Trans Mountain Pipeline ULC ("Trans Mountain")
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Information Request No. 1

Request

1. When the exposure happened did KM file an incident report? If so, provide the incident number.
2. Provide photos showing the current conditions of the pipeline, the water course and the surrounding area.
3. Provide a summary of the hydro-technical assessment previously performed and the proposed mitigations measure by the 3rd party who performed the assessment.
4. Is this a temporary or permanent mitigation?
5. Provide the design drawings showing the proposed construction work including the pipeline, the material barrier between the pipeline and the Articulated concrete mat (ACM), the area where the ACM will be placed in comparison to the location of the water body, and the material placed on top of the ACM.

Response

1. Trans Mountain did not file an incident report when the exposure was first detected in 2010 as it predated the issuance of the *NEB Event Reporting Guidelines*. The pipeline is exposed for the width of the channel and a concrete weight covers the pipeline near the west bank. Trans Mountain prioritizes hazard abatement works for watercourse crossings based on risk ranking. The probability of exposure and the risk of damage or failure if the pipeline were to become exposed are taken into consideration for determining this ranking. For the Stewart Slough crossing, the pipe is already exposed and there is no risk of damage or failure of the pipe from exposure to the watercourse elements or flow velocity. As such, this site has been ranked as 'Medium Priority' for mitigation. The only risk to the exposed pipe is potential damage by third-party ditch cleaning equipment. To minimize this risk, Trans Mountain has required that any work over and near the pipeline must be undertaken by hand digging with a Company Pipeline Protection Inspector present. There are also pipeline markers identifying this crossing with contact numbers. Multiple in-line inspection tool runs have also not revealed any potentially injurious features at this water crossing.

   Trans Mountain is working towards addressing the unintended exposed pipe in accordance with its hazard priority and risk ranking process. Trans Mountain does not intend to report historical exposures that are being managed using its risk based approach. However, going forward to the extent new unintended exposed pipe is encountered, Trans Mountain will report as recommended by the 12 January 2018 *NEB Event Reporting Guidelines*.

2. See Appendix A.

3. Trans Mountain retained a third-party hydrotechnical consultant to assess the Stewart Slough crossing. The survey included collection of bathymetric data and depth of cover measurements over

the pipeline. The assessment identified that long term bed scour and degradation had lowered the creek bed to result in exposure of the 24” diameter pipeline and concrete weights.

Annual flood peak frequencies were determined for the crossing site based on regional analysis using three Water Survey of Canada hydrometric gauges. A flow frequency analysis was completed for each gauge using their annual instantaneous peak discharges. The resulting drainage areas versus discharges were plotted on a log-log scale for return periods ranging from 2- to 200-years. The drainage area at the crossing site was used to determine peak flows at the pipeline crossing location utilizing the set of regional analysis equations.

Recommendation was provided for the exposed pipeline to be covered with concrete articulating mats (i.e. ArmorFlex) with a design to withstand shear stress for the 200-year flood peak. An analysis and hydraulic model of the watercourse hydraulics at the pipeline crossing was undertaken to determine specifications for the matting. The remediation design includes excavation to fully expose the pipeline followed by installation of a protective pipe coating layer, sand cushion, select backfill material, and concrete articulating mats through the pipeline crossing site. The concrete articulating mats (ArmorFlex Open Cell Class 40 or equivalent) will be placed in the channel and extend approximately 8 m upstream and 9 m downstream of the exposed portion of the pipeline. Additionally, 2.0 m long and 0.7 m deep keys will be constructed at the upstream and downstream edges of the mats and overlain with riprap.

4. Trans Mountain confirms that this is a permanent mitigation.

5. Please see attached design drawings.

Appendix A

On the right bank looking at the left bank along the pipeline centerline:

On the right bank looking upstream with the pipe locator on the centerline:

On the right bank looking downstream with the pipe locator on the centerline:

Upstream view (northeast aspect) Stewart Slough at the Trans Mountain right-of-way (“ROW”) crossing (pipeline marker is visible in background on right of frame). Photograph reference: Environmental Overview Assessment and Mitigation Plan prepared by Sartori Environmental Inc. (April 30, 2018).

East aspect of Stewart Slough taken from top of right bank at the Trans Mountain ROW crossing (pipeline marker is visible in background). Photograph reference: Environmental Overview Assessment and Mitigation Plan prepared by Sartori Environmental Inc. (April 30, 2018).