

**Region 6 - Enforcement & Compliance Assurance Division**  
**INSPECTION REPORT**

|                                        |                                                                                           |                                                                         |
|----------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| Inspection Date(s):                    | 05/16/2023                                                                                |                                                                         |
| Media Program:                         | Water                                                                                     |                                                                         |
| Regulatory Program(s)                  | Clean Water Act – National Pollution Discharge Elimination System (NPDES) – Brine Program |                                                                         |
| Company Name:                          | <b>Citation Oil &amp; Gas Corp.</b>                                                       |                                                                         |
| Facility Name:                         | <b>Healdton IV Unit</b>                                                                   |                                                                         |
| Facility Physical Location:            | 34.206231, -97.501974                                                                     |                                                                         |
| (city, state, zip code)                | Healdton, Oklahoma                                                                        |                                                                         |
| Mailing address:                       | 14077 Cutten Road                                                                         |                                                                         |
| (city, state, zip code)                | Houston, Texas 77069                                                                      |                                                                         |
| County/Parish:                         | Carter County                                                                             |                                                                         |
| Facility Phone Number                  | 281-891-1000                                                                              |                                                                         |
| Facility Contact:                      | Robert Redweik<br>bredweik@cogc.com                                                       | Vice President, EHS & Regulatory                                        |
| FRS Number:                            | n/a                                                                                       |                                                                         |
| EPA Identification Number:             | OKU000604 & OKU000783                                                                     |                                                                         |
| Media Identifier Number:               | n/a                                                                                       |                                                                         |
| NAICS:                                 | 211111                                                                                    |                                                                         |
| SIC:                                   | 1311                                                                                      |                                                                         |
| Personnel participating in inspection: |                                                                                           |                                                                         |
| Jeanne Eckhart                         | U.S. EPA Region 6 – ECDWE                                                                 | Lead Inspector                                                          |
| Michael Blaha                          | U.S. EPA Region 6 – ECDWE                                                                 | Inspector                                                               |
| Brad Ice                               | Oklahoma Corporation Commission                                                           | Manager of Field Operations                                             |
| Shawn Coslett                          | Oklahoma Corporation Commission                                                           | Manager of Pollution Abatement                                          |
| Virginia Hullinger                     | Oklahoma Corporation Commission                                                           | Manager of Technical Services                                           |
| Ambra Matheson                         | Oklahoma Corporation Commission                                                           | Environmental Coordinator                                               |
| Clayton Christian                      | Oklahoma Corporation Commission                                                           | Field Inspector                                                         |
| Josh Lakey                             | Oklahoma Corporation Commission                                                           | Field Inspector                                                         |
|                                        |                                                                                           |                                                                         |
|                                        |                                                                                           |                                                                         |
|                                        |                                                                                           |                                                                         |
| EPA Lead Inspector<br>Signature/Date   | <b>JEANNE ECKHART</b><br>Jeanne Eckhart                                                   | Digitally signed by JEANNE ECKHART<br>Date: 2023.07.13 07:36:17 -05'00' |
|                                        |                                                                                           | Date                                                                    |
| Acting Supervisor<br>Signature/Date    | <b>JEANNE ECKHART</b><br>for Enoch Johnbull                                               | Digitally signed by JEANNE ECKHART<br>Date: 2023.07.13 07:36:40 -05'00' |
|                                        |                                                                                           | Date                                                                    |

## Section I – INTRODUCTION

### PURPOSE OF THE INSPECTION

EPA Region 6 Inspectors, Jeanne Eckhart and Michael Blaha, arrived at the Citation Oil & Gas Corp., Healdton IV Unit (**EPA ID Nos. OKU000604 and OKU0000783**) at 8:20 AM on 05/16/2023 for a Clean Water Act (CWA) inspection under the National Pollution Discharge Elimination System (NPDES). This inspection was in response to a referral from the Oklahoma Corporation Commission (OCC) received by EPA Region 6. We met with OCC representatives on site for the entire inspection. There were no company representatives on site during the beginning of the inspection. The inspection was conducted by the authority of the Clean Water Act (CWA) and Safe Drinking Water Act (SDWA) to determine compliance with federal regulations.

### FACILITY DESCRIPTION

EPA conducted an CWA inspection at the Healdton IV Unit due to historical and potential ongoing sources of contamination referred to EPA by OCC. The identified historical and potentially ongoing contamination migrated downgradient in three tributaries that flowed towards Post Oak Creek. The surface, fluids, and soil throughout the area indicated potentially ongoing brine contamination as well as evident historical contamination. I conducted creek surveys of three tributaries during the inspection in response to state regulatory concerns.

Geology in this area was not assessed as a part of this inspection report. EPA will continue to assess this information external to this inspection report.

### EPA BACKGROUND OF HEALDTON IV UNIT

This information is included for background and informational purposes to summarize previous compliance and enforcement activities conducted by EPA. In the past, EPA has conducted inspections in this area in 2006, 2013, and 2014. EPA has also issued multiple Administrative Compliance Orders and has issued an Administrative Complaint (penalty).

The 2006 EPA inspection was conducted in response to a citizen complaint and Citation Oil & Gas Corp. representatives were on site during the inspection (**EPA NPDES No. OKU000604**). EPA's inspection identified potential seepages into a tributary of Post Oak Creek as well as issues with elevated chlorides in ponds with seepages. Citation Oil & Gas Corp. responded to an EPA Administrative Order with multiple activities, including installing a trench, sump pump, and other activities to remediate the site. This location corresponds with the same area as seen in the current **Appendix A**, Photo Log Photo No. 1. During the remedial activities to address EPA's Administrative Compliance Orders issued in 2006 and updated in 2007, Citation Oil & Gas Corp. identified four (4) seep locations while installing a trench:

- Seep A: 34.210722, -97.506472
- Seep B: 34.210833, -97.506583
- Seep C: 34.218330, -97.506750
- Seep D: 34.211111, -97.506806

According to Citation Oil & Gas Corp.'s Work Plan and amendments of that plan submitted to EPA throughout 2007 to address the EPA Administrative Compliance Order, there were ongoing sampling events and disposal events occurring after the initial work plan goals were achieved.

In 2013, EPA conducted an inspection at the Healdton IV Unit (**EPA NPDES No.: OKU000783**) in response to a spill into a tributary to Post Oak Creek (different tributary in the area from the 2006 EPA activities). The spill occurred due to a ruptured flow line that was connected to a production manifold (GPS: 34.2058, -97.5030). EPA initiated enforcement activities in response to this inspection including an Administrative Compliance Order in 2013. EPA also issued a penalty in 2014 in response to this inspection as well as an information request response from Citation Oil & Gas Corp. This location corresponds with the same area as described in the inspection at the confluence of the first tributary and the third tributary assessed in this inspection.

In 2014, EPA conducted an unannounced inspection at the Healdton IV Unit (**EPA NPDES No.: OKU000783**) at a tank battery on the lease (GPS: 34.2087, -97.5015). The EPA inspector identified that a sump pump system was overflowing with brine into an adjacent pit, which had an open valve on the south side of the pit allowing for fluids, including produced water or brine, to discharge into a tributary of Post Oak Creek. This location corresponds with the same area as seen in the current **Appendix A**, Photo Log Photo Nos. 55 – 60.

## **Section II - OBSERVATIONS**

OCC representatives indicated a recent rainfall event had occurred in the area prior to the inspection.

A recovery well or pump system was observed in **Appendix A**, Photo No. 1.

I assessed the surface water quality in the area with a total of three properly calibrated YSI Pro 30 Conductivity Meters. I brought two EPA YSI Pro 30 Conductivity Meters for the inspections; both meters were used until the batteries ran out as indicated in the **Appendix A**. Finally, I continued to conduct the inspections with OCC's assistance of their calibrated YSI Pro 30 Conductivity Meter. The assessment can be seen in the **Appendix A**. GPS location information for each observation is recorded with each photo in the photo log. I assessed three tributaries of Post Oak Creek in this area.

The first tributary flows from a pond seen in Photo No. 2 down to a confluence with the second tributary seen in Photo No. 41. The second tributary was assessed from Photo Nos. 41 – 54. The third tributary and recent spill from a tank battery was assessed in Photo Nos. 55 – 60.

With the conductivity meter, I took Total Dissolved Solids (TDS) readings throughout the creek surveys. The first tributary assessed (Photo Nos. 2 – 40) showed elevated TDS readings throughout the over 1 mile of tributary assessed. The furthest upstream on the tributary we assessed during the inspection was a pond, seen in **Appendix A**, Photo No. 2. The TDS reading of the pond was 157 milligrams per liter (mg/L) during the inspection. On the back side of the dam from the pond, a TDS reading of 6,389 mg/L was taken (Photo No. 7). Significant dam erosion was observed at this location, and it appears unsafe for vehicles to drive the spillway of this pond. Throughout the assessment, tributary features were observed including bed, bank (*e.g.*, high water markings), riparian vegetation (*e.g.*, cattails), and some aquatic life

was observed, including crawfish and minnows. Some aquatic life was dead during the inspection in the first tributary as well (Photo Nos. 28, 31, and 32). Throughout the first tributary, oil sheen, foam, and discoloration including black soiled banks were observed. Additionally elevated TDS readings were taken throughout this first tributary including:

- Approx. 100 feet downstream from the pond a TDS reading of 2,166 mg/L (Photo No. 10)
- Approx. 600 feet downstream from the pond a TDS reading of 3,206 mg/L (Photo No. 14)
- Approx. 720 feet downstream from the pond a TDS reading of 3,460 mg/L (Photo No. 18)
- Approx. 900 feet downstream from the pond a TDS reading of 3,242 mg/L (Photo No. 21)
- Approx. 1280 feet downstream from the pond a TDS reading of 3,966 mg/L (Photo No. 24)
- Approx. 0.28 miles downstream from the pond a TDS reading of 3,989 mg/L (Photo No. 30)
- Approx. 0.57 miles downstream from the pond a TDS reading of 3,521 mg/L (Photo No. 37)
- Approx. 1.16 miles downstream from the pond a TDS reading of 3,223 mg/L (Photo No. 40)

Further downstream after the confluence of the first tributary with the second tributary assessed during this inspection had additional TDS readings including:

- Approx. 1.85 miles downstream from the pond a TDS reading of 18,037 mg/L (Photo No. 44)
- Approx. 2.23 miles downstream from the pond a TDS reading of 10,792 mg/L (Photo No. 48)
- Approx. 2.62 miles downstream from the pond a TDS reading of 2,679 mg/L (Photo No. 51)

Upstream of the confluence of the first and second tributary elevated TDS readings were taken along the second tributary assessed in this inspection as described in Photo No. 41 and 54 of **Appendix A**.

The third tributary and recent spill impacts were assessed in **Appendix A**, Photo Nos. 55 – 60, where elevated TDS readings were observed. Oil, staining, and remedial impacts from the spill were also observed to have significant impacts to the tributary during the inspection.

Finally, during the creek survey of the first tributary, side hydrological features were observed that had impacts, including washes and small ponded areas. Photos of these locations are not provided in the creek survey information or in **Appendix A**. These features likely impact the first tributary and a brief aerial imagery assessment also supported that these features should be included in the area of concerns across the Healdton IV Unit. I am noting the location, TDS reading, and any observations associated with the feature that I observed here:

- Approx. ½ acre pooled up area with cattails next to the first tributary was observed to have a lot of oil sheen and a TDS reading of 5,202 mg/L was taken (GPS: 34.205222, -97.504556)
- A marsh area/ponded up area with cattails also next to the first tributary was observed to have a lot of oil sheen and a TDS reading of 11,116 mg/L was taken (GPS: 34.2052632, -97.5061824)
  - Following the flow of this side hydrological feature, it eventually reaches the first tributary and connects in at latitude 34.2048290, longitude -97.5079329. A TDS reading of 5,362 mg/L was taken here from this side hydrological feature.

### **Section III – AREAS OF CONCERN**

This site has multiple concerns that EPA identified. There are unknown potential production well, injection well, and abandoned well issues within this larger area of concern that should continue to be



assessed. EPA has not fully assessed the extent of these issues as a part of this inspection report, but will continue to work with OCC to assess the site.

I observed in particular, potential endangerment to underground sources of drinking water throughout the area assessed during the inspection. There are potential pressure issues associated with the enhanced recovery operations across the field. Historical contamination is also present and was never fully remediated or assessed, thus potentially endangering Undergrounds Sources of Drinking Water (USDWs). Further assessment is needed and should include: identification of potential public health and environmental issues within the larger area of concern, geological assessments, technical assessment of the wells in the area of concern, and any other appropriate information to identify potential concerns associated with the Safe Drinking Water Act and other OCC regulatory requirements.

The surface water quality across three tributaries of Post Oak Creek showed elevated TDS levels throughout the inspection. This was a large concern as well as under the Clean Water Act. Potential ongoing contamination as well as historical contamination has contributed to elevated TDS levels in the tributaries. The surface in the area had large erosion issues, lack of vegetation, and the soil appearance was indicative of brine/produced water contamination from upstream oil and gas field activities. EPA will continue to assess this issue under the Clean Water Act.

A recent spill had occurred from the central tank battery located on the Unit. This spill and the remedial efforts to clean up the spill were still evident, and impacts were still observed during the inspection, including oil, oil staining, and elevated TDS levels.

Well operations and maintenance throughout the area were of concern for multiple wells and the tank battery area, including oil staining and other well daily operations lacked best management practices. EPA will continue to assess these concerns with OCC. EPA staff have referred any tank battery operations in the larger area of concern to the EPA Region 6 Spill Prevention, Control, and Countermeasure (SPCC) program to have further assessment for SPCC regulatory requirements.

#### **Section IV – FOLLOW UP**

EPA will continue to follow up with OCC and operators in the area of concern as needed.

#### **Section V – LIST OF APPENDICES**

Appendix A – Photo Log – 60 photos taken 5/16/2023

## Appendix A

### Photograph Log 60 Photos



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 1

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010004.JPG

**Orientation:** SW

**Date of Photo:** 05/16/2023

**Time of Photo:** 8:38 AM

**Latitude:** 34.2111755

**Longitude:** -97.5068422

**Photographer:** Jeanne Eckhart

**Description:** This was a recovery well or pump system associated with a potential contaminated area for plume control. This area was associated with the EPA inspection and enforcement activities in 2006 and 2007. The well appeared to be hooked up during the inspection.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 2

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010013.JPG

**Orientation:** NE

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:00 AM

**Latitude:** 34.2062620

**Longitude:** -97.5015056

**Photographer:** Jeanne Eckhart

**Description:** This was a pond observed along an intermittent tributary. The pond had a large culvert associated with the spill way of the pond on the west side of this pond (or the left side of this photo).





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 3

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010014.JPG

**Orientation:** NE

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:07 AM

**Latitude:** 34.2062620

**Longitude:** -97.5015056

**Photographer:** Jeanne Eckhart

**Description:** A Total Dissolved Solids (TDS) reading of 157 milligrams per liter (mg/L) was taken in the field near the pond dam with an EPA calibrated YSI Pro 30 Conductivity Meter.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 4

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010015.JPG

**Orientation:** W

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:10 AM

**Latitude:** 34.2062620

**Longitude:** -97.5015056

**Photographer:** Jeanne Eckhart

**Description:** This photo shows a downstream view of the tributary of Post Oak Creek from the spill way of the dam of the pond seen in Photo No. 2 of this Appendix. Significant erosion and lack of vegetation were observed throughout this area of the tributary.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 5

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010023.JPG

**Orientation:** E

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:15 AM

**Latitude:** 34.2062620

**Longitude:** -97.5015056

**Photographer:** Jeanne Eckhart

**Description:** This photo shows an upstream view of the tributary of Post Oak Creek below the spill way of the dam of the pond seen in Photo No. 2 of this Appendix. Significant erosion and lack of vegetation were observed throughout this area of the tributary. Fluids appeared to be leeching through a corroded culvert and significant erosion under the dam road were also observed. Some black staining was observed along the fluids in the area from the northern bank of the tributary, which was flowing at the time of the inspection. There was some sheen observed in this location of the tributary as well.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 6

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010021.JPG

**Orientation:** E

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:11 AM

**Latitude:** 34.2062620

**Longitude:** -97.5015056

**Photographer:** Jeanne Eckhart

**Description:** This photo shows an upstream view of the tributary of Post Oak Creek below the spill way of the dam of the pond seen in Photo No. 2 of this Appendix. Significant erosion and lack of vegetation were observed throughout this area of the tributary. Fluids appeared to be leeching through a corroded culvert and significant erosion under the dam road were also observed. A TDS reading was taken at this location.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 7

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010020.JPG

**Orientation:** E

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:11 AM

**Latitude:** 34.2062620

**Longitude:** -97.5015056

**Photographer:** Jeanne Eckhart

**Description:** A TDS reading at the location in Photo No. 6 of this Appendix was 6,389 mg/L during the inspection.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 8

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010027.JPG

**Orientation:** E

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:18 AM

**Latitude:** 34.2062254

**Longitude:** -97.5019234

**Photographer:** Jeanne Eckhart

**Description:** This photo shows an upstream view of the tributary located below the spill way of the pond. The tributary was flowing at this location. Some black and darker discoloration of the soil along the immediate banks of the tributary was observed at this location.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 9

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010024.JPG

**Orientation:** W

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:15 AM

**Latitude:** 34.2062254

**Longitude:** -97.5019234

**Photographer:** Jeanne Eckhart

**Description:** This photo shows a downstream view of the tributary located below the spill way of the pond. The tributary was flowing at this location. Some black and darker discoloration of the soil along the immediate banks of the tributary was observed at this location.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 10

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010025.JPG

**Orientation:** W

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:17 AM

**Latitude:** 34.2062254

**Longitude:** -97.5019234

**Photographer:** Jeanne Eckhart

**Description:** A TDS reading of 2,166 mg/L was taken at this location shown in Photo No. 11.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 11

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010038.JPG

**Orientation:** W

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:35 AM

**Latitude:** 34.2057648

**Longitude:** -97.5027827

**Photographer:** Jeanne Eckhart

**Description:** This photo was taken over 480 feet downstream from the pond in Photo No. 2 of this Appendix.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 12

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010046.JPG

**Orientation:** E

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:41 AM

**Latitude:** 34.2056212

**Longitude:** -97.5031552

**Photographer:** Jeanne Eckhart

**Description:** This photo was taken over 600 feet downstream from the pond in Photo No. 2 of this Appendix. This is an upstream view of the tributary during the inspection. The tributary was flowing during this inspection and had bank like features observed. Several production flow lines from the oil and gas lease were also observed crossing over the tributary throughout out this area.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 13

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010046.JPG

**Orientation:** W

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:41 AM

**Latitude:** 34.2056212

**Longitude:** -97.5031552

**Photographer:** Jeanne Eckhart

**Description:** This photo was taken over 600 feet downstream from the pond in Photo No. 2 of this Appendix. This is a downstream view of the tributary during the inspection. The tributary was flowing during this inspection and had bank like features observed. Several production flow lines from the oil and gas lease were also observed crossing over the tributary throughout out this area.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 14

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010045.JPG

**Orientation:** S

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:41 AM

**Latitude:** 34.2056212

**Longitude:** -97.5031552

**Photographer:** Jeanne Eckhart

**Description:** This photo was taken over 600 feet downstream from the pond in Photo No. 2 of this Appendix. A TDS reading of 3,206 mg/L was taken at this location.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 15

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010049.JPG

**Orientation:** E

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:44 AM

**Latitude:** 34.2056822

**Longitude:** -97.5034884

**Photographer:** Jeanne Eckhart

**Description:** This photo was taken over 720 feet downstream from the pond in Photo No. 2 of this Appendix. This was an upstream view of the tributary at this location. The tributary was flowing during this inspection and had bank like features observed. Several production flow lines from the oil and gas lease were also observed crossing over the tributary throughout out this area. Some debris, like old tires, were also observed in the tributary during the inspection.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 16

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010048.JPG

**Orientation:** W

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:44 AM

**Latitude:** 34.2056822

**Longitude:** -97.5034884

**Photographer:** Jeanne Eckhart

**Description:** This photo was taken over 720 feet downstream from the pond in Photo No. 2 of this Appendix. This was a downstream view of the tributary at this location. The tributary was flowing during this inspection and had bank like features observed. Several production flow lines from the oil and gas lease were also observed crossing over the tributary throughout out this area. Some debris, like old tires, were also observed in the tributary during the inspection.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 17

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010051.JPG

**Orientation:** N

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:45 AM

**Latitude:** 34.2056822

**Longitude:** -97.5034884

**Photographer:** Jeanne Eckhart

**Description:** This photo was taken over 720 feet downstream from the pond in Photo No. 2 of this Appendix. On the northern bank of the tributary during the inspection, an oil or petroleum like sheen was observed seeping into the tributary, as seen in this photo.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 18

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010053.JPG

**Orientation:** N

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:48 AM

**Latitude:** 34.2056822

**Longitude:** -97.5034884

**Photographer:** Jeanne Eckhart

**Description:** This photo was taken over 720 feet downstream from the pond in Photo No. 2 of this Appendix. A TDS reading of 3,460 mg/L was taken at this location.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 19

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010055.JPG

**Orientation:** NW

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:50 AM

**Latitude:** 34.2053830

**Longitude:** -97.5039005

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 900 feet downstream from the pond in Photo No. 2 of this Appendix. This is a downstream view of the tributary of Post Oak Creek. Tributary features including banks, some bed, and flowing water were observed during the inspection.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 20

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010057.JPG

**Orientation:** SE

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:51 AM

**Latitude:** 34.2053830

**Longitude:** -97.5039005

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 900 feet downstream from the pond in Photo No. 2 of this Appendix. This is an upstream view of the tributary of Post Oak Creek. Tributary features including banks, some bed, and flowing water were observed during the inspection. Additionally, a culvert was placed in stream to assist with flow from the tributary.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 21

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010058.JPG

**Orientation:** SE

**Date of Photo:** 05/16/2023

**Time of Photo:** 9:51 AM

**Latitude:** 34.2053830

**Longitude:** -97.5039005

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 900 feet downstream from the pond in Photo No. 2 of this Appendix. A TDS reading of 3,242 mg/L was taken at this location during the inspection.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 22

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010068.JPG

**Orientation:** SE

**Date of Photo:** 05/16/2023

**Time of Photo:** 10:13 AM

**Latitude:** 34.20543663

**Longitude:** -97.5051678

**Photographer:** Jeanne Eckhart

**Description:** This photo was over 1,280 feet downstream from the pond in Photo No. 2 of this Appendix. This is an upstream view of the tributary of Post Oak Creek. Tributary features including banks, some bed, and flowing water were observed during the inspection.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 23

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010069.JPG

**Orientation:** NW

**Date of Photo:** 05/16/2023

**Time of Photo:** 10:13 AM

**Latitude:** 34.20543663

**Longitude:** -97.5051678

**Photographer:** Jeanne Eckhart

**Description:** This photo was over 1,280 feet downstream from the pond in Photo No. 2 of this Appendix. This is a downstream view of the tributary of Post Oak Creek. Tributary features including banks, some bed, and flowing water were observed during the inspection.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 24

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010070.JPG

**Orientation:** NW

**Date of Photo:** 05/16/2023

**Time of Photo:** 10:13 AM

**Latitude:** 34.20543663

**Longitude:** -97.5051678

**Photographer:** Jeanne Eckhart

**Description:** This photo was over 1,280 feet downstream from the pond in Photo No. 2 of this Appendix. An additional calibrated YSI Pro 30 Conductivity meter was used during the inspection and was initially used at this location in the creek due to the first meter's batteries died. A TDS reading of 3,966 mg/L was taken at this location.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 25

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010080.JPG

**Orientation:** W

**Date of Photo:** 05/16/2023

**Time of Photo:** 10:26 AM

**Latitude:** 34.20543663

**Longitude:** -97.5051678

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 0.28 miles downstream from the pond in Photo No. 2 of this Appendix. This is a downstream view of the tributary of Post Oak Creek. Tributary features including banks, some bed rock, and flowing water were observed during the inspection. Significant erosion was also observed in this part of the tributary.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 26

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010080.JPG

**Orientation:** W

**Date of Photo:** 05/16/2023

**Time of Photo:** 10:26 AM

**Latitude:** 34.20543663

**Longitude:** -97.5051678

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 0.28 miles downstream from the pond in Photo No. 2 of this Appendix. This is a downstream view of the tributary of Post Oak Creek. Tributary features including banks, some bed rock, and flowing water were observed during the inspection. Significant erosion was also observed in this part of the tributary.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 27

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010077.JPG

**Orientation:** NW

**Date of Photo:** 05/16/2023

**Time of Photo:** 10:25 AM

**Latitude:** 34.20543663

**Longitude:** -97.5051678

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 0.28 miles downstream from the pond in Photo No. 2 of this Appendix. This is a view of the stream column of the tributary of Post Oak Creek at this location. Tributary features including banks, some bed rock, and flowing water were observed during the inspection. Significant erosion was also observed in this part of the tributary. Some bank discoloration, including darker and black looking soil, were observed here. A meter reading was taken here at this location which was a deep drop off point in the tributary.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 28

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010078.JPG

**Orientation:** NW

**Date of Photo:** 05/16/2023

**Time of Photo:** 10:26 AM

**Latitude:** 34.20543663

**Longitude:** -97.5051678

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 0.28 miles downstream from the pond in Photo No. 2 of this Appendix. This is a view of the stream column of the tributary of Post Oak Creek at this location. This is a zoomed in photo at the same spot as Photo No. 27 in this Appendix. I observed one dead crawfish, as seen in this photo.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 29

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010081.JPG

**Orientation:** E

**Date of Photo:** 05/16/2023

**Time of Photo:** 10:28 AM

**Latitude:** 34.20543663

**Longitude:** -97.5051678

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 0.28 miles downstream from the pond in Photo No. 2 of this Appendix. This is a view of the stream column of the tributary of Post Oak Creek at this location. This is a zoomed in photo at the same spot as Photo No. 27 in this Appendix. I observed foam in the tributary, as seen in this photo.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 30

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010076.JPG

**Orientation:** NW

**Date of Photo:** 05/16/2023

**Time of Photo:** 10:25 AM

**Latitude:** 34.20543663

**Longitude:** -97.5051678

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 0.28 miles downstream from the pond in Photo No. 2 of this Appendix. A TDS reading of 3,989 mg/L was taken at this location.

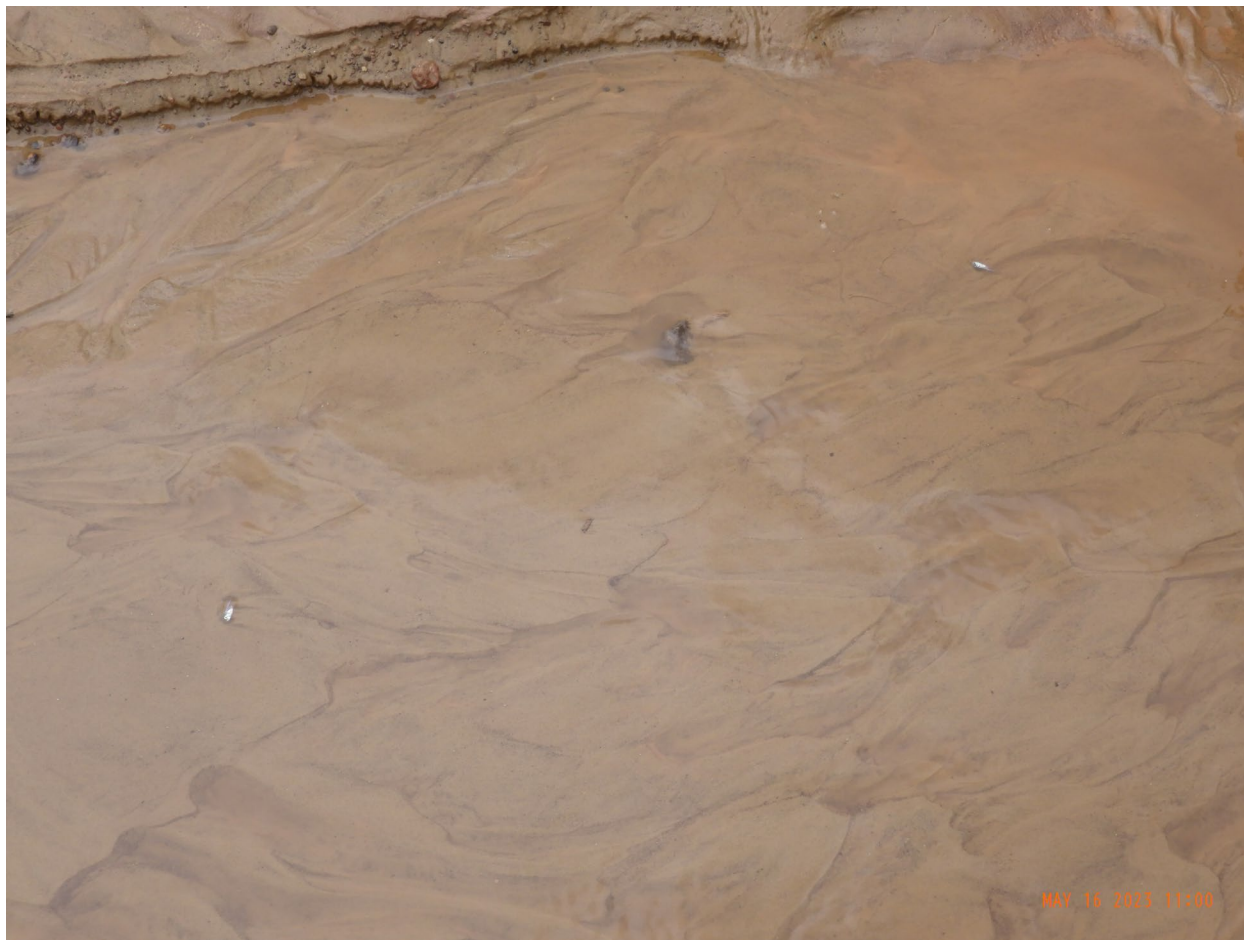


UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 31

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010105.JPG

**Orientation:** NW

**Date of Photo:** 05/16/2023

**Time of Photo:** 11:00 AM

**Latitude:** 34.2045739

**Longitude:** -97.5078812

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 0.43 miles downstream from the pond in Photo No. 2 of this Appendix. Two dead minnows (silver) and one crawfish that was alive were observed in the tributary at this location.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 32

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010109.JPG

**Orientation:** NW

**Date of Photo:** 05/16/2023

**Time of Photo:** 11:02 AM

**Latitude:** 34.204597

**Longitude:** -97.508428

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 0.48 miles downstream from the pond in Photo No. 2 of this Appendix. An additional dead minnow (silver) was observed in the tributary at this location.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 33

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010111.JPG

**Orientation:** NW

**Date of Photo:** 05/16/2023

**Time of Photo:** 11:15 AM

**Latitude:** 34.204597

**Longitude:** -97.508428

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 0.48 miles downstream from the pond in Photo No. 2 of this Appendix. Bed, bank, and riparian vegetation (*e.g.*, cattails) were observed at this location. The tributary was flowing during the inspection.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 34

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010113.JPG

**Orientation:** W

**Date of Photo:** 05/16/2023

**Time of Photo:** 11:16 AM

**Latitude:** 34.204597

**Longitude:** -97.508428

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 0.48 miles downstream from the pond in Photo No. 2 of this Appendix. A part of a PVC pipe was observed in the tributary. Additionally, some oil sheen was observed at this location during the inspection.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 35

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010121.JPG

**Orientation:** SW

**Date of Photo:** 05/16/2023

**Time of Photo:** 11:27 AM

**Latitude:** 34.2042029

**Longitude:** -97.5100454

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 0.57 miles downstream from the pond in Photo No. 2 of this Appendix. This photo shows a downstream view of the tributary to Post Oak Creek, where bed, bank, and other tributary characteristics were observed near the Wildflower Rd. Bridge crossing. There was also a significant quantity of larger debris in this part of the creek likely due to dumping of trash into this tributary. The debris was a separate concern from my observations associated with elevated TDS levels in the tributary.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 36

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010123.JPG

**Orientation:** SW

**Date of Photo:** 05/16/2023

**Time of Photo:** 11:29 AM

**Latitude:** 34.2042029

**Longitude:** -97.5100454

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 0.57 miles downstream from the pond in Photo No. 2 of this Appendix. This photo shows an upstream view of the tributary to Post Oak Creek, where bed, bank, and other tributary characteristics were observed near the Wildflower Rd. Bridge crossing. There was also a significant quantity of larger debris in this part of the creek likely due to dumping of trash into this tributary. The debris was a separate concern from my observations associated with elevated TDS levels in the tributary.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 37

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010122.JPG

**Orientation:** SW

**Date of Photo:** 05/16/2023

**Time of Photo:** 11:29 AM

**Latitude:** 34.2042029

**Longitude:** -97.5100454

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 0.57 miles downstream from the pond in Photo No. 2 of this Appendix. A TDS reading of 3,521 mg/L was taken at this location.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 38

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010138.JPG

**Orientation:** NE

**Date of Photo:** 05/16/2023

**Time of Photo:** 12:14 PM

**Latitude:** 34.200956

**Longitude:** -97.514033

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 1.16 miles downstream from the pond in Photo No. 2 of this Appendix. This photo shows an upstream view of the tributary, where bed, bank, and some riparian vegetation were observed.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 39

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010139.JPG

**Orientation:** SW

**Date of Photo:** 05/16/2023

**Time of Photo:** 12:14 PM

**Latitude:** 34.200956

**Longitude:** -97.514033

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 1.16 miles downstream from the pond in Photo No. 2 of this Appendix. This photo shows a downstream view of the tributary, where bed, bank, and some riparian vegetation were observed.





## UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

### Photograph Log

Photo No. 40

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010137.JPG

**Orientation:** SW

**Date of Photo:** 05/16/2023

**Time of Photo:** 12:14 PM

**Latitude:** 34.200956

**Longitude:** -97.514033

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 1.16 miles downstream from the pond in Photo No. 2 of this Appendix. A TDS reading of 3,223 mg/L was taken at this location. The second EPA meter's batteries died while conducting the creek survey. With permission of OCC, we utilized their calibrated YSI Pro 30 Conductivity meter for the rest of the inspection to take field readings in the creek.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 41

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010141.JPG

**Orientation:** W

**Date of Photo:** 05/16/2023

**Time of Photo:** 12:15 PM

**Latitude:** 34.2032424

**Longitude:** -97.5124393

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 1.23 miles downstream from the pond in Photo No. 2 of this Appendix I observed the confluence of the first tributary (observed in Photo Nos.: 2-40 in this Appendix) with a second tributary of Post Oak Creek. To observe conditions above the confluence of the two tributaries, a TDS reading of 2,309 mg/L was taken about 40 feet upstream from the confluence along the second tributary.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 42

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010157.JPG

**Orientation:** NE

**Date of Photo:** 05/16/2023

**Time of Photo:** 12:50 PM

**Latitude:** 34.195767

**Longitude:** -97.516069

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 1.85 miles downstream from the pond in Photo No. 2 of this Appendix in the second tributary (first tributary had merged into this tributary). This photo shows an upstream view of the second tributary surveyed during the inspection. The secondary tributary bed and banks features were well defined throughout the creek as observed in this photo. The tributary was flowing at the time of the inspection.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 43

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010156.JPG

**Orientation:** SW

**Date of Photo:** 05/16/2023

**Time of Photo:** 12:49 PM

**Latitude:** 34.195767

**Longitude:** -97.516069

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 1.85 miles downstream from the pond in Photo No. 2 of this Appendix in the second tributary (first tributary had merged into this tributary). This photo shows a downstream view of the second tributary surveyed during the inspection. The secondary tributary bed and banks features were well defined throughout the creek as observed in this photo. The tributary was flowing at the time of the inspection. A deeper area of the stream was observed in this location.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 44

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010156.JPG

**Orientation:** N

**Date of Photo:** 05/16/2023

**Time of Photo:** 12:49 PM

**Latitude:** 34.195767

**Longitude:** -97.516069

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 1.85 miles downstream from the pond in Photo No. 2 of this Appendix in the second tributary (first tributary had merged into this tributary). A TDS reading of 18,037 mg/L was taken at this location. The temperature at this location was cooler as well by approximately 2 degrees Fahrenheit in comparison to the rest of the secondary tributary observations from the meter during the inspection. A deeper area of the stream was observed in this location.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 45

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010159.JPG

**Orientation:** SW

**Date of Photo:** 05/16/2023

**Time of Photo:** 12:53 PM

**Latitude:** 34.195767

**Longitude:** -97.516069

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 1.85 miles downstream from the pond in Photo No. 2 of this Appendix in the second tributary (first tributary had merged into this tributary). This location was the same location as an elevated TDS reading. I observed a dead crawfish during the inspection.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 46

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010176.JPG

**Orientation:** NW

**Date of Photo:** 05/16/2023

**Time of Photo:** 1:15 PM

**Latitude:** 34.1922238

**Longitude:** -97.5179083

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 2.23 miles downstream from the pond in Photo No. 2 of this Appendix in the second tributary (first tributary had merged into this tributary). This photo shows an upstream view of the second tributary surveyed during the inspection. The secondary tributary bed and banks features were well defined throughout the creek as observed in this photo. The tributary was flowing at the time of the inspection.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 47

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010176.JPG

**Orientation:** SE

**Date of Photo:** 05/16/2023

**Time of Photo:** 1:15 PM

**Latitude:** 34.1922238

**Longitude:** -97.5179083

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 2.23 miles downstream from the pond in Photo No. 2 of this Appendix in the second tributary (first tributary had merged into this tributary). This photo shows a downstream view of the second tributary surveyed during the inspection. The secondary tributary bed and banks features were well defined throughout the creek as observed in this photo. The tributary was flowing at the time of the inspection.





## UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

### Photograph Log

Photo No. 48

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010176.JPG

**Orientation:** W

**Date of Photo:** 05/16/2023

**Time of Photo:** 1:15 PM

**Latitude:** 34.1922238

**Longitude:** -97.5179083

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 2.23 miles downstream from the pond in Photo No. 2 of this Appendix in the second tributary (first tributary had merged into this tributary). A TDS reading of 10,792 mg/L was taken at this location.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 49

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010178.JPG

**Orientation:** NW

**Date of Photo:** 05/16/2023

**Time of Photo:** 1:31 PM

**Latitude:** 34.1922238

**Longitude:** -97.5179083

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 2.62 miles downstream from the pond in Photo No. 2 of this Appendix in the second tributary (first tributary had merged into this tributary). This photo shows an upstream view of the second tributary surveyed during the inspection. The secondary tributary bed and banks features were well defined throughout the creek as observed in this photo. The tributary was flowing at the time of the inspection.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 50

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010179.JPG

**Orientation:** SE

**Date of Photo:** 05/16/2023

**Time of Photo:** 1:32 PM

**Latitude:** 34.1922238

**Longitude:** -97.5179083

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 2.62 miles downstream from the pond in Photo No. 2 of this Appendix in the second tributary (first tributary had merged into this tributary). This photo shows a downstream view of the second tributary surveyed during the inspection. The secondary tributary bed and banks features were well defined throughout the creek as observed in this photo. The tributary was flowing at the time of the inspection. This location was at the Memorial Road bridge.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 51

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010179.JPG

**Orientation:** SE

**Date of Photo:** 05/16/2023

**Time of Photo:** 1:32 PM

**Latitude:** 34.1922238

**Longitude:** -97.5179083

**Photographer:** Jeanne Eckhart

**Description:** This photo was approximately 2.62 miles downstream from the pond in Photo No. 2 of this Appendix in the second tributary (first tributary had merged into this tributary). A TDS reading of 2,679 mg/L was taken at this location.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 52

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010183.JPG

**Orientation:** E

**Date of Photo:** 05/16/2023

**Time of Photo:** 2:22 PM

**Latitude:** 34.2122613

**Longitude:** -97.5098634

**Photographer:** Jeanne Eckhart

**Description:** This photo shows an upstream view of the second tributary closer to the recovery well shown in Photo No. 1 of this Appendix. The tributary was further north on Wildflower Rd., where an additionally creek crossing was observed with a culvert diverting flowing water under the roadway. The tributary in this location had bed, bank, and riparian vegetation during the inspection.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 53

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010182.JPG

**Orientation:** W

**Date of Photo:** 05/16/2023

**Time of Photo:** 2:22 PM

**Latitude:** 34.2122613

**Longitude:** -97.5098634

**Photographer:** Jeanne Eckhart

**Description:** This photo shows a downstream view of the second tributary closer to the recovery well shown in Photo No. 1 of this Appendix. The tributary was further north on Wildflower Rd., where an additionally creek crossing was observed with a culvert diverting flowing water under the roadway. The tributary in this location had bed, bank, and riparian vegetation during the inspection.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 54

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010181.JPG

**Orientation:** W

**Date of Photo:** 05/16/2023

**Time of Photo:** 2:22 PM

**Latitude:** 34.2122613

**Longitude:** -97.5098634

**Photographer:** Jeanne Eckhart

**Description:** A TDS reading of 7,242 mg/L was taken at this location along the second tributary surveyed.



## UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

### Photograph Log

Photo No. 55

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010192.JPG

**Orientation:** NE

**Date of Photo:** 05/16/2023

**Time of Photo:** 2:49 PM

**Latitude:** 34.208358

**Longitude:** -97.502031

**Photographer:** Jeanne Eckhart

**Description:** This photo shows the central tank battery on the Healdton IV Unit lease, which also as an overflow pond observed in this photo. Oil was visible on top of this ponded structure which was full of fluids during the inspection. According to OCC there had been a recent spill from this location with remediation efforts underway and being monitored by OCC. Downhill from this tank battery is a third tributary, which eventually flows into the first tributary. This third tributary had significant impacts from remedial activities occurring to clean up the recent spill from the tank battery.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 56

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010193.JPG

**Orientation:** S

**Date of Photo:** 05/16/2023

**Time of Photo:** 2:49 PM

**Latitude:** 34.208358

**Longitude:** -97.502031

**Photographer:** Jeanne Eckhart

**Description:** This photo shows the downhill flow path from the central tank battery on the unit towards the third tributary I surveyed. According to OCC there had been a recent spill from this location with remediation efforts underway and being monitored by OCC. Downhill from this tank battery is a third tributary, which eventually flows into the first tributary. This third tributary had significant impacts from remedial activities occurring to clean up the recent spill from the tank battery.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Photograph Log

Photo No. 57

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010185.JPG

**Orientation:** NE

**Date of Photo:** 05/16/2023

**Time of Photo:** 2:40 PM

**Latitude:** 34.208358

**Longitude:** -97.502031

**Photographer:** Jeanne Eckhart

**Description:** This photo is approximately 540 feet downhill along the flow path from the central tank battery in the third tributary I surveyed. This photo shows an upstream/uphill view towards the tank battery. According to OCC there had been a recent spill of 100 barrels of mostly produced water from the tank battery and some remediation efforts had occurred. The third tributary, which flows into the first tributary, was significantly impacted from this spill and remedial activities had not addressed all the spill impacts as observed during the inspection. The tributary path has oil and staining throughout this third tributary area.





## UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

### Photograph Log

Photo No. 58

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010187.JPG

**Orientation:** E

**Date of Photo:** 05/16/2023

**Time of Photo:** 2:40 PM

**Latitude:** 34.208358

**Longitude:** -97.502031

**Photographer:** Jeanne Eckhart

**Description:** This photo is approximately 540 feet downhill along the flow path from the central tank battery in the third tributary I surveyed. This photo shows an upstream/uphill view towards the tank battery. According to OCC there had been a recent spill of 100 barrels of mostly produced water from the tank battery and some remediation efforts had occurred. The third tributary, which flows into the first tributary, was significantly impacted from this spill and remedial activities had not addressed all the spill impacts as observed during the inspection. The tributary path has oil and staining throughout this third tributary area. Some riparian vegetation was observed in this location (*e.g.*, cattails).





## UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

### Photograph Log

Photo No. 59

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010188.JPG

**Orientation:** E

**Date of Photo:** 05/16/2023

**Time of Photo:** 2:40 PM

**Latitude:** 34.208358

**Longitude:** -97.502031

**Photographer:** Jeanne Eckhart

**Description:** This photo is approximately 540 feet downhill along the flow path from the central tank battery in the third tributary I surveyed. This photo shows a downstream view along the third tributary. According to OCC there had been a recent spill of 100 barrels of mostly produced water from the tank battery and some remediation efforts had occurred. The third tributary, which flows into the first tributary, was significantly impacted from this spill and remedial activities had not addressed all the spill impacts as observed during the inspection. The tributary path has oil and staining throughout this third tributary area.





## UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

### Photograph Log

Photo No. 60

|                                 |                       |                 |
|---------------------------------|-----------------------|-----------------|
| Location: 34.206231, -97.501974 |                       |                 |
| City: Healdton                  | County/Parish: Carter | State: Oklahoma |



**Photo File Name:** R0010204.JPG

**Orientation:** E

**Date of Photo:** 05/16/2023

**Time of Photo:** 3:04 PM

**Latitude:** 34.2065923

**Longitude:** -97.5025641

**Photographer:** Jeanne Eckhart

**Description:** This photo is approximately 740 feet down from the central tank battery in the third tributary I surveyed. A TDS reading of 5,053 mg/L was taken in this area where a recent produced water spill had occurred with some oil. There was some flow in this third tributary, but the flow conditions were not normal in this location due to recent rain fall events as well as the remedial activities that had occurred due to the recent spill.