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Whangamata marine oil spill deployment exercise 12 June 2012

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Te Kaunihera ā Rohe o Waikato

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Abstract

The Rena grounding highlighted the need to look outside the standard response to oil spills and expect the unexpected. The assumed oil spill response has always focused on internal harbour spill scenario's requiring containment and recovery. This is the reality of most regional oil spills. There are however other scenarios which must be planned and trained for which unless addressed, can have far reaching implications for the environment and coastline populations.

There is a need to devise strategies to minimise the damage open sea oil spills may have on harbours and estuaries, due to the high intrinsic value of harbours and estuaries and the reality of heavy fuel oil finding its way into harbours. The non-standard boom deployments in this report are in response for the need to establish booming techniques that will help intercept oil before it enters these highly sensitive ecological areas. None of the boom settings in this deployment were within standard operating procedures but designed to test booming techniques and equipment limits.

Executive summary

This deployment exercise demonstrated the alternatives to the standard operating procedures when intercepting heavy oils entering harbours and estuaries. In the scenario of a major release of heavy fuel oil at sea, it is unacceptable to follow standard procedure pre-Rena. This was to contain and recover the oil once the oil had entered the harbour. Most of the NZ coastline is directly exposed to the open ocean which makes the booming of oil in the exposed open-sea area very difficult, due to swell and wave action on the boom. Oil response booms fundamentally work in flat water and in a current of less than three knots.

The only option other than letting oil enter the harbour, or using dispersants[1], is to intercept oil in the relatively swell protected area of the harbour entrance. Unfortunately most harbour and estuary entrances are narrow, causing high flow areas. The advantage of the narrow entrance is that the area requiring booming is very small and any deflection, such as a boom set at a very slight angle to the current, will gradually move oil laterally across the current without forcing oil under the boom. A standard boom set would be at an acute angle to the current, putting huge strain on gear, distorting the boom into a belly and forcing any oil under the boom.

The strategy of this exercise was to use very long booms set at minimal angle to the current (as much angle as possible without straining the gear or creating turbulence under the boom), while allowing any wave action reflecting off the boom to move floating oil down the length of the boom without forcing oil under the boom. One assumption made is that any heavy oil that reached the harbours would be reasonably weathered and in congealed lumps rather than a continuous slick. This assumption is based on the fact that large vessels do not pass very close to the eastern seaboard but stay on the open sea side of off-shore islands. If the oil did arrive in a fresh slick like form, it would be expected this technique would work to some degree, but would not be as successful as with weathered oil.

Techniques for handling long booms in high current areas are highlighted in this report. As long as basic safety rules highlighted in this report are followed, long booms can be manoeuvred into position in high current areas and used safely and successfully to deflect heavy oils into collection and recovery areas.

[1] Although dispersants are classed as a viable response option, the use of dispersants can be an emotive subject. The Regional Oil Spill Contingency Plan does not promote the use of dispersants in/close to harbours.

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1 Introduction

The main difference between this type of deployment and past deployments is the targeting of specific techniques for this region instead of a standard equipment familiarisation exercise. The deployment also turned out to be a very good familiarisation exercise, due to the amount of boom required for the exercise even though this was not the main purpose of the deployment.

Swift water boom deployment and the use and manoeuvring of very long booms in swift water prior to the static actual setting, was to be trialled to find out the limitations of the boom and experiment with different deployment techniques. These techniques are new and it is generally accepted that booms cannot be traditionally set in current anywhere near the tidal velocities experienced in most Waikato regions harbour and estuary entrances.

In order to develop Waikato Regional Council protective booming techniques it has to be acknowledged that booms cannot always be deployed in ideal conditions with low tidal movement. Most of New Zealand seaboards are characterised by strong tidal flows at entrances. In light of the Rena experience, the stance that deployed booms cannot be used to protect valuable resources would not be tenable to the general public.

1.1 Purpose

Carry out a deployment (field) exercise to increase responders' familiarisation with booms and to find the limitations of different booms and boom combinations, in high tidal flow areas. Following the exercise, any marine oil spill response should result in sound, sufficiently detailed, and effective marine oil spill (MOS) techniques, enabling a targeted site specific response if required.

If the Rena incident has taught us one thing it is this; environmentally, politically and culturally it is not an option to do nothing, or be seen to do nothing, to protect intrinsically valuable areas. It is unacceptable to allow oil into these environments without a well planned concerted effort to intercept and recover the oil.

The exercise also produced an opportunity to liaise with interested parties and stakeholders, which gave individuals and organisations the chance to engage with the response process. Individuals and organisations invited included local residents, Iwi, tier 1 operators, other organisations (coastguard, marina) and any other stakeholder and interested parties that showed an interest in attending the exercise.

The threat from the Rena grounding required the construction of a *Shoreline Booming Report* by Maritime NZ which was unique to the Coromandel area. This was to enable a response in the likelihood of oil being transported to the eastern seaboard of the Coromandel. Any oil slick would have had major environmental, cultural and political ramifications if the oil had entered estuaries and harbours. It is the *Shoreline Booming Report* that WRC wish to build on and formalise as a response plan for these areas.

Unique environmental geographic characteristics of the area are predominantly small to medium size estuarine and harbour environments with narrow entrances creating very high current flows at the entrances. Narrow entrances not only create high flow but also create the opportunity to intercept the oil by deflection methods while in a concentrated space, and in theory, easier to contain and recover.

Because of potential impacts to these important and vulnerable environments, every effort should be made to redirect and recover oil before it enters the upper areas of harbours and estuaries, minimising recovery cost and environmental damage.

It should also be noted that not all areas of every harbour can be protected. Hence, not only does each harbour need to be prioritised, so too must areas within each harbour.

The fact that there is very little that can be done to intercept oil once released into the open ocean (lessons from Rena) has highlighted the need for a concerted effort to be made to prevent oil entering sensitive habitats such as harbours and estuaries. The only realistic environmentally, culturally and politically acceptable place for oil collection and recovery is at the entrance to these areas. If a response is required and the interception is seen by the public as well organised, planned and effective, public support will follow rather than counter-productive frustration.

The purpose of the exercise:

1. To assess the parameters and restrictions of any oil response in swift water and their degree of restriction; to be confirmed by experience rather than present theorising limiting booming to low current areas.
2. Reinforce correct workplace health and safety procedures.
3. To find an effective means to manipulate oil by deflection to a nominated collection point, allowing interception and recovery.
4. Transform theory and learning's into fact and an action plan template (re: Maritime NZ's *Shoreline Booming Report*) for each type of habitat. This report will then form an event Incident Action Plan (IAP) for these specific areas and others like them.
5. Educate and inform stakeholders and other interested parties.

1.2 Scope

- Experiment with and confirm/complete the *Shoreline Booming Report* produced in response to inadequate harbour and estuary protection techniques highlighted during the Rena grounding response.

- Develop effective booming and collection methods for:
    - Whangamata harbour
    - Otahu estuary
    - Opoutere harbour.

- Study differing effects of booming techniques on high current flow unique to each site listed. These three diverse types of habitat should give a good grounding for most environs in the Coromandel region. Furthermore, the lessons learned from the deployment will develop strategy which can be transferred to other sites in the Waikato region if required.

1.3 Execution

The purpose of the deployment was to familiarise methodology with different booms and to find their limitations as deflectors in high current areas.

- Trial booms, boom anchoring, and boom type combinations to find the most effective method to deflect oil to designated collection points

- Use in-situ plant such as the mooring piles in the Whangamata harbour as an anchoring methodology to deflect any oil through a series of booms set at a very slight angle to the current.
- Experiment with buoy booms, floating ropes etc, and anchoring systems to create a surface deflective current to deflect oil for collection and recovery.
- Test the release of booms on an outgoing tide (as would need to happen in event)
- Use the day to educate and to inform local residents, Iwi, tier 1 operators, other organisations (coastguard, marina) and any other stakeholder and interested parties

As the majority of the deployment exercise can only be effective during incoming tides, exercise duration may have to extend for two or three days. One day per site may be realistic. Lessons learned may be able to be transferred to another site and in doing so reducing the time required for deployment.

As this exercise is not standard procedure, the time frame for each trial was hard to pre-determine. The initial deployment took place at Whangamata harbour and on the second day of deployment, both Otahu and Opoutere were boomed simultaneously to imitate a real event. The exercise purpose was to come to conclusions around booming procedures and not solely as an equipment familiarity exercise.

1.4 Development of shoreline booming report

The following booming strategy was developed prior to the deployment to try to ascertain the best angle and situation for the trial. However, due to tide/time restraints and concerns over the safety of both the boat crew and private property, it was decided that only the first scenario was to be used on the day.

1.5 Preliminary strategy

Each site to proceed with the boom deployments as stipulated in the Shoreline Booming Report. To develop and progress the efficiency of any boom deployed at each site there will be a progression of the booms into a role of deflection and collection points for recovery. The behaviour of the boom will need to be observed to make sure it is capable of intercepting and retaining oil without it being dragged under the boom. Sawdust was not used as an oil simulator for the following reasons:

- Its value as an oil substitute was questionable. Buoyancy tests need to be carried out comparing the buoyancy of each substance. The buoyancy of oil types may vary depending on molecular makeup, weathering, and concentration.
- The practice of adding foreign material to the environment may not hold up to scrutiny

It is the aim of the exercise to effectively deflect any potential oil out of the main stream current entering a harbour or estuary into an area suitable for collection.

The length of boom required to carry out the exercise is unknown and is one of the reasons the exercise is taking place. It is envisaged that a considerable amount of boom will be required to enable the small angle required in the swifter current. The booms are not to be used in the conventional way by allowing the boom to develop a pocket in it as this will immediately allow any oil detained to be pushed under the boom. The boom needs to be on such an angle that the oil will continually move down the boom rather than be pushed underneath and lost. Once the oil is out of the mainstream current, more conventional booming methods can be used to collect the oil.

Scenarios developed to assist the Shoreline Booming Report are highlighted in the following diagrams. These are guidelines for trials to develop successful booming combinations and/or learning's to give some certainty, confidence, and clarity as to actions required should a spill threaten this coastline.

Figure 1 Pre-deployment planned heads set

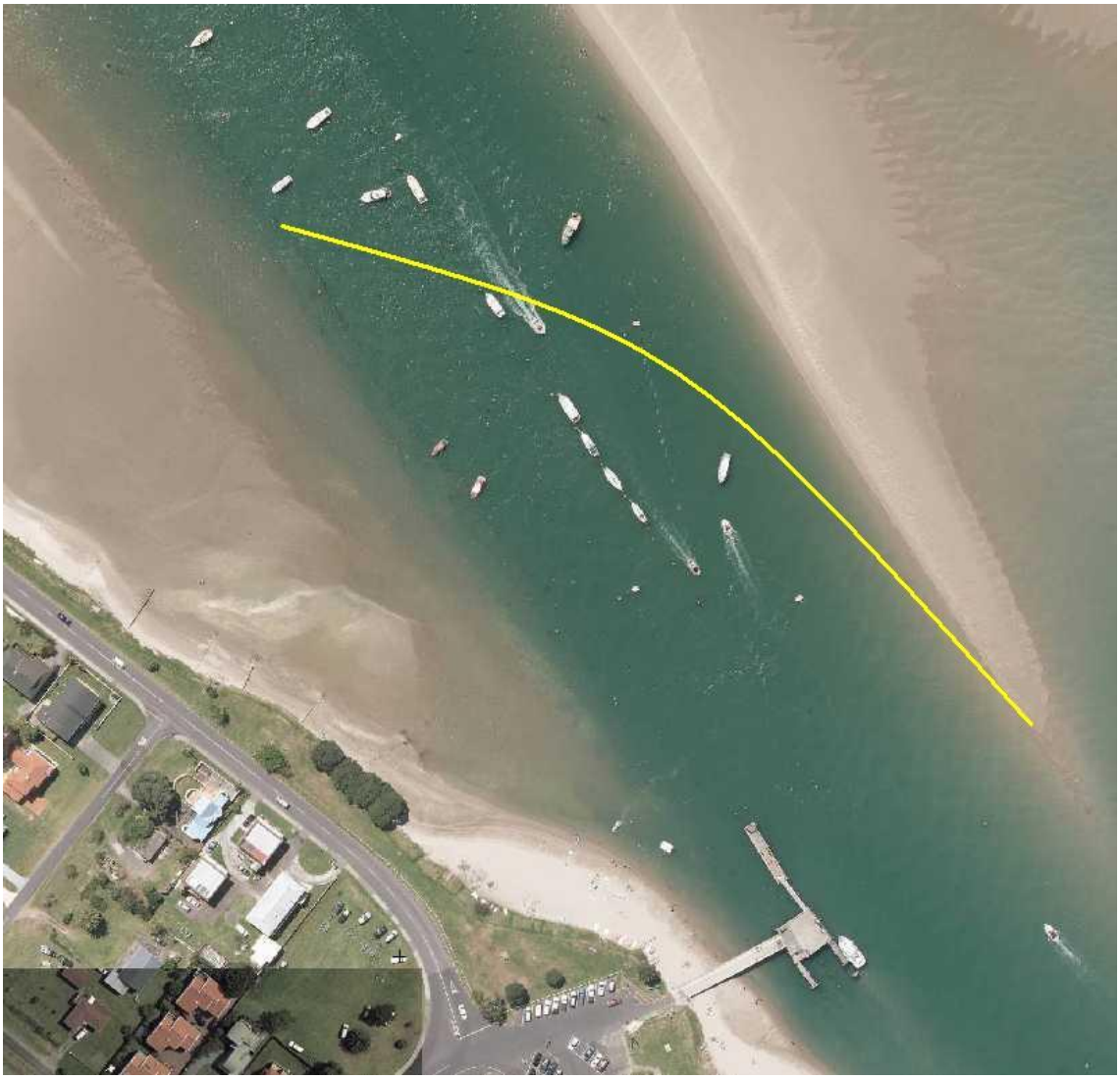

Figure 2 Pre-deployment setting

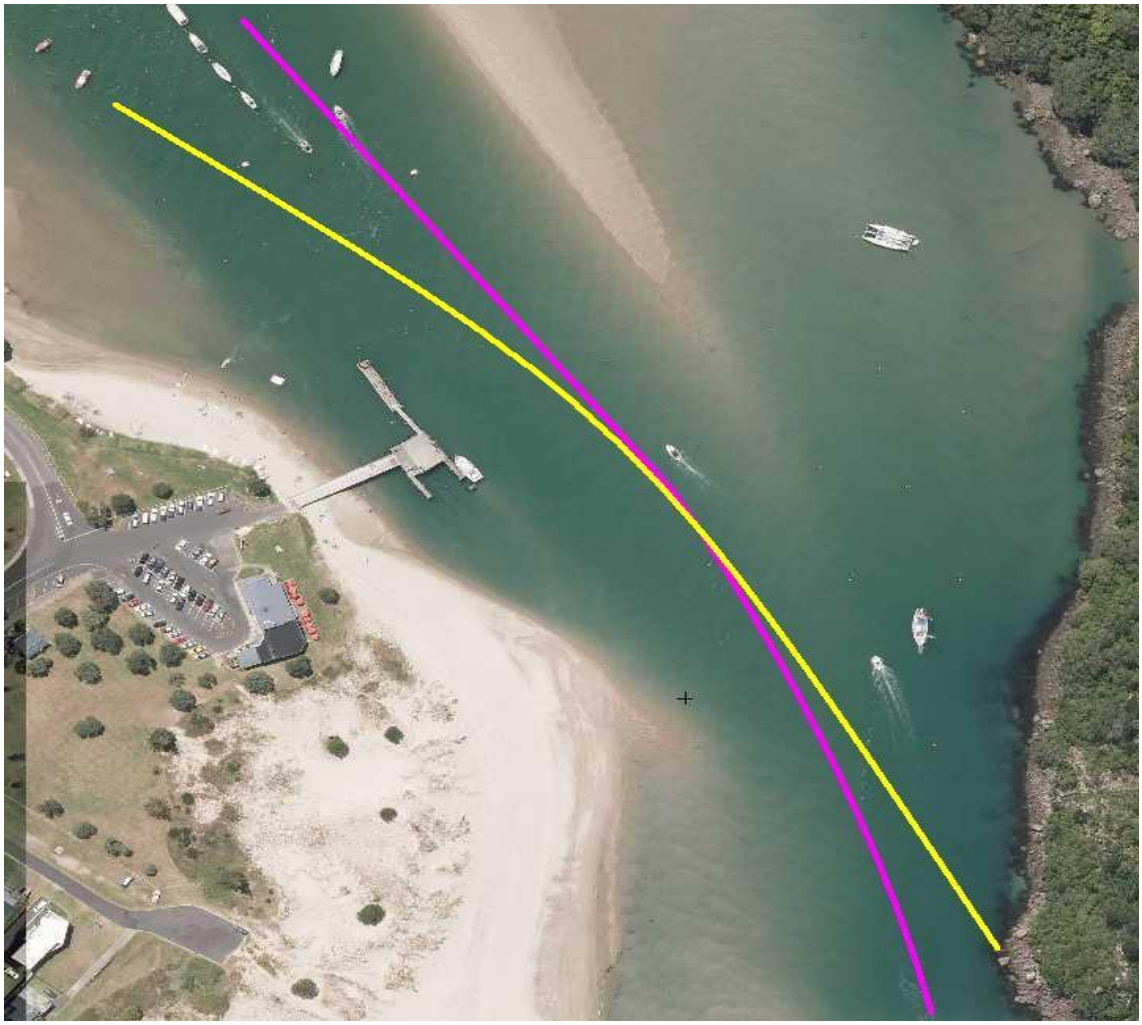

Figure 3 Main current flow at entrance and proposed boom set

Main current flow at entrance
Proposed boom set

2 Deployment

Weather on the first day was overcast and with light winds. The first day involved 28 staff from WRC as well as two from Taranaki Regional Council and one from Bay of Plenty Regional Council.

The weather on the second day was sunny with very light winds. Day two deployments consisted of two teams. A team of 8 went to Opoutere and another of 12 staff deployed boom at Otahu. There was no significant swell or sea on either of the days.

2.1 Day 1

The deployment schedule had been circulated (doc # 2182231) prior to the event which indicated that the truck needed to be unloaded by 0900 and the safety briefing to be held at 0930. According to the health and safety monitoring report (doc # 2209215), this anomaly of unloading of the truck before the safety briefing caused considerable confusion and led to a number of health and safety issues (doc #2204147). These issues will be addressed later on in the summary of this report. Set locations are below.

Figure 4 Location map showing set positions

Set positions are above: RED set 1; YELLOW set 2; GREEN set 3

2.1.1 Set 1

At 0930 the briefing took place and direction given for the first day. The truck unloaded the booms in preparation for the deployment and one large boom was deployed consisting mainly of rapid deployment boom stock. This was towed down to the channel going into the marina entrance and deployed out into the current as set out in the Shoreline booming report. This set was carried out with the seaward end secured to a mooring pole and the other pulled in until the angle and load was correct.

Figure 5 Preparing booms for towing to set site

Figure 6 Boom set 1

One of the first noticeable issues was that the radios supplied were very intermittent and made communication difficult. Because of the broad deployment area (refer figure 5) there was also a need for more radios, as contact needed to be made between the Regional on Scene Commander, the operations manager, three boat crews, and the crew supervisors deploying the boom on the beach. Realistically, this would be the scenario in a real event, making the chain of communications a high priority for operations and health and safety reasons to ensure the boats and shore crew can keep in contact. This would be critical if there was an issue with controlling the booms in swift water, for example; boat motor failure or similar. There is little margin for error while manoeuvring and setting booms in strong current. There needs to be operational awareness of others actions and requirements.

It was particularly difficult to communicate with staff around machinery. It is quite often windy on the coast which makes communications difficult if using inappropriate radios. Cellphones could have been used but cellphone coverage is very intermittent in coastal areas. Cellphones are not ideal if an ongoing conversation is needed as was the case in this situation.

2.1.2 Set 2

The second set of the day consisted of an all land-sea boom, with ballast water added before the boom was towed with the current into its position. The boom set was in the position of the second deflection boom as stipulated in the *Shoreline booming report.* The method employed to set this boom was in the conventional way with the land end of the boom secured first. This boom was relatively short so there was not the risk potential that the long booms presented in this situation.

Figure 7 Boom set 2

It soon became evident that the angle was far too acute to the current once the anchor held. The boat was also struggling to pull the boom against the current and it was very difficult to move the ballasted boom in the shallows to lessen the angle. The only real way to move the shore end was to drag the end downstream with a ute.

Figure 8 Dragging the ballasted boom downstream

Even with the current assisting, it proved to be a very difficult manoeuvre to carry out. Eventually the boom was moved somewhat but the angle was still too severe as can be seen by the pictures.

Figure 9 Angle of boom is still too severe

In similar current the oil must be deflected in-shore gradually as any oil caught in the belly will be forced under the boom. With time at a premium the set was released from the shore and both booms from set one and two were joined to carry out the final set of the day. Figure 9 demonstrates the necessity to set ballasted booms without the belly being allowed to form and cause the boom to trip or tip over allowing the flow and any oil, to be forced under the boom.

2.1.3 Set 3

The aims of set three were to see how the booms behaved in the stronger current out at the heads of the harbour and to try different deployment techniques to cover as much of the entrance as possible. The technique used for this set was to tow the very long boom alongside the shore line then swing the end of the boom out into the current as much as possible until the boom failed to function properly or the load became too great.

It is imperative in these sorts of operations to be acutely aware of safety and to have failsafe release mechanisms should the weight become too great on the vessel. The vessel facing into the current must always be in close contact with the ROSC while manoeuvring and positioning the boom. To release a boom of this size into the current could have a range of health and safety issues as well as potential damage to private property.

Figure 10 Location of boom set 3

Figure 10 illustrates how the boom passed close to the shoreline then went around the corner hugging the sandy side of the entrance to stay out of the main current flow. Once the shoreline end was in the right position the boat had to move quickly across the current and anchor the boom before the current caught it too much. This was because the shore end was partially restrained (figure 12). If the end of the boom was unrestrained the boat could anchor the boom with minimal strain on the equipment. The problem with this technique is if the boom cannot handle the current load the boom end nearest the shore may end up well off the shoreline. Another deflection boom could be installed on the outside of the already set boom (refer figure 1) to get the oil nearer the shore for collection.

In a real event it is envisaged that due to the shape of the coastline any oil would naturally hug the shoreline closest the wharf which would negate the need to boom the full width of the harbour entrance.

Figure 11 Boom towed out to setting position

Figure 12 Boom manually moved across the current towards shore line

A long rope was attached to the shoreline end of the boom. It was intended to be loosely held, to avoid putting any weight on the boom while the boat positioned the seaward end of the boom and anchored it before load came on it. Unfortunately through lack of communication, both at the briefing and by radio, the rope was secured to a tree. This made the boats job extremely risky as the boom loaded up in the current.

The rope was released from the tree and once the boat had anchored off the seaward end of the boom, the shore end was manually moved across the current and toward the shore line. Figure 13 clearly shows that even with the rapid deployment boom there is a deflection of scum towards the collection shoreline. If the boom was short of the shoreline, a shorter deflection boom could be used to move the oil closer to the shore (see figure 1). Figure 13 shows the extent to which the boom extended across the entrance.

Figure 13 Final fixed position of boom – shore end

It must be explained at this stage that the type of boom (rapid deployment) predominately used in this setting was not ideal. The ideal scenario would be to use land-sea boom with minimal partial ballast set to deflect maximum oil with minimal current load.

Once the set was finished the shore end rope was released (figure 14), the boat once again took over control of the boom, the anchor was retrieved and the boom was left to stream unloaded in the current.

Figure 14 Releasing the shore end rope

There was some debate over best methodology to use to retrieve the boom. It was decided that the boom could be retrieved with the current but that it would have to be pulled in very quickly before the current loaded up the boom and swept it up the harbour. All hands were required to rapidly retrieve the boom as the seaward boat slowed its harbour progress as much as possible (figure 15 & 16).

Figure 15 Manual retrieval of boom when released from boat

Figure 14 Manual retrieval of boom

At this time it must be explained again that these sets use untried and unconventional methods, so to brief exactly on the methodology was going to prove difficult until after the trials. Good radio communication would have made this task much easier and would be essential in a real scenario. The shore rope was released (off the boom, not the tree) to relieve the pressure but without the long rope attached to the released end. A boat did manage to bring the shore end of the boom back in with a shorter rope, and the long rope was re-secured to the shore end of the boom. This was pulled in manually until there was a slight deflection of scum towards the beach (figure 13).

2.2 Day 2

Due to tidal changes, the start of the deployment of day two was delayed by 1 hour to allow for the slight change in tide times. One crew was to take the WRC crane truck to Opoutere to deploy one length of rapid deployment boom, while the remaining crew were to deploy a long boom, consisting of land-sea boom, out into the current and back into the shallows where there was less tidal flow. Once again it would have been ideal to use all land-sea booms, but we had insufficient quantity for the land/sea interface as the main aim was to trial the un-ballasted boom in the current. This was the main priority for this set. This also gave a graphic demonstration to staff of the advantage of land-sea boom at the tidal interface when compared with the rapid deployment boom.

2.2.1 Opoutere set

The plan was to deploy one length of rapid deployment boom out at an angle to deflect any oil into the bank nearest the car park. The other aim of this deployment was to set a boom without a boat and use the bridge as a means of access to the other side of the creek. The boom would be held in place by anchors and ropes. Tidal flow at Opoutere was very slow and did not pose much of a problem for the rapid deployment boom.

Figure 157 Deployment of boom at Opoutere

2.2.2 Otahu set

Thanks to previous comments by Greg Meikle it was decided to blow the land-sea booms up with air (all chambers were filled with air which made the boom rigid) and carry them down to the water where they would be situated before they would be ballasted. This technique made the deployment of the land-sea boom very fast and meant the correct amount of ballast could be added gradually to get maximum performance out of the boom. Because most of the estuary was dry sand, it was a reasonably straight forward task to carry the inflated boom out onto the sand and set it.

Figure 168 Inflating the land-sea booms with air prior to setting

Figure 19 Setting the booms

Once the tide had turned the boat was launched and the boom was towed very easily out into the current. Because there was no ballast, the boom did not load with current and was easily straightened and moved from the shore. The shallow water in the estuary meant that it would have been very difficult to get the boat close to the boom to ballast the boom at any time other than full tide. Waders (with appropriate training) were suggested as a viable means to work the boom in the shallow water. This would seem to be a sensible answer to the depth problem for most of the eastern seaboard of the Coromandel with characteristically many small estuaries and harbours.

Figure 20 Booms set in the shallow water

Figure 21 Final boom set

3 Lessons learnt

The following is a summary of the lessons learnt from the deployment. Not only positive achievements but also deficiencies in equipment and the supporting structure of procedures which play a pivotal role in efficient booming techniques, carried out in a safe manner. It must always be remembered that this exercise was challenging and was exploring new ground, which meant there was no set methodology to follow with the boom setting.

3.1 Day one

The unloading of the truck once again demonstrated the health and safety problem that it has in the past. The problem lies in the interpretation of responsibilities surrounding the unloading operation, as a Waikato Regional Council (WRC) operation, under WRC control and health and safety policies. This is not the case; and unloading should be solely a contractor operation with WRC staff having minimal involvement with "principle" operation overview. In the past the unloading has been viewed as a WRC operation, possibly because Kerepehi Transport is permanently working with the Paeroa team and is viewed as a WRC operation from a plant and staff basis.

The original contract for services for *marine oil spill responses* reached its completion date on the 30th June 2012 (doc # 1798293). In effect there was still a contract in place to provide the service of transportation of oil spill equipment and trained staff at the time of the deployment, which has now expired. In order to simplify the trucking process and address the issues highlighted in the deployment health and safety report (doc # 2209215), the unloading and transportation of the equipment should be treated as any other contractor delivering a service and the operation carried out under the health and safety procedures of the contractor.

WRC are getting involved in actions they are not required to do, and in doing so, putting their staff at unnecessary risk. To remain clear cut and allow both individual health and safety policies to act as they should, the delivery of the gear should be treated as any other delivery of goods is treated. The unloading area should be demarcated with unloading the sole responsibility of the transport company's staff. **Once the goods are delivered and signed off the responsibility of the handling of those goods then becomes the responsibility of WRC.** This allows the unloading operation to be under the control of the transport companies staff and health and safety.

One comment was made in the health and safety report (doc # 2209215) that there should have been a health and safety briefing before the gear was unloaded. Because the site will be controlled by WRC once the deployment has commenced, it is important WRC staff ensure the unloading process is carried out safely, and intervene as the "principle authority" if there are obvious safety concerns. It is still primarily the responsibility of the truck operator to assess site hazards and to work around them in a safe manner while carrying out their operation. The demarcation point in the unloading of the marine oil spill gear needs to be defined and adhered to.

Another problem on the first day was the quality and quantity of the radios. They were kindly on loan from the Navigation Safety Team but it soon became clear there were not enough of the radios to allow good communication between all the necessary points of the deployment. In effect there were three boats, the ROSC, operations manager and the crew deploying the booms from the beach which all needed to be coordinated. Ideally, seven radios would have alleviated the communications issues. There was only

one radio on shore which, because of the extent of the deployment site, was not adequate and led to misunderstandings on several occasions.

There is a need for an open channel so the others involved in the operation know what is going on at other action points of the deployment. Due to the type of deployment and the conditions with the current, combined with the length of the boom, it was very difficult to change the direction of the deployment to suit the changing currents and unknown boom behaviour. In a real life situation, good radios would be critical to ensure the operation is carried out in a safe and efficient manner.

Despite the lack of communication, all boom settings for the first day were successful and a lot was learnt from the behaviour of the booms and the ease at which they could be set in current, as long as a few rules were observed. They were:

1. The boat must control the up-current end of the boom before the trailing end is loaded and positioned/secured as required.
2. Do not put any load on the boom till the seaward end is in place.
3. It was much easier for the boat to control the boom into the current than with the current. Despite this fact, it is still possible to control the boom with the current as long as every part of the operation knows their role.
4. Boom movement with the current requires two boats for proper control.
5. If going with the current, the upstream boat controls the rate of movement or speed while the downstream boat controls the direction of the boom.
6. Care and skill is required to ensure the boom does not load up at any time during down current manoeuvring.
7. When finished with the boom set, release the land and/or down current end first.
8. The downstream end needs to be set in such a way that enables it to be released quickly should the need arise due to staff or gear safety concerns.

The most important learning from day one was the knowledge that Waikato's harbours can be boomed regardless of the tidal flow

3.2 Day two

Day two comprised of two boom settings in very different situations. There were good learning's from both Opoutere and Otahu deployments. They were:

1. The landsea booms are easily handled once blown up. This enabled them to be placed, joined and anchored accurately with the weight spread over staff evenly.
2. Waders would have made setting the booms much easier as they could in effect be handled by one person in shallow water.
3. It was much easier moving and maintaining the booms by wading rather than by boat. Gumboots however where very limiting and not recommended for use in water if flooded.
4. Setting the booms by hand meant they could be deployed before an incoming tide brought oil into the estuary. Booms could only be deployed by boat at close to high tide.
5. Tidal rivers can be boomed without a boat as long as long ropes are available and structures are used to cross the rivers. Most tidal rivers in the coromandel have some form of bridge or crossing close to the river/tidal interface.
6. The landsea boom is much better than the rapid deployment at the sea/sand interface. Rapid deployment booms are okay if they do not dry out at low tide

3.3 Debrief points

Chain of command and delegations need to be clear and concise.

Waders would be invaluable in setting and maintaining booms as harbours and estuaries are very shallow even at high tide.

If time allows, booms can be easily set in most estuaries by hand on the dry sand at low tide and up to half tide either side of low.

Need good radio communications for land/land and land/boat.

Lifting attachments for boxes needed.

No decontamination gear yet.

Basic toolbox/shackles etc for Hamilton.

Blow up land-sea booms and put in situ before ballasting (easier on water than from land).

Land/sea booms with no ballast are easy to set up in low tide situations.

Health and safety officer needs to be on site at all times and work through ROSC and /or operations manager to ensure good practices at all times.

Need operations, logistics, and welfare staff on site at all times.

High current areas can be boomed as long as booms are set correctly.

Long lengths of boom can easily be manoeuvred and set by vessels. It is imperative that the land end of the boom can be released quickly in an emergency if control of the boom is lost. Control is lost by allowing the boom to belly out too much, becoming at right angles to the current and loading up. The pressure on the boom may need releasing from the shore because of the weight on the anchor or the boat being unable to control the weight. It is easier for the boat to rapidly gain control on the water once the shore end is released as the boat can move faster than staff on the beach. The danger is that the boom could take off and wrap around a boat or other structure, which would make retrieval impossible until slack tide. This could cause damage to private or public property. The boom would more than likely sustain damage from barnacles or sharp edges on the fixed object.

Land-sea booms can be ballasted to suit different conditions. This is the advantage of ballasting on the water and incrementally.

Identification on vests would help to identify who was in control of and responsible for what.

Basic rope knot skills need to be improved or have designated persons with knowledge.

Smaller plastic boat can be used to push the belly out of the boom and reduce weight temporarily.

Setting booms is easier at low tide than high tide in shallow estuarine areas. There is a very little window of sufficient depth to allow boats to work in the estuarine environment. In contrast the window of time wading can be used to set booms is far greater.

To purchase

- Toolbox
- Radios
- Decontamination gear
- Waders
- Stihl blower
- Lifting straps
- Identification vests
- Quick release coupling (under pressure) or knot lessons

4 Operational recommendations

Even though the deployment went very well, there were lessons learnt from the exercise which provide valuable feedback to WRC. The following are issues and recommendations regarding operational procedures. This exercise was definitely not a run of the mill exercise with a lot of challenges set and experienced. The exercise was new in content and very closely mimicked a real deployment for intensity and challenge. None of the sets were done by the book. The list is without prejudice and is intended to make MOS (marine oil spill) response safer and more efficient.

1. **Issue:** Participants' individual roles were not clear throughout the exercise. This caused confusion over the chain of command and affected the efficiency of the deployment exercise.

   Recommendation: Roles are clarified during briefing and those with important roles are provided with hi-vis jackets/jerkels, labelled with their position.

2. **Issue:** Organisational chart was not on display leading to confusion on roles

   Recommendation: An organisational chart is displayed during future deployment exercises or in an event to clarify who is doing what on the day. This will not only make it clear to all staff but also the delegated staff will have clarity in their role.

3. **Issue:** Pre-deployment meeting didn't spell out delegations and chain of command. This has partially been addressed in previous recommendations but a lack of CIMS training and understanding may be responsible for some of the confusion as there tends to be a reversion to the usual chain of command used for BAU instead of operating within the CIMS model.

   Recommendation: All MOS staff have CIMS 2 training as a minimum. CIMS does form a small part of responder training but there is may be a need for further development.

4. **Issue:** Task allocations where not clear

   Recommendation: Task allocations forms part of the organisational chart on the day. Tasks were sent out prior to the event but emails where not read. Allocation needs to be spelt out on the day.

5. **Issue:** There are no standard operating procedures for boom deployments. This results in a lack of clarity of the processes required in a boom deployment exercise.

   Recommendation: SOP templates should be created for deployments covering such topics as boom preparation, boom deployment, boom retrieval, health and safety and site management.

6. **Issue:** Lack of sun and rain shelter on site for staff. This is an issue which was also brought up in the Awakino oil spill report.

   Recommendation: Covers, ropes, or a portable gazebo and any other suitable equipment are included in response equipment. ***This has since been resolved with the consequential purchase of two tents.***

7. **Issue:** Resource requests from previous exercises and events were not followed up. In particular, this resulted in a lack of shelter even after this issue was discussed in the Awakino oil spill report.

   Recommendation: This exercise highlighted the importance of following up on the lessons learnt from previous events, particularly with resource requests. Report results or recommendations should be attached to the regional plan to ensure compliance during a review.

8. **Issue:** Traffic management was not set up correctly

   Recommendation: Because of ongoing issues surrounding traffic management it is recommended that either a traffic management company is engaged to carry out the task or specialist staff are trained within WRC to handle this issue.

9. **Issue:** The radios supplied were intermittent and made communication difficult. Loud machinery and the windy conditions of the coast added to the communication difficulty. Using cellphones was not desirable because of the intermittent coverage and ongoing conversation required with limited battery life.

   Recommendation: This issue has been rectified with training and purchase of suitable radios. It is also recommended that car phone chargers are included for field use. ***Suitable radios have since been purchased.***

10. **Issue:** There were not enough radios given the size and scope of the deployment area. Contact needed to be made between the ROSC, the operations manager, three boat crews, and the crew supervisors deploying the boom on the beach

    Recommendation: Addressed **a**s per above.

11. **Issue:** There was a lack of a basic toolbox with short pieces of rope, shackles, and basic hand tools like hammers and spanners etc.

    Recommendation: A basic toolbox is included in the deployment boxes.

12. **Issue:** Specialist health and safety advice is required sometimes as is assistance in providing PPE as required.

Recommendation: Dedicated H&S staff be on site for all exercises and responses.

13. **Issue:** MOS staff were needed to carry out tasks unrelated to response training. This tied up MOS staff meant to be involved in the exercise

    Recommendation: Untrained (MOS) staff and admin assistants are included in future deployments to facilitate any odd jobs.

14. **Issue:** Because of numerous tidal flats in the Waikato response region, it became apparent that booms could be easily set while wading as boats had limited access. Gumboots proved to be inadequate for checking or moving booms.

    Recommendation: Waders are purchased and training given for wader use to enable booms to be set during a large portion of the tidal timeframe.

15. **Issue:** There was some confusion over who was responsible for unloading the truck, which lead to the health and safety meeting occurring after the truck was unloaded. This caused considerable confusion and led to a number of health and safety issues.

    Recommendation: The health and safety meeting takes place before any unloading activities are undertaken by the contractor or WRC staff, so that all exercise participants are aware of health and safety issues and are also able to point out any issues to contract staff. It is also recommended that the unloading area is securely cordoned off with only transport company staff unloading crates. As WRC are the principle there is still a need to ensure safe practices are used on their work site.

16. **Issue:** During the exercise the land-sea booms were very easy to move around un-ballasted. The booms also required different volumes of ballast to be efficient in the current while still able to be controlled. Full ballast can only be used in little or no current.

    Recommendation: WRC investigate the techniques for water ballasting when the booms are in situ. This would allow better control of the ballast volumes.