DEVELOPING A COMPREHENSIVE INTERNATIONAL CURRICULUM IN OIL SPILL DISPERSANT OPERATIONS[1]

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ABSTRACT

Governments and industry, both national and international, contend that dispersants are an effective and practical response option under certain circumstances. However, a comprehensive training and education program in dispersant operations used to establish a baseline of understanding among responders and stakeholders is lacking.

Dispersant operations have played a positive and significant role on numerous oil spills in both national and international waters, yet a curriculum in dispersant operations remains a minor component of oil spill response course curricula. This may suggest that decision makers, responders and ultimately the public and environment are being shortchanged of alternative response technology training and education, which essentially fails to meet the needs of regional response teams, area committees, natural resource trustees, and the general oil spill response community's future decision makers.

Supported through case study analyses and critical argumentation, this paper presents an oil spill dispersant operations curriculum that governments and industry, both national and international, can adapt.

INTRODUCTION

In 2004, geographers Brent Yarnal and Rob Neff published a paper discussing the gap between human-environment relations and the overall geography education experience. They argue that human-environment geography is a central component of the discipline, yet many geography departments neglect to include the focus in their undergraduate and graduate curriculums, despite continued growth and interest. This paper underscores the logic and progressive thought processes reflected in their work and applies them to developing a curriculum in dispersant operations.

Delivering a laudable argument for enhancing dispersant capabilities in Hawaii, Martin, et al (2001) comments on how educating stakeholders about the benefits of a dispersant capability led to the first ever memorandum of agreement (MOA) allowing the Federal On Scene Coordinator (FOSC) use of dispersants during oil spill response operations. Training and educational opportunities in spill response technologies can and oftentimes do afford positive results as evidence of the 2001 MOA between the Oceania Regional Response Team (RRT) and the state of Hawaii. An international training and education curriculum is therefore necessary in order to allow decision makers, that is, local, State and Federal governments, natural resource trustees, and industry, a more informed and holistic view of the nexus of oil spill response options.

US national policy, through the Oil Pollution Act of 1990 (OPA), mandates mechanical recovery as the primary response method. However, UK policy relies on dispersants as the line of first response, with mechanical recovery playing a subordinate role only in areas where mechanical means are deemed appropriate (POST, 1996). Still, the use of dispersants is not widely accepted, especially among natural resource trustees; however, provided the potential trade-offs, dispersants may provide a net environmental benefit when compared to mechanical recovery or natural degradation (Elliott, 2002).

The node of dispersants response continues to be on unequal footing with the mechanical node and cannot near coequality until decision makers adapt a comprehensive dispersants curriculum for use in conjunction with a mechanical response curriculum. Allowing the culture of dispersant technologies to parallel that of mechanical technologies will promote a larger pool of response options.

The ultimate goal of this paper is first to show that dispersant application is both a nationally and internationally accepted response option through several case studies, second to discuss the importance of government and industry influence in training and education opportunities, and third to present a dispersant training and education curriculum framework from the recent Joint Agency Oil Spill Dispersant Operations Seminar and Exercise held in March, 2004.

CASE STUDIES OF RESPONSE OPERATIONS USING DISPERSANTS

The case studies presented in this paper represent a sample of case histories from the National Oceanographic and Atmospheric Administration's (NOAA) Hazardous Materials Response and Assessment Division. The studies are intended to both support and clarify the necessity for a dispersants curriculum that decision makers require in order to more effectively utilize available response options.

POSEIDON PIPELINE SPILL

In January 2000, a dragging anchor ruptured the 24" Poseidon pipeline causing a release of approximately 2,000 barrels of crude

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oil into the Gulf of Mexico. Marine Safety Office (MSO) Morgan City immediately contacted the NOAA Scientific Support Coordinator (SSC) for technical assistance during potential dispersant operations. Less than five hours later, 3,000 gallons of dispersants were applied to the slick resulting in a 75% effectiveness rate. A series of dispersant applications continued until it was determined that the remaining oil, approximately five barrels, could not be dispersed. This highly successful and effective response resulted in large part from prolific and proactive foresight, trained personnel, and notification of the proper Special Teams identified under the National Contingency Plan (40 CFR 300), i.e. NOAA SSC for technical support and USCG Gulf Strike Team for Special Monitoring of Applied Response Technology (SMART) support (Stoermer, et al, 2001).

GALAPAGOS ISLANDS FUEL SPILL

In January 2001, the tanker Jessica grounded off San Cristobal Island leaking approximately 170,000 gallons of diesel fuel, threatening one of the most ecologically sensitive regions on earth. The Ecuadorian Navy requested that United States Special Teams resources identified under the NCP be employed in support of response operations. The USCG Gulf Strike Team deployed along with a NOAA SSC team. Response operations included the use of dispersant technologies, but only after environmental trade offs were scrutinized and a low environmental risk factor determined (NOAA News Online, 2001). A mix of local knowledge, expertise in oil-shoreline interactions, and trained personnel in dispersant technologies improved the overall quality of the response (NOAA News Online, 2001).

MEGA BORG

In June 1990, during a lightering operation aboard the Mega Borg in the Gulf of Mexico, an explosion occurred in the ship's pump room. The explosion and subsequent fire led to the release of approximately 100,000 barrels of crude oil. In addition to the use of numerous other response technologies including bioremediation, in-situ burning, and open water oil recovery, approximately 11,000 gallons of dispersants were applied. Although observers noted a change in oil slick texture, weather conditions were not conducive for maximum dispersant effectiveness (NOAA, 1992).

TORREY CANYON

In March 1967, the Torrey Canyon ran aground off Lands End in England, releasing approximately 860,000 barrels of crude oil-the ship's entire cargo (NOAA, 1992). During the response, over 10,000 tons of dispersant, a lighter fuel used to cut the heavier oil, was applied to various areas on the slick, an amount far in excess of what normally should have been applied. A larger ecological footprint was left in oiled areas where dispersants were applied as opposed to oiled areas where no dispersants were used at all. The Torrey Canyon disaster was among the first such incident where a pseudo-dispersant was applied and consequently was also the first to draw attention regarding the dangers of dispersant use (NOAA, 1992).

These case studies illustrate how quick, decisive, and above all, informed decision-making can lead to an effective response using dispersant technologies. Conversely, they also prove how disastrous the consequences are when decision makers lack the necessary training. Lastly, they show how necessary it is to integrate the curriculums of dispersant operations and mechanical recovery.

GOVERNMENT AND INDUSTRY: A PEDAGOGIC ROLE

Governments and industry both national and international contend that dispersants are an effective and practical response option under certain circumstances. This stems from numerous experiments within a controlled environment and through field use on actual spills. Decisions makers therefore have the unique opportunity to play a significant role in developing dispersants training and education course curricula because of the diverse mix in functional areas of expertise.

Three reasons are associated with that opportunity. One, developing dispersant technology is a multidisciplinary function on the most basic level. Proper technology development, training and education require experts versed in public policy, engineering, chemistry, environmental science, incident management, meteorology and oceanography, and aviation, to name only a few. Two, use of dispersant technology demands a synthesis between public policy and law, sound scientific inquiry, and common sense. Three, dispersant technology now plays a larger and arguably more central role in the nexus of oil spill response options. Decision makers are therefore in a pivotal position.

Although a growing interest in dispersant technologies has occurred with relative ease in some regions, the steady trend could lose its footing. Because of environmental consequences, many contingency and response planning entities show continued reluctance to include dispersant technologies into the contingency planning process. (Response Plan Equipment Caps Review, 2000). Decision makers can begin to steady a position by encouraging greater collaborative efforts with representatives from academia. Such collaboration could signal a multidisciplinary partnership and renew the elements of a comprehensive approach to dispersant operations training and education. Collaborative efforts such as these align with the intent of Ecological Risk Assessments (ERA).

CURRICULUM FRAMING: THE REGION VI JOINT AGENCY DISPERSANT OPERATIONS SEMINAR AND TRAINING EXERCISE

True forms of collaboration will not occur unless the languages of public policy experts, chemists, engineers, environmental scientists, and incident management advisors converge into a holistic, integrated and multidisciplinary tradition. Theory and practical application must be integrated and involve the human dimension of response policy. Still, providing more opportunities is not sufficient enough to achieve the goal. Opportunities must offer more than the basics of dispersant technologies; they must offer the means to engage knowledge and information and apply them to real world response operations. Scientific theory and policy must be taught and learned, but curriculum design must allow participants to learn by doing, by applying knowledge gained through field and laboratory demonstrations.

A comprehensive curriculum in dispersant technologies was offered in March 2004 when MSO Corpus Christi, USCG Gulf Strike Team, NOAA, Texas General Land Office (TGLO), and Texas A&M University co-sponsored a joint agency dispersant operations training, education and exercise program.

Seminar and exercise participants benefited from the diverse selection of activities ranging from classroom instruction, to laboratory observations, to a field exercise. Most importantly, the opportunity created an informed audience capable of engaging the scientific, social, political, and technologic drivers that affect the option of dispersant response. The seminar and exercise defined the idea of a comprehensive curriculum in dispersant technologies and set the stage for future collaborative engagements.

Participants were immersed in the fundamental concepts and key theories of dispersant operations, followed by in-depth discussions on more advanced and progressive technologies. Using lessons learned in the classroom, participants were provided the opportunity for laboratory and field application. The following provides insight to the joint agency curriculum.

Lecturers from academia and industry explained the chemistry, physics and mechanics of dispersants in the marine environment and on spilled oil, in addition to the fundamentals of fluorometry. Special teams identified under the NCP discussed the goals of dispersant application, the use of dispersant technologies, a detailed examination of the SMART protocol, Occupational Safety and Health Administration (OSHA) safety considerations under 29 CFR 1910.120, and national policy regarding current and proposed dispersant requirements under the Notice of Proposed Rulemaking (NPRM) and 33 CFR 154 and 155.

Federal and State government representatives discussed the NCP Products Schedule under 40 CFR 300 subpart J, provided insight on near-shore dispersant use, decision-making matrices, and updates on the spill of opportunity. Lastly, participants observed a live oil-in-water dispersants application and fluorometer demonstration at the Shoreline Environmental Research Facility (SERF), part of the Texas A&M University system, followed by an aerial application demonstration using various aircraft as application and spotter aircraft.

All together, more than 65 participants attended the seminar and exercise. Participation came from local, State and Federal government, industry, and academia, as well as a number of international responders. As a result, the training produced a net increase of understanding and cooperation among all decision makers- a vital necessity in order to build and organize an immediate and effective response.

CONCLUSION

Where there exists robust disagreements regarding the use of dispersant technologies, there is also agreement regarding the goals of environmental protection and the ways to achieve those goals. The end point for restructuring dispersants training and education will be reached only through a synthesis of the sciences, policy and experience. Such a synthesis can be used in several key fashions: one, to improve basic oil spill response training and education; two, to realign existing training and education to address dispersant technologies; and three, to support responder and public awareness initiatives.

In sum, such an endeavor can be used simply to provide training and education opportunities for future decision makers, enhancing their ability to engage more critically the social, environmental, political, and economic systems that drive decisions. Failure to accomplish this will result in continued missed opportunities in shaping the future of marine environmental protection and response.

BIOGRAPHY

Lieutenant junior grade Jeffrey Rubini is the Assistant Operations Officer, Hazardous Materials Response Department Head, Training Officer, and a National Strike Force Response Officer assigned to the Gulf Strike Team. He holds a bachelor of science in geography and a master of arts in homeland security.

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