

Summer 2014

Lockheed Martin Middle River Complex
2323 Eastern Boulevard
Middle River, Maryland

Middle River Complex: **Groundwater Treatment System Startup Testing Has Begun**

Lockheed Martin has completed construction of the system for cleaning groundwater at the Middle River Complex at 2323 Eastern Boulevard. Utility hook-ups were completed in April. Startup and tracer testing of the system began in late April and ran through late June.

Tracer testing is the final test of the treatment system prior to beginning groundwater treatment. Tracer testing involves injecting a benign solution of a salt, i.e., bromide, into the groundwater, then sampling surrounding monitoring wells, sewer systems and storm water outfalls to determine the distance the injected liquid has traveled underground. This makes sure the injected solution has traveled to the intended places.

“We want the tracer solution to be found in the monitoring wells,” Chris Pike, from Tetra Tech, contractor to Lockheed Martin, said. “This indicates it is traveling in the groundwater aquifer; however, we do not want the bromide solution to make its way into the sewer system,” he added. “If we find it in the sewer system during the tracer test, we will consider a variety of system adjustments, such as reducing injection volumes and pressures when we inject remediation solution.”

The remediation solution is a mixture of water, vegetable oil and lactate (a non-toxic food additive that is produced from the sugars of corn or beets). This food mixture will stimulate naturally occurring microbes in the soil to consume and break down concentrations of trichloroethene (TCE), the contaminant found at the site.

Tom Blackman, Lockheed Martin’s project manager for the site, said, “This is a major milestone for the Middle River project. Everything we’ve been doing to clean up the groundwater at the site has been focused on the moment when we could begin injecting the remediation materials

into the ground. It’s taken a long time and a lot of hard work to get to this point, both on our part and the part of the community with whom we’ve been working. We are excited to say that our goal of cleaning up accessible groundwater is in sight.”

The remediation system is made up of 71 wells and associated piping for injecting the food mixture into the soil. The wells are located in the three areas identified with the highest concentrations of trichloroethene at the Middle River site. Small trailers where the food mixture will be mixed with water prior to injection are now located at two of the areas. Monitoring wells have been installed within and around the three areas so the Lockheed Martin team can evaluate the effectiveness of the remediation and make adjustments to the system as needed.



Groundwater injection ports.

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Groundwater injection system components.

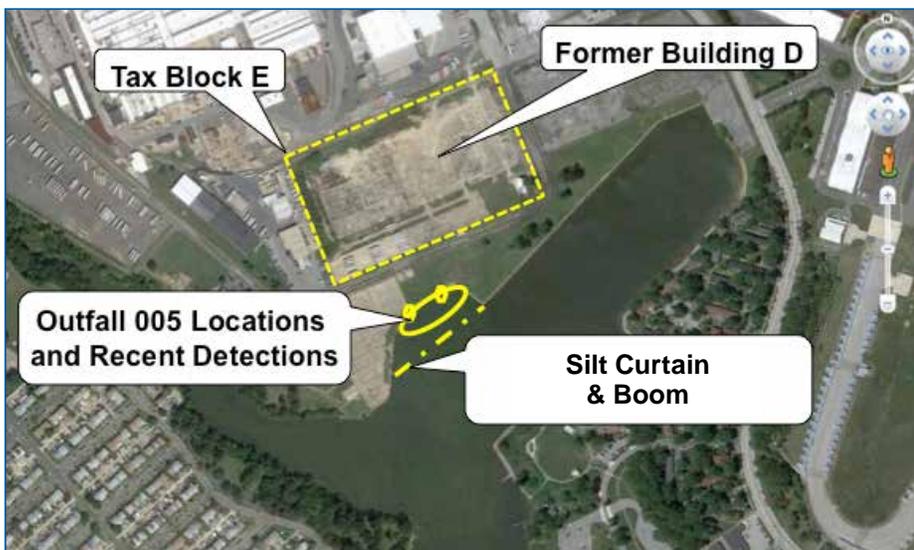
As part of construction of the groundwater treatment system, Lockheed Martin removed more than 3,000 cubic yards (about 200 truckloads) of contaminated soil and hauled it to a licensed landfill. Clean soil was added to replace the contaminated soil that had been removed. The groundwater remediation program also includes land-use controls such as deed restrictions to prevent groundwater use, and monitoring for—and as necessary, removal of—contaminated vapors that might intrude into the indoor air

of present and future buildings on site. The groundwater treatment system that is being implemented, along with land-use controls and the vapor mitigation system for the existing buildings at the Middle River Complex, will reduce the potential for risk of exposure to contaminated groundwater under both current and future conditions at the site.

Plans for Outfall 005 Sediment Removal Action of Dark Head Cove Sediments Proceed

In the fall of 2013, as part of its preparation for cleanup of sediment in Cow Pen Creek and Dark Head Cove, Lockheed Martin collected samples in Dark Head Cove. These samples revealed higher concentrations of polychlorinated biphenyls (PCBs) than had previously been detected, and very low levels of uranium and thorium. These contaminants were located in submerged sediments eight-to-ten feet beneath the surface of Dark Head Cove near the location of Outfall 005. As a consequence, the decision was made between Lockheed Martin and the Maryland Department of the Environment to clean up this location before the full sediment remedy is implemented.

The resulting Outfall 005 Sediment Removal Action has three parts: installation of a floating boom, with silt-control curtains attached (see photo on page 3); dredging of the area; and cleanup of Outfall 005. Lockheed Martin presented these plans at a public information session held at Marshy Point Nature Center on April 14, 2014, as part of its ongoing public involvement and outreach efforts to inform and educate the community about proposed remediation work.



Location of boom line installation preventing access to Outfall 005 area.

The Maryland Department of the Environment approved the plan for installation of the floating boom and dredging and will continue to review plans as they are prepared. The first phase—the boom with silt-control curtain—was installed within Dark Head Cove on May 14. Lockheed Martin also met with Baltimore County for its review of the initial dredging plans. Because polychlorinated biphenyls (PCBs) at a level above 50 parts per million were identified (the PCBs were measured in concentrations up to 3,600 parts per million immediately

adjacent to Outfall 005), plans for the initial dredging must also be reviewed by the U.S. Environmental Protection Agency.

The plans call for removal of the identified contamination to begin in 2015.

Please note that dredging of the sediment within Dark Head Cove had already been proposed as part of Lockheed Martin's final remedy for cleaning up sediment contamination from the Middle River Complex. These plans were approved by the Maryland Department of the Environment and the U.S. Environmental Protection Agency in 2013.

Lockheed Martin contractors were on the water in Dark Head Cove in June 2014 to take additional samples of the area proposed for dredging. Those samples will provide information to help decide the extent of the area to be



Boom line and silt curtain including informational sign installed.

as using a clamshell bucket, either from the shore or from a barge located within the area marked off by the floating boom. The dredged material will be transferred to shore where it will be allowed to drain before being transported to an approved offsite disposal area. The drained water also will be contained and transported to an approved offsite disposal facility. The boom and silt curtain will remain in place during this operation to contain the release of disturbed sediment.

Cleanup of Outfall 005, down to the bulkhead at Dark Head Cove, is also part of the sediment removal action. A portion of Outfall 005 was cleaned in 2011, down to the last accessible manholes. The remaining portions of the west and east branches of Outfall 005, which lead to the bulkhead, will now be cleaned.

Early in May, Lockheed Martin contractors installed a floating boom in Dark Head Cove to keep people away from an area where polychlorinated biphenyls (PCBs) were found in the sediment of the Cove. While the contaminants are embedded in sediment under eight-to-ten feet of water, limited exposure to people could occur if the sediment were to be disturbed. The floating boom and silt-control curtain were put in place to restrict access to the area, and to restrict the chance for any sediment, should it be disturbed, to move farther out into the Cove.

The boom includes a weighted curtain that hangs from the boom and reaches to the bottom of the cove. This curtain should also deter fish from venturing into the restricted area.

Signs have been erected along the boom line warning boaters not to anchor in the restricted area, and white navigational



Clamshell bucket dredging.

dredged, and the quantity of material to be removed. If regulatory approvals and permits can be obtained in time, then dredging is planned to occur before mid-February 2015, since Lockheed Martin contractors may be restricted from working in the water during the later fish-spawning season. Sediment will be removed by mechanical dredging, such

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lights have been fixed to the boom to make it visible to boaters at night. An informational sign has also been placed nearby at the Wilson Point Park boat ramp to provide boaters with answers to questions about the boom line and signage and the importance of adhering to the instructions. The sign includes links to Lockheed Martin and Maryland Department of the Environment (MDE) websites.

For more information on this project, the MDE web link is: <http://bit.ly/darkheadcove> and states: "Out of an abundance of caution, MDE is issuing an advisory to avoid contacting sediments in this area of Dark Head Cove because of the contamination of the sediments."

Because the boom impacts the waters of Maryland, installation required approval from the Maryland Department of the Environment, and also the Maryland Board of Public Works.

Lockheed Martin Continues Work in Block E

While Lockheed Martin contractors were digging trenches last summer to install the piping for the Block E groundwater system, two underground storage tanks were discovered. The tanks were found on the southern perimeter near the remaining foundation of former Building D. Sampling of the tanks revealed quantities of petroleum in one and trichloroethene in the other. The tanks were pumped empty and the material properly disposed of. The tanks, and soil contaminated with trichloroethene near the second tank, were removed and disposed of following Maryland Department of the Environment regulations.

Lockheed Martin conducted additional investigations in the vicinity of the two tanks. Results of these investigations revealed trichloroethene in the groundwater and soil at concentrations too high to be removed solely by the groundwater treatment system now being installed. Consequently, plans are underway for a separate cleanup action to take place this autumn. These plans call for a high vacuum extraction of groundwater and vapors which will then be treated prior to discharge. If permitted by Baltimore County, treated groundwater will be discharged to the Baltimore County sanitary sewer system. The vapors will be cleaned with activated carbon filter before being released to the air.

Because the tanks were around the former Building D perimeter, Lockheed Martin decided to conduct an additional search using ground-penetrating radar and other techniques. This surface investigation conducted in



Ground penetrating radar unit used for geophysical surveying.

April 2014 resulted in several signals possibly indicating additional underground storage tanks, but this can't be confirmed until a subsurface investigation is done. Lockheed Martin contractors will determine what these buried objects are in 2015 by digging down to expose these objects, and removing any that prove to be underground storage tanks.

MARTIN STATE AIRPORT: Planning Continues for Groundwater Treatment Facility at Martin State Airport

Lockheed Martin continues design of the groundwater treatment facility proposed for cleaning up contaminated groundwater in the Dump Road Area at Martin State Airport. The facility will be built at the airport between Taxiway T and Frog Mortar Creek. It will capture groundwater contaminated with volatile organic compounds, primarily the solvent trichloroethene (TCE), using a series of extraction wells that will be located parallel to the creek. Once captured, the contaminated groundwater will be treated and the cleaned water will be released to Frog Mortar Creek.

While advancing the design, Lockheed Martin is acquiring a number of permits for construction and operation of the treatment system. Permitting involves federal, state and local entities; regular coordination meetings are held among Lockheed Martin, the Maryland Aviation Administration (the property owner), and the Maryland Air National

Guard, which leases land from the Maryland Aviation Administration. Many of the treatment system permits will be issued to the Maryland Aviation Administration as the property owner.

One key permit currently in review is the Environmental Assessment, which is anticipated to be released soon by the Federal Aviation Administration (FAA) for public review. The Environmental Assessment is conducted under the National Environmental Policy Act with the Federal Aviation Administration as the overarching authority. The Environmental Assessment notes the potential for environmental impact from the construction and operation of the groundwater treatment facility and includes recommendations for what can be done to lessen any impacts that might occur. A Notice of Availability will be published when the Draft Environmental Assessment is released and the document will be available through the public library in Essex for review or comment.

Construction of the groundwater treatment system is scheduled to begin in the spring of 2015 with operation beginning approximately one year later, assuming no delays.

Innovation at Work: Lockheed Martin to Test Proven Technology in New Setting

Flux meters are used in monitoring wells to find out the specific depths where contaminants are moving through an aquifer. (Flux refers to flow, in this case groundwater movement, over a period of time.) They work very simply: the meter contains an alcohol that is depleted as water moves through it, plus activated carbon to absorb contaminants.

The combination of the diminishing alcohol and the contaminants captured by the absorbent shows how much water and contaminant is moving through any point along the length of the meter.

Now imagine using flux meters to figure out where contaminants may be entering Frog Mortar Creek. Four rows

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Retrieving Passive Flux Meter



Area where passive flux meters are being installed.

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of vertical plastic pipes will ultimately be installed in Frog Mortar Creek later this summer, with twelve pipes in each row. Each pipe will contain a flux meter allowing us to map where the groundwater is discharging into the creek and to evaluate how much contamination may be entering the creek. The flux meters will be installed in the sediments of Frog Mortar Creek for two to four weeks, then removed and sent for analysis.

“We want to create a baseline understanding of the discharge of groundwater into Frog Mortar Creek,” stated Ernest Ashley, who works for CDM Smith, a contractor to Lockheed Martin, in describing the system. “Our concept for cleaning up the contaminants in the Dump Road Area includes containing the groundwater to limit the movement of contaminated groundwater into Frog Mortar Creek. These flux meters, in this configuration, should make it possible to evaluate the effectiveness of our solution.”

Lockheed Martin has installed a test series of six flux meters driven into the bed of the creek 50 feet apart out to 250 feet from the airport shoreline. This will give the contractor an opportunity to test its methods of installing and retrieving the flux meters and will help calibrate the full-scale test.

“Using information from our maps of the groundwater plume, and by measuring water temperature and conductivity, we’ll develop an idea of where the groundwater discharges,” Ashley said. “That information will be used to tell us where to put our first line of monitors when we install the full-scale system late this summer.

“The pipes will temporarily sit underwater and will be buried in the sediment,” Ashley added. “We’ll make sure they’re not a hazard to navigation.”

The first test of a single flux meter was successfully completed in early June and a follow-up trial test with six flux meters will be in place for about two to three weeks in July. After reviewing information learned from these initial installations the larger grid will be installed and will likely be in place from two weeks to a month. The initial testing phase will be completed in July and the timeframe for the entire grid is planned for September.

MARTIN STATE AIRPORT AND MIDDLE RIVER COMPLEX: Status Of Permits

Many of Lockheed Martin’s plans for cleaning up the Middle River Complex are moving towards implementation. The plans for the Middle River Complex have been reviewed with the community and approved by the Maryland Department of the Environment (MDE). The Draft Environmental Assessment for Martin State Airport will likely be released for public comment soon. In many cases the next step is to begin work. Before that can happen, however, the necessary permits must be acquired.

Last spring’s Lockheed Martin Newsletter Update included an article on permitting, and since then a number of community members have asked for more information to help them better understand their role in the permitting process and how they could assist in expediting the process.

One of the most important factors to understand is that most permits are the last step before ground work can begin. For projects such as the environmental cleanup of the Middle River Complex and Martin State Airport, the Maryland Department of the Environment requires community input early in the development process.

Lockheed Martin’s commitment to an open and accessible process ensures that community members have ample opportunity to learn about a project from the beginning, and to participate in the development of the ideal cleanup solution.

The number of permits required for any one project varies according to a number of factors. For the environmental cleanup at Martin State Airport and the Middle River Complex there can be quite a number of factors and permits per project. This is especially true with the cleanup of Middle River and Martin State because both are located in the Chesapeake Bay Critical Area and close to communities. The Middle River Complex is private land, so a number of permits must be acquired from Baltimore County. Martin State Airport is state-owned land so in addition to reviews conducted by certain federal agencies, the state takes precedence over Baltimore County in review of certain permits. Plus, because Martin State is an airport, the FAA is taking the lead for preparation of the Environmental Assessment for construction of the groundwater treatment system.

Permit applications cover a variety of topics, such as storm water management, site erosion and sediment control and grading, among others. Permit applications for work in both tidal and non-tidal wetlands go to the U. S. Army Corps of Engineers, as well as the Maryland Department of the Environment. For some of the Lockheed Martin projects it is yet to be determined which agency will require a permit, or if public comment will be required.

Only a few permit applications require public review, and the form of the public review also varies. Some permit applications require public meetings. More typically, if public comment is required, the permit application is noted on an agency's website, usually allowing up to 45 days for people to submit comments, often online.

One thing is common as to how all public agencies handle permits. All comments, negative or positive, will be responded to, which can be a time-consuming process. A good rule of thumb is this: if you are in favor of a project and how it will be implemented, you don't need to comment. To keep progress flowing, Lockheed Martin suggests community members reserve their formal comments for those projects and permit applications with which they have concerns or take issue. Lockheed Martin welcomes all public interest, whether as questions, concerns or suggestions. For its own part, Lockheed Martin hosts public information sessions to receive these to assist in its planning process.

Here are upcoming permits in which public comment opportunities are available:

Martin State Airport - Groundwater Treatment Facility

- 1) Tidal and Non-tidal Wetlands and Section 404 Clean Water Act (CWA) Permit for impacts associated with construction; possible 30-day comment period (at Maryland Department of the Environment and U. S. Army Corps of Engineers discretion): Late Summer 2014
- 2) Environmental Assessment for National Environmental Protection Act (NEPA); anticipated public comment period: July/August 2014
- 3) Air Stripper Construction Permit; anticipated public comment period: August 2014
- 4) Construction General Permit for construction related storm water runoff; anticipated availability for 45-day public review and comment: August, 2014
- 5) Treated Water Discharge under National Pollutant Discharge Elimination System (NPDES); anticipated public comment period: October 2014

Middle River Complex – Outfall 005 Sediment Removal Action and Final Sediment Remedy; and Soil Remediation

- 6) Construction General Permit for construction-related storm water runoff for soil remediation; anticipated availability for 45-day public review and comment: July/August 2014
- 7) Emergency Authorization for Outfall 005 Boom and Dredging; 30-day comment period following submittal of JPA for dredging portion of the project: July/August 2014
- 8) July 2014 Construction General Permit for construction related storm water runoff for land-based work for Outfall 005 sediment remediation; anticipated availability for 45-day public review and comment: July/August 2014
- 9) Potential Environmental Assessment for National Environmental Protection Act (NEPA), for final sediment remediation; anticipated public comment period: 2015
- 10) Tidal and Non-tidal Wetlands and Section 404 Clean Water Act Permit for impacts associated with final sediment remediation; 30-day comment period: 2015
- 11) Construction General Permit for construction related storm water runoff for land-based work for final sediment remediation; anticipated availability for 45-day public review and comment: 2015

For More Information

Questions may be addressed to:
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All documents are available at the Essex Library,
410-887-0295, or on Lockheed Martin's Web site
at <http://lockheedmartin.com/middleriver>

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