

INTERIM EMERGENCY RESPONSE REPORT

FOR

RED RIVER FISH KILL
UNION VALLEY ROAD
OSCAR, JEFFERSON COUNTY, OKLAHOMA

U.S. Environmental Protection Agency Region 6
1445 Ross Avenue
Dallas, Texas 75202

25 June 2012

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1. PROJECT IDENTIFICATION

Date: 22 June 2012

Subject: Emergency Response: Red River Fish Kill
Union Valley Road
Oscar, Jefferson County, Oklahoma
NRC Report No. 986848

West Site Boundary: Latitude: 34.134604° North, Longitude: 97.7520561° West
East Site Boundary: Latitude: 33.857480 ° North, Longitude: 96.843160 ° West

Geographic coordinates along the identified portion of the Red River Fish Kill were determined by the Oklahoma Department of Environmental Quality (ODEQ) utilizing a Trimble GEOXT and provided to the Environmental Protection Agency (EPA) Region 6. EPA used a Garmin Oregon 550T geographic positioning system (GPS) to determine sample locations where sample coordinates had not been established by other agencies.

2. INTRODUCTION

On 19 August 2011, the ODEQ requested assistance from the Environmental Protection Agency (EPA) Region 6 Prevention and Response Branch (PRB) to support ongoing investigations of fish kills along the Red River. The incident was reported by the EPA-PRB to the National Response Center (NRC Report No. 986848, provided as Attachment E) on 23 August 2011. On 19 August 2011, the EPA activated the Superfund Technical Assessment and Response Team (START-3) contractor to mobilize to the incident site to conduct environmental sampling along the Red River. A Site Location Map and a Site Area Map are included in Attachment A.

3. BACKGROUND

The Oklahoma Department of Water Conservation (ODWC) was contacted on 04 July 2011 about a fish kill that occurred in the Red River near Oscar, Jefferson County, Oklahoma and began conducting a field investigation. ODWC contacted the Oklahoma Department of Environmental Quality (ODEQ) and requested assistance for conducting field investigations and providing analytical laboratory support. On 19 August 2011, ODEQ contacted the EPA to report fish kills along various segments of the Red River from near Terral, Oklahoma to Lake Texoma

and requested EPA assistance in assessing the river to determine the cause of the fish kill. Other agencies involved in the fish kill investigation include ODEQ, Texas Commission on Environmental Quality (TCEQ), Oklahoma Department of Wildlife Conservation (ODWC), Texas Parks and Wildlife Department (TPWD), Oklahoma Corporation Commission (OCC), and Railroad Commission (RRC) of Texas. EPA is also in communication with the United States Fish and Wildlife Service (USFWS) and with the Chickasaw Nation. Divisions within the EPA involved in the investigation included the Region 6 Superfund Division, Environmental Response Team (ERT), Office of Research and Development (ORD), Region 6 Houston Laboratory, the Region 6 Water Quality Division, and the National Enforcement Investigation Center (NEIC).

4. ACTIONS TAKEN

Mobilization and Sampling Activities

On 22 August 2011, EPA mobilized personnel and equipment resources to the Oscar, Oklahoma area to conduct field activities consisting of visual reconnaissance, environmental monitoring, water sampling, and sediment sampling. The objective of the response and sampling was to collect a limited number of water and sediment samples along the river to develop a snapshot of potential contamination along the investigated river segment. EPA outlined a plan to collect up to 10 water and 10 sediment samples at locations along the river. Collection of a background upstream sample was planned at Sample Location RR01 for comparison purposes, which is shown in Attachment A.

During the morning of 22 August 2011, EPA began conducting assessment activities along the Red River near Terral, Oklahoma. EPA collected 10 water samples from Sample Locations RR01 - RR09 along the Red River. Two water samples (RR02 and RR03) were collected at the same location, one at the surface and one approximately 4.5 feet below the water surface. In addition, a duplicate water sample was collected at Sample Location RR06. EPA collected four sediment samples at Locations RR01, RR02, and RR07 including one duplicate at Location RR07. Six of the sample locations coincided with sample locations established by ODWC and/or ODEQ. EPA collected water and sediment samples at two unique locations that did not coincide with other agency sample locations. One sample location, RR01, was selected for

collecting background data upstream of Terral, Oklahoma where the Little Wichita River flows into the Red River. The second unique sample location, RR07, was located approximately 100 feet upstream of an observed fish kill. EPA, ODEQ, and ODWC sample locations are illustrated in the Site Maps provided in Attachment A.

Prior to collecting a water sample, water quality readings were recorded by EPA representatives utilizing a Hanna Water Quality meter. Water quality readings including temperature, dissolved oxygen, pH, specific conductance, salinity, total dissolved solids, and oxygen reduction potential were recorded and are presented in Attachment B.

At each water sample location, the water depth was recorded prior to sampling, and if only one water sample was collected at the selected location, the sample was collected near the mid-water column level. Water samples collected in 4 feet of water or less were sampled using a mid-column grab method. Water samples that were collected in an area of the river greater than 4 feet in depth were collected via low-flow techniques utilizing a peristaltic pump with dedicated tubing. Sediment samples were collected from the river bottom using disposable field sampling equipment that was not reused between sampling points to prevent cross contamination of the sediment samples.

On the evening of 23 August 2011, EPA completed field sampling activities and all samples were shipped to a contract laboratory for analytical testing. Digital photographs are included as Attachment F.

Analytical Data

The water samples were analyzed for volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs) (with tentatively identified compounds [TICs] to specifically include siloxane); pesticides; polychlorinated biphenyls (PCBs); herbicides; total analyte list (TAL) metals (including strontium, uranium, and cyanide); reactivity, corrosivity, and ignitibility (RCI); biological oxygen demand (BOD); chemical oxygen demand (COD); and dissolved gases. It should be noted that dissolved gas analyses were requested after samples were submitted for analyses. The additional gas analyses were requested for the samples collected from locations RR01 through RR05 based on ODEQ concerns communicated to EPA regarding off-gassing and

bubbling on the surface of the river. The sediment samples were analyzed for VOCs; SVOCs (with TICs to specifically include siloxane); pesticides; PCBs; herbicides; total TAL metals (including strontium, uranium, and cyanide); and reactivity, corrosivity, and ignitability (RCI). The water analytical results are presented in Attachment C, and the sediment analytical results are presented in Attachment D. The analytical data was compared to the background concentrations reported for Sample RR01. Methane, butyl benzyl phthalate, heptadecane (TIC), dicamba, dichloroprop, carbon disulfide, COD, and various metals (14 of the 25 reported) were identified above the background concentrations in water samples. Conversely, only antimony was identified above the background concentration in sediment. The above-mentioned chemicals were identified above the background samples in the water and the sediment, but no definite cause of the fish kill was identified from this analysis.

EPA and ODEQ Coordination

On 31 August 2011, EPA participated in a conference call with ODEQ field and laboratory personnel to discuss future activities related to the recent fish kill. During the conference call, ODEQ expressed concerns of a cloudy, gel-like material that formed during the laboratory extraction step during SVOC analysis of water samples collected from the Ketchum Bluff River segment by ODEQ and ODWC personnel. ODEQ also expressed concerns regarding observed off-gassing on the water surface near Ketchum Bluff. The off-gassing produced large areas of bubbling on the surface of the water. Due to ODEQ concerns, EPA requested additional analyses of water samples previously collected and submitted from Sample Locations RR01, RR02, RR03, RR04, and RR05 for dissolved gas analysis. These samples had been collected on 22 August 2011 and previously submitted for analyses. After communicating with the laboratory, it was determined that the contract laboratory had sufficient sample volume remaining for analysis of methane, ethane, ethene, and propane. Results from the dissolved gas analyses are discussed in the Analytical Data section of this report.

Follow-up Reconnaissance

On 12 October 2011, EPA personnel returned to the Ketchum Bluff area to gain site access from both the Oklahoma and Texas sides of the Red River and to conduct reconnaissance activities of the reported off-gassing and river conditions. During the site reconnaissance visit, EPA gained

access on the Texas side of the Red River for the current site visit and for any future site follow-up visits with the accompaniment of a Texas Parks and Wildlife Department (TPWD) game warden. While on-site, EPA observed the river was significantly deeper and minimal off-gassing was observed possibly due to the large-volume flow increase of the river. EPA also met with representatives of the OCC at Ketchum Bluff.

On 02 November 2011, EPA mobilized to the Ketchum Bluff area to attempt to air monitor the surface water off-gassing along the Red River near Ketchum Bluff and to collect air samples for VOC and siloxane analyses. EPA gained access to Ketchum Bluff from the Texas side of the Red River under the supervision of a Texas Parks and Wildlife Department (TPWD) game warden. While on-site, EPA did not visually observe off-gassing along the river water surface and, therefore, determined it was not feasible to air monitor the off-gassing or collect air samples for laboratory analyses.

During the follow-up site reconnaissance in the Ketchum Bluff area, EPA observed personnel from ODEQ and the TPWD collecting samples while OCC personnel and a local landowner observed field activities. After completing site field activities on 02 November 2011, EPA demobilized from the site.

Additional Site Data

The EPA Region 6 Houston Laboratory received six samples of the cloudy, gel-like material that formed during the extraction step during SVOC analysis of water samples conducted by ODEQ at their laboratory and originally collected by ODEQ field personnel. The EPA Houston Laboratory analyzed the gel-like material for metals and identified elevated levels of manganese in all six samples of the gel-like material (Attachment G). After completing the analysis, the Region 6 Houston Laboratory shipped two of those samples to the EPA NEIC laboratory for analysis. The EPA NEIC laboratory determined that the gel-like material contained elevated levels of magnesium hydroxide and sodium chloride (Attachment H).

The EPA has been conducting studies on fish and water samples from the Red River that were collected by ODEQ personal and shipped to their laboratory for analysis. Through these studies, the EPA has determined that a type of mycotoxin was present in the river. While the EPA

recognizes that the mycotoxin is a potential cause for the fish kills, it is not confirmed as the source of the fish kills that have occurred on the Red River starting in July 2011 to present. As stated in the EPA summary, EPA and the State of Oklahoma officials are uncertain as to how the mycotoxins may have entered the river (Attachment I).

Path Forward

This report represents site reconnaissance, sampling, and analytical activities conducted through late 2011. Reports of recent fish kills in June 2012 have resulted in EPA conducting additional sampling and investigation activities that will be included in this report upon their completion.

5. LIST OF ATTACHMENTS

A. Site Maps

Map 1: Site Location Map

Map 2: Site Area Map

Map 3: Multi-Agency Sample Location Map

Map 4: EPA Sample Location Map

Map 5: Up River Sample Location Map

Map 6: Mid River Sample Location Map

Map 7: Down River Sample Location Map

B. Water Quality Data Readings

C. Water Analytical Results

D. Sediment Analytical Results

E. NRC Report No. 986848

F. Digital Photographs

G. EPA Laboratory Data for ODEQ

H. EPA NEIC Data

I. EPA Summary of Findings