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Infrastructure · Water · Environment · Buildings

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Transmittal Letter

To:
Tammie Hynum, ADEQ Chief Hazardous Waste Division

Copies:
Jeff Bunce, EMES

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From:
Rhiannon Parmelee, ARCADIS

Date:
March 21, 2014

Subject:
Surface Water Sampling and Analysis Plan Mayflower Pipeline Incident Response, Revision 10

ARCADIS Project No.:
B0086022.1401

We are sending you:

☒ **Attached** ☐ **Under Separate Cover Via _____ the Following Items:**

☐ Shop Drawings ☐ Plans ☐ Specifications ☐ Change Order
☐ Prints ☐ Samples ☐ Copy of Letter ☐ Reports
☒ Other: One hard copy of Surface Water Sampling and Analysis Plan

Copies	Date	Drawing No.	Rev.	Description	Action*

Action*

☐ A Approved ☐ CR Correct and Resubmit ☐ Resubmit _____ Copies
☐ AN Approved As Noted ☒ F File ☐ Return _____ Copies
☐ AS As Requested ☐ FA For Approval ☐ Review and Comment
☐ Other:

Mailing Method

☐ U.S. Postal Service 1st Class ☒ Courier/Hand Delivery ☐ FedEx Priority Overnight ☐ FedEx 2-Day Delivery
☐ Certified/Registered Mail ☐ United Parcel Service (UPS) ☐ FedEx Standard Overnight ☐ FedEx Economy
☐ Other:

Comments: Per the approved Downstream Area Data Assessment Report (March 2014), attached is a copy of the revised Surface Water Sampling and Analysis Plan that includes the weekly surface water sampling in Dawson Cove and Lake Conway with analysis for polycyclic aromatic hydrocarbons.

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ExxonMobil Environmental Services Company

Surface Water Sampling and Analysis Plan

Mayflower Pipeline Incident Response
Mayflower, Arkansas

Revision 10

March 21, 2014

Figures

Attachments

1. Introduction

On March 29, 2013, a breach in the 20-inch Pegasus Pipeline in Mayflower, Arkansas, led to a crude oil release near the town of Mayflower, Arkansas. An emergency response action has removed visible crude oil and various monitoring activities are being conducted to understand remaining conditions. This Surface Water Sampling and Analysis Plan (SAP) establishes sampling locations, sampling frequency, and laboratory analysis methods for monitoring and characterization of surface water downgradient of the crude oil incident, and at background locations.

Surface water sampling in drainage ways, the Dawson Cove outlet, and Lake Conway has been ongoing since March 30, 2013 (Figure 1). The sampling was conducted in accordance with the Sampling and Analysis Plan prepared by Center for Toxicology and Environmental Health (CTEH 2013) and approved by the Unified Command on April 5, 2013. Surface water sampling locations were added and/or revised based on requests by the Arkansas Department of Environmental Quality (ADEQ) and Arkansas Game and Fish Commission (AGFC). This SAP (Revision 10) revises the previously approved SAP (Revision 9, November 1, 2013) and reflects modifications to the program presented in the Downstream Areas Data Assessment Report (Revision 5; ARCADIS 2014) and approved by the ADEQ in March 2014 (ADEQ 2014).

2. Purpose and Objectives

This SAP was developed to establish the sampling methods and analytical parameters for surface water monitoring downstream of the crude oil incident following the emergency response efforts. The surface water monitoring program will provide data to monitor concentrations as well as characterize spatial and temporal variability in surface water quality to support an assessment, together with other data collection, of whether there are any continuing remediation needs.

3. Surface Water Sampling Locations

3.1 Locations Sampled To-Date

Historical surface water sample locations are shown on Figure 1. The following locations have been sampled downstream of the Incident, where an asterisk (*) indicates locations that have been sampled at both shallow and deeper intervals[1]:

- Drainage way along North Main Street: WS-008
- Dawson Cove outlet, south of Highway 89: WS-004*, WS-007*, WS-009, WS-010*, WS-020, and WS-021
- Dawson Cove outlet, north of Highway 89: WS-001*, WS-006*
- In Lake Conway downstream of Dawson Cove outlet: WS-012*, WS-002, and WS-011*
- At Lake Conway dam: WS-003
- In Palarm Creek: WS-018*
- In Lake Conway north of Dawson Cove: WS-005, WS-013*, WS-014*, WS-015*, WS-016*, and WS-017*
- In stream leading to Dawson Creek: WS-019*
- In background drainage way locations: WS-BKG-001 and WS-BKG-002

The Lake Conway locations are intended to monitor water quality in the lake and provide additional reference locations for comparison. Sample location WS-BKG-001 was used as a background drainage way sampling location along North Main Street, but became dry. This location was changed to WS-BKG-002 and is located in an upgradient area along North Main Street.

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[1] For sampling near the Dawson Cove outlet, "shallow" samples were collected at the surface and "deeper" samples were collected at the 1.0- to 1.5-feet depth interval. For sampling in Lake Conway, "shallow" samples were collected at the 1.0- to 1.5-feet depth interval and the "deeper" samples were collected at 80% of the water depth (determined in the field).

3.2 Proposed Locations

Based on the path forward summarized in the Downstream Areas Data Assessment Report (ARCADIS 2014), sampling will be conducted in Dawson Cove and Lake Conway (Figure 2):

Location	Sample Location ID	Depth Intervals To Be Sampled Per Location (Feet Below Water Surface)
Dawson Cove (south of Highway 89)	WS-004	0.5-1.0
	WS-007	0.5-1.0
Lake Conway (north of Highway 89)	WS-001	0.5-1.0
	WS-009	Surface
	WS-021	Surface

4. Sampling Methodology

The methodology presented herein allows for the collection of surface water samples that are representative of surface water quality.

4.1 Sample Collection

Sampling personnel will access the sample locations by land. If unsafe conditions exist at the location, the location will be adjusted, if possible, to a nearby safe location. Surface water sampling from land will be conducted as follows, provided that flowing conditions are present:

1. Park vehicle fully out of the roadway and in location where personnel can safely exit the vehicle. Follow traffic control procedures identified in the project Health and Safety Plan (HASP).

2. Verify that ExxonMobil has secured access to the property.

3. Verify that each piece of field equipment is calibrated, if necessary, and inspected to confirm that it is operational. Calibration and checks will be recorded in the sampler's field log book (ARCADIS 2013).

4. If using non-disposable sampling equipment, verify that the equipment has been decontaminated prior to reuse, using an Alconox© or equivalent wash and deionized or distilled water rinse.

5. If accessing the target sample location from land per the Standard Operating Procedure (SOP) included in Attachment A:

    - Park vehicle fully out of the roadway and in a location where personnel can safely exit the vehicle. Follow traffic control procedures identified in the project Health and Safety Plan (HASP).

- Identify safest access point to surface water body. Avoid undercut banks, eroded areas, densely vegetated areas, steep banks, and other slip, trip, and fall hazards.
- Visually assess and document surface water conditions at the target sample location. Slowly walk/wade to the target sample location starting from a downstream position and moving upstream towards the sampling location, and minimize turbidity to the extent practicable.
- Establish adequate footing. Make use of a spotter and follow HASP requirements for working in and near water.
- Using the grab sample method described in the SOP (Attachment A), collect surface water sample volume, including aliquot for measurement of field water quality parameters described below.
- Fill sample bottles in accordance with the QAPP (ARCADIS 2013).
- Observe the water surface during sampling for evidence of sheen, distressed wildlife, or other indications of oil impact.
- Document appearance of the sample.

4.2 Measurement of Surface Water Quality Field Parameters

In conjunction with the collection of the surface water samples for laboratory analysis, surface water quality field parameters will be measured by lowering the water quality probe into the water at each surface water sample location. Water quality parameters will be measured in accordance with the sampling requirements and quality assurance requirements contained herein. The water quality parameters will be documented in a field notebook or field log sheet. The following equipment will be used to measure field parameters:

- pH meter
- Conductivity meter
- Thermometer
- Turbidity meter
- Dissolved oxygen meter

Surface water quality parameters will be measured at each sample location. Surface water quality parameters will be monitored and recorded to confirm that surface water quality is stable and worker related disturbances are not affecting water quality (e.g., turbidity). Field parameter stability will be established as:

- pH stable +/- 1 standard unit

- Conductivity stable +/- 10% of previous measurement
- Temperature stable +/- 1 degree Celsius
- Turbidity stable +/- 10% NTU (or +/- NTU if turbidity is less than 10 NTU)

5. Sample Analysis

Surface water samples will be collected and submitted to Lancaster Laboratories for analysis of the Polycyclic Aromatic Hydrocarbons (PAHs) by United States Environmental Protection Agency (USEPA) Method 8270 SIM with standard turnaround time for analytical results.

6. Laboratory Sample Quality Assurance

In accordance with this SAP, the following quality assurance samples will be collected during implementation:

- One field duplicate sample per 20 field samples collected.
- One matrix spike/matrix spike duplicate (MS/MSD) per 20 field samples collected.
- One rinsate blank sample per day on decontaminated non-dedicated sampling equipment.

7. Surface Water Data Evaluation

PAHs in surface water samples will be compared to the ecological screening values identified in the Downstream Areas Data Assessment Report (ARCADIS 2014).

The data will be evaluated for summary statistics and any important spatial or temporal trends. If data review and analysis supports modification of this SAP, those proposed modifications will be provided to the ADEQ for review and approval prior to implementing any changes.

8. Schedule

The surface water monitoring locations will be sampled weekly. Events may be cancelled or rescheduled due to inclement weather. This SAP will be implemented starting the week of March 24, 2014.

9. References

ADEQ. 2014. Letter from Tammie Hynum (ADEQ) to Karen S. Tyrone, ExxonMobil Pipeline Company. RE: Downstream Areas Data Assessment Report, Revision 5 (March 2014). March 19. (Received March 20).

ARCADIS U.S., Inc. 2014. ExxonMobil Environmental Services Company. Downstream Areas Data Assessment Report, Pegasus Pipeline Release, Mayflower, Arkansas. Revision 5. March 11.

Center for Toxicology and Environmental Health, LLC. 2013. Sampling and Analysis Plan, Mayflower Pipeline Incident. Mayflower, Arkansas. Prepared on behalf of ExxonMobil Pipeline Company. Revised April 4.

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Figures

Office: CITRIX Author: MNesta
Path: Z:\GISPROJECTS_ENV\XOM_MayflowerAK\MXD\SURFACE_WATER\MAYFLOWER_SW_FILTERED_HIST_20131031.mxd

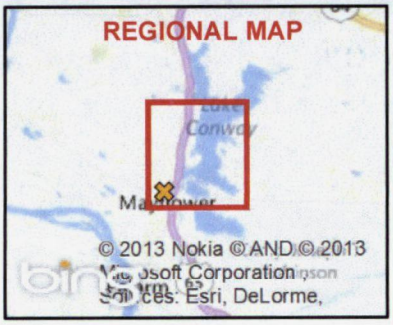
LEGEND

- Surface Water Sample Locations
- Source Point
- Parcel Boundary
- Approximate Surface Water Flow Direction
- Stream/River: Intermittent
- Stream/River: Perennial

***Background location WS-BKG-002 added on 5/9/2013 due to dry condition at location WS-BKG-001.**

Map date: 10/31/2013

REGIONAL MAP



EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY
MAYFLOWER PIPELINE INCIDENT RESPONSE
MAYFLOWER, ARKANSAS

HISTORICAL SURFACE WATER SAMPLE LOCATIONS

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FIGURE 1

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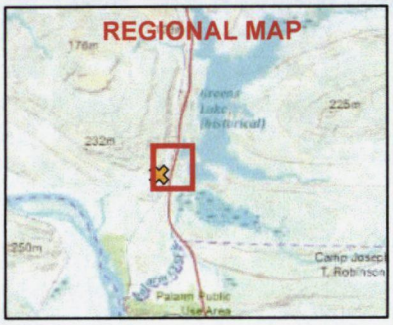
LEGEND

- Surface Water Sample Locations Accessed by Foot
- Source Point
- Parcel Boundary
- Approximate Surface Water Flow Direction
- Stream/River: Intermittent
- Stream/River: Perennial



Map date: 2/24/2014

EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY
MAYFLOWER PIPELINE INCIDENT RESPONSE
MAYFLOWER, ARKANSAS

SURFACE WATER SAMPLE LOCATIONS

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FIGURE 2

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Attachment A

Relevant Standard Operating Procedures

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Surface Water Sampling

Rev. #: 2

Rev Date: June 3, 2013

I. Scope and Application

This Standard Operating Procedure (SOP) describes the collection of surface water samples using a grab method, discrete depth sampler or peristaltic pump. This SOP should be followed whenever collecting surface water samples.

This SOP may change depending upon field conditions, equipment limitations, or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the Project Manager.

II. Personnel Qualifications

ARCADIS field personnel will have current health and safety training, including 40-hour HAZWOPER training, site supervisor training, and site-specific training, as needed. In addition, ARCADIS field personnel will be versed in the relevant SOPs and will possess the skills and experience necessary to successfully complete the desired field work. The project Health and Safety Plan (HASP) and other documents will identify any other training requirements such as site-specific safety training or access control requirements.

III. Equipment List

The following equipment list contains materials that may be needed in carrying out the procedures contained in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, pending field conditions.

- personal protective equipment (PPE) and other safety equipment, as required in the project Health and Safety Plan (HASP)
- project Quality Assurance Project Plan (QAPP)
- Sampling and Analysis Plan (SAP)
- indelible ink pens
- appropriate sample containers, labels, and forms
- decontamination supplies (see the SOP for Decontamination) including bucket, distilled or deionized water, cleansers appropriate for removing expected chemicals of concern.

- sample packing and shipping materials (see the SOP for Chain-of-Custody, Handling, Packing, and Shipping)

- water-quality (temperature/pH/specific conductivity/ORP/turbidity/dissolved oxygen) meter and flow-through measurement cell. Several brands may be used, including:

  - YSI 6-Series Multi-Parameter Instrument
  - Hydrolab Series 3 or Series 4a Multiprobe and Display
  - Horiba U-10 or U-22 Water Quality Monitoring System

- for grab sampling method: pole with polyethylene and/or stainless steel dipper, if applicable

- for discrete depth sampling method: discrete depth samplers (e.g., Kemmerer or Van Dorn samplers)

- for peristaltic pump sampling method: peristaltic pump with appropriate power source, Teflon® tubing or Teflon®-lined polyethylene tubing of an appropriate size for the pump being used. For peristaltic pumps, dedicated Tygon® tubing (or other type as specified by the manufacturer) will also be used through the pump apparatus.

IV. Cautions

If heavy precipitation occurs and no cover over the sampling area can be erected, sampling must be discontinued until adequate cover is provided. Rain water could contaminate surface water samples.

Do not use permanent marker or felt-tip pens for labels on sample container or sample coolers – use indelible ink. The permanent markers could introduce volatile constituents into the samples.

It may be necessary to field-filter some parameters (e.g., metals) prior to collection, depending on preservation, analytical method, and project quality objectives.

Store and/or stage empty and full sample containers and coolers out of direct sunlight.

Be careful not to over-tighten lids with Teflon liners or septa (e.g., 40 mL vials). Over tightening can cause the glass to shatter or impair the integrity of the Teflon seal.

Use caution and appropriate cut resistant gloves when tightening lids to 40 mL vials. These vials can break while tightening and can lacerate hand. Amber vials (thinner glass) are more prone to breakage.

If thunder or lighting is present, discontinue sampling and take cover until 30 minutes have passed after the last occurrence of thunder or lighting.

The ability to safely access the surface water sampling locations should be verified prior to sampling.

Field activities will be performed in accordance with a project-specific HASP, a copy of which will be present onsite during such activities.

Safety hazards associated with sampling surface water include fast-moving water, deep water, and steep slopes close to sampling sites. Extreme caution should be used when approaching sampling sites. Work will be performed in accordance with the project-specific HASP.

V. Procedure

Sampling Method

Surface water samples will be collected from sampling locations sequentially from downstream to upstream to prevent cross-contamination associated with sediment disturbance. Surface water samples will be collected prior to sediment sample collection.

Grab Sample Collection

Personnel conducting surface water sampling using grab sample collection techniques should perform the following:

1. Collect appropriate equipment, cleaned and decontaminated.

2. Obtain appropriate sampling containers.

3. Mobilize to surface water sampling location in accordance with the work plan or SAP.

4. Collect sample by directly lowering the laboratory-supplied sample container into the water and allowing the bottle to partially fill with water. The sampler will hold the bottle immediately below the water surface and allows the bottle to fill with sample. Field

personnel will handle only the portions of the sample containers that do not come in contact with the sample, to avoid contamination. Additionally, care will be taken to avoid exposing samples and sample containers to atmospheric inputs such as dirt or dust.

5. Measure water quality parameters in accordance with the SOP for Measuring Basic Water Quality Parameters.

6. Transfer surface water samples into laboratory-supplied sample containers to complete the scope described in the SAP. Avoid overfilling sample containers to prevent preservatives, if present, in sample container from being lost.

7. Handle samples in accordance with the SOP for Chain-of-Custody, Handling, Packing, and Shipping

Sample Collection Using a Discrete Depth Sampler (e.g., Kemmerer or Van Dorn)

Personnel conducting surface water sampling using grab sample collection techniques should perform the following:

1. Collect appropriate equipment, cleaned and decontaminated.

2. Obtain appropriate sampling containers.

3. Mobilize to surface water sampling location in accordance with the work plan or SAP.

4. Carefully set the sampling device so that water is allowed to pass through the tube.

5. Lower the pre-set sampling device to the predetermined depth using marked rope or line attached to the device.

6. When at desired depth; send down the messenger, closing the device. Avoid disturbing the bottom.

7. Retrieve sampler and discharge the first 10-20 mL to clear any potential cross-contamination.

8. Measure water quality parameters in accordance with the SOP for Measuring Basic Water Quality Parameters.

9. Transfer surface water samples into laboratory-supplied sample containers to complete the scope described in the SAP. Avoid overfilling sample containers to prevent preservatives, if present, in sample container from being lost.

10. Handle samples in accordance with the SOP for Chain-of-Custody, Handling, Packing, and Shipping.

Sample Collection Using Peristaltic Pump

Personnel conducting surface water sampling using peristaltic pump collection techniques should perform the following:

1. Surface water will be collected using a peristaltic pump if flow is slow and conventional sampling procedures are impossible without collecting excess suspended sediment in the sample. Note any observations such as color or odors and determine the depth of water. Record the information in the field log book or field log forms.

2. Personnel should be aware that contact with peristaltic pump apparatus (e.g., control knobs) can serve as a source of metals contamination in dissolved metals analyses. Operation of pump controls should be conducted with gloves that do not come into contact with the sample or with materials that contact the sample.

3. Prepare the stream tubing. Based upon the distance to the pump location, cut the desired length of new Tygon tubing with an approved cutting device.

4. Set up the pump. Cut approximately one-foot of new C-Flex tubing from the roll. Remove pump and controller from the transport case. Insert the C-Flex tubing into the pump head by releasing the pump head with the lever on top of the pump head. Close the pump head on the tubing with the lever on top of the pump head. Check to see that the tubing is aligned properly. Attach pump head to the pump controller using the two set screws.

5. Attach the stream tubing and discharge tubing. Attach the stream tubing to the C-Flex using a new plastic connector. Attach a convenient length of Tygon tubing to the C-Flex to serve as the discharge tubing. The discharge tubing may be attached to a flow-through cell for various field measurements. Remove the flow-through cell prior to the collection of surface water samples for laboratory analysis.

6. Connect the power supply. Connect the power cord to the pump unit and the automobile lighter or battery.

7. Start the pump. Set the head direction switch to have flow go in the correct direction for the set-up. Turn the pump switch to the ON position and adjust the flow rate with the dial to the desired flow rate.

8. Operate the pump. Operate the pump at the desired flow rate.

9. Measure water quality parameters in accordance with the SOP for Measuring Basic Water Quality Parameters.

10. Collect surface water samples by diverting flow out of the unfiltered discharge tubing into the appropriate labeled sample container.

    - If a flow-through analytical cell is being used to measure field parameters, the flow-through cell should be disconnected after stabilization of the field indicator parameters and prior to surface water sample collection.
    - Under no circumstances should analytical samples be collected from the discharge of the flow-through cell. When the container is full, tightly screw on the cap.
    - Samples should be collected in the following order: VOCs, TOC, SVOCs, metals and cyanide, and others (or other order as defined in the Sampling and Analysis Plan (SAP)).

11. Completion of sampling. At the completion of the sampling at the well, turn off the pump, and remove the tubing from the stream. Drain the tubing according to the project requirements. Remove the C-Flex tubing from the pump head. Discard all tubing and connectors according to project requirements.

12. Disconnect the power. Disconnect the power cord, disassemble pump head from controller and return equipment to the transport case.

13. Secure the well and properly dispose of PPE and disposable equipment.

14. Pack and store samples appropriately for transport to laboratory. Handle samples as described in the SOP for Chain-of-Custody, Handling, Packing, and Shipping.

15. Complete decontamination procedures for flow-through analytical cell, as appropriate.

VI. Waste Management

Investigative derived Waste (IDW) generated during the surface water sampling activities and disposable equipment will be transported for offsite disposal in accordance with the site-specific Waste Management Plan.

VII. Data Recording and Management

See the SOP for Field Documentation.

VIII. Quality Assurance

Sample quality will be achieved by complying with the procedures outlined in this SOP. Cross-contamination will be prevented by following the protocols described in the SOP for Field Equipment Decontamination. Field activities will be supervised by appropriate experienced field supervisors. Additional quality assurance information is presented in the project-specific Quality Assurance Project Plan.