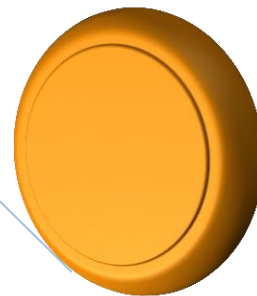




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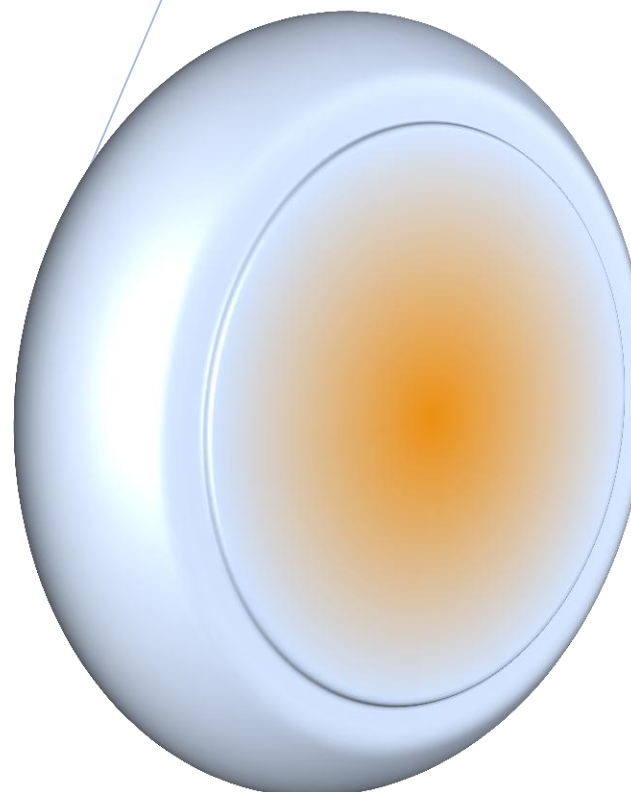


Shen Neng 1 Incident Response

Independent review of the response to the Shen Neng 1 grounding and associated pollution response

This report provides a review of the response to the Shen Neng 1 incident which occurred on Douglas Shoal in the Great Barrier Reef in April -May 2010. The incident response involved multiple agencies from all three tiers of government and the ship's salvor, and resulted in a successful re-floating of the vessel and oil spill response.

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Abbreviations and Acronyms

ADF	Australian Defence Force
AMOSC	Australian Marine Oil Spill Centre
AMSA	Australian Maritime Safety Authority
AQIS	Australian Quarantine Inspection Service
ATSB	Australian Transport Safety Bureau
CEO	Chief Executive Officer
DCS	Department of Community Safety
DDMGs	District Disaster Management Groups
DERM	Department of Environment and Resource Management
DG	Director-General
DPC	Department of the Premier and Cabinet (in Queensland)
EMQ	Emergency Management Queensland (part of the DCS)
GBRMPA	Great Barrier Reef Marine Park Authority
IAPs	Incident Action Plans
IC	Incident Controller
ICC	Incident Control Centre
ICT	Information Communication Technology
IMT	Incident Management Team (within the ICC)
LDMG(s)	Local Disaster Management Groups
LGAQ	Local Government Association of Queensland
MSQ	Maritime Safety Queensland (part of TMR)
National Plan	National Plan to Combat Pollution of the Sea by Oil and Other Noxious and Hazardous Substances
NOTAM	Notice To Airmen
NRT	National Response Team
OSRA	Oil Spill Response Atlas
OSRICS	Oil Spill Response Incident Control System
P&I	Protection and Indemnity
RCC	Rescue Coordination Centre
Reef Plan	Marine Pollution Contingency Plan for the Great Barrier Reef
RoadTek	Operational Division with TMR
SDCC	State Disaster Coordination Centre (run by EMQ)
SDMG	State Disaster Management Group
Sitreps	Situation Reports
SMPC	State Marine Pollution Controller
TMR	(Department of) Transport and Main Roads
QFRS	Queensland Fire and Rescue Service
QPS	Queensland Police Service
Queensland Plan	Queensland Coastal Contingency Action Plan

Executive Summary

The Chinese bulk coal carrier *Shen Neng 1* ran aground on the Douglas Shoal in the Great Barrier Reef on 3rd April 2010. The vessel was successfully re-floated on 12th April 2010 and after safety inspections, off-loading of some cargo and other preparations, the vessel was towed from Queensland waters on 31st May 2010. This report documents the findings of an independent review of the response to the *Shen Neng 1* incident to identify the lessons learned.

Although the *Shen Neng 1* grounding caused damage to the coral reef on the Douglas Shoal, only a relatively small amount of heavy fuel oil (approximately 3–4 tonnes) was spilled into the sea as a result of the incident - the majority of which broke up under the action of wind and waves and chemical dispersants or was recovered. However, had the salvage operation been unsuccessful or the vessel been more severely damaged as a result of the impact with the reef, the incident could have resulted in a spill of up to 975 tonnes of heavy fuel oil and around 65,000 tonnes of coal causing significant environmental damage.

Maritime Safety Queensland (MSQ) as the combat agency under the *National Plan*, led the multi-agency response to this incident in conjunction with the Great Barrier Reef Marine Park Authority (GBRMPA), the Australian Maritime Safety Authority (AMSA) and the Department of Environment and Resource Management (DERM). The incident response also involved the ship's salvor and numerous agencies under Queensland's disaster management arrangements; including Local Disaster Management Groups (LDMGs) which were activated at Rockhampton, Gladstone, Hervey Bay and Bundaberg.

The incident occurred 13 months after the *Pacific Adventurer* oil spill (11th March 2009) and many lessons from that incident were implemented in the response to the *Shen Neng 1* incident – particularly at the strategic level. The inclusion of disaster management agencies in the initial notification process, the involvement of Emergency Management Queensland (EMQ) in the State Incident Control Centre (SICC) and the recently formed Emergency Management Division within the Department of Transport and Main Roads interfacing with emergency service agencies, all greatly assisted in multi-agency coordination and cooperation arrangements.

The incident response achieved a positive outcome due to the effective management of many critical aspects:

- The incident notification process was effective and ensured that all relevant agencies and stakeholders were informed (despite the incident occurring in the middle of a public holiday long weekend).
- The early activation of resources resulted in good situational awareness and rapid resource mobilisation.
- Effective, early and proactive media liaison together with effective stakeholder communication resulted in generally positive support from the community in terms of the incident response.
- Close liaison with the ship's salvor throughout the incident response enabled effective cooperation.
- Close liaison between GBRMPA, MSQ and AMSA ensured cooperation at the senior level.
- The inclusion of EMQ staff in the SICC ensured good support from disaster management agencies.
- The use of liaison officers in the various control/coordination centres helped with coordination issues.
- Communication arrangements were effective.

However, the incident response was not without its challenges. This was only the second time that Queensland's disaster management arrangements had been activated to support the National oil spill response arrangements (the first being the *Pacific Adventurer* incident), and the doctrine for joint operations is yet to be fully documented. Consequently, many of the arrangements for joint operations for incident response at the operational level were developed as the incident unfolded.

At the operational level, command, control and coordination arrangements between oil spill response agencies and disaster management agencies require clarification; so to, reporting arrangements and the roles and responsibilities of LDMGs and local governments in oil spill response. In addition, the role of the combat agency in a multi-agency incident response has not in the past been so comprehensively exercised within the overall national oil spill response framework. Notwithstanding, the coordination challenges at all levels were alleviated by the use of liaison officers in the various coordination/control centres, and a strong spirit of cooperation amongst agencies prevailed during the eight week operation.

The incident response was essentially split into two areas:

- The oil spill response agencies focused on the 'sea side' activities which centred around the safety of the vessel, salvage operations, oil spill response at sea, environmental assessment and transferring the vessel to and from its safe haven. Sea side activities also included various compliance investigations associated with the vessel's grounding.
- The disaster management agencies focusing on 'land side' activities in preparation for a shoreline clean-up in the event of a further oil spill, and providing logistics support as required.

This enabled (1) the oil spill response agencies to focus on the vessel and preventing the incident from escalating and (2) the disaster management agencies to focus on land side contingency planning (in the event of an oil spill escalation). Whilst this separation of responsibilities at the operational level was appropriate under the circumstances, had shore-line oil inundation occurred the 'sea side'/'land side' separation would have required much more explicit integration.

This report provides a number of recommendations for consideration. The conduct of joint operations where disaster management arrangements are activated to support an oil spill response needs to be formalised and reflected in the *National Plan* (which will soon undergo periodic review). At the State level, the *Queensland Plan* also requires updating to include the arrangements for joint operations with Queensland's disaster management agencies and to clarify the identification of the statutory agency, noting that Queensland's new disaster management arrangements have recently been debated in the Parliament and will be implemented in due course. Other recommendations relate to 'multiple horizon' planning to guide the incident response; investigating the greater use of ICT in support of incident response coordination; the provision of legal advice in support of the incident response; and educating stakeholders in oil spill response considerations.

Introduction

This report provides an independent review of the response to the *Shen Neng 1* grounding which occurred on Douglas Shoal in the Great Barrier Reef on 3rd April 2010. This incident resulted in a coordinated response from multiple agencies across all three tiers of government in close cooperation with the ship's salvor to safely extricate the grounded vessel and manage the myriad of issues associated with the incident.

The incident occurred 13 months after the *Pacific Adventurer* oil spill which occurred off Cape Moreton in March 2009, and many of the lessons from that incident were implemented and consolidated – particularly the integration of Australia's national oil spill response arrangements with Queensland's disaster management arrangements.

The review is based on the Terms of Reference (Attachment 1) provided by MSQ within the Department of Transport and Main Roads (TMR) and draws on feedback collected during debrief sessions conducted in July 2010 with incident response participants.

The report's findings and recommendations are aimed at enhancing the effectiveness of Queensland's response to future oil spill incidents, particularly those requiring a coordinated multi-agency response.

Purpose and Objectives

The objectives of this review are based on the Terms of Reference (Attachment 1) and are:

- To report on the response to the *Shen Neng 1* grounding on Douglas Shoal on 3rd April 2010, including the associated pollution preparations and response, and linkages to Queensland's State Disaster Management System.
- To make recommendations on how the National Plan arrangements might be improved, and how the response to the *Shen Neng 1* incident might be improved upon for future reference.

Methodology

The content in this report was developed from:

- findings identified at stakeholder debriefs conducted in Brisbane on 12th July 2010 and Rockhampton on 19th July 2010. A list of attendees at these debriefs is at Attachment 2;
- discussions with key personnel from agencies involved in the incident response; and
- research material available in the public domain.

Limitations

This report provides a strategic overview of the response to the grounding and subsequent salvage of the *Shen Neng 1*. It does not address every tactical or operational issue that arose, nor does the report provide a comprehensive analysis of every strategic issue identified for future investigation. For instance, it does not address the causes of the grounding (which will be the subject of an Australian Transport Safety Bureau Report in due course), nor does it address steps presently being taken to prevent future incidents of this type. However, the report provides an external and objective overview as one tool to assist the responsible Commonwealth and State authorities in enhancing an already effective and efficient national framework for responding to ship incidents and potential oil pollution.

Background

At 1710 hours on 3rd April 2010 (Easter Saturday) the *Shen Neng 1*, a fully laden Chinese bulk coal carrier en-route from Gladstone to China, ran aground on the Douglas Shoal 43nm east of Great Keppel Island. The incident damaged one of the vessel's fuel tanks resulting in a small discharge of oil into the sea. Oil was observed in the water that night, and although initial estimates were higher, around 3–4 tonnes of heavy fuel oil were discharged into the sea as a result of the impact with the reef.

The early stages of the incident included both search and rescue issues as well as the operational response to a grounding / potential pollution incident. A Queensland Police Service launch departed the Port of Gladstone at 0200 hours on Sunday 4th April and was on station in close proximity to the *Shen Neng 1* at daybreak to rescue the 23 crew, if necessary.

At first light on Sunday 4th April it became apparent that the *Shen Neng 1* was hard aground and would require a salvage operation to extricate the vessel from the reef. There were initial concerns that the vessel was in danger of breaking up, potentially resulting in an oil spill of up to 975 tonnes of fuel oil and the loss of its cargo of 65,000 tonnes of coal. Two tugs were despatched to help secure and stabilise the vessel.

The response to the incident was immediate. A marine surveyor from the Australian Maritime Safety Authority (AMSA) was transferred to the vessel by helicopter around midnight on Sunday 4th April to assess the situation.

The oil spilled as a result of the initial impact of the vessel with the reef was efficiently broken up using chemical dispersants deployed by fixed wing aircraft from midday on Sunday 4th and again on Monday 5th April 2010. The 2-3 metre seas prevented the use of booms to contain the oil during the early stages of the response.

Svitzer's salvors were appointed by the ship's owner on Sunday 4th April to salvage the vessel. Salvors boarded the vessel on Monday 5th April to undertake a detailed ship condition assessment and to plan and manage the extrication process. The vessel was successfully re-floated on 12th April and anchored off Barren Island near Great Keppel Island (under advice from GBRMPA) to enable a safety inspection. Small amounts of oil were discharged into the sea as a consequence of the re-floating operation, however, this was largely contained by response measures including an open ocean boom.

After an unsuccessful attempt to tow the ship into the Port of Gladstone, in difficult weather conditions, the vessel was towed to a safe haven in Hervey Bay under a formal direction by AMSA, where 19,000 tonnes of coal was successfully off loaded. On 21st May 2010 the vessel was towed to the Gladstone region to prepare for its safe towage to an overseas discharge and repair port.

The incident captured public and political interest. The ship's grounding caused some initial controversy when it was suggested that the grounding occurred outside GBRMPA's Designated Shipping Area. However GBRMPA advised this was not the case and AMSA confirmed that the route between Douglas Shoal and the Capricorn Islands is a route regularly used safely by vessels travelling between Gladstone and Asian ports.

Although the incident had the potential to result in a major oil spill in an area of significant environmental sensitivity, the amount of oil spilt was relatively small (estimated at 3-4 tonnes), substantially contained with longer term monitoring procedures put in place. Small deposits of oil were detected on the beaches of North West Island on 13th April 2010, which may have resulted from the *Shen Neng 1* incident. In response, four

helicopters were used to position people to undertake an oil clean-up over a two day period. RoadTek crews were positioned on Heron Island on 13th April to erect turtle fencing as a precaution. A survey vessel was also positioned at Heron Island for observation duties, and this also assisted in communication support and situational awareness.

Local and State Government agencies were activated under Queensland's disaster management arrangements to prepare for a shoreline oil spill response, should this be required. This involved significant resources working in parallel with the agencies involved in the ship's salvage operations.

After a successful two-month salvage operation, the *Shen Neng 1* departed Queensland waters on 31st May 2010.

A chronology of the incident response and an incident chart is at Attachment 3.

Incident Context

The review found that Queensland was well placed to manage the *Shen Neng 1* incident. Firstly, Queensland was well prepared:

- Maritime Safety Queensland (MSQ) is recognised as a capable agency in oil spill response; MSQ staff are skilled and highly experienced in oil spill response operations and knowledgeable in oil spill response arrangements.
- A number of Queensland personnel were involved in the response to the Montara Wellhead oil spill incident which occurred off the Western Australian coast in late 2009. This provided additional experience in oil spill response techniques, and inter-operability with other jurisdictions.
- The incident occurred approximately one year after the *Pacific Adventurer* oil spill off Cape Moreton (11th March 2009) where many lessons were learned. The *Pacific Adventurer* incident was the first time that Australia's national oil spill arrangements were activated in conjunction with Queensland's disaster management arrangements. Two independent reports on the response to this incident had been considered by MSQ and other relevant agencies, and some of the recommendations were directly relevant to the *Shen Neng 1* incident response.
- The incident occurred three weeks after MSQ hosted a discussion exercise - *Exercise Maheno* (9th March 2010) in Brisbane and Gladstone to test response arrangements to an oil spill incident off Gladstone. This exercise involved many personnel who were subsequently involved in the *Shen Neng 1* incident including: the State Marine Pollution Controller and members of the State Incident Control Centre; the Regional Harbour Master (Gladstone) and members of the Incident Management Team, and representatives from the Great Barrier Reef Marine Park Authority (GBRMPA); the Department of Environment and Resource Management (DERM); AMSA; Queensland Fire and Rescue Service (QFRS); and the Fraser Coast Council. This exercise touched on a number of issues that transpired in the *Shen Neng1* incident.
- The *Reef Plan*, developed under the national oil spill response arrangements outlined the arrangements for responding to a marine oil spill in the Great Barrier Reef Marine Park. This plan was well known and outlined roles and responsibilities for an incident such as the *Shen Neng 1*.

Consequently, Queensland's level of oil spill preparedness was high and MSQ resources, in particular, were well practiced in responding to a marine pollution event. Importantly, the professional and technical relationships that had been developed between agencies and between individuals within agencies,

particularly during the *Pacific Adventurer* incident and *Exercise Maheno* provided a firm foundation for a successful *Shen Neng 1* incident response.

Secondly, the location of the *Shen Neng 1* incident was favourable from a logistics perspective, compared to other more isolated areas of the Queensland coastline. The grounded vessel was relatively close to the Port of Gladstone and associated infrastructure including major airports at Gladstone and Rockhampton, and this assisted in the logistic support efforts. Salvage and oil spill containment resources were close by and were activated quickly. Aerial surveillance flights could be undertaken easily. Key personnel and equipment could be ferried by helicopter to the incident site. Had this incident occurred in a more remote location (for example in a remote part of North Queensland) logistic support and access to the 'casualty' would have been a more significant issue.

Thirdly, the initial environmental impacts of the incident were contained within the close proximity of the vessel. The incident did not result in a substantial oil spill impacting the environment or involving an extensive shoreline clean-up, with around 3-4 tonnes of oil being spilled. Weather conditions, too, were generally favourable over the duration of the incident response (although weather and sea conditions did preclude the entry of the vessel to the Port of Gladstone in mid-April).



Shen Neng 1 Incident Response Context

Incident Challenges

Although the broad 'context' of the *Shen Neng 1* incident was generally favourable, the incident presented some significant and unique challenges:

- The grounding of the vessel and uncertainty of its structural integrity and sea-worthiness meant that safety and salvage issues predominated. This meant that the ship's salvor (who was not under the direct authority of the Incident Controller) played an influential role in the incident response. This required close liaison and negotiation to ensure that salvage operations were undertaken appropriately, and were coordinated with the broader incident response activities.
- The grounding of a vessel in the Great Barrier Reef Marine Park generated a number of compliance and enforcement requirements which needed to be undertaken alongside salvage and oil spill recovery operations. These activities were conducted by separate agencies making coordination with response activities difficult.
- The environmental considerations and potential environmental impacts surrounding this event were significant, noting its location within a world heritage listed marine park of national and international

significance. These had to be balanced against safety concerns and efforts to reduce the risk of further oil spills.

- The incident spanned jurisdictional boundaries and responsibilities where AMSA had responsibility for the vessel's safety; under the *Reef Plan*, GBRMPA was the designated 'statutory authority' (to oversee the response); and MSQ was the designated 'combat agency' (to take action to respond). This required significant liaison between all three agencies for the duration of the incident response.
- The incident involved the activation of Queensland's disaster management arrangements. This included the activation of four Local Disaster Management Groups (LDMGs); activation of the Rockhampton Disaster District Management Group (DDMG); and involvement of the State Disaster Coordination Centre (SDCC). This multi-agency environment presented significant command, control and coordination challenges.

Incident Elements

Essentially, the *Shen Neng 1* incident response involved four components:

- a salvage operation;
- an oil spill response operation;
- environmental assessment including physical impacts, and preparation for a potential environmental response including shoreline clean-up; and
- compliance / enforcement investigations and prosecutions.



Main Components of Shen Neng 1 Incident Response

The predominant focus of the *Shen Neng1* incident response related to the 'casualty' – that is, the condition and safety of the grounded vessel and its crew. This is consistent with (but not part of) Australia's national oil spill arrangements documented in the *National Marine Oil Spill Contingency Plan* (National Plan) and the *Queensland Coastal Contingency Action Plan* (Queensland Plan), which state that the first priority is safety and structural integrity of the vessel and safety of the crew. Consequently, the focus of the State Incident Control Centre (SICC) located in Brisbane and the Incident Control Centre (ICC) located at Gladstone was the

salvage operations and the transfer of the vessel to a safe haven to prepare the vessel for safe towage to a repair port.

The oil spill response component of the incident was an important corollary to the salvage operations and was concentrated around the ship's location. The incident resulted in a relatively small amount of oil which was broken down by the elements, chemically dispersed or contained and recovered. However, there was the potential for a significant oil spill (for example, in the event of structural failure of the *Shen Neng 1* during the re-float or transfer to a safe haven) which would have resulted in significant environmental impacts and an extensive shoreline clean-up; and these contingencies had to be addressed. Environmental impacts were generally limited to coral reef damage as a result of the impact of the *Shen Neng 1* on Douglas Shoal. At this stage no significant wildlife impacts have been detected as a result of oil spill although concerns remain that internationally significant nesting populations of seabirds may have been feeding in the slick which could result in undetected mortality.

Compliance issues associated with the incident and an assessment of impact and chemical damage to the Reef from antifoulant paints were also important and necessary in their own right, and these had to be coordinated with salvage operations. For example although undergoing investigation, the Master of the *Shen Neng 1* was required to assist in salvage planning and operations; at a later stage paint sampling and video recording of the vessel had the potential to delay the vessel's movements; and Australian Quarantine Inspection Service (AQIS) and Australian Customs also advised of reporting and compliance requirements. These issues had to be coordinated and prioritised with the relevant agencies.

In addition to these significant challenges, the usual requirements of logistic support, response resourcing, media and stakeholder communications also had to be addressed. All of these issues were successfully managed to achieve a favourable outcome.

Key Findings

The over-riding finding of the review of the response to the *Shen Neng 1* incident was that the operation achieved a positive outcome as a direct result of the immediate, extensive and effective incident response. The competence and preparedness of responding agencies; the existing relationships between agencies; and the established arrangements under the *Reef Plan* enabled the responding agencies to capitalise on relatively favourable circumstances - acknowledging that if the vessel had suffered more damage or had broken up during the salvage operation, the resulting oil spill would have been much larger, making the incident response more complex.

The effective management of the 'casualty' and coordination of the multi-agency response to the ship's salvage and oil spill response operations, managed the risks and limited the potential significant impacts of the incident. The spirit of shared purpose within which the incident response was undertaken is commendable.

The specific key findings of the *Shen Neng 1* incident response are detailed below:

Notification Arrangements

Despite the incident occurring on the evening of Easter Saturday, the call out and notification process was well executed and effective. The General Manager, Maritime Safety Queensland (State Marine Pollution Controller – SMPC) was advised of the incident by the Port of Gladstone's acting Harbour Master at 1910 hours and proceeded to activate and advise key personnel. AMSA provided similar advice shortly after the call from the Harbour Master. The State Incident Control Centre (SICC) was established in Mineral House (George Street, Brisbane) and was substantially operating by 2130 hours and all relevant personnel and agencies were notified, including:

- relevant sections of the Department of Transport and Main Roads (TMR) including the Emergency Management Division and RoadTek. TMR Internal resources were subsequently placed on standby;
- GBRMPA (which advised the Federal Minister for Environment Protection Heritage and the Arts);
- Emergency Management Queensland (EMQ) including the State Disaster Coordination Centre (SDCC) at Kedron Park;
- the Department of Environment and Resource Management (DERM);
- the Department of the Premier and Cabinet (DPC);
- the Department of Community Safety (DCS);
- relevant regional councils; and
- members of the National Plan State Committee.

The Director-General of the Department of Transport and Main Roads also attended the SICC that evening and personally contacted relevant Ministers and ministerial staff, Mayors and Directors-General of relevant Queensland Government departments.

Regular liaison was established between MSQ, AMSA and GBRMPA that evening. The SICC also advised the Protection and Indemnity (P&I) Club on that first evening.

Notification to relevant disaster management agencies was assisted through the SDCC which advised relevant LDMGs and DDMGs. The SDCC also contacted the Australian Defence Force (ADF) Duty Officer

(noting the proximity of the incident to the ADF facility at Shoalwater Bay) and a defence representative from Townsville was dispatched to the Rockhampton DDMG on Sunday 4th April.

The review identified that:

- The notification process was effective and well managed.
- All relevant agencies and stakeholders received timely advice of the incident, enabling early activation of response arrangements. (This was noteworthy considering the incident occurred midway through the Easter holiday break).

Situational Awareness

Many oil spill responses are hampered by poor situational awareness in the initial stages, however, this was not the case in the *Shen Neng 1* response. Although the vessel's crew were in shock and initial reports from the vessel were unclear, early situational awareness was developed by the responding agencies:

- The timely embarkation of an AMSA marine surveyor onto the *Shen Neng 1* within 5½ hours of notification of the incident, at night-time in challenging weather conditions,¹ enabled accurate information and early situational awareness. This was particularly important, noting the language difficulties with the ship's Master and crew.
- The early deployment of surveillance aircraft at first light on Sunday 4th April enabled accurate early situational awareness in assessing the extent and severity of the oil spill. Early surveillance flights included the Queensland Government jet, specially chartered helicopters (the first carrying the Director-General TMR and Chief Executive Officer of GBRMPA) and the AMSA Dornier.
- Aerial observation flights continued to provide ongoing situational assessments.
- A request for oil spill trajectory data modelling was activated early, and this assisted in predicting the impact and extent of potential oil spills.
- The early activation of the SICC and early notification of responding agencies enabled rapid early liaison between MSQ, AMSA and GBRMPA which helped to develop a common and early assessment of the situation.
- The expeditious activation of the *National Plan* by the SMPC on the first evening provided the necessary authority for the formal activation of oil spill arrangements, further supporting early situational awareness.

The review identified that:

- There was good situational awareness during the *Shen Neng 1* incident response due to the early and effective notifications, early activation, the timely embarkation of an AMSA surveyor onto the vessel, and early and continuous aerial surveillance flights.

Disaster Management Support

The *Shen Neng 1* incident was only the second time that Queensland's oil spill response arrangements had been activated in conjunction with Queensland's disaster management arrangements. Although the reviews following the *Pacific Adventurer* incident included recommendations that plans and arrangements regarding the joint activation of oil spill and disaster management arrangements be formalised (for example, updating the *Queensland Plan*) this work had not been completed at the time of the *Shen Neng 1* incident.

¹ This was achieved through a chartered helicopter from Bundaberg which, after refuelling at Rockhampton, placed the AMSA surveyor on-board the vessel at 2330. This short timeframe was noted as a 'record'.

Consequently, the details of how oil spill and disaster management response arrangements were to be undertaken jointly were not finalised. The report on the *Exercise Maheno* discussion exercise conducted three weeks prior to the *Shen Neng 1* incident also identified this issue and contained similar recommendations. It is noteworthy that the Queensland Parliament has recently debated the revised disaster management arrangements for Queensland.

Notwithstanding, at the strategic level many of the lessons emerging from the *Pacific Adventurer* incident (regarding the integration of Queensland's disaster management arrangements with Queensland's oil spill response arrangements) were implemented in the *Shen Neng 1* incident response. Three areas of improvement, in particular, had a significant and positive impact on the incident response:

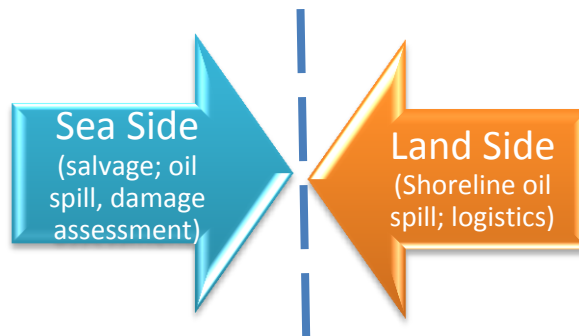
- TMR formed an Emergency Management Division, following a number of weather and transport operation incidents including the *Pacific Adventurer* oil spill, to improve the department's interface with Queensland's disaster management agencies. This group provided valuable support to MSQ in the activation of disaster management support, mobilisation of TMR's internal resources and managing the interface with disaster management agencies throughout the incident response. TMR Emergency Management liaison officers were located in the LDMG and the ICC to provide a conduit to TMR resources.
- Inclusion of EMQ and the SDCC in the notification process enabled the early activation of Queensland's disaster management resources.
- EMQ representation in the SICC and ICC was crucial in providing links between oil spill response and disaster management arrangements.

However, at the operational level the *Shen Neng 1* incident response demonstrates that the integration of oil spill response and disaster management arrangements requires further development. The nature of the incident meant that the incident's core focus was around the salvage operations and oil spill clean-up in the vicinity of the vessel. These operations were managed by the oil spill response agencies, directed by the SICC and the ICC operating in accordance with the *National Plan*.

In support of these seaborne operations, disaster management resources operating primarily under the LDMGs focused on preparations for the shoreline clean-up in the event of a further substantial oil spill; for example, as a result of a structural failure of the vessel.

The nature of the *Shen Neng 1* incident (ship grounding at a distance from the shore) allowed these two elements to co-exist with relative independence. A natural demarcation resulted with two distinct groups forming, both under the overall authority of MSQ as the combat agency, supported by AMSA and GBRMPA:

- **Sea side.** This group comprised the traditional oil spill response agencies and dealt with all aspects of the vessel including salvage operations; oil spill clean-up at sea; and transfer to a safe haven and off-loading of cargo. This also included and environmental damage assessment and various compliance-related investigations; and
- **Land side.** This group comprised the disaster management agencies and dealt with preparing for the shore-line clean-up, should it be required; responding to the oil recovery on North West Island; and engaging in logistic support.



These arrangements enabled the 'sea side' agencies, in conjunction with the salvor, to concentrate on their core business in relatively familiar territory operating under the *National Plan* and the *Reef Plan* under the clear direction from the SICC and ICC.

However, these arrangements were not familiar to the 'land side' agencies which were structured around LDMGs but under direction of MSQ as the combat agency (through the SICC and ICC). These arrangements were an anomaly to normal reporting arrangements through District (DDMG) and State (SDCC) level structures. As a result, the role, command and control, and reporting arrangements for disaster management agencies were initially uncertain and evolved as the incident progressed.

The review identified that:

- At the strategic level, many of the lessons from the *Pacific Adventurer* incident regarding joint activation of oil spill response and disaster management arrangements were implemented in the *Shen Neng 1* incident response.
- At the operational level, there was some confusion regarding the role and reporting arrangements for disaster management agencies in the *Shen Neng 1* incident response.
- Joint arrangements between oil spill response and disaster management response are yet to be formalised and documented, and the roles and responsibilities of disaster management agencies in oil spill response are unclear.
- Local governments, in particular, do not have sufficient written guidance regarding their role in oil spill response

Command and Control Arrangements

Command and control arrangements for the oil spill response agencies in the *Shen Neng 1* incident were well documented. The vessel ran aground in Commonwealth waters within the Great Barrier Reef Marine Park. Under the *Reef Plan*, GBRMPA was the statutory authority and MSQ was the combat agency. These arrangements required close and constant liaison between MSQ, GBRMPA and AMSA. On the whole, this liaison worked well and overcame any inter-agency issues; however, this linkage could have been further improved with senior GBRMPA and AMSA representation in the SICC. In particular, this would have helped to manage the overlaps in responsibility between AMSA in terms of ensuring the safety of the vessel, GBRMPA in its role of statutory authority, and MSQ as combat agency.

For the disaster management agencies, the command and control arrangements were not documented and were less clear, particularly during the early stages as the incident was unfolding. In the absence of published doctrine or specific tasking, and using the *Pacific Adventurer* incident as a precedent, the LDMGs assumed the role of logistics support under the direction of MSQ (the SICC and ICC) as the combat agency. Initially, LDMG planning and reporting was undertaken through normal disaster management channels

(LDMG to DDMG to SDCC), however these arrangements were later re-focused and LDMGs liaised directly with the ICC as the incident response progressed.

At the Federal level:

- AMSA established a coordination cell within the Rescue Coordination Centre (RCC) in Canberra.
- GBRMPA established a coordination cell in Townsville.

At the State level:

- the SICC was established in Mineral House in George Street, Brisbane, and was operational on the evening of Saturday 3rd April, with membership comprising the SMPC, Deputy SMPC, MSQ support staff and TMR media staff. The Director-General TMR also attended the SICC on the first evening. From Day 2 (Sunday) an EMQ liaison officer was included as a member of the SICC (this arrangement was maintained for two weeks) which provided an important resource for disaster management liaison and access to large scale resources as required.
- A TMR Disaster Management cell was temporarily established in Transport House on the evening of 3rd April 2010 to assist with the activation and coordination of TMR resources (for example, RoadTek), and liaison with the disaster management community.
- The SDCC at Kedron Park (24/7 operation) kept a watching brief on operations and liaised with the relevant LDMGs.
- An ICC was established in Gladstone on Sunday morning (4th April), comprising multiple agencies including MSQ, DERM, GBRMPA (as Environmental Scientific Coordinator), Queensland Police Service, TMR Disaster Management, and EMQ. The Director-General TMR also joined the ICC from Sunday 4th April until Friday 9th April to coordinate TMR resource allocations. A Senior Sergeant from QPS was also located within the ICC from Monday 5th April to act as a liaison between the ICC and LDMG. A RoadTek liaison officer was located in the ICC later in the first week of operations.
- The State Disaster Management Group (SDMG) formally met on Tuesday 6th April to be appraised on the situation.

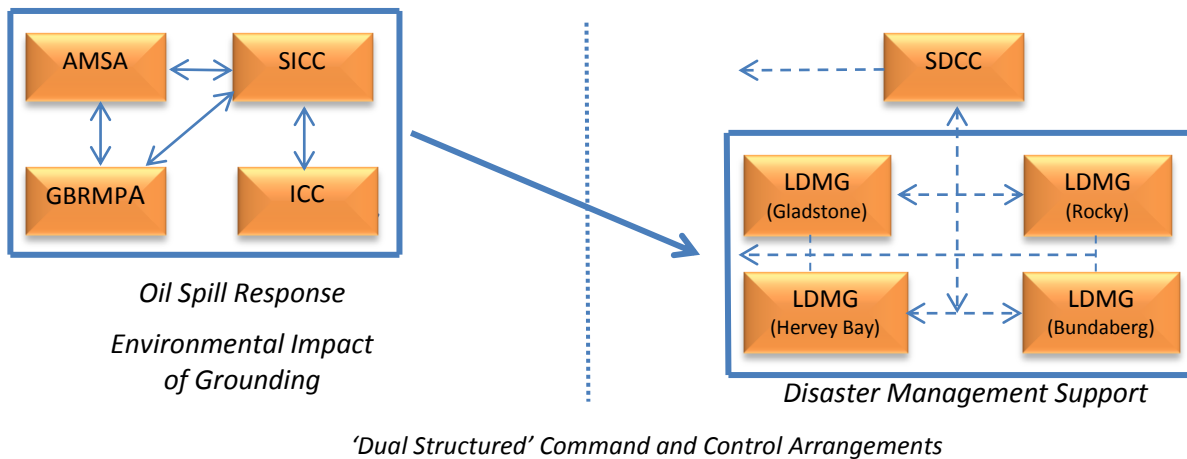
At the local government level, disaster management arrangements were activated in support of the oil spill response:

- The Rockhampton LDMG/DDMG² was established at 0900 hours on Monday 5th April.
- The Gladstone LDMG was established on Wednesday 7th April.

These arrangements were broadly maintained for the duration of the incident response, however, when the *Shen Neng 1* relocated to its safe haven in Hervey Bay on 15th April until the 21st May 2010, the ICC temporarily relocated to Hervey Bay, and the Bundaberg and Hervey Bay LDMGs were activated for this period.

² The Rockhampton DDMG and LDMG merged into one group known as the LDMG

In broad terms, the command and control arrangements were as follows:



Based on the context of the incident, the 'dual-structured' command and control arrangements that evolved enabled participating agencies to operate in their 'natural state'. In effect, the SICC and ICC focused on their core business of salvage and 'at sea' oil spill response, allowing the LDMGs to concentrate on land-side preparation with only limited direction. This transpired for a number of reasons:

- The workload of the SICC and ICC was significant throughout the duration of the incident response. For these groups, the 'main game' was management of the *Shen Neng 1* – initially coordinating the re-floating of the vessel with the salvor, followed by the off-loading of cargo, coordinating compliance activities, and safe towage to a repair port. The close involvement of the SICC in these activities meant that the capacity of the SICC and ICC to manage issues beyond these immediate strategic and tactical priorities was limited.
- The location of the grounded vessel and the oil spill trajectory predictions meant that in the event of a major oil spill, responders would have approximately 60 hours to prepare for a shoreline clean-up before any oil reached the mainland. From the SICC/ICC perspective, this provided sufficient lead time to finalise shoreline plans, if required. This enabled the SICC and ICC to focus the response efforts to seaward, and let the disaster management agencies manage shoreline clean-up preparations as a precautionary measure.
- The threat of a major oil spill reduced as the incident response unfolded, particularly following the successful re-float of the *Shen Neng 1* on 12th April and the subsequent hull inspection. Although preparing for a shoreline clean-up was still necessary, the risk of this eventuating reduced.
- The SICC and ICC knew that LDMGs and supporting disaster management agencies were well resourced and well organised under existing disaster management arrangements, and that liaison officers were in place. This provided the SICC/ICC with some comfort and assurance that the disaster management agencies would 'get on with the job'.

This 'sea-side' focus of the SICC and ICC was understandable, recognising that minimising the risk of an oil spill from the casualty was a highly appropriate strategy. However this impacted on the level of direction provided to the LDMGs, making the command and control arrangements for the disaster management agencies less clear than they were for the oil spill response agencies. This was reflected in:

- the daily teleconferences where LDMGs were invited to join the conference calls, but the discussions materially focused only on vessel-related (sea side) activities; and

- the ICC structure, where not all positions in the Incident Management Team were filled (in accordance with the OSRICS structure). This included the role of 'Shoreline Coordinator' which was responsible for shoreline clean-up and planning. The absence of a nominated contact officer in this role in the ICC further distanced the LDMGs from the ICC, noting that this would have been an important liaison point as LDMGs were tasked with preparing for a shoreline clean-up response.

The significance of this incident attracted high level political interest with the Prime Minister and Premier both visiting the site. In the first days of the incident, senior officers from TMR were also in attendance at the ICC and the Rockhampton LDMG to oversee response efforts and to help focus support at a critical phase of the incident response.

The attendance of senior officials and political representatives is expected and is beneficial to both the responders and the greater community. However greater effort needs to be given to ensuring that the operation of the normal incident response command and control arrangements are not impacted by these official visits.

The review identified that:

- MSQ was the appropriate lead agency for the *Shen Neng 1* incident.
- The OSRICS structure provides a sound platform for managing complex oil spill incidents.
- Command and control arrangements for joint operations have not yet been formalised or documented and this contributed to confusion in command and control responsibilities.
- The oil spill response agencies operated under traditional command and control arrangements that were familiar and consistent with published arrangements under the National Plan and the Reef Plan; however the disaster management agencies operated under command and control arrangements which were not fully documented and inconsistent with their normal disaster response arrangements.
- The OSRICS structure was not fully implemented in Incident Management Team (in the ICC) for the *Shen Neng 1* incident response (for example, the Shoreline Coordinator) and this had a detrimental impact on coordination of joint operations.
- Inclusion of GBRMPA and AMSA senior representatives in the SICC on a more permanent basis would have assisted interagency coordination, strategic discussion and overall incident response planning.
- The inter-section of responsibilities between the casualty coordinator, statutory authority and combat agency in incidents such as the *Shen Neng 1*, requires clarification.
- Senior TMR officers in the ICC directly tasking resources, in addition to the Incident Controller, helped focus support for the incident response but more care is required to work within the command and control arrangements.
- Combining the LDMG and DDMG in Rockhampton was appropriate.
- The limited coordination at the operational level between the 'sea side' and 'land side' operations resulted in some duplication of effort.
- Training, education and awareness needs to be undertaken with agencies which are likely to participate in joint operations, particularly in command and control arrangements.

Liaison Officers

The widespread use of liaison officers during the incident response – in the SICC, ICC and LDMGs - was extremely positive and provided a valuable lesson for future multiple-agency responses.

The presence of liaison officers within control/coordination centres helped to bridge the gap between the 'sea side/land side' operations. This assisted with inter-agency operations and awareness of agency capabilities.

Liaison officers were located as follows:

- An EMQ liaison officer in the SICC provided a strategic interface to the disaster management agencies.
- A QPS liaison officer in the ICC provided an interface to the Rockhampton DDMG/LDMG.
- An MSQ liaison officer in the Rockhampton LDMG provided guidance on oil spill arrangements and SICC/ICC command and control arrangements.
- A RoadTek liaison officer in the ICC and (later) in the LDMG provided coordination advice regarding RoadTek resources.
- An ADF liaison officer in the Rockhampton DDMG/LDMG provided defence liaison advice.
- TMR Emergency Management liaison officers were located in the Gladstone ICC and the Rockhampton LDMG.
- An AMSA officer in the ICC Gladstone providing advice and co-ordination of the ETV "*Pacific Responder*."

The review identified that:

- The use of liaison officers in the SICC, ICC and LDMGs was effective in promoting effective joint operations.
- The use of liaison officers in control/coordination centres should be standard practice in multi-agency/joint operations to provide increased awareness and better coordination.

Inter-agency Cooperation

The complex nature of the incident required the joint efforts of multiple agencies across three jurisdictions. The review identified that the spirit of cooperation between agencies at all levels and across all jurisdictions was extremely positive. The SMPC commented that throughout the response, every agency worked together to the same end and even when individual agency priorities differed, the spirit of cooperation prevailed.

This was helped in no small part by good relationships that had developed through inter-agency interactions during recent oil spill incidents and exercises. The importance of maintaining positive inter-agency relationships through regular exercising cannot be underestimated.

High levels of cooperation between TMR, GBRMPA, AMSA and DERM were necessary and evident. The CEO of GBRMPA also accompanied the Director-General TMR on an early surveillance flights to assess the incident site first hand, and this was useful in achieving a shared understanding of the incident and response strategy.

AMSA provided strong strategic and tactical support as well as coordinating many of the resource requests under the provisions of the National Plan.

The exercise of intervention powers by AMSA³ materially assisted the response effort. The exercise of the powers also involved the use of the 'place of refuge' agreement, possibly for the first time on the Australian coast. Therefore, the lessons from this incident should be used to review the application of the 'directions' powers and to identify if there is any need to revisit the application of the 'place of refuge' agreement.

The salvors were a critical participant in the incident response although largely operating under a commercial agreement with the owners. The SMPC liaised with the salvors throughout the development of the salvage plan and salvage operations.

The review identified that:

- Interagency cooperation in the *Shen Neng 1* incident response was extremely positive.
- Existing relationships developed during recent incidents and exercises provided a sound platform for positive inter-agency cooperation.
- There is a need to develop a better understanding of stakeholder agency capabilities. RoadTek in particular was identified as an agency with significant capability and resource potential for use in shoreline clean-up, as it had been successfully deployed on Moreton Island during the *Pacific Adventurer* incident.
- The incident provided an increased awareness by the relevant local governments of their vulnerability to a marine oil spill. To capitalise on this, Regional Harbour Masters have a role to play in familiarising their local disaster management groups (District and relevant Local levels) with the maritime context in their areas, and Queensland's oil spill arrangements.
- The LGAQ should be briefed on oil spill response arrangements and the role of local governments in response to oil spill incidents.
- AMSA be requested to review the application of both its 'directions powers' and 'place of refuge' agreement during the upcoming review of the National Plan, together with the relationship of the National Plan arrangements to casualty coordination and management.

Response Planning

The *Shen Neng 1* incident highlights the challenges facing SMPCs and senior staff in managing an oil spill incident response. Marine oil spills often are often 'response driven' rather than 'plan driven' as they occur without warning and require an immediate response⁴. This was the case with the *Shen Neng 1* incident. One debrief participant described the *Shen Neng 1* as being like '*a long running car crash unfolding one incident after another*'.

The incident response was dynamic and unfolding with the salvors determining many of the operational requirements, particularly in the first two weeks. Salvage operations were critically important with potentially devastating consequences in the event of a failure. Understandably, the SICC and ICC were closely engaged in salvage operations from the outset, and this close involvement continued throughout the incident response. This did not allow time to develop a 'whole of incident' strategic plan.

³ Under Commonwealth legislation to provide the legal certainty for the movement of the vessel along the coast whilst it was prepared for open water towage to the discharge port in China.

⁴ Unlike, for example, a response to a cyclone or public health incident where there is warning of the threat enabling a planned approach.

The planning undertaken by the ICC reflected the context and focus of the incident. The ICC developed Incident Action Plans (IAPs) for each 24 hour period, including wildlife response plans. These plans were (appropriately) approved by the Incident Controller who kept the SMPC informed of the plan content. Although the IAPs developed by the ICC were distributed, for some reason these plans were not received by the LDMGs. Consequently, the LDMGs were unaware of the planning being undertaken within the ICC.

The task of planning for foreshore clean-up was devolved to LDMGs, and these groups developed response plans accordingly. This could have been improved in two areas:

- The absence of a nominated Foreshore Coordinator position in the ICC exacerbated the 'disconnect' between the LDMGs (who were planning for foreshore clean-up) and the ICC.
- Oil spill trajectory models were provided to LDMGs to assist in the task of foreshore clean-up planning, however, LDMGs were not practised in interpreting this information. In hindsight, LDMGs would have benefitted from technical interpretation of the oil spill trajectory modelling data by relevant MSQ/NRT staff.

In hindsight, the incident response would have further benefitted from a more strategic approach to planning. This could have included, for example:

- A 'situation appreciation'⁵ at the commencement of the incident response with key stakeholders to assess the situation, identify issues, scope out possible scenarios and agree an overarching strategy. This would have assisted in developing a common 'whole of incident' picture of the response from the outset, identified response requirements (for example, compliance issues) and guided the level of resource activation.
- A process of periodic (for example, weekly) 'stock-take' sessions with senior representatives from key participating agencies monitoring the progress of the incident response and identifying and planning for emerging issues. This would have encouraged key responders to adopt both a long-term and short-term perspective, and periodically refocused response efforts in a premeditated way based on a common and agreed perspective.

The review identified that:

- Incident planning could have been improved through greater involvement of multiple agencies to ensure all issues were identified and planned for, thereby providing a more holistic view of the incident response requirements.
- The SICC and ICC were engaged in the response, leaving at times limited strategic and tactical capacity for detailed forward planning.
- Incident planning should include a 'whole of incident' plan to embrace all aspects of the response; and have multiple horizons (short and long term)
- Planning should include compliance investigation requirements (in the event of vessel grounding) and timeframes. Where possible, compliance investigations should be programed during quieter periods of the response.
- Incident Action Plans need to be distributed to all relevant stakeholders.
- LDMGs should consider developing sub-plans for shoreline incidents.
- Early and decisive activation of resources ('Ramping up early') is a legitimate response

⁵ The Appreciation Process could include: **Aim** (overall intention of the response); **Factors** - what is the threat and what is it likely to do; what resources do you have; physical environment; weather; timing deadlines; tasks (who's going to do what and when); what does previous experience suggest; **Courses** - what are the plausible scenarios; which is the most likely; **Plan** – develop a plan based upon the most likely and best course.

approach and should be adopted as a principle under both State and National Plan arrangements to enable early and definitive action.

Role of Combat Agency

The role of the combat agency in a complex incident response such as the *Shen Neng 1* is broad and includes the management and direction of all aspects of the incident response.

The brief description of the combat agency's role in the National Plan is focused exclusively on oil spill response, which reflects the Plan's narrow focus on the technical aspects of addressing oil spills. Whilst this is an important aspect, an oil spill response involving multi-agencies requires significant coordination and management of broader issues. In a complex multi-agency incident response, the combat agency under the direction of the SMPC, is required to provide direction to all responding agencies (both 'sea side' and 'land side' in the case of the *Shen Neng 1*) to address all aspects of the response, including:

- oil spill response,
- salvage operations (if relevant),
- shoreline clean-up,
- environmental planning and response,
- stakeholder and media management,
- logistics and support,
- coordination of compliance investigations (if relevant and appropriate), and
- other issues relevant to the response.

This is a formidable task, but one which can be managed under a fully resourced OSRICS structure adopting a 'whole of incident' approach. The OSRICS structure provides a solid platform to manage a complex incident and contains the elements necessary to address an oil spill response (including the broader aspects of media, environment, stakeholders, medical, finance, records, etc). It is scalable and can be expanded and contracted commensurate with the incident size and complexity.

The review identified that:

- The National Plan and Queensland Plan reflect a 'single agency' approach to oil spill response which does not align with the circumstances of the *Shen Neng 1* incident's multi-agency response.
- The role of combat agency needs to be reviewed and updated in the National Plan and Queensland Plan to acknowledge the contemporary nature of oil spill incident response in a multi-agency, multi-jurisdictional environment.
- The combat agency should adopt a 'whole of incident' approach to the oil spill incident response.
- Combat agency personnel should be trained in complex oil spill response incidents.

Environmental Advice and Support

At least 65,000 square metres of the Douglas Shoal were damaged as a result of the ship's impact with the reef. Although the immediate environmental impact resulting from oil spilled in this incident was limited, the *Shen Neng 1* incident emphasises the potential devastation that a significant oil spill in this area could have. The nearby North West Island is a significant bird rookery and turtle nesting colony, and an estimated 100,000 birds could have been affected if all 975 tonnes of the oil from the *Shen Neng 1* was discharged.

Within the ICC, the role of Environmental and Scientific Advisor was provided by the GBRMPA, supported by DERM. This arrangement worked well.

As outlined previously, oil spill trajectory modelling data was provided to LDMGs to assist their shoreline clean-up planning, and LDMGs would have benefitted from technical interpretation of this information by relevant MSQ/NRT staff.

The review identified that:

- Environmental advice was well informed, timely and well heeded.
- Environmental impacts from the oil spill (as opposed to the physical and chemical impacts of the grounding) were small whilst acknowledging any release of oil can be harmful and that some potential impacts are difficult to confirm or dismiss.
- Environmental agencies believed they would not have been able to cope effectively with a major oiled wildlife clean-up at that location.
- The Oil Spill Response Atlas (OSRA) managed by AMSA was not widely used during the incident, and some agencies were unaware of its existence.
- LDMGs were not familiar with interpreting oil spill trajectory modelling data.

Stakeholder Management

Communication with stakeholders and the media was positive, timely, open and transparent. TMR's media resources adopted a proactive approach and the first media release was dispatched on the first night. TMR media resources were initially located at the SICC, and on Sunday 4th April additional media resources were positioned at the ICC in Gladstone. The ICC assumed the role as primary media coordination point and was 'shadowed' by communication resources at the SICC. The experienced communication staff were crucial in creating positive and open relationships with the media by proactively providing information.

The multi-jurisdictional nature of this incident did highlight the need for broader coordination of media issues across Federal, State and Local Government levels.

At the local government level, Mayors provided media interviews to local media, and the involvement of the LDMGs (and Mayors) in daily teleconferences was crucial in providing Mayors and local spokespeople with accurate and consistent messages. MSQ and TMR liaison officers provided important support at the Local Government level to assist in providing accurate media content. The media was also fully advised and briefed of the reasons underpinning the decision to relocate to Hervey Bay.

Management of stakeholder groups was also well executed by the ICC and LDMGs. DERM representatives within the ICC (Consultation Unit) managed the liaison with Indigenous stakeholder groups throughout the incident response. This was particularly relevant when the *Shen Neng 1* was relocated to a safe haven in Hervey Bay. A number of helicopter observation flights included members from the local council and key Indigenous community members and this helped build positive relationships.

Liaison with traditional owners was well managed and improved over the course of the incident response (notification within the recommended 24hr timeframe). Eight Indigenous groups were consulted with positive outcomes.

The review identified that:

- Stakeholder management was generally well executed.
- Local media were generally supportive of the incident response efforts.

- Closer coordination between Federal and State level media resources would have helped in providing a consistent message across jurisdictions.
- Public and community support for the incident response efforts was positive.

Communications

The incident response highlighted the importance of communication processes within a multi-agency environment. Notwithstanding the coordination challenges associated with the command and control arrangements, in general, the communication processes were effective:

- Teleconferences were conducted twice daily hosted by the SICC with key participants including the ICC, AMSA, GBRMPA, DPC, DERM and EMQ. LDMGs were also invited to attend. The information discussed largely related to the 'sea side' only, but provided valuable information for stakeholders. This resulted in practical advantages, for example, the teleconference provided information for the Mayor of Rockhampton to use in media engagements.
- Teleconferences were conducted between SICC, GBRMPA and the salvors daily. These were essential to ensure the salvor was apprised of the broader issues and to coordinate incident response around the salvor's operations.
- Sitreps were produced by the ICC twice daily and distributed to a wide audience. These were of 2-3 pages in length and improved over time.
- AMSA also released its own sitreps for its audience.
- LDMGs produced sitreps which were provided to the SDCC and to the ICC.
- Status Boards were maintained by the ICC, providing a 'running sheet' (similar to an operations log) of activities. This was valuable in providing a record of operational issues and decisions to all participants and was widely used. These were emailed to key stakeholders, including Disaster Management representatives in the LDMGs.

The review identified that:

- Teleconferences were valuable in providing multiple agencies with up to date information.
- The content of the teleconferences reflected (particularly in the early stages) the 'sea side' focus of operations and should have been broadened to include all areas of the incident response including 'land-side' operations.
- A teleconference protocol should be developed (for example, to identify teleconference participants, etc).
- The Status Boards were highly valued by agencies in providing up to date operational details.
- Record management within the ICC was well executed.
- Some duplication occurs when sitreps are prepared and released by separate agencies, and that facilities such as a shared computer drive or secure website would improve communication efficiency.

Communication Technology

Recognising that communication can often be challenging in incidents such as the *Shen Neng 1*, in general, the communication technology was satisfactory, however this is an area requiring improvement. Information communication technology could have been enhanced to support general communications and to provide a coordinated 'tactical picture'.

Following initial communication difficulties with the vessel (due to poor VHF performance), communication arrangements improved. The LDMG initiated a communication data link relay facility which was installed on North West Reef to ensure 3G coverage for ships in the area. This required significant helicopter resources to position the equipment which subsequently suffered a generator failure and consequently resulted in limited benefit. In addition, responders experienced a poor quality satellite telephone services in the incident area.

The incident complexity meant that multiple operations were underway simultaneously (for example: salvage operations with tugs; oil spill response vessels, etc) requiring multiple resources to operate in close proximity on separate radio frequencies. It is acknowledged that multi-channel operations are necessary to enable separate operations to be undertaken, however, cross-channel communication was difficult in the *Shen Neng 1* incident response.

The review identified that:

- An ICT based system providing a common 'tactical picture' of operations and unit locations would assist in incident management and communications.
- A 'flyaway kit' containing essential communication equipment (for example; satellite phone, mobile email facility, etc) should be available at short notice to provide communication capability in the initial hours of incident response before a full communication facility can be established.
- Communication arrangements need to be improved for remote area operations. This could include satellite communications to improve interoperability.
- The responsibility for arranging communications to support incident response requires clarification.
- The QFRS have a communication capability which can be used in the support of oil spill response.
- A published communication plan would have been helpful to assist units at the operational level to communicate across channels, if required, particularly when operating simultaneously in close proximity.

National Response Team

Members of the National Response Team (NRT) from NSW, Western Australia and Tasmania were deployed to the ICC early, and were primarily employed in positions within the Incident Management Team (IMT) – including the logistics function. A further 12 NRT personnel from other States, the Northern Territory and the Australian Marine Oil Spill Centre were initially placed on standby for containment and recovery operations, and were then rotated through the IMT positions.

Most aspects of NRT support were well managed, although some logistical challenges did arise in managing rotations of NRT personnel after the ICC was closed. This incident, once again, highlighted the importance of having NRT support to fulfil critical roles within the IMT and to provide the additional technical capacity for local oil spill response.

The review identified that:

- National Response Team inclusion in the *Shen Neng 1* incident was appreciated and generally well managed.

Logistics

Compared to the *Pacific Adventurer* incident, the logistic requirements for the *Shen Neng 1* incident were modest and largely centred around 'sea side' response efforts. Notwithstanding, the logistics planning and pre-positioning undertaken by LDMGs for the shoreline clean-up response was also comprehensive.

However, had the incident resulted in a larger oil spill resulting in shoreline oil inundation or significant wildlife rehabilitation, the logistics requirements would have been substantial. The region has areas of exposed coastline; much of which is difficult to access by road and sea (subject to tidal restrictions). Supply and re-supply operations in these areas would present significant logistical challenges.

The logistic support for the oil spill response component of the incident was well managed:

- Dispersant was pre-positioned at Rockhampton airport within the first 24 hours of the operation, and the management of aerial spraying operations was effectively.
- Oil spill response support vessels were procured at short notice, and it was fortuitous that sufficient numbers of vessels were available close by at the time. For example:
 - The *Norfolk* had moved into the area at the time of the incident and this was available at short notice for the provision of specialist hydrographic surveys.
 - ETV Pacific Responder (operated by AMSA) was despatched from the Torres Strait at best speed.
- AMSA provided its ETV *Pacific Responder* with members of the National Response Team and containment and recovery equipment.
- Considerable effort was required to obtain the fuel barge *Larcom* for removal of oily waste.
- Hydrographical surveys were undertaken at short notice to support the salvage operations.

Government aircraft resources (EMQ helicopters and government fixed wing aircraft) were not initially available due to their servicing schedule⁶ and other tasking. Consequently, a charter helicopter from Bundaberg was used to place the AMSA surveyor on the *Shen Neng 1* on Saturday night.

The incident showed that LDMGs and the broader disaster management community are well practiced in logistic procurement to support the broader incident response. EMQ and QFRS, for example, have Standing Offer Arrangements in place with providers, and LDMGs have local knowledge of providers.

The 'sea side' / 'land side' command and control arrangements resulted in some duplication in logistics management. NRT personnel undertook the logistics function as part of the IMT within the ICC (mainly focusing the sea side operations); and LDMGs undertook logistics procurement and planning (mainly focusing on land side operations). This dual structure resulted in some duplication and future incidents would benefit from better coordination, particularly relating to the logistics function.

The review identified that:

- The command and control structure and separate logistics functions within the ICC and LDMGs resulted in some duplication of effort.
- Helicopters under contract with MSQ for Marine Pilot transfers have night operational capability, however this was not universally known and these were not used. These resources may have been available, subject to normal tasking constraints.
- Resource procurement for 'sea side' operations was well managed.

⁶ Only limited number of hours available (approximately 1.5 hours) before a service was due.

Resource Management

The incident response was intense and extended over eight weeks. In general, response and staff rotations worked well however the extra workload required to resource the incident response drained agency resources.

The incident dominated senior executives' time in MSQ and other areas of TMR, AMSA and GBRMPA; noting that normal organisational operations also needed to continue, and recognising that the incident also generated additional administrative work (for example, responding to Ministerial requests for information).

The review identified that:

- There was a cross-over of membership in the two relevant District Disaster Management Groups, which is problematic in a situation where an incident impacts both Districts simultaneously.
- Where possible, relief staff should be identified and recruited to address increased resource needs to enable key staff to focus their attention on the incident response. This might include, for example, establishing 'acting' arrangements in the 'home' agency, or recruiting suitable staff to assist.
- Some positions in the IMT were filled by only one person which provided insufficient continuity of operations.
- Staff fatigue should be monitored and managed.

Aviation Coordination

The incident included multiple air operations including aerial dispersant spraying, ferrying personnel to and from the vessel for salvage support and regular surveillance flights. Generally there were two helicopter surveillance flights and two Dornier surveillance flights per day (the Dornier flights were later reduced to one flight per day). AMSA established an aviation temporary restricted area around the incident site and this was advised to commercial flying operations through the Notice To Airmen (NOTAM).

An aviation coordinator was established within the ICC (under the OSRICS structure), however the personnel assigned to this role also flew as air observers on surveillance flights. Consequently, the aviation coordination role was not functioning at critical times, and this resulted in other areas tasking and coordinating air operations, including the Gladstone LDMG and Canberra (AMSA). This caused confusion in aviation coordination.

The review identified that:

- It would have been preferable for aviation coordination to be centralised in the ICC.
- The aviation movements relating to the *Shen Neng 1* incident response required a full time aviation coordinator.
- The aviation coordination function within the ICC (OSRICS structure) was not fully manned and this caused confusion regarding aviation coordination.

Occupational Health and Safety

The review did not identify any significant occupational health and safety issues. The precise constituency of the oil on board the *Shen Neng 1* could not be confirmed for a number of days, and this could have become an occupational health and safety issue in the event of a shoreline clean-up early in the incident response.

Compliance Investigations

The grounding of the *Shen Neng 1* in an internationally recognised marine park provided significant legal issues and required compliance operations to be undertaken, often alongside salvage and oil spill response operations. The grounding prompted the involvement of the Australian Transport Safety Bureau's Marine Safety Investigation Team, under the *Transport Safety Investigation Act 2003* (TSI Act).

In addition, on 14th April 2010 (two days after the re-float) Australian Federal Police officers executed a search warrant on the vessel and arrested the ship's Master and Chief Officer-on-Watch, who faced the Gladstone Magistrates Court on 15 April 2010 charged under Commonwealth law⁷.

GBRMPA was required to undertake environmental assessments around the vessel (using divers etc). AMSA, too, was required to undertake a safety assessment. Australian Customs and AQIS also had compliance requirements.

These compliance operations needed to be coordinated with salvage and oil spill response operations; noting that casualty coordination was the priority. This added further complexity to the response operations and was seen by the SICC and ICC as a distraction to salvage and response operations.

The review identified that:

- Compliance activities were initially seen to be a distraction/hindrance to the incident response given the lack of a coordinated approach.
- The responsibility for coordinating compliance activities requires clarification.
- As far as possible, compliance requirements need to be proactively managed with the relevant agencies and included as part of 'whole of incident' planning.

Legal Advice

The *Shen Neng 1* incident involved a number of legal complexities and raised issues regarding the authority the national and state authority has over a grounded vessel in state / Australian waters. In the initial stages of this incident, the vessel's owners and Master were making decisions regarding the attempted re-float of the vessel. In these circumstances, the SMPC must be able to assess the legal issues and identify what authority (head of power) is available to direct the Master of the vessel.

The review identified that:

- The SMPC requires legal support and advice to assist in decision-making.
- The provision of sound and informed legal advice is an issue requiring further consideration.

Operational Issues

The review identified a number of operational issues:

- Cost recovery arrangements for oil spills are unique. In essence, the costs directly associated with the oil spill response should be reimbursed from the national plan arrangements subject to review and agreement by the P&I Club. This requires financial records linked with documented operational

⁷ The ship's Master was charged under Commonwealth law with liability for a vessel which caused damage to the Great Barrier Reef Marine Park and the chief officer-on-watch was charged with the offence of being the person in charge of a vessel that caused damage to the Great Barrier Reef Marine Park.

decisions. In the case of the *Shen Neng 1* incident where multiple agencies were involved operating under different 'sea side' and 'land side' operations, records of expenditure were not consistent.

- There is a particular problem for environmental agencies which incur major costs associated with assessment and clean-up of impacts not directly related to oil spill.
- Operational learnings were not formally captured at each operation/control centre as deactivation of the SICC, ICC and LDMGs did not incorporate 'hot debriefs'.
- Salvage operations are complex and the re-floating process requires coordination of issues on-board the vessel as well as coordination of cleaning up oil spilled into the water as a result of the evolution.

The review identified that:

- Expenditure approvals regarding incident response should be documented by all agencies within a more formalised administrative framework, taking into account the documentation typically required by ships insurers (P&I Clubs) to support claims.
- Forms for cost recovery were different for MSQ and AMSA.
- A 'hot debrief' should be conducted in each area when control/coordination centres are 'stood down' to capture the immediate learnings.
- Two casualty coordinators should be on board a vessel for a re-float; one to manage salvage issues, and one to manage oil spill response issues.

Recommendations

The following recommendations are made based on the findings of the review of the *Shen Neng 1* incident response. These findings are made cognisant that the *National Marine Oil Spill Contingency Plan* will soon undergo substantial review, and that changes to Queensland's disaster management arrangements are imminent, given recent legislative amendments.

It is recommended that:

Preparation

1. AMSA, as part of the review of the *National Marine Oil Spill Contingency Plan*, update the National Plan to include:
 - The coordination role of combat agencies in a multi-agency response (for example, where a State activates disaster management arrangements in support of the oil spill response). (Refer to Page 21)
 - The use of liaison officers in joint operations in multi-agency operations to assist in incident response coordination. This includes considering the formal inclusion of liaison officers in the OSRICS structure. (Refer to Page 18)
 - The management of all aspects of the incident response, noting that in large, complex incidents this may include (in addition to managing the technical and other associated aspects of the oil spill response): multi-agency coordination, compliance requirements and legal advice support. (Refer Pages 14-19, and 27)
 - A multi-agency and inclusive approach to incident response planning in joint operations. (Refer Pages 19-20)
 - The adoption of Information Communication Technology (ICT) systems in providing a common tactical picture to support oil spill response operations. (Refer Page 23)
 - A review of the application of both its 'directions powers' and 'place of refuge' agreement. (Refer Page 19)
 - Clarification of the statutory agency in the event of an incident within the Great Barrier Reef Marine Park. (Refer Page 17)
2. MSQ review and update the *Queensland Coastal Contingency Action Plan*, as a priority interim measure⁸, to include the lessons identified from the *Shen Neng 1* incident response including:
 - How joint operations between oil spill response and disaster management agencies will be undertaken; in particular: (Refer Pages 12-19)
 - command and control arrangement for joint operations;
 - roles and responsibilities of disaster management agencies, including local governments, in support of an oil spill response;
 - the use of liaison officers in control/coordination centres;
 - membership of the SICC in joint operations to ensure appropriate representation of, for example, statutory authorities and disaster management coordination representatives; and
 - a summary of Queensland agency capabilities in joint oil spill incident response operations.

⁸. Further amendments may be required following the review and update of the National Plan.

3. MSQ identify ways to ensure appropriate and timely legal advice is available to the State Marine Pollution Controller during an incident response to assist in decision-making. (Refer Page 27)

Consolidation

4. Following the implementation of Recommendation 2, above:
 - MSQ undertake training, education and awareness with stakeholders likely to be involved in a multi-agency oil spill incident response regarding the revised arrangements in joint operations. (Refer Page 18)
 - MSQ undertake liaison with key stakeholders to improve the understanding of oil spill response arrangements, particularly in relation to joint operations, including: (Refer Page 18)
 - Regional Harbour Masters familiarise relevant disaster management groups (District and Local) with the maritime context of their areas and joint oil spill arrangements⁹.
 - MSQ brief the Local Government Association of Queensland (LGAQ) on oil spill response arrangements with particular reference to the role of local governments.
 - MSQ implement an exercise program (including discussion exercises) in conjunction with EMQ, to test joint arrangements where Queensland's disaster management arrangements are activated in support of an oil spill response. (Refer Pages 18-19)
 - This should include an exercise to test a multi-agency response to a significant oil spill in a remote location.

Operations

5. The State Marine Pollution Controller and Incident Controller ensure that, in future incident responses, the OSRICS structure is fully implemented and resourced within Incident Control Centres. (Refer Pages 17 and 26)
6. In incident responses involving joint operations, the State Incident Control Centre and the Incident Control Centre adopt a 'whole of incident' approach to incident coordination to address all aspects of the response, including key agency involvement in 'multiple horizon' (short and long-term) planning. (Refer Pages 19-20)
7. When incidents occur on the Great Barrier Reef, a GBRMPA representative is stationed in the State Incident Control Centre. (Refer Page 14)
8. MSQ consider developing a 'flyaway kit' for rapid deployment, containing essential communication to provide communication capability in the initial hours of incident response. (Refer Page 23)

⁹ This could be undertaken before Recommendation 2 is finalised.

Conclusion

The grounding of the *Shen Neng 1* on Douglas Shoal on 3rd April 2010 could have resulted in a significant marine environmental disaster, however, it did not. This was due in no small part to the well-resourced and well executed incident response which was led by MSQ in conjunction with the GBRMPA, AMSA, DERM and the ship's salvors, supported by Queensland's disaster management agencies.

Queensland was relatively well positioned to respond to the *Shen Neng 1* incident. MSQ staff were well trained in oil spill response, and the learnings from the *Pacific Adventurer* were still fresh in the minds of the responding agencies, including the disaster management agencies which were activated in support of the *Shen Neng 1* incident response.

The response to the incident was immediate. The notification and activation arrangements were expeditious and effective, enabling good early situational awareness. Proactive management of the media also set a positive tone for the incident response from a public relations perspective.

The immediate and significant threats to the stricken vessel were the initial priority of the response efforts. The potential for a significant oil spill during the first 10 days of the incident response was real, and this injected a sense of urgency into the incident response from the outset. Managing the casualty was the priority recognising that the extrication of the vessel from the reef would determine the follow-on requirements of the incident response. As a precaution, disaster management agencies were activated to prepare for a shore-line clean-up in the event that a more significant oil spill eventuated, and to provide logistic support to the combat agency.

The vessel's salvage was a success and environmental damage as a result of spilled oil from the *Shen Neng 1* was limited.

Whilst the *Shen Neng 1* grounding was a challenging maritime incident, it was one which sat within the remit of Australia's national oil spill arrangements and fitted with the *Reef Plan*. The incident aligned with the key response agencies' (MSQ, AMSA, GBRMPA and DERM) traditional areas of expertise, and the roles and responsibilities between oil spill response agencies were clear. However, further clarity is required for the disaster management agencies supporting the oil spill incident response, as these agencies operated outside their normal command, control and reporting arrangements.

Consequently, the *Shen Neng 1* incident response provided a number of valuable lessons, particularly regarding the joint activation of oil spill response and disaster management arrangements; and these have been the focus of the review and this report.

Many of the lessons from the *Pacific Adventurer* incident regarding joint activation of oil spill response and disaster management arrangements were implemented in the *Shen Neng 1* incident response – particularly at the strategic level.

The main lessons emerging from the review relate to the command, control and coordination in the event of the joint activation of oil spill response and disaster management arrangements. Associated with this is clarification of the role of the combat agency in a multi-agency response, and the approach undertaken in incident response planning. The use of liaison officers located in the various coordination/control centres during the incident response was particularly useful and should be considered in future multi-agency responses.

The *Shen Neng 1* incident highlights the vulnerability of Queensland's coast-line to a significant oil spill incident. Increased shipping movements and the continued likelihood of severe climatic events suggests that the threat of marine oil spills will remain and that future oil spills are inevitable.

In concert with this, it is highly likely that future marine oil spills in Queensland will result in the activation of disaster management arrangements to support the oil spill response – noting the success of the *Shen Neng 1* incident response which cements the precedent established by the *Pacific Adventurer* incident response in 2009.

Queensland must build on the lessons from the response to the *Shen Neng 1* incident and develop doctrine to guide effective operations for a multi-agency response where disaster management arrangements are activated in support of Queensland's oil spill response arrangements. This doctrine can be used as a model for other jurisdictions.

TERMS OF REFERENCE

National Plan to Combat Pollution of the Sea by Oil and Other Noxious and Hazardous Substances

Response to the Shen Neng1 Incident

Aim: To report on the response to the *Shen Neng 1* grounding on Douglas Shoal on 3 April 2010, and the associated pollution preparations and response, including the linkages to the State Disaster Management System.

Methodology: The process for this review will be to capture relevant information through the following:

- A debrief session with key National Plan stakeholders in Brisbane on 12 July 2010,
- A debrief session with key Disaster Management stakeholders in Rockhampton on 19 July 2010.

Terms of Reference: Report on the management of the incident from the oil pollution preparedness /response perspective and make recommendations to improve the National Plan arrangements and how the actual response to the *Shen Neng 1* incident might be improved upon for future reference. In this context:

1. Assess the oil pollution response aspects with particular reference to:
 - a. the call out procedures used, the effectiveness and timeliness of the initial and subsequent response;
 - b. the suitability and accessibility of National Plan equipment including State and industry equipment;
 - c. availability, timeliness and management of the National Response team arrangements;
 - d. the decisions made in respect of calls for equipment and personnel in regard effectiveness, sufficiency and timeliness;
 - e. the adequacy and effectiveness of the wildlife rescue and rehabilitation response;
 - f. the adequacy and effectiveness of incident response plans and their implementation;
 - g. the adequacy of the management of Occupational Health and Safety issues;
 - h. the adequacy of the administrative support, environmental advice and support, and other related activities;
 - i. the adequacy and effectiveness of the Oils Spill Response Incident Control System (OSRICS)
 - j. the interaction with the media and other interested parties;
 - k. the adequacy and effectiveness of communications with affected and interested community stakeholders.
2. Comment on the roles and interaction of the various parties to the response. In this regard, particular attention should be given to:
 - a. the effective involvement of the parties; ,
 - b. the interaction and cooperation between agencies;
 - c. the interaction and interoperability with Disaster Management agencies.

Outputs: A written report on the findings to the General Manager, Maritime Safety Queensland which will include recommendations for improvements and initiatives based on the lessons learned from the incident.

Debrief Participants

Brisbane (12 July 2010; Mineral House)

Dave Stewart (TMR)	John Young (AMSA)	Richard Johnson (MSQ)
Patrick Quirk (MSQ)	Narissa Bartlett (AMSA)	Tom Hilston (TMR)
Don Bletchly (TMR)	Michael Short (DERM)	Simon Gravnell
John Kavanagh (MSQ)	Jeff Cheadle	John Wright (MSQ)
Mike Lutze (MSQ)	Malcom Turner (GBRMPA)	Leonie Braund (MSQ)
Jim Huggett (MSQ)	Andrew Skeat (GBRMPA)	Mark Alen (MSQ)
Conrad Adams (MSQ)	Adrian Hawes	Paul Brandenburg
Kimberly Foster (MSQ)	Peter Marchbank	James Monkivitch (GBRMPA)

Rockhampton (19 July 2010; Rockhampton Library)

Patrick Quirk (MSQ)	Major Phil Duncan (ADF)	Graham Coleman (QPS)
Jim Huggett (MSQ)	Glenn Bell (EMQ)	Marcus Hill (QPS)
Don Bletchly (TMR EM)	Pat Downing (EMQ)	Erwin Hoffmann (QPS)
Mike Lutze (MSQ)	Peter Ruddick (EMQ)	Mel Adams (QPS)
Conrad Adams (MSQ)	Andrew Bicknell (RRC)	Rebecca Martin (QPS)
Leonie Braund (MSQ)	Brad Carter (RRC)	Jon Cookson (QPS)
Kellianne Dunne (TMR EM)	Gavin Steele (RRC)	Mal Churchill (BRC)
Brian Balwin (TMR EM)	Martin Crow (RRC)	Mark Holmes (GRC)
Mark Riordan (RoadTek)	John Fisher (QFRS)	Brad Lutton (GRC)
Richard Williamson (RoadTek)	Chris Vakas (FCRC)	Rick Hansen (GRC)
	Peter Ashe (DERM)	

Chronology of Incident Response

The following chronology outlines the key points of the *Shen Neng 1* incident response. The chart, attached, provides a geographic reference for the incident response:

3 April 2010: The 230 metre-long bulk coal carrier *Shen Neng 1* sailed from the Port of Gladstone bound for China, carrying 68,000 tonnes of coal as cargo.

3 April 2010: At 1710hrs, the vessel ran aground on Douglas Shoal (in the Great Barrier Reef Marine Park). The impact ruptured the ship's fuel tanks and released four tonnes of fuel oil.

3 April 2010: Maritime Safety Queensland activated National Plan response arrangements. Response crews and disaster management arrangements were activated.

3 April 2010: The Australian Maritime Safety Authority (AMSA) mobilised personnel and airlifted a surveyor onto the vessel. Emergency towage vessels were dispatched to the scene.

4 April 2010: Aerial surveillance conducted at first light revealed a patch of heavy oil 2km south-east of the vessel. Dispersants were applied by light aircraft. An air and sea exclusion zone was established around the vessel.

4 April 2010: Professional salvors (Svitzer Salvage) board the *Shen Neng 1*. Damage assessment indicated the engine room was breached, and the main engine and rudder were damaged.

5 April 2010: Tug *Tom Tough* on-site. Additional tugs *Austral Salvor* and *Pacific Responder* en-route to casualty. Qld Gov't hydrographic survey vessel *QG Norfolk* conducted full survey around the casualty.

8 April 2010: Additional support vessels arrived at the casualty: *Lorraine*, *Wandana*, *Pacific Responder* and *Pacific Conquest*.

9 April 2010: Oil transfer operation to *Larcom* commenced at 1056hrs. Overflight indicated no sight of oil.

10 April 2010: By 1600hrs, a total of 400m³ of oil / oily water had been transferred from the casualty to the *Larcom*.

12 April 2010: The *Shen Neng 1* was successfully refloated at 1948hrs with no loss of oil. The vessel was then towed to a safe location off Barren Is. for further assessment.

19 April 2010: Salvors placed a request to AMSA's Rescue Coordination Centre (RCC) for a 'place of refuge' for the casualty.

21 April 2010: Casualty was towed to the Port of Gladstone where appropriate repairs could be conducted. AMSA issue a direction to the Gladstone Port Corporation and MSQ to provide a safe haven at Gladstone.

22 April 2010: An attempt to enter Gladstone was made, however adverse weather conditions raised the risk profile and the attempt was abandoned.

30 April 2010: AMSA issued another 'place of refuge' direction for the ship to move to a safe and protected anchorage between the mainland and Fraser Island in the northern part of Hervey Bay.

9 May 2010: The *Shen Neng 1* was towed to Hervey Bay and went to anchor as planned.

12 May 2010: Coal transfer operations commenced involving the transfer of coal cargo to two lighterage vessels, the *Clipper Mistral* and *Johanna C*, in readiness for the long ocean tow home.

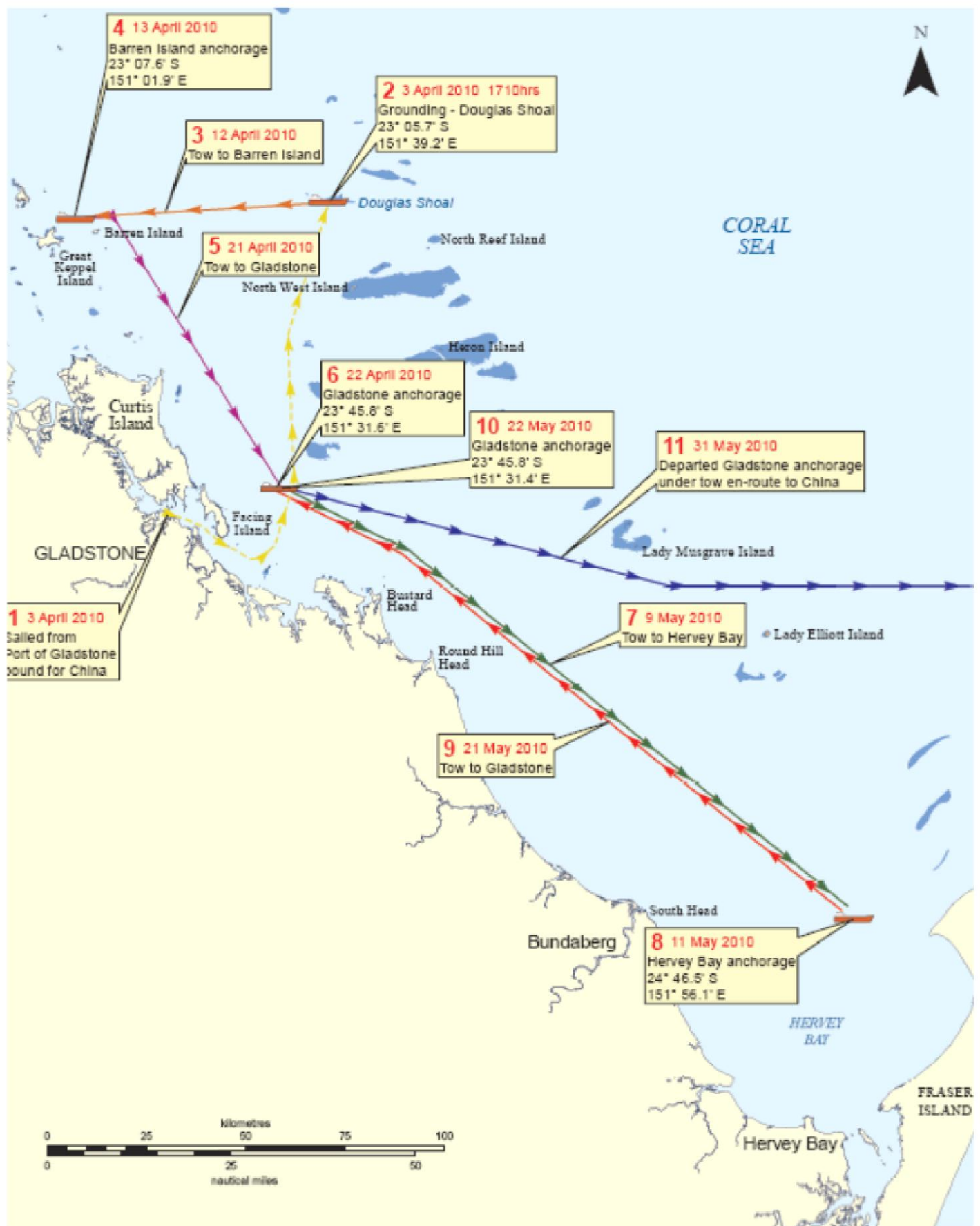
20 May 2010: Coal transfer operations were completed. 19,000 tonnes of coal were successfully transferred. No coal was lost during off-loading operations.

21 May 2010: At 1600hrs the vessel was taken under tow once again from its anchorage in Hervey Bay en-route to another anchorage off Gladstone to await the arrival of the ocean-going tug *De Da*.

22 May 2010: The casualty arrived at its anchorage in Gladstone.

31 May 2010: The *Shen Neng 1* towed by *De Da* departed the Gladstone anchorage en-route to China, marking the end of a two-month salvage operation.

2 July 2010: The *Shen Neng 1* arrived safely at her Chinese discharge port.



Horizontal datum: GDA94
 Map projection: MGA 56
 Map: C2-154
 Prepared 26 August 2010
 Maritime Safety Queensland
 Spatial Services Unit

SHEN NENG 1 Incident Chronology of Key Events

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