

APPENDIX II-7

**USERS' INTERPRETATION GUIDE FOR ATMOSPHERIC TRANSPORT
MODEL PRODUCTS PROVIDED BY RSMCs**

Standards in the provision of international services by RSMCs for nuclear environmental emergency response
The Delegated Authority requests support from WMO Regional Specialized Meteorological Centres (RSMC) for atmospheric transport modelling products by using the form entitled "Environmental Emergency Response — Request for WMO RSMC Support by Delegated Authority". The Delegated Authority then sends the completed form immediately to the RSMCs as per the regional and global arrangements and ensures receipt of the form by phone. This will initiate a joint response from the RSMCs in their region of responsibility.

The International Atomic Energy Agency (IAEA) requests support from WMO RSMCs for atmospheric transport modelling products by using the form agreed between WMO and IAEA. The IAEA then sends the completed form immediately, by fax and by e-mail (preferred), to the RSMCs as per the regional and global arrangements and ensures receipt of the form by phone. The lead RSMCs shall confirm receipt of the IAEA request by fax or e-mail (preferred) to IAEA. This will initiate a joint response from the RSMCs in their region of responsibility. The IAEA sends an information copy of its Request Form by fax or by e-mail (preferred) to RTH Offenbach. When the lead RSMCs' products become available, the lead RSMCs shall send an announcement to the IAEA that their respective products are available and the products' location (RSMC's dedicated website), by fax or by e-mail (preferred).

The designated RSMCs shall implement agreed standard procedures and products by:

- (a) The provision of the following standard set of basic products within two to three hours of reception of a request and according to the general rules for displaying results;
 - (b) The adoption of the following forecast periods for the numerical calculations;
 - (c) The adoption of a joint response approach;
 - (d) The adoption of the general rules for displaying results.
1. Default values to be used in response to a request for products for the unspecified source parameters¹
 - (a) Uniform vertical distribution up to 500 m above the ground;
 - (b) Uniform emission rate during six hours;
 - (c) Starting date/time: date/time specified at "START OF RELEASE" on request form or, if not available, then the "date/time of request" specified at the top of the request form;
 - (d) Total pollutant release 1 Bq (Becquerel) over six hours;
 - (e) Type of radionuclide ¹³⁷Cs.
 2. Basic set of products
Seven maps consisting of:
 - (a) Three-dimensional trajectories starting at 500, 1 500 and 3 000 m above the ground, with particle locations at six-hour intervals (main synoptic hours up to the end of the dispersion model forecast);
 - (b) Time-integrated airborne concentrations within the layer 500 m above the ground, in Bq s m⁻³ for each of the three forecast periods;
 - (c) Total deposition (wet + dry) in Bq m⁻² from the release time to the end of each of the three forecast periods.

A joint statement that will be issued as soon as available.

3. Forecast periods for numerical calculations

The initial set of products will cover the period from T, the start time of the release, through a forecast of 72 hours from t, the start time of the current output from the operational NWP model.

¹ The adoption of default values is based on the understanding that some runs of the transport/dispersion models need to be carried out with default parameters because little or no information (except location) will be available to the RSMC at an early stage. RSMCs are, however, requested to conduct and propose subsequent model runs with more realistic parameters as they become available (products based upon updated parameters will be provided on request only or confirmed from IAEA or a Delegated Authority). This may, for example, refer to a more precise assumption of the vertical distribution or the need to conduct a model run for the release of noble gases.

The first 24-hour period for integrated exposures in the dispersion model will start at the nearest synoptic time (0000 or 1200 UTC) prior to or equal to T. Subsequent 24-hour integrations of the dispersion model will be made up to, but not exceeding, the synoptic time nearest to $t+72$.

If T is earlier than t, the first response will use hindcasts to cover the period up to t.

4. Joint response and joint statements

A joint response means that the collaborating RSMCs shall immediately inform each other of any request received; initially both should produce and send the basic set of products (charts) independently and then move rapidly towards providing fully coordinated response and services for the duration of the response. Following the initial response, the RSMCs shall develop and provide, and update as required, a "joint statement" to describe a synopsis of the current and forecast meteorological conditions over the area of concern, and the results from the transport models, their differences and similarities and how they apply to the event.

5. General rules for displaying results

In order to make the interpretation of the maps easier, the producing centres should adopt the following guidelines:

General guidelines for all maps:

- (a) Provide labelled latitude and longitude lines at 10° intervals and sufficient geographic map background (shore lines, country borders, etc.) to be able to locate precisely the trajectories and contours;
- (b) Indicate the source location with a highly visible symbol (●, ▲, ✕, *, ■, etc.);
- (c) Indicate the source location in decimal degrees (latitude – N or S specified, longitude – E or W specified, plotting symbol used), date/time of release (UTC), and the meteorological model initialization date/time (UTC);
- (d) Each set of maps should be uniquely identified by at least product issue date and time (UTC) and issuing centre;
- (e) Previously transmitted products from the dispersion model need not be retransmitted;
- (f) Indicate with a legend if this is an exercise, requested services, or an IAEA notified emergency.

Specific guidelines for trajectory maps:

- (a) Distinguish each trajectory (500, 1 500, 3 000 m) with a symbol (▲, ●, ■, etc.) at synoptic hours (UTC);
- (b) Use solid lines (darker than map background lines) for each trajectory;
- (c) Provide a time-height (m or hPa) diagram, preferably directly below the trajectory map, to indicate vertical movement of trajectory parcels.

Specific guidelines for concentration and deposition maps:

- (a) Adopt a maximum of four concentration/deposition contours corresponding to powers of 10 with minimum values not less than 10^{-20} Bq s m^{-3} for time-integrated airborne concentrations and not less than 10^{-20} Bq m^{-2} for total deposition;
- (b) A legend should indicate that contours are identified as powers of 10 (i.e. $-12 = 10^{-12}$). If grey shading is used between contours, then the individual contours must be clearly distinguishable after facsimile transmission and a legend provided on the chart;
- (c) Use solid dark lines (darker than map background lines) for each contour;
- (d) Indicate the following input characteristics: (i) source assumption (height, duration, isotope, amount released); (ii) the units of time integrated concentration (Bq s m^{-3}) or deposition (Bq m^{-2}). In addition, charts should specify: (i) "Time integrated surface to 500-m layer concentrations"; (ii) "Contour values may change from chart to chart", and if the default source is used; (iii) "Results based on default initial values";
- (e) Indicate, if possible, the location of the maximum concentration/deposition with a symbol on the map and include a legend indicating the symbol used and the maximum numerical value;
- (f) Indicate the time integration starting and ending date/time (UTC).

The RSMCs will distribute their standard products to the NMHS Operational Contact Points by e-mail and retrieval from designated Web pages. Standard products in the ITU-T T4 format suitable for both group 3 facsimile machines and transmission on parts of the GTS will be maintained by exception and only if requested by the NMHS Operational Contact Point. The RSMC may also make use of other appropriate technologies.