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Electronically Transmitted

October 29, 2018

Ms. Simone Core, P.E.
Remediation Engineer
Florida Department of Environmental Protection
Permitting and Waste Cleanup
13051 N. Telecom Parkway
Temple Terrace, FL 33637-0926

Re: 2018 Remedial Action Status Report
Lockheed Martin Tallevast Site
FDEP Site No. COM_169624/Project No. 238148
Tallevast, Manatee County, Florida

Dear Ms. Core:

Please find enclosed one copy of the 2018 Remedial Action Status Report (RASR) for the referenced site. Per your request, this RASR is being distributed to you in electronic form only. This RASR covers the period of performance

REMEDIAL ACTION STATUS REPORT SEPTEMBER 2017 THROUGH AUGUST 2018 - TALLEVAST SITE, FLORIDA

Prepared for:
Lockheed Martin Corporation

Prepared by:
AECOM Technical Services, Inc

October 2018

Approved by:
Lockheed Martin, Inc.

Revision: 0

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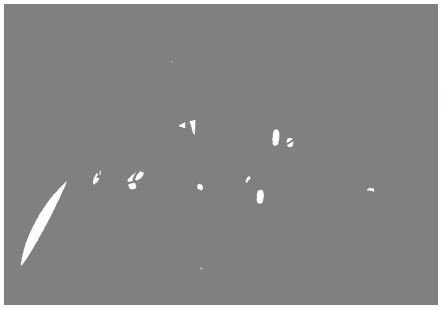

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APPENDICES

ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
ABC	American Beryllium Company
AECOM	ATz 0 Tr/F2 Technical Services, RONny

OMM	operation, maintenance, and monitoring
PCE	tetrachloroethene
PLC	programmable logic controller
POTW	publicly owned treatment works
RAO	Remedial Action Objective
RAP	Remedial Action Plan
RAPA	Remedial Action Plan Addendum
RASR	Remedial Action Status Report
RC	Infiltration Gallery
RO	reverse osmosis
RW	reference wetland
S&P	Salt & Pepper
SIM	selective ion monitoring
Site	The "Site" consists of both the Tallevast Facility and the surrounding area groundwater that is impacted by chemicals of concern
SOP	standard operating procedure
SU	standard units
SWFWMD	Southwest Florida Water Management District
TCE	trichloroethene
TDS	total dissolved solids
TestAmerica	TestAmerica Laboratories, Inc.
TPOC	Temporary Point of Compliance
TW	target wetland
USAS	Upper Surficial Aquifer System
USEPA	United States Environmental Protection Agency
VC	vinyl chloride
VOC	volatile organic compound
WMP	Wetlands Monitoring Plan
WUP	Water Use Permit

SECTION 1
INTRODUCTION

Lockheed Martin Corporation (Lockheed Martin) is pleased to present this annual Remedial Action Status Report (RASR) to the Florida Department of Environmental Protection (FDEP). This document provides a comprehensive summary of the remediation and monitoring activities for FDEP Site No. 169624 as described below.

1.1 GENERAL

This RASR describes operation, maintenance, and monitoring (OMM) activities for the Remedial Action Plan Addendum (RAPA; ARCADIS, 2009a) Groundwater Recovery and Treatment System (GRTS), at the Lockheed Martin Tallevast Site (also known as the Former American Beryllium Company [ABC] Site) (the Site) located in Tallevast, Manatee County, Florida. The Site consists of both the Facility (also referred to as the "on-Facility" portion of the Site) and the surrounding area (referred to as the "off-Facility" portion of the Site) where groundwater is impacted by chemical(s) of concern (COC). Refer to Figure 1-1 a Site Location Map. This RASR documents the reporting period from September 1, 2017 through August 31, 2018.

This report was prepared in accordance with and contains the applicable items required in Rule 62.780.700(12), Florida Administrative Code (F.A.C.) for a RASR. The activities, analyses, and results described in this report demonstrate fulfillment of Lockheed Martin commitments and achievement of FDEP requirements. The RASR also provides permit compliance status for Southwest Florida Water Management District (SWFWMD) Water Use Permit (WUP) number 20020198.000 and Manatee County Discharge Permit #IW-0025S. Manatee County Utility Operations (MCUO) will continue receiving annual reports concurrent with FDEP reporting requirements. Also included in this RASR are results of the biennial Persulfate Pilot Study Monitoring, the Wetlands Monitoring, and the Long-Term Water Level Monitoring (LTWLM) programs.

1.2 OBJECTIVES

The GRTS Remedial Action Objectives (RAOs) provided in the RAPA are as follows:

- Reduce the potential for human exposure to COC in groundwater.
- Hydraulically control groundwater containing COC in concentrations greater than the groundwater cleanup target levels (GCTLs) as listed in Chapter 62-777, F.A.C.
- Actively extract and treat the groundwater plume until concentrations are below GCTLs.
- Reduce the potential for exposure to COC present in soil at the Facility.
- Minimize community and natural resource disturbance.

This RASR provides descriptions and results demonstrating achievement of the RAOs.

1.3 REPORT ORGANIZATION

This report is organized into seven sections as described below.

Section	Description

2.3 FACILITY DESCRIPTION

2.4 FACILITY OPERATION

SECTION 3
GROUNDWATER RECOVERY AND TREATMENT SYSTEM DESCRIPTION

pressure transducer, sample port, check valve, Y strainer, and isolation ball valve. On-Facility extraction wells are individually piped to the treatment building. Conveyance piping for the on-Facility and off-Facility extraction wells is combined once inside the treatment building. Conveyance carrier piping is enclosed in secondary containment (i.e., containment piping, manhole structures, etc.) until it reaches the interior of the treatment building. Manifold piping inside of specific cleanout manholes and extraction well vaults is constructed to provide leak detection in the capture and conveyance system using permanent dual containment termination fittings and capacitance sensors capable of detecting water. Once the capacitance sensors detect water, the operator is alerted and the extraction well netw18(n)1ort,rt,lly vcM1(n)-132()19(a1)-21(i)cal-151(m-T

GCTLs and Florida Surface Water Quality Criteria for application to the infiltration galleries or injection wells; and 3) non-potable process water used for equipment wash-down, Facility irrigation, and miscellaneous non-potable uses. The on-Facility injection wells recharge the Upper Surficial Aquifer System (USAS) via five passive injection wells that focus flushing of areas with the highest historical COC concentrations. The three off-Facility infiltration galleries are used as needed to maintain established wetland hydroperiod water levels to minimize wetland health impacts due to drawdown effects of the groundwater extraction system.

A compressed air system operates the pneumatic equipment, including double-diaphragm pneumatic pumps and the pneumatic valves. Compressed air is also used to assist in metals oxidation in the primary pretreatment tanks. Displaced air from the pre-AOP holding tank, backwash surge tank, and solids thickening tank vent systems are routed to the vapor phase granular activated carbon (GAC) vessels located in the process area loading dock for passive treatment of volatile organic compounds (VOCs).

Various instruments are used to monitor key process variables (primarily flow rate, water level, line pressures, pH and temperature). Redundant alarms, switches, and control logic are used to automate the GRTS and prevent system failures such as accidental overfilling of tanks. A programmable logic controller (PLC) provides control and communications between systems, equipment, and instrumentation. The treatment building includes an operations room where operators monitor and control the GRTS.

and compliance sampling were conducted in accordance with FDEP Standard Operating Procedures (SOPs) FS 2000 *General Aqueous Sampling*, revision date March 1, 2014 (FDEP, 2014a) and FC 1000 *Cleaning/Decontamination Procedures*, revision date March 1, 2014 (FDEP, 2014b). Table 4 summarizes the monitoring schedule as originally specified in RAPA Table 12-1.

4.2.1 Compliance Sampling

Treatment System POTW effluent compliance samples were collected in accordance with the RAPA and the requirements of Manatee County Discharge Permit #IW-0025S. The Manatee County Discharge Permit, located in Appendix B, was renewed in late 2015 with an effective date of November 9, 2015. The current permit expires November 8, 2018. Effluent compliance sampling dates and analytical results are presented in Table 5. The analytical results of this

quality criteria for discharge to infiltration galleries and adherence to GCTL for discharge to injection wells.

Table 9a – Southwest Florida Water Management District (SWFWMD) E-Permitting Submittal Dates	
Month	**SWFWMD E-Permitting Submittal Date**
September 2017	October 2, 2017
October 2017	November 2, 2017
November 2017	December 1, 2017
December 2017	January 4, 2018
January 2018	February 8, 2018
February 2018	March 1, 2018
March 2018	April 2, 2018
April 2018	May 2, 2018
May 2018	June 1, 2018
June 2018	July 2, 2018
July 2018	August 1, 2018
August 2018	September 1, 2018

4.3 WATER LEVEL AND WETLANDS MONITORING

Groundwater level monitoring provides a means for confirming hydraulic capture of the COC plume, optimizing the extraction system, and providing adequate protection of groundwater supply resources. The following sections describe the water level gauging events performed in February 2018 and August 2018.

4.3.1 Semi-Annual Gauging Event

During the semi-annual groundwater gauging event, field personnel collected water levels from a total of 185 monitoring locations. These locations included monitoring wells, staff gauges, stilling wells, and piezometers, as identified in Table 10 and shown on Figure 2-3. The

monitoring wells gauged during this event were opened and vented on February 19, 2018 and water levels were allowed to equilibrate for up to 24 hours. Field personnel gauged monitoring wells on February 20, 2018 while under GRTS pumping conditions.

4.3.4 Wetlands Monitoring Program

In accordance with the July 2009 *Wetlands Monitoring Plan* (WMP; ARCADIS, 2009b) the semi-annual wetland manual water-level monitoring event was conducted on December 11, 2017 and the annual wetlands assessment was conducted on May 30 through 31, 2018. Wetland telemetry monitoring systems continued to provide real-time collection and reporting of water levels at each of the reference wetlands (RWs) and target wetlands (TWs). Results of monitoring activities are provided in the approved *Wetlands Monitoring Report June 2017 through June 2018* (AECOM, 2018: referenced herein as the Annual Wetlands Monitoring Report) in Appendix F.

4.4 GROUNDWATER QUALITY MONITORING

Groundwater quality monitoring was conducted in accordance with FDEP SOP *FS 2200 Groundwater Sampling*, revision date March 1, 2014 (FDEP, 2014c), and *FC 1000 Cleaning/Decontamination Procedures* (FDEP, 2014b). Completed groundwater sampling logs for the groundwater sampling events are included in Appendix G. Equipment used for field measurements was calibrated each morning before the start of purging and sampling and a calibration check was conducted each afternoon following completion of the day's activities. Field personnel sampled monitoring and private wells as part of the effectiveness monitoring events and extraction wells as part of the GRTS performance monitoring program.

Groundwater samples were placed into insulated coolers and maintained at temperatures between 2 and 6 degrees Celsius (°C), (4°C$\pm$2°C). The coolers were sealed and the contained samples were delivered to TestAmerica in Tampa, Florida for laboratory analysis. The coolers and samples were delivered to the laboratory under chain-of-custody procedures found in the USEPA's *Quality Assurance Handbook Volume II*, Section 8 (USEPA, 2008). Laboratory analytical reports and associated chain-of-custody forms are included in Appendix H. Data Validation Reports are presented in Appendix I. There were no laboratory analytical quality control issues that adversely affected data usability, as documented in the Data Validation Reports.

The following sections provide more detail on the performance and effectiveness sampling events.

4.4.1 Semi-Annual Extraction Well Monitoring

Field personnel conducted groundwater sampling at 77 vertical extraction wells and four horizontal extraction wells on February 22 and 23, 2018 and August 8 through 9, 2018. Groundwater pumped from 30 on-Facility extraction wells was collected from the sample ports located on each dedicated line inside the treatment building. Groundwater samples from three of the on-Facility extraction wells, 44 of the off-Facility vertical extraction wells and the four off-Facility horizontal extraction wells were collected utilizing dedicated sample ports located inside

Section 5.4.3 includes a discussion of the analytical results provided in Table 15. The next persulfate compliance monitoring event will take place in August 2020.

4.4.4 Annual Effectiveness and Private Well Monitoring

As part of the annual effectiveness monitoring, on August 7, 2018, total depths were measured in the accessible monitoring wells in the annual sampling program. These measurements were used to determine if monitoring wells require redevelopment to provide continued function. The monitoring well network did not require redevelopment to address siltation during this reporting period.

Annual effectiveness sampling was conducted at 148 monitoring wells, three private wells, and six piezometers between August 8 and August 31, 2018, in accordance with the RAPA and detailed in Table 13. TestAmerica analyzed the samples using USEPA Method 8260B for VOCs and USEPA Method 8260C SIM/ID with heated purge for 1,4-D. The analytical data from the August 2018 annual sampling event are summarized in Table 14. The analytical data from sampling from the private monitoring wells are summarized in Table 16. Section 5.4.4 includes a discussion of the analytical results from this sampling event.

SECTION 5
SYSTEM OPERATION, MAINTENANCE, AND MONITORING RESULTS

This section provides results from system operation, treatment and compliance, water level, effectiveness, persulfate, and wetlands monitoring. The section also includes a summary of waste management activities.

5.1 SYSTEM OPERATION

The total volume of groundwater pumped from the extraction system for the reporting period from September 1, 2017 to August 31, 2018 was approximately 80,053,200 gallons, resulting in a total of 379,502,100 gallons of groundwater extracted and treated since initial system startup in November 2013. A cumulative monthly summary of groundwater volumes that were extracted, treated and discharged is presented in Table 9. The GRTS was operational for 96.7% of the reporting period. The GRTS was able to process groundwater for 8,476.6 hours, with 240.6 hours of planned downtime and 42.6 hours of unplanned downtime. GRTS runtime is presented in Table 2.

Table 16a below presents monthly influent flow totals, plus the daily maximum and average flows, as recorded automatically by the PLC and archived in the reporting software database. The flow rates during the reporting period were in compliance with the WUP pumping volume allowance of 410,600 gallons daily (annual average) from the extraction network.

Table 16a – SWFWMD Influent Flow Totals

Figure 5 - Combined Influent Groundwater Concentrations

The individual and total COC concentrations have maintained a downward trend since the start of RAP operation; the exception is the concentration of VC, which has remained fairly consistent at low values since an initial drop in March 2014 and subsequent rebound. The continuing

ports. Table 7 provides the GRTS process monitoring analytical results. These process sampling results also allow operators to track the effectiveness of the AOP units in removing COC.

The permit requirements prescribed in the Manatee County Discharge Permit #IW-0025S were met. Refer to Appendix B for a copy of Manatee County Discharge Permit #IW-0025S. Appendix B also includes the required Manatee County Industrial Pretreatment Program Certification Statement. There were no laboratory analytical quality control issues that adversely affected data usability, as documented in the Data Validation Reports. Analytical results for the POTW effluent samples indicate that COC and metals concentrations in the treated effluent were below limits set forth in the discharge permit noted above, and treatment efficiencies for VOC and 1,4-D removal were 100% and 100%, respectively, averaged over the reporting period.

Table 16c below presents the Discharge Permit limits and recorded values for pH, temperature, and daily discharge flow, as recorded by the GRTS PLC using discharge instrumentation.

Table 16c - Manatee County Discharge Permit Compliance Limits

Monitored Parameter	Discharge Permit Limits	Publicly Owned Treatment Works (POTW) Discharge Recorded Values
pH Range	5 to 11.5 standard units (SU)	5.36 to 10.84 SU
Maximum Temperature	104 Degrees Fahrenheit	102.1 Degrees Fahrenheit
Maximum Daily POTW Effluent Flow		

Table 16e – SWFWMD Effluent Flow Totals				
SWFWMD DID	**DID 97**	**DID 97**	**DID 97**	**DID 96***
Month	**Maximum Daily POTW Effluent Flow in Gallons**	**Average Daily POTW Effluent Flow in Gallons**		

infiltration galleries RC-7001 and RC-7003 was initiated on July 5, 2017 and continued to the end of this reporting period. As shown on Table 9, a total of 16,562,900 gallons of RO system effluent was discharged to the three infiltration galleries during the reporting period.

5.4.2 Semi-Annual Effectiveness Monitoring

The results from semi-annual groundwater sampling conducted in February 2018 are presented in Table 14. This table also includes historical data dating to 2009. Further discussion of COC concentrations that includes consideration of the semi-annual groundwater sampling data is presented in Section 5.4.4.

5.4.3 Biennial Persulfate Compliance Monitoring

Groundwater samples from the biennial sampling event were collected and analyzed for the persulfate pilot study parameters, as described in Section 4.4.3. Analytical results indicate that the concentrations of aluminum, sulfate, manganese, iron or TDS exceeded either their GCTLs or baseline value in the monitoring wells sampled. A reduction in the number of analytes detected above baseline or GCTLs since the baseline sampling event in March 2008 is observed in both the USAS and LSAS monitoring wells. The results from sampling are presented in Table 15. The next biennial event is scheduled for August 2020.

5.4.4 Monitoring Well and Private Well Annual Effectiveness Monitoring

Groundwater monitoring events are also conducted on an annual basis to monitor current COC concentrations and provide a basis for comparison of the progress of ongoing active remediation and natural degradation occurring at the Site. The results of the annual effectiveness monitoring event at Site monitoring wells and private wells are provided in Table 14. Figures 5-1 through 5-39 present 1,4-D, TCE, PCE, cis-1,2-DCE, 1,1-DCE, 1,1-DCA and VC groundwater concentrations and interpreted isoconcentration lines in the USAS, LSAS, AF Gravels, S&P Sands and Lower AF Sands. Observed historical variations in concentration and plume morphology in the various aquifers from August 2017 and August 2018 are discussed in Sections 5.4.4.1 through 5.4.4.5 below.

The following information is provided to aid the discussion of the annual sampling results:

- Analytical results indicate an overall decline in average COC concentrations in the monitoring wells in the USAS, LSAS, AF Gravels and S&P Sands since August 2017, indicating continued reduction of in-situ COC mass. Consistent with previous sampling events, no COC were detected in the Lower AF Sands. Appendix J includes charts of

COC concentration versus time for a group of selected monitoring wells and relevant COC. The horizontal distributions of COC within aquifer zones in August 2018 are generally consistent with the distributions during August 2017.

- Average concentrations for each COC for the USAS, LSAS, AF Gravels and S&P Sands, calculated using the laboratory analytical data from the August 2017 and August 2018 sampling events, are summarized in Tables 16g, 16h, 16i, and 16j in the sections below. To avoid skewing results due to varying detection limits and in order to ease calculations in the tables, non-detect concentrations were set to zero.

5.4.4.1 COC Distribution in the USAS

The concentrations of 1,4-D, TCE, PCE, cis-1,2-DCE, 1,1-DCE, 1,1-DCA and VC in the monitoring wells and private wells within the USAS are shown on Figures 5-1 through 5-7,

Table 16g - Average COC Concentrations in the Upper Surficial Aquifer System (USAS) in 2014 through 2018					
COC	**August 2014 (µg/L)**	**August 2015 (µg/L)**	**August 2016 (µg/L)**	**August 2017 (µg/L)**	**August 2018 (µg/L)**
1,1-DCA	2.5	2.3	1.2	1.2	0.8
VC	0.0	0.0	0.0	0.0	0.0

The composite COC distribution in the USAS is presented on Figure 5-8, along with the estimated USAS capture zone. The area of COC concentrations exceeding GCTLs in the USAS during August 2018 was 44 acres, compared to 58 acres in August 2017. Appendix J includes charts of COC concentration versus time for a group of selected USAS monitoring wells (MW-27, MW-35, MW-63, MW-67, MW-114 and MW-254).

5.4.4.2 COC Distribution in the LSAS

The concentrations of 1,4-D, TCE, PCE, cis-1,2-DCE, 1,1-DCE, 1,1-DCA and VC concentrations in the monitoring wells and private wells within the LSAS are shown on Figures 5-9 through 5-15, respectively. Average concentrations for each COC using the laboratory analytical data from the August 2014 through August 2018 annual sampling events are summarized below in Table 16h. Average concentrations for individual COC have an overall decrease since 2014, with the exception of the average VC concentration, which increased in 2018 and was primarily attributed to the detection in MW-85 at 1.9 µg/L.

Table 16h - Average COC Concentrations in the Lower Shallow Aquifer System (LSAS) in 2014 through 2018					
COC	**August 2014 (µg/L)**	**August 2015 (µg/L)**	**August 2016 (µg/L)**	**August 2017 (µg/L)**	**August 2018 (µg/L)**
1,4-D	50.7	32.4	29.6	19.0	12.5
TCE	176.03	161.6	95.9	86.6	50.0
PCE	4.13	7.4	5.1	3.5	

Table 16h - Average COC Concentrations in the Lower Shallow Aquifer System (LSAS) in 2014 through 2018					
COC	August 2014 (µg/L)	August 2015 (µg/L)	August 2016 (µg/L)	August 2017 (µg/L)	August 2018 (µg/L)

Table 16i - Average COC Concentrations in the Arcadia Formation Gravels (AF Gravels) in 2014 through 2018					
COC	**August 2014 (µg/L)**	**August 2015 (µg/L)**	**August 2016 (µg/L)**	**August 2017 (µg/L)**	**August 2018 (µg/L)**
1,1-DCE	13.80	14.6	12.6	10.1	5.8
1,1-DCA	3.28	3.9	3.1	3.1	1.6
VC	12.42	16.0	18.0	14.9	6.3

The composite COC distribution is presented on Figure 5-24 along with the estimated AF Gravels capture zone. The area of COC concentratiomxn69(arad[(2ag21(f)32GCTLs-17(n)1at)-1n-17(n29( )-2

Table 16j - Average COC Concentrations in the S&P Sands in 2014 through 2018					
COC	**August 2014 (µg/L)**	**August 2015 (µg/L)**	**August 2016 (µg/L)**	**August 2017 (µg/L)**	**August 2018 (µg/L)**
PCE	0.3	0.0	0.0	0.0	0.0
cis-1,2-DCE	0.3	1.9	3.5	1.6	4.0
1,1-DCE	0.1	0.4	1.3	0.3	1.0
1,1-DCA	0.0	0.8	0.4	0.5	0.4
VC	0.2	0.1	0.1	0.1	0.2

The composite COC distribution is presented on Figure 5-32 along with the estimated S&P Sands capture zone. The area of COC concentrations exceeding GCTLs in the S&P Sands identified in August 2018 is two acres in size, compared to three acres in August 2017. Concentrations of COC in MW-21, IWI-2 and MW-128 have historically fluctuated. Appendix J includes charts of COC Concentration versus Time for a group of selected S&P Sands monitoring wells (MW-21, IWI-2 and MW-128).

5.4.4.5 COC Distribution in the Lower AF Sands

No COC were detected at concentrations greater than their respective GCTLs in monitoring wells screened within the Lower AF Sands, as shown on Figures 5-33 through 5-39. These results are consistent with historical data.

5.4.4.6 Temporary Point of Compliance

The comprehensive August 2018 overall GCTL boundary is presented on Figure 5-40. This overall boundary was derived from integrating the composite COC concentration maps from each unit impacted by COC above GCTLs and is used to define the proposed 2018 Temporary Point of Compliance (TPOC). The changes in groundwater COC concentrations and distributions discussed in Section 5.4.4 did not necessitate additional TPOC notifications, per Rule 62-780.220, F.A.C. The estimated area of the August 2018 GCTL boundary was 120 acres in size, as compared to 132 acres for the August 2017 boundary. This difference reflected a decrease in area of approximately 9%.

5.4.4.7 Additional Volatile Organic Compounds

Data from laboratory analyses were reviewed to determine if concentrations of additional compounds, other than the seven COC discussed in the preceding sections of this report, were detected or exceeded GCTL limits in groundwater samples. Concentrations of additional volatile compounds were either not detected or detected below their respective GCTLs.

5.5 CHEMICAL OF CONCERN MASS REMOVAL

The mass of COC (PCE, TCE, cis-1,2-DCE, VC, 1,4-D, 1,1-DCA, and 1,1-DCE) removed during this one-year reporting period is estimated to be approximately 55 pounds, based on the average combined influent COC concentrations and combining the volumes of extraction for each month. The mass is calculated using the average of two (if available) groundwater combined influent sample results per month, as presented in Table 8, and the monthly combined influent flow totals, which were presented in Section 5.1. The results of these calculations are shown in Table 17. Mass removal rates in 2018 averaged approximately 4.6 pounds per month compared to 5.3 pounds per month during the 2017 reporting period. The reduction in the mass removal rate is attributed to the overall decrease in COC concentrations due to contaminant removal by the GRTS and natural processes.

5.6 WETLANDS MONITORING PROGRAM

The May 2018 annual wetlands monitoring event was the fifth conducted during RAPA operations. The RWs and TWs exhibited normal water level fluctuations in response to the normal seasonal rainfall distribution for the region. The Wetlands Monitoring Report was submitted to the FDEP and the SWFWMD on August 23, 2018. FDEP approved the report on September 10, 2018. The wetland telemetry system continued to operate well, eliminating the previous need for frequent wetlands visits, and also allowed quick access to water level instrumentation status to determine changes in functionality requiring attention. Data provided by the telemetry system is used for monitoring and adjusting groundwater extraction and recharge in the vicinity of TW-6.

5.7 WASTE MANAGEMENT

Approximately 68,000 pounds of non-hazardous dewatered filter cake solids were removed and transported to the Clark Environmental disposal facility in Mulberry, Florida during the reporting

SECTION 6
SUMMARY AND CONCLUSIONS

Lockheed Martin constructed and has operated the GRTS at the Site per the following orders and guidance:

- Consent Order No. 04-1328
- Consent Order No. 08-22542009 (as amended)
- 2009 RAPA
- 2012 FDEP RAPA Approval Order
- Approved OMM Manual
- Approved recommendations in previous RASRs

The reporting period for this document documents operation from September 1, 2017 through August 31, 2018. The GRTS is meeting the RAOs described in Section 1.2. The following sections provide conclusions for the reported data during this operational reporting period by OMM activity in the appropriate context for further interpretation, and also provide recommendations for each activity.

6.1 PROCESS PERFORMANCE AND COMPLIANCE MONITORING

Based on the data presented in this report, Lockheed Martin has the following conclusions and recommendations for the GRTS:

- A total of approximately 80,053,200 gallons of groundwater was successfully ext5s(f)(g)-21a0 -20.88

- The conditions of the SWFWMD WUP for extraction volumes and monthly reporting were achieved.
- The RO effluent concentrations discharged to the infiltration galleries and on-Facility injection wells met discharge criteria, defined as the lower of either the GCTL or Surface Water Quality Standards for constituents summarized in Table 6.
- The GRTS removed approximately 55 pounds of COC mass.
- Approximately 68,000 pounds of non-hazardous dewatered filter cake solids and 50,000 pounds (dry weight) of non-hazardous spent GAC were removed and transported for disposal to approved facilities.

Lockheed Martin will continue to operate the GRTS through the next operational reporting period. The operation will include the following actions:

- Meet the established RAOs.
- Extract groundwater for treatment and discharge per the Consent Orders, the 2009 RAPA, the 2012 FDEP RAPA Approval Order, and the approved OMM Manual.
- Continue scheduled compliance sampling.
- Discharge to infiltration galleries as needed to maintain water levels in wetland areas.
- Discharge to on-Facility injection wells to perform flushing in the USAS.
- Use treated effluent water for on-site irrigation.
- Meet MCUO discharge permit and WUP requirements.

6.2 GROUNDWATER LEVEL MONITORING

Based on the data presented in this report, Lockheed Martin provides the following conclusions for the groundwater level monitoring program:

- Groundwater level monitoring indicated the GRTS system continued to maintain adequate hydraulic control of the Site COC in the USAS, LSAS, AF Gravels, and S&P Sands as discussed in Sections 5.3.2 and 5.4.

- By design, the GRTS system did not influence the Lower AF Sands.

- The LTWLM program continued to monitor the effects of the GRTS system and off-Site pumping influences and generally confirmed the description of hydraulic gradients detailed in Section 5.3.2.

Based on the data presented above, Lockheed Martin recommends continuing the current water level monitoring program, as described in Table 18, and the LTWLM program.

6.3 EXTRACTION WELL SAMPLING

Based on the data presented in this report, Lockheed Martin provides the following summary of the extraction well sampling program:

- The GRTS system continued to extract and treat the groundwater COC plume. Generally, the COC concentrations in the groundwater extracted from the USAS, LSAS and AF Gravels have been stable to decreasing, as indicated by the results discussed in Section 5.4.1. The COC concentrations in S&P Sands extraction wells have been generally stable to decreasing since February 2016.

- EW-2103 flow rates were regulated to maintain TW-6 water levels.

- Groundwater in the S&P Sands with COC concentrations in excess of GCTLs was well within the S&P capture zone. Therefore, EW-5002 remained off during the period of performance, with the exception of periodic operation to maintain well function.

Lockheed Martin recommends continuing semi-annual extraction well sampling aligned with the effectiveness monitoring to occur in February and August 2019. Future operation of extraction well EW-5002 will continue to be evaluated in an effort to achieve RAOs.

- Groundwater elevations at TW-6 during the 2018 monitoring event were consistent with those observed during the 2017 monitoring event. In 2018, RC-7002 successfully augmented groundwater recharge and effectively buffered TW-6 from declines which were attributable to operation of the GRTS system.

- Wetland vegetation observed in the RWs and TWs during the 2018 monitoring event remained similar to that recorded during the 2017 reporting period.

Lockheed Martin recommends the following for the wetlands monitoring program:

- Continue to address potential GRTS system impacts to TWs by appropriately adjusting flow rates at extraction wells and through the operation of infiltration galleries.

- Continue annual WMP monitoring and reporting in 2019 during GRTS operation.

- Submit a Wetlands Monitoring Report and comparative analysis with local climate and previously collected data to the SWFWMD by September 1, 2019.

Re-evaluate the monitoring plan with the FDEP and SWFWMD after five years of system operation and the 2019 annual monitoring event to determine whether it needs to continue or be modified, as described in the RAPA and the approved 2018 Wetlands Monitoring Report.

SECTION 7
REFERENCES

AECOM, 2014. *Remedial Action Status Report, Tallevast Site.* October 28.

AECOM, 2016. *Response to Comments 2016 Remedial Action Status Report, Tallevast Site*. January 27.

AECOM, 2018.