Purpose

This Directive establishes the policy and identifies the circumstances under which Alberta Environment and Parks (AEP or the Department) or the Alberta Energy Regulator (AER) will consider applications for riverbed armouring of pipelines that do not meet scour depth requirements under the Code of Practice for Pipelines and Telecommunication Lines Crossing a Water Body (the Code). The policy intent is to provide some flexibility for pipelines installed prior to the adoption of the Code while maintaining public safety and minimizing ecological risk.

Audience

This directive provides policy guidance to individuals designated as Directors under section 163 of the Water Act, and other staff operating under authority of this section. In addition, it is intended to inform potential applicants, pipeline owners and operators, and professionals handling pipeline maintenance.

Definitions

For the purpose of this directive “pipeline hardening” and “riverbed armouring” are deemed to be synonymous. "Riverbed armouring" is defined as the use of engineered designs to cover and protect pipeline crossings that do not meet scour depth requirements as required by the Code that are installed on or below the bed of a watercourse. This definition does not include engineered works placed along the bank such as but not limited to riprap erosion protection to restore cover of pipelines exposed by lateral movement of the watercourse.

Policy Scope

The policy applies to pipelines crossing a water body and the scour protection required to keep them safe. It does not apply to lateral erosion and methodologies to control it (such as bank stabilization or bank armoring) which are already permitted.

Policy Context

Public health and safety and environmental protection are the foremost objectives when decisions are made regarding pipeline crossings. The department’s objective for pipeline crossings is for all pipelines to comply with the Code. Pipelines not meeting scour protection set out by the Code are expected to be
replaced or otherwise come under compliance with the Code. This is to be achieved over time as existing pipelines, constructed prior to the Code, are replaced. However, the Department recognizes there may be circumstances where compliance with the Code is not feasible, or where this action may cause a greater environmental impact than riverbed armouring the crossing.

Policy Approach

The policy approach will be that:

- Any pipeline constructed/installed pursuant to the Code must continue to meet all requirements of the Code. As such, all activities must be commenced, continued, and carried out in accordance with the Code.
- If specified criteria are met, the AEP and the AER will allow pipeline operators to apply for an approval under the Water Act in order to use riverbed armouring.
- The applicant will be required to undertake risk assessments and mitigative action to address those risks.
- The approval term, if granted, will be for up to 10 years subject to terms and conditions.

Application of policy

According to section 37(1) of the Water Act, a person who applies for an approval must

(a) Make an application to the Director in a form and manner satisfactory to the Director
(b) Submit the information, including but not limited to plans and specifications, required by the Director.

In relation to riverbed armouring, the Director will consider an application if an applicant demonstrates that the following criteria are met (see appendix 1: policy application decision tree):

- The pipeline must have been installed prior to adoption of the Code in April 2000
- The proposed works must be not located in Code Class A designated water body, or within 2 kilometers upstream from the mouth of an uncoded water body entering into the Class A water body
- The pipeline must not be suspended above the bed of the watercourse
- The pipeline is fit for service and its integrity is not compromised by extending the lifespan of the crossing with riverbed armouring. In addition, the pipeline has acceptable integrity outside of this issue as per the requirements of CSA Z662, the Pipeline Act, and the Pipeline Rules)
- The segment of pipeline across the watercourse is not being reinstalled
- The decision to armour was evaluated and compared with other remedial options, including reburial of the line, and is deemed to be the most suitable method weighing all environmental impacts of each method

Information Applicant Required to Submit

According to section 37(2) of the Water Act, the Director may require an applicant to submit any additional information including but not limited to plans and specification the Director considers necessary within any time period required by the Director.

Appendix 2 provides information for prospective applicants and outlines the type of information, documentation, assessments, and plans that the applicant may be required to submit.
Approval Terms and Conditions

According to 38(3) of the Water Act, the Director may issue an approval subject to any terms and conditions that the Director considers appropriate. Without limiting the discretion of the Director, the following are the type of terms and conditions the Director will consider for riverbed armouring:

- Approvals will be issued for up to ten years. The terms may be extended for additional periods of up to ten years through the life of the proposed work.
- All approvals will require comprehensive monitoring and reporting conditions to ensure environmental risks are managed.
- A term that the Director may amend the approval to require the approval holder to replace the pipeline crossing or sag the existing line to meet all requirements of the Code if monitoring indicates negative environmental impacts are occurring or may occur.
  - Requirements respecting the removal or decommissioning of any structural work proposed.

Jurisdiction between Regulators

AEP and the AER share responsibility for water licensing and authorization in Alberta. The regulators will work collaboratively to implement this policy to ensure consistency in its application.

Effective Date

The Directive will come into effect on March 1, 2018.

Transitional Matters

Upon the coming into effect of this directive, the “Accepted Practice for Hardening Pipeline Crossings to provide Scour Protection, January 10, 2014” will be rescinded.

Directive review and Amendment

The Directive may be reviewed and amended by the Department as required.

Reference Documents

Water Act, RSA 2000, c W-3
Water (Ministerial) Regulation (205/1998)
Code of Practice for Pipeline and Telecommunication Lines Crossing a Water Body, April 2000
Accepted Practice for Hardening Pipeline Crossings to provide Scour Protection, January 10, 2014

Original signed by: ___________________________ Date: February 16, 2018

Karen Wronko, Executive Director
Water Policy
Environment and Parks
Appendix 1: Policy Application Decision Tree

1. Was the pipeline constructed prior to the Code?
   - Yes: The pipeline must be installed under the scour line depth required by the code.
   - No:
     - Is the pipeline crossing being replaced?
       - Yes: Policy requires new pipeline crossings and replacements must meet the Code.
       - No:
         - Is the proposed site in a Code of Practice Class A designated area?
           - Yes: Policy prohibits riverbed armouring in a Class A water Body or within 2 km of an uncoded water body entering into the Class A water body.
           - No:
             - Is the pipeline suspended above the bed of the watercourse?
               - Yes: The policy restricts riverbed armouring where the existing pipeline is hanging or the water body is degrading.
               - No: Pipeline Hardening application under the Water Act may be considered.
Appendix 2: Information for Applicants

This following information is intended to provide an applicant seeking an approval for riverbed armouring under the Alberta Water Act with guidance to develop and submit an application.

A. Basic Information Required in Application

The standard application form for activities regulated under the Water Act requires a detailed description, including location of works and activities, relating to the project. Applicants for these projects will also be required to provide the following information in their riverbed armouring project description:

- Regulator of the Pipeline (AER, NEB, etc.)
- License and line number of the pipeline(s). If multiple licensees in a common pipeline corridor please state
- Legal land description of works and name of water body if named.
- Substance(s) carried by pipeline
- Age and size of the pipeline at the water crossing
- Integrity and expected life of the pipeline
- Design and engineering of proposed armouring project
- Information respecting other relevant works in waterbody
- Information about the size and flow of the water body
- Distance between ordinary high water mark to ordinary high water mark

B. Other Approvals and Requirements

In addition to an approval under the Alberta Water Act, applicants for riverbed armouring may require other authorizations. For instance, the applicant may require authorizations under the Alberta Public Lands Act, the Canada Fisheries Act, or the Canada Navigation Protection Act.

C. Demonstrate Alternatives to Riverbed Armouring Considered

The applicant must demonstrate that riverbed armouring is the most suitable alternative method to reburial to scour depth which will result in an outcome that maintains public safety and minimizes ecological risk. Specifically, the applicant must:

- Provide the rationale for riverbed armouring compared to other options (e.g. abandonment, sagging, replacement according to the Code, etc.)
- Demonstrate there is a clear environmental case that would allow for riverbed armouring based on the remaining life of the pipeline and environmental risk
- Provide a hydrotechnical assessment to support the need for an engineered solution

D. Level of Protection Required in Relation to Life of Project and Risk

Obtaining an approval for riverbed armouring is one option for maintaining a pipeline which otherwise would have to be installed below the 1/50 or the 1/100 year scour depth. The applicant will be required to explain what level of protection the proposed project provides in relation to environmental and public safety risks and the life of the project.
E. Assessments of Impacts/Effects

The applicant will be required to submit an environmental effects report wherein all potential impacts are quantified and planned mitigative actions are outlined. The formal risk assessments should include the strategies that will be employed to mitigate or compensate for those impacts. The formal risk assessment must be completed by, or under the supervision of, a qualified professional.

Among the type of assessments that will be required are:

- River morphology/dynamics
- Impact on other structures and other users
- Fish passage and habitat impact

1. River Morphology/Dynamics

From a hydraulic perspective there are three issues that need to be addressed in a riverbed armouring application: river scour/riverbed degradation, channel migration/erosion potential, and water levels. Overall the main concerns are pipeline exposure and the effects on river hydraulics and water levels upstream, downstream and at the location of the works. The anticipated effects of any proposed works and the design to mitigate them need to be evaluated against the following concerns.

River scour/river bed degradation

- A scour calculation will be necessary. The applicant needs to demonstrate that the proposed works would be able to withstand the river forces on it over the life of the crossing to prevent pipeline exposure. The applicant should incorporate a mitigation plan should ongoing impacts (e.g. fish passage, siltation, flooding, erosion, etc.) be discovered resulting from the proposed hardening works that put infrastructure or aquatic environment at risk.
- The applicant will need to perform an analysis to determine whether the river bed is degrading and, if it is degrading, estimate the potential amount of degradation over the expected remaining life of the pipeline. In addition, the applicant will need to develop a monitoring and mitigation plan to ensure the pipeline remains competent over its remaining life.

Channel migration/erosion potential

- The applicant must assess the potential for bank erosion and/or channel migration. The impact (e.g. river velocities, change in cross section, scour, etc.) of any proposed erosion protection works must be documented. The design needs to demonstrate how the river bed armouring and any other works such as bank protection or channel realignment are going to achieve a stable regime for the river for the life of the pipeline and that erosion or river channel changes are not caused in areas upstream or downstream of the crossing.

Water levels

- The applicant must assess the effect of any proposed works on water levels over a range of flows. It must be shown that water levels for the design flood (where applicable) are not increased, and that changes in water level and depth will not be significant and will not cause negative effects on other uses and the aquatic environment.

2. Impact on adjacent structures and other users

The applicant must take into account the impact of riverbed armouring on other structures and other users of the water body. Thus the applicant must:

- assess the hydraulic effect upstream and downstream of riverbed armouring on adjacent structures
- note the impact on other users of the water body (traditional use, recreation, canoeists, ramblers, anglers, etc.).
• demonstrate that the proposed works will not result in an impediment to navigation or a public safety risk through the lifespan of the project.

3. Fish Passage and Habitat Impact

The project applicant must describe the current status of fisheries in the watershed and whether the project is consistent with local management objectives. In keeping with this, the application should contain the following information:

• The hydrologic HUC8 watershed in which the proposed project is located
• Fish Sustainability Index (FSI) status for fish species in the watershed
• List of any fisheries species at risk, their current status and recovery objectives, and whether the proposed project is consistent with these recovery objectives (e.g., if the management objective is to reduce sediment input, will the proposed project contribute to current sediment loading in the watershed?).
• Current management objectives for species located in the watershed. Management objectives may be requested from the local fisheries biologist and in time will be available online. For any areas where specific actions are recommended associated with the management objectives, the proponent shall identify each action’s applicability to the project, and where applicable, how the project has been designed to be consistent with the recommendation.

Applications must describe whether the project will support or impede fisheries management objectives. Where project effects do not support fisheries management objectives, this should be stated. The anticipated likelihood, magnitude and duration of effects should be clearly characterized.

Proponents shall consider historical fisheries data to support the application; but, should be aware that it may not preclude the need for current baseline data. Existing data for fish presence in the area can be obtained from the Fish and Wildlife Management Information System online at:

• https://maps.alberta.ca/FWIMT/?TermsOfUseRequired=true&Viewer=FWIMT

Proponents shall assess available data for applicability in the assessment and presentation of risks associated with the application. If current data are required, multi-season baseline surveys should be undertaken to establish current fisheries presence and use of habitat both upstream and downstream of the proposed project. Protocols for fisheries sampling are available online using the search terms “fish sampling Alberta” or on the Fish Research Licence web page:

• http://aep.alberta.ca/fish-wildlife/fish-research-licence/default.aspx

The upstream and downstream extent of the survey, or spatial extent, must align with the extent of potential effects. For example, the spatial extent of baseline survey data should cover the potential spatial extent of upstream and downstream effects that would occur with ongoing maintenance requirements and consequent downstream sedimentation. Potential for sedimentation, downcutting, bank instability, and shifts in substrate associated with the works should all be considered in the context of potential effects on aquatic systems and fisheries and addressed in the application.

F. Mitigation of Impacts, Monitoring and Maintenance

The applicant will be required to show that the environmental impacts identified in the assessments will be mitigated and monitored.

1. Mitigation

The applicant will be required to present a comprehensive mitigation plan. Specific mitigation measures to address potential effects should be discussed. A clear plan must be presented that identifies mitigation to be implemented and the anticipated level of effectiveness (e.g., will sedimentation
mitigation address all sedimentation risk, or a portion of it, and will it be effective throughout the life of the works?).

Among other matters, the applicant shall identify how and to what level of effectiveness the following will be mitigated:

- surface water and groundwater temperature change
- surface and groundwater water quality
- channel stability
- change in invertebrate community
- increased turbidity and TSS
- alteration of riparian habitat
- loss, degradation or alteration of spawning, rearing, resting, and staging habitat;
- migration delays and/or blockages;
- changes in fish community composition, declines in abundance, shifts in species assemblages and age distribution; changes in competitive interactions within and among species
- changes to the dynamic character of the floodplain and moving water connection/ hyporheic zone

2. Monitoring

All approvals will require comprehensive monitoring and reporting conditions to ensure environmental risks are managed. The applicant will be expected to design and undertake ongoing monitoring to:

- support adaptive management approaches
- confirm effects predictions and mitigation effectiveness in managing the risk of scour and impacts to the aquatic environment, including fish habitat

Baseline data collection should be considered in the context of this ongoing monitoring expectation and sample sizes and locations identified accordingly.

Monitoring Plans and Programs

The applicant will be required to submit monitoring plans and programs which may include, but not be limited to, the following:

- Flood monitoring program (real time monitoring - flow rates)
- Hydrotechnical monitoring (pipeline integrity, flow rates, etc.)
- Structure Integrity monitoring program (armouring structure)
- Habitat monitoring program (changes in vegetation)
- Siltation, sedimentation, and erosion control

The applicant will be required to compile an annual summary report for each calendar year that includes at a minimum the monitoring and sampling for the Habitat Monitoring and Structure Integrity Monitoring Programs.

Monitoring Timeframes

The applicant will be expected to undertake monitoring during construction and post construction.

- Monitoring during construction for compliance with approval conditions
  - Verify the effectiveness of erosion and sediment control measures
• Validate the design and assumptions of scientific and engineering predictions.
• Monitor suspended sediment load and composition
• Biological monitoring

Post construction monitoring for the life of the riverbed armouring to assess the condition of the crossing site and the effectiveness of physical and other measures at and adjacent to the pipeline crossing. Post construction monitoring expectations will include assessment of:

• The physical condition of the crossing site
• Engineered surveys upstream and downstream of the site to document changes to geomorphology
• Slope/bank stability,
• Erosion control measures,
• Physical integrity of the restoration measures
• Sedimentation/sediment loading

If reporting indicates negative environmental impacts, the approval holder may be required to:

• undertake additional monitoring and assessment (e.g., depth of cover survey, documentation of the geomorphology changes, water and biological monitoring, etc.)
• possibly remove the works and replace the pipeline crossing or sag the existing line to meet all requirements of the Code.

3. Maintenance

The applicant will be required to submit a draft timeline/schedule and plan for proposed maintenance of the works through the life of the project that includes the expected frequency and methods to be used for maintenance. This will help to evaluate risk as it relates to site disturbance of ongoing maintenance in addition to the initial footprint.

J. Removal of hardening works at end of life

The Alberta Public Lands Act presumes that works will be removed at the end of life. When submitting an application the applicant must:

• demonstrate that the riverbed armouring works are designed such that they are capable of being removed
• disclose with the AER or AEP preliminary end of life decommissioning/reclamation plans for the proposed structure.

Six months before the end of the approval term, the approval holder will need to indicate if the project should continue or come to an end. If the project life will end, the approval holder will need to provide a decommissioning plan and describe the impact of its removal.