51025

AECOM
10 Patewood Drive
Bldg VI, Suite 500
Greenville, South Carolina 29615
www aecom com

864 234 3000 tel
864 234 3069 fax





May 15, 2019

Ms. Kim Kuhn
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

RE: Feasibility Study Work Plan
Shakespeare Composite Structures Site (VCC 14-6271-RP)
Newberry, Newberry County, South Carolina
AECOM Project Number 60534283

Dear Ms. Kuhn:

Attached please find the Feasibility Study Work Plan (FS WP) for the Shakespeare Construction Composites Site (the "Site") prepared by AECOM Technical Services, Inc. (AECOM) on behalf of Signify North America Corporation (Signify). This FS WP describes the proposed approach/outline for the draft Feasibility Study (FS) that will be prepared and submitted to the South Carolina Department of Health and Environmental Control (SCDHEC) for the Shakespeare Composite Structures Site located in Newberry, Newberry County, South Carolina. Upon receipt of SCDHEC concurrence with the approach/outline identified in this FS WP and prior to the development of the draft FS, a bench-scale treatability study will be conducted to assess the potential for in situ bioremediation and/or abiotic degradation of chlorinated volatile organic compounds (CVOCs) in Site groundwater via enhanced reductive dechlorination (ERD), in situ chemical reduction (ISCR), and a combination of ERD/ISCR. Site samples will also be collected and bench-scale tested for total oxidant demand (TOD) using potassium permanganate and/or sodium persulfate as a means for CVOC degradation via in situ chemical oxidation (ISCO). A brief summary report will be generated to summarize the results of the bench-scale treatability study.

Based on the results of the bench-scale treatability, AECOM on behalf of Signify, proposes to conduct an effectiveness evaluation (pilot study) of the most promising remedial alternative for Site groundwater. A Pilot Study Work Plan will be developed with a scope of work including, but not limited to, injection well installation, a focused baseline groundwater sampling event, details regarding product injection type and quantities, associated analytical data results evaluation, and development of a Pilot Study Summary Report.

Following completion of the Pilot Study Summary Report, a draft FS will be prepared by AECOM on behalf of Signify. The FS will be conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for evaluating the feasibility of remedial action alternatives to mitigate potential human health and ecological risk. The draft FS Report will be prepared following the Guidance for Conducting the Remedial Investigations and Feasibility Studies under CERCLA (USEPA, October 1998).

If you have any questions or comments, please feel free to contact me at (864) 234-3042.

Sincerely,

**AECOM Technical Services, Inc.**

Timothy S. Renn, P.E
Remediation Engineer

Scott E. Ross, P.G.
Project Manager

cc: Mr. Dean Weeks - Signify
Timothy S. Renn, P.E., AECOM

**FEASIBILITY STUDY WORK PLAN**

**SHAKESPHERE COMPOSITE STRUCTURES SITE**

**VCC 14-6271-RP, FILE No. 51025**

**19845 US HIGHWAY 76, NEWBERRY, SC**

This document serves as the Feasibility Study Work Plan (FS WP) for the Shakespeare Composite Structures Site (the "Site"), located in Newberry, South Carolina. This document outlines the information to be included in the Feasibility Study (FS). The FS will be completed in accordance with the Voluntary Cleanup Contract (VCC); 14-6271-RP, File No. 51025), executed for the Site in September 2014.

The FS will consist of several sections including the information as described below.

## 1.0 INTRODUCTION

1.1 Feasibility Study (FS) Objectives

- Present Current Conceptual Site Model
- Summarize Bench-scale Treatability Study and Pilot Study Results
- Develop Remedial Objectives (RAOs), ARARs, and Remedial Goals (RGs)
- Identify and Screen Potentially Applicable Remedial Technologies
- Develop and Evaluate Remedial Action Alternatives

1.2 Site Background

- Facility Description and Location
- Facility Operational Background
- Site Investigation History/FS Activities
  - Pre-Voluntary Cleanup Contract (VCC)
  - Voluntary Cleanup Contract (VCC; 2014)
  - Remedial Investigation Summary (include Baseline Risk Assessment summary where groundwater chemicals of concern [COCs] are identified)
- Bench-scale Treatability and Total Oxidant Demand Study Results Summary (include summary report as an appendix)
- Pilot Study Results Summary (pilot test the most promising technology based on the bench-scale treatability study and include summary report as an appendix)

1.3 Report Organization

## 2.0 CURRENT CONCEPTUAL SITE MODEL

2.1 Site-specific Geology

- Include cross-sections

2.2 Site-specific Hydrogeology

- Identify the three aquifer units (shallow, intermediate, bedrock)
- June 2018 groundwater flow figures from RI
- Hydraulic conductivity, groundwater seepage velocity information

2.3 Summary of Nature and Extent
- Soil
- Groundwater
- Surface Water

2.4 Summary of Fate and Transport
- Leaching from former floor drain systems to soil to underlying groundwater to surface water

2.5 Summary of Fate and Transport
- Identify media of concern (groundwater), receptors, and COCs

2.6 Summary of Key Takeaways from the Current CSM

## 3.0 REMEDIAL ACTION OBJECTIVES AND REMEDIAL GOALS

3.1 Remedial Action Objectives (RAOs)
- Restore groundwater COCs to applicable remediation goals

3.2 Identification of Applicable or Relevant and Appropriate Requirements (ARARs)
- Chemical-specific, Location-specific, and Action-specific ARARs

3.3 Remedial Goals (RGs)
- RGs for the protection of human health are identified for the COCs identified in Site groundwater

## 4.0 IDENTIFICATION & SCREENING OF POTENTIAL GROUNDWATER TECHNOLOGIES

4.1 Overview

4.2 Area and Volume of Contaminated Groundwater Requiring Remedial Action

4.3 General Response Actions (provide brief description of each)
- No Action - Baseline
- Land Use Controls (LUCs)
- Monitored Natural Attenuation (MNA)
- In-Situ Treatment
- Extraction
- Ex-Situ Treatment
- Discharge

4.4 Identification and Screening of Remedial Technology Type and Process Options (evaluate based on effectiveness, implementability, and relative cost)
- No Action
- LUCs
- MNA
- Enhanced Reductive Dechlorination
- In Situ Chemical Reduction (ISCR)
- In Situ Chemical Oxidation (ISCO)
- In Situ Well Air Stripping (IWAS)

4.5 Summary of Retained Technologies

## 5.0 DEVELOPMENT AND DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES

5.1 Development of Remedial Action Alternatives - Developed to meet the RAOs, using the retained technologies either singly or in combination
- Development of Remedial Action Alternatives will be a function of the results of the bench-scale treatability test and subsequent pilot test)

5.2 Evaluation Criteria - Completed to meet the requirements of CERCLA and the NCP (40 CFR 300.430(e)(9)(iii))
- Overall Protection of Human Health and the Environment
- Compliance with ARARs
- Long-term Effectiveness and Permanence
- Reduction of Toxicity, Mobility, or Volume Through Treatment
- Short-term Effectiveness
- Implementability
- Cost (+50% to -30%)

5.3 Detailed Criteria Evaluation of Remedial Action Alternatives - This section will present a detailed analysis of each remedial alternative against each evaluation criterion

5.4 Comparative Analysis of Remedial Action Alternatives –This section will present a comparative analysis among remedial alternatives that identifies the advantages and disadvantages of the remedial alternatives relative to one another with respect to each evaluation criterion. A table that ranks the remedial alternatives with be provided as part of this section

## 6.0 REFERENCES

### Figures

- Monitoring Well Location Maps
- Cross-section Location Map and Cross-Section Maps
- Potentiometric Surface Maps (June 2018)
- Plume Maps – Upper Saprolite, Lower Saprolite, Bedrock
- CSM Figure
- Conceptual Layouts for Remedial Alternatives

### Tables

- Site Monitoring Well Construction Details
- Chemical-specific ARARs
- Location-specific ARARs
- Action-specific ARARs
- Summary of Site Remedial Goals
- Estimated Area and Volume of Groundwater Requiring Remediation
- Identification and Screening of Potential Remedial Technologies

- Cost Estimate Summary for Remedial Action Alternatives
- Comparative Analysis Summary with Rankings for Remedial Action Alternatives

**Appendices**

- Bench-scale Treatability Study Summary Report
- Pilot Study Summary Report
- Detailed Cost Estimates for Remedial Action Alternatives