United States
Environmental Protection Agency

The U.S. EPA's Oil Program Report

May 2004

Contents

Special Issue
Freshwater Spills Symposium 2004

The U.S. EPA's Oil Program hosted the Fifth Biennial Freshwater Spills Symposium (FSS) 2004 on April 6–8 in New Orleans, Louisiana. Kicking off the event with welcoming remarks and introductions were Beatriz Oliveira, EPA Oil Program Headquarters; Don Smith, Senior On-Scene Coordinator in EPA Region 6; and Roland Guidry, Oil Spill Coordinator in the Louisana Governor's Office. Joining in the welcome, Jimmy Graham, EPA Region 6, briefly introduced the crowded plenary hall audience to "An Integrated Approach" Region 6 has developed within their Oil Program.

For FSS 2004, the EPA Oil Program expanded the opening sessions to two plenaries. In the first plenary, Debbie Dietrich, Director of EPA's Office of Emergency Prevention, Preparedness, and Response, and Barbara Davis of EPA Oil Program Headquarters, along with Mike Drieu and Ray Perry of the U.S. Coast Guard (USCG), discussed issues related to Homeland Security and revamping the National Response Plan, and how these efforts will affect freshwater spill response. The Homeland Security

Containment boom deployment during the equipment demonstration.

discussion included the USCG's interim rules addressing security for ports, vessels, and facilities to implement the security requirements of the Maritime Transportation Security Act of 2002. The rules apply to facilities that are regulated by both EPA and the USCG, and EPA has raised several issues with the USCG on the universe of facilities covered by the rules. Barbara Davis' presentation went on to outline approaches that EPA can take to continue coordination with USCG and to assist regulated facilities in complying with these new security requirements. In the second plenary, EPA Oil Program Director David Evans, staff members Mark W. Howard and Nick Nichols, and invited state and industry guests presented "Trends in the EPA Product Schedule and Oil Spill Prevention." Exhibits from EPA Headquarters, Region 5, and Region 6 Oil Programs were on display and provided attendees with outreach materials.

For FSS 2004, more than 70 speakers volunteered their time and efforts to share their experience and expertise with attendees through breakout presentations, several of which are highlighted in this special issue of the *Update*. A number of these participants represented countries other than the U.S., showcasing the efforts taking place abroad. The presentations covered a wide array of spill-related topics such as biological countermeasures, petroleum storage tanks, planning, prevention, restoration, new technology, and case studies. Additionally, Nick Nichols of EPA Headquarters hosted a special session designed to gauge interest in and target the direction of a future Dispersant Workshop, which drew many interested parties. Contact Mr. Nichols at nichols.nick@epa.gov or 706-603-9918 for more information on this workshop.

Taking advantage of the riverside location of the Hilton conference center, FSS provided an equipment demonstration on Wednesday, April 7th. Mike Drieu, USCG, and invited vendors gave talks on spill response equipment and had several pieces of gear on hand for attendees to examine. Following the presentation on use and functionality, some of this equipment was then deployed on the Mississippi River.

Positive feedback was received from attendees and speakers at FSS 2004. The FSS Design Team succeeded in providing an event that presented as much information as possible over the symposium's short duration, yet still allowed for plenty of time for networking and off-line exchanges.

Please read on for synopses of some of the presentations given at FSS 2004, and visit the EPA Oil Program's Internet site at www.epa.gov/oilspill/fss for more information on the symposium.

Analysis of Benefits of EPA Oil Program

Presenter: Dagmar Schmidt Etkin, Ph.D., Environmental Research Consulting, etkin@environmental-research.com

The U.S. EPA Oil Program benefits were analyzed quantitatively with respect to prevented oil spills in non-marine navigable waters in EPA jurisdiction for oil spill response and also from facilities. Spills per million barrels of petroleum consumption have decreased by nearly 50 percent since 1980. Spills into inland waters result in average annual costs and damages of $2.7 billion, including $936 million for response, $1.3 billion for environmental damages, and $445 million for socioeconomic damages.

Comparisons of actual spillage and hypothetical spillage (spillage expected with increased petroleum consumption with no spill prevention measures) show that spillage prevented by the EPA Oil Program and other authorities (U.S. Coast Guard and state agencies) has increased from an average of 120 spills and 2 million gallons per year prevented during the 1980s, to 600 spills and 13 million gallons per year in 2003. Increased benefits of spill prevention should be realized over the next decade as oil consumption rises and spill rates continue to fall.

Costs averted due to prevented spillage averaged $1.3 billion annually since 1982, including: $391 million for response in EPA jurisdiction ($424 million for non-marine facilities); $224 million in environmental damages in EPA jurisdiction ($242 million for non-marine facilities); and $631 million in socioeconomic damages in EPA jurisdiction ($676 million for non-marine facilities). In 2003, the annual cost of inland waterway oil spills was estimated at $1.1 billion. Without prevention measures, costs would be an estimated $3.4 billion. In 2003, there were an estimated $2.3 billion in costs averted for prevented spills in EPA jurisdiction and $2.1 billion in costs averted for non-marine facility spills.

State of Coastal OSROs and Their Inland Survival

Presenter: John Temperilli, Garner Environmental

Since 1989, the volume of oil spilled in the U.S. as well the number of spills has decreased. Many attribute this to the implementation of the Oil Pollution Act of 1990. This trend has had a negative effect on Oil Spill Response Organizations (OSROs). The amount of spending on and capital generated by oil spill response activities has been decreasing, creating problems for coastal OSROs.

Commercial companies can no longer rely solely on emergency response activities for the future growth of their businesses. These companies now have to look to branch out into other fields and diversify their capabilities to remain competitive. Many have expanded their businesses to respond to hurricanes, floods, HazMat, and even international response activities.

A limited understanding of new technologies and equipment and the lack of experienced professionals have also become a problem. With experienced personnel retiring, new responders have not received the necessary hands-on training to make the decisions in the field. Also, with decreased spending on emergency response, companies do not see the advantage of investing their money in new technologies and equipment. The potential for a major spill incident is increased by inexperienced personnel with out-dated equipment.

With spill responses and demand for coastal OSROs continuing to decrease, action must be taken to prevent a major incident from occurring. The personnel responsible for response and removal need to be trained and provided with the current technologies in order to be prepared. Companies and government organizations need to continue to build relationships and work together to improve and support the capabilities of the OSROs.

Restoring Oiled Wildlife: The Cooper River Spill

Presenter: Susie Michaelson, Tri-State Bird Rescue & Research, Inc., smichaelson@tristatebird.org

In October 2002, the 12,500 gallon oil spill on the Cooper River was the result of a gaping hole torn in the hull of the container ship *Ever Reach*. Originating at the old naval base along the Cooper River in South Carolina, the oil eventually migrated down to the Charleston Harbor. Several miles of shoreline were impacted including sand beaches, marshes, shellfish beds, fishing areas, ports, and even Fort Sumpter.

Crab Bank, located in Charleston Harbor, is home to one of the largest breeding colonies of brown pelican. Tri-State Bird Rescue & Research, Inc. was called to the scene to respond to the oiled wildlife. Several factors should be considered when responding to oiled animals, such as the possibility of nesting areas outside the direct impact zone, in addition to regularly occurring bird patterns (e.g., loafing, roosting, and feeding).

Through careful analysis of field conditions, including fog, temperature, daylight hours available, and tidal patterns, Tri-State developed a retrieval plan for the oiled brown pelicans. The three steps of a good retrieval plan generally include the following: 1) capturing all immediately debilitated animals (i.e., birds that are severely oiled, at risk, and need immediate treatment); 2) identifying the resources that will be required to retrieve remaining animals impacted by the spill; and 3) initiating the bait and capture of the remaining animals.

In the Cooper River spill, there were no immediately debilitated animals; in all, 24 pelicans were only moderately oiled. Some of the resources that were identified for the retrieval effort included boats with skilled operators, nets, Tri-State personnel, the South Carolina Department of Natural Resources, and the U.S. Fish and Wildlife Service. In terms of baiting and capturing the birds, responders used high tide to their advantage because there was more water and less land to cover, which made it easier to flush the birds towards response personnel. The most common baiting techniques for brown pelicans are manually grabbing the birds by the bill or netting them with either a bow net or a cast net.

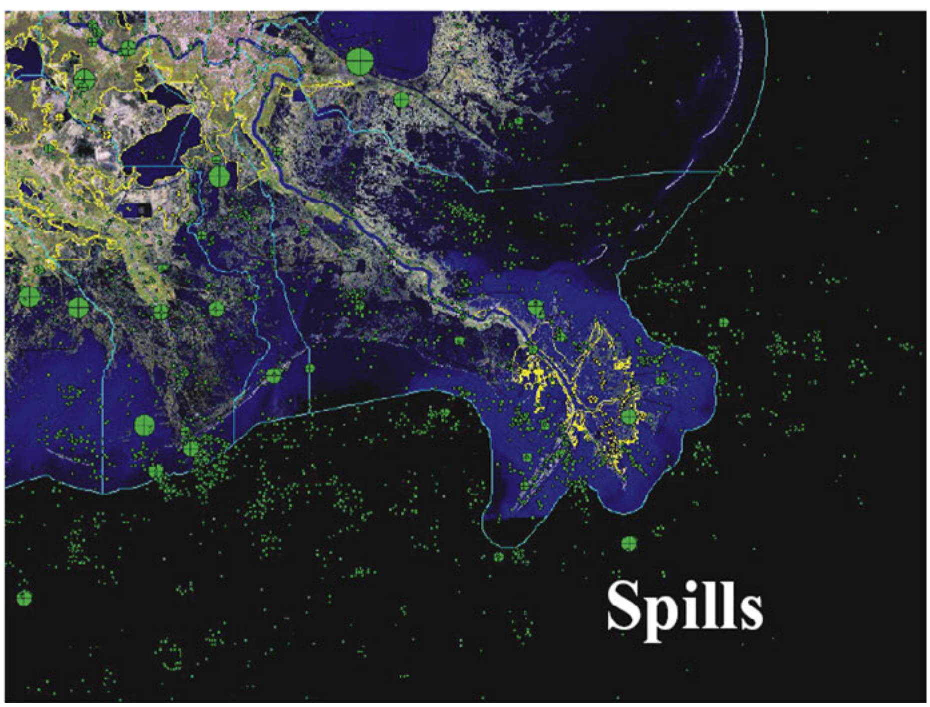
It is important to consider animal safety throughout the capture process. Birds could easily die due to the combination of fear and anxiety coupled with muscle exertion, a term known as "capture myopathy." This type of death is more common in warmer climates with heavier bodied birds. Anxiety can be minimized by covering the animal with a sheet and putting it in a well ventilated, solid box.

During the rehabilitation process, the birds receive an exam, blood work, and a thorough cleansing. Once they have become acclimated to outside conditions, the birds are ready for release. In the case of the Cooper River spill, all 21 captured brown pelicans were released back to the wild - a 100% release rate. In fact, one of the birds was discovered in Cuba six months later.

From the Marshes to Deepwater, Louisiana's Hydrocarbon Infrastructure is at Risk

Presenter: Donald W. Davis, Ph.D., Louisiana Applied and Educational Oil Spill Research and Development Program, osradp@attglobal.net

In 1901, oil was discovered in Jennings, Louisiana. Access to the oil was a problem, there were no methods for wetlands exploration. Over the last 100 years, Louisiana has lost over 400,000 hectares to open water. Prior to 1940, the majority of the oil and gas fields were in freshwater. Subsidence, the rise in sea level, and loss of land have contributed to all but one oil field being located in open saltwater. All of these fields are vulnerable to oil spills and are at risk, particularly those directly offshore. Due to the ever-changing conditions and dynamic environment of the Louisiana coast and Gulf of Mexico, the oil industry



Spills recorded in the vicinity of the Mississippi Delta.

has to adapt to these changes and be prepared to respond in case of an incident.

Nearly a quarter of the oil consumed in the U.S. travels through Louisiana via pipeline, tanker, or barge. Port Fourchon is the main logistics center for oil in the U.S. and is the largest ship-to-truck transfer port. The road used to transport the oil is currently at sea level. If this road were destroyed, the U.S. would lose 20 percent of its oil production. The Gulf Coast is also affected by hurricanes and tropical storms. The loss of roadways may present problems, not only with transportation of oil, but also with the ability of personnel to respond to a spill.

The landscape of Louisiana's shoreline is changing faster than the contingency plans. The state's pipeline network is at risk. Many thousands of kilometers of pipeline cross wetlands. Another factor of concern is the loss of wetlands along the coast. The Mississippi River is discharging at a rate that forces the sediments into the deeper water. The land along the coast is subsiding at a rate greater than sediment build-up. Therefore, wetlands are being submerged at an incredible rate. Pipelines and tanks that were once buried beneath these wetlands are now exposed. The pipelines and tanks that were built for freshwater environments now may be submerged in a marine environment.

Most current response and contingency plans do not take these conditions into account. The Minerals Management Service (MSS) provides exercises and training on these situations. Through the Oil Pollution Act of 1990, the MSS monitors the response capabilities of offshore operators. The MSS conducts announced and unannounced exercises to help prepare the oil and gas industry to respond to a spill event. Following the exercises, the MSS prepares a report detailing the strengths and weaknesses of the responders.

The complexity of the site and lack of current response contingency plans puts the Gulf Coast potentially at risk for a major spill event. In the future, plans need to take the freshwater plume created by the discharge of the Mississippi River into account. The occurrence of extreme weather conditions also increases the risk of a spill and may complicate spill response activities. Response planning and understanding of the marine and freshwater environments are essential for the protection of the Gulf Coast.

Impact of Oil Spill Removal on a Freshwater Wetland

Presenters: Michael F. Solecki, On-Scene Coordinator, U.S. EPA Region 2 Removal Program, solecki.michael@epa.gov; Royal J. Nadeau, Ph.D., The Eco-Strategies Group LLC

During the winter of 1996, a high water event caused oil to seep out of the ground and contaminate a floodplain wetland along the Pequannock River in Green Pond, New Jersey. The source was from a subsurface reservoir of oil remaining from a former pipeline. The original site facility was operated by the New York Transit Company after the 1911 Trust Bust (Standard Oil Company was the holding company). Operating as a crude oil pumping station, the pipeline was active from 1881 to 1920, then abandoned and torn down. The Green Pond Oil Spill site is quite unique in that it has a significant link to history. The former pumping station was part of the first major oil pipeline in the U.S., transferring over 50,000 barrels of crude oil per day from Olean, New York, to Bayonne, New Jersey. A total of eleven pumping stations were built every 28 miles along the length of the pipeline. Historical records indicate operations incorporated large bottomless breakout tanks to maintain pressure and keep the oil moving within the pipeline. The 1996 event raised ground water levels to the point that the confining layers in the bottomless tanks broke-through, causing the oil to flow out into the Pequannock River.

The affected wetland area is home to hundreds of bear, native trout, bobcat, and rare bird species. The Highlands forest that surrounds the Green Pond Oil Spill site provides clean drinking water for over 15 million people in New Jersey and New York City. After the initial oil spill discovery, the affected river area was boomed off and interceptor trenches were installed before soil removal began. Monitoring wells and a product recovery system were installed over a 15-acre area covered with floating oil. During the initial recovery phase, over 8,000 gallons of oil were pumped out of the wetland. The vegetation and topsoil were removed as part of the initial spill cleanup effort and the process of regenerating the native species in the wetlands began. During the autumn of 1998, coir logs were set up to stabilize the stream bank and cut down on erosion. By April 1999, potted plants were introduced to the site and the whole wetland area was fenced to keep out deer, allowing the plants to thrive.

There have been many successes over the course of the oil spill removal. Some of the lessons learned from the removal process include: 1) low level soil, total petroleum hydrocarbon (TPH) levels do not adversely affect potted shrub survival; 2) occasional re-occurrence of oil in the area does not affect the plant community as a whole; and 3) although the number of plant species has decreased, the plant community has maintained many of its characteristic species, such as sedges, rushes, and herbs. Since the beginning of the removal and recovery program, it is estimated that 38,000 gallons of oil have been recovered.

When Low Technology is the Answer

Presenter: Bob Mandel, U.S. EPA Region 9, On-Scene Coordinator, mandel.bob@epa.gov

Emergency responders need to resist the temptation to over-build response facilities. They need to balance the inherent conflicts of safety and effectiveness with the costs and benefits of the chosen response strategy. Emergency responders should always try to apply the simplest, most appropriate technology to the site and its problems. This should result in the most cost-effective and least disruptive response, while ensuring that the commitment to protect the human health and the environment is upheld.

A low technology solution was applied in central California, where oil seeps are common. One seep discharged up to 15 barrels per week into Toro Creek. Many discharges of heavy oil occurred each year from this seep. Stopping the flow was not feasible based on the recommendations of geologists; therefore, the goal became to keep the oil from entering Toro Creek. Due to the site's remote location, lack of electricity, and steep terrain, an innovative oil-water separator system was installed that was linked by gravity to an underground storage tank. In order to made this solution work, the following features were employed: 1) there were no moving parts, all separation and collection was done by gravity; 2) solar power ran a monitoring system and modem, which monitored system performance and phoned emergency responders if there was a problem; 3) all oil was collected, conveyed, and stored within secondary containment; 4) due to past vandalism, key elements of the system were buried for greater security; and 5) only four hours per month were required for routine operations and maintenance activities. Approximately two to four barrels of oil were retrieved each week.

There was a complication with this system during the last El Niño. With a heavy amount of rainfall, the oil-water separator was overwhelmed and water entered the underground storage tank. The pipelines were also exposed. To address failure during very high flow, the capacity to handle peak flows was increased to 800 gallons per minute. An additional upstream oil-water separator was installed and a new bottomless oil-water separator was set up on top of the seep.

EPA worked with the terrain and setting to design and construct an effective recovery and containment system. As a result of applying "appropriate technology" at this oil spill, there is no longer oil in Toro Creek. This situation highlights the use of conventional construction methods and readily available off-the-shelf supplies and equipment to build a treatment system.

Standard for Inspection of In-Service Shop-Fabricated ASTs

Presenter: Wayne Geyer, Steel Tank Institute, wgeyer@steeltank.com

The "Standard for Inspection of In-Service Shop-Fabricated Aboveground Storage Tanks (ASTs) for the Storage of Combustible and Flammable Liquids" (STI SP001) was developed by the EPA in conjunction with other federal agencies, introduced as a rule in 2000, and revised in 2003. Shop-constructed tanks differ in construction and installation from other large bulk storage tanks, and fall outside the scope of the American Petroleum Institute standard under which larger field-built tanks are inspected. Shop-built tanks are smaller, with capacity usually limited to 50,000 gallons. Since few states offer certifications for AST installers, inspection is important to ensure the integrity of even small ASTs.

As a provision of the Clean Water Act, applicable oil handling facilities must develop a Spill Prevention, Control, and Countermeasures (SPCC) Plan that is certified by a professional engineer. The new rule states, in addition, that each aboveground container must be tested for integrity on a regular schedule, combining visual inspection with another testing technique, such as hydrostatic testing, radiographic testing, ultrasonic testing, or other approved methods utilizing different technologies to measure the strength of the container wall without damaging or weakening it. Containers must also be inspected frequently for signs of deterioration, discharge, or oil accumulation.

The ultimate purpose of all such tank standards is to prevent the release of oil product and other hazardous chemicals into navigable waters. A majority of releases from ASTs may occur during the process of filling and dispensing oil. In many cases, a spill results not from an actual failure of the tank itself, but of important tank attachments such as vents, anti-siphon devices, gauges, alarms, shut-off valves, and spill buckets that were either installed improperly or not at all, or were not appropriately maintained. Efforts were made during the 1990s to ensure that industry tank standards acknowledged the importance of attachments, and to incorporate them into routine inspections. The new rule for shop-built tanks requires tank owners to visually inspect tank attachments monthly and regularly verify their operability.

Early identification of tank corrosion is another primary issue in release prevention. The new rule allows for corrosion to be detected in a number of ways, including pressure tests and tank wall thickness measurements. Tank wall thickness must be compared to its original thickness. Under certain conditions corroded tanks can be repaired, but in all cases, the cause of corrosion (commonly water) must be determined and removed from the system.

The small shop-built tank is considered by some to be unsophisticated equipment that does not merit the new and more rigorous inspection standard. However, recent evaluations have demonstrated an alarming level of non-compliance with the new rule among shop-built tanks, even among tanks that have been signed off as meeting code by the local jurisdiction. In a recent inspection of a major facility, 90 percent of the 28 ASTs in use lacked adequate venting and overfill protection, and over half did not have the required containment and spill control. Other common violations included rusted-shut emergency vents, leaks, and inadequate foundations.

Certified inspection by a qualified tank inspector must be conducted every ten years (and in some cases, five years). The cost for a ten-year inspection of a shop-built tank is dependent on location, quantity, type, capacity, and age, often exceeding $1000. It can also be dangerous; many fatalities have occurred among untrained personnel performing operations around tanks that store or once stored flammable liquids. Operators are encouraged to take the STI Certification course, which provides detailed instruction on how these inspections take place, the methods and type of equipment that can be used, and criteria for evaluating the tank's integrity. Attention to detail is paramount to shop-built AST inspection, and in every owner's best interest, to ensure that storage systems are effective throughout their life span.

Overview of Recent CWA Judicial Enforcement to Address Oil Pipeline Spills

Presenter: Cheryl Rose, U.S. EPA Headquarters, rose.cheryl@epa.gov

The Clean Water Act (CWA) prohibits the discharge of oil or hazardous substances in harmful quantities and the discharge of pollutants from a point source into waters of the United States. Enforcement of these prohibitions provides a deterrent to environmentally unsound practices and an incentive for companies to take action to prevent spills. The CWA also requires immediate notification to the National Response Center (NRC) of spills that violate this prohibition (many states and localities have other notification laws as well). The NRC forwards the notification to responders from EPA, the U.S. Coast Guard, or both. Failure to notify the NRC immediately may result in criminal charges.

Violations of the CWA may also be subject to criminal fines or civil or administrative penalties, as exemplified by two recent cases against pipeline companies for oil spills. Under the CWA, penalties can vary according to a number of factors, including the seriousness of harm caused by the spill, the economic benefit the violator gained by not preventing the spill, the violator's history of violations, and efforts to minimize or mitigate the effects of the discharge.

The Coast Guard recently analyzed NRC notifications to develop cumulative data for oil spills during 1973-2000. The Coast Guard report, called the Polluting Incident Compendium, is available on the Coast Guard website, www.uscg.mil. These data suggest that there is a greater spill problem on internal/headland waters than in the oceans: 83.8% of the volume of spills occurred on internal waters out to 3 miles offshore and nearly 50% occurred in inland/headlands waters. Pipeline spills, which are often in inland areas, comprise at least 3.5% of the number of spills reported from all vessels, facilities, and other sources, and comprise 17.5% of the volume spilled. During 1998-2002, summary statistics gathered by the Office of Pipeline Safety (OPS) from pipeline accident reports show a net loss of 378,843 barrels and property damage of $386,732,610.

The largest penalty for one defendant in an EPA civil environmental enforcement action was paid pursuant to an April 2003 settlement with the Colonial Pipeline Company for spills on its 5,500 mile-long pipeline, which runs from New Jersey to Texas. Colonial had a long history of spills, with more than 190 spills reported between 1968 and 1996. EPA alleged that Colonial was grossly negligent under the CWA in several of these spills, which would subject Colonial to treble penalties. One of the spills addressed in this action was a June 1996 spill of nearly one million gallons of diesel that were released into South Carolina's Reedy River from a rusted, exposed portion of the pipeline. Floating oil was visible for at least 23 river miles, and was present in its aqueous state for at least 34 river miles, killing an estimated 35,000 fish. Another spill at issue in the case was in May 1997, when Colonial spilled 18,900 gallons of gasoline into the Bear Creek watershed near Athens, Georgia. During the spill, a potentially lethal vapor cloud of gasoline formed and Colonial employees were forced to flee the scene and allow the spill to continue. In another spill, in February 1999, the pipeline discharged 53,550 gallons of fuel oil into and around Goose Creek and the Tennessee River, polluting at least ten miles of the river and saturating residential homes. After receiving information on a sudden drop in pressure, which indicates a leak, Colonial continued to send fuel through the line. Although they briefly shut down the line, Colonial reopened it until the fire department notified them that fuel was running into the creek. The penalty that Colonial agreed to pay in this action also resolved liability for four other spills, totaling more than 420,000 gallons spilled over a number of years.

Another landmark environmental action was taken against the Olympic Pipe Line Company and Shell Pipeline Company. The Olympic pipeline rupture in Bellingham, Washington, caused the discharge of 230,000 gallons of gasoline into Whatcom Creek that ignited, resulting in a fireball that traveled along the creek for more than a mile, devastating everything in its path, and generating a plume of smoke approximately six miles high. As a result of this spill, three people were killed (two ten year old boys and a teenager) and at least nine others were injured. The cleanup required a 22-day response and involved over 2,000 responders. The Federal and State enforcement actions resulted in $36 million in criminal fines and civil penalties against the two companies. Three employees, a manager, control room supervisor, and operator, were sentenced in criminal plea agreements that included prison terms for two of them.

The EPA On-Scene Coordinator (OSC) can play a vital role in enforcing the CWA when responding to an oil spill. OSCs are in an important position to gather evidence and document the circumstances of the spill with their first-hand observations, photographs, and detailed field journals. Photos of the spill site, despoiled wildlife, pipeline rupture or other spill cause, and other key spill components are of great importance to an enforcement case. OSCs should follow disciplined chain of custody procedures for such pieces of evidence. In many cases, OSCs are asked to provide testimony for the record. Thoroughness and professionalism is of the utmost importance.

Pipeline Release Prevention: Preventing Hydrocarbon Releases

Presenter: Ed Landgraf, Shell Pipeline Company LP, landgraf@shellopus.com

In March of 1997, Shell Pipeline Company averaged one release every 17 days. With each barrel of oil that spills, the average cost to Shell in cleanup and lost oil production costs is approximately $10,000 per barrel. Offshore releases can be even more expensive. The corporate motivation to prevent spills is beneficial to both the oil companies in terms of cost-savings in lost production time and cleanup costs, as well as to the environment.

But the real task behind preventing oil spills seems to be creating a change in mind set, not just at the corporate level, but at all levels of employment within an oil company. Awareness and ownership among all employees is the real key to success in preventing hydrocarbon releases.

A focus on release prevention emphasizes the practice of being the "best preventers" versus the old "best responders" attitude. If a company can create a training and education program to teach its employees to be expert release preventers, there will be far less need for (or dependance on) having the best responders immediately available.

To become an expert preventer, a company should evaluate its spill record and categorize each spill, whether one gallon or 20,000 gallons, by its cause, group and trend the past spill data, and form a checklist based on those data for future use in spills. For example, Shell Pipeline Company found that almost all of their past spills fit into three categories of causes: 1) equipment failure, 2) operator error, and 3) third party damage.

Once the major release causes were determined, possible prevention techniques were analyzed for each cause and put into practice. Every inch of pipeline and load line were routinely inspected for weak points or leaks to prevent future equipment failure. To prevent operator error, checklists and training sessions were developed for employees, and signs were posted at work sites with procedures in the case of a spill. Pipeline awareness presentations were given to local school children and police departments to prevent third party damage.

The results of Shell's new prevention mind set are beginning to show. In 2002, only 86 barrels out of the almost 850,000,000 total barrels produced were spilled, 78 of which were recovered.

The Ohio River Umbrella Plan

Presenter: Art Smith, U.S. EPA Region 4, On-Scene Coordinator, smith.art@epa.gov

The Ohio River spans over 980 miles from Pittsburgh, Pennsylvania, to Cairo, Illinois, and encompasses multiple response jurisdictions, including three EPA Regions, four U.S. Coast Guard (USCG) Marine Safety Offices, and six states. There was confusion as to what party was in charge along various areas of the river. Local sub-area plans had been developed, but differed in format and provided only locally-specific details. In addition, gaps existed where no sub-area planning had been done.

EPA Region 4 and the State of Kentucky have primary jurisdiction for inland spills along more than 600 miles of the Ohio River. In January 1993, the Federal Region 4 Regional Response Team (RRT) commissioned the development of an "umbrella document" to coordinate various Area Contingency Plans (ACPs) that existed along the Ohio River. The Ohio River Umbrella Plan (ORUP) will facilitate a consistent approach to response along the Ohio River for major incidents requiring the involvement of a Federal On-Scene Coordinator (FOSC).

The ORUP is not a contingency plan and does not replace any of the existing planning documents already in place for the area. Instead, it clarifies existing policy and applies it in terms of the concept of operations when responding to major oil discharges or hazardous substance releases along the Ohio River. In addition, the ORUP attempts to integrate information, including links to the existing contingency plans, and agreements between EPA Regions and other federal and state organizations, as applicable.

The ORUP is being developed as a basic response tool that will provide generic response information applicable for the entire length of the Ohio River. It is designed to be interactive and to enable users to link directly to additional sources of information.

This document will provide a description of the geographic response boundaries along the Ohio River. The response jurisdictions are broken down into "river reaches" that illustrate which EPA Region or USCG Marine Safety Office provides the FOSC, depending upon the conditions and initial location of an incident. The document concludes with a list of references (including hypertext links to websites where related information can be obtained) and a detailed summary of important contact information for the response community along the Ohio River.

The proposed timeline aims for a review of the draft document by plan holders in May 2004. In August 2004, the document will be submitted to the Region 4 RRT for approval. Finally, in May 2005, there will be a multi-regional RRT meeting to signify the endorsement of the ORUP across regional boundaries.

Train Derailment and Oil Spill into the Clark Fork River, Montana

Presenter: Jane Nakad, U.S. EPA Region 8, nakad.jane@epa.gov

On July 11, 1999, 29 of 74 total rail cars derailed in a railway accident and discharged asphalt, propane, and corn sweetener into the Clark Fork River.

Liquid asphalt and several thousand contaminated containers of beer lodged at several locations along the river bank and 26 miles downstream to the Thompson Falls Reservoir. Approximately 51,000 square feet of vegetation was damaged along the railroad right of way. A multi-agency response effort was conducted and debris, including the asphalt and asphalt-contaminated beer cans, was removed over a two week period. Approximately 39,500 of the 40,000 gallons of discharged asphalt were recovered and disposed.

An Administrative Penalty Order was issued to the responsible company in violation of Section 311(b)(3) of the Clean Water Act. The company paid a cash penalty of $17,000 and was ordered to expend not less than $55,000 for a Supplemental Environmental Project (SEP).

The SEP resulted in the purchase and staging of emergency response equipment for Sanders and Park counties' Departments of Emergency Services. Training was also provided for emergency response personnel in these counties to enhance their capacity to respond to oil spills. As a result of the SEP, Sanders and Park counties are now fully equipped to respond to oil spills into the Clark Fork, Yellowstone, and Flathead Rivers, the Thompson Falls Reservoir, and other streams and creeks. Through the training provided, emergency responders now know how to conduct on-water responses for oil and hazardous materials spills. Relationships have also been established between the railroad and local emergency managers and responders. As an added benefit, the perception of the railroad company has improved.

Voodoo Versus Science: The Practical Application of Bioremediation Techniques as a Removal Response Option

Presenters: Harry Allen, Ph.D., U.S. EPA Region 2, Emergency Response Team, allen.harry@epa.gov; Vincent Zenone, On-Scene Coordinator, U.S. EPA Region 3, zenone.vincent@epa.gov

Throughout the 1970s and most of the 1980s, much of the contaminated soil and debris generated during federal removal response activities at oil spills in northwestern Pennsylvania was transported and disposed of at off-site facilities. The need for costly, off-site disposal was debated by the local industry representatives. They reasoned that if the oil-contaminated soil had not naturally attenuated or biodegraded, then the entire area would be covered in oil from the numerous spills. During the late 1980s the contaminated soil left from federal removal response activities was divided up into “bio-pods” and “voodoo bioremediation” was implemented as a practical, low-cost alternative to traditional off-site disposal. It was termed “voodoo” because analytical data were not recorded to quantify the observations. Qualitative observations, such as restoration of vegetative growth, indicated cleanup was occuring. Scientists, at this time, strongly recommended that data be collected to verify that the oil-contaminated soil was being naturally remediated.

Since 1995, scientists have collected the data and evidence to show that the bioremediation of the soil was working. The bio-pods are periodically sampled and the concentration of total petroleum hydrocarbons (TPH) can be monitored. Once the TPH concentrations are reduced to approximately 10,000 mg/kg, soil conditions improve sufficiently to support various micro and macroorganisms and the “bio-pods” can sustain vegetative growth.

The first step in bioremediation is to excavate (rototil) the contaminated soil to allow the lighter hydrocarbons to evaporate and leach out. When the oil concentration in the soil reaches approximately 10 percent no sheen is apparent. When the soil reaches about three percent oil contamination, oil-tolerant vegetation can be planted and the plant roots will absorb some of the pollutants. When the oil contamination reaches one percent in the soil, native plants should be able to thrive. The general goal for natural attenuation is to reach an oil concentration level of 0.1 percent (1000 parts per million) in the soil. At this concentration, materials toxic to indigenous species have been removed. If earthworms are found in the soil, removal of oil has been achieved. However, this level may not always be obtainable depending on the conditions. The addition of native microorganisms will further degrade the oil products and help to maximize the bioremediation process.

Bioremediation provides response managers with a low-cost alternative compared to other methods of cleanup. However, there are some limitations. This method will take a longer time to reach acceptable cleanup levels. Also, bioremediation is only effective at the surface due to oxygen limitations at depth. Additional analytical techniques are also needed to determine the effectiveness of bioremediation.

Bioremediation will continue to be used in the future as an alternative removal response technology. Additional federal response activities are also planned with consultation of Dr. Harry Allen of EPA’s Emergency Response Team to evaluate other alternative technologies including biostimulation and phytoremediation as cleanup methods.

About The *Update*

The goal of the EPA Oil Program *Update* is to provide straight-forward information to keep EPA Regional staff, other federal agencies and departments, industries and businesses, and the regulated community current with the latest developments. The *Update* is produced quarterly, using a compilation of several sources. The views expressed here are not necessarily those of the EPA.

Oil Spill Program