

ENVIRONMENTAL MONITORING PLAN MATRIX FOR CALENDAR YEAR 2021

Sampling Location	Reporting to Regulators	Reporting to Departments	Lead Organization	Sample Type	Analysis/Frequency
<i>Air Monitoring: Surveillance - Radiological, Particulate Filter (See Chapters 5 and 6)</i>					
P2, P4, P7, P9, NYSDOH	SER	SER	EPD	Weekly Composite	Gross alpha/beta - sampled and analyzed weekly
BLIP and Bldg. 801	SER	SER	EPD	Weekly Composite	Gross alpha/beta - sampled and analyzed weekly
HWM 865 – FLT-101, -102, -107, -108	SER	SER	EPD	On Request	Gross alpha/beta, gamma – Only on request by Waste Management
<i>Air Emissions: Compliance, Non-Radiological (See Chapter 5)</i>					
CSF – Boiler #6 Stack	SER/QES	Yes	EU	Continuous	Opacity - continuous emissions monitoring
CSF – Boiler #6 Stack	SER/QES	Yes	EU	Continuous	NO _x , CO ₂ , CO - continuous emissions monitoring
CSF – Boiler #7 Stack	SER/QES	Yes	EU	Continuous	NO _x , CO ₂ , CO - continuous emissions monitoring
CSF – Boiler #7 Stack	SER/QES	Yes	EU	Continuous	Opacity - continuous emissions monitoring
CSF – Tank Nos. 4, 9, and 10	SER/QES	Yes	EU	Quarterly	Sulfur and nitrogen fuel content - quarterly analysis if fuel is delivered
Satellite Boiler Fuel Storage Tanks	SER/QES	Yes	EU	Quarterly	Sulfur content – quarterly analysis if fuel is delivered
CSF - Boiler #1A Stack	SER/STR	Yes	EU	Performance Test	NO _x TSP - every five years
CSF - Boiler #5 Stack	SER/STR	Yes	EU	Performance Test	NO _x TSP - every five years
CSF - Boiler #6 Stack	SER/STR	Yes	EU	Performance Test	TSP - every five years
CSF - Boiler #7 Stack	SER/STR	Yes	EU	Performance Test	TSP - every five years
Used AC Shop Compressor Oil and Collider Accelerator Waste Separator Oil	SER/QES	Yes	EU	3-4 times per year	Cadmium, arsenic, lead, chromium, sulfur, PCBs, total halogens, flashpoint, and gross heat content - sampled and analyzed as needed
CSF – Tank Nos. 4, 9, and 10	SER/QES	Yes	EU	Quarterly	Sulfur and nitrogen fuel content - quarterly analysis
Satellite Boiler Fuel Storage Tanks	SER/QES	Yes	EU	Quarterly	Sulfur content - quarterly analysis if fuel is delivered
Used AC Shop compressor oil and Collider Accelerator waste separator oil	SER/QES	Yes	EU	3-4 times per year	Cadmium, arsenic, lead, chromium, sulfur, PCBs, total halogens, flashpoint, and gross heat content - sampled and analyzed as needed
<i>Air Emissions: Surveillance - Radiological, Silica Gel (See Chapters 5 and 6)</i>					
P2, P4, P7, P9	SER	SER	EPD	Silica Gel	Tritium biweekly
BLIP	SER	SER	EPD	Silica Gel	Tritium - sampled weekly
HFBR T-Tube	SER	As Required	EPD	Silica gel	Tritium - sampled monthly

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Ambient Air: Surveillance - Radiological, Off-Site TLD Exchange - BNL Personnel (See Chapter 7)					
000-TLD9, 000-TLD10, 200-TLD1, 200-TLD5, 600-TLD3, 700-TLD4, 800-TLD1, 900-TLD2, 900-TLD5, 900-TLD7, 999-TLD1, and 999-TLD2	SER	SER	EPD	External Dose	Beta/gamma - exchanged quarterly
Ambient Air: Surveillance - Radiological, TLD Exchange - On-Site Locations (See Chapter 7)					
P4, S6, P7, P2, S5, 011-TLD1, 013-TLD1, 025-TLD1, 025-TLD4, 027-TLD1, 027-TLD2, 030-TLD1, 034-TLD2, 036-TLD1, 036-TLD2, 037-TLD1, 043-TLD1, 043-TLD2, 044-TLD1, 044-TLD2, 044-TLD3, 044-TLD5, 045-TLD1, 045-TLD2, 045-TLD4, 045-TLD5, 049-TLD1, 053-TLD1, 054-TLD1, 054-TLD 2, 054-TLD3, 055-TLD1, 065-TLD1, 065-TLD2, 063-TLD1, 066-TLD1, 073-TLD1, 074-TLD1, 074-TLD2, 075-TLD3, 075-TLD5, 080-TLD1, 082-TLD1, 084-TLD1, 085-TLD1, 085-TLD2, 085-TLD3, 086-TLD1, 086-TLD2, 086-TLD3, 088-TLD1, 088-TLD2, 088-TLD3, 088-TLD4, 090-TLD1, 095-TLD1, 096-TLD1, 105-TLD1, 108-TLD1, 108-TLD2, 111-TLD1, 122-TLD1, 126-TLD1, 025-TLD-N2, 034-TLD-N1, 034-TLD-N2, 042-TLD-N1, 042-TLD-N2, 043-TLD-N1, 043-TLD-N2, 054-TLD-N1, 054-TLD-N2, 054-TLD-N3, 064-TLD-N1	SER	SER	EPD	Quarterly	Beta/gamma - exchanged and analyzed quarterly; neutron chip TLD - exchanged quarterly
Ambient Air: Surveillance - Radiological, TLD Exchange - Off Site Facilities (See Chapter 7)					
000-TLD-5, 400-TLD1, 600-TLD4, 800-TLD3, 800-TLD4	SER	SER	EPD	Quarterly Composite	Beta/gamma exchanged and analyzed quarterly
Precipitation: Surveillance (See Chapter 8)					
P4, S5	SER	SER	EPD	Monthly Composite	Low-level mercury, and water quality - sampled and analyzed once per quarter
Flora and Fauna: Surveillance - On-Site Terrestrial Sampling (See Chapter 8)					
Soil	SER/IAG	SER	EPD	Grab	Gamma - concurrent sampling with vegetation
Vegetation	SER/IAG	SER	EPD	Grab	Gamma - 10-12 random locations
Deer - onsite	SER	SER	EPD	Grab Sample	Gamma analysis on meat and liver - 25 samples, as available
Deer - off site	SER	SER	EPD	Grab Sample	Gamma analysis on meat and liver - 40 samples, as available
Soil/Sediment - Recharge Basins	SER	SER	EPD	Grab Sample	Gamma, S-VOCs, TAL - Metals, PCBs - 10 samples for CY 2022

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Flora and Fauna: Surveillance - Off-Site Terrestrial Sampling (See Chapter 8)					
Fish	SER	SER	EPD	Grab Sample - fillets	Gamma, metals, and PCBs analysis (on site only) - 30 samples, as conditions and fish populations allow - 3 locations (BNL, Lower Lake, Carmans River)
Surface Water	SER	SER	EPD	Grab	TAL metals, nutrients, water quality parameters - Meadow Marsh
Water - SPDES: Compliance (See Chapter 9)					
STP Influent (12 months/year)	DMR	Yes	EPD	24 hr. Composite	TAL metals - sampled and analyzed twice per month
STP Effluent (12 months/year)	DMR	Yes	EPD	24 hr. Composite	TAL metals, TDS, total phosphorous, nitrogen series, HEDP, TTA - sampled and analyzed twice per month
STP Effluent (12 months/year)	DMR	Yes	EPD	Grab Sample	VOCs (EPA 624) and ketones, low-level mercury (EPA 1631), cyanide - sampled and analyzed twice per month
STP Effluent (Daily)	DMR	Yes	EU	Grab Sample	Temperature, pH, flow - sampled and analyzed daily
HN, HT-W, HS, CSF, HT-E, HW, Bldg. 1004/1002-Outfall 002B (monthly)	DMR	Yes	EPD	Grab Sample	Oil & Grease and pH (VOCs EPA 624, HW only) - sampled and analyzed monthly
HX (monthly)	DMR	Yes	EPD/EU	Grab Sample	Flow (EP totalizer) and pH
HN, HT-W, HT-E, HW, CSF, HS, Bldg. 1004/1002-Outfall 002B (quarterly)	DMR	Yes	EPD	Grab Sample	HEDP, TTA, VOCs (EPA 624) at HN, TAL Metals at HN, HS, CSF, and HW (filtered) - sampled and analyzed quarterly
Bldg. 498 Central Cleaning Facility (quarterly)	DMR	Yes	EPD/EU	Grab Sample	pH, Semi-VOCs (EPA 625), TAL metals, flow - sampled and analyzed quarterly
Bldg. 902 Cooling Tower (quarterly)	DMR	Yes	EPD/CA	Grab Sample	pH, flow (CA), PPGMBE - sampled and analyzed quarterly
HS, HO, HN, HT-W, HT-E, HM-N, HM-S, HQ, HZ, Outfall 002B (Flow circular chart/strip chart exchange)	SER	SER	EPD	Grab Sample	Flow readings collected weekly - HO, HZ, HM-S, HM-N, and HQ surveillance only; not reported to regulators
Recharge Basins: Surveillance (See Chapter 9)					
HT-E, HT-W	SER	SER	EPD	24 Hr. Composite	Metals (filtered/unfiltered), anions, gross alpha/beta, tritium, and gamma - sampled and analyzed semiannually
HN, HS	SER	SER	EPD	24 Hr. Composite	Anions, gross alpha/beta, tritium, and gamma - sampled and analyzed semiannually
HT-E, HT-W, HS, HO, HZ	SER	SER	EPD	Grab Sample	VOCs (EPA 624) - sampled and analyzed semiannually
HZ, HO	SER	SER	EPD	Grab Sample	Metals (filtered/unfiltered), anions, gross alpha/beta, tritium, and gamma - sampled and analyzed semiannually

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HW	SER	SER	EPD	Grab Sample	Anions, gross alpha/beta, tritium, and gamma – sampled and analyzed semiannually
CSF	SER	SER	EPD	Grab Sample	Anions, VOCs (EPA 624) - sampled and analyzed semiannually
<i>Sewage Treatment Plant: Surveillance (See Chapter 9)</i>					
EA	SER	SER	EPD	Composite	Sr-90 and gamma - sampled weekly and composited by contract analytical laboratory for monthly analysis
	SER	SER	EPD	Composite	Gross alpha/beta, tritium - sampled and analyzed weekly
DA	SER	SER	EPD	Composite	Sr-90 and gamma - sampled weekly and composited by contract analytical laboratory for monthly analysis
	SER	SER	EPD	Composite	Gross alpha/beta, tritium - sampled and analyzed weekly
<i>Miscellaneous Monitoring (See Chapter 9)</i>					
MH #192, STP influent and effluent to the primary clarifier	NA	NA	EPD	Daily Performance Check	Sewer line radiological monitors daily performance checked with Cs-137 button source
<i>Surface Water - Peconic River: Surveillance (See Chapter 10)</i>					
HY (outside RHIC Ring)	SER	SER	EPD	Grab Sample	Gross alpha/beta, gamma, tritium, Sr-90, metals (filtered/unfiltered), anions, VOCs (EPA 624) - sampled and analyzed semiannually
HV (inside RHIC Ring)	SER	SER	EPD	Grab Sample	Gross alpha/beta, gamma, tritium - sampled and analyzed semiannually
HM-S	SER	SER	EPD	Grab Sample	Metals (filtered/unfiltered), anions, VOCs (EPA 624), Sr-90, gross alpha/beta, gamma, and tritium - sampled and analyzed semiannually
HQ	SER	SER	EPD	24 Hr. Composite	Metals (filtered/unfiltered), anions - sampled and analyzed quarterly
HQ	SER	SER	EPD	24 Hr. Composite	Sr-90, gamma- sampled and analyzed quarterly
	SER	SER	EPD	24 Hr. Composite	Gross alpha/beta, tritium - sampled and analyzed quarterly
	SER	SER	EPD	Grab Sample	VOCs (EPA 624) - sampled and analyzed quarterly
HH	SER	SER	EPD	Grab Sample	Metals (filtered/unfiltered), anions, VOCs (EPA 624), gross alpha/beta, gamma, and tritium - sampled and analyzed semiannually

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Sampling Location	Reporting to Regulators	Reporting to Departments	Lead Organization	Sample Type	Analysis/Frequency
<i>Potable Water: Compliance (See Chapter 11)</i>					
Potable Wells 4, 6, 7, 10, and 11	WTPR	Yes	EPD	Grab Sample	Gross alpha/beta, gamma, tritium, Cs-137, Ra-228, Sr-90 - sampled and analyzed quarterly
Potable Wells 4, 6, 7, 10, and 11	WTPR	Yes	EU	Grab Sample	Water quality (alkalinity/calcium) - sampled and analyzed biannually
Potable Wells 4, 6, 7, 10, 11, and Water Treatment Facility	WTPR	Yes	EU	Grab Sample	Inorganic chemicals (IOC Groups 1, 2, 3, 4) - sampled and analyzed annually
Potable Wells 4, 6, 7, 10, 11, and Water Treatment Facility	WTPR	Yes	EU	Grab Sample	Iron sampled and analyzed quarterly
Potable Wells 4, 6, 7, 10, 11, GAC systems, and Water Treatment Facility	WTPR	Yes	EU	Grab Sample	Principle Organic Contaminants (EPA 502.2) - sampled and analyzed quarterly
Potable Wells 4, 6, 7, 10, 11, GAC systems, and Water Treatment Facility	WTPR	Yes	EU	Grab Sample	Bacteriology - sampled and analyzed quarterly
Potable Water Distribution System	WTPR	Yes	EU	Grab Sample	Bacteriology - sampled and analyzed at seven locations monthly
	WTPR	Yes	EU	Grab Sample	Water Quality - sampled and analyzed quarterly at three locations
	WTPR	Yes	EU	Grab Sample	Inorganic chemicals (IOC 1, 2, 3, 4), Nitrate/Nitrite, THMs, HAA5 - sampled and analyzed semiannually
	WTPR	Yes	EU	Grab Sample	Asbestos - sampled and analyzed once per year
	WTPR	Yes	EU	Grab Sample	Lead and Copper - sampled and analyzed once every six months at 40 locations
Potable Wells 10, 11, and Water Treatment Facility	WTPR	Yes	EU	Grab Sample	Hexavalent Chromium – sampled and analyzed annually
Potable Wells 10, 11, and Water Treatment Facility	WTPR	Yes	EU	Grab Sample	1,4 dioxane – sampled and analyzed quarterly
Potable Wells 4, 6, 7, 10, 11, and Water Treatment Facility	WTPR	Yes	EU	Grab Sample	SOCs - sampled and analyzed once per year
Potable Wells 4, 6, 7, 10, 11, GAC systems, and Water Treatment Facility	WTPR	Yes	EU	Grab Sample	Perfluoroalkyl substances (PFASs) – sampled and analyzed quarterly

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Points of Entry	WTPR	Yes	EU	Grab Sample	Temperature, conductivity, and pH - sampled and analyzed biweekly by operating personnel
<i>Groundwater: Compliance (See Chapter 12)</i>					
Major Petroleum Facility (8 wells)	MPF License SER/GMR	Yes	EPD	Grab Sample	VOCs and MTBE (EPA 624.1), Semi-VOCs (EPA 625.1) - sampled and analyzed semiannually
	MPF License	Yes	EPD	Grab Sample	Floating product check monthly
Waste Management Facility (8 wells)	RCRA Permit/SER/GMR	Yes	EPD	Grab Sample	VOCs (EPA 524.2), tritium, gamma, gross alpha/beta - sampled and analyzed semi-annually
STP (7 wells)	SER/GMR DMR	SER/GMR	EPD	Grab Sample	Metals (unfiltered) annually.
g-2 (5 wells)	SER/GMR	SER/GMR	EPD	Grab Sample	Tritium in wells immediately downgradient of source - sampled and analyzed semiannually. Other AGS surveillance wells located downgradient of Building 912 sampled and analyzed for tritium annually.
BLIP (4 wells)	SER/GMR	SER/GMR	EPD	Grab Sample	Tritium - sampled and analyzed semiannually to annually
<i>Groundwater: Surveillance (See Chapter 12)</i>					
BMRR (4 wells)	SER/GMR	SER/GMR	EPD	Grab Sample	Tritium - sampled and analyzed every two years; next samples collected in 2020
RHIC (13 wells)	SER/GMR	SER/GMRI	EPD	Grab Sample	Tritium - sampled and analyzed semiannually
NSLS-II (6 wells)	SER/GMR	SER/GMR	EPD	Grab Sample	Tritium - sampled and analyzed annually
AGS (48 wells)	SER/GMR	SER/GMR	EPD	Grab Sample	Tritium - sampled and analyzed annually
Motor Pool Facility (2 wells)	SER/GMR	SER/GMR	EPD	Grab Sample	VOCs - sampled and analyzed annually, and checked for floating product annually
<i>Groundwater: Environmental Restoration - Long Term Response Actions (See Chapter 12)</i>					
Site Background (9 wells)	SER/GMR	NA	EPD	Grab Sample	VOCs - sampled and analyzed annually
Current Landfill (12 wells)	SER/GMR	NA	EPD	Grab Sample	VOCs - sampled and analyzed quarterly to annually Anions, metals, cyanide - sampled and analyzed semiannually Gamma, tritium, Sr-90 - analyzed annually
Former Landfill (14 wells)	SER/GMR	NA	EPD	Grab Sample	VOCs, pesticides/PCBs, gross alpha/beta, gamma, tritium, Sr-90, anions, cyanide, metals - sampled and analyzed every even numbered year
OU III Middle Road (33 wells)	SER/GMR	NA	EPD	Grab Sample	VOCs - sampled and analyzed annually to quarterly

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OU VI Ethylene Dibromide (18 wells)	SER/GMR	NA	EPD	Grab Sample	EDB - sampled and analyzed annually to quarterly
Chemical/Animal Holes (29 wells)	SER/GMR	NA	EPD	Grab Sample	Sr-90 - sampled and analyzed annually to semiannually
OU I South Boundary (44 wells)	SER/GMR	NA	EPD	Grab Sample	VOCs and gamma - sampled and analyzed annually Tritium and Sr-90 - sampled and analyzed semiannually for core and perimeter and annually for core and perimeter and annually for background wells
OU III North Street (18 wells)	SER/GMR	NA	EPD	Grab Sample	VOCs - Plume core and bypass wells will be sampled semiannually and perimeter wells will be sampled annually Tritium - sampled and analyzed annually
OU III Central (2 wells)	SER/GMR	NA	EPD	Grab Sample	VOCs - for wells 109-03 and 109-04, which are sampled and analyzed quarterly
OU III Building 96 (31 wells)	SER/GMR	NA	EPD	Grab Sample	VOCs - sampled and analyzed quarterly
OU III South Boundary (45 wells)	SER/GMR	NA	EPD	Grab Sample	VOCs - sampled and analyzed annually to semiannually
OU III South Boundary Radionuclide (48 wells)	SER/GMR	NA	EPD	Grab Sample	Gross strontium-90, gamma, tritium - sampled and analyzed annually
OU III Western South Boundary (35 wells)	SER/GMR	NA	EPD	Grab Sample	VOCs - sampled and analyzed semi-annually to quarterly
OU III Magothy (42 wells)	SER/GMR	NA	EPD	Grab Sample	VOCs - sampled and analyzed annually to quarterly
OU III (BGRR/WCF Sr-90) (68 wells)	SER/GMR	NA	EPD	Grab Sample	Sr-90 - sampled and analyzed semi-annually to annually
OU III Offsite (11 wells)	SER/GMR	NA	EPD	Grab Sample	VOCs - sampled and analyzed annually
OU III – HFBR (10 wells)	SER/GMR	NA	EPD	Grab Sample	Tritium - sampled and analyzed annually to quarterly
OU III –Industrial Park 48 wells)	SER/GMR	NA	EPD	Grab Sample	VOCs - sampled and analyzed quarterly
OU IV – AOC 6 (20 wells)	SER/GMR	NA	EPD	Grab Sample	Sr-90 - sampled and analyzed annually to semiannually.
OU III Long Island Power Authority (11 wells)	SER/GMR	NA	EPD	Grab Sample	VOCs - sampled and analyzed semi-annually to quarterly
OU III Industrial Park East (4 wells)	SER/GMR	NA	EPD	Grab Sample	VOCs - sampled and analyzed quarterly
OU III North Street East (19 wells)	SER/GMR	NA	EPD	Grab Sample	VOCs - sampled and analyzed quarterly
OU III Airport (31 wells)	SER/GMR	NA	EPD	Grab Sample	VOCs - sampled and analyzed quarterly
Landfill Gas and Surface Leachate Monitoring (See Chapter 13)					
BNL Landfills, Soil Gas Monitoring - Current Landfill (58 sampling points) Former Landfill (24 sampling points)	ALMR	NA	EPD	Grab Sample	Methane and hydrogen sulfate - sampled and analyzed quarterly for the Current Landfill and annually for the Former Landfill

Note:

See Appendix A for acronym definitions.