

Region 6 - Enforcement & Compliance Assurance Division

INSPECTION REPORT

Inspection Date(s):	04/19/2022	
Media Program:	Water	
Regulatory Program(s)	Clean Water Act – National Pollution Discharge Elimination System (Brine)	
Company Name:	Contango Resources, LLC	
Facility Name:	Big Eagle Lease	
Facility Physical Location:	Latitude: 36.80963, Longitude: -96.67264	
(city, state, zip code)	Shidler, Oklahoma, 74652	
Mailing address:	10300 Greenbriar Place	
(city, state, zip code)	Oklahoma City, Oklahoma, 73159	
County/Parish:	Osage County	
Facility Phone Number	(918) 392-3396	
Facility Contact:	Mike Alkire	Field Supervisor
	Michael.alkire@contango.com	
FRS Number:	n/a	
Identification/Permit Number:	OKU002057	
Media Identifier Number:	n/a	
NAICS:	211111	
SIC:	1311	
Personnel participating in inspection:		
Matthew Allen	EPA, Region 6ECDW	Inspector
EPA Lead Inspector Signature/Date	MATTHEW ALLEN Digitally signed by MATTHEW ALLEN Date: 2022.06.06 09:27:41 -05'00'	
	Matthew Allen	Date
Supervisor Signature/Date	ANTHONY LOSTON Digitally signed by ANTHONY LOSTON DN: c=US, o=U.S. Government, ou=Environmental Protection Agency, cn=ANTHONY LOSTON, 0.9.2342.19200300.100.1.1=68001003655738 Date: 2022.06.06 09:59:26 -05'00'	
	Anthony Loston (<i>acting</i>)	Date

Section I – INTRODUCTION

PURPOSE OF THE INSPECTION

EPA Region 6 inspector Matthew Allen arrived at the Contango Resources, LLC / Big Eagle Lease (EPA ID No. OKU002057) at 12:30 PM on 04/19/2022 for an unannounced inspection. I met with Mike Alkire, Field Supervisor for Contango Resources, LLC. I presented my credentials to Mr. Alkire and informed him that this was an EPA inspection in response to a National Response Center Spill Report (NRC No. 1333875) which was received by EPA Region 6. The inspection was conducted by the authority of the Clean Water Act to determine compliance with Environmental Protection Agency (EPA) regulations. There was no other federal, state or local agency representative present at the time of the inspection.

FACILITY DESCRIPTION

EPA conducted an inspection beginning on the Contango Resources, LLC, Big Eagle Lease, where a poly flowline carrying produced water (brine) and oil crossed over an unnamed tributary. This flowline carried fluids from the production well to the separation/storage facility. The Big Eagle Lease was located North of Shidler, Oklahoma, in Osage County.

Section II - OBSERVATIONS

I was unable to observe the ruptured flowline from which the spill occurred. At the time of the inspection the damaged flowline had already been repaired and buried to prevent future spill events. During the inspection, I observed men, vacuum trucks and a backhoe participating in clean-up activities, including the removal of water from areas with elevated levels of TDS and areas where oil sheen was present on the surface of the impacted tributary. I observed areas of oil-stained rocks, oil-stained banks, and oil-stained vegetation along the impacted tributary, as well as oil absorbent material on the water and banks along the tributary, which was applied as part of the clean-up effort. Evidence of these impacts can be seen in photos No. 2, 4, 6, 8, 10 and 16 found in the Photo Log included with this document as Appendix 1. In some locations where oil staining was present, evidence of recent fire was documented in the form of ashes from recently burned pasture grasses, this can be seen in photos No. 3, 4 and 13 of Appendix 1. During the inspection, I used a properly calibrated YSI Pro 30 conductivity meter to take multiple Total Dissolved Solids (TDS) field readings. Each of the field readings taken along the impacted tributary showed elevated levels of TDS. The highest measured level of TDS during the inspection was 51,501 mg/L as seen in photo No. 11 of the photo log. I also gathered field TDS readings from tributaries which were not impacted by the discharge (“background”), these tributaries did not exhibit elevated TDS levels. The table below summarizes the elevated TDS measurements as well as the “background” measurements which were taken as the spill impacts were tracked downstream during the inspection. Each measurement included in the following table is also included in Appendix 1 / Photo Log included with this report.

2,024 mg/L	Photo No. 5
25,806 mg/L	Photo No. 7
26,416 mg/L	Photo No. 9
51,501 mg/L	Photo No. 11
596 mg/L	Photo No. 12
16,090 mg/L	Photo No. 15
35,655 mg/L	Photo No. 17
37,255 mg/L	Photo No. 18
2,343 mg/L	Photo No. 20
10,597 mg/L	Photo No. 21
15,008 mg/L	Photo No. 23
681 mg/L	Photo No. 25
4,349 mg/L	Photo No. 26
2,052 mg/L	Photo No. 28
2,478 mg/L	Photo No. 29
2,061 mg/L	Photo No. 30
537 mg/L	Photo No. 31
493 mg/L	Photo No. 33
473 mg/L	Photo No. 35

Through field readings, I observed elevated TDS levels in the impacted tributary for greater than 2 miles beginning at the point of entry (GPS:36.809130, -96.673740) and flowing downstream to (GPS:36.789174, -96.693080) which is the last location I obtained an elevated TDS field reading. At the time of the inspection, there was no containment present to prevent further downstream migration of waters with elevated levels of TDS. I observed a large turtle and a large fish swimming approximately 1.5 miles downstream from the point of entry, this was the only fish/wildlife I observed during the inspection.

Section III – AREAS OF CONCERN

EPA Region 6 inspector observed elevated levels of TDS along the impacted tributary, as seen in the Photograph log included with this report. At the end of the inspection, I spoke with Mike Alkire from Contango Resources, LLC and reviewed my primary area of concern being the elevated levels of TDS present in the waterway.

Section IV – FOLLOW UP

No additional information was received by EPA after exiting the Facility on 04/19/2022.

Section V – LIST OF APPENDICES

Appendix 1 – Photo Log – 36 photos taken 04/19/2022

Appendix 1

Photograph Log 36 Photos



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 1

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0001.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 12:59 pm

Latitude: 36.810150

Longitude: -96.674863

Photographer: Matthew Allen

Description: This was a well sign showing the operator/responsible party on the Big Eagle Lease. This well was located near the point source and was on the same lease as the origin point of the spill of produced water and oil.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 2

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0032.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 5:55 p.m.

Latitude: 36.809130N

Longitude: -96.673740W

Photographer: Matthew Allen

Description: This was the release point as well as point of entry (POE) into the tributary. During the inspection, the operator stated there was a 2" poly flowline exposed (not buried) over the streambed and there was a grass fire which weakened or ruptured the flowline causing the release. At the time of inspection, the damaged flowline had been repaired and buried to prevent recurrence. At the time of inspection, there was not enough fluid present at the POE to obtain a Total Dissolved Solids (TDS) measurement. The photograph showed oil residue and oil-soaked absorbent material which had been applied during the initial stages of cleanup activities. The oil soaked "sphagnum" or "sphag" absorbent material appeared black in the photo and is not easily distinguishable.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 3

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0034.JPG

Orientation: East

Date of Photo: 4/19/2022

Time of Photo: 5:58 p.m.

Latitude: 36.809130N

Longitude: -96.673740W

Photographer: Matthew Allen

Description: Photo taken at POE, looking upstream. Note, the virtually dry streambed there was no water deep enough for a TDS measurement at this location at the time of the inspection.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 4

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0033.JPG

Orientation: Southwest

Date of Photo: 4/19/2022

Time of Photo: 5:57 p.m.

Latitude: 36.809130N

Longitude: -96.673740W

Photographer: Matthew Allen

Description: Photo taken from POE looking downstream. Evidence of recent fire pictured with burned vegetation present along stream bank and surrounding pasture. Black rocks in the photograph looked to be both oil stained and fire charred. Tank trucks were actively flushing this section of the impacted area just before the inspection began.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 5

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0029.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 5:52 p.m.

Latitude: 36.809048N

Longitude: -96.673842W

Photographer: Matthew Allen

Description: With a calibrated YSI Pro 30 conductivity meter, a TDS measurement of 2,024 milligrams per liter (mg/L) was taken approximately 20' feet downstream from the POE of produced water and oil into the tributary from the production flow line.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 6

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0028.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 5:47 p.m.

Latitude: 36.808891

Longitude: -96.674180

Photographer: Matthew Allen

Description: Photo taken on tributary between photos 5 and 7 Oil-stained vegetation along the bank as well as "sphagnum sorb" oil absorbent material which had been applied in early cleanup efforts.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 7

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma

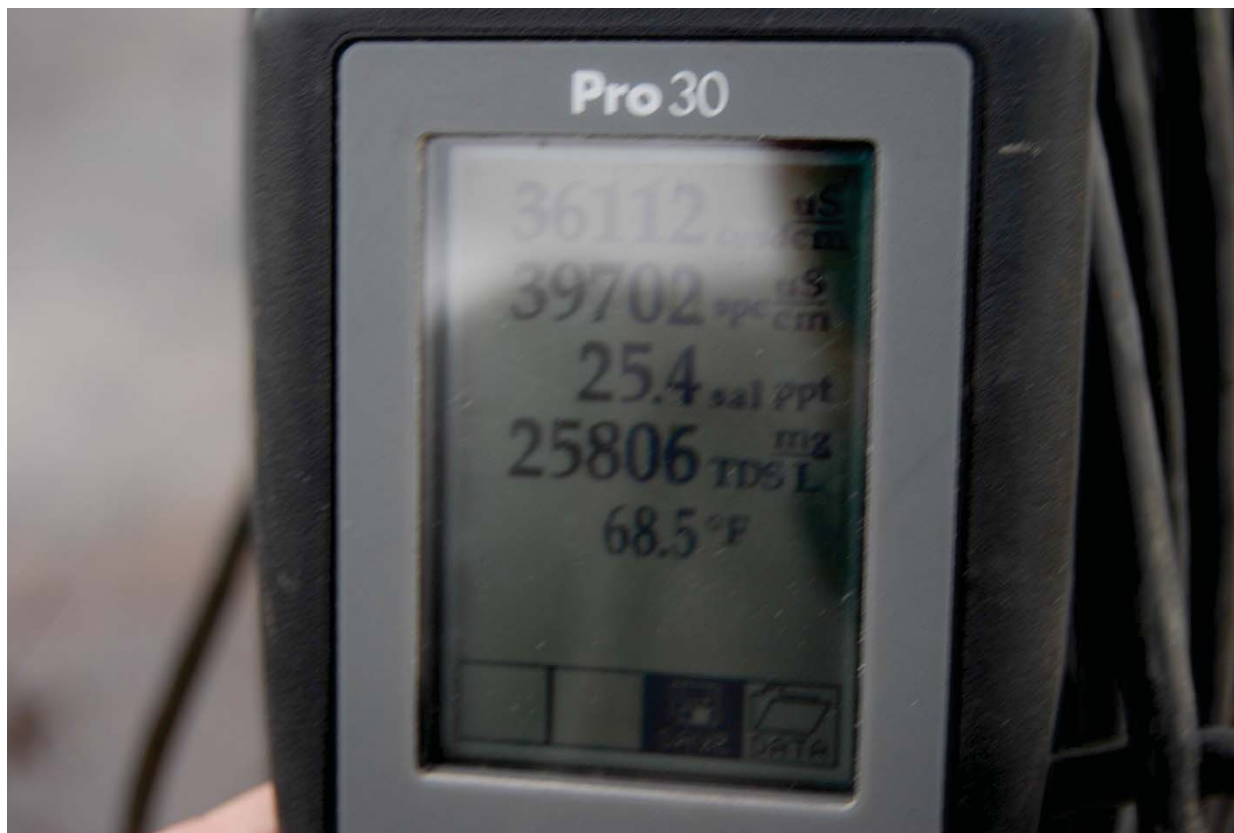


Photo File Name: DSC0027.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 5:46 p.m.

Latitude: 36.808744N

Longitude: -96.675094W

Photographer: Matthew Allen

Description: A TDS measurement of 25,806 mg/L was taken downstream from the POE.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 8

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0026.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 5:42 p.m.

Latitude: 36.808725N

Longitude: -96.675983

Photographer: Matthew Allen

Description: Photo downstream from previous photos (6 and 7) showing oil sheen present on the surface of the water at the time of inspection.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 9

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0025.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 5:42 p.m.

Latitude: 36.808725N

Longitude: -96.675983W

Photographer: Matthew Allen

Description: A TDS measurement was taken during the inspection recording 26,416 mg/L at this location. This reading was taken at the same location represented in Photo No. 8, which showed oil sheen present on the water's surface.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 10

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0024.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 5:35 p.m.

Latitude: 36.808437N

Longitude: -96.677725W

Photographer: Matthew Allen

Description: Oil sheen was present on the surface of the water at the time of the inspection. Oil staining was present on rocks, stream bank, and vegetation pictured above. Elevated TDS measurements also captured at this location and evidenced by Photo No. 11.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 11

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma

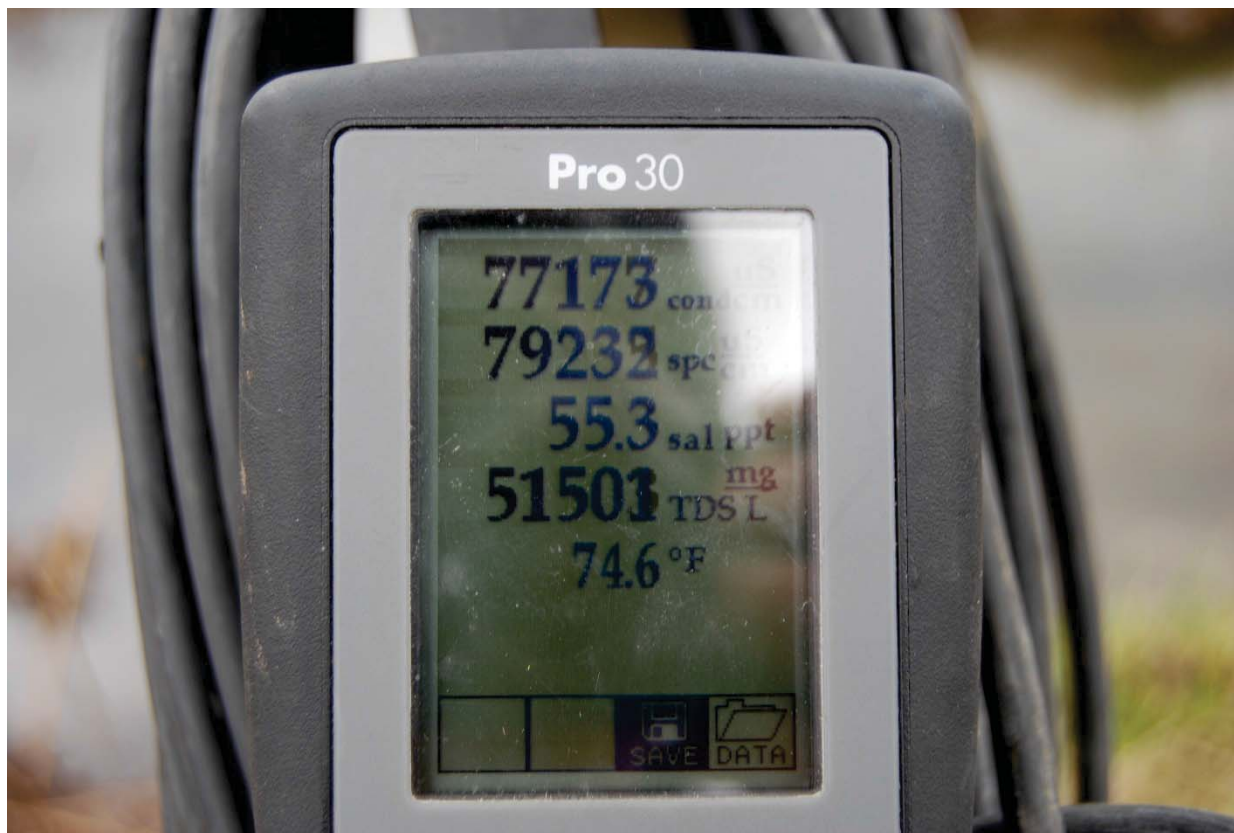


Photo File Name: DSC0023.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 5:34 p.m.

Latitude: 36.808437N

Longitude: -96.677725W

Photographer: Matthew Allen

Description: Elevated measurement of 51,501 mg/L TDS observed during the inspection.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 12

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0022.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 5:30 p.m.

Latitude: 36.808556N

Longitude: -96.677994W

Photographer: Matthew Allen

Description: Small unnamed tributary upstream from the confluence where it joins the impacted tributary from the north. This measurement was taken in waters which were NOT impacted by the spill, this should be considered a "background" TDS measurement and read 596 mg/L.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 13

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0021.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 5:26 p.m.

Latitude: 36.808272N

Longitude: -96.678482W

Photographer: Matthew Allen

Description: Small pond which the impacted tributary flows through. 1 floating oil absorbent boom was seen floating on the surface. The operator stated the dam was temporarily repaired on this pond to be used as a capture point in flushing operations as part of the ongoing cleanup. TDS measured 16,090 mg/L at the time of the inspection as evidenced in Photo No. 15 of this photo log.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 14

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0019.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 5:26 p.m.

Latitude: 36.808272N

Longitude: -96.678482W

Photographer: Matthew Allen

Description: Small pond was observed. The operator used a backhoe to temporarily repair this dam prior to this inspection and was using the pond as a catch pit during flushing operations as part of the cleanup activities. This was the first dam downstream from the POE. TDS measured 16,090 mg/L at the time of inspection as shown in Photo No. 15.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 15

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma

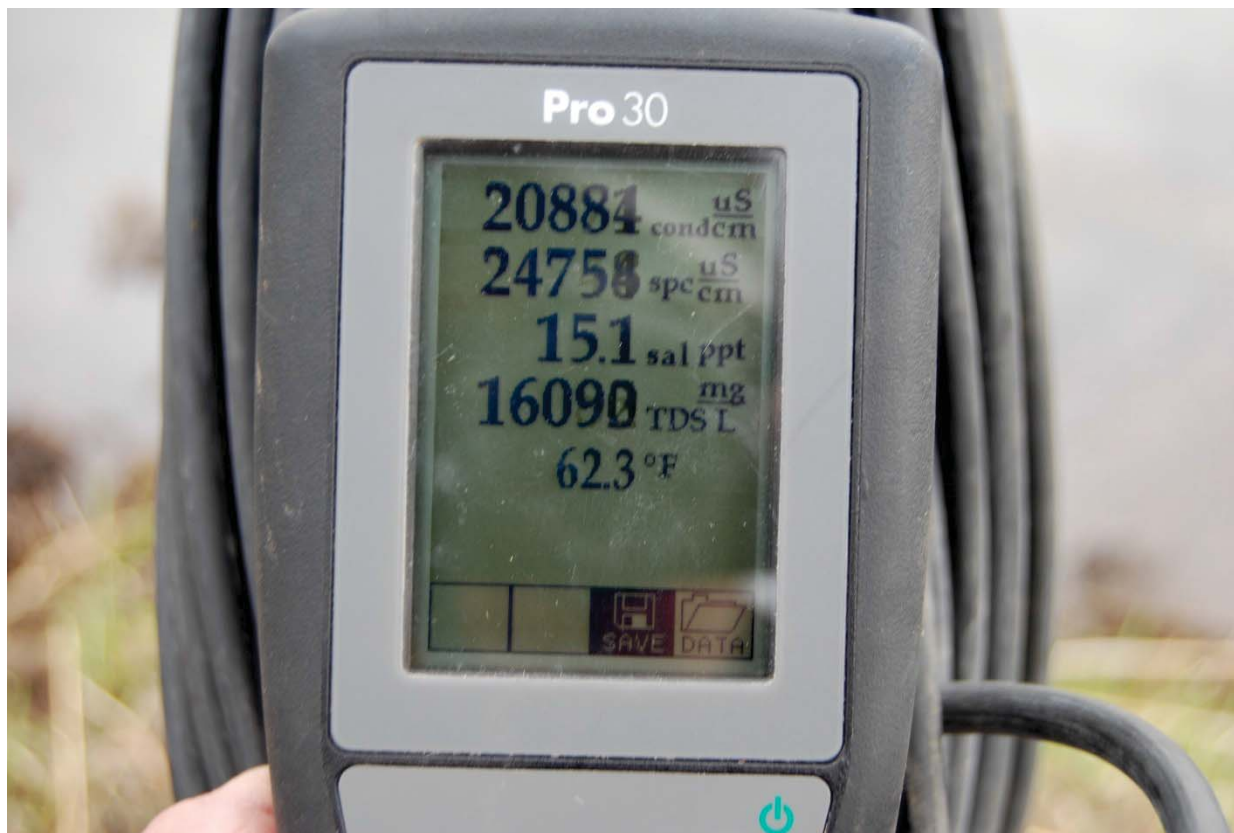


Photo File Name: DSC0018.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 5:24 p.m.

Latitude: 36.808272N

Longitude: -96.678482W

Photographer: Matthew Allen

Description: TDS measurement recorded 16,090 mg/L in the catchpit/pond immediately above the first dam on the impacted tributary. I saw a tank truck hauling water away from this location during the inspection.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 16

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0017.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 4:39 p.m.

Latitude: 36.808172N

Longitude: -96.678586W

Photographer: Matthew Allen

Description: Impacted tributary immediately below the 1st dam/catchpit. Oil absorbent material was observed along the bank, on the rocks and floating in the water. Areas of absorbent, which appear very dark brown or black, were soaked with oil and lighter brown colored areas had not been oil soaked.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 17

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0016.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 4:38 p.m.

Latitude: 36.807169

Longitude: -96.679461

Photographer: Matthew Allen

Description: Elevated TDS of 35,655 mg/L measured during the inspection. This reading was taken along the impacted tributary between the first dam/catchpit and the location associated with Photo No. 18. Latitude and Longitude were estimated for this location.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 18

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0014.JPG

Orientation: East

Date of Photo: 4/19/2022

Time of Photo: 4:34 p.m.

Latitude: 36.806166N

Longitude: -96.680523W

Photographer: Matthew Allen

Description: Elevated TDS measurement taken along the impacted tributary showing 37,255 mg/L TDS. This measurement was taken downstream from the first dam/catchpit, but upstream from the drained pond pictured in Photo No. 19.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 19

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0013.JPG

Orientation: West

Date of Photo: 4/19/2022

Time of Photo: 4:27 p.m.

Latitude: 36.803893N

Longitude: -96.681146W

Photographer: Matthew Allen

Description: Image shows a pond which had been nearly drained by the operator as part of the cleanup efforts. This pond was connected to the impacted tributary at the time of the spill, but the operator used a backhoe to divert the tributary away from the pond. A dirt berm can be seen middle/right side of the picture, that berm serves to re-route the impacted tributary around the pond which had been emptied and fenced off to prevent cattle from accessing water with elevated TDS.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 20

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0012.JPG

Orientation: East

Date of Photo: 4/19/2022

Time of Photo: 4:20 p.m.

Latitude: 36.803023N

Longitude: -96.681377W

Photographer: Matthew Allen

Description: TDS measured 2,343 mg/L along the impacted tributary downstream from the pond pictured in Photo No. 19.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 21

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0011.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 4:15 p.m.

Latitude: 36.801286

Longitude: -96.682566

Photographer: Matthew Allen

Description: Elevated TDS measurement showing 10,957 mg/L was taken. This photo was taken along the impacted tributary between the pond pictured in Photo No. 19 and the final dam/catchpit in Photo No. 22. Latitude and Longitude were estimated for this location.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 22

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0010.JPG

Orientation: East

Date of Photo: 4/19/2022

Time of Photo: 4:10 p.m.

Latitude: 36.799117N

Longitude: -96.684602W

Photographer: Matthew Allen

Description: Lowermost downstream catchpit used in cleanup/flushing operations. TDS measured 15,008 mg/L as shown in Photo No. 23.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 23

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0009.JPG

Orientation: East

Date of Photo: 4/19/2022

Time of Photo: 4:09 p.m.

Latitude: 36.799117N

Longitude: -96.684602W

Photographer: Matthew Allen

Description: Elevated TDS measurement of 15,008 mg/L taken at the lowermost dam/catchpit on the impacted tributary.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 24

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0008.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 4:06 p.m.

Latitude: 36.798731N

Longitude: -96.684800W

Photographer: Matthew Allen

Description: This temporary dam has been placed by the operator to collect fresh “flush” water from a tributary which joins the impacted stream. This dam and pool of water were not impacted by the spill, and a TDS measurement of 681 mg/L was taken from this pool and is evidenced in photo DSC007 on the following page. This TDS measurement should be used to help establish “background” TDS levels for the area.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 25

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0007.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 4:04 p.m.

Latitude: 36.798731N

Longitude: -96.684800W

Photographer: Matthew Allen

Description: Another “background” TDS measurement was taken from an unimpacted tributary just before it joins the impacted stream. This measurement was taken in the pool of water pictured in Photo No.24.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 26

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0006.JPG

Orientation: East

Date of Photo: 4/19/2022

Time of Photo: 4:00 p.m.

Latitude: 36.798093N

Longitude: -96.686222W

Photographer: Matthew Allen

Description: Elevated TDS measurement was taken below the lowermost downstream containment berm. TDS measured 4,349 mg/L at the time of inspection.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 27

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0005.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 3:47 p.m.

Latitude: 36.794145N

Longitude: -96.691408W

Photographer: Matthew Allen

Description: Evidence of increasing stream size as spill impacts continued downstream past the lowermost containment berm. The pool of water pictured above was approximately 20' wide, ranging from 1' to 3' in depth with a mostly rock bottom covered in moss and vegetation. This stream segment was approximately 70 yards long. During the inspection, I witnessed a large, 2-3lb fish swimming in the pool of water.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 28

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0004.JPG

Orientation: West

Date of Photo: 4/19/2022

Time of Photo: 3:47 p.m.

Latitude: 36.794145N

Longitude: -96.691408W

Photographer: Matthew Allen

Description: TDS measurement of 2,052 mg/L was taken in the large pool of water shown in Photo No. 27.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 29

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0003.JPG

Orientation: East

Date of Photo: 4/19/2022

Time of Photo: 3:42 p.m.

Latitude: 36.792117N

Longitude: -96.691397W

Photographer: Matthew Allen

Description: Elevated TDS measurement of 2,478 mg/L was taken from the impacted stream.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 30

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0002.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 3:33 p.m.

Latitude: 36.789174N

Longitude: -96.693080W

Photographer: Matthew Allen

Description: Elevated TDS measurement of 2,061 mg/L was taken with a properly calibrated YSI Pro 30 conductivity meter along the flowpath in the impacted stream/tributary was the Earthmate PN-60 handheld GPS which was used during the inspection to document latitude and longitude. The time/date are inaccurately displayed on the GPS unit, accurate time and date information are displayed in the information accompanying each picture in this photo log. This photo represents the furthest downstream location of which spill impacts were measured on the day of the inspection.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 31

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0035.JPG

Orientation: North

Date of Photo: 4/19/2022

Time of Photo: 6:22 p.m.

Latitude: 36.782764N

Longitude: -96.700175W

Photographer: Matthew Allen

Description: TDS measurement of 537 mg/L was taken approximately 250 yards upstream from confluence of impacted tributary and Hay Creek.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 32

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0040.JPG

Orientation: East

Date of Photo: 4/19/2022

Time of Photo: 7:09 p.m.

Latitude: 36.782247N

Longitude: -96.702131W

Photographer: Matthew Allen

Description: Photo taken from the upstream side, looking further upstream, from the last small pool before the impacted tributary meets Hay Creek. This photo was taken to define the amount of in-stream flow that was present at the time of the inspection.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 33

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0036.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 6:34 p.m.

Latitude: N 36.782247

Longitude: W -96.702131

Photographer: Matthew Allen

Description: TDS measurement taken approximately 20' upstream from confluence of Hay Creek and impacted tributary, measurement taken in the impacted tributary. TDS measurements indicated a "background" level, therefore the brine spill impacts have either diluted below detection levels or failed to reach this point downstream.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 34

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0038.JPG

Orientation: North

Date of Photo: 4/19/2022

Time of Photo: 7:09 p.m.

Latitude: 36.782247N

Longitude: -96.702131W

Photographer: Matthew Allen

Description: Site where TDS reading of 493 mg/L pictured in Photo No. 33 was taken, approximately 20' upstream from Hay Creek along impacted tributary. This was the last pooled up area of water before the impacted, unnamed tributary flows into Hay Creek. Picture also showed substantial in-stream flow at the time of inspection.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 35

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma



Photo File Name: DSC0037.JPG

Orientation: South

Date of Photo: 4/19/2022

Time of Photo: 6:38 p.m.

Latitude: N 36.782218

Longitude: W -96.702227

Photographer: Matthew Allen

Description: TDS reading taken in Hay Creek at confluence with impacted tributary. Measurement should be considered "background" or "not impacted" according to other background measurements taken during the inspection.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 36

Location: 36.809130, -96.673740		
City: Shidler	County/Parish: Osage	State: Oklahoma

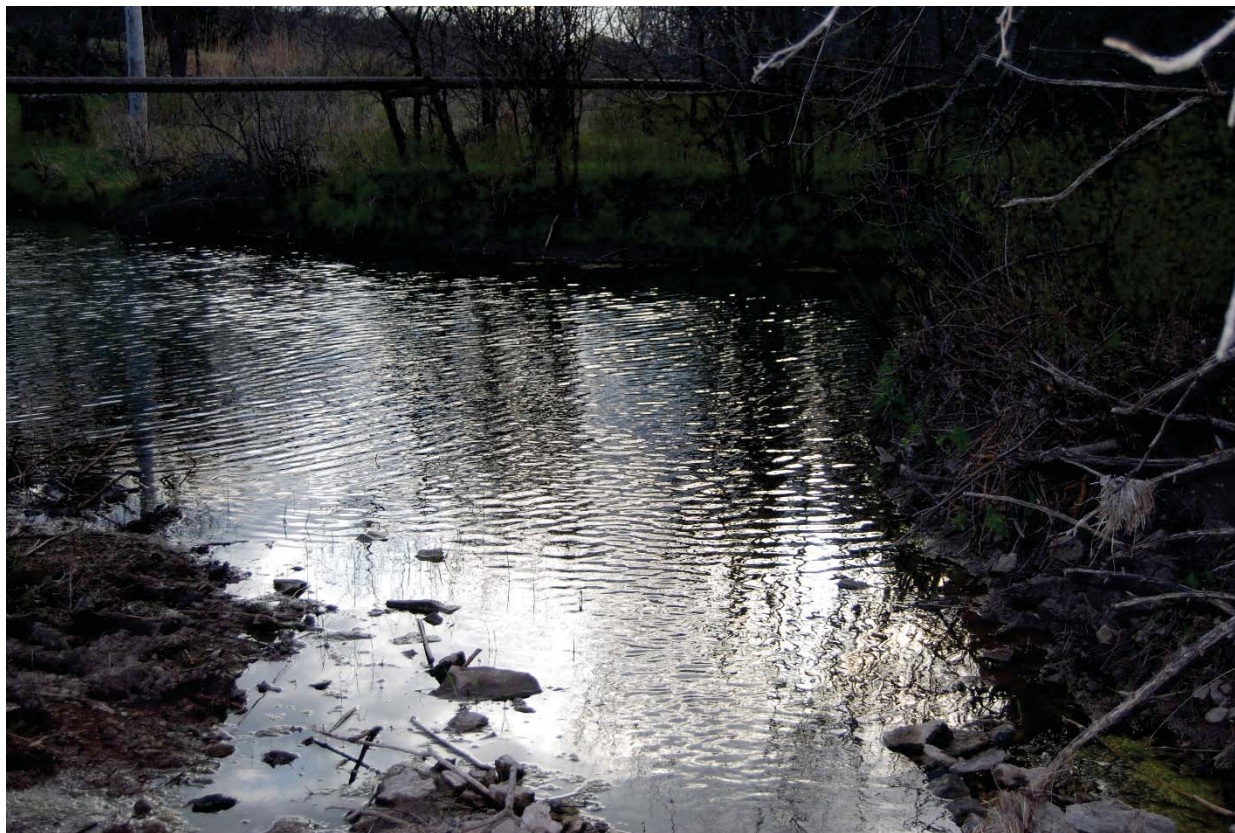


Photo File Name: DSC0041.JPG

Orientation: West

Date of Photo: 4/19/2022

Time of Photo: 7:10 p.m.

Latitude: N 36.782247

Longitude: W -96.702131

Photographer: Matthew Allen

Description: The mouth of the impacted tributary was observed in the bottom of this photo, stream width increases as it flows west into Hay Creek. Hay Creek was flowing from right to left across the picture.