

## **APPENDIX E**

# **HORIZONTAL DIRECTIONAL DRILL EXECUTION PLAN**





# Horizontal Directional Drilling - Execution Plan

**Note: This form shall be used on all HDD watercourse crossings (including rivers, sloughs, public drains or as required to meet the DFO Operational Statement on HDD)**

Date:		Location:	
Foreman:		MH Inspector:	
Drill Fluid:		Drill Equipment & Condition:	
Estimated Drill Fluid Qty:			
Max Pullback Load:		MER#	
		CD #	
Minimum Bend Radius:		Pipe Size, Material	
		Pre-Test Pressure	
Length of Drill:		Site Remediation Completion Date	

Fluid Loss Contingency Plan:	
Drill Fluid Management Plan (Incl. drill fluid disposal site):	
Environmental Protection and Monitoring: (DFO O/S, EPP, etc)	
Mitigation and contingency of geological conditions:	

# Horizontal Directional Drilling - Execution Plan

Workspace and equipment set-up (diagram showing entry and exit work areas including drag section)	
Drilling Comments	

Contractor Foreman: \_\_\_\_\_  
Date: \_\_\_\_\_

MH Inspector: \_\_\_\_\_  
Date: \_\_\_\_\_

## **APPENDIX F**

### **FRAC-OUT CONTINGENCY PLAN**



# Frac-Out Contingency Plan

## Frac-Out Contingency Plan for Horizontal Direction Drilling

Frac-Out, or inadvertent return of drilling lubricant, is a potential concern when Horizontal Directional Drilling (HDD) is used under sensitive habitats, waterways, and areas of concern for cultural resources. The HDD procedure uses bentonite slurry, a fine clay material as a drilling lubricant. The bentonite is non-toxic and commonly used in farming practices, but benthic invertebrates, aquatic plants and fish and their eggs can be smothered by the fine particles if bentonite were discharged to waterways.

The purpose of a Contingency Plan or "Frac-out" plan is to:

- Minimize the potential for a frac-out associated with horizontal directional drilling activities
- Provide for the timely detection of frac-outs
- Protect areas that are considered environmentally sensitive (streams, wetlands, other biological resources, cultural resources)
- Ensure an organized, timely, and "minimum-impact" response in the event a frac-out and release of drilling mud occur

## Contingency Response

- Once a frac-out is identified: All work stops, including the recycling of drilling mud/lubricant
- Determine the location and extent of the frac-out

If a frac-out occurs, isolate the area with sand bags, or silt fencing to surround and contain the drilling mud. Use vacuum trucks if necessary for clean-up. If the spill affects an area that is vegetated, the area will be seeded and/or replanted using species similar to those in the adjacent area, or allowed to re-grow from existing vegetation. After frac-out is stabilized and any required removal is completed, document post-cleanup conditions with photographs and prepare a frac-out incident report describing time, place, actions taken to remediate frac-out and measures implemented to prevent recurrence.

If a frac-out occurs in the River and has been monitored by our assigned personnel the drilling will stop.

If an abnormal loss of fluid, drop in pressure, or visible plume is observed indicating a frac-out or possible frac-out, drilling is to stop immediately and appropriate containment measures as needed to contain and recover the lost drilling fluids will be carried out as follows:

- Where conditions warrant and permit (i.e., readily accessible by a vacuum truck, shallow depth, clear water, not a potentially sensitive habitat, and low water velocity) and where a frac-out has been visually detected in a watercourse, attempts will be made to isolate the

fluid release using a large diameter stand-pipe such as a 45 gallon drum with both ends cut out, or a short piece of culvert.

- If the frac-out occurs on ground it will be contained using appropriate methods as proposed by the contractor.

The contractor will inform the Manitoba Hydro construction supervisor of the frac-out condition or potential condition, and jointly decide on the appropriate action as follows:

- Assign a person to monitor (visual or using a turbidity meter) for the presence of a muddy plume;
- Make adjustments to the mud mixture (e.g., add lost circulation material to the drilling fluid in an attempt to prevent further loss of fluid to the ground formation and/or the watercourse);
- Prior to commencing any pumping to deliver the lost circulation material to plug the fracture, have the vacuum truck in position to recover any fluids that otherwise may escape to the watercourse.

The Manitoba Hydro construction supervisor will make the final decision on the next course of action, but the discussions will be a joint effort between the contractor and Manitoba Hydro.

- Under circumstances where a frac-out has occurred, has been confirmed visually, and where conditions do not permit containment and the prevention of drilling fluids release to the watercourse, attempts to plug the fracture by pumping lost circulation material are not to continue for more than 10 minutes of pumping time.
- If the frac-out is not contained within this time, the Manitoba Hydro construction supervisor will halt any further attempts until a course of action (either abandon directional drilling or continue following consultation with the Manitoba Hydro Project engineer) is decided upon.

Any recovered drilling fluids will be recycled or disposed of at a stable upland location at least 100 m from any wetland, watercourse or waterbody or at a disposal facility.