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Contents

This Special Issue - Freshwater Spills Symposium 2002

This is a special edition of the USEPA Oil Program Center's Update, focusing on highlighted sessions and presentations from the Freshwater Spills Symposium 2002 (FSS 2002) held March 19-21, 2002, in Cleveland, Ohio. Beatriz Oliveira, FSS 2002 Chair, opened the Symposium, welcoming all the attendees, especially the international representatives, and thanked the FSS 2002 Design Team and Dyncorp, the support contractor, for their efforts in helping organize the event. David López, Director of the Oil Program Center, highlighted the fact that it was the first time the Symposium put out a call for papers, which met with an outstanding response. Elaine Davies, Acting Director of the USEPA's Office of Emergency and Remedial Response, and Captain Kurt Carlson, with the USCG Ninth District, welcomed attendees to the symposium in the opening session. Ms. Davies and Captain Carlson focused on the events of September 11, and highlighted the need to address terrorism, improve preparedness, and strengthen partnerships.

This year's plenary session speakers were Mike Gerber, Ohio EPA; Herb Oertli, USCG; Jim Augustyn, USEPA, Region 5; and John Gulch, City of Toledo, Division of Environmental Services. They introduced everyone to the Symposium's theme in a presentation on "Maximizing Prevention through Partnerships" by delineating several incidents where various agencies, offices and responsible parties worked together to minimize the impact and prevent potential damages to the environment. Prominent issues addressed at this year's Symposium included counter-terrorism measures,

sensitivity mapping and GIS, as well as scientific aspects of bioremediation, residual oil toxicity, and phytoremediation. In addition, the maintenance of oil storage tanks was discussed, and there were a number of presentations highlighting the recent efforts in the prevention, preparedness and response to inland oil spills in foreign countries.

The Symposium promoted coordination of prevention, planning, and response efforts in freshwater among federal agencies, states, tribes, local governments, industry, and international communities. Partnerships within the national and international response community increase coordination of knowledge and accessibility of resources between agencies, industry, and vested organizations. Various groups from international environmental agencies frequently visit EPA to exchange information, share experiences dealing with the management of inland and freshwater oil spills, and to establish or enhance partnerships with the bodies governing oil spills in the United States. FSS 2002 included nearly 80 presentations attended by approximately 300 registrants, with representation from industry, federal, state, tribal, and local governments and agencies. In addition, the 2002 meeting had more international attendees than any previous Symposium, with representatives from countries including Australia, Brazil, Canada, France, Germany, India, Nigeria, and Peru attending.

The goal of the Symposium is to share the knowledge and experience of those actively engaged in issues related to oil spills in freshwater environments. The presenters and speakers share their expertise and innovation leading to discussions, networking, and exchange of ideas among attendees. Through this process, the objectives of the Symposium are met. Some of the highest reviews were received through the surveys completed by the attendees. Summaries of some of the presentations are included on the following pages along with contacts for more information. A complete agenda of this year's Symposium, will be available on the EPA web site at www.epa.gov/oilspill.

Phytoremediation of Petroleum Spills in Riparian Areas: An Overview

Presenter: Mark Nega and Christopher Rog, Sand Creek Consultants, Inc. - (715) 365-1818, mnega@sand-creek.com, chrisr@sand-creek.com

Phytoremediation relies on the use of plants as a means of environmental restoration. The plants work as a natural pump and treat system to remove the oil or other contaminants from the soil. Riparian areas are ideal candidates for the use of phytotechnologies because the contamination is primarily kept close to the ground surface. The knowledge of this process has grown tremendously over the past decade.

The process of phytoremediation consists primarily of three steps: rhizodegredation, phytodegredation, and hydraulic control of the groundwater. All three of these processes are responsible for the enhancement of plant remediation. Rhizodegredation increases the oxygen in the soil, microbiological activity, the amount of organic matter, and the porosity of the soil. The hydraulic uptake and control slowly help with the removal of the contaminant. The roots of the plants remove the contaminants and water from the soil.

At a specific site, the phytoremediation process consists of several components. Before the initiation of remedial activities, a basic site assessment should be conducted. This assessment may include soil and groundwater sampling to determine the ph, levels of volatile organic compounds, and other preliminary tests. The existing plant community should be surveyed to determine whether the plants will phytoremediate or are merely tolerating the soil. Literature exists for known phytoremedation plants along with the limits on the amount of contaminants each plant can uptake.

Treatability and feasibility tests should be conducted at each site. These tests usually take at least one year. The tests should determine whether the plant will remediate or just tolerate the soil. It is important to remember that germination rates are not the same as survival rates, and survival rates are not the same as remediation rates. Treatability and feasibility tests are not optimal, but are crucial to the success of the remediation.

The final step in the process is the

design and implementation of the phytoremediation. The contaminant plume must be controlled and stabilized. The plants must be kept healthy and growing vigorously. Nutrient control may be used to help the plants thrive.

A common misconception of phytoremediation is that it can only be employed for small contamination sites. Testing has shown that phytoremediation can remove large amounts of contamination from the soil and groundwater.

The use of phytotechnologies involves long-term remediation efforts. This process may be used in combination with other technologies in order to provide the optimal remediation effort. Phytotechnologies may offer a cheaper alternative to conventional remedial methods.

***Exxon Valdez*: Long Term Effects from Residual Oil**

Presenter: Stanley Rice, NOAA - (907)789-6020, jeep.rice@noaa.gov

Over $100 million have been invested in post spill research on the effects of the *Exxon Valdez* oilspill, perhaps the most notorious oil spill in history. Unique in the physically isolated environment of Prince William Sound, the *Exxon Valdez* spill has had relatively few human effects, given its magnitude. To determine the existence and extent of residual oil effects, researchers asked three questions: is there oil physically there, is the oil biologically available to species (bioavailable), and has there been a fundamental change in the toxicity of the ecology (toxicity paradigm shift).

Residual oil

Examination in 2001 of originally oiled areas has determined that oil is still physically present. Surveys taken 12 years after the spill show that, of 91 sites and 9,000 pits, 53 to 58% of the sites have light, moderate, or heavy subsurface oil residue. Oil residue, where found, is predominantly light and "sheeny." Not surprisingly, however, the greatest impact is felt at sites where heavy or "saturated" oil residue still persists. Residual oil is distributed in both the upper and lower intertidal zones. Three particular species that have been identified as feeling the long term impact of residual oil are the pink salmon, sea otter, and harlequin duck. All share a common characteristic, that they spawn or feed in the intertidal zone.

Among intertidal prey species, clams, ribbon worms, gunnel, hermit crab, whelk, and mussels were all found to have some contamination, but the elevated levels shown in the clams were by far the most significant, at many times greater than in the next most contaminated species. Clams are the prime food source for several sea life species, including sea otters, who showed poor population recovery in oiled areas. In 1989, over 1,000 otters died as a result of the spill, and they have not returned to the bay in their previous numbers. Otters and ducks, both intertidal predators, showed elevated contamination levels and poor population recovery in oiled areas.

Pink salmon spawn in stream beds where their eggs incubate in the gravel, some of which has been found to be oiled. Research using dye released in the stream has demonstrated the flow of sea water to the stream banks during high tide, the likely means by which oil is delivered. Eggs incubating in the oiled gravel showed a higher rate of mortality; increased deformities, including extra fins, delayed growth, and irregular metabolism; less effective feeding; increased predation; and a lower percentage of returning adults. A 40% reduction in survival to adult stage was measured at certain levels of exposure in waters around Prince William Sound. However, some groups have questioned whether techniques used may have influenced the study results.

The body of research suggests that *Exxon Valdez* has evolved from critical toxicity to a region where "pockets" of residual effects persist. While levels of exposure to remaining contamination from oil residue may not be acute, resulting in death, evidence shows that chronic exposure to certain toxic compounds at lower levels has resulted in reduced fitness of

populations due to increased rates of deformities and leukemia, and decreased rates of growth, predator avoidance, and reproductive success.

Counter-Terrorism Measures
Presenter: Mark Mjoness, USEPA Emergency Response Pogram - (703) 603-8727, mjoness.mark@epa.gov

EPA's role in the National Contingency Plan (NCP) has evolved from theoretical to real time experience. In light of the recent terrorist attacks on American soil, EPA has had an active role in Domestic Preparedness and Response. This is commonly known as counter-terrorism, despite a noticeable difference in definition between the former and the latter.

EPA is federally mandated with broad authority under CERCLA Section 104 to take action when the National Response System (NRS) is activated. It is to act in conjunction with the FBI, DOE, DOI, the Federal Emergency Management Agency, and the Department of Health and Human Services. Specifically, EPA's emergency support function is to act as a technical assistant and liason to the FBI. EPA has a anticipatory role, thereby making its function critical before and after the event. EPA has over thirty years of hazardous waste expertise that allows it to remediate in the case of chemical, biological, or nuclear attacks. EPA also has a responsiblity to communicate with the public to educate them on exposure to these attacks and the impact that exposure could have on their lives.
The Emergency Response Team (ERT), directed under OERR, is the special force that is be required to respond when the national response system is activated. The lead ERT team, comprised of 23 technically skilled, multi-disciplinarian experts in groundwater and air releases, is based out of Edison, New Jersey and Las Vegas, Nevada. There is also a Radiological ERT that works in conjunction with DOE.

In cases of weapons of mass destruction and chemical terrorist attacks, EPA has a consequence management role. This is different from the role of the FBI and other law enforcement agencies, who have a crisis management role. Crisis management includes forensic investigation, while consequence managment is more focused on the remediation of the release. These two roles are counteractive to each other, and therefore, EPA must work closely with the FBI to educate responders of dangers to their health while collecting forensic evidence.

The weakest area in terms of response preparedness is in the realm of biological attacks. The anthrax attacks exposed a vulnerability in the NRS that can only be addressed through an increase of pre-incident information sharing, technology adapted to biological contaminant remediation, and sensitivity training in medical monitoring.

Another gray area is the difference between terrorist activities and sabotage. The FBI defines a terrorist attack as a violent act that is dangerous to life and a violation of the laws of a government to intimidate that government and its civilian population for the furtherance of a set of political or social objectives. There is no definition in the composition of a specific counter-terrorist response that determines what type of response is justified. Traditional definitions of responses dictate that localized releases are the responsibilities of the responsible parties who must use their own financial resources to clean up. EPA will assist in advising the removal of contaminants and ensuring the protectiveness of the health of the community, but it usually does not become involved directly. There are between 200-800 releases nationwide per year, and EPA becomes direcly involved in only 10% of those releases. Counter-terrorist measures mandate that all federal agencies in the NCP become involved.

Tundra Treatment Guidelines
Presenter: Thomas R. DeRuyter, Alaska Department of Environmental Conservation - (907) 451-2145, tom_deruyter@envircon.state.ak.us

The sensitive environment of the Alaskan tundra has presented difficulties in the remediation of oil spills. The tundra is easily damaged, not only by spills, but also from aggressive cleanup activities. The transportation of remedial equipment has degraded the tundra. Due to the sensitive nature of the tundra environment, new guidelines had to be developed

to adapt to remedial activities on tundra.

The Alaska Department of Environmental Conservation (ADEC), along with several other local and federal agencies, have developed the Tundra Treatment Guidelines (TTG). These guidelines focus more on the rehabilitation of the environment rather than on reducing the levels of contaminant to a certain level. Reducing the levels of the contaminant to meet other standards, may further destroy the delicate tundra environment.

These guidelines were based on the history of oil spill responses in Alaska, primarily on the North Slope. Alaska has an extensive history of oil exploration and drilling. The US Navy first began using the North Slope as a oil reserve in the 1940's. The oil exploration and drilling increased over the next several decades. The Trans-Alaska Pipeline was built in the 1970's. This extensive history has not come without environmental problems. Thousands of oil spills occur each year in Alaska. The transportation of the cleanup equipment, along with the spill itself, causes damage to the tundra. These guidelines, based on past successes and failures, attempt to reduce the damage to the tundra.

The Tundra Treatment Guidelines has three main objectives. They are to minimize the damage of the oil spill and the remedial actions, and to reduce the recovery period of the tundra. The type of response depends on the type of contamination. The remedial method will be decided based on previous cleanups.

For each incident, decision trees are used to help determine what type of cleanup will be used. These decision trees are comprised of six main steps:

1. Consult with government agencies,
2. Characterize the site,
3. Set treatment goals,
4. Select treatment tactics,
5. Assemble tactics into a strategy, and
6. Monitor treatment and recovery.

Remedial activities may have to adapt to the various types of tundra. These types include aquatic, wet, moist, and dry tundra. The cleanup may also have to deal with certain weather conditions. The freezing and melting of the tundra may present difficulties.

The remedial activity of the Alaskan tundra can present difficulty due to its sensitive nature. These guidelines have been adopted to protect these environments as much as possible while still remediating the contaminants.

The East Walker River Spill: Cleanup in a Severe Winter Environment

Presenter: Gary Reiter, Response Management Consultants - (719) 783-4010, r4701@aol.com

Extreme conditions marked the East Walker River Spill on December 31, 2000, when a 6,100-gallon tank truck rolled over an icy curve near Bridgeport, California. The fatal accident sent over 3,500 gallons of crude and gas-oil directly into the East Walker River. This was the first large oil spill to occur in the river, which draws sportsmen worldwide to its celebrated trout fishing and is vital to Bridgeport's economy. The three-month response was shaped by a extreme operating environment, as well as the needs of multiple stakeholders, including farmers and the State of Nevada, downstream from the spill.

The Unified Command for the response was established by the California Department of Fish and Game Office of Spill Prevention and Response (OSPR), and included representatives from their department, the Nevada Department of Environmental Protection, the responsible party (trucking company), and, during the final phase, the EPA.

The Three Phase approach to the spill, implemented by the Unified Command, consisted of containment and gross oil cleanup, water maintenance, and final cleanup. Strategic objectives were defined as: (1) to insure safety of personnel, (2) to minimize downstream oil spread, (3) to contain and remove oil, and (4) to regulate water levels according to mandatory requirements for fish habitat and irrigation rights. Tactics had to be reassessed daily based on existing conditions.

Physical hazards were significant. Since the severe incline and thick vegetation limited access to the oil from the riverbank, most of the labor had to be done manually by workers in the river stream. The 68

personnel involved in the first phase faced strenuous labor and escalated risks from the rocks, subfreezing temperatures, snowfall, and ice made slick by oil. Other threats to personnel included mountain lions, whose tracks were discovered nearby, and later rattlesnakes, when the weather warmed.

From the outset, response safety was a top priority, and thorough safety plans were developed for activities on the stream, its banks, the treacherous adjacent highway, and other site terrain. Plans were updated at daily meetings to suit changing conditions, and no serious injuries occurred.

The ice on the river both helped and hindered the cleanup. One effect was to cause water levels to rise and fall with daily freezing and thawing. This caused oil to be trapped under ice and along banks, as well as to flow up and become encapsulated in refreezing ice. Oil trapped beneath the ice was nearly impossible to remove. However, where the stream was frozen solid, the natural ice dams contained floating oil at "collection points." Hundreds of gallons of the oil, which became tar-like at low temperatures, were effectively removed with rakes and buckets from these points. Sorbent "pom-pom" oil snares placed on the ice were effective in trapping oil as the ice melted.

First phase responders successfully contained the oil in California, with only minor impacts in Nevada. For the next month during Phase Two, a five person crew maintained the containment boom and other recovery structures built during Phase One, and conducted inspection rounds to clean up any apparent floating oil.

One lesson learned from the Final Cleanup Phase was a Global Positioning System (GPS) proved very useful at locating any remaining oil concentrations. The Phase Three program of assessment, cleaning, and reassessment was highly efficient with the help of EPA-conducted GPS surveys. After 90 consecutive days of cleanup operations, the river was inspected by the States of Nevada and California, Federal Resource Trustees, the responsible party, and private landowners, where appropriate. It was approved for recreational use on March 29, 2001, in time for trout season.

Contingency Planning for Oil Spill Accidents in Brazil

Presenter: Alvaro Souza, Federal University of Rio de Janeiro - 55-21-2257-1531, absj01@ig.com.br

The focus for environmental regulatory plans is "under construction" in Brazil. A recent oil spill of significant magnitude lead to the passage of legislation in Brazil to prevent future incidents like the one described here from reoccuring

On January 18, 2000, a rupture in a pipeline running between a refinery and an oil terminal in the Guanabara Bay, Rio de Janeiro resulted in a spill that lasted four hours, with an estimated 340,000 gallons of oil spilled. Twenty-one miles of boom were deployed in the effort to contain the spill. Major environmental damage was inflicted on mangroves and fisheries as a result. The damage was extensive, with far reaching environmental and financial effects, even to industries generally unaffected by similar disasters, particularly tourism.

Environmental monitoring on a national scale began three weeks after the rupture. Although no environmental laws relevant to such a disaster existed, this major spill prompted a quick response which resulted in Act 9966, enacted just 3 months later, on April 28, 2000. This act calls for individual emergency plans, area plans, and local, regional and national contingency plans. Subsequently, on December 12, 2001, CONAMA Resolution 293 was passed. Resolution 293, in conjunction with Act 9966, delineates what the National Contingency Plan (NCP) should contain, at what levels it should operate, who the respondent agencies are, and the roles and responsibilities of the support committee.

Brazil continues to deal with environmental issues at the national level. Often in Brazil, environmental issues are dealt with solely in the legislative arena and their political aspects are not addressed. However, Brazil is still in the initial stages of dealing with environmental issues on a national level, leaving much room for evolution and improvement. There is hope that Brazil will learn from other countries such as the United States that have already dealt with similar issues.

Burning wetlands

The Use of Ammoniated Bagasse to Remediate an Oil Contaminated Wetland

Presenters: Dr. Wayne H. Hudnall and Dr. Dean Goodin, Louisiana State University - (225) 578-1344, whudnall@agctr.lsu.edu

The remediation methods that have been developed to clean up onshore spills are not applicable for all incidents. Sensitive environments, such as forested wetlands provide a unique environment, and new remediation methods need to be developed to accommodate these conditions. When an environment such as a forested wetland is contaminated, it provides an opportunity to develop new remediation methods.

A well blow near Cravens, Louisiana impacted the Kisatchie National Forest and a nearby wetland. Approximately 13,000 barrels of oil and 600,000 barrels of brine contaminated the area, killing and injuring extensive vegetation. The loblolly and longleaf pine trees were the most affected.

This incident provided the opportunity to develop an alternative remediation practice with the aid of the U.S. Forest Service. The new method would use ammoniated baggase to remediate the impacted wetland. A comprehensive soil and vegetation green house study was also conducted to determine the effects of the oil and brine on the loblolly and longleaf pine trees. Most of the surface oil was burned from the wetland. Basic site assessments were conducted to determine the pH, electric conductivity, and sodium concentrations of the wetland soil. Electrical conductivity was an initial concern due to the brine conditions. This was not a problem because heavy rains washed the brine out of the system.

Ammoniated bagasse was used as an alternative method to clean up the remaining oil in the soil. The bagasse combined with $CaCO_3$ (lime) and topsoil from a nearby area. Agricultural lime was applied to the soil to establish a pH of approximately 6.5. The ammoniated bagasse mixture should be added to the wetland at approximately one ton per hectacre. The ammoniated bagasse mixture was applied to different test plots throughout the wetland. The mixture was added to the test plot in various concentrations to further study its effect. The study was completed after 90 days. The result was a decrease in the amount of petroleum hydrocarbons, especially near the surface.

The green house experiments were conducted to evaluate the physiological effects of the oil and brine on the trees and soil and to evaluate the potential effectiveness of the ammoniated bagasse in oil remediation. The results showed that oil is more lethal when applied directly to the soil, while the brine was more lethal when applied directly to the pine trees.

Towards a Common Goal: Coordinating Actions under the Clean Water Act and the Endangered Species Act

Presenter: Amy Cocanour, USCG - (202) 267-2877, acocanour@comdt.uscg.mil

A recent Memorandum of Agreement (MOA) was signed with the goal of establishing a protocol for cooperation between all involved agencies in the exercise of oil spill planning and response duties and responsibilities under the Endangered Species Act (ESA). This project was an outgrowth of the *New Carissa* response in early 1999 in Oregon, in which miscommunication between the agencies involved almost resulted in a lawsuit. This MOA is a streamlined approach that outlines the already existent legal requirements of the NCP and ESA while facilitating cooperation and communication, increasing efficiency, and lowering cost.

Signed by the USCG, EPA, DOI, US Fish & Wildlife Service (USFWS), NOAA, and the National Marine Fisheries Service (NMFS) in July 2001, the most important portion of the MOA are pre-oil spill planning, activities during the spill, and post spill activities.

Critical to oil spill planning is communication between the agencies regarding the endangered species and their habitat in each

region. This requires experts from the USFWS and NMFS to become involved through the National Response System. The goal is to have all this information readily available, using the area committee planning (ACP) process as the vehicle. This will enable the on-scene coordinator (OSC) to make the best decisions without having to worry about legal ramifications when responding to spills. The MOA contains a template, labeled Appendix C, which can assist in developing the formal consultation and planning processes.

During the response process, notification will take place as agreed upon by all parties in the ACP. This will facilitate any emergency consultations that are required. These consultations are an outgrowth of the unknown and unforeseeable contingencies specific to each spill (e.g. animals present, environment, weather, type of spill). Emergency consultations will enable a more efficient and timely response. These responses will continue until all removal operations are complete, as defined in 40 CFR 300.320(b).

After the response is complete, the OSC will be able to initiate formal consultations regarding the adversely impacted species or habitat. The requirements of these consultations are included in the Services' Consultation Handbook. Finally, all pertinent information from the FWS or NMFS official will be included as lessons learned at the discretion of the OSC. This will enable the OSC to make improvements in the ACP and future spill response activities.

Oil Response in Fast Water Currents: A Field Guide

Presenter: Kurt Hansen, USCG - (860) 441-2865, khansen@rdc.uscg.mil

The immediate response and effective containment of oil spills have proven to be difficult challenges for many oil spill response teams, most notably when dealing with spills that occur in fast water currents, or any current moving faster than one knot. Because each response is tailored to the site-specific conditions of the affected area, there are unique characteristics that must be taken into account when responding. For this reason, in order to ensure timely and effective containment, it is essential that the responding teams are knowledgeable of the conditions they will encounter at the site of a spill. A field guide has been developed by multiple government agencies, the USCG, and commercial response companies that helps make the preparation for a spill response more manageable, from an information perspective. The guide does not cover the basics of a response, such as what types of equipment (e.g. booms or skimmers) and chemicals to use, but it provides useful information on different boom deployment techniques, site selection for the best locations to deploy boom, such as natural collection points in a river, and estimated current speeds. The importance of boom angles and anchoring are also emphasized.

Different boom deployment techniques, include DOWCAR, cascade, multiple cascade, J shape, deflection, and shore seal. Measuring current speed is a key element of accurately determining what materials and deployment techniques are necessary for a particular site Water flow rates in a river vary depending on multiple factors, such as the different points in a river, annual precipitation, and time of year. Although flow rates change, their estimation is important so that response issues such as lengthwise boom towing forces can be determined. This information is not only necessary to decide how large a boat is required to tow the boom to the desired location, but also for the purposes of tension measurements and effective anchoring to keep the boom stationary.

Cascade Diversion Boom

In addition to the normal considerations of a spill response, the guide discusses special conditions and alternate techniques, such as handling oil under ice, both broken and solid. Trenching ice is discussed, as are sorbent applications, alternative methods of containment or exclusion, such as pneumatic boom and water jets, and other flow diversion techniques/issues, such as moored vessels and barges, ship propeller washes, log booms, and treatment of debris in water.

The guide provides numerous models and diagrams from which to create a rough guide to a response, complete with basic formulas used

for determining estimated water flow values and desired boom angles as relevant to flow rates. The second chapter of the guide outlines the decision steps for selecting fast water response strategies, allowing a response team to consolidate the information relevant to the team's specific site. The information can then be plugged into a decision approach, creating a rough guide to what type of response is necessary at a particular site.

Indiana Harbor Canal Project, East Chicago, Indiana

Presenter: Betty G. Lavis, USEPA, Region 5 - (312) 886-7183, lavis.betty@epa.gov

Although East Chicago, Illinois has been an industrial center of oil, steel, and chemical production for over 100 years, concerted efforts to keep oil out of the water are relatively recent. The five-mile Indiana Harbor Canal was built to Lake Michigan from 1901-1909, and its shoreline and sediment are saturated with oil from a century of pollution. Over the years, EPA has been involved in many area studies, and companies and land owners are responsible for some clean up and improving environmental practices. However, the problem is pervasive, and oil from known and unknown seeps and runoff continues to float on the canal's surface, affecting wildlife and groundwater.

Great White Egrets near pipeline

Despite contamination, the area is the second largest flyway for migratory birds in the continental United States. Migratory birds, such as heron and great white egret, use the canal as a resting and feeding place, and some stay in the surrounding wetlands, though young are rare in the oiled areas. Visible on the canal are oiled wildlife and fish kills -- fish from Lake Michigan or elsewhere unfortunate enough to have entered the canal.

EPA Region 5 has recently initiated a pilot project to reduce oil in the canal and to explore methods of shoreline cleanup to complement the dredging. The project is in partnership with local and national agencies, including the U.S. Coast Guard, the State of Indiana, the City of East Chicago, U.S. Fish & Wildlife Services, U.S. Army Corps of Engineers, U.S. Department of Transportation Office of Pipeline Safety, U.S. Forest Service, Purdue University, and industry partners. Together, these groups seek to create a "portable process," one that can be duplicated in other waterways with similar problems.

Current activities involve regular inspections of the canal to identify and prevent illegal discharge, taking enforcement actions where needed. Abandoned pipes are being removed, and cooperation is ongoing with the Corps of Engineers dredging projects. Alternative methods of cleanup are also being pursued where appropriate, including bioremediation, phytoremediation, and filterpress technology.

Sampling during the summer of 2001 showed oil content levels of 27-35% on the shoreline. Filterpress technology, which is used by the oil industry, involves squeezing oil out of soil mechanically, and can reduce oil by 90% or greater. Project members, with EPA's Office of Research and Development, are looking at this and other ways to reduce oil levels and increase oxygen to assist bioremediation processes. Experimentation with phytoremediation, or the use of plants and trees, such as willows and poplars as "extraction wells" to suck up large amounts of contaminated groundwater, has also been conducted, and plants that are successful will be planted soon. If phytoremediation is viable, plants and trees will help prevent off-site migration of contaminated water and improve the area's appearance and can be harvested after they have served their purpose.

The ongoing project faces challenges and high expenses. The "spaghetti" mix of active pipelines which must not be disturbed and abandoned or leaking pipelines which must be fixed or removed creates the challenge of avoiding damage and additional contamination. Other cleanup challenges are due to high winds and the seiche effect (oscillation and rebounding of water), as well as the sheer volume of contaminated sediment and shoreline.

An Overview of a Freshwater Spill Response: Rehabilitation of Oiled Wildlife in Inland Areas

Presenter: Eileen Gilbert, Tri-State Bird Rescue and Research - (302) 737-7241, gilbertei@aol.com

Generally, when dealing with a freshwater oil spill response as opposed to an ocean spill response, it is common to find smaller amounts of contaminant product (spilled fuel), although the spills tend to occur more frequently and usually involve refined products. The habitats and species that freshwater spills generally affect are also more diverse. For this reason, when looking from a rehabilitation standpoint, it is extremely important to be knowledgeable of all of the effects that an oil spill would have on wildlife and the surrounding habitat. When looking at internal effects, factors such as inhalation, ingestion, and absorption through the skin need to be considered. The medical effects of exposure can range from dehydration and irritation of the skin, eyes, and mucousal surfaces to reproductive, endocrine, and nervous system damage and organ failure. External effects can result in an inability to fly for birds, a loss of buoyancy as animals become like sponges onto which oil can accumulate, and a loss of orientation and equilibrium.

Several components are involved in a successful rehabilitation effort. First, notification of the proper authorities must take place. Upon notification, Tri-State contacts DOI's Fish and Wildlife Service and the state wildlife agency, to ensure that all concerned parties are informed about the spill and the subsequent response effort. Tri-State's three major wildlife response strategies are to control the release and spread of oil, to keep unaffected animals away from the oil, and to capture and rehabilitate affected animals. For these events to take place successfully, there are several field considerations to be made. An assessment of resources and risk must be done, a task that includes looking at the breeding and migratory patterns of the animals of an affected area. Deterrent options must also be considered to determine the best way to keep unaffected animals out of the contaminated areas. A field safety plan must be in place. The issue of secondary contamination must also be considered, as some animals may feed off of oiled animals (such as scavengers or predators), while other animals may move into a contaminated area and then return to their young, exposing them in turn. The retrieval and transport of oiled animals must be coordinated, and records of the degree to which these animals are affected must be initiated in the field so as to provide a history for a more thorough medical evaluation once those animals are transported to a rehabilitation facility.

The selection of a wildlife facility also requires the consideration of several factors. A facility must be geographically close to a spill site, but not on the site. The facility must be climate controlled, it must have ample space, water, electricity and access to heating, ventilation and air conditioning. A wildlife facility site safety plan must be developed once the site has been selected. After the animals have been transported and the medical evaluations have taken place, several components of a successful cleaning, include making sure that the water temperature, pressure, and hardness are all ideal for the animal being washed, according to body temperature, size, and other factors, must be provided for. The type of detergent used to clean the animal is also very important. Detergents and soaps are solvents. Being so, the danger exists that the product may not completely wash away after rinsing. Some products adhere to fur or feathers causing the animal to appear more and more "wet" and to lose body heat increasing the chance of hypothermia.

After a successful cleaning, the rehabilitation effort moves to post-cleaning care, where the animals are reintroduced to their natural photo period, provided with the proper nutrition, provided with pools, waterproofed, and acclimated to outdoor temperatures. At this stage, behavioral observations of the animal, in addition medical monitoring, are key in determining the eventual release of a successfully rehabilitated animal.

New and Innovative Warning System

Presenter: S. H. Jackson, Iberville Parish, Louisiana, Local Emergency Planning Committee - (225) 687-5140, oep911@bellsouth.net

With the emphasis of emergency planning and preparedness being on timely response, the Iberville Parish

of Louisiana, in conjunction with local industry and businesses, emerges with an innovative emergency notification system that can be activated within seconds at an extremely low cost to all parish businesses. The E-merge/E-Notify notification software system, developed by S.H. Jackson of Iberville's Local Emergency Planning Committee and local contractors, allows industry to notify the parish government of emergencies using the Internet and email capabilities. The system furthers the use of the Internet to notify local AM radio and television stations, and local responders and to activate community sirens using a computerized telephone ringdown system.

The system is relatively simple in design. Industry has a template email that contains vital information regarding the nature of the emergency, which is sent to the Iberville Office of Emergency/911 Center. A computerized map shows the affected area to the operator, thus eliminating the potential for human error. Also, the map contains links to information regarding emergency response teams, law enforcement, community warning sirens (which can all be set off with the push of a button), and media outlets. This information can be forwarded within seconds. Telephone calls can be made simultaneously via a computerized telephone ringdown system, further eliminating the potential for human error or lack of information, to all emergency responders needed. Since all of this is done via the Internet, the only tools the industries need are a computer and access to the internet. This cuts costs further.

Iberville Parish currently uses the system for notification in a variety of ways, including chemical spills from local plants into the community and the Mississippi River, the Intracoastal Canal, and the Atchafalaya Basin. Also on the alert system are railroads, water and sewer plants, electrical generating facilities, natural gas lines, interstate highways, 2 state prisons, 2 National Guard facilities, a hospital, 11 schools, and 33,000 residents.

While the system was created through contractors volunteering time, those same contractors can now be contacted and hired to create similar systems for every interested community.

This system can be revamped to encircle a larger audience as well. Using geographic information system (GIS) capabilities, a similar system can be created to monitor the entire nation. The potential of decreasing emergency reaction time will only be further enhanced on a nation-wide scale.

Issues of security and access in storing the database can be contracted out. Bell South already houses the database. The database is self contained in a secure location that cannot be broken into. The security measures include both virtual and physical security blocks.

The Iberville Parish E-Merge/E-Notify emergency notification has already received international attention during a presentation at the EPA International Hazardous Material Spills Prevention and the EPA Region III Chemical Emergency Preparedness Conference in the past year. As a result of the success of their system, EPA presented its Chemical Emergency Prevention and Preparedness Partnership Award to the Iberville Parish.

About The Update

The goal of the EPA Oil Program Center *Update* is to provide straightforward 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 US EPA.