In-situ Burning Policy Development for California: A Consensus Approach to Policy and Decision-making

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Abstract

This paper outlines the current efforts spearheaded by the Office of Oil Spill Prevention and Response (OSPR) in the California Department of Fish and Game, to develop an *in-situ* burning policy to address oil spills in the open-water marine environments of the State. It describes the importance of early coordination and cooperation amongst the stakeholders in an *in-situ* burning decision, describes the formation of a working-group, and it discusses the consensus approach integral to current policy development efforts.

The paper describes how the differing perspectives and mandates of the agency representatives on workgroups can often lead to conflicting recommendations, further necessitating a consensus approach to problem solving. Although the consensus approach requires expenditure of more time and energy, the author discusses how this drawback is often off-set by the benefits of developing a good working relationship amongst agency representatives that will ultimately facilitate expedited decision-making.

The paper concludes with a description of the pertinent sections of the draft policy; a discussion of current projected timeline for completion of the finalized *in-situ* burning policy; plans for public review and comment on the draft policy and procedures for policy adoption and integration into appropriate State and Federal Plans. The implications of negative public perceptions regarding the use of *in-situ* burning are discussed and future plans for a public outreach and education program are outlined.

1.0 Introduction

To satisfy California's large petroleum requirements, hundreds of millions of barrels of crude oil and its refined products are shipped annually through its coastal waters and into ports. In addition, tens of millions of barrels of petroleum are produced each year from offshore oil wells and are transported ashore by subsea pipelines. Consequently, the California marine environment, including sensitive biological and amenity resources, is under continual threat of damage as a result of accidents that lead to spills of oil. The use of *in-situ* burning as an oil spill response method can play an important role in reducing the possible impact of oil spills on marine resources. However, the use of this technology, however, often requires the approval of many different oversight agencies and its use continues to be very controversial.

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There are presently two commonly recognized approaches to remove significant quantities of spilled petroleum from marine surface waters. The most common technique involves mechanical skimming devices which typically remove less than 20% of the spilled petroleum (National Research Council, 1989). The second and more controversial method is the use of chemical agents (e.g. dispersants) to disperse oil into the water column. The effectiveness of chemical dispersants has been reported to range from zero to 100 percent depending on the type of petroleum spilled, the dispersant used, and the approach employed to estimate effectiveness (National Research Council, 1989).

There is a third approach, *in-situ* burning, which is gaining acceptance as a viable oil spill response option. *In-situ* burning has distinct advantages over other oil spill countermeasures. It offers the potential to rapidly convert large quantities of oil into its primary combustion products with a small percentage of other unburned and residue byproducts (Evans *et al.*, 1992). This technique could be effective in dealing with a large spill at sea and in removing large quantities of oil from the water environmental before it comes ashore (S.L. Ross Environmental, 1990). Until recently, this response technology has not been regularly used, due largely to the lack of understanding of the effects of combustion products and the principles governing the combustibility of oil-on-water (Evans, *et al.*, 1992) as well as the lack of the equipment necessary to carry out a burn within the window of opportunity. Much of the renewed interest in *in-situ* burning has resulted from recent advances in the understanding of the dynamics of burning oil on water and of the nature and effects of combustion products produced during an *in-situ* burn.

In-situ burning removes the surface oil by driving much of it into the atmosphere in the form of combustion gases and soot. As such, *in-situ* burning reduces the environmental threat and impacts posed by on-water spills, but only at the cost of increasing the potential threat posed by the airborne plume. In the case of California, environmentally sensitive areas include the productive intertidal regions, tidal inlets, tidal marshes and other wetland areas of the coastal islands and mainland and the surface waters where endangered marine mammals and large concentrations of sea birds might exist. The problem for decision makers is to compare the effects of burning versus not-burning and choose the option that provides the greatest net benefit to the environment, without causing undue public health impacts.

In the wake of the *Exxon Valdez* and the *American Trader* oil spills, the Lempert-Keene-Seastrand Oil Spill Prevention and Response Act (Act) was enacted to protect waters of the State of California from oil pollution. This Act created a new and comprehensive statewide program which consolidated the primary authority for prevention and response efforts under the authority of the Administrator of the OSPR. Government Code Section 8670.7(g) requires the Administrator to develop a decision-making document for the use of *in-situ* burning to address oil spills within marine waters of the State. In furtherance of these requirements, the OSPR established an *in-situ* burning workgroup in

April of 1995 tasked with the development of a statewide *in-situ* burning policy. The workgroup consisted of representatives from a variety of special interest groups including industry, environmental organization, response organizations, federal, state and local government agencies. The workgroup utilized a consensus decision-making approach for decisions made by the group during policy development . The workgroup is currently reviewing its first internal draft *in-situ* burning policy document. Once the *in-situ* burn policy is finalized, a public education and risk communication program will be undertaken. Such a program is considered an integral component in the successful use of alternative response technologies.

2.0 The Use of Alternative Response Technologies in California

The use of any alternative response technology, whether dispersants or *in-situ* burning, will probably always be controversial. This is especially true for a State like California, which is characterized by a large, multi-cultural population, diversified business interests and a strong environmental movement. Although the response to every oil spill is unique, some situations and dynamics hold true for most, if not all, oil spills. One such situation is this is that virtually all catastrophic oil spills occur under extreme and/or unusual circumstances, either through negligence, unforeseeable events or an "act of God." Almost by definition, even the most diligent preplanning for oil spills can not take into account all possible unforeseeable events. With this as a backdrop and the proverbial "genie out of the bottle," responders are at the mercy of the given circumstances of a spill and must rapidly develop a plan that is appropriate and feasible to cleanup the spill as quickly as possible.

This situation is further complicated by the fact that the system usually established to combat an oil spill (the Incident Command System) does not correspond to the democratic tenets espoused by the greater society. The public has come to expect government to react in particular ways in response to catastrophes which adds another layer of complexity to response operations (Ott *et.al.*, 1997). In these types of scenarios, the ICS must respond to both the oil spill and to some extent, the expectations of the public. This includes concepts of public-right-to-know, the ability for individuals to comment on decisions within a public forum, the ability to express outrage or dissatisfaction with decision-makers and have these concerns heard and/or addressed in a timely, efficient manner (Sabatier, 1995; Sandman, 1995). If these areas of potential conflict are not addressed early during a spill response, the public will begin to distrust any and all actions taken during oil spill response. Unfortunately, this is often the very arena in which the use of alternative response technologies are decided.

It is important to point out that although oil spills are not the only emergency situations which require a multi-agency response (floods, forest fires, earthquakes), the public views the occurrence and therefore the resulting consequences of an oil spill differently from these other disasters. An earthquake is considered an "act of God" and as such, has no response party by definition. The public may come to question government agencies regarding

the appropriateness of safety standards for buildings or freeway structures after the incident is over, but this is different than having a specific target in which to focus outrage and blame for causing the incident. Even in the case of forest fires being caused by arson, the public usually does not have a Responsible Party with potentially deep pockets on which to focus its aggression and sense of loss, as the arsonist may be a reckless teenager, a homeless person trying to stay warm or a family camping in which a small fire got out of control. Oil spills are different. Unlike the forest fire or flood, oil spills are rarely considered unavoidable circumstances by the general public and as a result, the oil industry is always perceived to be at blame, negligently, for the spill. Indeed oil companies are and should be responsible for the cleanup and damages associated with spills, but the dynamics associated with public frustration and outrage surrounding oil spill response are quite distinct from those of many other emergency response operations. These difference should not be overlooked for they can easily overwhelm an Incident Command System focused on response and not structured to deal with these issues directly, if at all.

Preparation is critical in ensuring that spill response will be efficient and appropriate. Given the controversy surrounding the use of an alternative response technologies, establishment of an agreed-upon process by which use decisions will be made is requisite if any type of expedient decision is to be made at the time of a spill. In order for such a process to be effective, it must be developed in advance and agreed upon by the very people and agencies that would make these decisions during an actual spill response. Pertinent information can be gathered, discussed, and synthesized by a core group of stakeholders in advance of an emergency situation and consensus reached on the best approach for any given situation. This provides a greater likelihood that decisions will be made based on scientific data and best professional judgement and not solely on the emotional drama and political expediency that can often be overwhelming during a spill response. In this way, when a spill occurs, a foundation has been laid which provides decision makers with both a level of confidence and stability which can guide them through a use determination and a better understanding of and appreciation for the other players involved in the decision-making process. Even with such a foundation, the decision to utilize an alternative response technology will not always be uncomplicated; however, without this preliminary groundwork, history tells us that use determinations are dubious, at best.

3.0 The Workgroup Dynamic and Draft Policy Proposals

Although California Government Code Section 8670.7(f) gives the Administrator of the OSPR the State authority over the use of all response methods, including, but not limited to *in-situ* burning and dispersant use, many other local, state and federal regulatory agencies as well as environmental groups, industry and response community representatives are stakeholders in an *in-situ* burn use decision. These organizations have both differing mandates, missions and jurisdictions as well as expertise. For example, the Administrator

of the OSPR is responsible for overseeing cleanup operations and can also serve as the State trustee for wildlife resources for the Department of Fish and Game; while the local air pollution control districts are responsible for maintaining containment zones standards as required by the Federal Clean Air Act (standards vary among the air basins within the state). During an oil spill response, all the "stakeholders" need to come together and make a decision that is the best "for the State of California" but this may not necessarily "be the best" for their individual interests. It is with this general concept of the "greater good" that the *in-situ* burn working group was established.

From the beginning, workgroup members agreed to utilize a "consensus-based" approach to policy development. Additionally, members also agreed to try and move beyond the specific confines of individual and agency perspectives and try to work towards a policy that would provide the greatest net benefit to the environment, without causing undo risk to public health and safety. With this as a backdrop, several questions would need to be answered by the group in order for a policy to be developed.

The first question was: What potential effects can *in-situ* burning have on the environment and wildlife resources? After a review of the literature and thorough discussion, the resource agencies agreed that, at this time, they could document no unacceptable adverse effects of *in-situ* burning to biological resources. As such, they were willing to accept the heat and smoke generated by a burn as a trade-off against other more adverse effects that spilled oil might cause on the on-water and on-shore resources. Of course, this brought up the issue of what would be the potential adverse effects of the smoke plume on the general population, which would include individuals at high-risk for respiratory problems.

The second question was: What components of the smoke plume would be of concern with respect to public health? After a review of the burn data, local air districts agreed that the greatest threat from an *in-situ* burn would be from particulate matter, 10 microns or less (PM_{10}). This includes both the soot (elemental carbon) and the hydrocarbon particulates (unburned oil). The extent to which these particles would present a health risk during an *in-situ* burn would depend on the concentration and duration of exposure (ATSDR, 1991). Probably one of the most extreme examples of *in-situ* burning of oil would be the Kuwaiti oil fires, where the human population was exposed to smoke for some months. For the Kuwaiti oil fires, the highest concentration of total particulates found was 5.4 mg/m^3 at ground level in the plume, (Campagna, *et al.*, 1992) and 1.1 mg/m^3 of respirable particulates, in the plume of an oil fire (Ferek, *et al.*, 1992).

The third question was: What threshold level of exposure of PM_{10} is allowable to protect the public health? The National Ambient Air Quality Standards (NAAQS) for PM_{10} exposure is a 24-hour average of 150 $\mu g/m^3$. The California State Standard is 50 $\mu g/m^3$ averaged over a 24-hour period. The U.S. Occupation Safety and Health Administration (OSHA) 8-hour Permission Exposure limit (PEL) for total particulates is 15 mg/m^3 and 5 mg/m^3 for respirable particulates of PM_{10}. None of these standards seemed to be fully

appropriate for use in an *in-situ* burn. This is because an *in-situ* burn will generally produce only a few hours of potentially high concentrations of smoke, whereas the NAAQS were established to address everyday, long-term exposures and the OSHA standards for chronic exposures in the workplace. Additionally, the OSHA standards are based on exposure/dose tables for a twenty-two year old healthy white male in an occupational setting. Such a narrow data set would not be a good representative sample of the general public. The work group is currently reviewing a proposal which would incorporate a NAAQS-type standard for a short-term exposure and State-type standard for an exposure averaged over a 24-hour period.

The fourth question was: Where can/should *in-situ* burns be allowed to occur? or What are the safe distances of the general public from an actual *in-situ* burn? For several reasons, this was one of the most difficult questions for the work group to address. First, members of the workgroup agreed that they wanted to develop a policy that had "real-world relevance" and therefore, could actually be used at the time of a spill. Due to the timeframes constraining the use of *in-situ* burning, the workgroup decided that it would not be feasible to require that an air-monitoring program be in place prior to the time that a burn could be conducted and still meet the window-of-opportunity for a burn. Without a monitoring program, it would be difficult to precisely determine the level of exposure of the general public to PM_{10}. Requiring a monitoring program, however, would make the whole decision on *in-situ* burning moot. Currently, the workgroup is reviewing a proposal that would allow quick approval of an *in-situ* burn along the California coast based on simple criteria such as wind direction (off-shore or parallel to shore) and air mixing patterns that ensure that the local populations will not be exposed in any significant way to the plume.

Second, the geomorphology and climatic conditions of the California coast are quite diverse and a single common approach to an *in-situ* burning policy may not be feasible. To address the difference that exist along the coast, the workgroup is proposing burning designation zones that are divided into ten separate geographic zones, analogous to the local air pollution control district designations. This approach allows flexibility in addressing local political and topographic considerations and the differing air quality containment zone standards that exist for California's air basins. The workgroup is currently reviewing the feasibility of conducting air plume modeling for each of the geographic zones, with appropriate weather and spill scenario information. This will provide further data to help support the delineation of circumstances that are conducive to burning.

A final point that was important to members of the workgroup was that of follow-up. Members of the workgroup felt strongly that once the draft policy was completed, it must be followed by a public education and outreach program which would help provide a framework in which the public could understand a decision favoring the use of an alternative response technology. Without this type of outreach effort, the public would have to rely primarily on mass media for information in which to form their opinions. Given that the

mass media is not a scientifically rigorous source of information and given the nature of news coverage during emergency response situations, it is likely that "fear," "outrage" and "misinformation" could be the foundation for many of the decisions made by the general public. Such an outcome would serve neither the public nor those tasked with emergency response operations. The basic concepts for a proposed public outreach and risk communication program are discussed below.

4.0 Current Timelines

At the time this paper was published, the workgroup was reviewing the first draft of the *in-situ* burn policy. It is estimated that after revisions to the policy are made and internal reviews are completed, a draft policy will go out for public review and comment in late Fall, 1997. Timeframes for finalization of the policy will be greatly dependant on the nature and scope of the public comments, but it is hoped that the policy will be incorporated in the California State Oil Spill Contingency Plan and the Coast Guard Area Plans by spring of 1998. Once this is completed, the OSPR will begin work on a public outreach and risk communication program.

5.0 Public Outreach and Risk Communication

Any policies that are established regarding the use of alternative response technologies such as *in-situ* burning, will only be as good as our ability to implement the policies and to use them to address a real spill scenario. Although this seems obvious, how such implementation is accomplished is not so straightforward. The development of an *in-situ* burn policy for use in California is the first important step towards the use of this technology, but it is by no means, the end of the story.

"People's perceptions are their realities. . . . " and the public's perceptions of *in-situ* burning are critical to the use of this technology during any spill event. It is not enough to have a policy which was developed by experts, open for public input, finalized and then put on a shelf until needed for a spill event. The general public needs to be educated on response to oil spills. Groundwork needs to be laid for people to gain a reasonable understanding of the nature of oil spill response - what is being done and why. It is for these reasons that the OSPR is proposing a public outreach and risk communication program whose primary goal will be to facilitate a dialog with the public regarding oil spill response options, methods of specific prevention, concepts of risk, concepts of trade-offs and the specific trade-offs associated with different decisions made during response operations. The program will be centered around three specific points:

Prevention is the first and best line of defense, but accidents do happen. As with so many aspects of modern society, the general public only becomes aware of an issue when something goes wrong. The public becomes concerned with the problems associated with moving oil on or through marine waters when a spill occurs and it impacts things that are of value to them (gasoline prices, beaches, cancelled fishing or whale-watching trips, impacted wildlife).

Professionals in the field, however, (whether they be from industry, response organizations or government regulators) are keenly aware of what is being done to prevent spills and how these measures greatly reduce the risk of spills. The risk of spills, however, approaches but never reaches zero. It is often stated that the general public does not have a good understanding of risk nor the risks associated with the transportation of oil. However, the author maintain that the general public deals with risk everyday of their lives (the risk of speeding or not putting money in a parking meter; the risk of floating checks a couple of days before payday; or the risk of a pregnancy even when utilizing birth control)(Sandman, 1995). If the public is able to weigh risk and the consequences of particular behaviors or activities, then perhaps government agencies and others involved in oil spill response are obliged to educated the public about the risks associated with oil transportation and production and the efforts to reduce these risks. It seem ineffectual to hold on to an outdated idea that the general public wants the impossible (zero risk) or that they can't understand the complexities of an ever decreasing risk.

"Once oil is spilled, there will be damage." Oil spill specialists, must dispel the public perception that in response to a catastrophic spill, the oil can be completely removed from the environment by traditional clean-up methods (if only the responsible party were to employ enough resources). For example, the public must be made to understand that no amount of mechanical cleanup equipment could have completely cleaned-up the *Exxon Valdez* oil spill within the first few days of good weather following the initial release. *In-situ* burning, however, had the potential to eliminate a significant amount of oil during this timeframe of good weather and calm sea conditions (Allen, personal communication) had the option been exercised.

"The question becomes how to minimize damage not how to eliminate them?" Unfortunately, trade-offs must be made during response to a catastrophic oil spill (since point #2 is true) and it becomes the job of the response planners within the ICS to determine where the environment can best afford the impacts of oil. Critical to this discussion is also the recognition that if alternative response technologies, such as dispersants and *in-situ* burning, are not allowed, a de facto decision is being made that on-water and on-shore resources can best afford the impacts of an oil spill. These on-shore/on-water resources include not only the "charismatic megafauna" such as otters and puffins, but also the very beaches and shorelines that the public values so highly. It must be made clear that all actions taken during an oil spill response, including the use of alternative countermeasures, are consistent with society's concerns: to protect the public health and safety, to protect environmentally sensitive areas; and to protect economic resources. If an alternative response technology is used, it is because their use is consistent with these goals, and not simply because their use makes the cleanup easier or cheaper for a responsible party (although this may be a beneficial side-effect).

6.0 Summary

The movement of hundreds of millions of barrels of oil over and

through the marine waters of California poses a threat to the public heath and environmental resources from accidental oil spills resulting from such transport. Although prevention is the key to reducing the risk of oil spills, these risks can not be reduced to zero (save not transporting oil on or through the water). As a result, "pre-planning" for oil spill response becomes critical in ameliorating the adverse effects of spills once they do occur. Alternative response technologies, such as dispersants and *in-situ* burning, are simply more tools that should be available for use at the time of a spill. Given the political and logistical constraints associated with the use of *in-situ* burning, a predesignated approval process, agreed upon by all the stakeholders in advance of a spill, would greatly facilitate the use of this technology. This paper outlined the approach taken by the State of California in developing a statewide *in-situ* burning policy, including: establishing a workgroup; making decisions using the consensus approach; questions addressed and resolved by the group; proposed policy directions adopted by the group; finalization of the policy which includes public review and comment. The OSPR sees the finalization of an *in-situ* burn policy as a first step in the use of alternative response technologies. As stated previously, any policy that is established regarding the use of alternative response technologies will only be as good as one's ability to implement the policies and use them to address a real spill response scenario. To address this, the OSPR is proposing a public outreach and risk communication program whose primary goals will be to facilitate a dialogue with the public regarding oil spill response options and the trade-offs associated with different decisions made during response operations.

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