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September 14, 2017

Ms. Jessica LaClair
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New York State Department of
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Remedial Bureau D, 12th Floor
625 Broadway
Albany, New York 12233-7017

Mr. Henry Wilkie
Environmental Engineer 1
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Albany, New York 12233-7015

Re: *Extraction Wells 612, 613, and 617 – Shutdown Test Findings*
B/322 Area of Concern (Operable Unit 7)
Former IBM East Fishkill Facility, East Fishkill, New York

Dear Ms. LaClair and Mr. Wilkie:

On behalf of the IBM Corporation (IBM), Groundwater Sciences Corporation (GSC) has prepared this letter report describing the findings of a shutdown test of groundwater extraction wells GW-612, GW-613, and GW-617 located within the Building 322 (B/322) Area of Concern (AOC) of the former IBM East Fishkill Facility in East Fishkill, New York (Site). A 2015 review of groundwater monitoring results for the past two to three decades indicated significant improvements to groundwater quality had occurred in the B/322 AOC and the more recent decade of data also suggested continued operation of the B/322 groundwater extraction system was no longer necessary. Based on the findings of that review, GSC submitted a request on behalf of IBM to the New York State Department of Environmental Conservation (NYSDEC) to perform a two-year long shutdown test consisting of discontinuing groundwater withdrawals at B/322 groundwater extraction well locations GW-612, GW-613, and GW-617[1]. The purpose of the test was to confirm that the operation of groundwater extraction wells GW-612, GW-613, and GW-617 could be discontinued without a meaningful change in B/322 AOC groundwater quality. The shutdown test was initiated in August 2015, shortly after IBM's receipt of approval for the shutdown test request in a letter from the NYSDEC[2]. The shutdown test was performed as part of IBM's groundwater Corrective Action (CA) program which is regulated by the NYSDEC under the Site's New York State Part 373 permit[3].

[1] Groundwater Sciences Corporation, June 18, 2015, *Shutdown Test Request, Extraction Wells 612, 613, and 617, B/322 Area of Concern (Operable Unit 7).*
[2] NYSDEC to IBM Corporate Environmental Affairs July 15, 2015, *Shutdown Test Request – Extraction Wells 612, 613, and 617, B/322 Area of Concern (OU-7).*
[3] New York State Department of Environmental Conservation, November 2, 2011, *6NYCRR Part 373 Hazardous Waste Management Permit, IBM Corporation East Fishkill Facility*.

BACKGROUND

The Site consists of a semiconductor manufacturing and development facility located in south-central Dutchess County within the Town of East Fishkill, New York. As shown on the Site Location Map (Figure 1), the Site is located between Interstate 84 to the south and New York State Route 52 to the north. The B/322 AOC includes the area adjacent to the B/322 building along with paved parking and lawn areas west of B/322, in the area between the B/322 and Gildersleeve Brook. The B/322 AOC is also referred to as Operable Unit #7 (OU7) in the Final Statement of Basis, dated September 2013 (effective date of April 16, 2014), that was developed by the NYSDEC in consultation with the New York State Department of Health (NYSDOH) under the authority of RCRA. On July 1, 2015, the Site was acquired by GLOBALFOUNDRIES U.S. 2LLC (GF). GF is listed as the facility owner under the current NYSDEC Part 373 Permit, with IBM maintaining responsibility for the CA program[4]. The Site was subsequently subdivided, with National Resources acquiring several parcels on September 1, 2017. The B/322 AOC is located on parcels owned by GF.

Soil and groundwater RCRA Facility Investigations (RFIs) were completed in the B/322 AOC in the mid-1990s. Overburden (soil) conditions in the B/322 AOC include a downward sequence of soil fill, alluvial sandy soils, and a glaciolacustrine silt and clay which serves to inhibit vertical movement of groundwater and contaminants. The glaciolacustrine silt/clay layer is widespread but discontinuous across the site, with perched groundwater typically found in the overlying alluvial sandy soils. Beneath the glaciolacustrine unit and overlying the bedrock glaciofluvial ice-contact and glacial till soils are present. These deeper soil units are unsaturated in the central portions of the Site due to ongoing withdrawals from Site bedrock production wells. As shown on Figure 2, groundwater in the alluvium flows westerly from the area of the northeast corner of B/322 towards B/323 to the south-southwest and towards Gildersleeve Brook to the southwest. Due to the surface topography of the underlying glaciolacustrine silt and clay, a natural groundwater flow divide is present that separates a more southerly component of groundwater flow towards B/323 from a more westerly component of groundwater flow towards Gildersleeve Brook.

Chemical handling in the area of B/322 resulted in releases of volatile organic compounds (VOCs). The releases are believed to have occurred primarily in two areas: (1) in the area of the B/320B-B/322 linkway in the vicinity of a closed waste solvent tank farm; and (2) within B322 along the western side of the building. The primary VOCs identified in B/322 AOC groundwater include: 1) PCE and its breakdown products, trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC) (hereinafter collectively referred to as PCE-Series); and 2) Freon® TF and its breakdown product Freon® 123a. These VOCs are present in separate soil and bedrock groundwater plumes. The bedrock plume extends northwest from the area of the B/320B-B/322 linkway to a bedrock production well at the facility, designated PW-1. The shallow groundwater plume extends southwesterly from the area of the B/320B-B/322 linkway towards B/323, to the south-southwest, and Gildersleeve Brook, to the southwest.

[4] NYSDEC, July 1, 2015, Facility Permit Transfer IBM Corporation to GLOBALFOUNDRIES U.S. 2LLC, East Fishkill Facility.

Groundwater extraction operations began at well locations GW-612 and GW-617 in January 2000 with well GW-613 serving as a backup. The purpose of these extraction wells is to hydraulically contain the leading edge of the shallow groundwater plume located in the western portion of the B/322 AOC. TCE, cis-1,2-DCE, and to a lesser extent PCE are the primary VOCs detected in groundwater samples from extraction wells GW-612 and GW-617. Extracted groundwater is pumped to the Site's Water Pollution Control Facility (WPCF) for treatment and ultimately discharged to Gildersleeve Brook under the Site's SPDES permit. NYSDEC has approved the B/322 extraction system as an Interim Corrective Measure[5].

SHUTDOWN TEST FINDINGS

The shutdown test included a quarterly groundwater monitoring program consisting of the recording of water levels and the collection of groundwater samples at thirteen wells highlighted on Figure 3, including:

- Groundwater extraction wells GW-612 and GW-617;
- Plume area groundwater monitoring wells GW-740, GW-766, GW-767, GW-768, GW-769, GW-771, GW-772, GW-773, and GW-793; and
- Former waste solvent tank farm area wells GW-627 and GW-735.

Prior to the shutdown test, GW-612 and GW-617 groundwater extraction created a localized depression in the potentiometric surface. Outside of the increase in groundwater elevations observed at the extractions wells after the shutdown, there were no significant changes in B/322 AOC elevations or groundwater flow directions shown on Figure 2.

Wells GW-627 (six sampling events) and GW-740 (two sampling events) were dry for significant periods of the shutdown test, and could not be sampled on a quarterly basis. Results of the water level monitoring are summarized in Table 1. Results of laboratory analyses for the presence of VOCs in the B/322 AOC groundwater samples are summarized in Table 2.

Figure 3 provides a well location map with semi-logarithmic concentration versus time graphs for monitoring wells in the area of the B/322 AOC shallow groundwater plume and extraction wells GW-612 and GW-617. The well location map includes postings of the total concentrations of PCE and its daughter products TCE, cis-1,2-DCE, and VC (hereinafter collectively referred to as PCE-Series) detected in groundwater samples collected in the second quarter of 2017. Figure 3 also provides an isoconcentration contour map of the PCE-Series shallow groundwater plume in the B/322 AOC, including the inferred limits of the plume as defined by the annual median concentration equal to 5 ug/L of PCE-Series constituents.

The semi-log graphs on Figure 3 depict concentrations of PCE, Freon® TF, and their associated breakdown products using a log scale versus time in an arithmetic scale to assist in the identification of

[5] H. Wilkie, New York State Department of Environmental Conservation to S. Tranchina, IBM, *Technical Specifications and Record Drawings – B/322 RCRA Groundwater Containment System*, April 14, 2000.

concentration trends. The graphs also include a timeline depicting the start of the shutdown test. Groundwater quality in the area of these extraction wells and nearby monitoring well GW-773 met the 6NYCRR Part 703 New York State Groundwater Quality Standard (NYSGQS) during the shutdown test. The graphs for wells GW-612, GW-617, and GW-773 show that PCE, TCE, and cis-1,2-DCE were detected in at least one of these wells along the leading edge of the northern component of the shallow groundwater plume. None of these shutdown test detections exceeded 0.5 µg/L. Graphs for monitoring wells within the northern and southern components of the plume (see wells GW-769, GW-740, GW-766, GW-768, GW-767, GW-793, GW-772, and GW-771) show decreasing trends or no apparent trend in VOC concentration for the time period depicted. Shutdown test data for B/320B-B/322 linkway source area wells GW-627 and GW-735 is consistent with historical results.

Figure 4 compares PCE-Series isoconcentration contour maps for the shallow groundwater in the B/322 AOC in 1995 and 2017. As shown on the figure, due to the natural groundwater flow divide, the PCE-Series groundwater plume diverges into a southern component that extends to B/323 and a northern component that extends across West Drive. In 1995, the northern component of the shallow groundwater plume extended to the lawn area between West Drive and Gildersleeve Brook. A comparison of the 1995 and 2017 contour maps indicates an overall decline in the magnitude and extent of the shallow groundwater plume in the B/322 AOC, including a retraction in the westerly extent of the northern component of the plume. These significant plume reductions are likely associated with the closure of the waste solvent tank farm in the area of the B320B-B322 linkway and modifications in chemical handling and usage in the area of B/322. Similar plume reductions have also been observed for Freon® TF and Freon® 123a.

Acetone was detected at a concentration of 41 µg/L in the April 2017 sample collected from well GW-612. Four parameters not required under the Part 373 Permit, benzene, chloroethane, chloromethane and toluene as well as Part 373 Permit required parameter xylene were also detected at concentrations less than 1.5 µg/L in the April 2017 sample from that well. Acetone was also detected in the May 2017 (70 µg/L) and July (48 µg/L) samples collected from well GW-612. Benzene, chloroethane, and toluene were present in the May and July 2017 samples collected from well GW-612 at concentrations less than 1 µg/L. The source of this chemistry is unknown, but it appears to be limited in areal extent as none of these parameters have been detected in the other B/322 AOC wells west of B/322 during the shutdown test period, including nearby wells GW-617 and GW-773.

CONCLUSIONS AND RECOMMENDATIONS

Groundwater in the vicinity of monitoring well GW-773, active groundwater extraction wells GW-612 and GW-617, and inactive (backup) extraction well GW-613 has not exceeded the NYSGQS since startup of the B/322 shallow groundwater extraction system in January 2000. Inspection of the time versus concentration graphs for these locations at the leading edge of the plume show no significant increase in chemistry during the shutdown test. Over twenty years of monitoring shows that the magnitude and lateral extent of the shallow groundwater plume in the B/322 AOC has declined significantly. The shutdown test confirms that operation of this system can be discontinued without a meaningful change in B/322 AOC groundwater quality. The permanent shutdown of extraction wells GW-612, GW-613, and GW-617 is expected to have no meaningful effects that would constitute a threat to human health and the environment.

Considering the above conclusions, GSC recommends termination of GW-612, GW-613, and GW-617

groundwater extraction and treatment operations in the B/322 AOC. We recommend that the water quality sampling requirements for wells GW-613 and GW-617 be discontinued, and the sampling frequency in the approved Groundwater Monitoring Plan (GMP)[6] for GW-612 be modified from a monthly to a quarterly frequency. All other GMP sampling and hydraulic effectiveness frequencies for the B/322 AOC GMP wells would remain unchanged.

As part of the approval of the shutdown test of groundwater extraction wells GW-612, GW-613, and GW-617, NYSDEC requested that IBM investigate remedial alternatives for the remaining VOC presence in the B/320B-B/322 linkway area near wells GW-627 and GW-735. IBM initiated a program to evaluate and screen potential remedial technologies that may have some application to the remaining VOC presence in groundwater northeast of B/322[7]. On November 16, 2016 IBM informed NYSDEC that the evaluation was being put on hold due to: 1) the lack of occupancy of B/322; 2) the planned demolition of the majority of B/322 by the Site owner, GF, and 3) the uncertainty of the future use of B/322[8]. IBM remains committed to complete the evaluation of remedial alternatives for the B/320B-B/322 linkway area once the plans and future use of B/322 has been resolved.

Should you have any questions concerning this shutdown test letter report, please contact Dean Chartrand of IBM at (703) 257-2583.

Very truly yours,
GROUNDWATER SCIENCES CORPORATION

C. Edward Stoner, P.G.
Project Manager

Attachments:

Table 1 – Groundwater Elevation Data, GW-612, GW-613, and GW-617 Shutdown Test Groundwater Monitoring
Table 2 – Volatile Organic Compound Data, GW-612, GW-613, and GW-617 Shutdown Test Groundwater Sampling
Figure 1 – Site Location Map
Figure 2 – B/322 AOC (OU7), Elevation Contour Map–Soil Groundwater Table, April 24-26, 2017
Figure 3 – B/322 AOC (OU7), Well Location Map and Time vs. Concentration Graphs, Soil
Figure 4 – B/322 AOC (OU7) Soil Isoconcentration Contour Map, PCE-Series, Comparison of 1995 & 2017

[6] IBM to NYSDEC via e-mail, Groundwater Sciences Corporation, September 17, 2015, *Groundwater Monitoring Plan, Former IBM East Fishkill Facility.*
[7] IBM to NYSDEC via e-mail, September 18, 2015, *Status of Remedial Alternatives Evaluation, Apparent Groundwater Plume Origin Area Northeast of B/322.*
[8] IBM to NYSDEC, November 16, 2016, *Updated Status of Remedial Alternatives Evaluation, B/322 Area of Concern (Operable Unit 7).*

Table 1
Groundwater Elevation Data, GW-612, GW-613, and GW-617 Shutdown Test Groundwater Monitoring
B/322 Area of Concern (Operable Unit 7)
Former IBM East Fishkill Facility, East Fishkill, New York

Well ID	TOC Elev. (ft. amsl)	Date	Depth to Water Below TOC (ft)	Groundwater Elevation (ft)	Date	Depth to Water Below TOC (ft)	Groundwater Elevation (ft)	Date	Depth to Water Below TOC (ft)	Groundwater Elevation (ft)	Date	Depth to Water Below TOC (ft)	Groundwater Elevation (ft)
612	249.89	10/5/2015	17.48	232.41	1/5/2016	17.43	232.46	4/4/2016	17.11	232.78	7/6/2016	16.70	233.19
617	248.91	10/5/2015	17.81	231.10	1/5/2016	17.70	231.21	4/4/2016	17.16	231.75	7/6/2016	17.04	231.87
627	262.88	10/6/2015	DRY	DRY	1/6/2016	17.80	245.08	4/4/2016	17.32	245.56	7/7/2016	DRY	DRY
735	261.06	10/6/2015	20.33	240.73	1/15/2016	20.36	240.70	4/4/2016	19.68	241.38	7/7/2016	20.12	240.94
740	260.62	10/6/2015	DRY	DRY	1/6/2016	DRY	DRY	4/5/2016	DRY	DRY	7/7/2016	DRY	DRY
766	258.99	10/6/2015	22.22	236.77	1/6/2016	22.38	236.61	4/5/2016	22.24	236.75	7/7/2016	22.23	236.76
767	252.26	10/6/2015	15.56	236.70	1/6/2016	15.58	236.68	4/6/2016	15.60	236.66	7/7/2016	15.58	236.68
768	253.31	10/6/2015	17.03	236.28	1/6/2016	17.29	236.02	4/5/2016	16.88	236.43	7/7/2016	16.60	236.71
769	256.86	10/6/2015	21.40	235.46	1/6/2016	21.72	235.14	4/5/2016	20.95	235.91	7/7/2016	20.79	236.07
771	252.32	10/6/2015	17.27	235.05	1/6/2016	17.71	234.61	4/5/2016	16.88	235.44	7/7/2016	16.42	235.90
772	241.83	10/6/2015	10.78	231.05	1/6/2016	10.83	231.00	4/5/2016	10.42	231.41	7/7/2016	10.08	231.75
773	248.26	10/5/2015	16.20	232.06	1/5/2016	16.60	231.66	4/4/2016	15.74	232.52	7/6/2016	15.58	232.68
793	248.89	10/6/2015	21.54	227.35	1/6/2016	21.52	227.37	4/5/2016	21.74	227.15	7/7/2016	21.53	227.36

Well ID	TOC Elev. (ft. amsl)	Date	Depth to Water Below TOC (ft)	Groundwater Elevation (ft)	Date	Depth to Water Below TOC (ft)	Groundwater Elevation (ft)	Date	Depth to Water Below TOC (ft)	Groundwater Elevation (ft)	Date	Depth to Water Below TOC (ft)	Groundwater Elevation (ft)
612	249.89	10/6/2016	17.78	232.11	1/4/2017	17.11	232.78	4/24/2017	15.86	234.03	4/24/2017	15.86	234.03
617	248.91	10/6/2016	18.12	230.79	1/4/2017	16.32	232.59	4/24/2017	15.95	232.96	4/24/2017	15.95	232.96
627	262.88	10/7/2016	DRY	DRY	1/4/2017	17.90	244.98	4/26/2017	16.72	246.16	4/26/2017	16.72	246.16
735	261.06	10/7/2016	20.57	240.49	1/4/2017	20.06	241.00	4/25/2017	17.65	243.41	4/25/2017	17.65	243.41
740	260.62	10/6/2016	DRY	DRY	1/5/2017	DRY	DRY	4/25/2017	22.33	238.29	4/25/2017	22.33	238.29
766	258.99	10/6/2016	22.58	236.41	1/6/2017	22.30	236.69	4/25/2017	21.38	237.61	4/25/2017	21.38	237.61
767	252.26	10/6/2016	15.92	236.34	1/6/2017	15.49	236.77	4/25/2017	14.76	237.50	4/25/2017	14.76	237.50
768	253.31	10/6/2016	17.10	236.21	1/6/2017	17.00	236.31	4/25/2017	15.77	237.54	4/25/2017	15.77	237.54
769	256.86	10/6/2016	21.30	235.56	1/6/2017	20.97	235.89	4/25/2017	19.33	237.53	4/25/2017	19.33	237.53
771	252.32	10/6/2016	17.08	235.24	1/6/2017	16.92	235.40	4/25/2017	15.04	237.28	4/25/2017	15.04	237.28
772	241.83	10/6/2016	10.92	230.91	1/6/2017	10.02	231.81	4/25/2017	8.99	232.84	4/25/2017	8.99	232.84
773	248.26	10/6/2016	16.41	231.85	1/4/2017	15.75	232.51	4/24/2017	14.72	233.54	4/24/2017	14.72	233.54
793	248.89	10/6/2016	21.91	226.98	1/6/2017	21.51	227.38	4/25/2017	20.73	228.16	4/25/2017	20.73	228.16

Table 2
Volatile Organic Compound Data, GW-612, GW-613, and GW-617 Shutdown Test Groundwater Sampling
B/322 Area of Concern (Operable Unit 7)
Former IBM East Fishkill Facility, East Fishkill, New York

Parameter	Sample Location	612	612	612	612	612	612	612	612	612	617	617	617	617	617
	Sample Description	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
	Sample Date	10/27/2015	01/14/2016	04/11/2016	07/15/2016	10/18/2016	01/10/2017	04/06/2017	05/01/2017	07/07/2017	10/20/2015	01/14/2016	04/11/2016	07/13/2016	10/19/2016
	Laboratory Sample I.D.	8107681	8208367	8331080	8478109	8653029	8785339	8929619	8969015	9092410	8097219	8208366	8331079	8475297	8656820
1,1,1-TRICHLOROETHANE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (Freon®TF)		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE (Freon®123a)		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLOROBENZENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
ACETONE		ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	41	70	48	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0
CHLOROBENZENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CIS-1,2-DICHLOROETHYLENE		ND@0.5	0.1J	ND@0.5	0.1J	0.1J	0.1J	ND@0.5	ND@0.5	0.1J	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
DICHLORODIFLUOROMETHANE (Freon®12)		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
ETHYLBENZENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
M,P-XYLENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	0.2J	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
O-XYLENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TETRACHLOROETHYLENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	0.2J	0.2J	0.2J	0.2J	0.1J
TRICHLOROETHYLENE		0.2J	0.2J	0.1J	0.2J	0.2J	0.2J	ND@0.5	ND@0.5	ND@0.5	0.1J	0.2J	0.2J	0.2J	0.2J
TRICHLOROFLUOROMETHANE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
VINYL CHLORIDE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5

All Results reported in micrograms per liter (ug/L)

Parameter	Sample Location	617	617	617	627	627	627	627	627	627	735	735	735	735	735
	Sample Description	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
	Sample Date	01/10/2017	04/05/2017	07/07/2017	12/28/2015	01/15/2016	04/13/2016	01/10/2017	04/06/2017	07/07/2017	10/20/2015	01/15/2016	04/11/2016	07/11/2016	10/11/2016
	Laboratory Sample I.D.	8785338	8925556	9092411	8191216	8209517	8335538	8785342	8929615	9092412	8097220	8209516	8331071	8473069	8642506
1,1,1-TRICHLOROETHANE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@2.5	ND@2.5	ND@0.5	ND@1.0	ND@5.0
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (Freon®TF)		ND@0.5	ND@0.5	ND@0.5	1.4	4.2	3.5	4.7	3.1	8.6	26	28	30	70	470
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE (Freon®123a)		ND@0.5	ND@0.5	ND@0.5	0.8	2.1	1.8	0.4J	0.5	1.1	1.5J	1.6J	1.6	1.5	2.9J
1,2-DICHLOROBENZENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@2.5	ND@2.5	0.1J	0.3J	ND@5.0
ACETONE		ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@25	ND@25	3.7J	ND@10	52
CHLOROBENZENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@2.5	ND@2.5	ND@0.5	ND@1.0	ND@5.0
CIS-1,2-DICHLOROETHYLENE		ND@0.5	ND@0.5	ND@0.5	120	140	100	37	20	25	45	57	36	40	42
DICHLORODIFLUOROMETHANE (Freon®12)		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@2.5	ND@2.5	ND@0.5	ND@1.0	ND@5.0
ETHYLBENZENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@2.5	ND@2.5	ND@0.5	ND@1.0	ND@5.0
M,P-XYLENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@2.5	ND@2.5	ND@0.5	ND@1.0	ND@5.0
O-XYLENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@2.5	ND@2.5	ND@0.5	ND@1.0	ND@5.0
TETRACHLOROETHYLENE		0.1J	0.1J	0.1J	10	19	17	7.8	8.6	11	290	350	240	210	290
TRICHLOROETHYLENE		0.2J	0.2J	0.2J	8.9	14	10	6.1	4.7	6.3	21	24	22	20	22
TRICHLOROFLUOROMETHANE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@2.5	ND@2.5	ND@0.5	ND@1.0	ND@5.0
VINYL CHLORIDE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@2.5	ND@2.5	ND@0.5	ND@1.0	ND@5.0

All Results reported in micrograms per liter (ug/L)

Key:

GW Groundwater
REP Replicate
ND@X Not Detected at Detection Limit X
J Estimated Value

Table 2
Volatile Organic Compound Data, GW-612, GW-613, and GW-617 Shutdown Test Groundwater Sampling
B/322 Area of Concern (Operable Unit 7)
Former IBM East Fishkill Facility, East Fishkill, New York

Parameter	Sample Location	735	735	735	740	740	766	766	766	766	766	766	766	766	766
	Sample Description	GW	GW	GW	GW	GW	GW	GW	GW	REP	GW	GW	GW	REP	GW
	Sample Date	01/12/2017	04/06/2017	07/10/2017	04/07/2017	07/07/2017	10/20/2015	01/15/2016	04/11/2016	04/11/2016	07/11/2016	10/11/2016	01/12/2017	01/12/2017	04/06/2017
	Laboratory Sample I.D.	8787080	8929613	9095745	8929598	9092407	8097227	8209518	8331073	8331075	8473066	8642510	8787071	8787072	8929596
1,1,1-TRICHLOROETHANE		ND@5.0	ND@0.5	ND@5.0	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (Freon®TF)		94	140	340	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE (Freon®123a)		2.3J	3.3	3.9J	ND@0.5	ND@0.5	1.4	0.8	0.3J	0.3J	0.2J	0.3J	0.3J	0.3J	ND@0.5
1,2-DICHLOROBENZENE		ND@5.0	ND@0.5	ND@5.0	ND@0.5	ND@0.5	4.7	4.8	4.2	4.2	3.7	4.0	3.1	3.1	2.2
ACETONE		ND@50	27	ND@50	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0
CHLOROBENZENE		ND@5.0	ND@0.5	ND@5.0	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CIS-1,2-DICHLOROETHYLENE		54	8.3	8.3	2.8	1	3.3	2.5	3.1	3	3.4	2.2	3	3.1	3.1
DICHLORODIFLUOROMETHANE (Freon®12)		ND@5.0	ND@0.5	ND@5.0	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
ETHYLBENZENE		ND@5.0	ND@0.5	ND@5.0	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
M,P-XYLENE		ND@5.0	ND@0.5	ND@5.0	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
O-XYLENE		ND@5.0	ND@0.5	ND@5.0	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TETRACHLOROETHYLENE		250	110	680	1.4	1.5	0.2J	0.2J	0.2J	0.3J	0.2J	0.4J	0.3J	0.3J	0.8
TRICHLOROETHYLENE		23	13	25	2.5	2.4	0.9	0.6	1.0	1.0	1.6	1.1	0.9	0.9	1.4
TRICHLOROFLUOROMETHANE		ND@5.0	ND@0.5	ND@5.0	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
VINYL CHLORIDE		ND@5.0	ND@0.5	ND@5.0	ND@0.5	ND@0.5	0.8	1.1	1.4	1.4	1.7	0.7	0.9	0.9	0.6

All Results reported in micrograms per liter (ug/L)

Parameter	Sample Location	766	767	767	767	767	767	767	767	767	767	768	768	768	768
	Sample Description	GW	GW	GW	GW	REP	GW	GW	GW	GW	GW	GW	GW	GW	GW
	Sample Date	07/06/2017	10/20/2015	01/19/2016	04/13/2016	04/13/2016	07/12/2016	10/12/2016	01/12/2017	04/07/2017	07/10/2017	10/20/2015	01/19/2016	04/13/2016	07/11/2016
	Laboratory Sample I.D.	9092405	8097225	8212528	8335530	8335532	8473073	8645019	8787076	8929600	9095742	8097226	8212529	8335534	8473072
1,1,1-TRICHLOROETHANE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (Freon®TF)		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE (Freon®123a)		ND@0.5	1.9	1.8	2.2	2.2	3.7	3.2	2.4	0.9	0.6	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLOROBENZENE		2.1	1.5	1.8	1.3	1.2	1.5	1.6	1.4	0.6	0.7	ND@0.5	ND@0.5	ND@0.5	ND@0.5
ACETONE		ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0
CHLOROBENZENE		ND@0.5	0.6	0.7	0.6	0.6	0.6	0.7	0.6	0.3J	0.4J	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CIS-1,2-DICHLOROETHYLENE		2.6	24	25	17	17	19	21	18	9.7	9.5	2.2	2.0	1.4	1.4
DICHLORODIFLUOROMETHANE (Freon®12)		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
ETHYLBENZENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
M,P-XYLENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
O-XYLENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TETRACHLOROETHYLENE		1.3	0.5	0.8	0.4J	0.4J	0.4J	0.3J	0.5	0.6	0.5	5.6	5.5	4.1	3.6
TRICHLOROETHYLENE		1.9	3.3	3.5	2.9	2.8	2.9	3.0	2.6	1.3	1.7	10	10	7.2	8.1
TRICHLOROFLUOROMETHANE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
VINYL CHLORIDE		0.5J	1.2	1.8	1.6	1.6	2.1	1.4	1.6	0.6	0.4J	ND@0.5	ND@0.5	ND@0.5	ND@0.5

All Results reported in micrograms per liter (ug/L)

Key:

GW Groundwater
REP Replicate
ND@X Not Detected at Detection Limit X
J Estimated Value

Table 2
Volatile Organic Compound Data, GW-612, GW-613, and GW-617 Shutdown Test Groundwater Sampling
B/322 Area of Concern (Operable Unit 7)
Former IBM East Fishkill Facility, East Fishkill, New York

	Sample Location	768	768	768	768	768	769	769	769	769	769	769	769	769	771
	Sample Description	GW	GW	GW	REP	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
	Sample Date	10/12/2016	01/12/2017	04/06/2017	04/06/2017	07/10/2017	10/20/2015	01/19/2016	04/11/2016	07/12/2016	10/11/2016	01/12/2017	04/06/2017	07/07/2017	10/20/2015
Parameter	Laboratory Sample I.D.	8645020	8787077	8929622	8929624	9095743	8097229	8212530	8331038	8473075	8642511	8787079	8929617	9092408	8097228
1,1,1-TRICHLOROETHANE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	0.1J	0.2J	ND@0.5
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (Freon®TF)		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	0.8	0.3J	0.4J	0.5	0.3J	0.4J	0.9	1.3	0.6
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE (Freon®123a)		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	0.3J	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	0.4J	0.5	0.4J
1,2-DICHLOROBENZENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
ACETONE		ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0
CHLOROBENZENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CIS-1,2-DICHLOROETHYLENE		1.5	1.5	1.0	1.0	1.7	3.2	1.3	1.3	1.7	1.4	1.5	2.2	2.8	12
DICHLORODIFLUOROMETHANE (Freon®12)		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
ETHYLBENZENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
M,P-XYLENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
O-XYLENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TETRACHLOROETHYLENE		4.0	5.1	3.9	3.7	4.7	3.9	5.1	4.5	5	4.5	3.9	4.0	3.9	2.0
TRICHLOROETHYLENE		9.1	9.0	7.3	7.2	8.8	7.4	8.3	7.2	8.5	8.0	7.3	7.2	7.1	1.8
TRICHLOROFLUOROMETHANE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
VINYL CHLORIDE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5

All Results reported in micrograms per liter (ug/L)

	Sample Location	771	771	771	771	771	771	771	772	772	772	772	772	772	772
	Sample Description	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
	Sample Date	01/19/2016	04/13/2016	07/12/2016	10/11/2016	01/12/2017	04/06/2017	07/10/2017	10/20/2015	01/15/2016	04/11/2016	07/11/2016	10/11/2016	01/12/2017	04/06/2017
Parameter	Laboratory Sample I.D.	8212833	8335536	8473074	8642512	8787078	8929620	9095744	8097230	8209519	8331077	8473068	8642507	8787073	8929592
1,1,1-TRICHLOROETHANE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (Freon®TF)		ND@0.5	1.0	1.5	0.9	0.6	1.0	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE (Freon®123a)		0.3J	0.4J	0.6	0.5J	0.5	0.4J	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLOROBENZENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
ACETONE		ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0
CHLOROBENZENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CIS-1,2-DICHLOROETHYLENE		12	12	16	15	15	9.6	1.9	0.9	0.7	0.7	0.7	0.9	0.6	0.4J
DICHLORODIFLUOROMETHANE (Freon®12)		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
ETHYLBENZENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
M,P-XYLENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
O-XYLENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TETRACHLOROETHYLENE		2.1	0.9	1.1	1.6	1.2	1.1	2.4	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TRICHLOROETHYLENE		1.8	0.8	1.3	1.5	1.3	1.1	1.8	0.7	0.6	0.6	0.7	0.8	0.5	0.4J
TRICHLOROFLUOROMETHANE		ND@0.5	8.3	2.2	17	1.7	3.6	1.4	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
VINYL CHLORIDE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5

All Results reported in micrograms per liter (ug/L)

Key:

GW Groundwater
REP Replicate
ND@X Not Detected at Detection Limit X
J Estimated Value

Table 2
Volatile Organic Compound Data, GW-612, GW-613, and GW-617 Shutdown Test Groundwater Sampling
B/322 Area of Concern (Operable Unit 7)
Former IBM East Fishkill Facility, East Fishkill, New York

Parameter	Sample Location	772	773	773	773	773	773	773	773	773	773	773	773	793	793
	Sample Description	GW	GW	REP	GW	GW	GW	REP	GW	GW	GW	GW	REP	GW	GW
	Sample Date	07/06/2017	10/20/2015	10/20/2015	01/14/2016	04/12/2016	07/11/2016	07/11/2016	10/11/2016	01/10/2017	04/06/2017	07/06/2017	07/06/2017	10/20/2015	01/19/2016
	Laboratory Sample I.D.	9092404	8097221	8097222	8208368	8331088	8473070	8473071	8642505	8785325	8929594	9092401	9092402	8097231	8212831
1,1,1-TRICHLOROETHANE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (Freon®TF)		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE (Freon®123a)		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLOROBENZENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	0.3J	0.4J
ACETONE		ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0
CHLOROBENZENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	0.2J	0.2J
CIS-1,2-DICHLOROETHYLENE		0.7	0.1J	0.1J	0.1J	0.2J	0.2J	0.2J	0.2J	0.2J	0.2J	0.1J	0.2J	4.7	4.8
DICHLORODIFLUOROMETHANE (Freon®12)		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	1.1	0.8
ETHYLBENZENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
M,P-XYLENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
O-XYLENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TETRACHLOROETHYLENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	3.2	3.5
TRICHLOROETHYLENE		0.7	0.3J	0.3J	0.3J	0.2J	0.2J	0.2J	0.3J	0.2J	0.1J	0.2J	0.2J	4	4.2
TRICHLOROFLUOROMETHANE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
VINYL CHLORIDE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5

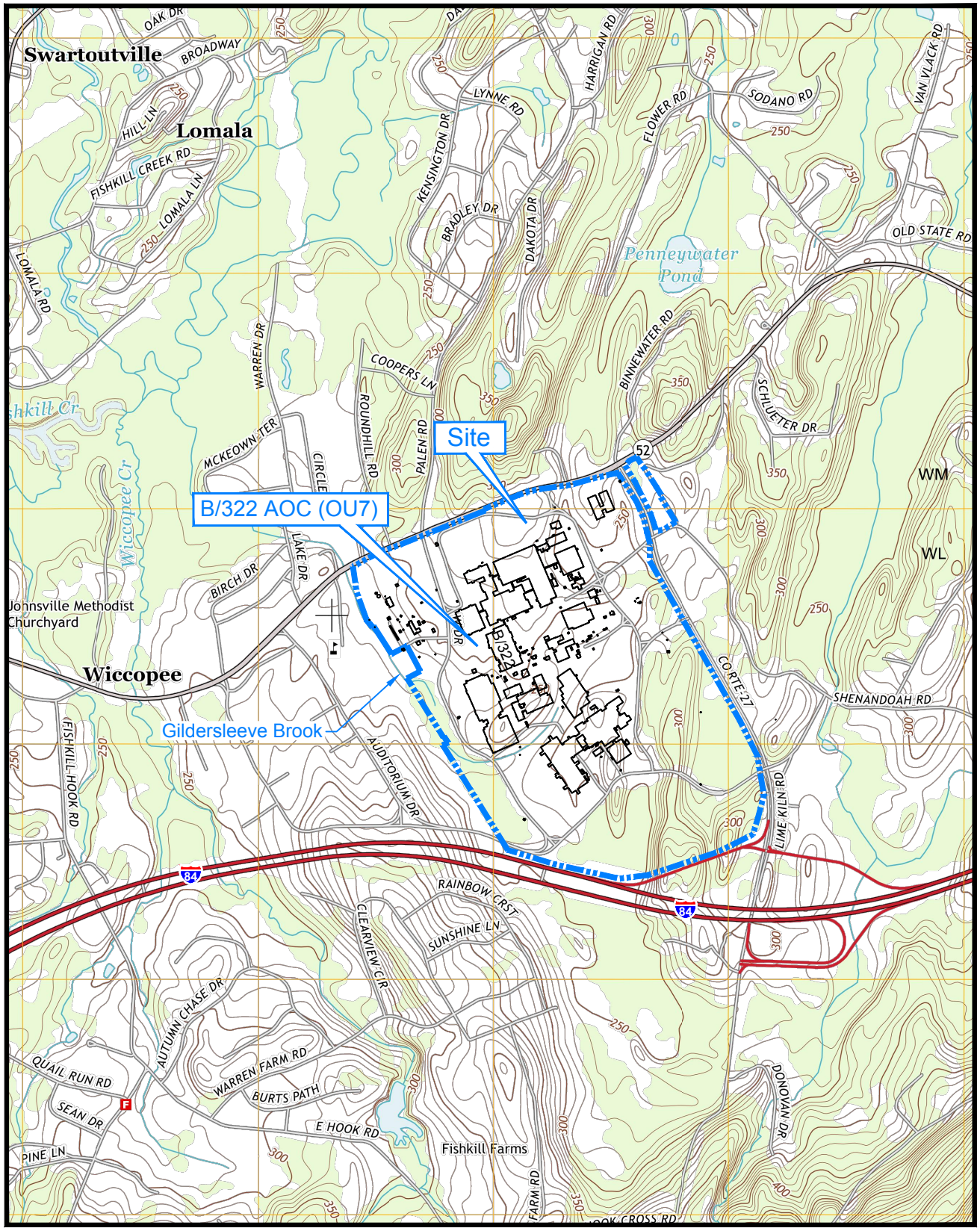
All Results reported in micrograms per liter (ug/L)

Parameter	Sample Location	793	793	793	793	793	793	793	793
	Sample Description	REP	GW	GW	GW	REP	GW	GW	GW
	Sample Date	01/19/2016	04/12/2016	07/11/2016	10/11/2016	10/11/2016	01/12/2017	04/07/2017	07/10/2017
	Laboratory Sample I.D.	8212832	8331086	8473067	8642508	8642509	8787074	8929602	9095746
1,1,1-TRICHLOROETHANE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (Freon®TF)		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE (Freon®123a)		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLOROBENZENE		0.5J	0.3J	0.2J	0.4J	0.4J	0.2J	0.2J	0.4J
ACETONE		ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0	ND@5.0
CHLOROBENZENE		0.2J	0.2J	0.2J	0.2J	0.2J	0.1J	ND@0.5	0.2J
CIS-1,2-DICHLOROETHYLENE		4.7	3.8	3.4	4.3	4.2	3.6	2.2	3.5
DICHLORODIFLUOROMETHANE (Freon®12)		0.7	1.1	0.8	0.6	0.6	0.4J	0.8	1.7
ETHYLBENZENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
M,P-XYLENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
O-XYLENE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TETRACHLOROETHYLENE		3.4	2.9	2.5	3.5	3.4	2.7	1.9	2.8
TRICHLOROETHYLENE		4.1	3.3	3.2	4.3	4.3	3.5	2.0	3.3
TRICHLOROFLUOROMETHANE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
VINYL CHLORIDE		ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5

All Results reported in micrograms per liter (ug/L)

Key:

GW Groundwater
REP Replicate
ND@X Not Detected at Detection Limit X
J Estimated Value



Portion of the Hopewell Junction, NY
7.5-minute USGS Quadrangle
(The National Map US Topo, 2013)
Latitude/Longitude: 41°32'27"N, 73°49'28"W (41.540714, -73.824185)

N

Scale
0 1000' 2000'

Figure 1

Former IBM East Fishkill Facility

Site Location Map

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95007-044-E3 / 1-21-16

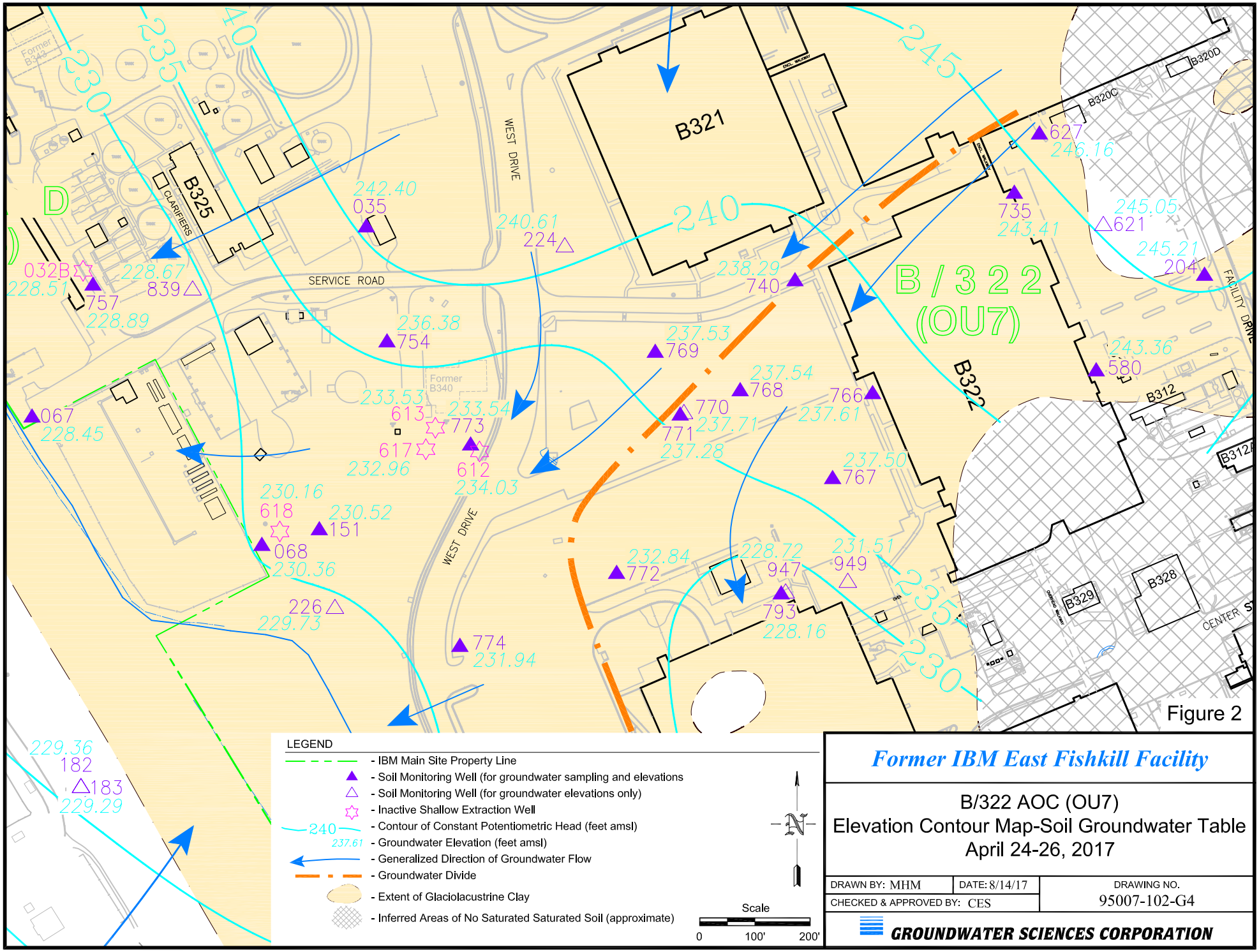

Figure 2

Former IBM East Fishkill Facility

B/322 AOC (OU7)
Elevation Contour Map-Soil Groundwater Table
April 24-26, 2017

DRAWN BY: MHM	DATE: 8/14/17	DRAWING NO. 95007-102-G4
CHECKED & APPROVED BY: CES		

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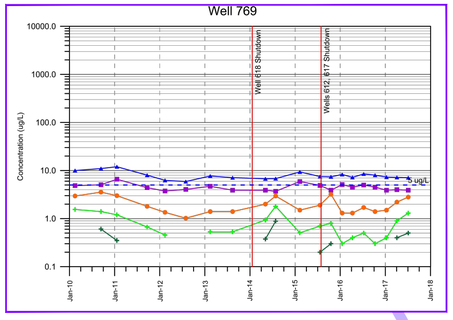
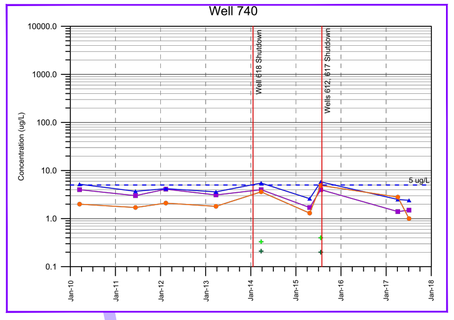
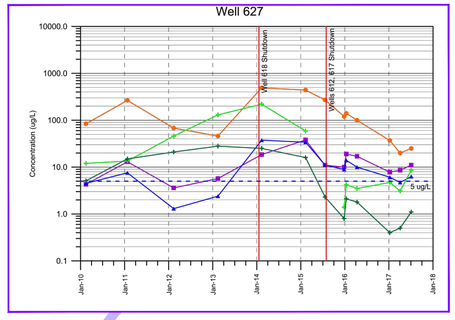
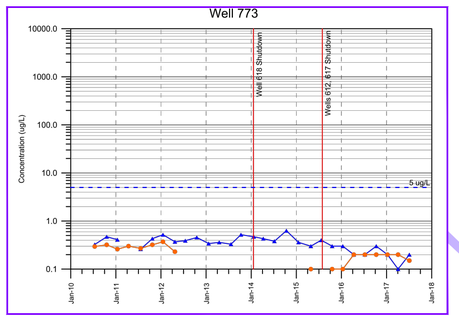
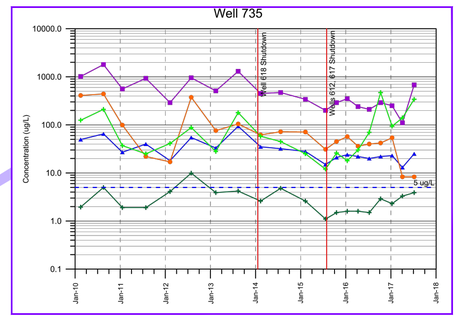
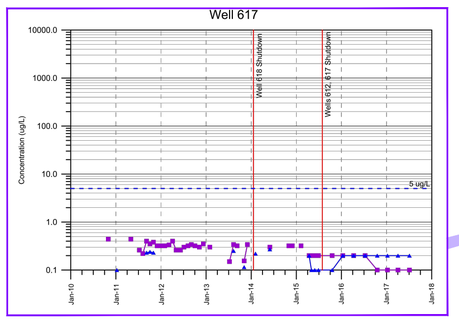


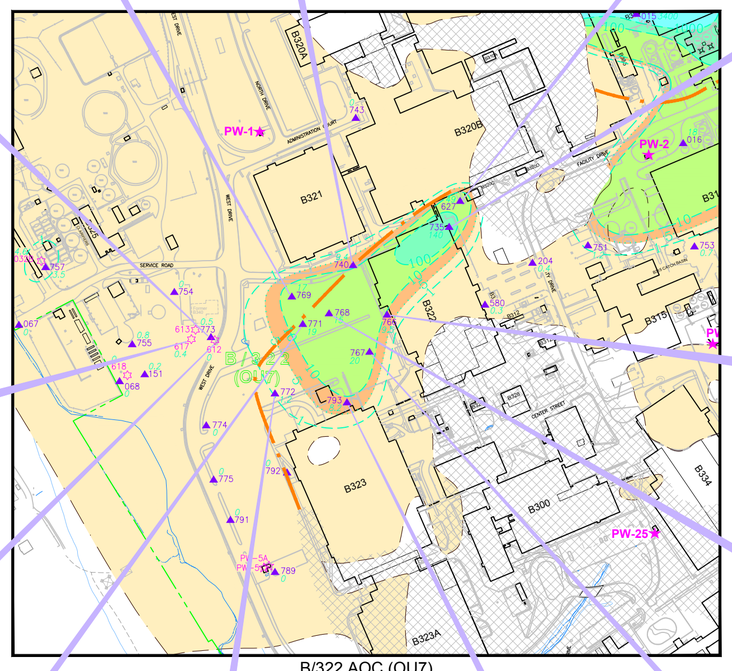




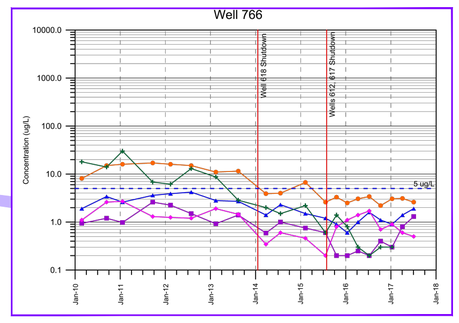


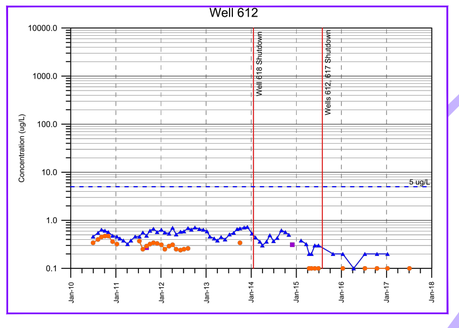


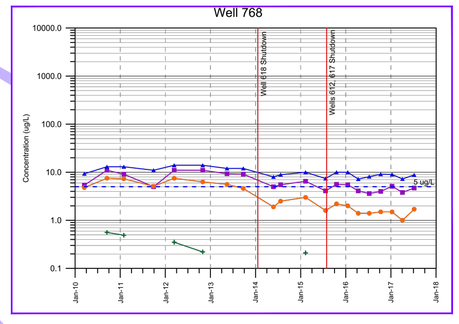


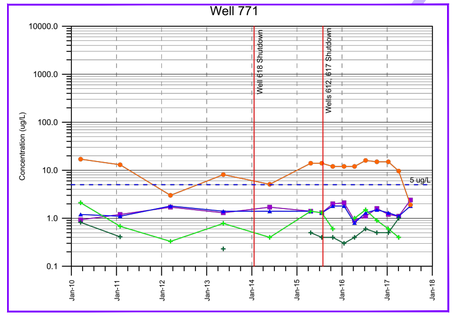


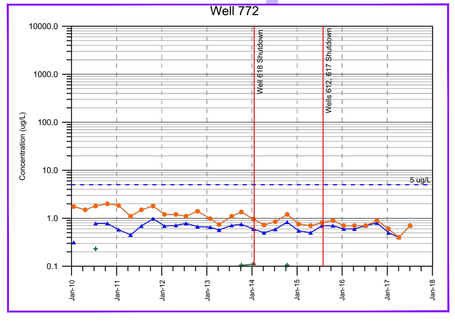
B/322 AOC (OU7)

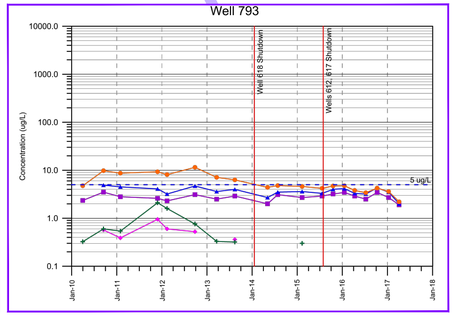


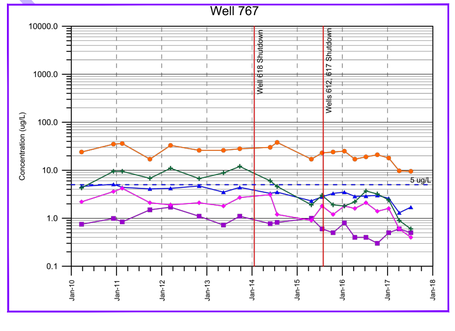












PCE - Tetrachloroethene
TCE - Trichloroethene
CIS12-DCE - cis-1,2-Dichlorothene
VC - Vinyl Chloride*
FREON TF - Freon TF
FREON 123A - Freon 123a

*Sampling for Vinyl Chloride began in 1990.

LEGEND

- Former IBM East Fishkill Facility Property Line
- GMP Soil Monitoring Well
- Bedrock Extraction Well
- Inactive Bedrock Extraction Well
- Soil Extraction Well
- Inactive Soil Extraction Well
- Extent of Glaciolacustrine Clay (East Complex only)
- Inferred Areas of No Saturated Soil (approximate)
- 10 — PCE-Series Concentration Contour (ug/l)
- 5 ····· Approximate Limit of Plume as Defined by Annual Median Concentration Equal to 5 ug/l of PCE-Series Compounds
- 20 PCE-Series Concentration (ug/l; April 4-May 12, 2017)

Note: All concentrations have been rounded to a maximum of two significant figures. "0" means not detected.

Concentrations greater than the MDL but less than the RL (which is 0.5 ug/l x DF for most compounds) are also reported by the laboratory (MDL=Method Detection Limit, RL=Reporting Limit, and DF=Dilution Factor). Values greater than the MDL but less than the RL should be considered estimates that would typically be flagged with a "J" qualifier.

The PCE-series concentration is a calculated concentration that uses the weighted sum of four constituent VOC concentrations. In performing this calculation, compounds that were "not detected" are treated as zeroes, and the resulting PCE-series concentration is shown as "0" if none of the four PCE-series constituents was detected.

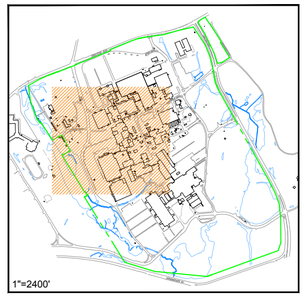


Figure 3

Scale
0 200' 400'

Former IBM East Fishkill Facility

B/322 AOC (OU7)
Well Location Map and
Time vs. Concentration Graphs
Soil

DRAWN BY: MHM	DATE: 8/31/17	DRAWING NO. 95007-088-H2
CHECKED & APPROVED BY: CES/RCW		

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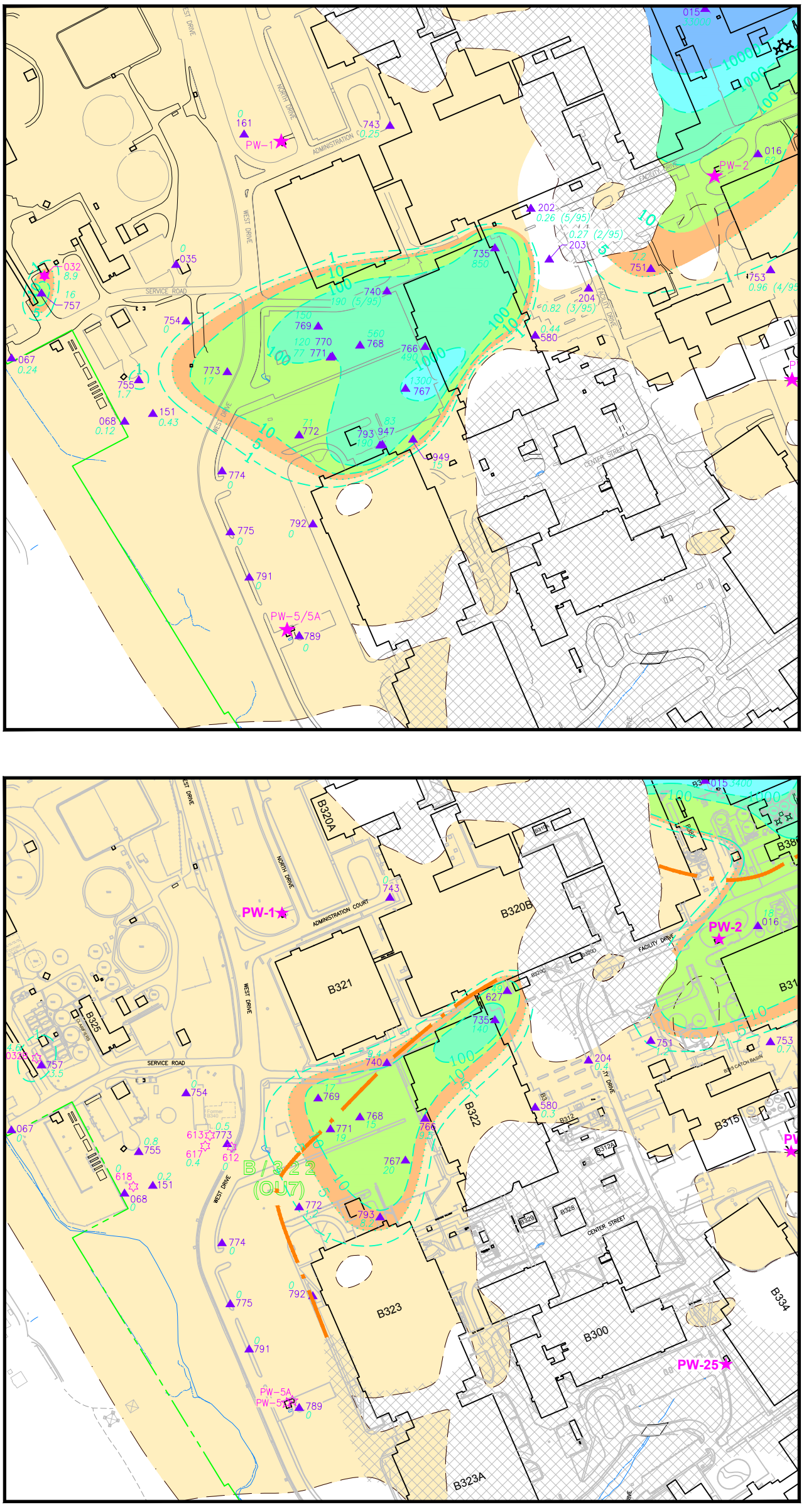

1995

B/322 AOC (OU7)

2017

B/322 AOC (OU7)

April-May

LEGEND

- Former IBM East Fishkill Facility Property Line
- GMP Soil Monitoring Well
- Bedrock Extraction Well
- Inactive Bedrock Extraction Well
- Soil Extraction Well
- Inactive Soil Extraction Well
- Groundwater Divide
- Extent of Glaciolacustrine Clay (East Complex only)
- Inferred Areas of No Saturated Soil (approximate)
- 10 — PCE-Series Concentration Contour (ug/l)
- 5 — Approximate Limit of Plume as Defined by Annual Median Concentration Equal to 5 ug/l of PCE-Series Compounds
- 15 — PCE-Series Concentration (ug/l)

Note: All concentrations have been rounded to a maximum of two significant figures. "0" means not detected.

Concentrations greater than the MDL but less than the RL (which is 0.5 ug/l x DF for most compounds) are also reported by the laboratory (MDL=Method Detection Limit, RL=Reporting Limit, and DF=Dillution Factor). Values greater than the MDL but less than the RL should be considered estimates that would typically be flagged with a "J" qualifier.

The PCE-series concentration is a calculated concentration that uses the weighted sum of four constituent VOC concentrations. In performing this calculation, compounds that were "not detected" are treated as zeroes, and the resulting PCE-series concentration is shown as "0" if none of the four PCE-series constituents was detected.

Scale
0 200' 400'

Figure 4

Former IBM East Fishkill Facility

B/322 AOC (OU7)
Soil Isoconcentration Contour Map
PCE-Series, Comparison of 1995 & 2017

DRAWN BY: MHM	DATE: 8/31/17	DRAWING NO. 95007-088-H1b
CHECKED & APPROVED BY: CES/RCW		

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