

**Management of Debris, Waste, and Operational Issues at a Multi-Jurisdictional Inland Oil Spill: A Coffeyville, Kansas, Refinery Oil Spill Case Study**

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**ABSTRACT**

Severe flooding in southeast Kansas caused the Verdigris River to overtop the levee surrounding Coffeyville, Kansas on July 1, 2007. Flood waters carried approximately 2,145 barrels of crude oil from Coffeyville Resources Refinery (the refinery) through the town of Coffeyville and southward into Oklahoma. On-Scene Coordinators (OSCs) from EPA Region 7 were deployed to Coffeyville on July 1, 2007. The refinery signed an Administrative Order on Consent with EPA approximately one week later, and subsequently submitted a work plan to EPA. Given that the release originated in Kansas, Region 7 was the lead EPA region, and coordinated with the state of Kansas and other regional stakeholders; EPA Region 6 had on-site personnel and provided oversight support and coordination with the state of Oklahoma. EPA regions, states and local stakeholders managed the incident response under unified command. Communication and coordination between the two states, two EPA regions, the refinery, and local representatives were major response challenges. Physical and infrastructure issues included the lack of local power, drinking water, and wastewater services during the initial phases of the response. Extensive agricultural areas were flooded and oil impacted. EPA Region 7 did not receive a Federal Emergency Management Agency (FEMA) Mission Assignment for management of oil and hazardous materials. The final steps in this response involved the demolition of over 300 structures that were impacted by oil and ultimately acquired by the refinery. The demolition of these structures required consideration of National Emissions Standards for Hazardous Air Pollutants (NESHAPs) and management of the demolition and disposal process by an asbestos management contractor for the refinery. EPA Region 7 coordinated the oversight of demolition activities with the appropriate state agencies. This paper intended to highlight the unique response challenges that were faced in addition to standard oil response procedures.

**INTRODUCTION**

During the late spring and early summer of 2007 heavy rains in central and southeastern Kansas caused local river levels to rise. As the rivers rose, downstream communities began to monitor stream gauge readings in their neighboring waterways. One such community was Coffeyville, Kansas. Coffeyville is a small town in southeast Kansas near the Oklahoma border. One of the town's larger employers is the Coffeyville Resources Refinery, located on the north side of town, just inside a protective levee adjacent to the Verdigris River, which flows southward through Kansas and into Oklahoma. During the night of June 30, 2007, the Verdigris River overflowed the levee around Coffeyville. The rapidly rising river exceeded the height of the levee by 3.9 feet. These flood waters entered the refinery and a release of crude oil occurred.

The final approximation of the volume of oil released was 2,145 barrels. While standard operational practices for oil spill clean-up and response were utilized during this response, the intent of this paper is to highlight the debris and waste management issues and the associated multi-jurisdictional and operational challenges associated with an event of this magnitude.

### **SITUATIONAL BACKGROUND**

The Verdigris River flows along the northern edge of Coffeyville, turning south at the northeast corner and heading towards Oklahoma. During this flooding event, crude oil was carried into approximately one-third of the town of Coffeyville, then southward 11 miles into rural Oklahoma. When the river topped the levee, water rushed in and turned the normally minimal path of the river into a broad flowing lake. Coke fines were also released from the refinery, suspended in the flood waters and deposited in the town of Coffeyville. The flooding Verdigris River carried oil southward into rural Oklahoma, affecting agricultural properties and leaving oil stained rings on trees at heights 10 to 15 feet above the ground. Although in a similar geographic setting, the debris and waste management issues from Kansas to Oklahoma differed. The protection of drinking water and mitigation of effects on agricultural properties were the primary focus of the response in Oklahoma. However, in Kansas, the impacts were more related to an urban-type setting with debris and wastes being derived from commercial/industrial areas and residences.

The flooding disrupted utility systems, including electrical, water, and wastewater systems. Raw sewage releases from upstream communities affected by flooding caused concerns of high bacteria levels in the flood waters. A boil order was put in place for the town's drinking water, as more than 300 homes and business structures were flooded. At the height of the flooding, water levels in town were six to eight feet deep. Single story homes had water near the eaves. Crude oil was observed floating on the water collecting in backwater and eddies. As the flooding continued, a portion of the oil continued to flow southward while much remained trapped in town, causing staining and oil deposits on buildings and other structures. Water levels gradually receded over the next week due in part to the city engineers pumping flood waters over the levee, leaving flooded buildings, vehicles and equipment, silt, coke fines, and oil deposited through approximately the eastern third of Coffeyville. The flooding of residences and businesses, in conjunction with the oil spill, created unique response considerations in addition to the usual challenges faced during an oil spill response.

### **INITIAL RESPONSE CONSIDERATIONS**

During the initial days of the response, the Environmental Protection Agency (EPA) Region 7 office based in Kansas City mobilized federal On-Scene Coordinators (OSCs) and an EPA Mobile Command Post (MCP) to Coffeyville and opened a U.S. Coast Guard (USCG) Pollution Removal Funding Authorization (PRFA) for an initial sum of \$600,000. The final PRFA for the EPA Region 7 response was \$900,000.

The EPA personnel deployed to Coffeyville were responding primarily under the authority of the Oil Pollution Act (OPA), although many other issues caused by the flooding would affect this OPA response. Due to concerns that hazardous substances and other contaminants were present in the flood waters, EPA began collecting flood water samples for analysis of volatile and semi-volatile organic compounds, pesticides, metals, and particulate air samples under EPA's Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) authority and funding. EPA also coordinated the collection of samples for analysis of fecal coliform levels. The Coffeyville Resources Refinery (the refinery) activated its

Oil Spill Response Organization (OSRO) contract and initiated a response to the oil spill. EPA began negotiating with the refinery to enter into an Administrative Order on Consent (AOC) to ensure the appropriate response and cleanup of the spilled oil.

Also during the initial days of the emergency, an Incident Management Team (IMT) was deployed by the State of Kansas to support the city's emergency response and recovery. At that time the perimeter of the affected area was shut down with access managed by the Kansas National Guard. EPA and refinery personnel had to present identification badges in order to enter the secured perimeter of the affected area to carry out assessment and sampling activities.

For jurisdictional considerations during the response, the oil from this spill originated in Kansas and was carried into Oklahoma on flood waters. Crossing the border from Kansas into Oklahoma not only involved two states, it also involved two EPA Regions. The State of Kansas is in EPA Region 7, while the State of Oklahoma is in EPA Region 6. This cross-regional impact required extensive coordination between the two states and two EPA Regions. Given that the spill originated in Kansas, EPA Region 7 assumed the lead for oil spill response activities. EPA Region 6 established a command post in Oklahoma and also provided a liaison to work in the Region 7 command post. Multiple conference calls and planning meetings occurred daily. In addition to the surface impacts of oil, the State of Oklahoma was focused on any potential impacts to drinking water intakes for towns along the Verdigris River and in Lake Oologah, the latter of which serves as the drinking water source for the City of Tulsa, Oklahoma.

This use of the Incident Command System (ICS) supported and facilitated this response action. The EPA and the affected states joined in Unified Command with the refinery, and coordinated the operational actions during tactical and planning meetings held throughout the response and recovery phases. Incident Action Plans (IAPs) were developed for each operational period, and approved by the members of unified command. In addition to the standard ICS meetings, multiple coordination and communication meetings were held daily between the EPA regions, the affected states, and the city of Coffeyville.

### **SHORELINE CONTAMINATION ASSESSMENT**

Shoreline Contamination Assessment Teams (SCATs) were used during this response to determine the extent of the oil spill. Teams were comprised of representatives from EPA, the states of Kansas and Oklahoma, and refinery personnel. Standards were developed to determine the degree of oiling and the appropriate cleanup method. The SCAT process was mainly used in areas of rural Oklahoma where the Verdigris River normally flowed within its banks along agricultural properties. However, during this flooding event the Verdigris River was out of its banks, in some places 10 to 15 feet higher than the surrounding land. The application of the SCAT process in these rural areas allowed the identification of some areas where oil was carried into small creeks by the flood waters, and then deposited when the waters receded. The EPA and the affected states reviewed the SCAT cleanup plans and concurred that some oil staining on trees and vegetation in rural areas would be left to weather or degrade in place, because attempts to power-wash vegetation would have been more damaging.

### **OIL IMPACTED PROPERTY MANAGEMENT**

#### **Residential Property Management**

The AOC agreement between EPA and the refinery required the refinery to remediate or remove oil from any impacted properties and structures. More than 300 homes in the town of Coffeyville were flood damaged and contaminated with oil. This posed a unique challenge with some potential uncertainty as to the final results. Most oil removal was conducted manually,

using gross oil removal techniques such as wiping with sorbent materials or hot water power washing.

One response consideration for this clean-up was that the refinery would be required to remove oil and staining from structures and homes that had been inundated with water and remained underwater for some time. While removal of the oil was the responsibility of the refinery, complete re-conditioning of the flood damaged structures was not. The wiring, appliances, structural and finished interior of these properties would also require replacement. Most property owners did not have flood insurance for the damage caused by the flooding. Some homeowners wanted to rebuild their homes immediately and began gutting the structures and piling appliances, building materials, and household hazardous waste (HHW) at the curb, expecting local, state, federal, or refinery personnel to dispose of it.

The city did not have the capacity to handle this volume of construction and household debris and waste; the refinery was only required to mitigate oiled items; and EPA Region 7 had not received a FEMA mission assignment for the management and disposal of HHW. As part of the refinery's cost-benefit considerations for the oil spill response action, the refinery offered buyouts to homeowners in the flooded and affected area. Over the course of four months after the initial spill, over 300 homeowners accepted buyout offers, leaving the refinery as the owner of multiple square blocks of homes of varying structural conditions, covered with oil residue, containing HHW and appliances, and requiring demolition.

### Commercial Property Management

Residential properties were not the only ones impacted by the flooding and oil. Businesses were affected, too, including several hotels and restaurants, a used farm implement dealer, two liquor stores, a gas station, and a grocery store. While many businesses were offered property buyouts, the buyout was intended only to cover the cost of the structure, not the business itself, so the response by businesses to the buyout offer was mixed. For those businesses that were not bought out, the refinery was required to remove any oil or oil staining from the structures and the surrounding property. In many cases, this necessitated the removal of interior sheet rock and other absorbent building materials, and power washing of structural members and hard goods. During the removal of oil and oil stained items, an extensive amount of construction related debris was generated.

## **WASTE DISPOSAL ISSUES**

As mentioned previously, homes and businesses were destroyed by flooding, the structures and their contents covered with oil. During the overall response and oil spill mitigation, hundreds of structures were demolished, and others had portions of their interiors removed to reveal structural members. The disposal of the various contents of these structures, both residential and commercial, as well as the final structural demolition, posed regulatory and logistical challenges.

### Liquor Store Waste Disposal

Several types of businesses were impacted by this oil spill. As mentioned previously, two liquor stores were flooded and their contents covered with oil. This posed the issue of how to dispose of thousands of individual containers with oil on the outside and liquor on the inside. While other oiled waste was disposed of in a permitted solid waste landfill, the presence of liquid inside each container did not allow them to be disposed as solid waste. After some state and local coordination, it was determined that each individual container of liquor from the two impacted

liquor stores would be opened and emptied into large totes. These totes were then transported to the local wastewater treatment plant and disposed as liquid waste.

In the State of Kansas, liquor is regulated by the Kansas Department of Agriculture. Personnel from this department monitored the bulking of liquor from individual containers into totes, and then oversaw the transfer of the bulk totes to the wastewater treatment plant. The individual cans and bottles, once emptied, were disposed of as oiled debris in a permitted solid waste landfill.

#### Putrescible Waste Disposal

A grocery store was also flooded, and the contents covered with oil as the water receded. All refrigeration units in the store were non-functional due to flooding, and their contents had remained in flooded cases and unpreserved for some weeks. Due to public health considerations, this putrescible waste could not simply be disposed as oiled debris, but was removed from the store by personnel wearing respiratory protection and placed in lined trucks for disposal in a permitted Subtitle D Landfill. The putrescible waste that was removed from the grocery store was covered with lime in the landfill.

#### Household Hazardous Waste Disposal

Many of the homes and commercial structures that were flooded and oil impacted also contained multiple small containers of hazardous waste. This household hazardous waste (HHW) was present in enough volume that it required management as a separate waste stream. This again brought the question of how to manage small containers that were covered with oil on the outside, yet had specific disposal requirements for their contents. As previously mentioned, EPA Region 7 did not receive a Mission Assignment from FEMA for the management of this waste stream, yet the responsibility of the refinery was only for the removal of oil, not management of hazardous waste. After some discussion and negotiation, the refinery agreed to remove the HHW containers from properties as the buyout progressed, as well as conduct gross removal of the oil on the outside of the containers, and set up a contract mechanism for disposal of the hazardous waste stream. In a similar manner, the refinery also managed the small containers of hazardous waste that were removed from the grocery store. This waste stream consisted of such items as bleach, household cleaners, drain treatments and pesticides.

#### Construction Debris and Asbestos Containing Material Disposal

The process of oil removal from structures that were not intended for demolition, and would be re-built, entailed the removal of absorbent materials such as sheet rock and insulation, and power-washing the structural members. The interior building materials removed during this process were transported to a permitted construction and demolition landfill in Kansas. However, when considering complete demolition of hundreds of structures, mostly small homes, additional waste management issues had to be considered. The National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulates the management of Asbestos Containing Materials (ACM). Many building materials, especially in older homes, may contain asbestos. These building materials can include, but are not limited to, caulk, tile and tile mastic, sprayed on coatings, wall board, shingles, siding, and pipe insulation. There is a waiver to NESHAP that allows for the complete demolition of structurally unstable buildings without an assessment for ACM. This waiver allows the assumption of some ACM in the building, and requires wet demolition and transport of the wetted demolition debris in lined trucks to a permitted asbestos cell in a Construction and Demolition Landfill.

More than 300 homes and several businesses were slated for demolition and disposal. It could not be clearly demonstrated, despite the fact that they had been inundated and underwater for up to a week, that these structures could be defined as structurally unstable. Therefore each

structure was assessed by the City of Coffeyville for structural stability. Those structures that were unsound were slated for complete demolition using the wet method and transport in lined trucks. Structures that were found to be sound enough for entry were inspected for ACM, the ACM abated by a certified asbestos abatement contractor, and the remaining structure demolished and disposed of in a Construction and Demolition Landfill.

### **SUMMARY**

The response to this oil spill was complicated by numerous issues and aspects, including the flooding of residential and agricultural properties, property buyouts, multiple regulatory jurisdictions and environmental regulations. During most oil spill response actions, basic spill response processes are used, such as open water oil boom, skimmers, and sorbents. While these were an integral part of this inland spill response, this paper highlights the additional unique challenges that were faced by regulators and responders regarding the Coffeyville Resources oil spill in 2007. These challenges included environmental regulatory and management processes that had to be considered—including, but not limited to, NESHAPs, the Resource Conservation and Recovery Act (RCRA), and state and local disposal requirements. This response brought to bear an administrative order between EPA and the responsible party, with the majority of the spill response and resulting clean-up and structural demolitions being conducted for a period of six months after the spill occurred.