Groundwater Remediation Systems

Quarterly Operations Report

January 1, 2020 through March 31, 2020

Brookhaven National Laboratory
Upton, Long Island, New York

Prepared by:

Brookhaven National Laboratory
Environmental Protection Division

Upton, N.Y. 11973

Prepared for:

U.S. Department of Energy
Brookhaven Site Office

July 2020

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Section 1

System Operations Overview 1st Quarter 2020

Table 1 – Summary of Operations						
Operable Unit System	***Type***	***Target Contaminant***	***Number of Wells***	***Years of Operation***	***Run Time For Quarter (%)***	***Pounds VOCS Removed (Quarter/Cum)***
Operable Unit I						
South Boundary	Pump and Treat (AS)	VOC	2	Operate- 16 Standby- 6	Closure Approved 9/19	0 369
Operable Unit III						
South Boundary	Pump and Treat (AS)	VOC	8	23	95%PP	4 3,057
HFBR Pump and Recharge	Pump and Recirculate	Tritium	4	Operate- 9 Standby- 13	Closure Approved 3/19	NA 180
Industrial Park	Recirculation/ In-Well (AS/Carbon)/ Pump and Treat (Carbon)	VOC VOC	7 2	Operate- 16 Standby- 4 Operate- 4 Standby-1	Standby Standby	0 1066 0 10
Building 96	Recirculation Well (AS/Carbon)	VOC	4	Operate- 16 Standby- 3	100%	0.3 144
Middle Road	Pump and Treat (AS)	VOC	7	19	95%	11 1294
Western South Boundary	Pump and Treat (AS)	VOC	6	18	95%	3 158
North Street	Pump and Treat (Carbon)	VOC	2	Operate – 11 Standby - 5	Standby	0 342
North Street East	Pump and Treat (Carbon)	VOC	2	Operate – 10 Standby - 6	Standby	0 44
LIPA/Airport	Pump and Treat (Carbon)	VOC	10	16	100% PP	8 474
*Industrial Park East	Pump and Treat (Carbon)	VOC	2	Operate- 5 Standby- 4	Dismantled	NA 38
Chemical Holes	Pump and Treat (IE)	Sr-90	3	Operate - 15 Standby- 1	Standby	NA
BGRR/WCF	Pump and Treat (IE)	Sr-90	9	15	95% PP	NA
Freon	Pump and Treat (AS)	Freon-11	1	Operate – 4 Standby – 4	Closure Approved 9/19	0 106
Operable Unit VI						
EDB	Pump and Treat (Carbon)	EDB	2	16	100%	NA**

AS = air stripping
IE = ion exchange
EDB = ethylene dibromide
NA = not applicable
PP = system is pulse pumping

* Dismantlement of the Industrial Park East system was completed in 2013.

** EDB has only been detected in the influent at trace levels, just above standard, therefore no removal is reported.

Section 2

Q1-2020 Operations Summary
OU I/RA V South Boundary Pump & Treat System
(System Closed)

Process: Groundwater extraction and air stripping treatment, with discharge to the RA V recharge basin

Goal: Reach Maximum Contaminant Levels (MCLs) in core monitoring wells within 30 years for the Upper Glacial aquifer (by 2030). The Petition for Closure of the OU I South Boundary Groundwater Treatment System was approved by the regulators in September 2019.
Note: Current Landfill monitoring well data is included in the attached data tables since this is one of the sources of the OU I/RA V plume.

Start Date: January 1997

Table 2-1
OU I South Boundary Pump & Treat System
Pumping Rates (gpm)

Extraction Well	EW-1*	EW-2*
Site ID #	115-27	115-43
Screen Interval (ft bls)	150-190	104-124/134-154
Desired Rate (GPM)	0	0
January	Off	Off
February	Off	Off
March	Off	Off
Actual (Avg. over Qtr.)	Off	Off

* The system was shut down and approved for closure in September 2019.

Figure 2-1
OU I South Boundary Pump & Treat System
Cumulative Mass Removal VOCs vs. Time

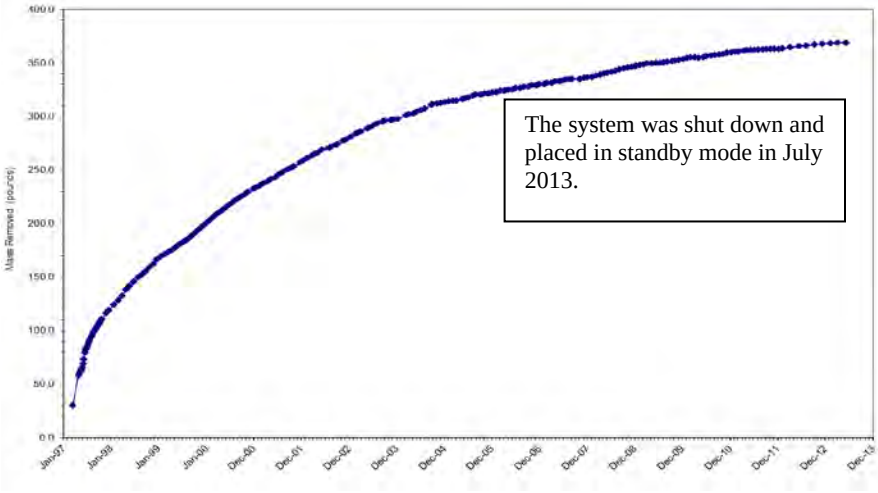


Figure 2-2
OU I South Boundary Pump & Treat System
Influent TVOC Concentrations vs. Time

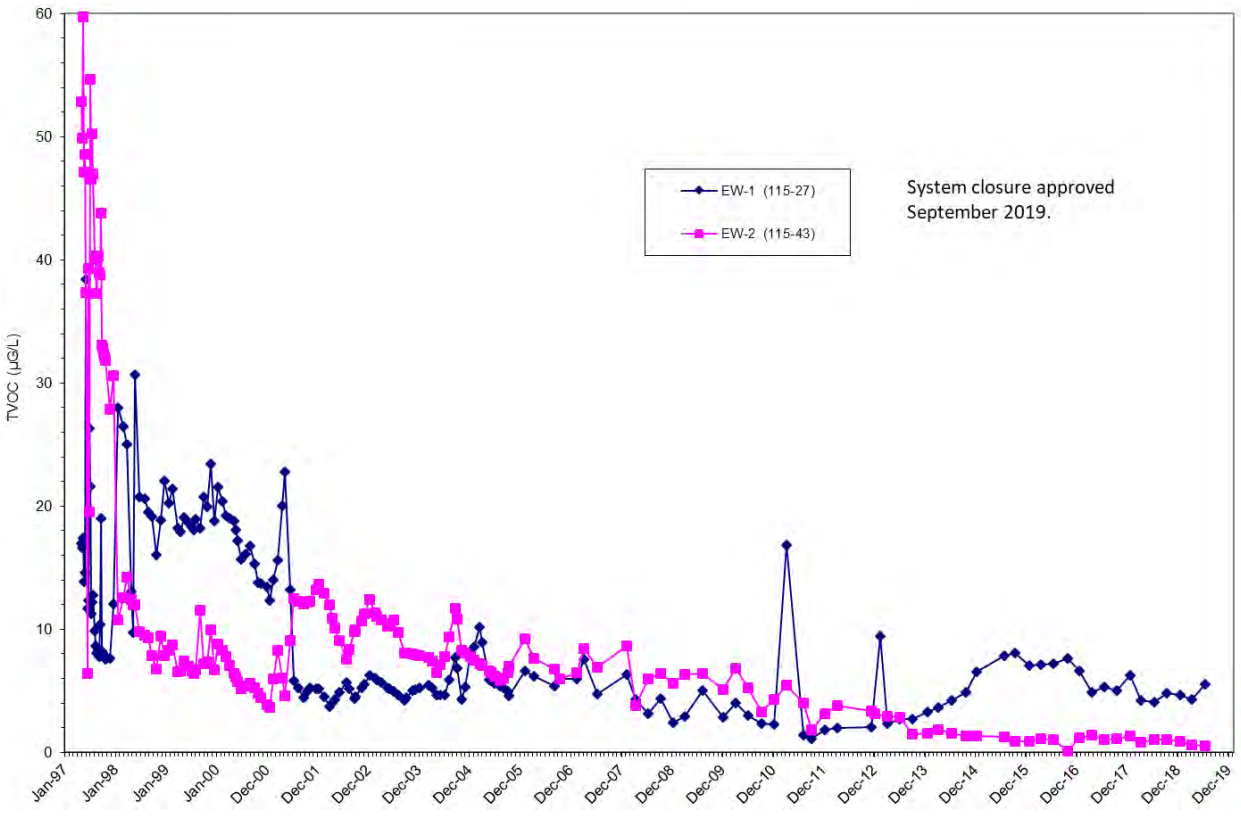


Table 2-2
Effluent Water Quality
SPDES Equivalency Permit Concentrations January 1 through March 31, 2020

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	Monitor	NA [1]	GPD	Continuous
pH (range)	6.0- 9.0	NA	SU	Weekly
Benzene	0.8	NA	ug/L	Month
Chloroform	7.0	NA	ug/L	Month
Chloroethane	5.0	NA	ug/L	Month
1,2-Dichloroethane	5.0	NA	ug/L	Month
1,1-Dichloroethene	5.0	NA	ug/L	Month
1,1,1-Trichloroethane	5.0	NA	ug/L	Month
Carbon Tetrachloride	5.0	NA	ug/L	Quarterly
1,2-Dichloropropane	5.0	NA	ug/L	Quarterly
Methylene Chloride	5.0	NA	ug/L	Quarterly
Trichloroethylene	5.0	NA	ug/L	Quarterly
Vinyl Chloride	2.0	NA	ug/L	Quarterly
1,2-Xylene	5.0	NA	ug/L	Quarterly
Sum of 1,3 and 1,4-Xylenes	10.0	NA	ug/L	Quarterly

[1] The system is closed and did not treat any water this quarter.

System Operations

January 2020:

The system remained closed.

February 2020:

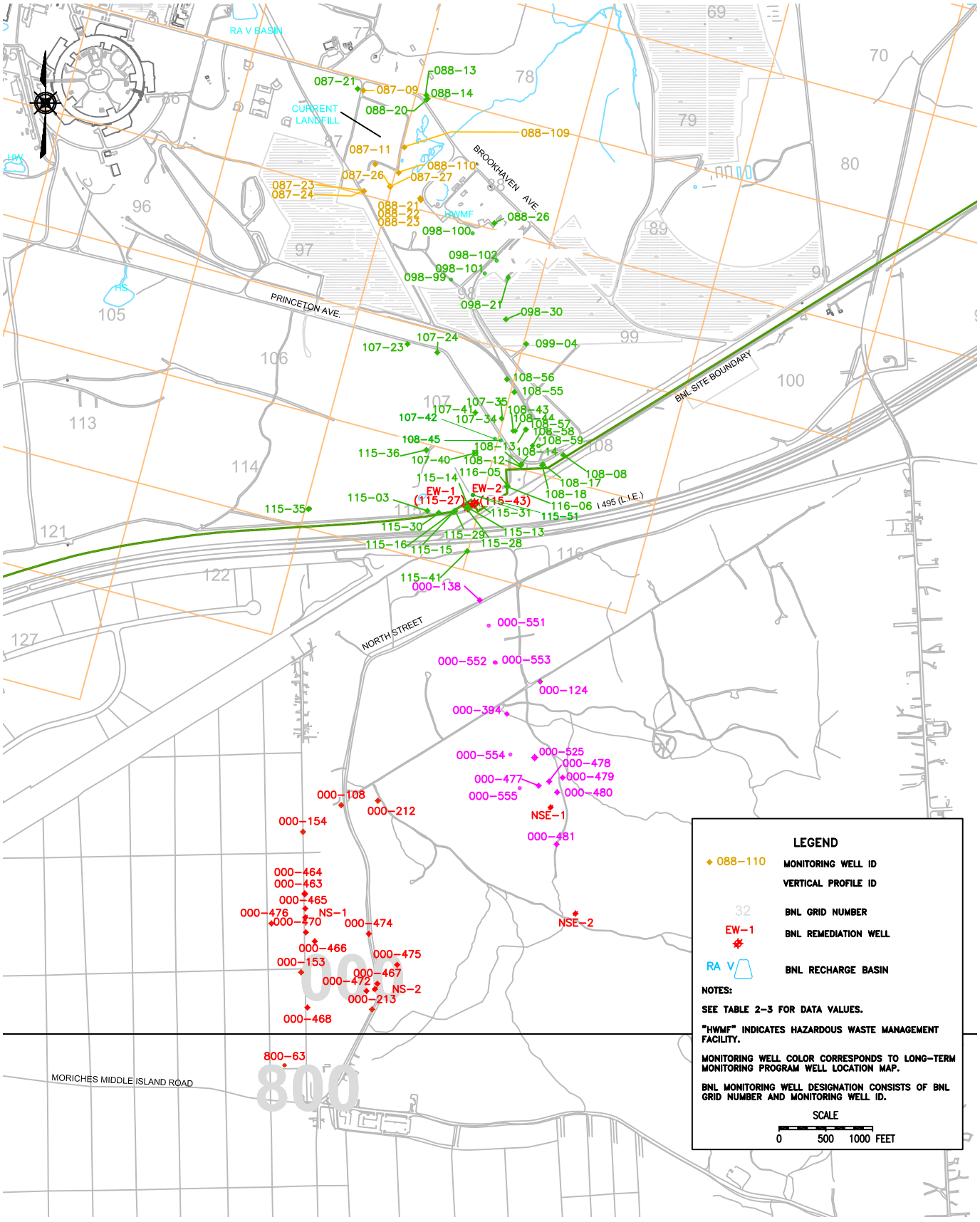
The system remained closed.

March 2020:

The system remained closed.

Planned Operational Changes

- Maintain the VOC post-closure groundwater monitoring program of an annual sample collection from post-closure wells: 098-99, 107-40, 107-41, 115-13, 115-16, and 115-51. Maintain quarterly sampling of Current Landfill sentinel well 098-99.
- In June/July 2020, install temporary wells as needed adjacent to monitoring wells 088-100, 088-101, and 088-102 to assess whether they are appropriately screened in the highest concentration segments of the Sr-90 plume immediately downgradient of the source area. Install temporary wells as needed to fill monitoring data gaps and characterize the extent of the Sr-90 plume. This temporary well data will be incorporated into the CERCLA Five-Year Review Report.



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BROOKHAVEN NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION DIVISION

TITLE:

OU I SOUTH BOUNDARY/NORTH STREET/NORTH STREET EAST MONITORING WELL NETWORK

SITEWIDE REMEDIATION SYSTEMS
FIRST QUARTER 2020 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
JEB	–	08/08/11	NA
CHKD:	APPD:	REV.:	NOTES:
LDS	--	07/07/20	–

FIGURE NO.: 2-3

Table 2-3
OU I RA V South Boundary - Current Landfill Monitoring Well Data - Current Landfill
'Hits Only' January through March 2020

Site ID : 088-109

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethane	02/11/2020	2.13	0.5	--	UG/L	13.50	
1,4-Dioxane	02/11/2020	0.627	0.2	--	UG/L	13.50	
1,4-Dioxane	02/11/2020	0.667	0.2	--	UG/L	13.50	
524.2 TVOC	02/11/2020	7.03	--	--	UG/L	13.50	
Benzene	02/11/2020	0.21	0.5	--	UG/L	13.50	J
Chloroethane	02/11/2020	4.69	0.5	--	UG/L	13.50	
Perfluorobutyric acid (PFBA)	02/11/2020	10.4	8.85	--	NG/L	13.50	

Site ID : 098-99

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethane	02/11/2020	2.88	0.5	--	UG/L	44.50	
1,4-Dioxane	02/11/2020	4.49	0.2	--	UG/L	44.50	
524.2 TVOC	02/11/2020	3.41	--	--	UG/L	44.50	
Chloroethane	02/11/2020	0.53	0.5	--	UG/L	44.50	

Table 2-3
OU I RA V South Boundary Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 088-109

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethane	02/11/2020	2.13	0.5	--	UG/L	13.50	
1,4-Dioxane	02/11/2020	0.627	0.2	--	UG/L	13.50	
1,4-Dioxane	02/11/2020	0.667	0.2	--	UG/L	13.50	
524.2 TVOC	02/11/2020	7.03	--	--	UG/L	13.50	
Benzene	02/11/2020	0.21	0.5	--	UG/L	13.50	J
Chloroethane	02/11/2020	4.69	0.5	--	UG/L	13.50	
Perfluorobutyric acid (PFBA)	02/11/2020	10.4	8.85	--	NG/L	13.50	

Site ID : 088-26

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorobutyric acid (PFBA)	03/10/2020	8.73	8.92	--	NG/L	14.44	J
Strontium-90	03/10/2020	4.06	0.405	0.573	PCI/L	14.44	

Site ID : 098-100

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorobutyric acid (PFBA)	03/10/2020	4.7	8.76	--	NG/L	12.50	J
Strontium-90	03/10/2020	18.4	0.415	1.77	PCI/L	125.00	

Site ID : 098-101

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorobutyric acid (PFBA)	03/10/2020	5.76	8.75	--	NG/L	20.00	J
Strontium-90	03/10/2020	0.658	0.432	0.299	PCI/L	20.00	

Site ID : 098-102

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorobutyric acid (PFBA)	03/10/2020	8.42	8.77	--	NG/L	20.00	J
Strontium-90	03/10/2020	1.45	0.445	0.366	PCI/L	20.00	

Site ID : 098-21

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	03/25/2020	2.01	0.318	0.342	PCI/L	28.80	

Site ID : 098-30

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	03/23/2020	30.8	0.271	2.7	PCI/L	37.80	

Site ID : 098-99

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethane	02/11/2020	2.88	0.5	--	UG/L	44.50	
1,4-Dioxane	02/11/2020	4.49	0.2	--	UG/L	44.50	

Table 2-3
OU I RA V South Boundary Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 098-99

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/11/2020	3.41	--	--	UG/L	44.50	
Chloroethane	02/11/2020	0.53	0.5	--	UG/L	44.50	

Site ID : 107-23

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	03/22/2020	3.98	0.2	--	UG/L	120.00	
Perfluorobutanesulfonate (PFBS)	03/22/2020	1.17	1.77	--	NG/L	120.00	J
Perfluorobutyric acid (PFBA)	03/22/2020	90.9	1.99	--	NG/L	120.00	
Perfluoroheptanoic acid (PFHpA)	03/22/2020	0.816	1.99	--	NG/L	120.00	J
Perfluorohexanesulfonate (PFHxS)	03/22/2020	5.19	1.81	--	NG/L	120.00	
Perfluorohexanoic acid (PFHxA)	03/22/2020	2.02	1.99	--	NG/L	120.00	
Perfluorooctanesulfonate (PFOS)	03/22/2020	2.25	1.99	--	NG/L	120.00	
Perfluorooctanoic acid (PFOA)	03/22/2020	4.87	1.99	--	NG/L	120.00	
Perfluoropentanesulfonate (PFPeS)	03/22/2020	0.957	1.87	--	NG/L	120.00	J
Perfluoropentanoic acid (PFPeA)	03/22/2020	1.64	1.99	--	NG/L	120.00	J

Site ID : 107-24

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	03/22/2020	2.62	0.2	--	UG/L	78.00	
Perfluorobutanesulfonate (PFBS)	03/22/2020	0.913	1.62	--	NG/L	78.00	J
Perfluorobutyric acid (PFBA)	03/22/2020	53.9	1.82	--	NG/L	78.00	
Perfluoroheptanoic acid (PFHpA)	03/22/2020	1.02	1.82	--	NG/L	78.00	J
Perfluorohexanesulfonate (PFHxS)	03/22/2020	4.94	1.66	--	NG/L	78.00	
Perfluorohexanoic acid (PFHxA)	03/22/2020	3.3	1.82	--	NG/L	78.00	
Perfluorooctanesulfonate (PFOS)	03/22/2020	2.69	1.82	--	NG/L	78.00	
Perfluorooctanoic acid (PFOA)	03/22/2020	6.75	1.82	--	NG/L	78.00	
Perfluoropentanesulfonate (PFPeS)	03/22/2020	0.764	1.71	--	NG/L	78.00	J
Perfluoropentanoic acid (PFPeA)	03/22/2020	2.06	1.82	--	NG/L	78.00	

Site ID : 107-26

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	02/21/2020	4.72	0.2	--	UG/L	140.00	
Perfluorobutanesulfonate (PFBS)	02/21/2020	1.01	1.6	--	NG/L	140.00	J
Perfluorobutyric acid (PFBA)	02/21/2020	75.9	1.79	--	NG/L	140.00	
Perfluorohexanesulfonate (PFHxS)	02/21/2020	3.67	1.63	--	NG/L	140.00	
Perfluorohexanoic acid (PFHxA)	02/21/2020	2.72	1.79	--	NG/L	140.00	

Table 2-3
OU I RA V South Boundary Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 107-26

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorooctanesulfonate (PFOS)	02/21/2020	4.14	1.79	--	NG/L	140.00	
Perfluorooctanoic acid (PFOA)	02/21/2020	3.44	1.79	--	NG/L	140.00	
Perfluoropentanesulfonate (PFPeS)	02/21/2020	0.84	1.69	--	NG/L	140.00	J
Perfluoropentanoic acid (PFPeA)	02/21/2020	0.828	1.79	--	NG/L	140.00	J

Site ID : 107-34

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	03/21/2020	1.16	0.258	0.251	PCI/L	55.00	

Site ID : 107-35

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	03/21/2020	5.01	0.265	0.579	PCI/L	65.00	

Site ID : 107-40

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	03/22/2020	3.73	0.2	--	UG/L	145.00	
Perfluorobutanesulfonate (PFBS)	03/22/2020	0.881	1.59	--	NG/L	145.00	J
Perfluorobutyric acid (PFBA)	03/22/2020	73.3	1.78	--	NG/L	145.00	
Perfluoroheptanoic acid (PFHpA)	03/22/2020	0.822	1.78	--	NG/L	145.00	J
Perfluorohexanesulfonate (PFHxS)	03/22/2020	4.22	1.62	--	NG/L	145.00	
Perfluorohexanoic acid (PFHxA)	03/22/2020	3.56	1.78	--	NG/L	145.00	
Perfluorononanoic acid (PFNA)	03/22/2020	1.11	1.78	--	NG/L	145.00	J
Perfluorooctanesulfonate (PFOS)	03/22/2020	4.52	1.78	--	NG/L	145.00	
Perfluorooctanoic acid (PFOA)	03/22/2020	3.32	1.78	--	NG/L	145.00	
Perfluoropentanesulfonate (PFPeS)	03/22/2020	0.663	1.67	--	NG/L	145.00	J
Perfluoropentanoic acid (PFPeA)	03/22/2020	4.41	1.78	--	NG/L	145.00	
Perfluoroundecanoic acid (PFUdA)	03/22/2020	0.588	1.78	--	NG/L	145.00	J

Site ID : 107-42

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorobutyric acid (PFBA)	03/18/2020	5.65	1.72	--	NG/L	68.00	
Perfluoroheptanoic acid (PFHpA)	03/18/2020	0.795	1.72	--	NG/L	68.00	J
Perfluorohexanesulfonate (PFHxS)	03/18/2020	1.76	1.56	--	NG/L	68.00	
Perfluorohexanoic acid (PFHxA)	03/18/2020	1.27	1.72	--	NG/L	68.00	J
Perfluorooctanesulfonate (PFOS)	03/18/2020	1.72	1.72	--	NG/L	68.00	
Perfluorooctanoic acid (PFOA)	03/18/2020	4.36	1.72	--	NG/L	68.00	
Perfluoropentanoic acid (PFPeA)	03/18/2020	0.624	1.72	--	NG/L	68.00	J

Table 2-3
OU I RA V South Boundary Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 107-42

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	03/18/2020	0.281	0.245	0.165	PCI/L	68.00	

Site ID : 108-14

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	03/23/2020	1.19	0.2	--	UG/L	95.00	
Perfluorobutanesulfonate (PFBS)	03/23/2020	1.21	1.7	--	NG/L	95.00	J
Perfluorobutyric acid (PFBA)	03/23/2020	23.1	1.91	--	NG/L	95.00	
Perfluorohexanesulfonate (PFHxS)	03/23/2020	22.3	1.74	--	NG/L	95.00	
Perfluorohexanoic acid (PFHxA)	03/23/2020	4.32	1.91	--	NG/L	95.00	
Perfluorooctanesulfonate (PFOS)	03/23/2020	8.45	1.91	--	NG/L	95.00	
Perfluorooctanoic acid (PFOA)	03/23/2020	3.34	1.91	--	NG/L	95.00	
Perfluoropentanesulfonate (PFPeS)	03/23/2020	1.26	1.8	--	NG/L	95.00	J
Perfluoropentanoic acid (PFPeA)	03/23/2020	0.654	1.91	--	NG/L	95.00	J

Site ID : 108-18

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	03/23/2020	0.339	0.2	--	UG/L	105.00	
Perfluorohexanesulfonate (PFHxS)	03/23/2020	1.86	1.63	--	NG/L	105.00	
Perfluorohexanoic acid (PFHxA)	03/23/2020	0.688	1.79	--	NG/L	105.00	J
Perfluorooctanesulfonate (PFOS)	03/23/2020	2.88	1.79	--	NG/L	105.00	
Perfluorooctanoic acid (PFOA)	03/23/2020	0.679	1.79	--	NG/L	105.00	J

Site ID : 108-43

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	03/21/2020	4.85	0.257	0.568	PCI/L	65.00	

Site ID : 108-45

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorobutyric acid (PFBA)	03/18/2020	7.42	1.71	--	NG/L	70.50	
Perfluoroheptanoic acid (PFHpA)	03/18/2020	1.27	1.71	--	NG/L	70.50	J
Perfluorohexanesulfonate (PFHxS)	03/18/2020	5.7	1.56	--	NG/L	70.50	
Perfluorohexanoic acid (PFHxA)	03/18/2020	1.73	1.71	--	NG/L	70.50	
Perfluorononanoic acid (PFNA)	03/18/2020	0.816	1.71	--	NG/L	70.50	J
Perfluorooctanesulfonate (PFOS)	03/18/2020	2.21	1.71	--	NG/L	70.50	
Perfluorooctanoic acid (PFOA)	03/18/2020	6.09	1.71	--	NG/L	70.50	
Perfluoropentanoic acid (PFPeA)	03/18/2020	1.54	1.71	--	NG/L	70.50	J
Strontium-90	03/18/2020	2.26	1.2	0.872	PCI/L	70.50	DL

Table 2-3
OU I RA V South Boundary Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 108-57

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	03/21/2020	4.53	0.245	0.535	PCI/L	70.00	

Site ID : 108-58

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	03/24/2020	4.94	0.478	0.734	PCI/L	70.00	

Site ID : 115-36

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	03/22/2020	5.18	0.2	--	UG/L	131.50	
Perfluorobutanesulfonate (PFBS)	03/22/2020	0.849	1.63	--	NG/L	131.50	J
Perfluorobutyric acid (PFBA)	03/22/2020	119	1.83	--	NG/L	131.50	
Perfluoroheptanoic acid (PFHpA)	03/22/2020	0.89	1.83	--	NG/L	131.50	J
Perfluorohexanesulfonate (PFHxS)	03/22/2020	3.14	1.67	--	NG/L	131.50	
Perfluorohexanoic acid (PFHxA)	03/22/2020	3.88	1.83	--	NG/L	131.50	
Perfluorooctanesulfonate (PFOS)	03/22/2020	4.53	1.83	--	NG/L	131.50	
Perfluorooctanoic acid (PFOA)	03/22/2020	7.19	1.83	--	NG/L	131.50	
Perfluoropentanesulfonate (PFPeS)	03/22/2020	0.726	1.72	--	NG/L	131.50	J
Perfluoropentanoic acid (PFPeA)	03/22/2020	1.62	1.83	--	NG/L	131.50	J

Site ID : 116-05

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	03/18/2020	1.56	0.2	--	UG/L	105.00	
Perfluorobutanesulfonate (PFBS)	03/18/2020	1.12	1.58	--	NG/L	105.00	J
Perfluorobutyric acid (PFBA)	03/18/2020	12.3	1.78	--	NG/L	105.00	
Perfluorohexanesulfonate (PFHxS)	03/18/2020	13.3	1.62	--	NG/L	105.00	
Perfluorohexanoic acid (PFHxA)	03/18/2020	2.1	1.78	--	NG/L	105.00	
Perfluorooctanesulfonate (PFOS)	03/18/2020	6.16	1.78	--	NG/L	105.00	
Perfluorooctanoic acid (PFOA)	03/18/2020	1.7	1.78	--	NG/L	105.00	J
Perfluoropentanesulfonate (PFPeS)	03/18/2020	1.09	1.67	--	NG/L	105.00	J

Site ID : 116-06

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	03/18/2020	0.723	0.2	--	UG/L	135.00	
Perfluorobutanesulfonate (PFBS)	03/18/2020	0.988	1.6	--	NG/L	135.00	J
Perfluorobutyric acid (PFBA)	03/18/2020	1.14	1.8	--	NG/L	135.00	J
Perfluorohexanesulfonate (PFHxS)	03/18/2020	5.68	1.64	--	NG/L	135.00	
Perfluorooctanesulfonate (PFOS)	03/18/2020	3.08	1.8	--	NG/L	135.00	

Table 2-3
OU I RA V South Boundary Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 116-06

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorooctanoic acid (PFOA)	03/18/2020	1.14	1.8	--	NG/L	135.00	J
Perfluoropentanesulfonate (PFPeS)	03/18/2020	1.06	1.69	--	NG/L	135.00	J

Qualifiers :

J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Organic Compounds :

B = Compound was found in both the sample And associated laboratory blank.

Inorganic Compounds :

B = Result Is between instrument detection limit And contract required reporting limit.

Section 3

Q1-2020 Operations Summary
OU III South Boundary Pump and Treat System

Process: Groundwater extraction and air stripping treatment, with discharge to both the OU III and RA V recharge basins.

Goal: Reach MCLs in core monitoring wells in OU III within 30 years for the Upper Glacial aquifer (by 2030).

Start Date: June 1997

Table 3-1
OU III South Boundary
Pumping Rates (gpm)

Extraction Well	EW-3	EW-4	EW-5	EW-6	EW-7	EW-8	EW-12	EW-17
Site ID	121-17	121-16	121-15	122-14	122-13	122-12	122-30	121-46
Screen Interval (ft bls)	150-190	160-180 &190-200	160-200	160-200	170-210	190-210 & 230-250	180-220	207-237
Desired Flow Rate (gpm)	0*	140	0*	0*	0*	0*	0*	150
January	0	54	0	0	0	0	0	154
February	0	0	0	0	0	0	0	124
March	0	100	0	0	0	0	0	141
Actual (Avg. over Qtr)	**0**	**77**	**0**	**0**	**0**	**0**	**0**	**140**

* Extraction wells placed in standby mode: EW-12 (2003), EW-8 (2006), EW-6 (2007), EW-7 (2007), EW-3 and EW-5 (2015). EW-4 is pulsed pumping (one month on and one month off.

Figure 3-1
OU III South Boundary
Cumulative Mass Removal of VOC's vs. Time

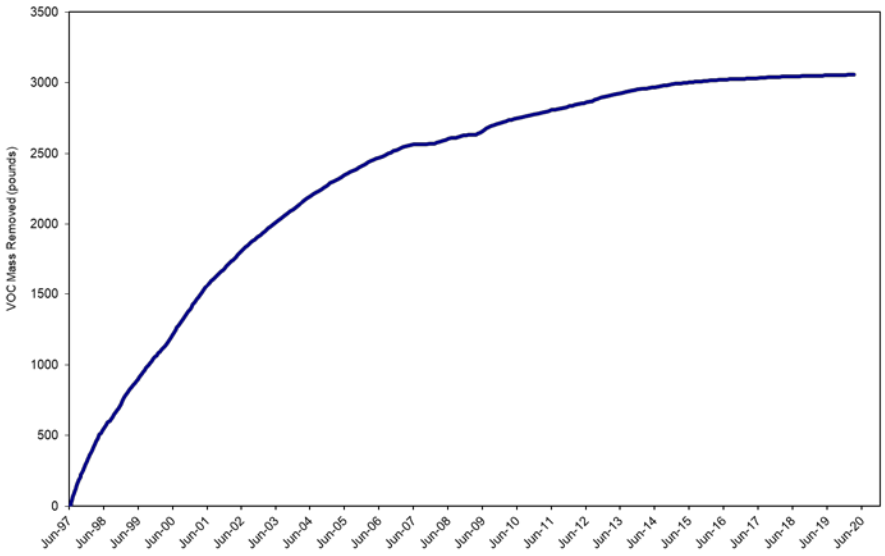


Figure 3-2
OU III South Boundary
Influent TVOC Concentration vs. Time

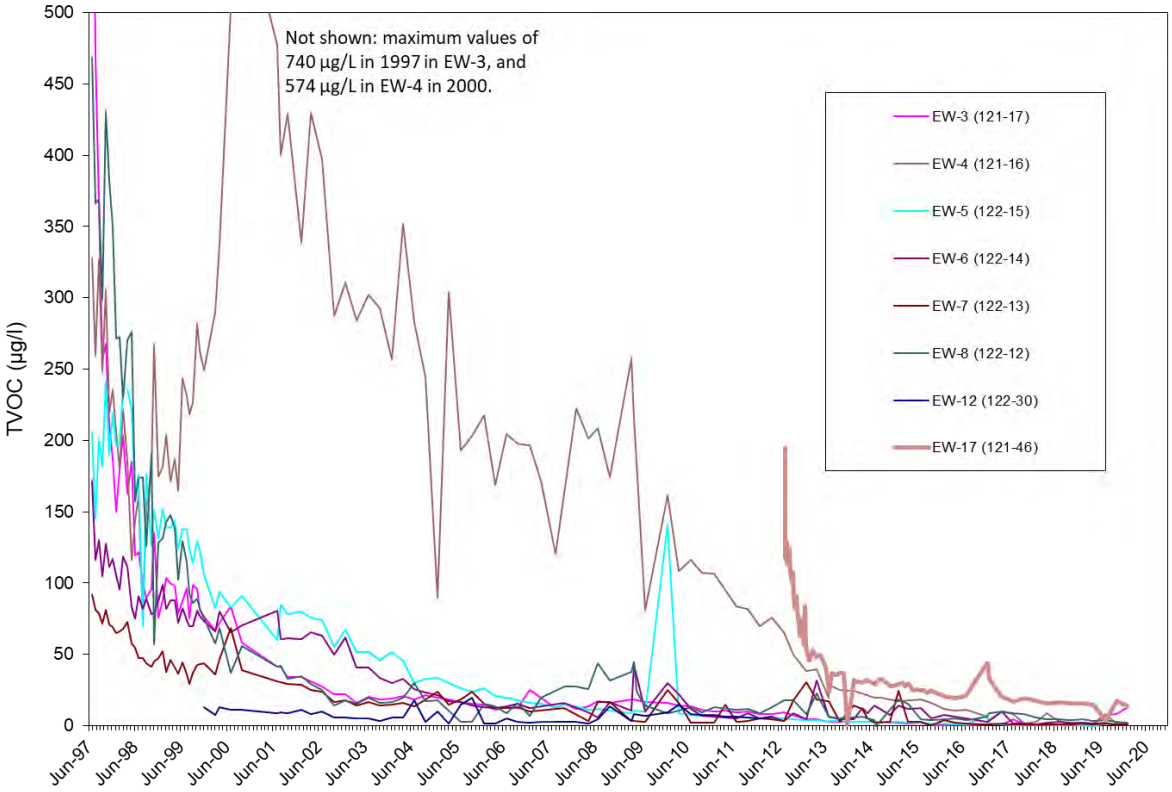


Table 3-2
OU III South Boundary Effluent Water Quality
SPDES Equivalency Permit Concentrations January 1 – March 31, 2020

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	**Monitor**	**781,599[1]**	**GPD**	**Continuous**
pH (range)	**6.5 - 8.5**	**6.6– 7.4[2]**	**SU**	**Monthly[3]**
Carbon Tetrachloride	**5**	**<0.50**	**ug/L**	**Monthly[3]**
Chloroform	**7**	**<0.50**	**ug/L**	**Monthly[3]**
Dichlorodifluoromethane	**5**	**<0.50**	**ug/L**	**Monthly[3]**
1,1-Dichloroethane	**5**	**<0.50**	**ug/L**	**Monthly[3]**
1,1-Dichloroethylene	**5**	**<0.50**	**ug/L**	**Monthly[3]**
Methyl Chloride	**5**	**<0.50**	**ug/L**	**Monthly[3]**
Tetrachloroethylene	**5**	**<0.50**	**ug/L**	**Monthly[3]**
Toluene	**5**	**<0.50**	**ug/L**	**Monthly[3]**
1,1,1-Trichloroethane	**5**	**<0.50**	**ug/L**	**Monthly[3]**
1,1,2 Trichloroethane	**5**	**<0.50**	**ug/L**	**Monthly[3]**
Trichloroethylene	**10**	**<0.50**	**ug/L**	**Monthly[3]**

[1] = The maximum monthly average flow rate for both the OUIII South Boundary and Middle Road Systems, during the operational period.
[2] = The minimum and maximum pH values during the operational period.
[3] = Beginning in April 2003, a SPDES modification was approved revising the pH and volatile organic sampling to once a month.

System Operations

January 2020:

Extraction well EW-4 was shut down for two weeks for repair. EW-17 was in full time operation. Wells EW-3, EW-5, EW-6, EW-7, EW-8 and EW-12 remained in standby mode. The system treated approximately 9 million gallons of water.

February 2020:

The system operated normally for the month. Extraction well EW-4 was off for pulsed pumping, and EW-17 was in full time operation. Wells EW-3, EW-5, EW-6, EW-7, EW-8 and EW-12 remained in standby mode. The system treated approximately 5 million gallons of water.

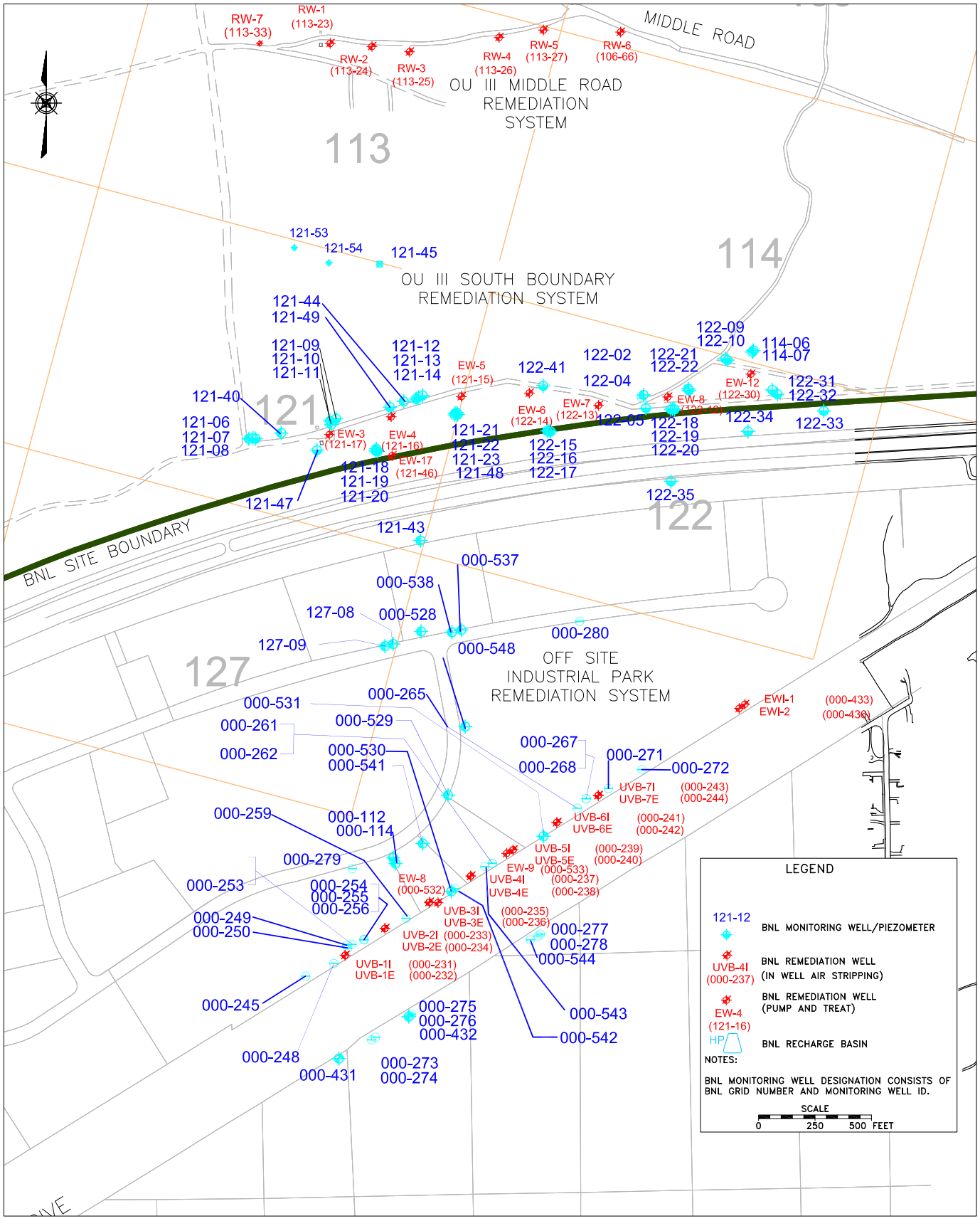
March 2020:

The system operated normally for the month. EW-4 and EW-17 were in full time operation. Wells EW-3, EW-5, EW-6, EW-7, EW-8 and EW-12 remained in standby mode. The system treated approximately 10.5 million gallons of water.

The system treated approximately 24.5 million gallons of water during the first quarter of 2020.

Planned Operational Changes

- Maintain wells EW-3, EW-5, EW-6, EW-7, EW-8, and EW-12 in standby mode. The system's extraction wells will continue to be sampled on a quarterly basis, with the exception of EW-12. The wells will be restarted if extraction or monitoring well data indicate TVOC concentrations exceed the 50 µg/L capture goal. During the first quarter, TVOC concentrations in extraction wells EW-3, EW-5, EW-6, EW-7, and EW-8 and adjacent monitoring wells were less than 50 µg/L.
- Continue to operate well EW-17 on a full-time basis. Continue pulsed pumping of well EW-4 one month on and one month off. During the first quarter, TVOC concentrations in extraction wells EW-4 and EW-17 were less than 50 µg/L. TVOC concentrations in monitoring well 121-49, located upgradient of and at the same depth as EW-17, remains above 50 µg/L in the first quarter, at a concentration of 89 µg/L.



\\OERNT\GIS\GW_PROJECTS\ERD_QUARTERLIES\1Q_2020\FIG 3-3.DWG

ENVIRONMENTAL PROTECTION DIVISION

TITLE:
OU III SOUTH BOUNDARY/INDUSTRIAL PARK/INDUSTRIAL PARK EAST MONITORING WELL NETWORKS

SITEWIDE REMEDIATION SYSTEMS
FIRST QUARTER 2020 OPERATIONS REPORT

DWN:	VT:HZ.:	DATE:	PROJECT NO.:
JEB	–	09/12/14	–
CHKD:	APPD:	REV.:	NOTES:
LDS	–	07/07/20	–

FIGURE NO.: 3–3

Table 3-3
OU III South Boundary Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 121-45

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/04/2020	6.79	--	--	UG/L	199.50	
Chloroform	02/04/2020	0.27	0.5	--	UG/L	199.50	J
Tetrachloroethylene	02/04/2020	6.2	0.5	--	UG/L	199.50	
Trichloroethylene	02/04/2020	0.32	0.5	--	UG/L	199.50	J

Site ID : 121-49

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/04/2020	89.13	--	--	UG/L	215.00	
Tetrachloroethylene	02/04/2020	70	5	--	UG/L	215.00	

Table 3-4
OU III South Boundary Extraction Well Data
'Hits Only' January through March 2020

Site ID : 121-15 (EW-5)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/09/2020	0.56	--	--	UG/L	0.00	
Tetrachloroethylene	01/09/2020	0.56	0.5	--	UG/L	0.00	

Site ID : 121-16 (EW-4)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/09/2020	0.93	--	--	UG/L	0.00	
Tetrachloroethylene	01/09/2020	0.93	0.5	--	UG/L	0.00	

Site ID : 121-17 (EW-3)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/09/2020	0.35	0.5	--	UG/L	0.00	J
524.2 TVOC	01/09/2020	12.81	--	--	UG/L	0.00	
Carbon tetrachloride	01/09/2020	1.7	0.5	--	UG/L	0.00	
Chloroform	01/09/2020	0.44	0.5	--	UG/L	0.00	J
Tetrachloroethylene	01/09/2020	10	0.5	--	UG/L	0.00	
Trichloroethylene	01/09/2020	0.32	0.5	--	UG/L	0.00	J

Site ID : 121-46 (EW-17)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/09/2020	0.3	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	01/09/2020	0.29	0.5	--	UG/L	0.00	J
524.2 TVOC	01/09/2020	14.11	--	--	UG/L	0.00	
Carbon tetrachloride	01/09/2020	1.7	0.5	--	UG/L	0.00	
Chloroform	01/09/2020	0.46	0.5	--	UG/L	0.00	J
Tetrachloroethylene	01/09/2020	11	0.5	--	UG/L	0.00	
Trichloroethylene	01/09/2020	0.36	0.5	--	UG/L	0.00	J

Site ID : 122-12 (EW-8)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/09/2020	2.4	--	--	UG/L	0.00	
Tetrachloroethylene	01/09/2020	2.4	0.5	--	UG/L	0.00	

Site ID : 122-13 (EW-7)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/09/2020	1.5	--	--	UG/L	0.00	
Tetrachloroethylene	01/09/2020	1.5	0.5	--	UG/L	0.00	

Site ID : 122-14 (EW-6)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/09/2020	0.31	--	--	UG/L	0.00	

Table 3-4
OU III South Boundary Extraction Well Data
'Hits Only' January through March 2020

Site ID : 122-14 (EW-6)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tetrachloroethylene	01/09/2020	0.31	0.5	--	UG/L	0.00	J

Table 3-5
OU III South Boundary Influent Data
'Hits Only' January through March 2020

Site ID : 121-41 (System Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/09/2020	0.17	0.5	--	UG/L	0.00	J
524.2 TVOC	01/09/2020	6.28	--	--	UG/L	0.00	
Carbon tetrachloride	01/09/2020	0.72	0.5	--	UG/L	0.00	
Chloroform	01/09/2020	0.29	0.5	--	UG/L	0.00	J
Tetrachloroethylene	01/09/2020	5.1	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	02/11/2020	0.34	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	02/11/2020	0.33	0.5	--	UG/L	0.00	J
524.2 TVOC	02/11/2020	14.22	--	--	UG/L	0.00	
Carbon tetrachloride	02/11/2020	1.7	0.5	--	UG/L	0.00	
Chloroform	02/11/2020	0.49	0.5	--	UG/L	0.00	J
Tetrachloroethylene	02/11/2020	11	0.5	--	UG/L	0.00	
Trichloroethylene	02/11/2020	0.36	0.5	--	UG/L	0.00	J
1,1,1-Trichloroethane	03/10/2020	0.27	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	03/10/2020	0.25	0.5	--	UG/L	0.00	J
524.2 TVOC	03/10/2020	8.35	--	--	UG/L	0.00	
Carbon tetrachloride	03/10/2020	0.97	0.5	--	UG/L	0.00	
Chloroform	03/10/2020	0.45	0.5	--	UG/L	0.00	J
Tetrachloroethylene	03/10/2020	6.1	0.5	--	UG/L	0.00	
Trichloroethylene	03/10/2020	0.31	0.5	--	UG/L	0.00	J

Table 3-6
OU III South Boundary Effluent Data
'Hits Only' January through March 2020

Site ID : 095-126 (System Effluent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/07/2020	0	--	--	UG/L	0.00	

Qualifiers :

J = Estimated value.

D = Compound was identified in an analysis at a secondary dilution factor.

Organic Compounds :

B = Compound was found in both the sample And associated laboratory blank.

Inorganic Compounds :

B = Result Is between instrument detection limit And contract required reporting limit.

Section 4

Q1-2020 Operations Summary
OU III Middle Road Pump and Treat System

Process: Groundwater extraction and air stripping treatment, with discharge to both the OU III and RAV recharge basins.

Goal: Reach Maximum Contaminant Levels (MCLs) in core monitoring wells in OU III within 30 years for the Upper Glacial aquifer (by 2030).

Start Date: October 23, 2001

Table 4-1
OU III Middle Road
Pumping Rates (gpm)

Extraction Well	RW-1	RW-2	RW-3	RW-4	RW-5	RW-6	RW-7
Site Id #	113-23	113-24	113-25	113-26	113-27	106-66	113-33
Screen Interval (ft bls)	90-130	170-200	228-268	150-180	150-180	188-218	202-222
Desired Flow Rate (gpm)	0*	150	100	0*	0*	0*	100
January (Avg monthly gpm)	0	78	94	0	0	0	107
February " " "	0	48	87	0	0	0	103
March " " "	0	57	111	0	0	0	133
Actual (Avg. over Qtr.)	**0**	**61**	**97**	**0**	**0**	**0**	**114**

* Extraction wells placed in standby mode: RW-4 and RW-5 (2003), RW-6 (2006), and RW-1 (2015).

Figure 4-1
OU III Middle Road
Cumulative Mass Removal of VOC's vs. Time

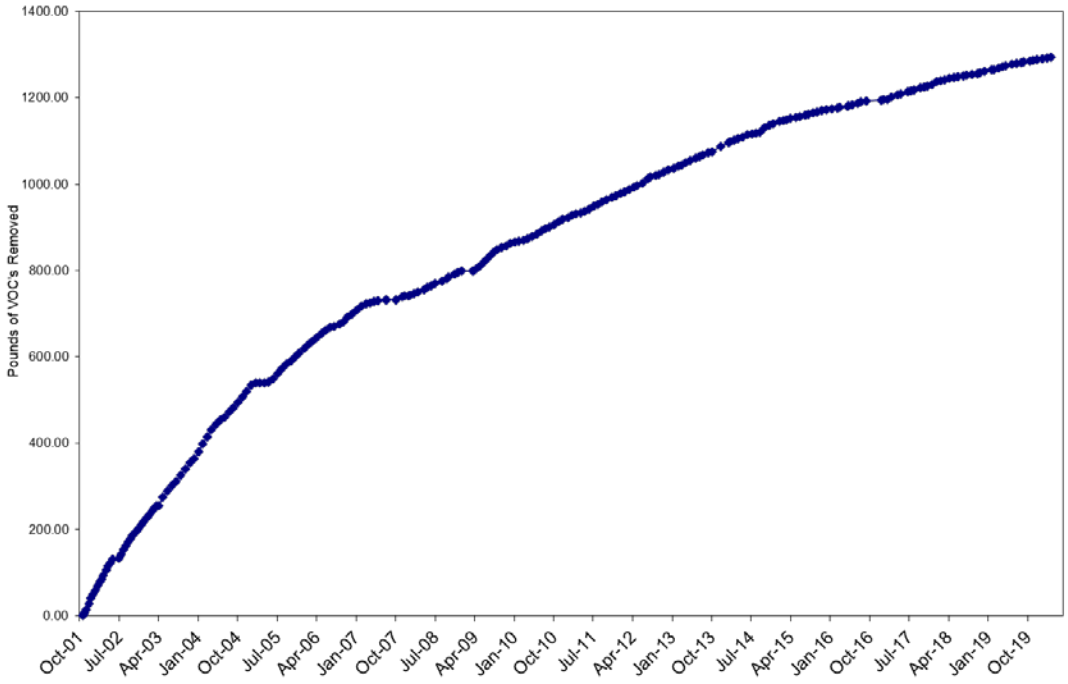


Figure 4-2
OU III Middle Road
Influent TVOC Concentrations vs. Time

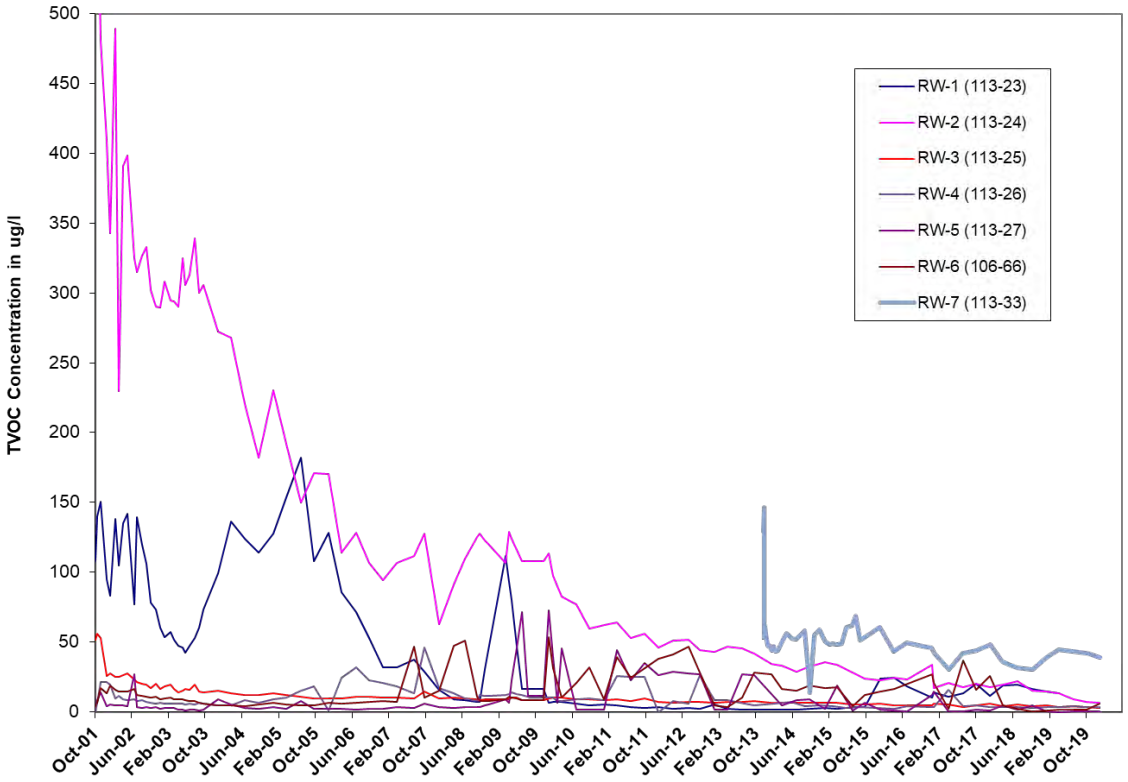


Table 4-2
OU III Middle Road Air-Stripping Tower Effluent Water Quality
SPDES Equivalency Permit Concentrations January 1, 2020 – March 31, 2020

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	**Monitor**	**781,599** [1]	**GPD**	**Continuous**
pH (range)	**6.5 - 8.5**	**6.6-7.4** [2]	**SU**	**Monthly**[3]
Carbon Tetrachloride	**5**	**<0.05**	**ug/L**	**Monthly**[3]
Chloroform	**7**	**<0.05**	**ug/L**	**Monthly**[3]
Dichlorodifluorometha	**5**	**<0.05**	**ug/L**	**Monthly**[3]
1,1-Dichloroethane	**5**	**<0.05**	**ug/L**	**Monthly**[3]
1,1-Dichloroethylene	**5**	**<0.05**	**ug/L**	**Monthly**[3]
Methyl Chloride	**5**	**<0.05**	**ug/L**	**Monthly**[3]
Tetrachloroethylene	**5**	**<0.05**	**ug/L**	**Monthly**[3]
Toluene	**5**	**<0.05**	**ug/L**	**Monthly**[3]
1,1,1-Trichloroethane	**5**	**<0.05**	**ug/L**	**Monthly**[3]
1,1,2 Trichloroethane	**5**	**<0.05**	**ug/L**	**Monthly**[3]
Trichloroethylene	**10**	**<0.05**	**ug/L**	**Monthly**[3]

[1] The maximum monthly average flow for the Middle Road and South Boundary Systems during the operational period.
[2] The minimum and maximum pH values for the Middle Road Effluent, during the operational period.
[3] Beginning in April 2003, a SPDES modification was approved revising the pH and volatile organic sampling to once a month.

System Operations

January 2020:

Extraction wells RW-2, RW-3, and RW-7 were in full time operation. Wells RW-1, RW-4, RW-5 and RW-6 remained in standby mode. The system was down for approximately five days for maintenance. The effluent sample was taken from the South Boundary tower effluent sample port. The system treated approximately 12 million gallons of water.

February 2020:

Extraction well RW-2, RW-3, and RW-7 were in full time operation. Wells RW-1, RW-4, RW-5 and RW-6 remained in standby mode. RW-2 was down for maintenance for two weeks. The effluent sample was taken from the Middle Road tower effluent sample port. The system treated approximately 10 million gallons of water.

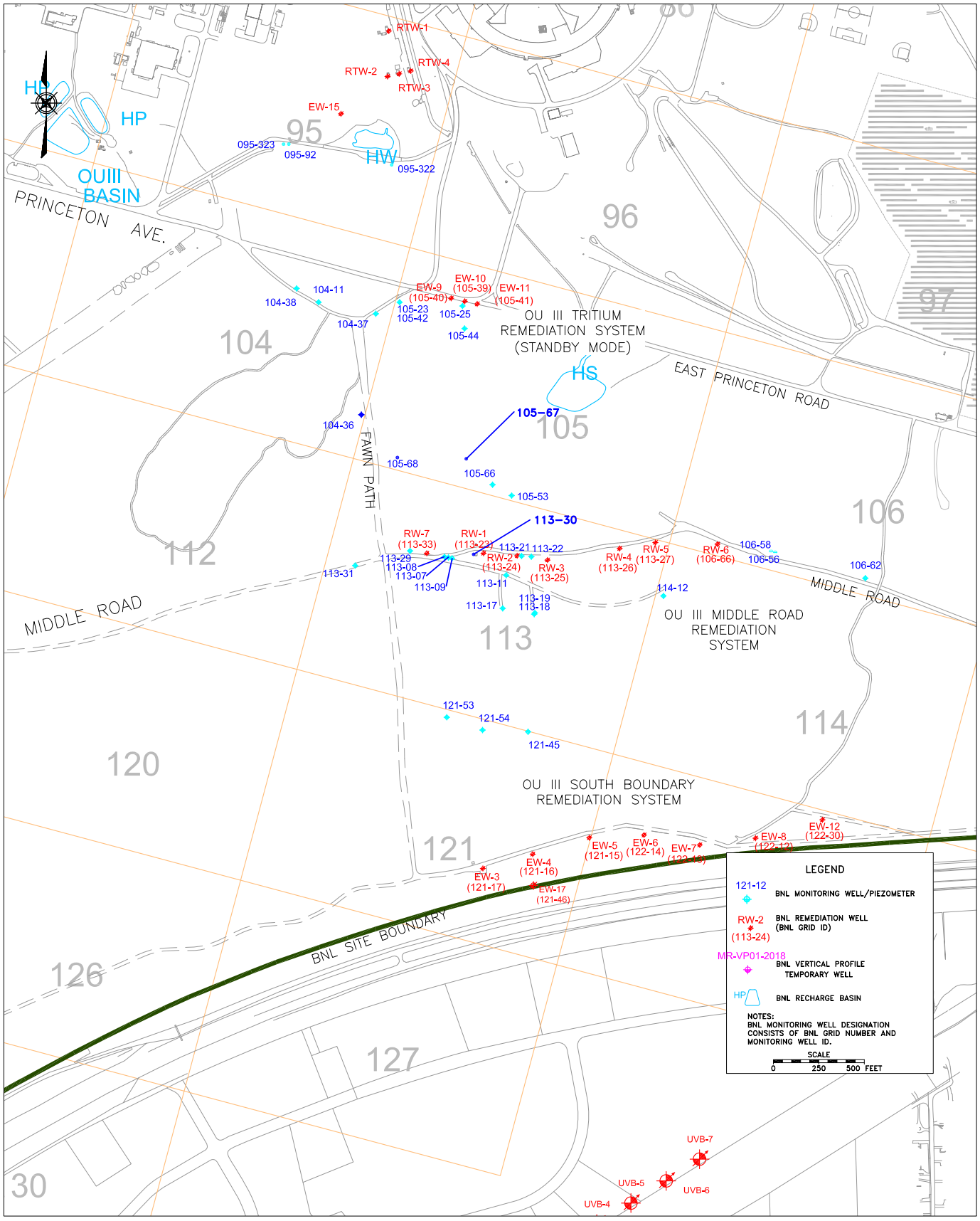
March 2020:

Extraction wells RW-2, RW-3, and RW-7 were in full time operation. Wells RW-1, RW- 4, RW-5 and RW-6 remained in standby mode. RW-2 was down for 10 days for maintenance. The effluent sample was taken from Middle Road effluent sample port. The system treated approximately 13 million gallons of water.

The system treated approximately 35 million gallons of water during the first quarter of 2020.

Planned Operational Changes

- Continue operation of extraction wells RW-2, RW-3 and RW-7, and maintain RW-1, RW-4, RW-5 and RW-6 in standby mode. Restart the well(s) if extraction or monitoring well data indicate that TVOC concentrations exceed the 50 µg/L capture goal. TVOC concentrations in extraction wells RW-4, RW-5 and RW-6 and adjacent monitoring wells were below 50 µg/L in the first quarter. Well RW-1 was not sampled this quarter due to electrical maintenance.



\\OERNT\GIS\GW_PROJECTS\ERD_QUARTERLIES\1Q_2020\FIG 4-3.DWG

ENVIRONMENTAL PROTECTION DIVISION

TITLE:

OU III MIDDLE ROAD MONITORING WELL NETWORK

SITEWIDE REMEDIATION SYSTEMS
FIRST QUARTER 2020 OPERATIONS REPORT

DWN:	VT:HZ.:	DATE:	PROJECT NO.:
JEB	–	02/08/07	–
CHKD:	APPD:	REV.:	NOTES:
LDS	––	07/07/20	–

FIGURE NO.: 4–3

Table 4-3
OU III Middle Road Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 095-322

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/03/2020	2.7	0.5	--	UG/L	180.00	
1,1-Dichloroethane	02/03/2020	0.51	0.5	--	UG/L	180.00	
1,1-Dichloroethylene	02/03/2020	4.3	0.5	--	UG/L	180.00	
524.2 TVOC	02/03/2020	27.78	--	--	UG/L	180.00	
Chloroform	02/03/2020	0.47	0.5	--	UG/L	180.00	J
Tetrachloroethylene	02/03/2020	13	0.5	--	UG/L	180.00	
Trichloroethylene	02/03/2020	6.8	0.5	--	UG/L	180.00	

Site ID : 095-323

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/03/2020	1.8	0.5	--	UG/L	205.00	
1,1,2,2-Tetrachloroethane	02/03/2020	1.4	0.5	--	UG/L	205.00	
1,1-Dichloroethylene	02/03/2020	1.1	0.5	--	UG/L	205.00	
524.2 TVOC	02/03/2020	17.24	--	--	UG/L	205.00	
Chloroform	02/03/2020	0.24	0.5	--	UG/L	205.00	J
Tetrachloroethylene	02/03/2020	8.7	0.5	--	UG/L	205.00	
Trichloroethylene	02/03/2020	4	0.5	--	UG/L	205.00	

Site ID : 104-37

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/30/2020	86.72	--	--	UG/L	209.00	
Tetrachloroethylene	01/30/2020	77	2.5	--	UG/L	209.00	

Site ID : 105-23

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/30/2020	0.27	0.5	--	UG/L	180.00	J
524.2 TVOC	01/30/2020	21.27	--	--	UG/L	180.00	
Tetrachloroethylene	01/30/2020	21	0.5	--	UG/L	180.00	

Site ID : 105-44

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	02/18/2020	0.187	0.2	--	UG/L	152.50	J
Perfluorobutanesulfonate (PFBS)	02/18/2020	1.43	1.61	--	NG/L	152.50	J
Perfluorobutyric acid (PFBA)	02/18/2020	21.2	1.81	--	NG/L	152.50	
Perfluoroheptanoic acid (PFHpA)	02/18/2020	2.62	1.81	--	NG/L	152.50	
Perfluorohexanesulfonate (PFHxS)	02/18/2020	10.1	1.65	--	NG/L	152.50	
Perfluorohexanoic acid (PFHxA)	02/18/2020	3.21	1.81	--	NG/L	152.50	

Table 4-3
OU III Middle Road Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 105-44

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorooctanesulfonate (PFOS)	02/18/2020	3.3	1.81	--	NG/L	152.50	
Perfluorooctanoic acid (PFOA)	02/18/2020	6.23	1.81	--	NG/L	152.50	
Perfluoropentanesulfonate (PFPeS)	02/18/2020	0.839	1.7	--	NG/L	152.50	J
Perfluoropentanoic acid (PFPeA)	02/18/2020	19.5	1.81	--	NG/L	152.50	

Site ID : 105-66

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/03/2020	214.29	--	--	UG/L	184.00	
Tetrachloroethylene	02/03/2020	200	13	--	UG/L	184.00	

Site ID : 105-67

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/03/2020	50.09	--	--	UG/L	185.00	
Tetrachloroethylene	02/03/2020	44	2.5	--	UG/L	185.00	

Site ID : 105-68

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/30/2020	267.89	--	--	UG/L	205.00	
Tetrachloroethylene	01/30/2020	230	5	--	UG/L	205.00	

Site ID : 113-11

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/31/2020	4.04	--	--	UG/L	201.00	
Chloroform	01/31/2020	0.24	0.5	--	UG/L	201.00	J
Tetrachloroethylene	01/31/2020	3.8	0.5	--	UG/L	201.00	

Site ID : 113-17

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/31/2020	14.58	--	--	UG/L	177.00	
Chloroform	01/31/2020	0.31	0.5	--	UG/L	177.00	J
Tetrachloroethylene	01/31/2020	14	0.5	--	UG/L	177.00	
Trichloroethylene	01/31/2020	0.27	0.5	--	UG/L	177.00	J

Site ID : 113-19

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/04/2020	9.5	0.5	--	UG/L	230.00	
1,1-Dichloroethane	02/04/2020	0.67	0.5	--	UG/L	230.00	
1,1-Dichloroethylene	02/04/2020	5.2	0.5	--	UG/L	230.00	
524.2 TVOC	02/04/2020	24.77	--	--	UG/L	230.00	

Table 4-3
OU III Middle Road Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 113-19

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Carbon tetrachloride	02/04/2020	4.6	0.5	--	UG/L	230.00	
Chloroform	02/04/2020	0.82	0.5	--	UG/L	230.00	
cis-1,2-Dichloroethylene	02/04/2020	0.28	0.5	--	UG/L	230.00	J
Trichloroethylene	02/04/2020	3.7	0.5	--	UG/L	230.00	

Site ID : 113-30

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/30/2020	17.1	--	--	UG/L	190.00	
Carbon tetrachloride	01/30/2020	4.7	0.5	--	UG/L	190.00	
Chloroform	01/30/2020	2.7	0.5	--	UG/L	190.00	
Tetrachloroethylene	01/30/2020	9.7	0.5	--	UG/L	190.00	

Site ID : 113-31

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/30/2020	1.2	0.5	--	UG/L	190.00	
1,1-Dichloroethylene	01/30/2020	0.42	0.5	--	UG/L	190.00	J
524.2 TVOC	01/30/2020	1.99	--	--	UG/L	190.00	
Trichloroethylene	01/30/2020	0.37	0.5	--	UG/L	190.00	J

Site ID : 114-12

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/31/2020	0.33	--	--	UG/L	155.00	
Chloroform	01/31/2020	0.33	0.5	--	UG/L	155.00	J

Site ID : 121-45

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/04/2020	6.79	--	--	UG/L	199.50	
Chloroform	02/04/2020	0.27	0.5	--	UG/L	199.50	J
Tetrachloroethylene	02/04/2020	6.2	0.5	--	UG/L	199.50	
Trichloroethylene	02/04/2020	0.32	0.5	--	UG/L	199.50	J

Site ID : 121-53

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/04/2020	60.35	--	--	UG/L	229.00	
Tetrachloroethylene	02/04/2020	47	2.5	--	UG/L	229.00	

Table 4-4
OU III Middle Road Extraction Well Data
'Hits Only' January through March 2020

Site ID : 106-66 (RW-6)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/09/2020	0.78	0.5	--	UG/L	0.00	
1,1-Dichloroethane	01/09/2020	0.15	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	01/09/2020	0.22	0.5	--	UG/L	0.00	J
524.2 TVOC	01/09/2020	6.01	--	--	UG/L	0.00	
Carbon tetrachloride	01/09/2020	0.48	0.5	--	UG/L	0.00	J
Tetrachloroethylene	01/09/2020	3.8	0.5	--	UG/L	0.00	
Trichloroethylene	01/09/2020	0.58	0.5	--	UG/L	0.00	

Site ID : 113-24 (RW-2)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/09/2020	6.44	--	--	UG/L	0.00	
Carbon tetrachloride	01/09/2020	0.44	0.5	--	UG/L	0.00	J
Chloroform	01/09/2020	0.3	0.5	--	UG/L	0.00	J
Tetrachloroethylene	01/09/2020	5.4	0.5	--	UG/L	0.00	
Trichloroethylene	01/09/2020	0.3	0.5	--	UG/L	0.00	J

Site ID : 113-25 (RW-3)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/09/2020	1.4	0.5	--	UG/L	0.00	
1,1-Dichloroethane	01/09/2020	0.23	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	01/09/2020	0.46	0.5	--	UG/L	0.00	J
524.2 TVOC	01/09/2020	2.82	--	--	UG/L	0.00	
Trichloroethylene	01/09/2020	0.73	0.5	--	UG/L	0.00	

Site ID : 113-26 (RW-4)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/09/2020	2.12	--	--	UG/L	0.00	
Carbon tetrachloride	01/09/2020	0.56	0.5	--	UG/L	0.00	
Chloroform	01/09/2020	0.61	0.5	--	UG/L	0.00	
Trichloroethylene	01/09/2020	0.95	0.5	--	UG/L	0.00	

Site ID : 113-27 (RW-5)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/09/2020	0.37	--	--	UG/L	0.00	
Chloroform	01/09/2020	0.37	0.5	--	UG/L	0.00	J

Site ID : 113-33 (RW-7)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/09/2020	0.79	0.5	--	UG/L	0.00	

Table 4-4
OU III Middle Road Extraction Well Data
'Hits Only' January through March 2020

Site ID : 113-33 (RW-7)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethylene	01/09/2020	0.4	0.5	--	UG/L	0.00	J
524.2 TVOC	01/09/2020	39.25	--	--	UG/L	0.00	
Carbon tetrachloride	01/09/2020	1.9	0.5	--	UG/L	0.00	
Chloroform	01/09/2020	0.42	0.5	--	UG/L	0.00	J
Tetrachloroethylene	01/09/2020	35	0.5	--	UG/L	0.00	
Trichloroethylene	01/09/2020	0.74	0.5	--	UG/L	0.00	

Table 4-5
OU III Middle Road Influent Data
'Hits Only' January through March 2020

Site ID : 113-34 (Combo Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/09/2020	0.65	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	01/09/2020	0.26	0.5	--	UG/L	0.00	J
524.2 TVOC	01/09/2020	16.67	--	--	UG/L	0.00	
Carbon tetrachloride	01/09/2020	0.9	0.5	--	UG/L	0.00	
Chloroform	01/09/2020	0.3	0.5	--	UG/L	0.00	J
Tetrachloroethylene	01/09/2020	14	0.5	--	UG/L	0.00	
Trichloroethylene	01/09/2020	0.56	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	02/11/2020	0.77	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	02/11/2020	0.24	0.5	--	UG/L	0.00	J
524.2 TVOC	02/11/2020	16.79	--	--	UG/L	0.00	
Carbon tetrachloride	02/11/2020	0.88	0.5	--	UG/L	0.00	
Chloroform	02/11/2020	0.28	0.5	--	UG/L	0.00	J
Tetrachloroethylene	02/11/2020	14	0.5	--	UG/L	0.00	
Trichloroethylene	02/11/2020	0.62	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	03/10/2020	0.91	0.5	--	UG/L	0.00	
1,1-Dichloroethane	03/10/2020	0.19	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	03/10/2020	0.43	0.5	--	UG/L	0.00	J
524.2 TVOC	03/10/2020	18.8	--	--	UG/L	0.00	
Carbon tetrachloride	03/10/2020	1.1	0.5	--	UG/L	0.00	
Chloroform	03/10/2020	0.4	0.5	--	UG/L	0.00	J
Tetrachloroethylene	03/10/2020	15	0.5	--	UG/L	0.00	
Trichloroethylene	03/10/2020	0.77	0.5	--	UG/L	0.00	

Table 4-6
OU III Middle Road Effluent Data
'Hits Only' January through March 2020

Site ID : 095-270 (System Effluent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/11/2020	0	--	--	UG/L	0.00	
524.2 TVOC	03/10/2020	0	--	--	UG/L	0.00	

Qualifiers :

J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Organic Compounds :

B = Compound was found in both the sample And associated laboratory blank.

Inorganic Compounds :

B = Result Is between instrument detection limit And contract required reporting limit.

Section 5

Q1-2020 Operations Summary
OU III Industrial Park In-Well Air Stripping System

Process: Groundwater extraction and in-well air stripping treatment, with discharge in same well (recirculating well technology) for wells UVB-1 through UVB-7, and groundwater extraction and liquid phase granular activated carbon treatment, with discharge to injection wells for wells EW-8 and EW-9.

Goal: Reach Maximum Contaminant Levels (MCLs) in core monitoring wells within 30 years for the Upper Glacial aquifer (by 2030), and 65 years for the Magothy aquifer (by 2065).

Start Date: September 1999

Table 5-1
OU III Industrial Park
Pumping Rates (gpm)

Recirculation Treatment Well	**UVB-1**	**UVB-2**	**UVB-3**	**UVB-4**	**UVB-5**	**UVB-6**	**UVB-7**	**EW-8**	**EW-9**
Site Id #	000-231	000-233	000-235	000-237	000-239	000-241	000-243	000-532	000-533
Screened Interval (feet below grade)	220-240	195-215	194-214	170-190	180-200	190-210	205-225	230-250	220-240
Desired Flow Rate (GPM)	*0	*0	*0	*0	*0	*0	*0	**0	**0
January	*0	*0	*0	*0	*0	*0	*0	**0	**0
February	*0	*0	*0	*0	*0	*0	*0	**0	**0
March	*0	*0	*0	*0	*0	*0	*0	**0	**0
Actual (Avg.over Qtr.)	*0	*0	*0	*0	*0	*0	*0	**0	**0

Note:
*Wells UVB-1 to UVB-7 were placed in stand-by mode February 2017.
Wells EW-8 and EW-9 started full-time operation January 2015.
**Wells EW-8 and EW-9 started one month on and one month off pulsed pumping February 2018 and were placed in stand-by mode July 2019.

Figure 5-1
OU III Industrial Park
Cumulative Mass Removal of VOCs vs. Time

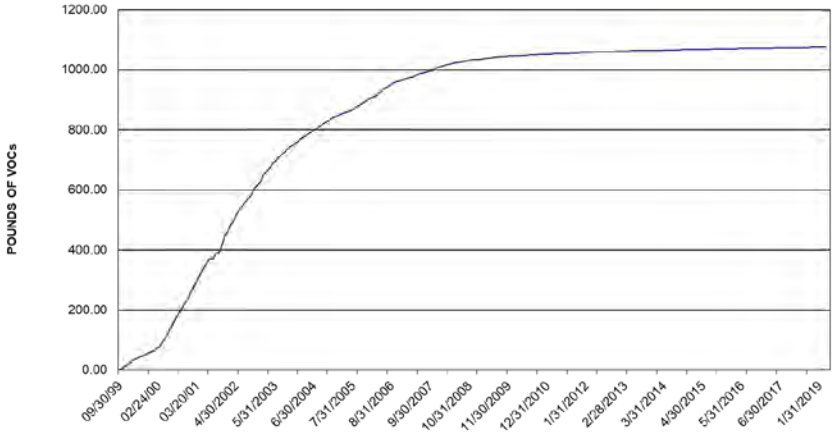
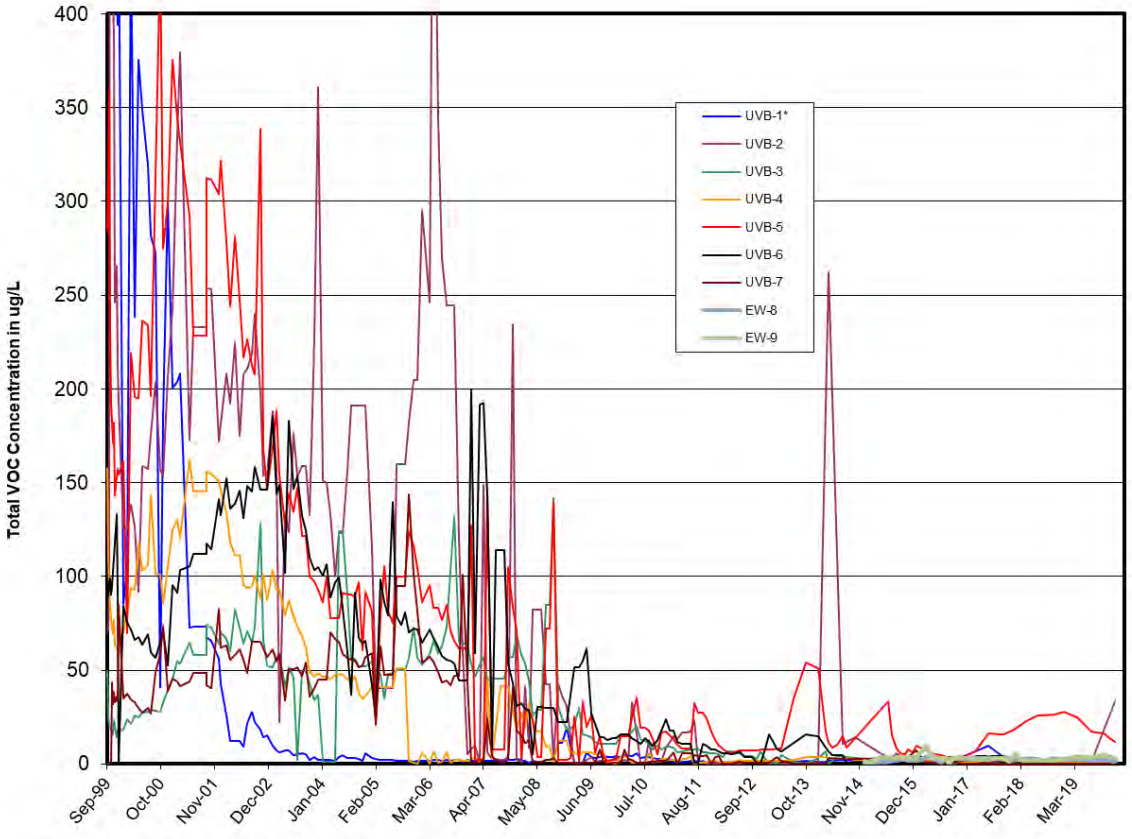


Figure 5-2
OU III Industrial Park
Influent TVOC Concentrations vs. Time



*Startup concentrations for UVB-1 are not illustrated on this graph.
TVOC concentration of 1,900 µg/L in September 1999, and 1,485 µg/L in October 1999.

Table 5-2
OU III Industrial Park Effluent Water Quality for EW-8 and EW-9
SPDES Equivalency Permit Concentrations January 1 – March 31, 2020

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	**Monitor**	**N/A**	**GPM**	**Continuous**
pH (range)	**5.0 - 8.5**	**N/A**	**SU**	**Weekly**
Carbon Tetrachloride	**5**	**N/A**	**ug/L**	**Monthly[1]**
Chloroform	**7**	**N/A**	**ug/L**	**Monthly[1]**
1,2-Dichloroethane	**0.6**	**N/A**	**ug/L**	**Monthly[1]**
1,1-Dichloroethylene	**5**	**N/A**	**ug/L**	**Monthly[1]**
Tetrachloroethylene	**5**	**N/A**	**ug/L**	**Monthly[1]**
Trichloroethene	**5**	**N/A**	**ug/L**	**Monthly[1]**
1,1,1-Trichloroethane	**5**	**N/A**	**ug/L**	**Monthly[1]**

[1] The minimum measurement frequency shall be monthly following a period of 24 consecutive weekly sampling events showing no exceedances of the stated discharge limitations. Monthly sampling was initiated in August 2015.
NA = Not applicable since the system was placed in standby mode in July 2019.

System Operation

January 2020:

Extraction wells UVB-1 through UVB-7, EW-8 and EW-9 remained in stand-by mode.

February 2020:

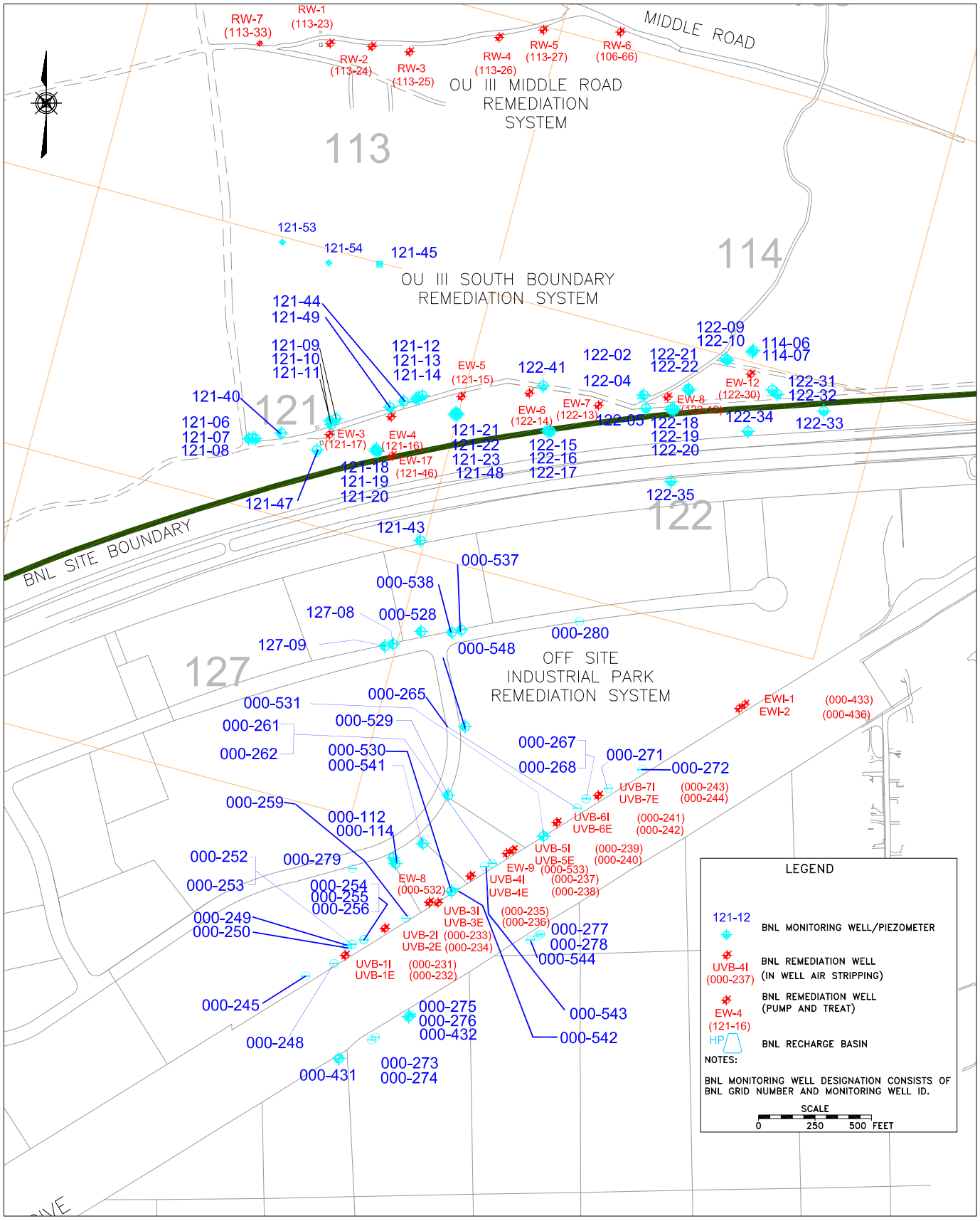
Extraction wells UVB-1 through UVB-7, EW-8 and EW-9 remained in stand-by mode.

March 2020:

Extraction wells UVB-1 through UVB-7, EW-8 and EW-9 remained in stand-by mode.

Planned Operational Changes

- Maintain the seven UVB wells, and EW-8 and EW-9 in standby. If TVOC concentrations exceed the 50 µg/L capture goal adjacent to any of the wells they may be restarted. During the first quarter, TVOC concentrations in the UVB extraction wells and EW-8 and EW-9, and adjacent core monitoring wells were below 50 µg/L.



\\OERNT\GIS\GW_PROJECTS\ERD_QUARTERLIES\1Q_2020\FIG 5-3.DWG

ENVIRONMENTAL PROTECTION DIVISION

TITLE:
OU III SOUTH BOUNDARY/INDUSTRIAL PARK/INDUSTRIAL PARK EAST MONITORING WELL NETWORKS

SITEWIDE REMEDIATION SYSTEMS
FIRST QUARTER 2020 OPERATIONS REPORT

DWN:	VT:HZ.:	DATE:	PROJECT NO.:
JEB	–	09/12/14	–
CHKD:	APPD:	REV.:	NOTES:
LDS	–	07/07/20	–

FIGURE NO.: 5–3

Table 5-3
OU III Industrial Park Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 000-112

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	03/02/2020	0.102	0.2	--	UG/L	180.00	J
524.2 TVOC	03/02/2020	0.71	--	--	UG/L	180.00	
Chloroform	03/02/2020	0.71	0.5	--	UG/L	180.00	
Perfluorobutyric acid (PFBA)	03/02/2020	2.33	1.73	--	NG/L	180.00	

Site ID : 000-245

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	02/24/2020	2.88	0.2	--	UG/L	212.00	
Perfluorobutanesulfonate (PFBS)	02/24/2020	0.703	1.68	--	NG/L	212.00	J
Perfluorobutyric acid (PFBA)	02/24/2020	7.15	1.88	--	NG/L	212.00	
Perfluorohexanesulfonate (PFHxS)	02/24/2020	4.38	1.71	--	NG/L	212.00	
Perfluorooctanesulfonate (PFOS)	02/24/2020	1.22	1.88	--	NG/L	212.00	J

Site ID : 000-248

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	02/25/2020	3.35	0.2	--	UG/L	232.50	
Perfluorobutyric acid (PFBA)	02/25/2020	1.92	1.76	--	NG/L	232.50	
Perfluorohexanesulfonate (PFHxS)	02/25/2020	4.12	1.6	--	NG/L	232.50	
Perfluorooctanesulfonate (PFOS)	02/25/2020	1.55	1.76	--	NG/L	232.50	J

Site ID : 000-249

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/25/2020	1.3	--	--	UG/L	264.00	
Carbon tetrachloride	02/25/2020	0.53	0.5	--	UG/L	264.00	
Chloroform	02/25/2020	0.29	0.5	--	UG/L	264.00	J
Tetrachloroethylene	02/25/2020	0.48	0.5	--	UG/L	264.00	J

Site ID : 000-250

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	02/25/2020	2.06	0.2	--	UG/L	298.00	
Perfluorobutyric acid (PFBA)	02/25/2020	7.9	1.86	--	NG/L	298.00	
Perfluoropentanoic acid (PFPeA)	02/25/2020	2.57	1.86	--	NG/L	298.00	

Site ID : 000-253

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/25/2020	1.34	--	--	UG/L	225.50	
Chloroform	02/25/2020	1.1	0.5	--	UG/L	225.50	
Tetrachloroethylene	02/25/2020	0.24	0.5	--	UG/L	225.50	J

Table 5-3
OU III Industrial Park Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 000-255

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorobutyric acid (PFBA)	02/24/2020	0.941	1.77	--	NG/L	167.50	J

Site ID : 000-256

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/24/2020	1.5	--	--	UG/L	222.50	
Chloroform	02/24/2020	1.2	0.5	--	UG/L	222.50	
Perfluorobutyric acid (PFBA)	02/24/2020	1.83	1.87	--	NG/L	222.50	J
Perfluoropentanoic acid (PFPeA)	02/24/2020	2.17	1.87	--	NG/L	222.50	
Tetrachloroethylene	02/24/2020	0.3	0.5	--	UG/L	222.50	J

Site ID : 000-259

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	02/24/2020	0.438	0.2	--	UG/L	202.50	
524.2 TVOC	02/24/2020	5.45	--	--	UG/L	202.50	
Carbon tetrachloride	02/24/2020	0.34	0.5	--	UG/L	202.50	J
Chloroform	02/24/2020	0.91	0.5	--	UG/L	202.50	
Methyl tert-butyl ether	02/24/2020	0.7	0.5	--	UG/L	202.50	
Perfluorobutyric acid (PFBA)	02/24/2020	1.42	1.75	--	NG/L	202.50	J
Perfluorohexanesulfonate (PFHxS)	02/24/2020	2.85	1.59	--	NG/L	202.50	
Perfluorooctanesulfonate (PFOS)	02/24/2020	1.33	1.75	--	NG/L	202.50	J
Perfluoropentanoic acid (PFPeA)	02/24/2020	1.14	1.75	--	NG/L	202.50	J
Tetrachloroethylene	02/24/2020	3.5	0.5	--	UG/L	202.50	

Site ID : 000-261

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	02/28/2020	0.131	0.2	--	UG/L	132.50	J
Perfluorobutyric acid (PFBA)	02/28/2020	4.05	1.74	--	NG/L	132.50	
Perfluorohexanesulfonate (PFHxS)	02/28/2020	3.75	1.58	--	NG/L	132.50	
Perfluorooctanesulfonate (PFOS)	02/28/2020	2.56	1.74	--	NG/L	132.50	
Perfluoropentanoic acid (PFPeA)	02/28/2020	2.19	1.74	--	NG/L	132.50	

Site ID : 000-262

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/28/2020	3.3	0.5	--	UG/L	182.50	
1,1-Dichloroethylene	02/28/2020	1.8	0.5	--	UG/L	182.50	
1,4-Dioxane	02/28/2020	1.81	0.2	--	UG/L	182.50	
524.2 TVOC	02/28/2020	15.73	--	--	UG/L	182.50	

Table 5-3
OU III Industrial Park Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 000-262

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Carbon tetrachloride	02/28/2020	3.5	0.5	--	UG/L	182.50	
Chloroform	02/28/2020	0.83	0.5	--	UG/L	182.50	
cis-1,2-Dichloroethylene	02/28/2020	1.3	0.5	--	UG/L	182.50	
Perfluorobutanesulfonate (PFBS)	02/28/2020	0.669	1.54	--	NG/L	182.50	J
Perfluorobutyric acid (PFBA)	02/28/2020	1.69	1.73	--	NG/L	182.50	J
Perfluoroheptanoic acid (PFHpA)	02/28/2020	0.585	1.73	--	NG/L	182.50	J
Perfluorohexanesulfonate (PFHxS)	02/28/2020	5.87	1.58	--	NG/L	182.50	
Perfluorohexanoic acid (PFHxA)	02/28/2020	0.721	1.73	--	NG/L	182.50	J
Perfluorooctanesulfonate (PFOS)	02/28/2020	2.89	1.73	--	NG/L	182.50	
Perfluorooctanoic acid (PFOA)	02/28/2020	2.07	1.73	--	NG/L	182.50	
Perfluoropentanesulfonate (PFPeS)	02/28/2020	0.903	1.63	--	NG/L	182.50	J
Perfluoropentanoic acid (PFPeA)	02/28/2020	0.731	1.73	--	NG/L	182.50	J
Tetrachloroethylene	02/28/2020	2.6	0.5	--	UG/L	182.50	
Trichloroethylene	02/28/2020	2.4	0.5	--	UG/L	182.50	

Site ID : 000-265

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	02/27/2020	0.593	0.2	--	UG/L	212.50	
524.2 TVOC	02/27/2020	0.35	--	--	UG/L	212.50	
Perfluorobutanesulfonate (PFBS)	02/27/2020	1.07	1.54	--	NG/L	212.50	J
Perfluorobutyric acid (PFBA)	02/27/2020	7.66	1.73	--	NG/L	212.50	
Perfluoroheptanoic acid (PFHpA)	02/27/2020	1.15	1.73	--	NG/L	212.50	J
Perfluorohexanesulfonate (PFHxS)	02/27/2020	7.05	1.57	--	NG/L	212.50	
Perfluorohexanoic acid (PFHxA)	02/27/2020	1.55	1.73	--	NG/L	212.50	J
Perfluorononanoic acid (PFNA)	02/27/2020	1.02	1.73	--	NG/L	212.50	J
Perfluorooctanesulfonate (PFOS)	02/27/2020	9.56	1.73	--	NG/L	212.50	
Perfluorooctanoic acid (PFOA)	02/27/2020	3.17	1.73	--	NG/L	212.50	
Perfluoropentanesulfonate (PFPeS)	02/27/2020	0.964	1.62	--	NG/L	212.50	J
Perfluoropentanoic acid (PFPeA)	02/27/2020	5.14	1.73	--	NG/L	212.50	
Tetrachloroethylene	02/27/2020	0.35	0.5	--	UG/L	212.50	J

Site ID : 000-267

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	02/27/2020	0.122	0.2	--	UG/L	160.50	J
Perfluorobutanesulfonate (PFBS)	02/27/2020	0.852	1.57	--	NG/L	160.50	J

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Site ID : 000-267

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorobutyric acid (PFBA)	02/27/2020	1.53	1.76	--	NG/L	160.50	J
Perfluorohexanesulfonate (PFHxS)	02/27/2020	9.8	1.6	--	NG/L	160.50	
Perfluorooctanesulfonate (PFOS)	02/27/2020	5.51	1.76	--	NG/L	160.50	
Perfluoropentanesulfonate (PFPeS)	02/27/2020	0.81	1.66	--	NG/L	160.50	J

Site ID : 000-268

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	02/27/2020	0.404	0.2	--	UG/L	215.50	
524.2 TVOC	02/27/2020	0	--	--	UG/L	215.50	
Perfluorobutanesulfonate (PFBS)	02/27/2020	1.57	1.63	--	NG/L	215.50	J
Perfluorobutyric acid (PFBA)	02/27/2020	0.77	1.83	--	NG/L	215.50	J
Perfluoroheptanoic acid (PFHpA)	02/27/2020	0.654	1.83	--	NG/L	215.50	J
Perfluorohexanesulfonate (PFHxS)	02/27/2020	10.7	1.67	--	NG/L	215.50	
Perfluorohexanoic acid (PFHxA)	02/27/2020	0.882	1.83	--	NG/L	215.50	J
Perfluorooctanesulfonate (PFOS)	02/27/2020	8.93	1.83	--	NG/L	215.50	
Perfluorooctanoic acid (PFOA)	02/27/2020	1.66	1.83	--	NG/L	215.50	J
Perfluoropentanesulfonate (PFPeS)	02/27/2020	1.55	1.72	--	NG/L	215.50	J

Site ID : 000-271

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	02/28/2020	0.198	0.2	--	UG/L	215.50	J
524.2 TVOC	02/28/2020	0	--	--	UG/L	215.50	
Perfluorobutyric acid (PFBA)	02/28/2020	4.01	1.88	--	NG/L	215.50	
Perfluorohexanesulfonate (PFHxS)	02/28/2020	1.75	1.71	--	NG/L	215.50	
Perfluorohexanoic acid (PFHxA)	02/28/2020	0.763	1.88	--	NG/L	215.50	J
Perfluorooctanesulfonate (PFOS)	02/28/2020	3.02	1.88	--	NG/L	215.50	
Perfluorooctanoic acid (PFOA)	02/28/2020	1.44	1.88	--	NG/L	215.50	J
Perfluoropentanoic acid (PFPeA)	02/28/2020	1.48	1.88	--	NG/L	215.50	J

Site ID : 000-272

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorooctanesulfonate (PFOS)	02/28/2020	1.04	1.74	--	NG/L	191.00	J

Site ID : 000-279

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/25/2020	2.04	--	--	UG/L	193.00	
Chloroform	02/25/2020	1.1	0.5	--	UG/L	193.00	

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Site ID : 000-279

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tetrachloroethylene	02/25/2020	0.94	0.5	--	UG/L	193.00	

Site ID : 000-528

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	03/02/2020	0.51	0.5	--	UG/L	220.00	
1,1-Dichloroethane	03/02/2020	0.097	0.5	--	UG/L	220.00	J
1,1-Dichloroethylene	03/02/2020	0.29	0.5	--	UG/L	220.00	J
1,4-Dioxane	03/02/2020	2.1	0.2	--	UG/L	220.00	
524.2 TVOC	03/02/2020	7.747	--	--	UG/L	220.00	
Chloroform	03/02/2020	0.86	0.5	--	UG/L	220.00	
cis-1,2-Dichloroethylene	03/02/2020	1.1	0.5	--	UG/L	220.00	
Perfluorobutanesulfonate (PFBS)	03/02/2020	1.66	1.55	--	NG/L	220.00	
Perfluorobutyric acid (PFBA)	03/02/2020	24.5	1.75	--	NG/L	220.00	
Perfluorohexanesulfonate (PFHxS)	03/02/2020	12.7	1.59	--	NG/L	220.00	
Perfluorohexanoic acid (PFHxA)	03/02/2020	1.83	1.75	--	NG/L	220.00	
Perfluorononanoic acid (PFNA)	03/02/2020	0.617	1.75	--	NG/L	220.00	J
Perfluorooctanesulfonate (PFOS)	03/02/2020	9.34	1.75	--	NG/L	220.00	
Perfluorooctanoic acid (PFOA)	03/02/2020	3.16	1.75	--	NG/L	220.00	
Perfluoropentanesulfonate (PFPeS)	03/02/2020	1.76	1.64	--	NG/L	220.00	
Perfluoropentanoic acid (PFPeA)	03/02/2020	0.746	1.75	--	NG/L	220.00	J
Tetrachloroethylene	03/02/2020	4.4	0.5	--	UG/L	220.00	
Trichloroethylene	03/02/2020	0.49	0.5	--	UG/L	220.00	J

Site ID : 000-529

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/20/2020	5.7	0.5	--	UG/L	219.00	
1,1-Dichloroethane	02/20/2020	0.13	0.5	--	UG/L	219.00	J
1,1-Dichloroethylene	02/20/2020	3.1	0.5	--	UG/L	219.00	
1,4-Dioxane	02/20/2020	1.03	0.2	--	UG/L	219.00	
524.2 TVOC	02/20/2020	23.98	--	--	UG/L	219.00	
Carbon tetrachloride	02/20/2020	1.4	0.5	--	UG/L	219.00	
Chloroform	02/20/2020	0.49	0.5	--	UG/L	219.00	J
Methyl tert-butyl ether	02/20/2020	0.86	0.5	--	UG/L	219.00	
Perfluorobutanesulfonate (PFBS)	02/20/2020	1.06	1.62	--	NG/L	219.00	J
Perfluorobutyric acid (PFBA)	02/20/2020	2.75	1.82	--	NG/L	219.00	

Table 5-3
OU III Industrial Park Monitoring Well Data
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Site ID : 000-529

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluoroheptanoic acid (PFHpA)	02/20/2020	0.637	1.82	--	NG/L	219.00	J
Perfluorohexanesulfonate (PFHxS)	02/20/2020	7.04	1.66	--	NG/L	219.00	
Perfluorohexanoic acid (PFHxA)	02/20/2020	0.952	1.82	--	NG/L	219.00	J
Perfluorooctanesulfonate (PFOS)	02/20/2020	8.93	1.82	--	NG/L	219.00	
Perfluorooctanoic acid (PFOA)	02/20/2020	3.83	1.82	--	NG/L	219.00	
Perfluoropentanesulfonate (PFPeS)	02/20/2020	0.852	1.71	--	NG/L	219.00	J
Perfluoropentanoic acid (PFPeA)	02/20/2020	1.01	1.82	--	NG/L	219.00	J
Tetrachloroethylene	02/20/2020	9.1	0.5	--	UG/L	219.00	
Trichloroethylene	02/20/2020	3.2	0.5	--	UG/L	219.00	

Site ID : 000-530

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/24/2020	18	0.5	--	UG/L	210.00	
1,1-Dichloroethane	02/24/2020	0.29	0.5	--	UG/L	210.00	J
1,1-Dichloroethylene	02/24/2020	10	0.5	--	UG/L	210.00	
1,4-Dioxane	02/24/2020	6.74	0.2	--	UG/L	210.00	
524.2 TVOC	02/24/2020	31.05	--	--	UG/L	210.00	
Carbon tetrachloride	02/24/2020	0.18	0.5	--	UG/L	210.00	J
Chloroform	02/24/2020	0.33	0.5	--	UG/L	210.00	J
cis-1,2-Dichloroethylene	02/24/2020	0.16	0.5	--	UG/L	210.00	J
Methyl tert-butyl ether	02/24/2020	0.39	0.5	--	UG/L	210.00	J
Perfluorobutanesulfonate (PFBS)	02/24/2020	0.621	1.53	--	NG/L	210.00	J
Perfluorobutyric acid (PFBA)	02/24/2020	2.94	1.72	--	NG/L	210.00	
Perfluorohexanesulfonate (PFHxS)	02/24/2020	5.16	1.56	--	NG/L	210.00	
Perfluorohexanoic acid (PFHxA)	02/24/2020	0.664	1.72	--	NG/L	210.00	J
Perfluorooctanesulfonate (PFOS)	02/24/2020	4.49	1.72	--	NG/L	210.00	
Perfluorooctanoic acid (PFOA)	02/24/2020	1.92	1.72	--	NG/L	210.00	
Trichloroethylene	02/24/2020	1.7	0.5	--	UG/L	210.00	

Site ID : 000-531

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/20/2020	2.6	0.5	--	UG/L	205.00	
1,1-Dichloroethylene	02/20/2020	2.2	0.5	--	UG/L	205.00	
1,4-Dioxane	02/20/2020	2.28	0.2	--	UG/L	205.00	
524.2 TVOC	02/20/2020	29.79	--	--	UG/L	205.00	

Table 5-3
OU III Industrial Park Monitoring Well Data
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Site ID : 000-531

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Carbon tetrachloride	02/20/2020	14	0.5	--	UG/L	205.00	
Chloroform	02/20/2020	2.2	0.5	--	UG/L	205.00	
Perfluorooctanesulfonate (PFOS)	02/20/2020	1.06	1.86	--	NG/L	205.00	J
Tetrachloroethylene	02/20/2020	0.89	0.5	--	UG/L	205.00	
Trichloroethylene	02/20/2020	7.9	0.5	--	UG/L	205.00	

Site ID : 000-541

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	03/04/2020	2.8	0.5	--	UG/L	235.00	
1,1-Dichloroethane	03/04/2020	0.2	0.5	--	UG/L	235.00	J
1,1-Dichloroethylene	03/04/2020	1.8	0.5	--	UG/L	235.00	
1,4-Dioxane	03/04/2020	1.68	0.2	--	UG/L	235.00	
524.2 TVOC	03/04/2020	45.12	--	--	UG/L	235.00	
Carbon tetrachloride	03/04/2020	17	0.5	--	UG/L	235.00	
Chloroform	03/04/2020	4.6	0.5	--	UG/L	235.00	
cis-1,2-Dichloroethylene	03/04/2020	0.22	0.5	--	UG/L	235.00	J
Perfluorohexanesulfonate (PFHxS)	03/04/2020	1.36	1.59	--	NG/L	235.00	J
Tetrachloroethylene	03/04/2020	7.5	0.5	--	UG/L	235.00	
Trichloroethylene	03/04/2020	11	0.5	--	UG/L	235.00	

Site ID : 000-542

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/24/2020	0	--	--	UG/L	235.00	

Site ID : 000-543

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	03/02/2020	5.06	0.2	--	UG/L	230.00	
524.2 TVOC	03/02/2020	0	--	--	UG/L	230.00	
Perfluorobutyric acid (PFBA)	03/02/2020	1.44	1.76	--	NG/L	230.00	J
Perfluorohexanesulfonate (PFHxS)	03/02/2020	0.637	1.61	--	NG/L	230.00	J

Site ID : 000-544

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	03/04/2020	14	0.5	--	UG/L	230.00	
1,1-Dichloroethylene	03/04/2020	8.4	0.5	--	UG/L	230.00	
524.2 TVOC	03/04/2020	31.27	--	--	UG/L	230.00	
Carbon tetrachloride	03/04/2020	5.9	0.5	--	UG/L	230.00	

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OU III Industrial Park Monitoring Well Data
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Site ID : 000-544

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Chloroform	03/04/2020	0.78	0.5	--	UG/L	230.00	
cis-1,2-Dichloroethylene	03/04/2020	0.39	0.5	--	UG/L	230.00	J
Trichloroethylene	03/04/2020	1.8	0.5	--	UG/L	230.00	

Site ID : 000-548

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	03/02/2020	11	0.5	--	UG/L	235.00	
1,1-Dichloroethylene	03/02/2020	5.2	0.5	--	UG/L	235.00	
1,4-Dioxane	03/02/2020	1.35	0.2	--	UG/L	235.00	
524.2 TVOC	03/02/2020	28.99	--	--	UG/L	235.00	
Carbon tetrachloride	03/02/2020	2.6	0.5	--	UG/L	235.00	
Chloroform	03/02/2020	0.57	0.5	--	UG/L	235.00	
cis-1,2-Dichloroethylene	03/02/2020	0.26	0.5	--	UG/L	235.00	J
Perfluorobutanesulfonate (PFBS)	03/02/2020	0.804	1.56	--	NG/L	235.00	J
Perfluorobutyric acid (PFBA)	03/02/2020	4.32	1.75	--	NG/L	235.00	
Perfluoroheptanoic acid (PFHpA)	03/02/2020	0.681	1.75	--	NG/L	235.00	J
Perfluorohexanesulfonate (PFHxS)	03/02/2020	7.41	1.59	--	NG/L	235.00	
Perfluorohexanoic acid (PFHxA)	03/02/2020	1.6	1.75	--	NG/L	235.00	J
Perfluorooctanesulfonate (PFOS)	03/02/2020	9.16	1.75	--	NG/L	235.00	
Perfluorooctanoic acid (PFOA)	03/02/2020	3.46	1.75	--	NG/L	235.00	
Perfluoropentanesulfonate (PFPeS)	03/02/2020	0.739	1.64	--	NG/L	235.00	J
Perfluoropentanoic acid (PFPeA)	03/02/2020	1.09	1.75	--	NG/L	235.00	J
Tetrachloroethylene	03/02/2020	0.46	0.5	--	UG/L	235.00	J
Trichloroethylene	03/02/2020	8.9	0.5	--	UG/L	235.00	

Site ID : 127-08

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/20/2020	0.95	0.5	--	UG/L	240.00	
1,1-Dichloroethylene	02/20/2020	0.51	0.5	--	UG/L	240.00	
1,4-Dioxane	02/20/2020	0.178	0.2	--	UG/L	240.00	J
524.2 TVOC	02/20/2020	31.96	--	--	UG/L	240.00	
Carbon tetrachloride	02/20/2020	6.2	0.5	--	UG/L	240.00	
Chloroform	02/20/2020	1.1	0.5	--	UG/L	240.00	
Tetrachloroethylene	02/20/2020	21	0.5	--	UG/L	240.00	
Trichloroethylene	02/20/2020	2.2	0.5	--	UG/L	240.00	

Table 5-3
OU III Industrial Park Monitoring Well Data
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Site ID : 127-09

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/19/2020	2.93	--	--	UG/L	225.00	
Chloroform	02/19/2020	0.93	0.5	--	UG/L	225.00	
Tetrachloroethylene	02/19/2020	2	0.5	--	UG/L	225.00	

Table 5-4
OU III Industrial Park Extraction Well Data
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Site ID : 000-532 (EW-8)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/07/2020	0.6	0.5	--	UG/L	253.00	
1,1-Dichloroethane	01/07/2020	0.18	0.5	--	UG/L	253.00	J
1,1-Dichloroethylene	01/07/2020	0.24	0.5	--	UG/L	253.00	J
524.2 TVOC	01/07/2020	1.31	--	--	UG/L	253.00	
Tetrachloroethylene	01/07/2020	0.29	0.5	--	UG/L	253.00	J
1,4-Dioxane	01/23/2020	2.72	0.2	--	UG/L	0.00	
Perfluorobutyric acid (PFBA)	01/23/2020	3.69	1.8	--	NG/L	0.00	
Perfluorohexanesulfonate (PFHxS)	01/23/2020	1.32	1.64	--	NG/L	0.00	J
Perfluorooctanesulfonate (PFOS)	01/23/2020	0.886	1.8	--	NG/L	0.00	J

Site ID : 000-533 (EW-9)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/07/2020	0.89	0.5	--	UG/L	243.00	
1,1-Dichloroethane	01/07/2020	0.9	0.5	--	UG/L	243.00	
1,1-Dichloroethylene	01/07/2020	1.1	0.5	--	UG/L	243.00	
524.2 TVOC	01/07/2020	3.16	--	--	UG/L	243.00	
Methyl tert-butyl ether	01/07/2020	0.27	0.5	--	UG/L	243.00	J
1,4-Dioxane	01/23/2020	4.28	0.2	--	UG/L	0.00	
Perfluorobutyric acid (PFBA)	01/23/2020	2.05	1.77	--	NG/L	0.00	
Perfluorohexanesulfonate (PFHxS)	01/23/2020	4.96	1.61	--	NG/L	0.00	
Perfluorooctanesulfonate (PFOS)	01/23/2020	3.26	1.77	--	NG/L	0.00	
Perfluorooctanoic acid (PFOA)	01/23/2020	1.92	1.77	--	NG/L	0.00	

Table 5-5
OU III Industrial Park Influent Data
'Hits Only' January through March 2020

Site ID : 000-231 (UVB-1 Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	01/23/2020	0.555	0.2	--	UG/L	0.00	
524.2 TVOC	01/23/2020	0	--	--	UG/L	230.00	
Perfluorobutyric acid (PFBA)	01/23/2020	2.92	1.85	--	NG/L	0.00	
Perfluoroheptanoic acid (PFHpA)	01/23/2020	0.799	1.85	--	NG/L	0.00	J
Perfluorohexanoic acid (PFHxA)	01/23/2020	1.36	1.85	--	NG/L	0.00	J
Perfluorooctanesulfonate (PFOS)	01/23/2020	1.35	1.85	--	NG/L	0.00	J
Perfluorooctanoic acid (PFOA)	01/23/2020	2.36	1.85	--	NG/L	0.00	
Perfluoropentanoic acid (PFPeA)	01/23/2020	1.41	1.85	--	NG/L	0.00	J

Site ID : 000-233 (UVB-2 Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/23/2020	33.2	--	--	UG/L	205.00	
Perfluorobutyric acid (PFBA)	01/23/2020	1.3	1.82	--	NG/L	0.00	J
Perfluorohexanesulfonate (PFHxS)	01/23/2020	0.724	1.66	--	NG/L	0.00	J
Perfluorooctanoic acid (PFOA)	01/23/2020	1.05	1.82	--	NG/L	0.00	J
Tetrachloroethylene	01/23/2020	0.2	0.5	--	UG/L	205.00	J
Toluene	01/23/2020	33	0.5	--	UG/L	205.00	

Site ID : 000-235 (UVB-3 Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	01/23/2020	0.183	0.2	--	UG/L	0.00	J
524.2 TVOC	01/23/2020	0	--	--	UG/L	204.00	
Perfluorobutyric acid (PFBA)	01/23/2020	4.15	1.86	--	NG/L	0.00	
Perfluorohexanesulfonate (PFHxS)	01/23/2020	4.62	1.69	--	NG/L	0.00	
Perfluorooctanesulfonate (PFOS)	01/23/2020	4.6	1.86	--	NG/L	0.00	
Perfluorooctanoic acid (PFOA)	01/23/2020	2.62	1.86	--	NG/L	0.00	

Site ID : 000-237 (UVB-4 Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/23/2020	0.27	0.5	--	UG/L	180.00	J
1,1-Dichloroethylene	01/23/2020	0.23	0.5	--	UG/L	180.00	J
1,4-Dioxane	01/23/2020	0.775	0.2	--	UG/L	0.00	
524.2 TVOC	01/23/2020	1.09	--	--	UG/L	180.00	
Perfluorobutanesulfonate (PFBS)	01/23/2020	1.13	1.62	--	NG/L	0.00	J
Perfluorobutyric acid (PFBA)	01/23/2020	2.25	1.82	--	NG/L	0.00	
Perfluoroheptanoic acid (PFHpA)	01/23/2020	0.651	1.82	--	NG/L	0.00	J

Table 5-5
OU III Industrial Park Influent Data
'Hits Only' January through March 2020

Site ID : 000-237 (UVB-4 Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorohexanesulfonate (PFHxS)	01/23/2020	8.25	1.66	--	NG/L	0.00	
Perfluorohexanoic acid (PFHxA)	01/23/2020	0.968	1.82	--	NG/L	0.00	J
Perfluorooctanesulfonate (PFOS)	01/23/2020	18.1	1.82	--	NG/L	0.00	
Perfluorooctanoic acid (PFOA)	01/23/2020	4.35	1.82	--	NG/L	0.00	
Perfluoropentanesulfonate (PFPeS)	01/23/2020	0.772	1.71	--	NG/L	0.00	J
Tetrachloroethylene	01/23/2020	0.59	0.5	--	UG/L	180.00	

Site ID : 000-239 (UVB-5 Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/23/2020	1.1	0.5	--	UG/L	190.00	
1,1-Dichloroethylene	01/23/2020	0.54	0.5	--	UG/L	190.00	
1,4-Dioxane	01/23/2020	1.55	0.2	--	UG/L	0.00	
524.2 TVOC	01/23/2020	11.86	--	--	UG/L	190.00	
Carbon tetrachloride	01/23/2020	3.8	0.5	--	UG/L	190.00	
Chloroform	01/23/2020	0.67	0.5	--	UG/L	190.00	
cis-1,2-Dichloroethylene	01/23/2020	0.45	0.5	--	UG/L	190.00	J
Perfluorobutanesulfonate (PFBS)	01/23/2020	0.708	1.62	--	NG/L	0.00	J
Perfluorobutyric acid (PFBA)	01/23/2020	0.708	1.82	--	NG/L	0.00	J
Perfluorohexanesulfonate (PFHxS)	01/23/2020	5.71	1.66	--	NG/L	0.00	
Perfluorooctanesulfonate (PFOS)	01/23/2020	2.48	1.82	--	NG/L	0.00	
Perfluorooctanoic acid (PFOA)	01/23/2020	1.16	1.82	--	NG/L	0.00	J
Perfluoropentanesulfonate (PFPeS)	01/23/2020	0.724	1.71	--	NG/L	0.00	J
Tetrachloroethylene	01/23/2020	1.5	0.5	--	UG/L	190.00	
Trichloroethylene	01/23/2020	3.8	0.5	--	UG/L	190.00	

Site ID : 000-241 (UVB-6 Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	01/23/2020	0.78	0.2	--	UG/L	0.00	
524.2 TVOC	01/23/2020	0	--	--	UG/L	200.00	
Perfluorobutanesulfonate (PFBS)	01/23/2020	0.729	1.64	--	NG/L	0.00	J
Perfluorobutyric acid (PFBA)	01/23/2020	1.78	1.84	--	NG/L	0.00	J
Perfluorohexanesulfonate (PFHxS)	01/23/2020	4.56	1.68	--	NG/L	0.00	
Perfluorohexanoic acid (PFHxA)	01/23/2020	0.628	1.84	--	NG/L	0.00	J
Perfluorooctanesulfonate (PFOS)	01/23/2020	6.3	1.84	--	NG/L	0.00	
Perfluorooctanoic acid (PFOA)	01/23/2020	2.61	1.84	--	NG/L	0.00	

Table 5-5
OU III Industrial Park Influent Data
'Hits Only' January through March 2020

Site ID : 000-243 (UVB-7 Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	01/23/2020	0.658	0.2	--	UG/L	0.00	
524.2 TVOC	01/23/2020	0	--	--	UG/L	215.00	
Perfluorobutanesulfonate (PFBS)	01/23/2020	1.54	1.63	--	NG/L	0.00	J
Perfluorobutyric acid (PFBA)	01/23/2020	4.5	1.83	--	NG/L	0.00	
Perfluorohexanesulfonate (PFHxS)	01/23/2020	7.85	1.67	--	NG/L	0.00	
Perfluorohexanoic acid (PFHxA)	01/23/2020	1.07	1.83	--	NG/L	0.00	J
Perfluorooctanesulfonate (PFOS)	01/23/2020	6.18	1.83	--	NG/L	0.00	
Perfluorooctanoic acid (PFOA)	01/23/2020	2.44	1.83	--	NG/L	0.00	
Perfluoropentanesulfonate (PFPeS)	01/23/2020	1.58	1.72	--	NG/L	0.00	J

Site ID : 000-534 (Influent for EW-8 and EW-9)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	01/23/2020	3.81	0.2	--	UG/L	0.00	
Perfluorobutyric acid (PFBA)	01/23/2020	2.74	1.81	--	NG/L	0.00	
Perfluorohexanesulfonate (PFHxS)	01/23/2020	3.11	1.65	--	NG/L	0.00	
Perfluorooctanesulfonate (PFOS)	01/23/2020	2.13	1.81	--	NG/L	0.00	
Perfluorooctanoic acid (PFOA)	01/23/2020	1.12	1.81	--	NG/L	0.00	J

Table 5-6
OU III Industrial Park Effluent Data
'Hits Only' January through March 2020

Site ID : 000-536 (Effluent for EW-8 and EW-9)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	01/23/2020	4.78	0.2	--	UG/L	0.00	
Perfluorobutyric acid (PFBA)	01/23/2020	7.56	1.81	--	NG/L	0.00	

Qualifiers :

J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Organic Compounds :

B = Compound was found in both the sample And associated laboratory blank.

Inorganic Compounds :

B = Result Is between instrument detection limit And contract required reporting limit.

Section 6

OU III Former Carbon Tetrachloride Pump & Treat System (System Closed)

The Draft Petition for Closure for the OU III Carbon Tetrachloride Groundwater Removal Action was submitted to the regulators for review in August 2009. Following the incorporation of EPA comments, in October 2009 the Final Petition for Closure for the OU III Carbon Tetrachloride Groundwater Removal Action was issued to the regulators. EPA and NYSDEC provided approval in October 2009. Since that time, activities have been concluded with decommissioning and dismantling of the Carbon Tetrachloride treatment system. A decommissioning report was submitted to the regulators in March 2011.

Section 7
Q1-2020 Operations Summary
OU III Building 96 Pump and Treat System

Process: Three (3) re-circulation wells each connected to an individual shallow tray air-stripping unit and one (1) well with a shallow tray air-stripping unit, with discharge to a drainage culvert and Recharge Basin HS.

Goal: Remediation of the volatile organic compounds (VOCs) in the source area and reach Maximum Contaminant Levels (MCLs) in core monitoring wells within 30 years for the Upper Glacial aquifer (by 2030).

Start Date: January 2001

Table 7-1
OU III Building 96
Pumping Rates (gpm)

Recirculation Treatment Well	RTW-1	RTW-2	RTW-3	RTW-4
Site Id #	095-151	095-153	095-155	095-157
Screen Interval (feet bls)	48-58	48-58	48-58	48-58
Desired Flow Rate (gpm)	60	30	0	0
January	54	31	0	0
February	56	33	0	0
March	58	32	0	0
Actual (Avg. over Qtr.)	**56**	**32**	**0**	**0**

Note: RTW-1 was restarted in 2008 with discharge to Basin HS. RTW-2 and RTW-3 were placed in standby mode in January 2016. RTW-4 was placed in stand-by mode in 2012. RTW-2 was restarted in November 2018. In June 2019, RTW-1 pumping rate was increased from 30 gpm to 60 gpm.

Figure 7-1
OU III Building 96
Cumulative Mass Removal of VOC's vs. Time

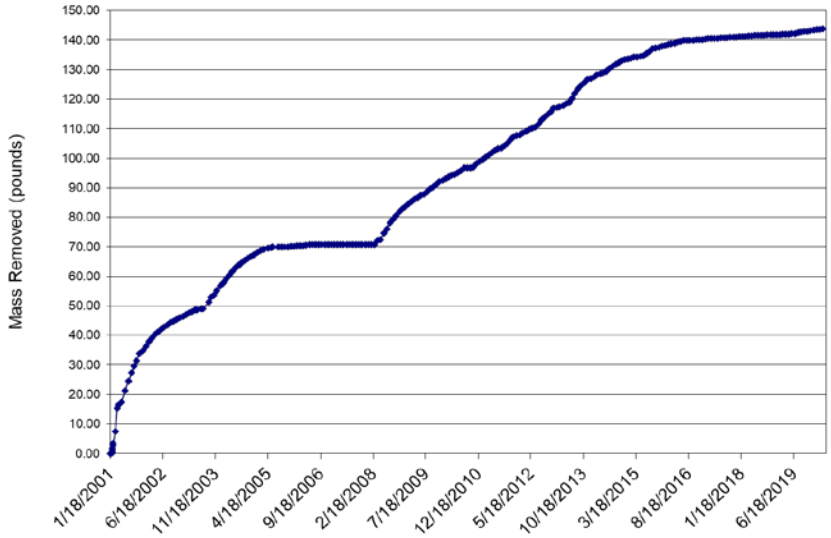


Figure 7-2
OU III Building 96
Influent TVOC Concentrations vs. Time

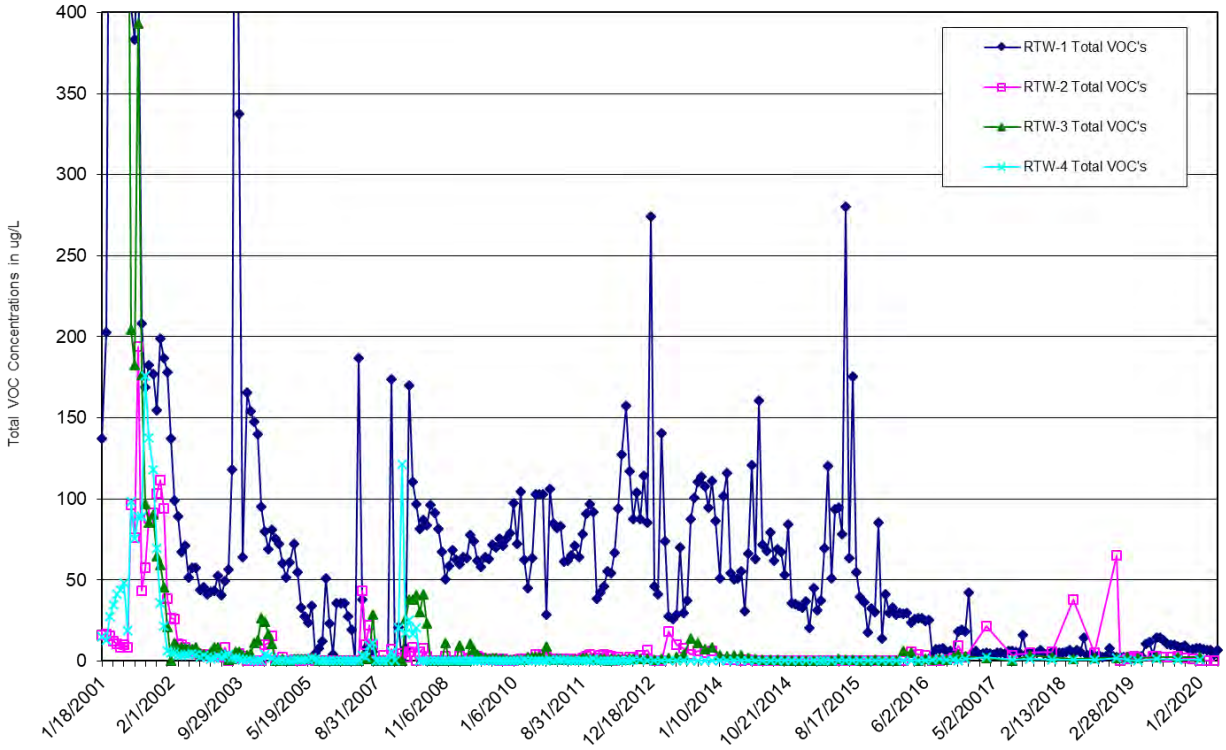


Table 7-2
Effluent Water Quality for RTW-1
SPDES Equivalency Permit Concentrations January 1, 2020– March 31, 2020

Parameter	Permit Limit	Max. Measured Value	Units	Frequency*
Flow	**40**	**58**	**GPM**	**Continuous**
pH (range)	**5.0 - 8.5**	**6.1 – 7.7**	**SU**	**Weekly**
Tetrachloroethylene	**5.0**	**<0.5**	**ug/L**	**Monthly**
1,1,1-Trichloroethane	**5.0**	**<0.5**	**ug/L**	**Monthly**
Thallium	**Monitor**	**<2.0**	**ug/L**	**Monthly**
Trichlorofluoromethane	**5.0**	**<0.5**	**ug/L**	**Monthly**
Methyl Bromide	**5.0**	**<0.5**	**ug/L**	**Monthly**
Methyl Chloride	**5.0**	**<0.5**	**ug/L**	**Monthly**
Methylene Chloride	**5.0**	**<0.5**	**ug/L**	**Monthly**

ND = Not detected.
* The required effluent sampling frequency is monthly following a period of 24 consecutive weekly with no exceedances. Weekly for pH.
Note: Starting in June 2019, the flow from Bldg. 96 RTW-1 was increased to 60 gallons per minute and the water is being treated at the Building 452 Freon-11 treatment system due to the larger capacity of that system. Beginning with the July Discharge Monitoring Report (DMR), the RTW-1 discharge is formally reported under the Freon-11 Equivalency Permit. The data are also provided here for informational purposes.

System Operations

January 2020:

The system operated normally for the month. The system treated approximately 3.6 million gallons of water.

February 2020:

The system operated normally for the month. The system treated approximately 3.8 million

gallons of water.

March 2020:

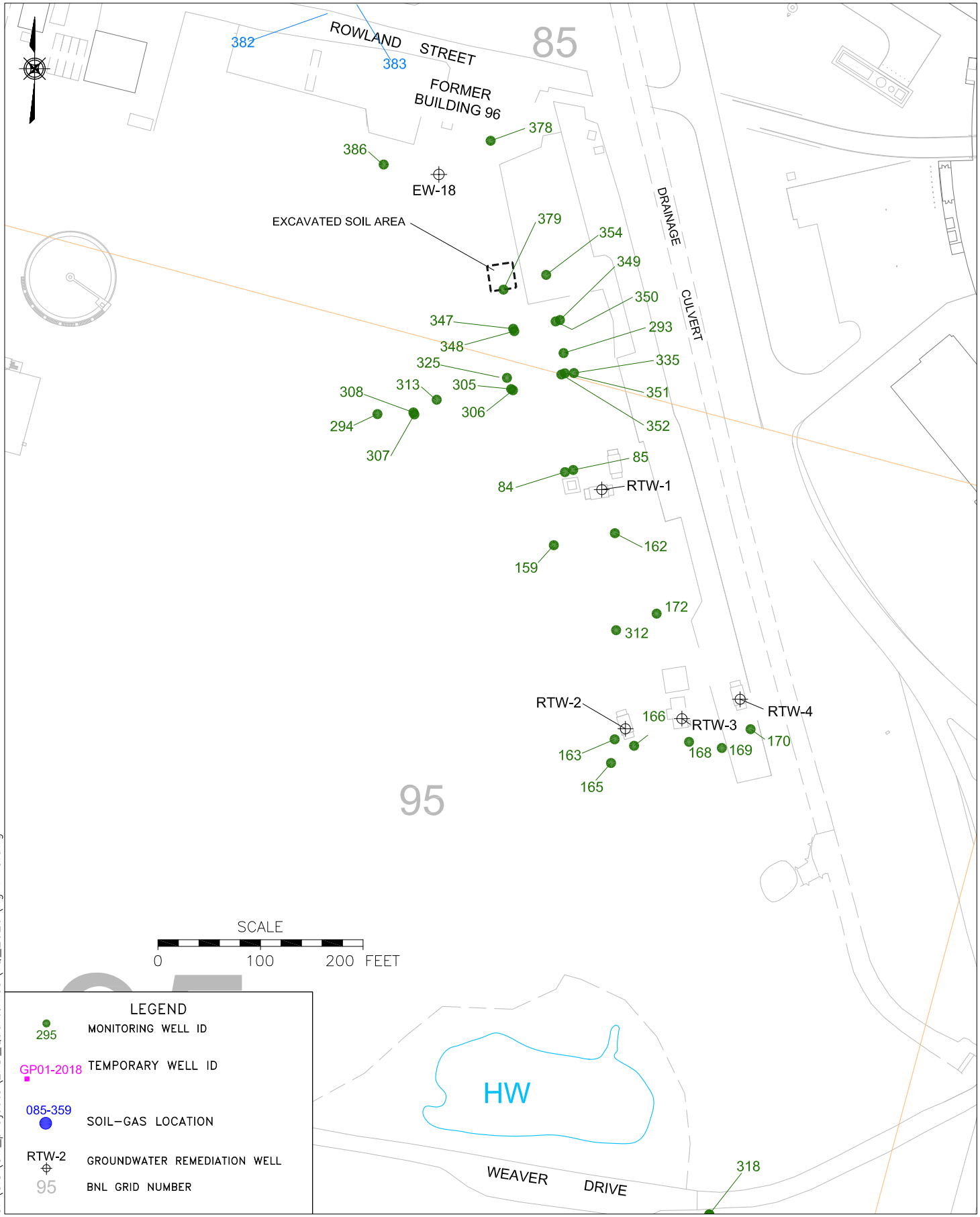
The system operated normally for the month. The system treated approximately 3.8 million gallons of water.

The system treated approximately 11.2 million gallons of water during the first quarter of 2020.

During the first quarter of 2020, the highest PCE concentration in the Building 96 monitoring wells was 91 µg/L in well 085-379. The maximum PCE detection in extraction well RTW-1 in the first quarter was 6.7 µg/L. Trichlorofluoromethane (Freon-11) was detected at 0.6 µg/L in RTW-1.

Planned Operational Changes

- Maintain full time operation of treatment well RTW-1. Monitor VOC concentrations in wells 085-379 and 095-159 to determine when this well can be shut down. Maintain a monthly sampling frequency of the influent and effluent.
- Place treatment well RTW-2 back in standby mode in June 2020 based on TVOC concentrations remaining below 5 µg/L since November 2018.
- Maintain a monthly monitoring frequency for well 095-159 to verify the westward expansion of the RTW-1 capture zone.
- Add former Building 452 Freon-11 monitoring well 085-386 to the Building 96 monitoring program. It will serve as a background well between the two source areas.
- Maintain treatment wells RTW-3 and RTW-4 in standby mode, and restart the wells if extraction or monitoring well data indicate that TVOC concentrations exceed 50 µg/L. During the first quarter of 2020, the maximum TVOC concentration was 3 µg/L in monitoring well 095-312. This well is located between extraction well RTW-1 and RTW-2. Neither RTW-3 or RTW-4 exceeded a TVOC concentration of 50 µg/L.



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BROOKHAVEN NATIONAL LABORATORY
ENVIRONMENTAL PROTECTION DIVISION

TITLE:

OU III BUILDING 96 MONITORING WELL NETWORK

SITEWIDE REMEDIATION SYSTEMS
FIRST QUARTER 2020 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
AJZ	–	06/15/18	–
CHKD:	APPD:	REV.:	NOTES:
LDS	––	07/07/20	–

FIGURE NO.: 7-3

Table 7-3
OU III Building 96 Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 085-293

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/17/2020	1.2	--	--	UG/L	50.00	
Chloroform	01/17/2020	1.2	0.5	--	UG/L	50.00	

Site ID : 085-335

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/17/2020	18.49	--	--	UG/L	35.00	
Bromodichloromethane	01/17/2020	0.57	0.5	--	UG/L	35.00	
Chloroform	01/17/2020	1.6	0.5	--	UG/L	35.00	
Dibromochloromethane	01/17/2020	0.32	0.5	--	UG/L	35.00	J
Tetrachloroethylene	01/17/2020	16	0.5	--	UG/L	35.00	

Site ID : 085-348

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,2-Trichloroethane	01/22/2020	0.27	0.5	--	UG/L	34.50	J
524.2 TVOC	01/22/2020	25.27	--	--	UG/L	34.50	
Tetrachloroethylene	01/22/2020	25	0.5	--	UG/L	34.50	

Site ID : 085-349

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/17/2020	2.6	--	--	UG/L	23.34	
Tetrachloroethylene	01/17/2020	2.6	0.5	--	UG/L	23.34	

Site ID : 085-350

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/17/2020	4.28	--	--	UG/L	34.50	
Chloroform	01/17/2020	0.38	0.5	--	UG/L	34.50	J
Tetrachloroethylene	01/17/2020	3.9	0.5	--	UG/L	34.50	

Site ID : 085-351

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/17/2020	3.3	--	--	UG/L	23.44	
Tetrachloroethylene	01/17/2020	3.3	0.5	--	UG/L	23.44	

Site ID : 085-352

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/17/2020	17.68	--	--	UG/L	34.50	
Chloroform	01/17/2020	0.68	0.5	--	UG/L	34.50	
Tetrachloroethylene	01/17/2020	17	0.5	--	UG/L	34.50	

Site ID : 085-354

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/23/2020	5.2	--	--	UG/L	22.50	

Table 7-3
OU III Building 96 Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 085-354

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tetrachloroethylene	01/23/2020	5.2	0.5	--	UG/L	22.50	

Site ID : 085-379

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/23/2020	91.6	--	--	UG/L	20.81	
Tetrachloroethylene	01/23/2020	91	5	--	UG/L	20.81	

Site ID : 095-159

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/14/2020	0.29	0.5	--	UG/L	50.00	J
524.2 TVOC	01/14/2020	19.63	--	--	UG/L	50.00	
Tetrachloroethylene	01/14/2020	19	0.5	--	UG/L	50.00	
Trichlorofluoromethane	01/14/2020	0.34	0.5	--	UG/L	50.00	J
1,1,1-Trichloroethane	02/11/2020	0.36	0.5	--	UG/L	50.00	J
524.2 TVOC	02/11/2020	13.56	--	--	UG/L	50.00	
Tetrachloroethylene	02/11/2020	13	0.5	--	UG/L	50.00	
Trichlorofluoromethane	02/11/2020	0.2	0.5	--	UG/L	50.00	J
1,1,1-Trichloroethane	03/04/2020	0.57	0.5	--	UG/L	50.00	
1,1-Dichloroethylene	03/04/2020	0.14	0.5	--	UG/L	50.00	J
524.2 TVOC	03/04/2020	15.2	--	--	UG/L	50.00	
Tetrachloroethylene	03/04/2020	14	0.5	--	UG/L	50.00	
Trichloroethylene	03/04/2020	0.31	0.5	--	UG/L	50.00	J
Trichlorofluoromethane	03/04/2020	0.18	0.5	--	UG/L	50.00	J

Site ID : 095-162

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/14/2020	0	--	--	UG/L	50.00	

Site ID : 095-163

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/15/2020	0	--	--	UG/L	50.00	

Site ID : 095-165

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/15/2020	0	--	--	UG/L	50.00	

Site ID : 095-166

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/15/2020	0	--	--	UG/L	50.00	

Table 7-3
OU III Building 96 Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 095-168

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/15/2020	0	--	--	UG/L	50.00	

Site ID : 095-169

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/14/2020	1.83	--	--	UG/L	50.00	
Chloroform	01/14/2020	1.6	0.5	--	UG/L	50.00	
Tetrachloroethylene	01/14/2020	0.23	0.5	--	UG/L	50.00	J

Site ID : 095-170

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/15/2020	2.12	--	--	UG/L	50.00	
Bromodichloromethane	01/15/2020	0.42	0.5	--	UG/L	50.00	J
Chloroform	01/15/2020	1.7	0.5	--	UG/L	50.00	

Site ID : 095-171

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorobutanesulfonate (PFBS)	02/21/2020	0.819	1.52	--	NG/L	50.00	J
Perfluorobutyric acid (PFBA)	02/21/2020	4.29	1.71	--	NG/L	50.00	
Perfluoroheptanoic acid (PFHpA)	02/21/2020	1.23	1.71	--	NG/L	50.00	J
Perfluorohexanesulfonate (PFHxS)	02/21/2020	2.51	1.56	--	NG/L	50.00	
Perfluorohexanoic acid (PFHxA)	02/21/2020	2.01	1.71	--	NG/L	50.00	
Perfluorononanoic acid (PFNA)	02/21/2020	1.02	1.71	--	NG/L	50.00	J
Perfluorooctanesulfonate (PFOS)	02/21/2020	16.4	1.71	--	NG/L	50.00	
Perfluorooctanoic acid (PFOA)	02/21/2020	3.02	1.71	--	NG/L	50.00	
Perfluoropentanoic acid (PFPeA)	02/21/2020	1.9	1.71	--	NG/L	50.00	

Site ID : 095-172

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/23/2020	2.1	--	--	UG/L	50.00	
Chloroform	01/23/2020	2.1	0.5	--	UG/L	50.00	

Site ID : 095-305

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/22/2020	3.7	--	--	UG/L	22.50	
Tetrachloroethylene	01/22/2020	3.7	0.5	--	UG/L	22.50	

Site ID : 095-306

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/22/2020	23	--	--	UG/L	34.50	

Table 7-3
OU III Building 96 Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 095-306

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tetrachloroethylene	01/22/2020	23	0.5	--	UG/L	34.50	

Site ID : 095-312

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/23/2020	2.5	--	--	UG/L	50.00	
Tetrachloroethylene	01/23/2020	2.5	0.5	--	UG/L	50.00	

Site ID : 095-313

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorobutanesulfonate (PFBS)	03/02/2020	0.622	1.6	--	NG/L	52.50	J
Perfluorobutyric acid (PFBA)	03/02/2020	4.04	1.8	--	NG/L	52.50	
Perfluorohexanesulfonate (PFHxS)	03/02/2020	1.95	1.63	--	NG/L	52.50	
Perfluorooctanesulfonate (PFOS)	03/02/2020	1.1	1.8	--	NG/L	52.50	J
Perfluorooctanoic acid (PFOA)	03/02/2020	0.74	1.8	--	NG/L	52.50	J

Site ID : 095-318

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/23/2020	4.07	--	--	UG/L	65.00	
Chloroform	01/23/2020	0.37	0.5	--	UG/L	65.00	J
Tetrachloroethylene	01/23/2020	3.7	0.5	--	UG/L	65.00	

Site ID : 095-325

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/22/2020	22.15	--	--	UG/L	45.00	
cis-1,2-Dichloroethylene	01/22/2020	0.15	0.5	--	UG/L	45.00	J
Tetrachloroethylene	01/22/2020	22	0.5	--	UG/L	45.00	

Site ID : 095-84

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/14/2020	11	--	--	UG/L	25.00	
Tetrachloroethylene	01/14/2020	11	0.5	--	UG/L	25.00	

Site ID : 095-85

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/14/2020	0	--	--	UG/L	95.00	

Table 7-5
OU III Building 96 Influent Data
'Hits Only' January through March 2020

Site ID : 095-151 (RTW-1 Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/02/2020	8	--	--	UG/L	0.00	
Chloroform	01/02/2020	0.67	0.5	--	UG/L	0.00	
Tetrachloroethylene	01/02/2020	6.7	0.5	--	UG/L	0.00	
Trichlorofluoromethane	01/02/2020	0.63	0.5	--	UG/L	0.00	
524.2 TVOC	01/14/2020	7.39	--	--	UG/L	0.00	
Chloroform	01/14/2020	0.64	0.5	--	UG/L	0.00	
Tetrachloroethylene	01/14/2020	6.2	0.5	--	UG/L	0.00	
Trichlorofluoromethane	01/14/2020	0.55	0.5	--	UG/L	0.00	
524.2 TVOC	02/04/2020	6.93	--	--	UG/L	0.00	
Chloroform	02/04/2020	0.71	0.5	--	UG/L	0.00	
Tetrachloroethylene	02/04/2020	5.7	0.5	--	UG/L	0.00	
Trichlorofluoromethane	02/04/2020	0.52	0.5	--	UG/L	0.00	
524.2 TVOC	02/19/2020	6.92	--	--	UG/L	0.00	
Chloroform	02/19/2020	0.73	0.5	--	UG/L	0.00	
Tetrachloroethylene	02/19/2020	5.8	0.5	--	UG/L	0.00	
Trichlorofluoromethane	02/19/2020	0.39	0.5	--	UG/L	0.00	J
524.2 TVOC	03/03/2020	4.03	--	--	UG/L	0.00	
Chloroform	03/03/2020	0.45	0.5	--	UG/L	0.00	J
Tetrachloroethylene	03/03/2020	3.3	0.5	--	UG/L	0.00	
Trichlorofluoromethane	03/03/2020	0.28	0.5	--	UG/L	0.00	J
524.2 TVOC	03/17/2020	6.6	--	--	UG/L	0.00	
Chloroform	03/17/2020	0.74	0.5	--	UG/L	0.00	
Tetrachloroethylene	03/17/2020	5.4	0.5	--	UG/L	0.00	
Trichlorofluoromethane	03/17/2020	0.46	0.5	--	UG/L	0.00	J

Site ID : 095-153 (RTW-2 Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/02/2020	0	--	--	UG/L	0.00	
524.2 TVOC	02/04/2020	0	--	--	UG/L	0.00	
524.2 TVOC	03/03/2020	0.5	--	--	UG/L	0.00	
Chloroform	03/03/2020	0.3	0.5	--	UG/L	0.00	J
Tetrachloroethylene	03/03/2020	0.2	0.5	--	UG/L	0.00	J

Site ID : 095-155 (RTW-3 Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/02/2020	2.2	--	--	UG/L	0.00	

Table 7-5
OU III Building 96 Influent Data
'Hits Only' January through March 2020

Site ID : 095-155 (RTW-3 Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Chloroform	01/02/2020	1.3	0.5	--	UG/L	0.00	
Methyl chloride	01/02/2020	0.36	0.5	--	UG/L	0.00	J
Tetrachloroethylene	01/02/2020	0.54	0.5	--	UG/L	0.00	

Site ID : 095-157 (RTW-4 Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/02/2020	0.57	--	--	UG/L	0.00	
Chloroform	01/02/2020	0.57	0.5	--	UG/L	0.00	

Table 7-6
OU III Building 96 Effluent Data
'Hits Only' January through March 2020

Site ID : 095-152 (RTW-1 Effluent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/02/2020	0	--	--	UG/L	0.00	
524.2 TVOC	01/14/2020	0	--	--	UG/L	0.00	
524.2 TVOC	02/04/2020	0	--	--	UG/L	0.00	
524.2 TVOC	02/19/2020	0	--	--	UG/L	0.00	
524.2 TVOC	03/03/2020	0	--	--	UG/L	0.00	
524.2 TVOC	03/17/2020	0	--	--	UG/L	0.00	

Site ID : 095-154 (RTW-2 Effluent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/02/2020	0	--	--	UG/L	0.00	
524.2 TVOC	02/04/2020	0	--	--	UG/L	0.00	
524.2 TVOC	03/03/2020	0	--	--	UG/L	0.00	

Qualifiers :

J = Estimated value.

D = Compound was identified in an analysis at a secondary dilution factor.

Organic Compounds :

B = Compound was found in both the sample And associated laboratory blank.

Inorganic Compounds :

B = Result Is between instrument detection limit And contract required reporting limit.

Section 8

OU IV Former Air Sparge/Soil Vapor Extraction System (System Closed)

A petition was submitted in June 2002 for closure of this project. The EPA and DEC provided their approval for system closure in July 2003. The system was decommissioned in the fall of 2003. Per the *2010 Groundwater Status Report*, groundwater monitoring related to the OU I Air Sparge/Soil Vapor Extraction System is concluded.

Section 9

Q1-2020 Operations Summary
OU VI Ethylene Dibromide Pump & Treat System

Process: Groundwater extraction and liquid phase granular activated carbon treatment, with discharge to injection wells.

Goal: Reach the ethylene dibromide Maximum Contaminant Level (MCL) in core monitoring wells within 30 years for the Upper Glacial aquifer (by 2030).

Start Date: October 2004

Table 9-1
OU VI Ethylene Dibromide Pump and Treat System
Pumping Rates (gpm)

Extraction Well	EW-1E	EW-2E
Site Id #	000-503	000-504
Screened Interval (feet below grade)	115-135	115-135
Desired Flow Rate (GPM)	160	190
January	0	189
February	152	207
March	163	196
Actual (Avg. over Qtr.)	**105**	**197**

Figure 9-1
OU VI Cumulative Mass Removal of EDB vs. Time

Note: Due to the low concentrations of ethylene dibromide in the extraction wells, presentation of a mass removal graph is not appropriate.

Figure 9-2
OU VI Ethylene Dibromide
Influent EDB Concentration vs. Time

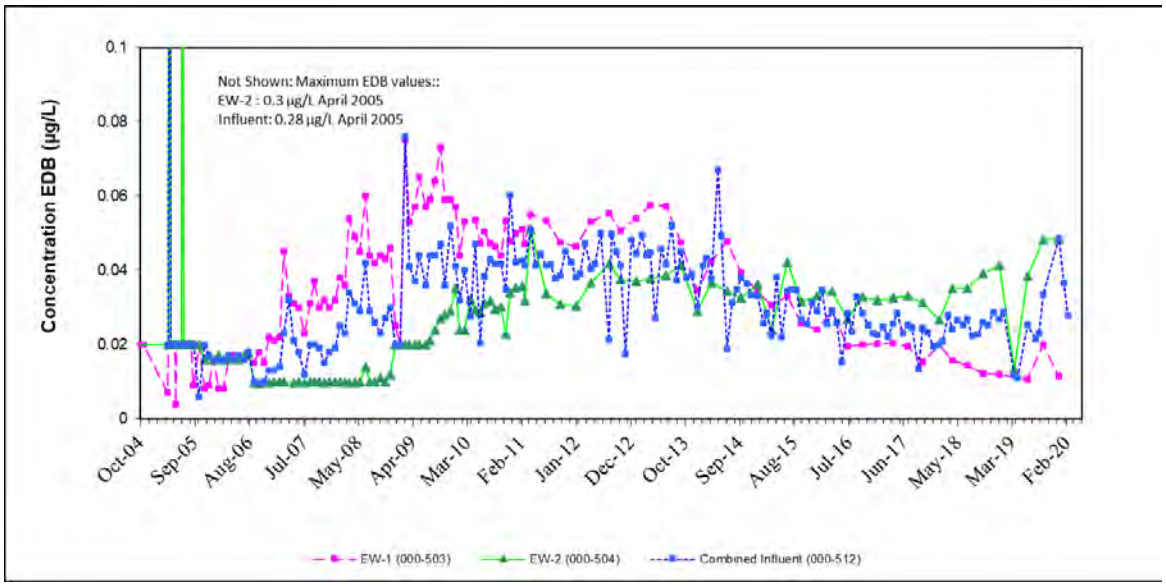


Table 9-2
OU VI Ethylene Dibromide Effluent Water Quality
SPDES Equivalency Permit Concentrations January 1, 2020 – March 31, 2020

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	450	359	GPM	Continuous
pH	5.0 - 8.5	5.2-6.3	SU	Weekly
Ethylene Dibromide	.03	<0.02	ug/L	Monthly**
Chloroform	7.0	<0.5	ug/L	Monthly**
1,1-Dichloroethene	5.0	<0.5	ug/L	Monthly**
1,1,1-Trichloroethane	5.0	<0.5	ug/L	Monthly**
Methyl Chloride	5.0	<0.5	ug/L	Monthly**
Methylene Chloride	5.0	<0.5	ug/L	Monthly**

***Minimum to maximum value for pH during this operational period.**
**** The minimum measurement frequency shall be monthly following a period of 24 consecutive weekly sampling events showing no exceedances of the stated discharge limitations.**

System Operations Summary

January 2020:

Well EW-1E was off for the month to replace the pump and motor. Well EW-2E operated normally for the month. The system treated approximately 8 million gallons of water.

February 2020:

The system operated normally for the month. The system treated approximately 15 million gallons of water.

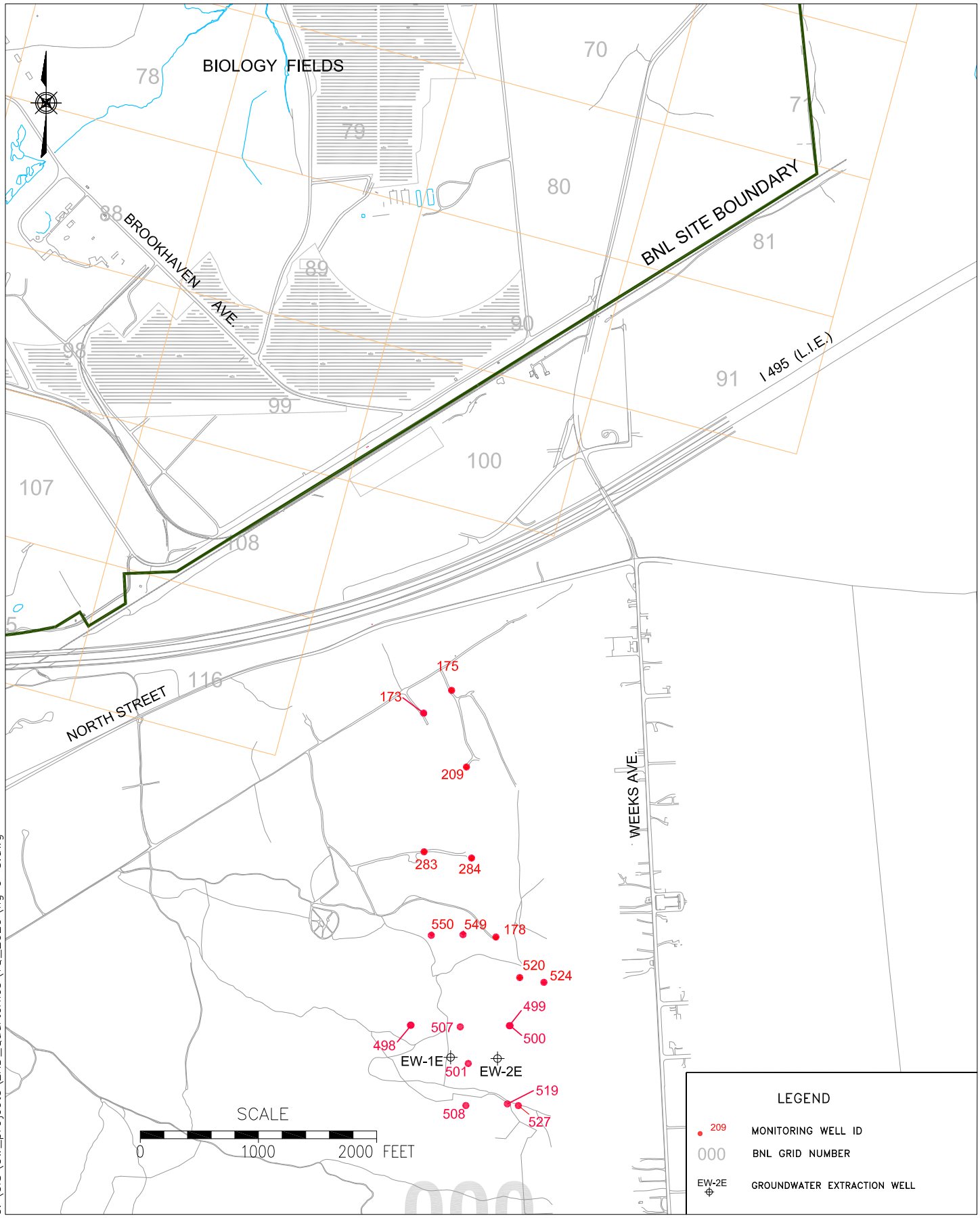
March 2020:

The system ran normally for the month. The system treated approximately 15 million gallons of water.

The system treated approximately 38 million gallons of water during the first quarter of 2020.

Planned Operational Changes

- Maintain full time operation of the treatment system and continue quarterly sampling of the extraction wells.
- The observed migration rate for EDB is significantly slower than originally predicted during treatment system design. Contaminant migration at the base of the Deep Upper Glacial aquifer and system capture of this deep contamination also requires a re-evaluation. Assess the groundwater model geologic framework for this area and if needed, collect additional data (soil borings/gamma logs) to address any data gaps. Perform a plume migration simulation utilizing any updated data. Based on this additional data and the recently characterized deep EDB identified in wells 000-549 and 000-550, the model will better determine if the existing treatment system will remediate the EDB plume to below the DWS by 2030, as required by the OU VI ROD. If needed, the model will be used to evaluate modifications which may include additional extraction wells and/or modifications to extraction well pumping rates.



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BROOKHAVEN NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION DIVISION

TITLE:

OU VI EDB

SITEWIDE REMEDIATION SYSTEMS
FIRST QUARTER 2020 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
JEB	–	09/26/05	–
CHKD:	APPD:	REV.:	NOTES:
LDS	--	07/07/20	–

FIGURE NO.: 9-3

Table 9-3
OU VI Ethylene Dibromide Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 000-500

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	03/12/2020	0.0913	0.0199	--	UG/L	135.00	

Site ID : 000-549

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	03/11/2020	0.374	0.0201	--	UG/L	145.00	

Site ID : 000-550

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	03/11/2020	0.0861	0.0202	--	UG/L	130.00	

Table 9-4
OU VI Ethylene Dibromide Extraction Well Data
'Hits Only' January through March 2020

Site ID : 000-503 (EW-1)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/14/2020	2.09	--	--	UG/L	0.00	
Chloroform	01/14/2020	1.6	0.5	--	UG/L	0.00	
EDB	01/14/2020	0.0115	0.0199	--	UG/L	0.00	J
Methyl tert-butyl ether	01/14/2020	0.49	0.5	--	UG/L	0.00	J
1,4-Dioxane	02/12/2020	0.151	0.2	--	UG/L	0.00	J
Perfluorohexanesulfonate (PFHxS)	02/12/2020	0.62	1.68	--	NG/L	0.00	J

Site ID : 000-504 (EW-2)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/07/2020	1.72	--	--	UG/L	0.00	
Chloroform	01/07/2020	1.72	0.5	--	UG/L	0.00	
EDB	01/07/2020	0.0484	0.0199	--	UG/L	0.00	
1,4-Dioxane	02/12/2020	0.128	0.2	--	UG/L	0.00	J

Table 9-5
OU VI Ethylene Dibromide Influent Data
'Hits Only' January through March 2020

Site ID : 000-512 (Combined Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/07/2020	1.81	--	--	UG/L	0.00	
Chloroform	01/07/2020	1.81	0.5	--	UG/L	0.00	
EDB	01/07/2020	0.0486	0.0199	--	UG/L	0.00	
524.2 TVOC	02/05/2020	1.55	--	--	UG/L	0.00	
Chloroform	02/05/2020	1.55	0.5	--	UG/L	0.00	
EDB	02/05/2020	0.0366	0.0202	--	UG/L	0.00	
1,4-Dioxane	02/12/2020	0.125	0.2	--	UG/L	0.00	J
524.2 TVOC	03/03/2020	1.19	--	--	UG/L	0.00	
Chloroform	03/03/2020	1.19	0.5	--	UG/L	0.00	
EDB	03/03/2020	0.0277	0.0197	--	UG/L	0.00	

Table 9-6
OU VI Ethylene Dibromide Effluent Data
'Hits Only' January through March 2020

Site ID : 000-510 (System Effluent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/07/2020	0.29	--	--	UG/L	0.00	
Chloroform	01/07/2020	0.29	0.5	--	UG/L	0.00	J
524.2 TVOC	02/05/2020	0	--	--	UG/L	0.00	
1,4-Dioxane	02/12/2020	0.169	0.2	--	UG/L	0.00	J
524.2 TVOC	03/03/2020	0	--	--	UG/L	0.00	

Qualifiers :

J = Estimated value.

D = Compound was identified in an analysis at a secondary dilution factor.

Organic Compounds :

B = Compound was found in both the sample And associated laboratory blank.

Inorganic Compounds :

B = Result Is between instrument detection limit And contract required reporting limit.

Section 10

Q-1 2020 Quarterly Operations Summary
OU III HFBR Tritium Pump and Recharge System
(System Closed)

Process: Pump and recharge (to the RAV basin) with monitored natural attenuation for tritium. Carbon filtration is also included in the pump and recharge system to remove VOCs that are also present in the groundwater.

Goal: Reach Maximum Contaminant Levels (MCLs) in core monitoring wells within 30 years for the Upper Glacial aquifer (by 2030). NYSDEC and EPA approved of the Petition for Closure in August 2018 and March 2019, respectively.

Start Date: May 1997

Table 10-1
OU III HFBR Pump and Recharge System
Pumping Rates (gpm)

Extraction Well	**EW-9**	**EW-10**	**EW-11**	**EW-16**
Site Id #	105-40	105-39	105-41	096-119
Screen Interval (ft bls)	130-150	130-150	130-150	80-120
Desired Flow Rate (gpm)	0 *	0 *	0 *	0 *
January (Avg monthly gpm)	0	0	0	0
February "	0	0	0	0
March "	0	0	0	0
Actual (Avg. over Qtr.)	**0**	**0**	**0**	**0**

* The system was approved for closure in March 2019.

Figure 10-1
OU III HFBR Pump & Treat System
Extraction Wells Tritium Concentrations vs. Time

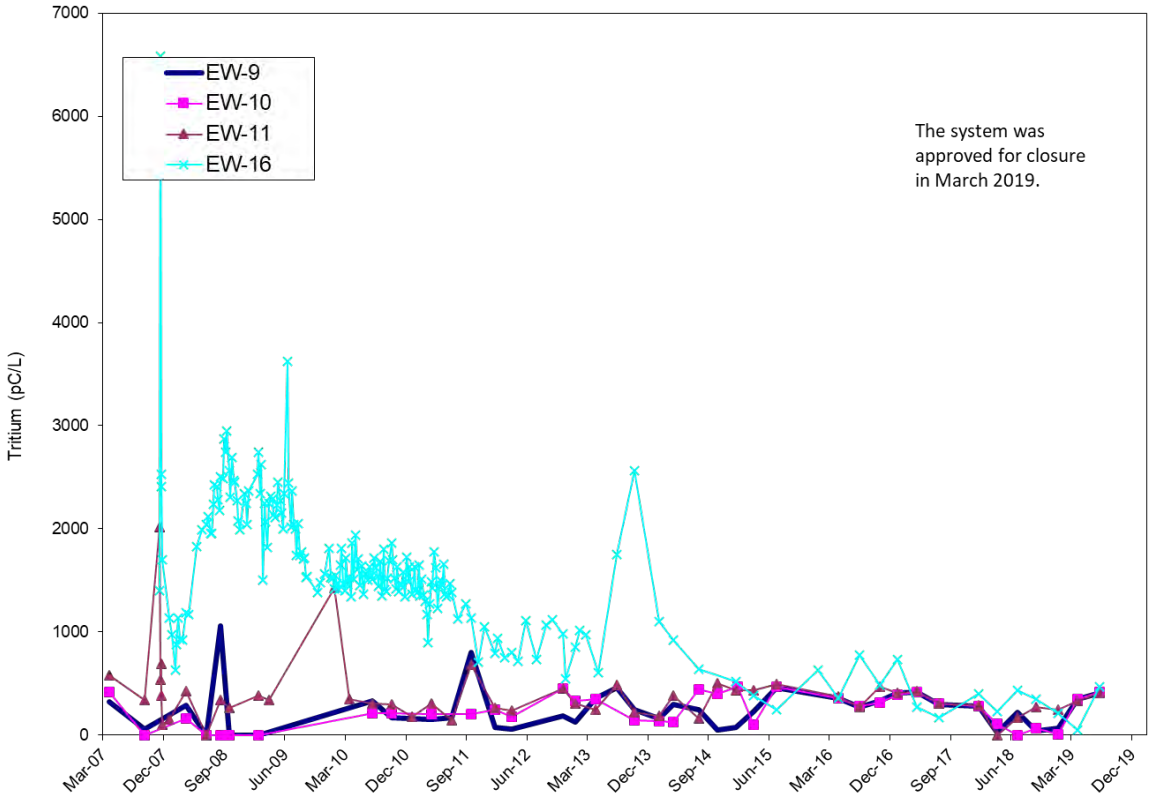


Table 10-2
Effluent Water Quality
SPDES Equivalency Permit Concentrations January 1, 2020 – March 31, 2020

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	Monitor	NA	GPD	Continuous
pH (range)	5.6 - 8.5	NA	SU	Weekly
Carbon Tetrachloride	5.0	NA	ug/L	2/Month
Chloroform	7.0	NA	ug/L	2/Month
1,1-Dichloroethane	5.0	NA	ug/L	2/Month

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
1,2-Dichloroethane	**0.6**	**NA**	**ug/L**	**2/Month**
1,1-Dichloroethene	**5.0**	**NA**	**ug/L**	**2/Month**
Cis-1,2-Dichloroethylene	**5.0**	**NA**	**ug/L**	**2/Month**
trans-1,2-Dichloroethylene	**5.0**	**NA**	**ug/L**	**2/Month**
Tetrachloroethylene	**5.0**	**NA**	**ug/L**	**2/Month**
1,1,1-Trichloroethane	**5.0**	**NA**	**ug/L**	**2/Month**
Trichloroethylene	**5.0**	**NA**	**ug/L**	**2/Month**

NA = Not applicable. The system is closed.

Monitoring Activities

The current monitoring well network is depicted on Figure 10-1. The first quarter monitoring well analytical results are shown on Table 10-3. The highest tritium concentration immediately downgradient of the HFBR in the first quarter of 2020 was 20,800 pCi/L in well 075-804. This well is located on the lawn of the HFBR immediately north of Cornell Avenue. Sampling of the extraction wells for this system was discontinued in July 2019.

System Operations

January 2020:

The system remained closed.

February 2020:

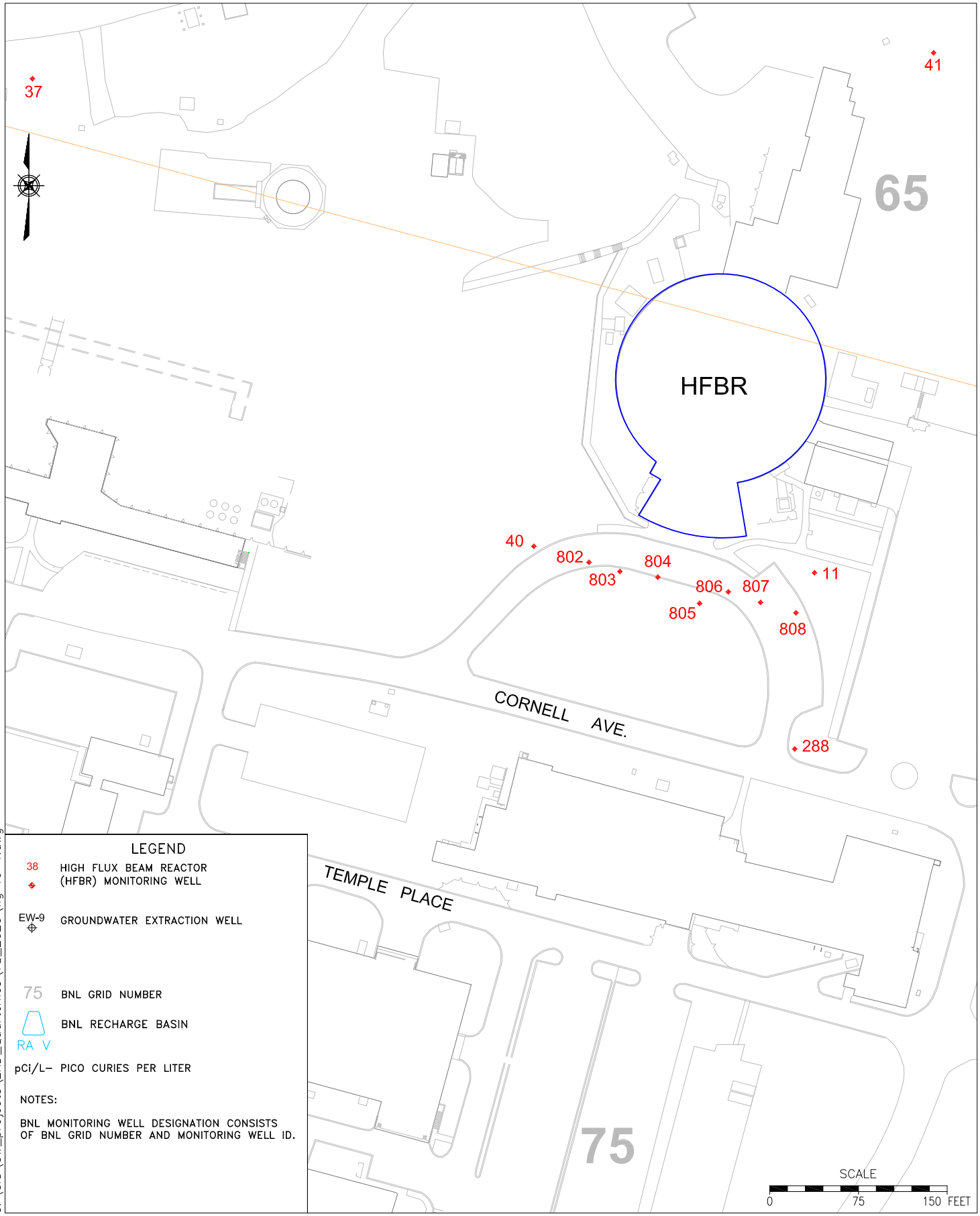
The system remained closed.

March 2020:

The system remained closed.

Planned Operational Changes

- Maintain the monitoring and extraction wells until a determination is made on their utilization related to emerging contaminants.



LEGEND

38 HIGH FLUX BEAM REACTOR (HFBR) MONITORING WELL

EW-9 GROUNDWATER EXTRACTION WELL

75 BNL GRID NUMBER

RA V BNL RECHARGE BASIN

pCi/L– PICO CURIES PER LITER

NOTES:

BNL MONITORING WELL DESIGNATION CONSISTS OF BNL GRID NUMBER AND MONITORING WELL ID.

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BROOKHAVEN NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION DIVISION

TITLE:

OU III HFBR AOC 29

FIRST QUARTER 2020 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
AJZ	–	06/14/16	–
CHKD:	APPD:	REV.:	NOTES:
LDS	–	07/07/20	–

FIGURE NO.: 10–1

Table 10-3
OU III HFBR Tritium Plume Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 075-804

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tritium	01/03/2020	20800	284	2040	PCI/L	52.71	

Site ID : 075-806

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tritium	01/03/2020	13200	293	1380	PCI/L	51.42	

Site ID : 075-807

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tritium	01/03/2020	12900	288	1340	PCI/L	51.12	

Site ID : 075-808

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tritium	01/03/2020	333	287	196	PCI/L	49.71	

Qualifiers :

J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Organic Compounds :

B = Compound was found in both the sample And associated laboratory blank.

Inorganic Compounds :

B = Result Is between instrument detection limit And contract required reporting limit.

Section 11

Q1-2020 Operations Summary
OU III Western South Boundary Pump & Treat System

Process: Groundwater extraction and air stripping treatment, with discharge to the Western South Boundary recharge basin

Goal: Reach Maximum Contaminant Levels (MCLs) in core monitoring wells in OU III within 30 years for the Upper Glacial aquifer (by 2030).

Start Date: September 2002

Table 11-1
OU III Western South Boundary Pump & Treat System
Pumping Rates (gpm)

Extraction Well	WSB-1	WSB-2	WSB-3	WSB-4	WSB-5	WSB-6
Site ID #	126-12	127-05	111-17	119-13	130-12	130-13
Screen Interval (ft bls)	140-160	150-170	168-188	170-190	160-190	196-216
Desired Flow Rate (GPM)	180	150	75	75	75	75
January	75	0	73	87	69	70
February	78	0	65	73	60	60
March	77	0	80	98	71	71
Actual (Avg. over Qtr.)	**77**	**0**	**73**	**86**	**67**	**67**

Extraction well WSB-2 is in standby mode. Extraction wells WSB-3 through WSB-6 became operational in March 2019.

Figure 11-1
OU III Western South Boundary Pump & Treat System
Cumulative Mass Removal of VOCs vs. Time

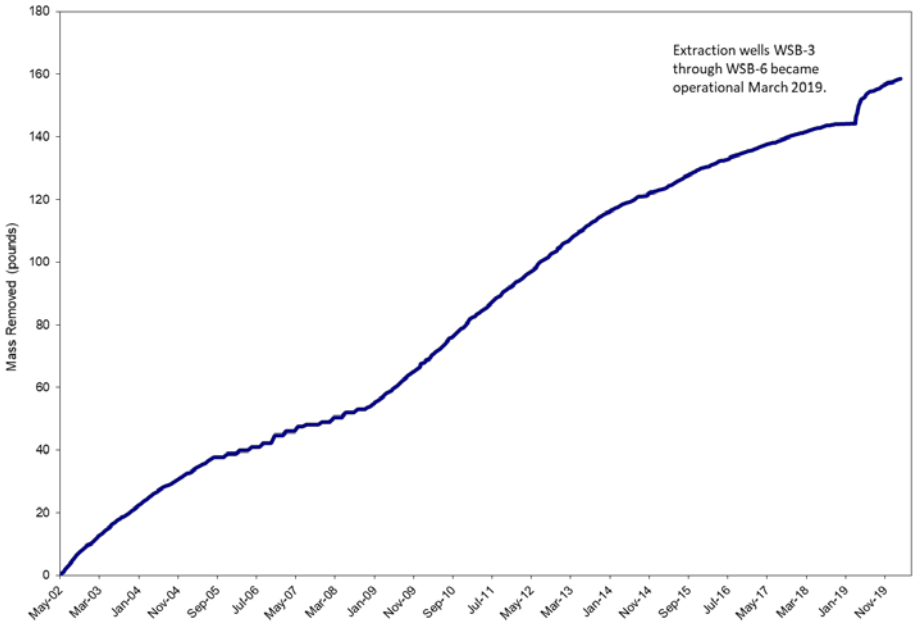


Figure 11-2
OU III Western South Boundary Pump & Treat System
Influent TVOC Concentrations vs. Time

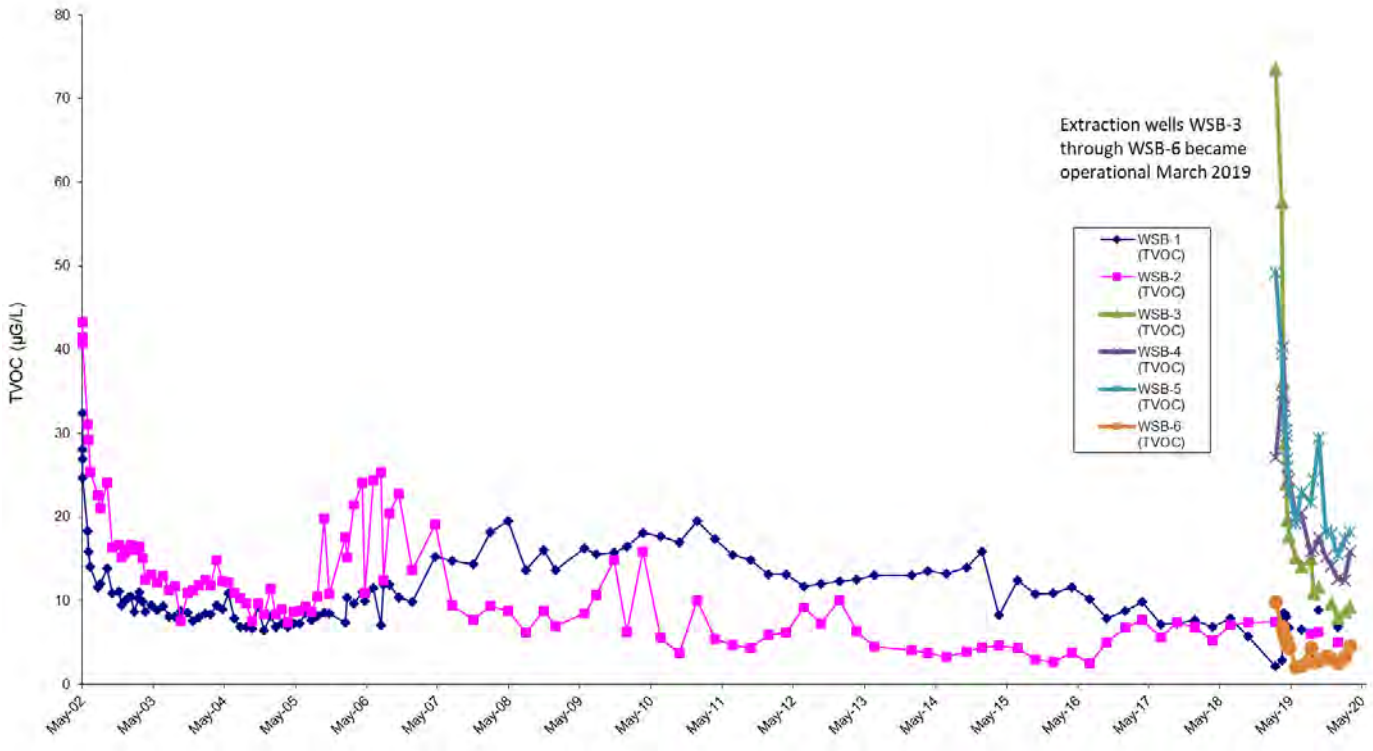


Table 11-2
Effluent Water Quality
SPDES Equivalency Permit Concentrations January 1, 2020 – March 31, 2020

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	**Monitor**	**556,838 [1]**	**GPD**	**Continuous**
pH (range)	**6.5 - 8.5**	**6.6 – 7.4**	**SU**	**Monthly**
Carbon Tetrachloride	**5**	**<0.50**	**ug/L**	**2/Month**
Chloroform	**7**	**<0.50**	**ug/L**	**2/Month**
Dichlorodifluoromethane	**5**	**<0.50**	**ug/L**	**2/Month**
1,1-Dichloroethane	**5**	**<0.50**	**ug/L**	**2/Month**
1,1-Dichloroethylene	**5**	**<0.50**	**ug/L**	**2/Month**
Methyl Chloride	**5**	**<0.50**	**ug/L**	**2/Month**
Tetrachloroethylene	**5**	**<0.50**	**ug/L**	**2/Month**
Toluene	**5**	**<0.50**	**ug/L**	**2/Month**
1,1,1-Trichloroethane	**5**	**<0.50**	**ug/L**	**2/Month**
1,1,2-Tricholorethane	**5**	**<0.50**	**ug/L**	**2/Month**
Trichloroethylene	**10**	**<0.50**	**ug/L**	**2/Month**

[1] The average flow for the operational period at the influent flow meter.
Note: As of March 2019, the water from the Western South Boundary is treated at the OU III South Boundary/Middle Road air stripper towers and discharged under that equivalency permit. This change in discharge location was reflected starting with the April DMR.

System Operations

January 2020:

Extraction well WSB-1, WSB-3, WSB-4, WSB-5, WSB-6 were running normally. Extraction well WSB-2 was in standby mode. The system treated approximately 16 million gallons of water.

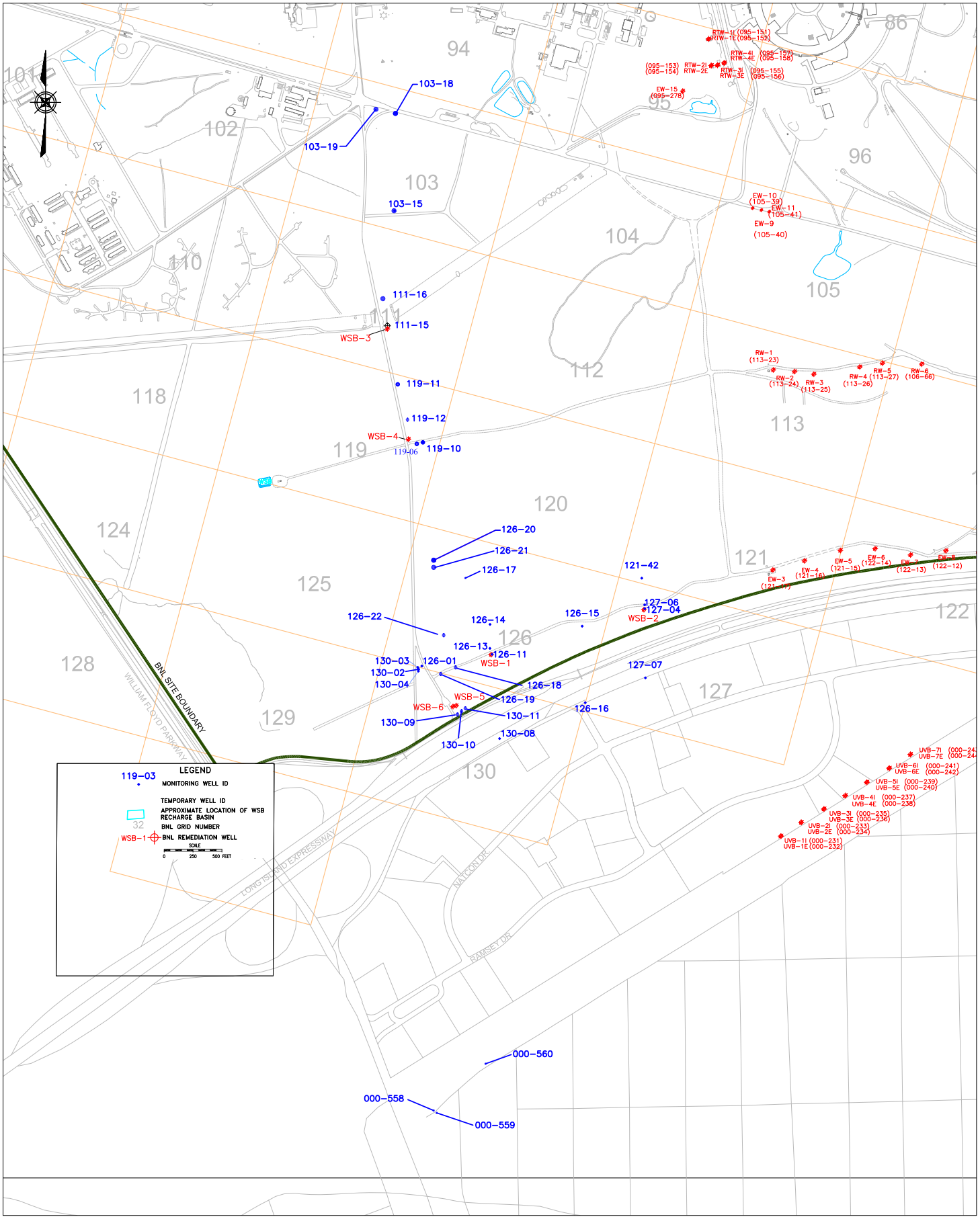
February 2020:
Extraction well WSB-1, WSB-3, WSB-4, WSB-5, WSB-6 were running normally. The system was off for five days for maintenance. Extraction well WSB-2 was in standby mode. The system treated approximately 14.5 million gallons of water.

March 2020:
Extraction well WSB-1, WSB-3, WSB-4, WSB-5, WSB-6 were running normally. Extraction well WSB-2 was in standby mode. The system treated approximately 17 million gallons of water.

The system treated approximately 47.5 million gallons of water during the first quarter of 2020.

Planned Operational Changes

- Continue full-time operation of extraction well WSB-1 based on elevated concentrations persisting at well 126-14.
- Continue full time operation of extraction wells WSB-3 through WSB-6.
- Based on the low TVOC concentrations below the capture goal of 20 µg/L, maintain extraction well WSB-2 in standby mode. If TVOC concentrations greater than 20 µg/L are observed in WSB-2 or the adjacent core monitoring wells, extraction well WSB-2 may be put into full time operation. During the first quarter, WSB-2 and adjacent monitoring wells were below the TVOC capture goal of 20 µg/L.



BROOKHAVEN NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION DIVISION

OU III WESTERN SOUTH BOUNDARY PUMP AND TREAT SYSTEM MONITORING WELL LOCATIONS

SITEWIDE REMEDIATION SYSTEMS
FIRST QUARTER 2020 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
JEB	–	09/26/05	–
CHKD:	APPD:	REV.:	NOTES:
LDS	––	07/07/20	–

FIGURE NO.: 11-3

Table 11-3
OU III Western South Boundary Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 000-558

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/14/2020	2.3	0.5	--	UG/L	165.00	
1,1-Dichloroethane	02/14/2020	0.76	0.5	--	UG/L	165.00	
1,1-Dichloroethylene	02/14/2020	2.8	0.5	--	UG/L	165.00	
524.2 TVOC	02/14/2020	14.22	--	--	UG/L	165.00	
Chloroform	02/14/2020	3.9	0.5	--	UG/L	165.00	
Dichlorodifluoromethane	02/14/2020	0.86	0.5	--	UG/L	165.00	
Trichloroethylene	02/14/2020	3.6	0.5	--	UG/L	165.00	
1,4-Dioxane	02/19/2020	7.6	0.2	--	UG/L	165.00	

Site ID : 000-559

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/14/2020	0.86	--	--	UG/L	215.00	
Dichlorodifluoromethane	02/14/2020	0.86	0.5	--	UG/L	215.00	
1,4-Dioxane	02/19/2020	3.35	0.2	--	UG/L	215.00	

Site ID : 000-560

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/14/2020	1.4	0.5	--	UG/L	159.50	
1,1-Dichloroethane	02/14/2020	0.6	0.5	--	UG/L	159.50	
1,1-Dichloroethylene	02/14/2020	2.6	0.5	--	UG/L	159.50	
524.2 TVOC	02/14/2020	10.8	--	--	UG/L	159.50	
Chloroform	02/14/2020	1.9	0.5	--	UG/L	159.50	
Dichlorodifluoromethane	02/14/2020	2.9	0.5	--	UG/L	159.50	
Trichloroethylene	02/14/2020	1.4	0.5	--	UG/L	159.50	
1,4-Dioxane	02/19/2020	6.31	0.2	--	UG/L	159.50	

Site ID : 103-15

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethane	02/05/2020	5.7	0.5	--	UG/L	200.00	
1,1-Dichloroethylene	02/05/2020	5	0.5	--	UG/L	200.00	
524.2 TVOC	02/05/2020	21.3	--	--	UG/L	200.00	
Dichlorodifluoromethane	02/05/2020	5.4	0.5	--	UG/L	200.00	
Perfluorobutanesulfonate (PFBS)	02/05/2020	0.843	1.6	--	NG/L	200.00	J
Perfluorobutyric acid (PFBA)	02/05/2020	2.78	1.8	--	NG/L	200.00	
Perfluorohexanesulfonate (PFHxS)	02/05/2020	4	1.64	--	NG/L	200.00	
Perfluorooctanesulfonate (PFOS)	02/05/2020	2.33	1.8	--	NG/L	200.00	

Table 11-3
OU III Western South Boundary Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 103-15

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluoropentanesulfonate (PFPeS)	02/05/2020	0.731	1.69	--	NG/L	200.00	J
Trichloroethylene	02/05/2020	5.2	0.5	--	UG/L	200.00	

Site ID : 103-18

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethane	02/05/2020	1.4	0.5	--	UG/L	170.00	
1,1-Dichloroethylene	02/05/2020	1.9	0.5	--	UG/L	170.00	
524.2 TVOC	02/05/2020	9.7	--	--	UG/L	170.00	
Dichlorodifluoromethane	02/05/2020	3.7	0.5	--	UG/L	170.00	
Perfluorobutyric acid (PFBA)	02/05/2020	5.62	1.76	--	NG/L	170.00	
Trichloroethylene	02/05/2020	2.7	0.5	--	UG/L	170.00	

Site ID : 103-19

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethane	02/05/2020	1.1	0.5	--	UG/L	170.00	
1,1-Dichloroethylene	02/05/2020	1.2	0.5	--	UG/L	170.00	
524.2 TVOC	02/05/2020	7.1	--	--	UG/L	170.00	
Dichlorodifluoromethane	02/05/2020	1.9	0.5	--	UG/L	170.00	
Perfluorobutyric acid (PFBA)	02/05/2020	3.19	1.76	--	NG/L	170.00	
Trichloroethylene	02/05/2020	2.9	0.5	--	UG/L	170.00	

Site ID : 111-15

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	02/05/2020	1.54	0.2	--	UG/L	175.00	
524.2 TVOC	02/05/2020	0	--	--	UG/L	175.00	
Perfluorobutanesulfonate (PFBS)	02/05/2020	1.77	1.53	--	NG/L	175.00	
Perfluorobutyric acid (PFBA)	02/05/2020	8.47	1.72	--	NG/L	175.00	
Perfluoroheptanoic acid (PFHpA)	02/05/2020	0.97	1.72	--	NG/L	175.00	J
Perfluorohexanesulfonate (PFHxS)	02/05/2020	27	1.57	--	NG/L	175.00	
Perfluorohexanoic acid (PFHxA)	02/05/2020	2.87	1.72	--	NG/L	175.00	
Perfluorooctanesulfonate (PFOS)	02/05/2020	5.05	1.72	--	NG/L	175.00	
Perfluorooctanoic acid (PFOA)	02/05/2020	6.42	1.72	--	NG/L	175.00	
Perfluoropentanesulfonate (PFPeS)	02/05/2020	2.24	1.62	--	NG/L	175.00	
Perfluoropentanoic acid (PFPeA)	02/05/2020	0.856	1.72	--	NG/L	175.00	J

Site ID : 111-16

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/05/2020	0.92	0.5	--	UG/L	173.00	

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Site ID : 111-16

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethane	02/05/2020	1.4	0.5	--	UG/L	173.00	
1,1-Dichloroethylene	02/05/2020	3.4	0.5	--	UG/L	173.00	
1,4-Dioxane	02/05/2020	3.88	0.2	--	UG/L	173.00	
524.2 TVOC	02/05/2020	7.5	--	--	UG/L	173.00	
Dichlorodifluoromethane	02/05/2020	0.69	0.5	--	UG/L	173.00	
Perfluorobutanesulfonate (PFBS)	02/05/2020	1.25	1.55	--	NG/L	173.00	J
Perfluorobutyric acid (PFBA)	02/05/2020	4.03	1.74	--	NG/L	173.00	
Perfluorodecanoic acid (PFDA)	02/05/2020	0.847	1.74	--	NG/L	173.00	J
Perfluorohexanesulfonate (PFHxS)	02/05/2020	11.7	1.58	--	NG/L	173.00	
Perfluorohexanoic acid (PFHxA)	02/05/2020	1.18	1.74	--	NG/L	173.00	J
Perfluorononanoic acid (PFNA)	02/05/2020	2.63	1.74	--	NG/L	173.00	
Perfluorooctanesulfonate (PFOS)	02/05/2020	2.01	1.74	--	NG/L	173.00	
Perfluorooctanoic acid (PFOA)	02/05/2020	2.25	1.74	--	NG/L	173.00	
Perfluoropentanesulfonate (PFPeS)	02/05/2020	1.22	1.63	--	NG/L	173.00	J
Perfluoropentanoic acid (PFPeA)	02/05/2020	0.588	1.74	--	NG/L	173.00	J
Tetrachloroethylene	02/05/2020	0.2	0.5	--	UG/L	173.00	J
Trichloroethylene	02/05/2020	0.89	0.5	--	UG/L	173.00	

Site ID : 119-06

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/10/2020	0	--	--	UG/L	130.00	

Site ID : 119-10

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethane	02/10/2020	2.4	0.5	--	UG/L	200.00	
1,1-Dichloroethylene	02/10/2020	1.9	0.5	--	UG/L	200.00	
524.2 TVOC	02/10/2020	8.6	--	--	UG/L	200.00	
Dichlorodifluoromethane	02/10/2020	2.8	0.5	--	UG/L	200.00	
Trichloroethylene	02/10/2020	1.5	0.5	--	UG/L	200.00	

Site ID : 119-11

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethylene	02/06/2020	44	2.5	--	UG/L	180.00	
1,4-Dioxane	02/06/2020	23.9	2	--	UG/L	180.00	
524.2 TVOC	02/06/2020	69.17	--	--	UG/L	180.00	
Perfluorobutanesulfonate (PFBS)	02/06/2020	2.37	1.55	--	NG/L	180.00	

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Site ID : 119-11

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorobutyric acid (PFBA)	02/06/2020	7.35	1.74	--	NG/L	180.00	
Perfluorohexanesulfonate (PFHxS)	02/06/2020	1.24	1.58	--	NG/L	180.00	J
Perfluoropentanesulfonate (PFPeS)	02/06/2020	0.904	1.64	--	NG/L	180.00	J

Site ID : 119-12

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/06/2020	5	0.5	--	UG/L	179.00	
1,1-Dichloroethane	02/06/2020	1.9	0.5	--	UG/L	179.00	
1,1-Dichloroethylene	02/06/2020	9.2	0.5	--	UG/L	179.00	
1,4-Dioxane	02/06/2020	7.27	0.2	--	UG/L	179.00	
524.2 TVOC	02/06/2020	20.78	--	--	UG/L	179.00	
Chloroform	02/06/2020	0.45	0.5	--	UG/L	179.00	J
Dichlorodifluoromethane	02/06/2020	0.43	0.5	--	UG/L	179.00	J
Trichloroethylene	02/06/2020	3.8	0.5	--	UG/L	179.00	

Site ID : 126-14

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/10/2020	33	0.5	--	UG/L	155.00	
1,1-Dichloroethylene	02/10/2020	34	0.5	--	UG/L	155.00	
1,4-Dioxane	02/10/2020	10.1	0.4	--	UG/L	155.00	
524.2 TVOC	02/10/2020	70.1	--	--	UG/L	155.00	
Perfluorobutanesulfonate (PFBS)	02/10/2020	0.757	1.6	--	NG/L	155.00	J
Perfluorobutyric acid (PFBA)	02/10/2020	8.75	1.79	--	NG/L	155.00	
Perfluorohexanesulfonate (PFHxS)	02/10/2020	5.34	1.63	--	NG/L	155.00	
Perfluorooctanesulfonate (PFOS)	02/10/2020	2.55	1.79	--	NG/L	155.00	
Perfluorooctanoic acid (PFOA)	02/10/2020	0.671	1.79	--	NG/L	155.00	J
Trichloroethylene	02/10/2020	3.1	0.5	--	UG/L	155.00	

Site ID : 126-15

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	02/10/2020	8.6	0.4	--	UG/L	155.00	
524.2 TVOC	02/10/2020	5.3	--	--	UG/L	155.00	
Dichlorodifluoromethane	02/10/2020	5.3	0.5	--	UG/L	155.00	

Site ID : 126-16

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/14/2020	2	0.5	--	UG/L	135.00	

Table 11-3
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Site ID : 126-16

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethane	02/14/2020	1.1	0.5	--	UG/L	135.00	
1,1-Dichloroethylene	02/14/2020	3.4	0.5	--	UG/L	135.00	
1,4-Dioxane	02/14/2020	6.71	0.2	--	UG/L	135.00	
524.2 TVOC	02/14/2020	15.8	--	--	UG/L	135.00	
Chloroform	02/14/2020	3.5	0.5	--	UG/L	135.00	
Dichlorodifluoromethane	02/14/2020	2.9	0.5	--	UG/L	135.00	
Perfluorobutyric acid (PFBA)	02/14/2020	9.36	1.78	--	NG/L	135.00	
Trichloroethylene	02/14/2020	2.9	0.5	--	UG/L	135.00	

Site ID : 126-17

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/13/2020	0.22	0.5	--	UG/L	140.00	J
1,1-Dichloroethylene	02/13/2020	0.2	0.5	--	UG/L	140.00	J
524.2 TVOC	02/13/2020	0.42	--	--	UG/L	140.00	

Site ID : 126-18

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/10/2020	26	0.5	--	UG/L	165.00	
1,1-Dichloroethylene	02/10/2020	35	0.5	--	UG/L	165.00	
1,2-Dichloroethane	02/10/2020	0.62	0.5	--	UG/L	165.00	
1,4-Dioxane	02/10/2020	14.9	0.6	--	UG/L	165.00	
524.2 TVOC	02/10/2020	62.24	--	--	UG/L	165.00	
Perfluorobutanesulfonate (PFBS)	02/10/2020	1.39	1.59	--	NG/L	165.00	J
Perfluorobutyric acid (PFBA)	02/10/2020	6.51	1.78	--	NG/L	165.00	
Perfluoroheptanoic acid (PFHpA)	02/10/2020	0.619	1.78	--	NG/L	165.00	J
Perfluorohexanesulfonate (PFHxS)	02/10/2020	4.75	1.62	--	NG/L	165.00	
Perfluorooctanesulfonate (PFOS)	02/10/2020	3.32	1.78	--	NG/L	165.00	
Perfluorooctanoic acid (PFOA)	02/10/2020	3.43	1.78	--	NG/L	165.00	
Perfluoropentanesulfonate (PFPeS)	02/10/2020	0.683	1.68	--	NG/L	165.00	J
Tetrachloroethylene	02/10/2020	0.2	0.5	--	UG/L	165.00	J
Trichloroethylene	02/10/2020	0.42	0.5	--	UG/L	165.00	J

Site ID : 126-19

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/06/2020	1.2	0.5	--	UG/L	195.00	
1,1-Dichloroethane	02/06/2020	1.5	0.5	--	UG/L	195.00	

Table 11-3
OU III Western South Boundary Monitoring Well Data
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Site ID : 126-19

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethylene	02/06/2020	3.5	0.5	--	UG/L	195.00	
1,4-Dioxane	02/06/2020	8.84	0.2	--	UG/L	195.00	
524.2 TVOC	02/06/2020	16.51	--	--	UG/L	195.00	
Chloroform	02/06/2020	0.61	0.5	--	UG/L	195.00	
Dichlorodifluoromethane	02/06/2020	9.7	0.5	--	UG/L	195.00	
Perfluorobutyric acid (PFBA)	02/06/2020	11.9	1.83	--	NG/L	195.00	

Site ID : 126-20

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/12/2020	23	0.5	--	UG/L	140.00	
1,1-Dichloroethane	02/12/2020	0.26	0.5	--	UG/L	140.00	J
1,1-Dichloroethylene	02/12/2020	30	0.5	--	UG/L	140.00	
1,2-Dichloroethane	02/12/2020	0.46	0.5	--	UG/L	140.00	J
1,4-Dioxane	02/12/2020	9.04	0.2	--	UG/L	140.00	
524.2 TVOC	02/12/2020	55.77	--	--	UG/L	140.00	
Chloroform	02/12/2020	0.74	0.5	--	UG/L	140.00	
Perfluorobutanesulfonate (PFBS)	02/12/2020	1.26	1.61	--	NG/L	140.00	J
Perfluorobutyric acid (PFBA)	02/12/2020	5.93	1.81	--	NG/L	140.00	
Perfluorohexanesulfonate (PFHxS)	02/12/2020	4.23	1.65	--	NG/L	140.00	
Perfluorooctanesulfonate (PFOS)	02/12/2020	2.51	1.81	--	NG/L	140.00	
Perfluorooctanoic acid (PFOA)	02/12/2020	1.64	1.81	--	NG/L	140.00	J
Perfluoropentanesulfonate (PFPeS)	02/12/2020	0.617	1.7	--	NG/L	140.00	J
Tetrachloroethylene	02/12/2020	0.31	0.5	--	UG/L	140.00	J
Trichloroethylene	02/12/2020	1	0.5	--	UG/L	140.00	

Site ID : 126-21

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/12/2020	0.43	0.5	--	UG/L	204.00	J
1,1-Dichloroethylene	02/12/2020	0.79	0.5	--	UG/L	204.00	
1,4-Dioxane	02/12/2020	1.75	0.2	--	UG/L	204.00	
524.2 TVOC	02/12/2020	1.66	--	--	UG/L	204.00	
Chloroform	02/12/2020	0.44	0.5	--	UG/L	204.00	J
Perfluorobutanesulfonate (PFBS)	02/12/2020	1.49	1.65	--	NG/L	204.00	J
Perfluorobutyric acid (PFBA)	02/12/2020	3.38	1.86	--	NG/L	204.00	
Perfluorohexanesulfonate (PFHxS)	02/12/2020	7.94	1.69	--	NG/L	204.00	

Table 11-3
OU III Western South Boundary Monitoring Well Data
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Site ID : 126-21

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorohexanoic acid (PFHxA)	02/12/2020	1.19	1.86	--	NG/L	204.00	J
Perfluorononanoic acid (PFNA)	02/12/2020	2.93	1.86	--	NG/L	204.00	
Perfluorooctanesulfonate (PFOS)	02/12/2020	4.91	1.86	--	NG/L	204.00	
Perfluorooctanoic acid (PFOA)	02/12/2020	3.24	1.86	--	NG/L	204.00	
Perfluoropentanesulfonate (PFPeS)	02/12/2020	0.868	1.75	--	NG/L	204.00	J

Site ID : 126-22

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethane	02/12/2020	0.59	0.5	--	UG/L	208.00	
1,1-Dichloroethylene	02/12/2020	0.39	0.5	--	UG/L	208.00	J
524.2 TVOC	02/12/2020	18.98	--	--	UG/L	208.00	
Dichlorodifluoromethane	02/12/2020	18	0.5	--	UG/L	208.00	

Site ID : 127-06

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,2,3-Trichloropropane	02/13/2020	13	0.5	--	UG/L	155.00	
1,2-Dichloroethane	02/13/2020	0.64	0.5	--	UG/L	155.00	
1,4-Dioxane	02/13/2020	7.14	0.2	--	UG/L	155.00	
524.2 TVOC	02/13/2020	14.21	--	--	UG/L	155.00	
Perfluorobutanesulfonate (PFBS)	02/13/2020	0.742	1.59	--	NG/L	155.00	J
Perfluorobutyric acid (PFBA)	02/13/2020	3.8	1.78	--	NG/L	155.00	
Perfluorohexanesulfonate (PFHxS)	02/13/2020	4.47	1.62	--	NG/L	155.00	
Perfluorooctanesulfonate (PFOS)	02/13/2020	2.75	1.78	--	NG/L	155.00	
Perfluorooctanoic acid (PFOA)	02/13/2020	1.34	1.78	--	NG/L	155.00	J
Perfluoropentanesulfonate (PFPeS)	02/13/2020	0.646	1.67	--	NG/L	155.00	J
Trichloroethylene	02/13/2020	0.57	0.5	--	UG/L	155.00	

Site ID : 127-07

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	02/14/2020	5.73	0.2	--	UG/L	151.00	
524.2 TVOC	02/14/2020	0	--	--	UG/L	151.00	
Perfluorobutanesulfonate (PFBS)	02/14/2020	0.781	1.58	--	NG/L	151.00	J
Perfluorobutyric acid (PFBA)	02/14/2020	4.72	1.77	--	NG/L	151.00	
Perfluorohexanesulfonate (PFHxS)	02/14/2020	4.59	1.61	--	NG/L	151.00	
Perfluorohexanoic acid (PFHxA)	02/14/2020	0.973	1.77	--	NG/L	151.00	J
Perfluorooctanesulfonate (PFOS)	02/14/2020	4.07	1.77	--	NG/L	151.00	

Table 11-3
OU III Western South Boundary Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 127-07

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorooctanoic acid (PFOA)	02/14/2020	1.97	1.77	--	NG/L	151.00	
Perfluoropentanesulfonate (PFPeS)	02/14/2020	0.647	1.67	--	NG/L	151.00	J

Site ID : 130-03

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/12/2020	1.3	0.5	--	UG/L	162.50	
1,1-Dichloroethane	02/12/2020	0.28	0.5	--	UG/L	162.50	J
1,1-Dichloroethylene	02/12/2020	1.8	0.5	--	UG/L	162.50	
1,4-Dioxane	02/12/2020	2.75	0.2	--	UG/L	162.50	
524.2 TVOC	02/12/2020	6.96	--	--	UG/L	162.50	
Chloroform	02/12/2020	2.3	0.5	--	UG/L	162.50	
Perfluorobutanesulfonate (PFBS)	02/12/2020	5.51	1.53	--	NG/L	162.50	
Perfluorobutyric acid (PFBA)	02/12/2020	12.4	1.72	--	NG/L	162.50	
Perfluorohexanesulfonate (PFHxS)	02/12/2020	8.42	1.56	--	NG/L	162.50	
Perfluoropentanesulfonate (PFPeS)	02/12/2020	3.92	1.61	--	NG/L	162.50	
Perfluoropentanoic acid (PFPeA)	02/12/2020	1.12	1.72	--	NG/L	162.50	J
Tetrachloroethylene	02/12/2020	0.41	0.5	--	UG/L	162.50	J
Trichloroethylene	02/12/2020	0.87	0.5	--	UG/L	162.50	

Site ID : 130-08

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	02/19/2020	0.171	0.2	--	UG/L	150.00	J
524.2 TVOC	02/19/2020	0.48	--	--	UG/L	150.00	
Chloroform	02/19/2020	0.48	0.5	--	UG/L	150.00	J

Site ID : 130-09

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/20/2020	0.36	--	--	UG/L	140.00	
Chloroform	02/20/2020	0.36	0.5	--	UG/L	140.00	J

Site ID : 130-10

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	02/18/2020	0.104	0.2	--	UG/L	155.00	J
524.2 TVOC	02/18/2020	0.35	--	--	UG/L	155.00	
Chloroform	02/18/2020	0.35	0.5	--	UG/L	155.00	J
Perfluorobutyric acid (PFBA)	02/18/2020	1.14	1.73	--	NG/L	155.00	J
Perfluorohexanesulfonate (PFHxS)	02/18/2020	0.832	1.58	--	NG/L	155.00	J

Table 11-3
OU III Western South Boundary Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 130-10

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorononanoic acid (PFNA)	02/18/2020	2.77	1.73	--	NG/L	155.00	
Perfluorooctanesulfonate (PFOS)	02/18/2020	0.893	1.73	--	NG/L	155.00	J
Perfluorooctanoic acid (PFOA)	02/18/2020	1.53	1.73	--	NG/L	155.00	J

Site ID : 130-11

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	02/18/2020	1	0.5	--	UG/L	200.00	
1,1-Dichloroethylene	02/18/2020	1.2	0.5	--	UG/L	200.00	
1,4-Dioxane	02/18/2020	1.86	0.2	--	UG/L	200.00	
524.2 TVOC	02/18/2020	2.93	--	--	UG/L	200.00	
Chloroform	02/18/2020	0.31	0.5	--	UG/L	200.00	J
Dichlorodifluoromethane	02/18/2020	0.42	0.5	--	UG/L	200.00	J
Perfluorobutyric acid (PFBA)	02/18/2020	1.24	1.8	--	NG/L	200.00	J
Perfluorodecanoic acid (PFDA)	02/18/2020	1.49	1.8	--	NG/L	200.00	J
Perfluorohexanesulfonate (PFHxS)	02/18/2020	1.5	1.64	--	NG/L	200.00	J
Perfluorononanoic acid (PFNA)	02/18/2020	4.48	1.8	--	NG/L	200.00	
Perfluorooctanesulfonate (PFOS)	02/18/2020	1.02	1.8	--	NG/L	200.00	J

Table 11-4
OU III Western South Boundary Extraction Well Data
'Hits Only' January through March 2020

Site ID : 111-17 (WSB-3)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/07/2020	1.6	0.5	--	UG/L	0.00	
1,1-Dichloroethane	01/07/2020	0.72	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	01/07/2020	4.5	0.5	--	UG/L	0.00	
524.2 TVOC	01/07/2020	7.85	--	--	UG/L	0.00	
Chloroform	01/07/2020	0.37	0.5	--	UG/L	0.00	J
Trichloroethylene	01/07/2020	0.66	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	02/11/2020	1.6	0.5	--	UG/L	0.00	
1,1-Dichloroethane	02/11/2020	0.84	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	02/11/2020	5.1	0.5	--	UG/L	0.00	
524.2 TVOC	02/11/2020	8.68	--	--	UG/L	0.00	
Barium	02/11/2020	7.8	20	--	UG/L	0.00	B
Calcium	02/11/2020	8000	250	--	UG/L	0.00	
Chloroform	02/11/2020	0.47	0.5	--	UG/L	0.00	J
Copper	02/11/2020	4.3	10	--	UG/L	0.00	B
Iron	02/11/2020	280	50	--	UG/L	0.00	
Magnesium	02/11/2020	4100	250	--	UG/L	0.00	
Manganese	02/11/2020	46	4	--	UG/L	0.00	
Nickel	02/11/2020	7.9	10	--	UG/L	0.00	B
Potassium	02/11/2020	1000	2000	--	UG/L	0.00	B
Sodium	02/11/2020	22000	250	--	UG/L	0.00	
Trichloroethylene	02/11/2020	0.67	0.5	--	UG/L	0.00	
Zinc	02/11/2020	130	20	--	UG/L	0.00	
1,1,1-Trichloroethane	03/10/2020	1.7	0.5	--	UG/L	0.00	
1,1-Dichloroethane	03/10/2020	0.94	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	03/10/2020	5.3	0.5	--	UG/L	0.00	
524.2 TVOC	03/10/2020	9.3	--	--	UG/L	0.00	
Chloroform	03/10/2020	0.56	0.5	--	UG/L	0.00	
Trichloroethylene	03/10/2020	0.8	0.5	--	UG/L	0.00	

Site ID : 119-13 (WSB-4)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/07/2020	4.3	0.5	--	UG/L	0.00	
1,1-Dichloroethane	01/07/2020	0.48	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	01/07/2020	6.4	0.5	--	UG/L	0.00	

Table 11-4
OU III Western South Boundary Extraction Well Data
'Hits Only' January through March 2020

Site ID : 119-13 (WSB-4)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/07/2020	12.6	--	--	UG/L	0.00	
Chloroform	01/07/2020	0.29	0.5	--	UG/L	0.00	J
Dichlorodifluoromethane	01/07/2020	0.27	0.5	--	UG/L	0.00	J
Trichloroethylene	01/07/2020	0.86	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	02/11/2020	4.1	0.5	--	UG/L	0.00	
1,1-Dichloroethane	02/11/2020	0.53	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	02/11/2020	6.4	0.5	--	UG/L	0.00	
524.2 TVOC	02/11/2020	12.44	--	--	UG/L	0.00	
Barium	02/11/2020	7.8	20	--	UG/L	0.00	B
Calcium	02/11/2020	13000	250	--	UG/L	0.00	
Chloroform	02/11/2020	0.3	0.5	--	UG/L	0.00	J
Dichlorodifluoromethane	02/11/2020	0.29	0.5	--	UG/L	0.00	J
Iron	02/11/2020	4000	50	--	UG/L	0.00	
Magnesium	02/11/2020	5500	250	--	UG/L	0.00	
Manganese	02/11/2020	300	4	--	UG/L	0.00	
Potassium	02/11/2020	1100	2000	--	UG/L	0.00	B
Sodium	02/11/2020	26000	250	--	UG/L	0.00	
Trichloroethylene	02/11/2020	0.82	0.5	--	UG/L	0.00	
Zinc	02/11/2020	93	20	--	UG/L	0.00	
1,1,1-Trichloroethane	03/10/2020	5.1	0.5	--	UG/L	0.00	
1,1-Dichloroethane	03/10/2020	0.68	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	03/10/2020	7.9	0.5	--	UG/L	0.00	
524.2 TVOC	03/10/2020	15.88	--	--	UG/L	0.00	
Chloroform	03/10/2020	0.43	0.5	--	UG/L	0.00	J
Dichlorodifluoromethane	03/10/2020	0.67	0.5	--	UG/L	0.00	
Trichloroethylene	03/10/2020	1.1	0.5	--	UG/L	0.00	

Site ID : 126-12 (WSB-1)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/07/2020	2.3	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	01/07/2020	3.3	0.5	--	UG/L	0.00	
524.2 TVOC	01/07/2020	6.87	--	--	UG/L	0.00	
Chloroform	01/07/2020	0.72	0.5	--	UG/L	0.00	
Trichloroethylene	01/07/2020	0.55	0.5	--	UG/L	0.00	

Table 11-4
OU III Western South Boundary Extraction Well Data
'Hits Only' January through March 2020

Site ID : 127-05 (WSB-2)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/07/2020	0.72	0.5	--	UG/L	0.00	
1,1-Dichloroethane	01/07/2020	0.31	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	01/07/2020	0.84	0.5	--	UG/L	0.00	
524.2 TVOC	01/07/2020	5.01	--	--	UG/L	0.00	
Chloroform	01/07/2020	0.95	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	01/07/2020	0.29	0.5	--	UG/L	0.00	J
Trichloroethylene	01/07/2020	1.9	0.5	--	UG/L	0.00	

Site ID : 130-12 (WSB-5)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/07/2020	5.4	0.5	--	UG/L	0.00	
1,1-Dichloroethane	01/07/2020	0.31	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	01/07/2020	4.5	0.5	--	UG/L	0.00	
524.2 TVOC	01/07/2020	15.41	--	--	UG/L	0.00	
Chloroform	01/07/2020	2	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	01/07/2020	1.8	0.5	--	UG/L	0.00	
Trichloroethylene	01/07/2020	1.4	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	02/11/2020	5.6	0.5	--	UG/L	0.00	
1,1-Dichloroethane	02/11/2020	0.33	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	02/11/2020	5.9	0.5	--	UG/L	0.00	
524.2 TVOC	02/11/2020	17.33	--	--	UG/L	0.00	
Barium	02/11/2020	4.5	20	--	UG/L	0.00	B
Calcium	02/11/2020	10000	250	--	UG/L	0.00	
Chloroform	02/11/2020	2	0.5	--	UG/L	0.00	
Copper	02/11/2020	8.1	10	--	UG/L	0.00	B
Dichlorodifluoromethane	02/11/2020	2.1	0.5	--	UG/L	0.00	
Iron	02/11/2020	36	50	--	UG/L	0.00	B
Magnesium	02/11/2020	5200	250	--	UG/L	0.00	
Potassium	02/11/2020	820	2000	--	UG/L	0.00	B
Sodium	02/11/2020	23000	250	--	UG/L	0.00	
Trichloroethylene	02/11/2020	1.4	0.5	--	UG/L	0.00	
Zinc	02/11/2020	97	20	--	UG/L	0.00	
1,1,1-Trichloroethane	03/10/2020	5.9	0.5	--	UG/L	0.00	
1,1-Dichloroethane	03/10/2020	0.43	0.5	--	UG/L	0.00	J

Table 11-4
OU III Western South Boundary Extraction Well Data
'Hits Only' January through March 2020

Site ID : 130-12 (WSB-5)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethylene	03/10/2020	5.7	0.5	--	UG/L	0.00	
524.2 TVOC	03/10/2020	18.23	--	--	UG/L	0.00	
Chloroform	03/10/2020	2.1	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	03/10/2020	2.5	0.5	--	UG/L	0.00	
Trichloroethylene	03/10/2020	1.6	0.5	--	UG/L	0.00	

Site ID : 130-13 (WSB-6)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethane	01/07/2020	0.22	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	01/07/2020	0.2	0.5	--	UG/L	0.00	J
524.2 TVOC	01/07/2020	2.62	--	--	UG/L	0.00	
Dichlorodifluoromethane	01/07/2020	2.2	0.5	--	UG/L	0.00	
1,1-Dichloroethane	02/11/2020	0.28	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	02/11/2020	0.26	0.5	--	UG/L	0.00	J
524.2 TVOC	02/11/2020	3.24	--	--	UG/L	0.00	
Barium	02/11/2020	6.1	20	--	UG/L	0.00	B
Calcium	02/11/2020	9400	250	--	UG/L	0.00	
Copper	02/11/2020	3.8	10	--	UG/L	0.00	B
Dichlorodifluoromethane	02/11/2020	2.7	0.5	--	UG/L	0.00	
Iron	02/11/2020	3800	50	--	UG/L	0.00	
Magnesium	02/11/2020	3600	250	--	UG/L	0.00	
Manganese	02/11/2020	330	4	--	UG/L	0.00	
Potassium	02/11/2020	980	2000	--	UG/L	0.00	B
Sodium	02/11/2020	8900	250	--	UG/L	0.00	
Zinc	02/11/2020	54	20	--	UG/L	0.00	
1,1-Dichloroethane	03/10/2020	0.42	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	03/10/2020	0.42	0.5	--	UG/L	0.00	J
524.2 TVOC	03/10/2020	4.64	--	--	UG/L	0.00	
Dichlorodifluoromethane	03/10/2020	3.8	0.5	--	UG/L	0.00	

Table 11-5
OU III Western South Boundary Influent Data
'Hits Only' January through March 2020

Site ID : 121-55 (System Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/07/2020	0.7	0.5	--	UG/L	0.00	
1,1-Dichloroethane	01/07/2020	0.29	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	01/07/2020	0.79	0.5	--	UG/L	0.00	
524.2 TVOC	01/07/2020	4.56	--	--	UG/L	0.00	
Chloroform	01/07/2020	0.98	0.5	--	UG/L	0.00	
Trichloroethylene	01/07/2020	1.8	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	02/11/2020	2.6	0.5	--	UG/L	0.00	
1,1-Dichloroethane	02/11/2020	0.35	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	02/11/2020	4.1	0.5	--	UG/L	0.00	
524.2 TVOC	02/11/2020	9.29	--	--	UG/L	0.00	
Chloroform	02/11/2020	0.64	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	02/11/2020	0.97	0.5	--	UG/L	0.00	
Trichloroethylene	02/11/2020	0.63	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	03/10/2020	2.8	0.5	--	UG/L	0.00	
1,1-Dichloroethane	03/10/2020	0.5	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	03/10/2020	4.7	0.5	--	UG/L	0.00	
524.2 TVOC	03/10/2020	10.99	--	--	UG/L	0.00	
Chloroform	03/10/2020	0.78	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	03/10/2020	1.4	0.5	--	UG/L	0.00	
Trichloroethylene	03/10/2020	0.81	0.5	--	UG/L	0.00	

Table 11-6
OU III Western South Boundary Effluent Data
'Hits Only' January through March 2020

Site ID : 095-126 (System Effluent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/07/2020	0	--	--	UG/L	0.00	

Site ID : 095-270 (System Effluent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/11/2020	0	--	--	UG/L	0.00	
524.2 TVOC	03/10/2020	0	--	--	UG/L	0.00	

Qualifiers :

J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Organic Compounds :

B = Compound was found in both the sample And associated laboratory blank.

Inorganic Compounds :

B = Result Is between instrument detection limit And contract required reporting limit.

Section 12
Q1-2020 Operations Summary
OU III Strontium-90 Chemical Holes Treatment System

Process: Groundwater extraction and treatment via zeolite resin (Clinoptilolite) for the removal of Sr-90, with discharge to dry wells.

Goal: Reach Maximum Contaminant Levels (MCLs) in core monitoring wells within 40 years for the Upper Glacial aquifer (by 2040).

Start Date: February 2003

Table 12-1
OU III Sr-90 Chemical Holes
Pumping Rates (gpm)

Extraction Well	EW-1 *	EW-2*	EW-3*
Site Id #	106-92	106-123	106-124
Screen Interval (ft bls)	23.5-38.5	35-45	35-45
Desired Flow Rate (gpm)	0.0	0.0	0.0
January (Avg monthly gpm)	0.0	0.0	0.0
February	0.0	0.0	0.0
March	0.0	0.0	0.0
Actual (Avg. over Qtr. when on)	0.0	0.0	0.0

***** All three extraction wells began pulse pumping (one month on and two months off) in October 2014. In October 2015, EW-1 began full time operation. In April 2016, EW-1 was placed into pulsed pumping mode (one month on and one month off). In October 2016, EW-2 and EW-3 were placed in stand-by mode while EW-1 continued in pulsed pumping mode. EW-1 was placed in stand-by mode in July 2018.

Figure 12-1
Chemical Holes Strontium-90 Cumulative Millicuries Removed

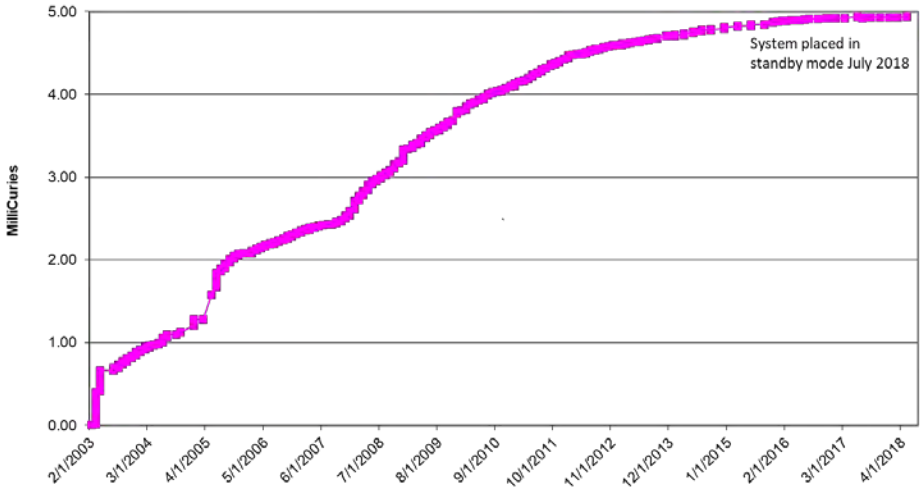


Figure 12-2
Chemical Holes Influent Strontium-90 Concentrations

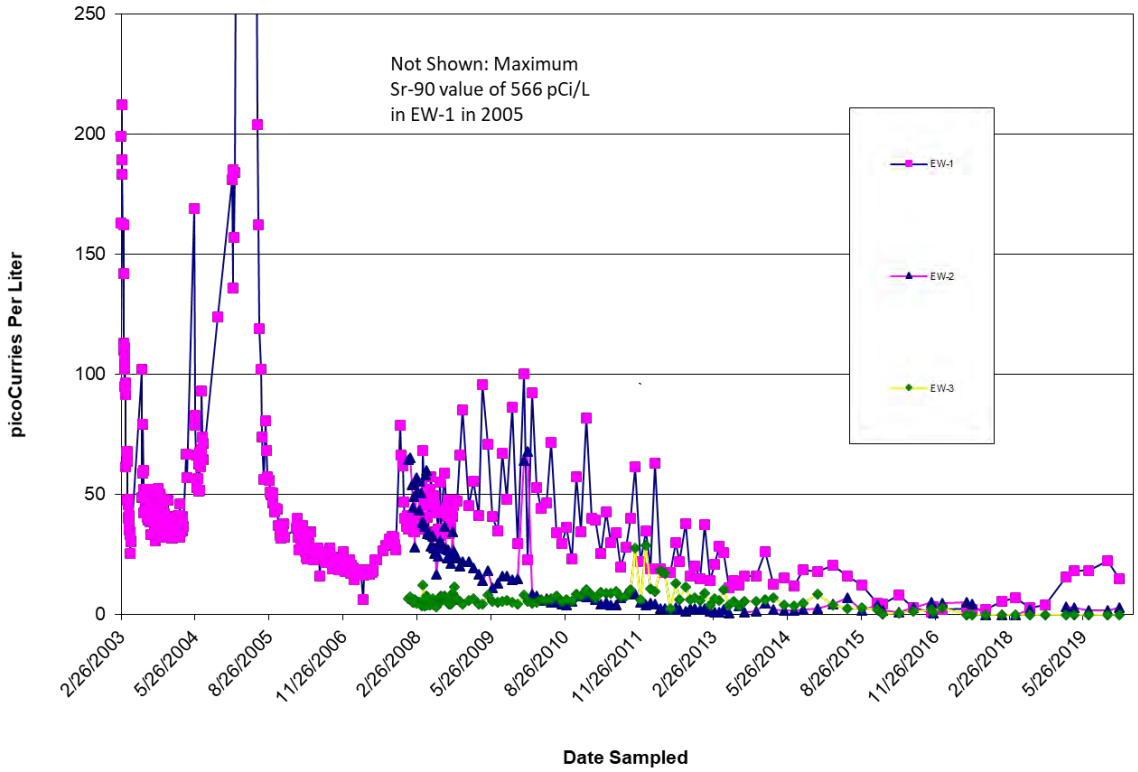


Table 12-2
OU III Sr-90 Chemical Holes Treatment System Effluent Water Quality
SPDES Equivalency Permit Concentrations January 1 – March 31, 2020

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	**Monitor**	**NA**	**GPM**	**Continuous**
pH (range)	**5.0 - 8.5**	**NA**	**SU**	**Monthly**
Sr-90	**8**	**NA**	**pCi/L**	**Monthly**

NA = Not Applicable. The system was shut down in July 2018.
ND = Not Detected.

Systems Operations

January 2020:

The system was in stand-by mode.

February 2020:

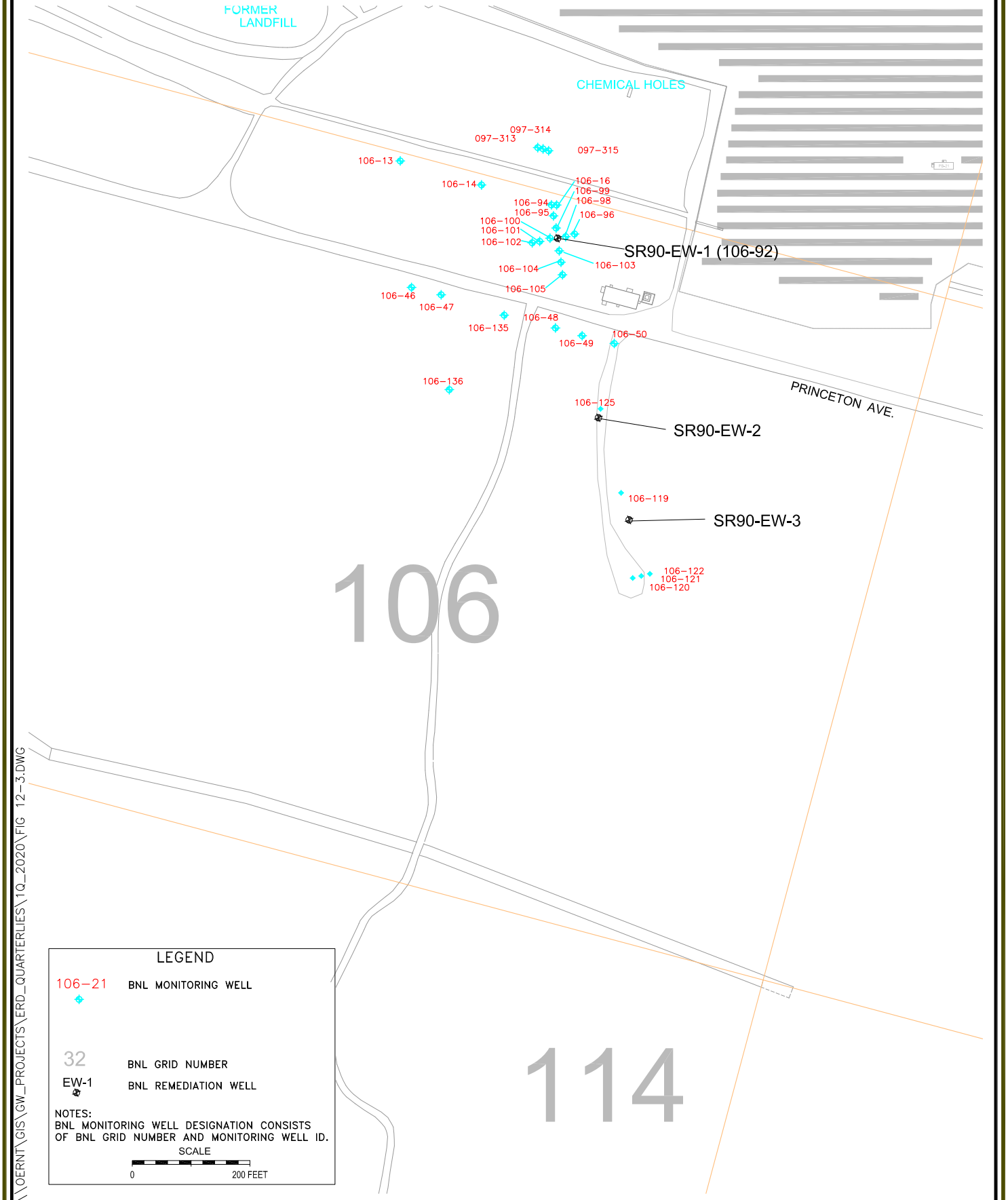
The system was in stand-by mode.

March 2020:

The system was in stand-by mode.

Planned Operational Changes

- Maintain the system in stand-by mode. If significant rebound is identified, the extraction wells may be restarted. During the first quarter, Sr-90 concentrations in extraction wells EW-2 and EW-3 were below the drinking water standard. Extraction well EW-1 had a Sr-90 concentration of 15 pCi/L for the first quarter 2020.



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BROOKHAVEN NATIONAL LABORATORY
ENVIRONMENTAL PROTECTION DIVISION

TITLE:

CHEMICAL HOLES
Sr-90 MONITORING WELL NETWORK

SITEWIDE REMEDIATION SYSTEMS
FIRST QUARTER 2020 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
JEB	–	07/15/08	–
CHKD:	APPD:	REV.:	NOTES:
LDS	– –	07/07/20	–

FIGURE NO.: 12-3

Table 12-3
OU III Strontium-90 Chemical Holes Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 097-313

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorobutanesulfonate (PFBS)	01/29/2020	0.685	1.62	--	NG/L	33.23	J
Perfluorobutyric acid (PFBA)	01/29/2020	3.62	1.82	--	NG/L	33.23	
Perfluoroheptanoic acid (PFHpA)	01/29/2020	0.927	1.82	--	NG/L	33.23	J
Perfluorohexanesulfonate (PFHxS)	01/29/2020	1.23	1.66	--	NG/L	33.23	J
Perfluorohexanoic acid (PFHxA)	01/29/2020	0.703	1.82	--	NG/L	33.23	J
Perfluorooctanesulfonate (PFOS)	01/29/2020	1.11	1.82	--	NG/L	33.23	J
Perfluorooctanoic acid (PFOA)	01/29/2020	2.64	1.82	--	NG/L	33.23	
Strontium-90	01/29/2020	5.36	0.792	0.587	PCI/L	33.23	

Site ID : 097-314

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	01/29/2020	64.1	0.689	2.75	PCI/L	36.00	

Site ID : 097-315

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	01/29/2020	2.79	0.868	0.59	PCI/L	33.07	

Site ID : 106-122

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorobutyric acid (PFBA)	01/29/2020	4.27	1.74	--	NG/L	40.00	
Perfluoroheptanoic acid (PFHpA)	01/29/2020	0.841	1.74	--	NG/L	40.00	J
Perfluorohexanesulfonate (PFHxS)	01/29/2020	0.659	1.58	--	NG/L	40.00	J
Perfluorohexanoic acid (PFHxA)	01/29/2020	1.14	1.74	--	NG/L	40.00	J
Perfluorooctanesulfonate (PFOS)	01/29/2020	2.57	1.74	--	NG/L	40.00	
Perfluorooctanoic acid (PFOA)	01/29/2020	3.33	1.74	--	NG/L	40.00	
Perfluoropentanoic acid (PFPeA)	01/29/2020	0.739	1.74	--	NG/L	40.00	J

Site ID : 106-14

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorobutyric acid (PFBA)	01/29/2020	6.48	1.7	--	NG/L	35.00	
Perfluoroheptanoic acid (PFHpA)	01/29/2020	1.51	1.7	--	NG/L	35.00	J
Perfluorohexanesulfonate (PFHxS)	01/29/2020	1.33	1.54	--	NG/L	35.00	J
Perfluorohexanoic acid (PFHxA)	01/29/2020	1.57	1.7	--	NG/L	35.00	J
Perfluorooctanesulfonate (PFOS)	01/29/2020	7.13	1.7	--	NG/L	35.00	
Perfluorooctanoic acid (PFOA)	01/29/2020	8.13	1.7	--	NG/L	35.00	
Perfluoropentanoic acid (PFPeA)	01/29/2020	1.32	1.7	--	NG/L	35.00	J

Site ID : 106-94

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluorobutyric acid (PFBA)	01/29/2020	2.13	1.74	--	NG/L	35.00	

Table 12-3
OU III Strontium-90 Chemical Holes Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 106-94

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Perfluoroheptanoic acid (PFHpA)	01/29/2020	1.13	1.74	--	NG/L	35.00	J
Perfluorohexanesulfonate (PFHxS)	01/29/2020	1.13	1.58	--	NG/L	35.00	J
Perfluorohexanoic acid (PFHxA)	01/29/2020	0.797	1.74	--	NG/L	35.00	J
Perfluorononanoic acid (PFNA)	01/29/2020	2.52	1.74	--	NG/L	35.00	
Perfluorooctanesulfonate (PFOS)	01/29/2020	3.74	1.74	--	NG/L	35.00	
Perfluorooctanoic acid (PFOA)	01/29/2020	6.78	1.74	--	NG/L	35.00	

Table 12-4
OU III Strontium-90 Chemical Holes Extraction Well Data
'Hits Only' January through March 2020

Site ID : 106-123 (EW-2)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	01/03/2020	2.72	0.757	0.653	PCI/L	0.00	

Site ID : 106-92 (EW-1)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	01/03/2020	15	0.755	1.46	PCI/L	0.00	

Qualifiers :

J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Organic Compounds :

B = Compound was found in both the sample And associated laboratory blank.

Inorganic Compounds :

B = Result Is between instrument detection limit And contract required reporting limit.

Section 13

Q1-2020 Operations Summary
OU III Former Industrial Park East Pump & Treat System
(System Closed)

The Petition for Closure for the OU III Industrial Park East Groundwater Treatment System was submitted to the regulators for review in May 2013. Approval was received from the regulators in June and July 2013 that the system met its treatment goals and can now be dismantled. Any remaining contaminants in the downgradient portion of the plume beyond the capture zone of the extraction wells will attenuate to below MCLs in the Upper Glacial and Magothy aquifers before the required 2030 and 2065 cleanup timeframes, respectively.

Dismantlement activities have been initiated including the abandonment of four groundwater monitoring wells (000-489, 000-493, 000-513, 000-514) and the two groundwater extraction wells (EWI-1 and EWI-2) in September 2013. Final decommissioning of the treatment system will be performed following the completion of remediation of the deep VOC contamination in the Industrial Park.

The building, carbon units, and the two recharge wells are being used with the two new extraction wells for remediation of the deep VOC contamination in the Industrial Park.

The post closure monitoring network consists of four wells. In accordance with the recommendation in the *2015 Groundwater Status Report*, VOC monitoring for seven wells was discontinued in the fourth quarter of 2016 since the wells have been below the AWQS for a minimum of four consecutive sampling events. The data from the four wells are also evaluated as part of the North Street and Magothy monitoring programs. Monitoring will continue until MCLs are achieved for a minimum of four consecutive sampling events. The monitoring schedule is described in the BNL Environmental Monitoring Plan (EMP).

Section 14

Q1-2020 Operations Summary
OU III North Street Pump & Treat System

Process: Groundwater extraction and liquid phase granular activated carbon treatment, with discharge to injection wells

Goal: Reach Maximum Contaminant Levels (MCLs) or asymptotic conditions in core monitoring wells within 30 years for the Upper Glacial aquifer and within 65 years for the Magothy aquifer (by 2030 and 2065, respectively).

Start Date: June 2004

Table 14-1
OU III North Street Pump & Treat System
Pumping Rates (gpm)

Extraction Well	NS-1	NS-2
Site ID #	000-471	000-473
Screen Interval (ft bls)	165-205	190-220
Design Flow Rate (GPM)	200	250
January	off	off
February	off	off
March	off	off
Actual (Avg. over Qtr.)	0	0

Notes: The system was shut down and placed in standby mode in 2013. NS-1 was temporarily restarted in 2014 due to increasing VOCs in nearby monitoring wells, and then shut down in June 2015. NS-1 was again restarted in August 2015. NS-2 was restarted September 2014 due to increasing VOCs in nearby monitoring wells, and then shut down in June 2015. The system was shut down and placed in standby mode August 2016.

Figure 14-1
OU III North Street Pump & Treat System
Cumulative Mass Removal of VOCs vs. Time

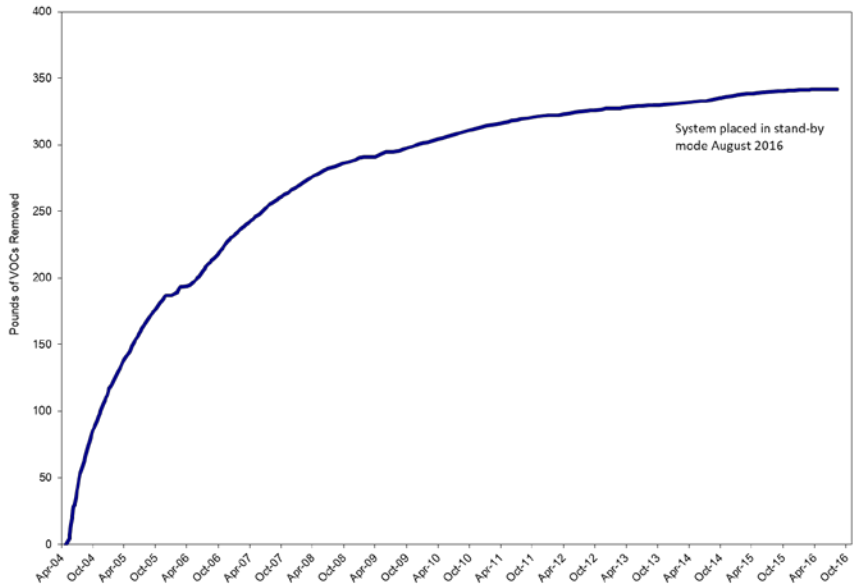


Figure 14-2
OU III North Street Pump & Treat System
Influent TVOC Concentrations vs. Time

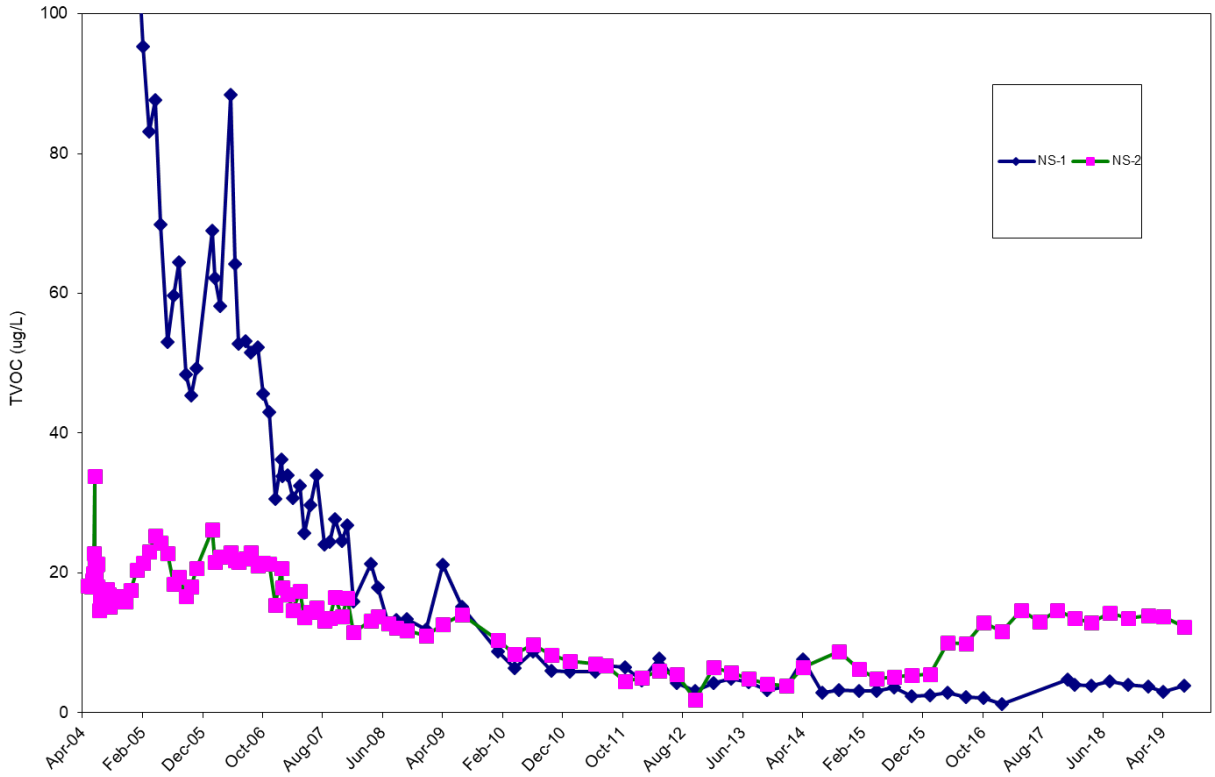


Table 14-2
Effluent Water Quality
SPDES Equivalency Permit Concentrations January 1 – March 31, 2020

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	**Monitor**	NA [1]	**GPD**	**Continuous**
pH (range)	**5.5 - 8.5**	NA	**SU**	**Monthly**
Carbon Tetrachloride	**5**	NA	**ug/L**	**Monthly**
Chloroform	**5**	NA	**ug/L**	**Monthly**
1,1-Dichloroethane	**5**	NA	**ug/L**	**Monthly**
1,2-Dichloroethane	**5**	NA	**ug/L**	**Monthly**
1,1-Dichloroethylene	**5**	NA	**ug/L**	**Monthly**
Tetrachloroethylene	**5**	NA	**ug/L**	**Monthly**
Toluene	**5**	NA	**ug/L**	**Monthly**
1,1,1-Trichloroethane	**5**	NA	**ug/L**	**Monthly**
Trichloroethylene	**10**	NA	**ug/L**	**Monthly**

[1] The system is in stand-by mode. [NA=] Not Applicable.

System Operations

January 2020:

The system remained in standby mode.

February 2020:

The system remained in standby mode.

March 2020:

The system remained in standby mode.

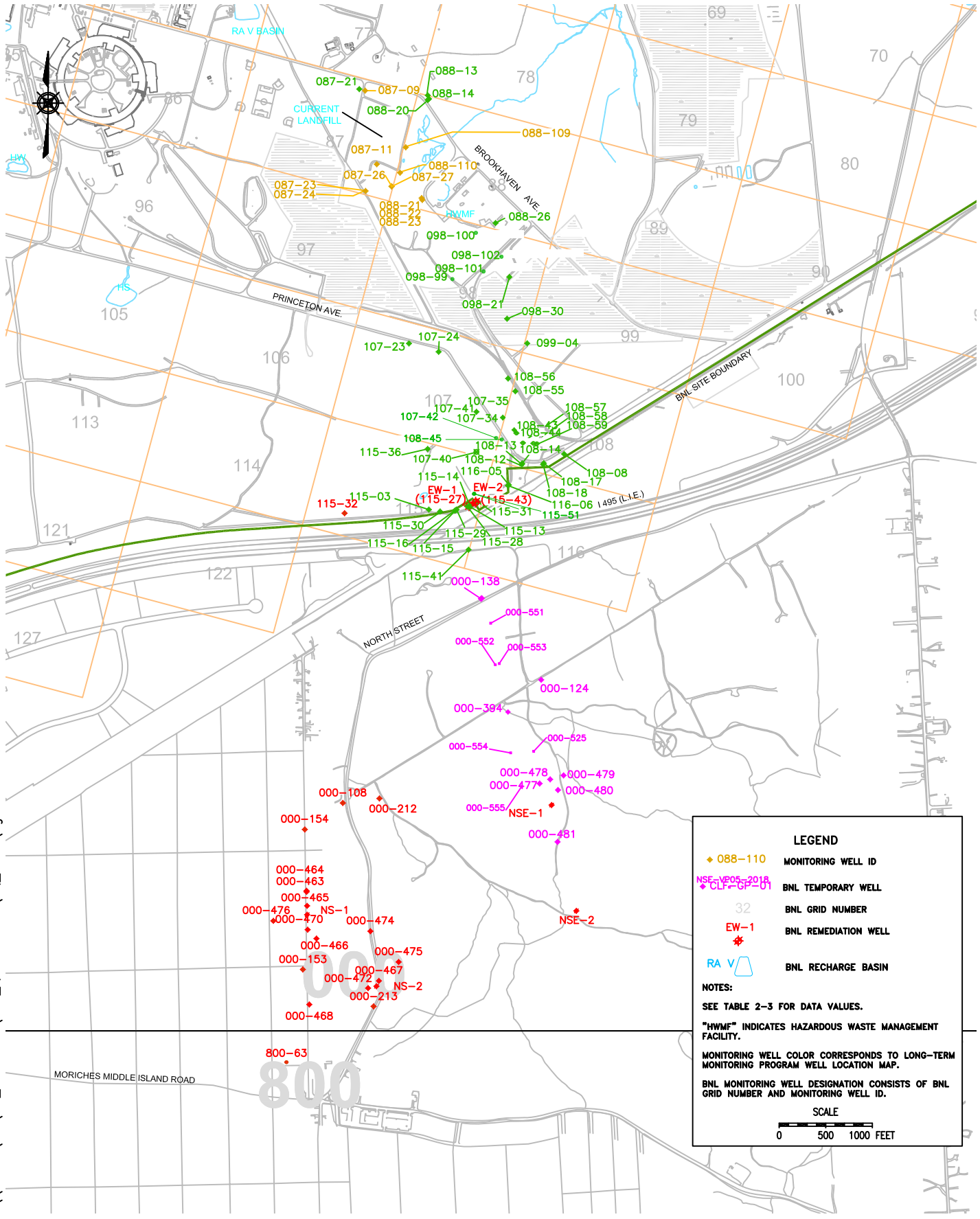
A Petition for Closure was submitted for this system to the regulators in February 2020, as this system has met its cleanup goals. NYSDEC provided their approval in March 2020. EPA had no response.

Due to the nearby construction of the new North Street East extraction wells and system modification, the North Street system has been shut down and electrically locked-out

since July 2019. Therefore, no North Street quarterly extraction well samples were obtained since.

Planned Operational Changes

- Since construction of the nearby North Street East extraction wells and system modification was completed, sampling of the North Street extraction wells will be performed in July 2020. This will be the last quarterly samples collected for this system.
- As noted in the Petition for Closure, seven of the 12 core monitoring wells are proposed for continued annual monitoring until the results for individual VOCs are consistently below MCLs. Sampling of the remaining 11 monitoring wells will be discontinued but the wells will be retained until the completion of the PFAS and 1,4-dioxane characterization.



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BROOKHAVEN NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION DIVISION

TITLE:

OU I SOUTH BOUNDARY/NORTH STREET/NORTH STREET EAST MONITORING WELL NETWORK

SITEWIDE REMEDIATION SYSTEMS
FIRST QUARTER 2020 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
JEB	–	08/08/11	–
CHKD:	APPD:	REV.:	NOTES:
LDS	--	07/08/20	–

FIGURE NO.: 14-3

Section 15

Q1-2020 Operations Summary
OU III North Street East Pump & Treat System

Process: Groundwater extraction and liquid phase granular activated carbon treatment, with discharge to injection wells.

Goal: Reach Maximum Contaminant Levels (MCLs) in core monitoring wells within 30 years for the Upper Glacial aquifer (by 2030).

Start Date: June 2004

Table 15-1
OU III North Street East Pump & Treat System
Pumping Rates (gpm)

Extraction Well	NSE-1	NSE-2
Site ID #	000-487	00-488
Screen Interval (ft bls)	161-191	152-182
Desired Flow Rate (GPM)	200	100
January	0	0
February	0	0
March	0	0
Actual (Avg. over Qtr.)	0	0

Notes: The system was shut down June 2014 following approval from the regulators on the Petition for Shutdown.

Figure 15-1
OU III North Street East Pump & Treat System
Cumulative Mass Removal of VOCs vs. Time

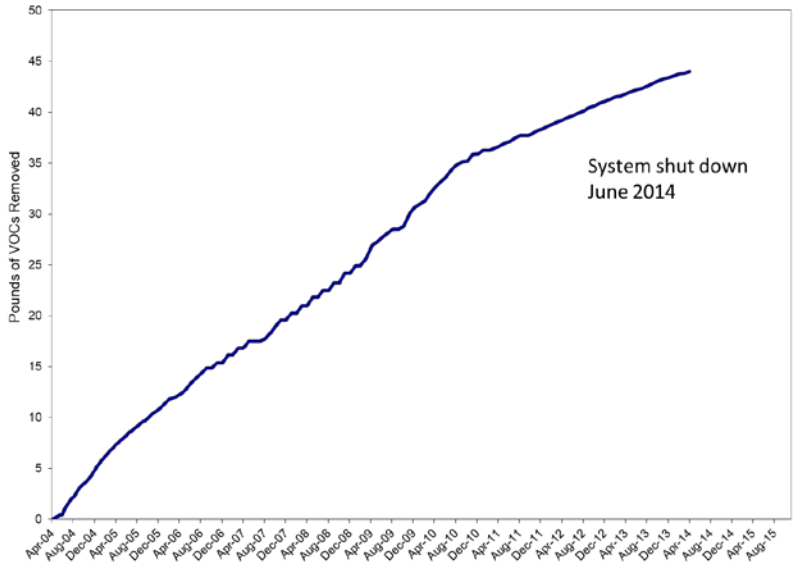


Figure 15-2
OU III North Street East Pump & Treat System
Influent TVOC Concentrations vs. Time

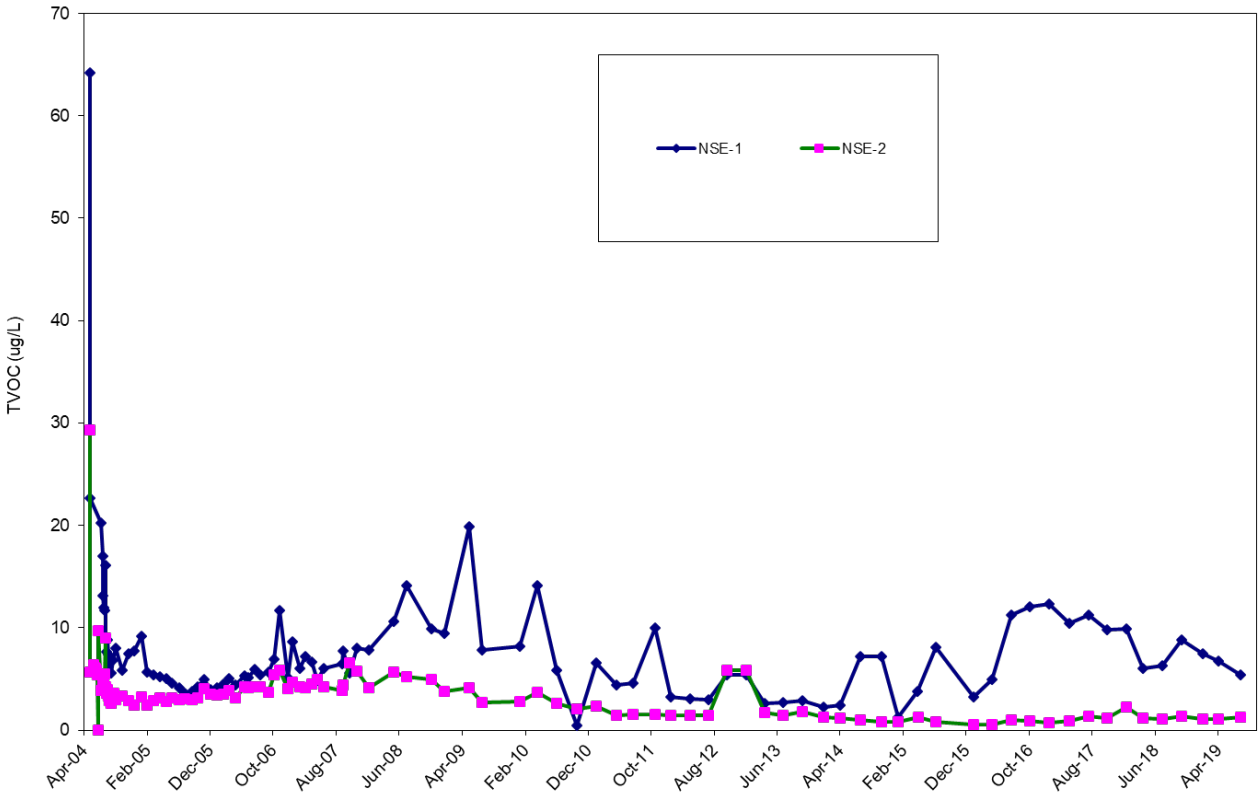


Table 15-2
Effluent Water Quality
SPDES Equivalency Permit Concentrations January 1 – March 31, 2020

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	Monitor	NA	GPD	Continuous
pH (range)	5.5 - 8.5	NA	SU	Monthly
Carbon Tetrachloride	5	NA	ug/L	Monthly
Chloroform	5	NA	ug/L	Monthly
1,1-Dichloroethane	5	NA	ug/L	Monthly
1,2-Dichloroethane	5	NA	ug/L	Monthly
1,1-Dichloroethylene	5	NA	ug/L	Monthly
Tetrachloroethylene	5	NA	ug/L	Monthly
Toluene	5	NA	ug/L	Monthly
1,1,1-Trichloroethane	5	NA	ug/L	Monthly
Trichloroethylene	10	NA	ug/L	Monthly

NA= Not Applicable. The system is in stand-by mode.

System Operations

January 2020:

The system remained in standby mode.

February 2020:

The system remained in standby mode.

March 2020:

The system remained in standby mode.

Two additional extraction wells and associated piping/electric/communications were installed to remediate the ethylene dibromide (EDB) plume. Due to the construction activities for the system modification, the extraction wells have been shut down and

electrically locked-out since July 2019. Therefore, no North Street East quarterly extraction well samples were obtained since.

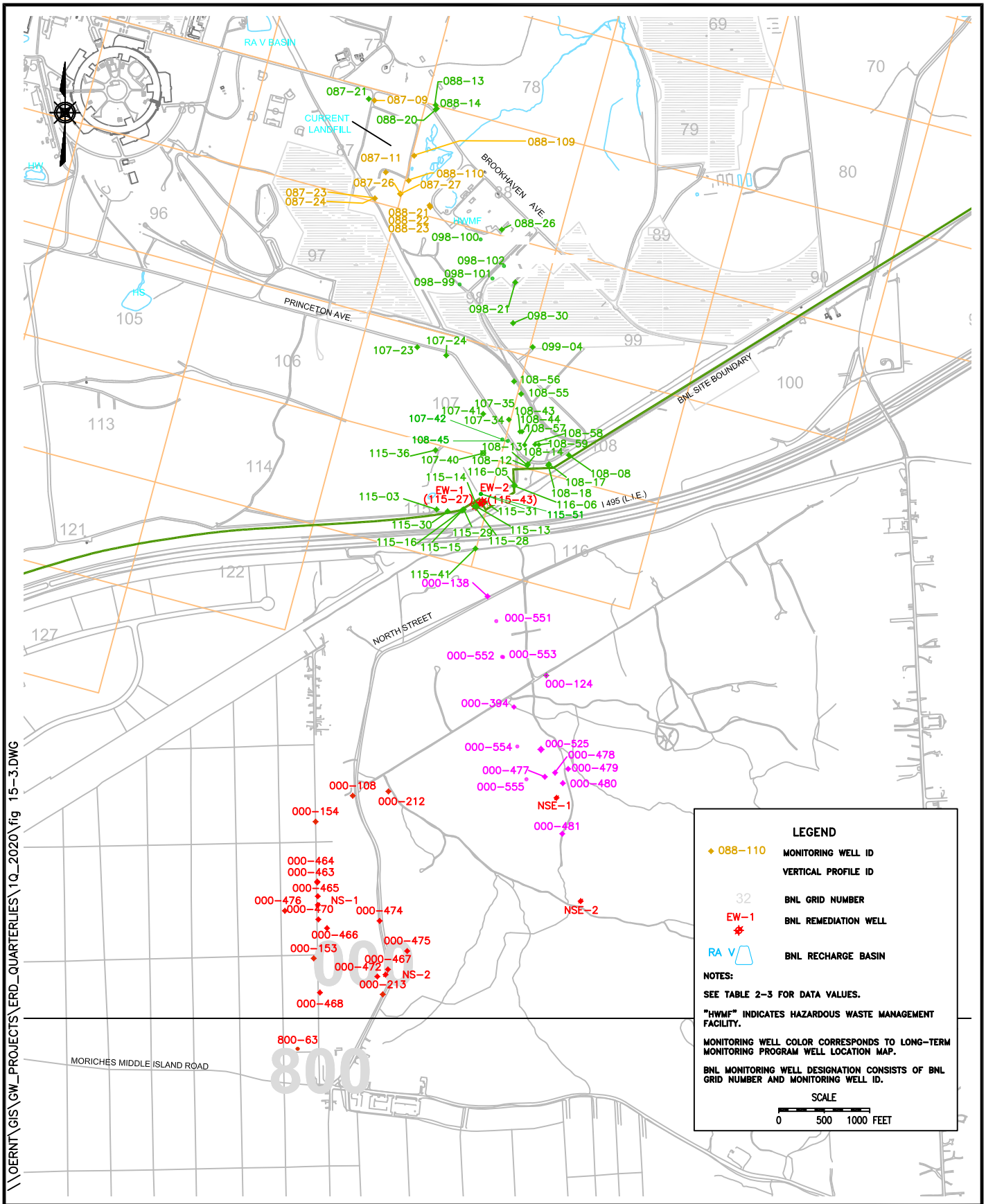
Planned Operational Changes

Original VOC Plume:

- The original NSE VOC treatment system (including extraction wells NSE-1 and NSE-2) met its goals in 2014 with no significant rebound identified. A formal petition for closure will not be prepared for the original VOC treatment system since the infrastructure will be used for remediation of the EDB plume. However, it is recommended that this system be administratively closed for its originally designed purpose. Until administrative approval for closure is received, this treatment system will be maintained in standby mode. The extraction wells will be sampled in July 2020 and will continue to be sampled on a quarterly basis for VOCs via Method 524.2 and NSE-1 for EDB using Method 504. One or both extraction wells can be restarted if TVOC concentrations in the core monitoring wells or extraction wells rebound to concentrations above the capture goal of 50 µg/L, or if EDB is detected in NSE-1. Sampling of extraction wells NSE-1 and NSE-2 will be performed in July 2020.

EDB Plume:

- Complete the connection of the two new EDB extraction wells and begin start-up testing in July 2020. Submit a revised Operations and Maintenance Manual to the regulators.
- Maintain the quarterly sampling frequency for the 12 EDB monitoring wells using Method 504, except for upgradient perimeter well 115-42 which is sampled semi-annually.



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BROOKHAVEN NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION DIVISION

TITLE:

OU I SOUTH BOUNDARY/NORTH STREET/NORTH STREET EAST MONITORING WELL NETWORK

SITEWIDE REMEDIATION SYSTEMS
FIRST QUARTER 2020 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
JEB	–	08/08/11	NA
CHKD:	APPD:	REV.:	NOTES:
LDS	--	07/08/20	–

FIGURE NO.: 15-3

Table 15-3
OU III North Street East Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 000-394

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	03/06/2020	0.076	0.0201	--	UG/L	178.00	

Site ID : 000-551

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	03/06/2020	0.0136	0.0202	--	UG/L	175.00	J

Site ID : 000-552

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	03/04/2020	0.0539	0.02	--	UG/L	155.00	

Qualifiers :

J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Organic Compounds :

B = Compound was found in both the sample And associated laboratory blank.

Inorganic Compounds :

B = Result Is between instrument detection limit And contract required reporting limit.

Section 16

Q1-2020 Operations Summary
OU III LIPA/Airport Treatment System

Process: Groundwater extraction and liquid phase granular activated carbon treatment, with discharge to injection wells

Goal: Reach Maximum Contaminant Levels (MCLs) in core monitoring wells within 30 years for the Upper Glacial aquifer (by 2030), and within 65 years for the Magothy aquifer (by 2065).

Start Date: August 2004

Table 16-1
OU III LIPA/Airport Treatment System
Pumping Rates (gpm)

Extraction Well	EW-1L	EW-2L	EW-3L	EW-4L*	RTW-1A	RTW-2A	RTW-3A	RTW-4A*	RTW-5A	RTW-6A
Site ID	000-453	000-455	000-457	000-461	800-109	800-110	800-111	800-112	800-113	800-132
Screen Interval (ft bls)	217-237	224-244	216-236	304-324	188-208	188-208	210-230	268-288	220-240	165-185
Desired Flow Rate (GPM)	0**	0**	0**	0**	100	100	100	100	0***	150
January	0	0	0	0	100	50	77	155	0	146
February	0	0	0	0	100	50	78	161	0	160
March	0	0	0	0	100	0	0	160	0	151
Actual (Avg. over QTR.)	**0**	**0**	**0**	**0**	**100**	**50**	**78**	**159**	**0**	**152**

***** EW-4L and RTW-4A are Magothy aquifer extraction wells.

****** EW-1L, EW-2L, and EW-3L are in standby mode. EW-4L was put in standby January 2017. RTW-2A and RTW-3A were pulsed pumped, consisting of one week on and three weeks off, through February 2020. Both wells were placed in standby mode in March 2020. RTW-4A resumed full time operation in 2011.

***RTW-5A was placed on standby September 2016.

Figure 16-1
OU III LIPA/ Airport Treatment System
Cumulative Mass Removal of VOCs vs. Time

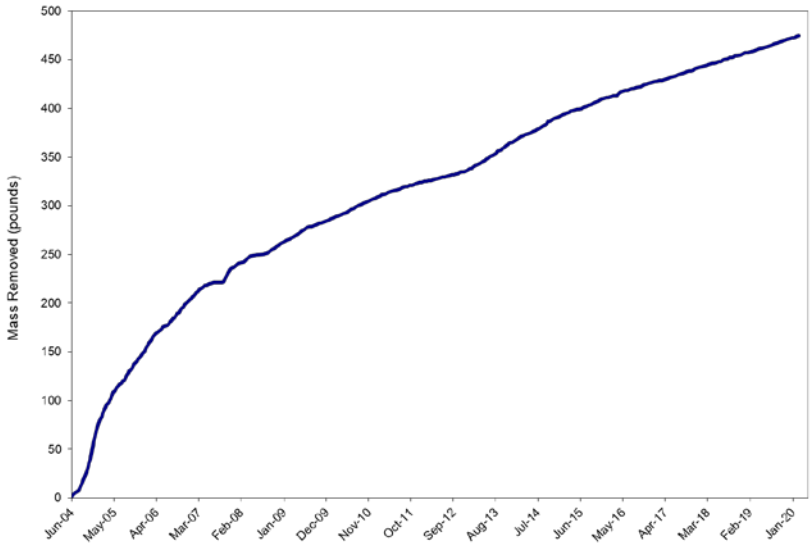


Figure 16-2
OU III LIPA/ Airport Treatment System
Influent TVOC Concentrations vs. Time

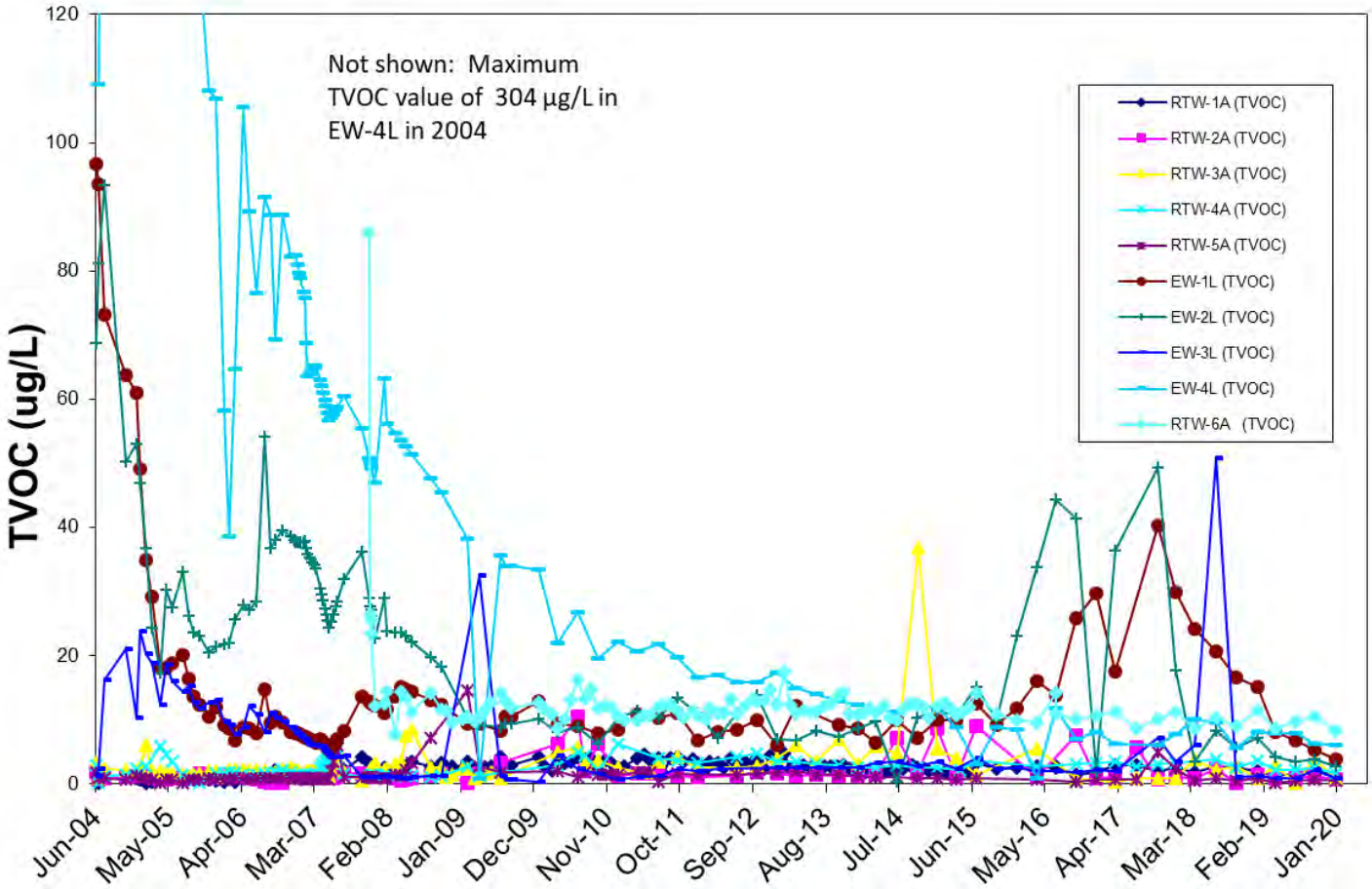


Table 16-2
Effluent Water Quality
SPDES Equivalency Permit Concentrations January 1 – March 31, 2020

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	Monitor	612,902 [1]	GPD	Continuous
pH (range)	5.5 – 7.5	5.6-6.1	SU	Monthly
Carbon Tetrachloride	5	<0.50	ug/L	Monthly
Chloroform	7	<0.50	ug/L	Monthly
1,1-Dichloroethane	5	<0.50	ug/L	Monthly
1,1-Dichloroethylene	5	<0.50	ug/L	Monthly
Methylene Chloride	5	<0.50	ug/L	Monthly
1,1,1-Trichloroethane	5	<0.50	ug/L	Monthly
Trichloroethylene	10	<0.50	ug/L	Monthly

[1] The average flow for the operational period at the influent flow meter.

System Operations

January 2020:

Extraction wells RTW-1A, RTW-4A, and RTW-6A ran normally for the month. RTW-2A and RTW-3A were pulsed pumped (one week on). The LIPA extraction wells and Airport extraction well RTW-5A remained in standby mode. The system treated approximately 18 million gallons of water.

February 2019:

Extraction wells RTW-1A, RTW-4A and RTW-6A ran normally for the month. RTW-2A and RTW-3 were pulsed pumped (one week on). The LIPA extraction wells and Airport extraction well RTW-5A remained in standby mode. The system treated approximately 19 million gallons of water.

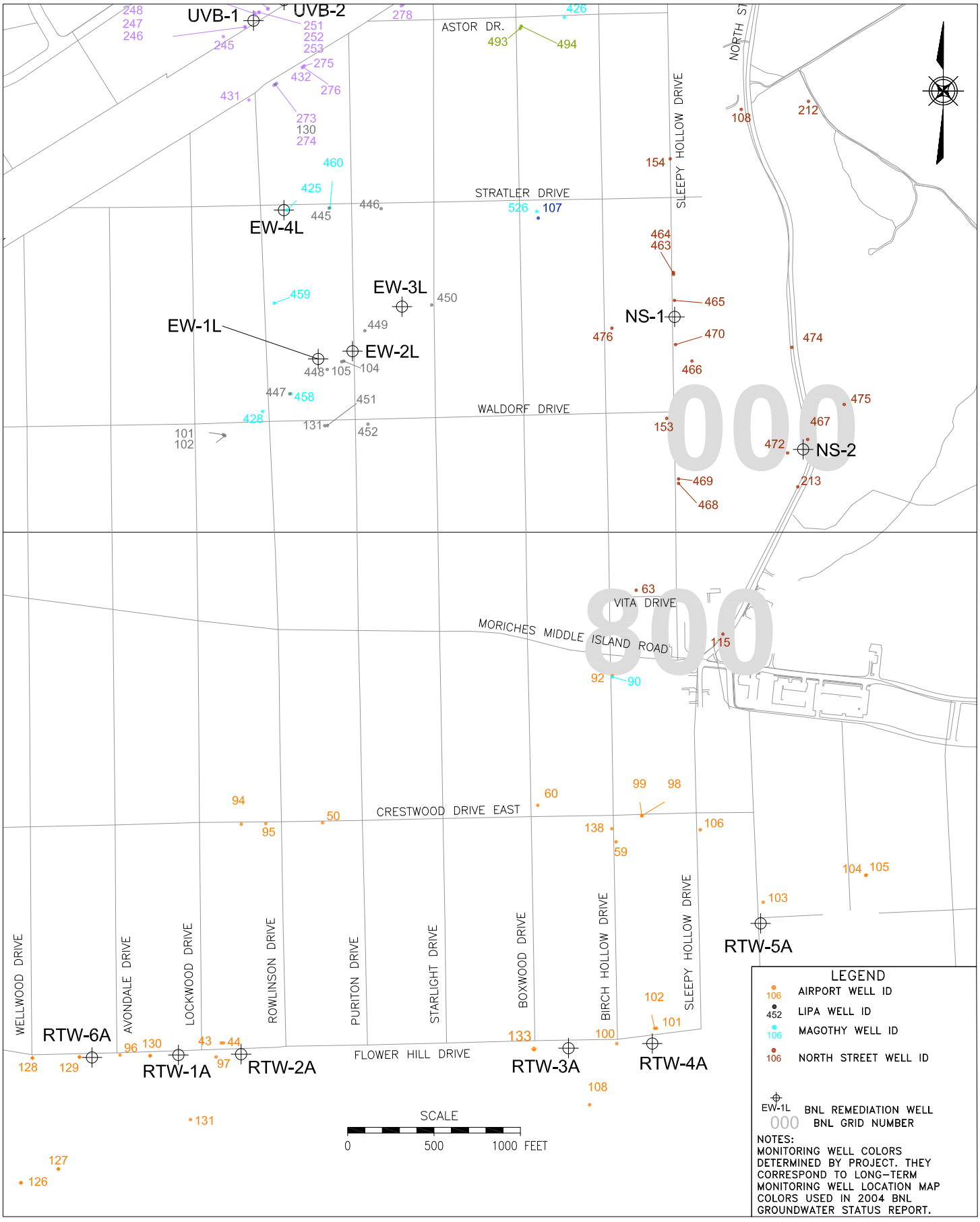
March 2020:

Extraction wells RTW-1A, RTW-4A and RTW-6A ran normally for the month. Wells RTW-2A and RTW-3A were placed in standby mode. The system was off for a few days for repairs to RTW-3A. The LIPA system and Airport extraction well RTW-5A remained in standby mode. The system treated approximately 17 million gallons of water.

The system treated approximately 54 million gallons of water during the first quarter of 2020.

Planned Operational Changes

- Continue full time operation of Airport extraction wells RTW-1A, RTW-4A and RTW-6A. Maintain wells RTW-2A, RTW-3A and RTW-5A in standby mode. If concentrations above the capture goal of 10 µg/L TVOC are observed in any of the extraction wells or the monitoring wells adjacent to wells that are not operating, the well(s) will be put back into full-time operation. During the first quarter of 2020, extraction wells RTW-2A, RTW-3A, RTW-5A, and adjacent monitoring wells did not exceed TVOC concentrations of 10 µg/L.
- Maintain LIPA wells EW-1, EW-2, EW-3L and EW-4L in standby mode. These extraction wells may be restarted if TVOC concentrations rebound above the 50 µg/L capture goal in either the plume core monitoring wells or the extraction wells. During the first quarter of 2020, none of the LIPA monitoring wells detected TVOCs above the capture goal of 50 µg/L.



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BROOKHAVEN NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION DIVISION

TITLE:

OU III AIRPORT/LIPA

SITEWIDE REMEDIATION SYSTEMS
FIRST QUARTER 2020 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
JEB	–	09/26/05	–
CHKD:	APPD:	REV.:	NOTES:
LDS	––	07/07/20	–

FIGURE NO.: 16-3

Table 16-3
OU III LIPA/Airport Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 000-428

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	03/12/2020	0	--	--	UG/L	298.00	

Site ID : 000-460

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	02/14/2020	0	--	--	UG/L	300.00	

Site ID : 800-108

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	03/09/2020	0	--	--	UG/L	216.00	

Site ID : 800-126

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	03/11/2020	0	--	--	UG/L	175.00	

Site ID : 800-127

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	03/09/2020	0	--	--	UG/L	175.00	

Site ID : 800-128

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	03/09/2020	0	--	--	UG/L	180.00	

Site ID : 800-131

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	03/09/2020	0	--	--	UG/L	194.00	

Site ID : 800-133

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	03/09/2020	1.4	--	--	UG/L	225.00	
Chloroform	03/09/2020	1	0.5	--	UG/L	225.00	
Methyl tert-butyl ether	03/09/2020	0.4	0.5	--	UG/L	225.00	J

Site ID : 800-60

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	03/11/2020	0.63	--	--	UG/L	210.00	
Chloroform	03/11/2020	0.63	0.5	--	UG/L	210.00	

Table 16-4
OU III LIPA/Airport Extraction Well Data
'Hits Only' January through March 2020

Site ID : 000-453 (EW-1L)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/08/2020	1.2	0.5	--	UG/L	227.00	
1,1-Dichloroethylene	01/08/2020	0.67	0.5	--	UG/L	227.00	
524.2 TVOC	01/08/2020	3.74	--	--	UG/L	227.00	
Chloroform	01/08/2020	0.87	0.5	--	UG/L	227.00	
Trichloroethylene	01/08/2020	1	0.5	--	UG/L	227.00	

Site ID : 000-455 (EW-2L)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/08/2020	0.75	0.5	--	UG/L	234.00	
1,1-Dichloroethylene	01/08/2020	0.62	0.5	--	UG/L	234.00	
524.2 TVOC	01/08/2020	2.7	--	--	UG/L	234.00	
Chloroform	01/08/2020	0.6	0.5	--	UG/L	234.00	
Trichloroethylene	01/08/2020	0.73	0.5	--	UG/L	234.00	

Site ID : 000-457 (EW-3L)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/08/2020	0.17	0.5	--	UG/L	226.00	J
524.2 TVOC	01/08/2020	0.86	--	--	UG/L	226.00	
Chloroform	01/08/2020	0.69	0.5	--	UG/L	226.00	

Site ID : 000-461 (EW-4L)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/08/2020	6.08	--	--	UG/L	314.00	
Carbon tetrachloride	01/08/2020	0.87	0.5	--	UG/L	314.00	
Chloroform	01/08/2020	0.71	0.5	--	UG/L	314.00	
Tetrachloroethylene	01/08/2020	3.2	0.5	--	UG/L	314.00	
Trichloroethylene	01/08/2020	1.3	0.5	--	UG/L	314.00	

Site ID : 800-109 (RTW-1A)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/08/2020	0.96	--	--	UG/L	198.00	
Carbon tetrachloride	01/08/2020	0.52	0.5	--	UG/L	198.00	
Chloroform	01/08/2020	0.44	0.5	--	UG/L	198.00	J

Site ID : 800-110 (RTW-2A)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/08/2020	0.64	--	--	UG/L	198.00	
Chloroform	01/08/2020	0.64	0.5	--	UG/L	198.00	

Table 16-4
OU III LIPA/Airport Extraction Well Data
'Hits Only' January through March 2020

Site ID : 800-111 (RTW-3A)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/08/2020	0.77	--	--	UG/L	220.00	
Chloroform	01/08/2020	0.41	0.5	--	UG/L	220.00	J
Trichloroethylene	01/08/2020	0.36	0.5	--	UG/L	220.00	J

Site ID : 800-112 (RTW-4A)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/08/2020	1.54	--	--	UG/L	278.00	
Chloroform	01/08/2020	0.69	0.5	--	UG/L	278.00	
Trichloroethylene	01/08/2020	0.85	0.5	--	UG/L	278.00	

Site ID : 800-113 (RTW-5A)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/08/2020	0.45	--	--	UG/L	230.00	
Chloroform	01/08/2020	0.45	0.5	--	UG/L	230.00	J

Site ID : 800-132 (RTW-6A)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/08/2020	0.21	0.5	--	UG/L	175.00	J
1,1-Dichloroethylene	01/08/2020	0.29	0.5	--	UG/L	175.00	J
524.2 TVOC	01/08/2020	8.12	--	--	UG/L	175.00	
Carbon tetrachloride	01/08/2020	1.9	0.5	--	UG/L	175.00	
Chloroform	01/08/2020	0.52	0.5	--	UG/L	175.00	
Trichloroethylene	01/08/2020	5.2	0.5	--	UG/L	175.00	

Table 16-5
OU III LIPA/Airport Influent Data
'Hits Only' January through March 2020

Site ID : 800-122 (Combined Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/08/2020	0.3	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	01/08/2020	0.26	0.5	--	UG/L	0.00	J
524.2 TVOC	01/08/2020	3.37	--	--	UG/L	0.00	
Carbon tetrachloride	01/08/2020	0.48	0.5	--	UG/L	0.00	J
Chloroform	01/08/2020	0.61	0.5	--	UG/L	0.00	
Tetrachloroethylene	01/08/2020	0.32	0.5	--	UG/L	0.00	J
Trichloroethylene	01/08/2020	1.4	0.5	--	UG/L	0.00	
524.2 TVOC	01/22/2020	3.42	--	--	UG/L	0.00	
Carbon tetrachloride	01/22/2020	0.6	0.5	--	UG/L	0.00	
Chloroform	01/22/2020	0.52	0.5	--	UG/L	0.00	
Trichloroethylene	01/22/2020	2.3	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	02/04/2020	0.13	0.5	--	UG/L	0.00	J
524.2 TVOC	02/04/2020	2.91	--	--	UG/L	0.00	
Carbon tetrachloride	02/04/2020	0.51	0.5	--	UG/L	0.00	
Chloroform	02/04/2020	0.57	0.5	--	UG/L	0.00	
Trichloroethylene	02/04/2020	1.7	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	02/19/2020	0.13	0.5	--	UG/L	0.00	J
524.2 TVOC	02/19/2020	4.25	--	--	UG/L	0.00	
Carbon tetrachloride	02/19/2020	0.91	0.5	--	UG/L	0.00	
Chloroform	02/19/2020	0.61	0.5	--	UG/L	0.00	
Trichloroethylene	02/19/2020	2.6	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	03/04/2020	0.21	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	03/04/2020	0.26	0.5	--	UG/L	0.00	J
524.2 TVOC	03/04/2020	5.42	--	--	UG/L	0.00	
Carbon tetrachloride	03/04/2020	1.2	0.5	--	UG/L	0.00	
Chloroform	03/04/2020	0.75	0.5	--	UG/L	0.00	
Trichloroethylene	03/04/2020	3	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	03/17/2020	0.17	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	03/17/2020	0.21	0.5	--	UG/L	0.00	J
524.2 TVOC	03/17/2020	4.62	--	--	UG/L	0.00	
Carbon tetrachloride	03/17/2020	0.97	0.5	--	UG/L	0.00	
Chloroform	03/17/2020	0.67	0.5	--	UG/L	0.00	
Trichloroethylene	03/17/2020	2.6	0.5	--	UG/L	0.00	

Table 16-6
OU III LIPA/Airport Effluent Data
'Hits Only' January through March 2020

Site ID : 800-124 (System Effluent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	01/08/2020	0	--	--	UG/L	0.00	
524.2 TVOC	01/22/2020	0	--	--	UG/L	0.00	
524.2 TVOC	02/04/2020	0	--	--	UG/L	0.00	
524.2 TVOC	02/19/2020	0	--	--	UG/L	0.00	
524.2 TVOC	03/04/2020	0.26	--	--	UG/L	0.00	
Chloroform	03/04/2020	0.26	0.5	--	UG/L	0.00	J
524.2 TVOC	03/17/2020	0.36	--	--	UG/L	0.00	
Chloroform	03/17/2020	0.36	0.5	--	UG/L	0.00	J

Qualifiers :

J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Organic Compounds :

B = Compound was found in both the sample And associated laboratory blank.

Inorganic Compounds :

B = Result Is between instrument detection limit And contract required reporting limit.

Section 17

Q1-2020 Operations Summary
OU III Strontium-90 BGRR/WCF Treatment System

Process: Groundwater extraction with liquid phase granular activated carbon treatment for volatile organic compounds, followed by clinoptilolite zeolite treatment for the removal of Sr-90, with discharge to dry wells.

Goal: Reach Maximum Contaminant Levels (MCLs) in core monitoring wells within 70 years for the Upper Glacial aquifer (by 2070).

Start Date: June 2005

Table 17-1
OU III Strontium-90 BGRR/WCF Treatment System
Pumping Rates (gpm)

Extraction Well	SR-1	SR-2	SR-3*	SR-4*	SR-5*	SR-6*	SR-7*	SR-8*	SR-9
Site Id #	065-368	065-369	075-676	075-677	075-678	065-403	075-702	075-703	075-704
Screen Interval (ft bls)	33-53	33.5-53.5	51-71	35-75	35-75	85-105	82-102	77-97	67-87
Desired Flow Rate (gpm)	**5**	**5**	**5**	**5**	**5**	**10**	**10**	**10**	**10**
January (Avg gpm)	5.4	6.9	5.4	0	0	0	0	12.8	10
February "	5.4	7.2	5.4	0	0	0	0	0	10
March "	4.5	6.0	4.5	0	0	0	0	5.9	8.3
Actual (Avg. over Qtr.)	**5.1**	**6.7**	**5.1**	**0**	**0**	**0**	**0**	**9.4**	**9.4**

*Wells SR-4 and SR-5 were placed in stand-by mode in September 2016. Well SR-6 was placed in standby mode in October 2017. Wells SR-3 and SR-7 were placed in standby mode October 2018. Well SR-8 was placed in pulsed pumping mode in October 2018. Well SR-3 was put back in operation in February 2019.

Figure 17-1
Strontium-90 BGRR/WCF Treatment System
Cumulative Millicuries Removed

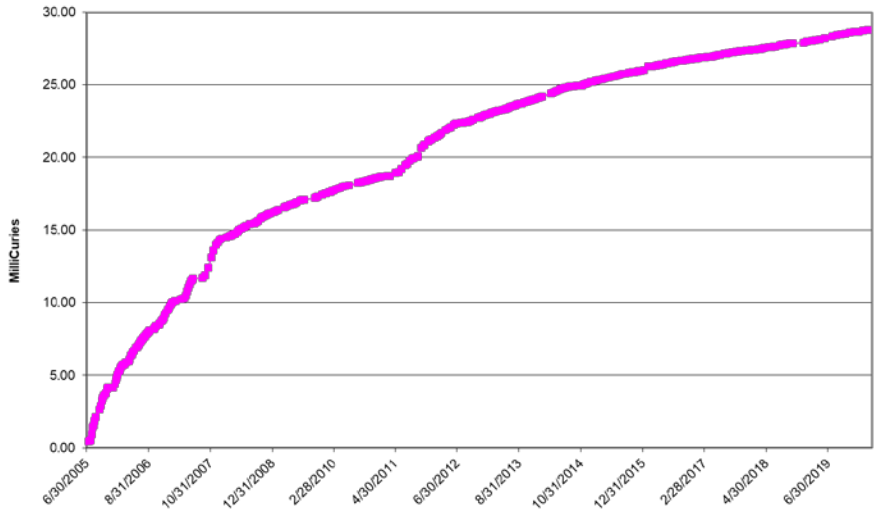

Figure 17-2
Strontium-90 BGRR/WCF Treatment System
Influent Sr-90 Concentrations vs. Time

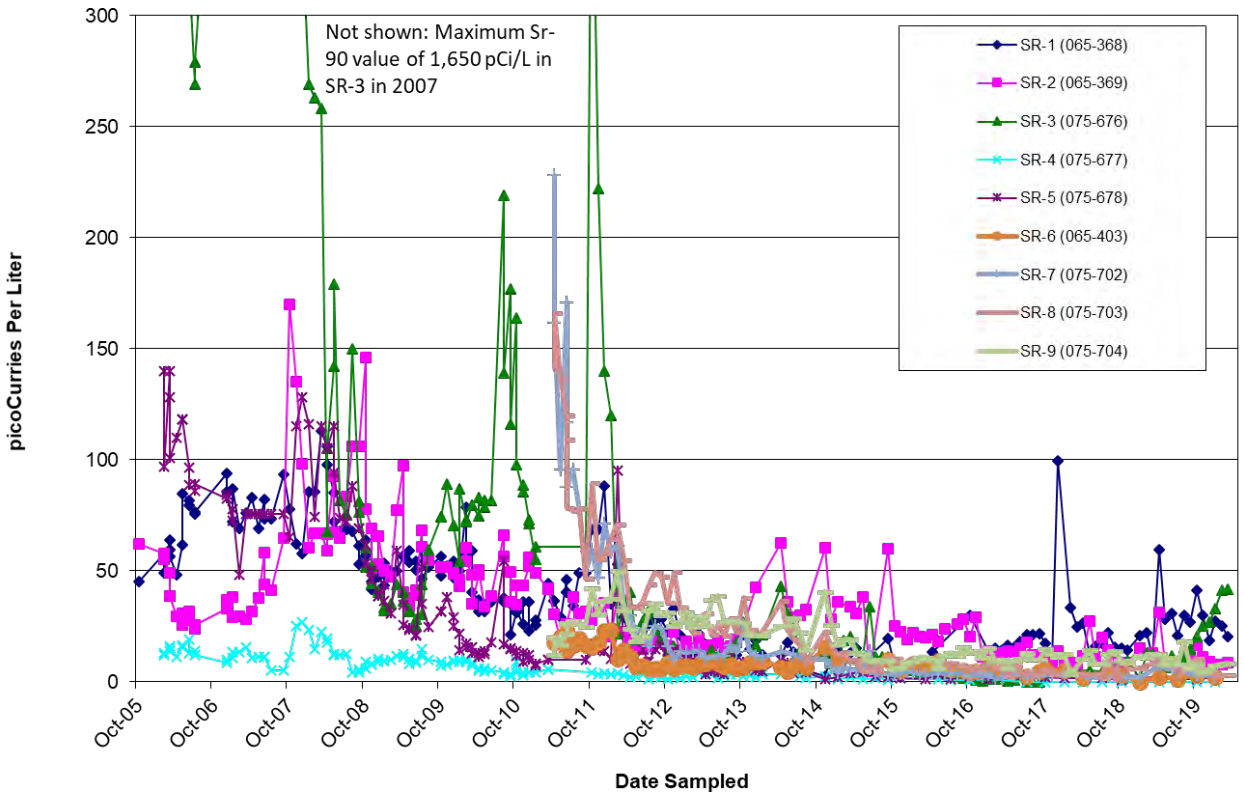

Table 17-2
Strontium-90 BGRR/WCF Treatment System Effluent Water Quality
SPDES Equivalency Permit Concentrations January 1, 2020 – March 31, 2020

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	75	41	GPM	Continuous
pH (range)	5.5 – 8.5	6.2– 6.5	SU	Weekly
Strontium-90	8.0	<0.5	PCi/L	Monthly[1]
Chloroform	7.0	<0.5	ug/L	Monthly[1]
1,1-Dichloroethane	5.0	<0.5	ug/L	Monthly[1]
Ethylbenzene	5.0	<0.5	ug/L	Monthly[1]
Methyl Chloride	5.0	<0.5	ug/L	Monthly[1]
Methylene Chloride	5.0	<0.5	ug/L	Monthly[1]
Toluene	5.0	<0.5	ug/L	Monthly[1]
1,2,3-Trichlorobenzene	5.0	<0.5	ug/L	Monthly[1]
1,1,1-Trichloroethane	5.0	0.6	ug/L	Monthly[1]
1,2,4-Trimethylbenzene	5.0	<0.5	ug/L	Monthly[1]
Xylene, total	10.0	<0.5	ug/L	Monthly[1]

[1] The minimum measurement frequency shall be monthly following a period of 24 consecutive weekly sampling events showing no exceedances of the stated discharge limitations.
[2] Not detected.

System Operations

January 2020:

The system ran normally for the month. Wells SR-4 through SR-7 were in stand-by mode. The system treated approximately 1.7 million gallons of water.

February 2020:

The system operated normally for the month. Wells SR-4 through SR-8 were in stand-by mode. The system treated approximately 1.2 million gallons of water.

March 2020:

The system was off from March 11th through March 16th to replace a pump and motor on well SR-3. Wells SR-4 through SR-7 were off in stand-by mode. The system treated approximately 1.3 million gallons of water.

The system treated approximately 4.2 million gallons of water during the first quarter of 2020.

Planned Operational Changes

- Continue operating wells SR-1, SR-2, SR-3 and SR-9 in full time mode, and maintain wells SR-4, SR-5, SR-6 and SR-7 in standby mode. If significant rebound occurs, place these extraction wells back in full time operation. Sr-90 concentrations in SR-4, SR-5, and SR-6 have remained below the drinking water standard since May 2016.
- Maintain SR-8 in pulsed pumping mode (one month on and one month off) based on low but fluctuating Sr-90 concentrations since August 2018.
- Continue to supplement the current monitoring network with temporary well data to get a comprehensive status of the plumes and account for well network gaps and groundwater flow related plume shifts. Areas of focus include:
    - Install several temporary wells along Temple Place to supplement monitoring of the downgradient segment of the WCF plume.
    - Install a temporary well downgradient of BGRR sentinel well 085-403 to re-establish the location of the leading edge of the plume.

LEGEND

160 MONITORING WELL ID

SR-1 EXTRACTION WELL ID
75 BNL GRID NUMBER

HFBR – HIGH FLUX BEAM REACTOR
WCF – WASTE CONCENTRATION FACILITY
BGRR – BROOKHAVEN GRAPHITE RESEARCH REACTOR

FORMER D-WASTE TANK AREA

WASTE CONCENTRATION FACILITY

SR-1

SR-2

SR-3

SR-4

SR-5

SR-6

SR-7

SR-8

SR-9

BGRR

FORMER PILE FAN SUMP LOCATION

BLDG. 708 UNDG. DUCTS LOCATION

HFBR

65

75

TO BLDG 855

FORMER UNDERGROUND TANKS A & B

TANK 1 TANK 2 TANK 3 TANK 4 610

Building 701

Building 801

FORMER CANAL HOUSE

LAWRENCE DR.

RUTHERFORD DR.

CORNELL AVENUE

BROOKHAVEN AVENUE

BELL AVENUE

TECHNOLOGY STREET

RAILROAD STREET

TEMPLE PLACE

GROVE STREET

TUNNEL

SCALE
0 150 300 FEET

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BROOKHAVEN NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION DIVISION

TITLE:

OU III BGRR/WCF

SITEWIDE REMEDIATION SYSTEMS FIRST QUARTER 2020 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
JEB	–	03/15/13	
CHKD:	APPD:	REV.:	NOTES:
LDS	--	07/078/20	
FIGURE NO.:		17–3	

Table 17-3
OU III Strontium-90 BGRR/WCF Monitoring Well Data
'Hits Only' January through March 2020

Site ID : 075-664

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	01/24/2020	423	0.364	35	PCI/L	66.00	

Site ID : 075-701

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	01/16/2020	538	0.576	3.57	PCI/L	59.42	
Strontium-90	02/05/2020	535	0.771	6.07	PCI/L	60.27	
Strontium-90	03/11/2020	279	5.07	8.32	PCI/L	60.27	

Table 17-4
OU III Strontium-90 BGRR/WCF Extraction Well Data
'Hits Only' January through March 2020

Site ID : 065-368 (SR-1)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	01/03/2020	27.2	0.792	1.44	PCI/L	0.00	
Strontium-90	02/04/2020	25.3	0.79	1.38	PCI/L	0.00	
Strontium-90	03/05/2020	20.2	0.661	1.64	PCI/L	0.00	

Site ID : 065-369 (SR-2)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	01/03/2020	7.94	0.768	0.815	PCI/L	0.00	
Strontium-90	02/04/2020	7.86	0.778	0.858	PCI/L	0.00	
Strontium-90	03/05/2020	8.45	0.61	0.628	PCI/L	0.00	

Site ID : 065-403 (SR-6)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	01/03/2020	2.35	0.778	0.537	PCI/L	0.00	
Tritium	01/03/2020	791	337	236	PCI/L	0.00	

Site ID : 075-676 (SR-3)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	01/03/2020	32.9	0.771	1.4	PCI/L	0.00	
Strontium-90	02/04/2020	41.1	0.773	2.21	PCI/L	0.00	
Strontium-90	03/05/2020	41.5	0.662	2.16	PCI/L	0.00	

Site ID : 075-678 (SR-5)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	01/03/2020	2.09	0.446	0.339	PCI/L	0.00	

Site ID : 075-702 (SR-7)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	01/03/2020	2.66	0.436	0.345	PCI/L	0.00	
1,4-Dioxane	02/27/2020	0.213	0.2	--	UG/L	0.00	

Site ID : 075-703 (SR-8)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	01/03/2020	3.09	0.451	0.387	PCI/L	0.00	
Tritium	01/03/2020	677	345	234	PCI/L	0.00	
1,4-Dioxane	02/27/2020	0.12	0.2	--	UG/L	0.00	J
Strontium-90	03/05/2020	2.91	0.753	0.69	PCI/L	0.00	
Tritium	03/05/2020	468	427	272	PCI/L	0.00	J

Site ID : 075-704 (SR-9)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	01/03/2020	7.39	0.795	1.04	PCI/L	0.00	

Table 17-4
OU III Strontium-90 BGRR/WCF Extraction Well Data
'Hits Only' January through March 2020

Site ID : 075-704 (SR-9)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tritium	01/03/2020	494	334	218	PCI/L	0.00	J
Strontium-90	02/04/2020	7.91	0.773	0.894	PCI/L	0.00	
Tritium	02/04/2020	405	373	234	PCI/L	0.00	J
1,4-Dioxane	02/27/2020	0.112	0.2	--	UG/L	0.00	J
Strontium-90	03/05/2020	8.34	0.742	1.11	PCI/L	0.00	
Tritium	03/05/2020	647	311	281	PCI/L	0.00	

Table 17-5
OU III Strontium-90 BGRR/WCF Influent Data
'Hits Only' January through March 2020

Site ID : 066-216 (Combined Influent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/03/2020	0.41	0.5	--	UG/L	0.00	J
524.2 TVOC	01/03/2020	1.14	--	--	UG/L	0.00	
Ethene, 1,2-dichloro-, (E)-	01/03/2020	0.73	0.5	--	UG/L	0.00	
Strontium-90	01/03/2020	4.27	0.455	0.412	PCI/L	0.00	
Tritium	01/03/2020	694	344	234	PCI/L	0.00	
1,1,1-Trichloroethane	02/04/2020	0.5	0.5	--	UG/L	0.00	
524.2 TVOC	02/04/2020	0.5	--	--	UG/L	0.00	
Strontium-90	02/04/2020	12.2	0.773	1.06	PCI/L	0.00	
1,1,1-Trichloroethane	03/05/2020	0.27	0.5	--	UG/L	0.00	J
524.2 TVOC	03/05/2020	0.27	--	--	UG/L	0.00	
Strontium-90	03/05/2020	9.68	1.67	2.04	PCI/L	0.00	

Table 17-6
OU III Strontium-90 BGRR/WCF Effluent Data
'Hits Only' January through March 2020

Site ID : 066-219 (System Effluent)

Chemical	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	01/03/2020	0.54	0.5	--	UG/L	0.00	
1,1-Dichloroethane	01/03/2020	0.21	0.5	--	UG/L	0.00	J
524.2 TVOC	01/03/2020	3.13	--	--	UG/L	0.00	
Chloroform	01/03/2020	0.19	0.5	--	UG/L	0.00	J
cis-1,2-Dichloroethylene	01/03/2020	0.27	0.5	--	UG/L	0.00	J
Ethene, 1,2-dichloro-, (E)-	01/03/2020	1.92	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	02/04/2020	0.4	0.5	--	UG/L	0.00	J
524.2 TVOC	02/04/2020	0.4	--	--	UG/L	0.00	
524.2 TVOC	03/05/2020	0	--	--	UG/L	0.00	

Qualifiers :

J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Organic Compounds :

B = Compound was found in both the sample And associated laboratory blank.

Inorganic Compounds :

B = Result Is between instrument detection limit And contract required reporting limit.

Section 18

Q-1 2020 Quarterly Monitoring Summary
g-2 Source Area and Tritium Plume

1.0 Background

In November 1999, tritium was detected in the groundwater near the g-2 experiment at concentrations above the 20,000 pCi/L maximum contaminant level (MCL). Sodium-22 was also detected in the groundwater, but at concentrations well below the 400 pCi/L MCL. An investigation into the source of the contamination revealed that the tritium and sodium-22 originated from activated soil shielding located adjacent to the g-2 target building. Rainwater was able to infiltrate the activated soils and carry the tritium and sodium-22 into the groundwater. To prevent additional rainwater infiltration into the activated soil shielding, a concrete cap was constructed over the soil shielding in December 1999.

Following the concurrence of the NYSDEC, a Record of Decision (ROD) was signed by the U.S. DOE and U.S. EPA in early 2007. This ROD requires continued routine inspection and maintenance of the impermeable cap, groundwater monitoring of the source area to verify the continued effectiveness of the storm water controls and monitoring the tritium plume until it attenuates to less than the 20,000 pCi/L MCL.

2.0 Monitoring Activities

Surveillance of groundwater quality is accomplished using five wells located immediately downgradient of the source area, and 10 wells located further downgradient, southeast of AGS facility Building 912. The monitoring frequency for five wells located immediately downgradient of the source area wells is semi-annual, with samples collected during the 2nd and 4th quarters of the year. The 10 wells located downgradient of Building 912 are sampled during the 4th quarter.

Source Area Monitoring Results:

No samples were collected during the 1st Quarter. During the 4th Quarter 2019 sampling period, the maximum tritium concentration in source area monitoring wells was 18,600 pCi/L in well 054-07 (Figure 18-1). The overall reductions in tritium concentrations observed in source area monitoring wells indicate that the cap is effectively preventing rainwater infiltration into the activated soil shielding and the amount of residual tritium that is available to be flushed out of the deep vadose zone is decreasing.

3.0 Recommendations

- Continue to sample the five monitoring wells directly downgradient of the source area (near Building 912A) semiannually (2nd and 4th Quarters), and the 10 wells located near Building 912 annually (4th Quarter).
- Continue scheduled inspections and perform required maintenance of the g-2 cap.
- Monitoring results will be communicated to the regulatory agencies via quarterly and annual reports.

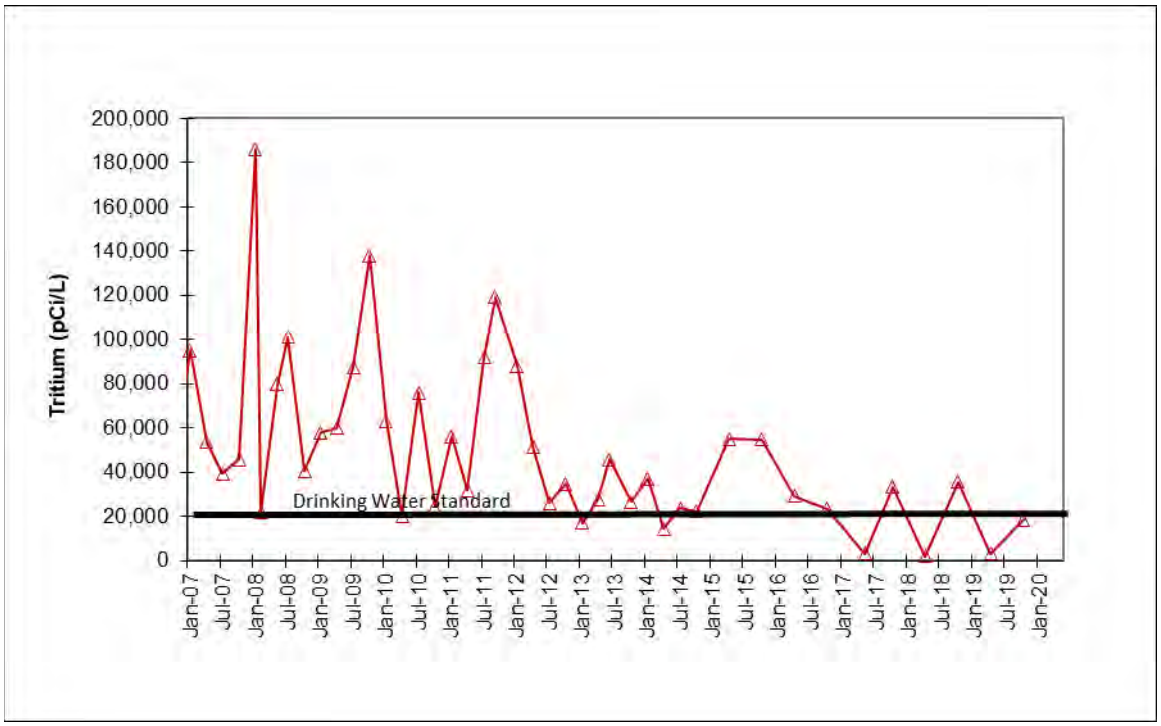


Figure 18-1. Maximum tritium concentrations observed from January 2007 through October 2019 in groundwater downgradient of the g-2 source area.

Section 19

Q-1 2020 Quarterly Monitoring Summary
BLIP Source Area

1.0 Background

The Brookhaven Linac Isotope Producer (BLIP) is an active accelerator facility located in the central portion of the site. The BLIP facility has been in operation since 1972 and is a national resource for producing the radioisotopes that are crucial in nuclear medicine for both research and clinical use. BLIP also supports BNL's research on diagnostic and therapeutic radiopharmaceuticals.

Beam line operations have resulted in the activation of soils that surround the BLIP target vessel. These activated soils are approximately 30 feet below the BLIP building, in a small zone surrounding the target vessel. In 1998, low levels of tritium were detected in the groundwater near the BLIP facility experiment at concentrations of approximately three times the 20,000 pCi/L MCL. Sodium-22 was also detected in the groundwater, but the levels were less than the 400 pCi/L MCL. A number of corrective actions were implemented in 1998 to prevent additional rainwater from entering the activated soil. These included repairing and reconfiguring the building's roof gutters and downspouts, resealing the paved areas south of the building, and installing a concrete cap in the remaining areas around the building. In 2000, a colloidal silica grout was injected into the activated soil to further immobilize the tritium and sodium-22, and in 2004 an additional impermeable cap was constructed over the beam line that runs from the Linac to the BLIP facility.

Following the concurrence of the NYSDEC, a Record of Decision (ROD) was signed by the U.S. DOE and U.S. EPA in early 2007. This ROD requires continued routine inspection and maintenance of the impermeable cap and groundwater monitoring to verify the continued effectiveness of the storm water controls.

2.0 Monitoring Activities

Three groundwater monitoring wells are positioned immediately downgradient of the BLIP facility. The wells are currently monitored on a semi-annual basis (during the 2nd and 4th Quarters).

Monitoring Results:

No samples were collected during the 1st Quarter. During the 4th Quarter 2019 sample period, the maximum tritium concentration was detected in downgradient well 064-67 at a concentration of 1,940 pCi/L. Since early 2006, tritium concentrations in the groundwater downgradient of BLIP have been continually less than the 20,000 pCi/L MCL (Figure 19-1). The overall reductions in tritium concentrations observed in the source area wells since 2006 indicate that the cap is effectively preventing rainwater infiltration into the activated soil shielding and the amount of residual tritium that is available to be flushed out of the deep vadose zone is decreasing.

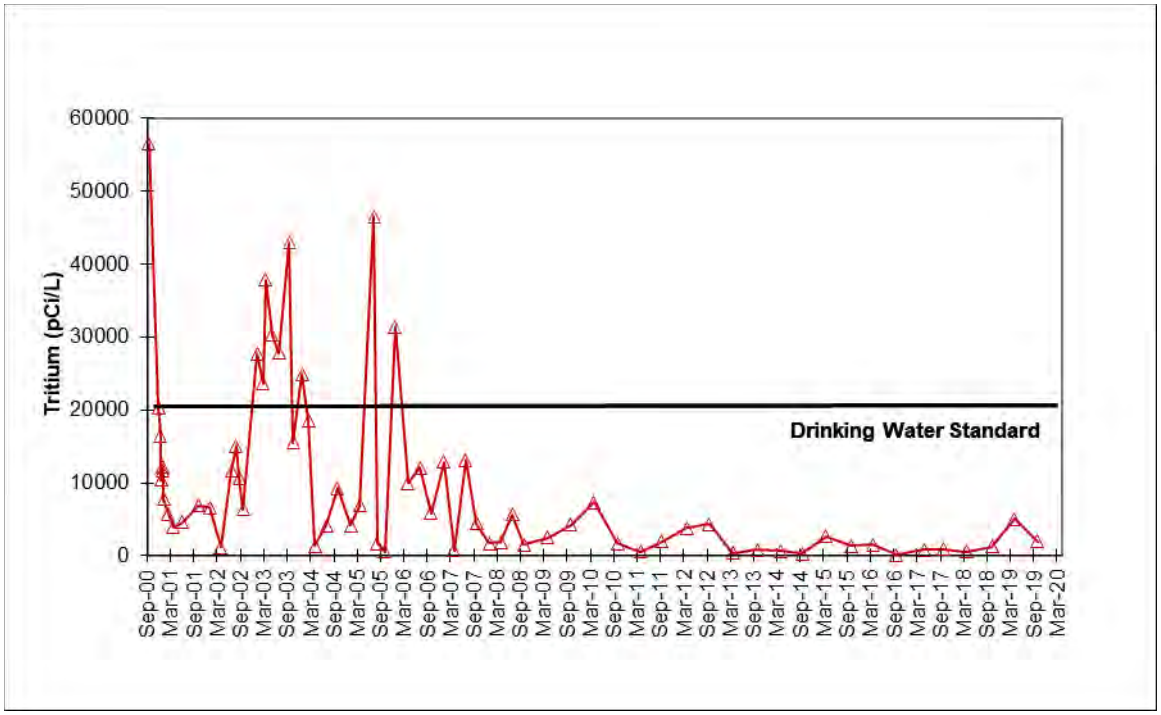


Figure 19-1. Maximum tritium concentrations observed from 2000 through October 2019 in groundwater immediately downgradient of the BLIP Facility.

3.0 Recommendations

The following are recommendations for the BLIP facility:

- Continue monitoring the three wells immediately downgradient of BLIP for tritium on a semiannual basis (2nd and 4th Quarters).
- Continue scheduled inspections and perform required maintenance of the BLIP cap.
- Monitoring results will continue to be communicated to the regulatory agencies via quarterly and annual reports.

Section 20
Q1-2020 Operations Summary
OU III Building 452 Freon-11 Pump & Treat System
(System Closed)

Process: Groundwater extraction and air stripping treatment, with discharge to a drainage culvert leading to Recharge Basin HS.

Goal: Remediation of Freon-11 in the groundwater and reach Maximum Contaminant Levels (MCLs) in core monitoring wells within 30 years for the Upper Glacial aquifer (by 2030). NYSDEC and EPA approved of the Petition for Closure in August and September 2019, respectively.

Start Date: March 2012

Table 20-1
OU III Building 452 Freon-11 Pump & Treat System
Pumping Rate (gpm)

Extraction Well	**EW-18**
Site Id #	095-316
Screened Interval (feet below grade)	55-65
Desired Flow Rate (GPM)	0**
January	0**
February	0**
March	0**
Actual (Avg. over Qtr.)	0**

* The system was approved for closure in September 2019.

Figure 20-1
OU III Building 452 Freon-11 Pump & Treat System
Cumulative Mass Removal of Trichlorofluoromethane vs. Time

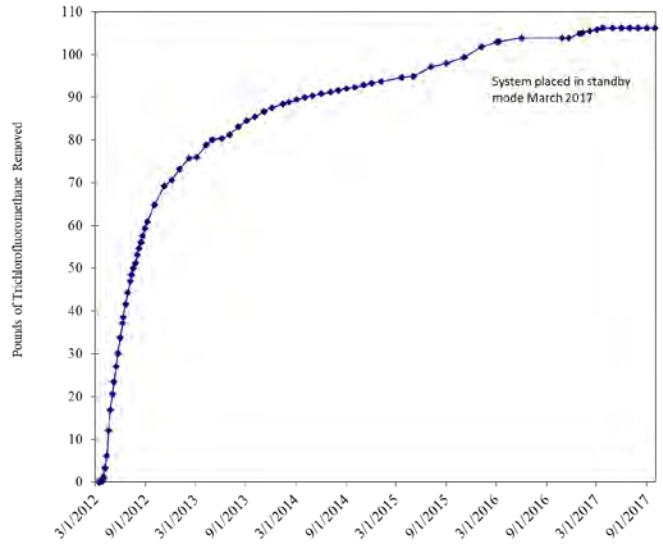


Figure 20-2
OU III Building 452 Freon-11 Pump & Treat System
Influent Trichlorofluoromethane Concentrations vs. Time

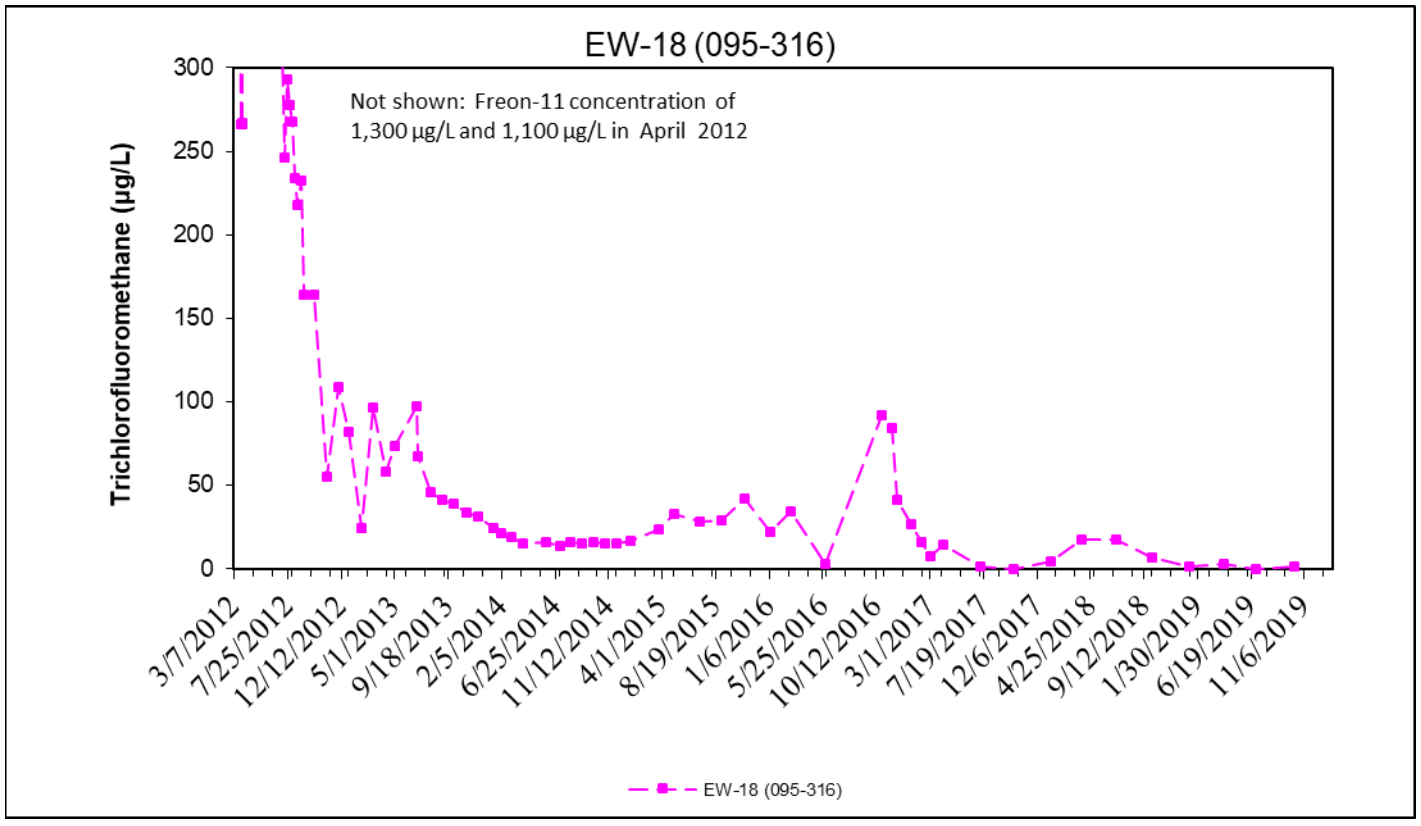


Table 20-2
Effluent Water Quality
SPDES Equivalency Permit Concentrations January 1, 2020 – March 31, 2020

Parameter	Permit Limit	Max. Measured Value	Units	Frequency*
Flow	120	NA	GPM	Continuous
pH (range)	5.0 - 8.5	NA	SU	Weekly
Benzene	1.0	NA	ug/L	Monthly
Bromodichloromethane	50	NA	ug/L	Monthly
Carbon Tetrachloride	5.0	NA	ug/L	Monthly
Chloroform	7.0	NA	ug/L	Monthly
Dichlorodifluoromethane	5.0	NA	ug/L	Monthly
1,1-Dichloroethylene	5.0	NA	ug/L	Monthly
4-Isopropyltoluene	5.0	NA	ug/L	Monthly
Methyl Chloride	5.0	NA	ug/L	Monthly
Methylene Chloride	5.0	NA	ug/L	Monthly
Tetrachloroethylene	5.0	NA	ug/L	Monthly
Toluene	5.0	NA	ug/L	Monthly
1,2,3-Trichlorobenzene	5.0	NA	ug/L	Monthly
1,1,1-Trichloroethane	5.0	NA	ug/L	Monthly
Trichlorofluoromethane	5.0	NA	ug/L	Monthly
1,2,4-Trimethylbenzene	5.0	NA	ug/L	Monthly
Xylene (meta + para)	10.0	NA	ug/L	Monthly

Note: Starting in June 2019, the flow from Bldg. 96 RTW-1 was increased to 60 gallons per minute and the water is being treated at the Building 452 Freon-11 treatment system due to the larger capacity of this system. Beginning with the July 2019 Discharge Monitoring Report (DMR), the RTW-1 discharge is formally reported under the Freon-11 Equivalency Permit.

System Operations

January 2020:

The system remained in stand-by mode.

February 2020:

The system remained in stand-by mode.

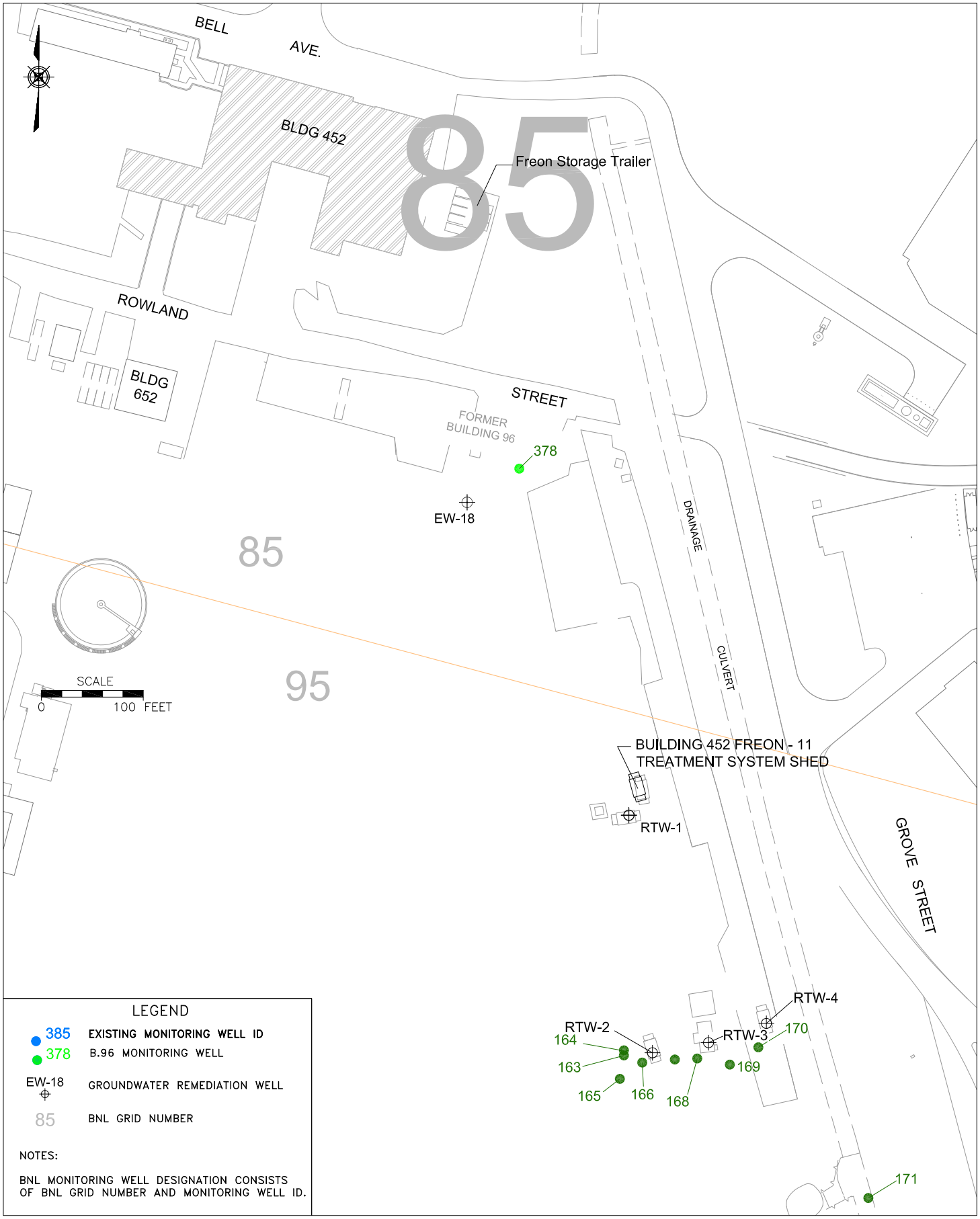
March 2020:

The system remained in stand-by mode.

A Petition for Closure was submitted to the regulators in July 2019. NYSDEC/NYSDOH approval of the Petition was received in August, and EPA comments were received in September. Responses to EPA comments were issued in November and the Petition was considered final.

Planned Operational Changes

- The monitoring program for the Building 452 treatment system has concluded. Monitoring wells 085-386 and 095-313 were incorporated into the Building 96 monitoring program.
- Postpone decisions to abandon extraction well EW-18 and the remaining monitoring wells until the PFAS plume originating from the former firehouse area has been fully characterized.
- Maintain full-time operation of the Building 96 treatment well RTW-1. Continue to report the RTW-1 discharge under the Freon-11 equivalency permit discharge monitoring report.



BROOKHAVEN NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION DIVISION

TITLE:

BUILDING 452 AREA FREON-11 MONITORING WELL NETWORK

SITEWIDE REMEDIATION SYSTEMS
FIRST QUARTER 2020 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
AJZ	–	08/24/12	
CHKD:	APPD:	REV.:	NOTES:
LDS	--	07/08/20	--

FIGURE NO.: 20-3