

**HMAS SYDNEY II Commission of Inquiry
Statutory declaration of SCOTT JAMES RIVETT**

Commonwealth of Australia

STATUTORY DECLARATION

Statutory Declarations Act 1959

I, **SCOTT JAMES RIVETT** of [REDACTED] in the State of New South Wales, Naval Officer, make the following declaration under the *Statutory Declarations Act, 1959*:

1. I am a Lieutenant in the Royal Australian Navy. I am a Seaman Officer specialised as a Maritime Geospatial Officer – Meteorology, and currently work as a watch keeper providing weather briefs and forecasts for ADF units deployed in theatres around the world including the Western Australian Exercise Area. When on watch in 2008 I provided weather forecasts covering the period of the final search for the SYDNEY. My qualifications specific to this inquiry are:

- a. Graduate Diploma Meteorology, through the Australian Bureau of Meteorology (BOM) 2007.
- b. Intermediate navigation course (Patrol Boat navigation course), through the Royal Australian Navy 2001.

2. The meteorology course is the required qualification to conduct forecasting in Australia.

3. I have served thirteen years in the defence forces and have spent six years posted to sea going vessels including a Fleet Base West based frigate, two Cairns Based patrol boats, and have had command of an Iraqi patrol boat as part of a coalition military training team to Iraq in 2004. Of note the suite of basic seaman officer skills developed and maintained while posted to sea going vessels include reading flag hoists, station keeping (on other vessels), ship handling, and ships boat operations.

4. In making my assessment of the impact of meteorological conditions on the 19th November 1941 on the SYDNEY and the KORMORAN I was given access to archived exhibits to the Parliamentary Inquiry including, but not limited to, routing charts for the Indian ocean, previous studies of the conditions at the time, and CSIRO modelling of ocean currents. I note that the majority of the exhibits were focused on finding the location of the SYDNEY not on impact of the weather conditions on either ship.



Accuracy of previously conducted meteorological work

5. The key features of the Western Australian weather patterns that dominate the waters where the SYDNEY rests are a semi-permanent anticyclone (high pressure system) in the east Indian Ocean and a coastal or inland trough that forms from Cape Leeuwin to the North West Cape. These two features combine to direct a south to south easterly flow at about 17-22knots for most of the late spring and summer. This seasonal flow is indicated on routing charts held in the archives relating to this inquiry. This flow generates a sea state of four with waves of 2 to 2.5 metres.

6. Mean sea level pressure (MSLP) charts off the coast of Western Australia were not available on 19th November 1941. A study entitled "AN ANALYSIS OF WEATHER CONDITIONS OFF THE COAST OF SHARK BAY IN NOVEMBER 1941" by Len VAN BURGEL was published 24 February 2008. This paper reviews previous work done in 1991 (Courtney, J.; Southern, R.; Steedman, R. & McCormack, M.) where efforts were made to extrapolate known pressure fields over the ocean and also where pattern matching of recent, similar, MSLP analysis was done. The method used to convert SLP to MSLP utilises the hydrostatic approximation and non-trivial (not equal to zero) solutions to the equations governing unsteady, compressible viscous flows (also known as the Navier-Stokes equations). Basically put, this allows you to take into account the height of an observation of pressure and convert it to the pressure it would equate to at the surface.

7. Once the MSLP conversions were done the next, and more difficult, step taken was to correlate the data from 19th November 1941 to archived MSLP charts held by the Bureau of Meteorology, and to find if any pattern matched the known conditions on the day. Additional weighting of correlation strength was given to any matching patterns found from after 2003; as they could be matched to satellite observations of sea surface derived wind speeds. From the pattern matching technique a wind speed and direction can be arrived at and from that it is simple to infer the conditions at sea off the WA coast on the day. I note that the weather pattern described by the study is an historically expected pattern for that time of year, and ties in with eye witness accounts. The strength of the approach taken is that it seeks to generate a synoptic pattern not a localised one. A synoptic scale pattern is easier to match than a localised pattern as small effects (such as the lee effects of hills, friction, turbulence, and other similar effects) can be averaged out.

Environmental impacts.

8. In my assessment of the impact of the environmental conditions on the SYDNEY – KORMORAN interaction I make the following assumptions:

- a. KORMORAN initially sighted the SYDNEY fine on her starboard (right) bow and altered course to port to a new course of between 250 – 260 degrees true at speed 10 – 15 knots. This would place the SYDNEY on the starboard quarter of the KORMORAN after KORMORAN's alteration of course.

- b. KORMORAN did not significantly alter her course or speed after the initial alteration.

9. I believe it likely that KORMORAN would have made the first sighting as the SYDNEY had a greater mast height. The reason for this is that due to the curvature of the Earth you will first see the top of an object at great distance and then the middle and eventually the base. Thus SYDNEY's masts would have become visible to KORMORAN before KORMORAN's lower mast tops would have been visible to SYDNEY assuming that SYDNEY and KORMORAN lookouts were at approximately similar heights above sea level and of similar skill as lookouts.. This means that the KORMORAN has greater reaction time than the SYDNEY and her subsequent course alteration increases the time it would take for the SYDNEY to close the range. Time was an issue in this engagement as only about three hours of light remained for the SYDNEY to identify the KORMORAN before an evening of total darkness followed.

10. I assess that the environmental data relevant to the SYDNEY – KORMORAN engagement is as follows, and will address the implications of these conditions based on my experiences at sea in various roles within the chain of command.

- a. Wind: from 160 degrees at 15-25 knots.
- b. Weather: Less than ¼ of the sky covered by cloud (inferred by the expected weather on the eastern side of a high pressure system north of the ridge).
- c. Visibility: 15 to 20 nautical miles (27-37km).
- d. Sea: From 160 at 2 to 2.5 metres.
- e. Swell: from a southerly direction, 1.5 to 2.5 metres, greater than 11 second period.
- f. Sunset: 1905, bearing 248 degrees true.
- g. Moonset: 1925 (a new moon).

11. Additionally I assess that the maximum range at which an experienced officer or signalman could read flags in these conditions would be 10000 yards (5nM) for a flag hoist that you were expecting to see, however it is more likely that with an unfamiliar flag hoist this would reduce significantly.

Impact of Wind

12. A wind from 160 at 15 to 25knots would mean that any flag hoist would be flying in a direction of 320 for a stationary ship. With a course and speed 260 at 10knots the flags would be flying approximately 20 degrees abaft the starboard beam. With a course and speed of 250 at 14knots, the relative wind across the deck would have been 016 at 25knots on Relative Green 125. This would mean that the SYDNEY





(initially positioned between the starboard quarter and right astern of the KORMORAN) would have any flags hoisted flying near to end-on towards her. In a starboard quarter to astern position, however, the visibility of a flag hoist may have been obscured by super structure or heat induced haze from the KORMORAN's funnel.

Impact of weather and visibility

13. The location of the engagement relative to the Indian Ocean anticyclone would have meant very little cloud cover in the area as the strong inversion layer associated with an anticyclone effectively prevents any significant convective cloud forming and the easterly component of the wind indicates a dry continental origin. Visibility would have been very good and the upper decks and masts of an approaching ship would have been sighted long before the hull.

Sea and Swell

14. The sea and swell conditions would have had a marginal impact on the ability of personnel to perform their basic duties. The conditions would have had a moderate impact on the ability of personnel to perform complex or difficult duties such as launching boats and planes. This impact would have increased as the ship altered across the swell and sea (and a course of 260 puts the KORMORON beam on to the swell) however it would not have impaired the capability of either ship to fire weapons.

15. The state of the sea would have represented a moderate impact on the ability of a ship to launch a boat. Additional manning would have been required to safely handle the boat lines (to control the movement of the boat while being lowered to the water) to prevent the boat smashing against the side of the ship. Furthermore the time taken to launch a boat would be increased (in comparison to a smooth or slight sea) as personnel lowering a boat would have to wait for a suitable roll of the ship between movements. Generally any boat being sent from one vessel to another in these weather conditions would likely be sent down sea (from the south) so as to reduce the impact of the sea state and any wind blown spray on the boat personnel.

16. I do not know the ship operating limits specified for the sea plane embarked in the SYDNEY, however with a moderate swell and a moderate sea state I would advise that at least a moderate impact on flight operations would have been experienced. Another consideration in this matter is the recovery of the aircraft, via crane from the sea surface, which would have been a dangerous evolution in the sea and swell conditions on the day.

Sunset and Moonset

17. The setting sun would have been on a bearing of about 248 degrees and although the reported time of the commencement of manoeuvring between SYDNEY and KORMORAN is about three hours before sunset I believe that if SYDNEY were positioned somewhere between the starboard quarter and right astern of the KORMORAN the sun would have made reading flags more difficult as they would be backlit rather than illuminated.

18. The most dramatic impact of the ephemeral data is that an evening of total darkness would follow the sunset. Both ships would have been well aware of this fact as sunset and moonset timings are calculated well before sunset every day in order (tactical issues aside) to darken the ship for night time operations.

Overall impact of ephemeral and environmental conditions

19. The overall impact of the environment conditions would have been to reduce the range at which a flag hoist could be read, identification progressed and to place a time constraint on any course of action chosen by SYDNEY.

Additional considerations

20. I assess that the work done on ascertaining the wind conditions on the 19th November 1941 was valid and accurate. The KORMORAN's stated alterations and final course would have positioned her flag hoist such that it could have impacted significantly on the ability of SYDNEY to identify the KORMORAN.


21. Knowing that an evening of total darkness was coming would have impacted on the decision making process for a ship without the radars and sensors that we can take for granted today.

I understand that a person who intentionally makes a false statement in a statutory declaration is guilty of an offence under section 11 of the *Statutory Declarations Act 1959* and I believe that the statements in this declaration are true in every particular.

Declared at SYDNEY on the 19 of January 2009



Before me



JOSHUA NOTTLE

Legal Practitioner

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