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Workshop on Dispersant Use in Eastern Canada

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EXECUTIVE SUMMARY

An ESRF-sponsored workshop on dispersant-use in Atlantic Canada was held in St. John's, NF in February 2004. The objectives were to: a) bring the spill response community up to date concerning dispersants; b) examine Canadian spill requirements and the role of dispersants; and c) examine Canada's dispersant approval process. Workshop planners posed a number of questions to be addressed by the workshop, including:

- Are the industry and other stakeholders aware of the process, currently in place, for providing direction/advice on the application of dispersants on a case-by-case basis?
- Should regulators develop a "pre-approval" or "formal expedited approval" system, for certain spill situations such as exist in the U.S. and elsewhere?
- Are industry and government willing to use this spill control method?
- What procedures need to be developed to identify when dispersants are a reasonable option relative to the specific oil type and geographic location?
- What procedures need to be developed for assessing the net environmental benefits of using dispersants?
- What East Coast hydrocarbons and spills are likely to be resistant to chemical dispersion?

Forty invited participants attended from government and industry. Participants identified: current stakeholder goals and concerns; issues for attention or improvement; common ground and a path forward for dispersant planning in Canada.

Invited presentations on Day One described the current situation in dispersants and identified stakeholders' goals and concerns. Several issues were highlighted including the following. Industry has identified certain problem spills for which dispersants would improve their capability to respond. They expressed caution about devoting resources to dispersant planning because dispersant use on a spill requires that the Lead Agency (LA), in partnership with the Regional Environmental Emergencies Team (REET), make a case-by-case assessment and decide whether or not to approve/agree to the use of dispersants. Favorable and timely decisions

from REET cannot be reliably predicted for any given case. Industry operators wish to improve/streamline the approval process, establishing pre-authorization for dispersant-use in some cases, before devoting resources to dispersant planning. On the other hand, REET's position was that government organization and guidelines regarding dispersant use exist, though they are in need of updating. During historical spills or exercises REET decisions on dispersants have been made within four hours, with dispersants being approved where merited. In the past, operators have requested permission for dispersants even though spill conditions clearly were not appropriate for dispersants and/or no advance preparation had been made for their use. As a consequence approval has been withheld in certain cases.

In short, the Day One discussions suggested that a difference of opinion existed within the spill response community in which, " no dispersant planning without approval; no approval without planning". Day Two addressed this difference through structured panel discussions of key questions, as follows.

What Spill Problems Will Dispersants Address?

Oil industry operators identified a number of spill scenarios in which dispersants would improve their capability to respond effectively, including: a) very small and very large spills at offshore platforms; b) all transportation-related spills of Grand Banks crude oil; c) all spills occurring in either highly sensitive areas (e.g., near Cape St. Marys seabird colonies) or in high spill risk areas (e.g., Cape Race); and d) all spills occurring where high sea states complicate mechanical recovery operations. In addition, response times with conventional methods are slow for some high-risk areas like Placentia Bay and may be improved if a dispersant capability were in place. Industry urges clarification of REET criteria for dispersant use on these spills. For reasons explained below, some industry spokespersons are seeking pre-authorization for dispersants for the very small spills from offshore platforms mentioned above (Two Cube Option)1. For all other spills industry recognizes that dispersant use will require the conventional REET assessment.

- 1 The pre-approved use of up to two cubic metres of dispersants to treat small spills from platforms was referred to as the "Two-Cube Option".

What Preparations Will Be Required To Fulfill This Role?

Three organizations involved in spill response, Canadian Coast Guard (CCG), Eastern Canada Response Corporation (ECRC) and Petro-Canada described the preparations needed to make dispersant use possible in Canada. CCG oversees planning and response to spills from ships. The shipping industry is required by regulation to have arrangements in place to respond to spills. Response capabilities needed to satisfy this requirement are provided by response organizations like ECRC, Canada's largest response organization. These organizations are required by regulation to provide two kinds of spill response capabilities, mechanical containment and recovery at sea and mechanical/manual cleanup on shore. Other countermeasures including dispersants, lightering and in-situ burning are considered optional. However, if the latter are to be used, CCG requires that potential spillers/responders make all necessary preparations in advance of a spill, including acquiring the necessary response resources. ECRC's planning and operations are guided by regulations in the Canada Shipping Act (CSA) and hence their operations focus on mechanical cleanup at sea and shoreline cleanup. Some planning for dispersant use has been done, but no actual response capability is in place. ECRC would develop a dispersant capability if required to do so by a client. Petro-Canada is an offshore oil producer and as such is: a) a potential spiller, b) a client to ECRC and c) a responder. Petro-Canada proposes to more effectively address spills from their facilities by developing dispersant capability for Tier I and Tier III spills from their offshore platforms. To be effective Tier I response must be rapid requiring that the response be mounted quickly using resources located at the platform. The timely use of these response resources will require pre-spill authorization for dispersants. Response to Tier III spills will be contracted to UK-based Oil Spill Response Limited (OSRL), with REET approval for dispersants being sought through the normal REET consultation process.

Regulatory Issues and Concerns

Speakers from the EC and C-NOPB described Canada's regulatory controls over dispersants. EC regards dispersants as an option in the Atlantic region and in Newfoundland and described the roles of the Lead Agencies and REET is spill response and their basis in legislation. In Canada, spill response is the responsibility of the spiller. Government oversees the response through a Lead Agency (LA) that deals directly with the spiller. The LA is determined by the

circumstances of the spill (e.g., C-NOPB is the LA for spills from offshore oil platforms, CCG is LA for ship-source or mystery spills at sea, EC is LA for spills from military ships or federal properties). REET is made up of a number of agencies, including EC, DFO, provinces and provides consolidated environmental advise to the LA during a spill. The legislative basis for EC's role in REET includes the Fisheries Act, the Canadian Environmental Protection Act, and the Migratory Bird Convention Act. An MOU between EC and DFO charges EC with the responsibility of dealing with pollution provisions of the Fisheries Act. The approach followed by EC and REET is outlined in the Fisheries Act and dispersant guidelines (EC 1984) that provide guidance on dispersant testing, effectiveness standards, toxicity standards, and considerations for use, etc. These guidelines were developed a number of years ago [1984] and are under revision.

The C-NOPB explained that it is the lead regulatory agency for offshore exploration and production activities in Newfoundland, with a regulated responsibility for spills and dispersants. An MOU between C-NOPB and EC identifies REET as the mechanism by which discussions of dispersant planning, including pre-approval, would take place. The C-NOPB made several observations. First, pre-approval for dispersant use on small spills from offshore platforms would be simpler than for an all-inclusive, region-wide pre-authorization for all spills from shipping. However, the situation might be complicated in Newfoundland by the fact that Grand Banks crude oils are waxy, meaning that the limits of the dispersant effectiveness against these oils might be uncertain. A second point addressed apparent conflicting jurisdictions, specifically, "What happens when it is not clear from the spill circumstances whether CNOPB or CCG should be designated as LA. In such cases, the C-NOPB and CCG would discuss the matter with the other potential LA and decide how to proceed.

Where and Under What Conditions Should Dispersants Be Used?

Elsewhere in North America dispersant planning has historically lead to a conflict between stakeholders who seek to protect seabirds on one hand and others who seek to protect fish on the other. That conflict was not evident here. Canadian Wildlife Service (CWS) protects the major marine bird populations of Canada's nearshore and offshore waters. They believe that because oil slicks kill birds at sea, any cleanup method that removes oil slicks from the sea must be used,

whether it is mechanical cleanup or dispersants. Unfortunately, on the Grand Banks mechanical cleanup is rendered ineffective much of the time due to sea state conditions; therefore dispersants must be available for use. CWS recognizes that dispersants themselves have limitations, but if they are the only reliable effective solution for protecting seabirds, then a capability must be in place to use them effectively and in a timely fashion. Department of Fisheries and Oceans (DFO) is responsible for protecting fisheries and fish stocks. One DFO spokesperson stated that during spills DFO is concerned about: a) direct hydrocarbon contamination of fish stocks and fishing gear, which present a short-term problem; and b) contamination of marine sediments, which can lead to longer-term contamination of fish stocks. Dispersants can minimize these contamination risks for both offshore and nearshore spills. For inshore spills, the main concern is preventing contamination of sediments. Dispersants can achieve this, but the dispersed oil may pose risks to fish stocks. In these cases environmental trade-offs must drive dispersant use/non-use decisions. For offshore spills, dispersed oil poses little risk to fish stocks, so trade-offs consistently favour dispersant use.

Research and Development Needs

On Day One, stakeholders had identified information gaps to be addressed during dispersant planning. For example, dispersibility of the waxy Grand Banks crude oils is apparently good when the oil is fresh, but dispersibility declines quickly with weathering making time-windows for dispersion uncertain. On Day Two, oil spill researchers from EC and the DFO were invited to comment on dispersant research needs in Canada and on initiatives in place to address them.

EC commented that research planning involves more than identifying a series of information gaps and doing research to find answers. This is useful, but it is also important to assemble an excellent research capability including trained, capable scientists and appropriate equipment and facilities.

DFO / COOGER described the agency's mandate and resources for conducting research. Resources included a meso-scale wave tank that was under construction and would be used for dispersant research. He also described 14 potential areas of research on dispersants identified in a recent DFO-sponsored workshop. Another DFO scientist cautioned that it was important to avoid

giving the impression that there are major gaps in dispersant knowledge that must be filled before dispersant use and planning could proceed. In specific terms, no research work is required before approving the use of 5 to 10 tonnes of dispersant on offshore spills. The top priorities for research are questions concerning environmental trade-offs related to dispersing large spills in sensitive inshore areas like Placentia Bay.

The Way Forward

Participants believed that the workshop had aided them in understanding each other's points of view and that a way forward was possible for dispersant planning.

In general, workshop organizers concluded that when spills occur in Atlantic Canada, several types of countermeasures might be used, including dispersants. Dispersants could be used under conditions where they will be effective and where potential environmental benefits outweigh drawbacks. However, it must be recognized that time delay is a critical factor in determining effectiveness of dispersant operations; so in order to maximize the potential effectiveness of dispersants both industry and government must plan accordingly.

Government should revise/update the existing dispersant use guidelines and streamline the spill-specific dispersant approval/endorsement process. Government should also evaluate the pre-approval option in selected spill scenarios. In order to facilitate the government planning process for dispersants, industry must put in place the response capabilities needed to successfully mount dispersant operations. Industry must also conduct planning, training, logistics and surveillance capabilities needed to support dispersant operations. In general, industry must build confidence in their ability to successfully conduct dispersant operations. The response community should review the use of dispersants for offshore rig spills, particularly in the case of small and very large spills. Finally, there is a need to critically review dispersant research that has already been done, identify outstanding research needs and identify resources for conducting and funding the needed research.

The REET spokesperson expressed willingness to examine existing criteria for dispersant decision-making, modify existing guidelines to be more specific, and learn from planning efforts

of other countries. However, REET stated clearly that it must know what industry wants in terms of dispersant application in order for government to plan effectively. Industry responded that the offshore oil industry has made a commitment to itself to communicate its needs effectively to government.

The industry spokesperson stated that much preparatory work had already been done, but more was required. This included research and technical analysis concerning dispersibility of Grand Banks oils and other oils that may be spilled in the region; assessing technical feasibility of dispersants (e.g., specifics about how the applications would be achieved in key local spill scenarios); and risk-reward analysis related to the net environmental benefits of dispersants in the region. Once these answers are in place, industry will begin to feel that they have a unified position on dispersants. A further task will be to involve international shipping in dispersant planning because they sail by the industry spokesperson presented a plan to implement dispersant response capabilities for Tier I and Tier III spills from its offshore platforms. The industry spokesperson concluded that the participants' efforts in the workshop were a great start and anticipated great progress over the next year.

RÉSUMÉ À L'INTENTION DE LA DIRECTION

SOMMAIRE

Un atelier financé par le Fonds de rétablissement des espèces en péril (FREP) sur l'utilisation de produits dispersants dans l'Atlantique a eu lieu à St. John's, à Terre-Neuve, en février 2004. L'atelier avait pour objectif : a) d'actualiser les connaissances des responsables des interventions en cas de déversement à l'égard des produits dispersants; b) d'étudier les exigences canadiennes en cas de déversement et le rôle des produits dispersants; c) d'examiner le processus d'autorisation des produits dispersants au Canada. Les organisateurs de l'atelier ont préparé un certain nombre de questions à l'intention des participants, dont les suivantes :

- L'industrie et les autres intervenants connaissent-ils le processus actuel de fourniture de directives ou de conseils sur l'application des produits dispersants en fonction de chaque cas?

- Les organismes de réglementation devrait-elles élaborer un système d'« autorisation préalable » ou d' « autorisation officielle accélérée » pour certains types de déversement, comme c'est le cas aux États-Unis et ailleurs dans le monde?

- L'industrie et le gouvernement sont-ils prêts à utiliser cette méthode d'intervention en cas de déversement?

- Quelles procédures doit-on élaborer pour déterminer si les produits dispersants sont un choix justifié avec un type de produit pétrolier et par rapport à la situation géographique?

- Quelles procédures doit-on élaborer pour évaluer les avantages environnementaux nets de l'utilisation de produits dispersants?

- Quels sont, sur la côte est, les hydrocarbures et les déversements susceptibles de résister à la dispersion chimique?

Les quarante représentants du gouvernement et de l'industrie qui ont participé à l'atelier ont relevé les points suivants : buts et préoccupations actuels des intervenants; points à améliorer ou auxquels il faut donner suite; points communs et voie à suivre pour la planification de l'utilisation des produits dispersants au Canada.

Le premier jour de l'atelier, les exposés des invités portent sur la description de l'utilisation actuelle des produits dispersants ainsi que sur les buts et les préoccupations des intervenants. Plusieurs problèmes sont mis en lumière, dont les suivants. Les représentants de l'industrie relèvent certains cas problématiques pour lesquels les produits dispersants pourraient améliorer leur capacité d'intervention. Ils émettent des réserves quant à l'octroi de ressources pour la planification de l'utilisation des produits dispersants parce que l'organisme responsable doit, en collaboration avec l'équipe régionale d'intervention d'urgence (ERIU), évaluer les situations au cas par cas et décider s'il autorise l'utilisation de produits dispersants. Or, il est impossible de prédire quelle sera la décision de l'ERIU dans chaque cas. Les exploitants de l'industrie désirent donc améliorer et simplifier le processus d'autorisation, obtenir une autorisation préalable pour utiliser des produits dispersants dans certains cas, et ce, avant d'allouer des ressources à la planification de l'utilisation des produits dispersants. Cependant, l'ERIU considère que l'organisme gouvernemental responsable de l'utilisation de produits dispersants et les lignes directrices à cet égard existent déjà, mais qu'ils doivent être actualisés. Au cours d'exercices de déversement ou de déversements antérieurs, les décisions de l'ERIU sur les produits dispersants étaient prises dans un délai de quatre heures et les autorisations nécessaires étaient données, au besoin. Par ailleurs, il est déjà arrivé que les exploitants demandent la permission d'utiliser des produits dispersants alors que les conditions du déversement ne s'y prêtaient pas ou que leur utilisation n'avait pas été préparée préalablement. L'autorisation d'utiliser de tels produits avait donc été refusée dans certains cas.

En bref, les discussions de la première journée donnent à penser que les responsables des interventions en cas de déversement ont des opinions partagées : soit qu'ils sont en faveur « d'aucune planification sur les produits dispersants sans autorisation », soit « d'aucune autorisation sans planification ». Au cours de la deuxième journée, les participants ont débattu de cette différence dans les discussions en groupe structurées sur les questions clés suivantes.

Quels problèmes les produits dispersants résoudront-ils?

Les exploitants de l'industrie pétrolière relèvent un certain nombre de scénarios de déversement dans lesquels les produits dispersants amélioreraient leur capacité d'intervenir efficacement, notamment : a) les déversements très restreints et très importants survenant à des plates-formes

de forage en mer; b) tous les déversements associés au transport de pétrole brut dans la région des Grands Bancs; c) tous les déversements se produisant soit dans des régions très vulnérables (p. ex. près des colonies d'oiseaux de mer de cap Sainte-Marie), soit dans les régions où des déversements risquent fortement de se produire (p. ex. au cap Race); d) tous les déversements se produisant lorsque des mers de force élevée compliquent les opérations de récupération mécanique. Par ailleurs, avec les méthodes classiques, les délais d'intervention sont longs dans certaines régions à risque élevé comme la baie de Plaisance et pourraient être raccourcis si on utilisait un produit dispersant. Les représentants de l'industrie insistent sur la clarification des critères de l'ERIU relatifs à l'utilisation de produits dispersants en pareils cas de déversement. Pour les raisons expliquées ci-après, certains représentants de l'industrie veulent obtenir une autorisation préalable pour utiliser des produits dispersants en cas de déversements très limités aux plates-formes de forage en mer (option des 2 m^3)[2]. Pour tous les autres types de déversements, les représentants de l'industrie reconnaissent que l'utilisation de produits dispersants devra être évaluée de la façon habituelle par l'ERIU.

Comment devra-t-on se préparer pour jouer ce rôle?

Les représentants de trois organismes qui interviennent en cas de déversement, à savoir la Garde côtière canadienne (GCC), la Société d'intervention maritime – Est du Canada Ltée (SIMEC) et Petro-Canada, décrivent les préparatifs nécessaires à l'utilisation de produits dispersants au Canada. La GCC supervise la planification et l'intervention en cas de déversement à partir de navires. La réglementation oblige la marine marchande à conclure des ententes pour des interventions en cas de déversement. Les capacités d'intervention nécessaires pour satisfaire à cette exigence sont fournies par des organismes qui effectuent des interventions, comme la SIMEC, l'organisme d'intervention le plus important au Canada. La réglementation oblige ces organismes à offrir deux types d'interventions en cas de déversement, soit le confinement mécanique et la récupération au large, et le nettoyage mécanique ou manuel du littoral. D'autres mesures, telles que l'utilisation de produits dispersants, le recours à des navires allégeurs et le brûlage *in situ*, sont considérées comme optionnelles. Toutefois, si le brûlage est considéré, la

- [2] Option des 2 m^3 : utilisation préalablement autorisée d'une quantité maximale de 2 m^3 de produits dispersants en cas de déversements restreints sur des plates-formes.

GCC exige que les responsables potentiels du déversement ou les intervenants soient parfaitement préparés, notamment qu'ils possèdent les ressources nécessaires à l'intervention. Comme la planification et les activités de la SIMEC sont assujetties aux règlements d'application de la *Loi sur la marine marchande du Canada*, ses activités sont axées sur le nettoyage mécanique côtier et extra côtier. La SIMEC a fait une certaine planification de l'utilisation des produits dispersants, mais elle ne dispose pas de capacité d'intervention. Elle utilisera des produits dispersants à la demande de ses clients. Par ailleurs, la société Petro-Canada extrait du pétrole en mer et est donc à la fois un responsable potentiel d'un déversement, un client de la SIMEC et un intervenant. Petro-Canada propose d'intervenir plus efficacement en cas de déversement à ses installations en se dotant des ressources nécessaires pour utiliser des produits dispersants en cas de déversements de niveau I et III à partir de ses plates-formes de forage en mer. Pour être efficace, l'intervention de niveau I doit être rapide, ce qui exige le recours à des ressources situées sur la plate-forme. L'utilisation rapide de ces ressources exigera une autorisation préalable pour l'application de produits dispersants. L'intervention en cas de déversements de niveau III sera assumée par une société privée britannique, la Oil Spill Response Limited (OSRL), moyennant l'obtention de l'autorisation de l'ERIU d'utiliser des produits dispersants dans le cadre normal de son processus de consultation habituel.

Problèmes et préoccupations concernant la réglementation

Les représentants d'Environnement Canada (EC) et de l'Office Canada–Terre-Neuve des hydrocarbures extracôtiers (OCTHE) décrivent la réglementation relative à l'utilisation de produits dispersants. Le représentant d'Environnement Canada considère que les produits dispersants sont une solution à envisager dans la région de l'Atlantique et à Terre-Neuve, et il expose les rôles des organismes responsables et de l'ERIU en cas de déversement ainsi que leurs fondements juridiques. Au Canada, il incombe au responsable du déversement de prendre les mesures d'intervention requises. Le gouvernement supervise cette intervention par l'entremise d'un organisme responsable, qui traite directement avec le responsable du déversement. L'organisme responsable est choisi en fonction de l'endroit où survient le déversement (l'OCTHE est l'organisme responsable des déversements sur les plates-formes de forage en mer; la GCC est responsable des déversements en mer par des navires ou des sources inconnues; EC est responsable des déversements de navires militaires ou dans les propriétés fédérales). L'ERIU

est composée d'un certain nombre d'organismes, dont EC, le MPO et les provinces, et fournit des conseils en matière d'environnement à l'organisme responsable en cas de déversement. Le fondement législatif du rôle d'EC au sein de l'ERIU comprend la *Loi sur les pêches*, la *Loi canadienne sur la protection de l'environnement* et la *Loi sur la convention concernant les oiseaux migrateurs*. Un protocole d'entente entre le MPO et EC confère à ce dernier la responsabilité d'appliquer les dispositions de la *Loi sur les pêches* relatives à la pollution. La démarche adoptée par EC et l'ERIU figure dans la *Loi sur les pêches* et les lignes directrices sur les produits dispersants (EC, 1984), lesquelles donnent des directives sur la mise à l'essai des produits dispersants, les normes d'efficacité et de toxicité, leur utilisation, etc. Ces lignes directrices ont été élaborées il y a plusieurs années (1984) et font l'objet d'une révision.

Un représentant de l'OCTHE explique que l'Office est l'organisme réglementaire responsable des activités d'exploration et d'exploitation en mer à Terre-Neuve, et que sa responsabilité à l'égard des déversements et des produits dispersants est réglementée. Selon le protocole d'entente entre l'OCTHE et EC, l'ERIU est le mécanisme de discussion pour la planification de l'utilisation des produits dispersants, y compris l'autorisation préalable à leur utilisation. Le représentant de l'OCTHE formule plusieurs observations. Premièrement, l'autorisation préalable à l'utilisation de produits dispersants en cas de déversements restreints sur les plates-formes de forage en mer serait plus simple qu'une autorisation préalable d'ensemble s'appliquant à tous les déversements associés au transport maritime dans toute la région. Toutefois, la situation peut se compliquer à Terre-Neuve du fait que le pétrole brut des Grands Bancs est paraffineux. Or l'efficacité des produits dispersants contre ce type de pétrole peut être incertaine. Il semble aussi qu'il y a conflit entre les autorités compétentes, plus particulièrement au sujet de la désignation d'un organisme responsable, soit l'OCTHE, soit la GCC, lorsque l'origine du déversement n'est pas claire. En pareille situation, l'OCTHE et la GCC discuteront de la question avec l'organisme responsable et décideront des mesures à prendre.

Où peut-on utiliser des produits dispersants et dans quelles conditions?

Ailleurs en Amérique du Nord, la planification de l'utilisation des produits dispersants a toujours donné lieu à un différend entre les intervenants qui veulent protéger les oiseaux de mer et ceux qui veulent protéger les stocks de poissons. Ce différend n'est pas évident dans le cas présent. Le

Service canadien de la faune (SCF) protège les importantes populations d'oiseaux de mer vivant près de la côte et dans les eaux canadiennes. Le Service croit que parce que les nappes d'hydrocarbures tuent les oiseaux en mer, il faut avoir recours à toute méthode de nettoyage capable de récupérer les nappes d'hydrocarbures en mer, qu'il s'agisse d'une méthode par nettoyage mécanique ou de produits dispersants. Malheureusement, le nettoyage mécanique dans le secteur des Grands Bancs est inefficace la plupart du temps en raison de l'état de la mer; c'est pourquoi des produits dispersants doivent être disponibles. Le SCF reconnaît les limites des produit dispersants, mais s'il s'agit de la seule solution fiable pour protéger des oiseaux de mer, il faudra être en mesure de les utiliser efficacement et rapidement. Le ministère des Pêches et des Océans (MPO) est responsable de la protection des pêcheries et des stocks de poissons. Un représentant du MPO mentionne qu'en cas de déversement, le MPO se préoccupe d'une part de la contamination directe des stocks de poissons et des engins de pêche par les hydrocarbures, ce qui représente un problème à court terme, et d'autre part de la contamination des sédiments marins, qui peut occasionner une contamination à plus long terme des stocks de poissons. Les produits dispersants peuvent réduire ces risques de contamination en cas de déversements près de la côte et en mer. Pour les déversements côtiers, la principale préoccupation est de prévenir la contamination des sédiments. Les produits dispersants peuvent prévenir cette contamination, mais le pétrole dispersé peut poser des risques pour les stocks de poissons. En pareil cas, l'effet néfaste sur le milieu naturel doit orienter les décisions quant à l'utilisation de produits dispersants. Pour ce qui est des déversements en mer, le pétrole dispersé pose peu de risques pour les stocks de poissons, c'est pourquoi l'utilisation de produits dispersants sera toujours retenue.

Besoins en matière de recherche et de développement

Le premier jour, les intervenants ont relevé les lacunes en matière d'information à combler au cours de la planification de l'utilisation de produits dispersants. Par exemple, il semble que la dispersibilité du pétrole brut paraffineux des Grands Bancs est bonne quand le pétrole vient d'être extrait, mais qu'elle décroît rapidement avec l'exposition aux conditions météorologiques qui ont une incidence sur la dispersion. Le deuxième jour, les chercheurs d'EC et du MPO spécialisés dans les déversements de pétrole ont été invités à commenter les besoins en matière de recherche sur les produits dispersants au Canada et les initiatives en place pour les combler.

Un représentant d'EC indique que la planification de la recherche va au-delà de l'énumération d'une série de lacunes en matière d'information et la réalisation de recherches pour les combler. Ces activités sont utiles, mais il est également important de se doter de solides capacités de recherche, notamment de scientifiques formés et compétents de même que des installations et de l'équipement adéquats.

Un représentant du MPO et du Centre de recherche environnementale sur le pétrole et le gaz extracôtiers décrit le mandat de l'organisme et les ressources dont il dispose pour mener la recherche. Du côté des ressources, on profitera d'une cuve à houle d'échelle moyenne (actuellement en construction) pour la recherche sur les produits dispersants. Il décrit également les 14 domaines de recherche possibles sur les produits dispersants qui ont été répertoriés au cours d'un atelier récent organisé par le MPO. Un autre scientifique du MPO indique qu'il est important d'éviter de donner l'impression qu'il faut combler d'importantes lacunes en matière de connaissances sur les produits dispersants avant de procéder à la planification et à leur utilisation. Ainsi, aucun travail de recherche n'est nécessaire avant d'autoriser l'utilisation de 5 à 10 tonnes de produits dispersants pour les déversements extracôtiers. La priorité en matière de recherche doit être accordée aux questions relatives aux effets néfastes sur le milieu naturel de la dispersion d'importants déversements dans des régions côtières sensibles comme la baie de Plaisance.

L'avenir

Les participants ont l'impression que l'atelier les a aidés à comprendre les points de vue des autres et qu'il est possible de poursuivre la planification de l'utilisation des produits dispersants.

De façon générale, les organisateurs de l'atelier en viennent à la conclusion que lors de déversements dans l'Atlantique, on peut recourir à divers types de mesures, dont les produits dispersants, lesquels peuvent servir dans des situations où ils sont efficaces et lorsque les avantages qu'ils peuvent présenter sur le plan environnemental sont supérieurs aux inconvénients. Toutefois, il faut reconnaître que le temps est un facteur essentiel pour déterminer l'efficacité des opérations avec des produits dispersants, c'est pourquoi la planification de

l'industrie et du gouvernement doit tenir compte de ce facteur.

Le gouvernement doit réviser et mettre à jour ses lignes directrices sur l'utilisation des produits dispersants et simplifier le processus d'autorisation de l'utilisation des produits dispersants selon le type de déversement. Il doit également évaluer la possibilité d'octroyer une autorisation préalable pour certains scénarios de déversement. Pour faciliter le processus de planification du gouvernement en matière de produits dispersants, l'industrie doit mettre en place les capacités d'intervention nécessaires pour mener à bien les interventions avec des produits dispersants. L'industrie doit également se doter de capacités de planification, de formation, de logistique et de surveillance pour soutenir ces opérations. De façon générale, l'industrie doit consolider sa confiance quant à sa capacité de mener avec succès ces opérations. Les responsables des interventions doivent passer en revue l'utilisation des produits dispersants en cas de déversements aux installations de forage en mer, particulièrement en ce qui concerne les déversements très restreints et très importants. Enfin, il faut examiner de façon critique la recherche déjà menée sur les produits dispersants, cerner les besoins en matière de recherche et déterminer les ressources dont on aura besoin pour mener et financer les recherches.

Un représentant de l'ERIU exprime sa volonté d'examiner les critères actuels pour la prise de décisions en matière d'utilisation de produits dispersants, de préciser les lignes directrices actuelles et de se renseigner sur les efforts de planification déployés à l'étranger. Toutefois, l'ERIU indique clairement qu'elle doit connaître les besoins de l'industrie en matière d'application de produits dispersants pour que la planification du gouvernement soit efficace. Les représentants de l'industrie répondent que l'industrie des hydrocarbures extracôtiers s'est engagée à transmettre efficacement ses besoins au gouvernement.

Un représentant de l'industrie signale que la majeure partie des travaux préparatoires ont déjà été réalisés, mais que d'autres travaux devaient être faits, dont l'analyse technique et des recherches sur la dispersibilité du pétrole extrait dans la région des Grands Bancs et les autres types de pétrole qui peuvent être déversés dans la région; l'évaluation de la faisabilité de l'utilisation des produits dispersants (p. ex. moyens particuliers de les utiliser dans les scénarios de déversements locaux) et l'analyse avantages-inconvénients des avantages nets pour l'environnement de

l'utilisation des produits dispersants dans la région. Une fois que ces analyses auront été menées, les représentants de l'industrie auront l'impression d'avoir une position commune sur les produits dispersants. Il faudra également que la marine marchande participe à la planification de l'utilisation des produits dispersants. Un représentant de l'industrie présente un plan de mise en œuvre de l'intervention en matière de produits dispersants pour les déversements de niveaux I et III de sa plate-forme de forage en mer. Il termine en indiquant que les efforts déployés par les participants au cours de l'atelier augurent bien, et qu'il prévoit la réalisation de grands progrès au cours de la prochaine année.

1. INTRODUCTION

Oil spill dispersants have received considerable attention in Canada in recent years as a result of spills (e.g., *Exxon Valdez* (Alaska, 1989), *M/V Katsheshuk* (Newfoundland, 2002)), planning activities, and research. Recognizing this interest, the Environmental Studies Research Funds (ESRF) funded a government/industry workshop to facilitate open and balanced discussions of dispersant issues in Atlantic Canada. Day One of the workshop was devoted to technical presentations made by invited speakers, intended to give participants a common understanding of dispersant issues. Day Two involved a series of panel discussions addressing issues of planning needs, regulatory concerns and research needs. This brief report summarizes workshop objectives, program, technical issues raised during the presentations, summary of the panel discussions, and an overall summary of the workshop.

1.1 Background

The subject of dispersant use in Canada has been raised in numerous contexts in recent years. Within the oil production sector, industry has taken the initiative by: including dispersants in spill contingency plans; funding dispersant research (e.g., testing of dispersibility of Grand Banks crude oils); and advocating a streamlining of the dispersant approval process, at least for certain types of spills. In the shipping sector, dispersants were seriously considered for use in several vessel spills in Atlantic Canada in 2002. On the regulatory side, the Atlantic REET discussed dispersants in its annual meeting in PEI in 2002 and held a dispersant training session as a part of its 2003 annual meeting. Quebec Table d' Expertise convened a dispersant workshop in June 2002 and has prepared a formal "*Procédure D'Évaluation D' Une Demand d' Utilization de Dispersants Lors D' Un Déveresement Maritime*", (Table D' Expertise (Quebec) 2002). Environment Canada's Emergencies Sciences and Technology Division continues to provide leadership with its dispersant research/testing activities, and Fisheries and Oceans' Centre for Offshore Oil and Gas Environmental Research (COOGER) sponsored a dispersant training/research seminar, also in November 2003. Finally, following CANUSPAC 2000 meetings, some participants openly discussed the frustrations that exist among Canadian agencies, as a result of the current Canadian dispersant policy.

Globally speaking, recent spill experience has demonstrated the advantages of dispersants in dealing with certain spills (e.g., *Sea Empress* spill, Wales 1996, Lunel et al. 1997) and research has lead to numerous important advances in dispersant knowledge (Fingas et al. 2003a, Lewis and Aurand 1997, SL Ross 2003). However, after two decades of dispersant research it is known that dispersants are not a panacea, but are certainly useful where conditions (spill conditions, weather, receiving environment) are suitable for their use. Canadian workers have contributed to development of knowledge about dispersants. Studies by early workers, such as P.G. Wells, D. Mackay, M. Fingas and K. Trudel are summarized in NRC (1989). Canadians have made important contributions to dispersant knowledge in recent years as well, including the work of Environment Canada (e.g., Fingas 2003, Fingas et al. 2003b) and S.L. Ross Environmental Research (Belore 2003, SL Ross 1997, SL Ross et al. in press, Trudel et al., 2003). Before undertaking dispersant planning in Atlantic Canada, planners must examine a number of important points, including: a) the role of dispersants in responding to spills in Eastern Canada; b) their effectiveness in dispersing Canadian oils and mitigating impact; c) the level of planning needed for dispersants to be useful against Canadian spills; and d) the shaping of government dispersant policy to support dispersant use where merited in Canada. The objective of this workshop was to bring Canadian government and industry together with internationally recognized technical experts to consider these issues and plan the way forward.

1.2 Workshop Objectives

The workshop objectives as specified by the ESRF Technical Advisory Group were:

- To create a greater, shared level of understanding regarding dispersants amongst key stakeholders on the East Coast;
- To identify limitations (i.e. physical, chemical and biological) that may be inherent in the use of dispersants
- To identify and address concerns of various regulatory agencies with the use of dispersants
- To determine the industry's capacity for using this technique effectively
- to identify areas where industry will have to undertake studies, develop assessment procedures and train staff

- To identify and discuss issues around the pre-approval of dispersant use for East Coast Operators.
- To discuss the current regional structure for approving use of dispersants to determine if there are ways to streamline the process.

Table 1. Key Questions for Discussion

Are Dispersants Potentially Useful in Eastern Canada?

- What operational spill cleanup challenges in Eastern Canada are dispersants intended to overcome?
- Are industry and government willing to use this spill control method?

Planning / Training / Risk Communication

- What planning activities should industry undertake to test dispersants in order to determine the effectiveness of various approved dispersants on their particular oils?
- What kind of dispersant application systems and strategies should be used for East Coast spills?
- What training must be developed/adopted in order to prepare industry staff for acquiring the appropriate spraying systems, handling and applying dispersants properly, and in recognizing the effectiveness of dispersant applications and operations?
- Do stakeholders understand the environmental advantages and disadvantages of using dispersants?
- What procedures must be developed/adopted for assessing the net environmental benefit of using dispersants?
- What ecologically sensitive areas can be identified where dispersants should not be employed and how can these be identified?

Decision-Making / Operations

- What East Coast hydrocarbons and what kinds of spills are likely to be amenable or resistant to chemical dispersion?
- What procedures must be developed/adopted to determine when dispersants are a reasonable option relative to the specific oil type and specific geographic location?
- Are industry and government ready to equip themselves to analyze environmental trade-offs quickly to make timely and intelligent dispersant-use decisions?
- What environmental or physical criteria should be considered in approval of areas where dispersants might yield a net environmental benefit?

Real-Time Approval Process

- Are the industry and other stakeholders aware of the process, currently in place, for providing direction/advice on using dispersants on a case-by case basis in Eastern Canada?
- Are there opportunities for improving the existing case-be-case process?
- Should regulators develop a “pre-approval” or “formal expedited approval” system for certain spill situations, such as exists in the U.S. and elsewhere?

1.3 Approach

The two-day workshop involved a small number of key members of the spill response community in Atlantic Canada, plus a number of internationally recognized technical experts. Day One of the workshop was intended to give all participants a common understanding of dispersants and dispersant issues. This was achieved through technical presentations made by invited speakers (Table 2a), and this knowledge was consolidated using a tabletop exercise on the morning of Day Two (Table 2b). This was followed by a series of panel discussions addressing issues of planning needs, regulatory concerns, and research needs. Participants discussed dispersant planning needs in Canada by:

- Considering the potential role for dispersant use in spill scenarios in Eastern Canada;

- Determining the level of dispersant preparedness required to respond effectively and in a timely fashion for each scenario;

- Assessing the impact of dispersant regulatory policies on planning and operations;

Identifying and addressing the concerns of various regulatory agencies regarding using dispersants to clean up marine oil spills in Eastern Canada; and

- Identifying the research needed to address regulator and operator concerns.

Selected representatives of responsible parties and government summarized the discussions and noted action items for moving the process forward.

Table 2a. ESRF Workshop on Dispersant Use in Canada -Agenda Day One

Time	Presentation	Presenter
0730	Registration	
0800	Welcome & Introduction	R. Percy
	Setting the Stage	
0820	Regional Spill Risks and Response Challenges	W. Halley
0835	Existing Dispersant Policy & Approval Process	S. Dewis and D. Burley
0905	Expanding Dispersant-Use	U. Williams & J. Henley
	Introduction to Dispersants	
0930	Dispersant Basics	M. Fingas
0950	Break	
	Effectiveness & Operations	
1010	Spill Experience, At-Sea Tests and Tank Testing	A. Lewis
1035	Role of Laboratory Research	M. Fingas
1100	Dispersant Operations and Monitoring	K. Trudel
1130	Capabilities in Eastern Canada	P. Nippard, D. Salt & W. Halley
1200	Lunch	
	Environmental Risks & Benefits	
1300	Introduction to Environmental Considerations	K. Lee
1310	Toxicity: Dispersants and Dispersed Oil	J. Clark
1340	Implications for Wildlife	A. Lock
1400	Implications for Fisheries	J. Payne
1420	Net Environmental Benefit Analysis: Planning & Real-Time	K. Trudel
1450	Break	
	Decision Making, Regulations & The Approval Process	
1520	Contingency Planning for Dispersants	K. Purnell
1600	Roll-Up/Review of Participant's Questions	R. Percy & U. Williams
1630	Adjourn	

Table 2b. ESRF Workshop on Dispersant Use in Canada - Agenda: Day Two

Time	Presentation	Presenter
0800	Welcome & Announcements	U. Williams
0815	Tabletop Spill Exercise	K. Trudel
1015	Break	
1035	Panel Discussion I: What Spill Response Problems will Dispersants Be Used to Address?	Chaired By: D. Burley
1100	Panel Discussion II: What regional response planning/training preparations are needed to allow effective dispersant use?	Chaired By: A. Parker
1145	Lunch (on own)	
1300	Panel Discussion III: Regulatory Issues and Concerns	Chaired By: R. Percy
1400	Panel Discussion IV: Where and Under What Conditions Should Dispersants be Used/Not Used in Atlantic Canada?	Chaired By: S. Dewis
1435	Break	
1450	Panel Discussion V: What gaps in knowledge must be addressed and how?	Chaired By: D. Taylor
1520	The Path Forward	Co-Chaired By: U. Williams & R. Percy
1615	Roll-Up and Final Comments	U. Williams
1630	Round-Table and Thank You	U. Williams

2. OVERVIEW OF DAY ONE

The first day of the workshop involved 18 presentations by internationally recognized technical experts, regulators, responders and stakeholders. In order to achieve the goals of the workshop, presentations focused on the following: a) setting the stage (existing spill risk, dispersant policies, industry's interest in expanding dispersant use); b) an introduction to dispersants; c) effectiveness and operations; d) environmental risks and benefits; and e) regulations and the approval process. Copies of the visual aids used by all speakers are available through the Environmental Studies Research Funds. Throughout the day, key questions and controversial issues were noted as they arose (Table 3).

Table 3. Key Questions and Issues Identified on Day One

1. Are Grand Banks oils dispersible?
2. What dispersant operating plans are available or needed?
3. What dispersant spraying resources are available or needed?
4. How can Net Environmental Benefit of dispersants in Atlantic Canada be assessed?
5. The following conundrum became evident on day one: "No dispersant approval without planning - no dispersant planning without pre-approval." Who takes the leadership role in resolving the conundrum?
6. Does dispersion facilitate biodegradation?
7. Technical experts presented two models of dispersion – a physical model and a chemical model.
8. Do small dispersed-oil droplets resurface at sea forming an invisibly thin slick?
9. Does re-coalescence of small dispersed-oil droplets contribute significantly to the fate of dispersed oil?
10. It was suggested that dispersant planning could begin by addressing small spills.
11. Dispersant operations are challenging but some jurisdictions have developed effective working capabilities.

3. PANEL DISCUSSIONS

Much of Day Two was devoted to panel discussions addressing:

1. What Spill Response Problems will Dispersants Be Used to Address?
2. What regional response planning/training preparations are needed to allow effective dispersant use?
3. Regulatory Issues and Concerns
4. Where and Under What Conditions Should Dispersants be Used/Not Used in Atlantic Canada?
5. What gaps in knowledge must be addressed and how?

This chapter is a summary of the panel discussions; condensed transcripts of the discussions are contained in Appendix A.

3.1 The Role of Dispersants

The first panel discussion dealt with, "What Spill Response Problems will Dispersants be Used to Address?" All presenters pointed out at the outset that their primary goal was to prevent spills, but recognized that from time-to-time they would occur.

Captain Philip McCarter of Canship Ugland Ltd. explained that the company manages the shuttle tankers to Hibernia and Terra Nova. His company is proactively preventing oil spills and has zero tolerance for such occurrences. Canship Ugland Ltd. is however concerned with a number of types of potential spills including: a) a "bunker burp", as vessels roll at sea, bunker may be spilled if it escapes through a tank vent; b) minor spills that may occur during bunkering operations are statistically common globally; c) spills resulting from accidentally discharging oil during the decanting phase of tank washing through the oil discharge monitoring equipment (ODME); and d) minor spills that may occur during the loading of the shuttle tankers in the offshore. In addition, the company is

also concerned with the remote possibility of a catastrophic spill from the grounding of a tanker in Placentia Bay.

Captain McCarter also pointed out several other issues. First, considerable time may be required to deploy mechanical containment and recovery for spills in Placentia Bay and dispersants might be useful in speeding up the response time to spills. Second, given the severe sea conditions on this coast, responders may benefit from dispersants. Given the fact that much of the time the sea conditions off Newfoundland are not conducive to boom deployment, dispersants might be beneficial. Ship owners may not sign contracts needed to implement dispersant operations and the matter may be up to the regulators (specifically the Canadian Coast Guard) to solve. Will (government) be anxious to take on that financial burden, risk and responsibility associated with dispersant response?

John Henley represented Newfoundland Transshipment Terminal (NTL), who own and operate the terminal at Whiffen Head, NF. All of the crude oil from the offshore platforms comes to NTL, who re-load it on to second leg tankers headed for international markets. NTL minimizes the risk of spill as far as possible using tugs to escort any loaded ships going back and forth through Placentia Bay and by vetting or selecting the type and quality of vessel they allow into the terminal. NTL recognizes that the risk of spills is very low probability, but their consequences are high when they occur. Their responsibility is to understand what to do in the event of an oil spill and what techniques will work. What they are looking for is to understand whether dispersants are applicable in the Newfoundland environment and look to the technical experts to evaluate: a) how effective they would be; b) if effective, then what is needed to put a capability in place; and c) would they be cost-effective.

Urban Williams of Petro-Canada began by identifying the oil spill challenges that they face. First, the environmental components that they are trying to protect include fisheries and sea birds. The offshore oil industry recognize that the risk of spills is low, but when

spills occur they need to have as many tools in the toolbox as possible, including dispersants. Right now they have containment and recovery and surveillance. However, from the industry perspective, dispersants are not a realistic response option because government's position on their use and acceptability is not sufficiently clear to permit effective and cost-effective planning. The latter concern is the main issue to be addressed in this workshop. Petro-Canada does not view dispersants as a cure for all problems, but they do offer potential for a faster response; the ability to operate in wider weather windows; and the ability to pool resources amongst the other operators and with the Canadian Coast Guard.

Petro-Canada is considering responses to both small and large spills and recognizes that the two would be handled differently. They would handle smaller spills (5 to 10 m^3 of oil) internally, while larger spills (10,000 m^3), would be handled by Oil Spill Response Limited of the UK (OSRL). Petro-Canada wants to achieve a number of things in planning for dispersant use offshore, including: dispersant pre-approval; dispersants located offshore; equipment needed to do the job; trained crews; and suitably revised plans. To conclude, Petro-Canada's oil spill response plan already has dispersants in the decision tree. For them, planning includes considering logistics and issues like pre-approval.

3.2 Required Preparations

The second panel dealt with, "What preparation will be required to fulfill this role?" Paul Nippard, of the Eastern Canada Response Corporation's (ECRC), pointed out that from ECRC's perspective, they operate within a regulatory framework, the Canada Shipping Act, which focuses on mechanical containment and recovery and, as a consequence, their focus is on mechanical response. Dispersants are an effective response tool and they have developed some plans to deliver them, including initial screening, standard operating procedures, and generic dispersant plans that can be submitted to REET on behalf of the responsible party when requesting approval to use dispersants. ECRC has no response

capability at present, but this is something that ECRC would be interested in participating in if there were changes to the regulatory regime or if a clients were interested in putting a capability in-place. In short, if there is approval and if there are established standards, then ECRC could meet them and the cost to their clients of developing that capability would be incremental to the costs for maintaining their existing capability.

Wayne Halley of the Canadian Coast Guard (CCG) pointed out that the regulatory regime in Canada requires that the shipping industry have an oil spill response capability in-place. That capability is provided by certified oil spill response organization's, like ECRC. The planning standard is a 10,000-ton spill and focuses mainly on mechanical containment and recovery and shoreline cleanup. The CCG considers five basic strategies for oil spill response, including: a) tanker lightering; b) dispersants or chemical treatment; c) in-situ burning; d) mechanical containment and recovery; and e) shoreline cleanup. Though the first three are not covered under the planning standards, they must be considered. If companies or potential polluters want to use dispersants as part of their oil spill response toolkit, they must plan accordingly. They will have to invest in sufficient resources to meet a given planning standard appropriate for this region. Government will have to explore the possibility of having a pre-approval process in place for certain situations. This does not necessarily mean a guarantee that one will get approval to use dispersants, but it will make the final approval process much easier. However the bottom line is that people will have to invest before the fact in terms of planning and resources.

Urban Williams of Petro-Canada pointed out that in order to effectively use dispersants certain things the must be in-place, including: a) verification that the chemical will be effective under the conditions that it will be used; b) verification that the dispersant application using support vessels is feasible and safe; c) surveillance protocols are in-place to make sure that we can observe what's going on; d) tools are in-place to allow managers to know dispersant application rate and dosage; e) implementing training; and f) implementing standard reporting procedures.

For smaller spills, Petro-Canada's response would be vessel-based, with gear kept at the offshore production site. The dispersant stockpile would be two cubic metres, possibly with some dispersants on other platforms, such as the Henry Goodrich. Standard visual methods would be used for a monitoring effectiveness. Surveillance would be by helicopter. Vessel crews would be responders and the OIM would be in command. For the larger spills Petro-Canada would go to OSRL, a response organization that can provide all services necessary to perform a dispersant response, including planning, surveillance, spraying, command and control, efficacy monitoring, and re-supply.

For intermediate-size spills (hundreds of tonnes of oil), Petro-Canada believes that these spills might be addressed by ECRC and the Canadian Coast Guard, possibly using: a) a portable airborne spraying system; b) a stockpile of less than 10 cubic metres of dispersants in St. John's; c) helicopters for surveillance using REET and Coast Guard specialist observers; and d) ECRC as the management team. The plans for this option would be put in place in advance.

3.3 Regulatory Issues and Concerns

Panel 3 dealt with, "Regulatory Issues and Concerns." Graham Thomas of Environment Canada dealt with the question, "how do we get dispersants into use?" In Newfoundland, REET plays a role in putting dispersants into use, serving as scientific and technical advisor and providing information to the Lead Agency (LA) in the spill. The LA is determined by the circumstances of the spill. Where spills involve the oil platforms offshore Newfoundland and Labrador the LA is the C-NOPB, under the Atlantic Accord. For ship-source or mystery spills at sea, the LA is the Canadian Coast Guard through Transport Canada, under the Canada Shipping Act. For military ships or federal properties, the LA is EC under EC's legislation. The LA deals directly with the polluter, while REET provides the scientific and technical information needed to manage the spill. Various agencies participate in REET including Department of Fisheries and Oceans (DFO), Canadian Wildlife Service (CWS), and the emergency science division. When

dealing with dispersants, the overall guiding principle that REET uses is that of Net Environmental Benefit (NEB).

The legislative basis for EC's role in REET includes the following: a) Canadian Environmental Protection Act -the EC environmental protection group works with this act; b) Migratory Bird Convention Act – the Canadian Wildlife Service works with this act; c) Fisheries Act - the habitat protection group works with this act. Under the Fisheries Act, EC has the responsibility of dealing with pollution incidents through a Memorandum of Understanding (MOU) between EC and DFO that charges EC with the responsibility of dealing with pollution provisions of the Fisheries Act. Thomas pointed out that there are Canadian guidelines for dispersant use in place that were developed a number of years ago (1984, Appendix B). They specify effectiveness and toxicity standards for dispersants and provide rudimentary guidance about use during spills. These guidelines are under revision. The guidelines must be made as complete and current as possible as soon as possible.

David Burley of the Canada-Newfoundland Offshore Petroleum Board pointed out that the CNOPB is the lead regulatory agency on behalf of government for offshore exploration and production activities in Newfoundland. They have a regulated responsibility for the authorization of chemical countermeasures and have a Memorandum of Understanding (MOU) with Environment Canada that states that REET would be the mechanism by which discussions with respect to dispersant pre-approval would take place (see Appendix B). Burley made several observations. First, with respect to the " Two Cube Option (plan proposed by industry, in which operators would have pre-approval to use up to two cubic metres of dispersants to deal with certain small spills from offshore platforms)", Burley believed that planning for this option would be less complex than planning for an all-inclusive pre-authorization for all spills from shipping. The offshore oil industry in the region is a small one. In order for the CNOPB and REET to assess the merits of pre-approval for dispersant use, they would need to consider only a small number of spill scenarios at a small number of offshore sites. Secondly, the Grand

Banks crude oils are waxy, with pour points that sometimes exceed ambient water temperatures. As a consequence, there is some uncertainty as to the potential effectiveness of currently available dispersants against these oils. That fact could complicate the debate somewhat. The third comment related to the question, "What happens when you don't know what side of the loading flange a spill came from?" In these situations the Board would quickly discuss the situation with the Canadian Coast Guard and/or Environment Canada and would decide how the two would proceed.

3.4 Conditions for Dispersant Use

Panel 4 considered, "Where and under what conditions should dispersants be used or not used in Atlantic Canada?" Jerry Payne of the Department of Fisheries and Oceans pointed out that from a fisheries perspective, it is unlikely that any offshore spill would have significant damage on fishery resources, whether the spill is small or large, dispersed or undispersed. On the contrary, the main concern for fishery managers is impacts on the fishery through tainting or contamination of gear. Anything that can be done to prevent these impacts would receive the approval of DFO. Dispersants can play a role in protecting fishing in both the offshore and near shore. It is reasonable to have pre-approval for small amounts of dispersants in both offshore and nearshore waters. In nearshore areas decisions must be made based on tradeoffs that in turn depend on the spill conditions, resources, and environmental conditions. The key objective is to avoid getting oil in the sediment or in the intertidal or nearshore subtidal areas where the oil can cause chronic effects. In the real world, the main concerns during spills in nearshore areas are tainting and gear fouling. In Payne's opinion, dispersants would play a role in minimizing these risks.

Tony Lock of the CWS pointed out that dispersant issues are seldom simple, but one truth is clear: oil slicks on the sea surface kill birds. Anything that can be done to avoid the killing of seabirds is worthwhile considering. Lock pointed out several issues. First, we do not know a great deal about the actual fate and effects of submerged oil and we should

be addressing this gap. Second, we must learn to plot the trajectory and fate of the dispersed oil. Lock pointed out that seabirds are charismatic megafauna. With dispersants, there will be a public perception problem, and regulators must ensure the public that, if they decide to use dispersants, it is a rational judgment and that they are confident of a positive outcome. Unfortunately, at present at least some members of the response community are not all totally confident, so we have to build on that knowledge. Another consideration is that inshore bird populations, such as cormorants, gulls, eider ducks and black ducks are populations that can rebuild fairly rapidly. What CWS is concerned about most are the offshore pelagic bird species that live over the horizon, out of sight and mostly out of mind. He contended that as a rule, spill responders and government regulators alike the world over believe that it is advantageous to have a spill driven offshore by offshore winds and that when this occurs no countermeasures are required other than monitoring. This may be true in some parts of the world, but it is emphatically not true in Atlantic Canada. In the northwest Atlantic, some of our most sensitive and vulnerable wildlife populations inhabit these offshore habitats, over the horizon. When oil slicks are headed in their direction serious damage may occur and spills therefore must be cleaned up as quickly as possible.

The only way we can compare impacts is to talk about populations. We must look at spills and their impacts in terms of what they do to bird populations. Unfortunately for pelagic sea birds the potential for major population impacts is great because they have evolved a reproductive strategy that involves breeding late and then laying a single egg each year. As a consequence, if damage occurs the recovery of the damaged populations would be slow. When oil spills occur near these places that are otherwise very, very safe from the natural hazards that threaten pelagic birds (e.g., Funk Island or Cape St. Mary's), we have to pull out all the stops to clean up the oil because those spills would have the potential of doing major damage to those populations of sea birds.

In short, as soon as the oil enters the pelagic zone, we have to go into panic mode. That does not necessarily mean that we have to use dispersants. Rather, we use whatever tools are available that allow us to remove the oil from the surface of the water. If that's

mechanical containment, then that is good. However, the reality is that, on the Grand Banks and in the offshore, mechanical containment will not work for most of the time. In short, for offshore spills we have only the choice of using dispersants. It is true that dispersants will work only if the oil is dispersible and if dispersants can be applied in a reasonable time. However, if dispersants are the only effective solution to protecting birds in the offshore, then we have to ensure that we have the capability of delivering them effectively, and in a timely fashion when they are needed.

3.5 Research and Development Needs

Panel 5 dealt with "Research and Development Needs for Dispersants" and identified gaps in knowledge that stakeholders believed should be addressed in order to improve our understanding of dispersants.

Merv Fingas of Environment Canada made the points that productive research and development involves more than simply coming up with a list of research topics and providing funding to address the questions. It takes years to build up a capability in research in this area. Even when research questions are identified one cannot expect to receive answers in three months, unless the questions and answers are very simple. It is important to recognize that little of the fundamental knowledge from the field of surface chemistry comes into oil spill research. Much of the new information being developed is directly relevant to oil spills and it is our duty as researchers to summarize this material and apply it.

Ken Lee of DFO described that department's plans for research on oil spills and dispersants. In November 2003 DFO formed a national center called the Center for Offshore Oil and Gas Environmental Research (COOGER), an organization whose primary role is research for the delivery of scientific information. COOGER's role is to identify research and development needs for offshore oil and gas, provide scientific

support for their internal clients, and provide scientific support for external research partners (academics, industry) to insure protection of marine resources. COOGER's research foci are: identification of sensitive habitats, study of drilling wastes and produced water, impacts of seismic operations, and oil spills. Oil spill work includes remediation, clay-oil-fluctuation, assessment of oil spill impacts and remediation, and dispersants. In oil spill dispersant research, DFO's aim is to identify research and development needs to facilitate dispersant planning and response in Atlantic Canada. To that end, DFO has identified 14 areas of research that are described in the report (Trudel and Lee in press).

Jerry Payne of DFO advised caution in discussing research needs. He cautioned that it was important to avoid giving the impression that there is a long list of great knowledge gaps that must be filled before we can consider using dispersants and granting pre-approvals. He concluded that for offshore spills, authorization for use of 5 to 10 cubic metres of dispersants on the Grand Banks should not be a problem. The top priorities, from a research and planning perspective, are issues associated with large spills in sensitive environments like Placentia Bay, where the biggest issue is fishery closure. Fishery closure can arise if there is a potential for the commercial fish species to become contaminated and pose a health risk to human consumers. Having closed a fishery, decision-makers must have some means of re-opening it, based on the absence of taint from fish flesh as measured in a monitoring program.

On the open ocean there is no question that dispersants offer net environmental benefits. Certainly in nearshore areas the risks to fishery species from dispersants is greater than in the offshore. However, even in the nearshore there is little risk of significant damage to fish stocks, except in relatively enclosed areas, where there is limited potential for dilution. Practically speaking, in inshore areas, where there is a risk of sediment contamination, the fundamental questions are: a) what will be the chronic effects of this contamination be; b) what will the thresholds for effects be; c) how long will contaminated sediments taint or cause chronic toxicity; and d) does it make a difference if

sediments are contaminated with oil or a mixture of oil plus dispersant? What are the answers to these questions with respect to risks to species like flounder species or lobster? Finally, Payne cautioned that there are knowledge gaps to fill and we should proceed to fill them. However, we cannot use the gaps as an excuse to delay dispersant planning.

3.6 Summation and Path Forward

Participants believed that the workshop had aided them in understanding each other's points of view and that a way forward was possible for dispersant planning in Atlantic Canada. REET expressed willingness to re-examine its dispersant policies by:

1. Reviewing its existing criteria for decision-making,
2. Modifying existing guidelines to be more specific, and
3. Learning from dispersant planning efforts of other countries.

However, REET stated clearly that if industry wishes to use dispersants, they must plan and put necessary resources in place to deploy them effectively in a timely fashion. In addition, they must make their needs clear with respect to streamlining the approval process, so that government agencies and REET can plan effectively.

Speaking on behalf of industry Urban Williams responded that the offshore oil industry has made a commitment to itself to do just that. The workshop had shown that much preparatory work had already been done, but more was required, including:

1. Research and technical analysis concerning dispersibility of Grand Banks oils;
2. Assessing technical feasibility of dispersants (e.g., specifics about how the applications would be achieved); and
3. Conducting a risk-reward analysis related to the net environmental benefits of dispersants in the region.

Once these answers are in place, Williams believed that industry would feel that they have a unified position on dispersants. Speaking on behalf of Petro-Canada, Williams expressed a willingness to move immediately to plan for dispersant response capabilities for Tier I and Tier III spills from its offshore platforms. Several participants pointed out

that ultimately it the international shipping that sails by our coast must be involved in the dispersant planning process, as they appear to constitute the greatest risk of spills. Finally, Williams believed that the participants' efforts in the workshop were a great start and anticipated great progress over the next year.

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APPENDIX A: CONDENSED TRANSCRIPTS OF THE PANEL DISCUSSIONS

Panel I: What Spill Response Problems Will Dispersants be Used to Address?

Chair: David Burley, Canada Newfoundland Offshore Petroleum Board.
Panel Members:

Captain Philip McCarter, Canship Ugland Ltd.;
John Henley, Newfoundland Transshipment Terminal;
Urban Williams, Environmental and Emergency Response, Petro-Canada Inc

Panelist Presentations

DAVID BURLEY: This panel is to identify the types of oil spill response problems that dispersants are will be used to address in Eastern Canada, in general, and in Newfoundland and Labrador in particular.

CAPTAIN PHILIP McCARTER: Our company manages the shuttle tankers to Hibernia and Terra Nova; berthing tugs in Whiffen Head; and a container vessel that operates out of Halifax. I will address the subject from an operational perspective and then from a spill management perspective.

Operationally, at Canship Ugland, our first priority is to not have spills, so we strive to keep oil out of the water. However, spills may occur. First, if a spill were to happen, the response will be slow, even though a contract is in place with an oil spill response organization. From a dispersant perspective, one might argue that there is a time-window issue, in that by the time booms are in place, hours will have passed since the spill and a portion of the time-window has been consumed. We heard from the discussions yesterday, that the time-window for dispersants [on Grand Banks oils] might be as short

as 12-hours. However, from a mechanical containment perspective, the situation may be even worse. By the time boom handling vessels steam from St. John's into Placentia Bay equipped for containment, the length of time involved is long and oil may already be on shore. So dispersants can certainly be used to address the time frame question that we face here on the East Coast. Second, given the severe sea conditions on this coast, we may benefit from dispersants. High sea states are common and these may be favorable for dispersant use. Those same sea conditions work against containment boom deployment.

What kind of spills might be cleaned up with dispersants? Several things could happen on tank ships that could result in operational spills, two involve bunkers and two involve crude oil.

a) First is a “bunker burp”, as vessels roll at sea oil bunker may be spilled if it escapes through a tank vent.

b) Second, minor spills that occur during bunkering operations are statistically common globally.

c) Third are potential spills resulting from tank washing, a standard practice on tank ships? The tank washings are discharged into a slop tank and once the oil and water separate the water can be discharged into the sea. The water is discharged through an ODME, a piece of equipment that is very sensitive to the presence of oil. However, when near to the interface between the oil and water, the ODME should automatically stop the discharge of water. One problem with shuttle tankers that very quickly shuttle from Placentia Bay to the offshore operations is that there isn't a lot of time for the oil and water to separate and an emulsion interface builds between the oil and water. With the presence of this emulsion layer, there's always the possibility that a burp of crude oil will be discharged into the sea. Canship Ugland Ltd. does not allow its tanker Masters to decant at sea. Slops are discharged to shore facilities for decanting/disposal.

d) The last type of potential spill may occur during the loading of the shuttle tankers offshore. The loading takes place through a hydraulic hose and coupler system in which a hose from the FPSO or platform are connected. Oil is loaded at a substantial rate. .

We have heard in the previous presentations that dispersants may not be particularly effective against bunker fuels that vessels use. Dispersants may be effective against crude oil spills, but there appear to be time window issues.

Finally, from the perspective of liability, it does not take long to rack up quite a bill. It appears that dispersant use is a costly process, involving aircraft. Ship owners may not arrange the requisite permits nor will sign contracts needed to implement dispersant operations and the matter may be up to the regulators (specifically the Canadian Coast Guard) to solve. Will [government] be anxious to take on that financial burden, risk and responsibility associated with dispersant response?

JOHN HENLEY: The Newfoundland Transshipment Terminal owns and operates the terminal at Whiffen Head. All of the crude oil from the offshore platforms comes to us and we re-load it on to second leg tankers headed for the international markets, mainly the eastern seaboard. Dispersants are simply one piece in an overall response to an oil spill. We are careful to minimize the risk of oil spill as far as possible. First, tugs escort any loaded ships going back and forth through Placentia Bay so we can keep them in the center of the Bay, in the shipping lanes, if they experience a mechanical failure. This is something that we do ourselves with an investment of about $30 million. Secondly we vet or select the type and quality of vessel that we allow into the terminal. Ships are categorized as being on the white list or the black list. This is done through a Ship Inspection Report Program SIRE[3] system, operated through the Oil Companies International Marine Forum (OCIMF), an international shipping advisory group. OCIMF prepares standards and guidelines on how to operate terminals and ships and how to inspect ships. They also run a shipping database and trained agents go around the world

[3] The SIRE Programme is a unique tanker risk assessment tool of value to charterers, ship operators, terminal operators and government bodies concerned with ship safety. It is a very large database of up-to-date information about tankers, focusing tanker industry awareness on the importance of meeting satisfactory tanker quality and ship safety standards.

inspecting ships. We use this information to decide whether or not to let ships into our terminal. In short our business is to minimize the risk of oil spills.

The risk of spills is very low probability, but their consequences are high when they occur. Our responsibility is to understand what to do in the event of oil a spill and what techniques will work. That leads to dispersants being another tool into toolkit. Our intent is to understand what they can do and what they cannot do. The tabletop exercise that we conducted this morning is a tool to learn what dispersants can do and what their limitations are. No piece of equipment works perfectly all the time. In oil spill response you have various pieces of equipment to do various things at various times. Dispersants are simply one of the tools in the toolbox. What we are looking for is to understand whether dispersants are applicable in our environment. We look to the technical experts to evaluate: a) how effective they would be; b) if effective, then what is needed to put a capability in place; and c) would they be cost-effective.

URBAN WILLIAMS: This presentation addresses our perspectives and problems with respect to oil spills. At the outset, I too want to point out that we emphasize spill prevention. However, spills happen, so what are the oil spill challenges that we face?

First, the environmental components that we aim to protect include fish and seabirds. One major concern is for fisheries. Trajectory models show that our spilled oil is probably going to move toward the east, toward Europe and there is little risk of our spills coming ashore. However, we have Canadian and international fishing activities to the east of us both on the Grand Banks and outside the 200-mile limit for both mobile and fixed gear. We also consider the potential impact on another Valued Ecosystem Component (VEC), sea birds. There are large numbers of sea birds on the Grand Banks and our daily monitoring program confirms this. In short, we don't expect oil to come onshore, but we do have VECs that are to the east of us and may be at risk from our spills.

We recognize that the risk of spills is low, but when spills occur we need to have as many tools in the toolbox as possible. We need to have the dispersant option. Right now we

have containment and recovery and surveillance. However, from our perspective dispersants are not on the table and that's the issue that we're dealing with today. We do not view dispersants as a cure for all problems, but they do give us potential for a faster response; the ability to operate in wider weather window; and the ability to pool resources amongst the other operators and with the Canadian Coast Guard.

We are considering both the small and large spills and recognize that the two would be handled differently. Larger spills we would be going to OSRL; smaller spills we would handle ourselves. For a small spill, five or ten cubes, such as from a break in a hose, given an adequate weather window I would like to be equipped to hit that oil with dispersants then and there. In fact, I would use dispersants before deploying our containment and recovery system down onto a supply boat to be used. For the large spill, 10,000 m^3, we go immediately to our large response option and go directly to OSRL.

Where do we want to be? We are looking for:
1. Dispersant pre-approval;
2. Dispersants located offshore,
3. Equipment needed to do the job;
4. Trained crews; and
5. Suitably revised plan.

We are committed to containment and recovery and we do exercise frequently to use that option. However, if dispersants become an option for us, then we will put the same level of planning and training into dispersants as well.

When and where would we use dispersants? Criteria might include spill volume, magnitude of risk to wildlife and oil type.

To conclude, our oil spill response plan already has dispersants in the decision tree. We believe that we need to plan carefully and failure to plan can have serious consequences. For us planning includes considering logistics and issues like pre-approval.

Comments

DAVID SALT: Based on the properties of the oils, the type of spill will be important in decision-making. If you have the small spill, then dispersants appear to be option. If responders can be there on hand, able to deploy dispersants from the vessels immediately, the oil will be fresh enough to be dispersible, and the vessels will have an encounter rate that will suit the response. They will be able to target the oil and do something with the small spill before containment and recovery equipment can be deployed. It seems to be a credible response.

For a large spill, if the oil [Grand Banks oil] will weather within 24 to 36 hours to a degree that it is not dispersible (we do not know what that time window is yet), the nature of the spill will be critical in the decision-making process. If the spill is an instantaneous release, then there will be limited benefit from dispersants, because dispersants will run out of steam very quickly. However, in reality few spills are genuine instantaneous discharges. More often the oil is discharged slowly over a long period of time. So the way that the event is unfolding is part of the decision-making process insofar as how you're going to get the benefit from you're the response that you put in place. This is solely because of the limited response window.

DAVID BURLEY: Spills from exploration drilling might be a special case. During routine production operations, spills usually involve oils other than crude oils. Most of our production-related spills have involved diesel or synthetic based mud, with crude oils making up only a very small proportion. On the other hand, statistics from exploration activity show a relatively low incidence of chronic spillage, but the proportion of spillage made up of crude oil is much higher. This is principally due to losses from well testing activity and the volumes may be as much as a barrel or two. This may be a category of oil spill response problem that we may want to look at as a candidate for pre-approval of one to two cubes of dispersants to deal with.

JERRY PAYNE: We have gone over dispersants a number of times, questioning what would be at most risk. In the offshore, the issues that arise over and over are a) tainting, b) gear fouling, c) risk to resources and d) birds. From a fishery perspective, the central issue is tar balls. If tar balls are visible in any catch, processing plants will not accept it. If they enter a plant, then shipments of catches like crab to buyers might be affected for months. From that perspective, anything you can do to prevent tar balls will result in major improvements. In short, the real issues in the offshore are not destruction of resources but contamination of wildlife and gear. Anything we can do to reduce the amount of oil on the surface is useful, even if dispersant operations are not 100 percent effective they can still be counted as beneficial.

JOHN HENLEY: One reasons for adding dispersants to the toolbox is our concern about risks from spills to birds in the Cape St. Mary's/Placentia Bay area. A lot of the discussion at this meeting so far has involved the offshore and tankers, but to me the biggest single risk in the area is the international ship traffic going by Cape Race. Cape Race is on the great Circle Route for ships leaving Europe for the United States and the Gulf of St. Lawrence. There is a huge amount of ship traffic that goes through this area that has nothing to do with the Newfoundland, the offshore or the tanker industry. Some of the ships come very close to Cape Race because of the miracle of autopilots and GPS and there is no exclusion zone to push them out into deeper water. This shipping is probably responsible for the oiled birds that are seen coming ashore in this area. These ships clean out their bilges before they head into inspection in one of the ports on the eastern seaboard, even though it is against the law to do so. The big issue is that seas are very rough in this area at certain times of the year. At those times it will be very difficult to put gear in the water. At the same time you have the huge bird populations that we all want to see protected. In that area, dispersants may give Coast Guard a powerful tool to deal with mystery spills and other spills to be able to get out there and get the oil under the water before it becomes ashore on the bird sanctuary. That is what has caught my interest in dispersants is the risk to the highly concentrated bird populations in these high-risk areas.

CAPTAIN PHILIP McCARTER: On board the tank ships we are required by regulation to carry an oil spill cleanup kit. This is kit is made up of a few drums of sorbents intended to cleanup small spills on deck. There are certainly no containment booms onboard. Indeed trying to deploy oil spill cleanup gear from a tank ship is not feasible. At present there is no intention, at least from Canship Ugland's perspective, to put any dispersants on tank ships. There is no requirement to carry a drum of dispersants aboard a tank ship. As it is not something that we would have on-board the crew are neither trained nor equipped to deploy it.

The forum must address the cost issue. Dispersants appeared to be useful, they clearly worked under certain conditions, but they appear to be very expensive as a cleanup tool. I go back to our scenario in the tabletop exercise, if the Greek tanker in this scenario had declared that his limit of liability had been reached and was not willing to pay for the dispersants response, is there a mechanism within REET to accept the cost that are involved? My impression is that the costs could escalate into the millions of dollars very quickly.

JOHN HENLEY: There is in Canada the Ship-Source Oil Pollution Fund. This fund may be the mechanism for dealing with Philip McCarter's question about cost, liability and ability to pay.

KEN TRUDEL: Our company prepares oil spill contingency plans for exploratory operations. For one operator dispersants made sense from an operational perspective, but they were taken off the table because of the perception that they would not be approved for use. In this case, both the proponent and the offshore petroleum board requested that we include dispersants in the oil spill response plan. Dispersants made sense to us in this case because the operation was particularly far offshore and potentially involved dispersible crude oil. Dispersants were included in the oil spill response plan and the plan was submitted for review. After the review stage, we were requested by the proponent to remove dispersants from the plan. The rationale for this decision was this. If dispersants were included in the plan then the proponent would be required to make some

preparations for dispersant use, thereby incurring some costs. The proponent perceived that they would be unlikely to ever receive permission to use dispersants during a spill and therefore the costs associated with planning for dispersants use were not justified. In this case dispersants made sense from an operational perspective, but they were taken off the table because of the perception that they would not be approved for use.

ROB DUNPHY: We should clarify Hibernia's position. Industry is being promoted as requesting dispersants pre-approval. We do not believe that Hibernia is at that point yet. Our purpose in participating in this workshop was to encourage and participate in discussion into finding a way forward, if one is needed. I believe that more planning is needed. We must work through the NEBA issue and get that clarified. Results of testing of dispersants on Hibernia crude have been presented. That work was not initially driven by Hibernia. It was driven by Hibernia's owners, who ship and receive Hibernia oil in regions that allow use of dispersants. Having that information is important, but testing should not be perceived as proof that Hibernia is pursuing this agenda. Rather Hibernia is interested in encouraging debate.

As for the question of what spills should and should not be considered for dispersants, I am not sure that we can answer that just yet. That is an answer that will come out of a good NEBA analysis. However, I think I can comment on what spills should not be treated with dispersants. I think we have heard about the relatively frequent spills in the offshore involving refined products. I do not necessarily agree that these spill are accurately described when said to be frequent, in fact they are infrequent and I do not understand where what statements of frequent spills is based on. I also understand that dispersant usage is approved in the UK for use on persistent oil and not for the lighter products like diesel fuel. I believe that the spills of small volumes of lighter end products would not justify us gearing up and preparing for dispersant use.

ALUN LEWIS: During this workshop the question of dispersing diesel has been mentioned. Dispersing diesel is generally regarded as not good practice as dispersing diesel does more damage and than if it is left on the surface. There are may be certain

circumstances where you could try it, but in general they are discouraged. Also when you get into heavy bunkers you obviously have a dispersibility problem. So out of the discussions we have had earlier, crude oils would be where dispersants are most appropriate.

JERRY PAYNE. As far as diesel is concerned, we learned last year during the Kacheshuk spill that in cold water diesel is sticky. If you pull a crab pot through a diesel slick and that crab shipment reaches the plant, plant workers can smell the diesel, the whole shipment of crab will be rejected. So even there you can make a case for using dispersants on diesel in cold water.

DAVID BURLEY: That concludes this panel discussion. I wish to thank the panel members Captain Philip McCarter, John Henley and Urban Williams and all those who participated in the discussion.

Panel II: What Preparation Will Be Required To Fulfill This Role?

Chair: Andrew Parker.
Panel Members:

Paul Nippard, Eastern Canada Response Corporation
Wayne Halley, Canadian Coast Guard,
Urban Williams, Petro-Canada Inc.

Panelist Presentations

ANDREW PARKER: The last panel talked about the various spills. I think they be characterized as small or large, Tier 1,2, and 3. Smaller spills include small spills from offshore platforms, burps from tankers in transit, small spills from loading and unloading tankers. Larger spills could include large spills from tankers, spills from production incidents; large spills from onshore or from the production platform. In addition, we could also consider mystery spills. We should also consider regulated spills like spills

from flaring and we might also consider sheens produced from produced water.

PAUL NIPPARD: From Eastern Canada Response Corporation's (ECRC) perspective, the question is what to do about planning and training for dispersant use. ECRC operates within a regulatory framework, the Canada Shipping Act, which focuses on mechanical containment and recovery and that is our focus also. We recognize dispersants as an effective response tool, and we develop plans to deliver dispersants. These plans address our initial screening, our standard operating procedure (S. O. P.), and our generic plan that we would submit on behalf of the responsible party for approval to use dispersants.

With respect to putting a capability in-place from a response organization perspective, I believe that this is something that ECRC would you interested in participating in. There are two ways for this to happen. If there were changes to the regulatory regime and planning standards that allowed for dispersant use, then we would put in place the capability specified by the standards. Alternatively, if one of our clients are interested in putting a capability in-place, then we would hold discussions with those clients to allow us to facilitate that planning. This might involve: taking on and maintaining the equipment and doing the planning training and exercising. Further, this would involve training with the equipment, maintaining the dispersant inventory, looking after the training and monitoring capabilities that would be required. From our perspective we look at this from a Tier 1 to a Tier 4 Tier for response within the planning standards, going from one hundred and fifty tons up to 10,000 tons.

The first problem to be addressed is the conundrum from yesterday, "No planning without approval - No approval without planning". If there is approval and if there are established standards, and then ECRC could meet them and the cost of that capability would be incremental to the costs for maintaining our existing capability.

In short, dispersants are something that we would be interested in entertaining and talking to any of our clients who are interested in pursuing them.

WAYNE HALLEY: The regulatory regime in Canada requires that the shipping industry have a certain oil spill response capability in-place. That capability is provided by certified oil spill response organization's, like ECRC. The planning standard is a 10,000-ton spill and it focuses mainly on mechanical containment and recovery and shoreline cleanup. As I mentioned yesterday, the CCG considers five basic strategies for oil spill response, including:

1. Tanker lightering (not covered under planning standards);
2. Dispersants or chemical treatment (not covered under planning standards);
3. In-situ burning (not covered under planning standards),
4. Mechanical containment and recovery; and
5. Shoreline cleanup.

Though the first three are not covered under the planning standards, they must be considered. Even though stakeholders are not required to plan for these strategies, there appears to be great interest, otherwise we wouldn't have everyone here for the last couple of days. Based on the workshop discussions, dispersants are of some value. However, the fact that the time-window for the use of dispersants on Grand Banks oils is short makes it impractical to rely only on resources that are available in England or in the eastern seaboard of the United States. So if companies or potential polluters want to use dispersants as part of their oil spill response toolkit, they are going to have to plan for it. They are going to have to invest in sufficient resources to meet a given planning standard appropriate for this region. Government will have to explore the possibility of having a pre-approval process in place for certain situations. This doesn't necessarily mean a guarantee that you'll get approval to use dispersants, but it will make the final approval process much easier. However the bottom line is that people will have to invest.

Planning and training must be done up front. Much of the equipment has to be in-place and certainly the basic equipment must be on site. In short, without planning and investing dispersants are not going to be a worthwhile consideration.

URBAN WILLIAMS: In order to effectively use dispersants we feel that certain things the must be in-place, including:

1. Verify that the chemical will be effective under the conditions that it will be used;
2. Verify that the application options are feasible; we believe that application by support vessels can be done in safety;
3. Put surveillance protocols in-place to make sure that we can observe what's going on;
4. Put tools in-place to allow the manager to know dispersant application rate and dosage;
5. Implement training; and
6. Implement standard reporting procedures in place.

For smaller spills we anticipate using a vessel mounted dispersant application system, with a small inventory of dispersants on board or aboard the FPSO. For larger spills we would be going to OSRL.

For the smaller spill, the response would be vessel-based, with gear kept at the offshore production site. The dispersant stockpile would be two cubic metres, possibly with some dispersants on other platforms, such as they Henry Goodrich. We would use the standard visual methods for a monitoring effectiveness. Surveillance would be by helicopter. We would use the vessel crew as the responders and the OIM would be in command. We would do the requisite training in planning and would exercise using the Synergy exercise, using the Coast Guard protocol.

For the larger spills we would go to OSRL, a full-service have responder. We would have to work with OSRL to implement the logistics needed to move dispersants into Newfoundland.

I believe that for the Tier 2 spill there is a significant role for ECRC and the Canadian Coast Guard. We could use portable airborne spraying systems, a stockpile of less than 10 cubic metres of dispersants located here in St. John's, helicopters for surveillance using REET and Coast Guard specialist observers and ECRC as the management team. The plans for this option would have to be put in place in advance.

Comments

ANDREW PARKER: I could address the issue of cost from an Offshore Board perspective. Our legislation is very clear that if the Board is not satisfied with the operator's response to a spill, the Board has the power to take over the response and have costs reimbursed by the operator. For the offshore oil production sector, I do not think that the financial responsibility issue has not been adequately addressed. I believe that details of financial matters could be described in the contingency plan. Clearly the operator has the first responsibility. If they don't undertake that appropriately and if it is deemed dispersants are appropriate response, then provision should be in-place to have financial and legal matters covered.

WAYNE HALLEY: Under the Canada Shipping Act, with the limits of liability that you 1encounter with ships, once they reach the other limits of liability their insurance companies stops paying. Now that does not mean that the ship and owners can just walk away. They can walk away to some extent. However, if they do the Government will take over the spill, Coast Guard will take over as on scene commander, and reimbursement will be sought from the ship owners. If it is a one-ship company, then you may not be reimbursed, but the matter will be dealt with in the courts.

SINCLAIR DEWIS: From the point of view of REET, potential responsible parties must be better prepared for dispersant use from the perspective of planning and training. In the past, during spill response exercises, responsible parties commonly asked for permission to use dispersants, but in most cases the advance planning for these dispersant requests had not been done. We must get beyond that and I think that the flowchart that Urban Williams presented earlier is a very good start for that kind of discussion.

CAPTAIN PHILIP McCARTER: Please consider the following, our tanker is unloading at the terminal in Placentia Bay and a spill occurs. It is not clear whether this spill is from the terminal or the tanker The tanker's oil spill advisers are recommending dispersant use while the terminal operators advisers recommends against dispersants. ECRC is the oil

spill contractor to both. How does ECRC proceed?

PAUL NIPPARD: The issue is complex as you say. We, ECRC, would we be working with our clients, possibly both clients. Depending on our clients wishes our first step would be putting together a plan for the use of dispersants and submitting it for approval. Obviously, as part of that process REET would have some input as to whether or not dispersants should or should not be use. From there ECRC would then source of the equipment, because we don't have any equipment in our inventory. In addition, I expect that the government lead agency would also be providing some advice in terms of what response actions would be required. In short we would work with both of our clients in this case, but a decision would have to be made as to what the most appropriate course of action would be.

CAPTAIN PHILIP McCARTER: Is it Coast Guard policy to actively seek dispersant pre--approval?

WAYNE HALLEY: If you as a potential polluter want to plan to use dispersants you should be prepared in advance. You are under no obligation to use dispersants, but if you want to use them you must prepare an advance. To my knowledge, the issue of dispersant use has been considered in Newfoundland for 25 years. In that time only once has an operator prepared for dispersant use. At some point ESRI brought in dispersants as part of their contingency plan. However beyond that virtually nothing has been done to get dispersants to the point where they can be use.

No, our approach will be to develop a plan describing how dispersants would be used. In a spill situation where we are considering dispersants we would present the case to Environment Canada through the REET process. The bottom-line is that if you want to use dispersants or have your contractor use dispersants you really should begin the planning process now.

MERV FINGAS: I would like to remind ECRC and everyone else that this is the second time through the cycle. Twenty-five years ago, the forerunner of ECRC had dispersants, a helicopter spray bucket and ship-based spraying systems. Coast Guard had ship-based spraying equipment and more dispersants. Over the years these organizations decided to divest themselves of the dispersant spraying capabilities.

DAVID BURLEY: My recollection is that the stockpiles were in the St. John's area. One held by ESRA or ESRI, a response organization for the up-stream oil industry. As I recall the principal reason that ESRA divested itself on its dispersants was the perception that the Hibernia oil was not dispersible.

MERV FINGAS: No, the reasons were that it was too expensive to maintain and concern about losses through corrosion of some drums.

DAVID BURLEY: Urban Williams, have you identified a delivery platform for use on Tier 2 spills?

URBAN WILLIAMS: I see Petro Canada becoming involved in the Tier 1 and the Tier 3 options. I do not see us becoming involved in Tier 2. Someone else will lead that option.

ROGER PERCY: Urban Williams, have you looked at the feasibility/value of using propeller wash for smaller Tier 1 spill incidents?

URBAN WILLIAMS: Our oil spill response plan lists conditions and criteria for each of the different oil spill response options including propeller washing.

DAVID SALT: Prop washing is a useful technique for diesel. However, if a crude oil spill is prop washed, the oil will simply re-coalesce and re-surface. With crude oil, prop washing just spreads the problem out.

KAREN PURNELL: Using prop wash on crude oil and heavy fuel oil spills will simply break up the oil and ensure that no cleanup technique will be effective.

JOHN HENLEY: Do you believe that you don't need dispersants for mystery spills? If the mystery spill work near a bird sanctuary would you consider dispersant use? Do you have the equipment to deploy dispersants?

WAYNE HALLEY: We are equipped for mystery spills and we have dispersants in our inventory. Mystery spills are usually very small. We have sufficient dispersant to deal with small mystery spills. If a spill were near a bird site, dispersants would be one of the response options. As for the equipment, we are in the process of upgrading a piece of equipment that was given to us. By the end of this month [Feb. 2004] we will have the equipment.

KAREN PURNELL: One of the concerns that I have about using dispersants on mystery spills is that they are generally not fresh treatable crude oil. More often than not mystery spills involve tank washings or bunkers, which are not amenable to dispersion.

WAYNE HALLEY: Every situation will be judged on its own merit and the first question would be whether the oil is dispersible. We would then go through the process with REET to determine whether or not dispersants would offer a net environmental benefit.

Panel III: Regulatory Issues and Concerns.

Chair: Roger Percy

Panel members:

Graham Thomas, Environment Canada

David Burley, Canada Newfoundland Offshore Petroleum Board

Panelist Presentations

GRAHAM THOMAS: The REET process and EC's position on dispersants were described very well in Sinclair Dewis' formal presentation yesterday. Dispersants are an option in the Atlantic region and in Newfoundland. The question is how do we get dispersants into use? In Newfoundland, REET plays a role in putting dispersants into use, serving a scientific and technical advisory role and providing information to the Lead Agency (LA) in the spill. The LA is determined by the circumstances of the spill. Where spills involve the offshore oil platforms the LA is the CNOPB, under the Atlantic Accord. For ship-source or mystery spills at sea, LA is the Canadian Coast Guard through Transport Canada, under the Canada Shipping Act. For military ships or federal properties, LA is EC under EC's legislation. The LA deals directly with the polluter, while REET provides the scientific and technical information needed to manage the spill. Various agencies participate in REET including Department of Fisheries and Oceans (DFO), Canadian Wildlife Service (CWS), and the Emergency Science Division (ESD). Whenever we perceive that there is an information gap we find other sources such as universities, other departments and private industry. REET works on a consensus and consultation basis. In addition to scientific and technical information we also include stakeholder organizations, Fisherman's unions, mayor's and politicians in order to learn all of the stakeholders' opinions issues and concerns. REET develops priorities for a response. We have an excellent sensitivity mapping system that we use to identify priorities and issues. When dealing with dispersants, the overall guiding principle that REET works by is that of Net Environmental Benefit (NEB). During a spill when dispersants are discussed we use the NEB framework to assess the impact on the

environment, the impact on resources and the impact on the public, in terms of both financial impact and personal well being.

The legislative to basis for EC's role in REET includes the following:
1. Canadian Environmental Protection Act -the environmental protection group works with this act;
2. Migratory Bird Convention Act - Canadian Wildlife Service (CWS) works with this act
3. Fisheries Act - the habitat protection group works with this act. Under the Fisheries Act, we have the responsibility of dealing with pollution incidents through an MOU between EC and DFO that charges EC with the responsibility of dealing with pollution provisions of the Fisheries Act.

Canadian guidelines for dispersant use were developed a number of years ago [1984]. They specify effectiveness and toxicity standards for dispersants and provide rudimentary guidance about use during spills. I understand that these guidelines are under revision. Those guidelines must be made as complete and current as possible as soon as possible.

DAVID BURLEY: The Canada Newfoundland Offshore Petroleum Board (CNOPB) is the lead regulatory agency on behalf of government for offshore exploration and production activities in Newfoundland. This explicitly excludes transportation. We have a regulated responsibility for the authorization of chemical countermeasures. In this connection, we have an M. O. U. with Environment Canada that states that REET would be the mechanism by which discussions with respect to dispersant pre-approval would take place.

There are two observations that I would like to make. First, with respect to the " Two Cube Option [proposal to seek pre-authorization from REET for the use of two cubic metres of dispersant]", planning for this option would be less complex than planning for a more all-inclusive pre-authorization dealing with shipping, that in this region covers a wide area. The offshore oil industry in our region is a small one, which means that any

kind of regulatory approval would include discharges from a small number of spill sites and would impact a small number of discrete sites. As a result, the net environmental benefit analysis (NEBA) for this limited case would be much smaller that one encompassing the entire region.

Secondly, the Grand Banks crude oils are waxy, with pour points that are not low. As a consequence, there is some uncertainty, as to the potential effectiveness of currently available dispersants against these oils. That fact could complicate the debate somewhat.

A third point addresses the implications of conflicting jurisdictions. This addresses the question about what happens when you don't know what side of the loading flange a spill comes from. Although this question may make lawyers rich after the spill, the question should not impede the regulatory participation in a response. In the example of the ship source spill vs. an offshore platform spill, the CNOPB would quickly discuss with the Canadian Coast Guard and would decide how we were going to proceed and if events proved us wrong later we would deal with it to the best of our ability.

Comments

TONY LOCK: The offshore petroleum boards were conceived of as a single window for the oil industry. The Accords Act, which brought you into existence, specifies that you have the powers to supersede any other acts, such as the Canada Shipping Act and Fisheries Act, with respect to offshore oil development. Why does the decision to use or not to use dispersants lie with REET rather than the CNOPB?

DAVID BURLEY: The Accord Act points out that in the event of a direct inconsistency between the Accord Act and other acts, then the Accord Act would take precedence. However, this does not mean that just because there is an Accord Act that all other acts become irrelevant with respect to the offshore. The intent of the legislators was that the Accord Act would have primacy with respect to the offshore oil producing installations, but it would not necessarily supersede the duties or responsibilities of other agencies. At

some point it may fall to the lawyers to decide whether the Accord Act has primacy over the Fisheries Act with respect to dispersant approval, but it is both our intent that we find a mutually satisfactory position that makes sense. If we (CNOPB) were to develop guidance concerning dispersant use in the offshore, we would expect that EC, DFO and other agencies would be consulted and their views respected in any document produced.

ROGER PERCY: EC has an MOU with both of the Boards stating that the Boards would rely on REET for environmental advice in these questions. In fact, CNSOPB has an annex to the MOU that deals specifically with spill treating agents.

CAPTAIN PHILIP McCARTER: The REET decision-making process has been described as consensual, but controversial issues may give rise to conflicts. How does REET deal with conflicts? Is there a mechanism within REET to formulate decisions when conflicts arise?

ROGER PERCY: The various agencies that participate in REET have their own legislation and REET does not absolve them of their responsibilities under their own legislation. REET is a mechanism for trying to identify the net environmental benefit (NEBA) in each situation. In spill situations REET is looking at trade-offs and if you cannot reach consensus, the chair will formulate a decision. However, this does not mean that any of REET participating agencies cannot precede and act in accordance with its legislation. Certainly REET does not abrogate this responsibility.

GRAHAM THOMAS: When we begin the REET process to deal with contentious issues, we begin with the understanding that this is a consensus building exercise. No one can expect to receive favorable decisions every time, REET attempts to make the best decisions even in difficult situations. What we are trying to achieve is a one-window approach for the polluter. That is, we want one set of priorities going to the polluter so that they can get on with a job of dealing with a difficult situation. The discussions may be heated and there are sometimes winners and losers. REET's objective is to find the best solution using this NEBA method.

WAYNE HALLEY: In every situation there is a Lead Agency (LA). The purpose of REET is to advise the LA. The REET advice is quickly communicated to the polluter. In the event that there is an issue that cannot be resolved at the level of REET, then it will be up to the LA to formulate a decision.

ROGER PERCY: Recognize that the advice of REET can be refused. REET's advice is advice, not a directive. It specifies that from an environmental perspective these are the best options.

WAYNE HALLEY: The federal government's policy for crisis management of having a Lead Agency (LA) means that there is a single agency that has responsibility of making the difficult decisions. The fact that decisions must be made stresses the fact that pre-planning must be done. Basically the more pre-planning that is done the easier it is to make decisions in real-time.

JOHN HENLEY: Is there a single person within the LA who can make these decisions in a timely manner. I recognize that the purpose of the workshop discussions is to review the REET process, but if you need to do NEBA you're not likely to get a decision in a timely manner if you are doing the analysis at the time of the spill. So, is there someone in the LA who can make a decision in a timely manner, or do these decisions always take a lot of time to formulate?

DAVID BURLEY: From the perspective of offshore and gas, the Accord Acts are very explicit with respect to spill response. The duty, responsibility, and power to deal with the environmental emergency response are vested in the Chief Conservation Officer of the Board, who is a named individual. That is the person who is responsible for dealing with that decision. The length of time required for making a decision remains uncertain.

ROGER PERCY: There has been lots of work on toxicity, effectiveness and resources at risk. We know which dispersants to use. I think that decisions could be made quickly.

WAYNE HALLEY: Under the present circumstances with respect to dispersants, I believe that we would have lots of time to make decisions because the pre-planning has not been done. The preparation is not in place to apply dispersants. There are no dispersants in anyone's inventory and it will take 24 hours to get dispersants here before they can be applied. Roger has said that he believes that REET could make decisions within six hours. I believe that if the preliminary work was done, then decisions could be made in much less than that.

With regard to bringing issues to REET for resolution during spills, one of the things that we all must bear in mind is that during the early stages of oil spill when dispersants are being addressed there will be a lot of other issues on the table. This highlights the critical importance of having the groundwork done in advance.

UNKNOWN SPEAKER: In Canada [in ship-source spills] the responsible party will appoint an On-Scene-Commander (OSC). Coast Guard will then oversee the OSC performance. The Coast Guard cannot tell the OSC what to do, but in practice, the spill is managed by having the responsible party, the Canadian Coast Guard and a number of other people consulting on the best approach to the spill.

DAVID BURLEY: The situation in the offshore oil industry is analogous to that. During a spill, the Board has a responsibility of ensuring that the response is adequate and timely. It's unlikely that the Board will attempt to provide advice on the details of the response. The Board's participation in the spill would be similar to the one just described for the ship-source spill. We would expect to have a close liaison with the command and control decisions for the response.

UNKNOWN SPEAKER: It's important to recognize that, in Canada, it's the right of the responsible party to decide whether or not use dispersants. The lead agency doesn't make a decision, until the Canadian government decides that the responsible party is not doing a good job and takes over responsibility for the spill.

CAPTAIN PHILIP McCARTER: We have been considering this question of dispersants in the context of offshore oil production and shuttle tankers into Placentia Bay, but it has been pointed out that there are many ships in our region other than Canadian flag ships carrying Canadian crude. Bear in mind that if one of these offshore vessels is involved then the Canadian OSC may be dealing with a responsible party in Cyprus who cannot speak English. If we have only a 12-hour window to do something, I wonder if the pre-approval in this type of scenario is not wasted time.

ROGER PERCY: With respect to NEBA, it's not necessarily true that these analyses require a great deal of time. In this exercise today we formulated answer within a matter of a couple of hours. As long as I have been involved in REET our policy is to provide an answer within six hours.

JIM CLARK: I have participated in a number of workshops in the United States where we have worked through pre-approvals based on NEBA. Commonly the scenarios involve trade-offs between fish vs. birds. Since the sensitivity of the birds is great by virtue of the fact that they are all concentrated in one place their sensitivity is high and their recovery potential is very low, decisions commonly favor the birds. In some cases the fisheries resource trustees become frustrated because they feel that they always lose. We point out that there are circumstances where risks to fisheries are high. These are situations where reproduction takes place in a narrow time window, or resources are aggregated in space. An example is a salmon population that always returns to the same stream to reproduce. After having done a number of NEBA you begin to recognize the circumstances where marine resources are at risk from dispersants and where dispersants use may not be advantageous. This preplanning does make it easier to evaluate NEBs during a real-time spill or exercises, so that when a real incident occurs decision makers simply checked their circumstances against the scenarios at analyzed in the planning exercises to verify that the circumstances still apply. In short, some work is involved but with experience you can begin to focus in on the issues that drive the decisions in one direction or another.

ROGER PERCY: We have done some of that type of work in cooperation with our U.S. colleagues in trans-boundary exercises. We have brought the fisheries and wildlife people and first nations people together and worked through the NEBA. We have not as yet done this on a region wide basis, but this is perhaps something that we should do.

JOHN HENLEY: Roger, I think we're missing the point in this discussion. The offshore operators are not the issue; they are fixed entities inside Canada with oil spill contingency plans that have been approved by the boards. The real issue here is the international shipping. The ships ply our waters armed with an international contingency plan that has been written in perhaps in places like Piraeus, Greece that says that they are going to use dispersants immediately. They are going to come to you from their operations center in downtown Athens demanding dispersant approval, saying that we want to fly OSRL, using Jim O'Brien of O'Brien's Oil Pollution Service (OOPS) as our OSC and we are going to fly now. You have never seen their plans. We're getting caught up in the situation inside Canada, but the real issue from a spill probability perspective is the international shipping in our waters. The international shipping business is completely different from the scenario that you are painting here. That's where the main problem lies. I believe that the Canadian government must have a decision-making process in place that will allow them to make a decision independently of the contingency plan off the responsible party.

ROGER PERCY: You don't think that a six-hour turn-around time is good enough.

JOHN HENLEY: I don't know. You may be in a position of having a responsible party hit rock off Cape Race and leave the ship because his head office is in Monrovia Liberia. Is Canada's national policy going to be to use dispersants there or not? It is not an issue for us as operators; it is an issue for the Canadian government. That is the issue that is being missed in this.

ROGER PERCY: Under those circumstances we will be providing advice to the LA, in this case the Canadian Coast Guard.

WAYNE HALLEY: I guess the answer is no. We don't have stockpiles of dispersants. In the absence of stockpiles and given the time lines that we have been discussing, I don't see that we would go out and invest taxpayers money for something that may or may not be used in that respect our approach would be very similar to that of industry. They are one of CCGs five response options; they would be useful to have perhaps. However, given the budget situation within our department we are focused on the response capability that we have now and in-situ burning.

URBAN WILLIAMS: Is there a national capability to use dispersants in the event that there's a no readily identifiable responsible party? It seems to be that if you want to have a national policy about dispersant use then you really must have a national capability to use dispersants as well.

GRAHAM THOMAS: Wayne Halley just addressed that question. If the responsible party walks away then the LA is responsible. For a vessel-based spill, the LA is the Canadian Coast Guard.

URBAN WILLIAMS: But do you have the capability of using dispersants?

GRAHAM THOMAS: In a ship-source spill, if the responsible party walks away, the Canadian Coast Guard steps in on behalf of the government Canada. REET would convene and one of the lead options will be dispersant use. We would then have the Canadian government or the Ship-Source Oil Pollution Fund pay for the response, possibly bringing in the aircraft to apply dispersants. REET would then be supplying information to lead agency to make that decision.

CAPTAIN PHILIP McCARTER: The discussion suggests that there is a double standard here with respect to dispersant approval. If Urban Williams and Petro-Canada or our company Canship Ugland want to secure dispersant pre-approval, we will have to provide the regulators with two dump trucks full of documentation in order to

substantiate it. A foreign flag ship runs around and its operators' contact you saying that dispersants are on the way and demanding approval. On the one, hand Petro-Canada or Canship Ugland have gone through considerable time an expanse to secure approval for dispersant use in a timely fashion, while on the other hand you have given the dispersant approval in 30 minutes to a foreign-flag ship operator from Greece.

WAYNE HALLEY: In my experience the time required for notification and contact is 24 hours or more, so that your question is moot.

ROGER PERCY: I think it would be useful to have a checklist of information that would be needed in formulating dispersant use decisions at the REET level. I feel that we're still in the situation where we do not plan until the spill happens and by that time it's too late to plan, so that perhaps this information can be assembled upfront.

KEN TRUDEL: Roger, who provides leadership in this planning?

ROGER PERCY: You people [industry] are asking for a decision. Leadership must be joint, but I think that it will take some initiatives on the part of industry to say what they want. If no one asks for a decision, no decision will be made.

KAREN PURNELL: I have here a booklet from the UK Licensing Association entitled, "The Approval and Use of Dispersants in the UK". I understand from this discussion that the parties are pretty close and that all that is required is some way of getting over this first hurdle. In UK, the MCA and DEFRA (who are the licensing authority) have agreed areas and circumstances where dispersants may or may not be used. The MCA has pre-approval to spray dispersants beyond 1nm and in depths greater than 20m. Within these limits, consultation with the licensing authority is required. Feeding into the NCP are the individual plans from the ports, the offshore [oil industry] and the various terminals and shippers. These various operators and oil handling facilities are required to make a case for using dispersants in their contingency plans. They have to demonstrate consideration of effectiveness of the dispersant, environmental sensitivities, oil type etc. and if the

licensing authority concurs, the can obtain a dispensation to use limited amounts of dispersant." Is it not possible to begin this process here, because it sounds like you have all of the information that you need to take that step? Why can't this process happen now rather than at the time of the spill? I recognize that you can't give approval if you don't know where the equipment is coming from, but perhaps you could give approval contingent on the operator demonstrating that you can get the equipment. This provides the operator with the assurance that they can use the equipment if they can get it, making it worth the investment. If the operators can demonstrate to you that they can get the equipment within the timeframe required, could you then go the step farther and approve dispersants within this boundary, but outside this boundary would require the REET process.

ROGER PERCY: I think it's the worth talking about. I think it is worthwhile identifying the criteria and that would be used for this type a decision. The difficulty that I see it is that most contingency plans do not deal with dispersants. The REET contingency plan does. The REET approach may be too onerous in this particular circumstance, but from our perspective industry has backed away on this issue. Their position it is that unless we are certain that we will receive a yes decision at the end of a process that we will do a preplanning. Our position it is that you're not to get approval until we can see that you have done the necessary preplanning.

ANDREW PARKER: One of the responsibilities of the Boards is to review and approve contingency plans prior to granting an authorization. This is done in consultation with EC, DFO and others. As a result of this workshop, in the future when reviewing these plans, the question will be aggressively asked whether or not dispersant should be included in those plans. If there is a NEB in using dispersants, then the oil industry should be prepared to use them. In short, I don't believe that we will wait for industry to address this question. I believe that we will ask these questions of industry and then we will collectively come up with the best environmental response.

ROGER PERCY: There are some things that we can do. I mentioned the dispersant guidelines; they are good as they are now, but they should be updated. We can look at dispersant use criteria. We could look at areas where dispersant should and should not be used. I believe that we can begin to address parts of this process, but I do believe that this is a two-way street.

Whenever we have been asked to approve dispersants in Canada/U.S. exercises or in small incidents, I cannot recall a situation where we have refused.

DAVID SALT: The issue is raised about a national capability for using dispersants. Other governments have recognized this problem and also recognize the fact that the cost of investing in dispersants is very high to provide a large capability and the potential frequency for use is very low. One of the approaches that we have for them is membership in our organization through associate membership. This gives them the option of Government accessing our resources in much the same way as a member without having to incur or high costs.

ROGER PERCY: I would like to see us go beyond this workshop. I would like to see us map out how we could get to a decision more quickly; I think six hours is the maximum. I think that we should have criteria in place so operators are clear on the information required for making dispersants visions so that delays can be avoided.

Panel IV: Where And When Should Dispersants Be Used/ Not Used In Atlantic Canada?

Chair: Sinclair Dewis, Environment Canada

Panel:

Jerry Payne, Department of Fisheries and Oceans (Newfoundland)

Tony Lock, Canadian Wildlife Service

Panelist Presentations

SINCLAIR DEWIS: This is session is about where and when to use dispersants.

JERRY PAYNE: From a fisheries perspective, in the offshore, it's hard to make a case for spills actually damaging resources, whether the spills be small or large, dispersed or undispersed. On the contrary, the main concern is impacts on the fishery through tainting or contamination of gear. Anything we can do to prevent that should be done. Dispersants can play a role in protecting fishing in both the offshore or nearshore. I think you can have pre-approval for small amounts of dispersants wherever. In nearshore areas decisions must be made based on trade-offs that in turn will depend on the spill conditions, resources and environmental conditions. In most cases, dispersants might be considered, if the water is not too shallow or stagnant. The key thing is not to get too much oil in the sediment or in the intertidal or near shore subtidal [areas] and where you can get chronic effects. But in the real world, the main concerns in nearshore areas are tainting and gear fouling and dispersants can clearly play a role in minimizing the risk of these impacts.

TONY LOCK: Oscar Wilde once said the truth is seldom pure and never simple. Substitute dispersants for truth and you just about have it. It is not in most cases a clear decision whether you should use them or not. There are so many competing factors to be considered. However, one truth is clear, oil on the surface kills birds! Anything that we can do to avoid that sad conclusion is worthwhile considering.

Now, it is very obvious that we do not know a great deal about the actual fate and effects of submerged oil. We don't know the immediate impacts of the submerged oil upon various different environmental components and I think we have to be looking at those components before we can advise on whether or not dispersants are appropriate for a given situation. As soon as I saw the disparate paths plotted for the surface oil and the dispersed submarine oil, I recognized that one thing that we must do is to learn to plot the trajectory and fate of the dispersed oil. We have very good capability in house to actually plot the path of the surface oil. I am not confident that we can, with equal certainty plot the path of the submarine plume. I think we have got to get that capability developed as soon as we possibly can. That will give us more confidence to make the decisions we have to make.

A second issue is the fate of seabirds. At the Canadian Wildlife Service and it's our duty to ensure the survival of populations of birds. Often we forget that they are the charismatic megafauna and we just cannot think rationally about the mortality of these creatures in purely biological terms. There is a public looking over our shoulder that is motivated usually not by biological intentions, but by sentimental intentions. So we not only have to do good, but we also have to be seen to be doing good. With dispersants, there will be a public perception problem and I think we always need to have enough agreement and confidence in what we are saying that we can confidently ensure the public that yes, if we decide to use them, this is a rational judgment. Unfortunately, today I sensed that we are not all totally confident, so we have to build that knowledge.

Another consideration is this. The inshore bird populations, such as cormorants, gulls, eider ducks, black ducks are populations that can rebuild fairly rapidly. We don't worry about the survival of those populations. On the other hand, as a biologist, what I really worry most about are those birds, which live in the offshore pelagic zone, over the horizon, out of sight, regrettably mostly out of mind. It has been traditional in oil spill response for responders to say “hey we've got an off shore wind boy, over the horizon that's the best place for the oil.” Well, it isn't! If we have to talk in abstract terms about where the real ecological damage is, it's off shore and I will justify that.

The only way we can compare impacts is to talk about populations. Sure, there could be a massacre of mysids, deaths of a hundred thousand mysids, but this is of little consequence either ecologically or from a public perception point of view, because this represents one-tenth of a millionth of a percent of a population. We must look at spills and its impacts in terms of what they do to populations of these creatures. Unfortunately, in the case of pelagic sea birds the potential for major population impacts is great because they have evolved a reproductive strategy of that involves breeding late and then laying a single egg each year. They have done this because they live in a mechanically simple environment, the ocean. They are beautifully adapted to the ocean and as long as we don't change it. Part of their strategy for survival is that they breed in a very few very, very safe places. If we choose to spill oil near those very, very safe places (e.g., Funk Island or Cape St, Mary's), we have to pull out all the stops to clean up the oil because we the spill has the potential of affecting a very large part of the population at one time.

In short, as soon as the oil enters the pelagic zone, we have to go into panic mode. That does not necessarily mean that we have to use dispersants. Rather, we use whatever tools needed to remove the oil from the surface of the water. If that's mechanical containment, then that is good. However, the reality is that on the Grand Banks and in the offshore, mechanical containment will not work for most of the time. In short, it appears that for the offshore we have only the choice of using dispersants. It is true that dispersants will work only if the oil is dispersible and if we they can be applied in a reasonable time. However, if dispersants are the only effective solution to protecting birds in the offshore, then we have to ensure that we have the capability of getting a sufficiency of dispersants available for use in the off shore if the opportunity presents.

Comments

SINCLAIR DEWIS: One of the tools we have in the region is sensitivity mapping. So, if we can identify dispersant use/non-use areas, these can be documented on the maps. I looked in the literature for accounts of dispersant use/non-use areas in other areas. A

South African document reported the following. Dispersants should not be used in areas of low water volume and with limited rate of exchange, near shellfish areas, in fresh water, in established fish breeding grounds, in migratory areas, in the vicinity of industrial water intakes, in areas far off shore where there is little likelihood of oil coming ashore, and on the shoreline. At the present time, in South Africa, it is recommended that dispersants be used on crude oils, if a slick is approaching islands or rocks supporting large sea bird colonies, especially in those colonies including species that are rare or in danger. (SINC REFERENCE PLEASE)

JIM CLARK: I just want to pick up on what Tony had said. Knowing the trajectory of surface oil is one thing, but knowing the trajectory of the dispersed plume is a lot more uncertain. In addition, its rate of dilution is very much site-specific and incident-specific, and so is very much unknown. There are also things like stratification due to temperature, salinity and subsurface currents to consider as well. We must obtain site-specific information on those rates in order to predict what the dilution rate might be.

KEN TRUDEL: Andrew Parker said earlier that is there are probably places where there is an overwhelming obvious net environmental benefit for the use of dispersants and there should be some mechanism identifying and planning for these. One possible approach is to make a broad scale assessment of net environmental benefit for the region or for part of it. Based on experience elsewhere in the world, in areas that are perhaps 10 km off shore and beyond the net environmental benefit will overwhelmingly favor the use of dispersants. In these deeper offshore waters in Canada, just as in other regions, the risk to seabirds may be great, but the risk to in-water populations is small. In Canada, the imperative for dispersant use is far stronger than in places like the Gulf of Mexico where they do not have vast populations of pelagic birds. They have some shore birds and they have a few pelagic birds, but they don't have these great rafts of pelagic species that we have. In Canadian waters you have resident populations of very sensitive species that really merit protection. The upside of the dispersant use trade-off is very, very positive. By using dispersants you are protecting sensitive seabird populations from suffering ecologically significant damage. On the other hand, the downside of the dispersant trade-

off is very modest. In offshore waters, even with an impact footprint of 20-40 square km, in which you impact epipelagic life stages of commercially important fishery species, the damage represents very little in terms of the productivity of fish populations as a whole. In offshore areas, there is an overwhelming net environmental benefit documented scientifically.

PIERRE RYAN: Where to use dispersants? I suggest that we use dispersants where the application reduces oil at the surface in the short or longer term provided that spraying dispersant doesn't affect birds in areas where oil is not present or where dispersants do not compromise other counter measures that will remove oil from the water or contain it. And that's basically the rule of limited resources.

Where not to use dispersants? I suggest that dispersants should not be used in areas that are identified as sensitive according to criteria that are identified before hand and documented in a national plan much like the model in Europe. Ideally, in Canada we should assess sensitivity based on criteria that we develop ourselves over the long term.

TONY LOCK: If dispersants become a standard part of our toolkit, we cannot use them in a cavalier manner. Operating protocols must be developed and these should include: a) a bird monitoring area procedure, so we know species and numbers present; b) a hazing procedure to get any non-damaged birds out of the area; and c) bird recovery procedure after the dispersant application to make sure that those animals caught in the middle of the process are given at least a chance of rescue. In the final analysis, however, we must recognize that we are looking for a net environmental benefit and, as such, we may be called upon to make sacrifices on one side in order to make major gains on the other. This trade-off aspect is what makes this a very difficult value judgment to justify to the public.

Panel V: Research and Development Needs for Dispersants

Chair: David Taylor, Husky Energy

Panel Members:

Mervin Fingas, Environment Canada

Ken Lee, Department of Fisheries and Oceans

Jerry Payne, Department of Fisheries and Oceans

Panelist Presentations

The intent of this panel was to identify gaps in knowledge that stakeholders believed should be addressed in order to improve our understanding of dispersants and to describe research initiative in progress or planned.

MERV FINGAS: Productive research and development involves more than simply coming up with a list of research topics and providing funding to address the questions. It takes years to build up a capability in research in area. In our laboratory, where we do oil analysis and dispersant research, we have three Ph.D.'s who are certified oil analysts one or two of whom the have 20 years of experience and approximately six million dollars of analytical equipment. Even though we have all of this knowledge and experience we still like to receive feedback about research needs. However, even when research questions are identified you shouldn't expect to receive answers in three months, unless the answer is very simple.

It strikes me how little of the fundamental knowledge from the large field of surface chemistry comes into oil spill research. The field of surface chemistry is a very large, and rapidly expanding one. Much of the new information being developed in surface chemistry is directly relevant to oil spills. It's our duty as researchers to summarize this material and apply it to oil spills.

I look forward to hearing questions from this workshop, but to this point I didn't get a lot of specific questions from this workshop that would lead me to refocus my research.

KEN LEE: This presentation describes our plans for research on oil spills and dispersants at Department of Fisheries and Oceans (DFO). Some of this material is a recent meeting at which DFO scientists and academics identified research needs for dispersants.

Last November (2002) the Minister of Fisheries and Oceans, formed a national center called the Centre for Offshore Oil and Gas Environmental Research (COOGER), an organization whose primary role is research for the delivery of scientific information. It is a national coordination center for existing regional expertise and infrastructure, this means that I can call on any DFO scientists to join my team to look at R&D needs. COOGER's role is to identify research and development needs for offshore oil and gas, provide scientific support for our internal clients, and provide scientific support for external research partners (academics, industry) to insure protection of marine resources. What we wish to do within COOGER is to promote research at a national and international level.

Our main role is assessment of environmental impacts associated with offshore oil and gas exploration, production and transportation. Our research foci, at present are identification of sensitive habitats; study of drilling wastes, produced water, impacts of seismic operations. In oil spills work includes the study of remediation, clay-oil-fluctuation, assessment of oil spill impacts and remediation and, a recent addition, dispersants. In addition, we have a large program involving environmental factors that looks at the impact of winds and waves of oil operations.

In oil spill dispersant research our aim is to identify research and development needs to facilitate dispersant planning and response in Atlantic Canada. We aim to be able to provide information to REET on dispersant effectiveness and net environmental benefit. The DFO research and develop seminar (November 2003) identified research needs and ranked them according to: their potential value in addressing questions that REET may have; the feasibility of addressing these questions with existing research programs; and very importantly, cost. I will summarize the research areas, but will not address the ranking.

We all heard yesterday about the Fisheries Act and the regulatory problem that under the act we cannot discharge the deleterious substance into the environment. My question is, “If a deleterious

substance, namely the oil, is already in the environment and the dispersed oil is no more toxic than the oil, is dispersant use worth pursuing?"

Are risks and potential impacts deriving from spills and dispersants in the offshore sufficiently understood that it is not a high priority for research. Alternatively, we could ask, " Given our existing knowledge base would the public agree with our assessment of risks from spills and dispersants?"

The list of research topics is as follows.

1. What species are at risk [in Canadian waters]? What are the valued ecosystem components or species that are most important? Which are the more sensitive life stages? What are the seasonal and spatial distribution considerations? Commonly researchers use surrogate species in toxicity studies. However, why not study locally important species and life stages like larval cod? This type of research may be more difficult, but the public might expect us to address this question. We have the expertise within DFO, so why not use it?

2. What are the population-level effects of exposure to dispersed oil? The most common type of toxicity work involves research on lethal effects on individuals, but what we should really be concerned about is long-term effects on population. We should really be looking at the long-term effects of short-term sublethal exposures. One of the considerations in this connection is endocrine disruption.

3. What products are suitable for use in Canadian waters? Are additional laboratory studies on effectiveness and toxicity required for purposes of product selection?

4. What are the effects of controlling factors such as mixing energy?

5. What are the interactions of chemically dispersed oil with mineral fines?

6. What capabilities are required for in-situ monitoring of oil and dispersed oil? DFO has experience in tracking suspended particles in the water column that could be applied to the challenge of monitoring chemically dispersed oil. In addition, we're looking at ways to view using fiber-optic technologies to quantifying dissolved hydrocarbons in the water column and to measure oil particles.

7. What improvements are needed in fate-and-effects models to improve our ability to make decisions? At DFO we have developed three instruments recently to study behavior of particles in the water column. We can use these technologies to improve our understanding of the fate in behavior of oil particles and chemically dispersed oil. These are: a) a Cam-Pod, a photography system, equipped to look at particles near the benthic boundary layer; b) a benthic boundary

layer sampler; and c) “Insect”, a particle settlement instrument, with cameras to photograph particles in the water column. DFO develops much oceanographic instrumentation that can be used the research on dispersants.

8. Are refinements needed to existing Net Environmental Benefit models to suit the Canadian environment? How do we delineate the impact zone in models to predict the volume of water that exceeds critical effect thresholds?

9. What environmental effects monitoring tools are required to measure exposure to dispersed oil?

10. Fish-tissue contamination and off-flavors in commercially exploited fishery species; are processes understood well enough for predictive and monitoring purposes for finfish, crustaceans and mollusks?

11. Science-based guidelines for fisheries closure and compensation; if something goes wrong they want to know who's going to pay?

12. Impact of dispersed oil on primary producers: does kelp need help? Should we look at impact on primary productivity, phytoplankton and macrophytes? What about the microbial loop, including bacteria and bacteriovores? .

13. Do we understand the environmental fate of dispersed oil droplets well enough to predict intermediate and long-term fates and impact? One of the things that I mentioned that I want to do is a controlled test of oil and dispersant formulations. To this end, I am in the process of building a wave tank facility at the Bedford Institute of Oceanography in Dartmouth Nova Scotia.

14. How do we develop the experience as was mentioned at the start of the meeting? How many people have seen oil disperse? How do we develop that experience and improve public confidence. One of the things I would like to do is to conduct experimental sea trials. This will give us working experience, as well as a way to communicate both our research activity and our progress to the public.

JERRY PAYNE. I want to advise caution in discussing needs for dispersant research. I do not want to give the impression that there is a long list of great knowledge gaps that must be filled before we consider using dispersants and pre-approvals.

As for dispersant use in the offshore, with all the science available on dispersants, I would find it difficult to suggest that authorization for using of 5-10 cubes of dispersants on the Grand Banks would be a problem. I do not know anybody here who would say that it could be a liability. The situation may be different for very large spills (tens of thousands of tons) or spills in nearshore areas, like Placentia Bay. However, for relatively small spills in the offshore there is no problem

with dispersants.

As I mentioned, the models suggest that there is basically no difference in terms of impact between volumes of dispersed oil versus untreated oil. The impact assessment models that we use to predict the impact of these spills exaggerate the toxicity and risk in the real world because they base toxicity thresholds for modeling on LD50's of 26, 48, 96 hrs. These threshold values are conservative (over-estimate toxicity), because actual exposure in the real world are of shorter duration than this so risk would be much less. Finally, even if you use the conservative threshold values in modeling, model outcomes suggest that impacts of dispersant use on very large spills would be modest. In one example, a 40,000-ton spill was estimated to result in a reduction of only 200 pounds in fish production. I believe that you could realistically reduce this value to only 2 pounds of fish.

In my view the top priorities, from a research and planning perspective, are issues associated with large spills in sensitive environments like Placentia Bay. In these scenarios, the biggest overriding issue is the fact that the fishery must be closed. The fishery can be closed legally only by the CCG for cleanup and by the Regional Director General for Fisheries, if there is a potential for the commercial fish species to become contaminated to the point that they pose a health risk to human consumers. Fisheries are not closed because of potential toxic effects on fish. Closing a fishery has major legal and liability ramifications. Having closed a fishery, decision-makers must have some means of re-opening it, so monitoring must be conducted. Re-opening is not done based on environmental contamination, but rather on the absence of taint from fish flesh as measured in a monitoring program.

On the open ocean there is no question that dispersants offer net environmental benefits. In nearshore areas, the objective is to prevent fouling of shoreline. Even in these more shallow, nearshore areas where the risks to fishery species from dispersants is greater than in the offshore, there is little risk of significant damage to fish stocks, except in relatively enclosed areas, where there is limited potential for dilution.

Practically speaking, in cases where large amounts of oil enter an inter-tidal sandy area, like a

winter flounder fishery area and you contaminate the sediments, the fundamental questions are:
1. What will be the chronic effects of this contamination?
2. What will the thresholds for effects be (The rule of thumb for a sediment quality guideline was 5 to 10 ppm of total hydrocarbons, but after the Exxon Valdez spill, this threshold has been reduced to 0.2 or 0.3 ppm)?
3. How long will contaminated sediments taint or cause chronic toxicity?
4. Does it make a difference if sediments are contaminated with oil or a mixture of oil plus dispersant?
What are the answers to these questions with respect to risks to species like flounder species or lobster?

In closing let me say that certainly there are gaps to fill and we should proceed to fill them. However, don't use the gaps as an excuse to delay dispersant planning. I think you can responsibly use dispersants and it would be better in the long run to use them to avoid causing shoreline contamination and gear fouling.

Comments

WAYNE HALLEY: Scientific work is needed. However, from a practical perspective we need experienced people to be on site during the application. The presentations showed that with all the instrumentation we have, it still comes down to the Mark 5 eyeball to say whether the dispersant is working or not.

SINCLAIR DEWIS: Tony Lock suggested that there was more work to do on birds with respect to oil and dispersants and that there didn't seem to be a lot of literature on the subject. Briefly, is there is more to be done on that topic?

TONY LOCK: Yes. There is almost nothing [about effects of dispersants on birds]. However, I suspect that so much dispersant experience exists around the world that the data are there in the gray literature and in reports. I believe that we have an opportunity here and that industry may be in a position to take leadership. We are at the time of year when we decide what to do with the

Environmental Studies Research Fund. Why not put a year of funding applied research on monitoring that will actually begin to get some of these little questions and other conundrums answered and out of the way. One part of this can simply be a search of that gray literature, which I did not have access to. And perhaps the answers that I am looking for are already out there.

JIM CLARK: I want to endorse the research that you want to conduct. It's the kind of activity that ExxonMobil has been involved in a long time - the field demonstrations that you've seen. I want to work with you guys in the future and I am sure that you will have industry support in these efforts. With regard to a number of these problems, we lack an appreciation for the physical and time scales. This leads to people doing research on questions that really don't need to be answered. I do not want to minimize the impact on birds from dispersed oil. However, from the example we used today in the tabletop exercise, the dispersed oil plume was be present for a few hours or maybe 3 days in the entire region of where these gannets were feeding. Thus, the potential impact of the birds going through a dispersed oil plume is a very transient risk. That being the case, we probably should not be spending a lot of time researching this. In short, on one hand, there is going to be oil on the surface in that area for several days, while on the other there is a dispersed plume that's of concern for several hours, we could spend a lot of time getting answers to questions that are not really time and spatially relevant. I argue that Jerry Payne is correct and that we must look at these issues on a population scale in order to obtain relevant answers.

Pierre Ryan: My comment relates the tabletop exercise of this morning. If you had a slick in Placentia Bay 10 x 20 km in size with 40% coverage by slicks, dispersants are applied and they work, what is the state of the treated slicks on days 1, 2 3,4. Practically speaking, Dr. Lewis mentioned yesterday that it is difficulty to detect effectiveness, so in my example, what does the dispersant do to the coverage of oil at the surface. My interest is for a bird that lives on the surface, flies over the surface, dives through the surface and feeds there. I want to know what the impact of dispersant use would be on the likelihood of a bird encountering either oil or dispersed oil.

WAYNE HALLEY: My question addresses development rather than research. Field workers will recognize that regardless of where we buy the major tools, making them work in our environment is always going to be an issue. So whether its writing procedures, training, modifying or installing equipment, those of us with experience realize that a lot of this stuff is not off the shelf equipment designed for our purposes. If we decide to go down this road, just making it work is going to be a challenge.

JOHN HENLEY: Regarding fishery closure and compensation, the way the International Oil Pollution Compensation Fund works in a spill is to consider shutting down the fishery and compensating the people involved. This was done in Spain immediately. In fact the Spanish fishing industry shut themselves down due to the perception of tainting, before the government could intervene. The insurance companies will quickly recognize that you are trying to minimize losses and prevent creating a bigger problem. We want everybody to understand that during a spill it would not be surprising at all to have those involved to shut the fishery down. They would recommend to government to shut the fishery down and provide compensation out of the insurance while the issue is being addressed. The objective is to avoid causing longer-term marketing damage. The people involved can apply to the IOSC Fund for compensation, loss of business, loss of income, etc. So, just to make people know, there is a lot of thought that has gone into that internationally. Rest assured a lot of thought goes into taking a fishery out of the market to avoid a longer-term and potentially more costly problem.

KAREN PURNELL: That is true. A system is in place for compensating people for the effects of closures, but it works only if there is a legitimate reason for the closure. One of the things the insurance will be looking at is a rational thought process for shutting the fishery and the criteria to be used to reopen it. There is no point closing something if you do not know how you are going to reopen it. So you should now be deciding what criteria you use for reopening. Will you use water quality, tainting or others? So there is a compensation system in place. However, you don't just automatically shut down unless there's good reason and you have in place a criteria for reopening.

Summary And Way Forward

Chaired by Roger Percy and Urban Williams

URBAN WILLIAMS: I would like to summarize some of the important points raised in the workshop and then invite participants to add their own final comments.

Regarding effectiveness of dispersants on our crude types, one of the more important questions is, "Is it reasonable to expect dispersants to work on our crude types?" We believe that some work has been done and we have some answers, but we there is additional work to do, including:
a) Research and technical analysis;
b) Assessment of technical feasibility of dispersants (e.g., safety issues, details and specifics about how the applications would be achieved), and
c) Risk re-ward analysis.
Once these answers are in place we will begin to feel that they have a unified position on dispersants.

Regarding regulatory controls, the key questions that come to mind at present are:

a) Does the dispersant decision-making process require revision?
b) Should there be guidelines for a pre-approval process?
c) Would those guidelines for pre-approval required changes to the existing regulations?

DAVID SALT: From a responder perspective, if dispersants are going to be an option it is not a question of whether or not they will work, but equally how long will they work? What is the window of opportunity for dispersants? We believe that the answer is that [for Grand Banks oils] the window of opportunity is relatively short. That being the case, if we want to use dispersants the only way in which we will be able to use dispersants is if we have a pre-approval system in place. The last speaker went through an excellent list from South Africa that defined conditions for using and not using dispersants. This list highlights the fact that sometimes, in the first instance, it is simpler to identify areas where we WOULD NOT use dispersants rather than trying to identify areas where we WOULD use dispersants. This is often a more straightforward

approach.

From the planning perspective, it's important to recognize that dispersants may only be effective for 24 to 36 hours. If this is the case, then it may not be worthwhile to begin dispersant planning by focusing on very big spills, for two reasons. For one thing, there is not a history of very big spills. On the other hand, you do have a response gap for small spills, so it's sensible to begin by planning for these spills. To do this, put a regime in-place that deals with 24 to 36 hour response to small spills. Once that is in place discussions can begin about how to deal with larger spills. Recognize that larger spills are very infrequent and they do not warrant spending huge amounts of money to put facilities in-place to deal with them and that if necessary resources can bought in to meet these needs

Another issue is cost. The dispersants listed at present are among the more expensive ones, but less expensive products are available. It's worthwhile considering other dispersants that may be effective but less costly.

If we accept that dispersants are worthwhile contemplating, then the approach is to get beyond the details, identify some key steps for implementing dispersants and carry those forward. Certainly the energy that went into the our earlier discussions and tabletop exercise suggests that people want to move in this direction, so the bottom line is to move forward with planning.

ROGER PERCY: I could not agree more. With respect to other dispersants, the EC lab does test other dispersants products as they are received. If they meet effectiveness and toxicity standards they are added to the list. [The Canadian list includes only Corexit 9500 and 9527 and a number of obsolete products.]

DAVID SALT: Dispersant technology and dispersant products have advanced considerably, so it may be worthwhile looking at the new products that available.

KAREN PURNELL: A number of good points have been made. I will pickup on one. That is to identify the areas where you will and will not use dispersants. There's clearly a lot of information

around that will aid you in doing this, so this will be a useful first step. If at the end of that exercise, you conclude that there are places, spill sources and scenarios where you would use dispersants, then you can begin to plan in detail.

ROGER PERCY: We did attempt to promote a project like that [to identify dispersant use/non-use areas and conditions], unfortunately our proposal was not funded.

Further, I agree that it is important to begin by looking at the information that we already have. It's useful to go out and collect a lot more information, but I don't believe that it is necessary to support the decision-making process.

PIERRE RYAN: I suggest that if we had reasonable seasonal estimates both seabird densities near the offshore installations, which is one of the spill sources that has been suggested for dispersant use, then that would be very useful. By this I mean both the area immediately adjacent to the platform, plus the areas reached by oil slicks during the spills.

URBAN WILLIAMS: The ESRF has funded work in this area [seabird census near platforms] in the past. Industry workers and others have done the work. We agree that there is more work of that kind that we could do.

CAPTAIN PHILIP McCARTER: As far as the shipping industry is concerned, the only way in which the dispersant issue will move forward is to work through the International Maritime Organization to establish rules regulations and conventions that international shipping will abide by. Conventions such as OPRC, MARPOL and others exist and there may be an opportunity to submit suggestions to the MEPC through the Canadian government, to look at the dispersants and dispersant plans, as a requirement for shipping. Until that is done, I do not believe that the international shipping community will move on this issue at all.

ROGER PERCY: In order for us to take the next step, it's important for us to know what you want [meaning industry] in terms a dispersant application. If you can give us an idea of what [plan] you want us to approve, then we can begin to work on the situation. That does not mean

that you are locked into that plan for the long-term, but our problem right now is that we [Environment Canada and REET] do not know what you want.

URBAN WILLIAMS: The offshore oil industry has made a commitment to itself to do just that. One problem that we see it is, how all do we involve the international shipping traffic that sails by our coast and appears to constitute the greatest risk of spills.

ROGER PERCY: That problem could be addressed, in part, by deciding where and under what conditions we would or would not use dispersants.

KAREN PURNELL: I believe, that the UK MCA or the UK Licensing Authority would be willing to discuss with you some of the issues that they faced and learn from their experiences in putting their dispersant policy in-place. I can certainly let you have requisite names and contact information.

ROGER PERCY: In closing, I would like to thank everyone for participating. This is a difficult issue, but clearly by a meeting like this we can come to appreciate each other's points of view. I believe that there is a way forward. Certainly as REET members, we can: a) look at our existing criteria for decision-making; b) modify the existing guidelines to be more specific; c) review and benefit from the planning efforts that have been conducted in other countries (e.g., the one that Sinclair Dewis cited earlier, pre-approval documents from Alaska and the east coast of the U.S.)

URBAN WILLIAMS: In closing, I would like to thank everyone who contributed to making this workshop possible. Thank you to everyone for attending and presenting their points of view frankly. Thank you to our visitors from overseas, you certainly brought a great deal to the table. I believe we have made a great start at looking forward to great progress over the next year.

APPENDIX B – SUMMARY OF DISPERSANT GUIDELINES IN ATLANTIC CANADA[4]

This paper summarizes the Canadian guidelines for using dispersants to cleanup or treat spills from offshore oil and gas (OOG) operations in Atlantic Canada. Three government agencies regulate dispersant use for these spills: Environment Canada has jurisdiction over dispersants in all marine waters, the CNSOPB for spills from OOG facilities in Nova Scotia waters and CNOPB for OOG facility spills in Newfoundland and Labrador waters. These three agencies cooperate and communicate with each other and other government agencies on dispersant issues through the Regional Environmental Emergency Team (REET)[5]. Three guidance documents (described below), developed over the past two decades, provide direction for both cooperation among agencies and decision-making in planning for dispersant use. This paper provides a brief summary and introduction to these guidelines.

Dispersants are oil spill response chemicals that are sprayed onto oil slicks to accelerate their dissipation through dispersion of the oil into the water column. In Newfoundland and Nova Scotia chemical dispersion may offer important environmental and operational advantages in responding to OOG spills, but their potential use is not without controversy. Environmentally, dispersants would achieve the important goals of reducing the risk posed by offshore spills to the abundant offshore marine wildlife and to important commercial fisheries. Operationally, dispersants will allow responders' to respond quickly to spills and broaden the range of sea state conditions under which they can deploy cleanup operations. However, dispersant use is controversial in the region for several reasons, including uncertainties about the length of time that spilled oil may remain amenable to dispersion and uncertainties about risks from dispersants to marine birds in the immediate vicinity of spraying operations. Members of REET must

[4] An overview of guidelines for the use of dispersants in Atlantic Canada prepared by K. Trudel for the Environmental Studies Research Fund Workshop on Dispersant Use in Canada, St. John's, Newfoundland, February 2004.

[5] In the early 1970s Environment Canada set up Regional Environmental Emergency Teams or REETs to facilitate communication among and provide advice to government agencies and responders regarding spill response. REETs include representatives of federal and provincial government agencies responsible for environmental protection and of private industry (Environment Canada, no date)

address these and other decision-making issues when considering dispersant use in offshore spills. The dispersant use guidelines described below provide guidance regarding the decision-making process and criteria on which decisions might be based.

Under the *Canada - Nova Scotia Offshore Petroleum Resources Accord Implementation Act*, the CNSOPB is the lead agency for regulating activities associated with offshore oil and gas development in Nova Scotia waters, including response to oil spills. The Act empowers the CNSOPB to prohibit the introduction of substances into the environment, or conversely to authorize the discharge of specific quantities of a substance and provides authority for the CNSOPB to take action necessary to cleanup a spill. Under normal circumstances, EC is a resource agency to the CNSOPB during these events. However, EC has its own mandated authority to respond to spills under the Fisheries Act, the Canadian Environmental Protection Act, and the Migratory Birds Convention Act. EC retains its responsibility to apply federal regulations when: a) CNSOPB regulations are insufficient to deal with the issue; b) are not being applied to the extent required to correct or mitigate the practice, or after consultation with the CNSOPB; or c) both agencies agree that the application of federal regulations is more appropriate. Cooperation between CNSOPB and EC in matters relating to dispersant use on OOG facility spills is described in Annex A to their Memorandum of Understanding (MOU) (Annex A to CNSOPB-EC MOU, 1999). Annex A defines joint mechanisms for delivering environmental mitigation for spills of oil or other hazardous materials. It also establishes a way for EC and CNSOPB to work together during spills and defines the central role of REET in delivering advice during environmental emergencies. Under the terms of ANNEX A, the CNSOPB and EC will work through REET, to jointly review requests from operators for approval to use dispersants, in consultation with REET partners. If REET approves the use of treating agents, EC may monitor their application and effectiveness. CNSOPB will arrange the logistics for the transportation of EC personnel.

A Memorandum of Understanding is in place for Newfoundland, addressing cooperation between the CNOPB and other agencies for spills from offshore operations in Newfoundland. The CNOPB/EC document also addresses the role of REET during emergencies, but is more

general than the CNSOPB/EC agreement and does not deal specifically with chemical dispersants (C-NOPB et al. 1988).

As pointed out above, REET was set up by EC to facilitate communication and coordination among and provide advice to government agencies and responders regarding spill response. The REET organizations include representatives of federal and provincial government agencies responsible for environmental protection and of private industry (Environment Canada, no date). In Atlantic Canada, REET plays a pivotal role in the process of reviewing requests for dispersant approval by seeking consensus on reasonable actions in dealing with spills and ensuring that net environmental benefit is achieved in managing spill response. REET must balance the sometimes-conflicting interests of stakeholders, as well as the apparently conflicting intents of legislation. On the one hand, REET is charged, under the Canadian Environmental Protection Act, to mitigate the environmental impact of spills, while on the other EC is charged under the Fisheries Act that "it shall not deposit" deleterious substances into the marine environment. EC has developed guidelines establishing that dispersants may be used with EC/REET permission under certain conditions where their use poses a clear net environmental benefit. These guidelines were originally established in the 1984 document, "Guidance on the Use and Acceptability of Oil Spill Dispersants (2nd Edition)" attached.

The 1984 document is the basis for dispersant planning in Canada, providing guidance on dispersant acceptability and use as follows.

1. Guidance on dispersant use includes: decision-making authority; decision-making considerations and a decision-tree, descriptions of the roles of the various government agencies.
2. Guidelines on acceptability of specific dispersant products, includes:
    a. An effectiveness testing protocol, based on the Mackay-Nadeau-Steelman Test (MNS Test);
    b. A toxicity testing protocol, based on a standard Environment Canada testing protocol that used rainbow trout.
    c. Standards for dispersant performance in the two tests.

Environment Canada has revised the testing procedures over the years, as needed. Testing for effectiveness is now performed using the Swirling Flask Test, developed by EC and described in ASTM (2003). Testing for toxicity is now performed using the Environment Canada standard test using early life stages of salmonid species (Environment Canada 1992).

When written in 1984, the EC guidelines represented the state-of-the-art in dispersant planning and they undoubtedly aided other nations in dispersant planning in the 1980s and 1990s. However, the intervening two decades have witnessed considerable spill experience, dispersant research and planning activities that have greatly advanced dispersant planning standards. Environment Canada has moved to keep pace with these advancements by placing dispersants on the agenda for discussion at the 2002 Atlantic REET meeting; preparing revised guidelines for dispersant use decisions in Quebec Region (Table d Expertise (Quebec) 2002); and initiating a complete revision of the EC 1984 guidelines. Industry has supported EC in the latter endeavour by convening an Environmental Studies Research Fund (ESRF)-sponsored workshop to consider the need to revise dispersant use policies and decision-making practices in Canada.

In summary, this paper summarized the Canadian guidelines for using dispersants on spills from offshore oil and gas (OOG) operations in Atlantic Canada. Three government agencies, Environment Canada, the CNSOPB and CNOPB regulate dispersants in these spills, communicating with each other and other government agencies through REET. Guidance for these agencies is provided by three documents that describe processes for cooperating with each other and making decisions on dispersant-related issues.

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APPENDIX C – REVIEW OF MARINE OIL SPILLS IN EASTERN CANADA[6]

Introduction

This is a brief summary of marine petroleum spills in eastern Canada in recent years. The objective is to report the numbers, sources, sizes, locations and types of oil spilled. This information will provide insight into the potential usefulness of dispersants in ameliorating the potential impacts of spills in Atlantic Canada.

This review addresses all spills of any petroleum material into marine waters in eastern sub-arctic Canada from 1999 to 2003. The information was drawn from three databases, Environment Canada's National Environmental Emergency System (NEES) database and environmental spill databases of the Canada-Newfoundland Offshore petroleum Board and Canada-Nova Scotia Offshore Petroleum Board. The NEES database, initiated in 1999, is intended to contain information concerning all accidental discharges of pollutants in Canada. However, although every effort has been made by operators of NEES to maintain accurate records of all spills, information concerning spills from offshore exploration and production operations may be incomplete (Richards, pers. comm.). For this reason data from the environmental spill databases of the Canada-Newfoundland Offshore petroleum Board, Canada-Nova Scotia Offshore Petroleum Board have been used to supplement NEES. The NEES database contains data on all spills of all types of pollutants, but only spills of petroleum pollutants into the marine environment are of interest here. Recognize that the three databases

[6] Working paper prepared as part of the project to present Workshop on the Use of Oil Spill Dispersants on Spills in Eastern Canada, sponsored by the Environmental Studies Research Funds.

vary in terms of the time span covered and level of detail provided on spills. Brief descriptions of all of three databases are provided in Table 1.

Table 1 Brief Description of Databases Used in this Work

Database	Description	Time Period	Source
Canada-Newfoundland Offshore Petroleum Board	Digital listing of all spills from 1997 to 2003, providing spill volume, generic oil type and source (exploration, production)	January 1997 to December 2003	Burley, pers. comm., 2004
Environmental Spills: Canada-Nova Scotia Offshore Petroleum Board	Digital listing of all spills from offshore drilling and production platforms providing: date, description of material spilled, volume, source and cause.	December 1994 to October 2003	Canada-Nova Scotia Offshore Petroleum Board Summary of Environmental Spills Database
National Environmental Emergency Database	Digital listing of pollutants in all environments in Canada. Contains information concerning province, date, receiving environment (freshwater vs. salt water), location, spill source, contaminant type, quantity spilled, cause and action taken.	January 1999 to December 2003(a)	Environment Canada, Response Ottawa

a. Records for 1999 were incomplete and have not been included in this work

In the following, an overview of Eastern Canada spills, including spills from offshore petroleum installations, is developed based on NEES. Information concerning spills from offshore exploration and production is then refined using CNOPB and CNSOPB databases.

Spills From All Sources

Information concerning spills from all sources is contained in the National Environmental Emergency System (NEES) database. This database covers the period from January 2, 1999 to December 16, 2003 and includes information concerning 1529 spills of petroleum products into both fresh and saltwater. Only spills into saltwater are of interest here. Data for the first year of data gathering, 1999, are incomplete and were not included in this analysis. Table 2 shows that temporal and spatial distribution of the 1339 spills from 2000 to 2003. Data suggest that in recent years approximately 280 to 380 marine petroleum spills are reported annually in eastern Canada and this number increases yearly.

Table 2 Marine Petroleum Spills by Province and Year (a)

Province	2003	2002	2001	2000
Nova Scotia	197	152	135	153
Newfoundland	123	139	161	97
New Brunswick	46	34	32	23
Prince Edward Island	14	10	13	8
Total Yearly Spills	380	335	341	281

a. Based on all spills into salt water from NEES database

Sources of 732 incidents or 55.3% of the 1339 spills are reported in NEES (Table 3). The majority of spills of known origin, 533, are from offshore sources (e.g., ships, offshore oil exploration), 192 are from land and 7 from aircraft. The 533 offshore spills represent 40.3% of the spills of known origin and include discharges from production platforms (76)[7], tankships (36), bulk carriers (27) and barges (9). However, the vast majority of these offshore spills (385)

[7] Environment Canada acknowledges that offshore platforms spills are under-represented in the database. CNOPB and CNSOPB databases report over 200 spills from offshore exploration and production activities over this period.

are spills of fuels from "other water craft", which include vessels engaged in fishing, transportation, petroleum development, the service industry and government service.

Table 3 Marine Spills by Source (a)

Spill Source	**Number of Spills**	**Percent**
Total Spills from Aircraft	**7**	**0.5**
Vessel Spills		
Other Water Craft (b)	385	
Offshore Production (c)	76	
Tanker	36	
Bulk Carrier	27	
Barge	9	
Total Spills from Vessels	**533**	**40.3**
Land Source Spills		
Marine Terminal	40	
Other Motor Vehicle	34	
Refinery	26	
Sewer	22	
Tank Truck	18	
Other Storage Facility	18	
Other Industrial Plant	14	
Pipeline	7	
Electrical Equipment	5	
Transport Truck	4	
Service Station	3	
Train	1	
Total Spills from Land Sources	**192**	**14.5**
Total Unknown or Unspecified	**592**	**44.7**
TOTAL ALL SOURCES	**1339**	

a. From NEES database
b. Made up largely of spills from ships from fishing, transportation, petroleum, service industry and government sectors
c. According to manager of this NEES database, information concerning spills from offshore oil exploration and production is incomplete

Of the 192 spills from land, 94 or approximately 49% involved spills from coastal petroleum industry operations including marine terminals, refineries and storage facilities. Most of these spills involve small quantities of refined products rather than crude oil.

Table 4 shows that the general type of oil spilled is identified in 762 of the 1339 spills. In the remainder, oil type is reported in generic terms (e.g., light oil, heavy oil, hydrocarbon) that are not useful in the present discussion of dispersants. Approximately 119 spills or 15.6% of all spills involved gasoline; bunker or oil-contaminated bilge water that are clearly not candidates for dispersion. Almost half of all spills, 341 (44.8%) involved diesel fuel. Presumably, this category includes both No. 2 fuel oil and the more viscous types of marine diesel or intermediate fuel oils (IFOs) used in large marine diesel engines, but the breakdown into specific fuel oil grades is not provided. No. 2 fuel oil and the less viscous grades of IFOs (e.g., IFO180) are dispersible with modern dispersants. Dispersibility of the more viscous grades is controlled by oil viscosity, dispersant product, sea state and dispersant application rate. An additional 30% of the total is made up of four categories of oil (hydraulic oil, mineral oils, waste oil, heating oil). These will have some persistence, but may be dispersible. Some 25 spills or 3.3% of spills involved crude oil. Most of these are likely to be dispersible when fresh, but true operational dispersibility will vary depending on the specific type of crude oil involved and the circumstances of the spill.

In short, approximately 85% of the spills involve persistent oils that will require cleanup depending on the circumstance. Many of these, including No. 2 fuel oil, marine diesel fuel, and most crude oils will be dispersible when freshly spilled. Approximately 15% of spills are clearly not candidates for dispersion.

Spill sizes were reported in 513 of the 1339 marine spills (Table 5). Over 90% of all cases involve spills of less than one m^3. A single spill was reported in the database in the 1000 to 9999 m^3 -category, however the incident involved a potential spill of 1500 m^3, but only 25 litres of oil was actually spilled. A total of 44 marine spills larger than one m^3 occurred in Eastern Canada from 2000 to 2003, for an average of 11.2 per year. These included 33 (6.4%) spills in the range of 1.0 to 9.9-m^3, 7 (1.4%) in the range10 to 99.9-m^3 and 4 (0.8%) in the range100 to 999.9-m^3. The vast majority of spills larger than 1m^3 involved spillages of diesel, though bunker, heating oil, jet fuel and crude oil were spilled as well. The database does not distinguish between less persistent grades of diesel (e.g., No. 2 fuel) and the more persistent, though dispersible forms of

marine diesel fuel that would be good candidates for dispersion. These larger spills are from other watercraft, marine tankers, marine terminals and bulk carriers operating in the fishing, transportation, petroleum and government sectors.

Table 4 Marine Spills by Type of Oil Spilled

Oil Type	Number of Spills	Percent of Oils Identified to Type	Cumulative Percent
Oils Identified to Type			
Diesel	341	44.8	44.8
Hydraulic oil	115	15.1	59.8
Mineral oils	58	7.6	67.5
Gasoline	41	5.4	72.8
Bilge water contaminated with oil	39	5.1	78.0
Bunker	39	5.1	83.1
Waste oil	28	3.7	86.7
Crude oil	25	3.3	90.0
Heating oil	25	3.3	93.3
Kerosene	11	1.4	94.8
Jet fuel	9	1.2	95.9
Mineral grease	5	0.7	96.6
Condensate	5	0.7	97.2
Transformer oil	4	0.5	97.8
Gas oil	4	0.5	98.3
Creosote	4	0.5	98.8
Sludge (petroleum)	3	0.4	99.2
Transmission oil	2	0.3	99.5
Asphalt	1	0.2	99.7
Tar	1	0.1	99.9
Lube oil	1	0.1	100.0
Total Oils Identified to Type	**886**		
Total Oils Not Identified	**453**		
TOTAL SPILLS	**1339**		

Table 5 Spill Volume: Offshore Spills by Spill Size Class (a)

Spill Volume in m^3	Numbers	Percent	Cumulative %
1000 or larger	0	0	0
100 to 999.9	4	0.8	0.8
10.0 to 99.9	7	1.4	2.2
1.0 to 9.9	33	6.4	8.6
0.1 to 0.99	98	19.1	27.7
0.01 to 0.099	157	30.6	58.3
0.001 to 0.0099	158	30.8	89.1
<0.001	56	10.9	100
Total spills	513	99.7	

a. NEES database (1999-2003)

The one spill in the 1000 m^3 or larger category actually involved an incident in Labrador with a potential for spilling 1500 tonnes, but actually spilled 25 litres.

Spills from Offshore Exploration and Production

The CNSOPB and CNOPB databases (OPB) span the period from 1994 to the end of 2003. Collectively they contain accounts of 353 spills, involving a total of 116.111 m^3 of pollutants spilled (Table 6). Spill frequencies have varied somewhat over this period, but have stabilized over the past four years, at a frequencies ranging from 36 to 50 spills per year with a total of 6.5 to 53.7 cubic metres of oil spilled per year

Both CNSOPB and C-NOPB databases contain information concerning the types of hydrocarbons spilled. The C-NOPB data is classified more simply and only these data are presented here. The most commonly spilled types of oil are listed in decreasing order of spill frequency in Table 7. Crude oil is by far the most commonly material spilled. The C-NOPB crude oils are persistent and dispersible when fresh. These spills have traditionally been small, less than $1M^3$. Diesel and hydraulic fluid are also commonly spilled in small quantities. Their persistence and environment impact potential debatable and hence the value of using dispersants on them are also debatable. The largest spills are of synthetic-based drilling mud, which are probably not good candidates for dispersion.

Spill volumes are reported in 308 of the spills in the CNSOPB and C-NOPB databases (Table 8). The vast majority of spills (approximately 94%) are smaller than one M^3. Most of the larger

spills and almost all of the spills over one M^3 involve synthetic-based drilling mud. The largest spill of a product other than SBM was of diesel (2.1 M^3).

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Table 6 Summary of Spill From Offshore Exploration and Production Operations in Eastern Canada

		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Total
NOVA SCOTIA												
Drill Muds and Fluids	Number	0	0	1	0	8	11	7	4	4	11	46
	Volume	0.000	0.000	0.002	0.000	1.231	1.159	0.157	0.062	0.257	1.878	4.766
Other Hydrocarbons	Number	3	3	12	2	14	25	35	16	16	15	141
	Volume	3.436	0.020	0.302	0.100	6.228	3.743	1.450	3.337	0.158	20.450	39.225
	Largest HC Spill	1.800	0.020	0.080	0.100	6.000	1.700	0.350	3.000	0.060	20.000	
Nova Scotia Total	Number	3	3	13	2	22	36	42	20	20	26	187
	Volume	3.436	0.040	0.304	0.100	7.459	4.902	1.607	3.399	0.415	22.328	43.991
NEWFOUNDLAND												
Drill Muds and Fluids	Number	No activity	No activity	No activity	0	2	9	5	2	2	5	25
	Volume				0.000	2.008	7.372	4.700	5.600	12.250	31.027	62.957
Other Hydrocarbons	Number	No activity	No activity	No activity	11	27	40	5	14	25	19	141
	Volume				1.731	3.789	2.866	0.223	0.132	0.033	0.390	9.163
	Largest HC Spill	na	na	na	1.000	2.080	0.640	0.160	0.100	0.010	0.200	
Newfoundland Total	Number	No activity	No activity	No activity	11	29	49	10	16	27	24	166
	Volume				1.731	5.797	10.238	4.923	5.732	12.283	31.417	72.120
TOTAL EAST COAST												
Drill Muds and Fluids	Number	0	0	1	0	10	20	12	6	6	16	71
	Volume	0.000	0.000	0.002	0.000	3.239	8.531	4.857	5.662	12.507	32.905	67.723
Other Hydrocarbons	Number	3	3	12	13	41	65	40	30	41	34	282
	Volume	3.436	0.020	0.302	1.831	10.017	6.609	1.673	3.469	0.191	20.840	48.388
East Coast Total	Number	3	3	13	13	51	85	52	36	47	50	353
	Volume	3.436	0.020	0.304	1.831	13.256	15.140	6.530	9.131	12.698	53.745	116.111

a. Based on data from CNOPB and CNSOPB

Table 7 Spills from Offshore Exploration and Production by Oil Type
(C-NOPB data only)

	Exploration				Production			
Pollutant Type	**No.**	**Total Volume M^3**	**Average Volume M^3**	**Largest Spill M^3**	**No.**	**Total Volume M^3**	**Average Volume M^3**	**Largest Spill M^3**
Crude oil	13	1.130	0.087	0.5	35	1.472	0.042	1.000
Diesel	11	4.209	0.387	2.1	16	0.618	0.39	0.200
Hydraulic oil	5	0.97	0.19	0.40	18	1.201	0.67	0.640
Unidentified	1	0.001	0.001	0.001	17	0.042	0.002	0.20
Mixed oil	2	0.070	0.035	0.04	12	0.123	0.01	0.040
SBM	1	4.4	4.4	4.4	12	54.740	4.526	23.70
SBM Base fluid	0	0	0	0	12	3.817	0.318	2.000
Lube oil	1	0.001	0.001	0.001	6	0.154	0.026	0.151
Condensate	0	0	0	0	4	0.042	0.011	0.030

Table 8 Platform Spills: Spill Volume vs. Frequency of Occurrence
Combined C-NOPB and CNSOPB Areas

Spill Volume in m^3	**Numbers**	**Percent**	**Cumulative %**
10.0 or more (a)	3	1.0	1.0
1.0 to 9.9	15	4.9	5.9
0.1 to 0.99	47	15.3	21.1
0.01 to 0.099	72	23.4	44.5
0.001 to 0.0099	104	33.8	78.2
<0.001	67	21	100
Total	308		

b. Spills in the "10.0 and over" category include spill of and synthetic-based drilling mud.
Oil-contaminated water not a true oil spill