RRT VI EMERGENCY RESPONSE PREAPPROVED GUIDELINES TO DECONTAMINATE VESSELS AND HARD STRUCTURES IN PORT AREAS USING SURFACE WASHING AGENTS
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Disclaimer

References to any specific surface washing product does not constitute an endorsement or recommendation. The National Contingency Plan (NCP) identifies many chemical agents suitable for the decontamination and cleaning of hard surfaces. It is the responsibility of the Unified Command (UC) to insure that selected products meet the requirements of these guidelines, and are consistent with established cleanup goals.

Introduction

As a result of the successful use of surface washing agents to enhance the cleaning and demobilization of oiled vessels during several spill events in Galveston Bay Texas, the United States Coast Guard (USCG) sought to expedite the RRT VI approval process by establishing preapproval authorization to the Federal On-Scene Coordinator (FOSC). Preapproval is limited to the guidelines delineated in this document for the use of shoreline cleaning agents to decontaminate vessels and hard surfaces in predesignated port areas during emergency events. In short, preapproval extends only to the use of NCP listed cleaning agents that demonstrate a "lift and float" action when used in accordance with the manufactures recommended practices. Preapproval extends only to preidentified and approved port locations listed in or amended to Area Contingency Plans (ACP). All effort must be made to minimize the use of chemical agents and to collect, contain, and recover all flushed oil. Preapproval requires a minimum level of monitoring and reporting to the RRT.

This document provides background information on the use of surface washing agents during two spills in the Galveston Bay area (the M/V GENMAR HECTOR and the M/V NEW AMITY incidents), an overview of surface washing agents with specific application guidelines approved by RRT VI, the procedures to approve specific port areas for preapproval, and RRT VI reporting and monitoring requirements. All locations identified for preapproval must be reviewed by the appropriate trustee and regulatory agencies with respect to any unique sensitivities which must be factored into response actions. Request for inclusion in this preapproval authorization will come from the local Area Contingency Plan (ACP) process.

Background

On 14 March 2001, the M/V GENMAR HECTOR was oiled on both the super structure and hull after a transfer line broke during an unexpected storm event with winds gusting to 70 mph. In addition to the tanker vessel, seven vessels were oiled at the waterline as well as floating docks and barges. The crude oil rapidly weathered to the point that conventional cleanup techniques were ineffective at removing residual oil from the vessels so that they could be released from the port area. The use of surface washing agents was evaluated in a field trial and found to enhance the demobilization process by reducing the time required and improving the degree of cleanliness.

During the response, members of RRT VI were convened and the use of NCP listed surface washing agents identified as having the effect of "lifting and floating" remobilized oil were approved. Using the guidance of the RRT, a test was conducted to evaluate conventional washing techniques as well as chemically enhanced washing techniques. As a result of the test, pretreatment with PES-51 followed by high pressure, hot water wash resulted in the desired cleanup level which was essential complete remove of oil and oil stain. PES-51 was selected for this application because of it's availability and minimal contact time required before flushing. The demobilization of the oiled vessels and port cleanup was greatly enhanced using a surface washing agent.

Six months later, the collision between the M/V NEW AMITY and a barge tow resulted in a 1000 bbl oil spill in the Upper Galveston Bay. Shortly after the collision, the holed vessel was moved into the Barbours Cut port facility resulting in heavy oiling of the piers and vessels in port. In the M/V NEW AMITY incident, the spilled oil was an IFO-380, a very heavy and persistent residual fuel oil. Again, RRT VI was petitioned to allow the use of surface washing agents in a manner similar to that which was approved during the M/V GENMAR HECTOR incident. Approval was granted and was later amended to include limited use on hard structures such as the Passenger Cruise Ship Terminal within Barbours Cut. Although approved, high pressure was not used for vessel demobilization, but was used for final cleaning of some hard structures within the port under RRT approval. Most of the vessels were cleaned using low pressure flushing and PES-51 as required. Corexit 9580 was also used during this response. The use of a surface washing agent enhanced the emergency response and cleanup actives by allowing port operations to continue. Vessels were allowed into the port to unload and load cargo then rapidly cleaned as they prepared to exit the port.

During the M/V NEW AMITY response, a third spill located at a port closer to Houston, resulted in a similar request to the RRT for the use of surface washing agents to clean and relocate an oiled vessel. From these events, it was clear that some form of RRT preapproval guidance was needed to both expedite approval and provide specific RRT VI concerns and restrictions on the use of surface washing agents for such emergency actions. Developing preapproval guidelines has the added benefit of providing planners proper time for a detailed evaluation of the response action request with a corresponding opportunity for the RRT to fully review the action. Such comprehensive considerations are often difficult during late night conference calls during actual spill response events.

The need for monitoring was identified by several of the trustee agencies; therefore, some form of monitoring must be established to evaluate effectiveness and potential environmental hazards. The information gained would improve the science of surface washing agents and future spill response decision making. Water sampling would be required for situations where oil dispersion was either observed or expected to result from the agent/washing technique employed. As a result of the need expressed during past spill responses and discussions with RRT members, a guidance document which clearly defines acceptable practices approved by RRT IV was developed. This is that document.

When to Consider a Surface Washing Agent?

Surface washing agents may be considered when conventional flushing techniques are inadequate in removing oil residues to the required cleanup standard or when cleanup times can be reduced such that a significant positive impact on overall cleanup goal is achieved. Often, it is difficult and time consuming to configure and use conventional high temperature and high pressure systems to demobilize small bands of oil near the waterline of vessels that have been inadvertently oiled. By using surface washing agents and simple techniques such as hand wiping and lower pressure - ambient water flushing from small boats, effective cleaning and demobilization of vessels can be achieved quickly (often with enhanced results relative to conventional hot water, high pressure washing).

The application of shoreline cleaners are at times an appropriate response tool since cleaning and returning collaterally oiled vessels back to commerce or, at a minimum, removing them from cleanup zones is often a priory element while responding to a spill in a port area. As with all alternative cleanup techniques, there should be a determination that the use of surface washing agents during a specific spill response provides an overall positive benefit to the response objectives.

Surface Washing Agents and Mode of Action

Surface-washing agents are chemicals that are used to enhance oil removal from beach substrates and hard surfaces. Most chemicals that are classified for this application contain a mixture of a non-polar solvent and a surfactant. The solvent dissolves into the highly viscous or weathered oil to create a less viscous and somewhat uniform liquid oil or oily mixture. The surfactant reduces the interfacial tension between the liquid oil and the surface the oil has adhered. Depending on environmental conditions and the selection and combination of solvents and surfactants, the removed oil will either float or disperse. The latter has a negative environmental impact for most shallow water coastal environments; therefore, products which "lift and float" are preferable. An exception would be in high-energy environments where the surface oil cannot be recovered. Under such conditions, it may be preferable to let the oil disperse rather than reoil adjacent areas. Note, preapproval does not extend to lift and disperse products, but this document should serve to expedite their appropriate use, when the situation requires such agents.

Approved "Lift and Float" Agents and Technical Support

For a product to be used, it must be listed on the NCP Product Schedule. The Product Schedule does not specifically identify shoreline cleaners as to their mode of action. The manufacture's product information, prior experience using a particular product, or laboratory test should provide the information necessary to classify a surface washing agent as "lift and float" or "lift and disperse." The Job Aids for Spill Countermeasures Technologies (see the following web site http://homepage.mac.com/csusalis/index.html) is highly useful in determining the mode of action for many of the listed products. Technical specialist such as the NOAA Scientific Support Coordinator should be consulted if there is any doubt as to the applicability of NCP listed products for specific applications. In addition, scientific and technical publications such as those published in the Proceedings of the International Oil Spill Conference may be consulted for technical overview and case studies (Michel et al is one such publication).

Application Guidelines

Each product will have recommended instructions for use provided by the manufacturer. During spill responses, these methods may require some modification to achieve the desired cleanup goals. The RRT does not wish to

define too narrow an approval guideline. The environmentally friendly and cost practical approach is to minimize the amount of chemical used and maximize containment and recovery of the treated oil. Several approaches which have been recommended and used in the past are outlined. Each has positive and negative trade-offs that must be balanced with the overall response goals including removing the oil to an acceptable standard with minimal additional environmental impact. The two most common approaches are the "Spray and Wipe" and the "Spray and Flush" techniques.

Technique I: Spray and Wipe. There are two ways to use this technique, spraying agent on a sorbent pad then wiping the oiled surface or spraying agent directly on the oiled surface and then wiping with sorbent pad. This technique is most useful on small accessible thin bands of oil and "bathtub rings" above the waterline of vessels and other hard surfaces.

Spray Chemical on Sorbent Pad then Wipe

Pros:

- uses less chemical agent
- minimal or no oil and chemical transported to the water
- no need for on-water recovery
- no additional equipment needed other than sorbent pads, sprayer, and a platform to work from
- good during periods of high wind (over spray minimized)

Cons:

- individual workers come in close contact with chemical
- may take longer than high pressure flushing techniques
- labor intensive
- less effective if the product requires contact or soak time

Spraying Agent on Oiled Surface then Wiping

Pros:

- generally less time consuming than spray pad and wipe technique
- no additional equipment needed other than sorbent pads, sprayer, and platform to work from

Cons:

- may require on water recovery as some of the oil will rapidly run down vertical surfaces and come in contact with the water (sorbent boom and/or pads at the contact point between the structure's surface and the water may serve this function).

- workers come in close contact with agent and may pose an inhalation hazard
- time consuming (but generally faster than cleaning without chemicals)
- labor or manpower intensive
- may require contact or "soak" time based on manufacturers recommendations

Technique II. Spray and Flush: The basic form of this technique is simply applying the surface washing agent using a low pressure garden type hand held sprayer followed by flushing the mobilized oil from the hard surface with water hoses. Removed oil is flushed into a containment boom system and collected using either sorbents or a skimming system. This technique has been demonstrated as useful on porous structures such as cement pilings and large oiled surfaces. The pressure and temperature of the water flushing system can be highly variable, but low pressure and ambient water temperatures are preferred since they more easily available and reduce the potential for physical oil dispersion into the water column.

Spray and Flush (General Considerations)

Pros:

- can remove oil from large areas effectively
- less manpower required (more efficient for larger areas)
- fewer workers come in direct contact with chemical agent
- soak time less of an issue due to time it takes to cover a large area with the agent prior to flushing.

Cons:

- requires more equipment to include containment boom
- must recover oil flushed onto the water surface
- higher pressures increase physical dispersion of both oil and chemical agent into the water column and will require sample collection.
- concerns for over spray to include collateral public and occupational worker exposure during windy conditions

There are several variations on the Spray and Flush technique that may be considered:

a) Apply agent then use low pressure (<10 psi) ambient or hot water (between 90 and 171°F) to wash.

b) Apply agent then use high pressure (>100 psi) ambient or hot water (between 90 and 171°F) to wash.

c) Apply agent then use steam cleaning (water temperatures > 171°F). Note, steam cleaning is general used in conjunction with very high pressure systems (often >2000 psi), but water volumes generated are very low relative to flushing systems.

d) High pressure ambient or hot water wash the surface to remove the bulk of the oil, apply surface washing agent, then low pressure wash to remove residual stain.

Ideally, the use of chemical agents should enhance the use of lower water pressures and cooler water temperatures to achieve the same degree of oil removal relative to high pressure steam cleaning. High pressure systems should only be used if lower pressure systems fail to achieve the cleanup goals. The same is true with water temperature: a good practice is to start with ambient water and increase temperature only if required. For some applications, high pressure flushing of the bulk of the oil from the surface followed by product treatment and low pressure flushing have been highly successful and minimize the amount of chemical agent required. Hot water and steam cleaning systems will increase worker inhalation exposure.

Monitoring Requirements and Guidelines

At a minimum, the FOSC is required to provide visual monitoring to insure that the surface washing agents are being applied as recommended, evaluate effectiveness, document any observed negative effects, and to make recommendations which may enhance future use of such cleanup technologies. The requirement for visual monitoring does not imply continuous monitoring during the entire cleanup process. Observations of the initial trails and spot observations during the response will normally meet this guideline. Photographic documentation is recommended, but not required. If subsurface plumes are observed, water sampling should be requested. If high pressure flushing is employed, water sampling is required under this preapproval guidance document to assess hazards to the aquatic environment. Worker health and safety monitoring must be established consistent with concerns identified by individual Material Safety Data Sheets (MSDSs).

During an oil spill response, there is a requirement to collect information about the use and effectiveness of various response technologies in a real-time, scientifically based manner to support decision making during the current

response and add to lessons learned for future responses. This is especially true for products that there is little or no actual field information available. Monitoring is primarily based on visual observations, but water sampling, as previously stated, is required where subsurface plumes are observed or when high pressure flushing systems are used. Observations should address the following questions where appropriate:

General Observations

- Does the product improve the rate of oil removal?
- Does the process achieve the required cleanup standard?
- Is the treated oil dispersed?

Effectiveness Observations

- Can the flushing pressure and temperature be reduced without loss of effectiveness?
- What fraction of the treated (removed) oil is recovered?

Effects Observations

- What were the oil concentrations in the water adjacent to the treated areas?
- Were there any observations of negative impact to animals in the adjacent waters?

Water Sampling and Laboratory Analysis.

Ideally, subsurface water grab samples should be collected at a depth of 1 meter into precleaned 1 liter amber bottles. Samples should be collected prior to treatment and several times during the cleanup process. Insure that samples are collected "downstream" from the location. Record the date and time each was sample collected, distance from actual cleaning operation, as well as log what activities were being conduct during and prior to sample collection. A simple drawing of the location and sample collection points is recommended. A field blank should also be submitted for analyses for QA/QC. Water samples should, at a minimum, be analyzed for TPH-Oil.

Reporting and Follow-up Documentation to the RRT

When time permits, the FOSC should notify the RRT co-chairs that surface washing agents are being used as defined in the preapproval. The initial

notification should include the location, product being used, and a short justification. The USCG 8th District Response Assistance Team (DRAT) can be tasked by the FOSC or his representative to make this initial notification to the RRT.

To document monitoring observations and provide a follow-up report to the RRT such that information gained may be used to improve future spill responses, the RRT request that a short summary be submitted to the RRT co-chairs as well as the Science and Technology Subcommittee Chairman. The responsibility for providing this feedback rest with the FOSC, but the actual task may be directed to a technical support specialist. The report need not be long and may be submitted electronically. For many situations, a simple email would capture the essential observations and lessons learned. The DRAT can be used as as the point of contact for RRT communication.

Preapproved Areas

Specific port locations to which preapproval applies should be proposed in a written request by the USCG Captain of the Port (COTP) as chairman of the ACP process. To be included as a preapproved area, the port and adjacent habitat must be reviewed to insure compliance with the Inter-agency Memorandum of Agreement Regarding Oil Spill Planning and Response Activities Under the National Oil and Hazardous Substances Pollution Contingency Plan and the Endangered Species Act and Essential Fish Habitat (EFH) consultation as required under the Magnuson-Stevens Fishery Conservation and Management Act (amended 1996). The NOAA SSC and other technical specialist may coordinate these consultations for the COTP. Area planners should evaluate the unique requirements for specific geographical regions and submit a request for approval within practical spatial limits. The RRT recommends that environmental assessments extend 0.5 nautical miles from the port entrances. Ideally, individual ports will be identified, but geographical regions may be proposed for highly clustered port areas so long as specific environmental concerns are not overlooked.

The RRT will review the information submitted in the written request and make any additional consultations deemed appropriate before approval. Once submitted and approved, the request to the RRT with a signed response cover letter will, in effect, serve as the preapproval document with this guideline referenced and attached.

References

Michel, J., A. Walker, D. Scholz, and J. Boyd. 2001. Surface-washing agents: product evaluations, case histories, and guidelines for use in marine and freshwater habitats. In the *Proceedings of the International Oil Spill Conference*, Tampa Florida. pp 805-813.

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