Dresden Nuclear Power Station

2022 ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (ARERR)

Docket Numbers: 50-010/50-237/50-249
Units 1, 2, 3

IE48
NMSS01
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Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

EXECUTIVE SUMMARY

The Radiological Effluent Controls (REC) Program monitors and records all radioactive effluents released from the plant for the purpose of calculating a dose to a member of the public. The results are recorded in this report for the Dresden Nuclear Power Station from January 1 through December 31, 2022. The Radiological Environmental Monitoring Program (REMP) is a separate program that serves as a backup or independent verification of the REC Program. The REMP samples are analyzed for radioactivity associated with the operation of Dresden Nuclear Power Station by an outside vendor and the results are compared against historical REMP data as well as the calculations from the REC Program. The REMP results and comparisons are contained within the Annual Radiological Environmental Operating Report (AREOR) for the Site.

There were no regulatory effluent limit exceedances in 2022 and the resultant calculated dose to a member of the public for 2022 due to all sources of the uranium fuel cycle was 7.47E+00 mRem, which is 29.88% of the regulatory limit of 25 mRem/year. The annual organ dose from all effluent sources is 3.18E-02 mRem/yr which is 4.23E-02% of the 75 mRem/yr (Thyroid) limit. Additionally, the AREOR supported the effluent dose calculation and indicates that Units 1, 2, and 3 of the Dresden Nuclear Power Station did not result in any adverse environmental impact.

The total dose to the nearest member of the public is a calculation of the sum of the gaseous and liquid effluents, the direct radiological dose from all sources including: ISFSI pad, storage tanks, skyshine, and Carbon-14 based upon Equivalent Full-Power Operation in days. There are many variables to consider, and in all cases, the most conservative factors were used to ensure there is sufficient margin to maintain regulatory compliance.

Table 1: Summation of Total Dose:

Liquid Effluents (All Units):			
	Total Body	2.25E-09	mRem
Noble Gas (All Units):			
	Total Body	1.76E-03	mRem
Radioiodines, tritium and Particulate (All units):			
	Total Body	3.00E-03	mRem
Direct Radiation			
	GE Facility	9.70E-02	mRem
	Skyshine	4.39E+00	mRem
	ISFSI/ CST	2.97E+00	mRem
	C-14	1.03E-02	mRem
Total		**7.47E+00**	**mRem**

BACKGROUND

Dresden Nuclear Power Station, located in rural Grundy County in Northern Illinois, is home to the nation's first full-scale, privately financed nuclear power plant, which began operation in 1960. Capable of generating 210 megawatts of electricity before its retirement in 1978, Dresden Unit 1 is designated a Nuclear Historic Landmark by the American Nuclear Society. Dresden Units 2 and 3 began commercial operation in June 1970 and November 1971, respectively. In October of 2004, the Nuclear Regulatory Commission (NRC) renewed the operating licenses for both units for an additional 20 years, extending them to 2029 and 2031. Both units contain boiling water reactors designed by General Electric. The units generate a combined 1,845 net megawatts of electricity (MWe), which is enough power to support the electricity needs of more than 1 million average American homes.

Part of the regulatory requirements of nuclear operation is to maintain a Radiological Effluent Control (REC) Program to track and record all radioactive effluent releases to the environment and calculate a dose to the public from all uranium fuel sources. This includes direct doses from storage tanks and off-site facilities. This requires a knowledge not only of plant operations but of plant design and potential sources of radioactive effluent releases. There are two forms of releases: gaseous and liquid. These can be released continuously or by a batch process. Particulate and iodine monitors are installed on plant effluent ventilation systems, which are monitored continuously and analyzed weekly. The continuous gaseous effluent release points are the 2/3 Chimney (a 300' elevated stack) and the 2/3 Reactor Building Ventilation Stack (150' mixed mode stack). A discrete volume that is released over a specific time period with a defined start and stop time is an example of a batch release. Effluent releases that are not typical or expected are categorized as "abnormal". These are documented in a Dresden Abnormal Release (DAR) report.

REGULTORY LIMITS

The NRC sets a Total Effective Dose Equivalent (TEDE) in 10CFR Part 20 Subpart D—Radiation Dose Limits for the Individual Members of the Public of 100 mRem/year. In 1977 the Environmental Protection Agency enacted 40 CFR Part 190 "Environmental Radiation Protection Standards for Nuclear Power Operations", which sets the annual dose equivalent to any member of the public at 25 millirem (0.25 millisievert (mSv)) to the whole body, 75 millirem (0.75 mSv) to the thyroid and 25 millirem (0.25 mSv) to any other organ.

These limits are incorporated into the site's Offsite Dose Calculation Manual (ODCM) which sets limits of:

Fission and activation gases:

A. Dose Rate (site)
   (1) Less than 500 mRem/year to the whole body.
   (2) Less than 3000 mRem/year to the skin.

B. Gamma Air Dose (each unit)
   (1) Less than or equal to 5 mrad/quarter.
   (2) Less than or equal to 10 mrad/year.

C. Beta Air Dose (each unit)
   (1) Less than or equal to 10 mrad/quarter.
   (2) Less than or equal to 20 mrad/year.

Iodine-131, Iodine-133, and all radionuclides in particulate form with half-lives greater than 8 days:

A. Dose Rate (site)
   (1) Less than 1500 mRem/year to any organ.

B. Dose (each unit)
   (1) Less than or equal to 7.5 mRem/quarter to any organ.
   (2) Less than or equal to 15 mRem/year to any organ.

Liquid effluents (each unit):

(1) Less than or equal to 1.5 mRem to the whole body during any calendar quarter.
(2) Less than or equal to 5 mRem to any organ during any calendar quarter.
(3) Less than or equal to 3 mRem to the whole body during any calendar year.
(4) Less than or equal to 10 mRem to any organ during any calendar year.

40CFR190 and 10CFR72 (all uranium fuel cycle operations in the region):

(1) Less than or equal to 25 mRem annual whole body dose.
(2) Less than or equal to 75 mRem annual thyroid dose.
(3) Less than or equal to 25 mRem annual dose to any other critical organ.

EFFLUENT CONCENTRATION LIMITS

Dose rates, rather than effluent concentrations, are used to calculate permissible release rates for gaseous effluents. The maximum permissible dose rates for gaseous releases are defined in Dresden ODCM Radiological Effluent Control (REC) Section 12.4.1.

Liquid effluent concentrations are limited per ODCM REC Section 12.3.1 to 10 times the concentration specified in 10CFR20 Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases and 2.00E-04 µCi/mL total activity for all dissolved or entrained noble gases.

The ODCM limits dose rates at or beyond the site boundary due to the release of noble gases to less than or equal to 500 mRem per year to the total body and less than or equal to 3,000 mRem per year to the skin, and average energy is not used to determine dose to the public. Compliance with these limits is demonstrated based on dose calculations using measured isotopic concentrations of effluent streams and not based on gross count rate measuring systems. Therefore, the average beta and gamma energies (Ē) for gaseous effluents as described in Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants," are not applicable.

EFFLUENT MONITORING

Gaseous Effluents

The 2/3 Chimney (elevated), 2/3 Reactor Building Vent (mixed mode), and the Unit 1 Chemical Cleaning Building (mixed mode) effluents are continuously sampled for iodine and particulates. These samples are obtained weekly and analyzed by gamma spectroscopy. The particulate filters are composited and sent to a vendor for gross alpha, Sr-89, Sr-90, Ni-63 and Fe-55 analysis quarterly. Noble gas grab samples of the 2/3 Chimney and 2/3 Reactor Building Vent are obtained weekly and analyzed by gamma spectroscopy. Contributing streams of the 2/3 Chimney and 2/3 Reactor Building Vent are also sampled and analyzed by gamma spectroscopy. Tritium samples of the 2/3 Chimney and 2/3 Reactor Building Vent are obtained monthly and analyzed by liquid scintillation.

For the 2/3 Chimney and 2/3 Reactor Building Vent effluents, the resultant activity concentration and measured flowrate at the release points are used to calculate the curies released. For the Chemical Cleaning Building effluent, the design basis flows are used to calculate curies released.

On June 15, 2022, Operations received a notification that the 2/3 Chimney SPING control switch was identified to be in the "backup" position versus the "normal" position. As a result, the 2/3

Chimney effluent monitoring system was declared inoperable. An investigation determined that the switch was accidentally moved during maintenance in the area on June 13, 2022 around 11:00 am. Normal operation was restored on June 15, 2022 at 1:00 pm. The sample was obtained and analyzed on June 15th per the normal schedule; however, the sample volume was adjusted to account for the loss in monitoring time. The resultant isotopic concentration was then applied to the time that the 2/3 SPING was declared inoperable to account for activity released in the 10CFR50 Appendix I report.

The Unit 1 Main Turbine Floor is used as an area to work on contaminated equipment. The Unit 1 Fuel Building is used as a storage area and potentially as a work area. The ventilation systems to these areas are no longer operational and the areas are at ambient pressure with the outside environment. The potential exists for airborne activity to be released to the environment through various points. Based on the work normally performed in these areas, an estimated 6.00E-06 Ci of Cs-137 was released via this path per month for a total of 7.20E-05 Ci during 2022.

The Unit 2/3 Heating Steam System has been contaminated in the past and occasionally contains low-level contamination. During normal operation, the condensate is converted to steam, a portion of which gets vented to the atmosphere. There was tritium identified above minimum detectable activity in 2022 for the months of January and November. An estimated 7.13E+03 μCi of tritium was released. This will continue to be monitored when the system is running.

The Chemistry Laboratory exhausts directly into the environment via its ventilation system and is not monitored. The activity concentration from the Offgas Recombiner samples taken weekly from each unit and the sample size (15 cc) was used to calculate a monthly activity released from each unit from the Chemistry Hot Lab fumehood. This activity was captured in the monthly 10CFR50 Appendix I calculation and is included in the noble gas totals in the Gaseous Release Tables 2.2.A(2) and 2.2.A(3) for Ground level releases.

Carbon-14

Carbon-14 activity released is determined using Electric Power Research Institute Report 1021106 Boiling Water Reactor proxy value of 5.1 Ci per GWth year, gaseous release fraction of 0.99%, a carbon dioxide fraction of 0.95, a reactor power rating of 2957 MWt for Units 2 and 3. The resultant dose due to C-14 was calculated using the EPRI approved C-14 worksheet. The equivalent full power days (EFPD) of operation of Unit 2 was 361.5 EFPD. The EFPD of operation of Unit 3 was 337.3 EFPD. This resulted in 14.94 Ci of C-14 from Unit 2 and 13.94 Ci of C-14 from Unit 3 being produced in 2022. The calculated dose from C-14 produced from Unit 2 was 5.34E-03 mrem/yr (Total Body-Child) and 4.97E-03 mrem/yr (Total Body-Child) for Unit 3 for a Station total of 1.03E-02 mrem/yr.

Liquid Effluents

The Waste Surge Tank (WST) utilized for river discharges is analyzed for gamma-emitting nuclides by gamma spectroscopy and for tritium by liquid scintillation prior to discharge. A representative portion of this sample is saved and composited with other discharges that occur during the calendar month. The composite is sent to a vendor for analyses of gross alpha, Sr-89, Sr-90, Ni-63 and Fe-55. The tank volumes and activities are used to calculate the diluted activity released at the discharge point from batch discharges. There were no discharges from the Waste Surge Tank in 2022. Batch release data can be found in Table 4 of this report.

Containment Cooling Service Water (CCSW) is sampled from the Low-Pressure Coolant Injection (LPCI) heat exchangers monthly and analyzed for gamma-emitting nuclides by gamma spectroscopy. These samples are composited quarterly and analyzed for tritium, gross alpha, Sr-89, Sr-90, Fe-55, and Ni-63. Results are conservatively applied for each month of the quarter. Batch release volume is based on LPCI heat exchanger volume. There were no releases from this system in 2022.

On-site storm sewers are sampled and analyzed for tritium content. The CBG well tritium concentration measured during each month of 2022 was used to calculate the released activity for each month via the storm sewers. The volume was based on the monthly rain fall over a 100,000 sqft area of the Site. Low level tritium was detected periodically throughout the 2022 year, and the total estimated tritium activity released via the storm sewers in 2022 was 6.15E-04 Ci in 8.77E+04 gallons of rain water.

Water in the Sewage Treatment Plant (STP) effluent is routinely sampled and analyzed for tritium, gross alpha, Sr-89, Sr-90, Fe-55, and Ni-63. Tritium was sampled monthly and was below the minimum detectable activity each month in 2022.

Beginning in September 2019, groundwater from the West Tritium Remediation Well was monitored via the 2/3 Discharge Tunnel. Although this is a planned continuous release, it is being mentioned here due to its relatively short duration over this life of the plant. For the year 2022, the pump was broken for all but the month of December. While the pump was broken, no tritium was released. In December, the monthly sample was below the minimum detected activity for tritium.

The estimated calculated dose from all of these releases was well below the regulatory limit of 25 mRem/yr for the whole body and 75 mRem/yr Thyroid as well as all quarterly dose limits.

Estimated Total Errors

The estimated total errors were calculated as the square root of the sum of the squares of significant errors present in the sampling and analysis process.

Less than the Lower Limit of Detection (<LLD)

Samples are analyzed such that the ODCM LLD requirements are met. When a nuclide is not detected, then "<LLD" is reported.

Abnormal Releases

None

Changes to the ODCM

There were no changes to the ODCM in 2022.

Errata

None

Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

RELEASE SUMMARY

Table 2.1(1): Gaseous Effluents- Summation of All Effluent Releases Unit 1

		Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Est. Total Error, %
A. Fission & Activation Gases							
1	Total Release	Ci	N/A	N/A	N/A	N/A	1.31E+01
2	Average release rate for period	µCi/sec	N/A	N/A	N/A	N/A	
3	Percent of ODCM Quarterly dose limit (site)	% Gamma[1]	N/A	N/A	N/A	N/A	
		% Beta[2]	N/A	N/A	N/A	N/A	
B. Iodine-131							
1	Total release	Ci	N/A	N/A	N/A	N/A	2.60E+01
2	Average release rate for period	µCi/sec	N/A	N/A	N/A	N/A	
3	Percent of ODCM Quarterly dose limit (*)	%	N/A	N/A	N/A	N/A	
C. Particulates							
1	Particulates with half-life >8 days	Ci	1.80E-05	1.80E-05	1.80E-05	1.80E-05	2.94E+01
2	Average release rate for period	µCi/sec	2.28E-06	2.28E-06	2.28E-06	2.28E-06	
3	Percent of ODCM Quarterly dose limit (*)	%	9.02E-03	9.02E-03	9.02E-03	9.02E-03	
D. Tritium							
1	Total release	Ci	N/A	N/A	N/A	N/A	7.56E+00
2	Average release rate for period	µCi/sec	N/A	N/A	N/A	N/A	
3	Percent of ODCM Quarterly dose limit (*)	%	N/A	N/A	N/A	N/A	
E. Gross Alpha							
1	Total release	Ci	N/A	N/A	N/A	N/A	2.94E+01
2	Average release rate for period	µCi/sec	N/A	N/A	N/A	N/A	
F. Carbon14							
1	Total release	Ci	N/A	N/A	N/A	N/A	
2	Average release rate for period	µCi/sec	N/A	N/A	N/A	N/A	

1. Based upon a quarterly dose limit of 5.00 mRad/yr for the Site
2. Based upon a quarterly dose limit of 10.00 mRad/yr for the Site

* "Percent of ODCM quarterly dose limit" indicates combined total of Iodine-131, Particulates, and Tritium

Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

Table 2.1(2): Gaseous Effluents- Summation of All Effluent Releases Unit 2

		Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Est. Total Error, %
A. Fission & Activation Gases							
1	Total Release	Ci	6.03E+00	6.01E+00	6.02E+00	4.38E+00	1.31E+01
2	Average release rate for period	µCi/sec	7.75E-01	7.65E-01	7.57E-01	5.51E-01	
3	Percent of ODCM Quarterly dose limit (site)	% Gamma[1]	5.58E-03	6.07E-03	6.10E-03	4.40E-03	
		% Beta[2]	1.07E-04	1.10E-04	1.12E-04	8.41E-05	
B. Iodine-131							
1	Total release	Ci	3.99E-05	3.62E-05	4.26E-05	6.03E-05	2.60E+01
2	Average release rate for period	µCi/sec	5.13E-06	4.60E-06	5.36E-06	7.59E-06	
3	Percent of ODCM Quarterly dose limit (*)	%	3.11E-02	2.92E-02	3.35E-02	5.01E-02	
C. Particulates							
1	Particulates with half-life >8 days	Ci	3.52E-05	5.53E-05	5.39E-05	3.39E-04	2.94E+01
2	Average release rate for period	µCi/sec	4.52E-06	7.04E-06	6.78E-06	4.26E-05	
3	Percent of ODCM Quarterly dose limit (*)	%	3.11E-02	2.92E-02	3.35E-02	5.01E-02	
D. Tritium							
1	Total release	Ci	2.53E+00	3.26E+00	9.40E+00	1.07E+01	7.56E+00
2	Average release rate for period	µCi/sec	3.25E-01	4.14E+01	1.18E+00	1.35E+00	
3	Percent of ODCM Quarterly dose limit (*)	%	3.11E-02	2.92E-02	3.35E-02	5.01E-02	
E. Gross Alpha							
1	Total release	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.94E+01
2	Average release rate for period	µCi/sec	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
F. Carbon14							
1	Total release	Ci	3.71E+00	3.74E+00	3.70E+00	3.79E+00	
2	Average release rate for period	µCi/sec	4.77E-01	4.71E-01	4.65E-01	4.77E-01	

1. Based upon a quarterly dose limit of 5.00 mRad/yr for the Site
2. Based upon a quarterly dose limit of 10.00 mRad/yr for the Site

* "Percent of ODCM quarterly dose limit" indicates combined total of Iodine-131, Particulates, and Tritium

Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

Table 2.1(3): Gaseous Effluents- Summation of All Effluent Releases Unit 3

		Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Est. Total Error, %
A. Fission & Activation Gases							
1	Total Release	Ci	3.48E+01	4.04E+00	4.29E+00	2.06E+00	1.31E+01
2	Average release rate for period	µCi/sec	4.48E+00	5.14E-01	5.39E-01	2.59E-01	
3	Percent of ODCM Quarterly dose limit (site)	% Gamma[1]	2.38E-02	2.35E-03	3.00E-03	1.70E-03	
		% Beta[2]	5.91E-04	7.09E-05	7.95E-05	3.84E-05	
B. Iodine-131							
1	Total release	Ci	4.66E-05	7.87E-05	1.28E-04	9.36E-05	2.60E+01
2	Average release rate for period	µCi/sec	6.00E-06	1.00E-05	1.60E-05	1.18E-05	
3	Percent of ODCM Quarterly dose limit (*)	%	3.81E-02	6.31E-02	1.01E-01	7.77E-02	
C. Particulates							
1	Particulates with half-life >8 days	Ci	6.54E-05	1.20E-04	1.69E-04	3.37E-04	2.94E+01
2	Average release rate for period	µCi/sec	8.42E-06	1.53E-05	2.12E-05	4.23E-05	
3	Percent of ODCM Quarterly dose limit (*)	%	3.81E-02	6.31E-02	1.01E-01	7.77E-02	
D. Tritium							
1	Total release	Ci	4.51E+00	7.04E+00	3.60E+01	1.25E+01	7.56E+00
2	Average release rate for period	µCi/sec	5.80E-01	8.95E-01	4.53E+00	1.57E+00	
3	Percent of ODCM Quarterly dose limit (*)	%	3.81E-02	6.31E-02	1.01E-01	7.77E-02	
E. Gross Alpha							
1	Total release	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.94E+01
2	Average release rate for period	µCi/sec	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
F. Carbon14							
1	Total release	Ci	3.71E+00	3.62E+00	3.78E+00	2.83E+00	
2	Average release rate for period	µCi/sec	4.77E-01	4.60E-01	4.76E-01	2.99E-01	

1. Based upon a quarterly dose limit of 5.00 mRad/yr for the Site
2. Based upon a quarterly dose limit of 10.00 mRad/yr for the Site

* "Percent of ODCM quarterly dose limit" indicates combined total of Iodine-131, Particulates, and Tritium

Lower Limits of Detectability for Gaseous Effluents

Fission / Activation Gases	**µCi/cc**
Kr-87	1.00E-04
Kr-88	1.00E-04
Xe-133	1.00E-04
Xe-133m	1.00E-04
Xe-135	1.00E-04
Xe-138	1.00E-04
Iodines	
I-131	1.00E-12
I-133	1.00E-10
Particulates	
Sr-89	1.00E-11
Sr-90	1.00E-11
Mn-54	1.00E-11
Co-58	1.00E-11
Fe-59	1.00E-11
Co-60	1.00E-11
Zn-65	1.00E-11
Mo-99	1.00E-11
Cs-134	1.00E-11
Cs-137	1.00E-11
Ce-141	1.00E-11
Ce-144	1.00E-11
Other	
H-3	1.00E-06
Gross Alpha	1.00E-11

The above limits are the ODCM required Lower Limits of Detection (LLD).

Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

Table 2.2.A(1) Gaseous Effluents Release Point: Unit 1 Ground Level

Nuclides Released		Continuous Mode				Batch Mode			
	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1. Fission gases									
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ar-41	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
2. Iodines									
I-131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
3. Particulates									
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	1.80E-05	1.80E-05	1.80E-05	1.80E-05	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
cr-51	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	1.80E-05	1.80E-05	1.80E-05	1.80E-05	<LLD	<LLD	<LLD	<LLD
4. Tritium									
H-3 Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
5. Gross Alpha									
Gross Alpha Total	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
6. Carbon 14									
C-14 Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

Table 2.2.A (2) Gaseous Effluents Release Point: Unit 2 Ground Level

Nuclides Released		Continuous Mode				Batch Mode			
	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1. Fission gases									
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	3.79E-08	3.80E-08	4.32E-08	4.45E-08	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	2.16E-07	2.22E-07	2.51E-07	2.66E-07	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	1.36E-07	1.38E-07	1.54E-07	1.74E-07	<LLD	<LLD	<LLD	<LLD
Xe-131m	Ci	<LLD	<LLD	3.20E-08	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	5.65E-09	7.47E-09	3.64E-09	8.92E-09	<LLD	<LLD	<LLD	<LLD
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	2.04E-07	2.12E-07	2.34E-07	2.61E-07	<LLD	<LLD	<LLD	<LLD
Xe-135m	Ci	4.38E-07	4.30E-07	5.23E-07	6.04E-07	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	1.68E-06	1.69E-06	2.13E-06	2.42E-06	<LLD	<LLD	<LLD	<LLD
Ar-41	Ci	4.27E-08	3.74E-08	4.90E-08	6.18E-08	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	2.76E-06	2.78E-06	3.42E-06	3.84E-06	<LLD	<LLD	<LLD	<LLD
2. Iodines									
I-131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
I-132	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
I-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
3. Particulates									
Br-82	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-57	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Te-123m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Hf-181	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Zr-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sn-117m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

Sb-124	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sb-125	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
4. Tritium									
H-3 Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
5. Gross Alpha									
Gross Alpha Total	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
6. Carbon 14									
C-14 Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

Table 2.2.A(3) Gaseous Effluents Release Point: Unit 3 Ground Level

Nuclides Released		Continuous Mode				Batch Mode			
	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1. Fission gases									
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	3.40E-08	2.49E-08	3.06E-08	1.36E-08	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	1.84E-07	1.44E-07	1.85E-07	7.63E-08	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	1.18E-07	9.07E-08	1.10E-07	4.90E-08	<LLD	<LLD	<LLD	<LLD
Xe-131m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	3.02E-09	7.79E-10	3.30E-09	3.81E-09	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	2.14E-07	1.71E-07	1.96E-07	9.60E-08	<LLD	<LLD	<LLD	<LLD
Xe-135m	Ci	4.66E-07	3.61E-07	4.20E-07	2.15E-07	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	1.69E-06	1.26E-06	1.54E-06	7.56E-07	<LLD	<LLD	<LLD	<LLD
Ar-41	Ci	3.38E-08	3.07E-08	3.43E-08	2.36E-07	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	2.74E-06	2.08E-06	2.51E-06	1.45E-06	<LLD	<LLD	<LLD	<LLD
2. Iodines									
I-131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
I-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
3. Particulates									
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-57	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Te-123m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Hf-181	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Zr-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sn-117m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sb-124	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sb-125	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

4. Tritium									
H-3 Total for Period	Ci	6.61E-03	<LLD	<LLD	5.12E-04	<LLD	<LLD	<LLD	<LLD
5. Gross Alpha									
Gross Alpha Total	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
6. Carbon 14									
C-14 Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

Table 2.2.B(1) Gaseous Effluents Release Point: Unit 1 Elevated

Nuclides Released		Continuous Mode				Batch Mode			
	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1. Fission gases									
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ar-41	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
2. Iodines									
I-131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
3. Particulates									
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
4. Tritium									
H-3 Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
5. Gross Alpha									
Gross Alpha Total	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
6. Carbon 14									
C-14 Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

Dresden Nuclear Power Station Units 1,2, 3 — Licensee: Constellation Energy Company, LLC

Table 2.2.B(2) Gaseous Effluents Release Point: Unit 2 Elevated

Nuclides Released	Units	Continuous Mode				Batch Mode			
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1. Fission gases									
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	3.12E-01	2.26E-01	2.05E-01	1.14E-01	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	1.15E-01	1.16E-01	1.20E-01	9.88E-02	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	1.44E-01	1.19E-01	1.09E-01	7.49E-02	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	8.28E-01	5.63E-01	5.18E-01	3.17E-01	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	1.25E-01	9.54E-02	9.61E-02	8.38E-02	<LLD	<LLD	<LLD	<LLD
Xe-135m	Ci	6.50E-01	6.24E-01	6.50E-01	5.50E-01	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	2.80E+00	2.74E+00	2.94E+00	2.44E+00	<LLD	<LLD	<LLD	<LLD
Ar-41	Ci	1.06E+00	1.53E+00	1.39E+00	6.98E-01	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	6.03E+00	6.01E+00	6.02E+00	4.38E+00	<LLD	<LLD	<LLD	<LLD
2. Iodines									
I-131	Ci	3.99E-05	3.62E-05	4.26E-05	5.81E-05	<LLD	<LLD	<LLD	<LLD
I-133	Ci	3.06E-04	3.96E-04	3.27E-04	3.41E-04	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	5.04E-05	2.58E-04	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	3.45E-04	4.82E-04	6.28E-04	3.99E-04	<LLD	<LLD	<LLD	<LLD
3. Particulates									
Zn-65	Ci	5.39E-06	7.51E-06	3.60E-06	5.59E-06	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	6.26E-06	1.09E-05	4.03E-06	1.16E-05	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	3.33E-06	5.20E-07	8.09E-06	9.08E-06	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	2.65E-07	2.98E-06	1.88E-05	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	2.15E-06	1.94E-06	5.40E-06	1.41E-05	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	1.54E-05	3.42E-05	2.97E-05	8.85E-05	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	9.10E-08	<LLD	<LLD	<LLD	<LLD	<LLD
Sn-117m	Ci	2.63E-06	<LLD	<LLD	1.85E-05	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	3.52E-05	5.53E-05	5.39E-05	1.66E-04	<LLD	<LLD	<LLD	<LLD
4. Tritium									
H-3 Total for Period	Ci	1.92E+00	1.99E+00	8.06E+00	6.24E+00	<LLD	<LLD	<LLD	<LLD
5. Gross Alpha									
Gross Alpha Total	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
6. Carbon 14									
C-14 Total for Period	Ci	3.71E+00	3.74E+00	3.70E+00	3.79E+00	<LLD	<LLD	<LLD	<LLD

Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

Table 2.2.B(3) Gaseous Effluents Release Point: Unit 3 Elevated

Nuclides Released		Continuous Mode				Batch Mode			
	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1. Fission gases									
Kr-85	Ci	<LLD	1.48E+00	1.11E+00	2.09E-01	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	2.07E+00	8.49E-03	1.09E-02	2.74E-02	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	3.16E+00	2.18E-01	2.11E-01	8.18E-02	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	5.47E+00	3.16E-02	4.04E-02	2.25E-02	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	1.82E+00	4.44E-02	3.59E-02	9.13E-02	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	1.80E+01	3.18E-01	3.29E-01	2.00E-01	<LLD	<LLD	<LLD	<LLD
Xe-135m	Ci	4.25E-01	3.91E-01	5.01E-01	2.66E-01	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	1.71E+00	1.54E+00	2.03E+00	1.01E+00	<LLD	<LLD	<LLD	<LLD
Ar-41	Ci	2.14E+00	1.24E-02	1.33E-02	1.57E-01	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	3.48E+01	4.04E+00	4.29E+00	2.06E+00	<LLD	<LLD	<LLD	<LLD
2. Iodines									
I-131	Ci	4.66E-05	7.87E-05	1.28E-04	8.96E-05	<LLD	<LLD	<LLD	<LLD
I-133	Ci	6.21E-04	7.96E-04	1.03E-03	5.29E-04	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	1.04E-04	7.57E-04	1.44E-04	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	6.68E-04	9.79E-04	1.91E-03	7.62E-04	<LLD	<LLD	<LLD	<LLD
3. Particulates									
Zn-65	Ci	1.03E-05	1.53E-05	1.10E-05	1.01E-05	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	8.52E-06	2.31E-05	1.37E-05	1.50E-05	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	6.13E-06	9.10E-07	2.40E-05	5.90E-06	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	4.63E-07	9.08E-06	2.06E-05	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	4.36E-06	5.12E-06	1.77E-05	2.79E-05	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	3.11E-05	7.52E-05	9.29E-05	9.36E-05	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	2.56E-07	<LLD	<LLD	<LLD	<LLD	<LLD
Sn-117m	Ci	5.05E-06	<LLD	<LLD	2.03E-05	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	6.55E-05	1.20E-04	1.69E-04	1.93E-04	<LLD	<LLD	<LLD	<LLD
4. Tritium									
H-3 Total for Period	Ci	3.83E+00	4.28E+00	3.12E+01	7.11E+00	<LLD	<LLD	<LLD	<LLD
5. Gross Alpha									
Gross Alpha Total	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
6. Carbon 14									
C-14 Total for Period	Ci	3.71E+00	3.62E+00	3.78E+00	2.83E+00	<LLD	<LLD	<LLD	<LLD

Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

Table 2.2.C(1) Gaseous Effluents Release Point: Unit 1 Mixed Mode

Nuclides Released		Continuous Mode				Batch Mode			
	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1. Fission gases									
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ar-41	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
2. Iodines									
I-131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
3. Particulates									
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
4. Tritium									
H-3 Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
5. Gross Alpha									
Gross Alpha Total	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
6. Carbon 14									
C-14 Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

Table 2.2.C(2) Gaseous Effluents Release Point: Unit 2 Mixed Mode

Nuclides Released		Continuous Mode				Batch Mode			
	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1. Fission gases									
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ar-41	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
2. Iodines									
I-131	Ci	<LLD	<LLD	<LLD	2.21E-06	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	2.21E-06	<LLD	<LLD	<LLD	<LLD
3. Particulates									
Zn-65	Ci	<LLD	<LLD	,LLD	8.29E-06	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cr-51	Ci	<LLD	<LLD	<LLD	1.22E-04	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	5.81E-06	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	6.74E-06	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	5.03E-06	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	2.47E-05	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sn-117m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	1.73E-04	<LLD	<LLD	<LLD	<LLD
4. Tritium									
H-3 Total for Period	Ci	6.09E-01	1.27E+00	1.33E+00	4.47E+00	<LLD	<LLD	<LLD	<LLD
5. Gross Alpha									
Gross Alpha Total	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
6. Carbon 14									
C-14 Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

Table 2.2.C(3) Gaseous Effluents Release Point: Unit 3 Mixed Mode

Nuclides Released		Continuous Mode				Batch Mode			
	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1. Fission gases									
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ar-41	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
2. Iodines									
I-131	Ci	<LLD	<LLD	<LLD	3.98E-06	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	3.98E-06	<LLD	<LLD	<LLD	<LLD
3. Particulates									
Zn-65	Ci	<LLD	<LLD	<LLD	5.39E-06	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cr-51	Ci	<LLD	<LLD	<LLD	8.10E-05	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	4.25E-06	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	2.26E-05	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	1.47E-05	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	1.52E-05	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sn-117m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	1.43E-04	<LLD	<LLD	<LLD	<LLD
4. Tritium									
H-3 Total for Period	Ci	6.72E-01	2.76E+00	4.78E+00	5.35E+00	<LLD	<LLD	<LLD	<LLD
5. Gross Alpha									
Gross Alpha Total	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
6. Carbon 14									
C-14 Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

Table 3.1(1) Liquid Effluents- Summation of All Releases: Unit 1

		Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Est. Total Error, %
A. Fission & Activation Gases							
1	Total Release	Ci	N/A	N/A	N/A	N/A	1.95E+01
2	Average Concentration	µCi/mL	N/A	N/A	N/A	N/A	
3	Percent of ODCM Quarterly dose limit	%	N/A	N/A	N/A	N/A	
B. Tritium							
1	Total release	Ci	N/A	N/A	N/A	N/A	2.37E+00
2	Average Concentration	µCi/mL	N/A	N/A	N/A	N/A	
3	Percent of ODCM Quarterly dose limit	%	N/A	N/A	N/A	N/A	
C. Dissolved and Entrained Gases							
1	Total release	Ci	N/A	N/A	N/A	N/A	2.03E+01
2	Average Concentration	µCi/mL	N/A	N/A	N/A	N/A	
3	Percent of ODCM Quarterly dose limit	%	N/A	N/A	N/A	N/A	
D. Gross Alpha							
1	Total release	Ci	N/A	N/A	N/A	N/A	2.00E+01
2	Average Concentration	µCi/mL	N/A	N/A	N/A	N/A	
E. Liquid Release Volume							
1	Total Release	Liters	N/A	N/A	N/A	N/A	
F. Dilution Volume							
1	Total Release	Liters	N/A	N/A	N/A	N/A	

Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

Table 3.1(2) Liquid Effluents- Summation of All Releases: Unit 2

		Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Est. Total Error, %
A. Fission & Activation Gases							
1	Total Release	Ci	N/A	N/A	N/A	N/A	1.95E+01
2	Average Concentration	µCi/mL	N/A	N/A	N/A	N/A	
3	Percent of ODCM Quarterly dose limit	%	N/A	N/A	N/A	N/A	
B. Tritium							
1	Total release	Ci	8.35E-05	0.00E+00	0.00E+00	2.24E-04	2.37E+00
2	Average Concentration	µCi/mL	1.06E-13	0.00E+00	0.00E+00	2.84E-13	
3	Percent of ODCM Quarterly dose limit	%	2.03E-08	0.00E+00	0.00E+00	5.46E-07	
C. Dissolved and Entrained Gases							
1	Total release	Ci	N/A	N/A	N/A	N/A	2.03E+01
2	Average Concentration	µCi/mL	N/A	N/A	N/A	N/A	
3	Percent of ODCM Quarterly dose limit	%	N/A	N/A	N/A	N/A	
D. Gross Alpha							
1	Total release	Ci	N/A	N/A	N/A	N/A	2.00E+01
2	Average Concentration	µCi/mL	N/A	N/A	N/A	N/A	
E. Liquid Release Volume							
1	Total Release	Liters	5.73E+04	0.00E+00	0.00E+00	1.09E+05	
F. Dilution Volume							
1	Total Release	Liters	7.89E+11	5.73E+04	5.73E+04	7.89E+11	

Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

Table 3.1 (3) Liquid Effluents- Summation of All Releases: Unit 3

		Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Est. Total Error, %
A. Fission & Activation Gases							
1	Total Release	Ci	N/A	N/A	N/A	N/A	1.95E+01
2	Average Concentration	µCi/mL	N/A	N/A	N/A	N/A	
3	Percent of ODCM Quarterly dose limit	%	N/A	N/A	N/A	N/A	
B. Tritium							
1	Total release	Ci	8.35E-05	0.00E+00	0.00E+00	2.24E-04	2.37E+00
2	Average Concentration	µCi/mL	1.06E-13	0.00E+00	0.00E+00	2.84E-13	
3	Percent of ODCM Quarterly dose limit	%	2.03E-08	0.00E+00	0.00E+00	5.46E-08	
C. Dissolved and Entrained Gases							
1	Total release	Ci	N/A	N/A	N/A	N/A	2.03E+01
2	Average Concentration	µCi/mL	N/A	N/A	N/A	N/A	
3	Percent of ODCM Quarterly dose limit	%	N/A	N/A	N/A	N/A	
D. Gross Alpha							
1	Total release	Ci	N/A	N/A	N/A	N/A	2.00E+01
2	Average Concentration	µCi/mL	N/A	N/A	N/A	N/A	
E. Liquid Release Volume							
1	Total Release	Liters	5.73E+04	0.00E+00	0.00E+00	1.09E+05	
F. Dilution Volume							
1	Total Release	Liters	7.89E+11	0.00E+00	0.00E+00	1.56E+12	

Lower Limits of Detection for Liquid Effluents

Fission and Activation Gase	**µCi/mL**
Kr-87	1.00E-05
Kr-88	1.00E-05
Xe-133	1.00E-05
Xe-133m	1.00E-05
Xe-135	1.00E-05
Xe-138	1.00E-05
Iodines	
I-131	1.00E-06
Particulates	
Fe-55	1.00E-06
Sr-89	5.00E-08
Sr-90	5.00E-08
Mn-54	5.00E-07
Co-58	5.00E-07
Fe-59	5.00E-07
Co-60	5.00E-07
Zn-65	5.00E-07
Mo-99	5.00E-07
Cs-134	5.00E-07
Cs-137	5.00E-07
Ce-141	5.00E-07
Ce-144	5.00E-06
Other	
H-3	1.00E-05
Gross Alpha	1.00E-07

The above limits are the ODCM required Lower Limits of Detection (LLD).

Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

Table 3.2(1) Liquid Effluents Release Point: Unit 1

Nuclides Released		Continuous Mode				Batch Mode			
	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
I-131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Zr-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Tc-99m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-55	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
H-3	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
	Ci								
	Ci								
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

Table 3.2(2) Liquid Effluents Release Point: Unit 2

Nuclides Released		Continuous Mode				Batch Mode			
	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
I-131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Zr-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Tc-99m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-55	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
H-3	Ci	8.35E-05	<LLD	<LLD	2.24E-04	<LLD	<LLD	<LLD	<LLD
	Ci								
	Ci								
Total for Period	Ci	8.35E-05	<LLD	<LLD	2.24E-04	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

Dresden Nuclear Power Station Units 1,2, 3 — Licensee: Constellation Energy Company, LLC

Table 3.2(3) Liquid Effluents Release Point: Unit 3

Nuclides Released		Continuous Mode				Batch Mode			
	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
I-131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Zr-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Tc-99m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-55	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
H-3	Ci	8.35E-05	<LLD	<LLD	2.24E-04	<LLD	<LLD	<LLD	<LLD
	Ci								
	Ci								
Total for Period	Ci	8.35E-05	<LLD	<LLD	2.24E-04	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

Table 4 Batch and Abnormal Release Totals Site

Batch Releases

A. Liquid Releases

		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual
1. Number of Batch Releases		0	0	0	0	0
2. Total duration of batch releases	min	N/A	N/A	N/A	N/A	N/A
3. Maximum batch release duration	min	N/A	N/A	N/A	N/A	N/A
4. Average batch release duration	min	N/A	N/A	N/A	N/A	N/A
5. Minimum batch release duration	min	N/A	N/A	N/A	N/A	N/A

B. Gaseous Releases

		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual
1. Number of Batch Releases		0	0	0	0	0
2. Total duration of batch releases	min	N/A	N/A	N/A	N/A	N/A
3. Maximum batch release duration	min	N/A	N/A	N/A	N/A	N/A
4. Average batch release duration	min	N/A	N/A	N/A	N/A	N/A
5. Minimum batch release duration	min	N/A	N/A	N/A	N/A	N/A

Abnormal Releases

A. Liquid Releases	Units	Annual
1. Number of Abnormal Releases		0
2. Total Activity	Ci	0.00E+00

B. Gaseous Releases	Units	Annual
1. Number of Abnormal Releases		0
2. Total Activity	Ci	0.00E+00

Dresden Nuclear Power Station Units 1,2, 3 — Licensee: Constellation Energy Company, LLC

RADIOLOGICAL IMPACT ON MAN

Table 5 Total Body Dose from Gaseous and Liquid Effluents

		Unit 1	Unit 2	Unit 3	Site
Liquid	mRem	N/A	1.12E-09	1.12E-09	2.25E-09
Gaseous	mRad	N/A	7.38E-04	1.03E-03	1.76E-03
Radioiodines, tritium and Particulates	mRem	1.04E-03	7.89E-04	1.28E-03	3.10E-03
C-14	mRem	N/A	5.34E-03	4.97E-03	1.03E-02

Table 5.1 Organ Dose from Gaseous and Liquid Effluents

		Unit 1	Unit 2	Unit 3	Site
Liquid	mRem	N/A	1.12E-09	1.12E-09	2.25E-09
Gaseous (Skin)	mRad	N/A	1.25E-03	1.75E-03	3.00E-03
Radioiodines, tritium and Particulates	mRem	2.71E-03 (Liver)	1.08E-02 (Thyroid)	2.10E-02 (Thyroid)	3.18E-02

Dresden Nuclear Power Station Units 1,2, 3 Licensee: Constellation Energy Company, LLC

Table 6 Solid Waste Shipped Offsite for Burial or Disposal (Not irradiated fuel)

1- Types of Waste

Types of Waste	Total Quantity (m^3)	Total Activity (Ci)	Period	Est. Total Error %
a. Spent resins, filter sludges, evaporator bottoms, etc.	9.03E+01	1.30E+02	01/01-12/31	± 25
b. Dry compressible waste, contaminated equip., etc.	4.49E+02	3.64E-01	01/01-12/31	± 25
c. Irradiated components, control rods, etc.	0.00E+00	0.00E+00	01/01-12/31	± 25
d. Other (describe)	0.00E+00	0.00E+00	01/01-12/31	± 25

2- Estimate of major nuclide composition (by waste type)

Major Nuclide Composition	%
Resins, Filters, and Evap Bottoms	
a. Cs-137 (2.59E+01 Ci)	19.94
Fe-55 (3.18E+01 Ci)	24.5
Co-60 (6.27E+01 Ci)	48.28
Ni-63 (3.24E+00 Ci)	2.5
Zn-65 (2.95E+00 Ci)	2.27
Mn-54 (1.89E+00 Ci)	1.46
Dry Active Waste	
b. Mn-54 (2.44E-02 Ci)	6.69
Fe-55 (1.60E-01 Ci)	43.84
Fe-59 (3.88E-03 Ci)	1.06
Co-58 (6.32E-03 Ci)	1.73
Co-60 (1.42E-01 Ci)	38.96
Zn-65 (1.05E-02 Ci)	2.87
Cr-51 (1.14E-02 Ci)	3.12
Irradiated Components	
c. None	
Other	
d. Mn-54 (0.00E+00 Ci)	0.00
Fe-55 (0.00E+00 Ci)	0.00
Co-58 (0.00E+00 Ci)	0.00
Co-60 (0.00E+00 Ci)	0.00
Zn-65 (0.00E+00 Ci)	0.00
Cs-137 (0.00E+00 Ci)	0.00
Cr-51 (0.00E+00 Ci)	0.00

3- Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
12	Ground	Energy Solutions--Oak Ridge, TN
20	Ground	Energy Solutions--Clive, UT

CHANGES TO THE PROCESS CONTROL PROGRAM

The Process Control Program procedure (RW-AA-100) Rev 12 was revised last on 8/17/2017. There have been no new changes for the 2022 year.

DIRECT RADIATION

There are five identified sources of direct radiation dose that meets the definition referenced in 10CFR72.104 and must be added to the gaseous and liquid effluents dose. They are:

1. Skyshine
2. West Independent Spent Fuel Storage Installation (ISFSI) Pad
3. East ISFSI Pad
4. Condensate Storage Tanks (CST)
5. General Electric Facility located southwest of the plant on Collins Road.

Skyshine

The radioactivity source that results in the most significant offsite radiation dose at the Dresden Station is skyshine resulting from ^{16}N decay inside turbines and steam piping.

The ^{16}N that produces the skyshine effect is formulated through neutron activation of the oxygen atoms in the reactor coolant as the coolant passes through the operating reactor core. The ^{16}N travels with the steam produced in the reactor to the steam-driven turbine. While the ^{16}N is in transport, it radioactively decays with a half-life of about 7 seconds and produces 6-7 MeV gamma rays. Typically, offsite dose points are shielded from a direct view of components containing ^{16}N, but there can be skyshine at offsite locations due to scattering of gamma rays off the mass of air above the steam lines and turbine.

The dose rate due to skyshine has been found to have the following dependencies:

1. The dose rate decreases as distance from the station increases.
2. The dose rate increases non-linearly as the power production level increases.
3. The dose rate increases when hydrogen is added to the reactor coolant, an action taken to improve reactor coolant chemistry characteristics.

To calculate offsite dose due to skyshine in a given time period, Dresden Station must track the following parameters:

1. The total gross energy E_h produced with hydrogen being added.
2. The total gross energy E_o produced without hydrogen being added.

The turbines at the site are sufficiently close to each other, such that energy generated by the two operating units may be summed. Because the hydrogen addition system is normally in-service during plant operation, the conservative assumption that all power is generated during hydrogen addition can be used.

An initial estimate of skyshine dose is calculated using equation 5-1 on page II.5.4 in the Dresden Offsite Dose Calculation Manual with the following assumptions from Table 5.1 on page II.5-11:

$$D_{sky} = (K)(E_o - M_h E_h)((OF_1 * SF_1 e^{-0.007*R1}) + (OF_2 * SF_2 e^{-0.007*R2}) \qquad (5\text{-}1)$$

Table 6.1 Parameters for Calculations of N-16 Skyshine Radiation from Dresden Units 2 and 3

Location Number K	Activity	Occupancy Hours (OH)	Occupancy Factor (OF)	Shielding Factor (SF)	Distance (R)
1	Living at Home	8344	0.95	0.7	800
2	Fishing	416	0.05	1.0	610

These parameters are used to obtain an initial estimate of skyshine dose to the maximally exposed member of the public using Equation 5-1. If desired, more realistic parameters could be used in place of these to refine the estimate. For example, one could determine whether the nearest resident really fishes the specified number of hours at the specified location.

a. The amount of time in a year that a maximally exposed fisherman would spend fishing near the site is estimated as 12 hours per week for 8 months per year. This yields an estimate of:

[12 hours/week] x [(8 months/yr)/(12 months/yr)] x [52 weeks/yr] = 416 hours/yr

The remaining time is assumed to be spent at the nearest residence.

b. Distance to nearest residence (See ODCM Table 4-1).

c. Estimated from a drawing of the site.

d. The OF_k is the quotient of the number of hours a location is occupied and the number of hours in a year. Thus $OH_k/8760$ hours = OF_k rounded to the 0.01 digit.

A survey of the nearest residents revealed that as they do enjoy fishing, they spend far less time than the above estimate in Table 6.1 above. Additionally, because they live on the Kankakee River, they enjoy fishing near their homes rather than the designated 610 meters from the plant. As such, these assumptions have been adjusted in order to calculate a more accurate dose to the nearest resident at 868 meters from the plant with 8000 occupancy hours per year allowing more time away from home to work, shop, and take vacation. This yielded a dose from Unit 2 due to skyshine of 2.271 mRem and 2.119 mRem from Unit 3 for a total of 4.39 mRem for the Site.

Independent Spent Fuel Storage Installation

There are currently two ISFSI pads (east and west) located within the Protected area of the Dresden station. These casks contain the spent fuel from the reactor and the pad is designed to store the spent fuel until a more suitable location is available. Optically stimulated luminescence dosimeters (OSLD) are placed on the fence around the pads and exchanged semi-annually to measure the direct dose from the ISFSI pad. The dose from each location is summed to acquire an annual dose for that specific location being a known distance from the casks.

The equation for a point source is used ($DR_1{*}D_1^2 = DR_2{*}D_2^2$) to calculate the annual dose to the nearest member of the public. The OSLD with the highest annual reading was used because they have a lesser contribution by percent of background radiation lending to more accuracy in the dose attributable only to the ISFSI pad.

Table 7: West ISFSI Pad Dose Calculations

	Q1 (mrem)	Q2 (mrem)	DR_1 (mrem/yr)	D_1 (ft)	D_2 (ft)	DR_2 (mrem/yr)
23	248.6	263.3	511.9	136.18	2640	1.36
24	857.8	806.2	1664.0	91.38	2640	1.99
25	545.4	446.8	992.2	98.41	2640	1.38
26	146.2	156.6	302.8	89.99	2640	0.35
27	413.6	324.2	737.8	61.40	2640	0.40
28	252.5	218.9	471.4	117.3	2640	0.93

Figure 1: West ISFSI Pad

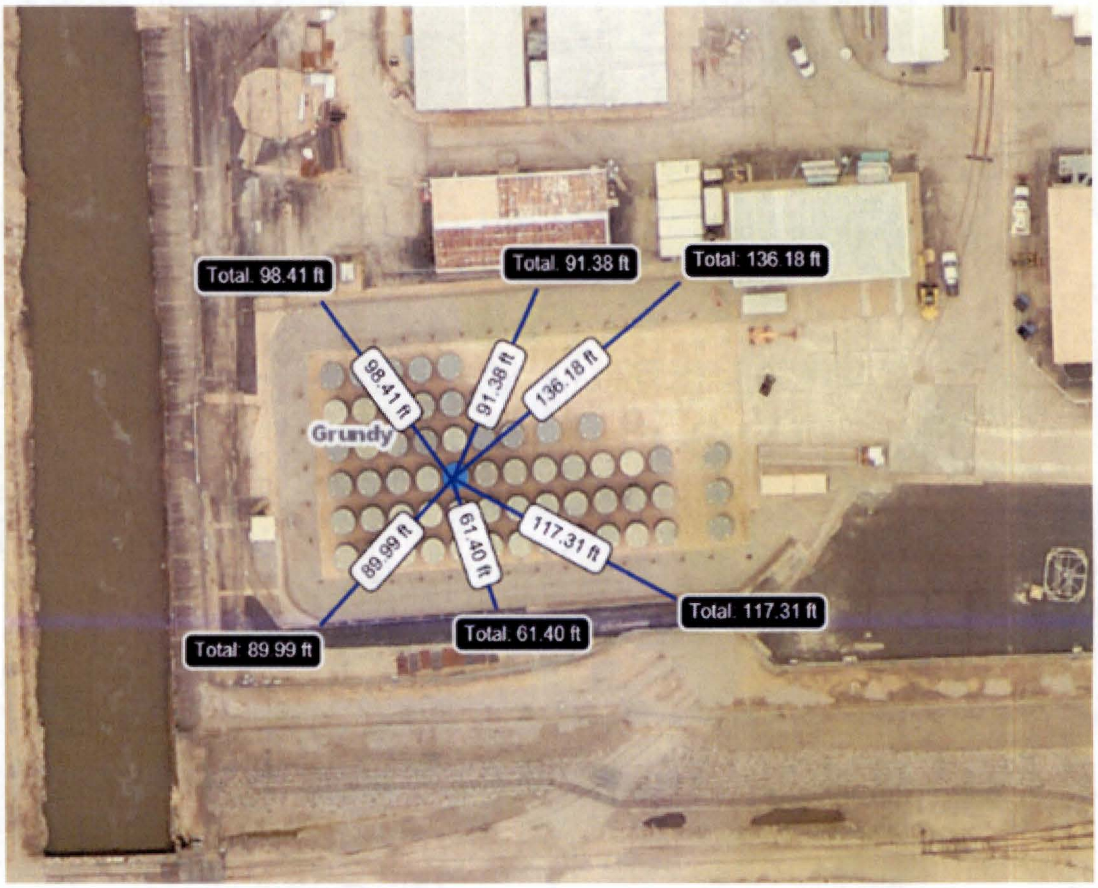
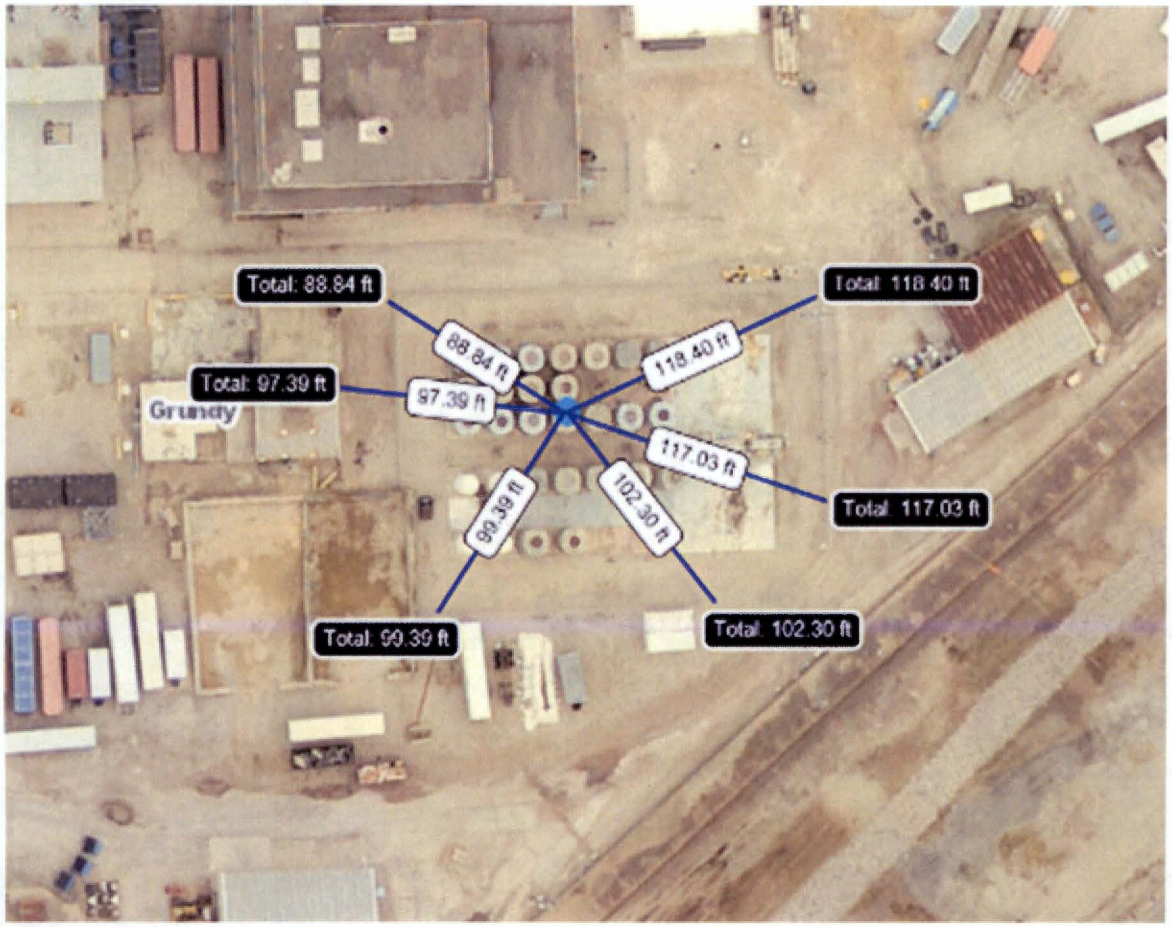


Table 7.1: East ISFSI Pad Dose Calculations

	Q1 (mrem)	Q2 (mrem)	DR_1 (mrem/yr)	D_1 (ft)	D_2 (ft)	DR_2 (mrem/yr)
17	75.1	85.3	160.4	88.84	2660	0.18
18	76.1	87.3	163.4	99.39	2660	0.23
19	69.5	81.1	150.6	102.30	2660	0.22
20	104.8*	104.8	209.6	117.00	2660	0.41
21	263.2	228.1	491.3	118.40	2660	0.97
22	90.8	90.3	181.1	97.39	2660	0.24

*Dosimeter lost and dose not reported. Assumed to be similar to Q2 value.

Figure 2: East ISFSI Pad



The highest annual dose received from the ISFSI pads were locations 21 and 24. These results and distances from the center of the pad were used to calculate a dose of 9.70E-01 mRem/yr for the West pad and 1.99E+00 mRem/yr for the East pad. This resulted in a combined annual dose of 2.96E+00 mRem/ yr. due to direct radiation from storage of spent fuel on the IFSFI pads.

Condensate Storage Tank (CST)

The Condensate Storage Tanks (A and B) are a source of make-up water and have become contaminated through the operation of the plant. Although the level of contamination of the water inside the tank is not at a level to produce a measurable dose rate, tanks are specifically listed in 40CFR190 and a calculation of the annual dose to the nearest resident must be performed.

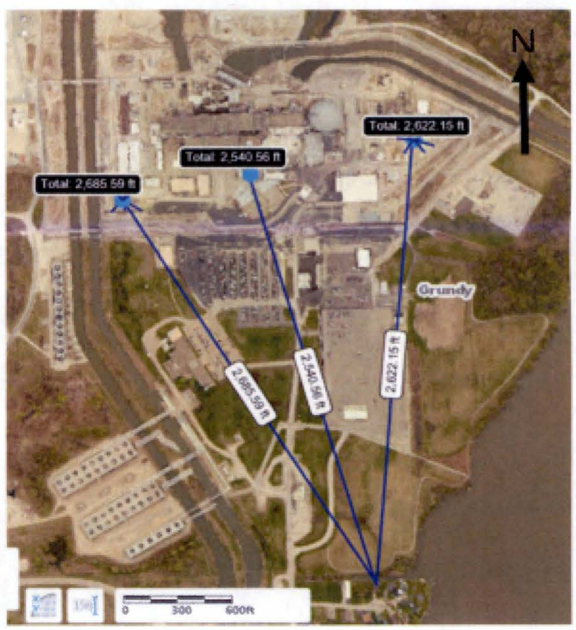
A direct radiation dosimeter (07) was placed on the northeast perimeter fence of the 2/3 Condensate Storage Tank identical to those on the ISFSI pad, and as such will use the same methodology to calculate an annual dose.

Table 7.2: CST Dose Calculations

	Q1 (mrem)	Q2 (mrem)	DR_1 (mrem/yr)	D_1 (ft)	D_2 (ft)	DR_2 (mrem/yr)
7	146.3	153	299.3	17	2540	0.013

Figure 3: 2/3 Condensate Storage Tanks

Figure 4: Distance to Nearest Resident



The approximate distance from the dosimeter on the fence to the edge of the tank is 17 ft. Using the same equation and the distance to the nearest residence (2543 ft.) $DR_1*D_1^2=DR_2*D_2^2$ yields an annual dose of 1.30E-02 mRem/year. These calculations are conservative because the measured dose is almost entirely from background and not from the plant or storage tanks.

GE Hitachi Nuclear Energy Facility

This facility is located southwest of the Dresden Nuclear Power Station on Collins Rd and is the location of a de facto high-level radioactive waste storage site that holds 772 tons of spent nuclear fuel. The used fuel from various nuclear generating sites across the country are stored in a spent fuel pool.

Since the source of radiation from the site is from the uranium fuel cycle, the site is also required to ensure that the requirements of 40CFR190 and 10CFR72 are met. Therefore, an Annual Operating Report is generated and submitted to the NRC to demonstrate that the regulatory limits are not exceeded to members of the public.

40CFR190 states that the annual whole-body dose to a member of the public shall not exceed 25 mRem/yr from all sources of the uranium fuel cycle. This distinction dictates that the sum of the dose from the operation of the Dresden Nuclear Power Station and the GE Hitachi Nuclear Energy site cannot cause a member of the public to exceed a whole-body dose of 25 mRem/year. As a result, communication from the two sites is necessary to exchange the calculated dose contributions to ensure this requirement is met. The dose contribution from the GE Hitachi site for the 2022 year was: 9.70E-02 mRem/yr.

Attachment 1

RADIOACTIVE GROUNDWATER PROTECTION PLAN (RGPP)

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AMO ENVIRONMENTAL DECISIONS
Environmental Risk & Remediation Consultants

Geologists
Hydrogeologists
GIS Analysts
Environmental Scientists

March 1, 2023

Constellation Energy Company, LLC
Dresden Generating Station
6500 North Dresden Road
Morris, IL 60450-9709

Subject: 2022 Annual RGPP Monitoring Report
Summary of Results and Conclusions
Dresden Generating Station
Morris, Illinois

This letter report presents the summary of Radiologic Groundwater Protection Plan (RGPP) results for the 2022 groundwater and surface water monitoring rounds conducted at the Constellation Dresden Generating Station. RGPP data for previous monitoring rounds is summarized in AMO's semi-annual/quarterly reports.

Background

In 2006, Conestoga-Rovers & Associates (CRA) was retained by Exelon Nuclear to perform a hydrogeologic investigation at the Dresden Generating Station to evaluate whether groundwater at or near the Station has been impacted by releases of radionuclides. Prior to performing the investigation, CRA evaluated available information concerning historic releases, as well as components, structures, and areas of the facility that have the potential to release radioactive liquid to the environment.

The results of the 2006 investigation identified that almost half of the 39 wells within the protected are showed measurable concentrations of tritium. It was concluded that the tritium in groundwater within the protected area came from historic spills from above ground tanks and leaks of underground lines within the protected area. Groundwater samples collected outside the protected area showed no detectable tritium for 24 of the 26 wells. The two exceptions for the wells outside the protected area include wells DSP 149(R) and DSP-159-I (M).

The results of the fleet wide study for the Dresden Generating Station (the Station) are presented in the report, entitled *Hydrogeologic Investigation Report, Fleetwide Assessment, Dresden Generating Station, Braceville, Illinois* (Conestoga-Rovers & Associates, September 2006). The referenced report also provides detailed descriptions of the Station's location, surrounding features and land use, subsurface geology and hydrogeology, and a summary of groundwater use in the area of the Station.

GHD completed three five-year update hydrogeologic investigation reports for the Station (*NEI 07-07, Hydrogeologic Investigation Report*, dated May 2011, December 2015, and December 2020). The reports summarized station activities since the 2006 hydrogeologic investigation, including changes at the Station as well as RGPP sampling activities and groundwater flow. Relevant conclusions from the 2020 report are:

- Tritium is not migrating off the Station at concentrations greater than the State of Illinois criteria of 200 pCi/L.
- Tritium concentrations in groundwater were detected at concentrations greater than the USEPA drinking water standard. The maximum tritium concentration at the end of 2019 was 33,850 pCi/L

(MD-11). Tritium concentrations greater than the USEPA drinking water standard were limited to the "B" CST, south of the Unit 3 Turbine Building.

- No gamma-radionuclides associated with licensed plant operations were detected at concentrations greater than their respective LLDs.
- Select transuranics U-233/234 and U-238 were occasionally detected in several wells since 2016. The concentrations are considered background.
- In 2019, Ni-63 was consistently detected in monitoring well MW-DN-101I and MW-DN-119I. Per revision 9 of the RGPP, and to investigate Ni-63 in groundwater, the Station includes Ni-63 and Fe-55 analysis for all Source wells and all Long-Term Shutdown wells currently sampled as part of the RGPP.
- In 2019, multiple Sr-90 concentrations were detected above its LLD. Sr-90 was detected in samples collected from MW-DN-105S three of the four sampling rounds in 2019. Sr-90 was also detected in DSP-108 during the second quarter 2019 RGPP sampling round.
- AFE-1 remains an ongoing tritium source to groundwater. No new AFEs were identified based on results between 2006 and 2015.
- Extraction well RW-DN-100S continued to withdraw tritiated water from the "B" CST area. Up until August/September 2019, groundwater withdrawal from RW-DN-100S was on an intermittent basis. Continuous groundwater extraction of RW-DN-100S began in September 2019. As of the date of the report, over one million gallons of groundwater was extracted from RW-DN-100S. The extracted groundwater is discharged to the Kankakee River through a permitted outfall (Outfall 002).

The next hydrogeologic investigation update is due by the end of 2025.

"B" Condensate Storage Tank

Elevated tritium concentrations in surface water (Sewage Treatment Plant (STP) samples and RGPP surface water samples), shallow aquifer samples, and intermediate aquifer samples were detected during the 2nd quarter 2014 RGPP sampling round. The source of the tritiated groundwater was determined to be the "B" Condensate Storage Tank (CST) south of the Turbine Buildings. The groundwater sample collected from shallow aquifer well MD-11, which is in the immediate vicinity of the CST, had a tritium concentration of approximately 1.5 million pCi/L. Subsequent samples collected from MD-11 have had a maximum tritium concentration of approximately 2.3 million pCi/L (June 27, 2014). The CST was taken out of service and water from the CST removed. The CST was inspected and subsequently repaired in August 2015.

A tritium monitoring plan was developed and implemented in June 2014, with weekly sampling of surface water, storm sewer water, sewer treatment plant water, shallow aquifer groundwater, and intermediate aquifer groundwater to evaluate and delineate the tritium plume. A modified tritium monitoring plan was implemented in November 2014. Based on tritium data collected, the plume was relatively small and only encompassed the area between the CST and Turbine Building.

Two groundwater extraction wells (RW-DN-100S and RW-DN-101S) were installed in January 2015 to assist in the mitigation of tritiated groundwater in the area of the CST. Aquifer testing was completed on the two extraction wells near the end of 2015. Results of the aquifer test concluded that only RW-DN-100S produced sufficient water to operate as a viable groundwater extraction well. RW-DN-100S began intermittent operation during the 1st quarter 2016 and continued operating intermittently through August 2019. In August 2019, the extraction well began pumping groundwater on a continuous basis. The extracted water is discharged to the

Kankakee River through NPDES permitted Outfall 002. Overall, tritium concentrations in the area of the CST continue to decrease since the CST was repaired.

As of the end of 2022, the maximum tritium concentration in the area of the CST was approximately 12,000 pCi/L (MD-11).

MW-DN-119I Nickel 63

Hard-to-detect radionuclide Nickel-63 was detected at a concentration over 50 pCi/L in a sample collected during the 2nd quarter 2017. An investigation into the source of the Nickel-63 was completed and additional samples were collected from MW-DN-119I and surrounding wells. Results and recommendations of the evaluation are included in AMO's *Evaluation of Nickel -63 detections in MW-DN-119I Update* (March 28, 2018). Hard-to-detects (Fe-55 and Ni-63) are currently analyzed annually to monitor concentrations in the area of MW-DN-119I.

As of the end of 2022, the Ni-63 concentrations over time in MW-DN-119I show a decreasing trend.

Current RGPP Summary

Dresden Generating Station had a total of 59 wells (20 Background wells, 18 Source wells, six Mid-Field wells, ten Long-Term Shutdown wells, and five perimeter wells), that are sampled as part of the Station RGPP (EN-DR-408-4160 Revision 10). Figure 1a shows the shallow aquifer RGPP sample locations and Figure 1b shows the intermediate aquifer RGPP sample locations.

RGPP sampling at the Station is performed by ATI, under contract to Exelon. Laboratory testing is performed by Teledyne Brown Engineering. The laboratory data, field data, and depth to water readings are uploaded to the RACER website, which is a data repository for the RGPP sampling rounds. The uploaded data is used by AMO for quarterly RGPP reporting.

Gross-Alpha Alert Level

At Dresden Generating Station, gross-alpha (dissolved and suspended fractions) was analyzed annually from 2011 through 2019. In 2020, gross-alpha data was evaluated to establish an Alert Level for the dissolved and suspended gross-alpha fractions. The gross alpha data was evaluated by looking at the average concentration for each gross-alpha fraction for each well. Statistical outlier results were considered during the gross-alpha evaluation. An outlier is a value that is significantly higher or lower than most of the results, that can skew the results and not reflect the true dataset. Therefore, outlier results are not factored into the average gross-alpha concentrations. Outliers were established using methods an online website such as *Statisticshowto.com*. Additional websites identified similar statistical models for removing outlier data.

Procedure EN-DR-408-4160 (Revision 9) established an Alert Level of three times the ongoing average gross-alpha concentration for each RGPP monitoring well that had gross-alpha analyzed more than one time and that will continue to be monitored for during future RGPP sampling rounds. According to the EN-DR-408-4160 (Revision 10), samples from the eighteen Source designated sample points and ten Long-Term Shutdown designated wells will be analyzed once every two years for gross alpha dissolved and suspended fractions in the future. The Alert Level will be able to account for fluctuations in naturally occurring alpha activity in the area of wells, while identifying a result that may be indicative of a potential release. Beginning in 2021, select transuranics were analyzed if a gross alpha concentration exceeded the Alert Level in a particular well, to ensure that the Alert Level is conservative enough to detect whether licensed material could be present in groundwater. If the results of the select transuranics analysis showed no unusual activity, the gross-alpha result that triggered the select transuranics analysis, was incorporated into the ongoing average concentration for that well.

Table 1 provides a gross-alpha (dissolved and suspended) results summary as well as the average concentration and Alert Level for each well. Gross-alpha analysis was most recently performed on samples collected from Long-Term Shutdown designated wells and Source designated wells during the 2nd quarter 2021 RGPP sampling round. The sample collected from MW-DN-116S had a gross-alpha (suspended) concentration of 3.35 pCi/L, which exceeded the Alert Level of 2.37 pCi/L, established for that well. Therefore, the 2nd quarter 2021 RGPP sample collected from MW-DN-116S was analyzed for select transuranics. Select transuranics were not detected in the sample collected from MW-DN-116S during the 2nd quarter 2021 RGPP sampling round.

Gross-alpha (dissolved and suspended) detections from other wells sampled during the 2nd quarter 2021 RGPP sampling round did not exceed the Alert Level. All Long-Term Shutdown and Source designated wells will have gross-alpha analysis performed again in 2023.

ANI completed a corporate audit in 2020 and informed Exelon that it needed to analyze a sample from the well with the highest gross-alpha result for select transuranics to ensure that the Alert Level is conservative enough that no unusual transuranics are present when the gross-alpha concentrations do not exceed the Alert Level. To satisfy the ANI request, the well with the highest average gross-alpha (dissolved) concentration (DSP-125) was analyzed for select transuranics during the 2nd quarter 2022. No select transuranics were detected in the sample collected from DSP-125 during the 2nd quarter 2022 RGPP sampling round.

Gamma-Radionuclides

Gamma-radionuclide analysis has been performed on RGPP samples (quarterly to annually) at Dresden Generating Station since 2006. This extensive sampling and analysis produced over 16,800 data records for the Station. Gamma-radionuclides have not been detected at concentrations greater than their respective LLDs, in RGPP samples submitted to the vendor laboratory since 2006. Therefore, in the 2020 RGPP, gamma-radionuclide analysis frequency was reduced from annual to every two years.

Samples collected from all wells were most recently analyzed for gamma-radionuclides during the 2nd quarter 2021 RGPP sampling round. Gamma radionuclides were not detected at concentrations greater than their respective LLDs in the samples collected in 2021. All wells will have gamma-radionuclide analysis performed again in 2023.

Select Transuranics

Select transuranics analysis is procedurally required annually for RGPP sample locations that were identified as Elevated designated wells in the historic EN-DR-408-4160 revisions and continued additional evaluation is warranted. Additionally, as part of the current EN-DR-408-4160 (Revision 10), select transuranics analysis is also warranted if a gross alpha concentration exceeds the Alert Level in a particular well.

Select transuranics analysis was performed on former Elevated designated wells MD-11, MW-DN-124S, and MW-DN-124I, during the 2nd quarter 2022 RGPP sampling round. Additionally, the sample collected from DSP-125 (highest historic gross-alpha (dissolved) concentrations) was analyzed for select transuranics during the 2nd quarter 2022 to satisfy an ANI request. Select Transuranics were not detected at concentrations greater than their respective LLDs in the samples collected during the 2nd quarter 2022 RGPP sampling round. Table 2 provides a summary of select transuranics results (U-233/234 and U-238) since 2006.

Hard-to-Detects (Fe-55 and Ni-63)

Hard-to-detect analysis (Fe-55 and Ni-63) is procedurally required annually for RGPP sample locations that were identified as Elevated designated wells in the historic EN-DR-408-4160 revisions and continued additional evaluation is warranted, as well as Long-Term Shutdown designated wells. Additionally, as part of the current EN-DR-408-4160 (Revision 9), hard-to-detect analysis is warranted on samples collected from Source designated wells once every 5 years, starting in 2021.

In 2022, samples collected from the nine Long-Term Shutdown designated wells, one former Elevated designated well, and two Source designated wells were analyzed for hard-to-detects (Fe-55 and Ni-63). Ni-63 was detected in the samples collected from Long-Term Shutdown wells MW-DN-101I and MW-DN-119I during the 2nd quarter 2022 RGPP sampling round at 10.6 pCi/L and 9.28 pCi/L, respectively. Ni-63 was not detected in the other samples collected during the 2nd quarter 2022 RGPP sampling round.

Sr-89 and Sr-90

Sr-89 and Sr-90 have been an annual procedurally required analysis on Detection, Long-Term Shutdown, and Elevated designated wells since sample point designations became part of the RGPP in 2010. EN-DR-408-4160 (Revision 9) states that Sr-89 and 90 analyses should be performed annually for Source and Long-Term Shutdown designated sample locations. If a positive result is reported, samples collected from the wells with Sr-89 and Sr-90 detections will be analyzed quarterly to evaluate the activity in the area of the well. In 2022, samples were collected from the eighteen Source designated wells, nine Long-Term Shutdown designated wells, and one Mid-Field designated well (former Elevated designation) were analyzed for Sr-89 and Sr-90. Sr-90 was detected in the sample collected from MW-DN-105S 1.59 pCi/L. Sr-89 and Sr-90 were not detected in any of the other samples collected in 2022.

Precipitation Recapture

Dresden Generating Station is a Boiling Water Reactor (BWR) generating station. The RGPP requires BWR generating stations to sample precipitation on a semi-annual basis. The RGPP states that a minimum of eight samples should be collected from within the protected area in a manner that surrounds the Turbine Building and Reactor Building as well as ancillary structures that could vent tritiated vapor to the atmosphere.

In 2022, four sample rounds were completed between March and November to evaluate if tritium was present in the atmosphere at the Station. Eight onsite samples were collected during each sampling round. A summary of 2022 precipitation recapture results is presented in Table 3 and a summary of historic precipitation recapture results is provided in Appendix A.

Tritium was detected in one or more samples during the four sampling rounds completed in 2022. The highest tritium concentrations were reported during the November 2022 precipitation recapture sampling round with detected tritium concentrations ranging between 230 pCi/L (FW-12) and 1,860 pCi/L (FW-1). Tritium was also detected at 1,330 pCi/L in the sample collected from FW-3 during the November 2022 precipitation recapture sampling round.

Summary of 2022 RGPP Sampling Rounds

March 2022 RGPP Sampling Round Activities (1st Quarter 2022)

Data Summary

A total of 29 groundwater samples were collected during the 1st quarter 2022 sampling round. A sample was not collected from MW-DN-117I due to the well being inaccessible during the 1st quarter 2022. Per the RGPP, the Background, Perimeter, and Mid-Field designated wells were not sampled during the 1st quarter 2022 RGPP sampling round. All samples were analyzed for tritium.

Tritium was detected in seven shallow aquifer samples with a maximum tritium concentration of 10,000 pCi/L (MD-11). Tritium was detected in eight intermediate aquifer samples with a maximum tritium concentration of 9,680 pCi/L (MW-DN-124I).

The tritium concentration in MW-DN-111S averaged 412 pCi/L since the inception of the RGPP in 2006 through the 4th quarter 2019. The tritium concentration in MW-DN-111S increased from approximately 1,000 pCi/L to almost 3,500 pCi/L between the 4th quarter 2019 and 1st quarter 2020. The tritium concentration in the area of this well has been fluctuating between 1,470 pCi/L and 5,530 pCi/L since the 1st quarter 2020. The 1st quarter 2022 RGPP tritium result for this well was 4,250 pCi/L. The increased tritium activity in this well could be due to historic plumes migrating around the building structures.

The Station continued to implement the tritium monitoring plan for the "B" Condensate Storage Tank (CST). The tritium concentrations in the area of the CST showed a decreasing trend at the Station. While the tritium concentration in MD-11 decreased from its maximum reported tritium concentration of approximately 2.29 million pCi/L, an elevated concentration persists in the area of the CST. Tritium concentrations in samples collected from wells (other than MD-11) used to monitor the CST leak have decreased to less than 2,000 pCi/L, indicating the extent of the CST leak is confined to a small geographic area south of the Turbine Building.

AMO concluded that since the CST responsible for the release was repaired, there does not appear to be an active source of tritium to groundwater at the Station. Note that high existing tritium concentrations present a masking effect for detections of a new leak in the area of the CST.

Water Elevations

All groundwater sample locations had depth to water measurements collected during the 1st quarter 2022 sampling round. The 1st quarter 2022 groundwater elevation data was compared to the 1st quarter 2021 sampling round to evaluate if changes in groundwater elevations occurred that may have an effect on groundwater flow direction. The variations in groundwater elevations have no significant effect on groundwater flow direction. Based on comparison of groundwater elevations, the wells sampled effectively monitored groundwater conditions at the Station.

June 2022 RGPP Sampling Round Activities (2nd Quarter 2022)

Data Summary

A total of 54 groundwater samples were collected during the 2nd quarter 2022 sampling round. Samples were not collected from DSP-126, MW-DN-103I, MW-DN-103S, MW-DN-106S, MW-DN-108I, and MW-DN-117I due to inaccessibility or well damage during the 2nd quarter 2022. All samples were analyzed for tritium. The samples collected from Long-Term Shutdown designated wells were also analyzed for hard-to-detects

(Fe-55 and Ni-63) and Sr-89 and Sr-90. Source designated wells were also analyzed for Sr-89 and Sr-90. Samples collected from mid-field designated well MW-DN-124I; and source designated wells MD-11 and MW-DN-124S were also analyzed for select transuranics and hard-to-detects (Fe-55 and Ni-63).

Tritium was detected in seven shallow aquifer samples with a maximum tritium concentration of 8,450 pCi/L (MD-11). Tritium was detected in twelve intermediate aquifer samples with a maximum tritium concentration of 10,900 pCi/L (MW-DN-124I).

The tritium concentration in MW-DN-111S averaged 412 pCi/L since the inception of the RGPP in 2006 through the 4th quarter 2019. The tritium concentration in MW-DN-111S increased from approximately 1,000 pCi/L to almost 3,500 pCi/L between the 4th quarter 2019 and 1st quarter 2020. The tritium concentration in the area of this well has been fluctuating between 1,470 pCi/L and 5,530 pCi/L since the 1st quarter 2020. The 2nd quarter 2022 RGPP tritium result for this well was 3,730 pCi/L. The increased tritium activity in this well could be due to historic plumes migrating around the building structures.

The Station continued to implement the tritium monitoring plan for the "B" Condensate Storage Tank (CST). The tritium concentrations in the area of the CST showed a decreasing trend at the Station. Tritium concentrations in samples collected from wells (other than MD-11) used to monitor the CST leak have generally decreased to less than 1,000 pCi/L, indicating the extent of the CST leak is confined to a small geographic area south of the Turbine Building.

Select transuranics analysis was performed on MD-11, MW-DN-124S, and MW-DN-124I, during the 2nd quarter 2022 RGPP sampling round. Additionally, select transuranics analysis was performed on the sample collected from DSP-125 to satisfy an ANI request. Select Transuranics were not detected at concentrations greater than their respective LLDs in the samples collected during the 2nd quarter 2022 RGPP sampling round.

Ni-63 continued to be detected in the sample collected from Long-Term Shutdown well MW-DN-119I during the 2nd quarter 2022 RGPP sampling round at 9.28 pCi/L. However, Ni-63 concentrations in the well show a decreasing trend over time. Ni-63 was also detected at 10.6 pCi/L in the sample collected from MW-DN-101I, which is in the same area as MW-DN-119I. Ni-63 was not detected in the other samples collected during the 2nd quarter 2022 RGPP sampling round.

Sr-90 continued to be detected in the samples collected from MW-DN-105S at 1.59 pCi/L. Detected Concentrations of SR-90 have ranged from 1.09 pCi/L to 4.93 pCi/L in MW-DN-105S. Sr-90 was not detected in the other samples collected during the 2nd quarter 2022 RGPP sampling round.

AMO concluded that since the CST responsible for the release was repaired, there does not appear to be an active source of tritium to groundwater at the Station. Note that high existing tritium concentrations present a masking effect for detections of a new leak in the area of the CST.

Water Elevations

All groundwater sample locations had depth to water measurements collected during the 2nd quarter 2022 sampling round. The 2nd quarter 2022 sampling round groundwater elevation data was compared to the 2nd quarter 2021 sampling round to evaluate if changes in groundwater elevations occurred that may have an effect on groundwater flow direction. The variations in groundwater elevations have no significant effect on groundwater flow direction. Based on comparison of groundwater elevations, the wells sampled effectively monitored groundwater conditions at the facility.

July 2022 RGPP Sampling Round Activities (3rd Quarter 2022)

Data Summary

A total of 29 groundwater samples were collected during the 3rd quarter 2022 sampling round. Per the RGPP, the Background, Perimeter, and Mid-Field designated wells were not sampled during the 3rd quarter 2022 RGPP sampling round. Additionally, a sample was not collected from MW-DN-117I due to inaccessibility. All samples were analyzed for tritium.

Tritium was detected in seven shallow aquifer samples with a maximum concentration of 9,390 pCi/L (MD-11). Tritium was detected in nine intermediate aquifer samples with a maximum concentration of 13,300 pCi/L (MW-DN-124I).

The tritium concentration in MW-DN-111S averaged 412 pCi/L since the inception of the RGPP in 2006 through the 4th quarter 2019. The tritium concentration in MW-DN-111S increased from approximately 1,000 pCi/L to almost 3,500 pCi/L between the 4th quarter 2019 and 1st quarter 2020. The tritium concentration in the area of this well has been fluctuating between 1,470 pCi/L and 5,530 pCi/L since the 1st quarter 2020. The 3rd quarter 2022 RGPP tritium result for this well was 4,510 pCi/L. The increased tritium activity in this well is likely due to historic plumes migrating around the building structures.

The tritium concentrations in MW-DN-141S show an increasing tritium concentration trend since the beginning of 2022. It was recommended that the Station evaluate SSCs in the area of MW-DN-141S for potential sources of the increased tritium activity.

The Station continued to implement the tritium monitoring plan for the "B" Condensate Storage Tank (CST). The tritium concentrations in the area of the CST showed a decreasing trend at the Station. Tritium concentrations in samples collected from wells (other than MD-11) used to monitor the CST leak have generally decreased to less than 1,000 pCi/L, indicating the extent of the CST leak is confined to a small geographic area south of the Turbine Building.

Water Elevations

All groundwater sample locations had depth to water measurements collected during the 3rd quarter 2022 sampling round. The 3rd quarter 2022 sampling round groundwater elevation data was compared to the 3rd quarter 2021 sampling round to evaluate if changes in groundwater elevations occurred that may have an effect on groundwater flow direction. The variations in groundwater elevations have no significant effect on groundwater flow direction. Based on comparison of groundwater elevations, the wells sampled effectively monitored groundwater conditions at the facility.

November 2022 RGPP Sampling Round Activities (4th Quarter 2022)

Data Summary

A total of 33 groundwater samples were collected during the 4th quarter 2022 sampling round. Samples were not collected from MW-DN-117I and MW-DN-127S due to the wells being inaccessible at the time of the 4th quarter 2022 RGPP sampling. All samples were analyzed for tritium.

Tritium was detected in nine shallow aquifer samples with a maximum concentration of 12,000 pCi/L (MD-11). Tritium was detected in eleven intermediate aquifer samples with a maximum concentration of 6,580 pCi/L (MW-DN-124I).

The tritium concentration in the area of MW-DN-111S had been fluctuating between 1,470 pCi/L and 5,530 pCi/L since the 1st quarter 2020. The 4th quarter 2022 tritium result for this well increased to 6,370 pCi/L. It was recommended that the Station sample MW-DN-111S on a monthly basis to further evaluate the tritium concentration in the area of the well.

The tritium concentration in MW-DN-141S increased from 2,910 pCi/L to 4,430 pCi/L between the 3rd and 4th quarter 2022 RGPP sampling rounds and shows an increasing tritium concentration trend since the beginning of 2022. It was recommended that the Station evaluate SSCs in the area of MW-DN-141S for potential sources of the increased tritium activity. Additionally, the Station should sample MW-DN-141S on a monthly basis to further evaluate the tritium concentration in the area of the well.

The Station continued to implement the tritium monitoring plan for the "B" CST. Tritium concentrations in samples collected from wells (other than MD-11) used to monitor the CST leak have generally decreased to less than 1,000 pCi/L, indicating the extent of the CST leak is confined to a small geographic area south of the Turbine Building.

Water Elevations

All sampled groundwater locations had depth to water measurements collected during the 4th quarter 2022 sampling round. Groundwater elevations and groundwater flow direction for the shallow aquifer are provided on Figure 2a and groundwater elevations and groundwater flow direction for the intermediate aquifer are provided on Figure 2b. Based on the groundwater flow depicted on figures 2a and 2b, the wells sampled effectively monitored groundwater conditions at the facility.

2023 RGPP Sample Locations

Samples could not be collected from DSP-126, MW-DN-103I, MW-DN-103S, MW-DN-106S, MW-DN-108I, and MW-DN-117I in 2022 due to inaccessibility and/or well damage. Not being able to sample these wells and assess data associated to the area of these wells is considered a data gap. Therefore, these wells should be repaired and made accessible to sampling crews to complete the RGPP.

Summary of 2022 RGPP Conformance

The Station did not conform with its RGPP in 2022 with respect to RGPP sampling protocol because water levels and samples were not collected from several Background, Perimeter, Mid-Field, and Long Term Shutdown wells. Several of these wells have not been assessed for over two years.

Conclusions

Based on the review of the data collected during the 2022 RGPP sampling rounds AMO concludes:

- The Station continued to implement the tritium monitoring plan for the "B" CST. The tritium concentrations in the area of the CST showed a decreasing trend at the Station through 2020. While the tritium concentration in MD-11 decreased from its maximum reported tritium concentration of approximately 2.29 million pCi/L, an elevated concentration persists in the area of the CST. However, tritium concentrations in samples collected from wells (other than MD-11) used to monitor the CST leak have generally decreased to less than 1,000 pCi/L, indicating the extent of the CST leak is confined to a small geographic area south of the Turbine Building.

- The tritium concentration in MW-DN-111S averaged 412 pCi/L since the inception of the RGPP in 2006 through the 4th quarter 2019. The tritium concentration in MW-DN-111S increased from approximately 1,000 pCi/L to almost 3,500 pCi/L between the 4th quarter 2019 and 1st quarter 2020. The tritium concentration in the area of this well has been fluctuating between 1,470 pCi/L and 5,530 pCi/L since the 1st quarter 2020. The 3rd quarter 2022 RGPP tritium result for this well was 4,510 pCi/L. The increased tritium activity in this well is likely due to historic plumes migrating around the building structures.

- The tritium concentration in MW-DN-141S showed an increasing tritium concentration trend since the beginning of 2022. It was recommended that the Station evaluate SSCs in the area of MW-DN-141S for potential sources of the increased tritium activity.

- Select Transuranics were not detected at concentrations greater than their respective LLDs in the samples collected during the 2nd quarter 2022 RGPP sampling round.

- Ni-63 continued to be detected in the sample collected from Long-Term Shutdown well MW-DN-119I, as well as MW-DN-101I during the 2nd quarter 2022 RGPP sampling round at 9.28 pCi/L, and 10.6 pCi/L, respectively. However, Ni-63 concentrations in the well show a decreasing trend over time.

- Sr-90 continued to be detected in the samples collected from MW-DN-105S (1.59 pCi/L). However, Sr-90 concentrations remained in the historic range for this well.

- Based on the evaluation of groundwater flow direction, the wells sampled effectively monitored groundwater conditions at the facility.

Please call me at 215-230-8282 if you have questions.

Respectfully,

AMO Environmental Decisions

Ralph T. Golia

Ralph T. Golia, P.G.
Principal
Hydrogeologist

attachments

File

Dresden Generating Station

Constellation Energy Company

Table 1

Summary of Gross-Alpha Results

SITE	Well ID	Well Average (-Outliers)	ALERT LEVEL	Gross Alpha - Dissolved Results																											
				2011				2012			2013			2014		2015		2016				2017			2018				2019		2021
				Feb	Mar	Jun	Dec	Mar	May	Jun	Mar	Jun	Jul	May	Jun	Jun	Nov	May	Jun	Aug	Oct	Feb	May	Nov	Feb	Jun	Sep	Nov	May	Dec	May
	DSP-105	1.71	5.14	--	--	--	--	--	0.611	--	--	1.15	--	--	3.06	1.9	--	--	2.5	--	--	--	1.79	--	--	1.31	--	--	1.39	--	--
	DSP-106	1.30	3.89	--	--	--	--	--	1.04	--	--	0.744	--	--	2.84	1.61	--	--	1.77	--	--	--	1.53	--	--	1.07	--	--	1.1	--	1.5
	DSP-107	1.68	5.04	1.05	--	--	--	--	0.847	--	--	1.03	--	--	2.96	1.74	--	2.72	--	--	--	--	2.73	--	--	1.17	--	--	1.21	--	1.35
	DSP-108	3.93	11.79	--	--	--	--	--	1.05	--	--	1.37	7.87	--	12.4	5.79	--	--	2.95	--	--	--	3.84	--	--	4.71	--	--	3.2	--	4.59
	DSP-122	5.42	16.26	6.93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.91
	DSP-123	2.00	6.00	0.893	--	--	--	--	1.99	--	--	1.71	--	2.45	--	2.81	--	2.63	--	--	--	--	1.7	--	--	1.86	--	--	1.95	--	5.29
	DSP-124	2.25	6.74	0.91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.58
	DSP-125	8.01	24.03	--	--	4.93	--	--	9.1	--	--	6.84	--	6.81	--	35.4	--	--	12.6	--	--	--	10.7	--	--	5.11	--	--	9.6	--	6.41
	MD-11	1.20	3.61	--	--	6.17	--	--	--	--	--	--	--	--	--	--	0.977	--	--	--	1.22	1.67	--	1.22	1.21	--	--	0.978	0.996	1.59	0.978
	MW-DN-101-I	2.74	8.23	--	--	--	--	--	2.39	--	--	1.25	--	2.32	--	1.26	--	3.05	--	--	--	--	4.81	--	--	4.6	--	--	1.86	--	3.14
	MW-DN-101-S	4.71	14.14	--	--	--	--	--	6.2	--	--	1.54	--	5.96	--	4.33	--	8.7	--	--	--	--	6.55	--	--	4.28	--	--	3.3	--	1.55
	MW-DN-102-I	2.30	6.89	--	--	0.675	--	--	--	1.46	--	1.29	--	--	3.03	4.08	--	2.63	--	--	--	--	13.8	--	--	4.46	--	--	0.758	--	--
	MW-DN-102-S	19.59	58.78	--	--	9.44	--	--	--	13.9	--	15.6	--	--	19.9	28.3	--	51.8	--	--	--	--	35.2	--	--	20.2	--	--	14.2	--	--
	MW-DN-104-S	5.00	14.99	2.44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.55
	MW-DN-105-S	#DIV/0!	#DIV/0!	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.2
	MW-DN-106-S	#DIV/0!	#DIV/0!	--	--	1.42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	MW-DN-107-S	5.71	17.13	--	--	--	6.37	9.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.895
	MW-DN-108-I	1.53	4.58	1.39	--	--	--	--	1.13	--	--	0.828	--	1.73	--	1.87	--	2.22	--	--	--	--	3.35	--	--	--	--	--	--	--	--
	MW-DN-109-I	3.13	9.39	--	--	--	--	--	1.04	--	--	0.499	--	0.936	--	3.81	--	4.29	--	--	--	--	4.02	--	--	3.79	--	--	3.71	--	6.06
	MW-DN-109-S	4.64	13.93	--	--	--	--	--	3.74	--	--	2.74	--	4.01	--	1.97	--	6.52	--	--	--	--	5.93	--	--	5.15	--	--	5.17	--	6.57
	MW-DN-111-S	#DIV/0!	#DIV/0!	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.816
	MW-DN-113-I	2.31	6.93	--	--	0.485	--	--	--	0.531	--	3.87	--	--	1.54	1.53	--	8.9	--	--	--	--	3.91	--	--	3.66	--	--	2.95	--	--
Dresden	MW-DN-113-S	2.24	6.71	--	--	2.34	--	--	--	1.76	--	2.56	--	--	2.08	1.45	--	3.02	--	--	--	--	3.16	--	--	2.1	--	--	1.65	--	--
	MW-DN-114-S	#DIV/0!	#DIV/0!	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.12
	MW-DN-115-S	#DIV/0!	#DIV/0!	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.42
	MW-DN-116-I	3.01	9.04	--	--	--	--	--	3.31	--	--	1.64	--	3.01	--	4.16	--	3.77	--	--	--	--	3.79	--	--	1.68	--	--	2.74	--	--
	MW-DN-116-S	2.97	8.90	--	--	--	--	--	2.53	--	--	3.55	--	1.15	--	5.21	--	4.83	--	--	--	--	3.82	--	--	1.57	--	--	2.08	--	1.97
	MW-DN-117-I	1.06	3.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	1.24	0.884	--	1.13	--
	MW-DN-118-S	1.27	3.80	--	--	--	--	--	0.745	--	--	1.24	--	--	1.84	0.897	--	4.81	--	--	--	--	2.34	--	--	0.551	--	--	1.11	--	1.41
	MW-DN-119-I	3.04	9.11	--	--	--	--	--	1.86	--	--	3.62	--	2.42	--	3.18	--	--	4.44	--	--	--	28.9	6.25	--	2.95	--	3.85	2.24	3.29	2.53
	MW-DN-119-S	3.26	9.78	--	--	--	--	--	2.35	--	--	1.55	--	4.23	--	4.95	--	--	7.23	--	--	--	1.57	--	--	3.03	--	--	2.98	--	1.44
	MW-DN-122-I	#DIV/0!	#DIV/0!	--	1.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	MW-DN-124-I	3.99	11.98	2.13	--	--	--	--	--	2	--	3.35	--	--	9.99	4.06	--	5.33	--	--	--	--	7.19	--	--	3.74	--	--	4.15	--	3.99
	MW-DN-124-S	4.21	12.63	--	--	--	--	--	--	2.63	--	1.71	--	--	4.74	5.76	--	5.77	--	--	--	--	6.35	--	--	3.72	--	--	2.96	--	4.26
	MW-DN-125-S	3.03	9.09	--	--	--	--	--	--	2.62	--	1.83	--	--	4.83	1.38	--	--	3.63	--	--	--	30	--	--	5.32	--	--	1.6	--	--
	MW-DN-126-S	6.94	20.83	--	--	--	--	--	--	11.5	--	12.7	--	--	13.1	6.66	--	4.16	--	--	--	--	6.85	--	--	1.56	--	--	3.46	--	2.5
	MW-DN-127-S	2.45	7.35	--	--	--	--	--	2.1	--	--	2.36	--	--	5.27	1.09	--	2.03	--	--	--	--	5.89	--	--	0.476	--	--	0.393	--	--
	MW-DN-134-S	2.78	8.33	--	--	--	--	--	--	--	1.65	2.62	--	--	3.65	3.77	--	4.38	--	--	--	--	1.06	--	--	2.88	--	--	2.21	--	--
	MW-DN-135-S	2.48	7.44	--	--	--	--	--	--	--	2.81	4.2	--	--	1.64	1.7	--	3.21	--	--	--	--	2.06	--	--	1.5	--	--	2.71	--	--
	MW-DN-136-S	4.93	14.78	--	--	--	--	--	--	--	2.31	3.28	--	--	4.51	6.46	--	7.85	--	--	--	--	3.65	--	--	3.27	--	--	8.84	--	4.16
	MW-DN-137-S	4.88	14.63	--	--	--	--	--	--	--	8.52	1.58	--	--	4.9	--	5.57	6.65	--	--	--	--	5.46	--	--	3.43	--	--	2.89	--	--
	MW-DN-140-S	3.85	11.54	--	--	--	--	--	--	--	6.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.1
	MW-DN-141-S	0.90	2.69	--	--	--	--	--	--	--	0.837	0.769	--	2.08	--	1.33	--	1.12	--	--	--	--	0.78	--	--	0.722	--	--	0.852	--	0.757
	MW-DN-142-S	4.56	13.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.27	--	--	2.98	--	--	4.31	--	--	3.66	--	--
	MW-DN-143-S	3.10	9.31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.16	--	--	4.71	--	--	3.06	--	--	2.48	--	--
	MW-DN-144-S	3.66	10.97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.17	--	--	4.76	--	--	3.27	--	--	2.43	--	--
	RW-DN-100-S	#DIV/0!	#DIV/0!	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.57
	RW-DN-101-S	#DIV/0!	#DIV/0!	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Results in pCi/L

AMO Environmental Decisions

Dresden Generating Station

Constellation Energy Company

Table 1

Summary of Gross-Alpha Results

SITE	Well ID	Well Average (-Outliers)	ALERT LEVEL	Gross Alpha - Suspended Results 2011 Feb	2011 Mar	2011 Jun	2011 Dec	2012 Mar	2012 May	2012 Jun	2013 Mar	2013 Jun	2013 Jul	2014 May	2014 Jun	2015 Jun	2015 Nov	2016 May	2016 Jun	2016 Aug	2016 Oct	2017 Feb	2017 May	2017 Nov	2018 Feb	2018 Jun	2018 Sep	2018 Nov	2019 May	2019 Dec	2021 May
Dresden	DSP-105	0.86	2.59	–	–	–	–	–	0.82	–	–	0.793	–	–	0.63	0.923	–	–	0.599	–	–	–	0.617	–	–	1.13	–	–	1.39	–	
	DSP-106	0.73	2.20	–	–	–	–	–	0.809	–	–	0.793	–	–	0.63	0.923	–	–	0.599	–	–	–	0.617	–	–	1.13	–	–	4.28	–	0.367
	DSP-107	0.62	1.87	0.345	–	–	–	–	0.349	–	–	0.361	–	–	0.63	0.918	–	4.74	–	–	–	–	0.618	–	–	1.13	–	–	0.896	–	0.367
	DSP-108	0.71	2.13	–	–	–	–	–	0.348	–	–	0.361	0.851	–	0.63	0.933	–	–	0.605	–	–	–	0.619	–	–	1.14	–	–	0.897	–	1.83
	DSP-122	1.32	3.97	0.245	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2.4
	DSP-123	0.66	1.99	0.614	–	–	–	–	0.347	–	–	0.601	–	1.9	–	0.923	–	0.608	–	–	–	–	0.617	–	–	1.16	–	–	0.719	–	0.369
	DSP-124	0.76	2.29	0.616	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.912
	DSP-125	1.67	5.00	–	–	1.28	–	–	0.66	–	–	1.69	–	1.9	–	0.892	–	–	2.88	–	–	–	2.21	–	–	1.65	–	–	3.72	–	1.84
	MD-11	0.67	2.00	–	–	0.639	–	–	–	–	–	–	–	–	–	–	0.711	–	–	–	0.777	0.347	–	0.822	0.624	–	–	0.844	0.898	0.628	0.366
	MW-DN-101-I	0.83	2.48	–	–	–	–	–	0.78	–	–	0.267	–	1.24	–	0.923	–	1.04	–	–	–	–	0.62	–	–	1.14	–	–	0.719	–	0.717
	MW-DN-101-S	1.89	5.67	–	–	–	–	–	1.12	–	–	0.695	–	1.24	–	0.962	–	3.41	–	–	–	–	13.55	–	–	1.73	–	–	3.82	–	2.14
	MW-DN-102-I	1.02	3.06	–	–	2	–	–	–	0.495	–	0.496	–	–	0.63	0.359	–	0.361	–	–	–	–	2.33	–	–	1.73	–	–	0.752	–	
	MW-DN-102-S	2.82	8.45	–	–	3.58	–	–	–	1.8	–	1.88	–	–	0.63	2.14	–	4.99	–	–	–	–	3.8	–	–	1.37	–	–	5.16	–	
	MW-DN-104-S	2.11	6.32	0.62	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3.59
	MW-DN-105-S	#DIV/0!	#DIV/0!	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3.58
	MW-DN-106-S	#DIV/0!	#DIV/0!	–	–	1.17	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
	MW-DN-107-S	3.40	10.20	–	–	–	2.5	6.96	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.742
	MW-DN-108-I	2.12	6.37	0.64	–	–	–	–	0.781	–	–	0.608	–	1.24	–	1.15	–	8.33	–	–	–	–	36.3	–	–	–	–	–	–	–	
	MW-DN-109-I	1.02	3.05	–	–	–	–	–	0.502	–	–	0.604	–	1.24	–	0.51	–	0.357	–	–	–	–	1.84	–	–	1.6	–	–	1.48	–	3.56
	MW-DN-109-S	1.46	4.39	–	–	–	–	–	0.396	–	–	0.503	–	1.24	–	0.508	–	2.05	–	–	–	–	1.84	–	–	1.6	–	–	1.48	–	3.56
	MW-DN-111-S	#DIV/0!	#DIV/0!	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.517
	MW-DN-113-I	2.70	8.09	–	–	1.18	–	–	–	0.499	–	1.3	–	–	1.21	0.361	–	20.18	–	–	–	–	1.85	–	–	7.89	–	–	7.27	–	
	MW-DN-113-S	4.70	14.10	–	–	0.649	–	–	–	1.63	–	0.446	–	–	2.47	3.24	–	15.7	–	–	–	–	7.59	–	–	8.62	–	–	1.94	–	
	MW-DN-114-S	#DIV/0!	#DIV/0!	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.931
	MW-DN-115-S	#DIV/0!	#DIV/0!	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.06
	MW-DN-116-I	0.70	2.11	–	–	–	–	–	1.02	–	–	0.503	–	1.24	–	0.503	–	0.374	–	–	–	–	0.623	–	–	0.627	–	–	0.726	–	
	MW-DN-116-S	1.07	3.22	–	–	–	–	–	0.69	–	–	0.502	–	1.24	–	0.506	–	0.746	–	–	–	–	1.02	–	–	0.871	–	–	0.747	–	3.35
	MW-DN-117-I	0.82	2.46	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.807	–	–	0.491	0.831	–	1.15	
	MW-DN-118-S	0.73	2.20	–	–	–	–	–	0.622	–	–	0.491	–	–	1.79	0.511	–	0.938	–	–	–	–	0.809	–	–	0.862	–	–	0.892	–	1.66
	MW-DN-119-I	0.88	2.65	–	–	–	–	–	0.62	–	–	1.03	–	2.83	–	0.515	–	–	0.912	–	–	–	2.78	0.85	–	0.501	–	0.981	1.54	1.03	0.849
	MW-DN-119-S	2.55	7.64	–	–	–	–	–	0.622	–	–	0.557	–	1.24	–	0.509	–	–	2.38	–	–	–	3.73	–	–	4.28	–	–	5.52	–	4.07
	MW-DN-122-I	#DIV/0!	#DIV/0!	–	3.2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
	MW-DN-124-I	1.28	3.83	0.345	–	–	–	–	–	0.491	–	0.665	–	–	1.21	1.28	–	1.73	–	–	–	–	2.78	–	–	1.5	–	–	1.5	–	4.33
	MW-DN-124-S	1.94	5.82	–	–	–	–	–	–	0.356	–	0.49	–	–	1.21	1.28	–	2.41	–	–	–	–	2.87	–	–	3.46	–	–	0.982	–	4.4
	MW-DN-125-S	1.14	3.43	–	–	–	–	–	–	0.362	–	0.798	–	–	1.21	1.94	–	–	0.739	–	–	–	2.87	–	–	1.51	–	–	1.44	–	
	MW-DN-126-S	1.75	5.24	–	–	–	–	–	–	1.33	–	1.5	–	–	1.21	1.29	–	1.79	–	–	–	–	2.77	–	–	1.5	–	–	2.57	–	4.54
	MW-DN-127-S	0.92	2.77	–	–	–	–	–	0.817	–	–	0.488	–	–	1.21	1.34	–	0.731	–	–	–	–	0.815	–	–	0.862	–	–	1.13	–	
	MW-DN-134-S	0.72	2.15	–	–	–	–	–	–	–	0.925	0.513	–	–	0.657	0.345	–	0.721	–	–	–	–	0.807	–	–	0.868	–	–	0.886	–	
	MW-DN-135-S	0.75	2.25	–	–	–	–	–	–	–	1.08	0.538	–	–	0.657	0.345	–	0.721	–	–	–	–	0.843	–	–	0.932	–	–	0.884	–	
	MW-DN-136-S	1.13	3.39	–	–	–	–	–	–	–	0.4	0.545	–	–	0.657	0.346	–	2.55	–	–	–	–	1.76	–	–	1.36	–	–	1.43	–	4.33
	MW-DN-137-S	1.41	4.24	–	–	–	–	–	–	–	1.25	0.645	–	–	1.1	–	0.351	2.5	–	–	–	–	2.61	–	–	1.42	–	–	1.44	–	
	MW-DN-140-S	1.18	3.54	–	–	–	–	–	–	–	1.49	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.869
	MW-DN-141-S	0.82	2.45	–	–	–	–	–	–	–	0.973	0.513	–	1.24	–	0.504	–	0.894	–	–	–	–	0.83	–	–	1.03	–	–	0.884	–	0.909
	MW-DN-142-S	1.16	3.49	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2.62	–	–	0.591	–	–	1.47	–	–	1.43	–	
	MW-DN-143-S	1.26	3.78	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.819	–	–	1.81	–	–	1.43	–	–	0.982	–	
	MW-DN-144-S	1.89	5.66	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3.23	–	–	1.85	–	–	1.44	–	–	1.02	–	
	RW-DN-100-S	#DIV/0!	#DIV/0!	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6.68
	RW-DN-101-S	#DIV/0!	#DIV/0!	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	

Explanation:

- 2.83 — Historic data outlier removed from the calculation of the average concentration that was used to calculate the Alert Level.
- 3.35 — Alert Level Exceedance where select transuranics were analyzed and found to be less than their respective LLDs. The result is now used in generating the Alert Level.
- 3.56 — Alert Level Exceedance However, the result is ND and less than LLD

Dresden Generating Station
Constellation Energy Company

Table 2
Summary of U-233/234
and U238 Results

Station	Well ID	U-233/234 Results																													
		2011				2012		2013		2014	2015		2016		2017			2018					2019				2020			2021	2022
		Feb	Mar	Jun	Dec	Mar	Jun	Mar	Jun	Jun	Jun	Nov	May	Oct	Feb	May	Nov	Jan	Feb	Jun	Oct	Nov	Mar	May	Aug	Dec	Mar	Jul	Nov	May	Jun
Dresden	DSP-107	0.09023																													
	DSP-122	0.1733																													
	DSP-123	0.1647																													
	DSP-124	0.03502																													
	DSP-125			0.1329																											0.08067
	MD-11			0.05616								0.1496		0.1019	0.03347		0.1252		0.1154			0.1121		0.04995		0.1377			0.1474	0.1156	0.1418
	MW-DN-101-I																	0.3894	0.05872	0.4567		0.2605	0.527	0.4477	0.2788	0.5173	0.2971				
	MW-DN-102-I			0.5784																											
	MW-DN-102-S			0.1116																											
	MW-DN-104-S	0.8506																													
	MW-DN-106-S			1.091																											
	MW-DN-107-S				0.371	0.9135																									
	MW-DN-108-I	0.3799																													
	MW-DN-111S																													0.03651	
	MW-DN-113-I			0.09059																											
	MW-DN-113-S			0.544																											
	MW-DN-116-S																													0.07296	
	MW-DN-119-I																0.8408	0.09179		0.1428	0.0229	0.0217	0.04698	0.1045	0.1441	0.1718	0.1187	0.06836		0.06477	
	MW-DN-122-I		0.324																												
	MW-DN-124-I	0.05192					0.06465	0.08076	0.1292	0.143	0.08868		0.1273			0.104				0.1055				0.03858					0.1186	0.1395	0.04893
	MW-DN-124-S							0.05753	0.9742	0.1876	0.7096		0.03498			0.113				0.02586				0.1175					0.1191	0.1802	0.092303
	RW-DN-100S																													0.1454	
	SW-DN-101			0.4082																											
	SW-DN-102			0.441																											
	SW-DN-103			0.6737																											
	SW-DN-104			0.7946																											
	SW-DN-105			0.553																											
	SW-DN-106			0.489																											

Station	Well ID	U-238 Results																													
		2011				2012		2013		2014	2015		2016		2017			2018					2019				2020			2021	2022
		Feb	Mar	Jun	Dec	Mar	Jun	Mar	Jun	Jun	Jun	Nov	May	Oct	Feb	May	Nov	Jan	Feb	Jun	Oct	Nov	Mar	May	Aug	Dec	Mar	Jul	Nov	May	Jun
Dresden	DSP-107	0.07626																													
	DSP-122	0.1605																													
	DSP-123	0.0743																													
	DSP-124	0.06065																													
	DSP-125			0.1879																											0.0433
	MD-11			0.07942								0.1058		0.09531	0.05797		0.1252		0.1233			0.1068		0.06118		0.1124			0.1575	0.03103	0.07612
	MW-DN-101-I																	0.1488	0.08303	0.1215		0.1775	0.2164	0.1499	0.1993	0.124	0.1755				
	MW-DN-102-I			0.1066																											
	MW-DN-102-S			0.1116																											
	MW-DN-104-S	0.4353																													
	MW-DN-106-S			0.845																											
	MW-DN-107-S				0.4338	0.6638																									
	MW-DN-108-I	0.2105																													
	MW-DN-111S																													0.06802	
	MW-DN-113-I			0.06406																											
	MW-DN-113-S			0.2991																											
	MW-DN-116-S																													0.07296	
	MW-DN-119-I																0.4422	0.1124		0.08746	0.04265	0.0217	0.08136	0.08333	0.1556	0.1403	0.1346	0.1141		0.1295	
	MW-DN-122-I		0.3512																												
	MW-DN-124-I	0.1465					0.07465	0.08076	0.0914	0.1891	0.05121		0.2437			0.1644				0.08823				0.122					0.08389	0.1801	0.04893
	MW-DN-124-S							0.04069	0.3889	0.1532	0.2626		0.1399			0.04273				0.1274				0.06283					0.1191	0.1472	0.09203
	RW-DN-100S																													0.1761	
	SW-DN-101			0.5516																											
	SW-DN-102			0.5302																											
	SW-DN-103			0.4086																											
	SW-DN-104			0.4812																											
	SW-DN-105			0.3978																											
	SW-DN-106			0.5952																											

Notes:
1 - If a sample was re-analyzed on a particular date, only the highest concentration is noted.

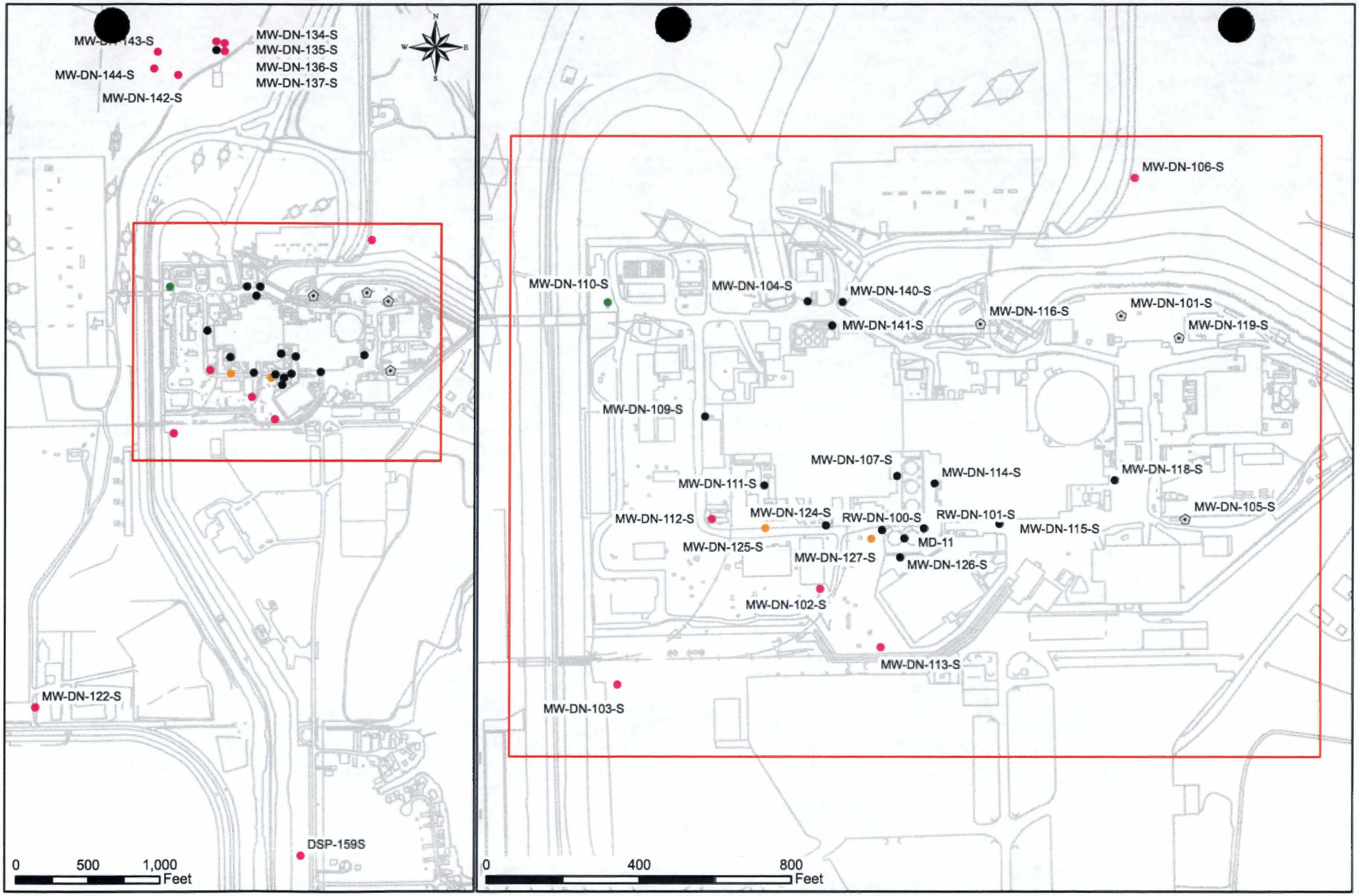
Results in pCi/L

AMO Environmental Decision

Table 3
Summary of 2022 Precipitation Results

Sample Location	Sample Date	Directional Sector	Result	Qual
FW-1	3/15/2022	NW	229	+
FW-10	3/15/2022	E	195	U
FW-11	3/15/2022	ESE	193	U
FW-12	3/15/2022	SSE	175	U
FW-2	3/15/2022	NNE	360	+
FW-3	3/15/2022	NNW	589	+
FW-4	3/15/2022	SW	171	U
FW-5	3/16/2022	NE	172	U
FW-1	6/7/2022	NW	735	+
FW-10	6/7/2022	E	204	+
FW-11	6/7/2022	ESE	173	U
FW-12	6/7/2022	SSE	182	+
FW-2	6/7/2022	NNE	377	+
FW-3	6/7/2022	NNW	394	+
FW-4	6/7/2022	SW	470	+
FW-5	6/6/2022	NE	229	+
FW-1	7/27/2022	NW	418	+
FW-10	7/27/2022	E	196	U
FW-11	7/26/2022	ESE	194	U
FW-12	7/28/2022	SSE	195	U
FW-2	7/27/2022	NNE	234	+
FW-3	7/27/2022	NNW	266	+
FW-4	7/27/2022	SW	195	U
FW-5	7/25/2022	NE	196	U
FW-1	11/16/2022	NW	1,860	+
FW-10	11/16/2022	E	176	U
FW-11	11/16/2022	ESE	242	+
FW-12	11/16/2022	SSE	230	+
FW-2	11/16/2022	NNE	902	+
FW-3	11/16/2022	NNW	1,330	+
FW-4	11/16/2022	SW	353	+
FW-5	11/16/2022	NE	191	U

Explanation:
U - Tritium not detected at a concentration greater than the laboratory detection limit.
+ - Tritium detected at a Concentration greater than the laboratory detection limit.
- All results presented in pCi/L.

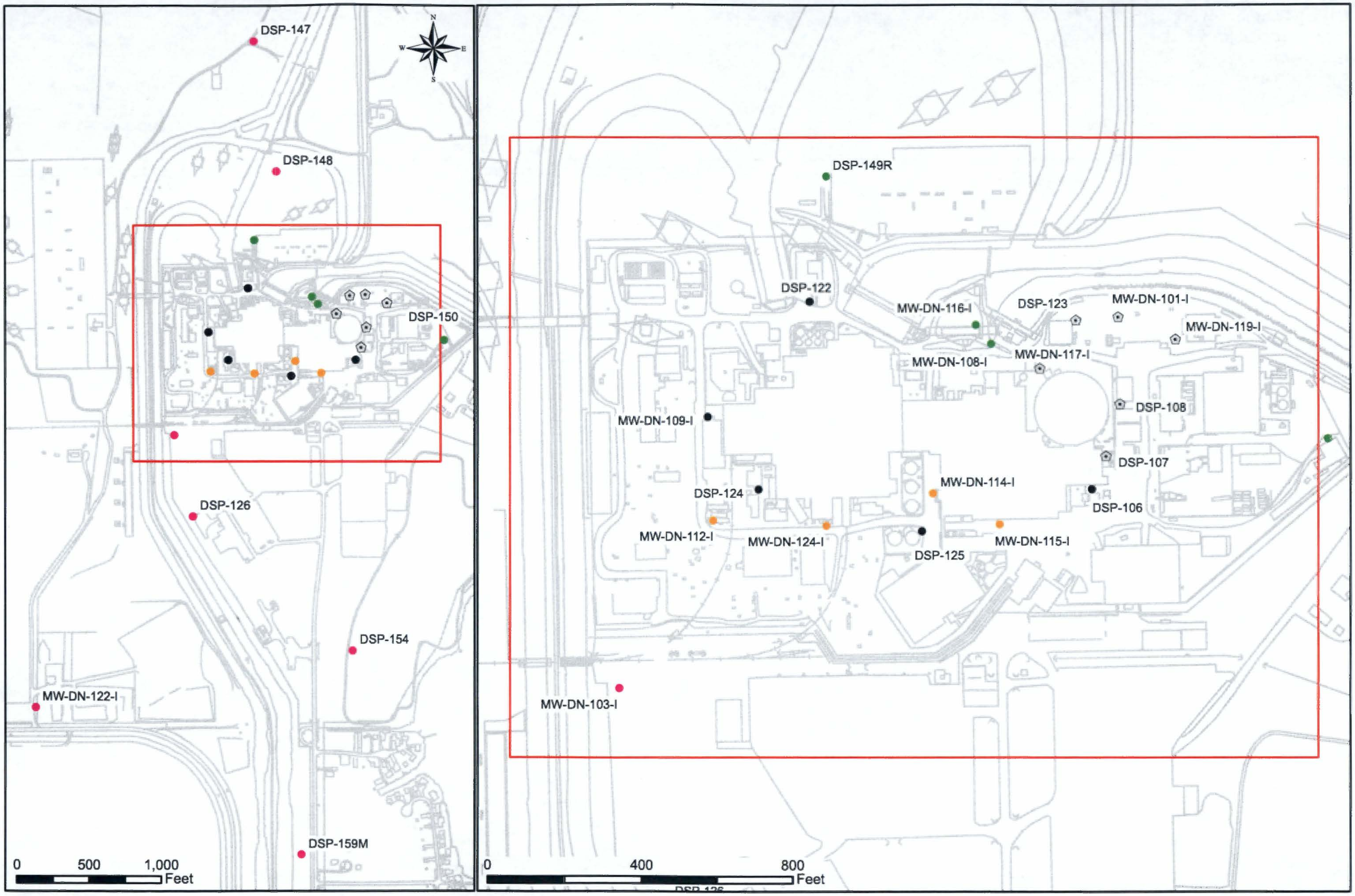


Explanation:

Shallow Aquifer RGPP Monitoring Location

- Background
- Long-Term Shutdown
- Mid-Field
- Perimeter
- Source

Figure 1a
RGPP Sample Locations
Shallow Aquifer
Exelon Corporation
Dresden Generating Station

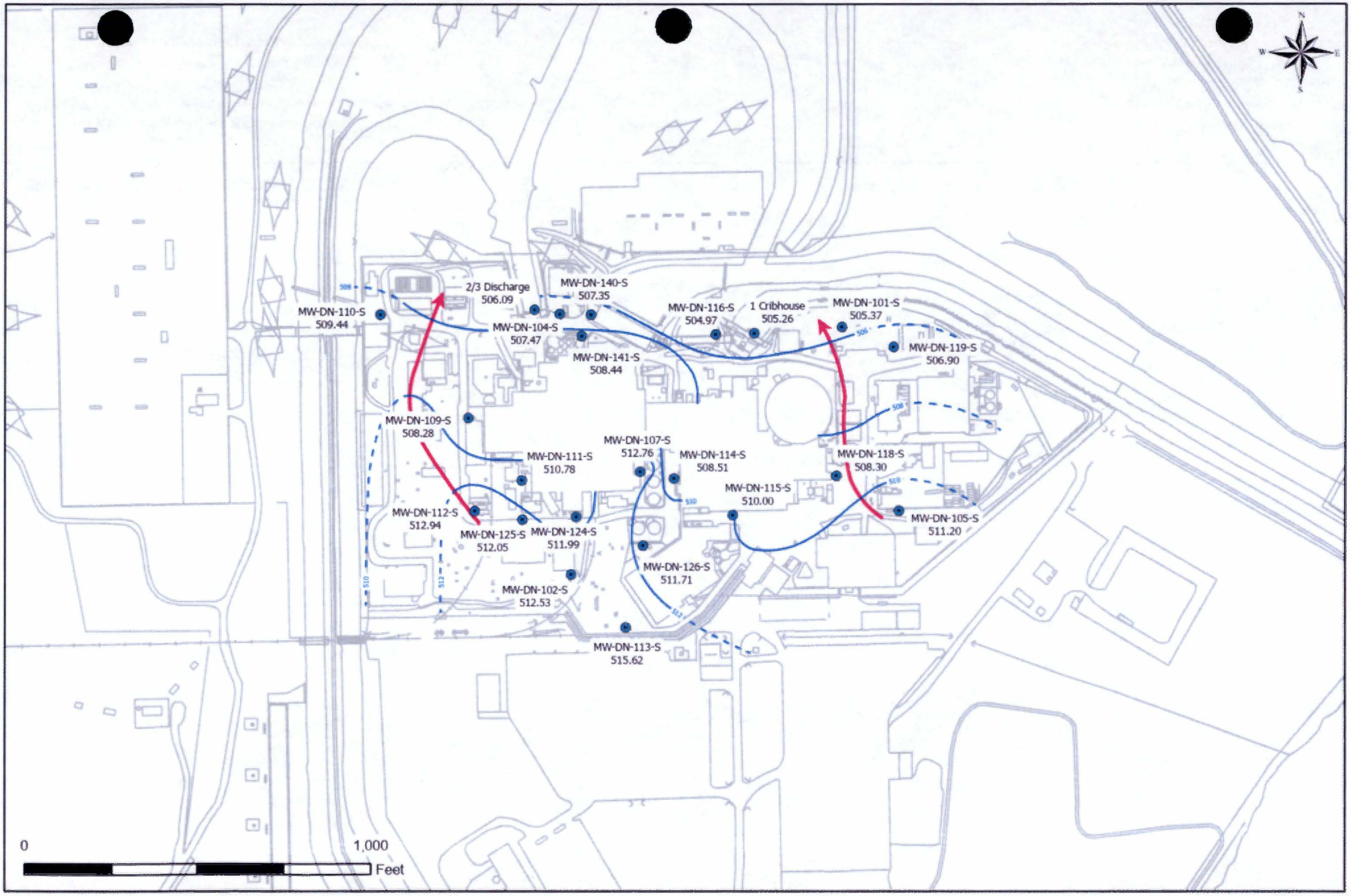


Explanation:

Intermediate Aquifer RGPP Monitoring Location

- Background
- Long-Term Shutdown
- Mid-Field
- Perimeter
- Source

Figure 1b
RGPP Sample Locations
Intermediate Aquifer
Exelon Corporation
Dresden Generating Station



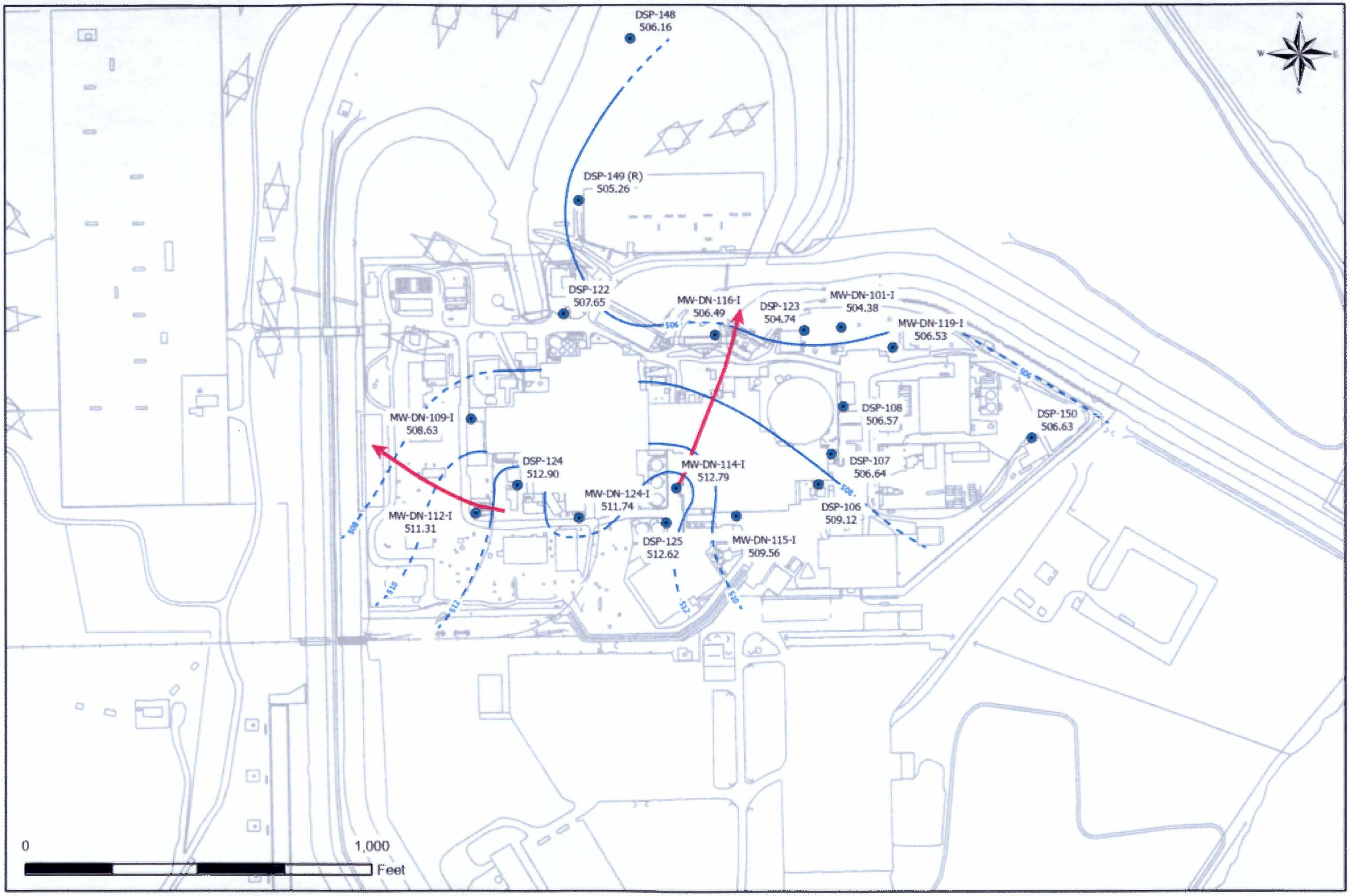
Explanation:

- 4th Qtr. 2022 RGPP Shallow Aquifer Monitoring Location

4th Qtr. 2022 RGPP Shallow Aquifer Groundwater Elevation Contour

- Groundwater Elevation Contour
- Inferred Groundwater Elevation Contour
- Estimated Groundwater Flow Direction

Figure 2a
4th Quarter 2022 (November) RGPP
Groundwater Elevations and
Water Elevation Contours
Surface Water and Shallow Aquifer
Constellation Energy Corporation
Dresden Generating Station



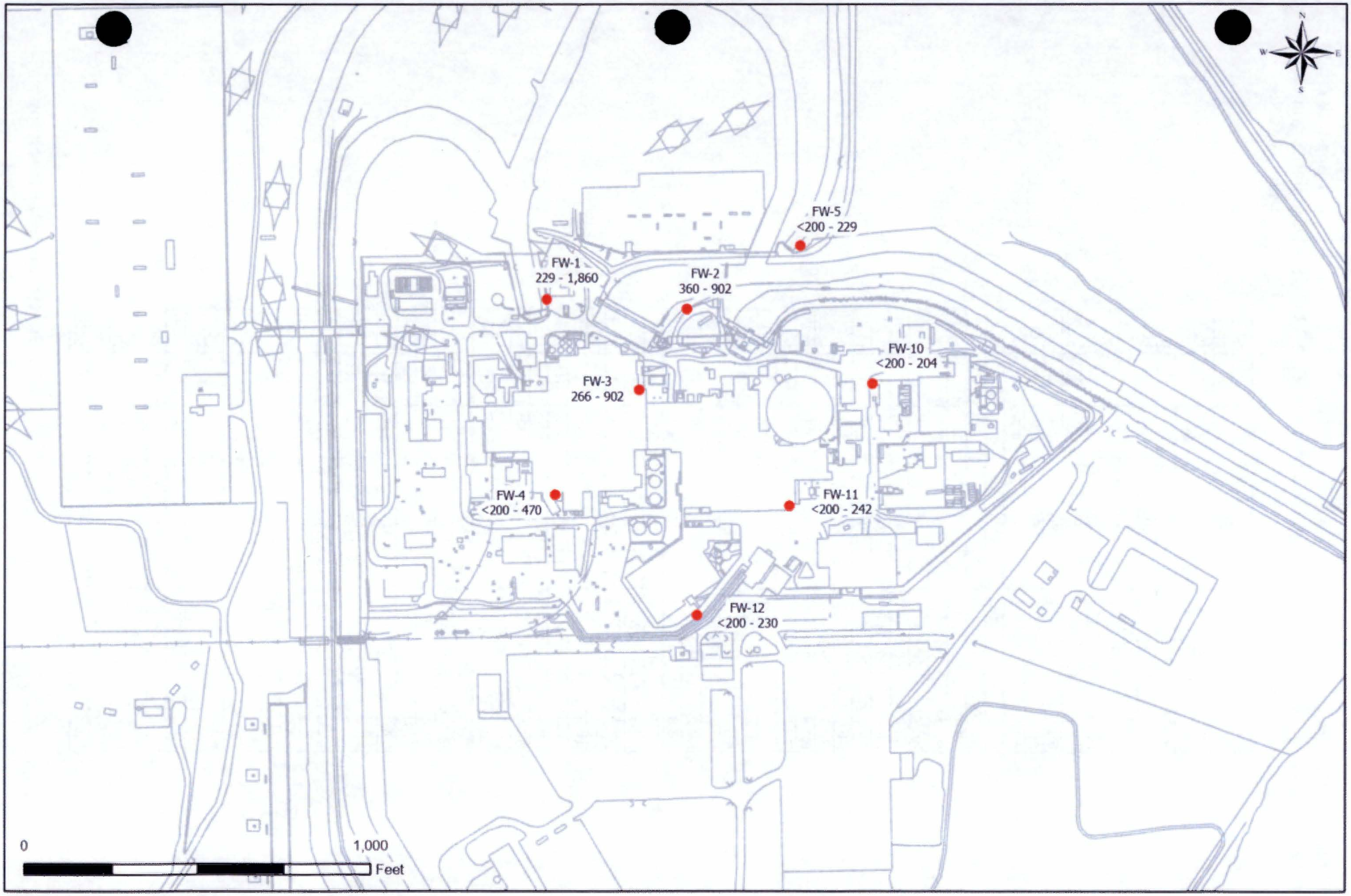
Explanation:

- 4th Qtr. 2022 RGPP Intermediate Aquifer Monitoring Location

4th Qtr. 2022 RGPP Intermediate Aquifer Groundwater Elevation Contour

- Groundwater Elevation Contour
- Inferred Groundwater Elevation Contour
- Estimated Groundwater Flow Direction

Figure 2b
4th Quarter 2022 (November) RGPP
Groundwater Elevations and
Water Elevation Contours
Intermediate Aquifer
Constellation Energy Corporation
Dresden Generating Station



Explanation:

2022 Precipitation Recapture Sample Locations

- Result >200 pCi/L
- Result <200 pCi/L

Figure 3
2022 Precipitation Recapture
Sample Locations
Constellation Energy Corporation
Dresden Generating Station

Sample ID	Date	Directional Sector	Result	Qual	Units
RB-1	7/28/2011	NW	400	+	pCi/L
RB-10	7/28/2011	E	630	+	pCi/L
RB-11	7/28/2011	ESE	300	+	pCi/L
RB-12	7/28/2011	SSE	100	U	pCi/L
RB-2	7/28/2011	NNE	630	+	pCi/L
RB-3	7/28/2011	NNW	200	U	pCi/L
RB-4	7/28/2011	SW	100	U	pCi/L
RB-5	7/28/2011	NE	100	U	pCi/L
RB-6	7/28/2011	ENE	200	U	pCi/L
RB-7	7/28/2011	SE	200	U	pCi/L
RB-8	7/28/2011	S	100	U	pCi/L
RB-9	7/28/2011	SSW	100	U	pCi/L
RB-1	10/21/2011	NW	300	+	pCi/L
RB-10	10/21/2011	E	0	U	pCi/L
RB-11	10/21/2011	ESE	200	+	pCi/L
RB-12	10/21/2011	SSE	100	U	pCi/L
RB-2	10/21/2011	NNE	300	+	pCi/L
RB-3	10/21/2011	NNW	300	+	pCi/L
RB-4	10/21/2011	SW	400	+	pCi/L
RB-5	10/21/2011	NE	300	+	pCi/L
RB-6	10/21/2011	ENE	200	U	pCi/L
RB-7	10/21/2011	SE	200	U	pCi/L
RB-8	10/21/2011	S	100	U	pCi/L
RB-9	10/21/2011	SSW	0	U	pCi/L
RB-1	1/11/2012	NW	400	+	pCi/L
RB-10	1/11/2012	E	300	+	pCi/L
RB-11	1/11/2012	ESE	100	U	pCi/L
RB-12	1/11/2012	SSE	300	+	pCi/L
RB-2	1/11/2012	NNE	600	+	pCi/L
RB-3	1/11/2012	NNW	600	+	pCi/L
RB-4	1/11/2012	SW	500	+	pCi/L
RB-5	1/11/2012	NE	400	+	pCi/L
RB-6	1/11/2012	ENE	300	+	pCi/L
RB-7	1/11/2012	SE	400	+	pCi/L
RB-8	1/11/2012	S	300	+	pCi/L
RB-9	1/11/2012	SSW	100	U	pCi/L
RB-1	5/23/2012	NW	191	U	pCi/L
RB-10	5/23/2012	E	199	U	pCi/L
RB-11	5/30/2012	ESE	168	U	pCi/L
RB-12	5/30/2012	SSE	167	U	pCi/L
FW-1	6/6/2013	NW	161	U	pCi/L
FW-10	6/7/2013	E	160	U	pCi/L
FW-11	6/13/2013	ESE	169	U	pCi/L
FW-12	6/14/2013	SSE	168	U	pCi/L
FW-1	5/29/2014	NW	194	U	pCi/L
FW-10	5/30/2014	E	191	U	pCi/L
FW-11	5/30/2014	ESE	194	U	pCi/L
FW-12	5/30/2014	SSE	196	U	pCi/L
FW-1	6/1/2015	NW	190	U	pCi/L
FW-10	6/2/2015	E	188	U	pCi/L
FW-11	6/3/2015	ESE	182	U	pCi/L
FW-12	6/8/2015	SSE	175	U	pCi/L
FW-1	06/07/2016	NW	181	U	pCi/L
FW-10	06/01/2016	E	183	U	pCi/L
FW-11	06/01/2016	ESE	181	U	pCi/L
FW-12	06/01/2016	SSE	182	U	pCi/L
FW-1	05/15/2017	NW	177	U	pCi/L
FW-10	05/23/2017	E	177	U	pCi/L
FW-11	05/17/2017	ESE	175	U	pCi/L
FW-12	05/24/2017	SSE	178	U	pCi/L
FW-1	06/12/2018	NW	193	U	pCi/L

Sample ID	Date	Directional Sector	Result	Qual	Units
FW-10	06/12/2018	E	193	U	pCi/L
FW-11	06/12/2018	ESE	196	U	pCi/L
FW-12	06/02/2018	SSE	196	U	pCi/L
FW-1	5/28/2019	NW	188	U	pCi/L
FW-10	5/28/2019	E	181	U	pCi/L
FW-11	5/28/2019	ESE	186	U	pCi/L
FW-12	5/28/2019	SSE	187	U	pCi/L
FW-1	11/12/2020	NW	207	+	pCi/L
FW-10	11/12/2020	E	170	U	pCi/L
FW-11	11/12/2020	ESE	175	U	pCi/L
FW-12	11/12/2020	SSE	276	U	pCi/L
FW-11	3/8/2021	ESE	182	U	pCi/L
FW-10	3/8/2021	E	187	U	pCi/L
FW-1	3/9/2021	NW	404	+	pCi/L
FW-4	3/11/2021	SW	180	U	pCi/L
FW-12	3/11/2021	SSE	186	U	pCi/L
FW-2	3/11/2021	NNE	184	U	pCi/L
FW-3	3/11/2021	NNW	182	U	pCi/L
FW-5	3/11/2021	NE	182	U	pCi/L
FW-11	8/10/2021	ESE	169	U	pCi/L
FW-5	8/10/2021	NE	169	U	pCi/L
FW-10	8/11/2021	E	161	U	pCi/L
FW-2	8/11/2021	NNE	176	U	pCi/L
FW-3	8/11/2021	NNW	421	+	pCi/L
FW-1	8/12/2021	NW	177	U	pCi/L
FW-4	8/12/2021	SW	176	U	pCi/L
FW-12	8/12/2021	SSE	173	U	pCi/L
FW-4	11/8/2021	SW	193	U	pCi/L
FW-5	11/8/2021	NE	177	U	pCi/L
FW-12	11/9/2021	SSE	187	U	pCi/L
FW-11	11/9/2021	ESE	181	U	pCi/L
FW-10	11/9/2021	E	186	U	pCi/L
FW-2	11/9/2021	NNE	192	+	pCi/L
FW-3	11/9/2021	NNW	239	+	pCi/L
FW-1	11/10/2021	NW	215	+	pCi/L
FW-1	3/15/2022	NW	229	+	pCi/L
FW-10	3/15/2022	E	195	U	pCi/L
FW-11	3/15/2022	ESE	193	U	pCi/L
FW-12	3/15/2022	SSE	175	U	pCi/L
FW-2	3/15/2022	NNE	360	+	pCi/L
FW-3	3/15/2022	NNW	589	+	pCi/L
FW-4	3/15/2022	SW	171	U	pCi/L
FW-5	3/16/2022	NE	172	U	pCi/L
FW-1	6/7/2022	NW	735	+	pCi/L
FW-10	6/7/2022	E	204	+	pCi/L
FW-11	6/7/2022	ESE	173	U	pCi/L
FW-12	6/7/2022	SSE	182	+	pCi/L
FW-2	6/7/2022	NNE	377	+	pCi/L
FW-3	6/7/2022	NNW	394	+	pCi/L
FW-4	6/7/2022	SW	470	+	pCi/L
FW-5	6/6/2022	NE	229	+	pCi/L
FW-1	7/27/2022	NW	418	+	pCi/L
FW-10	7/27/2022	E	196	U	pCi/L
FW-11	7/26/2022	ESE	194	U	pCi/L
FW-12	7/28/2022	SSE	195	U	pCi/L
FW-2	7/27/2022	NNE	234	+	pCi/L
FW-3	7/27/2022	NNW	266	+	pCi/L
FW-4	7/27/2022	SW	195	U	pCi/L
FW-5	7/25/2022	NE	196	U	pCi/L
FW-1	11/16/2022	NW	1,860	+	pCi/L
FW-10	11/16/2022	E	176	U	pCi/L

Sample ID	Date	Directional Sector	Result	Qual	Units
FW-11	11/16/2022	ESE	242	+	pCi/L
FW-12	11/16/2022	SSE	230	+	pCi/L
FW-2	11/16/2022	NNE	902	+	pCi/L
FW-3	11/16/2022	NNW	1,330	+	pCi/L
FW-4	11/16/2022	SW	353	+	pCi/L
FW-5	11/16/2022	NE	191	U	pCi/L