
TITLE	ISR Application for a Type A Water Licence
SECTION	6: Water Use for Pipeline Pressure Testing
SUBJECT	1: Pipeline Pressure Testing Water Requirements

INTRODUCTION

This section describes the activities that will be required to pressure test the pipelines within the Inuvialuit Settlement Region. Options for handling any subsequent wastewater are also described.

LOCATION OF UNDERTAKING (PART 3)

The pipeline routes extend for about 175.2 km through the ISR as shown in the following figures located in [Section 5](#):

- [Figure 5-1: ISR Map 1 of 17 \(KP-N0 to KP-N7\)](#)
- [Figure 5-2: ISR Map 2 of 17 \(KP-N7 to KP-N15.7, KP-T0 to KP-T1\)](#)
- [Figure 5-3: ISR Map 3 of 17 \(KP-T1 to KP-T10\)](#)
- [Figure 5-4: ISR Map 4 of 17 \(KP-T10 to KP-T21\)](#)
- [Figure 5-5: ISR Map 5 of 17 \(KP-T21 to KP-T31\)](#)
- [Figure 5-6: ISR Map 6 of 17 \(KP-T31 to KP-T44\)](#)
- [Figure 5-7: ISR Map 7 of 17 \(KP-T44 to KP-T56\)](#)
- [Figure 5-8: ISR Map 8 of 17 \(KP-T56 to KP-T68\)](#)
- [Figure 5-9: ISR Map 9 of 17 \(KP-T68 to KP-T78\)](#)
- [Figure 5-10: ISR Map 10 of 17 \(KP-T78 to KP-T81.4, KP-S0 to KP-S6\)](#)
- [Figure 5-11: ISR Map 11 of 17 \(KP-P0 to KP-P9\)](#)
- [Figure 5-12: ISR Map 12 of 17 \(KP-P9 to KP-P19\)](#)
- [Figure 5-13: ISR Map 13 of 17 \(KP-P19 to KP-P26.5\)](#)
- [Figure 5-14: ISR Map 14 of 17 \(KP-S6 to KP-S17\)](#)
- [Figure 5-15: ISR Map 15 of 17 \(KP-S17 to KP-S29\)](#)
- [Figure 5-16: ISR Map 16 of 17 \(KP-S29 to KP-S42\)](#)
- [Figure 5-17: ISR Map 17 of 17 \(KP-S42 to KP-S51.6\)](#)

The pipelines will undergo a pressure test prior to being placed into service. The design described in this application is to test the pipeline with a water-freeze depressant mixture. Another option under investigation is air as a test medium. For the purposes of this application, the water-freeze depressant mixture has been assumed. Pressure testing will be performed on segments that are about 15 km long. Exact locations and test section lengths will vary with the terrain and topography. [Table 6-1](#) is a list of proposed construction spreads and pressure test water sources.

Table 6-1: Pressure Test Construction Spreads and Proposed Water Sources

Spread	Starting KP	Ending KP	Length Estimated (km)	Proposed Primary Water Source
E1	N0.0	N15.7	38	Mackenzie River
E1	T0.0	T81.4	81.4	Mackenzie River
E1	P0.0	P26.5	26.5	Mackenzie River
E2	S0.0	S51.6	51.6	Mackenzie River

DESCRIPTION OF UNDERTAKING (PART 4)**Pressure Testing Procedure Using Water**

Before testing begins, a detailed test plan will be developed. This plan will provide the test medium, testing schedule, water sources, water withdrawal and disposal methodologies, schematic drawings and test pressures. It will be completed when final, detailed design and selection of the contractor(s) have been determined.

Pipeline testing is planned for winter, immediately following the construction process. Due to the low winter ground temperatures in the ISR, a water-freeze depressant mixture will be required as the test medium. A mixture consisting of about 50% freeze depressant and 50% water may be used. The water will be obtained from a source near the start of the pipeline section.

After a section of pipeline is installed, the pipe trench will be backfilled leaving the ends of the test section exposed for about 10 m. Test heads, comprised of a simple piping header with nozzles to allow the section to be filled with testing medium and pressurized, will be welded onto the ends of the test section. The required volumes of water will be withdrawn from the selected sources using a combination of pumps, trucks and temporary insulated surface water lines.

The minimum volume of water required to make up the water-freeze depressant mixture is about 50% of the volume of a 15 km NPS 30 pipeline section, or about 3,500 m³ of water. However, a larger volume of water-freeze depressant mixture will be prepared to allow for variability in test section lengths and handling activities. This volume of water, estimated at about 4,500 m³, will be blended with freeze depressant from temporary storage tanks and pumped into the first pipeline test section. As each subsequent section is tested, the water-freeze depressant mixture will be pushed along the gathering pipeline between laterals using temporary interconnects and compressed-air-driven displacement pigs.

Once a test section undergoes an acceptable pressure test, the water-freeze depressant mix might be pumped ahead to the next test section, or alternatively,

transported by water truck to the next test section. A pipeline pig will then be sent through the line to ensure that the tested section of the pipeline is clean and dry.

At the end of the first construction season, the water-freeze depressant mixture will be stored in the last test section of the pipeline for use in the next construction season. For this reason the water-freeze depressant mixture might be treated with a biocide and oxygen scavenger to inhibit corrosion in the pipeline while the mixture is stored in the last test section until the following construction season.

QUANTITY OF WATER INVOLVED (PART 7)

The quantity of water currently estimated to be required for the pressure testing of the gathering pipelines in the ISR will be about 4,500 m³ and will depend on the length of the test section, the water-freeze depressant mixture strength, and contingency volumes. This same volume is used repeatedly from section to section through the region in both of the first and second pipeline construction seasons.

There will be four gathering pipeline laterals constructed – a NPS 16 gas pipeline, NPS 18 gas pipeline, NPS 26 gas pipeline and a NPS 30 gas pipeline. The test mixture is calculated for the larger pipe. The same mixture might be used for the smaller pipe, with no incremental volumes being necessary.

The volumes listed in [Table 6-2](#) indicate the estimated water requirements. The same mixture will be used in the second test year with minor incremental volumes required as make-up.

Any spills or leaks of the freeze depressant mixture will be handled in accordance with the Emergency Response Plan (see [Section 11](#)).

Table 6-2: Pipeline Pressure Testing Water Requirements – ISR

Description	Estimated Water Requirements	
	Total Volume	Average Daily Volume ^a
51.6 km of 762 mm OD (NPS 30) gas pipe	4,500 m ³	Not applicable
81.4 km of 660 mm OD (NPS 26) gas pipe	Not applicable Test medium is taken from 762 mm OD test section	
26.5 km of 457 mm OD (NPS 18) gas pipe	Not applicable Test medium is taken from 762 mm OD test section	
15.7 km of 406 mm OD (NPS 16) gas pipe	Not applicable Test medium is taken from 762 mm OD test section	
Total water requirements for pressure testing	4,500 m ³	
NOTE: ^a Average daily volume is not meaningful in this context.		

The estimated water requirements will be refined when a final pressure testing plan has been completed during the final project design and prior to the commencement of construction.

WASTE DEPOSITS (PART 8)

After pressure testing is completed in the final construction season, the water-freeze depressant mixture will be removed from the pipeline. Test water containing freeze depressant will not be discharged into the natural environment. The freeze depressant will either be separated from the water or the complete mixture will be salvaged or disposed of in an environmentally appropriate manner.

A number of options are being investigated both singly and in combination for the disposal or salvage of the test mixture. These include:

- using mobile chemical recycling facilities to extract the freeze depressant on site
- pumping the mixture to the Inuvik area facility then to Norman Wells through the pipeline system for deep well injection
- temporarily storing the freeze depressant in tanks for salvage
- using a centralized process to recover or flare the depressant

If the freeze depressant is extracted by flaring, filtering or evaporation, the treated water will be tested to ensure standards of water quality have been met prior to its release into the natural drainage system. Recovered freeze depressant will be reused or disposed of through an approved facility or to a qualified salvage contractor. Arrangements will be made for extraction and disposal of the freeze depressant prior to the start of pressure testing.

SCHEDULE (PART 13)

In the ISR, testing is planned to take place when pipeline construction has been completed. These dates are currently estimated to be the late winters of 2007-2008 and 2008-2009 (see [Section 3](#) for additional information).