



# BUREAU OF METEOROLOGY

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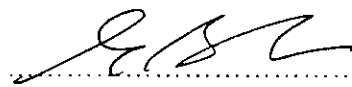
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## Inquest into the Deaths in the 1998 Sydney to Hobart Yacht Race

### Statement of Geoffrey Love

On 21 July 2000, I, Geoffrey Love, of 150 Lonsdale Street Melbourne in the State of Victoria, state:

1. I am the Deputy Director (Services) in the Bureau of Meteorology ("the Bureau") and currently acting Director of Meteorology. I have previously given evidence in this inquest.
2. On 26 December 1998, the Bureau issued storm warnings through its New South Wales and Victorian Regional Offices. These storm warnings were distributed by the Bureau as shown by the attachments marked GL1, GL2 and GL3. These attachments have been prepared from the Bureau's records of facsimiles it has sent.
3. GL1 shows that an initial storm warning for coastal waters (coast to 60nm seaward) from Merimbula to Gabo Island was issued by the NSW Regional Office of the Bureau at 2.14PM on 26 December 1998. GL1 shows the organisations to which the initial storm warning was dispatched and the time of dispatch.
4. A storm warning was issued by the Victoria Office of the Bureau at 1.58PM on 26 December 1998. GL2 shows the organisations to which the initial storm warning was sent.
5. An initial storm warning for the High Seas (beyond 60nm from the coast) was issued by the NSW Office of the Bureau at 2.15PM on 26 December 1998. GL3 shows the organisations to which the initial storm warning was sent and the time of dispatch.
6. The further dissemination of the warning is then determined by a variety of considerations including the target user community's requirements, the dissemination technology, local agreements and even international agreements such as the International Convention for Safety of Life At Sea (SOLAS). For example, warnings are broadcast by Sydney Radio VIS and Melbourne Radio WIM on receipt and repeated every two hours (at 3 minutes past each hour from VIS and 48 minutes past each hour from WIM). ("VIS" and "WIM" are call signs for Coastal Marine radio stations for Sydney and Melbourne respectively operated by Telstra.) Penta Comstat, a private radio station, I believe would have included the first mention of the storm warning with its NSW Coastal Waters forecasts broadcast at 4.25PM and Bass Strait forecast broadcast at 5.05PM. The warning would then be broadcast for NSW coastal waters at 7.25PM and for Victorian coastal waters at 7.35PM.
7. The form and content of marine forecasts and warnings issued by the Bureau follow the World Meteorological Organization (WMO) Manual on Marine Meteorological Services. The procedures contained in this Manual are practices set down by the WMO. Attachment GL4 is a copy of the relevant part of the Manual.

  
..... 27/7/00  
Geoffrey Bruce Love

## DISTRIBUTION OF INITIAL STORM WARNINGS FOR COASTAL WATERS ON 26/12/98

Initial storm warning from Merimbula to Gabo Island, including gale and strong wind warning north to Seal Rocks (south of Forster) issued by Sydney at 2.14pm. The time of dispatch by fax is shown before each addressee.

### Marine Radio Stations

- 2.17 VIS Sydney  
2.20 Penta Comstat

### Royal Volunteer Coastal Patrol

- 2.22 Old Bar (near Taree)  
2.21 Forster  
2.22 Port Stephens  
2.21 Lake Macquarie  
2.22 Gosford  
2.22 Hawkesbury River  
2.23 Sydney  
2.21 Headquarters  
2.23 Wollongong  
2.22 Shoalhaven Heads  
2.22 Jervis Bay  
2.23 Sussex Inlet  
2.23 Ulladulla  
2.17 Kioloa (south of Ulladulla)  
2.21 Bateman's Bay  
2.22 Moruya  
2.22 Narooma  
2.22 Merimbula  
2.18 Eden

### Australian Volunteer Coast Guard

- 2.19 Port Stephens  
2.17 Swansea  
2.21 Sydney  
2.21 Port Kembla  
2.21 Bermagui  
2.24 Mallacoota

### Land Radio Stations

- 2.18 ABC Sydney  
2.21 2MC Kempsey  
2.17 2GLA Forster  
2.25 2HD Newcastle  
2.24 LMFM Lake Macquarie  
2.17 2GO Gosford  
2.18 2WL Wollongong  
2.18 2WN Wollongong  
2.18 98FM Mt. St Thomas (near Wollongong)  
2.18 2ST Nowra  
2.23 2UUU Nowra  
2.18 2WKT Bowral  
2.17 2EC Bateman's Bay  
2.17 2EAR Moruya/Narooma  
2.18 2RK1 Dalmeny (near Narooma)  
2.17 2EC Bega  
2.17 2BA Bega (ABC)

### Television Stations

- 2.20 NBN3 Newcastle  
2.20 Prime Newcastle  
2.18 ABN2 Sydney  
2.23 TCN9 Sydney  
2.24 WIN4 Wollongong  
2.20 Prime Wollongong  
2.20 Prime Canberra

### Emergency Authorities

- 2.20 Police, Sydney  
2.26 Water Police, Sydney  
2.24 Water Police, Broken Bay  
2.23 State Emergency Services HQ  
Sydney  
2.19 Maritime Services Board Operations  
2.23 Sydney Ports Corporation  
2.23 Search & Rescue Emergency Services Board  
2.20 Norah Head Search and Rescue  
2.23 Shoalhaven Search and Rescue  
2.18 Bar Point, Brooklyn  
  
2.18 Port of Eden  
2.17 Montague Island Lighthouse  
2.19 Nobby's Head Signal Station (Newcastle)  
  
2.15 Nowra Navy Defence Centre (by land line)

Initial Storm Warning for coastal waters Wilson's Promontory to Gabo Island issued by Melbourne at 1.58pm. The time of dispatch is shown before each addressee.

**Marine Radio Stations**

2.03 VIM Melbourne

**Royal Volunteer Coastal Patrol**

2.02 Eden

**Austalian Volunteer Coastguard**

2.04 Sandringham

2.03 Loch Sport

2.02 Mallacoota

**Land Radio Stations**

2.02 ABC Melbourne

2.02 ABC Sale

2.02 3TR Traralgon

2.02 2BA Bega (ABC)

2.02 2EC Bega

**Emergency Authorities**

2.03 Emergency Management, Australia

2.03 Victorian Water Police

2.04 Point Lonsdale Lighthouse

2.01 Nowra Navy Defence Centre  
(by land line)

**Oil and Gas Field**

2.02 ESSO Headquarters

2.02 Flounder Platform

**DISTRIBUTION OF STORM WARNINGS FOR THE HIGH SEAS ON 26/12/98**

(These are intended for large ships outside coastal waters)

The time of dispatch is shown before each addressee.

**Issued From SYDNEY at 0315UTC (2.15pm local time)**

2.25 INMARSAT  
2.27 Radio VIS Sydney  
2.27 Radio VIM Melbourne  
2.27 Penta Comstat  
2.27 Australian Volunteer Coast Guard, Sydney  
2.25 AMSA  
2.27 Sydney Ports Corporation

**Issued From MELBOURNE at 0600UTC (5.00pm local time)**

5.52 INMARSAT  
5.54 Radio VIM Melbourne  
5.54 Penta Base  
5.54 Victorian Water Police  
5.54 Coast Guard Sandringham  
5.54 Coast Guard Loch Sport  
5.54 Coast Guard Mallacoota  
5.52 Nowra Navy Defence Centre  
5.54 ESSO Barry Beach

**Notes:**

1. INMARSAT is the means of sending forecasts and warnings to larger ships at sea. Messages are received automatically on the bridge within a minute or so of issue from a Regional Forecasting Centre
2. VIM Melbourne broadcasts forecasts and warnings for the High Seas from 28S to 50S, 129E to 160E. VIS Sydney broadcasts forecasts and warnings only for the High Seas from 28S to 38S, NSW coast to 160E.

2.2.1.3 Whenever a Member responsible for the issue of weather and sea bulletins for a given area is no longer able to provide this service, the Member should inform the Secretary-General at least six months in advance.

**2.2.2 Issue of weather and sea bulletins for the high seas**

2.2.2.1 Weather and sea bulletins for the high seas shall include, in the order given hereafter:

Part I - Storm warnings;

Part II - Synopsis of major features of the surface weather chart and, to the extent possible, significant characteristics of corresponding sea-surface conditions;

Part III - Forecasts.

2.2.2.2 Weather and sea bulletins for the high seas should, in addition, include the following parts:

Part IV - Analyses and/or prognoses in IAC FLEET code form;

Part V - Selection of reports from sea stations;

Part VI - Selection of reports from land stations.

NOTES: (1) The reports included in Part VI should be for a fixed selection of stations in a fixed order.

(2) Parts IV, V and VI may be issued separately.

2.2.2.3 Major changes in form and content of warnings, synopses and forecasts should be announced at least six months prior to the effective date of the change.

2.2.2.4 Information on broadcast schedules and contents of bulletins shall be conveyed to the WMO Secretariat for inclusion in WMO Publication No. 9, Volume D - Information for shipping.

2.2.2.5 For areas for which more than one Member has assumed responsibility, a common system of indicating forecast areas should be evolved by the Members concerned.

2.2.2.6 The basic meteorological information used for weather and sea bulletins relating to adjacent or overlapping areas of responsibility should be co-ordinated.

2.2.2.7 Weather and sea bulletins shall be issued by radio at least twice daily.

2.2.2.7.1 In fixing the time of broadcast of weather and sea bulletins, Members shall take into consideration the watch-keeping periods of the radio operators in all the areas to which these bulletins apply, as well as the transmission times of weather reports by ships.

2.2.2.7.2 In arranging the times of broadcast of weather and sea bulletins, Members should co-ordinate these with adjacent areas in order to stagger transmission times.

2.2.2.7.3 The transmission of Part I of the weather and sea bulletin shall commence at a scheduled time and be followed immediately by Part II and then Part III.

2.2.2.8 Warnings, synopses and forecasts shall be given in plain language.

2.2.2.8.1 Warnings, synopses and forecasts should be broadcast in the language of the issuing Member and in English.

2.2.2.8.2 Where bulletins are being transmitted by radiotelegraphy and English cannot be used, the MAFOR code form shall be used as a substitute for the forecast in English.

2.2.2.8.3 The language of the synopsis should be as free as possible from technical phraseology.

2.2.2.8.4 The terminology in weather and sea bulletins should be in accordance with the "Multilingual list of terms used in weather and sea bulletins".

NOTE: The "Multilingual list of terms used in weather and sea bulletins" is given in Annex I-2.A of the *Guide to Marine Meteorological Services* (WMO-No. 471) and in Appendix I.2 hereto.

### 2.2.2.9 INDICATION OF WIND

2.2.2.9.1 Wind direction shall be given in points of the compass and not in degrees.

2.2.2.9.2 Wind force should be given in Beaufort notation or wind speed in metres per second or in knots. If metres per second or knots are used, the words "metres per second" or "knots" shall be included in the text of the message.

NOTE: The criteria of the Beaufort notation of wind force are given in Appendix I.3.

### 2.2.3 Warnings

2.2.3.1 Warnings shall be given for gales (Beaufort force 8 or 9) and storms (Beaufort force 10 or over), and for tropical cyclones (hurricanes in the North Atlantic and eastern North Pacific, typhoons in the Western Pacific, cyclones in the Indian Ocean and cyclones of similar nature in other regions).

NOTE: Definition of a tropical cyclone is contained in the *International Meteorological Vocabulary* (WMO-No. 182) and classification of tropical cyclones is left to the Regions concerned.

2.2.3.2 The issue of warnings for near gales (Beaufort force 7) should be an optional service.

2.2.3.3 Warnings for gales, storms and tropical cyclones should have the following content and order of items:

- (a) Type of warning;
- (b) Date and time of reference in UTC;
- (c) Type of disturbance (e.g. low, hurricane, etc.) with a statement of central pressure in hectopascals;
- (d) Location of disturbance in terms of latitude and longitude or with reference to well-known landmarks;
- (e) Direction and speed of movement of disturbances;
- (f) Extent of affected area;
- (g) Wind speed or force and direction in the affected areas;
- (h) Sea and swell conditions in the affected area;
- (i) Other appropriate information such as future positions of disturbances.

2.2.3.3.1 Items (a), (b), (d), (f) and (g) listed under 2.2.3.3 shall always be included in the warnings.

2.2.3.4 In addition to indicating the positions of pressure disturbances in terms of latitude and longitude, or with reference to well-known landmarks, the boundaries of the existing and forecast storm-wind area or areas of high waves should be indicated.

NOTE: The usual practice in warnings is to indicate boundaries with reference to the centre of the pressure disturbance, or to divide the disturbance (low, tropical cyclone) into sectors for which prevailing and forecast conditions are described.

2.2.3.4.1 When warnings are included for more than one pressure disturbance or system, the systems should be described in a descending order of threat.

2.2.3.4.2 Warnings shall be as brief as possible and, at the same time, clear and complete.

2.2.3.5 The time of the last location of each tropical cyclone or extra-tropical storm shall be indicated in the warning.

2.2.3.6 A warning shall be issued immediately the need becomes apparent.

2.2.3.6.1 When no warnings for gales, storms or tropical cyclones are to be issued, that fact shall be positively stated in Part I of each weather and sea bulletin.

## 2.2.2 **Issue of weather and sea bulletins for coastal and off-shore areas**

2.2.2.1 Coastal and off-shore areas for which Members issue weather and sea bulletins (called Group B bulletins) shall be clearly defined.

2.2.2.2 Information on broadcast schedules, the content and forecast areas of Group B weather and sea bulletins shall be conveyed to the WMO Secretariat for inclusion in WMO Publication No. 9, Volume D - Information for shipping.

2.2.2.3 Weather and sea bulletins for coastal and off-shore areas shall include:

- (a) Warnings;
- (b) Synopses;
- (c) Forecasts.

NOTE: Weather and sea bulletins for coastal and off-shore areas may, in addition, include meteorological reports from selected coastal stations, ships and other sea stations.

2.2.2.4 Additional procedures for the issue of weather and sea bulletins for coastal and off-shore areas shall include those specified for bulletins for the high seas as follows:

Announcement of bulletin content	: 2.2.2.3
Broadcast by radio	: 2.2.2.7 and 2.2.2.7.2
Language and terminology	: 2.2.28 and subparagraphs
Indication of wind	: 2.2.2.9 and subparagraphs

NOTE: Various modes of radio broadcast are possible: telegraphy, telephony, facsimile and/or public radio; they may be chosen taking into account the needs and capabilities of marine users in the area covered by the bulletin.

## 2.2.3 **Warnings**

2.2.3.1 When included warnings shall be placed at the beginning of the bulletin.

2.2.3.2 Warnings shall be given for the following phenomena:

- (a) Tropical cyclones and associated phenomena;
- (b) Gales and storms;
- (c) Ice accretion.

2.2.3.2.1 In addition, warnings should be given for:

- (d) Restricted visibility (one nautical mile or less);
- (e) Unusual and hazardous sea-ice conditions;
- (f) Storm-induced water-level changes.

NOTE: Warnings for phenomena (e) and (f) may be the responsibility of more than one national agency or authority.

2.2.3.2.2 Warnings should include, whenever possible, the times when unfavourable weather and sea conditions are expected to begin and end.

2.2.3.3 Additional procedures for the issue of warnings for coastal and off-shore areas shall include those specified for warnings for the high seas as follows:

Warnings for near gales (Beaufort force 7)	: 2.2.3.2
Content of warnings and order of items	: 2.2.3.3
Boundaries of areas of storms or high waves	: 2.2.3.4
Descriptions of more than one system	: 2.2.3.4.1
Brevity and clarity of warnings	: 2.2.3.4.2

Location of tropical cyclones or other storms	: 2.2.3.5
Issue of warnings	: 2.2.3.6
Updating of warnings	: 2.2.3.6.2

2.2.3.4 Members establishing a new visual warning signal should select the appropriate one from the International System of Visual Storm Warning Signals.

NOTE: The international System of Visual Storm Warning Signals is given in Appendix II.I to this *Manual*.

#### 2.2.4 *Synopses and forecasts*

2.2.4.1 Date and time of reference in UTC shall be added to the synopsis of major features of the surface weather chart.

2.2.4.2 The forecasts should have the following content:

- (a) The valid period of forecast;
- (b) Name and designation of forecast area(s);
- (c) A description of:
  - (i) Wind speed or force and direction;
  - (ii) Visibility when forecast to be less than six nautical miles (10 km);
  - (iii) Ice accretion, where applicable;
  - (iv) Sea and swell.

2.2.4.3 Additional procedures for the inclusion of synopses and forecasts in bulletins for coastal and off-shore areas shall include those specified for bulletins for the high seas as follows:

Descriptions of systems and phenomena	: 2.2.4.2 and 2.2.5.1.1
Indication of movement of systems	: 2.2.4.3
Indication of valid period	: 2.2.5.2
Indication of visibility	: 2.2.5.3
Indication of units	: 2.2.4.3.1 and 2.2.5.3.1

#### 2.2.5 *Sea-ice bulletins*

2.2.5.1 Sea-ice bulletins shall be issued during the ice season.

NOTE: The issue of sea-ice bulletins may be the responsibility of more than one national agency or authority.

2.2.5.2 Sea-ice terminology, codes and symbols used in sea-ice bulletins shall not be in conflict with the *WMO Sea-Ice Nomenclature* (WMO-No. 259)

#### 2.2.6 *Data information services*

Data from observing stations established for the specific purpose of marine meteorological services for coastal and off-shore areas should be preserved and stored in an easily retrievable form.

NOTE: Some stations may be the responsibility of more than one national agency or authority.

#### 2.2.7 *Climatological services*

2.2.7.1 The network of climatological stations, established in accordance with Technical Regulations [A.1.1.] 3.2.1 and [A.1.1.] 3.2.2 should give a satisfactory representation of the climate characteristics of the coasts as well as of the coastal and off-shore areas for which the Member concerned is providing marine meteorological services.

NOTE: The network may include special observing stations operating over periods of less than ten years.