ANNEX 12

PROCEDURES TO INTEGRATE AND ACTIVATE NMSS/RSMCS IN CASE OF CHEMICAL INCIDENTS OR FOREST FIRES

SUMMARY

The following is an attempt to delineate, or highlight, some of the general and specific procedures, and associated information flows, relevant to the transboundary transportation of smoke and haze (resulting from forest fires) and other air-borne pollutants (resulting from major chemical incidents).

INTRODUCTION

The recent forest fires in South East Asia, during the latter part of 1997 and early 1998, and the associated haze and smoke problems affecting several countries in the region (WMO 1998) has highlighted the important role that NMSs and specialised WMO centres can play in the management of such events. These events, probably because of their relatively ad-hoc nature, tend to cause a certain degree of confusion at their onset resulting in unacceptable delays for a meaningful response from the various agencies. Thus, such events also emphasise the need for improvement in the management.

Part of this management improvement can be gained through ongoing development, and formalisation, of procedures to integrate and coordinate the abilities and facilities of NMSs, specialised centres within the area of interest (eg ASMC) and the various RSMCs with Environmental Emergency Response (EER) specialisation. In view of the potential risk from chemical incidents, it would be advantageous if the procedures were also applicable to chemical episodes involving the transboundary, or long range, transport of air-borne anthropogenic pollutants.

General and acceptable procedures should form the basis for a broad operational coordination framework for alerting and activating, in a rapid and effective manner, neighbouring NMSs and specialised centres, if necessary, whether for intraboundary or transboundary episodes. Also internal procedures may have to be set up, within NMSs and specialised centres, for the alerting, or notification, of observed incidents as they arise, and also for the timely updating, generation and dissemination of the various observational and forecast guidance products.

It is important during ongoing development of procedures to be aware of some of the (WMO) programmes which may have an impact on the characteristics of procedures being formulated. Two such programmes are PARTS and RHAP WMO 1998).

The following attempts to define the main information flows between the various agencies and some of the associated general and specific procedures for providing a rapid and effective response.

OVERALL PERSPECTIVE

When an environmental incident (caused by, for example, forest fires or some chemical explosion) occurs, it usually initiates an alert of some description which, in turn, eventually prompts a response from relevant agencies, or authorities, within the country (or countries) affected. In the case of a meteorological response, from either the NMSs or the WMO specialised centres, the generation of numerous products and their dissemination may be the primary action (Figure A1). In some cases, the provision of meteorological briefings (either specialised or general) to various agencies may form part of the response - even though, in the case of local agencies, this may be more appropriately carried out by regional offices. Depending on the nature, or longevity, of the incident, the response could be expected to be ongoing.

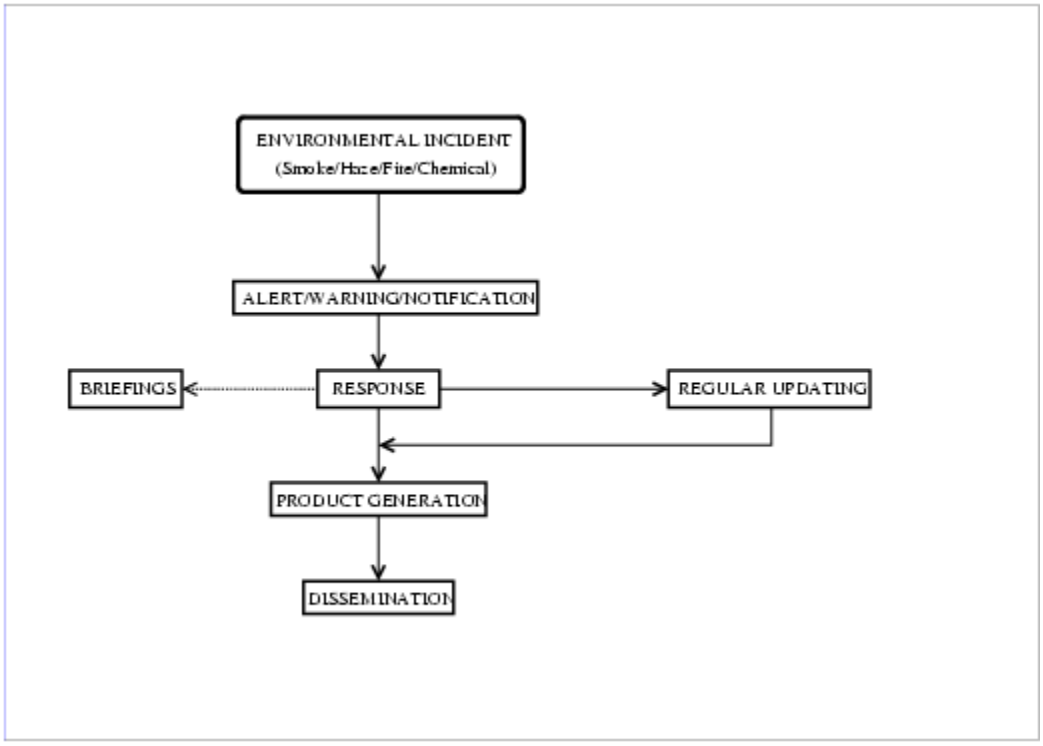

Figure A1. Basic functionality required by procedures in the management of environmental incidents.

ENVIRONMENTAL INCIDENT ALERT

The initial alert for an environmental incident may arise from a number of different origins (Figure A2) - which may include Aword-of-mouth@ (eg media or various authorities) or more direct and objective observational (eg from in-situ monitoring or satellite remote sensing - from, say, AVHRR, geostationary or TOMS data) origins. Notification of an emergency may also come initially from other NMSs or WMO specialised centres. In the case of a real emergency, there may be an inundation of alerts which can quickly confuse the situation. In such cases, mechanisms for prioritising the alerts need to be put in place. Initially, for eg, alert messages containing specific details about the source of the incident may be of more value than those describing the effects of the incident.

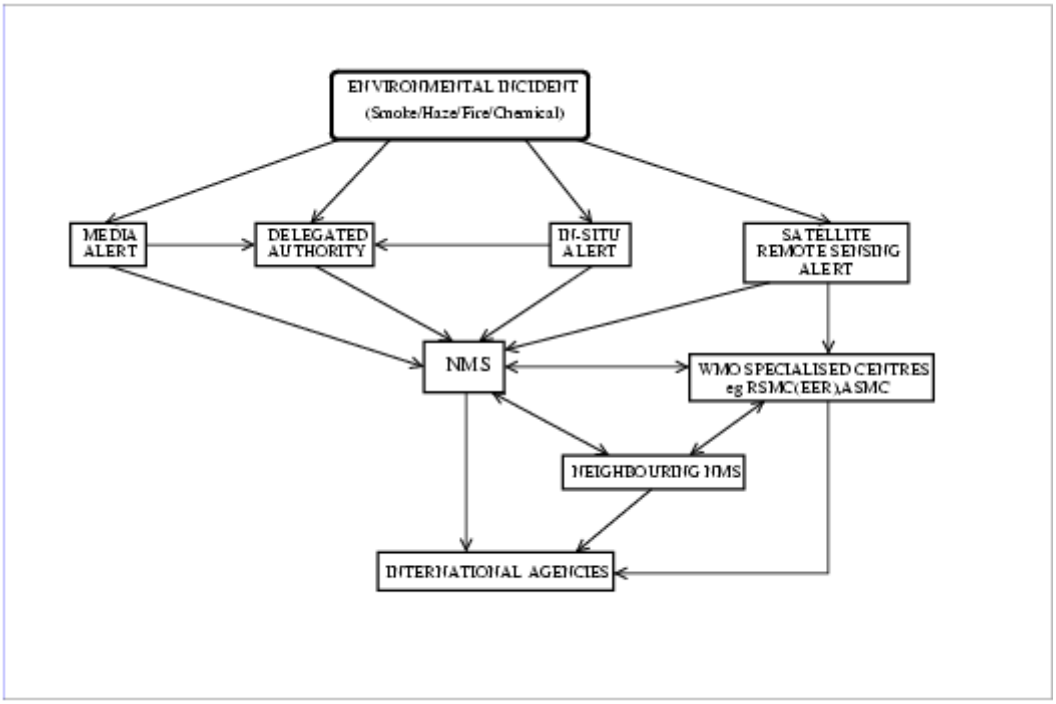

Figure A2. Schematic view of general alerting pathways.

GENERAL RESPONSE PROCEDURE

Initially on receiving an alert message, or a request for action, the NMSs or WMO specialised centres should send (if appropriate) an acknowledgment of receipt to the originating body. At this stage, it is perhaps worth highlighting the need for a 24-hour a day operational real-time capacity, in the NMSs or WMO specialised centres, in order to handle the emergency incidents in a quick and effective manner. This may involve introducing new duties and functions for the existing operational shift staff. After sending an acknowledgment, further notification should then be sent out to other centres and agencies indicating that there has been a request for action. The NMSs, or WMO specialised centres, then need to set about the preparation of the various guidance products and their consequent dissemination. Once the initial set of products has been distributed, it is then perhaps necessary that any further development of the episode be continually monitored and that updated products be continually prepared and disseminated (Figure A3). Finally, when the episode has finished, it is also important that some notification be sent out stating the same to save an unnecessary waste of resources.

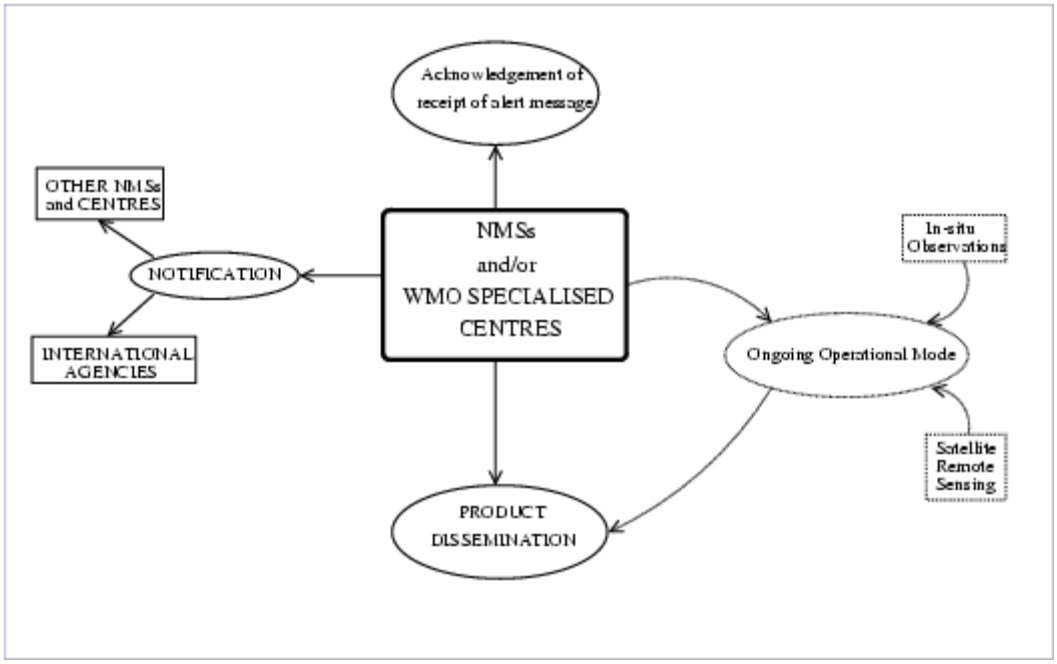

Figure A3. Response by NMSs, and centres, on receiving alert message.

PRODUCT GENERATION

When an alert message is received by the NMSs, or WMO specialised centres, a number of procedures should spring into place to generate the necessary products. Information about the location and type of incident is critical for the generation of meaningful products. The types of products can perhaps be categorised into those of a more general meteorological type and those associate with the output from an Atmospheric Transport Model (Figure A4). The former may include real-time processed satellite imagery and data (depicting, for eg, hot spots and plume extent), displays of in-situ measurements, various monitoring products (eg AQIs and PMs) and analysed and forecast wind and precipitation fields centred on the source location(s). In addition, more specific forecast products, using known details about the source together with input from the latest operational, real-time NWP model run, can be generated using the ATM. Products from the ATM include forecast trajectories and dispersion plots. The increased use of satellite remote sensed data, for both diagnostic purposes and also for eventual direct assimilation into the ATM - thus effectively enhancing the modelling of LRTAP, are important features of the RHAP and PARTS (WMO 1998).

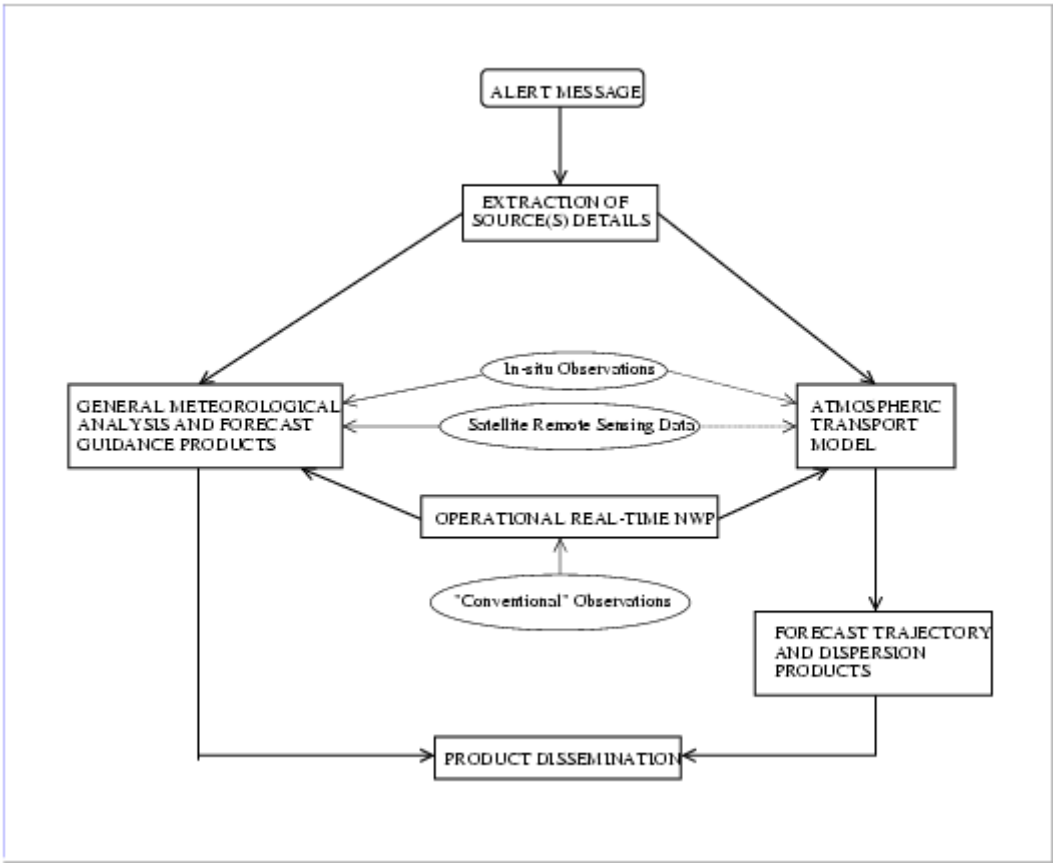

Figure A4. Product generation within NMSs and/or WMO specialised centres.

PRODUCT DISSEMINATION PROCEDURES

A number of different procedures can be used to disseminate, or make available, generated products to other NMSs, agencies or WMO specialised centres. These include using fax, the GTS, telex, phone or mail (Figure A5). The availability of direct PostScript to fax facilities and the attachment of >gif= files to mail messages are noted as newer ways of disseminating products. Each mechanism has advantages whether it be the reliability or robustness of the communication channels or the types of products that can be sent. In addition, the products can be made available through the web. This may imply that individual centres maintain their own web page or that common shared web pages, with other centres, are used. In view of the probable restricted access for many of the products, it is advisable that password protection (implying that users are registered) be put in place.

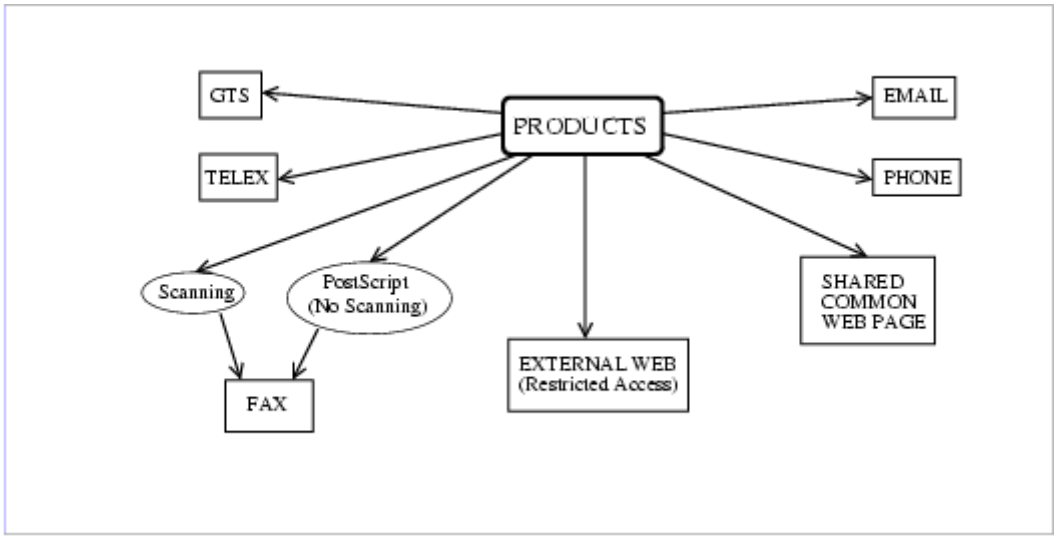

Figure A5. Product dissemination mechanisms.

PRODUCT DESTINATIONS

Associated with each of the dissemination mechanisms, mentioned above, are the intended destinations for the various products (Figure A6). These may include neighbouring NMSs, WMO specialised centres and various national and international agencies. These destinations will be incorporated into the dissemination mechanisms in different ways. When using faxes, telex or phones, the respective numbers of the various destinations will be required. For the web products, restricted user access (with password protection) will be required for the various

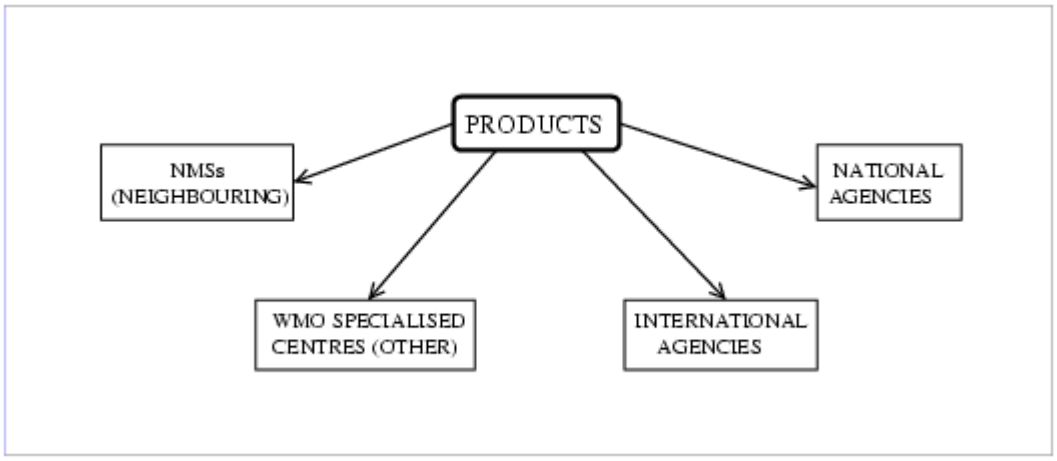

Figure A6. Product destinations**.**

"destinations". Email will require an operationally valid address for each of the destinations. The need for back-up procedures is also emphasised - eg the same products could be faxed and placed on the web. The availability of various audits with faxes (showing whether products arived at the destinations successfully) is noted.

STANDARDISATION OF PRODUCTS AND PROCEDURES

The following comments are more in the nature of suggestions rather than specific recommendations. There is a need to standardise the various products that may be generated during an environmental emergency. The standards need to be developed carefully, and then basically kept to, so that the products will be genrally understandable and useful. For example, it may be advisable to produce forecast meteorological charts which always extend a pre-defined number of degrees of longitude to the East and West of the source location. Standardisation in the definitions of AQIs would also help alleviate confusion. It may also be advisable to run forecast forward trajectories out to 48 hours, say, and to show only 3 trajectories on each chart. Again, with respect to the ATM, it may be advisable to have a default source, with certain pre-defined characteristics, for both a smoke and a chemical incident, in case not much is known about the source of the event at the outset. It is also noted that descriptive products play a useful role in emergencies. These can include joint (or combined) statements, generated by 2 or more centres, that give a united opinion on the situation. Again, the importance of back-up procedures is emphasised. These may range from the use of back-up fax numbers (in case fax lines are busy) to the back-up of systems producing ATM output (in case of computer maintenance occurring at the time of the incident).

There are perhaps a number of conventions that could be adopted when disseminating products, to facilitate usage. These may include:

(i) Faxes: cover sheets specifying issuing centre, issued date/time (UTC), event specification (eg source location), content of following sheets;

(ii) Email: specification of format of any attachments;

(iii) Web: notification by email that products have been updated (and notification of password changes, if necessary);

(iv) Acknowledgements: often these will save confusion when trying to ascertain whether products have reached their destination (even though automatic checking is sometimes available).

Finally, for later evaluation, it is perhaps advisable to keep a log of events as they happen, provided time permits.

SYSTEM UPDATES AND TESTS

In order to keep an emergency response system, within NMSs and WMO specialised centres, in a state of readiness, it is necessary to keep checking and testing the various components to make sure they are in a satisfactory working state. This is all the more important in the case of a system that has to cater for ad-hoc, and maybe infrequent, events. Internal changes such as upgrades and changes to computer operating and NWP systems are examples which may impact on the generation of products. From the dissemination point of view, fax and phone numbers and the various addresses can change. In view of these possibilities, it is important that regular tests should be carried out. These tests can vary from just sending out faxes to various centres or agencies to check the validity of numbers to more comprehensive tests whereby various products are exchanged with other centres

and are then compared. These tests should be relatively frequent (eg monthly) with different scenarios. These tests also have the advantage of making more of the operational staff familiar with the different procedures eventually leading to greater efficiencies in response. It is important that any test products contain a prominent heading saying that they are part of a test - to distinguish them from those for a real emergency. Also it is important that messages should be sent out at the conclusion of a test to say that it has officially ended.

CONCLUSION

The need for simple, quick and effective procedures is paramount in the good management of environmental emergency incidents, such as those caused by, or resulting from, forest fires or chemical explosions. The above discussion has attempted to highlight some of the procedures and at the same time make some suggestions in an attempt to improve the management of such episodes.

REFERENCE:

WMO 1998. "Workshop on Regional Transboundary Smoke and Haze in South-East Asia", 2-5 June, Singapore.

ACRONYMS USED

AQI	Air Quality Index.
ASMC	The ASEAN Specialised Meteorological Centre, Singapore. (A centre with WMO geographical specialisation).
ATM	Atmospheric Transport Model.
AVHRR	Advanced Very High Resolution Radiometer.
GTS	Global Telecommunications System (WMO).
LRTAP	Long Range Transport of Smoke Haze And Other Pollutants.
NMS	National Meteorological Service.
NWP	Numerical Weather Prediction.
PARTS	The Program to Address ASEAN Regional Transboundary Smoke.
PM	Particulate Matter (particle sizes in microns).
RHAP	The Regional Haze Action Plan.
RSMC (EER)	Regional Specialised Meteorological Centre (with Environmental Emergency Response specialisation). Designated centres include: Beijing, Bracknell, Melbourne, Montreal, Obninsk, Tokyo, Toulouse and Washington.
TOMS	Total Ozone Mapping Spectrometer.