Annual Radiological Groundwater Protection Program Report 2024

Docket Number: 50-010, 50-237, 50-249

TABLE OF CONTENTS

TABLES

1.0 LIST OF ACRONYMS AND DEFINITIONS

1. Composite Sample: A series of single collected portions (aliquots) analyzed as one sample. The aliquots making up the sample are collected at time intervals that are very short compared to the composite period.

2. Control: A sampling station in a location not likely to be affected by plant effluents due to its distance and/or direction from the Plant.

3. Counting Error: An estimate of the two-sigma uncertainty associated with the sample results based on total counts accumulated.

4. Curie (Ci): A measure of radioactivity; equal to 3.7×10^{10} disintegrations per second, or 2.22×10^{12} disintegrations per minute.

5. Grab Sample: A single discrete sample drawn at one point in time.

6. Indicator: A sampling location that is potentially affected by plant effluents due to its proximity and/or direction from the plant.

7. Ingestion Pathway: The ingestion pathway includes milk, fish, drinking water and garden produce. Also sampled (under special circumstances) are other media such as vegetation or animal products when additional information about particular radionuclides is needed.

8. LLD: Lower Limit of Detection. An *a priori* measure of the detection capability of a radiochemistry measurement based on instrument setup, calibration, background, decay time, and sample volume. An LLD is expressed as an activity concentration. The MDA is used for reporting results. LLD are specified by a regulator, such as the NRC and are typically listed in the ODCM.

9. MDA: Minimum Detectable Activity. For radiochemistry instruments, the MDA is the *a posteriori* minimum concentration that a counting system detects. The smallest concentration or activity of radioactive material in a sample that will yield a net count above instrument background and that is detected with 95% probability, with only 5% probability of falsely concluding that a blank observation represents a true signal.

10. MDC: Minimum Detectable Concentration. Essentially synonymous with MDA for the purposes of radiological monitoring.

11. Mean: The sum of all of the values in a distribution divided by the number of values in the distribution, synonymous with average.

12. Microcurie (µCi): 3.7×10^4 disintegrations per second, or 2.22×10^6 disintegrations per minute.

13. millirem (mrem): 1/1000 rem; a unit of radiation dose equivalent in tissue.

14. Milliroentgen (mR): 1/1000 Roentgen; a unit of exposure to X- or gamma radiation.

15. N/A: Not Applicable

16. NEI: Nuclear Energy Institute

17. NRC: Nuclear Regulatory Commission

18. ODCM: Offsite Dose Calculation Manual

19. Protected Area: A 10 CFR 73 security term is an area encompassed by physical barriers and to which access is controlled for security purposes. The fenced area immediately surrounding the plant and around ISFSI are commonly classified by the licensee as “Protected areas.” Access to the protected area requires a security badge or escort.

20. REMP: Radiological Environmental Monitoring Program

21. Restricted Area: A 10 CFRR 20 defined term where access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials.

22. TRM: Technical Requirements Manual

23. TS: Technical Specification

24. Unrestricted Area: An area, access to which is neither limited nor controlled by the licensee.

2.0 NEI 07-07 ONSITE RADIOLOGICAL GROUNDWATER MONITORING PROGRAM

Dresden Clean Energy Center has developed a Groundwater Protection Initiative (GPI) program in accordance with NEI 07-07, Industry Ground Water Protection Initiative – Final Guidance Document [1]. The purpose of the GPI is to ensure timely detection and an effective response to situations involving inadvertent radiological releases to groundwater in order to prevent migration of licensed radioactive material off-site and to quantify impacts on decommissioning. During 2024, Dresden Station collected and analyzed groundwater samples in accordance with the requirements of approved procedures following regulatory methods..

This section is included in this report to communicate results of NEI 07-07 Radiological Groundwater Monitoring Program. The monitoring wells installed as part of GPI program are sampled and analyzed as summarized in Table 1, Groundwater Protection Program Monitoring Well Sampling Locations. In addition to reporting results from NEI 07-07 monitoring wells, voluntary communications to offsite governmental agencies for onsite leaks or spills per NEI 07-07 Objective 2.2, are also reported as part of this report. It is important to note, samples and results taken in support of NEI 07-07 groundwater monitoring program are not part of the Radiological Environmental Monitoring Program (REMP) but should be reported as part of ARERR.

Table 1, Groundwater Protection Program Monitoring Well Sampling Locations

Site	Site Type	Location
CBG		
Domestic Water North Well	Monitoring Well	150 feet west of the P.A.F., just south of security fence
Domestic Water South Well	Monitoring Well	200 feet west of old vehicle checkpoint, 100 feet east of hot canal
DSP-105	Monitoring Well	30 feet east of east wall of EM Shop
DSP-106	Monitoring Well	65 feet east of east wall of EM Shop
DSP-107	Monitoring Well	9 feet east of the east Unit 1 Fuel Pool wall
DSP-108	Monitoring Well	40 ft east of the Unit 1 Sphere
DSP-122	Monitoring Well	50 feet north of the Radwaste Tank Farm
DSP-123	Monitoring Well	Northeast corner of the Unit 1 Off-gas Building
DSP-124	Monitoring Well	9 feet south of Floor Drain Collector Tank
DSP-125	Monitoring Well	Northeast corner of the Unit 2/3A CST
DSP-126	Monitoring Well	21 feet northwest of the northwest bend in road behind Training Building
DSP-131	Monitoring Well	35 feet NE of U2/3 Heating Boiler 150k gallon diesel tank
DSP-132	Monitoring Well	150 feet NE of U1 Sphere; sewer in middle of road with solid cover
DSP-133	Monitoring Well	Ditch that runs N of PAF easterly to Kankakee River; sample at side access W of PA
DSP-147	Monitoring Well	325 feet west of Telemetry Bridge
DSP-148	Monitoring Well	130 feet southeast of the Flow Regulating Station building
DSP-149R	Monitoring Well	35 feet south by southwest of the 138 KV yard fence
DSP-150	Monitoring Well	85 feet east of the northeast corner of the Unit 1 Spent Fuel Pool pad

Table 1, Groundwater Protection Program Monitoring Well Sampling Locations

Site	Site Type	Location
DSP-151	Monitoring Well	65 feet N of NE corner of Storeroom
DSP-154	Monitoring Well	33 feet west of the track; 165 feet east of the Security Checkpoint
DSP-156	Monitoring Well	70 feet E-NE of NW corner of 138 KV fence
DSP-157-M	Monitoring Well	25 feet S of S edge of employee parking lot
DSP-157-S	Monitoring Well	25 feet S of S edge of employee parking lot
DSP-159-M	Monitoring Well	250 feet west of the Thorsen house; 450 ft south of the plant access gate
DSP-159-S	Monitoring Well	251 feet west of the Thorsen house; 450 ft south of the plant access gate
FW-1	Precipitation	40 feet southwest of Unit 2/3 Off-gas Filter Building access door; north end of guardrail
FW-2	Precipitation	15 feet south of the U 2/3 Intake Canal
FW-3	Precipitation	100 feet north of the security fence, north part of switchyard
FW-4	Precipitation	10 feet east of the U 2/3 Trackway, adjacent to the TB south wall
FW-5	Precipitation	20 feet west of the concrete be on the north side of the gravel before it forks
FW-10	Precipitation	At the fence at the northwest corner of the SBO Building
FW-11	Precipitation	30 feet east of the east wall of the EM shop; at the stanchion for RGPP well DSP-105
FW-12	Precipitation	60 feet southeast of the southwest corner of the Admin Building; on the security fence
MD-11	Monitoring Well	Piping located between Condensate Storage Tanks.
MW-DN-101-I	Monitoring Well	60 feet north of the Unit 1 Diesel Fuel Storage
MW-DN-101-S	Monitoring Well	60 feet north of the Unit 1 Diesel Fuel Storage
MW-DN-102-S	Monitoring Well	13 feet south of the southeast corner of the MUDS Building
MW-DN-103-I	Monitoring Well	280 feet west of the northwest corner of N-GET Building, 50 feet S of S PA fence
MW-DN-103-S	Monitoring Well	281 feet west of the northwest corner of N-GET Building, 50 feet S of S PA fense
MW-DN-104-S	Monitoring Well	50 feet north of Radwaste Tank Farm
MW-DN-105-S	Monitoring Well	65 feet north of the northeast corner of the Storeroom
MW-DN-107-S	Monitoring Well	15 feet west by southwest of the Unit 1 CST

Table 1, Groundwater Protection Program Monitoring Well Sampling Locations

Site	Site Type	Location
MW-DN-109-I	Monitoring Well	8 feet north of Chemistry Building
MW-DN-109-S	Monitoring Well	8 feet north of Chemistry Building
MW-DN-110-S	Monitoring Well	25 feet west of the Waste Water Treatment (WWT) Building
MW-DN-111-S	Monitoring Well	9 feet east of the Floor Drain Collector Tank
MW-DN-112-I	Monitoring Well	100 feet south of the Chemistry Building
MW-DN-112-S	Monitoring Well	100 feet south of the Chemistry Building
MW-DN-113-S	Monitoring Well	91 feet west of the southwest corner of the Administration Building
MW-DN-114-I	Monitoring Well	50 feet east of the Unit 1 Clean Demineralized Water Tank
MW-DN-114-S	Monitoring Well	8 feet southwest of the Radiation protection Dept west access doors
MW-DN-115-I	Monitoring Well	11 feet south of Instrument Maintenance Shop
MW-DN-115-S	Monitoring Well	12 feet south of Instrument Maintenance Shop
MW-DN-116-I	Monitoring Well	75 feet south of the Calgon Building roll-up door
MW-DN-116-S	Monitoring Well	75 feet south of the Calgon Building roll-up door
MW-DN-118-S	Monitoring Well	Southeast corner of the Unit 1 Fuel Pool
MW-DN-119-I	Monitoring Well	20 feet east by northeast of the Unit 1 Sewage Ejector Building
MW-DN-119-S	Monitoring Well	21 feet east by northeast of the Unit 1 Sewage Ejector Building
MW-DN-122-I	Monitoring Well	150 feet north of Collins Road; northeast of the G.E. Fuel Storage Facility
MW-DN-122-S	Monitoring Well	150 feet north of Collins Road; northeast of the G.E. Fuel Storage Facility
MW-DN-124-I	Monitoring Well	11 feet south of the liquid nitrogen tanks
MW-DN-124-S	Monitoring Well	12 feet south of the liquid nitrogen tanks
MW-DN-125-S	Monitoring Well	40 feet east of 2/3 B CST
MW-DN-126-S	Monitoring Well	15 feet south of fence around Unit 2/3 A CST and B CST (outside of fence)
MW-DN-127-S	Monitoring Well	20 feet south of Unit 3 HRSS
MW-DN-134-S	Monitoring Well	20 feet North of Mausoleum Building
MW-DN-135-S	Monitoring Well	20 feet East of Mausoleum Building
MW-DN-136-S	Monitoring Well	14.5 feet South of Mausoleum Building
MW-DN-137-S	Monitoring Well	20 feet West of Mausoleum Building
MW-DN-140-S	Monitoring Well	East of MW-DN-104S at SW corner outside of 2/3 crib house

Table 1, Groundwater Protection Program Monitoring Well Sampling Locations

Site	Site Type	Location
MW-DN-141-S	Monitoring Well	North of 'A' Waste Tank next to 2/3 main chimney
MW-DN-142-S	Monitoring Well	338 feet NW of Mausoleum Building
MW-DN-143-S	Monitoring Well	408 feet NW of Mausoleum Building
MW-DN-144-S	Monitoring Well	458 feet NW of Mausoleum Building
RW-DN-100-S	Recovery Well	50 feet W of MD-11
RW-DN-101-S	Recovery Well	50 feet E of MD-11

Radiological Groundwater Monitoring Program tritium results are summarized in Table 2, Groundwater Protection Monitoring Well Tritium and Strontium in Ground Water Samples (pCi/L ± 2 sigma). No groundwater monitoring locations had detectable gamma or HTD in 2024

Table 2, Groundwater Protection Monitoring Well Tritium and Strontium in Ground Water Samples (pCi/L ± 2 sigma)

Site	Collection Date	H-3	Sr-89	Sr-90
CBG	2/27/2024	441 ± 138		
	5/28/2024	692 ± 155		
	8/13/2024	287 ± 126		
	10/21/2024	< 188		
	10/21/2024[B]	< 186		
DSP-106	2/27/2024	897 ± 171		
	5/31/2024	869 ± 175	< 8	< 0.7
	8/15/2024	912 ± 176		
	10/24/2024	720 ± 157		
DSP-107	2/27/2024	1200 ± 200		
	5/31/2024	1610 ± 239	< 6	< 0.7
	8/15/2024	1120 ± 195		
	10/24/2024	1150 ± 193		
DSP-108	2/27/2024	< 199		
	5/30/2024	257 ± 133	< 3	< 0.9
	8/15/2024	207 ± 129		
	10/23/2024	< 187		
DSP-122	2/28/2024	1560 ± 232		
	5/30/2024	1600 ± 242	< 4	< 0.7
	8/16/2024	1370 ± 214		
	10/23/2024	1400 ± 217		
DSP-123	2/28/2024	< 188		
	5/30/2024	< 196	< 4	< 0.9
	8/15/2024	< 196		
	10/23/2024	< 190		
DSP-124	2/26/2024	311 ± 130		
	5/28/2024	576 ± 146	< 5	< 0.8
	8/12/2024	263 ± 133		
	10/22/2024	323 ± 129		
DSP-125	2/27/2024	< 190		
	5/29/2024	< 199	< 8	< 0.8
	8/12/2024	< 195		
	10/21/2024	< 190		

[B] Reanalysis

Table 2, Groundwater Protection Monitoring Well Tritium and Strontium in Ground Water Samples (pCi/L ± 2 sigma) Cont'd

Site	Collection Date	H-3	Sr-89	Sr-90
DSP-126	5/30/2024	< 194		
DSP-147	5/29/2024	< 197		
DSP-148	5/30/2024	318 ± 130		
DSP-149	5/30/2024	309 ± 130		
DSP-150	5/31/2024	< 199		
DSP-154	5/30/2024	< 164		
DSP-159M	5/28/2024	342 ± 136		
DSP-159S	5/28/2024	< 198		
MD-11	2/27/2024	4870 ± 554	< 8	< 0.9
	5/29/2024	4820 ± 584		
	5/29/2024[B]	5060 ± 574		
	8/13/2024	6220 ± 693		
	10/21/2024	5700 ± 632		
MW-DN-101I	2/28/2024	249 ± 127	< 2	< 0.8
	5/30/2024	235 ± 131		
	8/15/2024	299 ± 122		
	10/23/2024	< 190		
MW-DN-101S	2/28/2024	< 190	< 7	< 0.9
	5/30/2024	< 195		
	8/15/2024	< 176		
	10/23/2024	< 188		
MW-DN-102S	5/29/2024	222 ± 129		
	5/29/2024[A]	221 ± 129		
	5/29/2024[B]	321 ± 136		
MW-DN-103I	5/28/2024	< 200		
MW-DN-103S	5/28/2024	< 195		
MW-DN-104S	2/28/2024	< 187	< 5	< 0.9
	5/30/2024	370 ± 136		
	8/16/2024	248 ± 117		
	10/23/2024	242 ± 127		
MW-DN-105S	2/27/2024	< 191	< 9	< 0.8
	5/30/2024	< 194		
	8/16/2024	< 171		
	10/23/2024	< 187		
MW-DN-106S	8/14/2024	176 ± 111		

[A] Recount

[B] Reanalysis

Table 2, Groundwater Protection Monitoring Well Tritium and Strontium in Ground Water Samples (pCi/L ± 2 sigma) Cont'd

Site	Collection Date	H-3	Sr-89	Sr-90
MW-DN-107S	2/27/2024	< 191		
	5/30/2024	< 196	< 9	< 0.8
	8/15/2024	< 177		
	10/23/2024	< 181		
MW-DN-109I	2/28/2024	278 ± 128		
	5/31/2024	247 ± 132	< 9	< 0.9
	8/15/2024	322 ± 119		
	10/22/2024	< 185		
MW-DN-109S	2/28/2024	< 193		
	5/31/2024	< 197	< 3	< 1
	8/15/2024	< 171		
	10/22/2024	< 182		
MW-DN-110S	5/31/2024	< 198		
MW-DN-111S	2/26/2024	8020 ± 867		
	2/26/2024[A]	8560 ± 925		
	2/26/2024[B]	8150 ± 876		
	5/28/2024	6700 ± 734	< 7	< 0.7
	5/28/2024[A]	6850 ± 751		
	5/28/2024[B]	6510 ± 717		
	8/12/2024	6420 ± 697		
	10/22/2024	5570 ± 619		
MW-DN-112I	5/28/2024	260 ± 130		
	10/22/2024	478 ± 132		
MW-DN-112S	5/28/2024	< 185		
MW-DN-113S	5/31/2024	< 192		
MW-DN-114I	5/29/2024	382 ± 133		
	10/21/2024	1620 ± 233		
MW-DN-114S	2/27/2024	273 ± 129		
	5/29/2024	< 183	< 9	< 0.7
	8/13/2024	< 175		
	10/21/2024	1500 ± 224		
MW-DN-115I	5/31/2024	284 ± 126		
	10/22/2024	283 ± 126		
MW-DN-115S	2/27/2024	337 ± 134		
	5/31/2024	< 187	< 7	< 0.9
	8/13/2024	< 171		
	10/22/2024	< 179		
MW-DN-116I	5/30/2024	< 193		

[A] Recount

[B] Reanalysis

Table 2, Groundwater Protection Monitoring Well Tritium and Strontium in Ground Water Samples (pCi/L ± 2 sigma) Cont'd

Site	Collection Date	H-3	Sr-89	Sr-90
MW-DN-116S	2/28/2024	< 195	< 6	< 0.6
	5/30/2024	< 196		
	8/16/2024	257 ± 120		
	10/23/2024	< 180		
MW-DN-118S	2/27/2024	< 194	< 2	< 0.8
	5/31/2024	< 195		
	8/15/2024	< 171		
	10/24/2024	< 180		
MW-DN-119I	2/27/2024	< 193	< 6	< 0.9
	5/30/2024	< 196		
	8/16/2024	< 171		
	10/23/2024	< 185		
MW-DN-119S	2/27/2024	< 189	< 4	< 0.7
	5/30/2024	< 196		
	8/16/2024	< 174		
	10/23/2024	< 184		
MW-DN-122I	5/30/2024	< 197		
MW-DN-122S	5/30/2024	< 199		
MW-DN-124I	2/26/2024	378 ± 133	< 10	< 0.9
	5/29/2024	< 198		
	8/16/2024	< 172		
	10/22/2024	< 180		
MW-DN-124S	2/26/2024	287 ± 129	< 6	< 0.8
	5/29/2024	311 ± 132		
	8/16/2024	229 ± 116		
	10/22/2024	538 ± 135		
MW-DN-125S	5/28/2024	296 ± 130		
	10/22/2024	188 ± 122		
MW-DN-126S	2/26/2024	< 189	< 7	< 0.8
	5/29/2024	< 196		
	8/13/2024	< 173		
	10/21/2024	< 179		
MW-DN-127S	5/29/2024	< 200		
	10/22/2024	< 188		
MW-DN-134S	5/29/2024	< 186		
MW-DN-135S	5/29/2024	< 197		

[A] Recount

[B] Reanalysis

Table 2, Groundwater Protection Monitoring Well Tritium and Strontium in Ground Water Samples (pCi/L ± 2 sigma) Cont'd

Site	Collection Date	H-3	Sr-89	Sr-90
MW-DN-136S	2/28/2024	< 193	< 3	< 0.9
	5/29/2024	255 ± 127		
	8/13/2024	< 175		
	10/24/2024	< 184		
MW-DN-137S	5/29/2024	< 188		
MW-DN-140S	2/28/2024	< 193	< 9	< 0.8
	5/30/2024	220 ± 127		
	8/16/2024	< 173		
	10/24/2024	< 185		
MW-DN-141S	2/27/2024	284 ± 354	< 8	< 0.9
	5/30/2024	1910 ± 268		
	8/16/2024	2590 ± 331		
	10/23/2024	2970 ± 361		
MW-DN-142S	5/31/2024	< 191		
MW-DN-143S	5/29/2024	< 196		
MW-DN-144S	5/29/2024	< 194		
RW-DN-100S	2/27/2024	1140 ± 194	< 3	< 0.7
	5/29/2024	1400 ± 217		
	8/13/2024	1390 ± 218		
	10/22/2024	501 ± 136		
RW-DN-101S	2/27/2024	10700 ± 1130	< 9	< 0.8
	2/27/2024[A]	11700 ± 1230		
	2/27/2024[B]	9950 ± 1060		
	5/29/2024	15900 ± 1650		
	5/29/2024[B]	18500 ± 1910		
	8/13/2024	298 ± 125		
	10/22/2024	298 ± 185		

[A] Recount

[B] Reanalysis

Table 3, Groundwater Protection Program Monitoring Well Gamma Isotopic in Groundwater Samples (pCi/L ± 2 sigma)

No Groundwater Samples Analyzed for Gamma Isotopic in 2024

Table 4, Groundwater Protection Program Monitoring Well Hard-To-Detects in Groundwater Samples (pCi/L ± 2 sigma)

Site	Collection Date	Fe-55	Ni-63	Am-241	Cm-242	CM-243/244	Pu-238	Pu-239/240	U-234	U-235	U-238
DSP-107	5/31/2024	< 81	< 4								
DSP-108	5/30/2024	< 69	< 4								
DSP-123	5/30/2024	< 124	< 4								
MD-11	5/29/2024	< 52	< 4	< 0.02	< 0.05	< 0.02	< 0.1	< 0.04	< 0.03	< 0.03	< 0.07
MW-DN-101I	5/30/2024	< 69	< 4								
MW-DN-101S	5/30/2024	< 53	< 4								
MW-DN-105S	5/30/2024	< 109	< 3								
MW-DN-116S	5/30/2024	< 38	< 4								
MW-DN-119I	5/30/2024	< 56	< 3								
MW-DN-119S	5/30/2024	< 60	< 5								
MW-DN-124I	5/29/2024	< 60	< 4	< 0.2	< 0.04	< 0.04	< 0.05	< 0.05	< 0.08	< 0.09	< 0.2
MW-DN-124S	5/29/2024	< 76	< 4	< 0.07	< 0.03	< 0.03	< 0.1	< 0.1	< 0.07	< 0.09	< 0.07

Table 5, Groundwater Protection Monitoring Well Tritium in Precipitation Water Samples

(pCi/L ± 2 sigma)

Site	Collection Date	H-3
DN-FW-1	2/28/2024	734 ± 158
	5/31/2024	615 ± 147
	8/15/2024	291 ± 124
	11/26/2024	519 ± 136
DN-FW-10	5/31/2024	< 190
	8/15/2024	< 192
	11/26/2024	< 179
DN-FW-11	2/28/2024	< 187
	5/31/2024	< 189
	8/15/2024	< 190
	11/26/2024	< 185
DN-FW-12	5/31/2024	< 187
	8/15/2024	< 188
	11/26/2024	< 182
DN-FW-13	5/31/2024	< 190
	8/15/2024	< 186
	11/26/2024	< 186
DN-FW-14	5/31/2024	231 ± 125
	8/15/2024	221 ± 123
	11/26/2024	340 ± 128
DN-FW-2	5/31/2024	249 ± 128
	8/15/2024	< 196
	11/26/2024	245 ± 125
DN-FW-3	2/28/2024	820 ± 164
	5/31/2024	567 ± 143
	11/26/2024	390 ± 128
DN-FW-4	11/26/2024	< 177
DN-FW-5	5/31/2024	< 191
	8/15/2024	< 189
	11/26/2024	< 182

2.1 Voluntary Notification

During 2024, Dresden Clean Energy Center did not make a voluntary NEI 07-07 notification to State/Local officials, NRC, and to other stakeholders required by site procedures.

3.0 BIBLIOGRAPHY

[1] "NEI 07-07 - Industry Ground Water Protection Initiative — Final Guidance Document, Rev. 1," Nuclear Energy Institute, Washington, D.C., 2019.

[2] Nuclear Regulatory Commission, 25 June 2015. [Online]. Available: http://www.nrc.gov/reading-rm/basic-ref/students/animated-bwr.html. [Accessed October 2020].

[3] "Japan Atomic Energy Agency," 06 November 2020. [Online]. Available: https://www.jaea.go.jp/english/04/ntokai/houkan/houkan_02.html.

[4] "NRC Resource Page," [Online]. Available: http://www.nrc.gov/about-nrc/radiation.html. [Accessed 10 November 2020].

[5] Nuclear Regulatory Commission, 30 June 2015. [Online]. Available: http://www.nrc.gov/reading-rm/basic-ref/students/animated-pwr.html. [Accessed October 2020].

[6] "Regulatory Guide 1.109 - Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Demonstrating Compliance with 10 CFR Part 50, Appendix I," Nuclear Regulatory Commission, Ocotober, 1977.

[7] "NUREG-0133 - Preparation of Effluent Technical Specifications for Nuclear Power Plants," Nuclear Regulatory Commission, 1987.

[8] "NCRP Report No. 160 - Ionizing Radiation Exposure of the Population of the United States," National Council on Radiation Protection and Measurements, Bethesda, MD, 2009.

[9] Health Physics Society, [Online]. Available: http://hps.org/hpspublications/radiationfactsheets.html. [Accessed 2020].