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File 3427016
20 December 2023

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Dear Dorothy Golosinski:

Trans Mountain Pipeline ULC
Trans Mountain Expansion Project
Certificate of Public Convenience and Necessity OC-065
Application pursuant to subsection 69(1) of the *Canadian Energy Regulator Act*
Mountain 3 Horizontal Directional Drill Variance Application
Reasons for Decision

Before: K. Penney, Presiding Commissioner; T. Grimoldby, Commissioner; S. Sajnovics, Commissioner

1 DECISION

On 31 October 2023, Trans Mountain ULC (**Trans Mountain**) filed a variance application with the Canada Energy Regulator (**CER**) pursuant to subsection 69(1) of the *Canadian Energy Regulator Act* (**CER Act**) requesting a variance to Schedule A of Certificate of Public Convenience and Necessity (**Certificate**) OC-065 with respect to the diameter, wall thickness and coating of pipe in an approximately 2 300 metre (**m**) segment in the Black Pines to Burnaby Tank Terminal segment of the Trans Mountain Expansion Project (**TMEP**) from approximately kilometre post (**KP**) 1064.4 to KP 1066.7 (**Variance**).

Trans Mountain requested that the Commission of the CER issue an order pursuant to subsection 69(1) of the CER Act granting:

- the Variance, conditional on Trans Mountain providing confirmation to the Commission on or before 22 November 2023 that it intends to proceed with the change in pipe diameter, wall thickness and coating pursuant to subsection 67(1) of the CER Act; and
- such further and other relief as Trans Mountain may request, or that the Commission may consider appropriate, pursuant to section 68 of the CER Act (C27032).

On 5 December 2023, the Commission denied the Variance application. The Commission took the exceptional step of issuing its decision with reasons to follow with a view to providing scheduling and practical certainty to Trans Mountain. Below, are the Commission's reasons.

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2 BACKGROUND

On 18 June 2019, the Governor in Council approved the TMEP, subject to 156 conditions. Subsequently, on 21 June 2019, the National Energy Board (**NEB**) issued Certificate OC-065 (C00061).

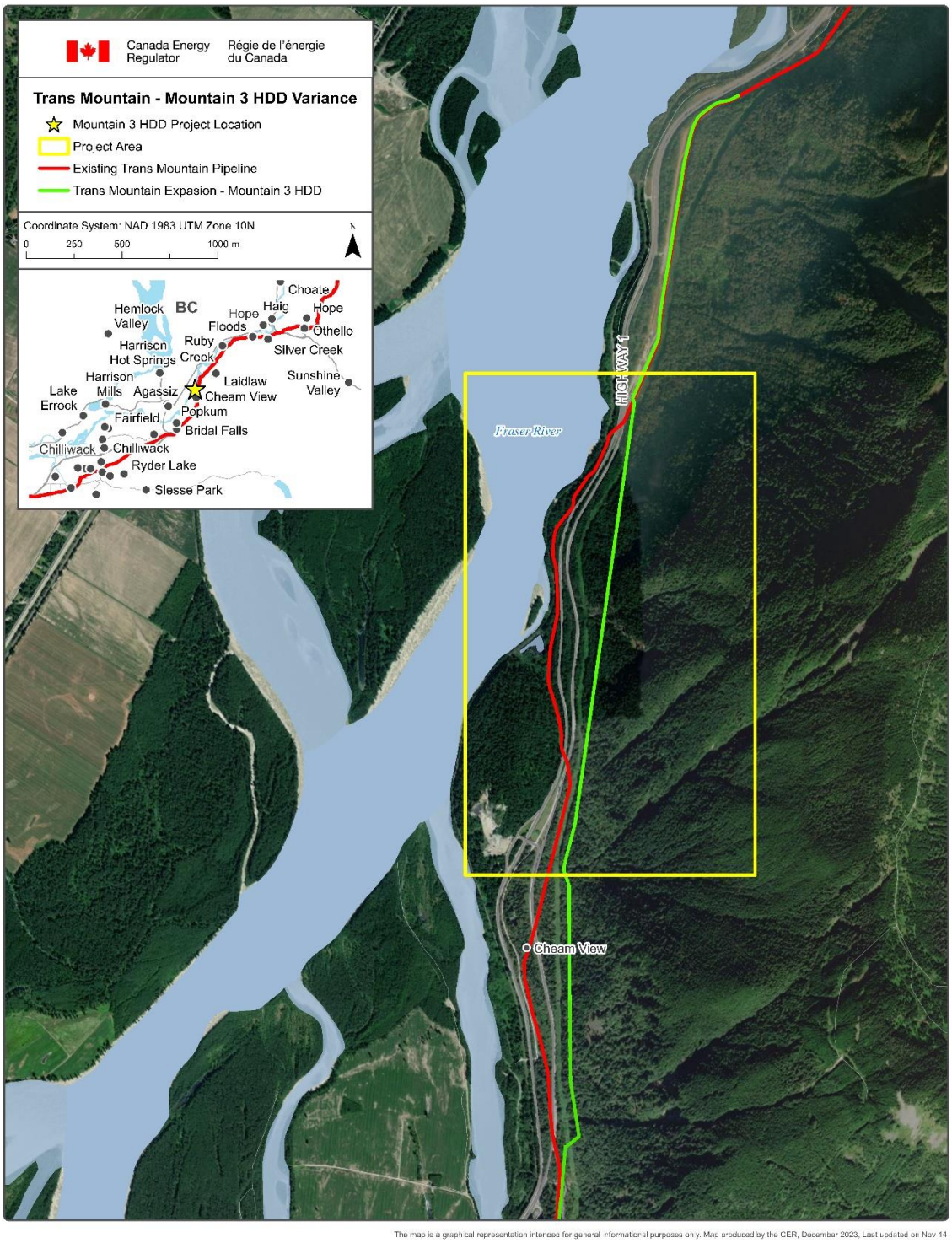
On 15 March 2022, the Commission approved Trans Mountain's Mountain 3 crossing route, under Order AO-012-OPL-004-2020 (C18157).

Trans Mountain filed its Variance application on 31 October 2023.

Trans Mountain's Mountain 3 crossing is an approximately 2 300 m segment that is to be constructed using horizontal directional drilling (**HDD**) in the Fraser Valley between Hope and Chilliwack, British Columbia. **Figure 1** provides a map of the Variance location. The pipe in question is located within the Black Pines to Burnaby Tank Terminal segment of TMEP from approximately KP 1064.4 to KP 1066.7.

Trans Mountain submits that drilling of the Mountain 3 HDD pilot hole began 7 June 2022. The 42-inch reaming is now complete, and the current HDD execution plan requires continuation of reaming to the 48-inch diameter to accommodate pullback of the Nominal Pipe Size (**NPS**) 36 pipe.

Figure 1 – Mountain 3 HDD Variance location



2.1.1 Certificate OC-065 Conditions

The following conditions from Certificate OC-065 relate to the Commission's consideration of the Variance application:

- Condition 4 – Engineering and Safety;
- Condition 9 – Quality Management Plan; and
- Condition 143 – Baseline inspections.

Condition 4, Engineering and Safety, states that:

> Trans Mountain must cause the Project to be designed, constructed, installed, and operated in accordance with, at minimum, the specifications, standards, policies, mitigation measures, procedures, and other information included or referred to in its Project application or to which it otherwise committed on the record of the OH-001-2014 proceeding.

Condition 9, Quality Management Plan (**QMP**), states that:

> Trans Mountain must file with the NEB, **at least 4 months prior to manufacturing any pipe and major components for the Project**, a Project-specific Quality Management Plan that includes:
>
> a) material/vendor qualification requirements;
>
> b) quality control and assurance of pipe, fittings, and components that ensure all materials meet Trans Mountain's specifications (i.e., processes, procedures, specifications, random testing, inspection, and test reports);
>
> c) mandatory documentation of process conditions during manufacture and verification of the conformance of manufacturer material test reports with Trans Mountain's requirements;
>
> d) mandatory inspection requirements, inspector competency training, and qualifications;
>
> e) non-conformance reporting and correction procedures;
>
> f) change management process;
>
> g) commissioning requirements; and
>
> h) material handling requirements during transportation.

Condition 143, Baseline inspections, states that:

> a) Trans Mountain must conduct the following pipeline inspections on Line 2 and the new delivery pipelines, at the times indicated:
>
> i. a high-resolution in-line caliper inspection (i.e., a GEOPIG™ inspection) **within 6 months after commencing operations** to establish accurate pipeline position and to detect pipe deformations;
>
> ii. an in-line ultrasonic crack detection inspection **within 2 years after commencing operations**;
>
> iii. an in-line corrosion magnetic flux leakage inspection in both the circumferential and longitudinal directions **within 2 years after commencing operations**;
>
> iv. an in-line ultrasonic wall measurement inspection **within 2 years after commencing operations**; and
>
> v. a close interval survey **within 2 years after commencing operations**.

b) Trans Mountain must file with the NEB, **within 6 months after completing each inspection in a)**, a report that includes a summary of the inspection results, the proposed re-inspection interval, and mitigation measures for the anomalies detected through any of the inspections, if required.

3 VARIANCE APPLICATION OVERVIEW

Trans Mountain submitted that the current HDD execution plan requires continuation of reaming to the 48-inch diameter to accommodate pullback of the NPS 36 pipeline. Construction of the HDD has been very challenging due to the hardness of rock and the complexity of a 2 300 m HDD. Trans Mountain stated that progress of the 48-inch reaming operation is unpredictable, with the risk of tool loss and additional delay, and that Mountain 3 is currently on the TMEP's critical path[1]. Trans Mountain further stated that the 42-inch reaming is now complete.

To reduce the risk of delays in the completion of the HDD and overall TMEP, Trans Mountain developed a NPS 30 contingency option that would, if implemented, involve the installation of NPS 30 pipe within the 42-inch ream. This would avoid the need to complete the 48-inch ream pass that is required to accommodate pullback of the NPS 36 pipeline. Trans Mountain stated that implementing the contingency option can be completed in 55 to 60 fewer days than it will take to complete the 48-inch ream and install an NPS 36 pipeline. Trans Mountain submitted that this modified approach would not result in material change to the pipeline risk assessment.

4 VARIANCE APPLICATION PROCESS

Upon filing its Variance application, Trans Mountain requested a decision from the Commission by no later than 30 November 2023 to advance the timely completion of the Mountain 3 HDD and the overall TMEP.

On 16 November 2023, the Commission issued Information Request (**IR**) No. 1 requesting further information from Trans Mountain pertaining to engineering, engagement, lands, and geographic information system matters. The Commission also directed Trans Mountain to invite parties, including Indigenous communities noted in its Variance application, to file any comment they may have by 20 November 2023 (C27303).

On 20 November 2023, PetroChina Canada Ltd. (**PetroChina**) filed a letter with the CER asking for further information from Trans Mountain pertaining to engineering and finance matters (C27347).

On 22 November 2023 (C27372), Trans Mountain:

- filed its responses to IR No. 1 and to PetroChina's questions;
- provided confirmation that Trans Mountain intends to proceed with the change in pipe diameter, wall thickness and coating; and
- confirmed that TMEP shippers were notified of Commission IR No. 1 and of the opportunity to file any comments with the CER by 20 November 2023.

[1] In these Reasons for Decision, critical path refers to the portion of the overall TMEP that will be, or is expected to be, the last to be completed so as to allow the TMEP to come into service.

On 23 November 2023, the Commission established an oral hearing process to ask questions of Trans Mountain and hear argument (C27399). A transcript of the oral hearing can be found on the public registry (C27448).

On 30 November 2023, Trans Mountain filed responses to undertakings committed to during the oral hearing session on 27 November 2023 (C27483).

On 30 November 2023, Canadian Natural Resources Limited (**CNRL**) filed a letter (C27485), on behalf of itself, Marathon Petroleum Canada Trading & Supply ULC, Parkland Refining (B.C.) Ltd., PetroChina, and Suncor Energy Inc. (collectively, **Commercial Stakeholders**). The letter urges the CER to ensure that any actions taken do not contribute to delays in the TMEP's in-service date. The letter also states that, should the Variance lead to any adverse effects or unforeseen impacts affecting the shippers, it is imperative that Trans Mountain bears all responsibility for rectifying these issues in a timely and reasonable manner and at its sole cost, risk, and expense.

5 WRITTEN AND ORAL SUBMISSIONS RECEIVED BY THE COMMISSION

The table below identifies all written and oral submissions received and considered by the Commission in this proceeding:

Date (2023)	Participant	Submission(s)	Filing ID
31 October	**Trans Mountain**	Request for Variance application	C27032
20 November	**PetroChina**	Comment Letter to Commission IR No. 1	C27347
22 November	**Trans Mountain**	Information Request No. 1 Response	C27372
24 November	**Trans Mountain**	Letter to CER regarding oral hearing participants	C27411
27 November	**Trans Mountain**	Letter to CER with witness bios	C27415
27 November	**Trans Mountain**	• Oral cross-examination of Trans Mountain • Oral argument	C27448 (Transcript Volume 1)
30 November	**Trans Mountain**	Response to Mountain 3 Undertakings	C27483
	CNRL on behalf of Commercial Stakeholders	Letter to CER addressing Variance impacts without delaying the TMEP	C27485

6 VIEWS OF PARTICIPANTS AND COMMISSION ANALYSIS AND FINDINGS

6.1 Engineering

6.1.1 Views of Trans Mountain

6.1.1.1 Technical challenges with HDD and effect on TMEP schedule

In its Variance application, Trans Mountain submitted that construction of the HDD has been challenging due to the hardness of rock and the complexity of a 2 300 m HDD, progress of

the 48-inch reaming operation was unpredictable, with the risk of tool loss and additional delay, and that Mountain 3 was currently on the TMEP's critical path. The option to install NPS 30 pipe within the 42-inch ream was developed to reduce the risk of delays in the completion of the HDD and overall TMEP. Trans Mountain anticipated that the schedule to install the NPS 30 pipe would be 55 to 60 days shorter than the time required to ream and install the NPS 36 pipe.

In its response to Commission IR 1.2, Trans Mountain stated that challenges encountered to date on the HDD include hard abrasive rock formations causing tooling damage and tool failure, water infiltration causing hole cleaning inefficiencies, and excess drilling waste contributing to tooling damage. Water ingress through fracture seams in the bedrock has been a concern that Trans Mountain has mitigated and continues to manage. Water inflow has not increased through the various reaming passes; however, by enlarging the borehole, there is a risk that the effectiveness of the mitigation measures may be compromised. Trans Mountain stated that the HDD execution plan for installing the NPS 36 pipe is feasible; however, it carries a greater level of risk and greater timeline to complete as compared to the proposed Variance.

At the 27 November 2023 hearing, Trans Mountain stated that it knew that Mountain 3 would be a hard rock drill, but it has proven more difficult than expected. Trans Mountain had expected a productivity rate of about 50 m per day but is only getting between 30 and 35 m per day. Trans Mountain has also experienced two twist-offs and several reamer failures. Trans Mountain has completed the 48-inch ream to 500 m on one side of the HDD and 570 m on the other side, which is 1 070 m of the total 2 295 m HDD length.

The other challenge for this HDD is the ingress of water from three fracture areas. Trans Mountain pushed grout into the fractures at the pilot hole stage and reduced the water inflow from about 30 metres cubed per hour to 8 to 10 metres cubed per hour. Trans Mountain has continued drilling at that lower rate of water influx and has been able to manage that by using bentonite in the drilling fluid and processing the water coming out of the hole.

Based on the geotechnical evaluations that were carried out prior to the HDD, including boreholes and the pilot hole, Trans Mountain knew that it was dealing with very hard rock over a long distance, and that there was a potential for water. Trans Mountain didn't find anything that wasn't expected, and there were no technical challenges encountered that weren't previously identified in the feasibility study. Trans Mountain did note that although they did not find anything that wasn't expected, they did find that the rates of penetration were lower than what they expected and that there was more water than they expected.

Trans Mountain stated that the consequences related to the risk of hard rock are lowered productivity and extending the length of time it will take to complete the HDD. The consequence related to the risk of increased water ingress is potentially having to abandon the HDD. Trans Mountain explained that this result could occur because if the water increased dramatically back to 30 metres cubed per hour or higher, Trans Mountain would not be able to effectively ream anymore as the viscosity of the fluid in the hole would prevent removal of the cuttings while reaming.

Trans Mountain added precision to its stated 55 to 60 day schedule impact, explaining that Mountain 3 would be completed an estimated 59 days sooner if the NPS 30 pipeline was installed instead of the NPS 36 pipeline. Given that the 42-inch ream is already complete (which allows for the NPS 30 installation without further reaming), and that Trans Mountain expected that the duration of pull back and post pull back activities would be the same for both pipeline diameters, the 59 day estimate was based on the time required to complete the

48-inch ream. Specifically, the 59 days was estimated using the baseline daily reaming rate (suggesting a timeline of 38 days), one assumed tool failure (adding 14 days), and an allowance for slower reaming than experienced historically (adding 7 days). Trans Mountain explained that a tool failure is likely, as is slower-than-historical reaming. Trans Mountain also highlighted that the 48-inch ream could take even longer to complete, or even result in abandonment of the HDD if water ingress mitigation failed (which could add “months and months” to the schedule).

In terms of how the Mountain 3 schedule would impact the TMEP in-service date, Trans Mountain initially indicated that switching to the NPS 30 pipeline would take Mountain 3 off the TMEP critical path. In oral testimony, however, Trans Mountain explained that based on up-to-date information about construction progress elsewhere on the TMEP, Mountain 3 could remain on the TMEP critical path even with the NPS 30 pipeline. In particular, construction at the Jacko Lake area of Spread 5A was going better than anticipated. As a result, Trans Mountain expected that rather than construction in the Jacko Lake area being completed on 21 February 2024, it would be completed in early February or maybe the last week of January. This meant that:

- construction in the Jacko Lake area would be completed at around the same time as the NPS 30 pipeline at Mountain 3, and both of these segments would be on the TMEP critical path;
- the TMEP could be in-service earlier than previously expected if the NPS 30 pipeline were installed at Mountain 3; and
- the difference between the NPS 30 and NPS 36 construction schedules at Mountain 3 would translate into an approximately equivalent difference to the TMEP in-service date.

Trans Mountain indicated that if the Variance application was denied, installation of the NPS 36 at Mountain 3 would continue into March, if not early April. Further, Trans Mountain advised that TMEP in-service could be within a month of mechanical completion.

6.1.1.2 Impact on design and operation

Trans Mountain stated that installing the NPS 30 segment at Mountain 3 would maintain the previously designated maximum allowable operating pressure of 9 930 kilopascals. A simulation carried out by Trans Mountain’s Hydraulic Engineering team concluded that the reduced pipe diameter would result in some additional head loss; however, there would be no overall impact to the throughput at the design flow rate under either winter or summer conditions, which is 568,400 barrels per day. Trans Mountain confirmed that the nominal capacity of the pipeline would remain unchanged at 890,000 barrels per day.

Due to the location of the Mountain 3 HDD, which is downstream of the Hope pressure-reduction station, Trans Mountain can reduce the pressure less at the Hope station in order to compensate for the minor pressure drop due to the 2.3 kilometer (**km**) of NPS 30 pipe, which is part of the reason the pipeline capacity is not impacted.

Trans Mountain stated that installing the NPS 30 pipe would have no effect on pumping requirements, leak detection capability, or slack flow conditions. Installation of the NPS 30 pipe would not require additional valves, and the smaller pipe would provide greater resistance to a surge pressure wave, reducing the transient pressure and improving the transient situation.

6.1.1.3 Impact on material quality

Trans Mountain purchased NPS 30 pipe for the Variance from distributors and not from manufacturers on its Approved Manufacturer's List (**AML**) as the quantity required was too small and the timeline too short for a dedicated mill run. Trans Mountain carried out the following additional measures to ensure the pipe was suitable for use:

- visual inspection;
- review for mill traceability;
- review of Material Test Reports;
- additional Charpy[2] (**CVN**) testing to comply with TMEP specification of -6°C where required; and
- the pipe was newly coated or stripped and coated to TMEP specifications.

Trans Mountain viewed its QMP as a forward-looking document that positions a vendor to supply quality material in the future. Trans Mountain stated that with the time constraints associated with the Variance, the only option it had was to purchase materials through distributors.

Trans Mountain stated that review of a vendor's QMP is less important when the pipe has already been manufactured. Trans Mountain explained that their process includes inspection of the pipe, looking at the Material Test Reports, and reviewing the material as opposed to the vendor's QMP. This includes appropriate testing and documenting those inspections and having the Engineer of Record, UniversalPegasus International, document that they reviewed and accepted the material. Trans Mountain confirmed that the above occurred.

Trans Mountain stated that the Engineer of Record gathered the information and provided it to Trans Mountain, and that this information served as the basis for Trans Mountain's decision to deviate from the AML. Trans Mountain also submitted that the required information was issued to the TMEP Procurement Team and the decision on whether to add a vendor to the AML was documented via the Vendor List Deviation Request form.

Trans Mountain provided the Vendor List Deviation Request forms for the three vendors it used that were not on the AML (Berg Pipe Panama City Corp. [**Berg**], SeAH Steel Corp. [**SeAH**], and Ezeflow). The Vendor List Deviation Request forms indicate that the vendors meet the TMEP pre-qualification requirements, and that justification can be found in the Design Change Notice (**DCN**). The Vendor List Deviation Request forms were signed by TMEP representatives between 27 November 2023 and 29 November 2023.

Trans Mountain stated that fittings acquired from Ezeflow were manufactured for Trans Mountain, to TMEP specifications and under TMEP staff oversight following the procedures in the QMP.

Trans Mountain relied on the Engineer of Record to conduct an assessment to ensure that the pipe and fittings acquired were of a quality equivalent to the material produced under

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[2] The CVN test, also known as Charpy impact testing, is a test that involves striking a standard notched specimen with a controlled weight pendulum swung from a set height. The test helps measure the amount of energy absorbed by the specimen during fracture, which gives an indication of the toughness of the material.

Trans Mountain's QMP. The following describes the additional measures Trans Mountain took to ensure quality:

- The pipe manufacturers were evaluated for equivalent acceptance based on the following criteria:
    - manufacturer's product used by other pipeline companies within the industry;
    - Trans Mountain's past experience with the manufacturer;
    - the manufacturer's International Standards Organization (**ISO**) certification; and
    - the manufacturer's quality assurance/quality control documentation.

- The Engineer of Record considered conformance to CSA Z662 and TMEP specifications and employed a third-party inspector to assess the suitability of the pipe. The Engineer of Record assessed the pipe as "suitable for use". TMEP staff relied on the Engineer of Record to ensure adherence to the Project's QMP.

- The SeAH pipe was acquired and provided to TMEP's induction bend vendor to produce induction bends. Trans Mountain submitted that this pipe is classified as an induction bend rather than line pipe and falls under the TMEP-approved induction bend vendor's QMP.

Condition 9 d) of Certificate OC-065 requires that Trans Mountain have mandatory inspection requirements and inspector competency training and qualifications. To demonstrate adherence to Condition 9 d) Trans Mountain submitted a chain of emails between itself, the Engineer of Record, and the distributor dated 6 October 2023, discussing the pipe that was manufactured by Berg. The email contains a list of inspections that should be carried out including:

- the CVN test value should be demonstrated at -6°C in accordance with TMEP specifications;
- pipe and heat numbers should be fully legible from the mill stencils;
- confirmation that all Material Test Reports are available for the stated pipe and heat numbers; and
- visual inspection for dents, gouges, excessive corrosion, ovality, etc.

To demonstrate all NPS 30 pipe and components purchased for the Mountain 3 HDD Variance comply with all relevant TMEP pipe specifications, Trans Mountain submitted a document entitled "Design Change Notice – NPS 30 Pipe Suitability for Mountain Crossing #3". The DCN provides a summary of steps taken by the Engineer of Record to ensure adherence to TMEP documented procedures. The DCN discusses the four manufacturers that made the pipe and components that Trans Mountain purchased. The DCN was signed by Trans Mountain and the Engineer of Record representatives between 27 November 2023 and 29 November 2023.

Trans Mountain stated that the Engineer of Record reviewed the QMPs for Berg and SeAH and found them equivalent to the approved AML manufacturers, and the QMP for JFE Steel Corporation West Japan Works (**JFE**) was found to be suitable. In the DCN the Engineer of Record stated that, as the pipe was previously manufactured, a review of pre-construction risk mitigation documents such as the QMPs and Inspection and Test Plan do not provide risk mitigation value at this stage. Instead, in accordance with Condition 9 and the Clause 3.1

approved vendor list deviation procedure, the manufacturers were evaluated for equivalent acceptance based on vendor acceptance criteria. This includes:

- the manufacturer's product used by other pipeline companies within the industry;
- Trans Mountain's past experience with the manufacturer;
- the manufacturer's ISO certification; and
- the manufacturer's quality assurance/quality control documentation.

The DCN states that JFE has been prequalified on the TMEP.

The DCN states that the Berg pipe was surplus from a joint venture project between two energy companies. As these are top tier organizations with industry leading QMP programs, Trans Mountain considers their quality assurance and quality control processes to be suitable for use on the TMEP.

The DCN states that the SeAH pipe was purchased from vendor stock. This manufacturer was used previously by Trans Mountain operations and was used for welding procedure qualifications on the TMEP. Trans Mountain has a high degree of confidence in the quality assurance and quality control processes and standards of the pipe supplier.

The Engineer of Record concluded in the DCN that the JFE and SeAH pipe was suitable for use, and only required coating applied by the TMEP approved coating vendor. The Berg pipe was found to require additional impact testing, which was carried out and determined to meet TMEP requirements. The Berg pipe was then also coated by the TMEP approved coating vendor.

Trans Mountain acknowledged that:

- it could not apply the mandatory inspection requirements, inspector competency training, and qualifications process in the QMP with respect to the manufacture of the pipe;
- it could not apply the non-conformance reporting and correction procedures in the QMP with respect to the manufacture of the pipe; and
- pipe handling activities prior to its purchase of the pipe were not subject to the QMP material handling requirements.

6.1.1.4 Impact on in-line inspection capability

If Trans Mountain proceeded with the Variance, it would use dual-diameter tools[3] and pigs to accommodate the change in pipe size and allow it to conduct the in-line inspection (**ILI**) caliper tool runs required for compliance with Condition 143 a)i).

Trans Mountain was pursuing two options regarding long-term ILI operations and compliance with Condition 143 a)ii), iii), iv), and v). One option was to install permanent pig traps on either end of the Mountain 3 HDD which would allow it to run conventional ILI tools on the NPS 30 segment. The second option was to pursue the design and build of custom dual-diameter tools. Specifically, this would mean developing custom high-resolution Magnetic

[3] The dual diameter ILI tool is capable of transitioning between 30-inch and 36-inch diameters on a single pipeline segment between pig traps.

Flux Leakage (**MFL**) tools (both axial and circumferential), an ultrasonic wall measurement tool, and an ultrasonic crack detection tool.

Trans Mountain confirmed that, if the Variance was approved, it would not be able to in-line inspect the 138.4 km of pipeline between the Hope Station and Burnaby Terminal for all threats before installing pig traps or developing the required ILI tools. Trans Mountain also stated that there is no alternative to in-line inspecting to meet Condition 143 and to ensure integrity of the pipeline system.

Regarding timelines, Trans Mountain stated that both the tool development option, and pig trap option have a similar timeline and would be completed around September 2025. Furthermore, the feasibility of the dual-diameter tool development has not yet been confirmed, and this step would take up to the end of April 2024.

Trans Mountain's preference between the two options is the tool development option, as the pig trap option would add two new facilities on either side of Mountain 3, adding complexity to TMEP operations. Trans Mountain explained that the operational complexity includes having to run three separate tools or pigs to cover the NPS 36 pipe, then the NPS 30 pipe, and then NPS 36 pipe, where a single dual-diameter tool or pig would cover the same amount of pipe.

6.1.2 Commission analysis and findings

The Commission considered Trans Mountain's evidence regarding the technical challenges associated with the HDD and their impacts on the TMEP construction schedule. The Commission also considered the impact of the Variance request on the design and operation of the balance of the TMEP, on material quality, and on the ability to conduct ILI.

As detailed below, the Commission has serious concerns regarding material quality and ILI capability that are not sufficiently addressed in Trans Mountain's evidence. Trans Mountain's evidence does not provide sufficient detail, definitive conclusions, and supporting documentation. In several cases, and especially with respect to the undertakings given by Trans Mountain at the oral hearing, the Commission made it clear that when it asked Trans Mountain to "demonstrate" something, the word was used in the sense it is defined in CSA Z662[4], and that is what is meant by "demonstrate" as used in these reasons.

6.1.2.1 Technical challenges with HDD and effect on Project schedule

The Commission acknowledges that Mountain 3 is a challenging HDD due to the hardness of the rock encountered resulting in a lower-than-expected production rate, accelerated tool wear and tool failures. Equally, the Commission understands that an ingress of water is reducing reaming efficiency.

However, the Commission finds that Trans Mountain has not encountered any technical challenges that were not identified by the feasibility study and geotechnical assessments carried out for this HDD. In addition, Trans Mountain has confirmed that the 48-inch ream is technically feasible, but with a greater risk and extended timeline compared to the proposed Variance.

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[4] Canadian Standards Association Standard CSA Z662 Oil and gas pipeline systems
Demonstrate – verify, or describe and explain, by the use of records, measurements, tests, comparisons of specimens, experiments, or analysis by a competent person, supported by documentation.

The Commission acknowledges the risk associated with the completion of the 48-inch ream pass of the Mountain 3 HDD to install the 36-inch pipeline. Trans Mountain has stated that, should the rate of water ingress drastically increase back to 30 metres cubed per hour or higher, reaming effectiveness would be reduced as the viscosity of the fluid would not allow for removal of the cuttings, potentially leading to abandonment of the HDD. While Trans Mountain has described a potential consequence scenario of a challenging 48-inch ream pass, Trans Mountain did not provide quantitative information regarding the likelihood of HDD abandonment. As a result, the Commission cannot make any precise determination of the risk level associated with the completion of the remaining 1 225 m of the 48-inch ream pass. The Commission also notes that Trans Mountain confirmed that the water ingress rate has not increased since grouting was completed during the pilot hole.

The Commission finds that Trans Mountain's evidence regarding the risk of failing to complete the HDD is not compelling. In its initial Variance application, Trans Mountain made no mention of water ingress posing a risk to the HDD. When Trans Mountain raised the matter in IR responses, and during oral questioning, it did not demonstrate that the present risk associated with the HDD completion is any greater than when Trans Mountain initially planned the HDD. Trans Mountain has confirmed that completing the 48-inch ream as originally designed is feasible.

The Commission finds that installation of the NPS 30 pipeline rather than the NPS 36 pipeline at Mountain 3 would likely impact the TMEP in-service date by an estimated two months. In reaching this finding, the Commission accepts Trans Mountain's 59 day estimate (which includes 14 days for a tool failure and seven days for slow reaming) for completing the 48-inch ream, and that the Jacko Lake area has progressed better than forecast. The Commission also finds that the impact to the TMEP in-service date could be less or more than two months, depending on realized construction progress in the Jacko Lake area and with the 48-inch ream at Mountain 3.

6.1.2.2 Impact on design and operation

The Commission acknowledges the installation of NPS 30 pipe at the Mountain 3 HDD would not have a significant effect on the design and operation of the balance of the TMEP outside of those discussed in **section 6.1.2.4**. Trans Mountain confirmed that the maximum operating pressure and nominal capacity of the pipeline will not be affected. Trans Mountain also confirmed that there will be no significant effect on transient pressures, slack flow conditions, or pumping requirements.

6.1.2.3 Impact on material quality

The Commission has concerns with the quality of materials that Trans Mountain has procured to construct the Variance. Trans Mountain's evidence lacked the documentation required to demonstrate that the steps it took in procuring the materials for the Variance were equivalent to the measures required by its own QMP. Trans Mountain failed to demonstrate that the quality of materials acquired for the proposed Mountain 3 Variance is equivalent to those procured for the balance of the TMEP.

The TMEP is a regulated project with a high level of CER oversight and public scrutiny. The goal of the QMP filed under Condition 9 is to ensure that Trans Mountain has appropriate oversight of the quality of pipe and major components specific to the TMEP. The Commission does not accept Trans Mountain's position that the QMP does not apply in scenarios like the Variance; quality of materials cannot be compromised due to Trans

Mountain's urgency to remove the Mountain 3 HDD from the TMEP's critical path. The QMP applies to all materials for the TMEP.

The Commission finds that Trans Mountain did not demonstrate conformance to its QMP processes governing AML deviations and change management throughout the procurement of materials for the Mountain 3 Variance. Trans Mountain's Vendor List Deviation forms and DCN were approved on and after the day of the 27 November 2023 hearing. The changes in the Variance request were approved after the procurement of pipe and components, after the application for Variance was filed with the CER, and following the undertakings resulting from the oral hearing. The Commission finds that this timing is not in conformance with Trans Mountain's management of change procedure contained within the QMP. Furthermore, there is a notable imbalance between the magnitude of the design change to the TMEP in the DCN, and the apparent lack of care given to change management, which was not demonstrated to the satisfaction of the Commission.

Trans Mountain relied on its Engineer of Record's assessment to ensure that the pipe and fittings it procured for the Variance were of a quality equivalent to the material produced under Trans Mountain's QMP. Trans Mountain stated that under its QMP, the Engineer of Record is ultimately responsible for the quality of the materials. The Commission finds that while the QMP references Trans Mountain's Quality Assurance Management Team, it does not indicate that the Engineer of Record is ultimately responsible for material quality.

The Commission finds that the email between Trans Mountain, the Engineer of Record, and the pipe distributor, which lists inspections to be carried out, does not demonstrate the creation and application of a formalized inspection and test plan (**ITP**) as required by Trans Mountain's QMP. A formal ITP is a document used for quality assurance purposes defining all tasks, tests, or inspections to be carried out and their associated acceptance criteria. It should also identify which tasks, tests, or inspections require review, which are "hold" or inspection points, and who is responsible for those actions. Trans Mountain's QMP submitted under Condition 9 formalizes expected ITP inspection points, activities, and frequencies. Trans Mountain did not provide documentation (such as test reports, inspection reports, or Material Test Reports) demonstrating that the inspections were carried out. The absence of formalized and completed ITP documentation raises concern and doubt regarding the equivalency in quality between the material acquired for the Mountain 3 Variance and that of the balance of the TMEP.

The Commission is not persuaded that Trans Mountain, either on its own or through its Engineer of Record, demonstrated that it reviewed manufacturers' QMPs, as required by Trans Mountains own QMP. Testimony at the oral hearing indicated that review of the manufacturer's QMPs was not carried out. Conversely, Trans Mountain stated in its response to Undertaking 3 that it had obtained and reviewed the manufacturer's QMPs. The DCN completed by the Engineer of Record and filed as an appendix to the undertakings indicates that review of the manufacturer's QMPs was not carried out as "it would not provide risk mitigation value at this stage".

The Commission finds that Trans Mountain's acceptance of other organizations' QMPs for use on the TMEP does not meet the intent and requirements of Condition 9.
Trans Mountain's QMP was developed specifically for the TMEP as a pre-construction requirement and was assessed and accepted by the NEB under Condition 9. As a pre-construction requirement, Condition 9 was intended to apply to all materials procured, stored, and used in TMEP construction, and deviation procedures were included to handle unforeseen circumstances.

The Commission holds Trans Mountain responsible for assuring that the pipe and fittings it purchases meet the specifications required for the TMEP. Having pipe or components with mechanical properties not meeting specifications could lead to failure of the pipe or components under pressure testing or operating conditions, which could impact people and the environment. Documentation from manufacturers can indicate that the materials provided meet the required specifications and were manufactured to the appropriate standards. However, this manufacturer documentation alone does not consistently ensure that material properties in fact meet the specifications and standards[5]. For these reasons, the QMP with its requirements for manufacturer qualification and oversight, is paramount in assuring that qualified manufacturers are providing products that meet the material specifications. The Commission finds that Trans Mountain has not taken the steps necessary, as defined in the QMP to assure that the pipe and components purchased for the Variance meet the specifications required for the TMEP.

6.1.2.4 Impact on ILI capability

Trans Mountain has not demonstrated it could ensure a level of safety and integrity for the 138.4 km section of pipeline between the Hope Station and Burnaby Terminal, that is equivalent to the rest of the TMEP. The Commission is of the view that having full ILI capability from the start of operation of the TMEP including this segment is essential to maintaining the integrity of the pipeline and ensuring acceptable performance of the pipeline segment in terms of safety and environmental protection, especially during unpredictable events such as floods and seismic activity. Notwithstanding the inspection timelines specified in Condition 143, TMEP conditions overall and Trans Mountain's own integrity management plan relies on the ability to perform a full suite of in-line inspections from the start of operation of the complete pipeline.

If the Variance was approved, Trans Mountain would not have the ability to inspect the 138.4 km section of pipeline between the Hope Station and Burnaby Terminal for all threats until either pig traps were installed on either end of the NPS 30 segment, or new dual-diameter inspection tools were developed, built, validated and made commercially viable. Trans Mountain's estimated timeline to complete either option is September 2025. The Commission finds that this timeline does not align with the Commission's view that Trans Mountain should have full ILI capability at the start of operation. The Commission is of the view that there is significant uncertainty regarding Trans Mountain's plan to develop four new dual-diameter ILI tools as the studies to confirm the feasibility of this option have not yet been completed.

The Commission agrees with Trans Mountain that there is no alternative to ILI to meet Condition 143 requirements and to ensure integrity between the Hope Station and Burnaby Terminal. ILI is a necessary component of any robust integrity management plan. Therefore, the Commission has serious concerns with the operation of the pipeline between the Hope Station and Burnaby Terminal without full ILI capability at commencement of operations. The Commission is not persuaded that safe operation of the Variance and protection of people, property, and the environment can be assured to the level of the remainder of the TMEP without access to the full suite of ILI tools relied on by Trans Mountain's integrity management plan.

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[5] NEB Order MO-003-2018 provides background on pipe and components that do not meet mechanical properties identified in industry standards or company specifications. The Order includes ongoing reporting requirements for regulated companies.

6.2 Economics

6.2.1 Views of Trans Mountain

6.2.1.1 Cost of TMEP delay

Trans Mountain confirmed that in terms of the monthly cost of delays to the TMEP in-service date, nothing material had changed as compared to the Commission's findings in this regard in its 20 October 2023 Reasons for Decision on the TMEP Jacko Lake deviation application (C26807). Consistent with this, Trans Mountain referred to the monthly cost of delay as $200 million associated with lost revenue and mentioned adverse impacts on Trans Mountain's shippers and other parties that depend on the project.

6.2.1.2 Impacts on other costs

Trans Mountain did not provide information on the difference between the Mountain 3 construction costs for the NPS 30 and NPS 36 pipeline alternatives. However, in response to a comment letter from PetroChina, Trans Mountain provided some information on operating costs. While Trans Mountain had not undertaken a detailed review of the annual maintenance costs or other costs associated with the trap sites and pigging referred to in its Variance application, at a high-level Trans Mountain would expect the costs to be less than $500,000 annually. Trans Mountain noted that under the toll methodology approved by the NEB in RH-001-2012, these additional maintenance and other operating costs would not be included in the tolls paid by shippers. Also, in response to PetroChina's letter, Trans Mountain indicated that it had no plan to later replace the NPS 30 pipeline with a NPS 36 pipeline; therefore, Trans Mountain did not provide a cost estimate for such a replacement.

6.2.1.3 Impacts on system capacity

Trans Mountain indicated that installation of the NPS 30 pipeline at Mountain 3 would have no overall impact to throughput at the design flow rate under either summer or winter conditions and provided diagrams of hydraulic simulations showing this. Further, Trans Mountain confirmed that the Variance would not impact the expanded Trans Mountain system's nominal capacity of 890,000 barrels per day, nor would there be any impact to any other measure of capacity. Trans Mountain explained that part of the reason that the capacity would not be impacted by the smaller NPS 30 pipeline is because of the location of Mountain 3. It is downstream of Hope where there is a pressure-reduction station after the downhill stretch from the top of the Coquihalla. Trans Mountain explained that it would reduce the pressure less at the Hope station in order to compensate for the minor pressure drop caused by the NPS 30 pipe.

6.2.2 Views of Participants

The Commercial Stakeholders indicated that they had concerns with the Variance application but did not take a position on whether it should be granted. They acknowledged the importance of the TMEP schedule and urged the CER to ensure any actions taken do not contribute to delays to the TMEP in-service date. Further, the Commercial Stakeholders stated that if the Variance leads to any "adverse effects or unforeseen impacts affecting the shippers, it is imperative that Trans Mountain bears all responsibility for rectifying these issues in a timely and reasonable manner and at its sole cost, risk and expense."

6.2.3 Commission analysis and findings

6.2.3.1 Cost of TMEP delay

Consistent with the Jacko Lake deviation Reasons for Decision, the Commission finds that each month of change to the TMEP in-service date will result in approximately $200 million in lost or gained revenues for Trans Mountain, and also impact shippers and other parties dependent upon the TMEP.

6.2.3.2 Impacts on other costs and system capacity

The Commission accepts Trans Mountain's submissions that if the NPS 30 pipeline was installed at Mountain 3, it would not result in any capacity impacts relative to installation of the NPS 36 pipeline. The Commission is not, in these reasons, making any findings with respect to who would bear responsibility for any costs or unforeseen impacts of the Variance application. Rather than making general findings in this regard as part of the current Variance application, the Commission finds that it would be appropriate to make such decisions if and when circumstances arise necessitating them.

6.3 Environmental and socio-economic effects

6.3.1 Views of Trans Mountain

Trans Mountain stated that the Variance is strictly technical in nature and relates only to a change in the pipe size, wall thickness and coating of the pipe to be installed. The work would take place entirely underground and within the existing easement.

Trans Mountain stated that future pig traps may be installed on either side of the Mountain 3 NPS 30 HDD segment to support future tool runs. In its response to IR No. 1.7, Trans Mountain confirmed that future pig traps to be installed on either end of the Mountain 3 NPS 30 HDD segment would be located within the approved TMEP corridor.

6.3.2 Commission analysis and findings

The Commission finds that the Variance's contemplated change in pipe diameter, with no impact on routing or method of construction, would not directly involve any change to the environmental or socio-economic effects already considered and approved for the TMEP. This conclusion must be read in conjunction with the Commission's findings relating to material quality and ILI capability which do raise potential environmental protection concerns of their own.

6.4 Rights and interests of Indigenous Peoples

6.4.1 Views of Trans Mountain

6.4.1.1 Trans Mountain's engagement with Indigenous Peoples

Trans Mountain stated that, concurrent with filing of the Variance, it would notify 19 Indigenous communities (as listed in Table 2 of the Variance application) of the Variance and invite questions or comments.

In response to the Variance, the Commission directed Trans Mountain to advise the Indigenous communities listed in it's Variance application that they could file any comment they may have directly with the CER by 20 November 2023. In response to the Commission's direction and IR No. 1.6, Trans Mountain confirmed that all Indigenous communities listed in the Variance application were notified of the Variance on 1 November 2023, were notified of the Commission's issuance of IR No. 1, and of the opportunity to file any comments with the CER by 20 November 2023. Trans Mountain stated that no concerns had been raised by Indigenous communities regarding the Variance. Trans Mountain committed to ongoing engagement with Indigenous communities and to address any concerns, should they arise.

6.4.1.2 Effects on the rights of Indigenous Peoples

As noted in **section 6.3.1**, the work for the Variance would take place entirely underground and within the existing easement. Trans Mountain submitted that the Variance does not involve any change to factors that could affect Indigenous rights or title.

6.4.2 Commission analysis and findings

6.4.2.1 Trans Mountain's engagement with Indigenous Peoples

The Commission notes that no concerns have been raised by Indigenous communities regarding the Variance to the CER or to Trans Mountain. The Commission finds that potentially impacted Indigenous Peoples were sufficiently notified of the Variance and the opportunity to file comments with the CER. The Commission notes Trans Mountain's commitment to ongoing engagement with Indigenous communities, including to address any concerns raised.

6.4.2.2 Effects on the rights of Indigenous Peoples

Given that the Variance is for a change in Schedule A to Certificate OC-065, with no impact on routing or the use of HDD as the construction method for this segment, the Commission finds that the Variance would not involve any change to the effects on the rights of Indigenous Peoples already considered and approved for the TMEP.

6.5 Engagement

6.5.1 Views of Trans Mountain

Apart from the Indigenous communities listed in Table 2 of the Variance application, Trans Mountain did not indicate that it had engaged with anyone about the Variance. In response to the Variance, the Commission directed Trans Mountain to advise any interested party that they could file any comment they may have directly with the CER by 20 November 2023.

Trans Mountain stated that it has engaged with the BC Ministry of Transportation and Infrastructure (**MoTI**), who is aware of the possibility that Trans Mountain would require extra land, should it need to build pig traps at either end of this segment. Trans Mountain submitted it has provided MoTI with the locations that it would be asking for if it were to pursue the traps, and MoTI has approved those locations. Trans Mountain stated while MoTI has its own consultation process regarding these land rights, Trans Mountain hasn't yet begun that process as it is still looking at the dual diameter ILI tools versus pig traps options and timing.

6.5.2 Commission analysis and findings

The Commission finds that those potentially impacted by the Variance were sufficiently notified of it and had the opportunity to file comments with the CER.

7 CONCLUSION

The Commission considered all submissions made by Trans Mountain and interested parties. In considering whether to grant a variance to a project, the Commission has to decide whether granting the variance is in the public interest by weighing its benefits against its drawbacks.

In terms of benefits, the Commission accepted that granting the Variance could have resulted in earlier mechanical completion of the TMEP, likely by about 59 days, and an approximately two month earlier in-service date. This would have resulted in approximately $400 million in additional revenues for Trans Mountain. Further, this would have enhanced the general economic benefits of the TMEP, as well as specifically benefited shippers who could have utilized its services earlier, benefits that underpinned TMEP's original public interest approval. These potential benefits remained contingent on all other segments of the TMEP reaching mechanical completion earlier than the Mountain 3 HDD.

These benefits were weighed against the Variance's drawbacks in relation to material quality and ILI capability as explained above by the Commission. Specifically, the Commission found:

- Trans Mountain did not demonstrate adherence to its QMP as filed under Condition 9 and could not demonstrate that the measures it did take assured that the quality of materials procured for the Variance is equivalent to those procured for the balance of the TMEP; and
- Trans Mountain did not demonstrate that without any proposed method to provide full ILI capability at the start of operation it could ensure a level of safety and integrity for the 138.4 km section of pipeline between the Hope Station and Burnaby Terminal, that is equivalent to the rest of the TMEP.

Combined, the Commission's findings relating to material quality and ILI capability raised doubts about pipeline integrity impacts from granting the Variance.

While Trans Mountain did not seek this relief, in the Commission's view, approving the Variance would also require exemptions or relief from certain requirements of CSA Z662 and TMEP Conditions 4 and 9. The Commission acknowledges that it had the discretion to grant such exemptions or relief, even where Trans Mountain had not asked it to do so, but it was not persuaded to exercise that discretion here.

The Commission's conclusions also reflect Trans Mountain's inadequate consideration of environmental protection impacts relating to the Variance, stemming from material quality and ILI capability concerns, while advancing a design change that would result in faster TMEP completion. This includes:

- Trans Mountain initially notifying the CER of the change in pipeline diameter via filing of updated engineering alignment sheets rather than a variance application;

- insufficient consideration of safety and environmental concerns throughout Trans Mountain's evidence and submissions relating to the Variance, despite the Commission drawing Trans Mountain's attention to its concerns about pipeline integrity via written IRs and oral hearing questions relating to material quality and ILI capability; and
- Trans Mountain forming its position that its QMP did not apply to situations like the Variance (or to the process to purchase pipeline materials to construct it), or in proposing to complete the TMEP in a way that did not provide full ILI capability at commencement, without adequately addressing safety and environmental protection reasons behind the material quality and ILI requirements applicable to the TMEP, and seeking appropriate relief from those requirements.

As well, much of the documentation provided by Trans Mountain in response to undertakings where it was asked to demonstrate that it had already taken certain measures, was signed on the date of the oral hearing where the undertakings were given or soon after, indicating at least that measures it took had not been documented fully until after the undertakings were given.

In sum, weighing the concerns about material quality and ILI capability against the Variance's potential benefits to the TMEP's mechanical completion and in-service dates, the Commission found that approval of the Variance would not be in the public interest. Accordingly, the Commission denied the Variance application.

Yours sincerely,

Signed by

Ramona Sladic
Secretary of the Commission

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