INTEGRATED BOOMING PLANS, EMERGENCY BOOMING STRATEGIES OR JUST THE THIN RED LINE?

An article contributed by Mark Francis of Oil Spill Solutions.

Mark Francis has been involved with the oil industry since 1975. He attended his first oil spill in 1976, the Tanker Elaine V incident. He became head of response for inland spills within the UK for British Petroleum E & P in 1980 for 10 years responding to well, storage tank and pipeline spills throughout the UK. Over the next 20 years he continued to build his international operations experience and has also specialised in spill response training, delivering IMO and other courses in more than 20 countries.

Have you encountered contingency plans that include oil booming strategies that really don't make sense?

This is a good idea that went wrong, usually because the people involved in positioning red lines on a map have never had to physically deploy a boom in this position.

These people may have done training exercises but there is a difference between this and real responses. Training is usually done in good weather with a large group of people of whom many do not want to get involved.

A real response involves a small group of people who have a job to do as effectively as possible in a given time, whether it is in the Arctic or a rainforest.

Lack of real experience leads to red lines being drawn on maps of plans in the wrong places e.g. the narrowest part of a river, this uses less boom but it is where the strongest current will be, especially if it rains or when the tide turns.

Red lines have found their way onto maps in plans around the globe. A large proportion of these are in the wrong place which will be found out the hard way when the incident happens and often when the media are taking photos.

Let’s visit a few places:

North of Usinsk, Komi, in the Russian Federation is an oil field. When I visited it belonged to a joint venture called Komi Arctic.

The nearest river is 250m wide with the water knee deep during the summer, frozen solid during the winter and full of broken ice during the spring.

A red line was drawn at 90˚to the river flow, tied off to the bridge stanchions where the photos were taken.

Anyone who knows the basics of boom deployment knows that booms positioned at 90˚ to the current will fail.

There is a big sweeping bend about a kilometer downstream. This is where we placed the anchor blocks and built a collection area in the river bank for the day when the spill happens.

I have been in a boat trying to connect a boom at a mid-channel buoy where the bend in the boom below is. This could only be done at slack tide.

Because of various factors the tide started to turn before we could complete the connection, this put extra force on the boom which parted and broke a responder's arm at the same time.

During training courses we are often asked to carry out the practical exercise at the first most critical point on the company's plan.

In this case the river current could be between 0.5mps (meters per second) and 1.5 mps.

The access was good and the exercise went well on the day.

It was later found out that the company had no equipment at the site and relied on another company supplying it from 200 km. away or 4 hours by road.

The basic problem is a mathematical one, worst case 1.5mps x 4hrs = 21,600m + 1 hour for deployment. i.e. 21,600m + 5400m = 27,000m or 27km from the supposed critical point.

With no equipment on site 27kms downstream would be the first potential booming point. Did anyone do a recce to see if there is access at this now first point of response?

It is probably too late to change these red lines into circles. A circle around an area indicated as a recovery point does not allow anyone one to say the boom is at the wrong angle. It allows for flexibility which is the most important thing.

Throughout the development process consultation with other relevant bodies such as neighbouring local authorities, fisheries departments, tourist boards and nature conservation bodies is essential to ensure their co-operation and input.

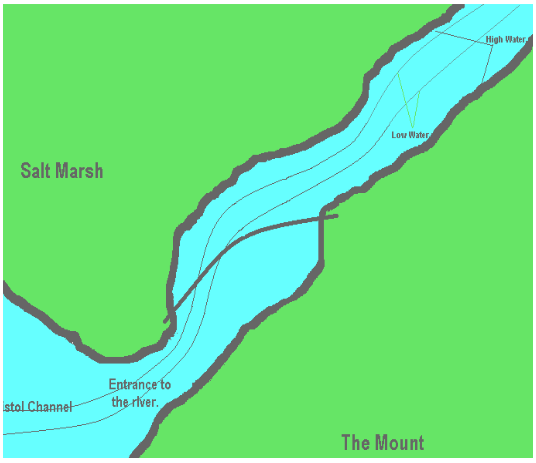
Plans must be flexible and allow for seasonal variations.

When a plan has been completed it should be evaluated by a full-scale trial. This is very important because the failure of a boom in an incident can waste valuable time and resources. In addition an unsuccessful deployment will appear incompetent to the public and media.

However, there will be some sensitive locations where the planning or validation may show that booming is not possible.

In these cases it is essential to keep detailed records to demonstrate that booming has been considered but would not work in that particular location.

Here is an example from what is considered one of the best response plans in the country.



The Bristol Channel has one of the largest tidal ranges in Europe at approx. 9m. When the tide rises it rises slowly but when the tide turns the current increases dramatically especially from small inlets like this one.

The boom *above left* was drawn between two points with difficult access. It would be better to accept a bit of contaminated shoreline to a point where there is good access than putting the boom in this position.

The example below shows dramatically the difference between the responder and the people drawing the red lines.

As can be seen the red lines (D) deflect oil into a (CR) U configuration where the apex is in the middle of the river, so recovery will be difficult. In fact oil will be lost.

Why there is no back up to this collection point is yet another problem. From a practical point of view every collection point requires a back-up as there will always be some oil that gets away.

Due to the fact that sealing to a steep river bank is difficult and the plug hole vortex[1] is normally present this isn't the best way to try to collect oil.

Then there is a (P) inlet being protected after the collection point!

1 "plug hole vortex" - In the corner of a boom where it meets the bank you find a vortex which looks like water going down through a plug hole. (see below)

Now let's go to the river rather than using Google Earth.

In real life the water flow in the river is considerable faster than 1.0 knot and the river banks have difficult or impossible access through the vegetation on both river banks. (see picture on left)

The speed of the river will be determined by the dammed reservoir up stream and the amount of rainfall for the time of year when the problem occurs.

Now (see picture below, left) we have the exercise and collection booms are positioned where access is most difficult. Driving stakes into these areas is made difficult by the amount of tree roots.

Just to make life more difficult you are not allowed to tie any ropes to the trees.

To get to this collection point you have to jump over the protected inlet or get a boat. Pumps, skimmers, temporary storage and tanker hoses all have to moved past the inlet to be positioned near the collection point.

The calmest and most easily accessible point (see picture above right) is being protected, why I do not know.

This to me would have been the best place to deflect the oil into. Here the water is calm and the access is easy even for a vacuum truck. We would just have to protect the vegetation on the banks as best we can and deflect the oil into this perfect collection and recovery point.

There is always a need by some people to try to protect everything.

Unfortunately with the best will in the world there will always be places that cannot be totally protected.

This is one of these places. There have been occasions when we were asked to boom the mouth of this area (see photo left) near Portsmouth in the south of England.

This sort of area fills slowly during the rising tide and booms could be put in place but when the tide turns all the water needs to leave through the narrow entrance.

During this time the current speed will reach double figures and no boom in the world would be able to withstand those forces without doing serious damage.

This photo (right) is during the falling tide in the Bay of Fundy, Nova Scotia.

The height of the tide can reach 16 meters (53ft) in the back of the bay.

During each tide cycle 100 billion tonnes of water leaves the bay. That is more than the flow of all the world's freshwater rivers combined.

I have no problem with the idea of integrated booming plans or emergency booming strategies that are essential for an effective response.

I do have a serious problem with red lines; let's change the line for a circle. Now a responder is not restricted to make the decision as to what angle and where the boom should be positioned on the day of the incident.

This would be more efficient and safer for the responder.