

## CHAPTER 22

### THE SUPPLY OF METEOROLOGICAL INFORMATION IN THE EVENT OF NUCLEAR OR CHEMICAL ATMOSPHERIC POLLUTION ACCIDENTS

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## CHAPTER 22

### THE SUPPLY OF METEOROLOGICAL INFORMATION IN THE EVENT OF NUCLEAR OR CHEMICAL ATMOSPHERIC POLLUTION ACCIDENTS

#### 22.1 Introduction

22.1.1 When a release of radioactivity or toxic chemicals seriously contaminates the atmosphere, various national agencies are involved in warning of the hazard and in assessing the damage to the environment and food chain; and in clearing up afterwards. These agencies depend upon the Office to supply actual and forecast data so that the track of the plume can be predicted and the polluted areas identified.

22.1.2 The Office has emergency procedures that are designed to supply suitable meteorological data to the managers of a nuclear or toxic chemical pollution incident. Broadly, the procedures are restricted to CFO and selected Main Met. Offices (M Met Os) and describe the requirement for meteorological data and also the communications that should be used during the emergency. The procedures address four types of emergency:

- a. Nuclear, national
- b. Nuclear, international
- c. Chemical, national
- d. Chemical, international

#### 22.2 Nuclear emergencies, national

22.2.1 Incidents in this category might happen within the United Kingdom civil nuclear industry (power stations, reprocessing plants, laboratories) or the military sphere (research establishments, nuclear-powered warships). A release could occur at a fixed site or while radioactive material (including munitions) is in transit. Procedures within The Met. Office to deal with these events are laid down in Procedures And Communications in the event of a release of RadioActive Material (PACRAM). Met O S&B(Defence) is charged with keeping PACRAM up to date and with distributing amendments to M Met Os, nuclear sites and agencies involved. Accidents involving other military nuclear material are dealt with by Met O S&B(Defence).

22.2.2 CFO and each M Met O are allocated nuclear sites on a regional basis as shown on the map at Annex A. The location of the sites, their local anemometer facilities together with the communications dedicated for use in an emergency are contained in PACRAM. During an emergency, the site operator and the M Met O will exchange weather observations and forecasts using the format at Annex B. The Office in general is kept aware of PACRAM through Meteorological Office Orders Series A.

#### 22.3 Nuclear emergencies, international

22.3.1 Emergencies involving a national incident that is likely to 'export' radioactivity to neighbouring countries is seen as an extension of a national incident. PACRAM will already be in use with the M Met O liaising with the nuclear site involved, providing the necessary forecast and trajectory advice. CFO will assume overall control of the forecasting responsibilities, liaising closely with the DTI, the lead Government Department, at the Nuclear Emergency Briefing Room (NEBR).

22.3.2 Procedures for handling emergencies where a foreign source of radiation poses a threat to the United Kingdom have been defined by the Government in the National Response Plan. The Office has an important role in the procedures connected with Radiation Incident Monitoring (RIM), providing most of the sites for a national network (RIMNET) of radiation monitors which are linked to a central computer. CFO and modelling experts at Bracknell are involved from an early stage, when the threat of radioactive pollution is identified, until the end of the emergency. Forecasts, including air trajectories and dispersion model output from the Nuclear Accident Model (NAME), are passed by CFO to the DoE, who are in overall control of the procedures. Following an international incident, and as part of the commitment by the Office to RIMNET, a network of around 35 offices will be required to provide rainwater samples. These will be analysed by nominated regional laboratories to ascertain whether there are any areas in danger of contamination from wet deposition of radionuclides.



22.3.3 The Office has been nominated by WMO as a Regional Specialized Meteorological Centre (RSMC) with the responsibility of providing details of the movement of radioactive and other toxic pollution released into the atmosphere. Bracknell has a particular responsibility for Europe, with transport model products (e.g. NAME output) being made available to government agencies of any country that might request them.

#### **22.4 Chemical emergencies, national**

22.4.1 Emergency procedures which are to be followed after a release of toxic chemicals in the United Kingdom are laid down in the current Meteorological Office Order Series A. The procedures were devised in response to the requirement for meteorological information to support the Control of Industrial Major Accidents Hazards Regulations 1984 (CIMAH). The procedures are known as CHEMET and they describe the Office response to a request from the Police or Fire Brigade.

22.4.2 Because chemical emergencies can happen at any time of the day or night, the Office action is restricted to CFO and selected M Met Os. Each office is allocated a region as depicted on the map at Annex C. The Police Authorities are advised by S&B(Defence) on the M Met O they should contact and on the emergency communications numbers that should be used for requesting and receiving meteorological data and forecasts. An agreed format for exchanging and receiving data is shown at Annex D (CHEMET Forms A and B). The Police or Fire Brigade act as a focal point for information and will pass on the meteorological data to other emergency agencies. If extra detail or clarification is required the emergency authorities can speak directly to the M Met O.

22.4.3 S&B(Defence) is charged with amending the procedures and with liaison between the Office and the various authorities and agencies involved with the management of chemical accidents.

22.4.4 Major chemical emergencies relating to toxic materials may often involve a short 5- to 10-minute release of material followed by a slower release for a longer period. In general, the area in which casualties are expected are within 1 or 2 kilometres of the site. Release caused by fires are generally less of a problem as the fire either destroys the toxicity or disperses the material so that concentrations are low when it returns to ground level. The diverse nature of chemical accidents and their often unpredictable location will always require a flexible approach and there will always be occasions when initiative and common sense are needed to augment established procedures.

#### **22.5 Chemical emergencies, international**

22.5.1 If a national chemical incident appears to pose a threat to neighbouring States, Central Government will appoint a Lead Department to handle international matters. This Lead Department will require assistance from CFO and modelling experts at Bracknell, while the M Met O continues to support the incident at the local level.

22.5.2 Chemical incidents in Europe that might pose a threat to the United Kingdom are dealt with by a variety of Government Departments. If the Office is the first to hear of an overseas incident and judges it to be a threat, CFO will advise the DoE. DoE will alert an appropriate Government Department to handle the national response to the incident. If the warning is received first by Central Government, the Lead Department will ask CFO for actual and forecast assistance in the form of trajectories and advice on rainfall.

#### **22.6 MAFF involvement with nuclear or chemical emergencies**

22.6.1 When nuclear or chemical emissions spread contamination beyond the release point MAFF may set up an Emergency Room (ER) to monitor the pollution spread. This is to enable them to give advice on the pollution effects to the soil, crops and animals under the area of contamination.

22.6.2 Although the MAFF involvement is not part of the normal CHEMET procedures, assistance will take the form of providing the Risk Assessment Unit of the Food Science Division of MAFF with copies of the advice provided by the normal CHEMET proforma including 'area-at risk' maps. Only in exceptional circumstances will the Risk Assessment Unit contact a M Met O directly following an incident.

22.6.3 During a nuclear incident MAFF units will have access to meteorological advice supplied to the appropriate lead Government Department and, following a national incident, advice provided under PACRAM to the site operator.

22.6.4 Other MAFF units should not normally be allowed routine access to the M Met O over the special emergency telephone line; contact is to be made normally via the public telephone line or over listed docfax/telex numbers.

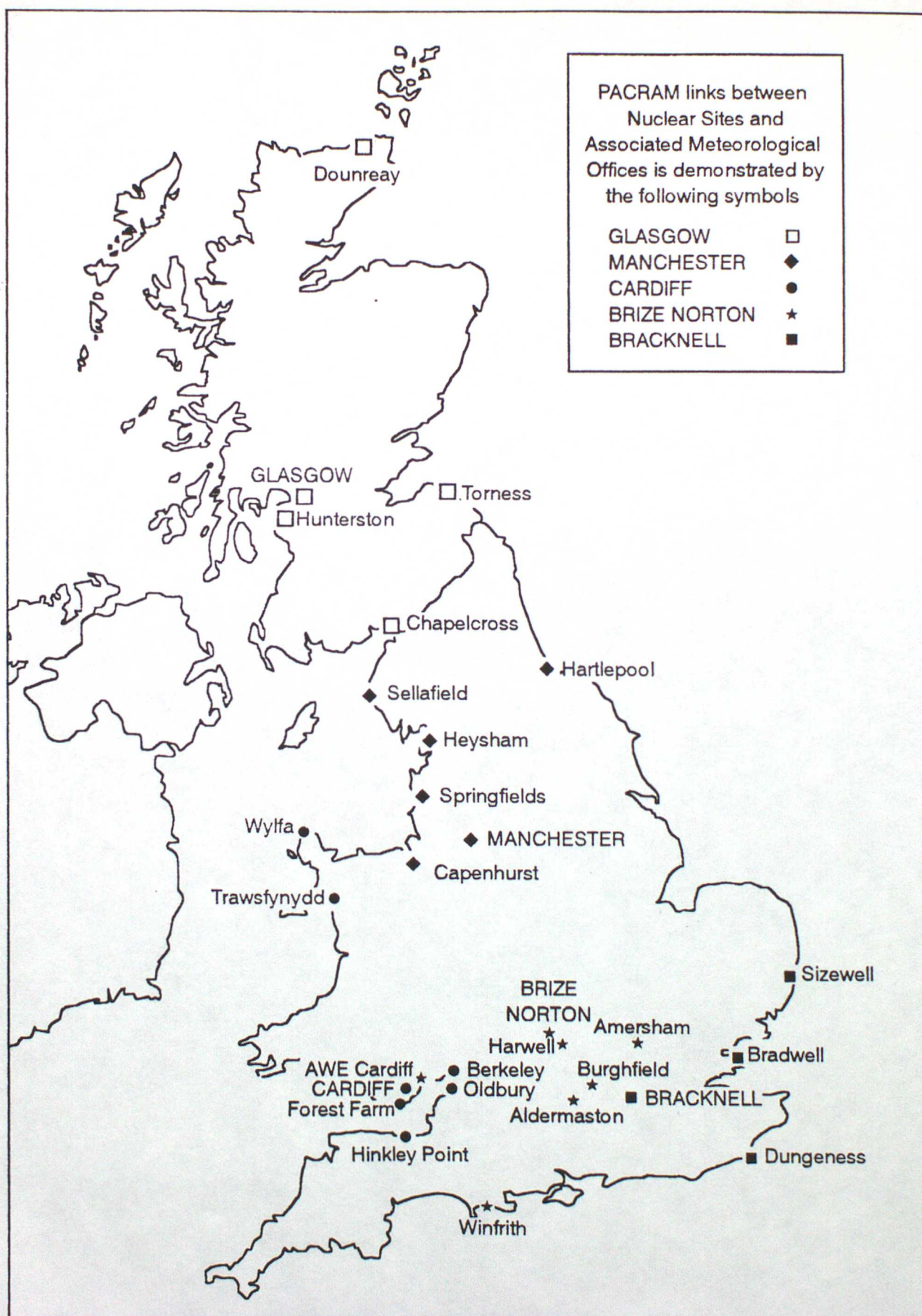


## 22.7 Media matters

22.7.1 As a rule, all media enquiries about radioactive and international chemical pollution events must be referred to the Press Officer of the Lead Department. Similarly, on a smaller scale, media enquiries concerning local CHEMET incidents are to be directed to the Press Office of the Police Force involved. If the Lead Department (or Police Force) wish, CFO (or M Met Os) can be asked to deal with specific meteorological subjects. This policy is not intended to be obstructive but to ensure that all media outlets receive the same information and in the time-scale that the authorities decide is best for the management of the emergency.



## Nuclear Installations &amp; Associated Main Meteorological Offices





**FORM FOR THE EXCHANGE OF WEATHER INFORMATION:  
PACRAM — FORECAST INFORMATION FORM**

Met. Office .....Telephone/Fax No. ....

**PART 1— SITE INFORMATION**

Establishment or grid reference  
or latitude and longitude (A) .....

Telephone and/or Fax nos  
for reply (B) .....

Time of message (C) Date .....Time .....Clock time

Name of sender (D) .....

Date and time of Release (E) Date .....Time .....Clock time

Estimated height of release (F) .....Metres

	Low-level data	High-level data
Wind direction (blowing from) (degrees)	(G) .....	(H) .....

Variation in wind direction (blowing from) (degrees)	(I) between.....and.....	(J) between.....and .....
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Mean wind speed ( $\text{m s}^{-1}$ )	(K) .....	(L) .....
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Local weather and cloud cover (M) .....

**PART 2 — FORECAST INFORMATION**

Forecast valid (1) From .....to .....Clock time  
\*\* Forecast information distances 0–75 km downwind unless specified otherwise

Surface wind — direction  
(blowing from) (2) .....

Surface wind — variation in  
direction (blowing from) (3) between .....and .....

Surface wind — speed ( $\text{m s}^{-1}$ ) (4) .....

Pasquill stability (A–G) (5) .....

Cloud cover (in eighths of sky covered) (6) .....

Precipitation (type, duration and intensity) (7) .....

Height of mixed layer\* (8) .....

Mean direction (blowing from) and  
wind speed ( $\text{m s}^{-1}$ ) in mixed layer (9) .....

Remarks, e.g. passage of fronts, sea-  
breezes, frost, etc. (10) .....

.....  
.....

Next Part 1 information needed at.....(clock time)

\* See guidance notes for amplification of the term 'mixed layer'







## METEOROLOGICAL OFFICE

**CHEMET FORM A**

Notification of a chemical emergency

- 
1. Notification made by .....
  2. Constabulary/Brigade .....
  3. Date/Time of making call ..... (Clock time)
  4. Call back numbers:      \* TELEPHONE .....
  - \* Underline preferred method      \* TELEX .....
  - \* DOCFAX .....
  5. Time of chemical release ..... (Date/Clock time)
  6. Site of release ..... (6-fig. OS ref)
  - ..... (Location)
  7. Site topography .....
  8. Name of chemical .....
  9. Buoyancy of chemical .....
  10. Nature of release: Continuous .....
  - Instantaneous ..... Fire at site .....
  11. Site weather details: Wind (from) .....
  - Cloud amount ..... Weather .....
- 

Enter weather forecast given by Meteorological Office:

WIND (from) ..... degrees      Speed ..... km/h

PLUME BEHAVIOUR: The plume is liable to disperse .....

Slowly ..... Rapidly .....

.....

.....



## METEOROLOGICAL OFFICE

**CHEMET FORM B**

## Chemical Emergency Weather Forecast for Police

NB: All winds are degrees from which the wind is blowing (e.g. 225 is a wind from the south-west), and kilometres per hour

1. To ..... Constabulary/Brigade
2. From .....
3. Call back numbers:      \* TELEPHONE .....
- \* Underline preferred method      \* TELEX .....
- \* DOCFAX .....
4. Forecast for incident ..... (Date/Clock time)  
at ..... (Location)
5. FORECAST PERIOD.....TO.....(Date/Clock time)
6. Surface wind (Degrees from: Km/h) .....
7. Expected plume behaviour: Little dispersion .....
- Vertical dispersion..... Horizontal dispersion.....
- .....
8. Lowest Cloud amount and height...../8 ..... Metres
9. Visibility ..... Metres
10. Air Temperature and Humidity ..... °C..... %
11. Precipitation .....
12. Depth of Mixed Layer ..... Metres
13. Mean wind in mixed layer (from) ..... ° ..... Km/h
14. PASQUILL:    A    B    C    D    E    F    G    (Identify with circle)
15. REMARKS .....
- .....
- .....
16. Forecaster..... Time of Issue.....
17. Area at RISK map is Attached/As issued at.....hours.