



LETTER DECISION

File OF-Surv-Gen-T217 01
20 September 2016

Mr. John Ferris
President and CEO
Trans-Northern Pipelines Inc.
45 Vogell Road, Suite 310
Richmond Hill, ON L4B 3P6
Facsimile 905-770-8675

Dear Mr. Ferris:

**Trans-Northern Pipelines Inc. (TNPI)
Safety Orders SG-T217-04-2009, SG-T217-01-2010, and SO-T217-03-2010
Amending Safety Order AO-001-SO-T217-03-2010
Overpressure and Pipeline Exposure Incidents**

For the reasons explained below, the National Energy Board (the Board) has decided to replace the existing Safety Orders SG-T217-01-04-2009, SG-T217-01-2010 and SG-T217-01-2010 (Safety Orders) with the attached Amending Safety Order AO-001-SO-T217-03-2010 (Amending Safety Order).

In 2009 and 2010, the National Energy Board (Board) issued the above three Safety Orders to TNPI, to address the causes of a number of pipeline releases and overpressure incidents on TNPI's pipeline system. The orders directed TNPI to reduce the maximum operating pressure (MOP) of its pipeline system, in order to immediately provide the equivalent level of public safety that would be provided by a new pipeline. TNPI was also directed to make improvements that would ensure that the pipeline system could operate at the same level of safety over several years.

In the intervening years, TNPI has made improvements to the operation of its pipeline system. Nonetheless, overpressures have still occurred. An overpressure is when the pipeline's operating pressure is higher, even for a very short period of time, than the maximum pressure authorized by the Board. On liquid pipelines, overpressures are most often the result of transient waves in

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the pipeline system caused by opening and closing valves. Pipeline systems are required to have effective overpressure systems (typically pressure-limiting controllers and/or pressure-relieving valves) to ensure that the pipeline will remain within its approved pressure range.

Operating a pipeline within its approved pressure range is one of the many checks and balances required by modern regulations to provide public safety and protection of the environment. After considering all of the facts surrounding the operation of the TNPI pipeline system, the Board has decided that TNPI should do more to ensure that overpressures cannot occur. Therefore the Board is directing TNPI to further reduce its maximum operating pressure by 10%. This action provides an immediate improvement in the safety of the pipeline system and addresses immediate concerns related to TNPI's ability to control overpressure occurrences. The Board is also directing TNPI to implement a number of longer term actions, such as computer simulations of all of the ways its system can be operated, to ensure that TNPI identifies the root causes of its overpressure incidents and solves them.

The Board is satisfied that the pipeline continues to operate safely under the current pressure restrictions, and is likewise satisfied that the added safety factor provided by the additional pressure restriction will protect the pipeline system from the effects of any additional overpressures, while TNPI develops and implements a long term solution to resolve its overpressure hazard.

As part of its public interest considerations, the Board notes that TNPI's pipeline system serves Ontario and Quebec as the system supplies fuel to major international airports and fuel outlets. The Board also notes that safety of people and the environment is our top priority. The Board is satisfied that this Amending Safety Order will provide additional protection, and consequently processes to consider a possible suspension of TNPI's authority to operate are not required at this time.

Overview of the Amending Safety Order

The Amending Safety Order aggregates the outstanding requirements and undertakings related to the previous Safety Orders; updates the undertakings for compliance with new regulations and standards¹; and provides additional requirements intended to address TNPI's ongoing non-compliances related to its overpressure system and watercourse crossing management. The Amending Safety Order directs TNPI to:

- Implement further pressure restrictions on its pipeline system;
- File annual fitness for service assessments for its pipeline system;
- Conduct and validate a hydraulic analysis, and develop and implement corrective and preventive measures;
- Assess and optimize its overpressure protection system;
- Reassess its overpressure incidents;

¹ *National Energy Board Onshore Pipeline Regulations, CSA Z662-15, Remediation Process Guide*

- Conduct engineering assessments in accordance with the requirements of CSA Z662-15 Clause 10.1;
- Implement a facility and pipeline integrity management program on its pipeline system compliant with sections 6.1 to 6.5 and section 40 of the *National Energy Board Onshore Pipeline Regulations* (OPR); and
- Develop and implement a water-crossing management program.

Conditions 1, 2 and 3 of the Amending Safety Order require TNPI to immediately restrict the operating pressure for its pipeline system and, within 60 days, report to the Board with the operating information specified by the Conditions. As the pipeline sections listed in Schedule A (Condition 1) were not under a pressure restriction, the restriction applied to these pipeline segments is 10%. The remaining pipeline segments listed in Schedules B and C (Conditions 2 and 3) are currently under a 20% pressure restriction, so the new pressure restriction will be 30% (i.e. 20% previous restriction + 10% new restriction). For the pipelines listed in Schedules B and C, TNPI must file an annual Fitness for Service Assessment. Annual Fitness for Service Assessments are not required for the pipelines in Schedule A, as TNPI demonstrated that they are fit for service when it applied to the Board for removal of the original pressure restriction.

TNPI has reported eleven overpressure incidents on its pipeline system since Safety Order SO-T217-03-2010 was issued in October 2010 and has submitted a corrective action plan with respect to those incidents. The Board is of the view that the recurrence of overpressure incidents demonstrates that TNPI has not yet effectively resolved its overpressure hazard. As set out in Condition 4 of the Amending Safety Order, the Board requires TNPI to conduct a hydraulic analysis, assess and optimize its overpressure protection system.

Additionally, the Board is not satisfied that TNPI has addressed all possible causal factors related to its overpressure incidents, particularly with respect to management systems and organizational factors. Condition 5 of the attached Amending Safety Order requires TNPI to review its past overpressure incidents from this perspective and implement identified corrective and preventative measures.

The Amending Safety Order also addresses pipeline watercourse crossings. As noted in Safety Order SG-T217-01-2010, the Bronte Creek incident site requires remediation. The Board has included Condition 6 in the Amending Safety Order to update the requirement for TNPI to provide a Remedial Action Plan commensurate with the expectations of the NEB's Remediation Process Guide, including the requirement for adequate stakeholder consultation. Condition 4.d. is included in response to the recent pipeline exposure incident INC2016-065 at a pipeline watercourse crossing. Condition 4.d. requires TNPI to develop and implement a water-crossing management program for its pipeline system.

Given the complexity of the Amending Safety Order and the requirement for clear tracking and reporting, Condition 7 of the Amending Safety Order requires TNPI to retain an independent third party to track and report on TNPI's progress in completing these requirements.

Additional Duty of Accountable Officer

In addition to the requirements of the Amending Safety Order, TNPI's Accountable Officer is directed to file with the Board, by 31 December 2016, a report outlining how TNPI has met the requirements of the OPR sections 6.5(1) (v), (w) and (x), and make available for the Board's review TNPI's required management system process and records to demonstrate that it has met the above requirements. These sections of the OPR require TNPI to establish and implement a process for evaluating the adequacy and effectiveness of its management systems, establish and implement a quality assurance program for its management system, and establish and implement a process for conducting an annual management review of its management system.

Conclusion

TNPI is reminded that failure to comply with the requirements of this letter and Amending Safety Order may result in an escalation of enforcement actions by the Board, up to and including suspension of TNPI's authority to operate.

The Board has also taken the step of ensuring the shareholders of TNPI are aware of these matters by copying the Chief Executive Officers of the respective corporate owners of the TNPI system.

Dissent of Member Richmond and Member Ballem

The foregoing decision of the Board is not unanimous. Member Richmond and Member Ballem dissent from the majority decision on this matter. The dissent decision, outlining the reasons, is set out in Appendix "A" to this letter decision.

Contact Information

If you have questions concerning Amending Safety Order AO-001-SO-T217-03-2010, please call the Board, Field Operations Business Unit, toll free at 1-800-899-1265.

Yours truly,

Original signed by

Sheri Young
Secretary of the Board

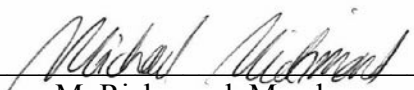
Attachment: Appendix A, Dissent of Member Richmond and Member Ballem

c.c. Steve Williams, CEO, Suncor Energy
Rich M. Kruger, CEO, Imperial Oil
Michael Crothers, CEO, Shell Canada

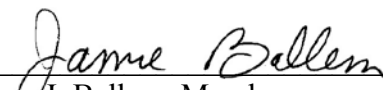
Appendix A to Board letter dated 20 September 2016

Dissent of Member Richmond and Member Ballem

TNPI has had six years to comply with numerous Safety Orders issued by the Board, but they have failed to fully comply. We are not confident that yet another similar Safety Order will guarantee that the changes necessary to make the pipeline as safe as possible will actually be made this time. We agree with the Majority that if and when all of the measures described in the Amending Safety Order are implemented, the pipeline system will be as safe as possible. However, until those safety measures are fully implemented, it would have been our preference to have the pipeline system shut down in the interim because TNPI's current operational controls do not meet the requirements of the *National Energy Board Onshore Pipeline Regulations* or CSA Z662-15.


M. Richmond, Member

20 September 2016


J. Ballem, Member

20 September 2016



AMENDING ORDER AO-001-SO-T217-03-2010

IN THE MATTER OF the *National Energy Board Act* (NEB Act) and the regulations made thereunder,

IN THE MATTER OF pipeline incidents and non-compliances which have occurred on the Trans-Northern Pipelines Inc. (TNPI) pipeline system; and

IN THE MATTER OF National Energy Board (Board) file OF-Surv-Gen-T217 01.

BEFORE the Board on 19 September 2016.

WHEREAS the Board regulates the construction and operation of the TNPI pipeline system;

AND WHEREAS the Board has issued Safety Orders SG-T217-04-2009, SG-T217-01-2010, and SO-T217-03-2010 (Safety Orders) requiring specific safety measures;

AND WHEREAS TNPI has operated the pipeline system beyond design limits and Board-established pressure restriction;

AND WHEREAS TNPI participated in a Technical Meeting with the Board and made undertakings related to facility and pipeline integrity management programs;

AND WHEREAS TNPI has not yet satisfied all of the conditions in the Safety Orders and all of the undertakings agreed to at the TNPI-Board Technical Meeting;

AND WHEREAS TNPI has reported eleven overpressure incidents on its pipeline systems since SO-T217-03-2010 was issued;

AND WHEREAS the Board is of the view that the recurrence of overpressure incidents demonstrates that TNPI has not yet effectively resolved its overpressure hazard and that TNPI will be required to conduct additional work to meet the Board's requirements;

AND WHEREAS, as an interim measure, the Board is of the view that requiring further pressure reductions would increase the safety of the pipeline system;

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AND WHEREAS the Board is not satisfied that TNPI has addressed all possible causal factors related to its overpressure incidents, particularly with respect to management systems and organizational factors;

AND WHEREAS the Board is of the view that TNPI should develop and implement a Water Crossing Management Program for its pipeline system, and that the Board should provide further direction with respect to on-going remediation activities related INC 2010-034 on Bronte Creek near Oakville, Ontario:

AND WHEREAS the majority of the Board decided to issue Amending Safety Order AO-001-SO-T217-03-2010 (this Order) and letter decision dated 20 September 2016;

AND WHEREAS Member Richmond and Member Ballem dissent from the majority decision, and their dissent decision, outlining the reasons, is in Appendix A to the letter decision of the majority of the Board dated 20 September 2016;

NOW THEREFORE, pursuant to paragraph 12(1)(b), subsection 21(2) and subsection 48(1.1) of the NEB Act, the Board rescinds Safety Orders SG-T217-04-2009, SG-T217-01-2010 and SO-T217-03-2010 and their associated conditions, and hereby orders that TNPI may continue to operate its pipelines, subject to the following conditions:

1. For each pipeline section listed in Schedule A
 - a. TNPI shall immediately restrict the operating pressure to the lower of 90% of the authorized MOP (Maximum Operating Pressure) or 10% below the highest pressure reached within the 90 day period prior to the issuance of this Order;
 - b. TNPI shall file with the Board, within 60 days after the date of issuance of this Order, a report which includes the following information:
 - i. the new restricted MOPs for each section, as directed in Condition 1. a.;
 - ii. all applicable overpressure protection system set points; and
 - iii. the overpressure system configuration.
2. For each pipeline section listed in Schedule B
 - a. TNPI shall immediately restrict the operating pressure by 30% of the authorized MOP;
 - b. TNPI shall file with the Board, within 60 days after the date of issuance of this Order, a report which includes the following information:
 - i. the new restricted MOPs for each section as directed in Condition 2. a.;
 - ii. all applicable overpressure protection system set points; and

- iii. the overpressure system configuration.
 - c. TNPI shall file with the Board a yearly Fitness for Service assessment, on or before 30 September 2017 and 30 September of each year thereafter that demonstrate the fitness for service of the pipeline sections listed in Schedule B at the reduced pressure. The assessment must include, but not be limited to:
 - i. revised defect growth rates since 2010; and,
 - ii. time-to-failure calculations, commencing September 2017 and ending when the pressure restriction has been lifted for each section of pipeline listed in Schedule B.
3. For each pipeline section listed in Schedule C
- a. TNPI shall immediately restrict the operating pressure by 30% of the authorized MOP;
 - b. TNPI shall file with the Board, within 60 days after the date of issuance of this Order, a report which includes the following information:
 - i. the new restricted MOPs for each section as directed in Condition 3.a.;
 - ii. all applicable overpressure protection system set points; and
 - iii. the overpressure system configuration.
 - c. TNPI shall file with the Board a yearly Fitness for Service assessment, on or before 31 December 2016 and 31 December of each year thereafter that demonstrate the fitness for service of the pipeline sections listed in Schedule C at the reduced pressure. The assessment must include, but not be limited to:
 - i. revised defect growth rates since 2009; and
 - ii. time-to-failure calculations, commencing December 2016 and ending when the pressure restriction has been lifted for each section of pipeline listed in Schedule C.
4. For each of the pipeline sections listed in Schedules A, B, and C
- a. TNPI shall perform the following actions:
 - i. TNPI shall conduct a hydraulic analysis that includes all possible steady and non-steady state condition scenarios for all TNPI facilities and pipeline segments at 100% MOP and their reduced operating pressures to identify where overpressure events may occur. TNPI shall include in the hydraulic analysis an assessment of the collateral effects to the operation of third party pipelines in the event of an overpressure;

- ii. TNPI shall conduct and validate the hydraulic analysis results by correctly predicting all of the reported overpressure incidents;
 - iii. TNPI shall develop and implement corrective and preventive measures in response to the results of the hydraulic analysis that are in compliance with CSA Z662-15 Clause 4.18. The recommended measures shall include the installation of pressure-relieving systems to ensure that overpressure will not occur at any point in the TNPI system;
 - iv. TNPI shall integrate and optimize pressure-limiting systems; pressure-relieving systems; and Supervisory Control and Data Acquisition (SCADA), programmable logic controllers (PLC) and programming;
 - v. TNPI shall file with the Board a report that describes the security measures with respect to its SCADA and PLCs operating systems;
 - vi. TNPI shall notify the Board within 2 days after derating a pipeline section, if TNPI derates the operating pressure of any section set out in Conditions 1 a., 2 a., and 3 a. due to an identified transient analysis related issue. The notice shall include the rationale for reducing the pipeline's pressure;
 - vii. TNPI shall file with the Board for approval by 30 September 2017, a report that describes all specific evaluated scenarios, hydraulic analysis results, the recommended corrective and preventive measures, and the locations where overpressure protection system are proposed to be installed;
 - viii. TNPI shall implement the recommended corrective and preventive measures within 24 months after receiving Board approval under 4.a.vii. TNPI shall file with the Board a report confirming that it completed the measures.
- b. TNPI shall review and revise its operational and emergency response procedures and manuals, for its pipeline system, that are related to pressure control and overpressure protection systems. TNPI shall file with the Board by 30 June 2017 a report confirming that the procedures and manuals have been revised and implemented.
- c. TNPI shall implement all outstanding proposed preventive and mitigation measures outlined in the 17 July 2015 "Comprehensive Review of Overpressure Incidents and Systemic Plan for Corrective Action" report. TNPI shall file with the Board by 31 December 2016 confirmation that TNPI has implemented the measures.
- d. TNPI shall evaluate its pipeline risk and reliability at all water crossings, and develop and implement a water crossing management program on the TNPI pipeline system within 24 months after the date of issuance of this Order. TNPI shall file with the Board for approval by 31 December 2018, a report which includes TNPI's pipeline water crossing management

program, and pipeline risk and reliability assessment. The Water Crossing Management Program must include, but is not limited to:

- i. A Depth of Cover survey;
 - ii. An Engineering Assessment for pipeline underwater crossings;
 - iii. A Scouring assessment based on 50-year and 100-year storm event conditions, as well as bank erosion and channel migration analysis;
 - iv. Mitigation, prevention and monitoring programs as per section 39 and 40 of the *National Energy Board Onshore Pipeline Regulations* (OPR);
 - v. A schedule for implementation of all mitigation, prevention and monitoring programs identified in Condition 4.d. iv.
- e. TNPI shall take the following actions with respect to undertakings agreed to at the TNPI-Board technical meeting:
- i. TNPI shall revise and implement the TNPI Integrity Management Programs (IMPs) for its pipeline system (Facility and Pipeline) as required in sections 6.1 to 6.5 and section 40 of the OPR.
 - ii. TNPI shall file the revised IMPs with the Board by 30 September 2017;
 - iii. TNPI shall, as part of its IMPs for facility and pipeline, establish and implement a Risk Management process. The process with a management system framework shall contain the steps for evaluating and managing the pipeline risks associated with identified pipeline and facility integrity hazards, including risk reduction measures related to normal and abnormal operating conditions. TNPI shall file the management risk process with the Board by 30 September 2017;
 - iv. TNPI's Accountable Officer shall file with the Board, by 31 December 2016, a report demonstrating that TNPI has met the requirements of the OPR sections 6.5(1) (v), (w) and (x) and make available for the Board's review TNPI's required management system process and records.
- f. TNPI shall, at least 45 days prior to any request to raise the restricted MOP of any pipeline or section of pipeline, file a request with the Board for approval with information that includes, but is not limited to:
- i. Information demonstrating that TNPI has implemented Conditions 4. a. to 4.e. of this Order;
 - ii. Evidence that, as a result of lifting the pressure restriction, the integrity condition on the pipeline or section of pipeline will not be negatively affected within 36 months after the date of the return to service application;

- iii. An Engineering Assessment prepared in accordance with CSA Z662-15 Clause 10.1 that demonstrates that the pipeline or section of pipeline is safe to operate at its maximum operating pressure. The Engineering Assessment must include, but not be limited to, the following items:
 1. A Risk Assessment guided by CSA Z662 Annex B including guidelines for documented reporting by CSA Z662 Annex B Clause B.6;
 2. A Fitness For Service assessment that is consistent with CSA Z662 Clause 10.10 including, but not be limited to, pressure cycling, tool validation (Probability of Detection, Probability of Identification, and Sizing Accuracy), representative material properties, defect interaction, time-to-failure calculations, Safety Factor targets, revised defect growth rates and Probability of Exceedance; and
 3. Required mitigative, preventive and monitoring measures;
 4. A schedule for implementation of all mitigation, prevention and monitoring programs identified in Condition 4. f. iii. 3.
5. TNPI shall perform the following actions:
- a. A historical review of past overpressures to identify causal and contributing factors specific to management systems and organizational factors, as well as recommended corrective and preventive measures.
 - b. Implementation of the associated corrective and preventive measures resulting from the historical review.
 - c. TNPI shall file with the Board for approval by 31 December 2016, a report which describes the process of incident investigation and analysis including the incidents assessed, the analytic results, and the implemented and required preventive and mitigative measures. The report shall include a timeline to implement the preventative and mitigative measures that are not implemented when the report is filed (outstanding measures).
 - d. TNPI shall file with the Board, within 30 days after the conclusion of the timeline to implement the outstanding measures, confirmation that the outstanding measures referred to in Condition 5(c) have been implemented.
6. TNPI shall perform the following actions with respect to the on-going remediation activities related to the 16 March 2010 incident (INC 2010-034) on the portion of the TNPI NPS 10 Cumber Junction to Oakville pipeline (Schedule B) that crosses Bronte Creek near Oakville, Ontario:

- a. TNPI shall file with the Board for approval by 31 March 2017 a Remedial Action Plan (RAP) consistent with the guidance provided in the Board's Remediation Process Guide, which includes but is not limited to:
 - i. confirmation that TNPI will send the RAP and the following notation to all previously identified stakeholders (as per the original stakeholder agreement).
 - ii. a detailed description of how the RAP is supported by the Community Based Risk Assessment (CBRA), including a letter from the Ontario Ministry of the Environment and Climate Change which notes its acceptance of the CBRA.
 - iii. confirmation that TNPI has sent the RAP and the following notation to all previously identified stakeholders (as per the original stakeholder agreement):

“This Remedial Action Plan (RAP) is concurrently being filed with the National Energy Board for approval. Please file any comments in respect of this RAP for the Board's consideration within 21 days after receipt of this correspondence”.

- b. TNPI shall file with the Board an annual status report, on or before 31 December 2017 and 31 December of each year thereafter until TNPI files its Remediation Closure Report for the incident site. The annual status report shall summarize remediation activities and progress to date, and include an estimated timeframe for completing remediation activities.
 - c. TNPI shall file with the Board for approval a Remediation Closure Report the content of which is consistent with the guidance provided in the Board's Remediation Process Guide. TNPI shall file the report with the Board after TNPI has completed the remediation objectives noted in the RAP.
7. TNPI shall perform the following actions in order to track and report its progress in completing all condition requirements of this Order:
- a. TNPI shall immediately appoint an independent third party responsible for the following actions:
 - i. Developing a Commitment Plan;
 - ii. Updating the Commitment Plan on a quarterly basis;
 - iii. Tracking the Commitment Plan for all Conditions of this Order;
 - iv. Reporting on the status of all requirements associated with this Order;
 - b. TNPI's Accountable Officer, appointed under subsection 6.2(1) of the OPR, shall sign the Commitment Plan and its Updates.

- c. TNPI shall file the Commitment Plan with the Board for approval within 30 days after the issuance of this Order.
- d. TNPI shall file Updates to the Commitment Plan with the Board on a quarterly basis, commencing 120 days after filing the first Commitment Plan and continuing until otherwise directed by the Board.

NATIONAL ENERGY BOARD

Original signed by

Sheri Young
Secretary of the Board

SCHEDULE A**National Energy Board Order AO-001-SO-T217-03-2010**

Schedule A - Pressure Reduction to the lower of 90% of Authorized MOP or 10% below the highest pressure reached within 90 days prior to the issuance of this Order.

Line Number	Line Section	Outside Diameter (mm)	Wall Thickness (mm)	Authorized MOP (KPa)	Reduced MOP (KPa)
1	NPS 16 Montreal to Ste Rose Loop	406	7.92	8274	Lower of 90% of MOP or 10% below the highest pressure reached within last 90 days
2	NPS 10 Ste Rose to Farran's Point sections	273.1	7.8	8274	Lower of 90% of MOP or 10% below the highest pressure reached within last 90 days
3	NPS 16 Ste Marthe Transition to Farran's Point Loops	406	7.14	8274	Lower of 90% of MOP or 10% below the highest pressure reached within last 90 days

National Energy Board Order AO-001-SO-T217-03-2010

SCHEDULE B

Schedule B - Pressure Reduction of 30% of Authorized MOP (as Specified)

Line Number	Line Section	Outside Diameter (mm)	Wall Thickness (mm)	Authorized MOP (KPa)	Reduced MOP (KPa) (70% MOP)
1	NPS 10 Montreal to Ste Rose	273.1	7.8	8275	5793
2	NPS 10 Dorval Lateral	273.1	6.35	8275	5793
3	NPS 10 Farran's Point to Cummer Junction	273.1	7.8	8275	5793
4	NPS 10 Cummer Junction to Oakville	273.1	7.8	8275	5793
5	NPS 16 Nanticoke to Hamilton	406	6.35, 7.14	8094, 9067	5665
6	NPS 10 Hamilton Junction to Oakville	273.1	7.8	8275	5793
7	NPS 10 Clarkson Lateral	273.1	7.8	8275	5793
8	NPS 20 Clarkson Junction to Toronto Airport Loop	508	7.14	8274	5793
9	NPS 16 Oakville to Clarkson Loop	406	7.14	9067	6347
10	NPS 10 Toronto Airport Lateral	273.1	6.35	8275	5793
11	NPS 8 CAFAS Lateral	219.1	6.35	8275	5793
12	NPS 10 Montreal Feeder System	273.1			70% MOP
13	Port Credit Lateral				70% MOP
14	Toronto Lateral				70% MOP
15	Toronto Lateral				70% MOP

National Energy Board Order AO-001-SO-T217-03-2010**SCHEDULE C****Schedule C - Pressure Reduction of 30% of Authorized MOP (as Specified)**

Line Number	Line Section	Outside Diameter (mm)	Wall Thickness (mm)	Authorized MOP (KPa)	Reduced MOP (KPa) (70% MOP)
1	NPS 12 Ottawa Lateral	323.9	4.8, 5.16, 5.94, 6.35	8274	5793