Revisions to Text Based on Completion of Tier III Validation

Section 1

Section 4.2

1. Introduction

ARCADIS U.S., Inc. (ARCADIS) has prepared this Downstream Areas Data Assessment Report (report) for ExxonMobil Environmental Services Company on behalf of ExxonMobil Pipeline Company (EMPCo) for the Mayflower Pipeline Incident Response located in Mayflower, Arkansas (the site). For the purposes of this report, the site consists of areas located downstream from the residential neighborhood affected by the incident. This report presents the results of environmental sampling conducted under the Downstream Areas Remedial Sampling Plan (DARSP; ARCADIS 2013), which was approved by the Arkansas Department of Environmental Quality (ADEQ) on July 12, 2013. ARCADIS conducted the sampling activities in July and August 2013 in the areas shown on Figure 1-1.

ARCADIS submitted the Downstream Areas Data Assessment Report to the ADEQ on October 11, 2013. ~~This~~ A revised report (Revision 1) ~~is~~ was submitted on November 1, 2013, to incorporate comments received by ADEQ and the Arkansas Game and Fish Commission (AGFC) on October 24, 2013. This revised report (Revision 2) is submitted to incorporate the final laboratory data validation results.

1.1 Background

On March 29, 2013, a breach in a pipeline operated by EMPCo (the 20-inch Pegasus Pipeline) released crude oil into a residential neighborhood in Mayflower, Arkansas. The crude oil was identified to be Wabasca heavy crude oil. An emergency response action was implemented immediately to mitigate the release, and removed a substantial amount of the crude oil. The area addressed by the DARSP (ARCADIS 2013) includes a drainage way that leads from a residential neighborhood near the Pegasus Pipeline release point to a shallow drainage swale along North Main Street, which then flows east under Highway 365 and Interstate 40 into a marsh known as Dawson Cove (Figure 1-1). Dawson Cove is separated from Lake Conway by Highway 89, with water conveyed between the cove and Lake Conway by two culverts beneath the highway.

The DARSP (ARCADIS 2013) was designed to evaluate the current conditions in soil, sediment, and surface water following the response actions. Specifically, the DARSP defines five operational areas where sediment, soil, and surface water samples were collected in July and August 2013 (Figure 1-1). These areas are in sequence from upstream to downstream and are described below:

One sample of laboratory-supplied deionized water used for equipment rinsate blanks was analyzed for forensic-level PAHs to evaluate the presence of analytes in the laboratory-supplied water. The QA/QC samples are presented in Table 4-1.

4.2 Data Verification and Validation

~~All~~ Laboratory data packages were checked for completeness to confirm that the deliverable requirements specified to each laboratory for this project were met.

Data validation is a standardized review process for judging the analytical quality and utility of a discrete set of laboratory results, and is used to confirm that data of known and documented quality are used for the project. It involves a systematic evaluation of data to ascertain its completeness, correctness, and consistency. Validation procedures were consistent with the U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines for Organic Data Review (1999) and USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (2004).

A tiered validation approach was used for the dataset presented in this report, and Tier II validation was performed on 100 percent of the data generated. A Tier III validation ~~is in the process of being~~was performed on one sample delivery group (SDG) per medium per parameter group, or approximately 10 percent of the data. Each of these tiers is described below.

Tier II data validation was performed on all SDGs and included review of the following:

- Chain of custody completeness
- Holding times
- Laboratory control samples/laboratory fortified blank recoveries
- Surrogate recoveries
- MS, MSD recoveries, and relative percent difference (RPD)
- Field duplicate RPD
- Method blanks, trip blanks, and field/equipment blanks

Tier III data validation ~~will be~~was performed on 10 percent of the data packages. This level of evaluation involves the review of calculations, compound identification, and/or potential transcription errors. Tier III evaluation includes the parameters listed above for Tier II evaluation, in addition (but not limited) to the following:

- Detection limit records
- Instrument calibration records
- Continuing calibration records
- Gas chromatography/mass spectrometry instrument tune records
- Internal standard records
- Target compound calculated results

~~Tier III data validation is underway, but has not been completed as of the date of this report. Upon completion of the Tier III validation process, if significant data changes are identified, an addendum to this report will be submitted describing the changes. If validation does not significantly change the results, no further documentation (beyond the validation report) will be submitted.~~

At the completion of the Tier II and Tier III data validation process, a data validation summary report was prepared specifying suitable uses for the data (see Appendix G). The data validation qualifiers were entered into the database through the use of a web-based validation form.

4.3 Data Usability

The decision on whether data are usable is based on the validation results. Following validation, the data were flagged (i.e., qualified) as appropriate, and any data use restrictions were noted. The USEPA guidance identifies a goal that 90 percent of the data points will not be rejected or deemed unusable. The goal of at least 90 percent useable data was met under the scope of the DARSP (ARCADIS 2013). Therefore, the data are acceptable for use as qualified.

The notable data restrictions following data validation include:

Summary of Tier II and Tier III Data Validation (Added to Appendix G)

Summary of Tier II and III Data Validation

A tiered data validation approach was performed for the dataset presented in this report as described in Section 4.2. Tier II validation was performed on 100 percent of the data generated and Tier III validation was performed on approximately 10 percent of the soil and sediment data for the parameters listed in Section 4.2. SDGs with the maximum number of soil and sediment samples were selected for the Tier III validation. Tier III validation was performed on all six surface water samples (plus one duplicate) collected during a one-time surface water sampling event.

Tier II data validation was performed on all SDGs and included review of the following:

- Chain of custody completeness
- Holding times
- Laboratory control samples/laboratory fortified blank recoveries
- Surrogate recoveries
- MS, MSD recoveries, and relative percent difference (RPD)
- Field duplicate RPD
- Method blanks, trip blanks, and field/equipment blanks

Tier III data validation was performed on 10 percent of the data packages. This level of evaluation involves the review of calculations, compound identification, and/or potential transcription errors. Tier III evaluation includes the parameters listed above for Tier II evaluation, in addition (but not limited) to the following:

- Detection limit records
- Instrument calibration records
- Continuing calibration records
- Gas chromatography/mass spectrometry instrument tune records

- Internal standard records
- Target compound calculated results

At the completion of the Tier II and Tier III data validation process, a data validation summary report was prepared specifying suitable uses for the data. The data validation qualifiers were entered into the database through the use of a web-based validation form.

Tier III evaluation was conducted on six background sediment samples (plus one duplicate sample), 41 soil samples (plus three duplicate samples), 42 sediment samples (plus two duplicate samples), and six surface water samples (plus one duplicate) for various analyses. A summary of Tier III validation is included below:

Table G-1 – Summary of Tier III Data Validation

SDG Number	Sampling Location	Sample Depth (feet)	Analyses
13-3101	SED-DA-005	0.5-1.0, 1.0-1.5	PAHs
	SED-DA-006	0.5-1.0, 1.0-1.5	
	SED-DA-007	0.5-1.0, 1.0-1.5	
	SED-DA-008	0.5-1.0, 1.0-1.5	
	SED-DA-012	0.0-0.5	PAHs, TEH
	SED-DA-013	0.0-0.5	
	SED-DA-014	0.0-0.5, 0.5-1.0	
	SED-DA-015	0.0-0.5, 0.5-1.0, 1.0-1.5	
	SED-DA-016	0.0-0.5, 0.5-1.0	
	SED-DA-017	0.0-0.5, 0.5-1.0	
13-3109, 1412641, and 1412646	WS-022DA	Surface	VOCs, PAHs, Metals (total and dissolved), Oil and Grease, TSS, Hardness
	WS-023DA	Surface	
	WS-024DA	Mid-depth	
	WS-025DA	Mid-depth	
	WS-026DA	Mid-depth	
	WS-027DA (Plus Dup)	Mid-depth	
13-3110	SO-DA-023	0.5-1.0, 1.0-1.5	PAHs
	SO-DA-026	0.0-0.5, 0.5-1.0, 1.0-1.5	
	SO-DA-028	0.0-0.5, 0.5-1.0, 1.0-1.5	
	SO-DA-029	0.0-0.5, 0.5-1.0, 1.0-1.5	
1408060 and	SED-DA-020	0.0-0.5, 0.5-1.0, 1.0-1.5	VOCs, Metals,

SDG Number	Sampling Location	Sample Depth (feet)	Analyses
T1301105	SED-DA-024	0.0-0.5, 0.5-1.0, 1.0-1.5, 1.5-2.0, 2.0-3.0	TOC, Black Carbon
	SED-DA-025 (Plus Dup)	0.0-0.5, 0.5-1.0, 1.0-1.5	
	SED-DA-026	0.0-0.5, 0.5-1.0, 1.0-1.5, 1.5-2.0, 2.0-3.0, 3.0-3.4	
	SED-DA-BG-007	0.0-0.5	
1410431 and T1301166	SO-DA-019	0.0-0.5, 0.5-1.0, 1.0-1.5, 1.5-2.0, 2.0-3.0, 3.0-4.0	VOCs, Metals, TOC, Black Carbon
	SO-DA-020	0.0-0.5, 0.5-1.0, 1.0-1.5	
	SO-DA-021	0.0-0.5, 0.5-1.0	
	SO-DA-022 (Plus Dup)	0.0-0.5, 0.5-1.0, 1.0-1.5	
	SO-DA-025	0.0-0.5, 0.5-1.0, 1.0-1.5	
	SO-DA-032	0.0-0.5, 0.5-1.0, 1.0-1.5	
T1301105	SED-DA-027	0.0-0.5	TOC, Black Carbon
	SED-DA-028	0.0-0.5	
	SED-DA-029	0.0-0.5	
	SED-DA-030	0.0-0.5	
	SED-DA-BG-008	0.0-0.5	
	SED-DA-BG-009 (Plus Dup)	0.0-0.5	
	SED-DA-BG-010	0.0-0.5	
	SED-DA-BG-011	0.0-0.5	
T1301166	SED-DA-039	0.0-0.5	TOC, Black Carbon
	SED-DA-040 (Plus Dup)	0.0-0.5	
	SO-DA-016	0.0-0.5	
	SO-DA-017	0.0-0.5	
	SO-DA-018 (Plus Dup)	0.0-0.5	
13-3110 and T1301166	SO-DA-023 (Plus Dup)	0.5-1.0, 1.0-1.5	PAHs, TOC, Black Carbon
	SO-DA-024	0.0-0.5, 0.5-1.0, 1.0-1.5	
	SO-DA-026	0.0-0.5, 0.5-1.0, 1.0-1.5	
	SO-DA-027	0.0-0.5, 0.5-1.0, 1.0-1.5	
	SO-DA-028	0.0-0.5, 0.5-1.0, 1.0-1.5	
	SO-DA-029	0.0-0.5, 0.5-1.0, 1.0-1.5	

Notes:
1. TOC and black carbon analyses were performed only on surface samples (0.0-0.5 foot).

Dup = duplicate sample
PAH = polycyclic aromatic hydrocarbon
TEH = total extractable hydrocarbons
TOC = total organic carbon
TSS = total suspended solids

VOC = volatile organic compound

Summary of Tier III Data Validation Changes

Tier III validation did not indicate any changes in the surface water samples. However, some changes were noted in the soil and sediment analytical results. A summary of these changes is below:

1. For surface soil samples (0.0-0.5 foot) collected at SO-DA-020 and SO-DA-022 (SDG – 1410431), non-detect results for some VOCs were qualified with UJ due to a low internal standard recovery.

2. The following samples were qualified with UJ or J for continuing calibration check outside control limits for compounds chloromethane, chloroethane, 2-butanone, tetrahydrofuran, and 4-methyl-2-pentanone:
   - SO-DA-020 – 0.0-0.5 foot, 0.5-1.0 foot, and 1.0-1.5 feet
   - SO-DA-022 – 0.0-0.5 foot, 0.5-1.0 foot, and 1.0-1.5 feet

3. The following sample locations were qualified with UJ for initial calibration verification check outside control limits for dichlorofluoromethane:
   - SO-DA-025 – 0.0-0.5 foot, 0.5-1.0 foot, and 1.0-1.5 feet
   - SO-DA-032 – 0.0-0.5 foot, 0.5-1.0 foot, and 1.0-1.5 feet
   - SO-DA-019 – 0.0-0.5 foot, 0.5-1.0 foot, 1.0-1.5 feet, 1.5-2.0 feet, 2.0-3.0 feet, and 3.0-4.0 feet
   - SO-DA-021 – 0.0-0.5 foot, and 0.5-1.0 foot
   - SO-DA-022 Dup – 0.0-0.5 foot

4. Non-detect results for ethyl ether in all 20 sediment samples in SDG 1408060 (Table G-1) were qualified with UJ for continuing calibration check outside control limits.

5. Benzo(e)pyrene results for following samples in SDG 13-3101 were qualified as estimated (J) due to initial calibration outside acceptable criteria:
   - SED-DA-014 – 0.5-1.0 foot
   - SED-DA-015 – 0.5-1.0 foot and 1.0-1.5 feet

Appendix G Attachments

ALS Laboratory and Validation Reports

B&B Laboratory and Validation Reports

Lancaster Laboratory and Validation Reports

Crude Oil Laboratory and Validation Reports