

RA23-028

10 CFR 50.36a

April 28, 2023

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

LaSalle County Station, Units 1 and 2
Renewed Facility Operating License Nos. NPF-11 and NPF-18
NRC Docket Nos. 50-373, 50-374, and 72-70

Subject: 2022 Annual Radioactive Effluent Release Report

Enclosed is the Constellation Energy Generation, LLC, 2022 Annual Radioactive Effluent Release Report for LaSalle County Station, submitted in accordance with 10 CFR 50.36a, "Technical specifications on effluents from nuclear power reactors," paragraph (a)(2), and Technical Specification 5.6.3, "Radioactive Effluent Release Report."

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

Respectfully,



John Van Fleet
Acting Site Vice President
LaSalle County Station

Enclosures: • LaSalle County Nuclear Power Station Annual Radioactive Effluent Release Report (ARERR) for 2022

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



Annual Radioactive Effluent Release Report

2022

Document Number: 50-373, 50-374, and 72-70

Annual Radioactive Effluent Release Report	YEAR: 2022	Page 1 of 59
Company: Constellation	Plant: LaSalle County Station Units 1 and 2	

1.0 EXECUTIVE SUMMARY

LaSalle County Station Units 1 and 2 (LAS) Radiological Effluent Control (REC) Program was established to limit the quantities of radioactive material that may be released based on calculated radiation doses or dose rates. Dose to Members of the Public due to radioactive materials released from the plant is limited by Appendix I of 10 CFR 50 and by 40 CFR 190. Operational doses to the public during 2022 were calculated to be very small compared to the limits required by regulation and compared to other sources of radiation dose and pose no health hazard. These doses are summarized and compared to the regulatory limits in Section 2.2, Comparison to Regulatory Limits, below.

The Annual Radioactive Effluent Release Report (ARERR) is published per REC requirements and provides data related to plant operation, including: quantities of radioactive materials released in liquid and gaseous effluents; radiation doses to members of the public; solid radioactive waste shipped offsite for disposal; and other information as required by site licensing documents.

In 2022 the Land Use Census dose assessments due to radioactive gaseous effluents showed that the critical receptor for LaSalle County Station Units 1 and 2 is the Infant, due to the pathways of inhalation, ground plane, vegetation, cow milk, and cow meat, at the hypothetical milk farm located in the ESE sector at 8000 meters. The maximum Annual Organ Dose calculated for this receptor was 1.12E-01, to the thyroid. This annual dose is a small fraction (3.73E-01%) of the 10 CFR 50, Appendix I guideline of 30 mrem to the Maximum Organ per two reactor units sites.

Solid radioactive waste shipped offsite for disposal included 1.82E+02 Curies and 1.06E+03 m³, shipped in 42 shipments.

In addition to monitoring radioactive effluents, LAS has a Radiological Environmental Monitoring Program (REMP) that monitors for buildup of radioactivity in the offsite environment. Data from the REMP is published in the Annual Radiological Environmental Operating Report (AREOR).

TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY.....	1
2.0	LIST OF ACRONYMS AND DEFINITIONS	4
2.2	Comparison to Regulatory Limits	6
3.0	INTRODUCTION.....	8
3.1	About Nuclear Power.....	8
3.2	About Radiation Dose.....	10
3.3	About Dose Calculation	12
4.0	DOSE ASSESSMENT FOR PLANT OPERATIONS.....	14
4.1	Regulatory Limits.....	14
4.2	Regulatory Limits for Gaseous Effluent Doses:.....	14
4.3	Regulatory Limits for Liquid Effluent Doses.....	15
4.4	40 CFR 190 Regulatory Dose Limits for a Member of the Public	16
4.5	Onsite Doses (Within Site Boundary).....	16
5.0	SUPPLEMENTAL INFORMATION.....	17
5.1	Gaseous Batch Releases	17
5.2	Liquid Batch Releases	17
5.3	Abnormal Releases	17
5.4	Land Use Census Changes	17
5.5	Meteorological Data.....	17
5.6	Effluent Radiation Monitors Out of Service Greater Than 30 Days.....	17
5.7	Offsite Dose Calculation Manual (ODCM) Changes.....	17
5.8	Process Control Program (PCP) Changes.....	17
5.9	Radioactive Waste Treatment System Changes.....	17
5.10	Other Supplemental Information	18
6.0	NEI 07-07 ONSITE RADIOLOGICAL GROUNDWATER MONITORING PROGRAM.....	21
6.1	Voluntary Notification.....	25
7.0	BIBLIOGRAPHY	26

TABLES

Table 1, LaSalle County Station Units 1 and 2 Dose Summary.....	6
Table 2, Total Annual Offsite-Dose Comparison to 40 CFR 190 Limits for LAS	7
Table 3, Non-Occupationally Exposed Individual Dose	16
Table 4, Groundwater Protection Program Monitoring Well Results.....	22
Table 5, Gaseous Effluents Summation of All Releases from the Site	27
Table 6, Gaseous Effluents – Elevated Level Release Batch Mode Site.....	28
Table 7, Gaseous Effluents – Elevated Level Release Continuous Mode Site.....	29
Table 8, Liquid Effluents – Summation of All Releases Site	30
Table 9, Batch Mode Liquid Effluents Site.....	31
Table 10, Continuous Mode Liquid Effluents Site.....	32

Annual Radioactive Effluent Release Report		YEAR: 2022	Page 3 of 59
Company: Constellation		Plant: LaSalle County Station Units 1 and 2	

Table 11, Resins, Filters, and Evaporator Bottoms Summary for the LaSalle Site	33
Table 12, Dry Active Waste (DAW) Summary for the LaSalle Site	34
Table 13, Irradiated Components Summary for the LaSalle Site	35
Table 14, Other Waste Summary for the LaSalle Site	36
Table 15, Sum of All Low-Level Waste Shipped from the LaSalle Site	37
Table 16, Solid Waste Disposition for the LaSalle Site	38
Table 17, Irradiated Fuel Shipments Disposition for the LaSalle Site	38
Table 18, Classification of Atmospheric Stability	39

FIGURES

Figure 1, Pressurized Water Reactor (PWR) [1]	8
Figure 2, Boiling Water Reactor (BWR) [2]	9
Figure 3, Sources of Radiation Exposure (NCRP Report No. 160) [3]	10
Figure 4, Potential exposure pathways to Members of the Public due to Plant Operations [6]	12

ATTACHMENTS

Attachment 1, ARERR Release Summary Tables (RG-1.21 Tables)	27
Attachment 2, Solid Waste Information	33
Attachment 3, Meteorological Data	39

Annual Radioactive Effluent Release Report	YEAR: 2022	Page 4 of 59
Company: Constellation	Plant: LaSalle County Station Units 1 and 2	

2.0 LIST OF ACRONYMS AND DEFINITIONS

1. Airborne Activity Sampling: Sampling of air through the collection of particulates and radionuclides on filter media, collection of noble gases in a container, and collection of water vapor containing tritium.
2. Alpha Particle (α): A charged particle emitted from the nucleus of an atom having a mass and charge equal in magnitude of a helium nucleus.
3. BWR: Boiling Water Reactor
4. Composite Sample: A series of single collected portions (aliquots) analyzed as one sample. The aliquots making up the sample are collected at time intervals that are very short compared to the composite period.
5. Control: A sampling station in a location not likely to be affected by plant effluents due to its distance and/or direction from the Plant.
6. Counting Error: An estimate of the two-sigma uncertainty associated with the sample results based on total counts accumulated.
7. Curie (Ci): A measure of radioactivity; equal to 3.7×10^{10} disintegrations per second, or 2.22×10^{12} disintegrations per minute.
8. Direct Radiation Monitoring: The measurement of radiation dose at various distances from the plant is assessed using thermoluminescent dosimeters (TLDs), optically stimulated luminescent dosimeters (OSLDs), and/or pressurized ionization chambers.
9. Grab Sample: A single discrete sample drawn at one point in time.
10. Indicator: A sampling location that is likely to be affected by plant effluents due to its proximity and/or direction from the plant.
11. Ingestion Pathway: The ingestion pathway includes milk, fish, and garden produce. Meat or other food products may also be included.
12. ISFSI: Independent Spent Fuel Storage Installation
13. Lower Limit of Detection (LLD): The smallest concentration of radioactive material in a sample that will yield a net count (above system background) that will be detected with 95% probability with a 5% probability of a false conclusion that a blank observation represents "real" signal.
14. MDA: Minimum Detectable Activity. - For radiochemistry instruments, the MDA is the a posteriori minimum concentration that a counting system detects. The smallest concentration or activity of radioactive material in a sample that will yield a net count above instrument background and that is detected with 95% probability, with only five % probability of falsely concluding that a blank observation represents a true signal.

Company: Constellation**Plant: LaSalle County Station Units 1 and 2**

15. MDC: Minimum Detectable Concentration, essentially synonymous with MDA for the purposes of radiological monitoring.
16. Mean: The average, i.e., the sum of results divided by the number of results.
17. Microcurie (μCi): 3.7×10^4 disintegrations per second, or 2.22×10^6 disintegrations per minute.
18. millirem (mrem): 1/1000 rem; a unit of radiation dose equivalent in tissue.
19. Milliroentgen (mR): 1/1000 Roentgen; a unit of exposure to X- or gamma radiation.
20. MWe: Megawatts Electric
21. MWTh: Megawatts Thermal
22. NA: Not Applicable
23. NEI: Nuclear Energy Institute
24. NRC: Nuclear Regulatory Commission
25. ODCM: Offsite Dose Calculation Manual
26. OSLD: Optically Stimulated Luminescence Dosimeter
27. Protected Area: The fenced area immediately surrounding the Plant. Access to the protected area requires a security badge or escort.
28. PWR: Pressurized Water Reactor
29. REC: Radiological Effluent Control
30. REMP: Radiological Environmental Monitoring Program
31. Restricted Area: Any area where access is controlled for the purpose of protecting individuals from exposure to radiation or radioactive materials.
32. SLCs: Selected Licensee Commitments
33. TEDE: Total Effective Dose Equivalent (TEDE) means the sum of the effective dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures).
34. TLD: Thermoluminescent Dosimeter
35. TRM: Technical Requirements Manual
36. TS: Technical Specification

2.2 Comparison to Regulatory Limits

During 2022 all solid, liquid, and gaseous radioactive effluents from LaSalle County Station Units 1 and 2 were well below regulatory limits, as summarized in Table 1 and Table 2.

Table 1, LaSalle County Station Units 1 and 2 Dose Summary¹

Liquid Effluents		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual
	Limit	3 mrem	3 mrem	3 mrem	3 mrem	6 mrem
	Total Body Dose	0.00+00	0.00+00	0.00+00	0.00+00	0.00+00
	% of Limit	0.00+00	0.00+00	0.00+00	0.00+00	0.00+00
	Limit	10 mrem	10 mrem	10 mrem	10 mrem	20 mrem
	Max Organ Dose	0.00+00	0.00+00	0.00+00	0.00+00	0.00+00
	% of Limit	0.00+00	0.00+00	0.00+00	0.00+00	0.00+00
Gaseous Effluents						
	Limit	10 mrad	10 mrad	10 mrad	10 mrad	20 mrad
	Gamma Air Dose ²	7.34E-04	9.10E-04	1.82E-04	2.42E-03	5.50E-03
	% of Limit	7.34E-03	9.10E-03	1.82E-03	2.42E-02	2.75E-02
	Limit	20 mrad	20 mrad	20 mrad	20 mrad	40 mrad
	Beta Air Dose	4.35E-05	5.89E-05	1.30E-04	1.52E-04	3.84E-04
	% of Limit	2.18E-04	2.95E-04	6.50E-04	7.60E-04	9.60E-04
	Limit	2.5 mrem	2.5 mrem	2.5 mrem	2.5 mrem	5 mrem
	NG Total Body Dose ³	4.90E-04	6.07E-04	9.54E-04	1.62E-03	3.67E-03
	% of Limit	1.96E-02	2.43E-02	3.82E-02	3.24E-02	1.47E-01
	Limit	7.5 mrem	7.5 mrem	7.5 mrem	7.5 mrem	15 mrem
	NG Skin Dose ²	8.28E-04	1.03E-03	1.62E-03	2.74E-03	6.22E-03
	% of Limit	1.10E-02	1.37E-02	2.16E-02	3.65E-02	4.15E-02
	Limit	15 mrem	15 mrem	15 mrem	15 mrem	30 mrem
	Max Organ Dose ⁴	1.37E-02	1.25E-02	3.81E-02	4.76E-02	1.12E-01
	% of Limit	9.13E-02	8.33E-02	2.54E-01	3.17E-01	3.73E-01

¹ Table 1 demonstrates compliance with 10 CFR Part 50, App. I Limits.

² WSW UAB Non-SB, All Age Groups

³ WSW UAB SB, All Age Groups

⁴ ESE Nearest Cow Milk / Infant, Thyroid

Table 2, Total Annual Offsite-Dose Comparison to 40 CFR 190 Limits for LAS¹

	Whole Body	Thyroid	Max Other Organ
Gaseous ^{2,3}	1.31E-02	1.12E-01	4.64E-02
Liquid	0.00E+00	0.00E+00	0.00E+00
Sky Shine & ISFSI	7.92E-01	-	-
Total Site Dose	8.05E-01	1.12E-01	4.64E-02
Total w/Other Nearby Facility⁴	8.05E-01	1.12E-01	4.64E-02
Limit	25 mrem	75 mrem	25 mrem
% of Limit	3.22E+00	1.49E-01	1.86E-01

¹ Table 2 is a summation of Units to show compliance with 40 CFR Part 190 Limits.

² Gaseous dose values in Table 2 include organ dose from Noble Gas, Iodine, Tritium, Carbon-14, and particulates with half-lives > 8 days.

³ Individual groups with the highest dose are used: Total Body: all age groups for Noble Gas and the Infant for particulates, Individual age group sum is lower.

⁴ Other fuel cycle sources within 5 miles of the site do not exist.

3.0 INTRODUCTION

3.1 About Nuclear Power

Commercial nuclear power plants are generally classified as either Boiling Water Reactors (BWRs) or Pressurized Water Reactors (PWRs), based on their design. A BWR includes a single coolant system where water used as reactor coolant boils as it passes through the core and the steam generated is used to turn the turbine generator for power production. A PWR, in contrast, includes two separate water systems: radioactive reactor coolant and a secondary system. Reactor coolant is maintained under high pressure, preventing boiling. The high-pressure coolant is passed through a heat exchanger called a steam generator where the secondary system water is boiled, and the steam is used to turn the turbine generator for power production.

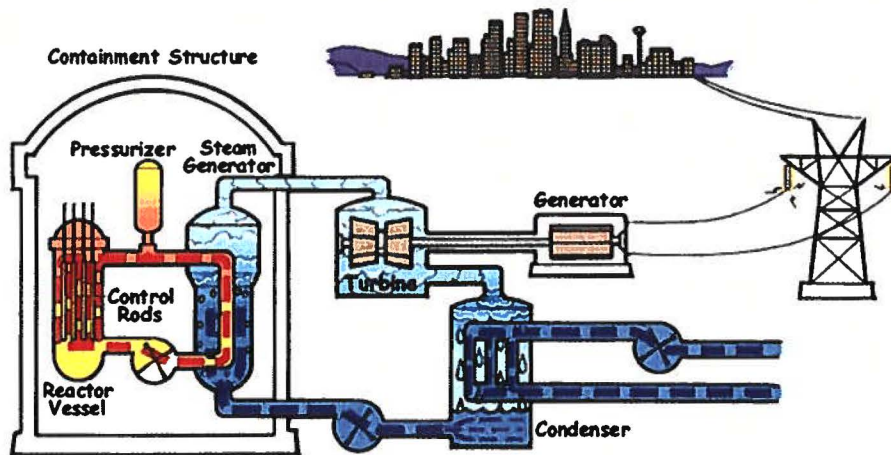


Figure 1, Pressurized Water Reactor (PWR) [1]

3.1 (Continued)

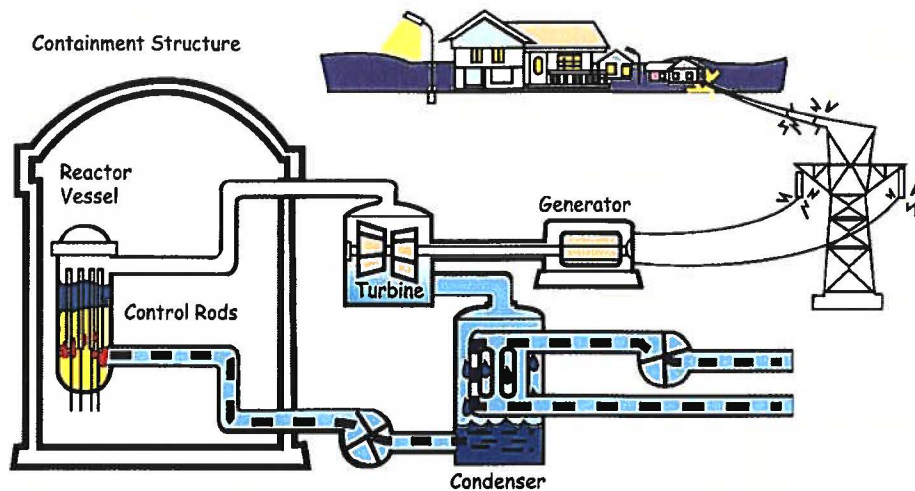


Figure 2, Boiling Water Reactor (BWR) [2]

Electricity is generated by a nuclear power plant similarly to the way that electricity is generated at other conventional types of power plants, such as those driven by coal or natural gas. Water is boiled to generate steam; the steam rotates a turbine that is attached to a generator and the steam is condensed back into water to be returned to the boiler. What makes nuclear power different from these other types of power plants is that the heat is generated by fission and decay reactions occurring within and around the core containing fissionable uranium (U-235).

Nuclear fission occurs when certain nuclides (primarily U-233, U-235, or Pu-239) absorb a neutron and break into several smaller nuclides (called fission products) as well as some additional neutrons.

Fission results in production of radioactive materials including gases and solids that must be contained to prevent release or treated prior to release. These effluents are generally treated by filtration and/or hold-up prior to release. Releases are generally monitored by sampling and by continuously indicating radiation monitors. The effluent release data is used to calculate doses to ensure that dose to the public due to plant operation remains within required limits.

3.2 About Radiation Dose

Ionizing radiation, including alpha, beta, and gamma radiation from radioactive decay, has enough energy to break chemical bonds in tissues and result in damage to tissue or genetic material. The amount of ionization that will be generated by a given exposure to ionizing radiation is quantified as dose. Radiation dose is generally reported in units of millirem (mrem) in the US.

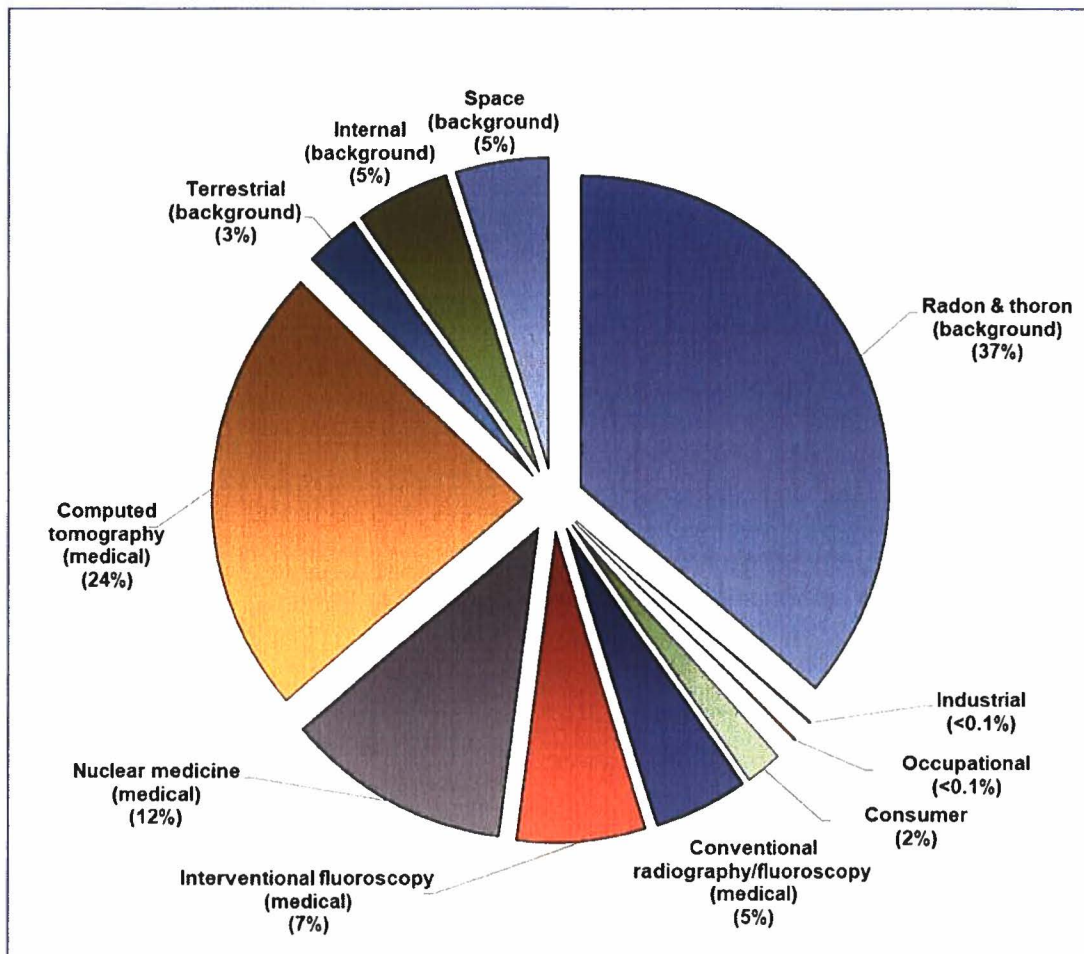


Figure 3, Sources of Radiation Exposure (NCRP Report No. 160) [3]

Annual Radioactive Effluent Release Report	YEAR: 2022	Page 11 of 59
Company: Constellation	Plant: LaSalle County Station Units 1 and 2	

3.2 (Continued)

The National Council on Radiation Protection (NCRP) has evaluated the population dose for the US and determined that the average individual is exposed to approximately 620 mrem per year [3]. There are many sources for radiation dose, ranging from natural background sources to medical procedures, air travel, and industrial processes. Approximately half (310 mrem) of the average exposure is due to natural sources of radiation including exposure to Radon, cosmic radiation, and internal radiation and terrestrial due to naturally occurring radionuclides. The remaining 310 mrem of exposure is due to man-made sources of exposure, with the most significant contributors being medical (48%) due to radiation used in various types of medical scans and treatments. Of the remaining 2% of dose, most is due to consumer activities such as air travel, smoking cigarettes, and building materials. A small fraction of this 2% is due to industrial activities including generation of nuclear power.

Readers that are curious about common sources and effects of radiation dose that they may encounter can find excellent sources of information from the Health Physics Society, including the Radiation Fact Sheets [4], and from the US Nuclear Regulatory Commission website [5].

3.3 About Dose Calculation

The concentrations of radioactive material in the environment resulting from plant operations are very small and it is not possible to determine doses directly using measured activities of environmental samples. To overcome this, Dose Calculations based on measured activities of effluent streams are used to model the dose impact for Members of the Public due to plant operation and effluents. There are several mechanisms that can result in dose to Members of the Public, including: Ingestion of radionuclides in food or water; Inhalation of radionuclides in air; Immersion in a plume of noble gases; and Direct Radiation from the ground, the plant or from an elevated plume.

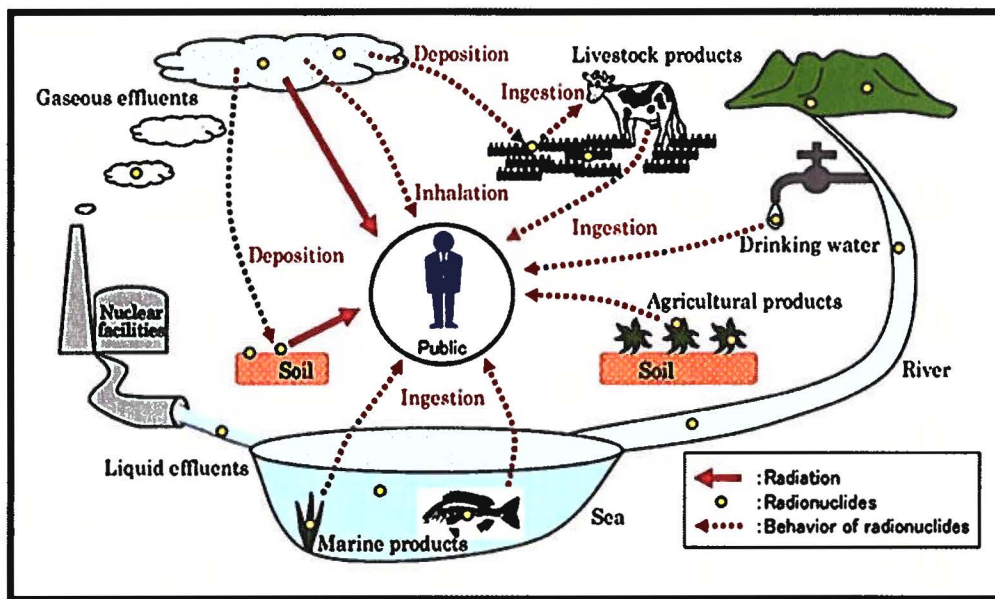


Figure 4, Potential exposure pathways to Members of the Public due to Plant Operations [6]

The Offsite Dose Calculation Manual (ODCM) specifies the methodology used to obtain the doses in the Dose Assessment section of this report. The methodology in the ODCM is based on NRC Regulatory Guide 1.109 [7] and NUREG-0133 [8]. Doses are calculated by determining what the nuclide concentration will be in air, water, on the ground, or in food products based on plant effluent releases. Release points are continuously monitored to quantify what concentrations of nuclides are being released. For gaseous releases meteorological data is used to determine how much of the released activity will be present at a given location outside of the plant either deposited onto the ground or in gaseous form. Intake patterns and nuclide bio-concentration factors are used to determine how much activity will be transferred into animal milk or meat. Finally, human ingestion factors and dose factors are used to determine how much activity will be consumed and how much dose the consumer will receive. Inhalation dose is calculated by determining the concentration of nuclides and how much air is breathed by the individual.

Annual Radioactive Effluent Release Report	YEAR: 2022	Page 13 of 59
Company: Constellation	Plant: LaSalle County Station Units 1 and 2	

3.3 (Continued)

For liquid releases, dilution and mixing factors are used to model the environmental concentrations in water. Drinking water pathways are modeled by determining the concentration of nuclides in the water at the point where the drinking water is sourced. Fish and invertebrate pathways are determined by using concentration at the release point, bioaccumulation factors for the fish or invertebrate and an estimate of the quantity of fish consumed.

Each year a Land Use Census is performed to determine what potential dose pathways currently exist within a five-mile radius around the plant, the area most affected by plant operations. The Annual Land Use Census identifies the locations of vegetable gardens, nearest residences, milk animals and meat animals. The data from the census is used to determine who is the likely to be most exposed to radiation dose as a result of plant operation.

There is significant uncertainty in dose calculation results, due to modeling dispersion of material released and bioaccumulation factors, as well as assumptions associated with consumption and land-use patterns. Even with these sources of uncertainty, the calculations do provide a reasonable estimate of the order of magnitude of the exposure. Conservative assumptions are made in the calculation inputs such as the number of various foods and water consumed, the amount of air inhaled, and the amount of direct radiation exposure from the ground or plume, such that the actual dose received are likely lower than the calculated dose. Even with the built-in conservatism, doses calculated for the highest hypothetical exposed individual due to plant operation are a very small fraction of the annual dose that is received due to other sources. The low calculated doses due to plant effluents, along with REMP results, serve to provide assurance that the site is not having a negative impact on the environment or people living near the plant.

4.0 DOSE ASSESSMENT FOR PLANT OPERATIONS

4.1 Regulatory Limits

Regulatory limits are detailed in Station Licensing documents such as the Offsite Dose Calculation Manual (ODCM), Technical Specifications 5.5.1.b, 5.5.4 and 5.6.3, Quality Assurance Topical Report, and Updated Final Safety Analysis Report. These documents contain the limits to which LAS must adhere. LAS drives to maintain the philosophy to keep dose "as low as reasonably achievable" (ALARA) and actions are taken to reduce the amount of radiation released to the environment. Liquid and gaseous release data show that the dose from LAS is well below the ODCM limits. The concentration of liquid radioactive material released shall be limited to ten times the concentration specified in 10 CFR 20, Appendix B, Table 2, Column 2, for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the total concentration released shall be limited to 2.0E-04 microcuries/ml. This data reveals that the radioactive effluents have an overall minimal dose contribution to the surrounding environment.

The annual whole body, skin and organ dose was computed using the 2022 source term using the dose calculation methodology provided in the ODCM. The calculated doses due to gaseous effluents to demonstrate compliance with offsite dose limits are presented in Table 1, LaSalle County Station Units 1 and 2 Dose Summary and Table 2, Total Annual Offsite-Dose Comparison to 40 CFR 190 Limits for LAS.

4.2 Regulatory Limits for Gaseous Effluent Doses:

1. Fission and activation gases:
 - a. Noble gases dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the site boundary shall be limited to the following:
 - 1) Less than or equal to 500 mrems/year to the total body
 - 2) Less than or equal to 3000 mrems/year to the skin
 - b. Noble gas air dose due to noble gases released in gaseous effluents, from each reactor unit to areas at and beyond the site boundary shall be limited to the following:
 - 1) Quarterly
 - a) Less than or equal to 5 mrad gamma
 - b) Less than or equal to 10 mrad beta
 - 2) Yearly
 - a) Less than or equal to 10 mrad gamma
 - b) Less than or equal to 20 mrad beta

Annual Radioactive Effluent Release Report	YEAR: 2022	Page 15 of 59
Company: Constellation	Plant: LaSalle County Station Units 1 and 2	

4.2 (Continued)

2. Iodine, tritium, and all radionuclides in particulate form with half-lives greater than 8 days.
 - a. The dose rate for iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released from the site to areas at and beyond the site boundary shall be limited to the following:
 - 1) Less than or equal to 1500 mrems/yr to any organ
 - b. The dose to a MEMBER OF THE PUBLIC from iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 DAYS in gaseous effluents released from each reactor unit to areas at and beyond the site boundary shall be limited to the following:
 - 1) Quarterly
 - a) Less than or equal to 7.5 mrems to any organ
 - 2) Yearly
 - a) Less than or equal to 15 mrems to any organ

4.3 Regulatory Limits for Liquid Effluent Doses

1. The dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released from each reactor unit to unrestricted areas shall be limited to the following:
 - a. Quarterly
 - 1) Less than or equal to 1.5 mrems total body
 - 2) Less than or equal to 5 mrems critical organ
 - b. Yearly
 - 1) Less than or equal to 3 mrems total body
 - 2) Less than or equal to 10 mrems critical organ

4.4 40 CFR 190 Regulatory Dose Limits for a Member of the Public

1. Total Dose (40 CFR 190)
 - a. The annual (calendar year) dose or dose commitment to any MEMBER OF THE PUBLIC in the unrestricted area due to releases of radioactivity and to radiation from uranium fuel cycle sources shall be limited to the following:
 - 1) Less than or equal to 25 mrems, Total Body or any Organ except Thyroid.
 - 2) Less than or equal to 75 mrems, Thyroid.

4.5 Onsite Doses (Within Site Boundary)

This section evaluates dose to non-occupationally exposed workers and members of the public that may be onsite for various reasons. The report must include any other information as may be required by the Commission to estimate maximum potential annual radiation doses to the public resulting from effluent releases as required by 10 CFR 50.36a(a)(2). While within controlled or restricted areas, the limits from Sections 4.1 through 4.4 do not apply; however, 10 CFR 20.1301 dose limit of 100 mrem per year TEDE and dose rate limit of 2 mrem per hour from external sources continue to apply. Occupancy times within the controlled areas are generally sufficiently low to compensate for the increase in the atmospheric dispersion factor above the site boundary. Groups of concern include onsite non radiologically badged workers and National Guard located at the National Guard Headquarters. Use of a conservative assumption of 2000 hours/year spent inside the site boundary for the non-dosimetry badged workers and 2500 hours/year for the National Guard conservatively represents the most-exposed individual.

Table 3, Non-Occupationally Exposed Individual Dose

Location	Sector	Approx. Distance (Meters)	Occ. Factor	Total Body Dose (mrem)		External Dose	Total
				Noble Gas	Iodine, Particulate, C-14 & H-3	TLD and Gamma	
Site Boundary	W	524	0.23	3.67E-03	4.34E-04	6.66E-01	6.70E-01
National Guard	NNW	2400	0.29	5.60E-05	1.61E-05	5.86E-02	5.87E-02

Annual Radioactive Effluent Release Report	YEAR: 2022	Page 17 of 59
Company: Constellation	Plant: LaSalle County Station Units 1 and 2	

5.0 SUPPLEMENTAL INFORMATION

5.1 Gaseous Batch Releases

5.1.1 LAS Site

There were no gaseous batch releases for 2022.

5.2 Liquid Batch Releases

5.2.1 LAS Site

There were no liquid batch releases in 2022.

5.3 Abnormal Releases

5.3.1 Gaseous Abnormal Releases

There were no abnormal releases for 2022.

5.3.2 Liquid Abnormal Releases

There were no abnormal releases for 2022.

5.4 Land Use Census Changes

There were no changes to the Land Use Census in 2022 that impacted the REC program.

5.5 Meteorological Data

LaSalle meteorological monitoring program achieved 99.9% joint data recovery for 2022.

5.6 Effluent Radiation Monitors Out of Service Greater Than 30 Days

There were no effluent monitoring time clocks exceeding 30 days during 2022.

5.7 Offsite Dose Calculation Manual (ODCM) Changes

There were no changes to the Offsite Dose Calculation Manual in 2022.

5.8 Process Control Program (PCP) Changes

There were no changes to the Process Control Program processing systems or components in 2022.

5.9 Radioactive Waste Treatment System Changes

There were no changes to the Radioactive Waste Treatment System in 2022.

Annual Radioactive Effluent Release Report	YEAR: 2022	Page 18 of 59
Company: Constellation	Plant: LaSalle County Station Units 1 and 2	

5.10 Other Supplemental Information

5.10.1 Average Energy

1. Not applicable - average energy is no longer used to determine dose to the public.
2. Measurements and Approximations of Total Radioactivity

5.10.2 Gaseous Effluents

1. The Containment Vent and Purge System (DW) is sampled prior to release by grab sample and analyzed for principal noble gas gamma emitters and H-3.
2. The Station Vent Stack (SVS) is sampled weekly by grab sample and analyzed for principal noble gas gamma emitters and H-3.
3. The Standby Gas Treatment (SBGT) System is sampled by grab sample whenever there is flow and analyzed for principal noble gas gamma emitters.
4. All release types as listed in 5.10.2.1 and 5.10.2.2 above are sampled at the SVS Wide Range Gas Monitor (WRGM), and those listed in 5.10.2.3 above are sampled at the SBGT WRGM whenever there is flow. These effluents are continuously sampled by charcoal cartridge and particulate filter paper. They are analyzed for iodines and principal gamma emitters, respectively. Particulate filter papers are composited and analyzed for gross alpha (monthly) and Fe-55, Sr 89, and Sr 90 (quarterly). Noble gases, gross beta and gamma are continuously monitored by noble gas monitors for the SVS and the SBGT System.
5. The Off Gas Post Treatment (OG Post) system is sampled weekly by grab sample for principle noble gas gamma emitters. The post treatment sample point was added in 2022 to the gaseous effluent program. Reg Guide 1.21 part 1.2 states major release points on gaseous effluents should be monitored to avoid dilution effects. Therefore, the total curies released in 2022 increased compared to previous effluent reports.

5.10.3 Liquid Effluents

1. Batch waste release tanks are sampled and analyzed for principal gamma emitters, I-131, dissolved and entrained noble gases, H-3, gross alpha, Sr-89, Sr-90 and Fe-55.
2. Continuous releases are sampled continuously in proportion to the rate of flow of the effluent stream and by grab sample. Samples are analyzed for principal gamma emitters, I-131, dissolved and entrained noble gases, H-3, gross alpha, Sr-89, Sr-90 and Fe-55.

Annual Radioactive Effluent Release Report	YEAR: 2022	Page 19 of 59
Company: Constellation	Plant: LaSalle County Station Units 1 and 2	

3. LaSalle Unit 1

During refueling outage L1R19, chemical cleaning of the condenser was conducted by first utilizing an acidic solution then, upon completion, a planned release of the acidic solution to the cooling lake. The planned release to the lake included a pH range to ensure NPDES compliance. The release was planned to be radiologically clean. During the chemical cleaning, leakage was observed from the circulating water expansion joints, collecting in the condenser pit area inside the plant. The 60,000 gallons of leakage were removed from the condenser pit area to temporary storage (frac) tanks for disposition. Sampling identified low level activity due to the leakage flow path across the condenser external surfaces and condenser pit flooring. Tritium, cobalt-60, and manganese-54, and cesium-137 were the isotopes present. The low pH of the frac tank contents complicated treatment options. The addition of high pH lake water to frac tank water was used to adjust the pH of the acidic solution prior to discharge. The pH adjustment resulted in a 5:1 dilution rendering radioactivity less than ODCM required effluent LLDs. However, a dose calculation was performed utilizing consumption of fish from the lake as well as the maximum observed activity values in the frac tanks prior to pH adjustment, as a bounding case. The resulting Adult Total Body dose was 1.82E-05 mrem and to the Teenager Liver 2.74E-05 mrem. A member of the public that consumes fish from onsite sources are subject to 100 mrem dose limit per 10 CFR 20.1301. This dose represents less than 2.74E-05% of the limit. Measured values at the plant's permitted outfall, the cooling pond blowdown to the Illinois River, remained undetectable as counted to effluent LLDs. Additionally, fish from the cooling lake were sampled and analyzed with results below detection limits.

5.10.4 Temporary Outside Tanks

In 2022 no temporary tanks were used that exceeded 10 Curies of activity excluding tritium.

5.10.5 Independent Spent Fuel Storage Installation (ISFSI) Monitoring Program

During the period January 1, through December 31, 2022, no radioactive effluents were released from the LaSalle Nuclear Station Independent Spent Fuel Storage Installation (ISFSI). Also, during this period, no casks were transferred to the outdoor concrete ISFSI storage pad. There are a total of 49 casks on the pad.

5.10.6 Carbon-14

Carbon-14 (C-14) is a naturally occurring radionuclide with a 5730-year half-life. Nuclear weapons testing in the 1950s and 1960s significantly increased the amount of C-14 in the atmosphere. Nuclear power plants also produce C-14, but the amount is infinitesimal compared to what has been distributed in the environment due to weapons testing and what is produced by natural cosmic ray interactions.

The LaSalle County Station 2022 total curies of C-14 released is based upon the following assumptions:

Annual Radioactive Effluent Release Report	YEAR: 2022	Page 20 of 59
Company: Constellation	Plant: LaSalle County Station Units 1 and 2	

- a normalized C-14 production rate of 5.1 Ci/GWt-yr,
- a gaseous release fraction of 0.99,
- a reactor power rating of 3546 MWt (per Unit),
- a Unit 1 equivalent full power operation of 336.7 days and a Unit 2 equivalent full power operation of 358.4 days.

In accordance with Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactive Material in Liquid and Gaseous Effluents and Solid Waste," the NRC recommended re-evaluating "principal radionuclides" and reporting C-14 as appropriate. Carbon-14 production and release estimates were calculated using EPRI Report 1021106, "Estimation of Carbon-14 in Nuclear Plant Gaseous Effluents". This calculation uses active core coolant mass, average neutron flux by energy and reactor coolant nitrogen concentrations to determine Carbon-14 generation based upon an effective full power year. The estimated generation for LaSalle County Station Units 1 and 2 during 2022 was 34.29 Ci of C-14 produced.

Public dose estimates were performed using methodology from the ODCM which is based on Regulatory Guide 1.109 methodology. Carbon dioxide is assumed to make up 20-30% of the Carbon-14 gaseous emissions from PWR stations and 95% of gaseous emissions from BWR stations. At LAS the total 34.29 Ci of C-14 produced only 95% is released as CO₂ (32.57 Ci), which then can be incorporated into the environment for dose analysis. C-14 dose is included in dose calculation results in Table 1 and Table 2.

5.10.7 Errata/Corrections to Previous ARERRs

There are no corrections to previous ARERRs.

Annual Radioactive Effluent Release Report	YEAR: 2022	Page 21 of 59
Company: Constellation	Plant: LaSalle County Station Units 1 and 2	

6.0 NEI 07-07 ONSITE RADIOLOGICAL GROUNDWATER MONITORING PROGRAM

LaSalle County Station Units 1 and 2 has developed a Groundwater Protection Initiative (GPI) program in accordance with NEI 07-07, Industry Ground Water Protection Initiative – Final Guidance Document [9]. The purpose of the GPI is to ensure timely detection and an effective response to situations involving inadvertent radiological releases to groundwater to prevent migration of licensed radioactive material off-site and to quantify impacts on decommissioning.

This section is included in this report to communicate results of NEI 07-07 Radiological Groundwater Monitoring Program. Monitoring wells installed as part of GPI program are sampled and analyzed on a frequency based upon well location, assessed risk, and site hydrogeology as described in the RGPP. In addition to reporting results from NEI 07-07 monitoring wells, new voluntary communications made for onsite leaks or spills per NEI 07-07 Objective 2.2, are also reported as part of this report. It is important to note, samples and results taken in support of NEI 07-07 groundwater monitoring program are not part of the Radiological Environmental Monitoring Program (REMP) but are reported as part of AREOR.

During 2022, LAS collected and analyzed groundwater samples in accordance with the requirements of EN-LA-408-4160. Samples from 19 different locations were analyzed for tritium activity with values ranging from <LLD to 5,790 pCi/L. There is no feasible pathway into a drinking water supply based on the hydrogeological study conducted as LaSalle. Also, based on established aquifer flow paths the location most representative of potential offsite release into groundwater was also less than the detection limit.

Hard-to-detect analyses were performed on 6 groundwater locations in accordance with the LaSalle RGPP and to aid in establishing background levels. The analyses included Fe-55, Ni-63, Am-241, Cm-242, Cm-243/244, Pu-238, Pu-239/240, U-234, U-235, and U-238. U-234 was detected in 4 of 6 samples and concentrations ranged from 0.44 to 3.28 pCi/L. U-238 was detected in 4 of 6 samples and concentrations ranged from 0.37 to 1.96 pCi/L. U-234 and U-238 are commonly found in groundwater at low concentrations due to the naturally occurring Radium (Uranium) Decay Series. The concentrations of U-234 and U-238 are considered to be background and are not the result of plant effluents.

Company: Constellation

Plant: LaSalle County Station Units 1 and 2

Table 4, Groundwater Protection Program Monitoring Well Results

Well Name	Type of Analysis	Number of Positive Detections	Number of Analyses	Average Concentration ¹ (pCi/L)	Maximum Concentration (pCi/L)
HP-2	Tritium	0	1	N/A	N/A
HP-5	Tritium	0	1	N/A	N/A
HP-7	Tritium	0	4	N/A	N/A
	Sr-89	0	1	N/A	N/A
	Sr-90	0	1	N/A	N/A
HP-10	Tritium	0	1	N/A	N/A
MW-LS-104S	Tritium	4	4	621	842
	Sr-89	0	1	N/A	N/A
	Sr-90	0	1	N/A	N/A
	Am-241	0	1	N/A	N/A
	Cm-242	0	1	N/A	N/A
	CM-243/244	0	1	N/A	N/A
	Pu-238	0	1	N/A	N/A
	Pu-239/240	0	1	N/A	N/A
	U-234	0	1	N/A	N/A
	U-235	0	1	N/A	N/A
	U-238	0	1	N/A	N/A
	Fe-55	0	1	N/A	N/A
	Ni-63	0	1	N/A	N/A
MW-LS-105S	Tritium	0	4	N/A	N/A
	Sr-89	0	1	N/A	N/A
	Sr-90	0	1	N/A	N/A
MW-LS-106S	Tritium	0	1	N/A	N/A
MW-LS-107S	Tritium	0	4	N/A	N/A
	Sr-89	0	1	N/A	N/A
	Sr-90	0	1	N/A	N/A
	Am-241	0	1	N/A	N/A
	Cm-242	0	1	N/A	N/A
	CM-243/244	0	1	N/A	N/A
	Pu-238	0	1	N/A	N/A
	Pu-239/240	0	1	N/A	N/A
	U-234	1	1	3.28	3.28
	U-235	0	1	N/A	N/A

¹ Results <MDA should not be included in the average concentration calculation.

Company: Constellation

Plant: LaSalle County Station Units 1 and 2

Table 4, Groundwater Protection Program Monitoring Well Results

Well Name	Type of Analysis	Number of Positive Detections	Number of Analyses	Average Concentration ¹ (pCi/L)	Maximum Concentration (pCi/L)
	U-238	1	1	1.96	1.96
	Fe-55	0	1	N/A	N/A
	Ni-63	0	1	N/A	N/A
MW-LS-111S	Tritium	0	1	N/A	N/A
OIL SEPARATOR	Tritium	0	4	N/A	N/A
	Sr-89	0	1	N/A	N/A
	Sr-90	0	1	N/A	N/A
	Am-241	0	1	N/A	N/A
	Cm-242	0	1	N/A	N/A
	CM-243/244	0	1	N/A	N/A
	Pu-238	0	1	N/A	N/A
	Pu-239/240	0	1	N/A	N/A
	U-234	1	1	0.67	0.67
	U-235	0	1	N/A	N/A
	U-238	1	1	0.48	0.48
	Fe-55	0	1	N/A	N/A
	Ni-63	0	1	N/A	N/A
RW-LS-100S	Tritium	4	4	880	1380
	Sr-89	0	1	N/A	N/A
	Sr-90	0	1	N/A	N/A
	Am-241	0	1	N/A	N/A
	Cm-242	0	1	N/A	N/A
	CM-243/244	0	1	N/A	N/A
	Pu-238	0	1	N/A	N/A
	Pu-239/240	0	1	N/A	N/A
	U-234	0	1	N/A	N/A
	U-235	0	1	N/A	N/A
	U-238	0	1	N/A	N/A
	Fe-55	0	1	N/A	N/A
	Ni-63	0	1	N/A	N/A
RW-LS-101S	Tritium	6	6	1037	1400
	Sr-89	0	1	N/A	N/A
	Sr-90	0	1	N/A	N/A
	Am-241	0	1	N/A	N/A
	Cm-242	0	1	N/A	N/A

Company: Constellation

Plant: LaSalle County Station Units 1 and 2

Table 4, Groundwater Protection Program Monitoring Well Results

Well Name	Type of Analysis	Number of Positive Detections	Number of Analyses	Average Concentration ¹ (pCi/L)	Maximum Concentration (pCi/L)
	CM-243/244	0	1	N/A	N/A
	Pu-238	0	1	N/A	N/A
	Pu-239/240	0	1	N/A	N/A
	U-234	1	1	0.44	0.44
	U-235	0	1	N/A	N/A
	U-238	1	1	0.37	0.37
	Fe-55	0	1	N/A	N/A
	Ni-63	0	1	N/A	N/A
TW-LS-114S	Tritium	0	4	N/A	N/A
TW-LS-116S	Tritium	5	5	3096	3550
	Sr-89	0	1	N/A	N/A
	Sr-90	0	1	N/A	N/A
TW-LS-117S	Tritium	0	4	N/A	N/A
	Sr-89	0	1	N/A	N/A
	Sr-90	0	1	N/A	N/A
TW-LS-118S	Tritium	4	4	4030	5790
	Sr-89	0	1	N/A	N/A
	Sr-90	0	1	N/A	N/A
	Am-241	0	1	N/A	N/A
	Cm-242	0	1	N/A	N/A
	CM-243/244	0	1	N/A	N/A
	Pu-238	0	1	N/A	N/A
	Pu-239/240	0	1	N/A	N/A
	U-234	1	1	1.46	1.46
	U-235	0	1	N/A	N/A
	U-238	1	1	1.18	1.18
	Fe-55	0	1	N/A	N/A
	Ni-63	0	1	N/A	N/A
TW-LS-119S	Tritium	0	4	N/A	N/A
	Sr-89	0	1	N/A	N/A
	Sr-90	0	1	N/A	N/A
TW-LS-120S	Tritium	0	4	N/A	N/A
	Sr-89	0	1	N/A	N/A
	Sr-90	0	1	N/A	N/A
TW-LS-121S	Tritium	0	2	N/A	N/A

Company: Constellation**Plant: LaSalle County Station Units 1 and 2****6.1 Voluntary Notification**

During 2022, LaSalle County Station Units 1 and 2 did not make any voluntary NEI 07-07 notification to State/Local officials, NRC, and to other stakeholders required by site procedures.

Annual Radioactive Effluent Release Report	YEAR: 2022	Page 26 of 59
Company: Constellation	Plant: LaSalle County Station Units 1 and 2	

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Attachment 1, ARERR Release Summary Tables (RG-1.21 Tables)

1.0 GASEOUS EFFLUENTS

Table 5, Gaseous Effluents Summation of All Releases from the Site

A. Fission & Activation Gases	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter4	Total	Est. Total Error %
1. Total Release	Ci	9.30E+01	1.30E+02	3.25E+02	3.18E+02	8.66E+02	2.50E+01
2. Average release rate for the period	µCi/sec	1.18E+01	1.65E+01	4.12E+01	4.04E+01	1.10E+02	
3. Percent of ODCM limit	%	*	*	*	*	*	
B. Radioiodines							
1. Total Iodine – 131	Ci	2.57E-03	2.26E-03	7.61E-03	9.44E-03	2.19E-02	1.50E+01
2. Average release rate for the period	µCi/sec	3.26E-04	2.87E-04	9.65E-04	1.20E-03	6.94E-04	
3. Percent of ODCM limit	%	*	*	*	*	*	
C. Particulates							
1. Particulates with half-lives > 8 days	Ci	3.63E-05	1.91E-05	6.16E-05	1.33E-04	2.50E-04	3.50E+01
2. Average release rate for the period	µCi/sec	4.67E-06	2.43E-06	7.75E-06	1.67E-05	7.92E-06	
3. Percent of ODCM limit	%	*	*	*	*	*	
D. Tritium							
1. Total Release	Ci	1.01E+01	8.75E+00	1.11E+01	1.64E+01	4.64E+01	1.50E+01
2. Average release rate for the period	µCi/sec	1.28E+00	1.11E+00	1.41E+00	2.08E+00	1.47E+00	
3. Percent of ODCM limit	%	*	*	*	*	*	
E. Gross Alpha							
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	3.50E+01
2. Average release rate for the period	µCi/sec	<LLD	<LLD	<LLD	<LLD	<LLD	
3. Percent of ODCM limit	%	*	*	*	*	*	
F. Carbon-14							
1. Total Release	Ci	7.19E+00	8.48E+00	8.32E+00	8.60E+00	3.26E+01	N/A
2. Average release rate for the period	µCi/sec	9.11E-01	1.08E+00	1.06E+00	1.09E+00	1.03E+00	
3. Percent of ODCM limit	%	*	*	*	*	*	

"<" Indicates activity of sample is less than LLD given in µCi/ml

Table 6, Gaseous Effluents – Elevated Level Release Batch Mode Site

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
Fission Gases						
None	Ci	N/A	N/A	N/A	N/A	N/A
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
Total for Period	Ci	N/A	N/A	N/A	N/A	N/A
Iodines						
None	Ci	N/A	N/A	N/A	N/A	N/A
	Ci					
	Ci					
	Ci					
Total for Period	Ci	N/A	N/A	N/A	N/A	N/A
Particulates						
None	Ci	N/A	N/A	N/A	N/A	N/A
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
Total for Period	Ci	N/A	N/A	N/A	N/A	N/A
Tritium						
H-3	Ci	N/A	N/A	N/A	N/A	N/A
Gross Alpha						
Alpha	Ci	N/A	N/A	N/A	N/A	N/A
Carbon-14						
C-14	Ci	N/A	N/A	N/A	N/A	N/A

Company: Constellation

Plant: LaSalle County Station Units 1 and 2

Table 7, Gaseous Effluents – Elevated Level Release Continuous Mode Site

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
Fission Gases						
Ar-41	Ci	2.41E+00	3.33E+00	3.39E+00	4.79E+00	1.39E+01
Kr-85m	Ci	1.98E+01	3.18E+01	6.39E+01	8.05E+01	1.96E+02
Kr-87	Ci	5.31E-01	3.03E-01	6.09E-01	2.92E+00	4.36E+00
Kr-88	Ci	1.90E+01	2.29E+01	3.54E+01	6.38E+01	1.41E+02
Xe-133	Ci	5.09E+01	7.17E+01	2.19E+02	1.65E+02	5.07E+02
Xe-135	Ci	3.29E-01	1.95E-01	2.55E+00	1.10E+00	4.17E+00
	Ci					
	Ci					
	Ci					
	Ci					
Total for Period	Ci	9.30E+01	1.30E+02	3.25E+02	3.18E+02	8.66E+02
Iodines						
I-131	Ci	2.57E-03	2.26E-03	7.61E-03	9.44E-03	2.19E-02
I-133	Ci	7.29E-03	9.14E-03	1.90E-02	3.71E-02	7.25E-02
I-135	Ci	<LLD	6.76E-03	2.18E-02	4.27E-02	7.13E-02
	Ci					
Total for Period	Ci	9.86E-03	1.82E-02	4.84E-02	8.93E-02	1.66E-01
Particulates						
Co-60	Ci	3.63E-05	1.91E-05	6.16E-05	1.04E-04	2.21E-04
Ba-140	Ci	<LLD	<LLD	<LLD	2.89E-05	2.89E-05
	Ci					
	Ci					
Total for Period	Ci	3.63E-05	1.91E-05	6.16E-05	1.33E-04	2.50E-04
Tritium						
H-3	Ci	1.01E+01	8.75E+00	1.11E+01	1.64E+01	4.64E+01
Gross Alpha						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Carbon-14						
C-14	Ci	7.19E+00	8.48E+00	8.32E+00	8.60E+00	3.26E+01

Note: Only nuclides with positive activity are reported.

2.0 LIQUID EFFLUENTS

Table 8, Liquid Effluents – Summation of All Releases Site

A. Fission & Activation Products	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter4	Total	Est. Total Error %
1. Total Release (not including tritium, gases & alpha)	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	N/A
2. Average diluted concentration during period	µCi/mL	<LLD	<LLD	<LLD	<LLD	<LLD	
B. Tritium							
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	N/A
2. Average diluted concentration during period	µCi/mL	<LLD	<LLD	<LLD	<LLD	<LLD	
C. Dissolved & Entrained Gases							
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	N/A
2. Average diluted concentration during period	µCi/mL	<LLD	<LLD	<LLD	<LLD	<LLD	
D. Gross Alpha Activity							
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	N/A
2. Average release rate for the period	µCi/mL	<LLD	<LLD	<LLD	<LLD	<LLD	
E. Volume of Waste Released (prior to dilution)	Liters	1.00E+09	4.73E+09	3.66E+09	6.77E+08	1.01E+10	
F. Volume of Dilution Water Used During Period	Liters	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

% of limit is on the Table 1, LaSalle County Station Units 1 and 2 Dose Summary
 "<" Indicates activity of sample is less than LLD given in µCi/ml

Table 9, Batch Mode Liquid Effluents Site

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
Fission and Activation Products						
None	Ci	N/A	N/A	N/A	N/A	N/A
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
Total for Period	Ci	N/A	N/A	N/A	N/A	N/A
Tritium						
H-3	Ci	N/A	N/A	N/A	N/A	N/A
Gross Alpha						
Alpha	Ci	N/A	N/A	N/A	N/A	N/A
Entrained Gases						
None	Ci	N/A	N/A	N/A	N/A	N/A
	Ci					
	Ci					
Total for Period	Ci	N/A	N/A	N/A	N/A	N/A

N/A Not Applicable

Table 10, Continuous Mode Liquid Effluents Site

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
Fission and Activation Products						
None	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
	Ci					
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Tritium						
H-3	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Gross Alpha						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Entrained Gases						
None	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
	Ci					
	Ci					
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD

"<" Indicates activity of sample is less than LLD given in µCi/ml

Attachment 2, Solid Waste Information

1.0 SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (NOT IRRADIATED FUEL)

Table 11, Resins, Filters, and Evaporator Bottoms Summary for the LaSalle Site

Waste Class	Volume		Curies Shipped	% Error (Activity)
	ft ³	m ³		
A	2.92E+03	8.27E+01	1.39E+02	+/-25%
B	1.14E+02	3.23E+00	4.26E+01	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
Unclassified	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	3.04E+03	8.60E+01	1.81E+02	+/-25%
Major Nuclides for Above Table H-3, C-14, Mn-54, Fe-55, Co-60, Ni-59, Ni-63, Sr-90, Tc-99, I-129, Cs-137, Ce-144, Pu-238, Pu-240, Pu-241, Am-241, Cm-242, Cm-243, Cm-244				
Waste Class A			≥ 1% Abundance	
Nuclide Name	Abundance		Curies	
C-14	6.07%		8.43E+00	
Fe-55	10.88%		1.51E+01	
Co-60	78.81%		1.09E+02	
Cs-137	2.00%		2.78E+00	
Waste Class B			≥ 1% Abundance	
Nuclide Name	Abundance		Curies	
Fe-55	11.56%		4.93E+00	
Co-60	85.28%		3.64E+01	
Ni-63	1.06%		4.52E-01	
Cs-137	1.24%		5.30E-01	
Waste Class C			≥ 1% Abundance	
Nuclide Name	Abundance		Curies	
None	N/A		N/A	
Total Combined			≥ 1% Abundance	
Nuclide Name	Abundance		Curies	
C-14	4.64%		8.43E+00	
Fe-55	11.04%		2.00E+01	
Co-60	80.33%		1.46E+02	
Cs-137	1.82%		3.31E+00	

Table 12, Dry Active Waste (DAW) Summary for the LaSalle Site

Waste Class	Volume		Curies Shipped	% Error (Activity)
	ft ³	m ³		
A	3.06E+04	8.66E+02	6.74E-01	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
Unclassified	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	3.06E+04	8.66E+02	6.74E-01	+/-25%
Major Nuclides for Above Table: H-3, C-14, Mn-54, Fe-55, Co-60, Ni-63, Sr-89, Sr-90, Tc-99, I-129, Cs-137, Ce-144, Pu-238, Am-241, Cm-242, Cm-244				
Waste Class A ≥ 1% Abundance				
Nuclide Name	Abundance		Curies	
Mn-54	1.76%		1.19E-02	
Fe-55	24.12%		1.63E-01	
Co-60	72.41%		4.88E-01	
Waste Class B ≥ 1% Abundance				
Nuclide Name	Abundance		Curies	
None	N/A		N/A	
Waste Class C ≥ 1% Abundance				
Nuclide Name	Abundance		Curies	
None	N/A		N/A	
Total Combined ≥ 1% Abundance				
Nuclide Name	Abundance		Curies	
Mn-54	1.76%		1.19E-02	
Fe-55	24.12%		1.63E-01	
Co-60	72.41%		4.88E-01	

Table 13, Irradiated Components Summary for the LaSalle Site

Waste Class	Volume		Curies Shipped	% Error (Activity)
	ft ³	m ³		
A	0.00E+00	0.00E+00	0.00E+00	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
Unclassified	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	0.00E+00	0.00E+00	0.00E+00	+/-25%
Major Nuclides for Above Table:				
Waste Class A			≥ 1% Abundance	
Nuclide Name	Abundance		Curies	
None	N/A		N/A	
Waste Class B			≥ 1% Abundance	
Nuclide Name	Abundance		Curies	
None	N/A		N/A	
Waste Class C			≥ 1% Abundance	
Nuclide Name	Abundance		Curies	
None	N/A		N/A	
Total Combined			≥ 1% Abundance	
Nuclide Name	Abundance		Curies	
None	N/A		N/A	

Table 14, Other Waste Summary for the LaSalle Site

Waste Class	Volume		Curies Shipped	% Error (Activity)
	ft ³	m ³		
A	3.76E+03	1.06E+02	1.77E-01	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
Unclassified	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	3.76E+03	1.06E+02	1.77E-01	+/-25%
Major Nuclides for Above Table: H-3, C-14, Fe-55, Co-60, Ni-63, Sr-90, Tc-99, I-129, Cs-137, Am-241, Cm-242, Cm-244				
Waste Class A ≥ 1% Abundance				
Nuclide Name	Abundance		Curies	
H-3	87.20%		1.54E-01	
Fe-55	1.63%		2.88E-03	
Co-60	10.43%		1.84E-02	
Waste Class B ≥ 1% Abundance				
Nuclide Name	Abundance		Curies	
None	N/A		N/A	
Waste Class C ≥ 1% Abundance				
Nuclide Name	Abundance		Curies	
None	N/A		N/A	
Total Combined ≥ 1% Abundance				
Nuclide Name	Abundance		Curies	
H-3	87.20%		1.54E-01	
Fe-55	1.63%		2.88E-03	
Co-60	10.43%		1.84E-02	

Company: Constellation

Plant: LaSalle County Station Units 1 and 2

Table 15, Sum of All Low-Level Waste Shipped from the LaSalle Site

Waste Class	Volume		Curies Shipped	% Error (Activity)
	ft ³	m ³		
A	3.73E+04	1.06E+03	1.40E+02	+/-25%
B	1.14E+02	3.23E+00	4.26E+01	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
Unclassified	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	3.74E+04	1.06E+03	1.82E+02	+/-25%
Major Nuclides for Above Table: H-3, C-14, Mn-54, Fe-55, Co-60, Ni-59, Ni-63, Sr-89, Sr-90, Tc-99, I-129, Cs-137, Ce-144, Pu-238, Pu-239, Pu-240, Pu-241, Am-241, Cm-242, Cm-243, Cm-244				
Waste Class A			≥ 1% Abundance	
Nuclide Name	Abundance		Curies	
C-14	6.03%		8.43E+00	
Fe-55	10.93%		1.53E+01	
Co-60	78.69%		1.10E+02	
Cs-137	1.99%		2.78E+00	
Waste Class B			≥ 1% Abundance	
Nuclide Name	Abundance		Curies	
Fe-55	11.56%		4.93E+00	
Co-60	85.28%		3.64E+01	
Ni-63	1.06%		4.52E-01	
Cs-137	1.24%		5.30E-01	
Waste Class C			≥ 1% Abundance	
Nuclide Name	Abundance		Curies	
None	N/A		N/A	
Total Combined			≥ 1% Abundance	
Nuclide Name	Abundance		Curies	
C-14	4.62%		8.43E+00	
Fe-55	11.08%		2.02E+01	
Co-60	80.23%		1.46E+02	
Cs-137	1.82%		3.31E+00	

2.0 SOLID WASTE DISPOSITION

Table 16, Solid Waste Disposition for the LaSalle Site

Number of Shipments	Mode of Transportation	Destination
24	Hittman Transport	Energy Solutions - Bear Creek 1560 Bear Creek Road
17	Hittman Transport	Energy Solutions LLC Containerized Waste Facility
1	Hittman Transport	Waste Control Specialist LLC Compact Waste Disposal Facility
Total 42		

3.0 IRRADIATED FUEL DISPOSITION

Table 17, Irradiated Fuel Shipments Disposition for the LaSalle Site

Number of Shipments	Mode of Transportation	Destination
0	N/A	N/A

Attachment 3, Meteorological Data

1.0 METEOROLOGICAL DATA SUMMARY

1.1 Joint Frequency Distributions

1. Period of Record: 2022
2. Stability Class: All
 - a. Periods of calm (hours): 0
 - b. Hours of missing data: 45
 - c. Meteorological data are reported in percentage of total for all stability classes.
3. Elevation: 400 ft

1.2 Stability class

Table 18, Classification of Atmospheric Stability			
Stability Condition	Pasquill Categories	Percentage 33 feet	Percentage 375 feet
Extremely Unstable	A	0.99	0.00
Moderately Stable	B	2.74	0.22
Slightly Unstable	C	6.17	1.10
Neutral	D	42.47	53.00
Slightly Stable	E	24.98	29.52
Moderately Stable	F	12.59	13.10
Extremely Stable	G	10.05	3.06

Annual Radioactive Effluent Release Report

YEAR: 2022

Page 45 of 59

Company: Constellation

Plant: LaSalle County Station Units 1 and 2

LaSalle County Generating Station
33 ft. Wind Speed and Direction

April-June, 2022
200Ft-33Ft Delta-T (F)

SPEED CLASS	WIND DIRECTION CLASSES																TOTAL	STABILITY CLASSES						TOTAL	
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		EU	MU	SU	N	SS	MS		ES
EU	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.23	0.14	0.00	0.09	0.05	0.00	0.00	0.00	0.64	0.64							
1 MU	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.09	0.09	0.05	0.05	0.00	0.05	0.00	0.00	0.37	0.37							
9 SU	0.00	0.00	0.00	0.05	0.00	0.05	0.14	0.05	0.05	0.05	0.18	0.05	0.00	0.14	0.00	0.00	0.73		0.73						
- N	0.00	0.00	0.00	0.27	0.00	0.14	0.73	0.18	0.23	0.60	0.41	0.64	0.32	0.87	0.09	0.00	4.49			4.49					
2 SS	0.00	0.00	0.00	0.00	0.00	0.41	0.23	0.27	0.50	0.41	0.00	0.27	0.14	0.23	0.00	0.00	2.47				2.47				
4 MS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.09					0.09			
ES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00		
																									8.80
EU	0.00	0.00	0.00	0.00	0.00	0.05	0.18	0.23	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.64	0.64							
G MU	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.09	0.05	0.09	0.00	0.09	0.00	0.00	0.00	0.00	0.37	0.37							
T SU	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.09	0.05	0.09	0.00	0.00	0.00	0.00	0.27			0.27					
N	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.32	0.05	0.09	0.05	0.18	0.05	0.00	0.00	0.00	1.19				1.19				
2 SS	0.00	0.00	0.00	0.00	0.00	0.05	0.09	0.14	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.37				0.37				
4 MS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					0.00			
ES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00		
																									2.84
TOT	3.71	3.39	3.48	4.67	7.01	4.63	5.96	7.24	8.20	9.12	6.69	7.56	6.65	10.36	5.55	5.77	100.00	2.84	4.49	8.07	40.24	25.34	12.14	6.87	100.00

Wind Direction by Stability

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-STABILITY CLASSES-
0.00	0.00	0.00	0.14	0.05	0.05	0.27	0.23	0.37	0.78	0.32	0.46	0.09	0.05	0.05	0.00	2.84	Extremely Unstable
0.05	0.05	0.32	0.18	0.18	0.05	0.14	0.09	0.41	0.55	0.32	0.78	0.09	0.78	0.23	0.27	4.49	Moderately Unstable
0.09	0.14	0.37	0.32	0.55	0.18	0.32	0.27	0.64	0.55	0.78	0.96	0.50	1.24	0.46	0.69	8.07	Slightly Unstable
1.70	2.38	2.34	3.02	2.25	1.19	2.38	2.11	1.51	2.43	1.70	2.38	2.47	5.00	3.30	4.08	40.24	Neutral
1.42	0.64	0.41	0.96	2.84	1.37	1.56	1.74	3.02	1.97	1.74	1.74	2.11	2.11	1.19	0.50	25.34	Slightly Stable
0.46	0.18	0.05	0.05	0.73	1.15	0.73	1.24	1.37	1.60	1.05	0.87	1.05	1.05	0.32	0.23	12.14	Moderately Stable
0.00	0.00	0.00	0.00	0.41	0.64	0.55	1.56	0.87	1.24	0.78	0.37	0.32	0.14	0.00	0.00	6.87	Extremely Stable

Wind Direction by Wind Speed

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-WIND SPEED CLASSES-
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	C A L M
0.09	0.14	0.09	0.14	0.09	0.09	0.14	0.18	0.05	0.05	0.09	0.23	0.09	0.18	0.05	0.00	1.70	< 3.5 mph
1.88	1.37	0.64	0.50	1.37	1.70	1.19	1.97	1.83	1.79	1.10	1.51	1.83	1.79	0.96	0.82	22.27	3.6 - 7.5 mph
1.56	1.28	1.97	2.11	3.62	0.96	0.82	1.65	2.25	3.21	2.93	1.83	2.43	3.44	2.47	3.53	36.07	7.6 - 12.5 mph
0.18	0.60	0.78	1.56	1.92	1.19	1.74	2.15	2.84	2.47	1.83	2.34	1.70	3.62	1.97	1.42	28.32	12.6 - 18.5 mph
0.00	0.00	0.00	0.37	0.00	0.60	1.24	0.50	1.15	1.33	0.64	1.10	0.50	1.28	0.09	0.00	8.80	18.6 - 24.5 mph
0.00	0.00	0.00	0.00	0.00	0.09	0.82	0.78	0.09	0.27	0.09	0.55	0.09	0.05	0.00	0.00	2.84	> 24.5 mph

