

**Summary of March 2012 Frog Mortar Creek
Surface Water Sample Results
Martin State Airport, Middle River, Maryland**

Forty (40) surface water samples were collected from Frog Mortar Creek near the Dump Road Area (DRA) site on March 20, 2012. Four samples were collected along each of nine transects, spaced approximately 350 feet apart, along the western shoreline of Frog Mortar Creek and four samples were collected along a transect extending out from the eastern shoreline at 3301 Edwards Lane. Along each transect, one sample was collected near the shoreline (“A” sample), one sample was collected approximately 50 feet from the shoreline (“B” sample), one sample was collected approximately 100 feet from the shoreline (“C” sample) and one sample was collected approximately 200 feet from the shoreline (“D” sample). Each sample was collected approximately one foot below the water surface. The sample locations are shown in Figure 1. The surface water samples were collected as part of an ongoing investigation to assess the effects of the DRA groundwater contaminants on the water quality of Frog Mortar Creek.

Table 1 summarizes the detected results for the samples. The samples were analyzed for volatile organic compounds (VOCs) by SW846 Method 8260C; metals (filtered in the laboratory) by SW846 Methods 6010C/7470A; and hexavalent chromium (filtered in the field) by United States Environmental Protection Agency (USEPA) Method 218.6. Water quality parameters, including temperature, pH, specific conductance, hardness, salinity, turbidity, dissolved oxygen, and oxidation reduction potential were measured at all surface water sample locations on both sides of the creek at the time of sampling. In addition, the depth of water at the sampling location and the tidal stage at the time of sampling were recorded. All information was documented on surface water sample forms.

In Table 1, the sample results are screened against the USEPA Region III Biological Technical Advisory Group (BTAG) Freshwater Screening Benchmarks, USEPA National Recommended Water Quality Criteria (NRWQC) and the State of Maryland ambient water quality criteria (AWQC) for acute and chronic aquatic organism exposure and for aquatic organism consumption. The NRWQC and AWQC screening values were adjusted for select dissolved metals (chromium, copper, lead, nickel and zinc) based on using a site specific hardness value of

260 mg/L, rather than the standard 100 mg/L. The surface water samples collected in March were analyzed for hardness and 260 mg/L was the lowest hardness value reported. Gray shading in Table 1 indicates that a result exceeds one surface water screening criterion.

Several VOCs and metals were detected in the surface water samples. Hexavalent chromium was detected in all 40 samples, but at concentrations more than 100 times below the screening criterion. The most frequently detected chlorinated VOCs (cVOCs) in the samples include trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC), which are also the primary cVOCs detected in the DRA groundwater plume. Other VOCs detected but at low frequencies (i.e., in only one or two samples) include 1,1-dichloroethene, 1,4-dichlorobenzene, acetone, carbon disulfide, chlorobenzene, trans-1,2-dichloroethene and the petroleum-related compounds toluene, ethylbenzene, and xylenes.

TCE results are shown on Figure 2, cis-1,2-DCE results are shown in Figure 3, and vinyl chloride results are shown in Figure 4. As shown in Figure 2, TCE was detected in all samples at concentrations ranging from 0.49 to 21 micrograms per liter ($\mu\text{g/L}$). As shown in Figure 3, cis-1,2-DCE was detected in all samples at concentrations ranging from 0.41 $\mu\text{g/L}$ to 39 $\mu\text{g/L}$. VC was detected less frequently (in 34 of 40 samples), at concentrations ranging from 0.24 $\mu\text{g/L}$ to 40 $\mu\text{g/L}$, as shown in Figure 4. As indicated in Table 1, all detected surface water cVOC concentrations were less than the screening criteria, with the exception of VC in sample MSA-SW40A, which was detected at a concentration of 40 $\mu\text{g/L}$, a concentration exceeding its USEPA NRWQC screening criterion for human health consumption of organisms of 24 $\mu\text{g/L}$.

Benzene, toluene, ethylbenzene and xylenes (BTEX), are common components of petroleum fuels, and are site groundwater contaminants. Benzene was not detected in any of the samples. Toluene was detected in one sample at a concentration of 0.71 $\mu\text{g/L}$. Ethylbenzene and xylenes were both detected in sample MSA-SW40A (near the shore), and xylenes were detected in MSA-SW40B (50 feet from the shore), but neither was detected in the samples collected 100 feet and 200 feet from shore along this transect. Xylenes were detected in two additional samples, MSA-SW42A and MSA-SW42B, at estimated concentrations of 0.25J $\mu\text{g/L}$ and 1.0J $\mu\text{g/L}$, respectively. Acetone was detected in three samples (1.3 $\mu\text{g/L}$ to 2.7J $\mu\text{g/L}$) and carbon disulfide

was detected in two samples (0.4 µg/L and 0.48 µg/L). Acetone is a common laboratory contaminant and is not a constituent of the DRA VOC plume.

Concentrations of TCE were greatest at samples MSA-SW40A and MSA-SW40B (11.0 µg/L and 21.0 µg/L, respectively). This transect is located north–northeast and slightly hydraulically side-gradient of DRA monitoring wells that contain some of the highest concentrations of site-related constituents in shallow and intermediate depth groundwater (e.g., wells DMW2S, DMW2A, DMW3I). Further from shore but along the same transect, lower TCE concentrations were detected in samples MSA-SW40C and MSA-SW40D (4.1 µg/L and 1.7 µg/L, respectively). TCE concentrations were mostly below 5 µg/L throughout the other sample locations with the exception of slightly-elevated concentrations detected in MSA-SW38A, MSA-SW41A, and MSA-SW42B (7.9, 6.2 and 10.0 µg/L, respectively), located both north and south of transect SW40. TCE was detected at low levels in EL-SW01A, EL-SW01B, EL-SW01-C and EL-SW01D (1.0 µg/L, 1.1 µg/L, 1.4 µg/L and 1.6 µg/L, respectively), located on the eastern shoreline of Frog Mortar Creek. These TCE results are consistent with concentrations of TCE in samples collected at this location in January 2012.

Generally, TCE concentrations decreased progressively in samples located north and south of transect SW40 (see Figure 2). Along sample transects SW37, SW42, SW40, SW43, SW44, and SW-45 TCE concentrations were highest in the samples located approximately 50 feet from the shoreline and decreased progressively in samples collected further from the shoreline. Along sample transects SW38 and SW41, the highest concentration was detected in the sample located closest to the shoreline. For the other sample transects, the TCE concentrations are relatively consistent along each transect. Compared to those detected during the December 2011 event, March 2012 TCE concentrations have decreased in transects SW38 and SW41, and increased in transect SW40.

As shown in Figure 3, the two highest cis-1,2-DCE concentrations, 39 µg/L and 18 µg/L, were detected at MSA-SW40A and MSA-SW41A, respectively. In December 2011, the highest detected concentration of cis-1,2-DCE was for SW38A (21 µg/L), located between transects SW40 and SW41. Concentrations of cis-1,2-DCE typically decreased to the north of transect SW40 and to the south of transect SW41 moving outward, with the exception of one slightly

elevated concentration detected at SW37A (10 µg/L). The cis-1,2-DCE concentrations typically decreased with increasing distance from the shoreline; in four transects - SW37, SW38, SW40 and SW41; the highest cis-1,2-DCE concentration was detected in the samples collected 50 feet from the shoreline. The cis-1,2-DCE concentrations in transect EL-SW01, located along the eastern shoreline, were similar in all four samples (range of 0.9J µg/L to 1.4 µg/L).

The concentration of cis-1,2-DCE in the near-shore samples in transect SW40 increased significantly in March 2012 (39 µg/L) compared to the concentrations detected in December 2011 (7.5 µg/L). In transect SW38, the near-shore concentration of cis-1,2-DCE decreased from 21 µg/L in December 2011 to 5.4 µg/L in March 2012. Concentrations of cis-1,2-DCE remained consistent between December 2011 and March 2012 in the near-shore samples in transect SW41 (18 µg/L). In the other transects, the concentrations of cis-1,2-DCE in March 2012 were generally slightly elevated compared to the December 2011 concentrations, with the largest increase (from 0.76J to 10 µg/L) in sample at MSA-SW37A.

As shown in Figure 4, VC shows spatial distributions and trends similar to TCE and cis-1,2-DCE. Relatively consistent with the pattern of cVOC detection seen in past rounds, and similar to TCE and cis-1,2-DCE in this round, the maximum VC concentration of 40 µg/L was detected at sample MSA-SW40A. During the December 2011 sampling event, the highest VC concentration was detected in SW38A (14 µg/L). During the March 2012 sample event, VC was detected at slightly higher concentrations in the sample transects located north of transect SW40 (SW42, and SW37), than it was in the samples collected further to the south (SW38, SW41, SW43, SW44, SW45, and SW39). The highest VC concentrations were detected in the samples collected 50 feet offshore at five of the 10 transects (SW41, SW42, SW43, SW44, and SW45). Concentrations decreased with increasing distance from the shoreline at three other transects (SW37, SW38 and SW40). At transects SW39 and EL-SW01, VC was detected in trace concentrations in the samples collected 100 feet and 200 feet offshore only (range 0.24J µg/L to 1.1 µg/L).

During the March 2012 sampling event, dissolved arsenic was detected in all samples, but only two samples (MSA-SW42A and MSA-SW42C) had concentrations (each 1.5J µg/L) slightly above the human health risk screening criterion of 1.4 µg/L. In December 2011, dissolved

arsenic was detected above the human health screening criteria, but less than the ecological and AWQC criteria, in all samples, at concentrations ranging from 1.6J to 2.4J $\mu\text{g/L}$. Dissolved barium concentrations (ranging from 25 $\mu\text{g/L}$ to 27 $\mu\text{g/L}$) exceeded the BTAG ecological screening level of 4 $\mu\text{g/L}$ in all samples. No other metals had exceedances of any screening criteria.

During the March 2012 sampling event, dissolved hexavalent chromium was detected in all samples at trace concentrations ranging from 0.054 $\mu\text{g/L}$ to 0.092L $\mu\text{g/L}$, well below the screening criteria. All concentrations of hexavalent chromium detected during the March 2012 sampling episode are L-qualified, meaning the results are biased low. Hexavalent chromium (total) was detected in all samples during the December 2011 sampling event, with the maximum concentration detected at MSA-SW41B (5.21 $\mu\text{g/L}$).

Lockheed Martin Corporation plans to conduct surface water monitoring for the same 40 locations on Frog Mortar Creek during the calendar year 2012. Subsequent sampling rounds are scheduled for June, July, August, September and December 2012.



FIGURE 1

2012 SURFACE WATER SAMPLING LOCATIONS

LEGEND

- SURFACE WATER SAMPLE LOCATION (1 FOOT DEPTH BELOW WATER SURFACE)
- ⊕ GROUNDWATER MONITORING WELL
- ⊖ ABANDONED WELL
- MARYLAND AIR NATIONAL GUARD BOUNDARY
- POND

**Frog Mortar Creek
 Lockheed Martin, Martin State Airport
 Middle River, Maryland**

0 75 150 300 Feet

DATE MODIFIED: 2/20/12 CREATED BY: MP

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FIGURE 2
CONCENTRATIONS OF TRICHLOROETHENE
IN SURFACE WATER SAMPLES,
MARCH 2012
FROG MORTAR CREEK

LEGEND

- MARCH 2012 SURFACE WATER SAMPLE LOCATION
- ⊕ GROUNDWATER MONITORING WELL
- ⊖ ABANDONED WELL
- MARYLAND AIR NATIONAL GUARD BOUNDARY
- POND

(1.7) = TCE Concentration
 J = Estimated Value
 -- = Not Detected

Concentration in micrograms per liter (ug/L)

Frog Mortar Creek
Lockheed Martin, Martin State Airport
Middle River, Maryland



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FIGURE 3
CONCENTRATIONS OF CIS-1,2-DICHLOROETHENE IN SURFACE WATER SAMPLES, MARCH 2012
FROG MORTAR CREEK

LEGEND

- MARCH 2012 SURFACE WATER SAMPLE LOCATION
- ⊕ GROUNDWATER MONITORING WELL
- ◇ ABANDONED WELL
- MARYLAND AIR NATIONAL GUARD BOUNDARY
- POND

(1.7) = CIS-1,2-DICHLOROETHENE
 J = ESTIMATED VALUE
 -- = NOT DETECTED

Concentration in micrograms per liter (ug/L)

Frog Mortar Creek
Lockheed Martin, Martin State Airport
Middle River, Maryland



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FIGURE 4
CONCENTRATIONS OF VINYL CHLORIDE
IN SURFACE WATER SAMPLES,
MARCH 2012
FROG MORTAR CREEK

LEGEND

- MARCH 2012 SURFACE WATER SAMPLE LOCATION
- ⊕ GROUNDWATER MONITORING WELL
- ⊖ ABANDONED WELL
- MARYLAND AIR NATIONAL GUARD BOUNDARY
- POND

(1.7) = Vinyl Chloride Concentration
 J = Estimated Value
 - - = Not Detected

Concentration in micrograms per liter (ug/L)

Frog Mortar Creek
Lockheed Martin, Martin State Airport
Middle River, Maryland



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TABLE 1
CHEMICAL RESULTS AND SCREENING CRITERIA
FOR FROG MORTAR CREEK SURFACE WATER SAMPLES- MARCH 2012
LOCKHEED MARTIN, MARTIN STATE AIRPORT, MIDDLE RIVER, MARYLAND
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SAMPLE ID: LABORATORY ID SAMPLE DATE LOCATION	National Recommended and Ambient Water Quality Criteria ⁽¹⁾		Ecological Surface Water Screening Level ⁽²⁾	Human Health Consumption of Organism Only ⁽¹⁾	EL-SW01A- 032012	EL-SW01B- 032012	EL-SW01C- 032012	EL-SW01D-032012
	Freshwater				240-9383-37 3/20/2012	240-9383-38 3/20/2012	240-9383-39 3/20/2012	240-9383-40 3/20/2012
	Acute	Chronic			EL-SW01A	EL-SW01B	EL-SW01C	EL-SW01D
VOLATILES (ug/l)								
I,1-DICHLOROETHENE	NA	NA	25	7100	--	--	--	--
I,4-DICHLOROETHENE	NA	NA	26	190	--	--	--	--
ACETONE	NA	NA	1500	NA	--	--	--	--
CARBON DISULFIDE	NA	NA	0.92	NA	--	--	--	--
CHLOROBENZENE	NA	NA	1.3	1600	--	--	--	--
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	0.9 J	1	1.2	1.4
ETHYLBENZENE	NA	NA	90	2100	--	--	--	--
M+P-XYLENES	NA	NA	NA	NA	--	--	--	--
O-XYLENE	NA	NA	NA	NA	--	--	--	--
TOLUENE	NA	NA	2	15000	--	--	--	--
TOTAL XYLENES	NA	NA	13	NA	--	--	--	--
TRANS-1,2-DICHLOROETHENE	NA	NA	970	10000	--	--	--	--
TRICHLOROETHENE	NA	NA	21	300 ⁽³⁾	1	1.1	1.4	1.6
VINYL CHLORIDE	NA	NA	930	24 ⁽³⁾	--	--	0.33 J	0.4 J
FILTERED METALS (ug/l)								
ARSENIC	340	150	5	1.4 ⁽³⁾	1.1 J	1.2 J	1.1 J	1.2 J
BARIUM	NA	NA	4	NA	26	26	26	26
BERYLLIUM	NA	NA	0.66	NA	--	--	--	--
CHROMIUM	1246 ⁽⁵⁾	162 ⁽⁵⁾	74	NA	--	--	--	--
COBALT	NA	NA	23	NA	0.1 B	0.11 B	0.096 B	0.097 B
COPPER	33.06 ⁽⁵⁾	20 ⁽⁵⁾	9	NA	3.5	3.6	3.6	4
LEAD	179.6 ⁽⁵⁾	7 ⁽⁵⁾	2.5	NA	--	--	--	--
NICKEL	1051 ⁽⁵⁾	117 ⁽⁵⁾	52	4600	1.7 J	2.5	1.6 J	1.6 J
SELENIUM	NA	5	1	4200	--	--	--	--
VANADIUM	NA	NA	20	NA	--	0.49 J	0.59 J	--
ZINC	263.3 ⁽⁵⁾	265 ⁽⁵⁾	120	26000	8.9 J	9 J	9.1 J	11 J
MISCELLANEOUS PARAMETERS (ug/l)								
HEXAVALENT CHROMIUM ⁽⁴⁾	16	11	11	NA	0.077 L	0.08 L	0.077 L	0.077 L

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CHEMICAL RESULTS AND SCREENING CRITERIA
FOR FROG MORTAR CREEK SURFACE WATER SAMPLES- MARCH 2012
LOCKHEED MARTIN, MARTIN STATE AIRPORT, MIDDLE RIVER, MARYLAND
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	MSA-SW37A-032012	MSA-SW37B-032012	MSA-SW37C-032012	MSA-SW37D-032012	MSA-SW38A-032012	MSA-SW38B-032012	MSA-SW38C-032012
SAMPLE ID: LABORATORY ID SAMPLE DATE LOCATION	240-9383-1 3/20/2012 MSA-SW-37A	240-9383-2 3/20/2012 MSA-SW-37B	240-9383-3 3/20/2012 MSA-SW-37C	240-9383-4 3/20/2012 MSA-SW-37D	240-9383-5 3/20/2012 MSA-SW-38A	240-9383-6 3/20/2012 MSA-SW-38B	240-9383-7 3/20/2012 MSA-SW-38C
VOLATILES (ug/l)							
I,1-DICHLOROETHENE	0.38 J	--	--	--	--	--	--
I,4-DICHLOROENZENE	--	--	--	--	--	--	--
ACETONE	--	--	--	--	--	--	--
CARBON DISULFIDE	--	--	--	--	--	--	--
CHLOROENZENE	0.28 J	--	--	--	--	--	--
CIS-1,2-DICHLOROETHENE	10	4.3	2	0.84 J	5.4	3.1	1.8
ETHYLBENZENE	--	--	--	--	--	--	--
M+P-XYLENES	--	--	--	--	--	--	--
O-XYLENE	--	--	--	--	--	--	--
TOLUENE	--	--	--	--	--	--	--
TOTAL XYLENES	--	--	--	--	--	--	--
TRANS-1,2-DICHLOROETHENE	--	--	--	--	0.23 J	--	--
TRICHLOROETHENE	2.3	3	1.9	1.3	7.9	3.9	2.4
VINYL CHLORIDE	8.6	2.4	0.7	0.27 J	1.6	1.3	0.63
FILTERED METALS (ug/l)							
ARSENIC	1.3 J	1.3 J	1.3 J	1.2 J	1.3 J	1.1 J	1.3 J
BARIUM	25	25	25	25	25	27	25
BERYLLIUM	--	--	--	--	--	--	--
CHROMIUM	--	1 J	--	--	--	--	--
COBALT	0.49 B	0.25 B	0.15 B	0.15 B	0.71 B	0.3 B	0.18 B
COPPER	3.4	3.7	3.5	3.6	3.5	3.4	3.3
LEAD	--	--	--	--	--	--	--
NICKEL	1.6 J	2.7	1.8 J	1.7 J	2.3	1.9 J	1.8 J
SELENIUM	0.74 J	--	--	--	--	--	--
VANADIUM	--	--	0.51 J	--	0.47 J	--	--
ZINC	11 B	12 B	10 B	12 B	21	9.7 B	14 B
MISCELLANEOUS PARAMETERS (ug/l)							
HEXAVALENT CHROMIUM ⁽⁴⁾	0.054 L	0.068 L	0.066 L	0.074 L	0.077 L	0.072 L	0.069 L

TABLE 1
CHEMICAL RESULTS AND SCREENING CRITERIA
FOR FROG MORTAR CREEK SURFACE WATER SAMPLES- MARCH 2012
LOCKHEED MARTIN, MARTIN STATE AIRPORT, MIDDLE RIVER, MARYLAND
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	MSA-SW38D-032012	MSA-SW39A-032012	MSA-SW39B-032012	MSA-SW39C-032012	MSA-SW39D-032012	MSA-SW40A-032012	MSA-SW40B-032012
SAMPLE ID: LABORATORY ID	240-9383-8	240-9383-9	240-9383-10	240-9383-11	240-9383-12	240-9383-13	240-9383-14
SAMPLE DATE	3/20/2012	3/20/2012	3/20/2012	3/20/2012	3/20/2012	3/20/2012	3/20/2012
LOCATION	MSA-SW-38D	MSA-SW-39A	MSA-SW-39B	MSA-SW-39C	MSA-SW-39D	MSA-SW-40A	MSA-SW-40B
VOLATILES (ug/l)							
I,1-DICHLOROETHENE	--	--	--	--	--	0.39 J	--
I,4-DICHLOROBENZENE	--	--	--	--	--	1.6	--
ACETONE	--	--	--	--	--	--	--
CARBON DISULFIDE	--	0.48 J	--	--	--	--	--
CHLOROBENZENE	--	--	--	--	--	--	--
CIS-1,2-DICHLOROETHENE	1.1	0.42 J	0.41 J	0.72 J	2.9	39	8.1
ETHYLBENZENE	--	--	--	--	--	1.4	--
M+P-XYLENES	--	--	--	--	--	11	0.48 J
O-XYLENE	--	--	--	--	--	1.9	--
TOLUENE	--	--	--	--	--	0.71 J	--
TOTAL XYLENES	--	--	--	--	--	13	0.48 J
TRANS-1,2-DICHLOROETHENE	--	--	--	--	--	0.77 J	0.38 J
TRICHLOROETHENE	1.7	0.59 J	0.49 J	0.94 J	4.2	11	21
VINYL CHLORIDE	0.34 J	--	--	0.24 J	1.1	40	2.3
FILTERED METALS (ug/l)							
ARSENIC	1.3 J	1.1 J	1.2 J	1.2 J	0.98 J	1.2 J	1.1 J
BARIUM	26	26	25	25	25	26	26
BERYLLIUM	--	--	--	--	--	--	--
CHROMIUM	--	--	0.73 J	--	--	--	--
COBALT	0.12 B	0.11 B	0.12 B	0.11 B	0.2 B	1	0.74 B
COPPER	3.4	2.7	3.4	2.7	3.3	3.3	3.2
LEAD	--	--	--	--	--	--	--
NICKEL	1.7 J	1.4 J	2.2	1.4 J	1.7 J	2.1	2.1
SELENIUM	--	--	--	--	--	--	--
VANADIUM	--	--	--	--	--	--	--
ZINC	11 B	4 B	7.8 B	12 B	10 B	18 B	15 B
MISCELLANEOUS PARAMETERS (ug/l)							
HEXAVALENT CHROMIUM ⁽⁴⁾	0.072 L	0.091 L	0.078 L	0.083 L	0.076 L	0.059 L	0.074 L

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CHEMICAL RESULTS AND SCREENING CRITERIA
FOR FROG MORTAR CREEK SURFACE WATER SAMPLES- MARCH 2012
LOCKHEED MARTIN, MARTIN STATE AIRPORT, MIDDLE RIVER, MARYLAND
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	MSA-SW40C-032012	MSA-SW40D-032012	MSA-SW41A-032012	MSA-SW41B-032012	MSA-SW41C-032012	MSA-SW41D-032012	MSA-SW42A-032012
SAMPLE ID: LABORATORY ID	240-9383-15	240-9383-16	240-9383-17	240-9383-18	240-9383-19	240-9383-20	240-9383-21
SAMPLE DATE	3/20/2012	3/20/2012	3/20/2012	3/20/2012	3/20/2012	3/20/2012	3/20/2012
LOCATION	MSA-SW-40C	MSA-SW-40D	MSA-SW-41A	MSA-SW-41B	MSA-SW-41C	MSA-SW-41D	MSA-SW-42A
VOLATILES (ug/l)							
I,1-DICHLOROETHENE	--	--	--	--	--	--	--
I,4-DICHLOROBENZENE	--	--	--	--	--	--	--
ACETONE	--	--	--	--	--	--	--
CARBON DISULFIDE	--	--	--	--	--	--	0.4 J
CHLOROBENZENE	--	--	--	--	--	--	--
CIS-1,2-DICHLOROETHENE	5.1	1.2	18	5.1	3.3	1.5	7.4
ETHYLBENZENE	--	--	--	--	--	--	--
M+P-XYLENES	--	--	--	--	--	--	0.25 J
O-XYLENE	--	--	--	--	--	--	--
TOLUENE	--	--	--	--	--	--	--
TOTAL XYLENES	--	--	--	--	--	--	0.25 J
TRANS-1,2-DICHLOROETHENE	--	--	0.82 J	--	--	--	0.53 J
TRICHLOROETHENE	4.1	1.7	6.2	4.9	3.3	1.7	4
VINYL CHLORIDE	2.4	0.35 J	1.2	1.5	1.4	0.43 J	3.2
FILTERED METALS (ug/l)							
ARSENIC	1.3 J	1.2 J	1.1 J	1 J	1.2 J	1.1 J	1.5 J
BARIUM	26	26	25	25	26	26	25
BERYLLIUM	--	--	--	--	--	--	0.37 J
CHROMIUM	1.2 J	--	--	--	--	--	--
COBALT	0.36 B	0.13 B	2.6	0.35 B	0.3 B	0.13 B	0.31 B
COPPER	3.2	3.3	3.4	3.2	3.3	3.9	3.1
LEAD	--	--	--	--	--	--	--
NICKEL	2.1	1.7 J	5	2	1.8 J	1.7 J	1.7 J
SELENIUM	--	--	--	--	--	--	0.7 J
VANADIUM	--	--	--	0.48 J	--	0.45 J	--
ZINC	10 B	9.9 B	18 B	15 B	11 B	23	6.5 J
MISCELLANEOUS PARAMETERS (ug/l)							
HEXAVALENT CHROMIUM ⁽⁴⁾	0.071 L	0.081 L	0.071 L	0.072 L	0.065 L	0.092 L	0.07 L

TABLE 1
CHEMICAL RESULTS AND SCREENING CRITERIA
FOR FROG MORTAR CREEK SURFACE WATER SAMPLES- MARCH 2012
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SAMPLE ID: LABORATORY ID SAMPLE DATE LOCATION	MSA-SW42B- 032012 240-9383-22 3/20/2012 MSA-SW-42B	MSA-SW42C- 032012 240-9383-23 3/20/2012 MSA-SW-42C	MSA-SW42D- 032012 240-9383-24 3/20/2012 MSA-SW-42D	MSA-SW43A- 032012 240-9383-25 3/20/2012 MSA-SW-43A	MSA-SW43B-032012 240-9383-26 3/20/2012 MSA-SW-43B	MSA-SW43C- 032012 240-9383-27 3/20/2012 MSA-SW-43C	MSA-SW43D- 032012 240-9383-28 3/20/2012 MSA-SW-43D	MSA-SW44A- 032012 240-9383-29 3/20/2012 MSA-SW-44A
VOLATILES (ug/l)								
I,1-DICHLOROETHENE	--	--	--	--	--	--	--	--
I,4-DICHLOROETHENE	--	--	--	--	--	--	--	--
ACETONE	--	--	--	1.3 J	--	--	--	2.7 J
CARBON DISULFIDE	--	--	--	--	--	--	--	--
CHLOROBENZENE	--	--	--	--	--	--	--	--
CIS-1,2-DICHLOROETHENE	8.7	3.3	2.6	2.1	3.7	3.4	2.8	1.6
ETHYLBENZENE	--	--	--	--	--	--	--	--
M+P-XYLENES	0.86 J	--	--	--	--	--	--	--
O-XYLENE	0.15 J	--	--	--	--	--	--	--
TOLUENE	--	--	--	--	--	--	--	--
TOTAL XYLENES	1 J	--	--	--	--	--	--	--
TRANS-1,2-DICHLOROETHENE	0.22 J	--	--	0.27 J	0.19 J	--	--	0.24 J
TRICHLOROETHENE	10	3.1	2.4	2.6	3.7	3.5	2.9	2.1
VINYL CHLORIDE	4.2	1.4	1.3	0.53	1.2	1.2	1.1	--
FILTERED METALS (ug/l)								
ARSENIC	1.3 J	1.5 J	1.4 J	1.1 J	1.2 J	1.2 J	1.2 J	0.97 J
BARIUM	25	25	26	25	26	26	26	26
BERYLLIUM	0.23 J	--	--	--	--	--	--	--
CHROMIUM	--	--	--	--	--	--	--	--
COBALT	0.48 B	0.31 B	0.21 B	2.1	0.39 B	0.22 B	0.19 B	3
COPPER	2.9	3.5	3.2	3.8	3	3.3	3.2	3.6
LEAD	--	0.2 J	--	--	--	--	--	--
NICKEL	1.8 J	1.9 J	1.7 J	4.6	1.9 J	1.8 J	1.7 J	6.2
SELENIUM	0.6 J	--	--	--	--	--	--	--
VANADIUM	--	--	0.45 J	--	--	--	--	--
ZINC	12 J	9.8 J	11 J	13 J	12 J	13 J	9.7 J	15 J
MISCELLANEOUS PARAMETERS (ug/l)								
HEXAVALENT CHROMIUM ⁽⁴⁾	0.072 L	0.07 L	0.075 L	0.062 L	0.066 L	0.067 L	0.071 L	0.073 L

TABLE 1
CHEMICAL RESULTS AND SCREENING CRITERIA
FOR FROG MORTAR CREEK SURFACE WATER SAMPLES- MARCH 2012
LOCKHEED MARTIN, MARTIN STATE AIRPORT, MIDDLE RIVER, MARYLAND
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	MSA-SW44B-032012	MSA-SW44C-032012	MSA-SW44D-032012	MSA-SW45A-032012	MSA-SW45B-032012	MSA-SW45C-032012	MSA-SW45D-032012
SAMPLE ID:	240-9383-30	240-9383-31	240-9383-32	240-9383-33	240-9383-34	240-9383-35	240-9383-36
LABORATORY ID	3/20/2012	3/20/2012	3/20/2012	3/20/2012	3/20/2012	3/20/2012	3/20/2012
SAMPLE DATE	MSA-SW-44B	MSA-SW-44C	MSA-SW-44D	MSA-SW-45A	MSA-SW-45B	MSA-SW-45C	MSA-SW-45D
LOCATION							
VOLATILES (ug/l)							
I,1-DICHLOROETHENE	--	--	--	--	--	--	--
I,4-DICHLOROETHENE	--	--	--	--	--	--	--
ACETONE	--	--	--	2 J	--	--	--
CARBON DISULFIDE	--	--	--	--	--	--	--
CHLOROBENZENE	--	--	--	--	--	--	--
CIS-1,2-DICHLOROETHENE	3.3	3.2	2.9	2.6	2.8	0.9 J	0.63 J
ETHYLBENZENE	--	--	--	--	--	--	--
M+P-XYLENES	--	--	--	--	--	--	--
O-XYLENE	--	--	--	--	--	--	--
TOLUENE	--	--	--	--	--	--	--
TOTAL XYLENES	--	--	--	--	--	--	--
TRANS-1,2-DICHLOROETHENE	--	--	--	0.34 J	--	--	--
TRICHLOROETHENE	3.5	3.3	3.1	3.2	3.3	1	0.71 J
VINYL CHLORIDE	1.4	1.2	1.1	0.62	0.91	0.25 J	--
FILTERED METALS (ug/l)							
ARSENIC	1.3 J	1.1 J	1.2 J	1.3 J	1.1 J	1.1 J	1 J
BARIUM	26	26	25	25	25	25	26
BERYLLIUM	--	--	--	--	--	--	--
CHROMIUM	--	--	--	--	--	--	--
COBALT	0.25 B	0.18 B	0.19 B	0.2 B	0.2 B	0.083 B	0.093 B
COPPER	3.2	3.6	3.2	3.3	3.4	3	3.1
LEAD	--	--	--	--	--	--	--
NICKEL	1.8 J	1.7 J	1.7 J	1.8 J	1.8 J	1.5 J	1.5 J
SELENIUM	--	--	--	--	--	--	--
VANADIUM	--	--	0.54 J	0.46 J	--	--	--
ZINC	11 J	11 J	7.6 J	6.2 J	8.3 J	6.5 J	7.3 J
MISCELLANEOUS PARAMETERS (ug/l)							
HEXAVALENT CHROMIUM ^(d)	0.078 L	0.072 L	0.079 L	0.069 L	0.069 L	0.075 L	0.085 L

TABLE 1
CHEMICAL RESULTS AND SCREENING CRITERIA
FOR FROG MORTAR CREEK SURFACE WATER SAMPLES- MARCH 2012
LOCKHEED MARTIN, MARTIN STATE AIRPORT, MIDDLE RIVER, MARYLAND
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- 1 National Recommended Water Quality Criteria, <http://water.epa.gov/scitech/swguidance/standards/current/index.cfm>;
and Maryland Numerical Criteria for Toxic Substances in Surface Waters, COMAR 26.08.02.03,
<http://www.dsd.state.md.us/comar/comarhtml/26/26.08.02.03-2.htm>
 - 2 USEPA Region 3 Biological Technical Advisory Group Freshwater Screening Benchmarks.
 - 3 For carcinogens, criterion is for incremental cancer risk of 1×10^{-5} .
Gray shading indicates the value exceeds one of the criteria.
 - 4 The hexavalent chromium results were qualified with a L flag due to the samples being analyzed outside of the 24 hour
method holding time. The analyses were performed between 24 and 48 hours.
 - 5 Screening criteria adjusted based on using a site specific hardness value of 260 mg/L as opposed to the standard 100 mg/L.
- B - Laboratory blank contamination.
J - Positive result is considered estimated.
L - Positive result is considered estimated biased low.
ug/l - micrograms per liter.
NA = Not analyzed or not available.
-- - Not detected at the method detection limit.