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IMPROVED DISTRIBUTION/ACCESS METHODS OF SPECIALIZED PRODUCTS

(Submitted by the Secretariat)

Summary and purpose of document

This document which is partly based on the report by Chris Little (UK), describes and evaluates the Environmental Emergency Response Global Exercise, of 27 June 2000., which demonstrated that the WMO Emergency Response Activities can realistically deliver authoritative, timely meteorological advice to nearly all National Meteorological and Hydrometeorological Services of its member countries. The improved procedures recommended by the Expert Team on Emergency Response and Related Activities, Beijing, China, 20-24 September 1999, was a success, although a number of improvements were identified, particularly, in a safety critical regime, where a few minutes delay could be deadly. Furthermore, the establishment of co-ordinated, frequent, regular, global exercises with clear objectives were recommended. Finally, proposals for enhancing regional and global arrangements.

Action proposed

- (a) Review the basic products and agree on further standardisation;
- (b) Establish the need for and define additional products based on new requirements;
- (c) Establish and recommend procedures for dissemination of products using new technologies;
- (d) Review principles of Environmental Emergency Response (EER) for exercises (Annex 6 WMO - TD/No778)

**Evaluation of 27 June 2000 Environmental Emergency
Response Global Exercise
(Submitted by the Secretariat based partly on the report by Chris Little, UK)**

1. Introduction

This document contains extracts based on the exercise evaluation report by Chris Little, and describes the lessons learnt from the recent Environmental Emergency Response (EER) exercise, held on 27 June 2000. It makes recommendations for further development and continuing co-ordination by the Commission for Basic Systems (CBS) Expert Team on Emergency Response and Related Activities.

1.1 Background

The CBS Expert Team on Emergency Response and Related Activities met in Beijing, China, 20-24 September 1999. It considered that there was no pressing need to substantially amend the current regional and global arrangements, but it recommended, among other proposals, improved operating procedures, and a global exercise with the specific and limited objectives to practice and evaluate these improved procedures and current ones. The team considered that previous international exercises in the Emergency Response Activities (ERA) area had involved many international organisations with their own agendas and objectives, which distracted from improving the meteorological and operational aspects.

1.2 Exercise aims

The strategic aim of the exercise is to test the usefulness of the Regional Specialized Meteorological Centres (RSMC) generated specialised products for NMCs and other International Agencies, and to assist in improving the quality, format and transmission of the RSMC products, under the auspices of the World Meteorological Organisation CBS programme of work and its obligations and agreement with the International Atomic Energy Agency (IAEA), within the international Conventions on Notification and Assistance in the event of a nuclear accident.

In particular, it will allow National Meteorological Services (NMS) to demonstrate at a national level their role and potential for emergency response, by receiving/accessing RSMC products, providing products and/or guidance on interpretation services to national competent authorities/national disaster management agency as required. Their role in responding to the incident will be evaluated.

Consequently, it helped develop better understanding of the needs and facilities which Regional Specialized Meteorological Centres and National Meteorological Centres (NMC) may need in the future. The full aims are in *Annex II* of the WMO Letter of Invitation to participate.

The specific, tactical aims are to test the proposed modified EER procedures, validate the suitability and effectiveness of the new arrangements, procedures and standards to be recommended to CBS, or confirm to adequacy of existing procedures.

In particular:

- IAEA can request basic products, without them being disseminated to other agencies;
- The test of the IAEA and Regional Telecommunication Hub (RTH)/Offenbach telecommunications link and procedures;
- The use of new IAEA /EMERCON forms used for formal Notification;
- The reliability and timeliness of RSMCs standard fax products over various links;
- RSMCs might make use of other appropriate technologies, in addition to fax;
- Selected RSMCs explore the use of the Web for access to their products, by both NMSs and other RSMCs.

In Regional Associations IV and V, RSMCs Montréal, Washington and Melbourne have conducted experiments with Web-based access by NMSs for the standard RSMC products as this could potentially alleviate some problems of faxing, hence improving on responsiveness and timeliness.

2. EXERCISE DESCRIPTION

2.1 Responses/Invitations

Out of the 185 members of WMO, 131 have registered and operate operational contact points for Environmental Emergency Response activities. 72 of these countries formally agreed to participate. A limited number (12) were allowed to participate even though they had missed the registration deadline. Such a deadline is needed, so that the telecommunications can be configured in time to encompass only the participants. Of the participants, 50 filled in a questionnaire (including 3 who didn't formally participate). This questionnaire was devised by the Expert Team to help evaluate the exercise objectively and to generate monitoring statistics so that improvements can be measured over time.

2.2 Arrangements

- The test was planned for 27/6/2000 from 0900 UTC to 1600 UTC, with incident in South America. IAEA's National Contact Points were asked by IAEA to liaise with their NMSs.
- NMSs and RSMCs ensured their Operational Contact information was up to date, including Delegated Authorities and IAEA National Contact Points.
- A number of communications tests were performed, including between IAEA and WMO.
- Initiation: according to a 'surprise' scenario, either IAEA notifies WMO formally according to the Convention (requiring a wide dissemination of products), or IAEA requests EER RSMC Services (according to proposed modified procedures), or a IAEA Delegated Authority requests services of an NMS.
- RSMCs provide products as required.
- NMS receive products and provide guidance and interpretation of these, and further products, for national authorities and disaster management agencies.
- IAEA notifies end of exercise.
- NMSs complete evaluation form and return to WMO by stated deadline.
- WMO evaluates replies received to improve quality, format and transmission of RSMC Products, to evaluate the role of NMSs, and verifies the suitability of the arrangements.

Notes: Notification (emergency, end of exercise) is by IAEA to RTH Offenbach. RSMCs disseminate to only participating NMSs or their respective regions. (NCPs also complete their evaluation form and return it to IAEA by deadline stated).

2.3 *Description of scenario*

A series of increasing levels of emergency, resulting in general release of pollutants to the atmosphere, with successive updates to information:

- IAEA issues an 'Alert' in fax format, 09:30 UTC, to RTH Offenbach;
- IAEA issues a 'Site Emergency', in fax format, at 10:40;
- IAEA issues a 'General Emergency', but no release, in fax format, at 10:44;
- IAEA issues a 'General Emergency', but no release, in fax format, at 11:30;
- IAEA issues a 'General Emergency', with release, in fax format, at 12:20;
- IAEA issues a 'General Emergency', with release, in fax format, at 13:09;
- IAEA issues Washington Standard Products, in fax format, at 13:13;
- RTH Offenbach issues a 'General Emergency', with release, via Global Telecommunication Network (GTS), in fax format, at 13:33;
- IAEA formally requests support from RSMCs Washington & Montreal at 13:50;
- IAEA issues a 'General Emergency', with release, in fax format, at 14:34;
- IAEA issues a 'General Emergency', with release, in fax format, at 15:45;
- IAEA issues Washington Standard Products, in fax format, at 15:55;
- IAEA issues Exercise Closure, in fax format, at 16:45, with Products again.

2.4 *Outcomes, Discussion*

There was much confusion and extra work generated in Offenbach, as the new IAEA forms Met Alert and EMERCON developed since the Beijing Expert Team meeting, assumed that information from previously transmitted forms was available. This is not realistic, and forms should accumulate information (in particular, the initial condition for running models), unless superseded. Offenbach combined three faxes and then transmitted them to ensure the WMO community had complete information.

When RTH Offenbach, or any other RSMC or NMS, receive a Met Alert, should it be distributed generally? Providing they are infrequent (e.g. one or two per year), if they are sent to all RSMCs, but no NMSs, the traffic is not great, the RSMCs are alerted, and no decision has to be made in RTH Offenbach. Other options, not recommended, are to transmit to all NMSs or keep message in RTH Offenbach.

RSMC Bracknell also was involved in confusion, as the IAEA National Contact Point requested a full 'General Emergency, with release', at the alert stage, so that countries in Regional Associations I and VI received full Standard Products much earlier than the scenario envisaged. The exercise highlighted the potential for disparities between international/WMO responses/expectations and those of national agencies. The current approach of IAEA, or its National Contact Points, of being able to request a meteorological service with standard forms, will help standardise expectations on the IAEA side and the NMS/national interface. Consequently, it is recommended that the Beijing recommendations be carried forward. However, clarification is needed from IAEA, as to when their NCPs would invoke a national service as opposed to an international one via IAEA (e.g. several NCPs request their national NMSs who in turn make separate requests to their RSMC).

The following scenario highlights precisely the different expectations:

- Suppose Danish Met Service requests a forecast for an unnotified/unconfirmed release from a United Kingdom nuclear plant, then the UK/ EER /RSMC gives them a forecast, and also warns the WMO Secretariat, IAEA and other RSMCs, so everyone knows;
- Suppose the UK Department of the Environment, an IAEA National Contact Point, requests a forecast for an unnotified/unconfirmed release from the same UK nuclear plant, then we give them a (national) forecast, and do not inform anyone else.

The information disseminated by IAEA was at times inconsistent or contradictory, e.g. 'no change' indicated on a form with significant changes of information. This is a realistic scenario, and several RSMCs were able to produce updated standard products, sometimes within a few minutes. This may be confusing to NMSs, who did not practice handling such emergencies, even though they are familiar with making judgements on incomplete information. It is the speed of the changing and conflicting information that is unfamiliar. This can be addressed by more realistic exercises.

As more National Meteorological Services become involved with their national organisations, it is important that they adopt 'best practice' in emergency handling using 'Emergency Cells'. There is some useful information in the Technical Document 778, but not readily accessible and it is incomplete. This should be developed as a capacity building exercise from the experience in the RSMCs, e.g. the separation of functions between forecaster, decision maker, information/event recording in a single log/diary and general 'runner'.

An attempt has been made to make a consolidated log of events, but more information is needed from the IAEA and its National Contact Points, and RAs III and IV to give a full picture. It is recommended that each RSMC maintain a log of significant events, in an agreed format, so that an accurate global picture of unfolding events can be constructed. This will help also to quantify transmission times for messages, providing the messages, and their routes, can be unambiguously identified. It is recommended that an initial form of a log entry that could readily be processed is:

- *nn:nnUTC RSMCxx send/receive product_pp to/from RSMCy/ NMSzz/IAEA via GTS/Internet/etc Comments*

There are a number of other detailed areas for improvement. Nearly all of these concern lack of familiarity with procedures and products, or undefined interfaces at the national level. All of these can be addressed by more exercises, at the national, regional and global level. If a regional or global exercise is held only annually, and because most forecasters are shift workers, it could be several years before all the forecasters in a centre acquire sufficient experience of such an exercise. This is unacceptable. Emergency Response must be routinely practised, and procedures should be refined to be as simple as possible. A number of training sessions have been held, but it is considered that the best training is a realistic exercise as part of the routine work, rather than in a separate training school.

3. Detailed areas for Improvement

Out of date Contact information - particularly the mismatch between paper and online (this is the same issue as up-to-date station lists). The Web pages must be routinely consulted by the NMSs. The contact details should be disseminated via the World Weather Watch (WWW) Newsletters at least annually, and preferably 6 monthly, for those members who still do not have Web access. Communication links are not reliable – many fax machines unable to receive products. Some NMSs, and RSMCs may need more fax machines.

(a) *Examples from routine tests:*

- Telex messages are often received several times and by different routes leading to confusion and difficulty in cataloguing real time events. A clearer indication of the sender and intended recipient should be considered in future;
- Occasionally, there is use of Local time rather than UTC on forms, telexes, faxes, fax and telex machines, which can cause confusion. IAEA uses local time on some of their forms, but WMO information, and requests to WMO should only be in UTC;
- Sometimes there is confusion between IAEA authorities and WMO ones. It is therefore a good idea to keep separate terminology. (i.e. Delegated Authority is a WMO term, National Contact Point is an IAEA one);
- The variety of slightly non-conforming RSMC standard products hinder the forecasters, unless there is plenty of time for familiarisation;
- Scaling & clipping maps dynamically to show more detail can be counterproductive (e.g. nice deposition, no coastline/frontiers for orientation. Standard projections and areas would make intercomparison of products easier.

There is an issue over multiple species, in that too much information can slow down the response. Currently some models do not handle multiple species, but just one at a time. If they did handle more, they would take significantly longer to run. Requesting multiple runs to cover the different species does not give much more distribution information, and raises the issue of which should be done first (which is why a set of default initial conditions were agreed). IAEA and its contact point should be educated into the possibilities and limitations of the current models. This is best addressed by frequent national, and regional exercises.

Much more detailed information about specific RSMCs and products is contained in the Questionnaire results, which are available in the form of spreadsheets.

4. Questionnaire

The WMO questionnaire was designed with many Yes/No questions to give unambiguous answers, and this has been successful in eliciting information that is easy to process. However the format of the questionnaire allowed the recipient to enter text, which is difficult and laborious to process. So it is suggested that a format very closely related to a spreadsheet be used, or even a simple spreadsheet used for those NMSs who have computers. The layout should only allow text to be entered in specific places. Such a spreadsheet should be based on a relatively old version for maximum compatibility (such as Excel 4). The IAEA evaluation for its National Contact Points uses this approach.

However, the information about arrival times of products was very difficult to process and obtain consistent and reliable statistics. This was because the staff at NMSs (and RSMCs) may not be familiar with the standard products and the routes by which they arrive (for example, a 'fax' may arrive directly over a dialled connection, via the GTS, AFTN, or even be e-mailed or retrieved from the Web and printed, unbeknown to the recipient. Equally, the entries reveal that many products are not clearly identified, possibly invalidating some of the results, and it is not possible to relate times to each other. It is suggested that successive runs from a centre display some form of dissemination sequence number, as the IAEA original faxes did.

The assessment form MUST have an entry for the country and contact person filling it in. Some replies did not have a covering letter, and had to be identified by the fax telephone number.

The questionnaire should ask NMSs to comment on what they propose to change as a result of the exercise ('lessons learnt'). This will be useful information for capacity building.

5. Recommendations for the Commission for Basic Systems

- (i) Further work by the Secretariat, the Expert Team and IAEA is needed to clarify the requirements for extra forms developed since the Beijing meeting, and to refine those needed.
- (ii) Further work by the Expert Team and IAEA is needed to understand the role of national contact points and to establish guidelines for when national or global services are invoked.
- (iii) Further work required by the Expert Team to ensure Products are refined and fully standardised, to help ensure rapid response, and the system responsiveness continues to develop.
- (iv) Encourage all member states to be involved.

6. Work for the Expert Technical Team

(a) Immediate

- More frequent global exercise (at least annually) to help continue to refine and simplify (human) processes. They should use normal comms, not special restricted lists of participants, and most members should be involved because scenarios are potentially global;
- Routine quarterly comms testing with frequent dissemination of results. Tests should use actual products to ensure familiarity within NMSs;
- Even more frequent tests at the bilateral and national level between RSMCs and NMSs. For example, Washington and Melbourne regularly test the first Tuesday of every month;
- Evaluations of tests and exercises should be in a standard machinable format, to facilitate intercomparisons;
- More highly standardised products;
- Explore the use of Internet based technologies for exchange between RSMCs.

(b) Near Term

- More products;
- Clarify national and international responsibilities for NMS and RSMCs;
- Develop operational facilities to allow RSMCs to exchange basic and other products using the Web;
- Explore the use of Internet based technologies for dissemination to NMSs from all RSMCs
- Continue to refine computer based processes to help produce faster responses;
- 'Best Practice' section in Technical Manuals, on how to handle emergencies (e.g. one person in charge, one recording information and log of events, someone else doing the forecasting, etc);
- More frequent tests, for example quarterly international tests:

(c) Longer Term

- Develop operational facilities to allow RSMCs disseminate basic products to NMSs
 - 'No Notice' tests, already carried out in some RSMCs for national purposes;
 - Quicker response, especially for the Joint Statement;
 - Development of new products, based on ensembles.
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