	16.80 - 24.40	Pass
ERW-5394	10/6/2014	Uranium	5.51 ± 0.37	5.80	4.34 - 6.96	Pass
ERW-5397	10/6/2014	H-3	6876 ± 383	6880	5940 - 7570	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., 2014
(Page 1 of 2)

			Concentration a			
Lab Code b	Date	Analysis	Laboratory result	Known Activity	Control Limits c	Acceptance
MAW-1140	2/1/2014	Gr. Alpha	0.77 ± 0.06	0.85	0.26 - 1.44	Pass
MAW-1140	2/1/2014	Gr. Beta	4.31 ± 0.08	4.19	2.10 - 6.29	Pass
MAW-1184	2/1/2014	Fe-55	0.40 ± 3.20	0.00	-0.01 - 2.00	Pass
MAW-1184	2/1/2014	H-3	345.10 ± 10.60	321.00	225.00 - 417.00	Pass
MAW-1184	2/1/2014	Ni-63	32.40 ± 3.20	34.00	23.80 - 44.20	Pass
MAW-1184	2/1/2014	Pu-238	1.28 ± 0.12	0.83	0.58 - 1.08	Fail (1)
MAW-1184	2/1/2014	Pu-239/240	0.91 ± 0.10	0.68	0.47 - 0.88	Fail (1)
MAW-1184	2/1/2014	Sr-90	7.00 ± 0.70	8.51	5.96 - 11.06	Pass
MAW-1184	2/1/2014	U-233/234	0.20 ± 0.07	0.23	0.16 - 0.29	Pass
MAW-1184	2/1/2014	U-238	1.25 ± 0.18	1.45	1.02 - 1.89	Pass
MAW-1184	2/1/2014	Co-57	27.86 ± 0.38	27.50	19.30 - 35.80	Pass
MAW-1184	2/1/2014	Co-60	15.99 ± 0.27	16.00	11.20 - 20.80	Pass
MAW-1184	2/1/2014	Cs-134	21.85 ± 0.54	23.10	16.20 - 30.00	Pass
MAW-1184	2/1/2014	Cs-137	28.74 ± 0.49	28.90	20.20 - 37.60	Pass
MAW-1184	2/1/2014	K-40	1.80 ± 2.00	0.00	0.00 - 10.00	Pass
MAW-1184	2/1/2014	Mn-54	14.06 ± 0.40	13.90	9.70 - 18.10	Pass
MAW-1184	2/1/2014	Zn-65	0.00 ± 0.19	0.00	-0.01 - 0.00	Pass
MAVE-1148	2/1/2014	Co-57	11.63 ± 0.19	10.10	7.10 - 13.10	Pass
MAVE-1148	2/1/2014	Co-60	7.28 ± 0.18	6.93	4.85 - 9.01	Pass
MAVE-1148	2/1/2014	Cs-134	6.29 ± 0.29	6.04	4.23 - 7.85	Pass
MAVE-1148	2/1/2014	Cs-137	5.18 ± 0.20	4.74	3.32 - 6.16	Pass
MAVE-1148	2/1/2014	Mn-54	9.22 ± 0.26	8.62	6.03 - 11.21	Pass
MAVE-1148	2/1/2014	Zn-65	8.59 ± 0.40	7.86	5.50 - 10.22	Pass
MAAP-1151	2/1/2014	Co-57	1.60 ± 0.05	0.00	NA	Fail (2)
MAAP-1151	2/1/2014	Co-60	1.38 ± 0.08	1.39	0.97 - 1.81	Pass
MAAP-1151	2/1/2014	Cs-134	1.75 ± 0.11	1.91	1.34 - 2.48	Pass
MAAP-1151	2/1/2014	Cs-137	1.81 ± 0.10	1.76	1.23 - 2.29	Pass
MAAP-1151	2/1/2014	Mn-54	0.01 ± 0.03	0.00	NA	Pass
MAAP-1151	2/1/2014	Zn-65	-0.24 ± 0.09	0.00	-0.50 - 1.00	Pass
MAAP-1151	2/1/2014	Sr-90	1.11 ± 0.14	1.18	0.83 - 1.53	Pass
MAAP-1154	2/1/2014	Gr. Alpha	0.56 ± 0.06	1.77	0.53 - 3.01	Pass
MAAP-1154	2/1/2014	Gr. Beta	0.98 ± 0.06	0.77	0.39 - 1.16	Pass
MASO-1146	2/1/2014	Ni-63	4.80 ± 15.30	0.00	NA	Pass
MASO-1146	2/1/2014	Co-57	1064.50 ± 3.60	966.00	676.00 - 1256.00	Pass
MASO-1146	2/1/2014	Co-60	1.70 ± 0.50	1.22	(3)	Pass
MASO-1146	2/1/2014	Cs-134	6.10 ± 1.80	0.00	NA	Fail (4)
MASO-1146	2/1/2014	Cs-137	1364.30 ± 5.30	1238.00	867.00 - 1609.00	Pass
MASO-1146	2/1/2014	K-40	728.90 ± 15.90	622.00	435.00 - 809.00	Pass
MASO-1146	2/1/2014	Mn-54	1588.00 ± 6.00	1430.00	1001.00 - 1859.00	Pass
MASO-1146	2/1/2014	Zn-65	763.50 ± 6.80	695.00	487.00 - 904.00	Pass
MASO-1146	2/1/2014	Sr-90	1.23 ± 1.37	0.00	NA	Pass

TABLE D-5 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
ENVIRONMENTAL, INC., 2014
(Page 2 of 2)

			Concentration a			
Lab Code b	Date	Analysis	Laboratory result	Known Activity	Control Limits c	Acceptance
MASO-4439	8/1/2014	Ni-63	771.62 ± 23.29	980.00	686.00 - 1274.00	Pass
MASO-4439	8/1/2014	Sr-90	778.34 ± 17.82	858.00	601.00 - 1115.00	Pass
MASO-4439	8/1/2014	Cs-134	520.60 ± 7.09	622.00	435.00 - 809.00	Pass
MASO-4439	8/1/2014	Co-57	1135.00 ± 7.40	1116.00	781.00 - 1451.00	Pass
MASO-4439	8/1/2014	Co-60	768.20 ± 7.70	779.00	545.00 - 1013.00	Pass
MASO-4439	8/1/2014	Mn-54	1050.70 ± 12.60	1009.00	706.00 - 1312.00	Pass
MASO-4439	8/1/2014	Zn-65	407.89 ± 15.03	541.00	379.00 - 703.00	Pass
MAW-4431	8/1/2014	Am-241	0.79 ± 0.08	0.88	0.62 - 1.14	Pass
MAW-4431	8/1/2014	Cs-137	18.62 ± 0.54	18.40	12.90 - 23.90	Pass
MAW-4431	8/1/2014	Co-57	24.85 ± 0.42	24.70	17.30 - 32.10	Pass
MAW-4431	8/1/2014	Co-60	12.27 ± 0.38	12.40	8.70 - 16.10	Pass
MAW-4431	8/1/2014	H-3	207.20 ± 10.60	208.00	146.00 - 270.00	Pass
MAW-4431	8/1/2014	Fe-55	55.10 ± 14.80	31.50	22.10 - 41.00	Fail (5)
MAW-4431	8/1/2014	Mn-54	14.36 ± 0.53	14.00	9.80 - 18.20	Pass
MAW-4431	8/1/2014	Zn-65	11.46 ± 0.78	10.90	7.60 - 14.20	Pass
MAW-4493	8/1/2014	Gr. Alpha	0.93 ± 0.07	1.40	0.42 - 2.38	Pass
MAW-4493	8/1/2014	Gr. Beta	6.31 ± 1.35	6.50	3.25 - 9.75	Pass
MAAP-4433	8/1/2014	Sr-90	0.74 ± 0.10	0.70	0.49 - 0.91	Pass
MAAP-4444	8/1/2014	Sr-89	7.82 ± 0.52	9.40	6.60 - 12.20	Pass
MAAP-4444	8/1/2014	Sr-90	0.76 ± 0.10	0.76	0.53 - 0.99	Pass
MAVE-4436	8/1/2014	Cs-134	7.49 ± 0.18	7.38	5.17 - 9.59	Pass
MAVE-4436	8/1/2014	Co-57	11.20 ± 0.19	9.20	6.40 - 12.00	Pass
MAVE-4436	8/1/2014	Co-60	6.84 ± 0.17	6.11	4.28 - 7.94	Pass
MAVE-4436	8/1/2014	Mn-54	8.11 ± 0.26	7.11	4.97 - 9.23	Pass
MAVE-4436	8/1/2014	Zn-65	7.76 ± 0.43	6.42	4.49 - 8.35	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.

(1) The high bias on the plutonium crosscheck samples was traced to contamination from a newly purchased standard. The results of reanalysis with replacement tracer purchased from NIST:

MAW-1184	Pu-238	0.68 ± 0.10	Bq / L
MAW-1184	Pu-239/240	0.66 ± 0.10	Bq / L

(2) Interference from Eu-152 resulted in misidentification of Co-57.

(3) Provided in the series for "sensitivity evaluation". MAPEP does not provide control limits.

(4) False positive test. Long sample counting time lead to interference from naturally occuring Bi-214 in sample matrix with a close spectral energy.

(5) Result of reanalysis Fe-55 32.63 ± 16.30 Bq/L

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 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 radioactive discharges were conducted. Calculations of environmental concentrations based on effluent, Illinois River flow, and meteorological data for the period indicate that consumption by the public of radionuclides attributable to LaSalle County Station does not exceed regulatory limits. Radiation exposure from radionuclides released to the atmosphere represented the critical pathway for the period with a maximum individual total dose estimated to be 1.67E+00 mrem for the year, where a shielding factor of 0.7 and an occupancy factor of 0.95 are assumed for the nearest resident. The assessment of radiation doses is performed in accordance with the Offsite Dose Calculation Manual (ODCM), specifically, a comparison of preoperational studies with operational controls or with previous environmental surveillance reports and an assessment of the observed impacts of the plant operation on the environment. Control locations are basis for "preoperational data." The results of analysis confirm that the station is operating in compliance with 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 3.87E+03 curies of fission and activation gases were released with an average release rate of 1.23E+02 μCi/sec.

A total of 1.87E-01 curies of I-131 were released during the year with an average release rate of 5.94E-03 μCi/sec.

A total of 3.59E-02 curies of beta-gamma emitters were released as airborne particulate matter with an average release rate of 1.14E-03 μCi/sec. Alpha-emitting radionuclides were below the lower limit of detection (LLD). Carbon-14 released in 2014 was calculated separately with a total of 3.35E+01 curies released with an average release rate of 1.06E+00 μCi/sec.

A total of 1.82E+01 curies of tritium were released with an average release rate of 5.76E-01 μCi/sec.

1.2 Liquids Released to Illinois River

There were no liquid batch releases in 2014. 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 2014 Annual Radioactive Effluent Release Report (ARERR). This report was submitted to the USNRC by the required date of May 1st, 2014.

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 3.19E-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 2.22E-02 mrem (Table 3.4-1).

The maximum gamma air dose was 4.78E-02 mrad from Table 3.1-1, and the maximum gamma air dose from concurrent meterorological data was 5.38E-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 5.38E-02 mrem from Table 3.1-1, and the skin dose from concurrent meteorological data was 5.57E-03 mrem (Table

3.4-1). The maximum offsite beta dose for the year was 2.22E-03 mrad from Table 3.1-1, and the maximum offsite beta dose from concurrent meteorological data was 1.93E-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 9.13E-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 2014, 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 99.9% during 2014.

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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 (2014)
GASEOUS EFFLUENTS ELEVATED RELEASE UNIT 1 AND UNIT 2

A. Fission & Activation Gases	**Unit**	**Quarter 1**	**Quarter 2**	**Quarter 3**	**Quarter4**	**Est. Total Error %**
1. Total Release	Ci	9.98E+02	7.88E+02	1.16E+03	9.23E+02	2.50E+01
2. Average release rate for the period	μCi/sec	1.28E+02	1.00E+02	1.46E+02	1.16E+02	
3. Percent of ODCM limit	%	*	*	*	*	
B. Iodine						
1. Total Iodine – 131	Ci	6.41E-02	5.01E-02	3.28E-02	3.98E-02	1.50E+01
2. Average release rate for the period	μCi/sec	8.24E-03	6.37E-03	4.13E-03	5.00E-03	
3. Percent of ODCM limit	%	*	*	*	*	
C. Particulates						
1. Particulates with half-lives > 8 days	Ci	1.04E-02	8.03E-03	8.86E-03	8.59E-03	3.50E+01
2. Average release rate for the period	μCi/sec	1.33E-03	1.02E-03	1.12E-03	1.08E-03	
3. Percent of ODCM limit	%	*	*	*	*	
D. Tritium						
1. Total Release	Ci	4.48E+00	2.40E+00	5.04E+00	6.25E+00	1.50E+01
2. Average release rate for the period	μCi/sec	5.76E-01	3.06E-01	6.35E-01	7.86E-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	8.38E+00	8.38E+00	8.38E+00	8.37E+00	
2. Average release rate for the period	μCi/sec	1.08E+00	1.06E+00	1.05E+00	1.05E+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 (2014)
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS
FOURTH QUARTER

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 2014 Annual Radiological Effluent Release Report (ARERR).

Table 3.1-1

LASALLE COUNTY NUCLEAR POWER STATION
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT (2014)
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	1.20E-02	0.24	9.77E-03	0.20	1.41E-02	0.28	1.19E-02	0.24	1.00E+01	0.48
Beta Air	1.00E+01	mRad	5.67E-04	0.006	4.41E-04	0.004	6.91E-04	0.007	5.24E-04	0.005	2.00E+01	0.01
NG Total Body	2.50E+00	mRem	8.00E-03	0.32	6.52E-03	0.26	9.42E-03	0.38	7.93E-03	0.32	5.00E+00	0.64
NG Skin	7.50E+00	mRem	1.35E-02	0.18	1.10E-02	0.15	1.59E-02	0.21	1.34E-02	0.18	1.50E+01	0.36
NNG Organ	7.50E+00	mRem	3.14E-01	4.18	2.43E-01	3.24	1.61E-01	2.15	1.95E-01	2.60	1.50E+01	6.08

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	1.20E-02	0.24	9.77E-03	0.20	1.41E-02	0.28	1.19E-02	0.24	1.00E+01	0.48
Beta Air	1.00E+01	mRad	5.67E-04	0.006	4.41E-04	0.004	6.91E-04	0.007	5.24E-04	0.005	2.00E+01	0.01
NG Total Body	2.50E+00	mRem	8.00E-03	0.32	6.52E-03	0.26	9.42E-03	0.38	7.93E-03	0.32	5.00E+00	0.64
NG Skin	7.50E+00	mRem	1.35E-02	0.18	1.10E-02	0.15	1.59E-02	0.21	1.34E-02	0.18	1.50E+01	0.36
NNG Organ	7.50E+00	mRem	1.29E-01	1.72	1.00E-01	1.34	6.66E-02	0.89	8.05E-02	1.07	1.50E+01	2.51

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	1.20E-02	0.24	9.77E-03	0.20	1.41E-02	0.28	1.19E-02	0.24	1.00E+01	0.48
Beta Air	1.00E+01	mRad	5.67E-04	0.006	4.41E-04	0.004	6.91E-04	0.007	5.24E-04	0.005	2.00E+01	0.01
NG Total Body	2.50E+00	mRem	8.00E-03	0.32	6.52E-03	0.26	9.42E-03	0.38	7.93E-03	0.32	5.00E+00	0.64
NG Skin	7.50E+00	mRem	1.35E-02	0.18	1.10E-02	0.15	1.59E-02	0.21	1.34E-02	0.18	1.50E+01	0.36
NNG Organ	7.50E+00	mRem	6.54E-02	0.87	5.07E-02	0.68	3.36E-02	0.45	4.07E-02	0.54	1.50E+01	1.27

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	1.20E-02	0.24	9.77E-03	0.20	1.41E-02	0.28	1.19E-02	0.24	1.00E+01	0.48
Beta Air	1.00E+01	mRad	5.67E-04	0.006	4.41E-04	0.004	6.91E-04	0.007	5.24E-04	0.005	2.00E+01	0.01
NG Total Body	2.50E+00	mRem	8.00E-03	0.32	6.52E-03	0.26	9.42E-03	0.38	7.93E-03	0.32	5.00E+00	0.64
NG Skin	7.50E+00	mRem	1.35E-02	0.18	1.10E-02	0.15	1.59E-02	0.21	1.34E-02	0.18	1.50E+01	0.36
NNG Organ	7.50E+00	mRem	4.13E-02	0.55	3.20E-02	0.43	2.13E-02	0.28	2.57E-02	0.34	1.50E+01	0.80

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.