13.5 GALLERY

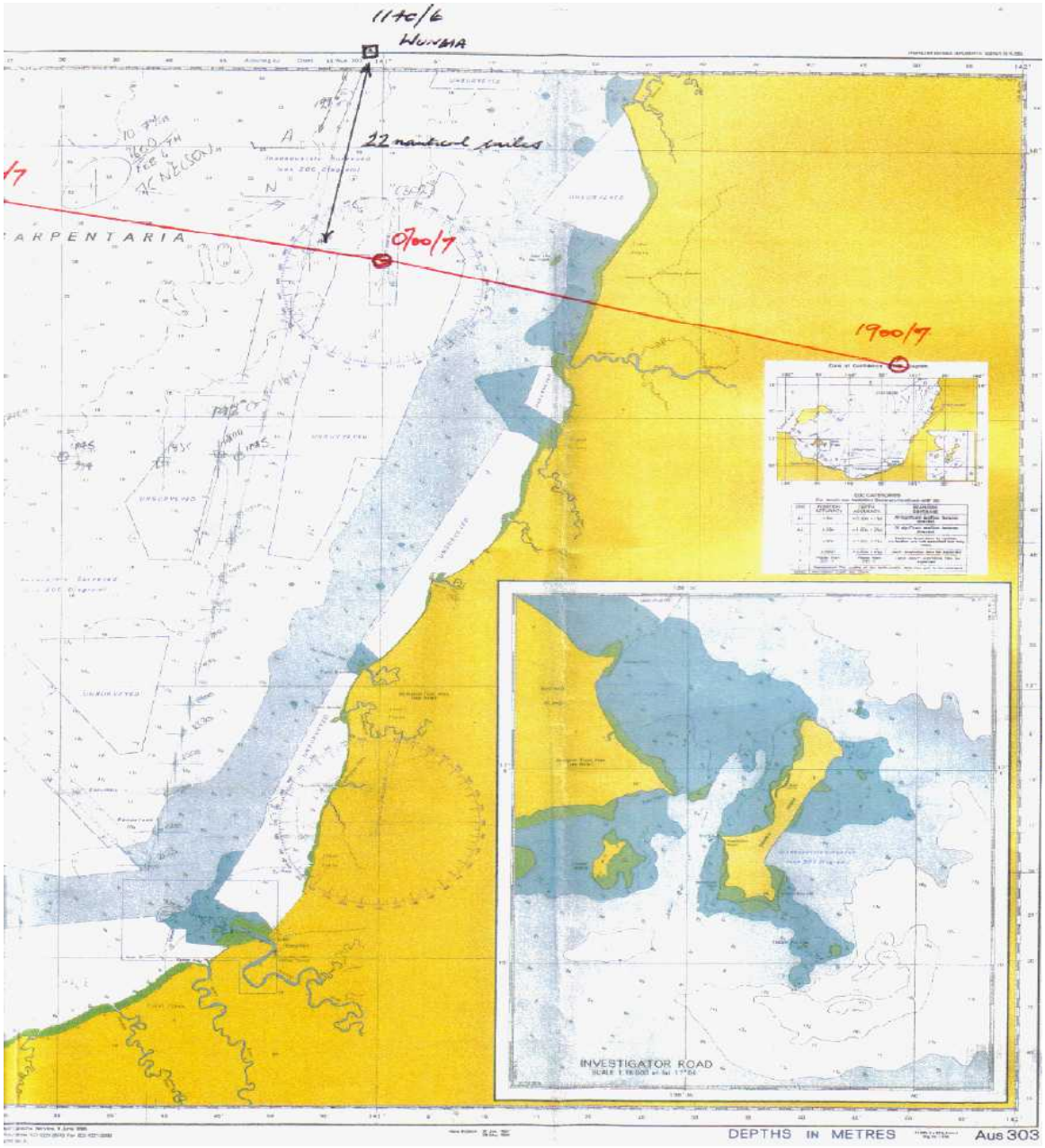


Figure 1 - Simple Plot of the Position of the *Wunma* Relative to the Predicted Path of Tropical Cyclone Nelson

Figure 2 - Showing the Actual Position of the *Wunma* and Tropical Cyclone Nelson at 1000 Hours on 6 February 2007

Figure 3 - Showing the Predicted Positions of the *Wunma* and Tropical Cyclone Nelson at 1140 Hours on 6 February 2007

Figure 4 - Showing the Predicted Positions of the *Wunma* and Tropical Cyclone Nelson at 1240 Hours on 6 February 2007

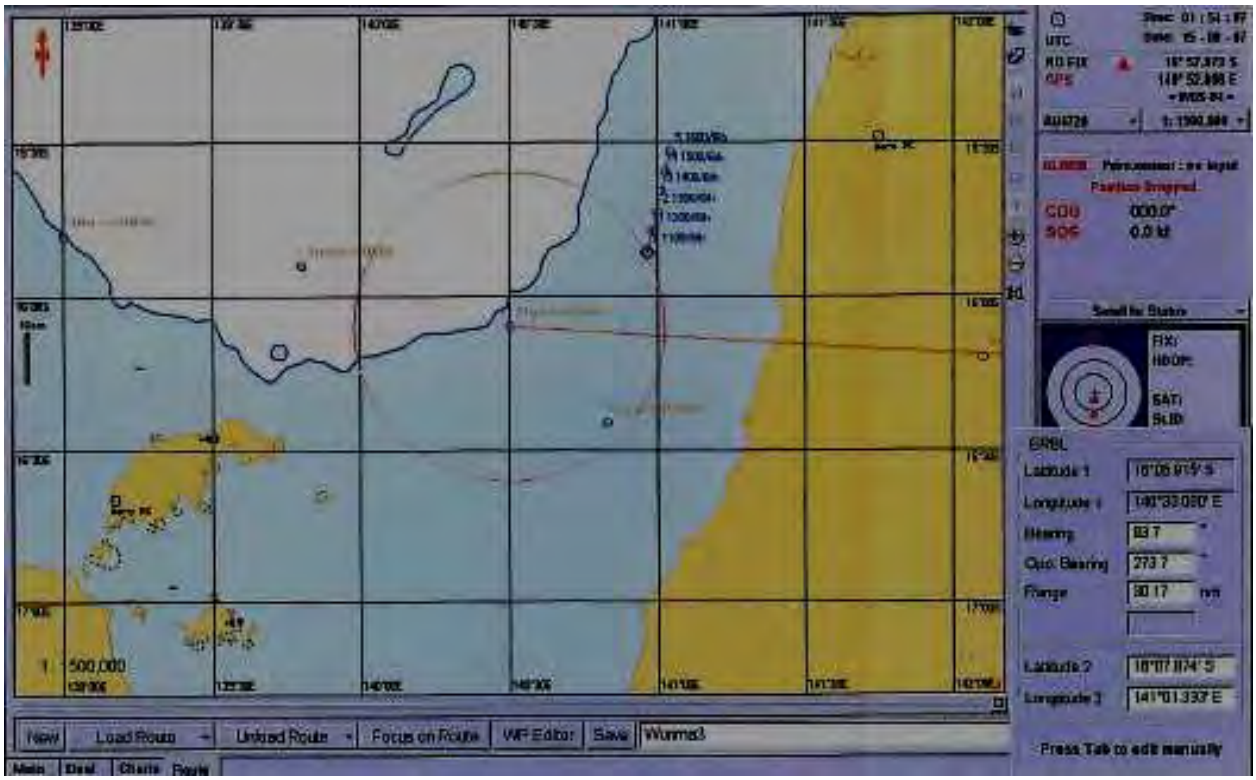


Figure 5 – Showing the *Wunma* and the Relative Track of the *Wunma* at 1530 Hours on 6 February 2007 had the Master Maintained a Northerly Heading

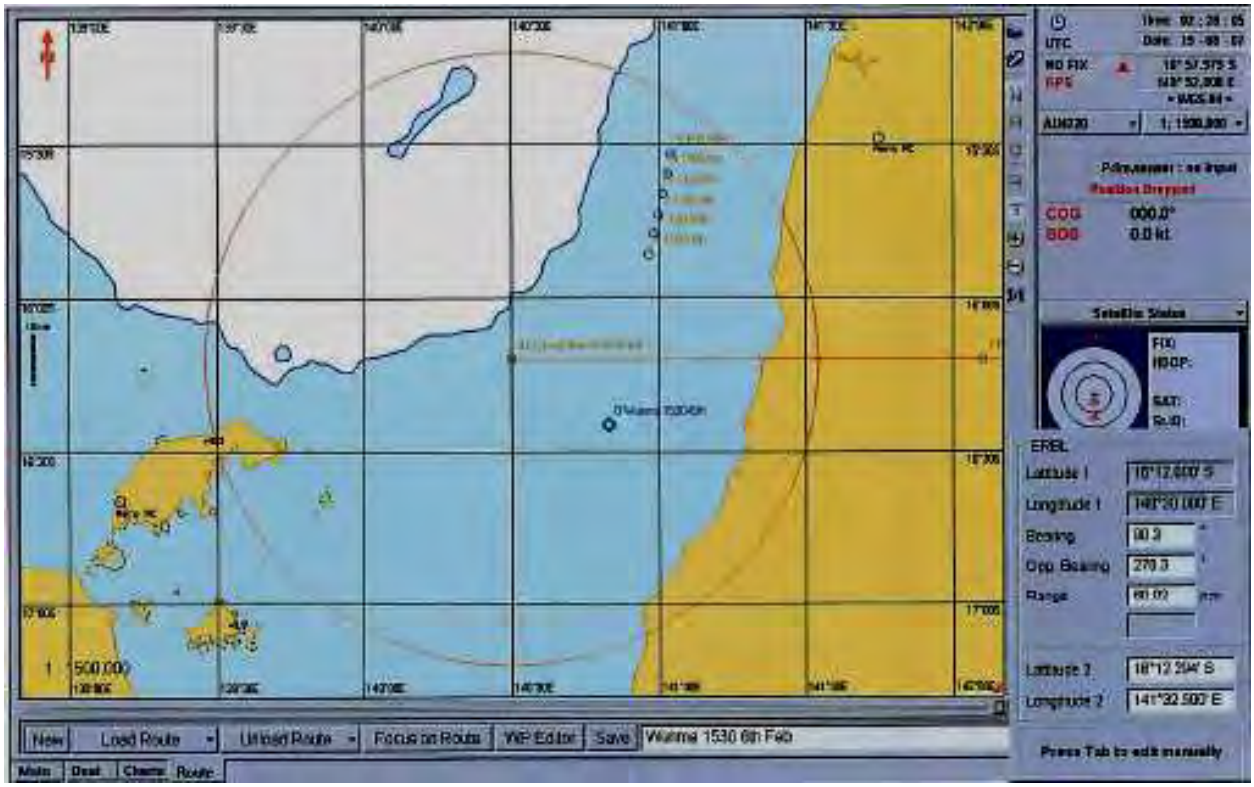


Figure 6 - Area Forecast to be affected by Tropical Cyclone Nelson at 1600 Hours on 6 February 2007 (Within a 60 Nautical Mile Radius of the Centre)

WUNMA BOARD OF INQUIRY

CHAPTER 14: THE IMMEDIATE RESPONSE TO THE INCIDENT

TABLE OF CONTENTS

WUNMA BOARD OF INQUIRY

CHAPTER 14: THE IMMEDIATE RESPONSE TO THE INCIDENT

14.1 OVERVIEW

[1] One of the Terms of Reference is as follows:

> "The adequacy and effectiveness of the response to the Incident including search and rescue procedures, salvage arrangements and the determination and provision of a port of safe haven."[1]

14.2 SEARCH AND RESCUE

[2] The Master and crew of the *Wunma* were evacuated by helicopter in two successive trips at 1130 hours and 1300 hours on 7 February.[2] According to Captain Seal, when the ship was abandoned, she was:

> "securely anchored and a considerable distance from a lee shore. Communication was via VHF only. There was some power to the ship but only to the non-essential circuits."[3]

[3] Reference has been made to the fact that certain information was not conveyed to the Master of the *Eastern Star* to enable it to be relayed to the *Wunma*. That aside, there is no basis to criticise the search and rescue procedures implemented during or immediately after the incident, whether on grounds of their effectiveness or adequacy or otherwise. To the contrary, the actions taken to establish communications via the *Eastern Star*,[4] to conduct aerial reconnaissance of the ship, to drop pumps to assist the discharge of water and to rescue the Master and crew from the ship[5] were all undertaken quickly and efficiently.

[4] There is nothing more that could have been done to assist the Master and crew, or the ship, in the circumstances that then prevailed.

14.3 SALVAGE

[5] Following the evacuation of the Master and crew, an Emergency Rescue Team was formed by Zinifex and proceeded with pumps and other equipment to the *Wunma*

---

1 Para 8 of the Terms of Reference; Exhibit 1.
2 Statements of Captain Seal - 26 February 2007 and 2 August 2007; Exhibit 18.
3 Statement of Captain Seal - 2 August 2007; Exhibit 18; p.18.
4 Statement of Mr Bull - 2 August 2007; Exhibit 60.
5 Statement of Mr Dorr - 12 June 2007; Exhibit 62; Statement of Mr Huggett - 30 July 2007; Exhibit 64; Statement of Sgt Sweeney - 10 July 2007; Exhibit 72.

during the afternoon of 7 February.[6] The pumps were placed aft and put into operation to transfer water and concentrate slurry from the cargo hold to the ballast tanks.[7]

[6] Zinifex can hardly be criticised for acting promptly to render assistance in all of the circumstances. However, the intervention of Zinifex in this regard and the subsequent assembly of an Electrical Team that went to the ship on the fishing vessel *Vixen II*, should have been the subject of better communication between Zinifex and the relevant authorities.

[7] As matters transpired, the use of a fishing vessel to transport Zinifex personnel to the ship led to the issuing of a Marine Infringement Notice to the Master of the *Vixen II*, with Queensland Transport authorities adopting the view that the Master should have applied for a Restricted Use Flag for the purpose of taking personnel to the *Wunma*.[8] This aroused ill-feeling in the community. A local resident wrote to the Board:

> "Karumba has always been a community that is a natural self starter in the event of any problem, using any resource available, the community is greatly disturbed that some of the "helpers" in the "Wunma" event were penalized for technical lawbreaking actions. The general feeling is that Authorities who cannot control foreign Poachers can nevertheless penalize a local who cannot run away and was trying to help. If ever we need these people in the future, I know what the answer will be. Actions like this cannot be undone."

[8] It is unfortunate that there was not better communication about the proposed use of fishing vessels so that the Queensland authorities could have promptly approved their use so as to avoid the Master of the *Vixen II* being penalized for operating a fishing ship in contravention of registered conditions.

[9] That said, the intervention of the Zinifex Emergency Rescue Team and its Electrical Team to stabilise the situation and restore power was appropriate. Better communication about their proposed intervention, and co-ordination and authorization of that intervention by the authorities could have avoided the Master of the *Vixen II* finding himself in breach of the law.

---

6 Statement of Mr Mewett - 9 August 2007; Exhibit 47; para 20(a). Mr Mewett; T.419-420.

7 Statement of Mr McDonald - 30 July 2007; Exhibit 50; para 16. The Annexure to Mr McDonald's Statement - 9 August 2007; Exhibit 50.

8 Statement of Mr Jarman - 6 June 2007; Exhibit 66.

[10] On 7 February, Mr Shannon - a Salvage Master employed by United Salvage Pty Ltd ("United") – was contacted by Inco for assistance. A Lloyd's standard form of Salvage Agreement was entered into for that purpose.[9]

[11] In company with Mr Skola – a Senior Salvage Engineer who was also employed by United – Mr Shannon proceeded to Karumba to join up with other personnel before boarding the *Wunma* on the evening of 7 February.[10] There they were greeted by the Zinifex personnel who were on board and, after a short meeting, those personnel departed the ship, leaving the salvage team to continue the work of transferring the water and slurry from the cargo hold to the ballast tanks. The salvage team was requested by Zinifex not to discharge any water or slurry into the sea and, accordingly, all liquids from the holds and the aft well deck were pumped to the ballast tanks.[11]

[12] At approximately 2300 hours on 7 February, an Electrical Team assembled by Zinifex arrived at the *Wunma* to assess the damage to the electrical circuitry and communications systems.[12] Mr McDonald, along with the Chief Engineer and the First Engineer accompanied this Team.[13] At that time, the ship was at anchor, the generators were still running and the pumps had removed some water from the cargo hold. Mr McDonald noticed that the water in the well deck was about halfway up the stern door, and about halfway up the space in the emergency generator room and the same distance on the port side.

[13] The Electrical Team found that there was no power to the GMDSS equipment because the batteries were run down. The battery charger was then rewired to the main power circuit and supply was restored to the GMDSS equipment. Once that occurred, communications via VHF, Sat Comm C and satellite telephone became operational.[14]

[14] Once the water levels in the cargo hold had been reduced to an acceptable level and reports on the condition of the *Wunma* were made to AMSA and to Captain Boath,[15]

---

9 Statement of Mr Shannon; Exhibit 70. Statement of Captain Watkinson; Exhibit 119; paras 12-14.

10 *Ibid*. Statement of Mr Skola - 15 February 2007; Exhibit 71.

11 The Annexure to Mr McDonald's Statement - 9 August 2007; Exhibit 50.

12 Statement of Mr Mewett - 9 August 2007; Exhibit 47; para 20(b). Mr Mewett; T.420; Statement of Mr Jarman - 6 June 2007; Exhibit 66.

13 The Annexure to Mr McDonald's Statement - 9 August 2007; Exhibit 50; paras 12-14.

14 Report of Captain White - 5 September 2007; Exhibit 114; para 5.3.15.

15 Statement of Mr Shannon; Exhibit 70; para 13.

attention turned to arrangements for the ship to be towed to a secure location out of the weather so that the cargo could be discharged and repairs effected.[16] There were obviously only two real alternatives in this regard – the Ports of Karumba and Weipa. However, given the narrow entrance to the Karumba Channel, it was determined that the Port of Weipa offered the "simplest solution for ease of access and provision of shelter whilst effecting repairs".[17]

[15] A decision was accordingly made in consultation with MSQ and MERCOM[18] to tow the ship to Weipa. Mr Huggett completed a risk assessment in conjunction with Captain Boath based on reports about the condition of the ship provided by the salvors.[19]

[16] This was in turn provided to Ports Corporation Queensland and Comalco. Each had reservations based on "safety, environmental and port infrastructure issues" but, in the end, permission was granted for the *Wunma* to enter the Port of Weipa[20] on condition that Zinifex provide appropriate indemnities.[21]

[17] An ocean going tug – *The Pacific Responder* – was chartered to tow the ship to Weipa[22] and arrived alongside the *Wunma* on 9 February and, by 1442 hours on the following day, the tow was underway.[23]

[18] By 0745 hours on Monday, 12 February, the *Wunma* had reached the Weipa Channel and, at 1018 hours, the vessel was anchored in the Weipa Emergency Anchorage under direction of the Pilot.[24] On Tuesday, 13 February, the Salvage Agreement terminated and the *Wunma* departed the emergency anchorage at 1110 hours and berthed alongside Humbug Point at 1305 hours.[25]

[19] After arrival in Weipa, Zinifex oversaw remedial work until the *Wunma* was re-commissioned. Zinifex also allocated maintenance, resources and personnel to

---

16 Statement of Mr Huggett - 30 July 2007; Exhibit 64; para 20.

17 *Ibid*; para 22.

18 Marine Emergency Response Commander (AMSA).

19 Statement of Captain Boath - 3 August 2007; Exhibit 90; para 60. Statement of Mr Huggett - 30 July 2007; Exhibit 64. Statement of Captain Watkinson - 30 July 2007; Exhibit 119; paras 12-14.

20 *Ibid*; paras 24 and 25.

21 Mr Mewett; T.434. The Annexure to Mr McDonald's Statement - 9 August 2007; Exhibit 50.

22 Statement of Mr Mewett - 9 August 2007; Exhibit 47; para 20(c). Mr Mewett; T.421. The Annexure to Mr McDonald's Statement - 9 August 2007; Exhibit 50.

23 The Annexure to Mr McDonald's Statement - 9 August 2007; Exhibit 50.

24 The Annexure to Mr McDonald's Statement - 9 August 2007; Exhibit 50.

25 The Annexure to Mr McDonald's Statement - 9 August 2007; Exhibit 50. Statement of Mr Shannon - 15 February 2007; Exhibit 70; paras 15-19.

support Inco to complete any remaining maintenance issues observed either during the incident or after it. [26]

[20] The salvage arrangements for the *Wunma* were both effective and adequate in all of the circumstances.

14.4 A PORT OF SAFE HAVEN

[21] The management of the incident became the responsibility of AMSA Pollution Response Unit as the lead agency and MSQ became involved through the National Maritime Plan Arrangements as the support agency.[27]

[22] MSQ is the State Government agency responsible for the regulation of the safety of ships and their operation and, relevantly, has responsibility for the prevention of pollution from ships. It works closely with other government agencies, including AMSA. AMSA provided support to MSQ, and vice versa. The Board should report that coordination of matters between them was efficient and effective.

[23] The current legislative framework regarding marine pollution in Queensland waters appears in the *Environmental Protection Act* 1994 ("EP Act") and the *Transport Operations (Marine Pollution) Act* 1995 ("*the MARPOL Act*")[28]. Because of the limits of Queensland's jurisdiction in the territorial sea, the *MARPOL Act* only deals with discharges from ships that happen, or are taken to happen, in the first three nautical miles of the territorial sea and other coastal waters subject to the ebb and flow of the tide.[29]

[24] The *National Plan to Combat Pollution of the Sea by Oil and other Noxious and Hazardous Substances* provides a national framework for responses to marine pollution incidents. As part of the intergovernmental agreement reflected by that plan, the EPA has an advice and support role to MSQ on marine pollution issues.

[25] MSQ was involved in a variety of respects in responding to the incident. This included the involvement of the Vessel Traffic Services in Cairns in relaying

---

26 Statement of Mr Iuliano - 31 July 2007; Exhibit 65.

27 Statement of Captain Boath - 3 August 2007; Exhibit 90; para 60. Statement of Captain Watkinson - 30 July 2007; Exhibit 119; para 10.

28 See in particular section 23 of the EP Act and sections 3, 11, 14 and 23 of the *MARPOL Act.*

29 Section 11.

communications to the *Eastern Star*. The Regional Harbour Master (Cairns) was involved in, and monitored, these developments.

[26] On 7 February the General Manager of MSQ, Captain Watkinson, was in Bundaberg and, in the circumstances, he asked the Director (Maritime Services), Mr Huggett, to act on his behalf in relation to the incident. Mr Huggett liaised with AMSA in order to clarify matters of jurisdiction. MSQ's view was that the search and rescue response in Commonwealth waters was a matter for AMSA. But because the ship was a Queensland registered ship, and there was a real possibility of marine pollution, MSQ formed the view that it should be involved in the response to the incident in consultation and cooperation with AMSA. Mr Huggett had the day-to-day management of MSQ's response. The documents and other evidence reviewed by the Board indicate that MSQ's response was appropriate and efficient.

[27] As previously noted, in the days immediately after the incident issues arose in arranging the ship's entry into the Port of Weipa. The matter was inevitably complicated by concerns by interested parties, including Comalco, about possible disruption to operations in the Port of Weipa. These concerns may have been overstated due to a lack of information about the nature and extent of the risks involved. MSQ correctly took the view that the threat of a pollution incident would be significantly minimised if the vessel could be secured within the relatively calm waters of an appropriate port or area of sheltered water.

[28] As Mr Huggett has stated,[30] the incident did not fall "strictly under the *National Maritime Place of Refuge Guidelines* which provide guidance for dealing with ships in distress at sea" given that:

> "The situation had stabilised, the weather had abated and the ship was under the control of professional salvors."[31]

[29] Captain Watkinson was of the same view, for essentially the same reasons.[32] It is helpful to quote passages from Captain Watkinson's statement to inform parties of the interrelationship between the "place of refuge" guidelines and the powers available to Commonwealth and State authorities in the event that a similar situation arises in the future:

---

30 Statement of Mr Huggett - 30 July 2007; Exhibit 64; para 20..

31 *Ibid*; para 21.

32 Statement of Captain Watkinson - 30 July 2007; Exhibit 119; paras 20 -24.

"20. … once the salvors were on board and the cyclonic conditions had passed, although the vessel still had the potential to cause significant pollution, both from its cargo and from oil carried on board, I did not consider that the 'place of refuge' guidelines were required to deal with the tow of the ship to Weipa. The place of refuge guidelines have been approved by the National Plan Management Committee and endorsed by the Australian Transport Council (the forum of chief executive officers of Government Transport Council (the forum of chief executive officers of Government Transport Departments in Australia) in 2003, with the intention of appropriately managing ships that become casualties in order to prevent and minimise marine pollution.

21. I formed the view that the place of refuge guidelines did not apply to this incident because:

    a. there were no crew on board, save for the salvors and the chief engineer;

    b. professional salvors were in charge of the ship and the tow;

    c. heavy weather conditions were no longer present;

    d. there was no immediate danger to the ship, its cargo or to life;

    e. the ship was a 'dead ship' and so could be towed;

    f. the towing vessel was significantly equipped, powered and crewed to more than adequately respond to any incident.

22. In those circumstances, the concept of place of refuge for the ship simply doesn't apply. … The PCQ had sufficient authority and experience to approve the entry of the ship to the port of Weipa, but declined to exercise such authority.

23. However, if there had been a continuing danger to property, risk to life or a potentially serious danger to the Queensland Coastline, then I would have had no hesitation in following the guidelines and exercising my powers of intervention under Part 12 Division 7 of the *Transport Operations (Marine Pollution) Act* 1995 and my powers as a harbour master under Part 7 Division 2 of the *Transport Operations (Marine Safety) Act* 1994.

24. In such circumstances however, the Marine Emergency Response Commander (MERCOM) may have intervened under the National Marine Emergency Response arrangements as agreed under an IGA between the Commonwealth and States

and as prescribed in *Protection of the Sea (Powers of Intervention) Act 1981*."

[30] As matters transpired, the difficulties encountered in arranging the entry of the ship into Weipa were negotiated by the provision of appropriate indemnities and the helpful production of a risk assessment by MSQ based on reports about the condition of the ship provided by the salvors. But in other circumstances, for instance, in which appropriate indemnities and the like could not be resolved and provided, it would have been necessary for either the Commonwealth or State authorities to intervene by exercising powers under relevant anti-pollution and marine safety legislation.

[31] Had the *Wunma* been in a situation of distress that required a port of safe haven, the choices were limited. As Captain Boath explained in his oral evidence, the obvious choice would be the Port of Weipa, but that may not be possible if that Port is affected by the same weather conditions that put the *Wunma* in peril because the Port of Weipa would be closed to large vessels such as the *Wunma*.[33] The availability of Bing Bong as a place of refuge would also be at least potentially affected by the same concern as well as the added feature that it is outside the maritime jurisdiction of MSQ. Captain Watkinson gave evidence that while the Port of Weipa provided the most beneficial location, the sheltered waters within Albatross Bay could have provided favourable sea conditions to allow various activities to take place to stabilise the *Wunma's* condition.[34] That said, the Port of Weipa is the likely choice as a "port of safe haven" for a ship such as the *Wunma* in the event that a place of refuge is required for it in cyclonic conditions.

[32] The physical environment in which the ship operates has not materially altered since 1999. In 1999 the limited opportunities for the ship to find shelter in the Wellesley Islands, the Sir Edward Pellew group of islands (approximately 260 nautical miles North-West of Karumba) and in other locations in the Gulf were canvassed in evidence in the Federal Court proceedings. Those environmental realities remain. Experience since 1999 highlights the difficulty encountered by the ship in navigating the channel at Karumba in high winds and the relatively narrow "tidal window" that is available to it when it is loaded.

---

33 Captain Boath; T.707-723, especially 718.

34 Exhibit 119; para 13.

[33] The Port of Weipa is a remote “port of safe haven” for a ship with the speed of the *Wunma*.

[34] These considerations reinforce the need for:

- the urgent installation of a suitable cyclone mooring in the Norman River;
- improvements to the ship’s design and operating procedures to minimise the risk that it will need to seek refuge in the future in “a port of safe haven”.

WUNMA BOARD OF INQUIRY

CHAPTER 15: THE REMEDIAL RESPONSE TO THE INCIDENT

TABLE OF CONTENTS

CHAPTER 15: THE REMEDIAL RESPONSE TO THE INCIDENT

15.1 OVERVIEW

[1] After the incident, a number of steps were taken by MSQ (as regulator), by Zinifex (as owner), by Inco (as operator) and by Lloyd's Register of Shipping (as the classification society).

[2] The purpose of this Chapter is to examine the nature and timing of the remedial steps that have been carried out, to consider what is planned by way of remedial steps in the future and to make some observations about the overall adequacy of the combined efforts of those parties.

15.2 MARITIME SAFETY QUEENSLAND

[3] Following the incident, Captain Aarons travelled to Karumba and took a number of statements from the Master and crew of the ship on 8 and 9 February and also interviewed a number of other people concerning the incident.[1] On 9 February, Mr Kavanagh as Manager of Compliance, MSQ took over the conduct of the investigation.[2]

[4] Amongst other things, by Notice dated 15 February issued pursuant to Section 165 of the *Transport Operations (Marine Safety) Act*, the registration of the ship was suspended so that she could be assessed and surveyed.[3]

[5] On 17 February, a Restricted Use Flag ("RUF") was issued by Captain Boath to facilitate the discharge of the cargo from the ship. The conditions of the RUF included compliance with Lloyd's Conditions of Class and several other conditions designed to ensure a safe voyage to the Roadstead to unload.[4] The discharge was completed on 17 February and, on the following day, a further RUF was issued by Captain Boath to allow the ship to return to Karumba.[5]

[6] On 20 February, Mr Kavanagh forwarded letters to Zinifex and Inco in which he

---

1 Statement of Mr Aarons - August 2007; Exhibit 59.
2 Statement of Mr Kavanagh - 1 June 2007; Exhibit 67.
3 Statement of Captain Boath; Exhibit 90; para 67. Statement of Mr Kavanagh - 1 June 2007; Exhibit 67; Statement of Mr Bundschuh - 1 August 2007; Exhibit 94; paras 78-90.
4 Statement of Captain Boath; Exhibit 90; paras 67 and 68.
5 *Ibid*; para 69.

asked a number of questions and sought documentary and other information.[6] Zinifex responded on 16 March and Inco responded on the same day. Mr Kavanagh made several other enquiries and sought and obtained information concerning the incident from a number of other sources before his investigation ceased on the announcement of this Inquiry.[7]

[7] In the following month, Mr Normington was retained by Zinifex to conduct a load line renewal survey with respect to the *Wunma*, and this was completed on 15 March.[8] As a result of this survey, the ship was considered by MSQ to "be in a satisfactory condition in regard to the load line survey and … suitable to have (an RUF) renewed to continue commercial operations".[9]

[8] The ship remains under this RUF pending completion of each of the Lloyd's Condition of Class requirements.[10] Once the Conditions of Class have been met, Mr Bundschuh is to consult with Captain Boath to determine whether the ship's registration ought to be renewed - that is, the suspension lifted - and, if so, on what conditions.[11]

[9] In early March, Captain Watkinson asked Captain Boath to "engage in discussions with the owners of the ship about alternative cyclone contingency arrangements as a matter of urgency".[12] In turn, Captain Boath requested Mr Hayward to draft an Interim Cyclone Contingency Plan for the *Wunma*.[13]

[10] Mr Hayward asked for Captain Thomson's assistance, although he informed Captain Thomson that the request from Captain Boath stated that the plan "could not allow for the Norman River to be used, it must be based on the safest option or options for the operation of the vessel in the Gulf".[14]

[11] In due course, an Interim Cyclone Contingency Plan was published by Captain

---

6 Statement of Mr Kavanagh - 1 June 2007; Exhibit 67; paras 18 and 19. Exhibits 102, 103.
7 *Ibid*.
8 Statement of Mr Normington - 3 September 2007; Exhibit 111; para 12.
9 Statement of Mr Bundschuh - 1 August 2007; Exhibit 94; para 88.
10 *Ibid*; para 70.
11 *Ibid*; para 85.
12 Statement of Captain Watkinson - 30 July 2007; Exhibit 119; para 18.
13 Captain Thomson; T.55. Statement of Captain Dally - 1 August 2007; Exhibit 53; paras 26-31.
14 Statement of Mr Hayward; Exhibit 74; paras 26-29.

Boath on 15 March.[15] It was specified to commence in operation:

- immediately a Tropical Low develops in the Gulf of Carpentaria Region;
- when a cyclone that has formed in the Coral Sea has a westerly moving aspect and is likely to cross Cape York Peninsula into the Gulf of Carpentaria region; or
- for reasons the Master of the *Wunma* has that storm and hurricane force winds may develop in the Gulf of Carpentaria within 48 hours.[16]

[12] The Gulf of Carpentaria Region was defined to include the whole of the sea space in the Gulf. A Tropical Low was defined as "an area of low pressure surrounded by at least one isobar that has potential to deepen and become a tropical cyclone".[17]

[13] The procedure provided for action to be taken depending upon the issue of a Yellow, Blue or Red Alert which was each triggered in the same way as under the Port of Karumba Cyclone Contingency Plan,[18] that is, on the forecast of destructive winds between 24, 16 and 6 hours, respectively.[19]

[14] On the commencement of the Plan (for instance, when a Tropical Low develops in the Gulf, the focus of the procedure was to ensure that the vessel was not loaded, either by discharging its load to the export vessel at the anchorage or, if at the Wharf, not to commence loading.[20]

[15] Any cyclone contingency procedure based on alerts should carefully select the timing of the activation of each of the Alerts and what is to be done at each stage. But as the incident shows, alerts can come too late to prevent loading. Importantly, the Interim Plan commenced in operation before any of the alerts do. Its objective was to ensure that the ship was not caught in a loaded state in the face of a cyclone. This is to be contrasted with the procedure under the SQS that did not at the time of this incident require loading operations to cease until the Blue Alert.

[16] Part 2 of the Plan required the *Wunma* to make preparations to sail and included several detailed lists of what is required in that regard – including the maximisation

15 Exhibit 15.
16 Exhibit 15; p.1.
17 *Ibid*; p.2.
18 Exhibit 8.
19 *Ibid*.
20 *Ibid*; p.3.

of all bunker tanks.[21] The procedure then required the *Wunma* to "let go and depart" the Wharf for the cyclone anchorage,[22] a position that is located about three nautical miles to the North West of the Fairway Beacon in 3 metres of water.[23]

[17] At all stages the crew of the Wunma were to continuously monitor the "position, track and intensity of the cyclone as well as the ship's position.[24]

[18] One of the benefits of the Interim Cyclone Contingency Plan was stated to be to ensure that the:

> "The *Wunma* has ample time to prepare at the onset of a severe Tropical Revolving Storm … (and be) in the state of readiness to ride-out Tropical Revolving Storms in close proximity to Karumba."[25]

[19] Following the suspension of the ship's registration the Director (Maritime Safety) of MSQ, Mr Bundschuh, instructed his Senior Naval Architect to liaise with the accredited surveyor, and through him with Lloyd's Register, about their requirements for the ship so as to ensure that relevant conditions are reflected in the registration and load line conditions issued by MSQ. One area of obvious concern is the ship's loading conditions during cyclone seasons. It will be recalled that shortly after the incident, Captain Boath recorded the views taken by him and other MSQ officers which succinctly summarised the problem:

> "1. The ship in a light ship condition is susceptible to dangerous pounding.
>
> 2. The ship in a loaded condition is susceptible to swamping."

The development of appropriate loading conditions must accommodate these stark realities. Mr Bundschuh indicated that if Lloyd's Register amends the loading conditions for operating during cyclone seasons then he would state them explicitly on the registration certificate.

[20] The other obvious matter of concern affecting the conditions of the ship's registration and its safe operation is the management of water on the ship,

---

21 *Ibid*; pp.3-5.
22 *Ibid*; p.5.
23 *Ibid*; p.2.
24 *Ibid*; p.5.
25 *Ibid*; p.6.

particularly arrangements to drain water off the ship and to store water that is not drained off the ship. In his witness statement of 3 August 2007 Mr Bundschuh advised that he was "monitoring progress" in relation to these matters.

[21] Unfortunately, as explained below, the progress of these arrangements has been much delayed, and there is no evidence that MSQ did much to hasten them, for instance, by indicating to the ship's owners and manager that it would consider exercising powers in relation to the ship's operation and withdrawing the RUF if the matters were not attended to by the start of the cyclone season.

15.3 ZINIFEX

[22] On the day following the incident - 8 February - Dr Lewin, who is the Group Manager Safety and Health at Zinifex, initiated an investigation in order to attempt to determine the cause of the incident.[26] Mr Placanica was directed to conduct the investigation. On 14 February, Mr Clarke of Thompson Clarke Shipping was asked to assist the investigation.[27]

[23] After the preliminary phase of this investigation was completed, on 3 April, a review was conducted in Melbourne at which Captain Dally, Mr McDonald, Mr Mewett, Mr Clarke,[28] Mr Placanica and Mr Ballantyne along with Dr Lewin were present.[29] The workshop highlighted "some immediate safety and operational issues".[30] In the end, the investigation was terminated for a number of reasons, including the convening of this Inquiry.[31] However Mr Clarke has continued to have an ongoing role in advising Zinifex as to how the *Wunma* "could be operated more safely and efficiently".[32]

[24] In July, Zinifex engaged the Australian Maritime College ("AMC") to investigate and prepare a report about cyclone contingency arrangements for the ship.[33] In

---

26 Statement of Dr Lewin - 9 August 2007 and Supplementary Statement of Dr Lewin - 22 August 2007; Exhibit 57.

27 Statement of Mr Clarke - 4 September 2007; Exhibit 99.

28 *Ibid*.

29 Statement of Dr Lewin - 9 August 2007; Exhibit 56; para 14. Dr Lewin; T.590-594.

30 Statement of Dr Lewin - 9 August 2007; Exhibit 56; para 18. Dr Lewin; T.590-594.

31 Statement of Dr Lewin - 9 August 2007; Exhibit 56; para 20. Dr Lewin; T.590-594.

32 Statement of Mr Clarke - 4 September 2007; Exhibit 99; para 10.

33 Statement of Mr Mewett - 9 August 2007; Exhibit 47; para 94. Supplementary statement of Mr Mewett - 20 August 2007; Exhibit 47; paras 3-10; Statement of Mr Clarke - 4 September 2007; Exhibit 99; para 12.

particular, the AMC was asked to consider the following alternatives:

- Remaining alongside the berth including any suggested modification to the structure of the berth and mooring arrangements.
- A single cyclone mooring in the Norman River close to the berth.
- Mooring the *Wunma* between two cyclone moorings and the Norman River close to the berth.
- Lying moored partially between the berth and a cyclone mooring in the river.
- Locating heavy anchors in strategic locations in the Norman River bed or a snag that could be picked up and made fast to the ship in the event of a cyclone approaching.
- Making for an alternative port of refuge such as Weipa.
- Heading to a protected anchorage off one of the islands in the Gulf.
- A new draft procedure by MSQ to ride out the cyclone at the quarantine anchorage which is located near the fairway buoy.
- A cyclone mooring situated elsewhere in the Gulf, possibly off one of the islands in the Gulf and as such, a review of the location and suitability of the current cyclone mooring buoy near Sweers Island.[34]

[25] In examining the above alternatives, the AMC was required to consider them in the context of the vessel being in ballasted, fully loaded and partially loaded conditions. The AMC was also asked to make recommendations concerning:

- the future operational arrangements for the ship;
- ports of safe haven; and
- the appropriateness of cyclone moorings in the Gulf of Carpentaria.[35]

[26] In September the AMC produced for Zinifex a report on Phase 1 of its study which consisted of advice on various cyclone mooring options ("the AMC Report"). This report was provided to the Inquiry on 11 October on a confidential basis since it wished to announce its planned action, and a process of community consultation had not commenced. On 18 October, a copy of the AMC Report was provided to the parties who had been granted leave to appear, initially on a strictly confidential basis for the purpose of making submissions in relation to the recommendations that the

---

34 *Ibid*; para 7.9.

35 The Supplementary Statement of Mr Mewett - 20 August 2007; Exhibit 47; para 9.

Board might make. An interim direction was made to this effect, but it was vacated for reasons given by the Chairperson on 1 November to the effect that no valid claim for confidentiality had been established, and that the public interest supported the general release of copies of the AMC Report.[36]

[27] The AMC Report considered various options without undertaking an in-depth technical study. From this assessment it concluded that there is no doubt that if the ship can remain in the Norman River, either alongside the wharf or at a dedicated mooring arrangement, during a cyclone then this is the safest place for it, for the crew and for the environment.

[28] The AMC recommended that these options be pursued further to determine the technical and operational requirements associated with them. Because it is extremely unlikely that any technical modifications to the wharf can be made in time for this cyclone season, the AMC at the time of its initial report felt that the best option for the forthcoming cyclone season was to locate heavy anchors in strategic locations in the Norman River.

[29] Its recommendations were:

> "1. As a matter of urgency, commence the process required to provide an anchorage for the MV WUNMA up the Norman River. This will involve:
>
> a) obtaining appropriate permission for anchors points, (note that this could be MSQ permission if the anchor points were to be below high water level, and it is estimated that this could be obtained in about two months)
>
> b) putting in place a study to determine the requirements for MV WUNMA to utilise fixed anchor points up the Norman River and
>
> c) procurement, installation and commissioning of the appropriate hardware including: anchor points; mooring lines; work boat; and storage/maintenance area.
>
> The aim should be to have this in place for the 2007/2008 cyclone season.

[36] Exhibit 127.

2. Commence a study to determine how to strengthen the wharf structure to permit the MV WUNMA to remain alongside the wharf during a tropical cyclone. This will involve:

   a) modelling of the likely influence of a tropical cyclone on Karumba and

   b) determining the requirements for MV WUNMA to remain alongside the wharf.

   It is recommended that this be commenced as soon as practical in order to determine which of the two recommended options can be adopted on a permanent basis."

[30] Further discussions were held between MSQ, Zinifex, P&O Maritime Services, AMC and Thompson Clarke in late October and early November with a view to finalising a cyclone contingency plan for the 2007/2008 cyclone season. On 5 November the lawyers for Zinifex advised the Board that the AMC had been substantially involved in a proposal for a single point mooring in the Norman River and that a Buoy Mooring application for that option was expected to be made the following week, and that applications for a four point mooring had been made the previous week.[37]

[31] Zinifex retained an engineer – Mr Ross Ellen[38] - to review the Storm Water Management System on board the *Wunma*. This occurred, to a greater or lesser extent, in consultation with Inco.[39] This process resulted in proposals for:

- increasing the size of the water collection tank for a first flush system;
- use of a water level transmitter; and
- hard piping roof down pipes to the new system, rather than the current system of water from the roof down pipes being collected on the deck and then being captured by the scuppers.[40]

[32] Subsequently, a "basic markup drawing" obtained from Inco of the revised Storm Water Plan was, at the cost of Zinifex, transformed into an engineering drawing by the Robert Bird Group.[41]

---

37 Exhibit 136.

38 Mr Mewett; T.408. Mr Mewett; T.423.

39 Supplementary Statement of Mr Mewett - 20 August 2007; Exhibit 47; paras 13-15.

40 Supplementary Statement of Mr Mewett - 20 August 2007; Exhibit 47; para 15.

41 Supplementary Statement of Mr Mewett - 20 August 2007; Exhibit 47; para 16; Exhibit 48. Mr Mewett; T.387-388, T.390-391. Statement of Mr McDonald - 9 August 2007; paras 15-18.

[33] Zinifex also engaged O'Brien Marine Consultants to undertake an assessment to determine the suitability and effectiveness of Dynamic Under Keel Clearance System ("DUKC").[42] Such a system could measure the depth of water under the keel in real time by drawing on live information from equipment located at various "strategic spots" to convey data concerning wind strength, wave heights at the entrance to the fairway and alike. The benefit of this system is, according to Mr Mewett, that Zinifex will know "whether or not the *Wunma* can enter or leave Port with a lot more certainty".[43]

[34] In addition to the above steps, Zinifex initiated a "pre-feasibility assessment regarding the installation of a wharf unloader" and, otherwise, undertook a strategic review of the *Wunma*'s operational capability.[44] In this regard, Mr Mewett agreed that it is "not a good idea to have a vessel in a loaded state in the face of a cyclone".[45]

[35] In the Supplementary Statement provided by Mr Mewett dated 20 August 2007,[46] he advised that Zinifex was in the process of upgrading the communication system on board the vessel. Until this incident, Zinifex understood that the *Wunma* had "more communications than is required by law and more than is reasonably need".[47] However Zinifex engaged AWA to install a new communication system.[48] This includes changes to its power supply, the installation of a new GMDSS system and the trial of a NextG modem to allow the ship to access the internet whilst offshore.[49]

[36] On 22 June the lawyers for Zinifex instructed Mr John Kernaghan of Noble Denton to investigate the incident and, as part of that investigation, to review the design of the vessel. Mr Kernaghan is a naval architect with over 40 years' experience in the marine industry. His Design Review report dated 4 September 2007 became an exhibit.[50]

---

42 Statement of Mr Clarke - 4 September 2007; Exhibit 99; para 12.
43 Statement of Mr Mewett - 9 August 2007; Exhibit 47; para 21(c). Mr Mewett; T.387.
44 Statement of Mr Mewett - 9 August 2007; Exhibit 47; paras 21(d) and (e). Mr Mewett; T.389, T.389, T.421.
45 Mr Mewett; T.421.
46 Exhibit 47.
47 Statement of Mr Mewett - 9 August 2007; Exhibit 47; para 2.
48 Statement of Mr Mewett - 9 August 2007; Exhibit 47; paras 2 and 21(b). Mr Mewett; T.386-387. Mr Mewett; T.433; Statement of Mr Thomas, Ex 107.
49 Statement of Mr Thomas, Ex 107; paras 34-37; Statement of Mr Fleming; Exhibit 123; para 28.
50 Exhibit 109.

[37] Mr Kernaghan made recommendations both in relation to operational and design matters, noting that an important part of the safe operation of the ship is that operating procedures should take account of the design. Mr Kernaghan correctly inferred that the ship was not designed to operate in a cyclone and therefore cyclone avoidance procedures are of paramount importance.

[38] A key aspect was to ensure that, in the future, the ship is not put into a similar position in which it found itself on 6 and 7 February. This requires the development of new processes to ensure that the operators of the ship will be better informed about the possibility of adverse weather conditions with the result that it will not be in a loaded condition when seeking to avoid cyclones in the Gulf.

[39] Mr Kernaghan's first recommendation was:

> "A full Risk Assessment of the operations of the "WUNMA" should be conducted. All present Masters and all those involved with "WUNMA" operations should be involved in the assessment procedure and play a full part in the development of mitigation strategies. The Risk Assessment should be undertaken by specialist independent consultants and cover the full operations of the "WUNMA" from loading the cargo through to offloading at export vessel and return to port. This Risk Assessment should be completed as soon as possible and no later than the start of the cyclone season in November 2007."[51]

[40] He advised that the analysis should consider:

- the ability of the vessel to expel water landing on the canopy and other parts of the vessel;
- the ability to expel water from the well deck;
- the ability of the vessel to handle cyclonic seas in the Gulf of Carpentaria; and
- a consideration of the above in loaded, partially loaded and unloaded conditions.[52]

[41] Mr Kernaghan recommended that any new cyclone contingency plan should include input from accredited weather forecasters familiar with the movement of cyclones in and around the Gulf of Carpentaria, with cargo loading and vessel sailing restricted on the receipt of warnings of the approach of potentially cyclonic conditions. He

---

51 Exhibit 109; para 8.2.1.

52 Exhibit 109; para 7.3.14.

noted that procedures had been developed in the Gulf of Mexico which restrict vessel loading and movements when major storms pass a specific geographic location.

[42] Mr Kernaghan noted that Lloyd's Register had included a number of conditions of class including modification of the emergency generator intake, stern door modifications and the development and submission of a new stormwater management plan. He noted that although these had completion dates varying from May to August 2007, at the time of his report these matters had not been completed and that it would be expected that they would be completed in a timely manner.

[43] In addition, Mr Kernaghan noted the observation of Mr Taylor that there was no watertight closure between the aft well deck and the cargo hold. He stated that consideration should be given to the possibility of fitting some form of watertight closure if their structural constraints permitted this. The *MV Aburri* has such a device. Mr Kernaghan noted, however, that the inclusion of such a device may inhibit the expulsion of water that enters the cargo hold as well as preventing water in the well deck from entering the cargo hold.

[44] Mr Kernaghan recommended that the number and effectiveness of all drains and scuppers be studied, preferably by an independent consultant. This assessment would include the amount of water collected, particularly during heavy rain storms. One would have thought that such an analysis would have been undertaken as part of the stormwater management plan to be submitted to Lloyd's Register as a condition of class. But this is not apparent from the evidence, and recent evidence disclosed that Lloyd's Register would "only assess the plan in the context of class rules more specifically in relation to hull penetrations and modifications to tanks".[53] Mr Kernaghan recommended that some form of independent verification be undertaken of the number and effectiveness of all drains and scuppers and that a similar study be undertaken as to the sizing and drainage of the collection tanks.

[45] Mr Kernaghan also recommended that a study be undertaken, preferably by independent consultants, into the watertight integrity of the stern, and that such a study would assess the probability of the stern being swamped and/or flooded based

[53] Statement of Mr Fleming – 24 October 2007; Exhibit 123; para 22.

on historic cyclone events. Mr Kernaghan anticipated that this may result in recommendations about the extent of watertight integrity required.

[46] Mr Kernaghan recommended that his operational recommendations be completed before the onset of the cyclone season in November 2007 and that all other recommendations should be completed as soon as possible.

[47] The Board is unaware whether each of Mr Kernaghan's operational recommendations, particularly his recommendation for a full risk assessment, have been implemented. However, Noble Denton was engaged to undertake a full technical design audit of the original design of the ship with a view to identifying further design enhancements, and to undertake a Hazard Identification process ("HAZID") as recommended by Mr Kernaghan and Captain White in their reports, and these matters were to be attended to in November 2007.

15.4 INCO

[48] Immediately after the incident, Inco conducted a de-briefing of the Master and crew over three days. What are described as "preliminary investigations" were also undertaken, although no reports were generated given the investigations already in train by the insurers, MSQ and Zinifex.[54]

[49] Captain Dally has outlined a number of remedial steps Inco wished to take with respect to the *Wunma*, but the expiration of the VOMA on 1 November 2007 means that his evidence in this regard is now more properly dealt with as recommendations.[55] These are addressed in the Recommendations Chapter of this Report (Chapter 18).

15.5 LLOYD'S REGISTER OF SHIPPING

[50] Following the incident, Lloyd's Register of Shipping imposed thirteen Conditions of Class on the *Wunma*.

[51] Following a visit by the Lloyd's Registered Surveyor on 28 May, eight of those Conditions of Class were deleted and five Conditions of Class were given due dates for completion of between August 2007 and September 2007. Captain White

---

54 Further Supplementary Statement of Captain Dally - 17 September 2007; Exhibit 120.

55 *Ibid*; para 7.

naturally enough, recommended that these Conditions of Class be satisfied as soon as practicable.[56] As already noted, Mr Kernaghan urged in his 4 September report that Lloyd's conditions of class including modification of the emergency generator intake, stern door modifications and the development and submission of a new stormwater management plan be completed in a timely manner.

15.6 CONCLUSION

[52] The Board was concerned at the lack of evidence concerning the satisfaction of these important conditions of class, despite requests by Counsel Assisting for advice about the status of remedial action. The Board expressed its concerns to the parties in a letter from Counsel Assisting dated 18 October 2007, and raised the issue of whether failure to satisfy those conditions should prompt MSQ to consider the exercise of its powers in relation to the operation and registration of the ship.

[53] A statement from Zinifex's lawyers[57] disclosed that an extension had been granted in respect of the stormwater management plan to November 2007 and in respect of the emergency generator vent to January 2008.

[54] Zinifex's final submissions dated 5 November 2007[58] state that these matters "are currently being progressed and are expected to be completed by the end of the current year".[59]

[55] The delay in satisfying these important conditions of class is unacceptable. Zinifex initially looked to Inco to progress these matters. There were discussions between them and some basic engineering drawings were prepared in relation to stormwater management. The lengthy delay in gaining Lloyd's approval to a matter as fundamental to the safety of the ship as its water management system cannot be justified.

[56] No proper explanation has been given for the delay in satisfying the condition of class in respect the emergency generator radiator intake.

---

56 *Ibid*; para 7.6. Appendix P to Captain White's Report (Exhibit 114), being a copy of the Lloyd's Survey Report No. CNS 70094.

57 Exhibit 123.

58 Para 401.

59 Paras 402, 405.

WUNMA BOARD OF INQUIRY

CHAPTER 16: ENVIRONMENT

TABLE OF CONTENTS

WUNMA BOARD OF INQUIRY

CHAPTER 16: ENVIRONMENT

16.1 OVERVIEW

[1] An essential starting point for any consideration of the possible environmental impact of the incident is to determine how much concentrate or other material was lost overboard. Once that is established, reference may be had to the expert evidence adduced before the Inquiry to ascertain the impact on the environment, if any, such a discharge into the Gulf of Carpentaria has given rise to.

16.2 THE ZINIFEX ENVIRONMENTAL POLICY

[2] Zinifex had, at the time of this incident, an Environmental Policy.[1] It had been promulgated by Mr McMillan, General Manager, on 22 June 2006. It consists of a series of what might be described as "motherhood statements". The preamble to those statements consists of the following:

> "We aim to achieve a high standard of care for the natural environment in all of the activities in which we engage – from mining and processing, through to the transfer, filtration, drying and shipment of lead and zinc concentrate.
>
> We undertake to minimize our impact on the natural environment." [Emphasis added].[2]

[3] Apart from this document, there is no specific procedure dealing with the discharge of water overboard the *Wunma*. Of course, it maybe said that parts of the SQS had that as one of its unspoken objectives but one would think that, ordinarily, there would be a clear procedure outlining what could or could not be done in the operation of the vessel so far as the discharge of water was concerned.

[4] The absence of such a procedure leads to confusion. For example, Captain Seal interpreted the Policy as, in effect, a "no spills" Policy which meant that he was not permitted to discharge water overboard unless it was truly an emergency situation.[3] Others, such as Captain Thomson and Captain Dunnett took a more pragmatic approach.[4]

---

1 Exhibit 36.
2 Exhibit 36.
3 Captain Seal; T.245. Mr McDonald; T.464. Captain Dally; T.557.
4 Captain Dunnett; T.341-342.

[5] Mr Fisher shared the same understanding of the policy, that is, that "no zinc contaminated water is to be discharged over the size".[5] However, he was not aware of any "environmental policy" to that effect; rather, it was "just the practice that was there when (he) came in"[6]

[6] According to Captain Dally:

> "It was very clear to us the way we were to conduct it. It was their ship and it was that policy, so I didn't have any reason to question it. That was our goal, to deliver what the client wanted provided it was safe."[7]

[7] Indeed, Captain Dally was surprised to hear of the pragmatic line taken by Captain Thomson and Captain Dunnett in the operation of the vessel.[8]

16.3 LEGISLATION AND PLANS TO COMBAT MARINE POLLUTION

[8] These have been addressed in other parts of the report, principally in the description of legislation in Chapter 5 and the Immediate Response to the Incident (Chapter 14).

16.4 THE ENVIRONMENTAL PROTECTION AGENCY

[9] On 30 November 1999, lawyers acting for the Lardil, Kaiadilt, Yangkaal and Gangalidda Peoples and the Carpentaria Land Council Aboriginal Corporation, wrote to the Environmental Protection Agency ("EPA") to request that an environmental investigation be conducted into the construction and operation of the buoy mooring at Sweers Island.[9]

[10] For the reasons explained in Chapter 4, many years later the EPA was able to avoid reaching any conclusions about any potential for environmental harm for the use of the cyclone mooring.

[11] This was because of advice provided to the EPA by Inco on behalf of Zinifex that the buoy would not be used in connection with the *Wunma*.[10]

---

5 Mr Fisher; T.313.
6 Mr Fisher; T.314.
7 Captain Dally; T.543.
8 Captain Dally; T.543.
9 Statement of Mr O'Connor - 27 July 2007; Exhibit 44, para 4. Statement of Mr Jones - 21 August 2007; Exhibit 58. Jones; T.626-628.
10 Mr O'Connor; T.353.

16.5 THE AMOUNT OF CARGO LOST OVERBOARD

[12] In his report following his inspection of the *Wunma* on 10 February,[11] in Captain Thomson's opinion, approximately 800 tonnes of cargo had been washed from the loaded pile and "spread across the hold floor in a wedge shape tapering out to the well deck". Of course, this evidence does not address how much concentrate was lost overboard: Captain Thomson was only speaking about the displacement of cargo onboard the ship.

[13] He reported the following about cargo spillage:

> "At one stage the aft end of the hold had water slopping in and out of the aft cut-outs and over the side of the door above the ceiling point. This would point to a loss of zinc contaminated water.
>
> It is evident that contaminated water from the hold was going over the stern from the initial efforts to stabilise the vessel and from the stern cut-outs while the hold aft was still full of water.[12]
>
> From photos published during the height of the incident and those taken on Saturday the 10th February[13] there seems to be sufficiently more staining on the port stern of the *Wunma* which would suggest there may have been more contaminated water pumped overboard before the salvors took over the ship and started pumping into the ballast tanks."[14]

[14] So far as the topic of pollution is concerned, Captain Thomson recorded the following observations:

> "The bobcat approximately 20 litres of engine oil, 40 litres distillate plus 40 litres (of) hydraulic oil. There was evidence of a fair amount of oil still in the cargo hold and on speaking to the salvors they had pumped some oil contaminated water into the ballast whilst stabilising the cargo hold. There would have to (have) been some oil contaminated water go over the side with the slopping through of the aft cut-out.
>
> The engine room bilge showed very little signs of oil contamination but in saying this some oil leaks from machinery were evident which would point to some oil pollution coming from here during the bilge pumping operations at sometime but I would doubt if there were any large quantities. Bilge pumps were started and run from approximately 2300 on the night of the incident and were kept running to combat

---

11 Exhibit 12.
12 Exhibit 12.
13 Exhibits 12 and 14.
14 *Ibid*.

> ingress of zinc contaminated water from the starboard steering flat, hot workshop on the starboard side and soft hatch midships."[15]

[15] In his oral evidence at the Inquiry, Mr Mewett provided an estimate of the amount of zinc concentrate lost overboard during the incident. That estimate was "approximately 200 tonnes".[16] The basis for that estimate is a comparison between the amount of cargo loaded against the amount cargo discharged.[17]

[16] However, later evidence from Mr Johnson of the Australian Fisheries Management Authority called into question the accuracy of Mr Mewett's estimate in this regard.[18] Mr Johnson's concerns were founded on a series of photographs provided to him by Mr O'Brien, a member of the Northern Prawn Fishing Association, and which were taken by Mr Garry McNamara - a Marine Engineer - when on board the *Wunma* on 7 and 8 February 2007. Mr Johnson suggested that the photographs evidence the loss of "significantly more than the 200 tonne estimate" provided by Zinifex and that the amount lost was "more likely to be in the order of 1,000 to 1,500 tonnes".

[17] In response, Zinifex produced evidence from Mr Bolton who is the Port Superintendent, Operations at Karumba.[19] He was tasked earlier this year with providing an accurate calculation of the amount of cargo lost for insurance purposes. Shortly stated, he calculated that 245 tonnes were unaccounted for.

[18] To do so, he referred to the original weight of cargo (4442 dry tonnes) and compared that with draft surveys that were performed to determine the amount of cargo discharged after the incident (1410 wet tonnes and 2094 wet tonnes respectively). Those tonnages were then converted to a dry tonne measurement and, in the result, Mr Bolton concluded that 4197 dry tonnes of zinc concentrate was recovered of 4442 dry tonnes loaded – a difference of 245 dry tonnes. However, he then made the point that the amount lost was likely to be "more like 200 tonnes" because "extra concentrate was recovered from the ballast tanks".

[19] Mr Bolton was not required for cross-examination and his evidence is unchallenged. His evidence is based on loading and discharge data. For obvious commercial and other reasons the amount loaded on the *Wunma* was accurately recorded at the time,

---

15 Exhibit 12.
16 Mr Mewett; T.439.
17 *Ibid*.
18 Statements of Mr Johnson - 4 September 2007 and 17 October 2007; Exhibit 112.
19 Statement of Mr Bolton - 6 September 2007; Exhibit 113.

just as the amounts subsequently discharged were recorded. It is this data that was primarily referred to by Mr Bolton in making his calculations.

[20] The legitimate concerns of Mr Johnson, based on impressions gained from photographs of the cargo after the ingress of water, need to be balanced against the hard data. The settling effect of the ingress of water into the cargo hold should not be ignored.

[21] It may of course have been mistakenly thought that the cargo had been loaded to the extremities of the cargo hold, that is, up to what are referred to as the "barn doors", but that in fact is not the case. Alternatively, the impression may have been gained from Captain Thomson's report that 800 tonnes of concentrate had been washed overboard, but Captain Thomson was only speaking of the displacement of the cargo onboard the ship.

[22] In the end, and whilst Mr Johnson very properly raised concerns, the evidence of Mr Bolton establishes that the amount of concentrate lost overboard was approximately 200 tonnes but, in any event, no more than 245 tonnes.

16.6 THE EXPERT EVIDENCE

[23] The Inquiry received evidence from two experts who had considered the potential for environmental harm caused by the incident:

- Dr Munro Mortimer, a Senior Principal Scientist employed by the EPA[20]
- Professor David Parry, of the Charles Darwin University.[21]

[24] Dr Mortimer has wide experience and expertise in the detection of aquatic contamination.[22] He explained that the metal concentrates carried by the *Wunma* are mineral ores comprising zinc and lead sulphides that have been separated by mechanical processes from much of the other mineral components with which they were incorporated in a natural state.[23] Any assessment of the risk of potential of environmental harm from spillage must of course take into account the chemical and physical properties of those metals.[24]

---

20 Statement Dr Mortimer - 3 August 2007; Exhibit 46.
21 Statement Professor Parry - 9 August 2007; Exhibit 76.
22 Statement of Mr O'Connor - 27 July 2007; Exhibit 44, para 4.
23 Statement Dr Mortimer - 3 August 2007; Exhibit 46, para 5.
24 *Ibid*; para 6.

[25] He explained that there are two types of harm associated with the spillage of particulate matter into a waterway; first, physical effects such a smothering of plant and animal life living in, on or near the bottom of the sea floor and, secondly, toxic effects due to the chemical properties of the concentrate.[25]

[26] Dr Mortimer considered the potential impact due to increased turbidity or suspended particulate matter in the water column and impacts from material settling on the seafloor and concluded that:

> "The metal concentrates carried by the *Wunma* during Cyclone Nelson would, if spilled into the ocean, settle very readily, not spread very far, with little or no impact due to increased turbidity or light exclusion."[26]

[27] However, Dr Mortimer stated that if the concentrates accumulated on the sea floor after a spillage, it is likely there would be some loss of sea life due to smothering and changes to sediment particulate structure, and that plants such as seagrass could be affected if present.[27]

[28] To determine whether there was any potential toxic effect from a spillage, it is necessary to first consider the bioavailability of the material. Dr Mortimer stated that, in an aquatic environment, a potentially toxic material must be in a water soluble chemical form or in a chemical form that can become water soluble before it may be considered to be bioavailable. Material that is not bioavailable cannot be absorbed by the gut or respiratory systems such as the gills of marine animals. Thus, material that is not soluble and cannot be absorbed cannot exert a toxic effect or be bioaccumulated. In this regard, Dr Mortimer stated:

> "The metal concentrates carried by the *Wunma* are sulphides and are extremely insoluble in water. Accordingly, although lead, and to a lesser extent, zinc, are potentially very toxic metals in aquatic systems, with very strict limits … under the ANZECC Water Quality Guidelines … the lead and zinc in the concentrates are tightly bound (in a chemical sense) with sulphur (as sulphide) and are not bioavailable to marine life.
>
> It is an established principle of the toxicology of metals such as lead, zinc and cadmium in aquatic sediments that when sulphides are present, the metals are able to exert little toxicity."[28]

---

25 *Ibid*; para 8. Dr Mortimer; T.372. Exhibit 14.
26 *Ibid*; para 27. Dr Mortimer; T.373-374.
27 *Ibid*; paras 21 and 22.
28 *Ibid*; paras 23 and 24.

[29] As such, Dr Mortimer concluded that, because the concentrates are metal sulphides, he would expect "no significant bioavailability of the metals, and as a consequence, no significant chemical toxicity or bioaccumulation of metals such as lead, zinc or cadmium."[29]

[30] To underscore this conclusion, Dr Mortimer referred to testing conducted by the CSIRO in 1995 with respect to marine alga and bacterium of waste waters from the dewatering of lead and zinc concentrates at the Century Zinc Mine. These wastewaters have been in intimate mixing contact with the concentrates during pipe transport and dewatering. Consequently, as Dr Mortimer states, toxicity measured in such wastewater (free of any treatment to reduce potential toxicants) gives a worst case scenario for water coming into contact with bulk concentrates spilt on the seafloor.[30] The CSIRO study found that these untreated wastewaters, even without dilution, were of low toxicity to the bacterium and have no toxicity to the alga.[31]

[31] As Dr Mortimer put it, this testing showed that waters that had been thoroughly mixed with both the lead and zinc concentrates for an extended period of time are "only of low or no toxicity, even without dilution". As such, he believed it unlikely, given the opportunities for dilution associated with a spillage in the open sea, that "significant toxic impact to sea life would result from a spill such has occurred from the *Wunma* during Cyclone Nelson".[32]

[32] Dr Mortimer agreed during his oral evidence that his conclusions are closely aligned to those drawn by Professor Parry.[33] Professor Parry was engaged by Zinifex to undertake a survey of the area around where the incident occurred and to prepare a report as to the environmental impact. At the recommendation of the Carpentaria Land Council Aboriginal Corporation, this report was peer reviewed by the CSIRO.[34]

[33] Professor Parry noted in his report that the "spillage of zinc concentrate was approximately 200 tonnes according to Zinifex records". He analysed seawater and sediment samples from the vicinity of the incident – as determined from information

---

29 *Ibid*; para 29.
30 *Ibid*; para 25. Dr Mortimer; T.374.
31 *Ibid*; para 26. A copy of which study, authored by JL Stauber, appears in evidence as part of Exhibit 46. Dr Mortimer; T.374.
32 Dr Mortimer; T.372.
33 Dr Mortimer; T.375.
34 Statement of Mr Mewett - 9 August 2007; Exhibit 47, para 22. Exhibit 76.

provided by Zinifex, AMSA and interpreted wind data from the US Navy's Monterey Marine Meteorology Division, being approximately two nautical miles in area - for lead, zinc, cadmium and copper.[35]

[34] The sampling results were then interpreted in accordance with the guidelines published by the Australia and New Zealand Environment and Conservation Council ("the ANZECC Guidelines").[36] He noted that:

> "The largest accumulations of spilt concentrate were located in the immediate vicinity of the *Wunma* drift track. Smaller, but widespread, deposits of concentrate were found predominantly to the north of the drift track."[37]

[35] Based on the analyses of the samples that were obtained, Professor Parry concluded that the concentrations of metals in sediment and seawater as a result of this incident did not exceed the ANZECC ISQ-low guideline values and, in accordance with the ANZECC Guidelines:

- There should be no significant ongoing impacts on the marine eco-system.
- There is no need for further action, or investigations.[38]

[36] However, he made the following recommendation:

> "In consideration of the relatively pristine nature of the Gulf of Carpentaria and taking a precautionary approach, it was recommended … that further chemical and biological analysis on existing samples be carried out to provide a more detailed assessment of metal dissolution rates, bio-availability and biological impacts. (F)urther sediment sampling to the north of the Wunma drift track together with further seawater sampling and analysis in the vicinity of the drift track (was also recommended)."[39]

[37] The peer review of Professor Parry's report by the CSIRO reported that:

- the zinc concentration levels were well below the conservative sediment quality guidelines;
- any longer term dissolution of zinc concentrations would be effectively diluted so as to not pose a threat to aquatic biota;

---

35 Exhibit 76; paras 10 and 11.
36 *Ibid*; paras 16 and 17.
37 *Ibid*; para 23.
38 *Ibid*; para 31.
39 *Ibid*; para 32.

- the analysis of water samples showed barely detectable concentrations of zinc as either dissolved or suspended particulates; and
- all concentrations in the water samples were almost two orders of magnitude below the water quality trigger values for pristine ecosystems.[40]

16.7 CONCLUSION

[38] The expert evidence of Dr Mortimer and Professor Parry, as supported by the CSIRO study and CSIRO Peer Review respectively, is that the incident did not cause any significant environmental impact so far as spillage of zinc concentrate is concerned. That is also the view taken by the EPA with respect to the matter.[41]

[39] Although there appears to have been a minor degree of oil pollution based on the observations made by Captain Thomson, it cannot be said that this had any significant impact on the marine environment.

[40] The conclusion that the spillage of zinc concentrate at around the time of the incident has not been shown to have produced any significant impact on the marine environment does not diminish the concerns of local communities, persons involved in the fishing industry and members of the general public about the spillage, and the need to avoid a repetition of it. The waters of the Gulf are part of a unique ecosystem. Local indigenous communities and native title holders have a special relationship with these waters. The fishing industry and those who rely upon it for their livelihoods depend upon the protection of the marine environment, and, to some extent, upon the Gulf's reputation as a relatively pristine body of water. The wider community has an interest in preserving the Gulf of Carpentaria's ecosystem.

[41] The preservation of the Gulf as a unique and relatively pristine body of water serves a variety of private interests and the public interest. The public interest in preventing the spillage of cargo into the marine environment is reflected in both international conventions and domestic law. Spillage of the cargo of the *Wunma* into the marine environment should be avoided. The importance of that objective is not diminished by the fact that the spillage in February 2007 has not been shown to have produced any significant impact on the marine environment.

---

40 *Ibid*; para 34.

41 Mr O'Connor*;* T.359.

WUNMA BOARD OF INQUIRY

CHAPTER 17: CAUSES OF THE MARINE INCIDENT

[1] The Board's essential task is to inquire into and report on the *causes* of the marine incident. As appears from the previous Chapters, the causes were many and varied. Some can be characterized as systemic. Others can be characterized as operational. The Board's function is not to put labels on the causes, and to place labels on them may be unhelpful. To describe a cause, such as an operational decision to change course as an "immediate cause" may be accurate, but it says little of assistance. To describe certain operational matters as the "actual, direct or proximate" causes of the incident, and to consign systemic factors as merely "indirect" contributing factors is to play with words.

[2] The marine incident would not have happened if errors in the management and operation of the ship in early February 2007 had not occurred. The marine incident would not have happened if systemic matters, such as the design and operation of the ship's water management system and the need for the ship to have a safe and effective cyclone mooring, had been addressed years before the incident.

[3] Pointing to operational causes does not lessen the importance of systemic causes. Equally, pointing to systemic matters, which, if addressed, would have meant that the ship would not have gone to sea on 5 February 2007 or been in a much better condition to cope with cyclonic conditions if she did, does not lessen the importance of operational errors that occurred prior to and on the voyage.

[4] The Board's previous discussion of systemic and regulatory matters and the course of events in February 2007 already has identified factors, decisions and omissions that made a major contribution to the incident. The extent of that contribution does not depend on when, in point of time, the act or omission occurred. For example, the communication of information to Captain Seal on the morning of 7 February was *a* cause of the marine incident, namely the abandonment of the ship. It was probably the last cause in point of time. But its proximity in point of time, to the abandonment of the ship does not make it any more a cause of the incident than matters that occurred years earlier. Each was *a* cause. Some had greater causative

potency than others and, in that respect, some have been described in earlier chapters as major contributing factors to the incident.

[5] The Board's function is not to apportion responsibility for the incident, or make findings in terms of culpability. It is required to report on the causes of the marine incident.

[6] The list of causes appearing below is based upon findings made in previous Chapters. It does not attempt to rank causes as major or minor, direct or indirect. The following list does not include contributing factors that played an insignificant part in the course of events.

(1) The absence of a cyclone mooring in the Norman River to replace the decommissioned cyclone mooring at Sweers Island.

(2) The absence of operating procedures to prevent the ship from being loaded when a low pressure system, with the potential to develop into a cyclone, was in the Gulf.

(3) The design and operation of the ship's water management system that enabled a large volume of water to accumulate in the aft well deck and cargo hold during a voyage in cyclonic conditions. In particular:

- the operation of the system so that rainwater that fell on the ship's canopy during heavy or prolonged rain would collect in the aft well deck rather than being directed overboard;
- the blockage of side deck drains with ore concentrate;
- the blockage of valves in side deck drains that might have been operated to direct water overboard after an initial "first flush" of dust from the canopy into "dirty water tanks";
- in general, the design and operation of the system so that it did not operate as a "first flush" system, namely with waste water from rain run off from the canopy being collected in "dirty water tanks", following which rainwater that fell on the ship's canopy would be directed overboard.

(5) The registration of the ship in 1999, and the upgrading of her registration in 2005:

- without adequate consideration of her compliance with Section 7 of the *USL Code*, particularly in respect of the entry of water into the

well deck, arrangements to free water from the well deck, the location of the emergency generator room and the entry of water into the emergency generator room via its radiator vent;

- without adequate consideration of the need to store or discharge the volume of water that might accumulate in the hold during tropical downpours, in circumstances in which the ship was treated, for the purposes of assessing her stability, as having an open hold.

(6) The upgrading of the ship's registration in 2005, and the revision of her cyclone procedures to permit her to undertake voyages in the open waters of the Gulf in the event of a cyclone, without a comprehensive risk analysis being undertaken of the ship's seakeeping properties in cyclonic conditions.

(7) The upgrading of the ship's registration in 2005, and the revision of her cyclone procedures to permit her to undertake voyages in the open waters of the Gulf in the event of a cyclone, without the imposition of loading conditions and a review of her water management system.

(8) The loading of the ship on 3 February 2007 when a low pressure system was in the Gulf.

(9) The practice of returning to port once the ship's "dirty water tanks" were full, which led to the ship returning to port on 4 February 2007, thereby delaying her departure until the "tidal window" on the night of 5 February 2007.

(10) The failure to take adequate steps on 5 February 2007, or beforehand, to prepare the ship and her crew for a prolonged voyage in open waters during cyclonic conditions, including:

- bunkering sufficient fuel to enable the ship to remain at sea for an extended period whilst operating all three of her engines;
- unblocking deck drains to permit, so far as possible, rainwater to be directed overboard through deck drains;
- familiarisation by navigation officers of procedures in the ship's Safety & Quality System to avoid cyclones at sea.

(11) The failure during the voyage that commenced on 5 February 2007, and particularly during the period prior to the decision at around 1140 hours on 6 February to turn South, to obtain current weather information by email or satellite phone. The consequential lack of plotting of the cyclone's position

and path, and the ship's position in relation to the cyclone. The making and recording of only infrequent observations of wind direction and barometric pressure.

(12) In general the failure to apply the procedure to avoid cyclones at sea contained in the ship's Safety & Quality System (SQS 06; D 220) or similar procedures to avoid cyclones at sea.

(13) The decision of the Master at approximately 1140 hours on 6 February 2007 to turn South without:

- adequate current information about the cyclone's position and path;
- adequate analysis of the limited information that was on hand at 1140 hours;
- adequate consideration of the consequences of turning South;
- consultation with the Chief Mate, the Second Mate, the Designated Person Ashore or other persons ashore about the proposed course of action.

(14) The operation of the water management system during the ship's voyage that allowed a large volume of water to accumulate in the aft well deck and cargo hold.

(15) The absence on the aft well deck of freeing ports, thereby allowing the accumulation of a large volume of water in the aft well deck during the voyage in cyclonic conditions. Alternatively, the absence of an active pumping system appropriate to an open hold ship to rid the well deck of accumulated water.

(16) To a lesser extent, the blockage of a small drain in the aft well deck that prevented water that had accumulated in the aft well deck being directed overboard.

(17) The absence of adequate pumps to discharge water overboard.

(18) The failure of pumps to operate or to operate effectively due to blockages caused by concentrate.

(19) The entry of seawater over the stern, including through openings on either side of the stern ramp.

(20) The entry of seawater through holes in the portside canopy that had been caused by the impact of waves in cyclonic seas on materials that were incapable of withstanding the impact of waves.

(21) In general, the ingress of water into the ship's well deck whilst she was in a loaded condition at a rate greater than the capacity of pumps to discharge it overboard.

(22) The position of a radiator vent in the emergency generator room that permitted water that had accumulated in the aft well deck to enter the emergency generator room.

(23) The entry of water through a door to the emergency generator room which was not securely dogged.

(24) The shorting of a switchboard following the ingress of water into the emergency generator room.

(25) The total loss of power to the ship following the ingress of water into the emergency generator room.

(26) The consequent loss of power to various primary systems on the ship, including damage to and loss of power to certain communication systems.

(27) Difficulties experienced in the communication of advice and information that was relevant to the Master's decision to abandon ship.

(28) The communication of advice to the Master of the ship at around 0600 hours on 7 February 2007 to the effect that if the water level was higher than halfway up the stern ramp, the eventual loss of the ship was probable and that he should make preparations to abandon ship.

(29) The Master's evaluation of the situation on the morning of 7 February 2007 and how it was expected to develop, and his judgment that the safety and lives of the crew necessitated abandonment of the ship.

WUNMA BOARD OF INQUIRY

CHAPTER 18: RECOMMENDATIONS

TABLE OF CONTENTS

WUNMA BOARD OF INQUIRY

CHAPTER 18: RECOMMENDATIONS

18.1 OVERVIEW

[1] This Chapter reviews the recommendations made by various witnesses. It then identifies recommendations that are not endorsed, and finally sets out the Board's recommendations. The Board takes the view that any recommendation in response to paragraph 9 of its Terms of Reference concerning possible future proceedings should be the subject of a separate report to avoid possible prejudice to any such proceedings.

[2] The recommendations made by the Board in this Chapter are made at a time when further investigations are being undertaken into cyclone moorings, applications are being made for cyclone moorings and cyclone procedures involving a new ship's manager are being finalised. As was noted during the course of its public hearings, the Board was never going to be in a position to devise complex engineering solutions or detailed operating procedures for the ship's future operation. These include the design and operation of its water management system. Apart from anything else, these matters depend upon the completion of ongoing investigations, design modifications to the ship and the development and refinement of operating procedures in the context of contractual arrangements between the ship's owners and new manager.

[3] That said, the Board hopes that its recommendations will inform decisions to be made by the owners and operators of the ship, regulatory authorities and others with an interest in the safe operation of the *Wunma* and marine safety in general.

18.2 THE RECOMMENDATIONS OF VARIOUS WITNESSES

[4] Reference has been made to the recommendations of Mr Kernaghan, Professor Parry and Captain Dally. Sea Transport Solutions, Captain White, Captain Seal and Mr Davis also advanced a number of remedial suggestions in their evidence.

[5] The recommendations of Mr Kernaghan have been set out in Chapter 15 on Remedial Responses to the Incident. Professor Parry recommended further chemical and biological analysis on existing samples be carried out, and that further sediment

and seawater sampling and analysis be undertaken. His recommendations appear in Chapter 16 on The Environment.

18.2.1 Captain Dally

[6] Captain Dally outlined a number of remedial steps Inco wished to take with respect to the *Wunma*, but the expiration of the VOMA on 1 November 2007. Inco's suggestions were to:

- implement a procedure for opening the stern door in the event that the cargo hold is flooded;
- relocate trunking for the emergency generator room;
- redesign piping for the scuppers and roof cladding;
- remote operation of sea openings of deck scuppers;
- additional wiring for items on the emergency switchboard;
- a watertight division between the well deck and the cargo hold;
- installation of high volume slurry pumps together with fixed piping;
- remote indicators for the under deck passage doors and hot workshop door;
- review and amendment of the cyclone contingency plan; and
- upgrade the infrastructure at Karumba so that the *Wunma* can discharge at the wharf.[1]

18.2.2 Sea Transport Solutions

[7] In a letter to MSQ dated 4 April 2007, Sea Transport Solutions advised that its recommendations for the ship had been, and still were, restricted to the following two options:

> "1- Stay alongside – preferably starboard side to, which is has large Svedala inflatable fenders, and place a bow anchor out at close to maximum cable range, with another mooring attached to the stern. This way the vessel should not impact heavily on the structure or even ride up on it if the tidal surge is excessive
>
> 2- Go upstream in a fully ballasted condition until touching the river bed at high tide. Let go both anchors and back off to maximum cable range. She should be sitting on the bottom (ensure no rock) at mid or low tide and leave full crew on board. Stay there til the storm passes. If she is still aground or has been moved to shallower areas, pump out the ballast and pull on both anchor cables."

---

1 *Ibid*; para 7.

[8] These options were elaborated upon in the witness statement and oral evidence of its Managing Director, Mr Ballantyne. In fairness to him, the option of going upstream in a fully ballasted condition was recognised by Mr Ballantyne to involve risks of being stranded in the event of a large storm surge.

18.2.3 Captain White

[9] Captain White is employed by Noble Denton as the Manager for Marine and Casualty Investigation. He is a Master Mariner and served at sea for some twenty-two years at various ranks to Master, followed by seventeen years as a Marine Consultant. His command experience focused on salvage, wreck removal, ocean towage and he gained experience handling relatively small vessels in a range of adverse weather conditions.

[10] In the last seven years, Captain White has specialised in marine incident investigation. He was retained by the lawyers for Zinifex on 22 June 2007 to investigate the incident. For that purpose, he visited the port facility and the *Wunma* between 4 and 6 July 2007 . He made a number of recommendations.

[11] He noted that given "the imminent arrival of the cyclone season, some measures do have to be put in place to ensure that the risk is managed to an acceptable level".[2] He urged that various specified measures be considered.

[12] Captain White's first recommendation was that an independent dedicated weather forecasting service should be contracted. Such a service would provide "site specific weather forecast"[3] on a twice daily basis but more frequently if necessary. An example of the weather forecast produced by such a service appears in Appendix O to Captain White's report. A perusal of that sample reveals that very specific and detailed information about the path and likely track of the cyclone, as well as the progression of weather systems generally, is provided. In addition, particularised information is provided about wind speed and direction, wave heights, swell and the like.

---

2 *Ibid*; para 7.1.

3 *Ibid*; para 7.2.

[13] Captain White makes the point that the provision of such a service by an independent body would result in site specific weather forecasts being provided on a twice daily basis, but more frequently if necessary.[4]

[14] He saw the advantages of this service over that offered by the Bureau of Meteorology as follows:

- The forecasters employed are generally experienced marine forecasters.
- Forecasts issued are dedicated to the specific location and operation in hand, whereas Bureau issued forecasts are issued for a general area.
- The forecasting service has experience with sensitive memory and projects which are weather dependent.
- The Master can have direct contact with the duty forecaster if he requires updated advice to assist decision making.
- The forecasting service is not bound to use in a single source for raw data and can access other agencies to assist them.
- Most services can also offer a weather routing advisory service to assist vessels in avoiding weather conditions that are inappropriate for them.[5]

[15] Such a service would serve to notify the Master or Operations Superintendent in Karumba of any imminent adverse weather and the effect it is likely to have on loading and sailing operations in order that any restrictions on loading and/or sailing can be imposed.

[16] Captain White also recommended that a full Hazard Identification ("HAZID") workshop be conducted by a specialist independent consultant. He recommended that the relevant representatives of the owner, operators, deck officers and others who are involved with the loading or sailing of the *Wunma* attend such a workshop. The full cycle of the operation for the *Wunma* should be examined, from planning loads, loading, sailing, discharging to export vessel and returning to the wharf. [6]

[17] As part of the HAZID, a contingency plan could be drawn up for the coming cyclone season after input is received from the dedicated weather forecasting service referred to above.

---

4 *Ibid*; para 7.2.
5 *Ibid*; para 7.2.
6 *Ibid*; para 7.3.

[18] The HAZID workshop findings were intended to provide the basis for the safe operation of the *Wunma* and for interfacing with Zinifex Port Procedures and with the Operating Procedures under the SQS.[7]

[19] Captain White recommended that a Marine Engineer, preferably with technical management experience, be retained to undertake a full Hull and Machinery Condition Survey of the vessel in order that any defects or deficiencies can be identified and remedied. The purpose of such a survey would be to attempt to address the concerns that have been expressed with regards to the standard of maintenance on the *Wunma*.[8]

[20] Captain White also recommended that the waste water management system on the vessel be modified in accordance with the proposal advanced by the Robert Bird Group.[9] That proposal involves increasing the size of the water collection tank for the first flush system, the use of a water level transmitter, an installation of hard piping of the roof down pipes to the new system, as opposed to the current system of water collection which sees water from the roof down pipes being discharged onto the deck and then captured by the scuppers.

[21] Captain White has expressed the opinion that this recommendation "should be progressed without delay" and proper technical drawings and the procedure produced and presented to Lloyd's Register for approval.

18.2.4 Mr Kernaghan

[22] Mr Kernaghan made recommendations in relation to both operational and design matters which have been outlined in Chapter 15 on the Remedial Response to the Incident. Like Captain White, Mr Kernaghan urged that conditions of class be completed without delay. As noted, these matters have been unacceptably delayed .

18.2.5 Mr Cowle

[23] Mr Cowle of Weather Direct provided a report to the Inquiry after considering the interaction between Tropical Cyclone Nelson and the *Wunma*.[10] In it, he stated:

---

7 *Ibid*; para 7.5.
8 *Ibid*; paras 1.4 and 7.7.
9 *Ibid*; para 7.8; and see Appendix Q, being a copy of that proposal.
10 Exhibit 108.

> "The track and development of Tropical Cyclone Nelson was covered by the Australia Bureau of Meteorology bulletins and warnings. These are designed primarily for coastal communities and as such, do not specifically cater for vessels at sea. Moreover, such bulletins do not specifically cater to any particular vessel, or its current circumstances in relation to a cyclone. From my examination of the synoptic situation, Tropical Cyclone Nelson was a particularly difficult cyclone to track and changed course many times and moved at varying speeds. Sudden changes in the speed and direction of movement of the cyclone would not have resulted in additional warnings being issued by the Bureau of Meteorology, as these are issued at fixed times only."

[24] He also stated:

> "Had the vessel been receiving forecasts and warnings from a private weather service, it is very likely the situation would have been somewhat different. Commercial organisations exist which can provide a dedicated forecast and warning service to a vessel and offshore locations that are tailored to the current operations. In this particular case, a custom tropical cyclone chart would have been provided showing the vessel's position in relation to the cyclone and offer a route recommendation away from Tropical Cyclone Nelson and into areas of safe weather. These services are typically offered for less than A$80 a day.
>
> These forecasts are provided via email or facsimile to vessels at sea using SatCommC, VSAT etc. An example of a typical forecast service offered by Fugro GEOS in Singapore is included. Fugro GEOS use only experienced marine weather forecasters and provide these services to over 150 clients in South East Asia and Australia. A large portion of this business is in providing forecasts and warning to vessels towing oil rigs and the large component parts for offshore oil platform construction, ie topsides and jackets."

18.2.6 Captain Seal

[25] In an email[11] to the then Operations Manager, Mr Graham Mackenzie, dated 29 March 2007, Captain Seal suggested a number of steps that ought to be taken to ensure the survival of the *Wunma* "in the future".[12] Captain Seal's recommendations were well-considered, and the Board appreciates receiving them. It is a pity that his employer, Inco, and the ship's owner did not take more active steps to implement them in the last several months.

[26] They included:

---

11 Exhibit 24.

12 Captain Seal; T.180.

- putting a single point cyclone mooring in the middle of the Norman River;[13]
- ensuring that the vent in the emergency generator room was not capable of being a point of ingress for water;[14]
- isolation of the emergency generator room circuits;[15]
- piping of the roof drainage directly overboard;[16]
- the installation of a watertight hydraulic door between the stern and the cargo hold;[17]
- the provision of diesel driven pumps;[18]
- the clearance of the dump valve from the well deck.[19]

18.2.7 Mr Davis

[27] At the end of his oral evidence at the Inquiry, Mr Davis made a number of suggestions for the improvement of the operation of the ship:

- The installation of a walkway on the port side.
- A boarding ladder on the port side.
- The removal of the life raft and boarding ladder from the starboard side because of the "gap in the fenders" which, in combination with a rolling sea are in Mr Davis' opinion, dangerous.[20]

18.3 RECOMMENDATIONS THAT ARE NOT ENDORSED

18.3.1 Going upstream with full ballast until touching the river bed at high tide

[28] The suggestion that the ship should proceed upriver with full ballast, drop anchor and, once the cyclone has passed, de-ballast and "float off"[21] is not recommended. This proposal, whilst well-intentioned as part an assessment of relative risks, including the risks associated with the ship going into open waters during a cyclone, presents unacceptable risks. Consideration of river confines, tidal surge and hull grounding forces makes this an option with an unacceptable level of risk. Whilst the option of heading "up the creek" is clearly appropriate for smaller ships that can seek shelter in the Norman River, it is not an appropriate option for the *Wunma*.

---

13 Captain Seal; TT.230-231; 254.
14 Captain Seal; T.231.
15 Captain Seal; T.231.
16 Captain Seal; T.17, 232.
17 Captain Seal; T.181.
18 Captain Seal; T.181.
19 Captain Seal; T.181.
20 Mr Davis; T.690.
21 Statement of Mr Ballantyne, Exhibit 97; para 39.

[29] It will be recalled that Mr Ballantyne's preference is for the ship to stay alongside with its large fenders on the wharf side to avoid or minimise damage to the wharf and with the port anchor out to hold the ship a small way off the wharf.[22] Mr Ballantyne said that when the ship was designed he made recommendations to Pasminco and Inco regarding cyclone contingency plans. The recommendation was to stay in port or to go up the Norman River with full ballast so that if the ship was aground, it could always pump out the ballast and float off.

[30] Mr Ballantyne acknowledged the risks associated with going up the river, namely that in a bad flood the ship might find itself stranded inland[23] or, as Mr Ballantyne stated, "as a monument or a shopping centre"[24].

[31] Mr Ballantyne explained that the ship should be taken "preferably up the river with full ballast so that, if you found yourself aground, you could always pump out the ballast and float off. That is a standard procedure."[25] He stated:

> "If you have to go up the stream you maximise the ballast and you would go up to the extent of where you have no more water and drop the anchor there because you can't really get into much trouble. When the storm fades you pump out the ballast and come back out."[26]

[32] The Board considers that the risks associated with this proposed strategy are unacceptable:

- In comparison with a small ship such as a trawler, it would be a major task to find an appropriate location in which to locate the ship in the river to implement this strategy.
- The ship's structure is not designed to take the bottom, so grounding the ship may result in local or global structural damage due to bottom contours or obstructions on the river bottom at the grounding location.
- The grounding force provided by ballast may be insufficient to take account of change in river levels such as storm surge.
- The success of the strategy is dependent upon the ship being in line with the riverbed.

---

22 *Ibid*; para 41.
23 *Ibid*; para 40.
24 Mr Ballantyne; T.804.
25 Exhibit 97; para 39.
26 Mr Ballantyne; T.804.

- The ship may be subjected to beam winds, which, if there is insufficient grounding force and even if the anchor holds, may result in it swinging across the river and suffering uncontrolled grounding, causing local and/or global structural damage.
- If, to maximise the grounding force, the ship were to be required to take ballast after it has grounded, then the ballast system may need to be re-arranged to facilitate such ballast movements.

18.3.2 Opening the stern door in the event that the cargo hold becomes flooded

[33] The suggestion that a procedure be implemented for opening the stern door in the event that the cargo hold becomes flooded is inappropriate. This suggestion was made to enable water to be released from the hold once it is imminent that the loadline will be submerged. Such a course presents the risk of a large volume of water mixed with concentrate entering the marine environment. More importantly, it carries the risk of not achieving the objective of freeing water from the hold. There is a significant risk that opening the stern door will permit the ingress of seawater.

18.4 THE BOARD'S RECOMMENDATIONS

[34] The Board makes the following recommendations.

18.4.1 Cyclone Mooring in the Norman River

[35] Both long-term and short-term measures are required to avoid a recurrence of the incident. The installation of a cyclone mooring in the Norman River is necessary both in the short-term and long-term. The need for a cyclone mooring in the Norman River has long been recognized. It was recommended by Captain Boath in July 2004 and by the Thompson Clarke Operational Review in December 2006. The AMC was engaged by Zinifex in July 2007 to report on various cyclone mooring options. It concluded in its initial September 2007 report that there is no doubt that if the ship can remain in the Norman River, either alongside the wharf or at a dedicated mooring arrangement, during a cyclone then this is the safest place for it, for the crew and for the environment.

[36] The best solution would be for a single point mooring in the Norman River, and the Board recommends it.

[37] There may be insufficient time to complete the necessary engineering and other investigations, to obtain necessary approvals and to install a long-term, single point mooring in the coming weeks. If a long-term single point mooring cannot be installed as a matter of urgency, then temporary mooring arrangements are required for this cyclone season.

[38] Some evidence before the Board indicated that there was insufficient swing room in the river for a single point cyclone mooring. Counsel Assisting the Board made written submissions that the assumption that there was insufficient swing room for a single cyclone mooring in the river should be tested by further surveys and investigations. This appears to have been done and resulted in an application for a single point mooring.

[39] The development of a single point cyclone mooring in an appropriate location may be enhanced if procedures ensure that the ship is unloaded when required to use the mooring.

[40] The precise location of a single point mooring is a matter to be determined and approved by the authorities in the interests of marine safety in general, and having regard to the interests of persons who may be affected by the proposal.

[41] If for reasons that the Board presently cannot anticipate, it proves impossible to install a single point mooring, then other mooring options in the Norman River should be investigated as a matter of urgency. These would include:

- a “four point mooring” near the Zinifex wharf, with two of the four points on the shore;
- a “four point mooring” further up the river, with two of the four points on the shore;
- a “two point mooring” further up the river in the location described in Captain Diack’s evidence.

[42] These less preferred options would require investigations into the location of the proposed moorings, engineering solutions and design loads. Having considered these options without the advantage of such details, the Board considers it appropriate to make some general observations, in case a single point mooring is not installed.

[43] The option of installing a "four point" mooring near the Zinifex wharf is, in some respects, a variation upon the "stay alongside" option favoured by Mr Ballantyne and the option of staying alongside that has been practised by some Masters of the *Wunma* on various occasions over the years. The effectiveness of this option would be greatly enhanced by modifications to the Zinifex wharf, which was not designed to accommodate loads that might be experienced due to wind and current with the ship alongside the wharf during cyclonic conditions.

[44] The essential features of this "four point" option would be the installation of two appropriately engineered mooring points on the riverbank. Two other mooring points would be situated in the river. Once the ship is connected to these four points, it may be possible for the ship to be positioned so that it is held slightly off the Zinifex wharf so as to reduce impacts on the wharf.

[45] The advantages of such an option, apart from the obvious advantage of not subjecting the ship, the crew and the marine environment to the risks of the ship going into open waters during a cyclone, is that its location close to the Zinifex facility permits water to be pumped ashore to the facility with a reduced danger of water mixed with concentrate entering the marine environment.

[46] The risks associated with this option include the well-recognised risk that a high storm/tidal surge may increase loads on the moorings and on the Zinifex wharf and, in a worst case scenario, risk the ship riding up and onto the wharf itself. Another risk associated with any two point or four point mooring is the risk that destructive winds may damage the canopy of the ship and, result in part of the canopy being lost, with risk of injury to persons, property and the environment. These risks must be recognised, but weighed against the risks associated with other options, including the risk to the safety of the crew and the marine environment that would arise upon the ship going into open waters in a cyclone that was more destructive than Tropical Cyclone Nelson.

[47] It is possible that the risks of damage to the ship and to the wharf might be reduced by positioning the ship, as suggested by Mr Ballantyne, with its starboard side to the wharf so as to make use of the ship's fenders. The suggested positioning of the ship in this direction would need to form part of a proper engineering study and risk assessment of this "four point" option.

[48] The extent of the risk of damage to the ship and the wharf associated with a high storm/tidal surge should be the subject of proper investigation and assessment if a suitable single point mooring cannot be installed in the Norman River. If the risks are assessed to be too great, then consideration would be required to the option of locating a "four point mooring" further up the river. A properly engineered mooring is a preferred solution to the use of heavy anchors. Any proposal to locate two mooring points on each shore risks blocking the river. It has the potential to create a danger to shipping and inhibit other craft seeking shelter in the Norman River. To avoid these disadvantages, consideration should be given to a four point mooring with two secure mooring points on the shore and two mooring points in the river.

[49] A "four point mooring" presents advantages over a "two point mooring". But, the option of a "two point mooring" further up the river is preferred to the option of going to sea in a cyclone. Again, the feasibility of engineering mooring points in the location indicated in Captain Diack's evidence or some other location would require investigation. A two point mooring exposes the ship, and especially its canopy, to greater wind loads than would be experienced at a single point mooring. In an extreme event, this may result in substantial parts of the canopy being lost. Appropriate operating procedures to ensure that the ship was not loaded when it went to such a two point mooring would minimize the risk of cargo entering the environment.

[50] The Board wishes to emphasise that its preceding observations about four point and two point moorings in the Norman River is precautionary, in case the preferred option of a single point mooring in the Norman River is not installed.

[51] A cyclone mooring in the Norman River was intended as an essential part of the ship's operation when it was designed. Such a facility should be established without further delay. Temporary mooring arrangements should be established in the Norman River, and all necessary approval processes expedited to facilitate such arrangements in the current cyclone season. A long-term cyclone mooring should be established in the Norman River to reflect the original design intent and the fact that in 1999 the ship was, and remains today, "far from a typical seagoing example".

18.4.2 Cyclone Contingency Plan

[52] It is vital that any cyclone contingency plan for the current cyclone season be finalized without delay. The Board notes that MSQ was not satisfied with a draft plan submitted by P&O to MSQ on Friday 18 October 2007. The Board was advised on 5 November 2007 that MSQ, P&O, Zinifex, AMC and Thompson Clarke were working on finalizing a plan. The Board does not wish to complicate or delay that process. It is appropriate that two general observations be made. Clearly, any plan should address loading procedures with the objective that the ship have no cargo in the event of a cyclone threat. Pending further investigation into, approval of and the installation of a cyclone mooring in the Norman River (either temporary or long-term), any interim cyclone contingency plan might include the option of remaining alongside the Zinifex wharf.

18.4.3 Loading Procedures

[53] The ship's operating procedures should include, and the conditions of its registration should include, loading conditions that generally reflect the terms of the Interim Cyclone Contingency Plan developed by MSQ in March 2007[27], so as ensure, as far as reasonably possible, that the ship is not loaded when:

- a "Tropical Low" (as defined in the Interim Cyclone Contingency Plan or some similar definition that refers to a low pressure system that has the potential to deepen and become a tropical cyclone)) develops in the Gulf of Carpentaria Region (as defined) ;
- a cyclone has formed in the Gulf of Carpentaria;
- a cyclone that has formed in the Coral Sea has a westerly moving aspect and is likely to cross Cape York Peninsula into the Gulf of Carpentaria region; or
- the Master of the Wunma anticipates that storm or hurricane force winds may develop in the Gulf of Carpentaria within 48 hours.

[54] The Board notes that P&O's draft procedure adopts a similar approach.

[55] Such operating procedures and loading conditions may be reviewed in the event a discharge facility is established at the Zinifex wharf.

---

[27] Exhibit 15.

[56] The Board agrees with the submission of MSQ that that the ship's loading conditions should allow for the dirty waters tanks to be filled plus a substantial safety factor to ensure that the load line will not be immersed.

[57] In general, the Board's recommendations do not descend to detail about operating procedures, and therefore have not addressed sensible submission made by MSQ of the appropriateness that the Master contact the export vessel to determine weather and sea conditions at the Roadstead before loading. These and similar suggestions about operating procedures should be considered by the ship's operators.

18.4.4 Remaining Alongside

[58] An option that presumably have been considered in the light of Mr Kernaghan's recommendation for an urgent risk analysis would be for the ship to remain alongside the Zinifex wharf.

[59] If that risk assessment concludes that the option of remaining alongside carries unacceptable risks to the ship, port infrastructure or the environment, then it would not be appropriate to include it in any Interim Cyclone Contingency Plan. Otherwise an Interim Cyclone Contingency Plan should include as an option available to the Master, the option of remaining alongside the Zinifex wharf with additional moorings and other precautions designed to minimize the risk of damage to the wharf, the ship, other ships and facilities in the Port of Karumba. The option of remaining alongside the wharf rather than proceeding:

- to the anchorage or a similar location as provided for in the previous Interim Cyclone Contingency Plan;
- to the open sea;
- upstream, as recommended by some persons and proposed in P&O's earlier draft plan;

should be available in the event that the Master decides, on reasonable grounds, that the option is in the best interests of the safety of the ship and her crew.

[60] Zinifex should negotiate such contractual and other arrangements with the ship's Master, the ship's manager and others as may be necessary to authorise and facilitate such an option, and review its and the ship's cyclone procedures to facilitate such an option, pending the installation of a dedicated cyclone mooring in the Norman River.

[61] The Port of Karumba Cyclone Contingency Plan should be reviewed to facilitate such an option.

18.4.5 Voyages in Open Waters

[62] In the event that the ship is unable to access a dedicated cyclone mooring, remain alongside the Zinifex wharf, safely anchor off Karumba or safely anchor upstream and is required to voyage into open waters to avoid a cyclone:

- she should do so well in advance of being required to leave Port under the Port of Karumba Cyclone Contingency Plan, and in sufficient time to undertake cyclone avoidance measures;
- the voyage should be planned and undertaken on the basis of accurate and timely weather information, including weather information of the kind recommended by Captain White, Mr Kernaghan and Mr Cowle;
- all appointed Masters and navigation officers should be familiar with Gulf of Carpentaria weather patterns and cyclone avoidance procedures;
- the ship should do so in ballast, rather than in a loaded condition;
- adequate precautions are taken to manage the ingress of water into the ship on such a voyage.

[63] These recommendations should not be misinterpreted. The ship was not designed to voyage into open waters to avoid a cyclone. Her design and the geography of the Gulf make the option of voyaging into open waters in cyclonic conditions a very unattractive option. Cyclone moorings in the Norman River, and the temporary option to remain alongside the Zinifex wharf with additional mooring lines and other precautions if the expected conditions makes this the safest option in the circumstances, are preferred options to going to sea to avoid a cyclone. The development and installation of a long-term cyclone mooring in the Norman River should remove the possibility of the ship being required to voyage into open waters to avoid a cyclone;

[64] However, if for some reason, the ship is required to voyage into open waters to avoid a cyclone, it is important that any such voyage be undertaken in a manner that reduces the risks to the ship, her crew and the marine environment. The foregoing recommendations are advanced on that basis.

[65] If, for some unexpected reason, further investigations into the installation of a cyclone mooring in the Norman River, establish that a suitable cyclone mooring could not be installed, then a major review would be required into whether improved operating procedures and design modifications could make it safe for the ship to undertake a voyage in the Gulf in cyclonic conditions. One possible design modification would be for the sides of the canopy to be reinforced to enable it to better withstand the expected sea loads associated with such a voyage. Another would be to address the entry of seawater in the vicinity of the stern ramps. But these possible design modifications are mentioned for the purpose of completeness. Even with them, the option of undertaking a voyage in the Gulf in cyclonic conditions entails unacceptable risks, especially if the ship is caught in a loaded condition.

18.4.6 Cyclone Procedures

[66] Cyclone procedures applicable to the ship should be based, so far as possible, upon a consistent set of alerts, and the ship's cyclone procedures should be consistent with and integrated into the owner's cyclone procedures for its Port facility.

18.4.7 Weather Information

[67] An independent dedicated weather forecasting service is being implemented as recommended by both Captain White and Mr Cowle. The Board endorses the proposal to equip the *Wunma* with current and detailed weather information tailored to its area of operation. Naturally, compliance with cyclone contingency plans that are formulated in terms of alerts issued by the BOM, and the need to monitor BOM warnings and alerts will require the ship's crew to have regard to BOM weather information.

18.4.8 Risk Analysis

[68] In the event that it has not already been implemented, the recommendation contained in the Kernaghan report for a full risk assessment of the operations of the *Wunma* be implemented. The relevant recommendation states:

> "A full Risk Assessment of the operations of the "WUNMA" should be conducted. All present Masters and all those involved with "WUNMA" operations should be involved in the assessment procedure and play a full part in the development of mitigation strategies. The Risk Assessment should be undertaken by specialist independent consultants and cover the full operations of the "WUNMA" from

loading the cargo through to offloading at export vessel and return to port."

[69] In addition, in accordance with the recommendation contained in the Kernaghan report, a full analysis of the capabilities of the ship in cyclonic conditions should be undertaken. Such an analysis should consider:

- the ability of the vessel to expel water landing on the canopy and other parts of the vessel
- the ability to expel water from the well deck;
- the ability of the vessel to handle cyclonic seas in the Gulf of Carpentaria; and
- a consideration of the above in loaded, partially loaded and unloaded conditions.

18.4.9 Hazard Identification Workshop

[70] A hazard identification workshop should be conducted, as recommended in paragraph 7.3 of Captain White's report, if it has not been completed.

18.4.10 Water Management System

[71] The design and operation of ship's water management system should be reviewed so that it operates as a "first flush" system, with waste water from rain run off from the canopy and deck waste water being collected in "dirty water tanks", following which the rain run off from the canopy would be directed overboard before it comes into contact with the ship's decks.

[72] Pending the completion of that review and its implementation, and the implementation of any stormwater management plan developed to meet a condition of class imposed by Lloyd's Register:

- the ship's water management system including the state of its deck drains and the operation of its side deck drains should be independently reviewed as a matter of priority to ensure that, should the safety of the ship and her crew require it, water collected from the ship's canopy can be discharged overboard through side deck drains;
- the ship should be equipped with additional storage tanks and pumps necessary to either store or discharge water that accumulates in the aft well deck in the event of a monsoonal downpour and allowance be made for the

filling of such tanks during all loaded voyages over the cyclone season so as to avoid over-loading.

[73] Procedures for the operation of the ship's water management system, both pending the implementation of any new stormwater management system and after its implementation, be based upon:

- a study of the duration and/or intensity and/or level of rainfall required to wash the canopy of dust;
- the objective of avoiding entry of water mixed with zinc/lead concentrate into the marine environment.

[74] The study and the procedures should be reviewed by the Environmental Protection Agency to ensure that entry of water mixed with zinc/lead concentrate into the marine environment is avoided so far as is reasonably practicable.

[75] In the ship's present state, so far as the Board is aware, problems of blockages in deck drains have not been resolved, and, the water management system has not been modified to ensure that the ship does not accumulate excessive water on board. The delay in resolving these issues raises an issue concerning the ship's seaworthiness, and the general safety obligation of its owners and operators under the *TOMS Act.*

18.4.11 Conditions of Assignment

[76] The conditions of assignment for load line of the ship be independently reviewed by a suitably qualified naval architect engaged by the owners of the ship, to ensure that they comply with the requirements of Section 7 of the *USL Code* (or such other statutory requirement for load line as may apply at the relevant time), and in particular regard be had to:

- the standard of watertight protection required for the emergency generator room, including its radiator vent.
- arrangements to free water from the well deck.;
- the objective that any freeing ports are designed in a way that avoids, so far as reasonably practicable, entry into the marine environment of water mixed with zinc/lead concentrate, for instance by the insertion of a shutter or other device into the freeing port during wash down activities.

18.4.12 Barrier between the aft well deck and the cargo hold

[77] A weathertight barrier should be fitted to restrict the ingress of water from the well deck into the cargo space. Such a barrier may be of the removable coaming type as fitted on the *MV Aburri* or a "jack-knife" style weather-tight door fitted in place of the "barn doors".

18.4.13 Recommendations by Captain Dally and Captain Seal

[78] Captain Dally and Captain Seal made a number of helpful recommendations in order to improve the operation of the ship's electrical systems, to prevent the ingress of water into the well deck and cargo hold and to improve the management of water. The Board assumes that these suggestions have been reviewed by the ship's owner and operator, their consultants, the classification society and its surveyor and the regulator.

[79] They include the trunking for the emergency generator room, the isolation and arrangement of emergency generator circuits, the operation of openings of deck scuppers and the installation of pumps capable of pumping slurry. If they have not already been reviewed in the course of the risk analysis recommended by Mr Kernaghan, the technical audit of design undertaken by Noble Denton and/or recent surveys of the ship, they should be reviewed by the ship's owners and surveyors and appropriate action should be taken to address those matters.

18.4.14 Recommendations by Mr Davis

[80] If they have not already been investigated, the matters raised by Mr Davis should be urgently reviewed by an inspector of MSQ, and the owners and operators of the ship.

18.4.15 Compliance with Conditions of Class

[81] A matter of concern to the Board is the delay in satisfying conditions of class imposed by Lloyd's Register in relation to critical matters such as the emergency generator room vent and the ship's water management system. These changes to the ship's physical arrangements should have been approved and implemented long ago. Their effectiveness should be independently reviewed, as recommended by Mr Kernaghan. But that should not delay their urgent implementation.

[82] All steps that are necessary to comply with the conditions of class imposed by Lloyd's Register, including modification of the emergency generator vent and the

approval of new storm water management plans, should be attended to without further delay. New stormwater management plans should be implemented as a matter of urgency if they have not already been implemented.

[83] If changes to these arrangements, particularly arrangements in respect of the emergency generator room and the operation of the ship's water management system, have not been implemented, and will not be promptly implemented, then MSQ should consider the continuation of the ship's RUF and whether the operation of the ship in these circumstances involves a breach of the general safety obligation imposed by the *TOMS Act* on the owner and operator.

18.4.16 Thompson Clarke Recommendations

[84] The following recommendation of the Thompson Clarke Operational Review should be implemented by the ship's owners:

- A root cause analysis of product spillage be undertaken by a specialist task force set up to address the causes and effects of product spillage. The task force should include representatives of the ship's manager, operating crews and Zinifex. Following its completion it may be necessary to conduct an ergonometric survey to determine effective cleaning methods around and underneath conveyor belts, and the effectiveness of procedures to ensure the cleanliness of the vessel and the proper operation of drains.
- Scheduled maintenance periods be established to allow a proper program of maintenance, including contractors to come on board, with special attention to the maintenance of drains and valves.

[85] The owners and operators should respond to such other issues as were identified by the Thompson Clarke Operational Review that remain relevant to the operation of the ship in the light of recent changes to her management and the evidence before the Inquiry.

18.4.17 Crewing

[86] The adequacy of crewing, both in terms of numbers and competence, be reviewed by MSQ in consultation with such occupational health and safety consultants as may be appointed by the ship's owners or managers, with special regard to the intensity of the trade undertaken by the ship during its normal operations and crew fatigue issues.

18.4.18 Environment

[87] The recommendations made by Professor Parry that further:

- chemical and biological analysis on existing samples to provide a more detailed assessment of metal dissolution rates, bio-availability and biological impacts;
- sediment sampling to the north of the Wunma drift track; and
- seawater sampling and analysis in the vicinity of the drift track,[28]

should be carried out as soon as possible.

18.4.19 Legislative and administrative changes

[88] Legislative and administrative changes should be made to end what was described in Mr Bundschuh's evidence as the "mix and match" registration system with "partial class approvals".

[89] A more comprehensive approach to assessment of the safe operation of a ship should be undertaken at the registration stage, particularly in respect of a ship with novel design features, or in respect of a ship, the features of which create a higher risk in its intended area of operation than the risk profile of most other ships in that area of operation. For instance, the *Wunma* was not originally designed to voyage in cyclonic conditions and was intended to have access to a cyclone mooring. Its risk profile in open waters in cyclonic conditions was higher than a ship that was designed to voyage in open seas in cyclonic conditions. This risk profile justified insistence on a comprehensive risk assessment of her seakeeping properties and seaworthiness in open waters in cyclonic conditions.

[90] Whilst the receipt of certificates from accredited persons or classification societies, coupled with obligations on operators to operate ships safely, may be sufficient in many cases to entitle a ship to registration, a more comprehensive approach is required in such cases.

[91] This may require a comprehensive risk analysis to be undertaken of the ship's seakeeping properties in its intended area of operation. It may require the registration authority to "look behind" any certificate of compliance issued by an accredited person associated with the ship's design or construction, so that the registration authority is itself satisfied that the ship's design ensures that it will be

[28] *Ibid*; para 32.

able to operate safely in its intended area of operation. It should involve consideration by the registration authority of, and consultation with other sections of MSQ about, operating procedures and arrangements (eg cyclone moorings) so as to ensure the safe operation of the ship.

[92] The Submissions of MSQ to the Inquiry convey an excessively "hands off" approach to regulation. MSQ correctly points to the important role of accredited persons and the reliance that MSQ places upon their certificates. MSQ correctly points to the fact that the obligation to safely operate ships is upon those who operate them, and that the function of MSQ as regulator in not to be a "nautical nanny". But the MSQ Submissions do not suggest that the incident has prompted it to review its approach to regulation. For instance, its submissions state:

> "MSQ takes the view that the on-board drainage problems with the ship are an 'internal matter' for management by INCO and Zinifex. Such an internal matter is very much within the control of the ship owners and operators and beyond the scope of what MSQ should be reasonably required to know, or take action about."

[93] On the contrary, MSQ might reasonably be required to have known something about the water management system of a ship that was specially designed to keep water on board in the interests of environmental protection, in circumstances in which MSQ was being asked to approve an upgrade in her registration to permit her to sail into cyclonic seas in tropical downpours. Given its lack of a role in plan approval, when the ship was registered in 1999, the Queensland registration authority did not have a comprehensive set of drawings[29] and did not have any understanding that there was some intent that water be kept onboard for environmental reasons.[30] In 2005 prior to granting the registration upgrade, MSQ only understood about the intent that water be kept onboard for environmental reasons "in a very general sense", and did not become aware of the details until after the incident.[31] MSQ certainly should have known more about the ship's novel water management design, and its actual operation before upgrading the ship's registration in 2005.

[94] MSQ in its submissions correctly identifies the fact that the ship went to sea in a loaded condition as a cause of the incident, and supports a recommendation that the

---

29 Mr Bundschuh; T.772.
30 Mr Bundschuh; T.754.
31 *Ibid*.

ship not load when a tropical low is present in the Gulf. But it rejects the contention that there were shortcomings in regulatory arrangements that enabled the ship's registration to be upgraded in 2005 without loading conditions being addressed. MSQ makes the remarkable submission:

> "In relation to the loading conditions to meet a cyclone, from the perspective that the ship was sufficiently buoyant, had sufficient stability, adequate watertight integrity, appropriate safety equipment and adequate hull strength, it was immaterial whether the ship was in a loaded or unloaded condition." (Emphasis added)

[95] MSQ seeks to shift responsibility to Lloyd's Register for not expressing in 2005 concerns about the proposed operation of the ship outside her classification limits. But Lloyd's Register undertook strength tests, and gave no assurance that the ship could safely operate in cyclonic seas, let alone that it would be seaworthy in cyclonic seas in a loaded condition. Lloyd's Register might have assumed, as did Captain Cole, that MSQ as regulator would want to satisfy itself that the ship would be seaworthy in those conditions before upgrading its registration.

[96] MSQ accepts the Board's view that there is an important distinction between:

(a) the collection and retention of rainwater during the ship's normal daily operations, whereupon the ship is *able to return to port* and empty her dirty water tanks; and

(b) the collection and retention of rainwater (and seawater) during a voyage in open seas in cyclonic conditions in circumstances where the ship is *unable to return to port*.

However MSQ submits that this ought to have been dealt with by way of operating procedures, for which the operator is responsible. Again, MSQ correctly identifies the responsibility of others, but recognizes no role for itself as regulator in addressing these issues. It agrees in its submissions that no risk assessment was undertaken, but "questions whether this is simply something that should have been dealt with by the operator". The answer is that it should have been dealt with by the operator, but that MSQ as regulator should have ensured that the operator had undertaken a comprehensive risk assessment.

[97] Overall, MSQ submits that issues of water management are "class issues to be dealt with as a matter between the owner and the class society… not a matter for MSQ". On the contrary, they are a matter for MSQ. As experience shows, water

management and conditions of assignment impinge directly on the safety of the ship, the safety of its crew and the marine environment.

[98] In circumstances in which MSQ manifests such a "hands off" approach to its role as regulator, the Board's recommendation that a more comprehensive approach to assessment of the safe operation of a ship should be undertaken at the registration stage may not count for much. In response to that recommendation, MSQ makes the submission that "it should not be a matter for MSQ to look behind a holistic risk assessment that is produced to it by an apparently competent and qualified person". If that continues to be MSQ's approach, then there may no point in the recommendation. A risk assessment document will simply join the list of documents to which the MSQ rubber stamp is applied at the registration stage.

[99] Beyond the registration stage, MSQ has a restricted view of its powers as regulator. This is apparent in the view taken by its officers in 2005 that it was powerless to insist that the safe operation of the ship in the cyclone season required the ship to have access to an operational cyclone mooring. This approach is advanced in MSQ's submissions. If the safe operation of the ship required her to have a cyclone mooring in the Norman River or some other sheltered location (as senior MSQ officers believed at the time), then MSQ as regulator should have pressed the issue with the ship's owners and operators, and, if nothing came of it, exercised its powers as regulator to enforce what it understood to be the safety obligations of the ship's operators. If there is any doubt about the power of MSQ to take steps to enforce what its officers consider is necessary in the interests of marine safety, then this doubt should be removed by legislative amendments.

[100] Incidentally, MSQ makes the interesting submission that "MSQ had no evidence to suggest that the operation of the ship in a cyclone was not a reasonable and practicable alternative" and that there was "absolutely no evidence" that the decommissioning of the cyclone mooring off Sweers island was other than a safe and reasonable option. MSQ appears to have overlooked the evidence that was given by it and others in the Federal Court in 1999, and the advice in 2005-2006 of its own officers, Captain Boath and Captain Diack, that operating the ship without a

cyclone mooring was dangerous[32] and presented "a major safety issue in respect of the ship's crew".[33]

[101] Overall, MSQ's Submissions convey a narrow conception of its role as regulator. Whilst correctly emphasizing the responsibilities of "accredited persons" under the *TOMS Act* and MSQ's reliance on their certificates, and pointing out the responsibilities of owners and operators, MSQ's submissions give the impression that once a ship is registered, the obligation to operate it safely rests on those in charge of its operation, there is not much that MSQ can do to alter the situation. In the case of the *Wunma* this led to the ship's registration being upgraded over the documented safety concerns of Captain Boath and Captain Diack.

[102] A system that operates on the basis of certificates from accredited persons has certain advantages. But if accredited persons know that the regulator chooses to not "look behind' their certificates, then there will be a temptation upon some accredited persons to certify matters without having a proper basis to do so.

[103] MSQ's Submissions explain what MSQ does not do as a regulator, namely act as a "nautical nanny" or assume the duties and functions imposed on others under the *TOMS Act*. They do little to explain what MSQ in fact does as regulator.

[104] The Board recommends that MSQ reflect on its role as regulator. If it does not have the resources to adequately assess the seaworthiness of ships like the *Wunma* when processing applications to register, or to properly enforce safety obligations once registrations are granted, then this should be made apparent to the general public. Otherwise, the general public might be misled into thinking that the granting of registration is more of an assurance of seaworthiness than it in fact is.

[105] The extent to which MSQ, through legislative arrangements, lack of resources or inclination, adopts a "hands off" approach to regulation is shown in the words of Mr Ballantyne, who defends what he describes as "the Queensland self regulatory marine safety system".

---

32 Exhibit 49, CB124.

33 Exhibit 49, CB119.

[106] The Queensland Government should consider whether legislative, administrative and financial arrangements have led to a system of self regulation, and, if so, whether such a system serves the public interest.

WUNMA BOARD OF INQUIRY

CHAPTER 19: CONCLUDING OBSERVATIONS

TABLE OF CONTENTS

WUNMA BOARD OF INQUIRY

CHAPTER 19: CONCLUDING OBSERVATIONS

19.1 STRENGTH, STABILITY AND SAFETY

[1] A recurring theme in the evidence was that the ship had ample stability. Even if her cargo hold was awash with seawater, as occurred during the incident, she was not going to sink.

[2] Although not designed for open waters, Lloyd's Register's strength assessment in late 2004 indicated that the ship probably had the strength to undertake a voyage in cyclonic conditions in the Gulf. Her voyage on 6 and 7 February 2007 suggests that she has the strength to survive a Category 2 cyclone in the Gulf.

[3] The focus was on strength and stability when the ship was designed. It remained the focus when the proposal was approved to permit the ship to ride out a cyclone in open waters.

[4] Strength and stability are vital. But they do not guarantee the safe operation of a ship such as the *Wunma* in cyclonic seas. The focus on strength and stability meant that little or no attention was given to the design and operation of the ship's water management system. Her design and operation turned the ship into a large water receptacle. In a loaded condition every extra tonne of water retained onboard was going to further immerse the load line.

[5] One would have thought that the incident demonstrated that the focus should not be simply on strength and stability. But some witnesses at the Inquiry were inclined to maintain the strength and stability mantra. This was reflected in the rationalisation that the ship would not have been abandoned if there had not been a miscommunication of information to the Master. After all, the ship was practicably unsinkable.

[6] First impressions can be deceptive. A photograph of the stern of the *Wunma*, with her stern ramp fully retracted, shows gaps and windows where seas might enter. In a loaded condition and with a following sea, Captain White described the stern as the "Achilles-heel of the vessel". But to some this Achilles heel was a strength.

[7] In 1999 when an employee of its designer, ADSMAR, was explaining to AMSA

why the ship did not need freeing ports near her stern ramp, he advised that the hold was modelled with spill points at the top of the watertight seal on the stern door "allowing the liquid level to fall to this height" and that stability conditions were satisfied "with wide margins". The same focus on stability permitted the ship's registration and procedures to be amended in late 2005 to permit her to voyage into open waters during cyclones.

[8] But the ship was never designed to voyage in cyclonic seas. Her manager described it in 1999 as "far from a typical seagoing" vessel. Lloyd's Register, which classed her for service not exceeding 21 nautical miles from shore, was careful to pass the task of issuing a load line certificate to someone else. The ship's designer obliged. The Managing Director of the designer gave evidence that he thought that freeing ports had been installed near the stern ramp. But the naval architect employed by his company knew that they had not been, and made a declaration on a Certificate of Compliance for Loadline that the ship was seaworthy for load line in restricted off shore waters.

[9] A belief that the ship was seaworthy during its normal operations between Karumba and the Roadstead is understandable. Freeing ports near the stern were required if you were "working to the letter of the law", but to install them risked water mixed with concentrate entering the marine environment. If the Queensland registration authority had been asked in 1999 to relax the strict application of the load line requirements in the *USL Code* in the circumstances, it probably would have done so. But it was not asked to do so. Its system was built around receiving certificates, and it received all of the certificates that it needed to register the ship. In 1999 the Queensland regulator did not confront the tension between competing objectives of:

- shedding water that may accumulate in the aft well deck via freeing ports in the interest of marine safety; and
- keeping water mixed with concentrate out of the marine environment.

It did not do so at any stage prior to the incident.

[10] Surveyors who inspected the ship over the years probably assumed that her conditions of assignment for load line complied with the applicable rules at the time of her original registration. Otherwise the ship would not have been registered.

[11] People who in later years supported the ship going to sea in cyclonic conditions seem to have assumed that someone else had the responsibility to check that she would not accumulate water in cyclonic conditions. It was someone else's responsibility. In the end, no one assumed the responsibility to check.

[12] Whatever tolerance of the absence of freeing ports or other devices to shed water from the well deck may have been justified for the ship's routine operations, a different approach was required when assessing the safe operation of the ship in open waters during cyclones. But there was no different approach. The focus was on strength and stability. No analysis was undertaken of the ship's ability to shed water from its well deck, despite the ship's manager knowing that her water management system was dysfunctional. A proper risk assessment was never undertaken.

[13] The crew of the *Wunma* battled on the afternoon of 6 February 2007 to stop water accumulating in the well deck. They faced the consequences of a water management system that was incapable of directing large volumes of rainwater overboard through operational deck drains. If someone had asked them at the time whether freeing ports near the stern ramp seemed like a good idea, they probably would have agreed.

[14] Plenty of strength and stability did not make the ship seaworthy in the open waters of the Gulf. It certainly did not stop the water rising in the well deck. Plenty of strength and stability was not enough to ensure the safety of the ship or her crew.

19.2 THE CREW

[15] Those who are not prepared to confront the systemic and regulatory arrangements that permitted the incident to occur may downplay the incident as something of a storm in a teacup. After all, no one was killed or seriously injured. But at times some of the crew probably thought they were going to die, and it is appropriate to make some concluding observations about the crew.

[16] In retrospect, it is easy for some to say that the lives of the crew were never at risk. It is said that, at worst, the ship would have sunk from the stern and righted itself as cargo spilled over the stern ramp and into the waters of the Gulf. As matters transpired, the storm abated and the crew was able to be rescued by helicopter. But such a happy ending was not guaranteed, and may not have occurred if the cyclone had been more intense and the ship ended her voyage in a different location.

[17] If the crew had been forced to take to life rafts, then Captain Seal had real concerns for their chances of survival. As Captain Dunnett said in a characteristic Australian turn of phrase: "It is a long walk to the shore".

[18] The crew deserve recognition. The engineering crew, and Mr Fisher in particular, deserve commendation for restoring power to the ship in extremely difficult circumstances after the blackout that occurred at the height of the cyclone. Criticisms that have been made earlier in the report about certain operational decisions made by Captain Seal. But the evidence indicates that his composure and leadership at the height of the incident enabled the crew to remain calm and attend to their duties. During those hours the water level in the cargo hold was at one with the sea. The Chief Mate, the Second Mate and the Bosun observed flexing in the hull. Having seen this the Chief Mate feared that the ship might quickly sink. Despite the difficult situation in which they found themselves, the crew remained calm, including crew members with little seagoing experience.

[19] This Report has attempted to identify the systemic failures that permitted a ship with a dysfunctional water management system to venture into the open waters of the Gulf in a cyclone. The installation of a dedicated cyclone mooring in the Norman River and other remedial measures should ensure that the *Wunma* is not placed in that situation again. But unless the systemic arrangements that allowed the incident to happen are addressed, the lives of crew on other ships will be placed at unnecessary risk.

WUNMA BOARD OF INQUIRY

LIST OF APPENDICES

D 200 Cyclone Procedure
D 210 Sailing Procedure in the Event of Cyclone

Objective
To describe the process whereby the crew of the Wunma must react to a Tropical Revolving Storm (TRS) or cyclone event to ensure the safety of the crew and vessel at all times and to ensure that the vessel of cargo does not present as a risk to the environment.

Scope
This procedure is applicable each time the Port of Karumba, and surrounding waters are threatened with a TRS or cyclone event.

Responsibilities
The Managing Director is ultimately responsible for this procedure. The operation of the vessel is the responsibility of the Operations Manager in Karumba, and the operation of the vessel at sea is the responsibility of the Master.

Procedure
General
The cyclone season in Northern Australia extends from December to April, although cyclones in Australia have occurred as early as November and as late as May. Records indicate that cyclones in the Karumba area are more likely to occur in January, and can be expected within a 150 Km radius on average once in every four years.

The Tropical Cyclone Warning Centre (TCWC) responsible for the Karumba area will send out alerts when a cyclone is expected as follows:
- Cyclone watches six hourly.
- Cyclone Earnings three hourly, becoming hourly when the cyclone is in close proximity to a major population centre and is in the range of a weather radar.
- Gale, Storm and Cyclone Warnings for shipping six hourly.

The vessel will receive daily weather information by Satcom 'C', facsimile, VHF or MF/HF radio.

The Operations Superintendent will communicate on a regular basis with the Port Manager and will relay cyclone warnings received by the vessel.

The Operations Superintendent will communicate with Head Office on a regular basis to keep them advised of cyclone activity in the region.

The Operations Superintendent and the Master will monitor the cyclone alerts and will make a preliminary choice of action in the event a cyclone is imminent. Their choice of action will take the form of one of the following:

- Anchor off Karumba in position (Lat. Long). This action to be undertaken if the cyclone is not intended to intensify and is expected to pass over (50 kms??) of the Port. Have both anchors down at maximum scope of cable and engines should be employed to ease the weight on the anchors. The vessel will remain on full alert at the anchorage during the duration of the cyclone.
- Proceed to Weipa. This action to be undertaken if there is sufficient time to make the journey (nautical miles??, / hours). Permission must be obtained from the Port Authority of Weipa who will allocate a berth of an anchorage position.
- Head for the open sea and remain in open waters until the cyclone has passed. This action to be undertaken if either there is no time to steam to Weipa, or permission to enter Weipa has been declined because of the prevailing conditions at the Port at that time.

The Master will have the final responsibility of choice of action taking into account prevailing weather conditions and any changes in forecast conditions that may occur. Choice of action will be relayed to the Port Authority and to the Operations Superintendent.

CYCLONE ALERTS

The Company has adopted the following procedure with respect to Cyclone Alerts.

BLUE ALERT

This is effective when the Bureau of Meteorology has advised the vessel that a 'Watch Alert' is effective i.e. Gale Force Winds > 40 knots are expected within 48 hours, but not less than 24 hours.

Action

- Recall crew and ensure everything is firmly lashed and secure. Specific attention is to be given to any material that may become airborne in extreme wind conditions.
- Ensure vessel has sufficient bunkers to be able to proceed to sea and steam for a minimum of four (4) days. This may require returning to Karumba if the vessel is at the transfer anchorage.
- Cease loading or discharging operations.
- Ensure sufficient ballast water is on board to maintain good stability in the vent vessel proceeds to sea. Ensure that the vessel is not at a draft, which may prevent her from leaving Karumba, taking into account weather and tidal conditions.

YELLOW ALERT

This is effective when the Bureau of Meteorology has advised that a 'Warning Cat 1 Alert' is effective i.e. Gale Force Winds > 40 knots expected.

Action

- If berthed, run extra mooring lines and make appropriate preparations to depart the wharf and proceed to sea if the wind is expected to intensify further.
- Place engine room on stand by and maintain the vessel at an alert status for the passing of the cyclone.
- If alongside overseas ship, let go and remain in vicinity but be prepared to head either to open sea or to the anchorage point closer to Karumba if the wind is expected to intensify further.

RED ALERT

This is effective when the Bureau of Meteorology has advised that a 'Warning Cat 2 Alert' is effective i.e. DesTructive Winds are expected > 70 knots within 24 hours.

Action

- If in Port, depart the wharf and proceed to sea. Make preparations for navigating in heavy weather as per procedure Safety Actions.
- If at sea, either proceed to anchor off Karumba or proceed into deep water keeping in mind procedures to be followed in the event of encountering a Cyclone (see D220).
- If the vessel is unable to proceed to sea for whatever reason, ensure sufficient mooring lines have been run, rig extra fenders if this is possible, and lay out the starboard anchor only if this is possible due to possible weather conditions and time constrains.

D 220 Avoiding Cyclones at Sea

Objective
To describe the procedure for the Wunma to avoid cyclones at sea.

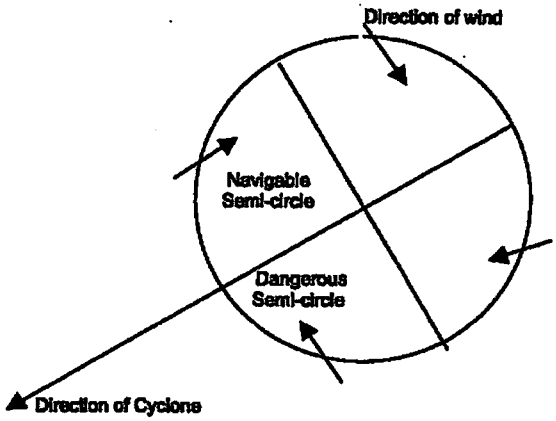
Scope
This procedure is applicable each time the Port of Karumba and surrounding waters are threatened with a TRS or cyclone event, and the MV Wunma heads for open waters.

Responsibilities
The Managing Director is ultimately responsible for this procedure. The operation of the vessel is the responsibility of the Operations Superintendent in Karumba, and the operation of the vessel at sea is the responsibility of the Master.

Procedure
General
After receiving a Red Alert from the Bureau of Meteorology, and the MV Wunma decides to proceed to sea, either to head for Weipa or to remain in open waters, it is imperative that the Master maintains a good track of the eye of the cyclone. The Bureau of Meteorology will give information on a regular basis (see above), however it is the responsibility of the Master to maintain a plot so as to determine if the vessel has sufficient speed to outrun the cyclone or it is more prudent to 'heave to' to allow the cyclone to pass.

Plotting the Cyclone
1. Plot cyclone centre on the chart.
2. Construct a circle to equal the cyclone radius.
3. Construct tangential lines to the cyclone circle at approximately 40° from the forecast path.
4. Construct the quadrant from the cyclone centre to equal 1 day's movement of the cyclone. This is known as the imminent danger area.
5. By projecting the cyclone's movement for an additional 24 hour period, the 'probable danger area' can be charted.

Taking Avoiding Action
1. Determine the semi-circle in which the vessel is situated.
2. If the wind is backing the vessel is in the dangerous semi-circle. The Master should make the best speed keeping the wind on the port bow between 10° to 40°. Alter course to port to keep the wind on the port bow as the wind continues to back.
3. If the wind is observed to veer, the vessel is in the 'navigable semi circle'. The Master should make all possible speed with the wind on the port quarter. Alter course to starboard to keep the wind on the quarter as it continues to veer.
4. If the wind is remaining steady, or nearly steady, the Master should alter course to obtain the wind well on the port quarter and proceed towards the navigable semi-circle. Once within this semi-circle alter course to starboard to maintain the wind on the quarter.



Wind Observation	Ship's Location
Veering	Vessel located in navigable semi circle
Backing	Vessel located in the dangerous semi circle
Steady	If the pressure is falling, the vessel is in the PATH of the cyclone

Table 1: Ship's Location

Location	Action
Dangerous Semi-Circle	Put wind on port bow and alter course to port as wind backs
Navigable Semi-Circle	Put wind on port quarter and alter to starboard as wind veers

Table 2: Ship's action in vicinity or cyclone

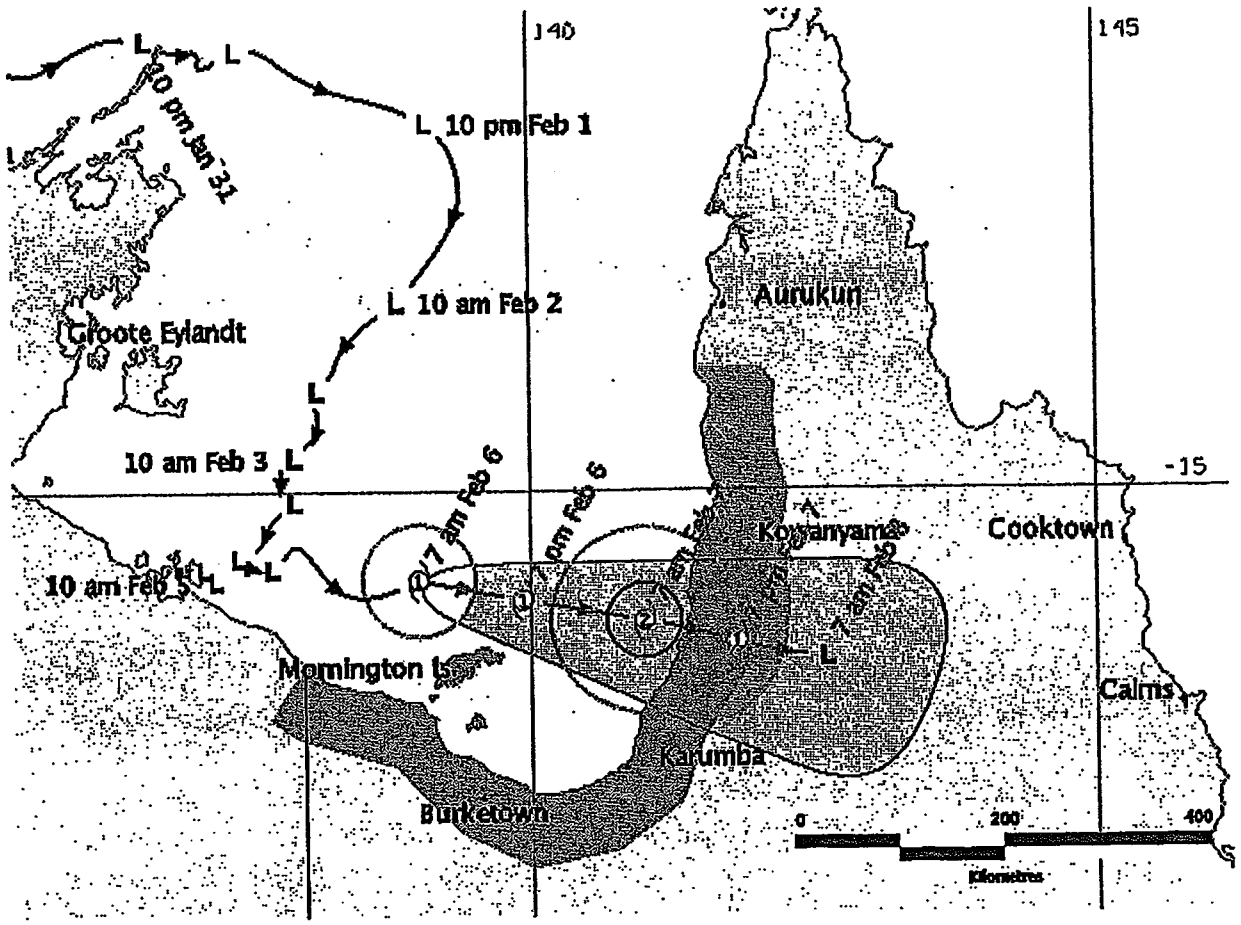
5. It is imperative that the vessel avoids a 'lee shore'. If it is evident that the vessel may be placed in this dangerous situation by altering course, it may be better to turn into the wind and ride out the cyclone in deep water.

From: Amy Seal [mailto:amyc@yahoo-inc.com]
Sent: Tuesday, 6 February 2007 11:27 AM
To: 'master.wunma@intship.amosconnect.com'
Subject: TROPICAL CYCLONE FORECAST TRACK MAP

TROPICAL CYCLONE FORECAST TRACK MAP

Tropical Cyclone Nelson

Tropical Cyclone Advice Number 32 Issued at 7:48 am EST Tuesday 6 February 2007



Community Threat		Past Cyclone Details	
Warning Zone - Gales within 24 hours		Past Location and Intensity Number	(3) or L
Watch Zone - Gales from 24 to 48 hours		Past Track and Movement	

23/10/2007

Current Cyclone Details		Forecast Cyclone Details (at 24 and 48 hours from issue)	
Current Location and Intensity Number	(3) or L	Forecast Location and Intensity Number	(3) or L
Very Destructive Winds		Very Destructive Wind Boundary	
Destructive Winds		Destructive Wind Boundary	
Gale Force Winds		Gale Force Wind Boundary	
		Most Likely Future Track	
		Range of Possible Tracks	

The forecast path shown above is the Bureau's best estimate of the cyclone's future movement and intensity. There is always some uncertainty associated with tropical cyclone forecasting and the grey zones indicates the range of likely tracks.

Due to the uncertainty in the future movement, the indicated winds will almost certainly extend to regions outside the rings on this map. The extent of the warning & watch zones reflects this.

Remarks:

Tropical Cyclone Nelson is expected to continue moving east-southeast while intensifying. It may cross the coast between KOWANYAMA and KARUMBA on Wednesday afternoon.

GALES may develop on the coast between the Northern Territory border and Kowanyama during today or overnight.

The cyclone is expected to cross the coast near low tide, however the associated storm surge is expected to raise these tides close to the highest tide of the year.

People between the Northern Territory Border and Cape Keerweer should take precautions and listen to the next advice at 11am. If you are unsure about precautions to be taken, information is available from your local government or local State Emergency Service.

Name: Tropical Cyclone Nelson

Details:

	Time (EST)	Intensity Category	Latitude (decimal deg.)	Longitude (decimal deg.)	Estimated Position Accuracy (km)
0hr	7 am February 6	1	15.8S	139.0E	55
+6hr	1 pm February 6	1	15.9S	139.5E	85
+12hr	7 pm February 6	1	16.0S	139.9E	110
+18hr	1 am February 7	1	16.1S	140.4E	130
+24hr	7 am February 7	2	16.2S	141.0E	150
+36hr	7 pm February 7	1	16.4S	141.8E	155
+48hr	7 am February 8	tropical low	16.5S	142.6E	175

The next Forecast Track Map will be issued by 11:00 am EST Tuesday.

IDDP0007
Australian Government Bureau of Meteorology
Queensland
Tropical Cyclone Warning Centre

23/10/2007

BOARD OF INQUIRY

INTO THE MARINE INCIDENT INVOLVING THE SHIP "WUNMA"

IN THE WATERS OF THE GULF OF CARPENTARIA

ON OR ABOUT 6 AND 7 FEBRUARY 2007

GLOSSARY

AFMA ..... Australian Fisheries Management Authority

AMC ..... Australian Maritime College

AMSA ..... Australian Maritime Safety Authority

AUSAR ..... Australian Search and Rescue

COSPAS-SARSAT .... International satellite system for search and rescue

DUKC ..... Dynamic Under Keel Clearance

EFPL ..... Exemption from Pilotage Licence

EIA ..... Environmental Impact Assessment

EMP ..... Environmental Management Plan

EPA ..... Environmental Protection Agency

EPIRB ..... Emergency Position Indicating Radio Beacon

GMDSS ..... Global Maritime Distress and Safety System

GPS ..... Global Positioning System

HF ..... High Frequency Radio

IMO ..... International Maritime Organisation

ISM ..... International Safety Management

JSA ..... Job Safety Analysis

Lloyds ..... Lloyds' Register of Shipping

MARPOL ..... Convention for the Prevention of Marine Pollution from Ships

MERCOM ..... Marine Emergency Response Commander (AMSA)

MHP ..... Materials Handling Plant

MSO ..... Maritime Safety Officer

MSQ ..... Maritime Safety Queensland

PASS ..... Positive Action Safety System

PCQ ..... Ports Corporation Queensland

PPM ..... Port Procedure Manual

QPS ..... Queensland Police Service

QT ..... Queensland Transport

RCC ..... Rescue Coordination Centre

RHM ..... Regional Harbour Master

RUF ..... Restricted Use Flag

SAR ..... Search and Rescue

SatNAV ..... Satellite Navigation System

SERS ..... Ships Emergency Response Service (Lloyds)

SIS ..... Shipping Information Service

SOLAS ..... Safety of Life at Sea (an IMO Convention)

SQS ..... Safety and Quality System

SUKC ..... Static Under Keel Clearance

TOMPA ..... Transport Operations (Marine Pollution) Act 1995

TOMSA ..... Transport Operations (Marine Safety) Act 1994

TRS ..... Tropical Revolving Storm

UHF ..... Ultra High Frequency Radio

USL ..... Uniform Shipping Laws Code

VHF ..... Very High Frequency Radio

VMR ..... Volunteer Marine Rescue

VTS ..... Vessel Traffic Services

VTSO ..... Vessel Traffic Service Operator

BOARD OF INQUIRY

INTO THE MARINE INCIDENT INVOLVING THE SHIP "WUNMA"

IN THE WATERS OF THE GULF OF CARPENTARIA

ON OR ABOUT 6 AND 7 FEBRUARY 2007

LIST OF EXHIBITS

NUMBER	DESCRIPTION	DATE TENDERED	TRANSCRIPT PAGE
1.	Extract from Queensland Government Gazette 16.03.07	22.05.07	13 Dir Hearing Trans
2.	Extract from Queensland Government Gazette 20.04.07	22.05.07	13 Dir Hearing Trans
3.	Practice Direction 16.05.07	22.05.07	13 Dir Hearing Trans
4.	Satellite photograph of Port of Karumba and Anchorage	13.08.07	13 Auscript
5.	Cyclone Nelson track map	13.08.07	14
6.	SQS Cyclone Procedure	13.08.07	14
7.	Graphic of Tropical Cyclone Nelson track and the voyage of the *MV Wunma*	13.08.07	14
8.	Advisory Message from the Regional Harbour Master and Port of Karumba Cyclone Contingency Plan	13.08.07	19
9.	Statement of Francis Thomson	13.08.07	19
10.	SQS Cyclone Procedure, taken into possession of Mr Thomson from the ship 10.2.07	13.08.07	20
11.	Zinifex Century Mine Cyclone Procedure – *MV Wunma* ,taken into possession of Mr Thomson from the ship 10.2.07	13.08.07	41

NUMBER	DESCRIPTION	DATE TENDERED	TRANSCRIPT PAGE
12.	Inspection report by Mr Thomson February 2007	13.08.07	41
13.	Charts: (a) Approaches to Karumba (b) Nassau River to Wellesley island, showing roadstead (c) Booby Island to Cape Wessel (d) Cairns regional jurisdiction	13.08.07	41
14.	Photographs of the *MV Wunma* displayed during Mr Thompson's evidence	13.08.07	41
15.	Interim Cyclone Contingency Plan – 15 March 2007	13.8.07	56
16.	Cyclone Avoidance Procedures: (a) MSQ "Small Ships" Fifth Edition (pp.190-195) (b) Australian Seafarers Handbook (p.51) (c) Extracts from "The Mariner's Handbook" (subject of examination 16.8.07; T 223-224; tendered as part of Ex 16, T 225 line 45) (d) Admiralty Weather Manual (Chapter 10)	14.08.07	96
17.	Photographs: (a) Lip on the upper deck; (b) Stairs to the well deck; (c) Communications Systems.	14.08.07	112
18.	Statements of Captain Seal: (a) Statement taken 9 February 2007 and signed 26 February 2007; (b) Statement dated 2 August 2007; (c) Supplementary statement dated 2 August 2007.	14.08.07	116
19.	Undated letter from Captain Seal to Mr Andrew Dally	14.08.07	159
20.	Original navigation charts	14.08.07	159
21.	Marine pilot application	14.08.07	159

NUMBER	DESCRIPTION	DATE TENDERED	TRANSCRIPT PAGE
22.	Email from Mr Gurr, dated 3 February	14.08.07	161
23.	AMSA SAR file	14.08.07	178
24.	Email Captain Seal to Graeme Mackenzie, dated 29.03.07	14.08.07	184
25.	Email from Captain Seal to various individuals at Zinifex dated 04.02.07, 11.12pm – subject: "Load four or five to the Ernest Oldenforff".	14.08.07	185
26.	Inco shipping summary	14.08.07	189
27.	Photograph of stern drain and associated valves	16.08.07	206
28.	Captain Seal's calculation of capacity of drain	16.08.07	206
29.	Chart of wind direction in cyclone	16.08.07	212
30.	Various charts depicting position of Wunma, position of cyclone and its predicted path	16.08.07	228
31.	Monthly list of certificates	16.08.07	228
32.	ISM Code Audit of SQS – August 2006	16.08.07	229
33.	Certificate of Compliance for Survey- September 2006	16.08.07	230
34.	Schematic of drainage system	16.08.07	235
35.	Photographs of Wunma after incident	16.08.07	245
36.	Zinifex Environmental Policy	16.08.07	246
37.	Inco ship's memoranda 2498 and 2499 concerning designated person and office structure dated 29.01.07	16.08.07	250
38.	Statement of Kelly Osmand	16.08.07	270
39.	List of Compact Discs supplied to the parties, and compact discs	16.08.07	289
40.	Statement of Geoffrey Mark Fisher – February 2007	17.08.07	297
41.	Supplementary statement of Geoffrey Mark Fisher	17.08.07	297
42.	Engine Room Checklists - SQS	17.08.07	320

NUMBER	DESCRIPTION	DATE TENDERED	TRANSCRIPT PAGE
43.	Statement of Gordon Dunnett 17 August 2007	17.08.07	322
44.	Statements of Gary O'Connor: (a) 27 July 2007; (b) 6 August 2007	17.08.07	351
45.	Statements of Andrew Leeson: (a) 15 February 2007; (b) 2 August 2007	17.08.07	360
46.	Statements of Dr Munro Mortimer, curriculum vitae and CSIRO Report "Toxicity of Wastewaters from Century Zinc Concentrates" (August 2005)	17.08.07	371
47.	Statements of Malcolm Mewett (a) 9 August 2007 (b) 20 August 2007	20.08.07	379
48.	Drawings and Plans for Storm Water Management – prepared by Zinifex and Inco. Drawn by Robert Bird Group - 2007	20.08.07	389
49.	Core bundle of documents	20.08.07	439
50.	Statements of Richard McDonald (a) 30 July 2007 (b) 9 August 2007	20.08.07	440
51.	Statement of Ian Ives - 6 August 2007	21.08.07	470
52.	Letter, AMSA to Board of Inquiry dated 15.08.07 re voice recordings	21.08.07	504
53.	Statements of Andrew Dally (a) 1 August 2007 (b) 19 August 2007	21.08.07	506
54.	Letter, Intercontinental Ship Management to Captain Watkinson, Marine Division, Queensland Department of Transport dated 30.03.99	21.08.07	522
55.	Statement of Gregory Gurr dated 10 August 2007	22.08.07	587
56.	Statement of Dr Andrew Lewin (a) 9 August 2007	22.08.07	590

NUMBER	DESCRIPTION	DATE TENDERED	TRANSCRIPT PAGE
	(b) 22 August 2007		
57.	Statements of Mark Tonkin (a) 8 March 2007 (b) 22 August 2007	22.08.07	597
58.	Statement of Lloyd Jones	22.08.07	627
59.	Two statements of Paul Aarons	23.08.07	632
60.	Statement of Stephen Bull	23.08.07	632
61.	Statement of Ross Caletti	23.08.07	632
62.	Statement of Alexander Dorr	23.08.07	632
63.	Statement of Lindsay Harvey	23.08.07	632
64.	Statement of Jim Huggett	23.08.07	632
65.	Statement of Peter Iuliano	23.08.07	632
66.	Statement of Bruce Jarman	23.08.07	632
67.	Statement of John Kavanagh	23.08.07	632
68.	Statement of Cassandra Konnecke	23.08.07	632
69.	Statement of Cameron Peltohaka	23.08.07	633
70.	Statement of Drew Shannon	23.08.07	633
71.	Statement of David Skola	23.08.07	633
72.	Statement of Gary Sweeney	23.08.07	633
73.	Statement of James Waldron	23.08.07	633
74.	Statement of Bevis Hayward	23.08.07	633
75.	Statement of George Hadley	23.08.07	633
76.	Statement of David Parry	23.08.07	633
77.	Statement of Jeffrey Callaghan	23.08.07	633
78.	Statement of Ian Shepherd	23.08.07	633
79.	Statement of Philip White	23.08.07	633

NUMBER	DESCRIPTION	DATE TENDERED	TRANSCRIPT PAGE
80.	Statement of Arthur Diack	23.08.07	633
81.	Statement of Graham Taylor	23.08.07	633
82.	Statement of Peter Green	23.08.07	633
83.	Two statements of Troy Shepherd	23.08.07	633
84.	Statement of Matthew Rohrsheim	23.08.07	633
85.	Statement and CV of Paul Davis	23.08.07	634
86.	Wunma Logbook Entries 1 February 2007 to 7 February 2007	23.08.07	662
87.	Statement of Wally Newton	23.08.07	690
88.	Statement of Dale Raynor Cole	23.08.07	691
89.	SQS Revision dated 01.04.04 referred to in evidence of Captain Cole/ Supplementary statement of Caaptain Cole	23.08.07	707
90.	Statement of Captain Alan Boath	23.08.07	707
91.	Letter Campbell Smith of Pasminco Century Mine Ltd to Captain Alan Boath dated 26.06.98	23.08.07	708
92.	Port of Weipa Advisory Cyclone Season 2006-2007 Advisory Message and attached Cyclone Contingency Plan	23.08.07	718
93.	Hydrographic Surveys – Karumba – Norman River K955-076	24.08.07	
94.	Statements of Werner Bundschuh: (a) 3 August 2007 (b) 16 August 2007 Letter Counsel Assisting to Crown Solicitors 9 August 2007; letter Werner Bundschuh to Counsel Assisting 19 August 2007	24.08.07	741
95.	Lloyd's Register Provisional Interim Certificate 18 August 1999	24.08.07	746
96.	Email, Lloyds Register to Board of Inquiry 3 August 2007	24.08.07	764

NUMBER	DESCRIPTION	DATE TENDERED	TRANSCRIPT PAGE
97.	Statement of Stuart Ballantyne dated 9 August 2007	05.09.07	790
98.	Drawing of Dust Control Waste Water System prepaid by ADSMAR Pty Ltd/Sea Transport Solutions dated 24 September 1997	05.09.07	857
99.	Statement of Arnold Richard Clarke dated 4 September 2007	05.09.07	857
100.	Supplementary statement of Andrew Dally	06.09.07	872
101.	Compact disc containing copy of SQS, letter Inco Ships to Mr Kavanagh 13 March 2007	06.09.07	875
102.	Letter Shipping Inspector, John Kavanagh MSQ, to Inco Ships Pty Ltd dated 20 February 2007	06.09.07	882
103.	Letter Inco Ships Pty Ltd to John Kavanagh MSQ circa 13 March 2007	06.09.07	882
104.	Various emails, threat maps and weather information supplied with letter of 13 March 2007	06.09.07	882
105.	Inco Ships to Zinifex, response to Thompson Clarke Operational Review	06.09.07	884
106.	Supplementary statement of Paul Davis dated 31 August 2007	06.09.07	936
107.	Statement of David Thomas dated 31 August 2007	06.09.07	936
108.	Statement of Robert Cowle dated 3 September 2007	06.09.07	936
109.	Statement of John Kernaghan dated 4 September 2007	06.09.07	936
110.	Further supplementary statement of Troy Shepherd dated 4 September 2007	06.09.07	936
111.	Statements of Graeme Normington dated 4 and 5 September 2007	06.09.07	936
112.	Statements of David Johnson dated 4 September 2007 and 17 October 2007	06.09.07	936
113.	Statement of Gregory Bolton dated 6 September 2007	06.09.07	936
114.	Statement of Nicholas White dated 5 September 2007	06.09.07	936

NUMBER	DESCRIPTION	DATE TENDERED	TRANSCRIPT PAGE
115.	Statements of Paul Campbell dated 6 and 17 September 2007	06.09.07	936
116.	Zinifex Century Mine: Safety and Health Management Plan	06.09.07	936
117.	Zinifex PASS meeting records 29.01.07 – 06.02.07	06.09.07	936
118.	Additional relevant documents from MSQ file	06.09.07	936
119.	Statement of Captain Watkinson dated 30 July 2007	06.09.07	937
120.	Statement of Andrew Dally dated 17 September 2007	-	N/a
121.	Letter Mr Rutherford to Board dated 23 March 2007	-	N/a
122.	Letter from Dr Sammon dated 24 October 2007	-	N/a
123.	Statement of Rees Fleming	-	N/a
124.	Report of the Australian Maritime College Sep 07	-	N/a
125.	Copy Email – Thomson/Kavanagh/Campbell/Sammon	-	N/a
126.	Letter from Blake Dawson Waldron dated 18 October 2007 and attached Quarterly Review Meeting Minutes	-	N/a
127.	Ruling – Chairperson – Report of the Australian Maritime College - 1 November 2007	-	N/a
128.	Catastrophic Risk Assessment - 2004	-	N/a
129.	Catastrophic Risk Assessment - 2005	-	N/a
130.	Letter from Blake Dawson Waldron to Counsel Assisting dated 26 October 2007	-	N/a
131.	First Supplementary Statement of Captain Seal dated 23 October 2007	-	N/a
132.	Second Supplementary Statement of Captain Seal dated 1 November 2007	-	N/a
133.	Ruling – Board - Further Statements of Captain Seal – 5 November 2007	-	N/a

NUMBER	DESCRIPTION	DATE TENDERED	TRANSCRIPT PAGE
134.	Supplementary Statement of Captain Boath dated 25 October 2007	-	N/a
135.	Supplementary Statement of Werner Bundschuh dated 18 October 2007	-	N/a
136.	Letter from Blake Dawson Waldron to Counsel Assisting dated 5 November 2007	-	N/a
137.	Letter from Counsel Assisting to Holman Fenwick & Willan dated 15 July 2007	-	N/a
138.	Letter from Counsel Assisting to Dr Sammon dated 12 November 2007	-	N/a
139.	Letter from Dr Sammon to Counsel Assisting dated 16 November 2007	-	N/a
140.	Ruling - Chairperson – Exhibits - 16 November 2007	-	N/a
141.	List of Exhibits	-	N/a

KEY EVENTS

DATE	EVENT
1990	Ore body discovered at Lawn Hill.
1994 – 1995	Impact Assessment Study Reports for Century Mine anticipates use of two transfer vessels.
Aug 1995	PCML decides to use one larger transfer vessel.
1996	Hull design commences.
Dec 1997	PCML appoints AUSCAN to supervise construction.
Dec 1997	PCML and ISM agree to Memorandum of Understanding to operate transfer vessel.
July 1998	Construction of ship commences in China.
16.02.1999	Lloyd's Register advises Queensland Transport that it will not be issuing an International Load Line Certificate and that it assumes that the load line certificate will be issued by Queensland Transport without any involvement from Lloyd's Register.
16.04.1999	Ship launched.
17.08.1999	Certificate of Compliance for Loadline issued by an accredited designer ASDMAR Pty Ltd.
18.08.1999	Provisional Interim Certificate in respect of hull and machinery issued by Lloyd's Register in Shanghai.
22.08.1999	Ship delivered to owners and named *Wunma*.
25.08.1999	Certificate of Registration Class 2C (not more than 50 nautical miles from the coast) issued by Queensland Transport.
Sept 1999	Delivery voyage.
18.09.1999	*Wunma* arrives in Karumba.
Nov 1999	Affidavits filed by PCML and State of Queensland in injunction proceedings in the Federal Court to the effect that a cyclone mooring buoy at Sweers Island was necessary for the safe operation of the ship.
16.12.1999	Restricted buoy mooring authority issued for cyclone mooring at Sweers Island.
19.12.1999	*Wunma* completes first transfer of zinc concentrate.

DATE	EVENT
Late 2002	Proposal to discontinue cyclone mooring buoy at Sweers Island communicated to MSQ by representatives of owners and ship manager.
Dec 2003	New draft cyclone procedures provided to Regional Harbour Master.
14.07.2004	Regional Harbour Master (Cairns) advises representatives of ship's owner and ship's manager that there was a problem with the ship having no cyclone moorings and that the best solution was to have a mooring in the Norman River, a discharging system at the wharf to avoid the ship being caught with cargo on board when a cyclone was approaching and procedures to move to the mooring in the river.
06.092004	Representatives of MSQ and EPA and consultant to EPA meet to discuss EPA consultant's review of relative risks associated with use of mooring buoy at Sweers Island and going to sea.
13.09.2004	Meeting between representatives of MSQ, Zinifex and ISM to discuss proposal to change the vessel's registration to allow it to proceed into the Gulf outside of its Class 2 classification as part of a new cyclone procedure.
17.09.2004	MSQ communicates its conditional approval to a proposal that the ship no longer be required to utilise the cyclone mooring at Sweers Island.
Late 2004	Lloyd's Register provides reports in relation to global and local strength of the vessel in cyclonic conditions.
Feb 2005	MSQ provided with Lloyd's Register reports by Sea Transport Solutions, which seeks advice from MSQ about modifications to the ship's registration to allow it to "operate outside its normal service conditions, under ballast in special circumstances of a cyclone".
25.02.2005	Regional Harbour Master (Cairns) advises MSQ's Director (Maritime Safety) of his strong opposition to any extension of operating limits in a cyclone event.
11.05.2005	MSQ advises ISM of requirements to upgrade the ship's registration.
Aug 2005	Application to upgrade Class 2B lodged.
08.09.2005	Certificate of Registration for Class 2B "to operate within the Gulf of Carpentaria only and restricted to voyages undertaken to avoid cyclonic conditions".
16.12.2005	Cyclone mooring buoy authority at Sweers Island expires.
Jan 2006	New cyclone operating procedures inserted into the ship's Safety and Quality System.

DATE	EVENT
07.02.2006	Captain Diack, Deputy General Manager of MSQ records that expiry of cyclone mooring authority "leaves us with a major safety issue in respect of the ship's crew".
04.12.2006	Thompson Clarke Operational Review report completed, including critique on cyclone preparedness.
01.02.2007	Low pressure system that later becomes Tropical Cyclone Nelson enters Gulf of Carpentaria.
02.02.2007	*Wunma* completes discharge of a third load to the export vessel *Ernst Oldendorff*. *Wunma* then anchors offshore and monitors weather.
03.02.2007	*Wunma* returns to Port, commences loading at 0920 hours. Load is fourth of a planned live loads. Completes loading 1800 hours and departs wharf at 1830 hours. On arrival at export vessel conditions deemed unsuitable for cargo transfer. Ship anchors.
04.02.2007	Ship anchored offshore. Strong Easterly winds and moderate to rough seas. Dirty water tanks full at 1206 hours. Vessel returns to port due to bad weather. Strong winds and rough seas, with 3.5 metre swell. Returns to Port through evening "tidal window". Secured at wharf at 2100 hours.
05.02.2007	Decision made to sail. Sails at 1900. Voyages North because conditions unsuitable to discharge into export vessel.
06.02.2007	Ship continues on Northerly track. 1140 hours Decision made to turn South.
	During the afternoon water collects and rises in aft well deck. Ship in heavy confused seas and swell, and begins to take waves around the stern well ramp onto the well deck. 1530 hours *Wunma* alters course to the South South West 1800 hours *Wunma* alters course to the West 1900 hours seas observed to enters cargo hold through damage on prtside canopy. Water level to about 1.8 metres in well deck.
	2010 hours: Water in emergency generator room causes total blackout of the ship.
	Chief Engineer able to restore some limited power.

DATE	EVENT
	2100 hours Mayday sent, later downgraded.
	Communications with Inco head office and its Operations Manager and Rescue Coordination Centre in Canberra.
	2200 hours Starboard anchor dropped.
	Steps taken to reduce and control the amount of water in the engine room, including pumping directly overboard.
07.02.2007	0200 hours Ship blacks out again. Difficulties in restoring power. Communications difficulties. Communications by VHF radio via an export vessel the *Eastern Star*.
	0430 hours: Water level in the engine room stabilised.
	Circa 0600 – 0615 hours *Wunma* receives advice relayed through the *Eastern Star* that if the water level had reached halfway up the stern ramp the vessel would eventually sink and that the ship should be abandoned. 0615 hours Preparations to abandon ship.
	1130 hours Helicopter takes five crew members.
	1300 hours Second helicopter takes remaining five crew members. Ship left with auxiliary generator still running. Engine room bilge pump and general service pump running.
	Zinifex charters vessel for use by its emergency response team. Salvors appointed and its crew arrive progressively on the evening of Wednesday, 7 February to Thursday 8 February.
10.02.2007	Inspection by Maritime Safety Officer, Frank Thomson.
	Ship taken under tow by *Pacific Responder*.
11.02.2007	MSQ prepares risk assessment for entry to Port of Weipa.
	Negotiations over terms of approval by Ports Corporation of Queensland to enter Port of Weipa.
12.02.2007	*Wunma* secured at Weipa.
15.02.2007	Registration suspended.
17.02.2007	Restricted use flag for a voyage from Weipa to export ship.
	Lloyd's Register surveyor issues certificate including numerous conditions of class.

DATE	EVENT
18.02.2007	*Wunma* discharges cargo to export vessel.
	Second restricted use flag permits ship to voyage to Karumba.
15.03.2007	Interim Cyclone Contingency Plan.
Sept 2007	Australian Maritime College Reports to Zinifex that there is no doubt that if the ship can remain in the Norman River, either alongside the wharf or at a dedicated mooring arrangement, during a cyclone then this is the safest place for it, for the crew and for the environment.
Oct 2007	Counsel Assisting Board of Inquiry pursues earlier requests for information from parties concerning status of remedial steps, including steps to apply for cyclone mooring in Norman River and cyclone contingency plan
Oct 2007	Zinifex advises that two important conditions of class still not satisfied, and that an extension had been granted by Lloyd's Register in respect of the stormwater management plan to November 2007 and in respect of the emergency generator vent to January 2008. It advises that these matters are "expected to be completed by the end of the current year"
Nov 2007	Zinifex applies for buoy mooring authorities in Norman River