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U.S. Army Garrison Fort George G. Meade
Directorate of Public Works-Environmental Division
2212 Chisholm Avenue, Suite 5115
Fort Meade, Maryland 20755-7068

ENVIRONMENT

Subject:
Final Off-Post Monitoring Well Sampling Report—Year 1
Fort George G. Meade
Fort Meade, Maryland

DoD Delivery Order Contract Number: W912DR-09-D-0016-0024

Date:
9 July 2012

Contact:
Dan Sheehan

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Our ref:
02118175.0000

Dear Mr. Fluck:

This 2012 Off-Post Monitoring Well Sampling Letter Report-Year 1 (Report) for monitoring wells (MW)-123s, MW-124s, MW-125d and MW-126d has been prepared on behalf of the United States (U.S.) Army to further remedial activities at Fort George G. Meade (FGGM), Maryland. This Report has been prepared by ARCADIS/Malcolm Pirnie, under U.S. Army Corps of Engineers (USACE) Baltimore District, Contract Numbers W912DR-09-D-0021 Delivery Order 0004 (monitoring well sampling) and W912DR-09-D-0016, Delivery Order 0004 (monitoring well repairs).

The sections of this Report are as follows:

- A. Background
- B. Purpose
- C. Monitoring Well Repair
- D. Monitoring Well Sampling
- E. Data Analysis and Results
- F. Investigation Derived Waste
- G. References

Attachments:

- A. Laboratory Report
- B. Data Validation Report
- C. Investigation Derived Waste Manifest and Laboratory Report
- D. Response to Comments

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Imagine the result

A. Background

As part of the Remedial Investigation (RI) of the Closed Sanitary Landfill (CSL) at FGGM, four groundwater monitoring wells (identified as MW-123s, MW-124s, MW-125d, and MW-126d), were installed in 2003 on the Anne Arundel County right-of-way just outside the southeastern boundary of the installation on the east edge of North Patuxent Road (**Figure 1**). There are two well clusters, each with a deep and shallow well (MW-125d/ MW-123s and MW-126d/ MW-124s), which were initially sampled in June 2004. The deep monitoring wells (MW-125d and MW-126d) were also sampled in March 2005 as part of the CSL RI. Upon completion of the RI in 2007, tetrachloroethylene (PCE), trichloroethylene (TCE), and carbon tetrachloride (CCl₄) were recognized as contaminants within the Lower Patapsco aquifer, including at the subject well locations. Therefore, the constituents of concern (COCs) for this project were established as CCl₄, PCE, and TCE with cis-1,2-dichloroethene (cis-1,2-DCE) as a breakdown product for PCE and TCE.

Concentrations of CCl₄ and PCE were detected above their respective federal maximum contaminant levels (MCLs) beginning with the 2004 sampling event. TCE was detected above its MCL at MW-125d and MW-126d beginning in 2008. None of the COCs were detected at or above MCLs in the shallow wells.

In November 2008, FGGM redeveloped and re-sampled the two deep monitoring wells, MW-125d and MW-126d, as part of the Army's continual effort to monitor groundwater associated with the CSL. The results of this sampling event showed concentrations of CCl₄ from MW-125d and CCl₄, TCE, and PCE from MW-126d all increased in concentration from the 2004 sampling event and were all above their respective MCL. Thus, the U. S. Environmental Protection Agency (USEPA) issued the Interim Measure Required letter to FGGM (USEPA, 2009), requiring FGGM to conduct interim measure activities for monitoring wells MW-125d and MW-126d. Results of these interim measures are presented in the *Final FGGM Off-Post Well Investigation Interim Measures Report* (ARCADIS/Malcolm Pirnie, 2011a).

As part of the interim measure activities, the Army sampled the four wells in April 2009 and June 2009 for Volatile Organic Compounds (VOC). As stated above, the Interim Measures Required letter only required activities to be conducted at monitoring wells MW-125d and MW-126d. Monitoring wells MW-123s and MW-124s (co-located with MW-125d and MW-126d, respectively) were also analyzed to ensure all contamination was confined to the Lower Patapsco aquifer. The results of these sampling events showed that concentrations of CCl₄ from MW-125d and CCl₄, TCE, and PCE from MW-126d have increased; the concentrations remain above their respective MCLs. Chloroform was detected in both MW-125d and MW-126d, and

cis-1,2-DCE was detected in MW-126d. However, neither compound was detected above its respective MCL (**Table 1**). None of the COCs were detected in the shallow wells.

In March 2009, during a groundwater sampling event of MW-123s, MW-124s, MW-125d, and MW-126d, the field crew observed damage to the well head assembly of monitoring wells MW-124s and MW-126d. Damage included sheared-off bolts and a potentially leaking seal on the well head assembly. It was also suggested that, for security reasons, all four of the monitoring wells should to be fitted with flush mount security well head assemblies to ensure they are tamper/vandal resistant.

B. Purpose

This Off-Post Monitoring Well Sampling Report—Year 1 documents the monitoring well repair activities and analytical results for Year 1 of the monitoring well sampling program. All sampling activities were conducted in accordance with the Final Off-Post Monitoring Well Repair and Sampling Work Plan (ARCADIS/Malcolm Pirnie, 2011b).

C. Monitoring Well Repair

Based on the observations and suggestions made during the April 2009 groundwater sampling event, monitoring well repair activities were conducted on January 12, 2012. Photographs of the repaired wells are included as **Figure 2**. Repairs were conducted by a Maryland-licensed driller and included the following:

- The concrete pads surrounding MW-124s and MW-126d were jack-hammered, and the existing flush-mount well head assemblies were removed. New flush-mount well head assemblies were installed, and new concrete pads were constructed. The concrete pads extend approximately 1.5 feet below grade and radially approximately 1.5 feet from the well head assemblies. The PVC pipe was not cut or reshaped during these repairs.
- The waterproof seal (rubber o-ring) on all well head assemblies was replaced to prevent surface water (e.g., rain water) from entering the well head.
- Tamper proof bolts (requiring a specialized tool to open) were installed on all four well head assemblies.
- All wells were properly labeled with the Maryland state license tag and well identification.

D. Monitoring Well Sampling

After the well repairs were completed, the wells were redeveloped in accordance with the approved work plan (ARCADIS/Malcolm Pirnie, 2011b). Field measurements were performed during the well purging and included pH, specific conductivity, temperature, oxidation/reduction, dissolved oxygen, and turbidity measurements. Measurements were collected by inserting the appropriate probes in a closed non-dedicated container (flow-through cell). Well redevelopment was performed to prepare the wells for sampling.

Approximately two weeks after the wells had been redeveloped, groundwater samples were collected from the monitoring wells. MW-123s, MW-124s, and MW-125d were sampled on January 31, 2012; MW-126d was sampled on February 1, 2012.

Groundwater samples were collected using the low-flow pump and tubing at a rate of approximately 100 milliliters/minute. Groundwater was collected directly into laboratory prepared VOC sample vials. Quality Assurance / Quality Control samples were collected in accordance with the Final Off-Post Monitoring Well Repair and Sampling Work Plan (ARCADIS/Malcolm Pirnie, 2011b).

E. Data Analysis and Results

Groundwater samples were analyzed using USEPA method SW846/8260 for the full Target Compound List (TCL) for VOCs. Data analyses were completed by a National Environmental Laboratory Accreditation Program (NELAP) laboratory, with a turnaround time of five business days. A third-party data quality review and validation was conducted on all samples (100%). The data validation was performed under USEPA Region III, Level M3 guidelines. The analyses were validated using the following documents, as applicable to each method:

- U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1, April 22, 2009
- USEPA Region III Innovative Approaches for Data Validation, June 1995
- USEPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

As discussed earlier, the COCs for this project are CCl₄, PCE, and TCE with cis-1,2-DCE as a breakdown product for PCE and TCE. There were no detections of the COCs in either of the shallow wells (MW-123s and MW-124s). TCL VOC detections for the deep wells (MW-125d and MW-126d) are shown in **Table 2**. In addition to the

COCs, the following compounds were detected in the corresponding wells; all at concentrations below their respective MCL:

- Benzene (MW-125d);
- Ethylbenzene (MW-125d);
- Toluene (MW-125d and MW-126d);
- Total xylenes (MW-125d); and
- m,p-xylenes (MW-125d).

As shown in **Table 2**, both CCl_4 and PCE exceeded their respective MCLs in MW-126d. While there were detections of TCL VOCs in MW-125d, no VOCs were detected above their respective MCLs. As shown in **Table 1**, the concentrations of CCl_4 in MW-125d have decreased from 17 micrograms per liter ($\mu\text{g/L}$) to 3.5 $\mu\text{g/L}$ since the June 2009 event, whereas the concentrations of CCl_4 in MW-126d have stayed relatively constant (65.8 $\mu\text{g/L}$ in June 2009 and 64.3 $\mu\text{g/L}$ in February 2012). PCE concentrations have decreased in MW-126d from 31.4 $\mu\text{g/L}$ in June 2009 to 9.2 $\mu\text{g/L}$ in February 2012. PCE in MW-125d has either been qualified or not detected above the method detection limit in the two 2009 and the January 2012 samples.

The full laboratory report is presented in **Attachment A**. The full data validation report is reported in **Attachment B**. Year 2 groundwater sampling is planned for early 2013.

F. Investigation Derived Waste

All purge water generated during the well redevelopment and sampling was collected in drums. A total of nine drums of purge water were generated during the January 2012 well redevelopment activities, and two drums of purge water were generated during the January and February 2012 groundwater sampling activities. The drums were transported to the FGGM Recycling Center for storage. One drum per well was sampled (four samples total) for VOCs, semi-volatile organic compounds, pesticides, herbicides, polychlorinated biphenyls, metals, pH, and total suspended solids by a NELAP laboratory. All purge water was determined to be non-hazardous and was transported to an off-Post wastewater treatment plant on March 6, 2012, by a licensed waste hauler/processor/disposal facility. The full laboratory report and manifest are presented in **Attachment C**.

G. References

ARCADIS/Malcolm Pirnie. 2011a. *Final FGGM Offpost Well Investigation Interim Measures Report*. September 2011.

ARCADIS/Malcolm Pirnie. 2011b. *Final Off-Post Monitoring Well Repair and Sampling Work Plan*. October 2011.

USEPA III, 2004. *USEPA Region III Modifications to the National Functional Guidelines for Organic Data Review*.

USEPA III, 2009. "Interim Measure Required" letter from U.S. Environmental Protection Agency to Fort George G. Meade dated 29 January 2009.

Sincerely,

ARCADIS U.S., Inc..



Daniel P. Sheehan, PE, BCEE
Project Manager

CC:
Mick Butler, Fort George G. Meade Environmental Division
Francis Coulters, United States Army Environmental Command

TABLES

Table 1: Detections of COCs and Chloroform in Monitoring Wells 2004- 2012

Well No.	Round	Date Collected	Compound Detected (MCL)				
			Chloroform (80 µg/L)	CCl ₄ (5 µg/L)	cis-1,2-DCE (70 µg/L)	PCE (5 µg/L)	TCE (5 µg/L)
MW-123s	1	4/16/09	ND	ND	ND	ND	ND
	2	6/18/09	ND	ND	ND	ND	ND
	--	1/31/12	ND	ND	ND	ND	ND
MW-124s	1	4/16/09	ND	ND	ND	ND	ND
	2	6/18/09	ND	ND	ND	ND	ND
	--	1/31/12	ND	ND	ND	ND	ND
MW-125d	--	2004	--	21.3	--	2.8	0.5
	--	11/7/08	1 J	25	< 0.8	5	1 J
	1	4/16/09	ND	20.3	ND	0.66J	ND
	2	6/18/09	1.0	17.0	ND	ND	ND
	--	1/31/12	ND	3.5	ND	0.83J	0.52J
MW-126d	--	2004	--	4.1	--	12.4	3.5
	--	11/7/08	2 J	51	3 J	51	16
	1	4/16/09	ND	21.8	0.69J	11.5	4.9
	2	6/18/09	1.6	65.8	2.3	31.4	13.1
	--	2/1/12	ND	64.3	0.75J	9.2	3.2

Note: Values in parenthesis indicate the associated MCL

Round 1 and 2 are the 16 April 2009 and 18 June 2009, respectively, two Interim Measures sampling events.

ND = Not Detected at or above the reporting detection limit

Cells shaded gray exceed the MCL.

µg/L = micrograms per liter

J= estimated concentration below the method detection limit

Table 2: Detections of VOCs in Deep Monitoring Wells- MW-125d and MW-126d, 2012

Well No.	Date Collected	Compound Detected (MCL)								
		Benzene (5 µg/L)	CCl ₄ (5 µg/L)	cis-1,2-DCE (70 µg/L)	Ethylbenzene (700 µg/L)	PCE (5 µg/L)	Toluene (1,000 µg/L)	Total Xylenes (10,000 µg/L)	TCE (5 µg/L)	mp-Xylenes (10,000 µg/L)
MW-125d	1/31/12	0.67J	3.5	ND	0.91J	0.83J	1.5J	1.2JB	0.52J	1.2JB
MW-126d	2/1/12	ND	64.3	0.75J	ND	9.2	1.3	ND	3.2	ND

Note: Values in parenthesis indicate the associated MCL. Only the detected concentrations are presented in this table. There were no detections in shallow wells MW-123s and MW-124s.

ND = Not Detected at or above the reporting detection limit

Cells shaded gray exceed the MCL.

µg/L =micrograms per liter

J= estimated concentration below the method detection limit

B= compound was not detected substantially above the level reported in laboratory or field blanks

FIGURES

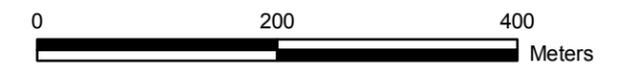
Fort George G. Meade
Off-Post Monitoring Well
Sampling Letter Report — Year 1



Figure 1
General Location of Off-Post Monitoring Wells

Legend

- Installation Boundary
- Deep Monitoring Well
- Shallow Monitoring Well
- Railroad



Data Sources: ESRI, World Imagery, 2003
FGGM, GIS Data, 2005

Coordinate System: UTM Zone 18
Datum: NAD 1983
Units: Meters

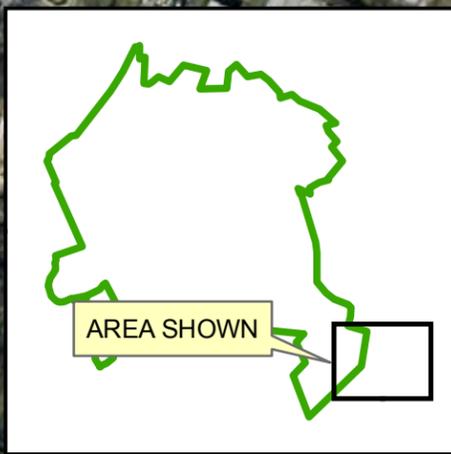
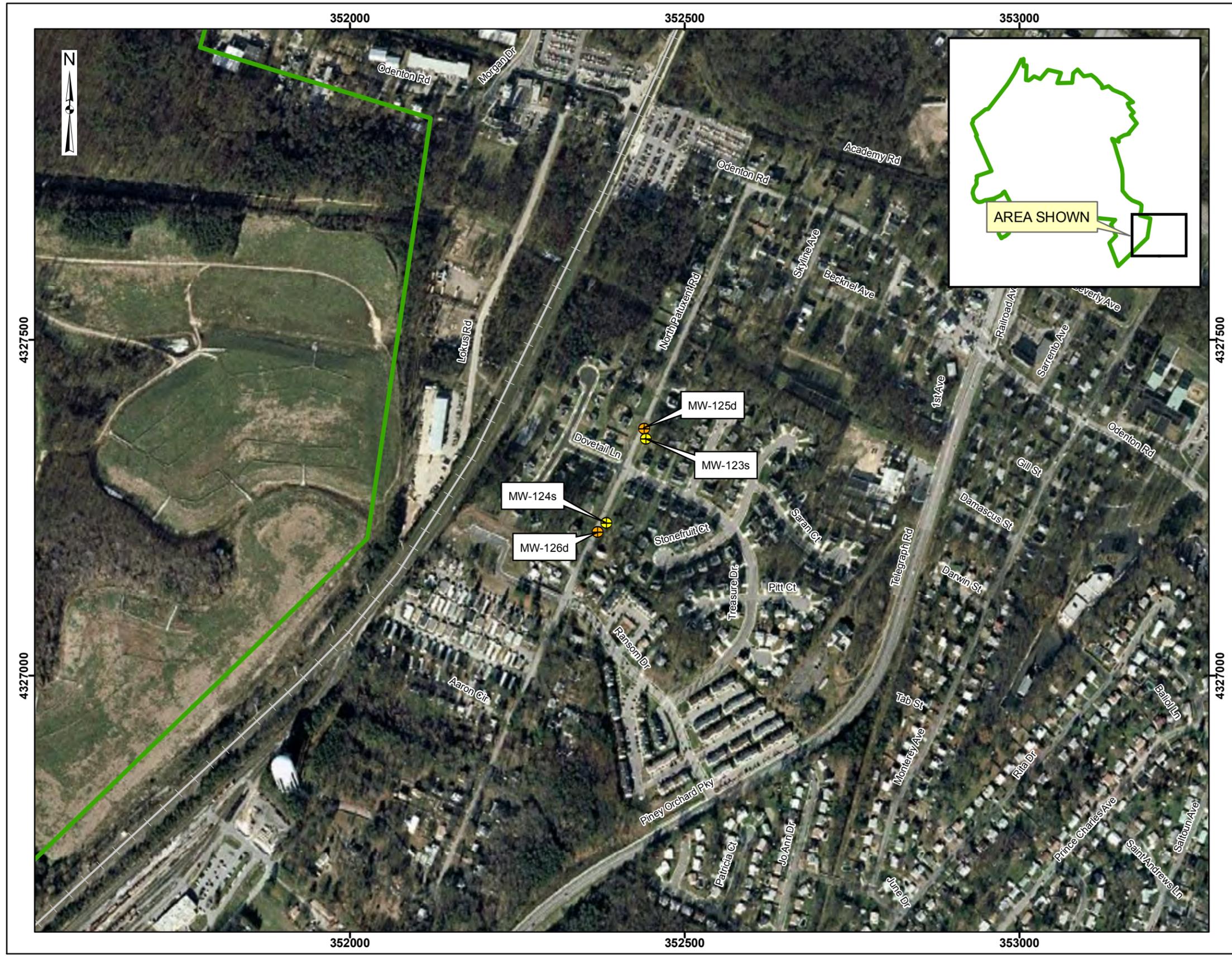


Figure 2: Well Repairs at MW-123s, MW-124s, MW-125d, and MW-126d



MW-123s and MW-125d looking north



MW-124s and MW-126d looking north

//////////////////// ATTACHMENT A

//////////////////// Laboratory Report

ATTACHMENT D
Response to Comments

Response to Comments Table

Draft Off-Post Monitoring Well Sampling Letter Report—Year 1

May 2012

Response Code: A = Agree with comment D = Disagree with comment C = Comment requires clarification N = Comment noted, no action required or taken

Comment Number	Commenter	Page(s)	Section	Comment	Response Code	Response
1	EPA Hydro		C. Monitoring Well Repair	If any of the PVC was cut/reshaped or altered in any way, new Top-Of-Casing elevations would need to be established.	A	The PVC was not cut or reshaped during this repair. This was noted in Section C.
2	EPA Hydro		General	Just for future reference; please be aware of CoC nomenclature in the event data is misplaced. MW-123s etc.	N	Comment noted.
3	MDE		General	The Federal Facilities Division (FFD) of the Maryland Department of the Environment's Land Restoration Program has completed its review of the above document. The FFD has no comment on this document, and looks forward to receipt of the final for incorporation into our site file.	N	Comment noted.



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029**

July 5, 2012

Paul V. Fluck, P.G., REP
Installation Restoration Manager
Dept. of Army DPW - Environmental Division
239 Chisholm Avenue
Suite 5115
Fort George G. Meade, MD. 20755-7068

Subject: Final Off-Post Monitoring Well Sampling Report – Year 1.

Mr. Fluck:

Thank you for the opportunity to review the subject document. EPA has no additional comments and it is the opinion of EPA that the document is ready for inclusion in the Administrative Record for the Site.

If you have any questions, please contact me at 215-814-3378.

Sincerely,

A handwritten signature in black ink, appearing to read "John Burchette", is written over a light gray rectangular background.

John Burchette
Remedial Project Manager

cc: Dr. Elisabeth Green