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VIA PRIVATE CARRIER

Ms. Ruth Prince, PhD Toxicologist
U.S. Environmental Protection Agency, Region 3
Land and Chemicals Division
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Philadelphia, Pennsylvania 19103

Subject: Protecting the Middle River Complex Sediment Remedy from PCBs in Storm Drains
Lockheed Martin Corporation; Middle River Complex
2323 Eastern Boulevard, Middle River, Baltimore County, Maryland

Dear Ms. Prince:

Prior to the Outfall 005 Sediment Removal Action (SRA), polychlorinated biphenyls (PCBs) were found in off-shore sediments outside of outfalls 005E and 005W at concentrations up to 3,600 milligrams per kilogram (mg/kg). These outfalls originate from the location of the former Building D in Tax Block (Block) E, which is a likely source of PCBs within Dark Head Cove. Outfalls 005E and 005W have been permanently plugged at IL-30A (Figure 1) (Tetra Tech, 2016). However, a potential pathway still exists between PCB contaminated storm drain sediments (upstream of IL-30A) and Dark Head Cove through Outfall 008 and through the cross connection to Outfall 006.

The purpose of this memo is to summarize the past, present, and upcoming storm drain sediment investigations, storm drain cleaning, sediment remedial actions, and periodic monitoring activities in Block E storm drains at the Lockheed Martin Corporation (Lockheed Martin) Middle River Complex (MRC). This memo focuses on the storm drains within the Outfall 006 and 008 pathways described above and shows that while a pathway between PCB contaminated storm drain sediments and Dark Head Cove exists, PCBs are not moving through the storm drains and discharging through Outfalls 008 and 006 at concentrations that may affect sediments complying with remediation goals.

Previous Storm Drain Sediment Investigation and Cleaning Events

2009 Investigation. As documented in the *Block E Supplemental Soil and Storm Drain Sediment Characterization Report*, a 2009 investigation was conducted to inspect the storm sewer systems connecting to Outfalls 005, 006, and 008 and sample the sediment in the storm sewer systems. PCBs were detected in nearly

all of the 21 samples that were collected, and 13 of the samples were above the storm drain sediment preliminary clean-up goal at the time of 1 mg/kg, including all of the samples taken from Outfall 005 storm drain lines (Tetra Tech, Inc. [Tetra Tech], 2010). The preliminary clean-up goal has since been updated to 10 mg/kg. None of the samples from Outfall 006 and 008 storm drain lines exceeded this preliminary clean-up goal.

2011 Investigation and Cleaning. A site-wide utility cross-connection investigation was conducted in 2011 to establish a deeper understanding of the various utilities and their historical uses at the MRC site. As part of these activities, and in conjunction with the interim remedial measures (IRM) investigation described below, portions of Block E storm drain systems were cleaned, inspected, and televised (Tetra Tech, 2012a).

2011 Cleaning. In 2011, interim remedial measures were completed to minimize the transport of contaminated sediments in the storm drain system to off-site locations and to improve Block E storm water drainage. These activities included: removing sediment and debris from system piping (Figure 2); implementing sediment controls such as silt fences; and repairing or replacing inlets and manholes where necessary. In general, storm sewer cleaning activities were successful, though blockages prevented cleaning in the northern portion of the Outfall 005 system and portions of the East-West lateral drains (Figure 2) (Tetra Tech, 2012b).

2014 Site-Wide Investigation. Further sampling was conducted in 2014 to reevaluate the storm drain systems in Block E since the IRM had taken place 2 years prior. Data was used to evaluate whether storm drain systems could serve as pathways for PCB contamination entering into Dark Head Cove following remediation. The majority of the sediment samples with the highest concentrations of PCBs were found in the Outfall 005 and 008 systems in Block E that were unable to be cleaned during the IRM due to debris blockage in the pipes. Concentrations of PCBs in these outfall systems ranged from 40-780 mg/kg (Tetra Tech, 2014b).

2014-2015 Sediment Removal Action (SRA) Including Cleaning and Plugging Outfall 005 System. Work associated with the SRA included measures taken in the Outfall 005 system to protect the sediment remedy. See Figure 1 for a layout of Outfall 005 piping and structures. The project included the following work elements:

Internal pipe inspection showed that upstream drain inlet IL-30A had a debris plug that effectively blocked upstream flow from Block E from reaching Dark Head Cove. IL-30A is located within the Chesapeake Park Plaza roadway (a Baltimore County-maintained road) and had been previously paved over. To expedite the SRA, a temporary plug was installed in IL-30 until permits could be obtained and a permanent system plug could be installed in IL-30A.

The Outfall 005 drains were cleaned south of IL-30, which is located in the median of Chesapeake Park Plaza (road).

Approximately 5,300 cubic yards of sediment contaminated with elevated PCBs was dredged from Dark Head Cove off of the Outfall 005 east and west branches. This removal was performed from November 2014 to March 2015 as part of the sediment IRM.

After sediment removal, IL-30A was uncovered and a permanent plug was installed downstream of the debris blockage. With the permission of Baltimore County, IL-30A pavement cover was restored.

Due to the plug, Block E no longer discharges stormwater through Outfall 005 to Dark Head Cove. Drainage south of IL-30A remains open to collect storm runoff from Chesapeake Park Plaza (road) through IL-30 which discharges to Dark Head Cove through Outfall 005.

2016 Storm Drain Sediment Investigation. In August of 2016, an addendum for additional sampling activities along the Block E, Outfall 006 and 008 storm drain systems was added to the *Block E Remedial Investigation Work Plan*. Sediment samples were collected and analyzed for PCBs from 16 storm drain manholes and inlets (Lockheed Martin Corporation [Lockheed Martin], 2016).

The attached figure, “Figure 1 – Storm Drain Sediment Samples Block E,” demonstrates that PCBs in sediments remain in the storm drains that could not be cleaned during the IRM. However, the concentration of PCBs (expressed as Aroclor-1260) decreases significantly while moving from MH-7 to Outfall 008. Additionally, field observations indicate that MH-9 marks a change in elevation for the storm drainage pipe. The upstream pipe is several feet lower than the downstream pipe, which may create a sediment trap hindering entrained sediments from reaching Dark Head Cove.

Off-Shore Sediment Sampling Results near Outfalls 006 and 008

2005 Investigation. In 2005, a sampling investigation was conducted to obtain data in order to analyze the presence of site chemicals of concern (COCs) in Cow Pen Creek and Dark Head Cove. Sediment samples were collected at 4 depths (0-6”, >6-18”, >18-30” and >30-52”). Of the samples collected, three were located near Outfall 006 and 008; analysis showed PCB concentrations ranging from 0.049 mg/kg (>18-30”) to 2.8 mg/kg (0-6”). When compared to the concentrations surrounding Outfall 005, Outfalls 006 and 008 did not appear to be relaying appreciable concentrations of PCBs to the sediment.

2008 Investigation. In 2008, additional sampling activities were completed, in order to further characterize the contamination in the waterways. During this sampling event, one sample was located near Outfall 006 and 008. This sample contained PCBs at 0.37 mg/kg at <6-18” (Tetra Tech, 2009). PCBs were not detected in this sampling location at the other 3 sampling depths: 0-6”, >18-30”, and >30-52”.

2014 Investigation. An investigation to further characterize PCBs in the sediment of the waterways was conducted in 2014. During this investigation, samples were taken from twelve locations surrounding Outfall 008. Similar to the results of the previous investigations, most of the samples were analyzed at four depths.

During this sampling event, PCB concentrations ranged from 0.0023 mg/kg (>30-52”) to 2.406 mg/kg (>6-18”). There were two locations that were non-detects at every depth and nine locations that had a non-detect for at least one depth (Tetra Tech, 2014c).

Based on these investigation, the sediment remedy proposed dredging directly adjacent to Outfalls 006 and 008 and *in situ* treatment further offshore. Dredging will be completed during the Sediment Remedy Construction Season 1 (October 2016 through February 2017) and *in situ* treatment will be performed during Season 2 (October 2017 through February 2018).

Storm Drain Cleaning, Repairs and Manhole Installation during Sediment Remedy

As part of the full sediment remedy for Cow Pen Creek and Dark Head Cove, portions of the Outfall 006 and 008 systems were cleaned in 2016 (Figures 1 and 2). Specifically, the Outfall 008 storm drain system was cleaned from Outfall 008 to MH-9 and IL-7 and the Outfall 006 storm drain system was cleaned from Outfall 006 to JB 6-1 to IL-14 (Figures 1 and 2). The lines were cleaned prior to dredging that occurred near the respective outfalls. Cleaning the pipes involved: installing temporary plugs to prevent movement of sediment or debris to the waterway; using jet lines to wash sediment in a downstream-to-upstream direction and into the vacuum line; and removal of the cleared debris from the storm line with a jet/vacuum truck. Following cleaning, a mobile CCTV truck conducted video inspections of the cleared portion of the drain lines. As during the IRM, it was infeasible to effectively clean the portion of storm drain systems 005 and 008 between IL-17 and MH-9 with the highest concentrations of PCBs due to the presence of debris.

New manholes were installed at Outfall 006 and 008 downstream of Block E. This will make cleaning the pipes easier in the future as the new manhole locations will be able to be utilized for plugging the storm drains. Additionally, a portion of pipe in Outfall 008 was replaced.

Conclusions and Proposed Next Steps

It appears that only sediments with low concentrations of PCBs are moving through the storm drains and potentially discharging through Outfall 006 or 008 based on the following:

Sediment PCB concentrations decrease moving eastward from MH-7 (910 mg/kg) to IL-3 (0.41 mg/kg).

Field observations indicate that MH-9 marks a change in elevation for the storm drainage pipe since the upstream pipe is several feet lower than the downstream pipe. The depression of the upstream pipe creates a sediment trap, acting as a catch basin and preventing the sediments from reaching Dark Head Cove. Only an inch or two of sediment has been observed in MH-9 since it was partially cleaned in 2011.

The relatively low concentrations of PCBs in off-shore sediment near Outfall 006 and 008 (prior to dredging), despite the length of time (several decades) since the possible release of PCBs, indicates that there has not been significant accumulation along this pathway.

Assuming the revised Block E remedial action plan (RAP) is submitted and approved by the regulators, the Block E soil remediation is currently scheduled to take place in 2021 to address PCB contaminated soils. During this remediation, the majority of the Outfall 005 and portions of the Outfall 008 storm drain systems will be removed and replaced with a drainage system appropriate for the stormwater flow expected from the site upon restoration. Additionally, soils with high concentrations of PCBs will be removed during remedial activities.

Until the Block E soil remedial action begins, Lockheed Martin proposes to periodically monitor the amount of sediment collected in the new manhole installed just upstream of Outfall 008, IL-1, IL-2, IL-3 and MH-9. If sufficient sediment accumulates, a sample will be collected and analyzed for PCBs using Method 8082. If an increasing PCB concentration trend is detected, further cleaning will be conducted.

Please let me know if you have any questions. My office phone is (301) 548-2209.

Sincerely,



Thomas D. Blackman
Project Lead, Environmental Remediation

Enclosures:

Figure 1

Figure 2

cc: (via email without enclosure)
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References

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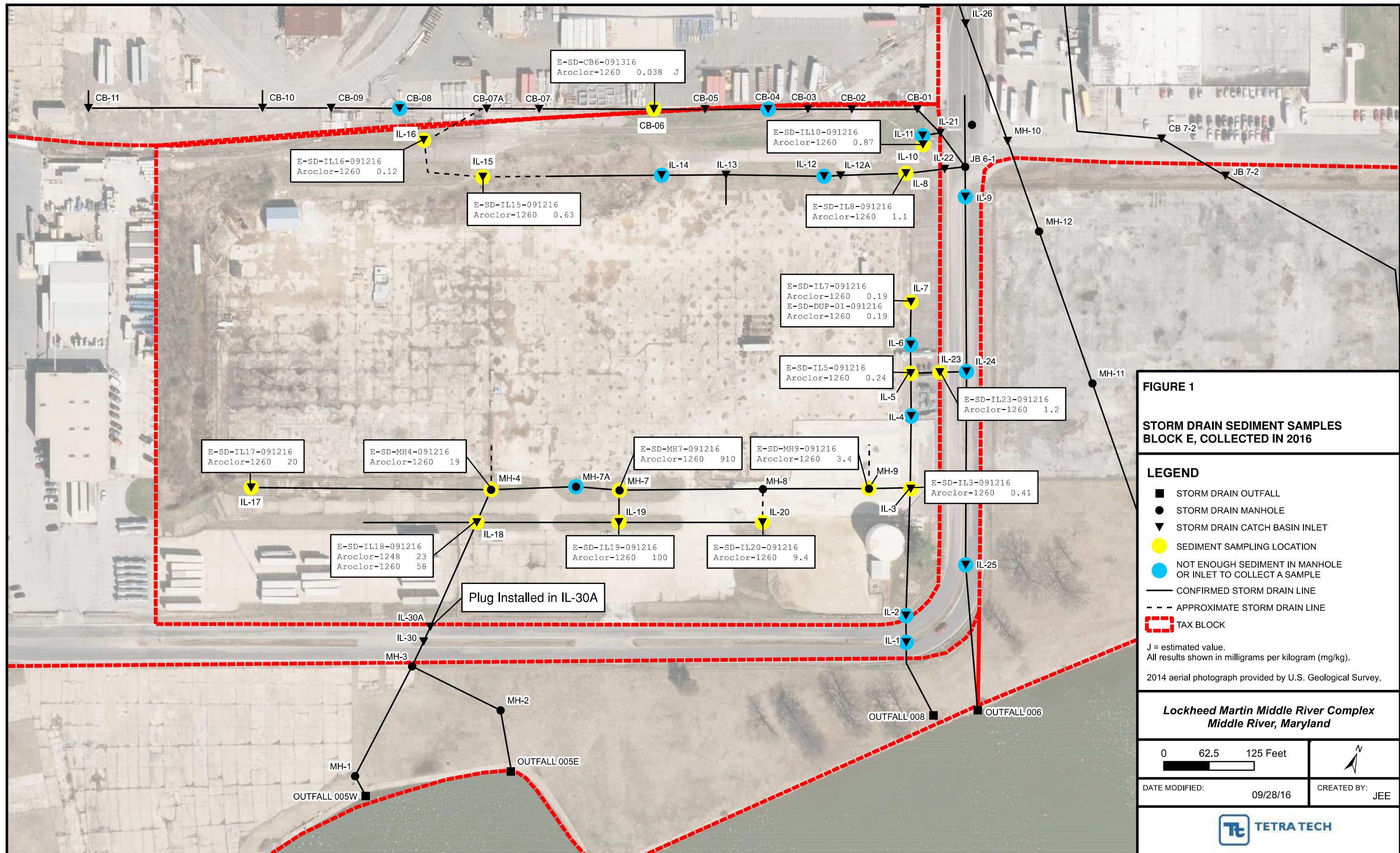
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0 100 200 Feet

Lockheed Martin Midde River Project
FIGURE 2: STORM DRAIN CLEANING

