

Changes in the United States Response Scheme After the EXXON VALDEZ Incident¹

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ABSTRACT

This March marks the 12th year anniversary of the EXXON VALDEZ oil spill. As a result of the vessel grounding, over 258,000 barrels of crude oil spilled into the pristine environment of Prince William Sound, Alaska. The spill impacted one of our nation's most sensitive ecosystems and resulted in the largest and longest oil spill response in U. S. history. The spill also generated more media and public interest, both nationally and internationally, than any previous U. S. spill. The United States Congress responded with the unanimous passage of the Oil Pollution Act of 1990 (OPA 90) which fundamentally changed this nation's prevention, preparedness and response scheme.

This paper will outline the changes brought about as a result of OPA 90, but will primarily focus on three key areas:

- (1) Response Management with the adoption of the Incident Command System ² (ICS),
- (2) Preparedness through the National Preparedness for Response Exercise Program (PREP), and
- (3) Research and Development with emphasis on a new Viscous Oil Pumping System (VOPS).

¹ Opinions or assertions in this paper are solely those of the author and do not necessarily represent the views of the United States Coast Guard.

² In this paper, the term Incident Command System (ICS) is used to denote the National Interagency Incident Management System (NIIMS) based ICS.

Introduction

Twelve years ago on March 24, 1989, the tanker EXXON VALDEZ grounded on Bligh Reef in pristine Prince William Sound, Alaska spilling over 258,000 barrels of crude oil. The oil impacted over 1,100 miles of non-continuous coastline making the EXXON VALDEZ incident the largest spill to date in U. S. waters. The response and cleanup also involved more people and equipment than any other spill in U. S. history. At the peak of the response, over 11,000 personnel, 1,400 vessels, and 85 aircraft were involved. The oil impacted one of this nation's most sensitive ecosystems which included a national forest, four national wildlife refuges, three national parks, five state parks, four state critical habitat areas, and a state game sanctuary. The toll on marine wildlife included over 300 harbor seals, 2,800 sea otters, and 250,000 birds.

The EXXON VALDEZ oil spill generated more media and public interest, both at the national and international level, than any other spill in U. S. history. The U. S. Congress responded with the unanimous passage of the Oil Pollution Act of 1990 (OPA 90). This single law is the most comprehensive legislation that the U. S. Coast Guard has ever had to implement. OPA 90 fundamentally changed spill prevention, preparedness and response in the United States. The requirements of OPA 90 are divided into five categories:

PREVENTION
PREPAREDNESS
RESPONSE
LIABILITY AND COMPENSATION
RESEARCH AND DEVELOPMENT

I will provide a short overview of the key provisions of the Act and follow that with a more detailed discussion of three areas where significant improvements have been made to allow this nation to more efficiently and effectively respond to spills. These areas include response management, exercises, and a very promising research and development project for pumping viscous oils.

OPA 90 OVERVIEW¹

PREVENTION

Double hull requirements for tank vessels.

By 2015 all tank vessels must meet double hull specifications.

Operational measures to reduce oil spills from existing single – hull tank vessels.

Includes bridge resources management training, minimum rest requirements for watchstanders, and enhanced vessel surveys.

Access to National Driver's Register and Criminal Records Review.

Permits Coast Guard to review these records prior to issuing or renewing a Merchant Mariner's license or document.

Enhancements to civil and criminal penalty provisions.

Permits Coast Guard to take appropriate legal action against polluters.

PREPAREDNESS

Area Committees and Area Contingency Plans.

Requires formation of response plans tailored specifically to areas that could be effected by oil spills.

Vessel and Facility Response Plan.

Requires certain tank vessels and oil facilities to develop response plans to enhance private sector planning and capabilities to minimize the impact of spilled oil.

National Exercise Program.

In order to exercise the various new contingency plans, the Preparedness for Response Exercise Program (PREP) was established. The Coast Guard conducts six government-led exercises a year.

RESPONSE

Response Management System.

Established guidelines for creating a unified command that can coordinate multiple federal, state, local, and industry responders.

National Strike Force.

A third Strike Team was re-established and the National Strike Force Coordination Center (NSFCC) was established to coordinate the activities of the three teams.

LIABILITY AND COMPENSATION

National Pollution Fund Center.

Established to manage the billion dollar oil spill liability trust fund which is used to fund spill responses, compensate claimants, fund environmental assessments, and recover costs from responsible parties.

Financial Responsibility for Pollution.

Vessel owners or operators must establish and maintain evidence of adequate insurance.

RESEARCH AND DEVELOPMENT (R&D)

Over 30 initiatives have been funded by the Coast Guard.

The Coast Guard has funded over 30 initiatives for oil spill prevention and response.

¹ More details on OPA 90 requirements can be obtained at www.nrt.org

RESPONSE MANAGEMENT SYSTEM:

The U. S. Coast Guard's decision in 1996 to formally adopt the Incident Command System as the standard response management system to oil spills as arguably the most significant initiative to improve the United States ability to effectively and efficiently manage a spill response.

Whenever a spill occurs, the common goal is to mount a timely, effective, and efficient response in order to protect human life and safety, and to minimize impact to the environment and the economy. Common sense dictates that all stakeholders, which includes the U. S. Coast Guard, other federal agencies, the affected state and local governments, and the responsible party, can best achieve this by working together cooperatively. While the U. S. National Oil and Hazardous Substance Pollution Contingency Plan (NCP) recognized the need for a response management structure that allowed all stakeholders to work together, prior to EXXON VALDEZ, no national standard response management system was in use.

WHY ICS?

The EXXON VALDEZ incident highlighted many of the problems frequently encountered during a spill which included different organizational structures among the various response groups, non-standard terminology, ineffective communications among agencies, poor joint planning and information gathering and dissemination, and lack of accountability.

ICS is simply a model that allows all stakeholders to work together under a single organizational structure. ICS incorporates the sound principles of modern business management into a universally accepted and proven response management system. The basic components include:

- a. Common terminology
- b. Modular organization (which can easily expand or contract)
- c. Integrated communications
- d. Unified Command structure
- e. Consolidated action plans
- f. Manageable span of control
- g. Pre-designated incident facilities
- h. Comprehensive resource management

To implement these components, the ICS structure has five functional areas of responsibility: Command, Planning, Operations, Logistics, and Finance. Each of these functional areas may sub-divide into additional organizational elements as the response dictates. These functional areas transcend boundaries and, therefore, can be implemented for all types of incidents. Although ICS works very well when managing an incident wholly within an organization, it is especially useful when responding with different organizations. For this reason, the key underlying principle of the system is flexibility. The "all risk, all hazard" model can be used to respond to any contingency including natural disasters (earthquakes, hurricanes), accidents (airplane crashes, train derailments, search and rescues), and planned events (major athletic events, parades).

The public domain aspect of ICS is important in that all the training and qualification material is readily available at a low cost. This increases accessibility and encourages implementation by the many different organizations that need to respond to the same incident.

Today the Coast Guard has adopted ICS as the response management system for “all risk, all hazards”. Further, ICS has been adopted by many other federal, state, and local agencies as well as industry. ICS is also rapidly growing international acceptance.

PREPAREDNESS FOR RESPONSE EXERCISE PROGRAM (PREP):

With the enactment of OPA 90, the federal government needed to establish a workable exercise program to validate the new contingency plans that were mandated. A valuable lesson from EXXON VALDEZ was the need to exercise for a spill as realistically as possible. The Preparedness for Response Exercise Program (PREP) was developed to meet that goal.

PREP exercises should be viewed as an opportunity for planholders to make continuous improvements to their response plans and their response system. Planholders can use issues that arise during the evaluation of the exercise to make necessary changes to their response plans to maintain the highest level of preparedness.

Every three years, all components of the entire response plan must be exercised. Rather than requiring each plan holder to conduct a major exercise every three years, PREP allows for the individual components to be exercised in portions through the required exercises. While the plan may be exercised in segments over a period of three years, each component of the response plan must be exercised at least once in the triennial cycle. PREP is comprised of a series of internal and external exercises.

Internal exercises are those that are conducted wholly within the planholders organization. While the internal exercises include personnel such as the Qualified Individual, the Spill Management Team, and those affiliated with the Oil Spill Removal Organization (OSRO), the internal exercises usually do not involve other members of the response community. These internal exercises are designed to examine the various components of the response plan to ensure the plan is adequate to meet the needs of the organization for spill response. All internal exercises should be self-evaluated and self-certified.

External exercises are exercises that extend beyond the internal focus of the plan holder’s organization and involve other members of the response community. The external exercises are designed to examine the response plan and the plan holder’s ability to coordinate with the response community to conduct an effective response to a pollution incident. The key to these external exercises is the area exercises.

The primary purpose of the area exercise is to activate and observe the response infrastructure in a given area, and the ability of the entire response community to effectively conduct a spill response. An area is defined as that geographic area for which a separate and distinct Area Contingency Plan (ACP) has been prepared as described in OPA 90. These areas generally correspond to our field units Area of Responsibility (AOR). For example, we have an ACP for

Hawaii and one for Guam. The focus of the area exercise is on the interaction between the responsible party and the federal, state, and local governments and other stakeholders to exercise both the Area Contingency Plan and the responsible party's plan.

PREP calls for 17 area exercises per year nationwide, 51 within the triennial cycle. This ensures that all areas of the country are exercised triennially. The federal government leads six of these annual area exercises, and industry response planholders lead 11.

PREP area exercises offer a wide range of flexibility on incident types, and actual length of exercise play. Area exercises can vary from an eight-hour, real-time tabletop exercise, that focuses on the formation of a Unified Command and those initial response activities which occur in the early hours of a response, to a 12 - 36 hour, real-time exercise, which includes actual equipment deployments and shift changes. An industry planholder that participates in an area exercise is not required to participate in another area exercise for a minimum of six years.

Area exercises are designed and developed by a joint design team. The joint design team is comprised of representatives from the federal, state, and local governments, industry players, and other stakeholders in the response community. The organization that holds the primary plan to be exercised will take the lead on the joint design team, and has the final word on designing the scope of the exercise. However, exercises are designed as a cooperative effort of the entire joint design team.

Once an area exercise has been conducted, an evaluation report is completed to document the lessons learned and the recommended improvements to the respective contingency plans. It is incumbent on the planholders to incorporate these changes into their plans.

Planholders may take credit for internal and external exercises for those actions conducted in response to an actual spill. The plan holder must determine which of the exercise objectives were completed as part of the actual response, and the spill response must be evaluated.

To ensure preparedness for an incident the size of the EXXON VALDEZ, the Coast Guard has developed processes and procedures to conduct a Spill of National Significance (SONS) exercise periodically. Two SONS exercises have been held, and the next one is scheduled for the spring of 2002.

A SONS is a rare, catastrophic spill that greatly exceeds the capabilities of the response community at the local and regional level. They are generally characterized as:

- (1) Spills which affect more than one Area Contingency Planholder or cross international borders;
- (2) Involve a significant impact, or threat, to public health and welfare, wildlife, economy or property;
- (3) Have a protracted period of discharge and/or expected cleanup;
- (4) Generate significant public concern and demand for action;
- (5) And, if there is the existence of, or potential for, a high level of political or media interest.

As a result of OPA 90, the federal government revised its national level planning and organization to be capable of responding to any size spill including a SONS. The periodic cooperative exercising of the national, regional and local response agencies and organizations ensures a continued level of preparedness for the next spill incident.

RESEARCH AND DEVELOPMENT:

The Coast Guard is a leader in cooperative research and development efforts, actively working with other federal agencies, industry, and research partners from abroad to share resources for R&D projects. Since the passage of OPA 90, the Coast Guard has funded over 30 new initiatives. As federal spending decreases, these cooperative efforts become even more important. Significant improvements have been made in response equipment since the EXXON VALDEZ incident, such as fast current booms and vessel of opportunity skimming systems as well as better use of computer simulation and training programs. However, we are now on the verge of a major breakthrough for the age-old problem of how to effectively pump viscous oil. The basic problem with pumping viscous oil is that pump flow rates were too low and the line pressure was too high, and exceeds the pressure rating of the fittings. Several recent high visibility cases highlighted these problems and again very clearly point the need to improve existing pumping equipment to achieve the capability of removing viscous oil.

Vessel groundings in the United States such as the tank barge MORRIS BERMAN (1994), the freight vessel KUROSHIMA (1997), and the freight vessel NEW CARISSA (1999) are just a few recent examples where pumping off viscous oil presented a major challenge. As a result of these cases, a unique partnership was established to try and resolve the problem. A team of Coast Guard, Navy, industry and equipment manufacturers met in September 1999 to share experiences and technology. The outcome of this workshop was the development of a prototype viscous oil pumping system (VOPS) based on the Annular Water Injection (AWI) method.

The core of the system is a water injection annulus flange mounted on the discharge side of a DESMI: DOP 250, DS-250 OR DOP-160 screw pump. The ring is stainless steel with two one-inch pipe connections for water injection ports. The annulus delivers a small amount of water (approximately 5% of the oil flow) at high pressure of about 220 psi to surround the oil stream moving through the hose and largely eliminates the friction between the oil and the hose allowing much thicker oil to be pumped greater distances without hose failure or over-pressurization at the pump. A water "ring" is created which reduces the friction between the highly viscous oil and the pipe or hose wall and thereby reduces the high pressure to the system historically incurred during viscous oil lightering operations. The concept was to inject a relatively small volume of water through a specially-designed flange at the discharge side of a pump. The flange causes the water to form a thin layer that coats the inside wall of the hose or pipe. The thin film tends to lubricate the flow of fluid and greatly reduce line pressures.

Significant findings from the first workshop were validated and expanded upon during a follow-on workshop held in November 1999. The prototype VOPS was successful in reducing discharge head pressure by ratios of greater than 10:1, and enabling viscous oil to be pushed

longer distances without increasing the quantity or size of the discharge pumps. This system was tested again in the fall of 2000 in the North Slope of Alaska with great success. Altogether, three workshops and an exercise were held to share information on how best to lighter viscous oil and provide hands-on training and experience that will lead to major improvements in the Coast Guard, Navy, and industry salvage, lightering and viscous oil pumping capabilities and readiness. Currently, each of the three Coast Guard National Strike Force Strike Teams have a VOPS in inventory ready to be used for future viscous oil lightering events.

Further tests of this system, through partnership between industry and government, are planned to improve VOPS capability, as it applies to overall vessel salvage and pollution abatement. The cooperative effort that led to this promising new response technology is yet another example of improvements to response capabilities as a result of a major incident.

CONCLUSION:

The passage of the Oil Pollution Act of 1990 has had a profound, positive effect in improving this nation's prevention, preparedness and response posture for oil spills. This comprehensive legislation mandated a wide range of measures directly geared towards preventing spills and better protection of the environment.

As a measure of success since the passage of OPA 90:

- Both the number and volume of oil spilled has declined significantly in the U. S.. The United States preparedness for oil spills is at on all time high.
- The adoption of the Incident Command System is a key reason for this increased preparedness level by providing the framework to coordinate all responders under one organization.
- Through the various contingency plans required under OPA-90, we have further increased our preparedness. However, the only viable way of knowing if our plans will work is to exercise them. The Preparedness for Response Exercise Program (PREP) is a dynamic program that achieves that goal.
- Research and development along with strong partnerships have led to advancements in oil spill technology and prevention. The latest project with the Viscous Oil Pumping System (VOPS) is a prime example of how working together to address a problem can led to, at least in this case, what looks to be a major break through is response capability.

While we have made positive strides in preventing pollution, we must not rest on our laurels. We must continue to identify areas for improvement, implement promising ideas, and build future partners.