



GUIDE

TO THE CODE OF PRACTICE FOR PIPELINES AND TELECOMMUNICATION LINES CROSSING A WATER BODY, INCLUDING GUIDELINES FOR COMPLYING WITH THE CODE OF PRACTICE

APRIL 2000 Revised April 2001

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GUIDE TO THE

INTRODUCTION

Under the *Water Act* (the Act), a code of practice sets out the regulatory mechanism to govern a certain activity or diversion of water included in the overall regulatory scope of the Act. The *Code of Practice for Pipelines and Telecommunication Lines Crossing a Water Body* (the Code of Practice) is incorporated in the Water (Ministerial) Regulation under the authority of the Act and became effective on April 1, 2000 and was amended on April 1, 2001.

The potential harmful effects of pipeline or telecommunication line activity within a water body can be eliminated or minimized by identifying the objectives that are to be met when such an activity is undertaken. Objectives set out in the Code of Practice are based on the principles of sustainable water management. These principles are:

- Water must be managed sustainably.
- Water is a vital component of the environment.
- Water plays an essential role in a prosperous economy and balanced economic development.
- Water must be managed using an integrated approach with other natural resources.
- Water must be managed in consultation with the public.
- Water must be managed and conserved in a fair and efficient manner.

The Code of Practice establishes the objectives, standards and conditions to be met when undertaking the activity of constructing or removing a pipeline or telecommunication crossing of a water body. Alberta Environment, as the government department responsible for the administration of the Act, establishes the environmental objectives, standards and conditions, monitors and audits for compliance, and enforces non-compliance with the Code of Practice requirements. An owner/proponent of a pipeline or telecommunication line crossing is responsible for meeting all requirements set out in the Code of Practice, and bears responsibility for obtaining appropriate information and advice from appropriate professionals to meet the objectives, standards and conditions of the Code of Practice.

Persons responsible for the placement, construction, installation, maintenance, replacement or removal of a pipeline or telecommunication line crossing a water body must ensure their activities are now in compliance with the requirements of the Code of Practice. Operating under and following the requirements set out in the Code of Practice allows an owner/proponent to proceed with the pipeline or telecommunication line crossing a water body without the requirement to obtain an approval under the Act (as was the previous requirement).

This Guide is intended to assist those responsible for a pipeline or telecommunication line crossing in meeting their obligations and the requirements of the Code of Practice.

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TOPICS IN "CODE OF PRACTICE	WHAT IT MEANS
What activities does this Code of Practice apply to?	This Code of Practice applies to "any works." This includes placing, constructing, installing, maintaining, replacing or removing a pipeline crossing or telecommunication lines crossing.
	A ''pipeline crossing' is defined in section 1(2)(m), and generally means a pipe and associated structures under a water body.
	A "telecommunication lines crossing" is defined in section 1(2)(s), and generally means a pipe, cable or other arrangement of lines of wire or conductors for communication transmittal and receipt under a water body. It also includes associated structures.
	This Code of Practice does not apply to overhead pipeline or telecommunication line crossings. As well, the Code of Practice does not cover any measures or physical structures outside the pipeline right-of-way required to meet clause (a) of Part 1, Schedule 2 of the Code of Practice.
	Compliance with the Code of Practice does not relieve a person of their obligations and responsibilities under other legislation. Regulatory approvals may be required under provincial legislation such as the <i>Public Lands Act</i> , <i>Environmental Protection and Enhancement Act</i> or under federal legislation such as the <i>Fisheries Act</i> and the <i>Navigable Waters Protection Act</i> .
Definitions [s. 1] Terms that are used in this Code of Practice are defined in section 1.	If a term is used in either the <i>Water Act</i> or the Water (Ministerial) Regulation and is not defined in this Code of Practice, those terms will be used as defined in the <i>Water Act</i> or the Water (Ministerial) Regulation.
	If a term is used in either the <i>Water Act</i> or the Water (Ministerial) Regulation and is defined in this Code of Practice, the term will be used as defined in this Code of Practice.
Definition, "this Code of Practice" [s. 1(2)(a)]	An owner and person carrying out a works must comply with the most recent version of the <i>Code of Practice for Pipelines and Telecommunication Lines Crossing a Water Body.</i> To secure a copy of the most recent Code of Practice, contact the appropriate Director, as specified in Schedule 5 of this Code of Practice.
Definition, "productive capacity" [s. 1(2)(o)]	The term "productive capacity" is used in this Code of Practice in the context of fish habitats that comprise the aquatic environment. Under this Code of Practice, fish and fish habitat are the primary indicators of the "productive capacity" of the aquatic environment that should be considered in meeting clause (a) of Part 1 of Schedule 2. Measures to meet clause (a) of Part 1 of Schedule 2 include, but not limited to, fish habitat mitigation and compensation measures that would help to achieve the objective of "no net loss" of productive fish habitat as described in "A Fish Conservation Strategy for Alberta, 2000 – 2005".
Definition, "fish" [s. 1(2)(f)]	For the purposes of this Code of Practice, the definition of fish encompasses the definition of fish under the federal <i>Fisheries Act</i> . In addition to fish used for sustenance, recreational or commercial purposes, fish species of special concern, including rare, endangered, threatened or vulnerable species, are included in the definition.

TOPICS IN "CODE OF PRACTICE	WHAT IT MEANS
Definition, "Director" [s. 1(2)(d)]	Schedule 5 of this Code of Practice sets out which Director should be notified. Addresses, faxes and telephone numbers are also listed. The term "Director" as used in this Code of Practice may not be the same as
Definition, "water body" [s. 1(2)(v)]	an administrative "Director" within Alberta Environment. The term "water body" is defined in this Code of Practice to mean a water body with defined bed and banks whether or not water is continuously present but does not include fish bearing lakes. Under this definition, a fen or a muskeg that does not have a defined bed and bank is not captured. The Code of Practice does not apply to crossings of a fen or muskeg of this nature.
What is a "qualified aquatic environment specialist? [s. 1(2)(q)]	A qualified aquatic environment specialist may include a private individual, consultant or employee of a company that owns, plans or constructs pipeline crossings. The specifications and recommendations prepared by the qualified aquatic environment consultant under the Code of Practice would include but not be limited to mitigation and compensation measures related to the harmful alteration, disruption and destruction of fish habitat. The qualified aquatic environment specialist determines what information and assessments are needed to meet the requirement of the Code of Practice. In the event of enforcement actions resulting from contraventions of the Code of Practice, a qualified aquatic environment specialist should be able to defend and rationalize any specifications and recommendations prepared on behalf of the owner.
Terminology:	
"Dry" and "Frozen"	The Code of Practice allows for the construction and installation of a pipeline or telecommunication line crossing under certain construction conditions when a water body is "dry" or "frozen". In these circumstances, a water body can be considered "dry" when there is no free standing water covering the bed of the water body at the crossing site or if there is insufficient water in quantity or depth to support fish.
	"Frozen" means frozen to the bed of the water body or frozen with no water between the ice and the bed of the water body.
What is the difference between the Code of Practice and the Guidelines contained in the Guide to the Code of Practice?	The Code of Practice consists of section 1, Definitions, to section 16, Code of Practice Amendment, inclusive, and Schedules 1 to 6, inclusive. The legal obligations of an owner and a person carrying out a works for a pipeline and telecommunication line that crosses a water body are set out in this Code of Practice.
	The Guidelines contained within the Guide to the Code of Practice are the best management practices for carrying out the legal obligations set out in the Code of Practice, and are provided only to assist users. The Guidelines are not intended to apply to all situations and if there is another way of meeting obligations under the Code of Practice, the Guidelines do not have to be followed.

TOPICS IN "CODE OF PRACTICE	WHAT IT MEANS		
Notice to the Director [s. 3 and 4]	The owner of the pipeline or telecommunication line is required to provide notice to the appropriate Director (as listed in Schedule 5). Notice must be in writing and given 14 days before starting work.		
	Any changes to these notice requirements such as reducing the 14 day prior notice requirement must be secured from the Director (as listed in Schedule 5) in writing. Notice must contain the information listed in Schedule 1.		
	If the works are not completed within the time specified in the notice, that notice expires and a new notice must be provided. This new notice must contain:		
	 the new start date, the time period when there will be activity in the water body, any changes in information from the first notice, the new expected completion date. 		
Notice in Emergencies [s. 5, clauses (a), (c), and (d) of Schedule 1]	In some cases, where there is an emergency, it may not be feasible to provide the Director notice before starting work. In these emergency situations, a person responsible must notify the Director (as outlined in Schedule 5) within 24 hours of becoming aware of the emergency.		
	Notice about an emergency must contain the following information: - name, address and phone number of an owner of the pipeline or telecommunication line crossing, - name and phone number of the contact person,		
	 the diameter of the pipe, conduit, cable or arrangement of lines to be (or that was) constructed, a map, diagram or air photo, as described in clause (b) of Schedule 1, any other information on the emergency that is available. 		
	Within 30 days of completing works to address a emergency, additional information as specified in section 5 (3) of the Code of Practice is required including an indication whether the works incorporated the specifications and recommendations of a qualified aquatic environment specialist. Given the nature of emergencies that may occur, obtaining the specifications and recommendations of a QAES is not a requirement under the Code of Practice but should be obtained in fish bearing water bodies wherever possible.		

TOPICS IN "CODE OF PRACTICE	WHAT IT MEANS
Plans [s. 6 and Schedule 2]	The owner of a pipeline or telecommunication line that will cross a water body is required to prepare a plan for the proposed work. In selecting a crossing site and in preparing a plan to comply this Code of Practice, it is also necessary to meet other resource and land management requirements (i.e. <i>Public Lands Act</i>). This plan is to be prepared before written notice is given to the Director.
	 A plan for a pipeline will consist of: a description of the construction method and conditions to be used, determined in accordance with section 8 and Schedule3, including the specifications and recommendations of a qualified aquatic environment specialist where required, the specifications of a professional engineer that are prepared in accordance with Part 2 of Schedule 2, contingency measures to deal with potential problems, monitoring plans.
	 A plan for a telecommunication line will consist of: a description of the construction method and conditions to be used, determined in accordance with section 8 and Schedule3, including the specifications and recommendations of a qualified aquatic environment specialist where required, the specifications prepared by the owner in accordance with Part 2 of Schedule 2, contingency measures to deal with potential problems, monitoring plans.
	These plans will be prepared to: - meet the design and construction standards outlined in Part 1 of Schedule 2, - be consistent with the Class of water body in which the works will take place.
Certification Regarding Plans for a Telecommunication Lines Crossing [s. 9(3)]	In addition to preparing the plans as outlined above, the owner of a telecommunication lines crossing must certify that the information and written specifications for the works that is contained in the plan meets the required design and construction standards. The required design and construction standards are set out in Part 1 of Schedule 2.
Removal of a Pipeline or Telecommunication Lines Crossing	If a pipeline or telecommunication line crossing must be removed during abandonment, the following must be done: - prepare a plan containing the information contained in section 6, - provide notice to the Director under section 3, - the owner must certify that the design and construction standards outlined in Part 1 of Schedule 2 have been met in preparing the plan.

TOPICS IN "CODE OF PRACTICE	WHAT IT MEANS
Maps and class of water bodies [s. 7]	A map that is listed in Schedule 6 will indicate what the class of a water body is. Determination of the class of a water body also determines the construction method, timing and conditions under which the pipeline or telecommunication line crossing is constructed or removed. Some maps were amended effective April 1, 2001.
	The Code of Practice applies to both mapped and unmapped water bodies. Due to the large scale of the maps, there are many water bodies that are not shown on the maps. The Code of Practice outlines how the class of an unmapped water body is determined.
	The class of water body that is determined based on the "sensitivity" of fish habitats and their known distribution. The sensitivity for the class of water body is as follows:
	Class A – highest sensitivity; habitat areas are sensitive enough to be damaged by any type of activity within the water body; known habitats in water body critical to the continued viability of a population of fish species in the area.
	Class B – high sensitivity; habitat areas are sensitive enough to be potentially damaged by any type of activity within the water body; habitat areas important to continued viability of a population of fish species in the area.
	Class C – moderate sensitivity; habitat areas are sensitive enough to be potentially damaged by unconfined or unrestricted activities within a water body; broadly distributed habitats supporting local fish species populations.
	Class D - low sensitivity; fish species as defined under this Code of Practice not present.
	The Code of Practice references a distance of 2 km in determining the class of the water body. The 2 km distance refers to a "length of stream" distance measurement.
Construction Methods and Conditions [s. 8]	The Code of Practice sets out the construction methods and conditions under which pipeline and telecommunication crossings are to be carried out.
	Other than a situation where a crossing is within a Class A water body, the owner of a crossing may choose to follow the construction methods and conditions set out in the Code of Practice. Alternatively, if the owner determines the outlined construction method is not technically or environmentally feasible, the owner may choose an alternate construction method upon the specifications and recommendations of a qualified aquatic environment specialist. Alternate methods that do not require the specifications and recommendations of a qualified aquatic environment specialist are also provided for.

TOPICS IN "CODE OF PRACTICE	WHAT IT MEANS
Restricted Activity Period [s. 9]	Restricted activity periods are times when works that disrupt the bed or banks of a water body must be avoided. Maps under this Code of Practice identify restricted activity periods for mapped Class B and Class C water bodies. The restricted activity period for a Class A water body is determined by a qualified aquatic environment specialist. Restricted activity periods do not exist for Class D water bodies. The Code of Practice sets out how restricted activity periods for unmapped water bodies may be determined. The restricted activity period must be adhered to in carrying out the pipeline or telecommunication line crossing. If the pipeline or telecommunication line crossing is to be carried out within a restricted activity period, the recommendations and instructions of a qualified aquatic environment specialist area required unless specified otherwise under the Code of Practice.
Certification of Works [s. 10]	Upon completion of the pipeline or telecommunication line crossing, the owner of the crossing must certify the crossing was completed according to the plans prepared for the crossing. The owner retains this certification in their records.
Reporting [s. 11]	If there is contravention of the Code of Practice, a person involved in carrying out a works must report details of the contravention and the possible environmental impacts within 24 hours. A followup written report is required within 7 days of the report of the contravention.
Record Keeping [s. 12]	The owner responsible for a works must retain records, including plans, photographs and certifications, for a period of one year following the abandonment or removal of the pipeline or telecommunication crossing.
Date this Code of Practice Comes into Force [s. 15]	The Code of Practice came into force on April 1, 2000 and was amended on April 1, 2001.
Enforcement of this Code of Practice	Monitoring for compliance with the Code of Practice on intended crossings will be done by Alberta Environment.

Code of Practice for Pipeline and Telecommunications Crossing of Water Bodies Applicability of Class of Water Bodies – Requirements and Options

Water Body Class (Mapped and Coded)	Code of Practice Specification	Actions under The Code of Practice	Options provided for under the Code of Practice
Class "A"	 No new crossings Maintenance and replacement of existing crossings only 	 Replacement with same size or smaller diameter pipeline. A qualified aquatic environment specialist (QAES), with appropriate field assessment, determines timing of activity. Trenchless method may be used without instructions of a QAES. 	Not applicable – no other options allowed for under the Code of Practice.
Class "B"	• Trenchless method of construction	Trenchless method of constructing pipeline at any time without the requirement of a QAES.	 Trenchless may be determined as being not technically or environmentally feasible. If so, then can move to isolation, or to open-cut method where isolation is not feasible, upon QAES assessment and recommendations. Restricted activity period applies for isolation and open-cut crossings. Habitat mitigation/compensation measures may be necessary.
Class "C"	• Isolation method of construction	 Isolation method may be used without requirement of a QAES, outside of the restricted activity period. Open-cut method allowed where water body is frozen or dry without the instructions of a QAES. 	 Isolation may be determined as being not technically or environmentally feasible. If so, then can move to open-cut method upon QAES assessment and recommendations. Isolation method within the restricted activity period requires QAES assessment and recommendations. Mitigation measures may be necessary. Trenchless method used at anytime without requirement for QAES involvement.

Class "D"	• Open-cut method may be used.	• No requirement for a QAES and no restricted activity periods.	 No requirements for a QAES and no restricted activity periods. Trenchless or isolation methods may be used.
All mapped and uncoded water bodies within 2 km of entering a Class "A", "B" or "C" mapped water body.	• The water body takes on the same class as the receiving water body (i.e. will take on the specified Class A, B or C conditions and construction methods).	• Methods and conditions as per the requirements of the appropriate class of water body.	As per the requirements of the appropriate class of water body.
All <u>unmapped</u> water bodies within 2 km of a Class "A", "B" or "C" water body.	• The unmapped water body takes on the same class as the receiving water body.	• Methods and conditions as per the requirements of the appropriate class of water body.	As per the requirements of the appropriate class of water body.
Unmapped water body entering a Class "A" water body and the crossing site is greater than 2 km from the Class "A" water body.	• The unmapped water body is classed as Class "B" and takes on the restricted activity period of the nearest mapped Class "B" or "C" water body entering or downstream of the Class "A" water body.	Methods and conditions as per the requirements of the appropriate class of water body.	As per the requirements of the appropriate class of water body.
Unmapped water body entering a Class "B" water body and the crossing site is greater than 2 km from the Class "B" water body.	• The unmapped water body is classed as being Class "C" and takes on the same restricted activity period of the Class "B" receiving water body.	• Methods and conditions as per the requirements of the Class "C" water body.	• As per the requirements of the Class "C" water body.

Unmapped water body entering a Class "C" water body and the crossing site is greater than 2 km from the Class "C" water body.	• The unmapped water body is classed as being Class "C".	• Methods and conditions as per the requirements of the Class "C" water body.	 Isolation method of construction allowed year round in these unmapped water bodies without QAES assessment if no fish presence has been documented. If fish presence documented, then as per the requirements of the Class "C" water body.
Unmapped water body entering a Class "D" water body and the activity area is greater than 2 km from the Class "D" water body.	• The unmapped water body is classed as being Class "D".	Methods and conditions as per the requirements of the Class "D" water body.	• As per the requirements of the Class "D" water body.
Unmapped water body entering any fish-bearing lake.	• The unmapped water body is classed as being Class "C" water body and takes on the restricted activity period of the nearest mapped water body entering the lake, the mapped outlet, or nearest Class "C" water body.	Methods and conditions as per the requirements of the Class "C" water body.	• As per the requirements of the Class "C" water body.

GUIDELINES FOR COMPLYING WITH THE CODE OF PRACTICE FOR PIPELINES AND TELECOMMUNICATION LINES CROSSING A WATER BODY (the "Code of Practice")

NOTE: These Guidelines identify measures and best management practices to assist the user <u>in meeting the objectives and conditions of the Code of Practice</u>

Practice and do not form part of the Code of Practice

Guidelines Applicable to all Crossings of Water Bodies as defined under the Code of Practice

- 1. Measures to prevent deleterious materials or materials toxic to aquatic organisms from being deposited in the water body and to prevent the transfer of biota (as required by clause (i) and (j) in Part 1 of Schedule 2 of the Code of Practice) include, but not limited to:
 - (a) inspecting equipment and, as necessary, repairing equipment to stop any leaks of oil and other fluids (non-toxic hydraulic fluids such as vegetable based fluids are recommended),
 - (b) cleaning and freeing equipment of external grease, oil and other fluids prior to the equipment entering the water body,
 - (c) cleaning and freeing equipment of all mud and dirt prior to the equipment entering the water body, or the area adjacent to the water body, and before the equipment exits areas adjacent to the water body upon completion of instream works, to prevent the transfer of biota not indigenous to the crossing site. Biota of concern include, but are not limited to, plants identified under the *Weed Control Act*, and diseases or alien organisms such as Whirling Disease. It is not necessary to clean equipment after completion of instream works if the equipment is being moved to another instream site on the same water body or a tributary of the same water body,
 - (d) storing fuel and servicing and refuelling equipment in a manner that prevents fuel and equipment fluids from entering the water body, and
 - (e) ensuring that operators involved in the water body crossing are trained and equipped to contain spills or leakage from equipment.
- 2. Measures to minimize sediment from entering water in the water body as required by clause (k), Part 1 of the Code of Practice include but are not limited to:
 - (a) managing the flow of surface and subsurface water in and around the crossing,
 - (b) immediately installing temporary erosion control measures which remain in place until vegetation or other long-term erosion management methods are fully established and functioning,
 - (c) stabilizing all disturbed areas using measures including, but not limited to, sloping, using silt fencing, armouring, installing geotextile fabric blankets, planting approved seed mixtures or vegetation,
 - (d) placing excess material in a location where erosion into the water body will be minimized,
 - (e) maintaining original groundcover vegetation by not blading, grubbing, or rooting on the banks of the water body and adjacent to the crossing site, except where required for the trench line,
 - (f) preventing silt, and other materials being carried by water, from flowing along the trench into the water body, until such time as the installation of the crossing is imminent. Methods include, but not limited to,
 - (i) using hard ditch blocking and pumping,
 - (ii) de-watering the trench in a manner to prevent erosion and siltation of the water body by de-watering to settling ponds or to upland areas in a manner that does not have an adverse effect on any land, and
 - (iii) installing adequate cross and diversion drainage on portions of the right-of-way which slope to the water body, and
 - (g) referring to other appropriate methods as described in the <u>Watercourse Crossings</u>, 2nd Edition Nov. 1999 published by Canadian Pipeline Water Crossing Committee.

Guidelines for Trenchless Method Crossings

- 3. Where a trenchless method is used, it should be done in a manner that does not cause a disturbance;
 - (a) in the water,
 - (b) to the exposed bed or shore of the water body, or
 - (c) to an area of undisturbed vegetation that measures 10 metres, or other distance as identified by the local land manager or land-use officer, from each bank of the active channel.

- 4. Where a trenchless method uses pressurized drilling fluids or water, the monitoring of the water body for possible frac-out should be conducted over the area that could be impacted by the frac-out. At a minimum, this monitoring should be conducted at a distance of 400 metres downstream of the crossing site.
- 5. Where a trenchless method uses pressurized drilling fluids or water, contingency and monitoring measures referred to in section 6(1)(b) and Part 2 of Schedule 3 of the Code of Practice should include:
 - (a) instructions to be followed to monitor for potential seepage into the water body of drilling fluids or water used, including monitoring and recording drilling fluid volumes on a continuous basis during the drilling operation for the purpose of detecting seepage during and after the drilling while the risk of seepage exists, and
 - (b) instructions on how to mitigate for the effect of any seepage into the water body of drilling fluids or water used.

Guidelines for Isolation Methods Crossings

- 6. Where an isolation method is used, measures to prevent the introduction of sediment and suspended solids into the water body should be taken, to meet the requirements of clause (k) in Part 1 of Schedule 2 of the Code of Practice, that may include but are not limited to constructing temporary isolation dams, pumping water from the trench to settling ponds or to upland areas in a manner that does not adversely affect the land, and installing the intake of any bypass pump line where it will not disturb sediments in the water body.
- 7. To meet the requirements of clause (k) in Part 1 of Schedule 2 of the Code of Practice, where an isolation method is used, measures should be taken to prevent erosion of the area at and surrounding the outlet of a bypass pump or dewatering pump or flume by dissipating the energy of the released water using devices that include, but are not limited to tarps, flip buckets, plates, and appropriately sized granular materials.
- 8. To meet the requirements of clause (g) in Part 1 of Schedule 2 of the Code of Practice, where an isolation method is used, all instream pumps should have capacity that exceeds expected flows, and backup pumps and generators shall be on site and operational if required.
- 9. Follow other appropriate methods as described in the <u>Watercourse Crossings</u>, 2nd Edition Nov. 1999, published by Canadian Pipeline Water Crossing Committee.

Guidelines for Preparation of Contingency Measures as Required in this Code of Practice

- 10. Contingency measures prepared under section 6(1)(b)(iii)(B) and Part 2 of Schedule 3 of the Code of Practice should identify steps and measures to be taken by the owner in the event of;
 - (a) crossing method failures (i.e., situations where a trenchless or isolation method cannot be completed successfully),
 - (b) emergency situations (i.e., equipment failures, adverse weather, flooding, spills, etc.), and
 - (c) other occurrences or circumstances that require the owner to deviate from the proposed plan or schedule for completion of the works.
- 11. Contingency measures should identify, where appropriate,
 - (a) alternative crossing methods, and
 - (b) procedures and back-up measures for possible emergency situations.

Guidelines for Crossing Site Monitoring as Required in this Code of Practice

- 12. Monitoring required under the Code of Practice includes, but is not limited to:
 - (a) monitoring during isolation and open cut methods to assess immediate effects of the works on the aquatic environment (e.g., measurement of sediment release),
 - (b) monitoring during trenchless crossing construction to detect possible frac-out of drilling fluids, as outlined under guideline 4 and 5 above, and
 - (c) post-construction monitoring to assess the condition of the crossing site and effectiveness of physical measures and other measures taken to meet the requirements of clause (a) in Part 1 of Schedule 2.
- 13. Monitoring during the works to measure immediate construction effects on the aquatic environment should be undertaken when the works are located in a highly sensitive aquatic environment (e.g., a Class A water body) or where an alternative to a preferred crossing method, as specified in section 8, is used (e.g., at a site where an isolation or open cut method is used in a Class B water body, or a site where an open cut method is used in a Class C water body). The intent of this monitoring

should be to quantify the effects of the works for the purpose of identifying additional physical or other measures that would be required in order for the works to meet clause (a) in Part 1 of Schedule 2 of the Code of Practice. The monitoring should be designed and conducted by a qualified aquatic environment specialist.

- 14. In order to meet the requirements of section 13(1) of the Code of Practice, post construction monitoring of the crossing site should be done annually, at a minimum, during the snow free season. Site inspections should be conducted more frequently (especially after high flow events) until establishment of permanent erosion control measures. Post construction monitoring should assess
 - (a) the physical condition of the crossing site,
 - (b) slope/bank stability,
 - (c) erosion control measures,
 - (d) physical integrity of restoration measures.
- 15. Post construction monitoring required under this Code of Practice is not intended to replace pipeline monitoring programs required through other statutes and regulations and can be conducted in conjunction with other monitoring programs where appropriate.
- 16. The <u>Watercourse Crossings</u>, 2nd <u>Edition Nov. 1999</u>, <u>published by Canadian Pipeline Water Crossing Committee</u> provide additional information and guidelines for environmental monitoring during and after completion of the works.

Guidelines for Aquatic Environment Assessments, Specifications and Recommendations

- 17. In addition to the information requirements identified in section 1(1)(d) of Schedule 4 of the Code of Practice, the following features should be noted:
 - (a) areas of streambed groundwater upwelling and streambank seepage,
 - (b) barriers to fish movement,
 - (c) identification of other physical activities or natural disturbances which may have impacted the crossing site,
 - (d) surrounding land use activities and description of surrounding terrain,
 - (e) other environmental features or values that might be adversely affected by the works.
- 18. In describing the anticipated effects of the works on the water body the following should be considered by the qualified aquatic environment specialist:
 - (a) the anticipated effects resulting from disturbance of the streambed, streambanks and riparian area at and adjacent to the water body,
 - the anticipated extent (zone of impact) of downstream sediment transport and sedimentation resulting from the works,
 - (c) the anticipated effects of sediment transport and sedimentation on aquatic biota and fish habitat.
- 19. Recommendations developed by the qualified aquatic environment specialist for measures required to meet the requirements of clause (a) in Part 1 of Schedule 2, include but are not limited to descriptions of sediment control measures and fish habitat restoration measures.
- 20. Where existing fish and fish habitat data and information are deemed by the qualified aquatic environment specialist to be insufficient to complete an assessment of the potential effects of the works on the aquatic environment, the following methods should be followed where possible in designing and conducting field assessments at the crossing site:
 - (a) Study sections Establish a minimum of two study sections for the purpose of conducting physical and biological assessments as follows:
 - (i) one, a minimum length of 100 metres, *immediately upstream* of the proposed crossing site
 - (ii) one, a minimum length of 300 metres, or *encompassing the entire zone of impact* (whichever is greater), consisting of the crossing site and the area downstream of the crossing site
 - (iii) establish additional study sections either upstream or downstream of the zone of impact as needed to determine the presence of fish species that could be potentially affected by the works
 - (b) **Physical Assessment** This assessment should be done to determine water body conditions and characterize fish habitat in the study sections immediately upstream of the crossing site and encompassing the zone of impact.
 - (i) Determining the zone of impact For the purpose of this assessment, the zone of impact is defined as the area of the water body where 90% of the sediment discharged as a result of the works will be deposited. Substrate sampling may be needed to determine the zone of impact and potential adverse effects of the works on the aquatic environment.
 - (ii) Physical assessment methods and parameters One assessment of the upstream study section and the zone of impact study section should be conducted prior to the works. All data should be date referenced. The

types and location of fish habitat in both study sections should be mapped as part of the physical assessment using an accepted habitat classification system. Generally habitat mapping should identify and document habitat types and cover composition including:

- cover provided by surface turbulence
- ♦ aquatic vegetation
- ♦ instream cover
- terrestrial canopy
- rock/boulder substrates
- under-cuts
- ♦ turbidity
- cover provided by depth
- ♦ pool/riffle/run ratio

To complement habitat mapping, establish a minimum of five cross section transects across the two study sections (two transects upstream of the crossing site, one at the crossing site, and a minimum of two in the zone of impact) and record the following:

(i) At the crossing site

- water velocity and discharge
- four photos at the proposed right-of-way transect; one of each bank taken from the opposite bank, one looking upstream of the crossing site, and one looking downstream of the crossing site
- water quality parameters
- water temperature and time of day reading taken
- ♦ pH, conductivity, DO, turbidity

(ii) At each transect within each study section

- bank full width and wetted width
- water depths at 0.25, 0.5, and 0.75 of the wetted width
- water velocity
- ♦ bottom types
- ♦ % fines, gravel, cobble and boulder
- ♦ description of both banks of the water body
- height, slope, stability
- (c) Biological Assessment This assessment should be done to determine the current presence/absence of fish in the water body at each study section. To account for seasonal variation, the biological assessment should ideally be conducted once in the spring, and again once in the fall, and should be conducted during that time period during which anticipated impacts of the works on fish species life stages, such as spawning and egg incubation, are best documented.

For the biological assessment:

- (i) record the actual length of the study section,
- (ii) using electrofishing, sample the entire length of the study section. Record the type of equipment used, and the electrofishing effort made (seconds) and catch per unit effort. Other active and passive fish capture methods may be used to augment electrofishing where required,
- (iii) record all fish species captured, the number of each species and the location or habitat types where fish were captured,
- (iv) record the fork length and weight of all sportfish species captured,
- (v) record the gender and maturity of sportfish species if externally determinable,
- (vi) note spawning potential,
- (vii) note during restricted activity periods any evidence of spawning activity (redds, fish on redds, etc.), and determine where possible the presence of fish and fry at the crossing site.
- 21. A qualified aquatic environment specialist must obtain a Fish Research Licence from the appropriate area office of the Fisheries and Wildlife Management Division, Alberta Environment, prior to collecting fish data that may be needed in conducting field assessments. As part of the Fish Research Licence, the specialist is required to provide a copy of field data and reports to the Fisheries and Wildlife Management Division in a format specified in the licence. Field data and reports provided to the Fisheries and Wildlife Management Division will be available to the public upon request.