Figure 16 - Slurry on the Access Walkway to the Hot Workshop

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Figure 18 - Blocked Deck Drain - Starboard Deck

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WUNMA BOARD OF INQUIRY

CHAPTER 12 CRITICAL OPERATIONAL DECISIONS PRIOR TO THE VOYAGE

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CHAPTER 12 CRITICAL OPERATIONAL DECISIONS PRIOR TO THE VOYAGE

12.1 THE DECISION TO LOAD

[1] The decision to commit the *Wunma* to a fourth load of zinc concentrate was made on 2 February or early 3 February. Based upon the minutes of Operational Review Meetings, Mr Mewett and Mr Gurr gave written statements that the decision to load on 3 February was made on 2 February. The minutes for the meeting that occurred at around 0745 hours on 2 February 2007 do not record such a decision. It is possible that a decision to take a fourth load was made later on 2 February 2007 since the Operational Review Meeting that occurred at around 0745 hours on 3 February 2007 records that a fourth load was planned for 3 February.[1] Captain Seal, in his evidence to the Inquiry, stated that the decision to load would have been made at least one to two hours and "most probably quite a bit before" loading commenced at 0920 hours on 3 February 2007.[2] As previously noted, it is difficult to pinpoint who makes the decision to load: it is possible to say that it occurs at the Operational Review meeting but the Master can decide to not load.

[2] Captain Seal's evidence is that typically the decision to load involved the Zinifex Duty Manager, Mr Tonkin and himself. Captain Seal said that he would not have been surprised if the decision to load the ship was made the previous day, but did not recall being involved in the decision, only that he "agreed to it".[3] Any decision to load the *Wunma* required the Master and the Operations Superintendent to gather adequate information about the location of the tropical low in the Gulf.

[3] It is necessary to analyse the evidence about the decision to load and the information on which it was based.

[4] The matter is complicated by the fact that very late in the Inquiry, and after some submissions had been received in relation to these matters, Captain Seal submitted a Second Further Supplementary Witness Statement dated 1 November 2007. This

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1 Statement of Mr Mewett - 9 August 2007; Exhibit 47; para 75(c). Statement of Mr Gurr; Exhibit 55 and the Annexures to that statement. Annexure to that 7, being a copy of the relevant Minutes of the Operational Review Meetings. Mr Mewett; T.383. Mr Gurr; T.586-589. Mr Mewett; T.397-403. Mr Mewett; T.437-438.

2 Captain Seal; T.191.

3 Captain Seal; T.191.

statement seeks to correct previous evidence given by Captain Seal in his witness statement dated 2 August 2007 and in his oral evidence about the state of his information and belief when he agreed to load the *Wunma* on 3 February 2007. The Board is conscious of the fact that this statement was not the subject of cross examination, and was given in response to submissions from Counsel Assisting that were critical of his earlier evidence. This makes it necessary to review Captain Seal's evidence and other evidence is some detail in order to determine if the evidence given in his most recent statement should be accepted.

[5] In the Supplementary Statement dated 2 August 2007 Captain Seal stated that he "agreed" to load the *Wunma* on 3 February because he was informed by email from the Port that the low had crossed over land near Bing Bong and that the Cyclone Warning had been cancelled.[4] Captain Seal stated that he:

> "informed the Port Manager on duty at the time that we wouldn't be loading again till the cyclone passed. The cyclone crossed over land near Bing Bong and the warning was cancelled. The Port informed via email that the cyclone had crossed over land, and I agreed to load the vessel."[5]

[6] No email containing such advice was produced to the Inquiry. The possibility that Mr Gurr or someone else in the Port sent Captain Seal an email before loading commenced on 3 February to the effect that the cyclone was *expected* to cross over land cannot be excluded. About six hours after loading commenced on 3 February Mr Gurr sent a general email that attached a "threat map". The email was sent at 1339 hours and stated "it would appear that the progress of the Low has slowed down". The attached "threat map" anticipated that the low would cross the coast at around 0400 hours on 4 February. But it also made clear that the low was still well out to sea.

[7] In support of his account of events, Captain Seal's main witness statement of 2 August 2007 included an email sent by Mr Gurr which contained information issued by the BOM in Darwin. There were however at least three difficulties with reliance on that email as a basis for his decision, or agreement, to load the *Wunma*:

- First, the low did not cross over land.

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4 Exhibit 18.

5 Annexure B to the statement of Captain Seal - 2 August 2007; Exhibit 18.

- Secondly, the email was sent by Mr Gurr at 1919 hours on 3 February – 10 hours after the ship had commenced loading, after the ship had departed the Port on its voyage; and
- Thirdly, whilst the email communicated the cancellation of the Cyclone Warning, it advised that a Cyclone Watch was in effect and gave the position of the low. It mentioned the possibility of a tropical cyclone developing and that small gales could develop if the low remained over the water.

To the extent that the email is supportive of Captain Seal's decision to load, it relates to where the low was expected to travel, not where it was. There is no evidence that the email was received on board the ship on the night of 3 February.

[8] In Captain Seal's Second Further Supplementary Witness Statement dated 1 November 2007 he seeks to correct the evidence given in his witness statement dated 2 August 2007 and in his oral evidence to the effect that:

- His agreement to load on 3 February 2007 was based on a belief that he held that the low had crossed land;
- His belief was based on the email from Mr Gurr sent at 1919 hours on 3 February 2007;
- He may have misread or misinterpreted weather information prior to agreeing to load.

He says that following discussions with Mr Tonkin on 2 and 3 February 2007 he agreed that the ship would commence loading on the morning of 3 February 2007 because the low pressure system was predicted to cross land near Bing Bong, and therefore was unlikely to pose a threat to the ship's operations. Captain Seal says that at no time did he believe that the low pressure system had, in fact, crossed land. He says that his understanding that the low pressure system was predicted to cross land was based on BOM weather information that he obtained on 2 and 3 February and that this information was not limited to documents saved on the hard drive of the ship's computer but also comprised documents he printed directly from the BOM website and placed next to the ship's computer. The BOM weather information was said to include "threat maps" showing that the low pressure system was predicted to cross land on 4 February and move inland.

[9] The critical issue is what weather information Captain Seal as Master and Mr Tonkin as Operations Superintendent had when the decision to load was made,

and at the time loading commenced at 0920 hours on 3 February. Any information at those times would have placed the low at sea in the southern part of the Gulf. This appears from the graphic at the end of Chapter 10 showing the position at 0700 hours on 3 February 2007.

[10] Captain Seal knew that the behaviour of cyclones is erratic and that this was "all the more reason to take special care before deciding to load the vessel",[6] and he agreed that, had he not misread the information, he would not have loaded the vessel.[7] Whilst he could not recall precisely what information he had regarding the low on 2 February or the morning of 3 February,[8] he could neither point to nor produce any other weather information to support his decision to load.

[11] In his oral evidence at the Inquiry, Captain Seal conceded that, because loading had commenced at 0920 hours on 3 February, it was possible that the decision to load was made on the previous day, that is, 2 February.[9] He said that the decision was made by him in consultation with Mr Tonkin and Mr Gurr or, at least, they would typically be involved in such a decision.[10] If the decision to load was made on 2 February, it was most likely made at the Operational Review Meeting at approximately 0730 hours on that day.[11] However, Captain Seal could not recall having been consulted about that issue on 2 February, although he conceded that was possible.[12]

[12] In the end, Captain Seal said in his oral evidence that:

> "We sort of got to the point that it was decided ashore and then they sought clarification that it was okay to load with me. There was some discussion about that. I really can't recall the exact goings-on with the load, the decision to load."[13]

[13] Captain Seal's oral evidence to the Inquiry was to the effect that he "would have" read weather information before agreeing to load.[14] It provided no detail about what

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6 Captain Seal; T.162.
7 Captain Seal; T.237.
8 Captain Seal; T.237, T.240.
9 Captain Seal; T.191.
10 Captain Seal; T.191, T.203.
11 Captain Seal; T.191-192.
12 Captain Seal; T.192.
13 Captain Seal; T.237.
14 Captain Seal; T.121.

this information was or when he read it. Captain Seal agreed that it was he who "finally determined that it was in order to load the *Wunma*".[15]

[14] Mr Tonkin gave evidence that at the time he discussed whether or not the ship should be loaded, he and Captain Seal both knew that there was a "low in the Gulf".[16] Although he knew that weather conditions "can change quite quickly in the Gulf" and that storm systems can "track erratically", he did not feel that there was "any impediment to load".[17] Captain Seal would obtain the weather information for the basis of these discussions and interpret it or, as Mr Tonkin put it, "decipher" that information.[18] If Mr Tonkin had been asked by Captain Seal to provide weather information to the vessel, he would have been able to do so.[19]

[15] There is a lack of precision in the evidence of Captain Seal and Mr Tonkin about the weather information that they had when they discussed whether the ship should be loaded and when that discussion occurred. But there cannot have been any information from the BOM that indicated that the system had "crossed over land" and for that reason was no longer a threat to operations. Nor is there any reliable evidence to suggest that Captain Seal or Mr Tonkin took reasonable steps to obtain and analyse current weather information.

[16] Captain Seal's initial reconstruction of events in his main witness statement was that he was told that the low had passed over land. But there is no evidence that supports this, and Mr Gurr's email of 1339 hours on 3 February or access to BOM data during the loading process would have disabused him of any such belief.

[17] Captain Seal agreed in his oral evidence that he may have been affected by fatigue when he saw a threat map that predicted that the weather system would go over land and may have misread it as to whether it had or had not crossed the land.[20] Whether he did so is a matter of speculation. It is equally possible that he saw a threat map prior to or during the course of loading on 3 February 2007, correctly read it and expected that the low pressure system would behave, as predicted, and go over land.

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15 Captain Seal; T.237.
16 Mr Tonkin; T.600.
17 Mr Tonkin; T.600.
18 Mr Tonkin; T.604.
19 Mr Tonkin; T.605.
20 Captain Seal; T.238.

In any event, he could not recall when giving oral evidence precisely what information he had regard to on 2 February 2007 or the morning of 3 February.[21]

[18] The imprecision in Captain Seal's evidence left him open to the suggestion that he misread a threat map and interpreted it as indicating that the low had already passed over land. The suggestion that Captain Seal misread an email prior to loading and believed that the low was over land may be thought by some to place him in a better light than the suggestion that he loaded the ship when he knew the low was still over the sea. Captain Seal allowed the former suggestion to be left open in his oral evidence. But it is probable that, as Mr Tonkin said, they knew there was a low in the Gulf, and Captain Seal made a prediction, in accordance with BOM forecasts, that the low would move towards the Northern Territory coast and cross it.

[19] The unsatisfactory nature of Captain Seal's evidence, and the inconsistency between parts of his earlier evidence and the evidence given in his Second Further Supplementary Witness Statement dated 1 November 2007, warrants a careful review of his evidence, and the rejection of parts of his earlier evidence which cannot be reconciled with contemporaneous documents. It also requires the Board to have regard to other evidence, such as Mr Tonkin's evidence, that he and Captain Seal knew that there was a low in the Gulf.

[20] Captain Seal's initial witness statements and his oral evidence about what he knew and where he understood the low pressure system to be at the time of loading are generally unreliable. Parts of his evidence in this regard are contradicted by contemporaneous documents. He has now resiled from that evidence. The evidence to the effect that a decision was made not to load until the cyclone had passed over land and the suggestion that he may have misread a threat map should not be accepted. At best, this evidence was a flawed reconstruction of events. At worst, it was evidence given without any reliable recollection so as to give the impression that he was a party to a decision that conformed with what is obviously a sound practice, namely not to load when a low pressure system is still over water.

[21] The rejection of Captain Seal's earlier evidence does not necessarily mean that his Second Further Supplementary Witness Statement should be accepted. To the extent that it corrects previous evidence that has been shown to be unreliable, then his

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21 Captain Seal; T.237, T.240.

Second Further Supplementary Witness Statement should be accepted. However, other parts of it, which have been untested by cross examination, assert that he had regard to weather information on 2 and 3 February 2007 from a number of sources. This evidence is hard to reconcile with his oral evidence which was vague about the weather information that he had regard to when allowing the ship to be loaded. It probably amounts to evidence of what Captain Seal thinks that he would have read and done, rather than being a genuine recollection.

[22] Nevertheless, it is probable that on late on 2 February or early on 3 February, Captain Seal had regard to some weather information about the low pressure system, and any weather information to which he had regard at the time would have shown the low to be out to sea. If he read a track map or consulted weather information from the BOM then that information may well have predicted that the low was moving in the direction of the Northern Territory coast.

[23] Having reviewed the evidence, the Board finds that the decision to load the ship on the morning of 3 February was made, and agreed to by Captain Seal, when Captain Seal and Mr Tonkin knew that the low was still over the Gulf, but predicted that it would cross over land. Such a prediction took inadequate account of the known erratic behaviour of cyclones in the Gulf.

[24] The decision to load is important. As Mr Mewett explained:

> "Once the *Wunma* is loaded, she can only discharge into a bulk carrier. Because of the design of the Wharf, the onshore loading mechanism and the *Wunma* discharge mechanism, there is no way she can discharge at Karumba. The onshore loading mechanism cannot be reversed. In any event, it is not designed to collect material being discharged. The Wharf is in L shape and not wholly connected to the land. If the *Wunma* was to attempt to discharge onto the Wharf, much of the concentrate would end up in the river, either directly or by being blown in."[22]

[25] Once the decision to load was made and confirmed by the decision to commence loading at 0920 hours on 3 February, the ship was not able to unload its cargo short of a successful discharge to the export vessel at the Roadstead. As such, the decision to load was a significant contributing cause of the incident.

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22 Statement of Mr Mewett - 9 August 2007; Exhibit 47; paras 78. Mr Mewett; T.394-395.

[26] Given the state of the evidence, it is impossible to reach any reliable finding about whether Captain Seal had regard to a "threat map" prior to agreeing to load the ship on the morning of 3 February or had reference to BOM coastal waters warnings and other information. At 0345 hours on Saturday, 3 February the BOM issued a Coastal Waters Wind Warning for eastern Gulf waters. The synoptic situation was as follows:

> "A Tropical Low in the SW Gulf of Carpentaria moving SW towards the Northern Territory coast may develop into a tropical cyclone during the morning. Fresh to strong NW monsoonal flow to the north of this low.
>
> Gale Warning
> Gulf waters west of Mornington Island
> N/NE winds 25/33 knots, possibly increasing to 30/40 knots during the morning.
> Seas rising to 3.5 metres. A 2.0 metre NW swell.
>
> Strong Wind Warning
> Elsewhere over Eastern Gulf waters
> N/NW winds 25/33 knots. Seas rising to 2.5 metres on a 1.5 to 2.0 metre NW swell."[23]

[27] Captain Thomson gave evidence to the Inquiry to the effect that he would not have loaded the ship given the existence of the forecast because he knew the area.[24] Indeed, he said that such a forecast represented "alarm bells" provided one understood "the area".[25]

[28] Subsequently, when Captain Ives learned that the ship had been loaded in the presence of a low in the Gulf, he was "surprised."[26] He agreed that it was a sensible practice not to load in those circumstances, although that procedure was not recorded anywhere. He agreed that was a deficiency in the written procedures for the vessel.[27]

[29] In summary, the decision commit to loading was made and agreed to by Captain Seal when a tropical low with a potential to develop into a tropical cyclone was over the waters of the Gulf. To the extent that it was made or confirmed at the Operational Review Meeting that occurred at around 0745 hours on 3 February, it

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23 Statement of Mr Callaghan - 23 August 2007; Exhibit 77; Annexure B; p.7/27.
24 Captain Thomson; T.73-74, T.88.
25 *Ibid*.
26 Captain Ives; T.478.
27 Captain Ives; T.478, 480.

was made at a time when the wharf and port facility planned cyclone preparations for that day. Captain Seal was not at that meeting. Mr Tonkin was. The Zinifex Duty Manager later that day at 1339 hours issued a cyclone tracking map that showed that the low was still well out to sea and reported that its progress had slowed down. This suggests that earlier emails or discussions had monitored its progress and predicted that the low would cross over land. It is difficult to conclude what weather information either in the form of Zinifex group emails or information from the BOM information or other sources that Captain Seal and Mr Tonkin had in their possession and relied upon when, as it were, the "final decision" was made shortly before 0920 hours on 3 February that loading should commence.

[30] The provisional and final decisions to load were made on the basis of a *prediction* about where the low was expected to go, and not on the basis of an analysis of where it was: still over water. But such weather systems are, by their nature, unpredictable and Captain Seal knew that they can track erratically. The decision to commence loading at 0920 on 3 February, and to continue loading that day, was a result of inadequate attention to weather information that was available to Captain Seal as Master and Mr Tonkin as Operations Superintendent.

[31] Inco's submissions to the Inquiry seek to deflect criticism of the absence of any prohibition in the ship's operating procedures against loading when a low pressure system is over Gulf waters in "cyclone season". Inco points to what it describes as the "minimum requirement" contained in its SQS cyclone procedure to cease loading in the case of a Blue Alert and says that "otherwise the matter is left to the judgment of the Master".[28] Inco submits that a prohibition in the SQS against loading when there was a low in the Gulf would have made no difference to Captain Seal's decision because his decision to load was based on his belief, albeit mistaken, that the low had crossed the coast.[29] It submits that Captain Seal was adhering to a practice consistent with what critics of the Inco SQS contend should have been expressly stated in it, but that he erred in thinking that the low had crossed onto land. Its submissions seek to disclaim responsibility for the failure to obtain and monitor current weather information and contend there is no reason to criticise Mr Tonkin

[28] Inco's submissions; para 3.1.3.

[29] Inco's submissions; para 3.2.2.

for "any failure by the Master to keep himself up to date with the weather conditions or forecast".[30]

[32] It is true that the Master has a major responsibility to monitor weather information. But under the SQS cyclone procedure the Operations Superintendent had a responsibility for the operation of the ship in Karumba. Under the SQS cyclone procedure and more generally both the Operations Superintendent and the Master had a responsibility to monitor weather information. Incidentally, the Operations Superintendent was obliged to communicate with Head Office on a regular basis to keep them advised of cyclone activity in the region.

[33] The criticisms that can be made of Captain Seal's analysis (or lack of analysis) of available weather information do not justify Inco's cyclone procedures at the time of the incident. The fact that Captain Seal did not follow the practice of other Masters in not loading when a low was over the waters of the Gulf is, in part, because this practice was not reflected in Inco's operating procedures. Inco's submissions, and Captain Dally's evidence, was that the matter was "left to the judgment of the Master". To the extent that Captain Seal made an error of judgment in loading the ship when he predicted that the low would head over land, it was an error that Inco's written operating procedures permitted him to make. Appropriate loading procedures in the SQS would not have permitted Captain Seal and Mr Tonkin to allow the ship to be loaded. The appropriate procedure was reflected in the practice of Masters such as Captain Thomson and Captain Dunnett and was reflected in Captain Daniel's email of 22 September 2005. If it had been in Inco's operating procedures, and applied by Captain Seal and Mr Tonkin on 3 February, the ship would not have been loaded.

[34] Inco's "minimum requirement" to cease loading in the case of a Blue Alert simply was not good enough. Its prohibition on loading came far too late.

[35] Captain Seal's reconstruction of events led him initially to assert that he was informed by email that the low had crossed the coast. No email has been provided which said that. As earlier noted, it is possible that Captain Seal misread a threat map and mistakenly believed that the low had crossed the coast. His oral evidence

30 Inco's submissions; para 3.3.3.

left this open as a possibility.[31] But it is more probable that Captain Seal based his decision to load on information about where he and others predicted the low would go, not where it was. Those predictions took inadequate account of the known erratic behaviour of tropical weather systems. Captain Seal made an error of judgment in permitting the ship to be loaded on 3 February on the basis of a prediction about where the low would go. The inadequate "minimum requirement" contained in Inco's SQS permitted him to make that error of judgment.

[36] Captain Seal was not the only person who made a decision to load based on a prediction of where the low was heading. He was the last. The plan to load was made and confirmed at meetings onshore and Inco's Karumba Operations Superintendent was involved in that plan. Captain Seal had the opportunity to not agree with the plan that had been discussed and recorded at the Operational Review Meeting on the morning of 3 February. In circumstances in which Mr Tonkin was not guided by a written operating procedure that prohibited loading when a low was situated in the Gulf, when he was not informed of the practice that had been adopted by his predecessor and in circumstances in which he deferred to decisions by the Master of the ship, his failure to adequately monitor the presence of the low in the Gulf and prevent the ship from being loaded cannot be heavily criticised.

[37] A better written procedure by Inco would have removed the potential for error by compelling compliance with the sound practice of not loading when such a weather system was over the sea. Even if it be assumed that Captain Seal misread weather information and wrongly assumed that the low had crossed land, an improved procedure would have been applied by both the Operations Superintendent, who had responsibility for the operation of the ship in Karumba including decisions to load it, and the Master. An improved procedure, reflecting the sound practice of previous Masters and the practice described by the previous Operations Superintendent, would have led to a decision by the Operations Superintendent to not load. The occasion for Captain Seal to make his "final decision" to load on the morning of 3 February would not have arisen. The operation of a sound cyclone procedure would not have led Captain Seal to make the error of judgment that he did. The ship would not have been loaded on 3 February.

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31 Captain Seal; T.160, 237-238.

[38] The absence of a written operating procedure that would have prevented the ship from being loaded when a low pressure system, with the potential to develop into a cyclone, was in the Gulf, contributed to the loading of the ship, and therefore to the incident

12.2 THE DECISION TO RETURN TO PORT

[39] The attempt to discharge at the Roadstead on the evening of 3 February was unsuccessful. The *Wunma* was then anchored for over 12 hours in the prevailing weather conditions until noon the next day when her dirty water tanks had filled around midday. A decision was made to return to Port.

[40] The alternative to embark upon the northerly voyage he was to commence a little over 18 hours later instead of returning to Port was not pursued. Captain Seal had experienced the worsening sea conditions (over two voyages – on the nights of 2 and 3 February). Captain Seal does not contend that this "bad weather" - strong winds and rough seas with a 3.5m swell – was the reason the ship returned to Port. It was so that the dirty water tanks could be discharged.[32] The decision to return to Port courted the risk that the low would develop into a cyclone, and quickly. Returning to Port to discharge the dirty water tanks would relieve the ship of a relatively small amount of weight, but delay the ship's departure from Port until the "tidal window" on the evening of 5 February.

[41] Captain Seal later explained his decision to return to Port was based on regulations not to "dump dirty water" at sea. He wrote to Captain Dally a few months after the incident:

> "It would have … been prudent to leave earlier. However due to the regulations imposed on me not to dump dirty water at sea and the fact that when the Wunma re-entered the port it was still a tropical low and had not developed into a cyclone I did not consider the act of dumping the water to be justified. I was then significantly delayed by tide due to the vessel being (in) a loaded condition."[33]

[42] The operation of the water management system and adherence to a "no spills" policy placed Captain Seal in an awkward situation. The water management system did not operate as a "first flush" system permitting Captain Seal to direct rainwater to sea.

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32 Statement of Captain Seal - 26 February 2007; Exhibit 18. And see: Supplementary Statement of Mr Tonkin - 22 August 2007; Exhibit 57; para 10.

33 Exhibit 19.

Captain Seal must have appreciated that further rainfall would lead to the accumulation of water in the well deck of an already loaded ship. But on 4 February the ship was not in distress and the course of emptying the dirty water tanks at sea would have been a bold step to take in terms of MARPOL prohibitions on the discharge of cargo and adherence to what the crew described as the "no spills" policy.

[43] That said, returning to Port to empty the dirty water tanks might provide only a short-term postponement of the difficulty in which any Master of the ship was placed by systemic deficiencies on the ship's safe operation in cyclonic conditions. Returning to Port and emptying the dirty water tanks would increase the capacity of the ship to store rainwater once it went to sea again. But depending upon the intensity and duration of the rain that it would collect during that voyage and the operation and capacity of deck drains to direct rainwater overboard, the dirty water tanks might fill again in a relatively short time.

[44] In retrospect, the decision to return to Port to discharge dirty water tanks provided limited benefits in terms of weight reduction and the additional capacity created in the emptied tanks. In retrospect, those benefits were greatly outweighed by the delay in heading North. But the decision was made partly as the result of design and operational deficiencies for which Captain Seal had no responsibility and could do little to alter.

[45] Had Captain Seal decided to steam North instead of returning to Port, the *Wunma* would have been well clear and to the North of the track of the cyclone by 6 February.

[46] It might be suggested that it was necessary to return to Port to ensure that the ship was fully bunkered or otherwise prepared to avoid a cyclone at sea. But these preparations should have been undertaken before the *Wunma* loaded on the morning of 3 February and sailed on the evening of 3 February.

[47] These matters concerning the decision to return to Port on 4 February and the significant delay it caused in the ship being able to sail North to avoid the threatened cyclone serve to reinforce the significance of the decision to load on 3 February. That earlier decision placed the ship in the situation of being unable to discharge into

the export ship due to deteriorating sea and weather conditions. Once the dirty water tanks were full a difficult decision had to be made to:

- Return to Port and pump them out in accordance with the usual practice; or
- Stay at sea either at the Roadstead or by voyaging North.

The first option may have been the natural and logical choice in normal conditions. But in the face a weather system that had the potential to develop into a cyclone, the decision to return to Port significantly delayed the attempt to avoid the threatened cyclone.

[48] This does not mean that Captain Seal should be criticised for deciding to return to Port. His decision carried potential adverse consequences, which came to be realised. But his decision to return to Port was largely the product of systemic problems in the design and operation of the ship's water management system. Whatever practice earlier Masters such as Captain Thomson may have engaged in once the dirty water tanks were full, the SQS gave no guidance about appropriate operating procedures in such a situation. The practice approved by the ship's manager and owners was to return to Port once the dirty water tanks were full. In the circumstances that prevailed on 4 February, Captain Seal cannot be said to have acted inappropriately in following that practice.

12.3 THE DECISION TO DEPART AGAIN

[49] No entries appear in the deck logbook for the morning of 5 February 2007. They do not record the state of the weather or preparations for a voyage to avoid a threatened cyclone. The first entry in the deck logbook for 5 February 2007 is at 1830 hours, shortly before departure when the bridge gear was tested.

[50] The ship had returned to Port through the available "tidal window" on the night of 4 February and by 2110 hours was secure at the Wharf. At 2312 hours Captain Seal appreciated that conditions were not expected to improve and that the low was predicted to intensify into a cyclone. He sent an email to various persons at Zinifex and to others, including Mr Tonkin, on the subject of "load 4 of 5 for the *Ernst Oldendorff*." The email stated:

> "Although Wunma sailed on the 4th conditions where (sic) unsuitable for her to discharge. The swell in the Roadstead was up to 3.5 metres at times and both vessels rolling in excess of what is considered safe to

> discharge. The Wunma returned to port on Sunday night as Her dirty water tank was full to capacity.
>
> Conditions are not expected to improve with the tropical low moving out to sea and predicted to intensity into a cyclone. This low is now moving eastwards. Wunma will most probably sail tomorrow night in order to be at sea in case of a cyclone, but is unlikely to be able to discharge her cargo."

[51] If a provisional decision was made by Captain Seal on the night of 4 February to go to sea the next night to avoid an expected cyclone, and if that decision was confirmed on 5 February, then it required a number of steps to implement it:

(a) informing the crew of the intended course of action;

(b) making preparations for sea in accordance with the SQS and requirements for the safe operation of the ship on a voyage in cyclonic conditions including:

(i) bunkering sufficient fuel for a potentially lengthy voyage at sea;

(ii) attention to the operation of the ship's water management system so that, as far as possible, rainwater and any seawater that would be collected by the ship during that voyage could be discharged to the sea;

(iii) obtaining current weather information before leaving port and during the expected voyage.

These matters will be addressed. It however is first necessary to review the decision to head to sea.

[52] In his statement to MSQ, Captain Seal advanced as the reason for deciding to leave the Port on the evening of 5 February that the "cyclone had crossed back into the Gulf in the morning" and that the "forecast was for the low to pass directly over Karumba".[34] He then recorded, as his reasons for sailing the following:

- High tidal levels;
- Predicted tidal surges;
- High river levels.[35]

[53] In his written evidence to the Inquiry, Captain Seal added to those reasons:

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34 Statement of Captain Seal - 26 February 2007; Exhibit 18.

35 *Ibid*.

"1. Tidal surge (The low pressure system in the atmosphere creates less force on the ocean, allowing it to rise more than usual).

2. River flooding (The heavy rainwater in the region floods low-lying areas, raising the level of the river. This, combined with high flows, significantly increase the risk to the vessel. High water levels may cause the vessel to ride up on the Wharf doing significant damage. There is also the possibility that if the vessel breaks free, it may end up on the mangroves; when the water recedes, the chances of getting the ship off are remote. This has already happened to a smaller ship in a cyclone in about 1974 – that ship is still on the mangroves about 2 miles upstream of where the Wunma normally moors).

3. Wind force (The force of the wind may be beam-on at stages during a cyclone, increasing the damage done to the *Wunma*'s canopy; as opposed to being head to wind or close-to, where the metal accommodation takes a significant amount of the wind force).

4. Pollution (If the canopy were to blow off whilst alongside and a full load was onboard, the dust contamination may be significant in the local town)."[36]

[54] Captain Seal then consulted the Port of Karumba Cyclone Contingency Plan[37] which requires the removal of large vessels to sea. The *Wunma* left the Port of Karumba before any of the Alerts under any of those plans were triggered.[38] But the terms of the Port of Karumba CCP, in requiring large ships to go to sea, was a factor in the decision to go to sea.

[55] Captain Seal intended to assess the sea conditions once the ship reached the Fairway Beacon in order to determine whether it would be possible to discharge the cargo into the *Ernst Oldendorff*. Once at sea he assessed the conditions as not being suitable for unloading[39] and he proceeded on a course to Weipa.[40] According to Captain Seal:

> "The plan was to proceed in the general direction towards Weipa, get to the North of the cyclone track, wait for it to cross over land and dissipate, then return to Karumba."[41]

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36 Statement of Captain Seal - 2 August 2007; Exhibit 18; p.8.
37 Exhibit 8.
38 Statement of Captain Seal - 2 August 2007; Exhibit 18; p.10.
39 Statement of Captain Seal - 2 August 2007; Exhibit 18; p.10.
40 Statements of Captain Seal - 26 February 2007 and 2 August 2007; Exhibit 18.
41 Statement of Captain Seal - 2 August 2007; Exhibit 18; p.10.

[56] As to this, based on a threat map received on 5 February prior to departure,[42] Captain Seal was of the opinion that there was "enough time and sea room to proceed in the general direction towards Weipa". He stated that he did not make a "final decision" until "departure from the Channel".[43] He said:

> "At 10 knots the *Wunma* should have been able to travel a distance of 444 km in 24 hours. If the cyclone had not sped up and changed direction further to the North, it would have been well clear, giving a distance from the centre of the eye of around 300 km."[44]

[57] Two observations may be made about that statement:

- On departing the Wharf and on the northerly part of the voyage, Captain Seal decided against engaging the main engine for, it appears, fuel preservation reasons. As such, the vessel never sailed at 10 knots;
- The cyclone did increase in speed as it made its easterly track across the face of the Gulf but it did not change direction "further to the North".

[58] Captain Seal said that the only person he spoke to with respect to the decision to head to sea was Mr Tonkin and that this occurred on the morning of 5 February. Mr Tonkin said that he spoke to Captain Seal on the morning of 5 February and said to him: "We will discuss what you need to do after you have had a decent sleep", and that he told Captain Seal to "Go put your head down and we will discuss it at 3 o'clock".[45] Mr Tonkin also recalls speaking to Captain Seal in the presence of Mr Fisher, Ms Osmand and Mr Davis on the afternoon of 5 February to clarify "that there were no doubts about this intended action" and that the vessel was "sufficiently prepared and capable of the voyage".[46]

[59] Mr Tonkin had a discussion with Captain Seal "and his officers" about the "predicted low pressure system coming across the Gulf".[47] According to Mr Tonkin, Captain Seal discussed whether to remain at the Wharf or head to sea with him. Captain Seal expressed concerns about "setting up on the wharf with a storm surge if he remained alongside.[48]

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42 Statement of Captain Seal - 2 August 2007; Exhibit 18; p.10.
43 Statement of Captain Seal - 2 August 2007; Exhibit 18; p.11.
44 Statement of Captain Seal - 2 August 2007; Exhibit 18; p.10.
45 Mr Tonkin; T. 601-602
46 Supplementary statement of Mr Tonkin - 22 August 2007; Exhibit 57; para 13.
47 Supplementary statement of Mr Tonkin - 22 August 2007; Exhibit 57; para 9.
48 Statement of Mr Tonkin - 8 March 2007; Exhibit 57.

[60] Ms Osmand stated in her written evidence that she was "not directly involved in the decision to sail".[49] At the time of the incident Ms Osmand lived in Karumba and, therefore, tended to be out of touch with on-board activities during the time that she was at home. On 5 February she was due to go on leave from the ship, but was recalled because the ship required an additional watch keeper. Ms Osmand returned to the ship about an hour before she sailed. She stated:

> "I came back onboard knowing that it was going to sail. But from general discussions that occurred between the ship's officers about what we were going to do, I gained a general understanding of the Master's reasons for sailing."[50]

[61] Her understanding of the "passage plan" was to "go out of the Channel and assess whether it would be possible to discharge into the *Ernst Oldendorff*" and then to "head north and try to heave-to at Kowanyama to see if we had communications" with the "ultimate destination", being Weipa. The plan, at least as Ms Osmand understood it, was to "head North with the hope that (they) would not need to go further North than Edward River or Pompuraaw".[51]

[62] According to Mr Mewett:

> "In terms of when the *Wunma* is to leave Port, the Master has absolute authority. If a decision is made not to sail, I will usually discuss that decision with the Master or other Inco personnel. However, I never tell the Master he has to sail. I've always understood that the Master has absolute authority in relation to when the *Wunma* will sail and that authority is something which I unconditionally respect."[52]

[63] Captain Seal cannot be fairly criticised for deciding to go to sea and to voyage North in order to avoid the threatened cyclone. The cyclone mooring at Sweers Island was not operational. Even if it had been, difficulties may have been encountered in connecting to it in high winds and, most importantly, to voyage to that cyclone mooring would have required the ship to head in the general direction of the low pressure system that was predicted to head East. It simply was not an option.

[64] Remaining alongside presented a number of difficulties, including those identified by Captain Seal in his evidence. Captain Seal was entitled not to adopt the practice

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49 Statement of Ms Osmand - 16 August 2007; Exhibit 38; para 16.
50 Statement of Ms Osmand - 16 August 2007; Exhibit 38; para 16.
51 Statement of Ms Osmand - 16 August 2007; Exhibit 38; para 27.
52 Statement of Ms Osmand - 16 August 2007; Exhibit 38; para 53. Mr Mewett; T.385.

favoured by Captain Thomson and others to stay alongside and then hope for the tide, winds or current to supply an excuse if questioned by the Regional Harbour Master. His reasons for not doing so were reasonable. In addition, the option of remaining alongside was not included as an option in the SQS cyclone procedure and was contrary to the objectives of the Port of Karumba CCP. If the ship remained alongside and the cyclone hit Karumba, with or without a storm surge, there was a risk of damage to the ship and the wharf, with severe consequences for Captain Seal and his employer.

[65] The suggested option of going "up the creek" was not a realistic option in the circumstances. The Port of Karumba Cyclone Contingency Plan did not recommend it because of the risk of the ship being stranded in a storm surge.

[66] In the circumstances, the decision to depart Port and go to sea was a reasonable course of action in the difficult situation in which Captain Seal found himself on 5 February. He cannot be fairly criticised for deciding to depart Port that evening. However, the *Wunma* was forced to undertake a cyclone avoidance voyage in a loaded state and with less time to outrun a developing cyclone than if she had stayed at sea and headed North sooner.

12.4 PREPARATIONS FOR SEA

12.4.1 PREPARATIONS IN GENERAL

[67] According to Captain Seal, preparations for departure commenced at 0800 hours on 5 February.[53]

[68] Captain Seal asked the Bosun, Mr Shepherd, to secure the vessel for sea. As already noted, the Second Mate, Ms Osmand, did not board the vessel until about an hour before she sailed. Her recollection is that when she came on board the last of the dirty water from the dirty water tanks was being pumped ashore. Ms Osmand recalls that the preparations for departure were in accordance with the SQS. In addition to the normal, daily preparations which are undertaken in accordance with a checklist, she recalls that preparations for sea were undertaken by her, Mr Shepherd and deckhands and that in addition to the normal pre-departure preparations, they had to batten down the ship using "heavy weather checklists".[54]

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53 Statement of Captain Seal - 2 August 2007; Exhibit 18.

54 Statement of Kelly Osmand; Exhibit 38; para 28.

[69] The Chief Mate, Mr Davis, rejoined the ship shortly prior to its departure, having commenced travel at 0430 hours that morning to make his swing. The ship had a relatively small crew. The absence of a Chief Mate and a Second Mate until an hour or two prior to the ship's departure on 5 February limited the scope for preparation. Neither Mr Davis nor Ms Osmand was on board throughout 5 February to prepare, and direct deckhands to prepare, for a cyclone avoidance voyage.

[70] In his inspection report,[55] Captain Thomson stated:

> "I suspect the *Wunma* was somewhat unprepared to face the perils of going to sea in these conditions. It is evident in photos that gear that was not properly secured was removed from its stowed position by the force of the water.
>
> If the deck drains were clear in going to sea there would have been a fair percentage less water in the cargo hold before the vessel reportedly began getting pooped.
>
> The pooping led to the well deck and cargo hold aft of the stockpile filling up and water entering the emergency generator room which led to the complete loss of power to all essential services and loss of all emergency backup systems."

[71] In making those remarks, Captain Thomson was aware that he was reporting conduct that was in breach of Section 41 of the *Transport Operations (Marine Safety) Act*.[56] Indeed, he "picked up the language of Section 41" in the terms of his report[57] and the conclusion – "I suspect the *Wunma* was somewhat unprepared to face the perils of going to sea".

[72] In his evidence at the Inquiry, Captain Thomson was asked to comment on his contention that the *Wunma* was "somewhat unprepared to face the perils of going to see". He stated:

> "That was based on, let's say, my professional judgment. When you look in the cargo hold and you see oxyacetylene bottles that were washed around and thrown up into the cargo hold, it just means they were not locked down, there were clamps there, there were brackets to hold them, it just meant a fair amount of gear had not been secured for that sort of condition."[58]

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55 Exhibit 12.
56 Captain Thomson; T.100.
57 *Ibid*. And see: Exhibit 12.
58 Captain Thomson; T.30, 50, T.104.

[73] It is possible that certain items had not been secured. However, there is evidence that some items became free as a result of the cargo hold becoming awash. Drums that were lashed down became free through the force of waves.[59] Normally, oxyacetylene bottles that were "clamped" would not become free from a normal rolling and pitching of the ship. But depending upon their buoyancy and the impact of waves and timber that were floating in the cargo hold at the height of the incident they may have become free. The evidence does not permit the Board to conclude that these items were not properly secured prior to the voyage.

12.4.2 FUEL RESERVES

[74] A remarkable feature of the preparation for the voyage is the fact that the Chief Engineer, Mr Fisher, was only notified that the ship was leaving Port and sailing North a half hour before she left.[60] This period of notice did not allow him to take more fuel onboard.[61] Mr Fisher stated:

> "If I had been notified that we would be sailing that evening, if I had been notified in the morning we were sailing North to avoid the cyclone, I could have took on more bunkers."[62]

[75] The First Engineer, Mr Leeson, only learned that the voyage was other than a routine trip to and from the Roadstead as the ship was "heading out of the Channel".[63] Had he known that a longer voyage was in contemplation, he too would have topped up the bunkers.[64] According to Mr Mewett, bunkers are available 24 hours a day at Karumba. Provided the proper notifications are made, fuel for the *Wunma* is readily available.[65] Normally 24 hours notice is required, but if circumstances of urgency that existed, as they did on 5 February, the evidence indicates that fuel could have been obtained that day.[66]

[76] The failure of Captain Seal to inform the engineering department on the morning of 5 February that a potentially long voyage north was in contemplation had significant consequences. A concern about fuel conservation prompted him to direct the *Wunma* to sail without the main engine being engaged.

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59 Mr Leeson; T.365.
60 Mr Fisher; T.321.
61 Statement of Mr Fisher - 2 August 2007; Exhibit 41; para 34.
62 Mr Fisher; T.317.
63 Mr Leeson; T.370
64 Mr Leeson; T.370
65 Statement of Mr Mewett - 9 August 2007; Exhibit 47; para 19.
66 *Ibid.*

[77] Although the ship had enough fuel to get to Weipa, it did not have enough to return from Weipa, and there was a concern that emerged at some stage during the voyage about being able to purchase fuel in Weipa.[67] On 5 February Captain Seal's preference was to sail North of the cyclone's path and return to Karumba once the cyclone had passed.

[78] Given the purpose of the voyage, namely to attempt to outrun a developing cyclone, and, if necessary, to remain at sea for some days, proper preparation for the voyage required steps to be taken to take on additional fuel before departing the Port.

[79] It is difficult to understand why additional fuel was not taken on board. The *Wunma* sailed with only 75 tonnes of fuel onboard when her maximum capacity was 120 tonnes.[68] For Captain Seal it was suggested that the ship could not have bunkered more fuel because she was already loaded to her "marks" and indeed, that was the evidence that Captain Seal gave in this regard.[69] However that cannot be correct because:

- the ship was last bunkered on 27 January;[70]
- from then until her departure on the morning of 5 February, the ship undertook four return voyages to the Roadstead;[71]
- at least 20 tonnes of fuel would have been consumed during those voyages;[72]
- there is no evidence to suggest that the ship, when bunkered on 27 January, was overloaded, that is, that her load line was submerged.

It follows that it must have been possible to take on at least another 20 tonnes of fuel prior to departing on 5 February. This would have been more than enough fuel to have supported a full day's steaming on all three engines[73] and, ought to have allayed any concerns about engaging the centre main engine on the northerly part of the voyage.

[80] Further, the ship had discharged 25 tonnes of "dirty water" from her tanks prior to the voyage and that alone ought to have permitted her taking on of additional fuel reserves.

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67 Mr Leeson T.363; Mr Fisher; T.298-299.
68 Captain Seal; T.164.
69 Captain Seal; T.165.
70 Exhibit 49; CB182, p.2.
71 Exhibit 26.
72 Statements of Mr Fisher; Exhibit 40; para 42; Exhibit 41; para 31.
73 *Ibid.*

[81] Even if the ship was loaded to her marks after the discharge of 25 tonnes of water from her dirty water tanks, then steps could and should have been taken to remove as much cargo as possible once the ship returned to Port on the night of Sunday 4 February. Earthmoving equipment could have been deployed to remove as much cargo as possible before the ship departed on the night of 5 February. If, for instance, 45 tonnes could have been removed during this period of about 22 hours, an additional 45 tonnes of fuel could have been taken on board. This was a simple, practical way to ensure that fuel reserves would not be a problem. Such steps could have been supplemented, if required, by a review of the amount of fresh water that was required for the expected voyage. Removing as much cargo as possible in the time available on the night of 4 February and during 5 February prior to departure would have enabled additional fuel to be taken on board.

[82] Proper consideration of these issues and consultation with the Chief Engineer early on 5 February probably would have led to a decision to request additional bunkers and to additional fuel being provided prior to departure. There was no proper explanation why Mr Fisher and Mr Leeson were not informed of the proposed lengthy voyage to the North much earlier in the day.[74]

[83] Even without additional fuel, a decision to only engage the outer engines is puzzling given that the sole purpose for the voyage was to outrun the cyclone. In this regard, when Captain Seal was asked why he decided not to top off the bunkers, he said that he believed that there was sufficient fuel to sail in accordance with the requirement contained in the SQS - sufficient for a minimum of four days' steaming[75] - and one would think that he would be anxious to ensure that the ship was sailing under full power. But having not taken on additional fuel, the amount of fuel became a matter of concern to Captain Seal late on 5 February and led to the decision to engage only the outer engines.

[84] Captain Seal and Mr Fisher agreed that, once the vessel cleared the Channel, they would "shut down the centre main engine"[76] and just run on the two outer engines – something that would reduce the fuel consumption by one third.[77] On the other

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74 Statement of Mr Fisher - 2 August 2007; Exhibit 41; para 34.
75 Captain Seal; T.165.
76 Mr Fisher; T.299.
77 Mr Fisher; T.298.

hand, engaging the centre main engine would have increased the speed of the ship by 1.5 to 2 knots.[78]

[85] As it was, the centre main engine was not engaged again until the decision was made to turn South at 1140 hours on 6 February,[79] a decision influenced in large part by an assessment on Captain Seal's part that the ship was not far enough to the North of the track of the cyclone.

[86] Captain White put the matter this way:

> "Had the fuel remaining on board not been of concern, and had the centre engine been engaged, the *Wunma* should have been capable of making an additional two knots speed. This would have had the effect of putting the Wunma some 30 nautical miles further to the north at 1140 hours on 6 February when the decision was taken to alter course on to a reciprocal course."[80]

12.4.3 CLEARING AND CHECKING DECK DRAINS

[87] Shortcomings in the design and operation of the ship's water management system have been addressed in Chapter 6. Cleaning, clearing and maintenance of side deck drains and valves that could direct water to sea were a constant problem.

[88] First decks had to be cleared of concentrate. To clear the concentrate from the deck below the conveyor belt involved "a lot of shovelling",[81] and if done twice daily would take a total of four hours. If the ship was empty of cargo then clearing the decks of concentrate might be undertaken with hoses, with the holes under the covered on the port deck being opened to wash concentrate through them into the cargo hold. Either because of wash down activities, or despite it, deck drains could be blocked with concentrate that tended to cake when it dried out. Air hoses were used on occasions to try to clear drains. For the reasons canvassed in Chapter 6, the valves that might be operated to direct water in them to sea were prone to being blocked with concentrate, and blocked valves could not be quickly and easily serviced.

[89] Because the *Wunma* was fully loaded on 3 February, there were two days before she sailed on the relevant voyage within which to attempt to clear any blockages in the

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78 Mr Fisher; T.298.
79 Mr Fisher; T.298.
80 Statement of Captain White - 5 September 2007; Exhibit 114; para 6.1.3.
81 Captain Thomson; T.106.

deck drains.[82] Captain Seal's evidence was that the deck drains were normally cleaned when the walkway was cleaned, and that was only occasionally when a contracted "suction truck" came from Cairns to extract the zinc concentrate off the walkway.[83] It was nearly "an impossible job" for the crew to do.[84] Captain Seal could not specifically recall if the decks were cleaned by having the crew shovel around the conveyor belt after 3 February when the ship was loaded, but he thought that this was probable.

[90] It was Ms Osmand's practice, as she walked around the ship, to check the drains.[85] For this purpose, air lines were used but if they were not successful in clearing the drains, the "Engineering Department" would be alerted that the "valves might need to be cleared".[86]

[91] In preparing for a potentially long voyage through tropical downpours it was critical to ensure that water did not accumulate in the aft well deck, given the limited capacity of the dirty water tanks, the limited capacity of the small drain from the sump that led overboard and the potential for drains leading from the sump to the dirty water tank and overboard to become blocked with concentrate. Attention was required to the operation of side deck drains**.** The evidence indicates that on 5 February Captain Seal thought about checking the side deck drains and realized that the best way to test whether the drains and valves were working would be to direct the side deck drain valves to sea and run water through the drains. But this risked sending water mixed with concentrate residue in the drains into the Norman River. Captain Seal's inability to come up with a solution about checking the deck drains whilst in port seems to have been largely due to a concern that dirty water might enter the marine environment whilst the deck drains were being tested and thereby violate the "no spills" policy.[87]

[92] Captain Seal cannot be criticised for the fact that he was unfortunate enough to confront the systemic problems that existed in relation to the operation of the ship's water management system during a voyage in cyclonic conditions. One of those problems was that blocked deck drain valves could not be serviced and made

82 Captain Seal; T.235.
83 *Ibid*.
84 *Ibid*.
85 Ms Osmand; T.287.
86 *Ibid*.
87 Captain Seal; T.170.

operational in the space of a few hours. In addition, on 5 February Captain Seal did not have the assistance of a Chief Mate or a Second Mate on board the ship until late in the afternoon and shortly prior to the ship's departure. They were not available to consult about what should be done in connection with the ship's drains. They were not there to attend to these matters or direct other crew to do whatever was possible, in the circumstances, to clear deck drains so that they might be directed to sea during the forthcoming voyage.

[93] If Captain Seal could not think of a way to check that the side deck drains would be able to send water overboard, then he had no reason to conclude that they would be operational on the voyage that was to commence that evening. Consideration of the likelihood that a large volume of water would accumulate in the aft well deck during a prolonged voyage through tropical downpours should have prompted precautions such as the provision of additional portable pumps.

[94] According to Captain Seal, at 0800 hours he asked the First Engineer, Mr Leeson to check that the dump valve from the well deck was "clear and ready for operation".[88] Mr Leeson could not recall being asked by Captain Seal to do so,[89] although he recalled cleaning out the galley drain in the company of Mr Pitts.[90] According to Captain Seal, he had that morning been asked by Mr Leeson to provide a man to "help clear the dump valve". Mr Pitts was assigned and Captain Seal believed that the task in relation to sump drain was being carried out. Later that day, Captain Seal "heard on the UHF radio that the valve had been cleared". However, what Captain Seal heard was a report that a drain had been cleared. He understood that it was the dump valve in the aft sump drain, when it was in fact the drain in the galley.[91]

[95] Captain Seal did not learn until 6 February that Mr Leeson had discovered that, although the dump valve was functioning, the drain was blocked and could not be operated. After the incident, he learned, as did many others associated with this Inquiry, that the drain had been permanently blocked with a timber bung inserted from the shell plate of the vessel.[92]

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88 Statement of Captain Seal - 2 August 2007; Exhibit 18.
89 Mr Leeson; T.361-362.
90 Mr Leeson; T.361.
91 Statement of Captain Seal - 2 August 2007; Exhibit 18, p.23.
92 *Ibid*.

[96] On 10 February, at the request of Captain Boath, Captain Thomson boarded the *Wunma* and conducted an inspection. He was asked to assess any damage to the vessel, ascertain the cause of that damage and the probable causes of the water inundation of the vessel.[93] When Captain Thomson inspected the *Wunma* after the cyclone, he could only find "four or five scuppers" that had been draining. The others were "all full of concentrate". He could see the blockages.[94] The deck drains around the bridge were open and working. Only one deck drain on the port side deck and only one deck drain on the starboard deck were working.[95]

[97] In Captain Thomson's report[96] of his inspection,[97] the following relevant observations were made about the operation of the deck drains:

- In the engine control room, he observed from the mimic screen[98] that the deck drain valves had been "closed to the sea and open to the tanks".[99]
- In the case where valves were open but were not working properly, the mimic screen[100] would "flash yellow". When otherwise functioning properly, the mimic screen[101] would be illuminated in red or green. On his inspection, Captain Thomson saw that there was "a couple of them ... were flashing Yellow".[102] He thought that this indicated that the valves "haven't opened or they haven't closed, there could be a problem there".[103]
- On the starboard quarter deck, he noticed that all freeing ports were open but that the deck drains in this area were blocked. On the starboard side deck, he observed that all deck drains were blocked with concentrate.
- On the forward main deck, he reported that all drains were clean and that they "seem to have been working".
- In the cargo hold, he noticed damage to the cladding on the portside but there were "no visible signs of water going over the side of the cargo hold portside wall". However, he reported that "all drainpipes to the cargo hold from the port deck under the conveyor were open with no bungs evident".

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93 Captain Thomson; T.20.
94 Statement of Captain Thomson, Exhibit 9; para 47.
95 Captain Thomson; T.27.
96 The report was prepared on about 12 February 2007. Captain Thomson; T.20.
97 Exhibit 12.
98 Mr Fisher; T.307-308.
99 Captain Thomson; T.20.
100 Mr Fisher; T.307-308.
101 Mr Fisher; T.307-308.
102 Captain Thomson; T.67.
103 *Ibid*.

- In addition, "all but one deck drain along the starboard side was blocked".[104]

[98] The possibility that the side deck drains only became blocked with concentrate during the voyage when concentrate was washed down them was put to Captain Thomson during his evidence. He acknowledged that it was possible that the "portside scuppers around the conveyor" might have become blocked in this way, but could not see how any concentrate that became a slurry could have entered and blocked the "starboard side scuppers".[105]

[99] In the absence of specific evidence concerning the cleaning of decks after 3 February, the Board is unable to conclude with certainty that they were cleaned prior to the voyage. But it is a reasonable assumption that the normal shovelling of split concentrate below the conveyor belt occurred. The "bungs" under the conveyor belt were removed at some stage prior to the incident. The evidence does not reveal when or by whom this was done. If the side decks were reasonably clean of concentrate at the start of the voyage on 5 February (and there is no specific evidence that they were) as a result of shovelling and other cleaning activities, then this does not mean that the deck drains were free of concentrate or unblocked. They could have been blocked for a substantial period of days or even weeks, or they could have been blocked in the few days prior to the voyage by concentrate that was washed down them during cleaning activities and which dried out.

[100] In the absence of records or reliable oral evidence of when the side deck drains and valves were last checked prior to the voyage on 5 February, many of them may have been blocked with concentrate for a substantial period of time. The failure of Inco to produce maintenance records or any acceptable evidence about when the side deck drains and valves were last checked and serviced makes it more probable than not that side deck drains and valves had not been checked for probably several days, if not longer, prior to the voyage on 5 February.

[101] Indeed, the same reluctance to test the operation of side deck drains and valves to check that water could be directed overboard that Captain Seal had on 5 February probably applied as a matter of general practice prior to 5 February.

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104 Captain Thomson; T.29.

105 Captain Thomson; T.87.

[102] If side deck drains and valves had been found on 5 February to be blocked, there was however little that could be done in the limited time that was available that day to make the valves operational. In the end result, additional preparations prior to departure on 5 February in respect of the ship's drains and water management system may not have made much of a difference to the accumulation of water in the well deck during the voyage.

[103] The detection and removal of the bung in the outlet of the small drain from the sump may also not have made much of a difference. This drain has a limited capacity to discharge large quantities of water and is not supplemented by a pump. If before the voyage it was tested and made operational it was unlikely to remove more than a small proportion of the water that accumulated on the aft well deck during the voyage once the ship's dirty water tanks were full. It probably would have become blocked with concentrate. In Mr McDonald's view, even had the drain from the well deck been operating, it would not have been likely have made a great deal of difference.[106] The position might have been otherwise however, if the deck drains were open to the sea and operational.[107]

[104] Captain Seal's direction to Mr Leeson to check that the dump valve from the well deck was "clear and ready for operation" was an appropriate direction. But further preparations in relation to the ship's water management system were required, particularly in relation to side deck drains. The need to check that they were operational should have been apparent in circumstances in which during the previous 48 hours Captain Seal had experienced the dirty water tanks being filled with rainwater runoff. Although, the failure to check side deck drains was not fully explained by Captain Seal in his evidence to the Inquiry, the only way to test them was to direct the side deck drain valves overboard and run water through the drains, and he was probably reluctant to do so in case test violated the "no spills" policy.

[105] On 5 February, a potentially prolonged voyage in tropical downpours was in anticipation. Additional checking and maintenance of side deck drains should have been undertaken. But blocked valves could not be quickly serviced and replaced. Even with additional attention, the ship faced the risk of accumulating a large

106 McDonald; T.457.
107 McDonald; T.457. McDonald; T.456-467.

volume of rainwater on its decks that the side deck drains and the aft sump drain could not discharge to sea.

12.4.4 CHECKING CYCLONE AVOIDANCE PROCEDURES

[106] The voyage to be undertaken commencing on the night of 5 February was to be the first voyage by Captain Seal and his crew into open waters North of the Roadstead. Their training and experience on the *Wunma* did not include a lengthy voyage in open waters undertaken to avoid cyclones at sea. Because Captain Seal and his crew had not trained to undertake such a voyage it would have been appropriate for him and his navigation officers to familiarise themselves on 5 February with the SQS procedure for avoiding cyclones at sea. The navigation officers would have been able to acquaint themselves with the requirements of the SQS including the importance of obtaining weather information and plotting it, and the importance of frequent and accurate wind observations in order to determine the ship's position in relation to the cyclone.

12.4.5 CONCLUSION: PREPARATIONS FOR SEA

[107] General preparations on 5 February were undertaken without the presence on board of a Chief Mate or a Second Mate. They came on board an hour or two prior to the ship's departure on 5 February. Their presence earlier in the day may have assisted in general preparations for the voyage into cyclonic conditions, and prompted questions about whether preparations contained in the SQS Cyclone Procedure, including its fuel requirements, had been met.

[108] Captain Seal failed to inform the Chief Engineer in sufficient time of the planned voyage North to enable additional fuel to be bunkered. Early consideration of the need to increase fuel reserves by Captain Seal or other members of the crew would have allowed additional fuel to be bundered.

[109] Additional steps could and should have been taken to check whether the side deck drains were operational. Whether they were blocked or not could not be ascertained simply by looking at the mimic panel. To check them required the valves to be directed overboard and water run through the drains. Captain Seal was understandably reluctant to do this, due to the risk of sending concentrate into the marine environment. But even if this check had been done, and the valves were

found to be blocked with concentrate, it is unlikely that could be serviced in time due to the time-consuming and difficult process of gaining access to them.

[110] The *Wunma* went to sea on 5 February with a number of side deck drains blocked, but this was principally due to shortcomings in the design and operation of its water management system. Systemic problems with the design of, and operating procedures for, the water management system prevented the ship being able to direct overboard the large the rainwater that it would encounter on the voyage.

WUNMA BOARD OF INQUIRY

CHAPTER 13 THE VOYAGE

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CHAPTER 13 THE VOYAGE

13.1 THE VOYAGE

13.1.1 Operational Matters on the Voyage

[1] The voyage that commenced at 1900 on 5 February was to avoid a cyclone. The cyclone avoidance procedures in the SQS reflected well-known principles. They stressed the importance of monitoring the weather and charting the cyclone's path. The *Wunma* was equipped with a range of communication systems to monitor weather information from the BOM and, if required, to seek assistance from experienced persons ashore about what to do.

[2] This Chapter initially analyses the operation of the ship prior to the critical decision at around 1140 on 6 February to turn South. Four points will emerge from this analysis:

- The failure to obtain weather information during this period of around sixteen hours.
- The consequential lack of plotting of the cyclone's position and path, and the ship's position in relation to the cyclone.
- Only infrequent observations of wind direction and barometric pressure were made and recorded, and these inadequate observations did not facilitate the application of the cyclone avoidance rules in the SQS.
- There was a failure to engage onshore assistance.

13.1.2 Weather Information

[3] Mr Davis reported for duty at approximately 1630 hours on 5 February, after having travelled all of that day.[1] He learned of the existence of the cyclone and of the Captain Seal's intentions to "not stay alongside".[2] Captain Seal was "going to sail the vessel with intentions to unload the ship if he could and, if he could not, to head towards Weipa". Mr Davis was told these things on the bridge prior to sailing.[3] This was his first voyage after his four week induction.[4] Mr Davis was asked by Captain Seal to do "a quick plot giving us a speed of 10 knots to see how we would

1 Mr Davis; T.635.
2 Mr Davis; T.635.
3 Mr Davis; T.635.
4 Mr Davis; T.637.

clear the cyclone".[5] Mr Davis did so with reference to a threat map that had been obtained prior to the commencement of the voyage.[6]

[4] The *Wunma* was at the Fairway Beacon at 2028 hours. At about this time Captain Seal assessed the conditions as unsuitable for discharge to the export vessel, so he laid "off a passage plan to the North from the chart".[7] The ship headed North.

[5] Some weather information was obtained via VHF radio from Karumba before the ship was out of VHF range. Captain Seal realized at some point that there was a problem with the HF Radio receiving broadcasts after the ship sailed,[8] and that the SatComm C was not automatically generating reports. There was a discussion with Mr Davis and Ms Osmand. From the start of the voyage until the afternoon of 6 February, the ship did not receive information via the HF Radio. Captain Seal says that they thought that they would be able to solve the communications problems in the coming hours.[9]

[6] Mr Davis retired to his quarters at approximately 2330 hours.[10] Ms Osmand came onto the bridge to start her watch, and Captain Seal retired around 2330 hours.[11]

[7] Ms Osmand was the Deck Officer on watch from midnight to 0400 hours. She recalls that, during that time, the weather worsened and that she "put the first cyclone plot on the chart with its track and speed".[12] However, there is no satisfactory evidence of this plotting, and the source of weather information that enabled her to put the "first cyclone plot" is not established by the evidence.

[8] By the end of her watch the winds had built up to approximately 40 knots and were coming from an easterly direction and the seas were rough.[13] Ms Osmand recalls that the barometer was "falling steadily", but not greater than normal daily patterns. She says that more observations were needed in this regard and that she mentioned

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5 Mr Davis; T.637.
6 Mr Davis; T.639.
7 Captain Seal; T.127.
8 Captain Seal; T. 125.
9 Captain Seal; T.137 -138.
10 Mr Davis; T.642.
11 Captain Seal; T.139.
12 Statement of Ms Osmand - 16 August 2007; Exhibit 38, para 41.
13 Statement of Ms Osmand - 16 August 2007; Exhibit 38, para 43.

this to Mr Davis, when she handed over the watch.[14] After handing over her watch, Ms Osmand retired to her quarters and slept until 1100 hours on 6 February.[15]

[9] At 0400 hours a notation was made in the deck logbook of moderate seas with wind gusting. Mr Davis was on watch between 0400 hours and 0800 hours. His evidence was to the effect that he had a very limited knowledge of the communication systems onboard the *Wunma*.[16] Without being critical of Mr Davis, who impressed the Board as a conscientious seaman, his evidence underscored deficiencies in his training by Inco to operate the communications systems on the voyage North.

[10] During his four week period of induction between mid-December 2006 and 15 January 2007 the ship was not outside the range of VHF communications, and he did not gain experience in the operation of all aspects of the ship's communication equipment. The SatComm C was virtually never used and the HF system was never used, and so Mr Davis had never seen anyone using the HF or the SatComm C other than to test it by using the test button.[17] He was the holder of a GMDSS General Radio Operator qualification, and experienced in the use of communications systems. But he was not familiar with the specific operating procedures of each of the communications systems on board the ship. During his period of induction he concentrated on matters of more immediate importance in becoming acquainted with the ship's normal, daily operations. Unfortunately, this lack of familiarity with the ship's communication systems proved to be a problem on the morning of 6 February when he was on watch.

[11] Mr Davis' lack of familiarity with the communications systems should have been addressed before he was required to undertake a voyage in open seas. Captain White observed in his report:

> "The obligation to ensure that watchkeeping officers are familiar with the ship's communication system is also a matter of good seamanship and now well documented in the Seafarer's Training, Certification and Watchkeeping Code and Convention. I believe it is also set out in Marine Waters Part 28 and more importantly, section B SQS 04C. It is also unsatisfactory to have persons unfamiliar with equipment

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14 *Ibid*.
15 Statement of Ms Osmand - 16 August 2007; Exhibit 38, para 44.
16 Mr Davis; T.678-683; T.686.
17 Mr Davis; T.682.

> attempting to operate it as settings could be changed that may lead to the equipment being rendered inoperable."[18]

The general point being made about the need for navigation officers to be familiar with the specific equipment on the ship they are navigating is well made. Mr Davis should have been given instruction on the use of all aspects of the ship's communications systems during his period of training or, failing that, instruction during the first part of the voyage and before he took over the watch.

[12] Mr Davis vaguely recalls something being said to him by Ms Osmand about the radio equipment at the handover.[19] He had problems with the communications systems from the time he took over. He could not say whether the problem was that the system was not operating properly or he was not using it properly. Mr Davis did what he could to rectify the problem with the radio, but his attention was on other matters. He had restricted visibility, the crew member who was supposed to be on duty with him was seasick, and he had to ask the Bosun to stay on the bridge to keep lookout. It seems unlikely that Mr Davis' attempts to use the HF radio rendered it inoperable. The evidence supports the conclusion that it was problematic before he took over on the watch. His lack of familiarity with it meant that he could not fix any pre-existing problem and could not use it.

[13] In the result, during his watch Mr Davis did not receive any weather information.[20] This is to be contrasted with his usual experience on other ships where, unless there is a problem with the equipment, you receive "reams of information" that can be routed to a printer or a disc.[21] The absence of any weather update for the four hours that he was on watch alarmed Mr Davis, but he did not raise the problem with Captain Seal or Ms Osmand during those hours.

[14] Captain Seal came back onto the bridge at around 0630 or 0700 hours and remained in charge of the ship's navigation throughout that day. He could recall problems with the communications system that day. If the SatComm C system had been functioning properly then weather information would be automatically received, stored and printed. Had this been done, a person such as Mr Davis who was unfamiliar with the particular GMDSS equipment on board the *Wunma*, would have

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18 Report of Captain White - 5 September 2007; Exhibit 114; para 5.1.13.
19 Mr Davis; T.680.
20 Mr Davis; T.681.
21 *Ibid*.

received the forecasts issued by the BOM as and when they were issued, as would Captain Seal and Ms Osmand.

[15] If the memory (a 3½" floppy drive) on the SatComm C was full, or the printers had run out of paper, the automatic generation of reports would cease.[22]

[16] Early in his evidence Captain Seal had a recollection of the HF radio providing positions on the cyclone, and thought that he delegated the task to the First Mate and the Second Mate who wrote the positions on various pieces of paper. But this does not seem to have occurred on the morning of 6 February, and his later evidence was that there were problems with the HF radio that morning.[23]

[17] Ms Osmand stated in her written evidence that the "HF radio was passworded out and (they) could not change the transmit frequency on it".[24] There was no evidence of Ms Osmand having plotted any weather information received during her midnight to 0400 watch on 6 February.[25] The evidence indicates that the HF radio was not able to receive weather information during her watch.

[18] Captain Seal said that there "seemed to be some sort of password protection which couldn't enable us to get the standard HF broadcast", although later on 6 February that was rectified "by using higher frequencies".[26] Captain Seal could not be sure that the HF radio was working from the commencement of the voyage.[27] Before departure he did not receive a report about the HF radio, just that "everything was ready".[28] He inferred that the normal testing of it was done by DSC (Digital Selective Calling) because there is not normally any verbal checking of HF radios due to the closure of voice communications stations around the coast.[29] DSC is a facility by which a text message is transmitted to establish contact by VHF or HF radio. Unless voice communication is required, the text will result in an acknowledging text.

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22 Captain Dunnett; T.327.
23 Captain Seal; T.125.
24 Statement of Ms Osmand - 16 August 2007; Exhibit 38, para 39.
25 Ms Osmand; T.273.
26 Captain Seal; T.125.
27 Captain Seal; T.126-126.
28 Captain Seal; T.125.
29 Captain Seal; T.126.

[19] Given that the purpose of the voyage was to outrun a cyclone, proper steps should have been but were not taken to ensure that the HF radio was functioning before the voyage commenced. The HF radio on the *Wunma* was not a "standard set".[30] The evidence justifies the conclusion that from the start of the voyage until the afternoon of 6 February 2007, the system was not able to receive information from the BOM via HF radio. The possibility exists that problems with the HF radio only arose during the course of the voyage and were not rectified at the time they became evident. In any case, the ship was not in receipt of weather information during the first part of the voyage.

[20] However, the continuing problems that Captain Seal had reported to him when he came on the bridge on the morning of 6 February concerning the HF radio and/or the SatComm C did not prevent him from obtaining current weather information.

[21] The ship's satellite telephone was working until late on the evening of 6 February and the AMOS system was able to send and receive emails.[31] It is remarkable that Captain Seal did not avail himself of one of these modes of communication soon after coming on the bridge on the morning of 6 February.

[22] When Captain Seal was asked during his evidence whether he tried to communicate with someone onshore to get detailed information on the track of the cyclone, he said that he attempted to speak to Mr Tonkin via the satellite phone "a couple of times on the morning" of 6 February.[32] According to Captain Seal he attempted to telephone Mr Tonkin on his mobile number and landline number.[33] He said this occurred at probably around 0830 hours and again, at 1100 hours on 6 February and that he made "maybe two or three attempts".[34]

[23] Although Captain Seal may have attempted to speak to Mr Tonkin by telephone, he did not choose to leave a message on his answering machine.[35] There was nothing to stop him telephoning Captain Ives or Mr Iuliano at Inco in Sydney, but he chose

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30 Captain Seal; T.126.
31 Captain Seal; T.136.
32 Captain Seal; T.122.
33 Captain Seal; T.123-124.
34 Captain Seal; T.124.
35 Captain Seal; T.250.

not to do so.[36] In addition, when problems were encountered with the password for the HF radio, he did not think to contact Inco to seek its assistance.[37]

[24] Captain Seal agreed that when he came back on the bridge at around 0630 or 0700 hours he was alarmed that the ship had been sailing for about 12 hours without any new information, and that the deck officers had been unsuccessful in sorting out the problem with the communications systems. He spent about half an hour looking at the equipment, then unsuccessfully tried to contact Mr Tonkin.[38] When asked why he didn't "contact the Bureau of Meteorology or the office of Inco Ships" for up-to-date meteorological information, Captain Seal replied:

> "As I said before, it was a Cat 1 cyclone and I wasn't particularly concerned about it, and I didn't want to bother the office basically to supply maps and so forth when I felt I should be able to do that myself on the ship."[39]

[25] It is worth noting that for all Captain Seal knew at this time, the cyclone could have been intensifying, increasing speed and changing direction. If he was as unconcerned as his evidence suggests, it shows a failure to appreciate the importance of obtaining current weather information, so as to assess it and to plot relevant information on the chart. His initial attempt to obtain information from Mr Tonkin, rather than from Inco's head office or the BOM, is understandable. But when he was unable to speak to Mr Tonkin, he should have promptly sought information from these sources. Instead, he made further calls to Mr Tonkin and when he could not get through began "chasing" his wife to "basically send me a map".[40] A current threat map was going to be better than nothing. But more detailed weather information sourced from the BOM on the cyclone's location, its speed and its direction, along with a description of sea and weather conditions was available, and was needed to inform decisions about whether to continue North, to do so with the middle engine engaged or to turn South.

[26] This information was not obtained during a period of hours starting at 0700 hours when Captain Seal came on the bridge.

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36 Captain Seal; T.250.
37 Captain Seal; T.250.
38 Captain Seal; T.140.
39 Captain Seal; T.140. Captain Seal; T.227.
40 Captain Seal; T. 140.

[27] By around 1100 hours, Captain Seal was "starting to come to the view that he might have to turn around" and that was his reason for attempting to telephone Mr Tonkin.[41] When he contacted his wife, he asked her to send him "any information" she could find.[42] When asked whether the only thing that he required to be sent was a threat map, Captain Seal answered "She was probably busy at work and decided that was sufficient".[43] But the decision to turn South required more than a threat map. It required whatever information he could obtain from the BOM and other sources on the cyclone's position and path, and ideally, input from an experienced navigator like Captain Ives, to discuss the options.

[28] Given the significance of a decision to reverse course during a cyclone avoidance voyage, and his inability to speak to and obtain current weather information from Mr Tonkin, Captain Seal should have sought both information and advice from the Designated Person Ashore or Captain Ives, who had recently vacated that position. Captain Ives was still Operations Manager and the person to whom Captain Seal eventually turned to for assistance on the night of 6 February. On the morning of 6 February Captain Seal did think to call him but chose not to because he "didn't believe that (he) was in danger at that time and (he) didn't particularly want to trouble him".[44]

[29] What Captain Seal did with the threat map that was emailed by his wife at 1127 hours will be discussed later. The present issue is what he did not do during the morning of 6 February prior to 1140. He did not obtain current weather information.

[30] Captain Seal was not aware of the information about the cyclone's position and path that was issued at 0700 hours that morning.[45] He had been "sailing for about twelve hours without any fresh information as to the position of the cyclone".[46] All he could say was that he had "a feeling that the cyclone was pretty much to the West" of him.[47]

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41 Captain Seal; T.124.
42 Captain Seal; T.268.
43 Captain Seal; T.269.
44 Captain Seal; T.132.
45 Captain Seal; T.133.
46 Captain Seal; T.133.
47 Captain Seal; T.133.

[31] It was put to him during his oral evidence that, apart from the two threat maps, he was "sailing blind", to which he replied "we did have communication problems, I agree with that".[48] But those communications problems on the morning of 6 February did not prevent him from obtaining information by telephone or receiving written weather information by email via the AMOS system. No new weather information was received by him about the cyclone.[49] Although he said that he was "quite stressed"[50] about this lack of information about the precise position of the cyclone, Captain Seal did very little to allay those concerns.

[32] When pressed about why he didn't obtain "regular updates of the weather" as he proceeded on the voyage, Captain Seal replied:

> "You will have to understand, of course, that at that time the cyclone wasn't that bad. I was looking at other things as well and it wasn't (the) only thing that I was chasing. I did make a fair attempt in my mind to obtain the latest weather."[51]

[33] Captain Seal's failed to comply with his obligations under the SQS to closely monitor the weather in circumstances where he was, for the first time as a Master, attempting to avoid a cyclone. His attempts to obtain the latest weather information prior to 1140 hours on the morning of 6 February were inadequate. By not obtaining current weather information during this period, the opportunity was missed to make an earlier, more informed and more considered assessment of the appropriate course of action required under cyclone avoidance rules.

[34] Mr Davis and Ms Osmand are in a different position to Captain Seal in this regard, if for no other reason than they were under the command of the Master after 0700 hours on 6 February. That said, either could have, on their watch in the early hours of 6 February, sought information by satellite telephone or email on the progress of the cyclone when they realised that the HF radio and SatComm C were not functioning. But when their failure to obtain weather information from those sources became apparent to Captain Seal at 0700 hours, he should have obtained current weather information in the hours that followed by phone and email. He did not.

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48 Captain Seal; T.133.
49 Captain Seal; T.134.
50 Captain Seal; T.133.
51 Captain Seal; T.153.

[35] As Captain Seal made plain in his evidence, the only weather information on which he based his decision to turn South at 1140 hours on 6 February were two threat maps – one obtained by him prior to departure on 5 February which reflected the general position at 1600 hours on 5 February and one emailed to him by his wife at 1127 hours on 6 February which reflected the position at 0700 hours that day.

[36] Reliance on such a paucity of information is conduct that falls well short of the standards of good seamanship. It was not current information. The threat map, by its nature, gave a generalised depiction of the storm system. It was inadequate information on which to base such a critical decision.

13.1.3 Recording of Information

[37] Given the paucity of information about the cyclone's position prior to the decision to turn South, it is not surprising that the cyclone's path was not plotted as required by the SQS and well-established cyclone avoidance procedures.

[38] When Captain Seal's attention was directed to the requirement contained in the cyclone procedure of the SQS to "maintain a good track of the eye of the cyclone" and to "maintain a plot so as to determine if the vessel has sufficient speed to outrun the cyclone" he agreed that he did not maintain a good track of the eye of the cyclone or plot the cyclone on the chart with reference to the *Wunma* as required by that procedure.[52] He agreed that "up until 1140 hours on 6 February" there had been no plotting of the cyclone in accordance with the procedure in the SQS and that this was because he did not have the information to do it.[53]

[39] During his watch Mr Davis made weather observations in the deck logbook. On the question of charting, Mr Davis looked at the charts from the voyage,[54] and observed that a number of notations had been erased.[55] He was very critical of this. The positions at 0300 and 0330 hours on 6 February had been erased.[56] Captain Seal's explanation was that they were erased when the voyage South occurred along the same course. A relative motion plot that Mr Davis recalls having placed on the charts on the evening of 5 February 2007 does not appear.[57]

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52 Captain Seal; T.167.
53 Captain Seal; T.167.
54 Exhibit 30.
55 Mr Davis; T.663.
56 Mr Davis; T.663-664.
57 Mr Davis; T.665.

[40] When asked "what steps were taken to chart the voyage and how regularly entries were made on the chart" Captain Seal responded:

> "The vessel's position was regularly plotted on the chart. I cannot recall the exact entries that I placed on the chart."[58]

[41] The evidence does not enable the Board to conclude that the ship's position how regularly the ship's position was plotted on any chart because entries that were made were erased.

[42] The ship's logbook[59] does not record frequent observations of the weather and wind conditions or barometer readings. The cyclone avoidance rules in the SQS and elsewhere emphasise the importance of monitoring wind direction in order to determine whether the wind is backing or veering, and thereby to assess if the ship is in the "dangerous semi-circle" or the "navigable semi-cycle". Because of the importance of pressure readings, cyclone avoidance manuals such as *The Mariners Handbook* advise that frequent barometer readings should be made. *The Mariners Handbook* states that it is wise to take hourly barometer readings.

[43] For the evening of 5 February, the logbook only has the wind and barometric pressure recorded at midnight. Between midnight and 0400 hours on 6 February 2007, there were three entries. Between 0400 hours and 0800 hours there is only one entry, namely at 0600 hours which recorded the wind direction as East North East. There is an entry at 0800 hours with the wind direction recorded as East and the barometer 1000.

[44] Critically, after 0800 hours and prior to 1200 hours there is no wind or pressure recording. During the first three and half hours of this critical period, the ship did not receive any weather information from the BOM or other onshore sources. Even if it had received such information, onboard weather observations were essential in order to ascertain the location of the cyclone's centre and to apply cyclone avoidance rules.

[45] The failure to frequently record wind direction and pressure readings during this critical period fell well below the standards required for a cyclone avoidance voyage.

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58 Statement of Captain Seal – 2 August 2007; Exhibit 18(c); p.15.

59 Exhibit 86.

[46] There is an entry at 1200 hours. The failure to frequently record wind direction and pressure readings continued on the afternoon and evening of 6 February. Between 1200 hours and 1600 hours there are entries at 1530 hours and 1600 hours. There are entries at 1800 hours and 2000 hours.

13.1.4 Onshore Assistance

[47] The failure to seek information from Captain Ives during the morning of 6 February, and the reasons for it have been noted. Captain Ives was a busy individual, and it is understandable that, in the first instance, Captain Seal would seek weather information from Mr Tonkin. But as already noted, by 1100 hours a significant cyclone avoidance decision was required, and Captain Ives' counsel would have been valuable.

[48] Later in the day, as things got progressively worse, assistance was not sought from Captain Ives or the Designated Person Ashore, Mr Iuliano. Instead, at around 1800 hours when another important decision was made, this time to turn to the West, Captain Seal forwarded an email to Mr Tonkin (copied to Mr Iuliano and Captain Ives) which was in the following terms:

> "Just letting you know we are traveling OK. Have a fair bit of freshwater runoff down the tail end approx 1m deep. Ship in loaded condition."[60]

[49] This was the only communication Inco received from the ship prior to Captain Seal telephoning Captain Ives later that evening to advise that the ship was in distress.[61]

[50] Although Zinifex has up to date weather information available, it did not assume any responsibility for providing that information to the ship at sea, since Inco's Operations Superintendent had that responsibility.[62]

[51] Mr Tonkin gave evidence to the effect that there was a "routine" to be in telephone contact with the ship at 2100 hours, 2400 hours, 0300 hours and 0900 hours.[63] That routine presumably developed to monitor the ship's daily operations to and from the export vessel. There is no satisfactory evidence that communications were made at those times as the ship voyaged North. Mr Davis could not recall Mr Tonkin

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60 Attachment AD6 to the Statement of Captain Dally - 19 August 2007; Exhibit 53.
61 Supplementary statement of Captain Dally - 19 August 2007; Exhibit 53; para 11.
62 Mr Mewett; T.408-409.
63 Mr Tonkin; T.606.

telephoning the vessel.[64] Captain Seal did not give evidence of receiving telephone calls from Mr Tonkin. Mr Tonkin did not recall receiving a telephone call from Captain Seal on the morning of 6 February.[65] He was out of the office attending to cyclone preparations. He had his mobile phone with him, but for reasons he explained, it did not record missed calls. Mr Tonkin said he could not remember getting any calls between 0700 hours and midday.[66] He gave evidence that he spoke to "Dean late on Tuesday",[67] that is, at "7pm after dusk".[68]

[52] During the afternoon of 6 February as the ship voyaged South it was "taking a lot of water" and its condition was deteriorating. Captain Seal knew that Captain Ives was an experienced mariner and he respected his opinions.[69] The fact that Captain Seal was preoccupied with the situation on board may explain why he did not contact Captain Ives during these hours.

[53] In addition, Captain Seal thought that he could extricate himself from the situation without outside assistance:

> "Captain, did you think you could extricate yourself from this situation without outside assistance? ---At that point I did.
>
> Did you think it would reflect poorly on you if you called for outside assistance? ---I have no comment.
>
> You must answer? ----That would have crossed my mind, that it would have reflected poorly on me.
>
> That was a consideration for you? ---That's correct."[70]

[54] His email at 1804 hours that was copied to Captain Ives did not seek assistance. But within an hour or two, assistance was being sought from Captain Ives and the RCC in Canberra. In short, Captain Seal did not seek assistance from persons onshore until very late in the day.

[55] Earlier in the day, when he was deciding whether to turn South the situation was not nearly as serious. Captain Seal's evidence was that he was not particularly worried

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64 Mr Davis; T.667.
65 Mr Tonkin; T.607.
66 Mr Tonkin; T.608.
67 Mr Tonkin; T.608.
68 Mr Tonkin; T.608. Compare: Mr Tonkin*;* T.614.
69 Captain Seal T.198.
70 Captain Seal; T.198.

about the cyclone because it was a Category 1 cyclone and he had seen a lot windier conditions.[71] He says that he was not particularly concerned about the situation.[72] If Captain Seal was not particularly concerned about the situation late on the morning of 6 February, as some passages of his evidence suggest, if he did not want to bother Inco's head office with a request for weather information and if he was conscious that Captain Ives was busy managing the operations of the Inco fleet, then this may explain why he did not seek information and advice from Captain Ives before deciding to turn South. But some passages of Captain Seal's evidence indicate a concern by 1100 hours about his lack of weather information, and consideration of the option of turning South.

[56] In retrospect, the decision to turn South proved to be a critical decision. But even at the time and in circumstances in which Captain Seal says he was not "particularly concerned"[73] about the Category 1 cyclone that he was seeking to avoid, it was a significant decision. Captain Seal had prior experience as a junior officer in two cyclones off the North West Coast of Australia.[74] This was his first cyclone avoidance voyage as a Master. Captain Seal was confident in his own abilities. He had seen far worse conditions at sea, and he was understandably reluctant to seek assistance from Captain Ives about an operational decision that was ultimately a decision for Captain Seal, and not Captain Ives, to make.

[57] If Captain Seal at around 1100 hours was not particularly concerned about the situation and, as a consequence, did not feel the need to seek onshore advice and assistance, then his perception of the situation was, in part, due to his failure to obtain current information about the position, speed and path of the cyclone. Advice from Captain Ives or another experienced mariner about current weather information and the appropriate cyclone avoidance action in the circumstances would have informed the decision that Captain Seal had in contemplation of turning South.

13.1.5 Plotting

[58] The SQS required the Master to maintain a good track of the eye of the cyclone and to maintain a plot on the chart. This was essential in order to determine if the ship was able to "outrun the cyclone". Remarkably, no plotting of the cyclone in

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71 Captain Seal; T. 270.
72 Captain Seal; T. 140.
73 Captain Seal; T.140.
74 Captain Seal; T.136-137.

accordance with the SQS or prudent seamanship was undertaken before the decision to turn South. There was inadequate plotting throughout the voyage.

[59] In order to estimate the nearest approach of another vessel or storm it is essential to keep a continuous record of its track. Combining this track with the track of one's ship is the essence of "plotting".

[60] The purpose of the plot is to discover if the storm presents a threat, potential or actual, to the safety of the ship. Knowledge of a threat is supplemented by information regarding its degree and urgency. This information will assist in deciding on a course of action. The most effective indication of a threat lies in the predicted distance of the CPA (Closest Point of Approach).

[61] There are two forms of plots, true motion plots and relative motion plots.

[62] True or geographic plotting gives a natural and easily understood picture. It can be done directly on the chart if the scale is large enough to give a clear picture. If the two courses are extended, the anticipated positions of both storm and ship can be marked on them since the speeds of each are known. A study of the expected positions at the intersection of the projected tracks will enable an approximation to be made of when the storm and the ship will be closest together.

[63] The true motion plot does not provide the observer directly with the distance of the nearest approach, hence the relative motion plot is more often used. In relative motion plotting, one's ship is considered a fixed point. To determine this relative motion a vector triangle of velocities is constructed.

[64] Neither form of plotting was undertaken during the voyage North and prior to the decision to turn South.

13.1.6 Conclusion

[65] Prior to the critical decision at around 1140 hours on 6 February to turn South:

- there was an inexcusable failure to regularly obtain, record and analyse weather information;
- there was a consequential failure to plot the cyclone's position and path, and the ship's position in relation to the cyclone in order to assess appropriate cyclone avoidance measures;

- infrequent observations of wind direction and other weather observations were made and recorded, and inadequate wind observations did not facilitate the application of cyclone avoidance rules in the SQS;
- there was a failure to engage onshore assistance.

13.2 THE DECISION TO TURN SOUTH

[66] Any decision to alter course during a voyage needs to take account of observations of prevailing weather and sea conditions, current weather information and weather forecasts. This is especially so if the purpose of the voyage is cyclone avoidance. A decision that is based on completely inadequate information may be the "correct" decision based on the information at hand, but unjustifiable in terms of the information that could reasonably have been obtained and analysed.

[67] A decision as important as a decision to reverse course in cyclonic conditions requires careful consideration. Although the decision is the final responsibility of the Master, consultation with other navigation officers, and the plotting of positions and paths will inform the Master's choice of action, and reduce the risk of a hasty and wrong decision being made. The relative positions of the ship and the cyclone should be calculated under different options.

[68] This Section analyses the decision to turn South that occurred at around 1140 hours on 6 February. This analysis indicates that:

- the decision was made in haste, without prior consultation with other navigation officers and without adequate information;
- inadequate analysis of even the limited information that was on hand at 1140 hours about the path of the cyclone led Captain Seal to make an inadequate assessment of how far North of the cyclone's path the ship was;
- inadequate consideration was given to the consequences of turning South, since in addition to having to cross back over the cyclone's path at some stage, it put the ship in the position of having a following sea and carried the of risk being pooped;
- the option of engaging the main engine to make better headway North was not pursued;
- if relevant and current weather information had been obtained, plotted and analysed with the assistance of other navigation officers, then along with

consideration of changing wind directions and guidance from the cyclone avoidance procedures of the SQS, a Master in Captain Seal's position exercising reasonable skill and care would not have decided to turn the *Wunma* to the South at 1140 hours on 6 February 2007.

13.2.1 The Decision to Turn South and the Master's Reasons for Making It

[69] The decision to turn South and voyage in an opposite direction was based upon generalized information that was 4½ hours old.[75] The only weather information in Captain Seal's possession at the time the decision was made was two "threat maps".[76] The first threat map was obtained by him prior to departure on 5 February and indicated the cyclone's position as at 1600 hours. The second threat map was emailed by his wife to him via AMOS Connect at 1127 hours on 6 February and indicated the cyclone's position as at 0700 hours.[77] It follows, as Captain Seal agreed, that he decided to reverse course in the space of thirteen minutes.[78]

[70] Captain Seal's evidence is that in these thirteen minutes he:

- considered the threat map that had been emailed to him by his wife;
- compared it with the other threat map in his possession from the previous day;[79]
- discussed the alteration of course with Ms Osmand and Mr Davis;[80]
- asked Ms Osmand to "pull out the appropriate documentation to ensure that we had it, in fact, right", which documentation consisted of the *Mariner's Handbook* and the extract from the SQS containing the cyclone procedures;[81]
- spoke to the Chief Engineer from the "fuel perspective".[82]

[71] In his statement to MSQ taken on 9 February, and signed on 26 February, Captain Seal said that the decision to sail on a "reciprocal course" was to increase speed and make good a course for the South West quadrant of Cyclone Nelson. Captain Seal's statement to MSQ, and also his main witness statement to the Inquiry dated 2

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75 Captain Seal; T.148.
76 Captain Seal; T.129.
77 Captain Seal; T.130.
78 Captain Seal; T.130.
79 Captain Seal; T.132.
80 Captain Seal; T.150.
81 Captain Seal; T.151. Exhibits 10 and 16.
82 Captain Seal; T.151.

August 2007 asserted that the cyclone "had changed its track to a position South of Edward River".[83] This is not reflected in the threat map. The threat map, as emailed by Captain Seal's wife at 1127 hours on 6 February 2007 is an Appendix to the Report.

[72] The threat map does not show Edward River or Pompuraaw, and showed the cyclone passing well to the South of Kowanyama.[84] Edward River, Pompuraaw and Kowanyama are all North of the balloon shape depicted on the threat map. Captain Seal may have been mistaken when he referred to Edward River in his witness statements. He said he was acting under time constraints and stressed when he prepared them, and could have shown more care.[85] But if he thought on 6 February that the threat map depicted the cyclone would cross the coast at a position South of, and in the vicinity of, Edward River, he was mistaken, and must have viewed the threat map in great haste and misinterpreted it.

[73] Some support for the conclusion that Captain Seal read the threat map in haste, and misinterpreted it as indicating that the cyclone would cross the coast near Edward River and that the ship was then South of the cyclone's track appears in the evidence of Mr Fisher who gave evidence that he was on the bridge at the time the decision to turn South was made. Mr Fisher's evidence was:

> "… Dean assured me he had new information on the cyclone, that we were south of the track and it was well to the west of us."[86]

[74] If Captain Seal interpreted the threat map as indicating that the cyclone's path was in the general direction of Edward River and that the ship was south of its track then this would amount to an inexcusable failure to give even cursory attention to the cyclone's path, as depicted on the threat map. Despite the distinct possibility that Captain Seal's decision to turn South was based upon a belief that the cyclone had changed its track to a position South of Edward River, the Board is prepared to assume, in his favour, that the reference to Edward River in his statement to MSQ,

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83 Statements of Captain Seal - 26 February 2007; 2 August 2007 p.13; Exhibit 18; Captain Seal; T.214. Exhibit 13 for the location of Edward River.

84 Captain Seal; T.215-216.

85 Captain Seal; T. 216.

86 Fisher; T.300.

and incorporated into his statement of 2 August 2007, was, as he claimed, "a geographical mistake" on his part in preparing his statement.[87]

[75] After providing his account of events to MSQ on 9 February, Captain Seal had a further opportunity to explain his decision to reverse course as a result of an email from Captain Dally on 21 March. Captain Dally, appreciating that investigations were being conducted by MSQ, thought that it was "worth having an answer that is clear and concise now" as to why Captain Seal altered course at 1140 hours and also whether there was any weather information that caused Captain Seal to make that decision.[88] In his written response to Captain Dally, Captain Seal included a copy of the two threat maps.[89] His evidence to the Inquiry confirmed that they were the weather information on which he based his decision.[90]

[76] His response to Captain Dally states:

> "This is the Threat Map I basically made the decision to alter course on. It was received by me on AMOS Connect at 11:27 am on the 6th Feb. The wind being on my port bow had reduced the speed of the vessel down to 4 knots. I saw no reason to proceed on the current course due to my lack of speed, increased remoteness and the fact that although I was in the dangerous semicircle it is better to be in the southern quadrant than the northern quadrant.
>
> When I altered course my speed increased to 10 knots and I kept the wind on the port quarter as much as practicable as described in the Mariner's Handbook. …
>
> On sailing, my only escape route was to the North as this is mentioned in the Cyclone Procedures on the vessel. However, on receiving the updated report at 11:27 I realized that the cyclone had significantly changed track and considering the current speed of the vessel, it was inevitable that I would be in the track of the cyclone. …
>
> The fact that remains however, that a vessel should always avoid being in the left front quadrant as not only is the eye moving towards you, but the winds are blowing the vessel towards the area of maximum wind."[91] [Emphasis added]

[77] The threat map that Captain Seal received from his wife gave a visual representation of the position of the centre of the cyclone as at 0700 hours on 6 February. Captain

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87 Captain Seal; T.216.
88 Captain Seal; T.117.
89 Exhibit 19. They are the two threat maps that are annexed to his written statement to the Inquiry; Exhibit 18.
90 Captain Seal; T.118.
91 Captain Seal; T.118.

Seal relied on nothing else.[92] Thus, Captain Seal believed that a radical course change was required based solely on an assessment of the non-current and generalised information contained on the threat map, compared to one that had been issued the previous afternoon.

[78] The email sent by his wife at 1127 hours contained additional information about the cyclone, but Captain Seal did not say in his evidence that he had regard to that information, which included the position of the cyclone at 0700 hours and its estimated positions over the next 48 hours. He did not plot the cyclone's reported position at 0700 hours or its path on a chart. He did not rely on this information to calculate the closest point of approach of the cyclone to the ship if he continued North compared to turning South. He did not apparently note that the Tropical Cyclone Advice (which had been issued at 0748 hours) advised that the next forecast track map would be issued at 1100 hours. Less haste at around 1130 hours would have resulted in Captain Seal seeking the details that in fact had been issued by the BOM at 1114 hours, including the position of the cyclone at 1000 hours and its path.

[79] In his written evidence to the Inquiry, Captain Seal gave essentially the same explanation for his decision as he had to Captain Dally:

> "Ultimately all decisions made in regards to the deck department were my own. However, I always consulted with members of the bridge team regarding important matters.…
>
> The decision to sail South was made shortly before 1140 on 6 February. It was primarily based on a Threat Map received via email on the ship's computer.[93] The cyclone had altered direction further to the North and increased speed. The wind <u>was now on my port bow</u> and the ship's speed down to 4 knots. I saw no reason to continue on the current course because of these changes and the predictions issued by the BOM. Also it is better to be in the southern quadrant of the cyclone rather than the northern and I believed that I could greatly increase my speed and get further away from the eye of the cyclone."[94] [Emphasis added]

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92 The two Threat Maps he relied upon (dated 5 and 6 February) were retained on the shipboard computer and Captain Seal retrieved them on the commencement of his first "swing" on the Wunma after the incident. No other information was retrieved from the computer (Captain Dally; T. 872 – 876 and Exhibit 120). Emails his wife sent him after the "blackout" at 2010 on the night of 6 February and the morning of 7 February were not received on board the vessel until 11 February. Exhibit 120; Further Supplementary Statement of Captain Seal – 23 October 2007, Exhibit 131 para 8.

93 Captain Seal then referred to the Threat Map received by him on 6 February 2007 being part of Annexure C to his statement - 2 August 2007; Exhibit 18.

94 Statement of Captain Seal - 2 August 2007; Exhibit 18; pp.14 and 15.

[80] In essence, the decision was based on the belief that the cyclone's track had moved further to the North, and that because the ship was making slow headway, she was at risk of being caught in the dangerous northern quadrant of the cyclone.

[81] In fact, the cyclone had not altered direction further to the North. A quick comparison between the two threat maps may have given this impression. But the cyclone avoidance rules in the SQS did not authorise comparison between "threat maps". They required the position of the cyclone to be plotted, and stated "it is imperative that the Master maintain a good track on the eye of the cyclone".[95] At 1140 hours Captain Seal had the means to obtain the BOM's publicly issued information on the position of the cyclone as at 1000 hours. He may have been able to obtain even more current information. If he had plotted his ship's position, and the cyclone's track on a chart, then the result would have appeared something like the page from Exhibit 7 at 1140 hours on 6 February appearing at the end of Chapter 10.

[82] The impression that the cyclone had altered direction further to the North was not one based on reliable and current information, and would not have been gained if the cyclone's centre had been plotted during the course of the voyage. Instead, the cyclone's path would have been in an easterly direction, and the ship would have been North of its path. Access to the details issued at 1114 hours by the BOM in Tropical Cyclone Advice Number 33 would have included the advice that the cyclone was moving east at 20 km/h and was "expected to move east-south east while intensifying".[96] It predicted that the cyclone would cross the coast between Kowanyama and Karumba on Wednesday morning.

[83] In any event, wherever Captain Seal thought at the time the cyclone might cross the coast, his oral evidence to the Inquiry was that he did not think that he would make it far enough to the North of the cyclone's path because "it had sped up and it changed course".[97] Captain Seal accepted that the ship was already North of the cyclone's path. He rejected the suggestion that to turn South meant that he was trying to "outrun it to the South" and was putting himself on a collision course with it. He

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95 SQS Cyclone Procedure; Exhibit 6; p.D9

96 Statement of Mr Callaghan, Exhibit 77; Attachment A page 3 of 14.

97 T. 217.

said that he believed that the ship was only a small distance to the North of the cyclone's path.[98]

[84] In short, Captain Seal's belief that the cyclone's track had moved further to the North was based on a quick comparison between one outdated threat map, and another more recent one, and not on an analysis of the actual track of the cyclone. The cyclone's path having not been plotted on the basis of current and precise weather information, his views about how far North the ship was of the cyclone's path were not based on a reliable analysis.

[85] The second essential reason given to turn South was that the ship was making slow headway going North. On Captain Seal's calculations, at a speed of 4 knots, in five hours' time, the ship would be 20 nautical miles to the North of the track of the cyclone whereas, if the ship voyaged South at 10 knots, in five hours running, she would be 50 nautical miles to the South of the track of the cyclone.[99]

[86] This analysis overlooks the feature that the ship, although only making headway of between 4 and 4.5 knots at the time, did not have her main engine engaged. It also ignores the feature that, to turn to the South, would almost certainly put the ship in the position of having a following sea and risk being pooped. It also involved the prospect of intersecting with the predicted path of the cyclone, at least at some point.

[87] In circumstances in which Captain Seal and his crew had not plotted the path of the cyclone, and the weather information available to him was so limited, he made an inadequate assessment of how far North of its path he was when he decided to turn South. His inadequate assessment of his ship's position relative to the cyclone's path did not enable him to make an informed decision on the merits of maintaining a course to the North compared to turning South.

[88] Even without a current BOM forecast, Captain Seal failed to give proper consideration to the wind conditions. As Captain White has stated:

> "If he believed that he was still below the track of the cyclone he would have correctly applied the advice in the Handbook. However, given that he was aware that before he turned the vessel the wind had backed to the NxW he ought to have realised that he was North of the

98 T. 217-218.

99 Captain Seal; T.154.

> track of the cyclone and in the dangerous hemisphere. If he was aware that this was so he did not apply the advice in the Handbook in turning to the South and putting the wind on the port quarter. It appears that the Master had failed to continue to observe and consider the wind position so as to ascertain his position in relation to the cyclone."[100]

[89] Under cross examination by Counsel for Captain Seal, Captain Thomson accepted the proposition that, when in the vicinity of a cyclone, if outrunning a cyclone cannot be achieved, the best course is always to navigate the ship in order to move it into the navigable zone.[101] He was then referred to extracts from the *Admiralty Weather Manual*.[102] It was suggested then to him that the ship ought to have, in these circumstances, "run with the wind" keeping the wind on the portside.[103]

[90] Although Captain Thomson appeared to agree with those propositions, a few matters should be noted. First, the wind was backing and was in fact on the port bow of the *Wunma* at the time the decision was made to turn South indicating that it was in the "dangerous quadrant". Secondly, the assumption contained in the proposition put to him was that the ship could not outrun the cyclone. Whether it could or not depended on how far North of the path of the cyclone it was, including whether engaging the main engine would have enabled it to clear the dangerous quadrant by keeping the wind on its port bow, or whether it was preferable to alter course and try to "run with the wind". Captain Thomson confirmed what "the rules" were, but was not prepared to say whether continuing North or turning South and "running with the wind" was the best option. This was because he was not on board at the time to know the conditions.

[91] Publications such as the *Admiralty Weather Manual*, *Small Ships Training Operation Manual*; *The Australian Seafarer's Handbook* and *The Mariner's Handbook* provide essential guidance, based on accumulated experience. Their cyclone avoidance rules are based on the use of observations of wind direction and the plotting of the cyclone's path. But as Captain Thomson said, "things don't happen like … you see in the good book."[104] There is no substitute for experience as well as training in navigating in the area of intended operation of the ship, including the tendency of cyclones to recurve in the Gulf. The application of the avoidance

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100 Statement of Captain White - 5 September 2007; Exhibit 114; para 6.1.6.
101 Captain Thomson; T.95.
102 Exhibit 16.
103 Captain Thomson; T.96.
104 Captain Thomson; T.95.

techniques in "the books", or a decision to depart from those techniques, requires accurate information about and plotting of the cyclone's path and the relative position of the ship and the cyclone under various scenarios. These scenarios at around 1130 hours on 6 February should have included the ship making better headway North by engaging the main engine and improving her speed as she moved away from the storm's centre.

[92] Cyclone avoidance rules require careful attention to changes in wind direction. As Captain Seal's statements indicate, before he decided to turn South, the wind had changed direction onto the port bow, in other words, it was backing.[105] He stated:

> "Even though, as you quite correctly state, the book does say to keep the wind on the port bow, but that would be – the majority of mariners would say if you are close to the track of the cyclone you put it on the port quarter."[106]

[93] In short, the ship was North of the path of the cyclone, but by failing to plot the cyclone's path, Captain Seal was not well informed about how far North of it he was. Without a careful analysis of the relative positions of the ship and the cyclone under various scenarios, Captain Seal could not make an informed decision about the merits of continuing North or returning South.

[94] Captain Seal should have made detailed observations of wind direction and the tendency of the barometric pressure when assessing his position in relation to the cyclone.[107] In this context, Captain White expressed the following opinion:

> "At 1140 hours on the morning of 6 February, the Wunma was in all probability to the north of the track in the dangerous semi-circle. It is noted that it seems as if the wind had "backed"; come around from the east to the north by west. In these circumstances, the Master in my opinion, should have followed the procedure in the *Mariner's Handbook* and put the wind on the port bow and continued in a northerly direction, and put as much distance as he could between his vessel and the storm. Had this path been taken the Wunma would have travelled to the north and away from the oncoming cyclone."

[95] Mr Robert Cowle agreed:[108]

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105 Captain Seal; T.151-152. Exhibit 86.
106 Captain Seal; T.152.
107 Report of Captain White - 5 September 2007; Exhibit 114; para 5.5.2.
108 Exhibit 108.

"The decision on what course of action to take for the safety of the WUNMA was based on limited and not full (being up to the minute) information on the track of TC NELSON.

After turning to the South and the vessel was experiencing severe weather conditions the master, without full information on the cyclone and associated weather, was put in to a position where he would have been unable to be certain that any decision he made was the correct one to avoid the worst effects of the cyclone.

…

The decision to change from a northerly heading to a southerly heading contributed to the incident and was further compounded by the subsequent change in heading to the west. Both these actions brought the vessel closer to the cyclones centre even though they also took the vessel into what is known as the "safer" quadrant. However, had the vessel continued north rather than turn to the South, far less severe weather would have been experienced. By the actions of the Master the WUNMA was heading towards the "safer semi-circle" but only by definition. In fact, even though the Master positioned the vessel in the "navigable semi-circle" it was more dangerous than being north of the storm (in what is termed "the dangerous semi-circle") because of the relative distance to the centre of the cyclone. If the vessel were 100nm to the north of the cyclone it would be in a far safer position than being 10nm to the south. In this respect, the concept of "safe" and "dangerous" semi-circles must also be defined in terms of distance to the centre of the cyclone.

The Mariners' Handbook advises masters to keep winds on the port bow when encountering the weather associated with storms and cyclones. It appears the master did not follow this advice. Prior to the change in course at 1140 hours the vessel would have had winds off the starboard side, contrary to the instructions in the Mariners' handbook. As the master waited so long to make the course change to bring the winds on to the port side of the vessel he had crossed the forecast track of the cyclone. It appears that at about 11:40 hours the wind had backed to the North by West and the winds were coming on the port bow. At that time progressing on a course which kept the wind on the port bow would have been in accordance with the mariners' Handbook. Given that at the time of the change in course the vessel was in the "dangerous semi-circle" the application of the directions in the Mariners' Handbook would have taken the vessel away and to the north of the approaching cyclone. The change in course at 1140 hours, however, then put the vessel on a course to cross the forecast track again.

Overall, the vessel effectively reached the north of the track of the cyclone and then turned south ahead of it. Had the master continued on the northerly track he would have moved in to less severe weather. By turning south at the time he did and putting the winds on the port side of the vessel the vessel was in fact being steered back to the more

> severe weather. The vessel having already endured the worst of the weather by heading north ahead of the storm in fact turned back to encounter it again."[109]

[96] In his defence, Captain Seal emphasized that on the basis of the information that he considered, the option of continuing North was considered and dismissed as being "the inferior option".[110] Captain Seal's evidence was:

> "In hindsight, I was unlucky that the cyclone happened to track to the South like it did. It was taking a 90-degrees change to its course, and in hindsight it was the wrong decision to make, if you look at the track of the cyclone, but I had to operate on the information that I had available to me at the time."[111]

[97] One major difficulty with this is that the information on which Captain Seal based his decision to turn South was completely inadequate. In addition, his analysis of that information was rushed. Further, for the reasons to be discussed in the next section, his analysis was inadequate

13.2.2 Inadequate Analysis of Information then in his Possession

[98] Long before receiving the email at 1127 hours, Captain Seal should have been plotting the position of the cyclone, its expected path and the relative positions of the cyclone and the ship. But even with the inadequate information in his possession at around 1130 hours on 6 February in the form of a threat map that had been issued about four hours earlier, Captain Seal did not properly analyse the information on hand. The information that was emailed to him at 1127 hours should have permitted appropriate plotting to be undertaken including a relative motion plot. But even the most rudimentary analysis of the threat map would have permitted him to estimate how far North of the cyclone's path he then was.

[99] The following could have been done with information provided in the 1127 hours email:

(a) Even using the threat map which provided a very general indication of the cyclone's path, Captain Seal could have marked on the threat map the position of the ship at 1140 hours;

(b) Preferably, and quite easily, he could have marked on a readily-available chart:

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109 Exhibit 108.
110 Captain Seal; T.154.
111 Captain Seal; T.154.

(i) The predicted path of the cyclone and even duplicated on it the "threat balloon" depicted on the threat map;

(ii) The position of the ship;

(iii) The location of the cyclone at 0700 hours;

(iv) The presumed location of the cyclone at 1140 hours (assuming the path and speed provided by the BOM);

(v) The radius of the cyclone.

[100] Even with the rudimentary exercise referred to in (a) or the more precise exercise in (b)(i) and (ii) it would have been apparent that the ship was a substantial distance North of the path of the cyclone. A simple plotting exercise would have indicated that the ship was then approximately 22 nautical miles North of the cyclone's path. An illustration of the plotting exercise appears at the end of this Chapter (**Figure 1**). By marking on the chart the forecast latitudes and longitudes at their corresponding times, and then by drawing a line between these positions, the most likely future track of Tropical Cyclone Nelson is shown. The distance from the *Wunma's* plotted latitude and longitude position taken from the GPS (Global Positioning System) relative to the most likely future track can then be "read off" by measuring with a simple navigational tool known as dividers.

[101] Reference to the threat map and the shading of areas of current and expected gales indicated that less severe winds were forecast to the North.

13.2.3 Inadequate Consideration of Consequences

[102] On the basis of the information in his possession, the course that Captain Seal decided to take would have two consequences;

- Having to cross back over the cyclone's path at some stage: at what stage depended on, amongst other things, how far North of the cyclone's path the ship already was, and whether the cyclone recurved in a south easterly direction.
- It would put the ship in the position of having a following sea and carried the risk of being pooped.

[103] As to the first point, Captain Seal knew that the common recurve of cyclones in the Southern Hemisphere meant that cyclone was more likely than not to travel in a south easterly direction, and that was the premise on which he originally sailed the

ship.[112] The tendency of cyclones tracking from the West of the Gulf to the East to recurve to the South should have been taken into consideration. If the cyclone recurved to the South it would take the ship longer to cross its path and enter the navigable hemisphere. Worse still, the ship might be caught in the dangerous quadrant and head into the eye of the cyclone, or be only a small distance South of the cyclone's path.

[104] As to the second point, up until the time when the *Wunma* turned to the South, it would appear from the evidence of the various witnesses, including Captain Seal, that the ingress of water onto the *Wunma* had not reached unmanageable proportions. However, the decision to turn to the South meant that the stern would be exposed to a following sea or, as Captain White has described it, the "Achilles-heel of the vessel".[113] The SQS, Section I 330, warns that when going with the weather, the speed of the vessel should be adjusted so that "surfing/broaching is avoided, and that the sea breaks behind the stern".

[105] It was not until the stern was presented to the following sea that the sea started breaking over the stern ramp and this, as those onboard quickly discovered, exacerbated the accumulation of water in the well deck.

13.2.4 No Prior Consultation with Navigation Officers

[106] Although the decision to turn South was the ultimate responsibility of the Master, consultation with other navigation officers, including the plotting of positions and paths and calculating the closest point of approach of the cyclone to the ship under various options, was likely to assist consideration of the available courses of action and reduce the chance of a wrong decision being made.

[107] Differences in the recollections of witnesses make it necessary to refer to their evidence about the involvement of other navigation officers in the decision to turn South.

[108] According to Captain Seal, during the thirteen minutes between the receipt of the threat map by e-mail at 1127 hours and the decision to turn to the South, "all members of the bridge team were … at the chart table".[114] The bridge team

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112 T.213-214.

113 Statement of Captain White - 5 September 2007; Exhibit 114; para 6.1.7.

114 Captain Seal; T.156.

comprised Captain Seal, Mr Davis and Ms Osmand. Captain Seal recalled a discussion between the three officers about whether the *Wunma* should adopt a "reciprocal course" or continue in a northerly direction.[115] However, a relative motion plot was not produced.[116]

[109] Ms Osmand was due to commence her next watch at 1200 hours and she went to the bridge at about that time. According to her written evidence:

> "I found out that we had turned around on a reciprocal course South at about 9:00am. There was also water in the cargo hold. The deck water discharge was not working."[117]

[110] Her oral evidence was that she slept until 1100 hours and then proceeded to the bridge and discovered that the ship had turned around.[118] Captain Seal did not agree with her recollection in this regard, contending that she was on the bridge at the time the decision was made.[119] He says that, even though her watch started at midday, the normal practice was for someone is her position to come up on the bridge earlier, and she was on the bridge and involved in the decision.

[111] Ms Osmand says that, when she came onto the bridge, she saw from the camera vision of the cargo hold that there was "obviously water in the stern".[120] She was informed by Captain Seal of the reason why he had altered course to head in a southerly direction, namely, that the ship had "ceased to make headway".[121] Her evidence is that she did not assist Captain Seal in making his decision by checking any reference works in the library such as the *Mariner's Handbook* until later on in the afternoon on 6 February after the ship had changed "onto a westerly course".[122] She believed the reference work she consulted was the *Small Ship's Manual*.[123]

[112] Mr Davis performed the 0400 to 0800 hours deck watch on 6 February 2007.[124] His evidence was that the first he knew about the change of course was after he awoke at about midday on 6 February. By that time, the *Wunma* had already turned around.

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115 *Ibid*.
116 Captain Seal; T.146-147.
117 Statement of Ms Osmand - 16 August 2007; Exhibit 38;para 45.
118 Ms Osmand; T.272.
119 Captain Seal; T.195.
120 Ms Osmand; T.274.
121 Ms Osmand; T.274 and T.282.
122 Ms Osmand; T.275 and T.282.
123 Ms Osmand; T.275.
124 Mr Davis; T.642.

He said that he went to the mess and was told by a crew member "Oh don't you know? We are now heading South".[125]

[113] That Mr Davis was not consulted on the decision to turn South was specifically put to Captain Seal during the course of his oral evidence but he had a different recollection, whilst conceding that his recollection could be wrong.[126]

[114] Mr Davis' evidence was that after he went to the bridge he "noticed that the vessel was on a southerly course in comfortable conditions".[127] Mr Davis was asked at the Inquiry whether he discussed with the Master the option of turning the ship around and going back North, to which he responded, "Definitely not".[128] Mr Davis explained that he was not the Master and did not make the final decisions, even though he had an opinion on the matter. His opinion was that if the ship had continued North it would have passed to the North of the cyclone. He said:

> "Keeping in mind cyclones are unpredictable, but they don't head north in the Southern hemisphere. The worst that could be was that it could head East, it might track North a little bit but it's not going to chase you North."[129]

[115] But Mr Davis kept any opinion about the earlier decision to head South to himself. He deferred to the authority and knowledge of the Master who:

> "**…** seemed very confident in what he was doing. He had the information in front of him and he also had information I didn't know and that could have been the fuel."[130]

[116] Whereas Mr Davis did not express an opinion about the earlier decision to turn South, and whether the Master should turn the ship around again and head North, later in the afternoon he expressed his concerns about the proposal to head West. By then seas were coming over the stern and, according to Mr Davis, the ingress of water was "the important thing". At this time, Ms Osmond was reading from the *Mariner's Handbook* and a "little debate" started. According to Mr Davis, he said:

> "The *Mariner's Handbook* doesn't say what to do when you are filling with water, either. It is telling you what to do when you are avoiding a

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125 Mr Davis; T.647.
126 Captain Seal; T.193.
127 Statement of Mr Davis - 8 February 2008; Exhibit 85.
128 Mr Davis; T.654.
129 Mr Davis; T.654.
130 Mr Davis; T.654.

> cyclone. We are filling up full of water. Your problem is not the cyclone, it's the ingress of water."[131]

[117] The discussion with Ms Osmand occurred prior to the alteration of course to the West.[132]

[118] Mr Fisher said that he was not part of any of any discussions about whether to turn around, and did not hear any discussion because "there wasn't anyone else in the wheelhouse except for Dean and myself" when the ship turned around.[133] He made the point that the only discussions he had with Captain Seal was in regards to the fuel remaining onboard.[134] However, he stated:

> "As part of the discussion he had prior to turning around, Captain Seal stated that we were still South of the track with the cyclone well West of us still." [Emphasis added][135]

[119] Relevantly, Mr Leeson recalls being on the bridge before the ship changed course and overhearing a discussion between Captain Seal, Mr Davis and Ms Osmand along with Mr Fisher.[136] He recalls this conversation because, in consequence of it, he was directed to "start up the centre main engine for extra population".[137] Up until that point the ship had been "cruising just on two main engines, to conserve fuel".[138] However, Mr Leeson then expressed some confusion about when he overheard this conversation but recalled a "disagreement between the First Mate and the Second Mate" on that topic.[139] He acknowledged that it was possible that the discussion he referred to occurred after the ship had changed course to the South.[140]

[120] Unsurprisingly, because of the traumatic events during the voyage and the natural tendency of individuals to have different recollections of events at the best of times, there is a conflict in the evidence about the involvement of other navigation officers in the decision to turn South. The Board finds that the most probable course of events is:

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131 Mr Davis; T.658.
132 Mr Davis; T.685.
133 Mr Fisher; T.312.
134 Mr Fisher; T.312.
135 Mr Fisher; T.312.
136 Mr Leeson; T.362.
137 Mr Leeson; T.363.
138 Mr Leeson; T.363.
139 Mr Leeson; T.363.
140 Mr Leeson; T.364.

(a) Chief Mate Davis and Second Mate Osmand were not on the bridge at 1140 hours when the decision was made to turn South, and only learned of this change of course after it was made;

(b) Chief Engineer Fisher and First Engineer Leeson were not directly consulted about the decision to turn South, but were consulted about fuel consumption and the need to engage the main engine prior to turning South;

(c) Second Mate Osmand came onto the bridge not long after the ship turned South;

(d) Chief Mate Davis learned of the decision to turn South in the messroom, and not long afterwards came onto the bridge;

(e) Neither Mr Davis nor Ms Osmand expressed disagreement with the decision to turn South.

13.2.5 The Fuel Situation

[121] Some evidence raised the possibility that a concern about fuel reserves may have influenced the decision to turn South. However, the evidence is not sufficient to support such a conclusion.

[122] Mr Leeson, the First Engineer, gave evidence that with their knowledge of the fuel consumption there was sufficient fuel to get to Weipa but not sufficient fuel to return from Weipa and there were concerns about being able to purchase fuel in Weipa. However, he gave no evidence that the concern about fuel featured in the decision to turn South.[141]

[123] Mr Davis, when he learned of the decision to turn South thought that it may have something to do with fuel but, on the basis of his discussions with Captain Seal at the time, realised that the change of course had to do with the cyclone's position. He recalls Captain Seal saying words to the effect that he was not having much luck, that the cyclone had altered course and was heading for them, or chasing them.[142]

[124] Mr Fisher, who was probably the only other person on the bridge when the decision to turn South was made, put the issue of fuel as a factor in the decision to turn South as no higher than a possibility. His evidence indicates that his conversation with Captain Seal at the time indicated that the position and track of the cyclone justified

141 Mr Leeson; T.363.

142 Mr Davis; T.649.

the decision to head South.[143] Mr Fisher's evidence indicates that it was "new information on the cyclone" that led to the decision to head South. There is insufficient evidence, and only speculation, that concern about fuel reserves was the reason to turn South.

13.2.6 The Appropriate Decision in the Circumstances

[125] Had Captain Seal obtained current weather information, plotted the path of the cyclone as well as the position of the *Wunma* and then followed cyclone avoidance rules in the SQS in order to determine whether the ship was in the "navigable hemisphere" or the "dangerous hemisphere", he would have concluded that the ship was North of the cyclone's path. The wind was coming from the North by West unlike the prior readings recorded in the deck logbook.[144] The wind had backed so that it was on the ship's port bow as it proceeded North. In those circumstances Table 2 of the *SQS Cyclone Avoidance Procedure* advised him to continue on the course he was, only ever changing course to keep the wind on the port bow.[145]

[126] Better weather information would have allowed the path of the cyclone to be plotted, and the relative positions of the cyclone and the ship to be calculated under various scenarios. Incidentally, had Captain Seal been in possession of current weather information he would have appreciated that the forecast at 1000 hours on 6 February was that high winds were predicted for the North East of the Gulf and gale force winds were predicted for the South East of the Gulf. He was not aware of that difference at the time he made the decision to alter course.[146] He "just went as per the threat map".[147]

[127] The failure to obtain current and appropriate weather information placed Captain Seal in an invidious position. It certainly compromised his capacity to make an informed decision about the track and likely path of the cyclone.

[128] If relevant and current weather information had been obtained, plotted and analysed with the assistance other navigation officers, then along with consideration of changing wind directions and guidance from the cyclone avoidance procedures of the SQS, a Master in Captain Seal's position exercising reasonable skill and care

143 Mr Fisher; T.300.
144 Exhibit 86.
145 Captain Thomson; T.83-84.
146 Captain Seal; T.123.
147 Captain Seal; T.123.

would not have decided to turn the *Wunma* to the South at 1140 hours on 6 February.

[129] The Board reaches this conclusion despite the fact that when he was asked during his evidence whether he would have made the same decision to turn South had he been armed with up to date information about the position and tracking of the cyclone, Captain Seal said that he would.[148]

[130] His evidence may be on account of a lack of consideration of that information, and insufficient time to reflect on its implications. His evidence was given prior to Captain White's Report becoming available, and Captain Seal may not have carefully studied the BOM data and plotted it before giving evidence. But the essential point was well-illustrated by Exhibit 7, which was circulated by the Counsel Assisting shortly before the hearing. It graphically illustrates that at 1140 hours on 6 February, the *Wunma* was North of the path of the cyclone, and, if the cyclone continued on its Easterly path , the *Wunma* would be even further North of its path later on 6 February. This Exhibit appears at the end of Chapter 10.

[131] The failure to make an appropriate concession in response to a "what if" question may be explained by the pressure of giving oral evidence. Captain Seal made concessions during his oral evidence about his failure to obtain weather information from sources that were accessible during the morning of 6 February prior to the decision to turn South. No one likes to admit making a mistake. Admitting error in public proceedings is very difficult indeed. Captain Seals' written submissions did not persist in asserting that he would have made the same decision to turn South had he been armed with up to date information about the position and tracking of the cyclone.

[132] A figure[149] produced by Captain White, which is reproduced at the end of this Chapter (**Figure 2**), depicts the position of the cyclone according to the forecast issued by the BOM at 1122 hours, which gave the cyclone's position at 1000 hours. The position of the *Wunma* for 1000 hours is based on its logbook. The circle around the cyclone represents a radius of 30 nautical miles. The predicted track and the predicted positions of the cyclone at 2200 hours on 6 February and 1000 hours

148 Captain Seal; T.211.

149 Exhibit 30; Report of Captain White; Exhibit 114; para 6.2.6, Figure 10.

on 7 February are also shown. It depicts the ship North of the cyclone's path at 1000 hours on 6 February.

[133] Mr Cowle calculates that at 1000 hours on 6 February, the cyclone was 66 nautical miles, almost due West of the ship.

[134] The next figure,[150] which is also reproduced at the end of this Chapter (**Figure 3**), depicts the estimated position of the cyclone at 1140 hours based on the forecast track and speed given in the forecast issued by he BOM at 1122 hours, which gave the cyclone's position at 1000 hours. The position of the *Wunma* for 1140 hours is based on its logbook. The figure also shows the estimated position of the ship at 1240 hours, based on an estimated speed of 8 knots.[151] This figure confirms the impression conveyed by the Board's Graphic of the track of the cyclone and the position of the *Wunma* at 1140 hours (Exhibit 7), namely that at 1140 hours the ship was a substantial distance North of the cyclone's predicted path.

[135] Mr Cowle calculates that at 1140 hours, when the *Wunma* reached the most Northerly point on her track, she was 68 nautical miles to the North East of the cyclone's centre.

[136] The next figure reproduced at the end of this Chapter (**Figure 4**)[152] depicts the estimated position of the cyclone and the ship at 1240 hours. Relevantly, it shows that after steaming South for an hour the ship was approaching the 30 nautical mile circle from the cyclone's presumed centre, and was still a significant distance to the North of its path.

[137] The last two figures (**Figures 3 and 4**) are at odds with the view expressed by Captain Seal in his evidence that he was close to the path of the cyclone and would quickly cross back over its path if he turned South and put the wind on the port quarter.

[138] It will be recalled that Captain Seal's evidence was that in hindsight, he was unlucky that the cyclone happened to track to the South like it did, taking a 90 degrees

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150 Exhibit 30; Report of Captain White; Exhibit 114; para 6.2.7; Figure 11.

151 The ship's logbook for its voyage South between 1140 and 1800 hours produces an average speed of 7.9 knots.

152 Exhibit 30; Report of Captain White, Exhibit 114; para 6.2.8; Figure 12.

change to its course.[153] It would be unfair to assess Captain Seal's decision at 1140 hours to turn South by reference to the cyclone's sharp turn to the South after 1600 hours, as graphically depicted in Exhibit 7 and other exhibits. His decision must be assessed by reference to the position of the ship, the position of the cyclone, its expected path and the application of cyclone avoidance rules based upon weather information that was available at the time. One returns to the importance of determining how far North of the cyclone's path the ship was at 1140 hours, and assessing where she would be in relation to the cyclone in a number of hours depending upon whether she continued North or turned South.

13.2.7 What if the Ship Had Continued North?

[139] Captain Seal gave evidence to the effect that, by 1140 hours, the speed of the ship had been reduced to about 4 knots. But if the ship kept heading north, the sea conditions would have improved the further she moved away from the centre of the storm, allowing her to make more speed.[154] This was the assumption made by Captain White who plotted the position that the *Wunma* would most likely have reached had she maintained a northerly heading. For this purpose, he adopted a speed of 5 knots which was an average calculated over the known positions recorded in the logbook.[155] Notably, it does not take account of any additional speed and distance the ship might have achieved had it engaged the main engine.

[140] A figure[156] produced by Captain White, and which is reproduced at the end of this Chapter (**Figure 5**), depicts the cyclone position at 1600 hours on 6 February, based upon the forecast issued by the Bureau of Meteorology at 1709 hours. It shows the actual position of the *Wunma* taken from the ship's logbook at 1530 hours. It shows the position that the *Wunma* , assuming she had maintained a Northerly course at a speed of 5 knots.

[141] It depicts the ship outside the 30 nautical mile circle from the cyclone's presumed centre at 1600 hours.

[142] It does not gainsay Captain Seal's contention that he was "unlucky" that the cyclone took a sharp turn to the South late on the afternoon as he was voyaging South.

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153 Captain Seal; T.154.

154 Statement of Captain White - 5 September 2007; Exhibit 114; para 6.2.10.

155 Exhibit 86.

156 Statement of Captain White - 5 September 2007; Exhibit 114; Figure 13, p. 126; Exhibit 30.

Instead, it calls into question the decision to turn South in the first place. That decision was based on a superficially attractive comparison to the effect that more *distance* would be covered by heading South at 10 knots over a five hours period (50 nautical miles) than by heading North at 4 knots over the same period (20 nautical miles). That comparison assumes the correctness of the estimate of 10 knots heading South, which proved to be an overestimate, and that not more than 4 knots could be achieved heading North, which was probably conservative.

[143] But any 50 nautical miles versus 20 nautical miles *distance* comparison depended on the starting point from which the distance was to be measured. Plotting of the ship's position in relation to the cyclone's path at 1140 hours based on information available at the time, would have shown it to be was a substantial distance North of the cyclone's predicted path. It appears that at 1140 hours the ship was approximately 22 nautical miles North of the cyclone's predicted path, based upon the weather information that Captain Seal obtained by email at 1127 hours. Applying his 50 nautical miles versus 20 nautical miles distance comparison, continuing North would have placed the ship 42 nautical miles North of the cyclone's path in five hours, whereas turning South, retracing 22 nautical miles back to the cyclone's path and then continuing the Southerly course for a total distance of 50 nautical miles would have placed the ship 28 nautical miles South of the path. In short, on these assumptions about distance and speed, continuing North would place the ship 42 nautical miles north of the cyclone's path, whereas turning South would place it only 28 nautical miles South of the cyclone's path.

[144] The final figure,[157] reproduced at the end of this Chapter (**Figure 6**), shows the same information as in the previous figure save that the orange circle depicts the area affected by the cyclone as 60 nautical miles

[145] It can be seen that, at a speed of 5 knots, the Wunma would have been close to the extremity of the 60 nautical mile zone that had been predicted by the Bureau of Meteorology to be affected by the cyclone. As Captain White says, "had the Master used three engines throughout the night, it is quite possible that he would have been beyond this predicted area".[158]

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157 Statement of Captain White - 5 September 2007; Exhibit 114; Figure 14; p. 127; Exhibit 30.

158 *Ibid*; para 6.2.11.

[146] It was "unlucky" that the cyclone turned South late on the afternoon of 6 February, but only because Captain Seal had made a rushed decision at 1140 hours that day to turn South.

[147] The appropriate decision in the circumstances was to continue North.

[148] If the ship had continued North, by 1600 hours she probably would have been well outside a 30 nautical mile radius from where the cyclone's centre was expected to be at that time, and close to the extremity of the area predicted to be affected by the cyclone.

[149] In the result, the decision at about 1140 hours to turn South was a significant cause of the incident.

13.2.8 Conclusion

[150] The decision to turn South was a crucial decision that was made without obtaining adequate weather information, without plotting the path of the cyclone based on that information, without prior consultation with the Chief Mate or the Second Mate and without adequate consideration of its consequences. It was a decision that was made under pressure. But much of that pressure was self-imposed by Captain Seal's failure to obtain at an earlier stage on the morning of 6 February weather information from readily-available sources, or to seek advice or assistance from the Designated Person Ashore.

[151] Captain Seal sailed with no new cyclone information other than a generalised representation of the cyclone at 1600 hours the day before – almost 20 hours before he obtained an update - and, when that arrived, it depicted the position of the cyclone four and a half hours earlier. The arrival of his wife's e-mail at 1127 hours on 6 February prompted Captain Seal to make a hasty decision to turn South.

[152] No one can suggest that the decision he had to make at 1140 was a simple one. The "books" could offer guidance, but an exercise of judgment was called for. It is unfair to assess Captain Seal's decision by reference to where, with the benefit of hindsight, one sees the cyclone tracked later on 6 February. But it is not unfair to have expected him, over the previous hours, to have plotted the cyclone's track and expected path, and to have taken account of the possibility that it would re-curve to the South. The BOM forecast issued at 1114 hours said it was "expected to move

east-south east". Nor is it unfair to have expected Captain Seal to have a better idea of how far North of the cyclone's path he was at 1140 hours on 6 February, and, on that basis, assessed the relative positions of the ship and the cyclone under various scenarios.

[153] Captain Seal found himself at 1140 hours on 6 February in the position of making a difficult decision about competing choices because of a failure to plot the cyclone over the duration of the voyage and to consider the best course for cyclone avoidance, including engaging the main engine. Instead, at around 1130 hours on 6 February the arrival of a second "threat map" and a quick comparison between it and the one he had obtained before leaving port led to a hasty assessment of his position relative to what he understood to be the cyclone's path to be, and a quick decision to turn South.

[154] The decision taken by Captain Seal to turn to the South was not an informed one:

- He was not in possession of current weather information and did not attempt to obtain such information at 1130 hours via the AMOS email system or the satellite telephone which were operational at that time. This is despite the fact that the email received at 1127 hours indicated that the Tropical Cyclone Advice had been issued nearly four hours ago and that further information was to be issued by the BOM at 1100. In fact Tropical Cyclone Advice Number 33 was issued at 1114 hours and a further threat map was issued at 1117 hours. Consideration of the need to obtain current weather information should have led Captain Seal to obtain the most current weather information that was available at 1130 hours.
- He failed to make appropriate observations about the prevailing wind direction and to analyse what he should do in the light of changes in wind direction in accordance with well-established cyclone avoidance rules, as reflected in the SQS.
- He did not know or calculate at 1140 hours how far North of the path of the cyclone he was, and therefore did not assess the relative positions of the ship and the cyclone under various scenarios.

[155] A decision was required about the merits of heading North as against turning South, re-crossing the cyclone's path at some stage and hopefully making enough distance

to be sufficiently South of the cyclone's path to be able to avoid its impact. The choice of heading South risked being pooped by following seas and the ingress of seawater into the well deck.

[156] Even with the inadequate information in his possession at 1140 hours Captain Seal should have analysed the available information and the consequences of turning South. He was able to ascertain on the basis of the information in his possession that he was a substantial distance North of the cyclone's expected path. Gale force winds were expected in the southern Gulf. Turning South risked being pooped by following seas and the ingress of seawater into the well deck. The cyclone was predicted to move East-South East while intensifying and it might recurve even further to the South, as it in fact did later on 6 February. Turning South involved turning back into what has been described as a "marine cul de sac". Last, but not least, turning South did not apply the cyclone avoidance procedures contained in the SQS or other publications.

[157] The decision to turn South came to be made at around 1140 hours because the need to make a decision about continuing North or turning South had not been confronted by Captain Seal much earlier. If it had been, then a careful consideration of the options, based on current weather information, would have favoured continuing North but with the main engine engaged to make better headway. But even if, for the reasons given by Captain Seal, the decision to turn South at 1140 hours was the correct decision based upon the information that was available to him at that time about the cyclone's likely path, then that decision should have been made much earlier.

[158] A decision to either continue North or to turn South with the main engines engaged having not been made much earlier on 6 February 2007, Captain Seal made a hasty decision at 1140 hours without adequate information, without adequate assessment of competing choices, without consultation with the other navigation officers and without adequate consideration of the consequences of the ship having a following sea.

[159] The decision at about 1140 hours on 6 February to turn South was a significant cause of the incident.

13.3 DECISIONS TO AGAIN ALTER COURSE

[160] As appears from the earlier account of events, during the afternoon of 6 February as the ship voyaged South, the crew tried to deal with the accumulation of water in its well deck from rainwater and following seas.

[161] The various versions of events given by individual crew members makes it hard to reconcile precisely when steps were taken. Witness statements were based upon individual recollections of when things occurred, and, understandably, recollections differed. The crew were too busy dealing with emerging problems to be looking at their watches all the time. But the steps taken by them during that day can be summarised as follows:

- Opening deck drains in an attempt to direct rainwater overboard.
- Attempting to clear and operate the sump drain to direct water in the well deck overboard.
- Pumping dirty water tanks overboard.
- Setting up pumps in the well deck.

[162] Captain Seal ordered the deck drain valves be opened to sea after the dirty water tanks were full. At that stage he did not consider that the ship in any particular distress".[159] His recollection was that this occurred at 1100 hours when he and Ms Osmand tried to open the deck drains. Ms Osmand says she was not on duty at 1100 hours and so this may have occurred later. Captain Seal had a definite recollection of going into the control room with Ms Osmand to open the deck drains, and that "maybe two or three on either side of the vessel" had problems, and the mimic panel had flashed yellow.[160]

[163] During the afternoon of 6 February, Mr Davis alerted Captain Seal to the extent of the water collecting on the ship and entering the cargo hold and suggested that Captain Seal open the valves to sea. Captain Seal told Mr Davis that some of the valves could not be opened.[161] Mr Davis' confirms the exchange with Captain Seal abut the ingress of rainwater was to the effect that the deck drains could not be opened, not that Captain Seal was not willing to open them. Captain Thomson's finding of the state of the valves is not inconsistent with this evidence. When

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159 Captain Seal; T.194.
160 Captain Seal; T.194.
161 Captain Seal; T.193.

Captain Thomson inspected the ship after the incident the valves were closed to sea and open to tanks and a couple of them were flashing yellow on the control panel, meaning that they either had not opened or had not closed and that a problem existed.[162] It is possible that after the salvage was in progress and before Captain Thomson' inspection, the valves were re-directed to the tanks, rather than have "dirty water" directed overboard.

[164] Photographs of the ship taken after the incident indicate that at least some of the deck drains were functioning.[163] But the opening of deck drains late on the morning or early on the afternoon of 6 February did not prevent the accumulation of water in the aft well deck.

[165] Despite various attempts by Mr Leeson and Mr Caletti to clear the sump drain pipe, it would not drain any water. As was discovered after the incident, this was because of the presence of a timber bung that had been inserted in the outlet to the drain.

[166] Pumping dirty water tanks overboard did not prevent the accumulation of water in the aft well deck. In any event, blockages in the drains leading into the dirty water tanks limited the volume of water that could enter them, and in Port the pumps took several hours to empty the tanks. Therefore these pumps did little to rid the ship of water.

[167] Difficulties were encountered in using pumps in the well deck to pump water overboard. In the afternoon of 6 February, Ms Osmand returned to the well deck with Mr Leeson and Mr Caletti to endeavour to pump water from the well deck over the side. However, the pumps available for use were "too small and … not effective enough to lower the water level".[164]

[168] During the course of the afternoon of 6 February, as the ship continued on its Southerly course it took seas over the stern. Mr Fisher estimated that it was an hour or an hour and a half after turning around that the seas started coming in.[165]

[169] At some stage, precisely when cannot be stated, wave impact caused substantial damage to the portside canopy permitting water to enter the cargo hold. Ms Osmand

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162 Captain Seal; T.67.
163 Exhibit 35.
164 Statement of Ms Osmand - 16 August 2007; Exhibit 38; para 48.
165 Mr Fisher; T.312.

recalls that the stern was taking on water over the stern ramp and various attempts were made to tie down welding equipment that had become loose in the well deck. During this time the water level in the well deck rose from shin to thigh deep. Waves were pooping the ship. Ms Osmand informed Captain Seal of this by radio and this led to an alteration in course which, according to Ms Osmand, stopped the ingress of water over the stern.[166]

[170] After her time at the stern, Ms Osmond returned to the bridge along the port walkway and was hit by a wave that came through a hole in the cladding. She noticed that one wave would lift the cladding while another would then break in.[167]

[171] Despite the best attempts by various witnesses to recall the events of the afternoon of 6 February, it is impossible for the Board to make any definite finding about how much of the water that accumulated in the well deck was run off rainwater that, for one reason or another, could not be directed overboard through deck drains, and how much of it was sea water that was taken over the stern and also through the hole in the portside canopy. Heavy rain was recorded in the deck logbook on the afternoon of 6 February.

[172] With the crew's focus on managing the ingress of water and navigating, it appears that not a lot of time was spent on analysing weather information. But the deck logbook records that the barometer continued to fall. In the morning it had been 1,000 mb. At noon it was 997 mb. By mid afternoon it was 996. By 1800 hours it had dropped to 993 mb.

[173] It is likely that during the early afternoon the ship received some further emails from Captain Seal's wife. Their contents and what was done in response to them was not explored in detail at the hearing because it was only after the conclusion of the evidence that copies of the emails were produced to the Inquiry in a further supplementary witness statement dated 23 October. Prior to the hearing copies of them had not been provided by Inco or anyone else by retrieving them from the AMOS system. Because Captain Seal only produced copies of the emails from his wife's computer at that late stage, he was not examined at the hearing on their contents. As he acknowledged, because of the loss of the ship's essential circuits

166 Statement of Kellie Osmond Exhibit 38; para 46.
167 *Ibid*; para 47.

following the blackout that occurred at about 2010 hours on 6 February he would not have been able to receive a number of the emails that were sent by his wife on the night of 6 February and the morning of 7 February. Relevantly for present purposes, Captain Seal produced copies of emails that were sent by his wife:

- At 1220 hours on 6 February which sent Tropical Cyclone Advice No 33 which had been issued by the BOM at 1114 hours.
- At 1349 hours on 6 February which attached a "threat map" that had been issued in conjunction with tropical cyclone advice No 33 at 1117 hours.
- At 1613 hours on 6 February which attached a "threat map" issued at 1408 hours as part of Tropical Cyclone Advice No 34.
- At 1902 hours on 6 February which attached a "threat map" issued at 1719 hours as part of Tropical Cyclone Advice No 35.

[174] It is unfortunate that the contents of these emails were not made available to the Inquiry prior to its hearing. If the emails were received on board shortly after the time they were sent then they permitted Captain Seal and the navigation officers to review the information that had been issued by the BOM at 1114 hours and reconsider the decision to turn South. Captain Seal did not give evidence at the hearing that he did this. Mr Davis gave evidence of seeing documents, including threat maps on the bridge that afternoon. He was critical of the failure to make proper use of them and to mark when they had been received on board. The threat maps came with the inherent limitations that such a generalised visual representation has concerning the precise location of the cyclone. Apart from threat maps the only email received on the afternoon of 6 February that provided a position for the cyclone was the Tropical Cyclone Advice No 33 which gave its position at 1000 hours. It is possible that these details were used by Ms Osmand to plot the cyclone's position at 1000 hours. At some stage on the afternoon HF radio communications were restored and it is possible that this was the source of information used to plot the cyclone's position at 1300 and 1600 hours.

[175] In summary, any emails received by Captain Seal from his wife during the afternoon of 6 February were not said by him to have been analysed so as to plot the cyclone's path and to reconsider the earlier decision to turn South. Because he did not give evidence of having used this information, particularly any information that may have been received as a result of the email sent at 1220 hours, it is unnecessary to dwell

on whether his decision to continue voyaging South was the correct one, based upon the contents of that email or the "threat maps" that were sent later that afternoon. The decision to continue voyaging South appears to have been based upon the same objective as the decision to turn South, namely to cross the path of the cyclone and navigate to its safe "southern quadrant".

[176] At 1200 hours the logbook recorded that the ship was rolling and pitching in a "moderately to heavy swell". At 1530 hours the logbook recorded that she was rolling in a heavy sea.

[177] The course change made at 1530 hours was taken because of concerns about the ship being pooped and as a result of Ms Osmand's advice about the ingress of water over the stern. It involved a course change to the South South West.

[178] A further substantial course change to west was made at 1800. The deck logbook records that at 1800 hours the ship was pitching and rolling in a very heavy confused sea and swell. A notation was made in the deck log to the effect that the ship's courses were various and to the Master's orders.[168] A reconstruction of the vessel's movements on the evening and night of 6 February depicts a Westerly voyage.

[179] Despite the difficulties which the ship was in late on the afternoon of 6 February, as previously noted, at 1804 hours Captain Seal forwarded an email to Mr Tonkin, which was copied to Mr Iuliano and Captain Ives at Inco which advised:

> "Just letting you know we are travelling OK. Have a fair bit of freshwater runoff down the tail end approx 1m deep. Ship in loaded condition."[169] [Emphasis added]

[180] The failure to seek assistance or advice from the Designated Person Ashore during the afternoon of 6 February is remarkable.

[181] Throughout the afternoon of 6 February Captain Seal continued to hope that he could extricate himself without outside assistance from the difficult situation in which he found himself.

[182] By the time course changes were made at 1530 and at 1800 hours on 6 February the ship was close to the cyclone's centre. As Mr Cowle explained:

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168 Exhibit 86.

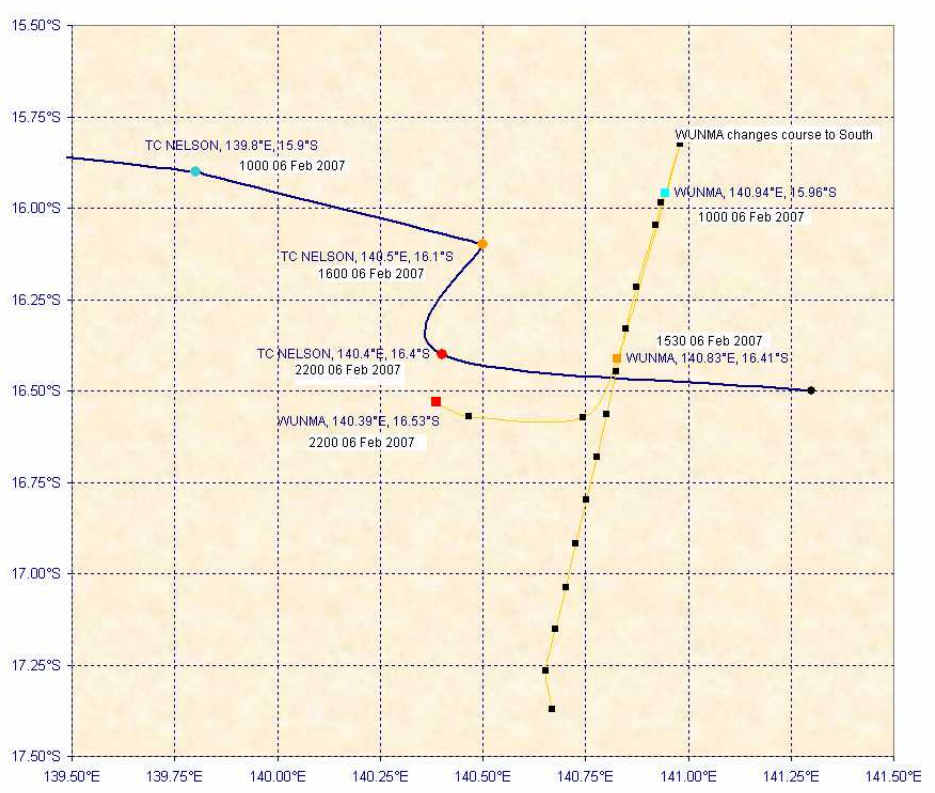
169 Attachment AD6 to the Statement of Captain Dally - 19 August 2007; Exhibit 53.

"After the vessel had turned to the south and moved closer to the cyclone the general rules concerning the avoidance of cyclones (such as are found in the Mariners' Handbook) would be less applicable due the small distance between the WUNMA and the cyclone's centre. The nearer the centre of a cyclone the more the winds tend to blow across the isobars towards the centre. Over water the cross-isobaric is between 6 and 10 degrees this can become as much as 45 degrees very close to a cyclone's centre.

The decision to change from a northerly heading to a southerly heading contributed to the incident and was further compounded by the subsequent change in heading to the west. Both these actions brought the vessel closer to the cyclones centre even though they also took the vessel into what is known as the "safer" quadrant."[170]

[183] As the Board's Graphic of "*Wunma* and Tropical Cyclone Nelson"[171] shows, and unbeknownst to Captain Seal and his crew at the time, the later course changes took the *Wunma* closer to the cyclone's centre. This Graphic (Exhibit 7) appears at the end of Chapter 10.

[184] The figure below, prepared by Mr Cowle, shows the relationship between the track of the vessel and that of Tropical Cyclone Nelson.



[185] According to Mr Cowle:

170 Exhibit 108.
171 Exhibit 7.

> "The Wunma continued South until reaching the "orange" position, 1530 hours on 6 February 2007, 27 nautical miles from the centre of Tropical Cyclone Nelson. By that time, the winds would have increased to 45 to 50 knots from the East or East South East. The significant wave height would have been in the range of 4.5 to 5.5 metres. The winds would have shifted on to the port beam suggesting the vessel should continue on the current track and would have kept the vessel heading towards the less severe quadrant of Tropical Cyclone Nelson.
>
> At around 1800 hours however, the vessel adjusted course to the West which would have put the winds and waves almost fully on the stern of the vessel. The vessel continued to head West until it reached the "red" position, 2200 hours 6 February 2007 where it dropped anchor. At around the time the vessel turned West, Tropical Cyclone Nelson made a sudden change of direction and headed south, the distance between the vessel and Tropical Cyclone Nelson decreased rapidly and at 2200 hours when the vessel dropped anchor, the cyclone was only 8 nautical miles to the north. At this point, the winds would have been almost southerly and up to 65 knots, having probably backed to this direction from a short time blowing from the South West. Very confused seas would have been present, over 6 metres. Tropical Cyclone Nelson then changed course again and headed East, away from the Wunma.
>
> At the point where the distance between the vessel and the storm centre were at a minimum, 8 nautical miles, Tropical Cyclone Nelson was at its most intense. Tropical Cyclone Nelson was a Category 2 Tropical Cyclone with maximum winds of 60 to 65 knots."

[186] The decisions to turn to the South South West and then to the West compounded the problems that had been produced by earlier decisions.

13.4 THE DECISION TO ABANDON SHIP

[187] Consideration of the Master's decision to abandon ship must begin with the following observation by Captain White in his evidence to the Inquiry:

> "The decision to abandon ship must be one of the most difficult calls a Master will ever have to make. No Master should be overly criticised for taking the decision to abandon his ship if the information available to him at the time gave him cause for concern for the safety of his crew."[172]

[188] When asked the reasons why he decided to abandon ship, Captain Seal responded:

> "Having lost communications, I did not know the position of the cyclone. I asked the SER plane on probably five occasions "did they know the position of the cyclone?" to which they answered they would get back to me on that but never did.

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172 Statement of Captain White - 5 September 2007; Exhibit 114; para 5.9.2.

> I received a message from the Eastern Star that read from memory "If the water level is higher than halfway up the stern ramp, the eventual loss of the vessel is probable and you should make preparations to leave the vessel." This message had been given by the Eastern Star who had purely Chinese Nationals onboard whose English left much to be desired, however I was not prepared to risk people's lives on the assumption that they had got the message wrong from Lloyd's who had in their possession all of the vessel's data.
>
> The vessel had developed a list, we were out of contact with all people except the Eastern Star and there was a lot of free surface effect and the cargo itself was becoming slurry changing its effect on GM from a positive to a negative.
>
> I was not happy with the positioning of the Eastern Star. I had asked on repeated occasions for the vessel to move closer to the Wunma so that they could observe the vessel, however they were at some stages over 12 miles away.
>
> My training on the effectiveness of life rafts in high winds.
>
> The fact that the pumps would soon run out of petrol. There was little else that could have been done to further secure the vessel and there was only risk left for personnel."[173]

[189] Captain Seal can hardly be criticised for his decision, given the reasons set out above. No party or witness has suggested that he should be. This included the information conveyed to him by the *Eastern Star* which, if accurate, meant the ship and her crew were in serious danger. His decision to abandon ship on the basis of the information known to him, his evaluation of the situation and his concern for the safety and lives of his crew accorded with the SQS's guidance on the decision to abandon ship. It was a reasonable decision based on the information known to him at the time the ship was abandoned.

[190] As to that information, Ms Osmand received a message from the *Eastern Star* which she wrote down on a piece of paper which has since been misplaced. To the best of her recollection, the message from the *Eastern Star* stated that, amongst other things, that "once the water in the hull was more than halfway up the stern ramp, progressive down flooding would occur" and "the Master was advised to abandon ship if he thought it was necessary".[174]

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173 Statement of Captain Seal - 2 August 2007; Exhibit 18; pp.17 and 18. Captain Seal; T.175-176.

174 Statement of Ms Osmand - 16 August 2007; Exhibit 38; para 53. Ms Osmand; T.280-281.

[191] At that time, the well deck was completely full of water and certainly considerably above "halfway up the stern ramp". On the other hand, the sea level outside the hull, as a mean, would have been approximately 2 metres lower outside the stern ramp.[175]

[192] Captain Seal knew from his satellite telephone conversations with Captain Ives at approximately 2230 hours on 6 February that Lloyd's SERS had performed a number of calculations based on computer modelling of the ship and had concluded that she "still had plenty of stability".[176] After 0130 hours the next morning, the *Wunma* was not in direct communication with Inco. Captain Seal was reliant upon communications from Inco to through RCC that would then be relayed to the *Eastern Star* and via VHF radio to the *Wunma*.[177] Captain Seal's evidence was:

> "A message was received via the Eastern Star and I have to say that the level of English on the Eastern Star was minimal, it was a Chinese ship and we got a message at approximately 6:30 in the morning and what we deciphered at the time it said that if the water at least halfway up the ramp the vessel was in danger of progressively sinking and you should make arrangements to abandon ship. ... At that time, the water was fully up to the edge of a ramp."[178]

[193] Captain Seal also explained:

> "I was concerned with the fact the amount of water in the back of the cargo hold was creating a free surface effect along with the fact that the zinc was beyond its transportable moisture limit, it was actually turning into a slurry. I was also concerned that the engine room at that stage was taking on water and the free surface effect of that. The other thing I was concerned about was that I knew if we got off the ship in life rafts our probability of survival would be very little."[179]

[194] According to Captain Ives, between 0400 and 0430 hours on 7 February:

> "Lloyd's contacted me to advise that the indications were that they could assume that the cargo had shifted, but the ship would be okay as long as the engine room didn't flood. <u>If the flooding in the engine room got greater than 50%, the ship would sink by the stern</u>. By this, I understood that this could happen because the water level in the cargo hold was <u>halfway up the stern ramp</u>, with the ship having this huge trim. If the engine room, which is below the cargo hold, then continues to flood with the flooding increased to 50%, the extra weight at the back of the ship from the cargo shifting and the weight

175 Captain Seal; T.177.
176 Captain Seal; T.175.
177 Supplementary Statement of Captain Dally - 19 August 2007; Exhibit 53; para 43.
178 Captain Seal; T.176.
179 Captain Seal; T.175.

> from the flooding, would make the ship sink by the stern."[180] [Emphasis added]

[195] On receiving this information, Captain Ives spoke with RCC Canberra at 0424 hours and requested that they relay a message to Captain Seal via the *Eastern Star*. Captain Ives recalls saying words to the effect that:

> "You will need to tell Dean that if the engine room fills more than 50% with water, the ship will sink by the stern."[181] [Emphasis added]

[196] RCC Canberra agreed to convey Captain Ives' message to Captain Seal via the *Eastern Star*.[182] A copy of the RCC Operator's notes of the conversation with Captain Ives at about 0424 hours[183] records the following points were written:

> "If:
>
> - No power
> - And to continue flood
> - He should abandon ship
> - Model indicate cargo liquafies (sic)
> - Sink by stern"

[197] RCC sent a message in writing via Immarsat-C to the Master of the *Eastern Star* which relevantly requested the following information be passed to the Master of the *Wunma*:

> "1. Inco has conducted modelling and advise that you should abandon ship if you have no power, and are taking water.
>
> 2. If possible you should check the trim aft. Modelling indicates that if trim is above halfway of (sic) the rear door progressive flooding will occur into the engine room."[184] [Emphasis added]

[198] As Captain Seal noted in his evidence, the written message is ambiguous as to whether the water level referred to – "above halfway of the rear door" – was intended to be a reference to the water level inside the ship or the sea level aft.[185] Of course, Captain Seal did not have the message in writing at the time. He understood

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180 Statement of Captain Ives - 6 August 2007; Exhibit 51; para 22.
181 Statement of Captain Ives - 6 August 2007; Exhibit 51; para 23.
182 Statement of Captain Ives - 6 August 2007; Exhibit 51; para 23.
183 Exhibit 23, p.30.
184 Exhibit 23, p.27.
185 Captain Seal; T.177.

the message conveyed to him from the *Eastern Star* related to the water level being half way up the internal side of the ramp.[186] At this time the well deck was completely full and water was "flowing out the sides".[187]

[199] In his oral evidence at the Inquiry, Captain Ives was asked about the accuracy of the RCC message to the *Eastern Star*. He said:

> "The message that went to him should have gone as basically, if the cargo hold is full and the water is – and the trim is such that the water is halfway up the stern door where the top of the seal is and the cargo hold is full of water and the trim is excessive, we were under the impression that the trim – the vessel was trimmed by the stern such that the aft draft was halfway up the stern door.
>
> …
>
> But the crunch where this message is incorrect, it says that it is okay as long as the engine room stays in tact and is not flooded. If the engine room floods by more than 50%, then the vessel could sink by the stern."[188]

[200] Later in his evidence Captain Ives was asked to look at the handwritten notes taken by the RCC Operator of the conversation with him at 0424 hours, which have been set out above. Captain Ives stated:

> "What he's neglected to write down and I think he has tried to summarise what I was saying, that, sure, modelling indicates cargo liquidates and sink by the stern, that's fine. In his note, he has it half correct. He has said modelling indicates that if trim is above halfway over the rear door progressive flooding won't necessarily occur into the engine room, right, because the engine room could still have stayed intact but we knew we had leaks into the engine room because that was established very early on in the case. So progressive flooding would not necessarily have occurred into the engine room at that stage. He has referenced then to no power. I indicated to him when I last spoke to the vessel that they had pumps running, right, and I said if no power – if they have lost the pumps and they have no power at all and the engine room continues to flood, then if it reaches 50% and the modelling is correct it would sink by the stern."[189]

[201] Captain Ives was asked to look at the typewritten message that had been sent by RCC to the *Eastern Star*. At to the two relevant paragraphs which have been quoted above, he stated:

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186 Captain Seal; T.177.
187 Captain Seal; T.177.
188 Captain Ives; T.485.
189 Captain Ives; T.486.

> "If you have a look at it, even going through paragraph by paragraph, paragraph 1, Inco has conducted modelling and advised that you should abandon ship if you have no power and are taking water, well that is nonsensical. If you have no power and the ship was at anchor anyhow, we knew the cargo hold was full of water anyhow and we knew they were taking on water, but if the pumps are running there is not a problem. The problem was if we were having progressive flooding in the engine room and the trim by stern was correct you would need to abandon ship."[190]

[202] Requests were made to AMSA by the Board to locate and provide a copy of the voice recording of the conversation between Captain Ives and the RCC Operator, but AMSA for the reasons explained in Exhibit 52, said that they could not be provided.[191] In short, although voice recordings were made on a new voice recording system that RCC introduced in late 2006, an AMSA employee and an outside technician had not been able to locate archived calls for the relevant period. It would have assisted the Inquiry if the recordings of these conversations had been available to it.

[203] AMSA's legal representative at the Inquiry cross examined Captain Ives,[192] but it was not suggested to him that his recollection of what he conveyed by telephone to the RCC Operator was inaccurate in any respect.[193] Rather, it was put to Captain Ives that he ought to have passed these messages on in a hard form, such as by facsimile or email and Captain Ives, utilizing hindsight, agreed that would have been a better course,[194] It should be added that Captain Ives was not asked to do so at the time, and had been told at the time of his initial contact with the RCC that his calls were being recorded.[195]

[204] Following Captain Ives' evidence, the Chairperson observed:

> "It seems that there is a distinct possibility that the Board will make a finding that there was some miscommunication. But whether it makes that finding depends to some extent upon the evidence as to what was said by Captain Ives to the RCC. All I wanted to say is that if, for instance, AMSA wishes to submit at the end of the evidence that certain aspects of Captain Ives' evidence should not be accepted, then the Board will need to take account of the fact that so far AMSA

190 Captain Ives; T.487.
191 T.503-504.
192 Captain Ives; T.492-496.
193 Captain Ives; T.492-496.
194 Captain Ives; T.495.
195 Statement of Captain Ives, Exhibit 51; para 26.

> has not produced a witness statement from the person who was at the other end of the telephone call from Captain Ives. In the absence of someone who contradicted Captain Ives' account of events, the Board might be more inclined to accept his evidence than if it was contradicted. I'm not saying that someone from AMSA will contradict what he said, but I'm simply making what I think is probably an unnecessary observation about the way in which any Board reaches its conclusions of fact, about whether it accepts evidence and its greater preparedness to accept evidence where it is not contradicted."[196]

[205] Despite that statement, no witness statement was provided by AMSA to contradict qualify or supplement the evidence of Captain Ives. The Board has no good reason to reject Captain Ives' evidence about what he said to the RCC Operator in Canberra at around 0424 hours on 7 February. By the same token, the Board has no good reason to not place appropriate reliance upon the contents of the RCC Operator's contemporaneous, handwritten note. That said, the note does not purport to be a verbatim record of what was said by Captain Ives and the person who made the note has not contradicted or qualified Captain Ives' account of their conversation.

[206] Ultimately, for reasons to be briefly stated below, there may not be the degree of conflict between Captain Ives' evidence about what he said to the RCC Operator and the RCC Operator's file note as some of the submissions received by the Board tend to suggest. Before addressing that issue it is appropriate to return to the principal issues in connection with the decision to abandon ship and to place that decision in some context.

[207] The decision to abandon ship did not suddenly arise at about the time that Captain Seal and Ms Osmand received the message in question from the *Eastern Star*. It is unnecessary to detail the course of events. But it is necessary to refer to some of the evidence. According to Captain Ives, Captain Seal had given consideration to abandoning ship on the night of 6 February because of the amount of water in the cargo hold, the sheeting that had already been lost from the canopy and the fact that water was going into the engine room.[197] The ship suffered a total blackout at around 2010 hours on 6 February. Some power was restored. The ship was faced into the wind and anchored. The situation was stabilised to some extent. Information was passed directly from the ship to Inco's Sydney headquarters. But power was lost

196 Captain Ives; T.503-505.

197 Statement of Captain Ives; Exhibit 51; para 13.

again and for reasons previously canvassed, direct communications between the ship and Inco's head office did not continue. Given the state of flooding on the ship, including observations made by certain crew members of flexing in the hull, the crew was in a state of readiness to abandon ship throughout the night. Before communications between the ship and Inco were interrupted, there had been some assurances given about the advice from Lloyd's SERS about the ship's stability. But that was at about 2230 hours on 6 February.

[208] In considering the decision to abandon ship and the information upon which it was based, it is important to distinguish between:

(a) The information available to individuals in Inco's Emergency Response Team in Sydney and their views about whether the ship would sink, and how long it would take to do so; and

(b) The information available to Captain Seal on the morning of 7 February.

[209] As to the former, various individuals who were in Inco's Sydney office that night gave their views about whether the ship was in danger of sinking.[198] But their views may have been coloured, to some extent, by information that they received after the event which led them to conclude that the ship was in no danger of sinking. The belief of Mr McDonald that if there was excessive flooding the ship would go down by the stern and the cargo would slip out with the result that the ship would rise again[199] could hardly have provided much comfort to Captain Seal and his crew, even if his view had been conveyed to them at the time. Incidentally, there is a conflict in the evidence between the Inco witnesses about the advice that was received from Lloyd's SERS about the level of flooding in the engine room that would need to occur before the ship sunk by the stern. Captain Dally thought it was 70%.[200] Mr Iuliano thought that the critical figure was 80%.[201] Mr McDonald thought that so long as the engine room was "not flooded" the ship was not going to sink.[202] But it is well to recall that Mr McDonald's evidence was that he overheard words from the Lloyd's SERS in London that "if the engine room floods the results would be catastrophic".[203] In short, although in the early hours of the morning of 7

198 See for example, Captain Ives; T.496; Captain Dally; T.555 and Mr McDonald; T.455.
199 Mr McDonald; T.455.
200 Statement of Captain Dally; Exhibit 53; para 42.
201 Statement of Mr Iuliano; Exhibit 65; para 8.
202 Statement of Mr McDonald - 30 July 2007; Exhibit 50; para 8.
203 Supplementary Statement of Mr McDonald - 9 August 2007; Exhibit 50; para 28; T.455.

February, some Inco managers in Sydney, on the basis of earlier advice, may not have expected the ship to sink, the advice to Inco from Lloyd's at the time was that if the engine room flooded the results would be catastrophic.

[210] It was this advice that informed Mr Ives' conversation with RCC. His view at the time, rather than after the event when he saw photographs, was that the ship may sink via the stern. His evidence was;

> "If the conditions were what we expected, that we passed on to Lloyds, the information was if the thing was about eight metres aft ad-raught (sic) and it was continuing to flood in the engine room, it may sink via the stern"[204]

[211] The more important issue is the information that was available to Captain Seal on the morning of 7 February. His evidence has been quoted above and is corroborated by the evidence of Ms Osmand. It should be noted that prior to the hearing Captain Seal and others appeared to be under the misapprehension that the Master of the *Eastern Star* had been unable, through language difficulties or difficulties in the VHF communications, to accurately convey the information that had been sent to him by RCC in Canberra. In fact, as has been shown, the substance of that advice was in fact conveyed to Captain Seal and Ms Osmand. In essence, it was that if the water was at least halfway up the ramp the ship would eventually sink and they should abandon ship.[205]

[212] A subsidiary issue, although one of obvious importance to Inco, AMSA and other parties, is what was said between Captain Ives and the RCC Operator. The Board has had regard to the extensive written submissions of the parties, including submissions in reply, the evidence of Captain Ives and other witnesses, and contemporaneous documents, particularly the relevant pages from Exhibit 23. It finds that it is probable that Captain Ives conveyed the following advice and information with a request that it be forwarded to the Master of the *Wunma*.

(a) Inco was aware that water was leaking into the engine room;

(b) If the ship had no power and lost the pumps that had been running and the engine room continued to flood, then Lloyd's modelling indicated that the ship would sink by the stern, and Captain Seal should abandon ship;

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204 Captain Ives; T. 496

205 Statement of Captain Seal – 2 August 2007; Exhibit 18; pp.14 and 17.

(c) Lloyd's modelling indicated that the ship would sink by the stern if the flooding in the engine room got greater than 50%;

(d) Lloyd's modelling had indicated that if the trim was such that the water was halfway up the stern ramp (where the top of the seal is) so that the cargo hold was full of water, then the cargo would liquidate, and the ship would sink by the stern.

[213] It is possible to be critical, in hindsight, that the message sent by RCC Canberra to the *Eastern Star* was not more complete in details about the extent of flooding in the engine room that, according to Lloyd's modelling, would be required before the ship sunk by the stern. But it is also possible to be critical, in hindsight, of the manner in which details were conveyed by Inco to the RCC Operator. Leaving aside these hindsight criticisms, the written message sent by RCC Canberra to the *Eastern Star* conveyed important information. In the difficult circumstances prevailing in terms of communications between the *Eastern Star* and the *Wunma* the view might have been taken by the RCC Operator that sufficient information was conveyed to the *Eastern Star* in the circumstances. Unfortunately, the RCC Operator has not given evidence to the Inquiry about what he was told by Captain Ives and his reasons for formulating his written message to the *Eastern Star* in the terms that he did.

[214] The submissions of the parties elevated the extent of possible inconsistency between Captain Ives' evidence and the message conveyed to the *Eastern Star* by the RCC Operator and, to some extent, framed the issue as whether Captain Ives said to the RCC Operator something about water being halfway up the engine room, or halfway up the stern ramp. But this is a false issue. On his own evidence[206] Captain Ives was concerned with two separate, but related, "halfway" measurements. The first was whether flooding in the engine room would be greater than 50%. The other was his understanding that progressive flooding into the engine room and sinking by the stern this would happen if the water level in the cargo hold was halfway up the stern ramp. In the end result, the 50% figure in respect of flooding of the engine room was not conveyed to the *Eastern Star* and, therefore, was not conveyed to the *Wunma*. But the substance of the rest of Captain Ives' advice was.

206 Statement of Captain Ives – 6 August 2007; Exhibit 51; para 22.

[215] Captain Seal probably received the relevant advice and information sometime shortly after 0600 hours on 7 February. His initial witness statement suggested a time of 0630 hours but limited reliance can be placed upon that precise time since Captain Seal's witness statement was prepared without reference to the ship's logbook or other contemporaneous records. The ship's logbook records the decision to abandon ship at 0615 hours.

[216] Captain Seal continued to monitor the situation and, although the weather abated to some extent and there was some progress in removing water from the well deck by the use of pumps that were dropped to the ship, Captain Seal did not countermand his decision to abandon ship. Relevantly, the advice that he had received about progressive flooding into the engine room and the probable loss of the vessel was not contradicted, qualified or supplemented by further communications from the RCC or any other source. In addition, he was concerned that the pumps that had been set up would soon run out of petrol. In his words, "There was little else that could have been done to secure the vessel and there was only risk left for personnel".

[217] In summary:

- Captain Seal's decision to abandon ship on the basis of the information known to him, his evaluation of the situation and his concern for the safety and lives of his crew was a reasonable decision in the circumstances; and
- the information that was conveyed to him from the *Eastern Star* made a significant contribution to his decision to abandon ship.

[218] The submissions of some parties raise the issue of whether Captain Seal would have abandoned the ship if he had been informed that Captain Ives had advised that if flooding in the engine room "got greater than 50%" the ship would sink by the stern. It is unnecessary for the Board to decide that issue and, in any case, the state of the evidence does not permit the Board to reach any confident conclusion in relation to it.

[219] It is appropriate to briefly explain why this is so. One reason is that Captain Seal was not asked the question. This is a minor consideration because limited reliance can be place upon a response to such a "what if" question. The written submissions of Zinifex places particular reliance upon the views of various individuals in Inco, the fact that by 0430 hours on 7 February water levels in the engine room had been

stabilised and that although the water was between one metre and a metre and a half deep in the starboard corner of the vessel and about one-fifth of the way up the walls of the engine room, it was "nowhere near to being 50% inundated".[207] It submits that if RCC had relayed the information received from Inco it is most unlikely that Captain Seal would have ordered the evacuation of the ship. There would have been no need to do so because the ship was not in danger: the cyclone had passed and the conditions were improving. But this submission does not take sufficient account of the concerns that Captain Seal had for the safety of his crew even with the engine room not being flooded to a substantial level. Lloyd's modelling was one thing, but it might be wrong and the power and fuel that was being used to pump water might not last. The engine room might quickly fill. Although some persons ashore probably estimated that it would take many hours for the engine room to fill to a 50% level if power was lost, they were not in Captain Seal's position. A precautionary approach was appropriate. The Zinifex submissions do not persuade the Board to make the finding that it seeks.

[220] AMSA in its submissions point to other features that operated on Captain Seal's decision to abandon ship. The evidence in this regard has already been quoted. In addition, AMSA points to evidence of reports by other crew members of the flexing of the ship. AMSA submits that the advice received from Lloyd's SERS, via the *Eastern Star*, was "one factor but was not a significant factor in the decision-making of the Master in deciding to abandon ship".[208] For the reasons previously given, the Board is unable to agree with this submission. The advice received from the *Eastern Star* was a significant factor in the decision to abandon ship. Although the abandonment of the ship had been in contemplation and in a degree of advanced preparation throughout the night of 6 February and the morning of 7 February, the receipt of the advice from the *Eastern Star* made a significant difference. It featured in Captain Seal's explanation for his decision and in point of time immediately preceding the recording of the decision to abandon ship in the logbook.

[221] The issue of whether Captain Seal would have abandoned ship if additional information had been conveyed to him by the *Eastern Star* is an issue about which the evidence permits different inferences to be drawn. It is unnecessary for the

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207 Zinifex written submissions; para [285] citing Mr Fisher; T.316.

208 AMSA written submissions; para 72.

Board to make a finding on this issue and it declines to do so. It is sufficient for the Board to identify the matters that materially contributed to the decision to abandon ship. The receipt of information from the *Eastern Star* was a material and significant factor in that regard. Accordingly, it was *a* cause of the incident.

[222] For completeness, it is necessary to refer to AMSA's submission that the Board cannot make findings in relation to the alleged miscommunication by the RCC Operator of information to the Master of the *Eastern Star* or the role that this alleged miscommunication had on the decision to abandon ship. AMSA's submissions focus upon what is said to be a lack of jurisdiction to investigate actions under AMSA's search and rescue function. But, with respect, this misses the point. The "jurisdiction" of the Board is to inquire into the marine incident. The relevant "marine incident" in terms of s.123 of the *TOMS Act* is an event "causing or involving" the abandonment of a ship.[209] AMSA submits that an administrative board of inquiry established under a State Act does not have the power to investigate the activities of a Commonwealth authority. No authority is cited in support of this proposition. The Board is not persuaded that it is correct. Surprising results would flow in respect of the conduct of commissions of inquiry under State Acts if the proposition was correct.

[223] AMSA applied for and was granted leave to appear as a party. Under the Board's Practice Direction, and as indicated at the initial directions hearing, it was anticipated that parties would prepare witness statements. This practice was adopted by other parties. AMSA chose not to. After Captain Ives' evidence the point was made, which has already been quoted, that AMSA had not produced a witness statement from the operator who received the telephone call from Captain Ives and of the possible consequences of a witness statement not being produced. AMSA chose not to provide one. In its final written submissions, AMSA stated:

> "AMSA has consistently put that the subject matter of paragraph 8 of the terms of reference was not within the competence of the BOI. Accordingly, AMSA would have been in error to have called a witness, who would then have been subject to cross-examination, to give evidence in relation to the search and rescue. For the same reason, AMSA was not prepared to provide the evidence sought by counsel assisting in relation to the recording processes."

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209 *TOMS Act*, s.123(1)(c).

[224] Whatever view AMSA takes concerning paragraph 8 of the Board's terms of reference, evidence concerning communications between it and the *Eastern Star* are relevant to the "marine incident" that is the subject matter of this Inquiry. Despite appearing as a party and cross-examining Captain Ives, AMSA made a forensic or tactical choice not to provide a witness statement from the relevant RCC Operator. Having made the choice not to provide a witness statement on a matter relevant to the abandonment of the ship, AMSA must accept the forensic consequences of doing so, including, as foreshadowed by the Board on 21 August 2007,[210] the greater preparedness to accept the evidence of Captain Ives where it is not contradicted by a witness statement from the other participant in the relevant conversation.

210 T.505.