Paper 15: THE CASE FOR MORE EFFECTIVE SCIENTIFIC SUPPORT IN OIL SPILL RESPONSE

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Introduction

This workshop provides a timely and unusual forum to explore the role of Scientific Support Co-ordinator (SSC), particularly in terms of how that role is implemented at the National and State/regional levels. From the information supplied by the designated SSCs in each State and region (see Workshop Preprints), it would appear that the role of SSC is now recognised as an important element of overall response organisation. Such a conclusion is, however, simplistic. The role of SSC in most States is poorly defined, lacks adequate dedicated resources and has historically been left to those relatively few individuals with the expertise and energy to effectively provide scientific advice. While this situation is improving, as evidenced by the recent activities described in the State Position papers, there appears to be general agreement amongst agencies involved with providing scientific support that more can and should be done to improve the effective provision of such support.

As the objectives for this workshop suggest, there also appears to be general agreement on the need for those involved in other areas of spill response, particularly the "'mainstream areas" of logistical organisation, for these areas to articulate their scientific support needs.

This paper does not seek to provide a comprehensive overview of the role of an SSC. Adequate overviews, already exist in the papers of Healy (1983 and 1987) and in various papers on scientific aspects of oil spills (see, for example, Craik, 1985; SPILLCON, 1985 and 1987; IMO/UNEP, 1982). Rather, this paper seeks to identify some areas of apparent need in relation to clarification or further development of the role of SSC and to outline possible options for meeting these needs. The paper is thus intended to stimulate discussion during the workshop on the nature of problems with SSC role definition and options for improvement of role effectiveness. In the latter case options'are proposed with due recognition of the extremely limited resources available for role implementation and the need to balance the practical requirements for spill response with (often conflicting) scientific requirements for information collection and hypothesis testing.

Current Problems With SSC Role

In assessing whether the role of SSC has been effectively implemented in Australia, questions of relativity quickly emerge - there are no defined Australian "prescriptions" for the role, nor are there suitable global "models" which can be readily adapted to the requirements of Australian spill response. During preparation for this workshop, various SSCs were contacted and asked how effective they believed their activities have been (in developing and implementing the agreed role in a particular State/regional plan context). The responses were extremely mixed, and usually qualified to the extent that comparison between States is seemingly impossible. Each SSC operates within the broad context of the National Plan, however, the "on ground" implementation of this role is then subject to the shaping influences and constraints of policy and resources peculiar to each State/regional response organisation. Thus, the establishment of "benchmarks" for comparison between States or a framework for problem identification is a difficult task.

Despite these limitations, the informal survey did reveal that most SSCs believe that the role has not been as effectively implemented as is possible or desirable under the provisions of the National Plan. The reasons for this include (but are not limited to):

a. the devolvement of priorities for response planning - much of the emphasis in spill response planning to date has been in the necessary areas of logistics and operations, with lesser commitment to what are perceived as desirable (but lower priority) scientific inputs (e.g. sensitivity mapping, monitoring, etc.). The prioritization of response activities reflects IMO/ITOPF guidelines. the administrative framework for spill response, the nature of spill events (under which, for example, there is strong public pressure for a field as opposed to a laboratory-based response) and a myriad of other factors often related to the seeming inability of SSC to define a clear understanding of the importance and value of scientific input. The net result of these influences has been that the role of SSC is somewhat analagous to that of the twelfth man in a cricket team - part of the team on paper, called out to help in routine events and sometimes in a crisis, but not really a central player in the game!

b. the lack of awareness/acceptance of the capabilities of an SSC - while numerous SSCs have made significant contributions to the dcvclopmcnt of contingency plans, and have played key roles in a number of incidents, for various reasons, there remains a relatively low level of awareness of wider SSC abilities. This has led to a lower level of acccptance of the requirements for SSC input than may otherwise be desirable, particularly if comparison is made with the organisation of scientific advice to other "emergency events" such as whale strandings, road spill of hazardous materials and bushfire response. For example, the current National Plan includes only the following specific comments about scientific input to spill response:

.... 1.2 Scientific Support .... coordination of scientific and environmental advice

.... 2.2.9.4 The Commonwealth, through the DAIE has [rained scientific support personnel who

are on call to respond to a request for assistance from any State Committee. They have the use of... (OSSM)...

. . . . 3.2.4 Scientific support is available to- the on-scene coordinator through the State Oil Pollution Committee...,. State supplements.... OSSM . . . . REEFPLAN.... and Commonwealth expertise.... FSSSC advice on currents and communications.... Maritime Services Advisory Committee....

While selective quotation, without due acknowledgement of supporting policies and 'resources (particularly as described in supplements to the National Plan) is potentially unfair, the above excerpts stand in clear contrast to the more detailed and comprehensive material in the Plan relating to other aspects of response. As such, they thus reflect a lack of systematic provision for scientific input to response.

c. the lack of provision for SSC role development in response planning - this issue is interwoven with both (a) and (b) above. It is due to a number of factors, including:

* the lack of operational experience/field testing of SSC abilities and input,
* the sporadic nature of SSC activities - most SSCs assume the role as part of broader, more formally defined employment requirements. There also has been a relatively high "turnover" of SSCs within -State organisations responsible for the provision of scientific advice,
* the lack of resources for role implementation particularly directed towards development of a research base for the acquisition of knowledge relevant to the provision of scientific advice, and
* the limited involvement of SSCs in training activities (most of which are focussed at the operational level).

Against this background of problems, it is encouraging to note that most States are now actively seeking to improve the capability of SSCs to contribute to response. This workshop represents an important complementary initiative at the National level which should lead to better understanding of SSC needs and capabilities and, possibly, to. better integration of scientific input with other areas of response organisation.

Towards a More Effective SSC

Oil spill response organisation essentially comprises three sequential and cyclical phases - Pre-planning, Response and Follow-up. The role of an SSC in each has been discussed at length by Healy (1983 and 1987). It is also addressed to varying dcgrccs in the State and regional supplements to the National Plan. In all of these, and in the extensive IMO/ITOPF literature, there is strong support of the notion that scientific input is fundamental to an. adequate response. Oil spills are highly visible and often catastrophic events - they thus have a high profile amongst the general public, often reinforced by media interest. They are identified by most Australian environmental agencies with responsibility for coastal and offshore areas as a priority environmental threat. For example, at a workshop on contaminants in waters of the Great Barrier Reef (Dutton, 1984), oil spills were identified as the principal pollution threat, amongst a wide range of potential threats.

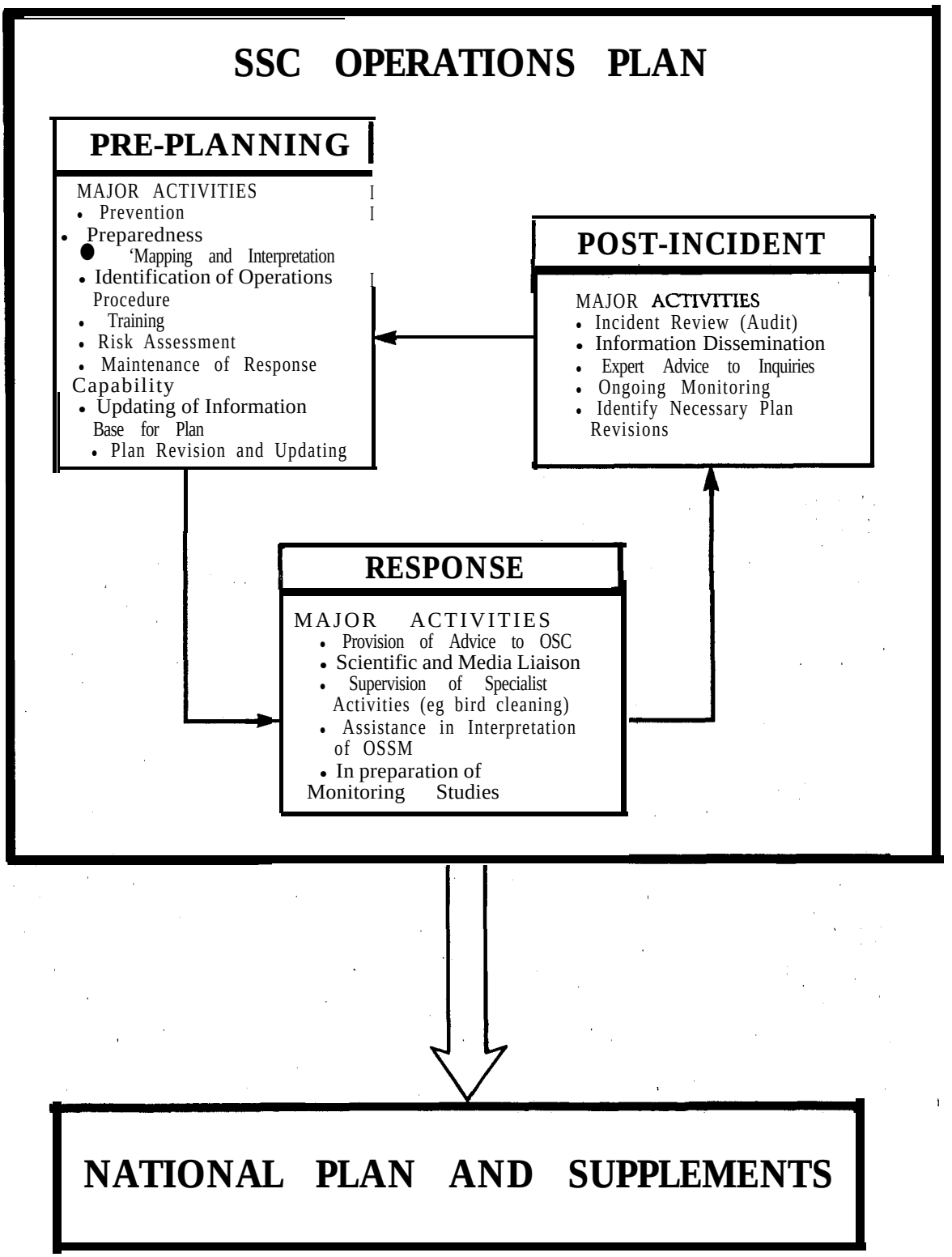
Given the perceived importance Of the threat and the statutory obligations on environmental management agencies, it is therefore surprising that more attention has not been paid to the capacity to input environmental information/considerations to spill response. The capacity for such input is closely linked with the adequacy of the three phase response system defined previously. While theoretically sound, as noted above, a range of factors preclude the effective implementation of the response system. For example, the theoretical feedback loop between Follow-up and Pre-planning is compromised by the return period between events and the pressures of other issues on the day to day activities of SSCs.

How can we therefore develop a model which more closely matches the day to day realities of SSC input? To resolve this question a multi-dimensional adaptive approach is recommended comprising of five principal elements.

1. An Integrative Planning Model

The Figure below outlines an expanded version of the current three phase response planning model - the difference between this and the prevailing approach is esscniially based on better linkage between the three phases, under the overall guidance of an SSC "Operations Plan". The latter is discussed in more detail below, but in model terms, provides the core guidelines for SSC involvement in each phase of the overall contingency plan.

Figure 1: An Integrative Model for SSC Involvenent in Rem-Planning



As the Figure indicates, implementalion of this model would require improved facilitation and coordination between plan elements by National Plan and State Plan Committees, as well as improved role definition by SSCs. To ensure that the model remains responsive to change, an emphasis on adaptive methods would also be required. This involves, for example, a commitment to use monitoring and evaluation methodologies to validate and improve scientific advice. These methodologies are most effective in the context of operational experience, but can also be related to information derived from training and simulation exercises.

2. Information 'Catch up'

Reference material for Australian SSCs is limited. This reflects both the lack of Australian research in areas such as the environmental effects of spills and the lack of critical assessment of international literature in the Australian context. Thus, in comparison with the empirical basis for scientific advice available to scientific response teams in other countries, Australian SSCs suffer a relative paucity of information necessary for input to decision-making.

To fully redress this situation would require an ongoing research commitment which, in view of current priorities and constraints, may not be feasible. Until such research is undertaken, two priority actions are recommend&

a. the compilation of a national bibliographic database on scientific information relevant to oil spills; and

b. the compilation and dissemination of incident and response assessment reports. Ideally, such reports would focus on aspects of the role of SSC and include an assessment of the effectiveness of various scientific inputs to the response (e.g. what additional field measurements would have made predictive advice more realistic/usable?).

Both measures would require relatively little effort on the part of National Plan agencies.

3. SSC Operations Plan

As indicated in the figure, the vertical and horizontal integration of SSC input with other aspects of the overall response organisation, could bc enhanced if SSCs have a clear understanding of their role and requirements. Such an understanding could bc dcvclopcd in the production of a handbook (operations plan) which outlines activities and procedures specific to the role of SSC in all phases of response organisation, including:

* commonly referenced sources of information (guidelines on oil types, dispersant characteristics, a listing of experts for specific advice, etc.);

* sensitivity maps and procedures for operations in specific areas (similar to those produced by the NSW SPCC); and

* periodically updated material (e.g. tide timetables, policy decisions relevant to environmental protection, etc.).

The production of such a handbook would be a relatively inexpensive undertaking by each SSC and would greatly enhance SSC role effectivness, particularly in rapid response situations, or where there are problems of SSC staff continuity. It may also be possible to "package" parts of the handbook for use by OSCs and others involved in response organisation.

4. National Atlas of Coastal and Offshore Environments

While maps of most parts of the Australian coast arc readily available, and sensitivity assessments have been prepared for most areas at risk from an oil spill, the quality and utility of this information in 'real time response' is highly variable. Perhaps the most advanced sensitivity assessments currently available are those produced by the NSW SPCC.

In common with most other States, the SPCC maps provide fundamental information on the location and nature of particular environments. In addition, they provide policy and practical guidance on response options under a range of conditions in particular areas. Such information makes the reports usable by OSCs without the specific need for SSC consultation in the first instance - a critical factor in emergency situations and/or where ready communication between SSC and OSC is not possible. A micro-computer based system extension of the SPCC approach is currently under development at the Great Barrier Reef Marine Park Authority (W. Craik, pers. comm.). Computer systems provide the additional advantages of being readily updated and extcndable to new sources of data, although they suffer the potential disadvantage of not being as "field usable".

The variable quality and patchiness of Australian sensitivity maps is of concern, as these effectively limit the quality of scientific advice which can be provided (given that such advice is often critical early in the response organisation when expert local knowledge may not be available to substitute for sensitivity maps).

To redress current deficiencies requires filling of current information gaps and, desirably, upgrading of existing map systems to include guidelines for map interpretation. To meet these needs is likely to remain beyond the resources of individual SSCs in the near term, and yet is of such priority that an acceleration of effort is critical to effective establishment of SSC capability in all parts of Australia. For this reason, there is a strong case for deployment of National Plan funds to this activity and/or additional funding from external agencies. If undertaken on a national basis, it is likely that such a

mapping effort would achieve considerable 'economics of scale' and would lead to 'spin-off benefits' to a wide range of applications (e.g. fishcries management, tourism planning, management of recreational use of near shore waters, conservation area definition, etc.)

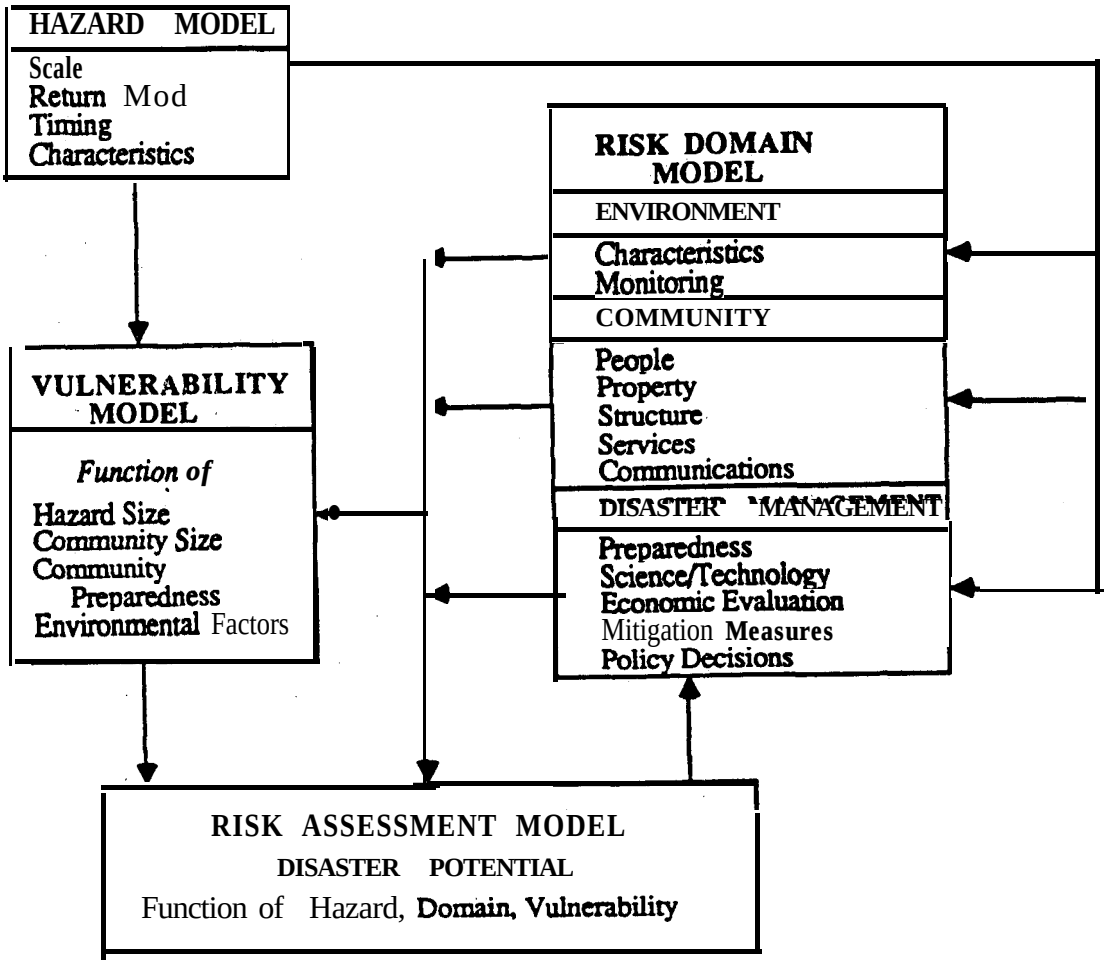
This workshop should provide an important forum for the discussion of mapping formats, funding and scheduling of mapping activities.

5. Risk Assessment

Despite the best efforts of contingency planners, the only certainty in such activities is that the problem/decision making environment(s) relevant to those plans will continue to change. Thus in order to improve our capacity to make judgements and provide advice in emergency situations requires an SSC to develop systems for coping with uncertainty. The application and incorporation of such systems requires the decision maker to make explicit the notion that uncertainty will continue to exist, and thus SSCs should be sceptical of any plan which claims to be able to deal with all emergencies.

Possible systems for dealing with uncertainty are still under development. However, lessons may be drawn from research in areas such as risk assessment and adaptive environmental assessment and management. The figure below sets out an approach to risk assessment which, if implemented by SSCs may lead to further refinement of other aspects of State and regional supplements to the National Plan. A number of fundamental inputs to risk assessment by SSCs already exist (e.g. BIE, 1974, James et al, 1985, Aldwinckle and Pomeroy, 1983; and the various local contingency plans for ports and other areas of identified "higher risk"). The risk assessment system set out in Figure 2 provides the SSC with a useful checklist of factors to be considered in preparation of the SSC Operations Plan discussed above.

Figure 2: Risk Assessment System



Source: Stark, James and Dight (1987)

The incorporation of environmental assessment and management techniques requires the adoption of carefully identified monitoring and review activities in the overall contingency planning process. The use of these is discussed further in the scsssion on monitoring later in the workshop.

Prognosis

The suggestions made above are relalively minor, but important incremental steps in improving the effectiveness of scientific input to oil spill response. Their adoption in the current schedule of activities of most SSCs would not require significant additional resources from State agencies. They may also lead to a more effective National response system, by allowing for the interchange of ideas and experience between States/regions.

It is hoped that the workshop will provide opportunities to discuss these and other proposals - through our further deliberations, we may just bc able to elevate the role of SSC from twelfth man to at least that of an out of form batsman, someone who the press suggests is often harder to get out of a team than to get into one!

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