

The National oil Spill Response
DISPERSANT USE POLICY
NOVEMBER 2009

DISPERSANT USE POLICY

BACKGROUND

Sec.1. (a) Dispersants are chemical formulations which reduce the surface tension between oil and water, and thereby facilitate the breakup and dispersal of the oil in the form of finely divided droplets throughout the water column.

Dispersants are known for about 40 years and only last 10 years widely accepted as effective and environmentally friendly oil spill response tool when they are used properly. Dispersants help the oil slick to spread on the water surface, break it up into small drops (less than 100 μ in size) and transfer into sea water column about 10 meters thick, forming a substance similar to milk. Increasing contact surface of oil with bacteria presented in natural conditions they speed up the natural oil degradation processes many times. The dispersants ingredients surround each drop of oil, keeping them from coalescing and floating back to the surface and sticking to hard surfaces. Satisfactory dispersion of oil in water re-quires a dispersant-to-oil application ratio (DOR) of 1% to 10%. The sooner the dispersant is applied, the less of it is needed to achieve the desired positive effect.

Skepticism towards the Use of Dispersants

(b) For many years regulatory authorities all over the world have confined to mechanical recovery as the one and only method of combating oil spills at sea. The skepticism towards the use of chemicals has been obvious. The old regulations from 1980s clearly stated this point of view. Any use of dispersants exceeding 1000 liters had to be approved by the authorities, and it was not allowed to disperse the oil if mechanical recovery was possible. It was further not allowed to use dispersants in rivers, lakes or seashore.

World Experience

(c) Experience from oil spill response (OSR) operations all over the world indicated that these procedures described in these regulations were out of date, and neither government environmental regulatory bodies nor entities directly involved in OSR were satisfied. The reason was that permits were issued by the central authorities without any input from the territorial authorities, i.e., without taking local conditions into account. The entities were dissatisfied because permits were not issued rapidly which would be extremely valuable in an emergency situation.

Research Contributions

(d) Since 1980 large amounts of research has been done in finding less toxic dispersants and more suitable application equipment. We also know much more about fate and effects of the dispersed oil in the water column. This includes how quickly the dispersed oil dilutes to concentrations not considered toxic to marine life. In short: research shows that the possibility of biological effects of the dispersed oil dispersants is limited in areas with rapid water replacement and few vulnerable resources present in the water column (e.g. spawning fish). These researches have caused major shifts in dispersant use in many jurisdictions such that newer regulations seek to:

1. Regulate the application of dispersants in environmentally friendly manner with minimum environmental damage, economic damage and damage to biological resources, as well as time required for issuance of a permit;
2. Take into account all of the latest advances in OSR and dispersant usage;
3. Comply with the requirements and recommendations of international agreements and organizations that those jurisdictions are a party to or member of;
4. Define dispersant-permit application and issuance procedures that take into account the opinions and interests of territorial-level environmental protection authorities, industry, and organizations directly involved in OSR operations.

National Oil Spill Contingency Plan

(e) Ghana has developed a National Oil Spill Contingency Plan (NOSCP) since 1986 in preparation towards oil spills. The NOSCP has not ruled out the use of dispersants as a combat option. However, the policy statement in the NOSCP lacks clear direction on the use of dispersants, such as pre-approval, permitting process, operational procedures, etc.

Title and Approval

(f) This document, entitled “The National Oil Spill Response: Dispersant use Policy” (and hereinafter referred to as the “policy”) has been completed and adopted for implementation in November 2009. It was prepared by the EPA (the designated National Authority) and adopted by the National Oil Spill Response Committee and approved by the Ministry of Environment, Science and Technology. Positive opinions and conclusions have been received from the leading institutes for environmental protection and the fishing industry, as well as various research institutes and centers of expertise. The policy and its associated guidelines have undergone a national Environmental Expertise Review, and received a favorable evaluation. This evaluation was approved by the Ministry of Environment, Science and Technology.

PURPOSE

Sec. 2: This policy addresses the pre-authorization of the use of chemical dispersants for the purpose of responding to oil spills in the territorial waters of the Republic of Ghana, as a means of reducing the overall impact of such spills on marine ecosystem.

SCOPE

Sec. 3: This policy covers the marine waters off the coasts of the Republic of Ghana, extending seaward of the high water line to the outermost extent of the Exclusive Economic Zone.

ZONES

Sec. 4: The waters addressed in this policy, as defined above, will be delineated into two zones.

Conditional Approval Zone

(a) The use of any chemical agent in response to an oil spill in the territorial waters of the Republic of Ghana within two nautical miles of the mainland or has a mean low water depth of less than forty (40) feet (12 meters) will require approval under the methods and restrictions set forth in the latest National Oil and Hazardous Substances Pollution Contingency Plan, unless otherwise pre-authorized.

Pre-Authorized Zone

(b) The use of chemical dispersants as described in the EPA guidelines for importation of chemical dispersants in response to an oil spill in the territorial waters of the Republic of Ghana, which are seaward of two nautical miles of the mainland and have a mean low water depth greater than forty (40) (12 meters) feet is pre-authorized under the supervision of the Pre-designated On-Scene Commander with restrictions set forth below.

Special Consideration Areas

(1) Special Consideration Areas (SCAs) may be designated and described in writing by the Environmental Protection Agency.

(2) Special Consideration Areas will consist of restrictions imposed on the use of chemical dispersants for a specific geographic area to be described in this policy (Annex A). These restrictions may range from outright prohibition to a requirement for consultation prior to deployment of the chemicals. They may be spatial, seasonal or species-specific in nature. Each Special Consideration Area submitted by the Agency shall describe the specific restrictions to be applied on the use of chemical dispersants, including, as applicable, primary and alternate point-of-contact telephone numbers.

(3) Changes to any aspect of the Special Consideration Areas will be submitted, in writing, to the Chairperson of the appropriate Area Committee and will take effect thirty (30) days following receipt by the Chairperson. Upon receipt, the Chairperson shall forward copies of these changes, as soon as practicable, to the membership of that Area Committee and to the Co-Chairpersons of the Regional Response Team.

POLICY REVIEW

Sec. 5: This plan, along with the Special Consideration Areas in Annex A will be reviewed by the National Plan Management Committee (NPMC) set up under the NOSCP.

DETERMINATION OF EFFECTIVENESS

Sec. 6 (a) The Pre-Designated On-Scene Commander (OSC) with authority over the oil spill in question will determine the effectiveness of the dispersant during the time of application. This effectiveness test will be conducted visually and qualitatively by the use of qualified and trained oil spill observers. Qualified observers will be individuals with oil observation experience from the OSC's staff, or those identified by the OSC at the time of the response. These individuals will conduct overflights to determine if the oil is being effectively dispersed. If it is determined by the OSC, based on the report of the

observers mentioned above, that the chemical dispersant is having minimal effect, application of that chemical dispersant will cease.

(b) If an authorized chemical dispersant application has been halted and conditions change which contribute positively to the effectiveness of re-application (for example, if a new release event occurs or weather conditions change), the OSC, following consultation with his or her scientific support team, may attempt a new application of the chemical dispersant. This new application will be subject to the same effectiveness monitoring as described above.

DISPERSANT MONITORING PROTOCOL

Sec. 7 (a) As agreed upon by the NPMC, the OSC will follow the Dispersant Monitoring Protocol, as outlined in Annex B. An inability to implement this plan in a timely manner will not revoke the OSC's pre-authorization to apply chemical dispersants. However, the OSC should make every attempt to implement this plan as soon as practicable.

(b) As soon as practical, a post-application biological monitoring plan will be developed as a section of Annex B and will be implemented routinely following the use of dispersants. An inability to implement this plan in a timely manner will not revoke the OSC pre-authorization to apply chemical dispersants. However, the OSC should make every attempt to implement this plan as soon as practical.

NOTIFICATION

Sec. 8 (a) If a decision has been made by the OSC to use chemical dispersants under the provisions of this policy, the OSC, as soon as practicable, will notify the Head of the National Oil Spill Response Centre, as set forth in the most recent version of the National Oil Spill Contingency Plan, of that decision.

(b) If chemical dispersants are used as described in this policy or for the protection of human life, the OSC will hold a post incident debriefing within forty-five (45) days after dispersant application to gather information concerning the effectiveness of the chemical agent used and to determine whether any changes to this agreement are necessary. This debriefing should include, but is not limited to, the National Oil Spill Response Committee, or their representatives. The results of the de-briefing will be included in the OSC report.

Annex A: Special Consideration Areas For Dispersant Pre-authorization Policy Summary:

| Area/Situation: | Additional Condition: | Submitted by: |
|---|--|----------------------------|
| Dispersant types other than Corexit 9527 or 9500 (US), | Not pre-authorized (Other stockpiled dispersants must receive specific approval from the EPA before they may be pre- authorized). | Oil Spill Response Limited |
| All pre-approval areas | Implementation of the 6-point Dispersant Monitoring Protocol, Bioassay protocol, and physiochemical data collection (temp, salinity, conductivity, pH) at each sampling location, etc. | |
| Areas where whales are present and feeding | Suspend dispersant application | |
| Known fishing grounds | Consultation with Fisheries Commission and EPA | |

Annex B
Dispersant Monitoring Protocol

DISPERSANT MONITORING PROTOCOL

OBJECTIVES:

The EPA has developed this protocol to monitor the deployment of chemical dispersants during oil spill response actions in marine and estuarine waters. The monitoring protocol is designed to assess movement of dispersed oil from the water surface into the water column and bottom sediments, and to provide data for analysis of potential biological effects.

Adoption of this protocol does not constitute a decision to use dispersant. Such decisions are the result of separate agreements (pre-approval) or incident specific discussions.

This protocol eliminates the need to develop incident specific monitoring requirements during an ongoing spill and in addition to satisfying the stated objectives, is intended to expedite chemical dispersant response actions.

BACKGROUND:

The EPA has developed the following monitoring protocol to enable rapid response to oil spills. This eliminates the need to develop incident specific monitoring requirements and providing the On Scene Commander (OSC) with the information necessary to plan for dispersant use should expedite responses.

OSC must always be prepared to respond to an oil spill with all available equipment, personnel and technology to reduce the impact from accidents. The National Oil Spill Contingency plan provides for the formation of Area Committees that shall, under the direction of the On Scene Commander, enhance National and local oil contingency planning by developing appropriate procedures for use of dispersants. Dispersant technology has been recognized as a potential method of reducing the impact to the shoreline environment from accidental oil spills. In order to effectively utilize this technology, a protocol must be in place before a spill to identify the requirements for monitoring the dispersant application.

This dispersant monitoring protocol will:

1. Provide scientific background information regarding the spill, dispersant utilization and effects. This will provide natural resource trustees with information crucial to their impact trade-off decisions. The data gained will assist with subsequent damage assessment responsibilities.
2. Provide the OSC with the requirements of a monitoring program so that advance planning and coordination may occur. The data will also assist officials with support regarding post incident challenges-
3. Establish an education program for future learning regarding dispersant application. This will assist in reviewing dispersants as a permanent response tool.

The NPMC established the requirement to monitor all dispersant applications. The requirement is not to delay the effective application of the product but will enhance the scientific and educational values for the future. This protocol is presently established to gain knowledge in dispersant usage and will require review and updating as better information and data are gathered. As most oils must be dispersed within an approximate 48 hour period, rapid response is a necessity. Rapid response can not be insured unless a monitoring protocol is in place which accurately assesses movement of dispersed oil and potential biological effects. This monitoring protocol does not establish limits by which dispersant are applied or not applied, but identifies samples to be collected for laboratory scientific analysis.

The monitoring protocol established here will be impacted by incident specific variables. Spill size, spill dimensions, weather, direction of trajectory and depth of water all provide variables to the planned monitoring. Incident specific directions will be required from the OSC, in consultation with appropriate state agencies, regarding monitoring. The plan should be initiated promptly whenever the OSC authorizes the use of dispersants on an oil spill. Implementation of the plan shall not interfere with the spill cleanup. Should unforeseen circumstances make it not possible to implement this monitoring plan in whole or in part during or subsequent to authorized dispersant application, the OSC shall advise the incident specific response team as soon as possible.

EQUIPMENT AND CHEMICALS REQUIRED FOR MONITORING

The following equipment will be necessary to conduct the monitoring protocol. The equipment listed will only provide one monitoring platform. In the instance of larger spills where extensive monitoring is required, the OSC may need to consider additional platforms. It is not envisioned in this program that each and every dispersant application pass is individually monitored. For planning purposes, it takes 1.5 hours to perform the six point sampling protocol. Collection of sediment grab samples and benthic invertebrate samples will take additional time but are not time sensitive.

a. Aircraft for air surveillance of the dispersant application and for initial guidance and direction of vessels conducting the monitoring program. There are no specifics on the type of aircraft. Rotary or fixed wing aircraft are suitable for the job. The aircraft used must be able to communicate with vessels in the area. Portable radios are often sufficient to meet this requirement.

b. A boat large enough to conduct required sampling. Large vessels with on board scientific equipment may be employed however are not required. Immediate analysis of the water samples is not a requirement. Boats approximately 23 inches (7 meters) in length, radar and electronic navigation system equipped provide sufficient capacity. Any work from boats should take into account the existing and predicted weather conditions and location when determining a suitable platform. Oftentimes offshore spills have several large vessels attending much smaller vessels conducting actual work. Vessels are likely to require aircraft to lead them to the dispersant application site.

- c. A fluorometer with the appropriate filter and capability to take samples at 1, 3 and 10 meters depth. The supply line should be fitted with a valve at the unit so that immediate water samples can be drawn with positive fluorescent readings.
- d. Water sample bottles, one liter, teflon lined screw caps and amber in color. A minimum of 120 bottles should be readily available.
- e. Ice chest with ice for keeping samples cool during transit to laboratory.
- f. 35mm camera with film
- g. Video camera with one cassette
- h. Radios for various monitoring platforms. One radio per platform should be sufficient.
- i. Drift buoy for estimating the dispersed oil plume movement. This buoy should be equipped to allow tracking by the monitoring vessel, with a radar reflector. The six point monitoring protocol requires sampling in relative positions to the deployed buoy. Should long term sampling of the same plume be desired a radio beacon buoy will be required.
- j. Supply of Hydrochloric acid (HCL) for sample preservation.
- k. Safety equipment should be carefully reviewed. Initial oil spills will possibly contain levels of benzene, however by the time the dispersant program and this monitoring program are in place exposure should not be a problem. Consultation with appropriate safety personnel should solve this problem. All sampling should be done wearing Personal Flotation Devices (PFD) work vests, neoprene or latex gloves, steel toed shoes and eye protection. Monitors using aircraft and vessels should conform to established safety procedures of the craft. In the case of products which contain higher amounts of Benzene, initial air monitoring may be required.
- l. A 20 liter sample container for the collection of clean sea water at position number 1 (see the attached Six Point Dispersant Monitoring Protocol).

This monitoring program is designed to require a minimum of scientific personnel offshore and to conduct the analysis in a shore side laboratory. Personnel going offshore should be able to navigate accurately, utilize the fluorometer correctly and take proper water and sediment samples for analysis using standard analytical protocols. Scientific personnel will be required Nearshore and Inland Zones when conducting benthic invertebrate sampling. Other sampling may be desired for scientific purposes, but are not part of the required monitoring program.

ESTABLISHMENT OF DISPERSANT MONITORING ZONES:

The monitoring program is divided into three geographic zones including Offshore, Nearshore and Inland. The Offshore Zone is considered all waters 3 nautical miles and greater from the shoreline. The Nearshore Zone is considered all waters from three miles

to the shoreline. The Inland Zone is all waters within the headlands including bays, estuaries, rivers and harbors.

DISPERSANT MONITORING TECHNIQUES

1. Visual observation (either aerial or by vessel) of the dispersant application shall be conducted during dispersant use. This observation will determine if the application is on target, whether initial dispersing is occurring and identify any shortfalls. The visual observation should be immediately after application. Most often the use of aircraft is the most practical due to height of eye. Vessels used for this purpose would have to provide a considerable height to allow appropriate observation. Timing of the aircraft is important to insure sufficient airtime is available for both the observation and direction of boats for the monitoring program. Use of both still and video cameras is necessary to document the application and its results. Video film should be immediately taken back to the OSC and other officials for review. The OSC may use the film as a basis for further decisions regarding dispersant application. The OSC shall assign one of his staff in offshore areas and a local representative in near shore and inland areas at a minimum for observation. Each individual should be trained or possess experience in aerial observation of spilled oil. Very limited space will be available in aircraft and documentation using the video will allow others in the command center to observe the application.
2. Field expedient tube testing may supplement or augment the immediate visual observation to determine the dispersibility of the oil. Using the test protocol established in the attached Six Point Dispersant Monitoring Protocol, OSC may approve use. The tube test will use a sample of the spilled oil and the dispersant to be applied.
3. This procedure establishes a 6 point sample collection protocol. The 6 point program will be utilized right after dispersant application and continue as deemed necessary by the OSC. Enclosure (2) shows the layout to be used in collecting samples using the 6 point collection pattern. At each monitoring point data will be gathered at 1 meter, 3 meter and at 10 meter depths. Additionally, a 20 litre clean water sample will be taken at position number 1 for analysis purposes. Information to be gathered includes a position (geographical coordinates) fluorometer reading and water samples at maximum meter deflection. Water samples are collected for further scientific analysis. Fluorometers must be properly calibrated using the manufacturer's instructions. Water samples should be collected in the one liter bottles and kept cool using the ice chest until analysis is completed. Flexibility in implementing this protocol will be required due to the restricted ability and safety of on scene personnel.
4. Fluorometers will be utilized to observe and measure emulsified and dissolved oil in the water column. It will provide a baseline using surrounding water as the normal background. Fluorometers and ancillary equipment should be designed and calibrated for working with oils.

5. Sediment grab samples, when required, will be taken and placed in 1 litre clean sample jars. The samples will be kept frozen until analysis can take place. Enclosure 3 outlines the procedures for sediment sampling.
6. Benthic invertebrate sampling, when required, will be conducted with personnel suitably qualified and using sample containers that are clean and oil free. All means necessary to eliminate contamination by other than spilled oil must be taken. Enclosure 4 outlines the procedures for benthic sampling.

NOTE: Caution should be utilized in gathering sediment and benthic invertebrate samples to avoid cross contamination with oil in the water. Sediment or benthic invertebrate samples will normally be taken after floating and dispersed oil passes the collection points. Oil from the spill impacting sediments and invertebrates will remain for extended periods and rapid collection is not necessary. It is expected that this sampling will be conducted within weeks of the actual dispersant application.

MONITORING REQUIREMENT OFFSHORE:

- (1) Visual monitoring initially and after every load of dispersant taken offshore.
- (2) Video tape of the initial results of application
- (3) Fluorometer readings and water sampling using the 6-point protocol. Continued monitoring or the extent of monitoring will be determined by the spill size and the amount of dispersant to be applied.

Quantitative monitoring offshore is less than nearshore or inland due to the greater water depth, larger mixing zone and generally fewer sensitive resources in the area of impact.

NEARSHORE:

- (1) Visual monitoring initially and after every application.
- (2) Video tape and stills for the initial results of application.
- (3) Fluorometer readings and water sampling using the 6-point protocol. Continued monitoring or the extent of monitoring will be determined by the spill size, amount of dispersant to be applied, location of the spill and trajectory of the spill. The OSC should develop these in consultation with local representatives. Continued monitoring at 6 hour intervals would allow sufficient information gathering to perform the required analysis. Due to the possibility of encountering shallow water impacting the 3 and 10 meter water samples, the program should continue by taking water column samples at maximum water depth.
- (4) Sediment grab samples should be taken in non oiled and oiled or potentially oiled water areas for comparative analysis. The only samples required are those to give a representative indication of sediment impact from the dispersed oil. Beach sampling of oiled beaches is not part of this program. When fluorometer readings are high in near bottom waters, sediment sampling is not necessary due to known impact.
- (5) Benthic invertebrate sampling should occur in non-oiled and oiled or potentially oiled water areas for comparative analysis. The only samples required are those to give a representative indication of benthic invertebrate contamination from the dispersed oil.

INLAND:

- (1) Visual monitoring continually during application and until the expected trajectory reaches the shoreline.
- (2) Video tape and stills of the oil being dispersed and results of the initial dispersal.
- (3) Fluorometer readings and water sampling using the 6 point protocol. Continued monitoring or the extent of monitoring will be determined by the spill size, amount of dispersant to be applied, resources at risk, location of the spill and trajectory of the spill. The OSC should develop these in consultation with National, Regional and Local representatives specifically for the area to be governed. Continued monitoring at 4 hour intervals or until the dispersed oil trajectory reaches the shore would allow sufficient information gathering to perform the required analysis. Due to the possibility of encountering shallow water impacting the 3 and 10 meter water samples, the program should continue

- by taking samples at maximum water depth.
- (4) Sediment grab samples should be taken in non oiled and oiled or potentially oiled water areas for comparative analysis. The only samples required are those to give a representative indication of sediment impact from the dispersed oil. Beach sampling of oiled beaches is not part of this program.
 - (5) Benthic invertebrate sampling should occur in non-oiled and oiled or potentially oiled water areas for comparative analysis. The only samples required are those to give a representative indication of benthic invertebrate contamination from the dispersed oil.

SAMPLE CUSTODY

All samples collected will be handled in accordance with international standard procedures for proper handling, storage, chain of custody and labeling of sample containers.

LABORATORY ANALYSIS

Laboratory analysis procedures for water, sediment and benthic invertebrate samples should follow internationally recognized procedures. These procedures should be utilized unless otherwise stipulated or requested by the OSC.

FUNDING

Funding dispersant application and monitoring should remain with the party responsible for the oil spill. This monitoring program is provided to OSCs for their use in reviewing the adequacy of facility or vessel response plans and for potential parties responsible for oil spills in determining the needs should dispersant application be determined feasible. These plans should indicate funding source for application and monitoring. In the absence of a party responsible for the spill, the OSC needs to be prepared to take action necessary and may plan on using this protocol.

REPORTS

Reports are required during the dispersant application and monitoring program. The OSC command centre should be the focal point for reporting. Close coordination is necessary to ensure all activities and constituents are kept abreast of activities and the decisions required. The OSC's representative on scene at the application site should provide immediate verbal feedback regarding the application and results. The observer should maintain a logbook and document each action taken by the dispersant contractor and the monitoring platform. The OSC observer aboard the monitoring platform should provide operations normal reports hourly and provide updates regarding monitoring status. The OSC Command Center should maintain all reports regarding the monitoring program and its results. A copy of all data should be forwarded to the OSC, with copies to other agencies, within 24 hours. Problems or difficulties should be immediately reported to the command center. Long term monitoring programs should develop a reporting procedure suitable for the specific incident.

A written report is required regarding dispersant application within 45 days of the

application. Copies of the draft report should be provided to the OSC prior to issuance of the final report. Using all the information gathered during the program, the report should review the information and develop specifics regarding dispersant application, its impact and a cost benefit analysis. Responsible parties should be prepared to compile the report for submission to the OSC, with copies to other agencies and the National Response Centre. All technical data and analysis information should be included with the report.

PROGRAM REVIEW

This plan should be reviewed based on exercises and actual field applications of dispersants. Suggested revisions should be prepared by or submitted to the National Oil Spill Response Committee for future incorporation into the plan.

Enclosures

- (1) SIX POINT DISPERSANT WATER MONITORING PROTOCOL
- (2) OIL SPILL DISPERSANT GUIDELINES
- (3) FIELD DISPERSANT EFFECTIVENESS TEST

SIX POINT DISPERSANT MONITORING PROTOCOL

Sample 1 is uncontaminated control. Sample 2-6 are representative samples of oil in the water column

On scene sea and weather conditions may require the use of drogue to follow plume direction of travel.

