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

INTRODUCTION

This section describes the water sources, pressure testing, and disposal activities that will be required to pressure test the pipelines within the SSA. Options for disposing of any subsequent wastewater are also described.

LOCATION OF UNDERTAKING (PART 3)

The pipeline route extends for about 513.9 km through the SSA, as shown in the following figures located in [Section 5](#):

- [Figure 5-1: SSA Map 1 of 53 \(KP-184 to KP-195\)](#)
- [Figure 5-2: SSA Map 2 of 53 \(KP-196 to KP-206\)](#)
- [Figure 5-3: SSA Map 3 of 53 \(KP-206 to KP-217\)](#)
- [Figure 5-4: SSA Map 4 of 53 \(KP-217 to KP-228\)](#)
- [Figure 5-5: SSA Map 5 of 53 \(KP-228 to KP-239\)](#)
- [Figure 5-6: SSA Map 6 of 53 \(KP-238 to KP-247\)](#)
- [Figure 5-7: SSA Map 7 of 53 \(KP-248 to KP-259\)](#)
- [Figure 5-8: SSA Map 8 of 53 \(KP-260 to KP-270\)](#)
- [Figure 5-9: SSA Map 9 of 53 \(KP-269 to KP-278\)](#)
- [Figure 5-10: SSA Map 10 of 53 \(KP-278 to KP-287\)](#)
- [Figure 5-11: SSA Map 11 of 53 \(KP-287 to KP-297\)](#)
- [Figure 5-12: SSA Map 12 of 53 \(KP-297 to KP-307\)](#)
- [Figure 5-13: SSA Map 13 of 53 \(KP-307 to KP-318\)](#)
- [Figure 5-14: SSA Map 14 of 53 \(KP-319 to KP-330\)](#)
- [Figure 5-15: SSA Map 15 of 53 \(KP-331 to KP-341\)](#)
- [Figure 5-16: SSA Map 16 of 53 \(KP-342 to KP-352\)](#)
- [Figure 5-17: SSA Map 17 of 53 \(KP-353 to KP-364\)](#)
- [Figure 5-18: SSA Map 18 of 53 \(KP-364 to KP-374\)](#)
- [Figure 5-19: SSA Map 19 of 53 \(KP-374 to KP-386\)](#)
- [Figure 5-20: SSA Map 20 of 53 \(KP-386 to KP-394\)](#)
- [Figure 5-21: SSA Map 21 of 53 \(KP-394 to KP-407\)](#)
- [Figure 5-22: SSA Map 22 of 53 \(KP-406 to KP-416\)](#)
- [Figure 5-23: SSA Map 23 of 53 \(KP-417 to KP-426\)](#)
- [Figure 5-24: SSA Map 24 of 53 \(KP-426 to KP-438\)](#)
- [Figure 5-25: SSA Map 25 of 53 \(KP-439 to KP-449\)](#)
- [Figure 5-26: SSA Map 26 of 53 \(KP-448 to KP-456\)](#)
- [Figure 5-27: SSA Map 27 of 53 \(KP-457 to KP-466\)](#)
- [Figure 5-28: SSA Map 28 of 53 \(KP-466 to KP-474\)](#)
- [Figure 5-29: SSA Map 29 of 53 \(KP-473 to KP-480\)](#)

- Figure 5-30: SSA Map 30 of 53 (KP-481 to KP-489)
- Figure 5-31: SSA Map 31 of 53 (KP-489 to KP-496)
- Figure 5-32: SSA Map 32 of 53 (KP-497 to KP-505)
- Figure 5-33: SSA Map 33 of 53 (KP-505 to KP-514)
- Figure 5-34: SSA Map 34 of 53 (KP-514 to KP-525)
- Figure 5-35: SSA Map 35 of 53 (KP-525 to KP-534)
- Figure 5-36: SSA Map 36 of 53 (KP-535 to KP-542)
- Figure 5-37: SSA Map 37 of 53 (KP-542 to KP-550)
- Figure 5-38: SSA Map 38 of 53 (KP-551 to KP-560)
- Figure 5-39: SSA Map 39 of 53 (KP-561 to KP-569)
- Figure 5-40: SSA Map 40 of 53 (KP-569 to KP-578)
- Figure 5-41: SSA Map 41 of 53 (KP-578 to KP-586)
- Figure 5-42: SSA Map 42 of 53 (KP-586 to KP-597)
- Figure 5-43: SSA Map 43 of 53 (KP-598 to KP-608)
- Figure 5-44: SSA Map 44 of 53 (KP-608 to KP-618)
- Figure 5-45: SSA Map 45 of 53 (KP-619 to KP-629)
- Figure 5-46: SSA Map 46 of 53 (KP-629 to KP-641)
- Figure 5-47: SSA Map 47 of 53 (KP-641 to KP-653)
- Figure 5-48: SSA Map 48 of 53 (KP-653 to KP-664)
- Figure 5-49: SSA Map 49 of 53 (KP-664 to KP-674)
- Figure 5-50: SSA Map 50 of 53 (KP-674 to KP-684)
- Figure 5-51: SSA Map 51 of 53 (KP-680 to KP-691)
- Figure 5-52: SSA Map 52 of 53 (KP-688 to KP-697)
- Figure 5-53: SSA Map 53 of 53 (KP-696 to KP-706)

The pipeline 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. 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 Kilometre Post (KP)	Ending Kilometre Post (KP)	Estimated Length (km)	Proposed Primary Water Source
D1	186.3	202	15.7	Mackenzie River at KP-204.5
D2	202	326	124	Mackenzie River at KP-204.5
C1	326	473	147	Hare Indian (Rabbit-skin) River at KP-330.0

Table 6-1: Pressure Test Construction Spreads and Proposed Water Sources (cont'd)

Spread	Starting Kilometre Post (KP)	Ending Kilometre Post (KP)	Estimated Length (km)	Proposed Primary Water Source
C2	473	620	147	Hare Indian (Rabbit-skin) River at KP-330.0
B1	620	700	80	Mackenzie River at KP-632.0

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 detailed design and the selection of 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 SSA, a water-freeze depressant mixture will be required as the test medium. A mixture consisting of about 50% freeze depressant and 50% water will 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 pipeline, using 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 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 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 pressure testing in the SSA will be about 4,500 m³ per section 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. Throughout the SSA, up to three test sections may be active simultaneously for a total testing water requirement of 13,500 m³. Some of the test sections will extend into the GSA and DCR.

There will be two pipelines constructed – an NPS 10 NGL pipe and the NPS 30 gas pipe. 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.

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

Description	Water Requirements	
	Total Volume (m ³)	Average Daily Volume ^a (m ³)
501.7 km of 762 mm OD (NPS 30) gas pipe	13,500	2,250
289.9 km of 273 mm OD (NPS 10) NGL pipe	Not applicable Test medium is taken from the 762 mm OD test section.	
Total water requirements for pressure testing	13,500	
NOTE: ^a Average daily volume is total volume averaged over six days.		

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

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 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 SSA, 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).

