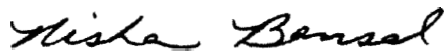

Historical Research Report Lockheed Martin Middle River Complex 2323 Eastern Boulevard Middle River, Maryland

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Executive Summary

Tetra Tech, Inc. conducted a historical research investigation of the Lockheed Martin Middle River Complex (MRC), located in Middle River, Maryland in the summer of 2004. The investigation was conducted to address a facility-wide 2003 Phase I Environmental Site Assessment (ESA) recommendation requiring further investigation of the facility's former activities. In addition, the historical research investigation was conducted to identify other areas of recognized environmental condition (RECs) previously not identified in the Phase I ESA.

The historical research investigation was performed in June 2004 and included a review of available engineering maps (e.g., as-builts, proposed construction plans, survey and plot maps, utility maps, etc.); interviews with facility personnel; and a spot-check visual inspection. Based on the results of the investigation, 31 RECs were identified at the Lockheed Martin MRC. The RECs were identified based the recommendations set forth in the Phase I ESA (13 RECs identified), on a previous soil and groundwater investigation, historical data indicating a potential for hazardous substances to be released to the surrounding media, or based on visual observations made during the facility inspections. RECs identified included a former sewage treatment plant, several test buildings, removed or abandoned-in-place petroleum storage tanks and associated piping, former and active chemical handling and storage units, and various underground structures such as drain lines, sumps, and an oil/water separator. The data collected during this historical research investigation will be used to develop a Phase II ESA investigation scheduled to occur in the fall of 2004.

Section 1

Introduction

On behalf of Lockheed Martin Corporation (LMC), Tetra Tech has prepared the following Historical Research Report of the Lockheed Martin Middle River Complex (MRC) located at 2323 Eastern Boulevard in Middle River, Maryland. The investigation was performed at the request of LMC to address a facility-wide 2003 Phase I Environmental Site Assessment (ESA) recommendation for further investigation into the facility's historic activities. During the Phase I ESA, several areas of recognized environmental condition (RECs) were identified based on limited historic information on former site activities. Consequently, this historical research investigation was performed to supplement the historical information provided in the Phase I ESA thereby refining the report's recommendations for further investigation activities and to identify other facility RECs associated with historic site activities. The identified RECs and the collected historical data will be used to implement a facility-wide comprehensive Phase II ESA investigation of the MRC.

This report is organized into the following sections:

Section 2 – Site Overview: Presents a brief description of site history and previous facility investigations;

Section 3 – Historical Data Summary: Discusses the investigation activities conducted, lists the identified RECs, and presents the findings of the historical research investigation;

Section 4 – Summary: Summarizes the findings of the investigation;

Section 5 – References: Lists references and citations used for compiling this historical research report.

Section 2

Site Overview

2.1 SITE LOCATION AND DESCRIPTION

The Lockheed Martin MRC is located at 2323 Eastern Boulevard in Middle River, Maryland. The facility consists of approximately 161 acres of land with twelve main buildings. The property also includes perimeter parking lots, an athletic field, Lot D (presently a vacant lot with a concrete foundation for former Building D), a trailer and parts storage lot, and a vacant waterfront lot. The facility is bounded by Eastern Boulevard (Route 150) to the north, Dark Head Creek to the south, Cow Pen Creek to the west and Martin State Airport to the east.

Currently, Lockheed Martin's activities at the site are limited to facility and building management and maintenance. There are two main tenants at the site, Middle River Aircraft Systems (MRAS) and Naval Electronics & Surveillance Systems (NE&SS), also referred to as Vertical Launch Systems. MRAS conducts design, manufacturing, fabrication, testing, overhaul, and repair and maintenance of aeronautical structures, parts, and components for military and commercial applications. NE&SS conducts fabrication, assembly, testing and support of vertical launch systems. Historically, the property has been used for aircraft and missile launching systems design, development, and sales.

2.2 PREVIOUS INVESTIGATION

2.2.1 2003 Phase I ESA

A Phase I ESA was conducted on the MRC in 2003 in accordance with ASTM Standard E 1527 Earth Tech (Earth Tech, 2003). The objective of the ESA was to identify potential areas of environmental concern that could adversely impact the subject property. The scope of the Phase I

involved conducting a records search and review of regulatory agency databases, contacting local agencies, and conducting a site inspection of the subject property.

Thirteen RECs, based on available site and regulatory documents and databases, were identified throughout the entire facility. These RECs are primarily associated with known petroleum-related issues or active chemical handling and storage units. Only a few RECs identified in the Phase I ESA were based on former site activities. Due to the very limited historic data obtained during the investigation, the Phase I ESA report recommended further investigation into former site activities.

2.2.2 2003 Phase II ESA of the MRC Exterior Areas

A limited Phase II ESA investigation of seven MRC exterior area RECS identified in the Phase I ESA was conducted in the fall of 2003 (Tetra Tech, February 2004). The investigation consisted of the collection of soil and groundwater samples, a geophysical survey, and radiological survey. Results of the investigation are discussed individually by REC in Section 3.0.

Historical Data Summary

3.1 HISTORICAL RESEARCH INVESTIGATION ACTIVITIES

Investigation into the facility's historic site activities was conducted through a review of available facility maps and documents, interviews with facility personnel, and a spot-check visual inspection of potential areas of concern. Documents, files, and drawings reviewed for this investigation included previous investigation reports, aerial and site photographs, and engineering drawings (i.e., as-builts; plot and survey maps; construction plans; and utility, building, and facility layout maps). Interviews were conducted with Mr. Robert Huntington, Lockheed Martin Health and Safety Manager; Mr. Ned Moore, Lockheed Martin Senior Environmental Engineer; and, Mr. Richard Zambito, Middle River Aircraft Systems (MRAS) Senior Environmental Engineer. A visual inspection of potential areas of concern identified during the file review and personnel interviews was conducted in June 2004 to determine if a release had occurred (if visually possible), the potential for the migration of hazardous substances if released to the surrounding media, and to identify possible transport migration routes.

3.2 REC IDENTIFICATION

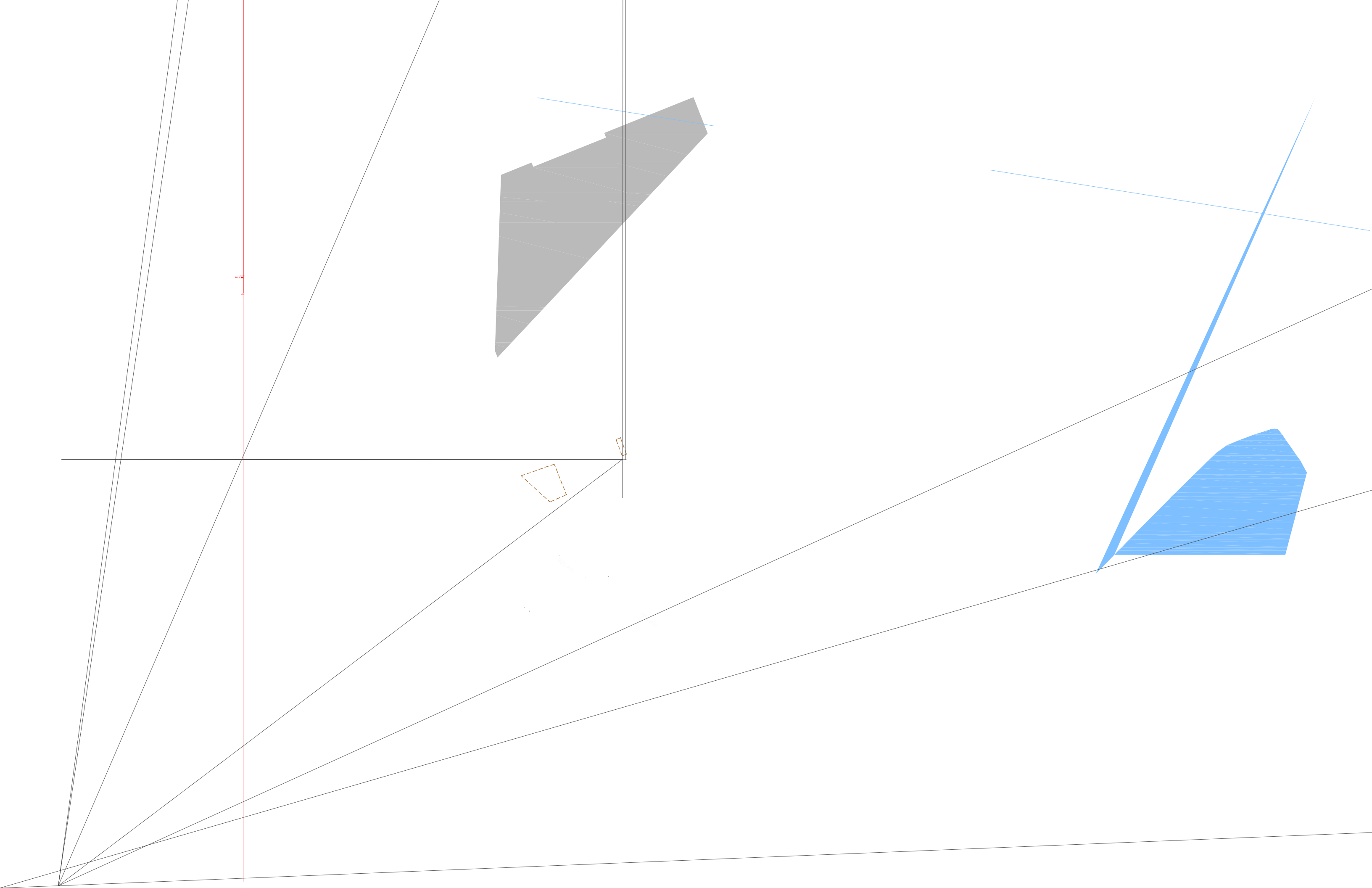
A total of 31 RECs have been identified at the Lockheed Martin MRC based on the Phase I ESA and the historical research investigation. The locations of the 31 RECs are shown on Figure 3-1. The following subsections list the 31 facility RECs and the historical data obtained justifying their classification.

3.2.1 Former Building D (REC #1)

Building D, formerly located in the southern section of the facility, was used for the final assembly of metal carcasses onto aircraft frames from the late 1940s through the 1960s until it was demolished in the early 1970s. The building encompassed approximately 400,000 square feet of floor space. No information on former chemical handling processes, chemical storage, or waste stream disposal within the building was documented in the Phase I ESA report. However, limited historic data obtained during the investigation suggested nuclear activities were conducted at the building. Consequently, the Phase I ESA classified former Building D as a REC due to the potential historical use of the building.

A limited Phase II ESA investigation consisting of soil and groundwater sampling and a radiological survey was conducted in the footprint of Building D in the fall of 2003. No impacts to the soils were detected; however, groundwater samples collected at the site contained elevated concentrations of halogenated and fuel-related volatile organic compounds (VOCs). In addition, three gamma radiation anomalies were detected during the radiological survey.

Based on the Phase I and limited Phase II investigation results, further investigation into former building activities was conducted as part of the historical research investigation. Engineering maps provided by the facility identified the presence of several nuclear-related offices and laboratoosection of75.7(thf Building Dbassem75.5(t)-15(nrt. Twot of the gamm75.5(a)114(e)TJ-13418 -1



3.2.2 Product Pipeline (REC #2)

The Phase I ESA identified the Former Product Pipeline as a REC based on a documented release of fuel oil #2 to the subsurface and its impacts on the underlying media. The former product pipeline ran between a former 500,000-gallon #2 fuel oil aboveground storage tank (AST) in Lot D (REC 3) to the facility's Power House. In 2002, a 40-foot section of the pipeline leaked and contaminated soil was excavated and removed under MDE supervision. The remaining 1,815 feet of piping was not previously assessed.

The Former Product Pipeline was investigated in the fall of 2003 as part of the limited Phase II investigation. No soil or groundwater impacts were detected along the entire length of the pipeline except for an elevated benzene concentration in the groundwater sample collected closest to the facility's Power House. Given the lack of contamination elsewhere along the pipeline and several potential benzene sources upgradient, no further historical investigation into the pipeline was conducted.

3.2.3 Former 500,000-Gallon AST and Associated Tanks (REC #3)

The Phase I ESA reported the presence of a former 500,000-gallon AST and its associated 500-gallon underground storage tank (UST) in the southeastern corner of Lot D, surrounded by an earthen berm. Both the AST and UST were permanently removed on November 7, 2002. The 500,000-gallon AST supplied #2 fuel oil to the facility's Power House via the former Product Pipeline (REC #2). The former 500-gallon UST was used to collect excess oil from the pressurized lines after filling the 500,000-gallon AST. Based on available documentation, no evidence of soil or groundwater impacts were identified during UST closure.

The AST and UST along with a nearby 275-gallon diesel fuel AST in the fire pump building were investigated during the fall of 2003 limited Phase II investigation. Elevated fuel related compounds were detected in both the soil and groundwater samples. Because the tanks are the most likely source of the petroleum compounds, and the history of the tanks is fairly well defined, no additional historical research was conducted on these tanks.

3.2.4 Waterfront Lot/Boat Launch Area (REC #4)

Although not specifically identified as a REC in the Phase I ESA report, historical information obtained during the Phase I investigation indicated potential environmental impacts to the surrounding media. The Boat Launch area is a concrete-covered tarmac located along the facility's waterfront. The area was initially used during World War II for the staging, fueling, and launching of military seaplanes. After World War II, the area was used for the fueling, maintenance, testing, and prototype evaluation of Chase boats along with staging of vehicles, equipment, and dry materials. By 1957, the site had been improved with the concrete tarmac. By 1969, the area was abandoned and all onsite structures were demolished. Currently, no structures other than the concrete tarmac exist on the site.

A limited soil and groundwater investigation of the Boat Launch Area was conducted in the fall of 2003. Based on the sampling results elevated metal concentrations were detected in the

3.2.7 Existing Monitoring Wells (REC #7)

Active groundwater monitoring investigations associated with documented leaking UST Maryland Department of the Environment (MDE) cases was identified as a REC in the Phase I ESA report. Due to inconsistencies in the regulatory databases and facility files, the Phase I ESA was unable to determine the location or source of some of the open cases.

During the Phase I site visit, four existing monitoring wells (MW-1 through MW-4) were observed at the MRC. Monitoring wells MW-1, MW-2, and MW-3 were surrounding the former tank farm immediately north of the Power House. The three wells were installed to monitor groundwater around the UST tank field after free phase hydrocarbons and petroleum-contaminated soil were observed during abandonment of two 15,000-gallon #2 fuel oil USTs in October 1991. No analytical results from the monitoring wells were obtained as part of the Phase I ESA. In addition, no MDE monitoring requirements were noted for the documented release and the status of the leaking UST case was not determined during the Phase I ESA.

According to the Phase I ESA, the fourth well, MW-4, was installed to evaluate the groundwater quality in the vicinity of a former 4,000-gallon gasoline UST located immediately northeast of Building L. The UST, historically used to fuel facility vehicles, was permanently removed in 1988. MW-4 was installed at the request of MDE to monitor the groundwater quality after impacted soil and groundwater had been encountered and removed. After installation, free phase hydrocarbons were detected in the monitoring well. Over time, the quantity of free phase hydrocarbons in the well has reduced. A review of the state databases during the Phase I ESA indicates the leaking UST case may still be open; however no information regarding the continued monitoring of the well was obtained.

All four monitoring wells were sampled during the 2003 Phase II investigation. None of the compounds sampled in monitoring wells MW-1 through MW-3 exceeded MDE cleanup criteria. Although no free phase hydrocarbons were measured in MW-4, elevated fuel related compounds were detected. Since the source of the organic compounds is well defined based on data obtained from the Phase I ESA report no additional historical information was reviewed.

A fifth groundwater monitoring well, MW-5, was observed during site scoping activities for the limited Phase II investigation. The well is located immediately east of the Power House and southeast of the MW-1, MW-2, and MW-3 well cluster. The monitoring well was not identified during the Phase I ESA and the installation date and reason for the well's installation were not determined. At the time of the Phase II investigation, it was unclear whether the monitoring well was associated with the Power House tank field or whether it was installed to monitor a separate release. The groundwater sample collected from MW-5 contained elevated concentrations of fuel-related compounds. Based on the presence of fuel-related compounds in MW-5 and not within the MW-1, MW-2, and MW-3 well cluster further investigation into the source of the contaminants

3.2.9 Area of Former 2,000 Gallon Waste Oil UST (REC #9)

An approximately 30 year old, 2,000 gallon capacity, waste oil UST located in the southwestern

3.2.12 Southern Portion of Lot 3 (REC #12)

During the historical research investigation, aerial photographs of the southern portion of Lot 3 showed features of disturbed ground. The features indicating disturbed ground were observed in aerial photographs dated 1964, 1971, 1979, and 1989 but were most prevalent in the 1964 and 1971 photographs. Although all applicable file information regarding Lot 3 indicates only parking and trailer storage, the proximity of the former STP and test buildings and the presence of the disturbed ground were cause for identifying the area as a REC.

3.2.13 Boat Dock Area (REC #13)

Although not identified as a REC in the Phase I ESA, several structures present to the west of the Boat Launch Area were observed and documented in the report. During the review of available facility documents, an undated facility layout map of the entire MRC and surrounding area depicted several structures in the area of the boat dock (herein informally designated as the “Boat Dock Area”). The structures identified on the map included a cottage, service building, storage building, training school, and boat house. Based on a review of other facility maps, all of the buildings were demolished by 1969. Uses other than those implied by the designated names of the structures are not known and no additional information including chemical and material storage and handling practices were obtained during the Phase I ESA and the historical research investigation.

3.2.14 Building A Northwest Corner Pump Island (REC #14)

During a review of facility documents, a former gas pump island was observed adjacent to the northern exterior wall of Building A, near the building’s northwestern corner, in an undated plot map of the MRC. Based on site features, the age of the plot is estimated to be around 1970. The former gasoline pump island was unknown to the interviewed facility personnel.

3.2.15 Hydraulic Pits (REC #15)

The Phase I ESA identified the potential release of hazardous substances to the underlying soils and groundwater beneath the pits of hydraulically driven machines located in Building B as a REC. The hydraulic pits accommodate the foundation of the machines and collect oils and solvents incidentally released from the machines hydraulic parts or maintenance activities. During the Phase I ESA, the pits were not accessed to determine whether their integrities were compromised.

The hydraulic pits were visually inspected as part of the historical research investigation. During the site visit, MRAS was in the process of abandoning three hydraulic pits. Abandonment consisted of filling the pits with compacted sand and finishing the pits to grade with concrete pavement. During abandonment activities, facility personnel observed several cracks within the brick lined sidewalls of the hydraulic pits. The cracks were located along the western sidewall of the furthest western hydraulic pit. In addition, heavy petroleum-related stains were also noted on the walls of the three pits. Based on the visual description of the hydraulic pits during abandonment activities, a release of hazardous substances to the underlying strata is possible.

3.2.16 Building A – Plating Shop (REC #16)

The Building A Plating Shop is located in the southwestern section of Building A immediately north of the Finishing Shop (REC #20) and adjacent to but not underlain by Building A's basement (REC # 18). The shop utilizes multi-stage in-line dip baths and plating tanks with a variety of solvents and surface-stripping agents for cleaning and pretreatment stages of the manufacturing process. During Phase II site scoping activities, yellow stained bricks and infiltrating water marks were observed on the sidewall of Building A's basement adjacent to the Plating Shop. The Plating Shop was not identified in the Phase I ESA as a REC.

3.2.17 Abandoned AST Product Lines (REC #17)

Eight empty steel ASTs, each approximately 15,000-gallons in volume, are located along the exterior western wall of Building A. The tanks reportedly contained fuel oil used in the past to

supply furnaces and heaters in Building C. The AST's product lines reportedly ran in concrete-lined channels from the tanks to the associated furnace/heaters. The exact location of the product lines running beneath Buildings A, B, and C is currently unknown, however according to available site plans, the product lines run along the ceiling of "A" Basement and then traverse underground beneath the section of Building A which is not underlain by a basement. Based on available site drawings and visual observations obtained during the historic research visual site inspection, the abandoned product lines appear to run beneath the remaining portion of Building A within a narrow (approximately 2 foot diameter) utility trench along column row #14. The lines are then suspected to travel above ground within a large concrete lined utility service trench beneath Building B and along the ceiling of C Basement.

In the early 1990's, the facility discontinued the use of the heaters and the tanks were decommissioned. The associated product pipes were also cleaned, flushed with detergents and left in-ground; however, no indication of the integrity of the product lines was obtained prior to or during closure activities. Based on the lack of integrity information, a potential release to the underlying soils and groundwater from the underground fuel oil lines were identified as a REC in the Phase I ESA. No additional information regarding the former product pipes was obtained during the historical research investigation.

3.2.18 "A" Basement Wastewater Underground Lines (REC #18)

During the Phase I ESA, numerous drums and containers filled with various chemicals and wastes were present in the basement of Building A. The chemicals and wastes appear to be residuals from previous manufacturing/maintenance operations. Abandoned and inactive equipment, including furnaces, fuel pumps, air compressors, and air tanks were also observed in this location. An oil/water separator (OWS) was observed adjacent to abandoned air compressors. Multiple floor drains are located throughout "A" Basement, with some of the drains being in the direct vicinity of the drums, containers, and equipment. According to the Phase I ESA, multiple sealed floor drains are present within the "A" Basement. Significant discoloration and debris were observed on the floor, atiab

have been present. Although no visual evidence or file information regarding a former spill or release at this site was obtained, the presence of the concrete patch suggest a potential former migration route to the underlying subsurface media.

3.2.24 “C” Basement – Photo Lab (REC #24)

The Building C basement photographic lab was not discussed in the Phase I ESA report. Based on available facility records and information obtained from facility personnel, the photo lab has been present in “C” Basement since at least the 1950s. Currently, the photographic lab has a silver recovery system in place. It is unknown when silver recovery began. During a historical research site visit several floor drains and possibly a sump were observed in this area. Although no file information or information obtained from facility personnel indicated a release of silver to the nearby drains, a potential for impacts to the underlying soil and groundwater was identified.

3.2.25 Incinerator/Conservation Building (REC #25)

Although not discussed in the Phase I ESA, based on a review of available facility maps the Incinerator/Conservation Building has been present at the MRC since at least the 1940’s. Currently the building is used as a recycling center and for trash collection. No information on when the structure was used as an incinerator nor the types and quantities of materials incinerated, nor the ultimate disposition of the generated ash was obtained from facility records.

3.2.26 Die Storage Area (REC #26)

The Die Storage Building was constructed after the original die storage unit, reportedly an open, gravel-covered yard was remediated following detection of elevated lead in the underlying soils. After, soil excavation activities were conducted, the area was paved with concrete, bermed, and covered with a sheet-metal roof to prevent the infiltration of rain water. No analytical data was obtained during the Phase I ESA or historical research investigation to verify the effectiveness of remedial action.

3.2.27 Bone Yard (REC #27)

Based on available facility documents and aerial photographs, the Bone Yard, an area used for equipment, supply, and scrap storage and located between the hazardous material storage cages and the Tilley property, has been present at the facility since at least the 1940s. Given the former and continued use of the unit as a storage area, a potential exists for hazardous substances to be released or spilled to the underlying media. The area is currently covered with a mixture of deteriorating concrete and asphalt pavement and soil and appears to have been used for the storage of primarily scrap metal.

3.2.28 Former Hazardous Materials Storage Pad (REC #28)

According to facility personnel interviewed during the historical research investigation, hazardous material storage historically occurred on an uncovered concrete pad (approximately 20 by 20 feet in size) located behind the current Hazardous Materials Storage Building. The former storage pad is surrounded by grass. No visual evidence of former storage or releases to the surrounding soil was observed during the historical research site visit.

3.2.29 Firecoat Building (REC #29)

According to facility personnel, paint and solvents are and have been historically used at the Firecoat Building, a structure built in the early 1980s for coating the interiors of thrusters. Paints are stored in the southwestern corner of the building while solvents are used in the southeastern portion of the building. According to facility personnel, hazardous materials were historically stored outside in 55-gallon drums. The Firecoat Building has been constructed on a concrete slab which appears to be in good condition. No cracks or fractures were observed. No drains or sumps were observed within the structure. The building is surrounded by concrete and asphalt-pavement used for the storage of supplies and equipment. No visual evidence of a release or spill was observed around the building. Given the type and quantity of chemicals used at the Firecoat Building, and the reported storage of chemical waste in 55-gallon drums outside the building there was the potential for a release of hazardous chemicals to have occurred.

3.2.30 Mar Forms (REC #30)

During the historic research visual inspection of the facility, two active Mar Forms (fabrication presses) were observed in the south-central portion of Building A. Both pieces of equipment are underlain by pits used to house the foundation of the equipment and contain fluids which may incidentally leak from the equipment. Du

Section 4

Summary

Tetra Tech completed a historical research investigation of the Lockheed Martin MRC located in Middle River, Maryland. The primary objective of the investigation was to supplement information provided by a 2003 Phase I ESA and identify RECs associated with historical site activities. The investigation consisted of reviewing available facility documents, maps, and reports; interviewing facility personnel; and conducting a visual inspection of the identified RECs. Based on the information collected, 31 RECs were identified at the facility. The RECs consist of active and former areas or shops used for various manufacturing processes, former and current chemical handling and storage units, and areas containing features reflecting unknown site activities. The identified RECs and the information collected regarding the RECs will be used to develop a facility-wide comprehensive Phase II investigation currently scheduled to be conducted in the fall of 2004.

Section 5

References

1. Earth Tech, Inc., Phase I Environmental Assessment, Chesapeake Industrial Park. May 2003.
2. Tetra Tech, Inc., Final Report, Phase II Site Investigation of Exterior Areas, Lockheed Martin MRC. February 6, 2004.