

ATTACHMENT 81 – *EXCERPTS OF ENBRIDGE EMERGENCY RESPONSE BOOK 7, RESPONSE METHODS FOR RIVERS*

Excerpts from Enbridge Operating & Maintenance Procedures
Book 7:
Emergency Response

June, 2009

Purpose Containment of a product released in a river requires careful selection of control points and response strategies, which may change depending on weather and river conditions. Once released product reaches a river or stream, the rate of contamination is greatly increased.

Requirements Initial Response

When selecting containment, recovery, and cleanup techniques for releases in rivers, consider:

- amount and type of product released
- resource requirements
- equipment availability
- time required to get equipment and personnel onsite, and to deploy equipment
- site accessibility for equipment and personnel
- potential environmental effects
- weather conditions (e.g., wind speed and direction, temperature, weather forecast)
- water conditions (e.g., velocity, currents, turbulence)
- areas of natural accumulation
- containment sites and control points
- aquatic habitat and vegetation
- wildlife in the area
- rate of oil slick movement

Containment

When containing releases in rivers, attempt to:

- confine the product as close to the release source as possible
- prevent the product from reaching a major river
- minimize the cost of recovery and cleanup

If containment in a major river is necessary, use techniques that are shore-based to take advantage of predetermined control points.

Contain releases in rivers using one or a combination of the following techniques:

- containment booms
- diversion booms
- sorbent booms
- earth dikes
- containment weirs

Booms

Boom configuration and the method of deploying boom depend in part on the location of control points. Typical methods for deploying river boom involve using anchors/boats or using BoomVane.

Dikes and Containment Weirs

Dikes and containment weirs can be constructed on intermittent drainage channels or on relatively narrow or shallow rivers to contain the flow of product. A dike can extend above the water and out from one shoreline, or from one shoreline to the other.

For dikes that extend from one shoreline to the other, maintain the flow of water by installing an inverted culvert through the center of the berm. This will keep the water from overflowing the berm.

**Table 1
Containment for Releases in Rivers**

Technique	Primary Use	Controlling Variables	Effects on Environment	Major Resources
containment booms	<ul style="list-style-type: none"> • where release enters water or if product is traveling down one shoreline 	<ul style="list-style-type: none"> • current speed—must be less than 0.6 mi/hr (1.0 m/s) 	<ul style="list-style-type: none"> • minor disturbance at anchor points 	<ul style="list-style-type: none"> • work crew—a three-person crew can deploy 90 m of boom per hr • booms—length totaling 1.5 to 2 times slick diameter • work boat and safety boat • storage site for recovered product and water or for BoomVane
diversion booms	<ul style="list-style-type: none"> • in large or swift rivers to divert slick to calmer water for recovery 	<ul style="list-style-type: none"> • current speed—must be less than 4 mi/hr (2.0 m/s) 	<ul style="list-style-type: none"> • minor disturbance at anchor points 	<ul style="list-style-type: none"> • work crew—a three-person crew can deploy 90 m of boom per hr

				<ul style="list-style-type: none"> • boom for diversion • work boat and safety boat or BoomVane
sorbent booms	<ul style="list-style-type: none"> • across narrow rivers • behind containment boom to absorb sheen 	<ul style="list-style-type: none"> • current speed—must be less than 0.5 m/s • degree of contamination—must be minor 	<ul style="list-style-type: none"> • minor disturbance at anchor points 	<ul style="list-style-type: none"> • work crew • sorbent boom • work boat and safety boat • disposal containers or incinerator for used sorbent
earth dike	<ul style="list-style-type: none"> • across very shallow streams and intermittent creeks 	<ul style="list-style-type: none"> • availability of sufficient earth 	<ul style="list-style-type: none"> • damage at excavation and construction sites 	<ul style="list-style-type: none"> • work crew or operator—a 10×4×2 m berm takes 1 hr to build • earth-moving or digging equipment • boom recovery device and storage area for recovered product • sandbags, liner material sheets of metal or wood
containment weirs	<ul style="list-style-type: none"> • in shallow streams and creeks to slow upstream velocity and to allow water movement from site while containing product • to maintain constant water level at release site 	<ul style="list-style-type: none"> • availability of personnel—may require constant maintenance in fastflowing streams • availability of construction materials 	<ul style="list-style-type: none"> • surface disturbance 	<ul style="list-style-type: none"> • work crew • earth-moving equipment or shovels • culvert material