Historical Background Report: Trans Mountain Pipeline, 1947-2013

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Contents

About the Author

0.1. Sean Kheraj is an assistant professor of Canadian and environmental history in the Department of History at York University. He is a leading scholar of British Columbia history and author of *Inventing Stanley Park: An Environmental History*, winner of the Canadian Historical Association Clio Prize for best book in BC history and finalist for the City of Vancouver Book Award. He is also the author of several scholarly articles in environmental history, including the 2007 winner of best article in *Canadian Historical Review*, "Restoring Nature: Ecology, Memory, and the Storm History of Vancouver's Stanley Park." Dr. Kheraj's research focuses on a wide range of topics, including parks and conservation, urbanization, and energy history. His current research, for which he was awarded the 2013 Petro Canada Young Innovator Award, examines the history of long-distance oil pipelines in Canada since 1947.

See Appendix A for full curriculum vitae

About the Report

0.2. The City of Vancouver retained the author to write a report on the history of the Trans Mountain pipeline. This report includes:

1. **An overview of the original purpose of the Trans Mountain Pipeline and the regulatory approvals and parliamentary oversight that existed at the time, providing a context for the development and construction of the original pipeline**
2. **A quantitative history of oil spills or other incidents relating to the existing Trans Mountain Pipeline**
3. **An overview of the evolution of pipeline regulation and reporting requirements applicable to the Trans Mountain Pipeline during its lifetime**
4. **An overview of the operation of the Trans Mountain pipeline**
5. **Analysis of the relationship between the pipeline operator and environmental concerns**

Methodology and Sources

0.3. The author compiled and synthesized his findings using traditional qualitative historical research methods and simple quantitative analysis of public records. The research materials for this report included a range of historical sources from newspapers, published and archival government records, corporate reports, and published scholarship. See Appendix B for a complete list of sources.

0.4. The main quantitative evidence was drawn from the annual reports of the National Energy Board (1959-2012), annual reports of Trans Mountain Pipe Line Company (1954-1992), two separate National Energy Board pipeline incident databases covering a period from 1950-1996 and 2000-2012,[1] Kinder Morgan's publicly disclosed spill history for the Trans Mountain pipeline,[2] and two National Energy Board reports on the Trans Mountain pipeline. In combination, these records provided data to determine the following historical information about the Trans Mountain pipeline used in this report:

- **Liquid hydrocarbon deliveries (barrels per day), 1954-2010 (excluding the years 1993-1995, 1997-2001)**
- **Liquid hydrocarbon tanker deliveries from Westridge facilities (barrels), 1954-1982**
- **Number of Trans Mountain employees, 1974-1992**
- **Number of liquid hydrocarbon spills reported to NEB, 1961-2013**
- **Volume of liquid hydrocarbon spills reported to NEB, 1961-2013**
- **Incident types reported to NEB, 1961-1996**
- **Causes of spills reported to NEB, 1961-1996**

[1] The author acquired a pipeline incident database from the National Energy Board library in Calgary, Alberta with data for the period 1950 to 1996. With the support of Adrian Gamble, a research assistant at York University, the database was digitized and compiled into a spreadsheet for quantitative analysis. In 2013, CBC News acquired the second database via an access-to-information request covering a period from 2000 to 2012. It made the database available here: http://www.cbc.ca/newsblogs/community/editorsblog/2013/10/digging-for-data-on-pipelines.html

[2] This spill history is available here: http://www.transmountain.com/spill-history

0.5. Further details regarding events in the history of the Trans Mountain pipeline were drawn from the analysis of the annual reports of the Trans Mountain pipeline company, a commemorative history of the construction of the pipeline published in 1954, annual reports of the National Energy Board, reports of the Board of Transport Commissioners, records of the House of Commons, and historical newspaper sources. The author was also able to derive qualitative evidence regarding pipeline incidents from the NEB pipeline incident databases which include short written descriptions of each incident, detailing various causes and circumstances.

1.0 Origins and Rationale for Construction of the Trans Mountain Pipeline

Section Summary:

- **Between February 4, 1952 and October 17, 1953, Trans Mountain Oil Pipeline Company constructed a long-distance oil pipeline from Edmonton, Alberta to Burnaby, BC and parts of Washington**
- **The original purpose of the pipeline was to create markets (both domestic and foreign) for newly discovered crude oil resources in Alberta following the discoveries at Leduc in 1947**
- **All parties involved in the decision to approve the construction of the Trans Mountain pipeline envisioned the pipeline serving the economic interests of BC by supplying the province with cheap, accessible oil**
- **Trans Mountain also envisioned the pipeline serving a strategic defence purpose in the event of war with the Soviet Union**
- **The Board of Transport Commissioners approved the pipeline proposal following three days of hearings**
- **The original pipeline approval process did not involve public consultation nor did it involve environmental assessment**

1.1. The discovery of large deposits of crude oil at Leduc, Alberta in 1947 precipitated Canada's first wave of long-distance oil pipeline construction (Appendix C, Figure 1). In 1950, Interprovincial Pipe Line Company (now Enbridge) started the effort with the completion of an oil pipeline from Edmonton, Alberta to Superior, Wisconsin. Shortly thereafter, the Trans Mountain Oil Pipe Line Company built a long-distance oil pipeline in the opposite direction from Edmonton, Alberta to Burnaby, BC and the Puget Sound area in Washington as part of a rush of pipeline infrastructure development in the late 1940s and early 1950s when oil and gas companies sought to take advantage of the newly found energy resources of Western Canada.

1.2. Between February 4, 1952 and October 17, 1953, Trans Mountain constructed 1155.2-kilometres of 61-centimetre main line between Edmonton and Burnaby, an additional 4-kilometre delivery

line to a loading dock at Westridge on Burrard Inlet, and an 8.9-kilometre spur line from Sumas, BC to Ferndale, Washington (and later Anacortes). The pipeline crossed the Rocky Mountains at Yellowhead Pass, running through both Jasper National Park and Mount Robson Provincial Park. It traveled south through Kamloops and the Coquihalla Canyon before running through the Fraser River Valley on its way to Burnaby (Appendix C, Figure 2). Along its Canadian path, the Trans Mountain pipeline made 49 small river crossings and two major crossings at the Thompson and Fraser Rivers. The original system consisted of two tank farms, a receiving tank farm in Edmonton and a delivery tank farm on Burnaby Mountain, a marine loading dock at Westridge on Burrard Inlet, and four pump stations (Edmonton, Edson, Black Pool, and Kamloops). The pipeline opened in October 1953 with just two pump stations operating diesel engines that could reach a maximum throughput of 75,000 barrels per day (bpd). With all four stations operating a full capacity, the line could handle as much as 150,000 bpd and could expand to 300,000 bpd with additional pump stations.[3]

1.3. A consortium of investors first began to investigate a possible route for such a pipeline between Alberta and BC in early 1950, deciding on Yellowhead Pass as the best option, from an engineering perspective. The Parliament of Canada passed a private charter incorporating the Trans Mountain Oil Pipe Line Company on March 21, 1951.[4] As an interprovincial pipeline proposal, Trans Mountain required approval for construction from the federal Board of Transport Commissioners. On December 10, 1951, two representatives from Trans Mountain met before the five members of the Board of Transport Commissioners along with legal counsel for the Province of Alberta and the Province of British Columbia to seek approval for construction of the main line from Edmonton to Burnaby. Trans Mountain presented evidence of its preliminary engineering studies, feasibility of financing and construction plans, and the proposed route of the pipeline.

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[3] Neill C. Wilson and Frank J. Taylor. *The Building of Trans Mountain: Canada's First Oil Pipeline Across the Rockies*. (Vancouver: Trans Mountain Oil Pipe Line Company, 1954), 85-96.

[4] *An Act to incorporate Trans Mountain Oil Pipe Line Company*, *Acts of the Parliament of the Dominion of Canada*, 1951, c. 93.

The three-day hearing involved no public consultation nor did it involve an environmental assessment.[5]

1.4. During the course of the Board of Transport Commissioners application hearing for the Trans Mountain pipeline, five parties were represented: Trans Mountain Oil Pipe Line Company, the Dominion of Canada (not in person), the Province of Alberta, and the Province of British Columbia. All parties endorsed the application, primarily on the grounds that the pipeline would create a vital market for Alberta's crude oil resources. For example, the Deputy Minister of Defence Production for the Dominion of Canada (M.W. Mackenzie) supplied a letter testifying to the desire of his department to grow the market for Canadian-produced crude oil. He also assured the Board that the United States government endorsed the project and would likely provide an allocation of limited steel supplies to Trans Mountain to help complete the pipeline. In the Deputy Minister's own words, he wrote:

> In summary, the Department is definitely anxious to see the development of a wider market for Alberta crude in order that the best progress may be made in the further development of this natural resource, and the Department's information is that, at least in some quarters in the United States, the building of a line to the West Coast would justify a special allocation of steel to Canada for the purpose.[6]

1.5. The Province of Alberta supplied a statement endorsing the proposal mainly because it would create larger markets for the province's oil producers, "It is of great importance to the future development of the oil industry that additional outlets and markets be found for Alberta oil."[7] It also argued that the construction of this pipeline was in the best interests of the national economy of Canada and the development of the Pacific coast region. Similarly, the Province of British

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[5] *Report of the Board of Transport Commissioners*, Vol. 41, no. 20, 15 January 1952, 334
[6] *Ibid*, 336.
[7] *Ibid*.

Columbia provided full support for the proposal and indicated its desire for the application to be approved immediately.

1.6. Trans Mountain offered four primary rationales for its proposal to construct a long-distance pipeline to the Pacific coast. First, the pipeline would be economically lucrative and make best use of Alberta's crude oil resources. Second, it would solve a geographical problem. Alberta was landlocked and distant from the major urban and industrial markets of Canada and the US. The Trans Mountain pipeline would integrate Alberta into the rich markets of the Pacific Northwest and help realize the full economic potential of the 1947 Leduc strike. Third, supplying Alberta crude to refineries in the Vancouver area would benefit the BC economy. Prior to the completion of the Trans Mountain pipeline, BC acquired most of its oil by tanker shipment from California. Trans Mountain argued that this dependence on foreign oil left the province with a vulnerable trade deficit.[8] BC had also previously suffered from temporary oil famines in the 1930s and 1940s as California supplies were not always reliable. Most notoriously, California producers temporarily cut off oil shipments to BC in the 1930s during a conflict with Premier Duff Pattullo over price controls.[9] Similarly, the province struggled to obtain adequate supplies of crude oil during the Second World War. Finally, Trans Mountain saw the pipeline as a vital piece of infrastructure for strategic defence. Within the context of heightened tensions between the Soviet Union and the United States, the Trans Mountain pipeline would ensure a supply of critical energy resources in the event of war. In the foreword to the company's 1954 commemorative book about the construction of the pipeline, Trans Mountain president J.G. Spratt stated, "Its existence is a military asset adding powerfully to the defensive strength of Canada and the United States."[10]

1.7. Based on evidence and arguments presented by Trans Mountain along with the support of all levels of government, the Board of Transport Commissioners approved the application to

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[8] *Ibid*, 336-337; Wilson and Taylor. *The Building of Trans Mountain*, 1-2.
[9] Robin Fisher, "Regulating Fuels in the Depression: The Coal and Petroleum Control Board of British Columbia" *BC Studies* 66 (Summer 1985): 3-27.
[10] Wilson and Taylor. *The Building of Trans Mountain*, ix.

construct the pipeline on December 13, 1951, after just three days. After weighing the engineering and financial evidence, Justice John D. Kearny wrote the final decision of the Board, indicating the opinion "that the construction of the proposed pipeline appears to be in the public interest."[11] Although the original proposal called for an "all-Canadian" pipeline connecting Edmonton and Burnaby, one year later the Board expanded its judgement and approved an additional request to build a spur line from Sumas, BC to refineries in Washington.[12] Tom Goode, Member of Parliament for Burnaby-Richmond, spoke out against the spur line and accused Trans Mountain of "double-crossing" the Province of British Columbia and the Dominion of Canada. He feared that the spur line would divert most of the oil directly to US refineries and cut out the Canadian refineries in the Vancouver area.[13] In spite of this limited opposition, the Board approved the construction of the spur line and Trans Mountain completed the entire project by October 1953.

[11] *Report of the Board of Transport Commissioners*, Vol. 41, no. 20, 15 January 1952, 338.
[12] *Forty-Ninth Report of the Board of Transport Commissioners for Canada* (Ottawa: 1954), 9.
[13] "Liberal Charges B.C. Doublecross by Pipeline Firm" *Globe and Mail*, 14 March 1953, 3.

2.0 Regulating the Trans Mountain Pipeline

Section Summary:

- **Between 1951 and 1959, the Board of Transport Commissioners regulated Trans Mountain under the authority of the *Pipe Lines Act* (1949)**
- **The Board of Transport Commissioners exercised minimal oversight and did not require regular reporting of safety statistics**
- **In 1959, the *National Energy Board Act* replaced the *Pipe Lines Act* and created the National Energy Board (NEB) as the new regulatory body to oversee interprovincial and international pipelines**
- **In 1961, the NEB began to require pipeline operators to submit regular safety statistics and reports on all incidents, including oil spills, a range of malfunctions, workplace injuries, and deaths**
- **In 1988, the NEB specified that pipeline operators only needed to report oil spills greater than 1,500 litres, unless oil came into contact with a body of water**
- **In 1999, the NEB expanded its reporting requirement to include the release of any low vapour pressure hydrocarbon product**

2.1. As oil began to flow through the Trans Mountain pipeline on October 17, 1953, the operation of the pipeline fell under the regulatory authority of the federal government. Even though provincial governments held jurisdiction over natural resources, the Dominion of Canada retained authority to regulate all interprovincial or international trade and transport. In the immediate years following the Leduc oil strike, pipeline operators inundated Parliament with proposals and requests for private charters. In response to this flurry of new economic activity, the federal government passed legislation to regulate all long-distance pipelines that crossed provincial borders or the border with the US.

2.2. On April 5, 1949, the Minister of Transport, Lionel Chevrier, introduced Bill 190, "An act respecting oil or gas pipelines," also known as the *Pipe Lines Act*. He believed that the rapid

development of the oil and gas sectors along with pipeline infrastructure demanded state intervention. "The new oil fields discovered in Alberta," Chevrier told Parliament, "will require the construction of trunk pipe lines to carry the crude oil to refineries and the finished products from the refineries to the markets." Those pipelines, however, would require federal oversight and regulation. As Chevrier claimed, "to give private companies power over interprovincial and international pipe lines, without some governing body, would be to create a position of chaos in a new and growing field."[14] The field, he believed, would provide new prosperity for the country once the newly discovered resources of Alberta could be brought to market. However, the minister was concerned that pipeline operators could potentially stunt the development of these natural resources if they were not regulated as common carriers and their tariffs set at fair rates.

2.3. While the Official Opposition endorsed the *Pipe Lines Act* in principal, some of the BC Members of Parliament insisted that the federal government ensure that any new pipeline regulations guarantee that the rich oil resources of Alberta first be used to benefit the industrial development of Canada and not export markets in the US. For example, Howard Green, the Member of Parliament for Vancouver South, insisted that the Leduc discovery "has been one of the most important developments in the life of this nation." Therefore, he believed that the regulation of pipelines should ensure that "oil and gas should be used in Canada as much as possible."[15] Green was specifically concerned that proposals to pipe oil and gas to Vancouver would, in fact, be used to carry Canadian energy resources through to Washington. The federal government ultimately rejected this proposal and passed the *Pipe Lines Act* by the end of April 1949.

2.4. The *Pipe Lines Act* granted the federal Board of Transport Commissioners the authority to regulate all interprovincial and international oil pipelines.[16] In addition to making the Board responsible for approving all construction proposals, the act also granted the Board a range of powers to inspect pipelines and review the operations of pipeline companies. While the act included no

[14] *Debates of the House of Commons*, Vol. 3 (Ottawa: 1949), 2509-2510.
[15] *Ibid*, 2512-2513.
[16] *An Act respecting Oil or Gas Pipe Lines*, 1949, c. 20.

provisions for environmental protection, it did make pipeline companies liable for damages caused to property or individuals during construction and operation. It also allowed the Board to intervene in order to guarantee public safety. For the most part, the Board of Transport Commissioners rarely intervened in the operation of the Trans Mountain pipeline. It also required minimal reporting. As such, there appears to be no public safety record of the operation of the Trans Mountain pipeline during the years when the Board of Transport Commissioners was responsible for its regulation and oversight.

2.5. The Board of Transport Commissioners regulated the Trans Mountain pipeline under the terms of the *Pipe Lines Act* from 1951 until 1959 when the National Energy Board (NEB) assumed regulatory responsibility. Following controversy over the construction of the TransCanada gas pipeline through northern Ontario, the federal government held two Royal Commissions to investigate the country's regulation of the oil and gas industries. One of the consequences of these Royal Commissions was the replacement of the *Pipe Lines Act* with the *National Energy Board Act* in July 1959.[17] This act created a new quasi-judicial board appointed by the Government of Canada with responsibility for the regulation of interprovincial and international pipelines. Under the *National Energy Board Act*, this board could create rules and regulations for the construction and operation of pipelines that, in some cases, had enforcement power under the Criminal Code. This included powers to create safety regulations. The act also introduced public hearings for pipeline proposals.

2.6. Beginning in 1961, the NEB began to keep regular records on pipeline incidents, requiring operators to provide reports. In its first couple of years, the NEB struggled to acquire the necessary staff to begin to keep regular records on pipeline performance and safety. In 1961, the Board reported that "Gradual success in recruiting professional staff enabled the Board to progress in establishing records and conducting examinations and studies required by the Act or deemed to be

[17] *An Act to provide for the Establishment of a National Energy Board*, 1959, c. 46.

necessary to the discharge of the Board's responsibilities."[18] As a result, pipeline incident reports prior to 1961 are limited and incomplete. Since 1961, these reports covered a wide range of incidents, including oil spills, fires, explosions, various malfunctions, and workplace injuries and deaths. In 1988, the NEB established new Onshore Pipeline Regulations to consolidate and review its past practices.[19] The Board modified its incident reporting requirements for oil spills to include only those greater than 1.5 cubic metres (1,500 litres), unless oil made contact with a body of water. Then in 1999, the Board expanded its requirements to report all low vapour pressure (LVP) hydrocarbon releases greater than 1.5 cubic metres.[20] The NEB continues to regulate interprovincial and international oil and gas pipelines in Canada.

[18] National Energy Board, *Annual Report*, 1961, 1.
[19] National Energy Board, *Annual Report*, 1988, 43-47.
[20] National Energy Board, *Onshore Pipeline Regulations*, SOR/99-294.

3.0 Operation of the Trans Mountain Pipeline

Sections Summary:

- **The original purpose of the Trans Mountain pipeline changed several times over the course of its history**
- **Between 1953 and 1972, the Trans Mountain pipeline expanded and grew at a significant rate mainly due to exports to the US**
- **From 1965 to 1975, US exports constituted a majority of total throughput of the pipeline**
- **In 1972, the Trans Mountain pipeline reached its historic peak capacity of 381,871 barrels per day**
- **The operation of the Trans Mountain pipeline has regularly been vulnerable to fluctuations in global commodity prices and events in international relations**
- **In 1973, the Yom Kippur War and OPEC embargo disrupted global oil prices and led to changes in NEB policy that limited oil exports from Canada**
- **Between 1973 and 1991, Trans Mountain experienced substantial decline in throughput**
- **Between 1992 and 2010, Trans Mountain rebounded to throughput exceeding 200,000 bpd for the first time since the 1970s mainly due to shipments of heavy crude oil for export from the exploitation of northern Alberta's bitumen resources**
- **Between 1954 and 1982, the company shipped crude oil via tankers from Westridge in a sporadic fashion, often in response to international crises**
- **Trans Mountain only shipped crude oil via tankers from Westridge in ten of the first thirty years of operation**

3.1. The Trans Mountain pipeline has operated for more than sixty years, delivering crude oil and other petroleum products to refineries in BC, Washington, and beyond. During that time, the pipeline and the company have changed considerably often in response to broader changes in the international market for petroleum products. As such, the rationale for the construction of the pipeline in the 1950s had to be modified and adjusted to conform to contemporary market conditions.

3.2. In the period between 1953 and 1972, the Trans Mountain pipeline experienced tremendous growth and expansion far beyond its original purposes and capacity (Table 1). This coincided with the enormous growth in both the production and consumption of oil in Canada. Production of crude oil in Alberta and other parts of Western Canada grew exponentially between 1947 and 1972 (Table 2). Accordingly, Canadians began to consume oil in ever-greater quantities as it became cheaper and easier to access. In 1972, Canadians consumed approximately 2,859 petajoules of crude oil, more than had ever been consumed in a single year in all of Canadian history.[21]

3.3. In its first twenty years, Trans Mountain benefitted from this period of increased production and consumption of oil. According to its first annual report to shareholders, the company reported a net loss of more than $2.3 million. By 1973, however, it could happily report earnings of more than $15.6 million.[22] The overwhelming majority of profits came from the delivery of crude oil to refineries in Washington and BC.[23] The throughput volume of crude oil reached a peak in 1972 with more than 139 million barrels delivered at an average of 381,871 bpd.[24] The pipeline never exceeded this capacity again. During these years, Trans Mountain almost continuously expanded the capacity of the pipeline growing from 2 pump stations in 1953 to 20 in 1973. By 1973, the company completed an approved loop and pump station expansion to bring the maximum capacity of the pipeline to 410,000 bpd.[25]

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[21] Richard W. Unger and John Thistle, *Energy Consumption in Canada in the 19th and 20th Centuries* (2013), 125.
[22] Trans Mountain Oil Pipe Line Company, *Annual Report*, 1954, 2; 1973, 2.
[23] According to Trans Mountain's 1973 annual report, the company delivered 65.1% of its total throughput to Washington refineries. Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1973, 5.
[24] *Ibid*, 16.
[25] *Ibid*, 9.

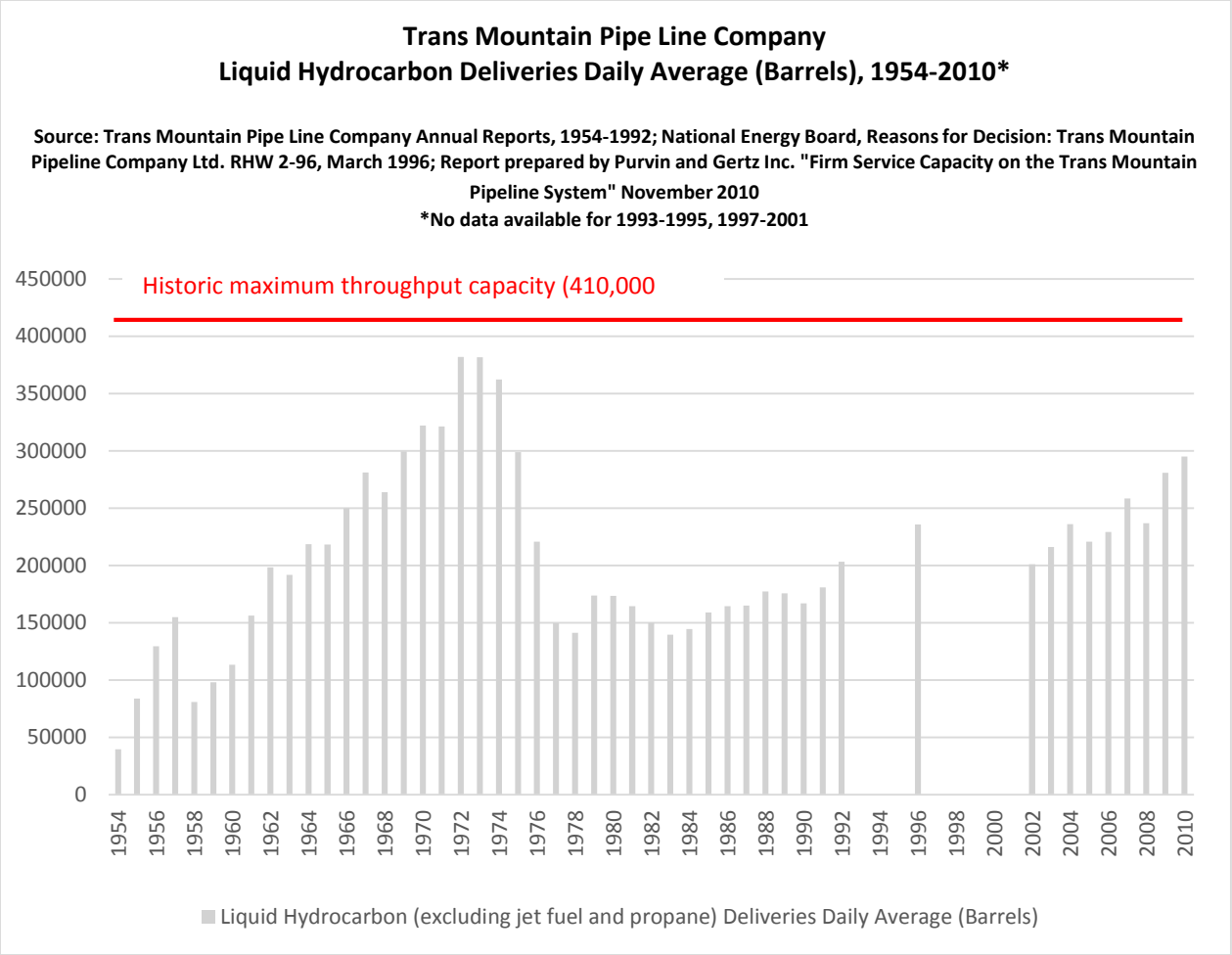

Table 1

3.4. Most of this extraordinary growth was driven by direct pipeline exports to the US. While in its first years, Trans Mountain delivered the majority of its total throughput to BC refineries, this changed in 1957 when Washington refineries overtook their BC counterparts as the main destination for crude oil on the Trans Mountain pipeline system.[26] From 1965 to 1975, US exports constituted a majority of total throughput of the pipeline, often exceeding 60%. US exports reached a peak of 69.9% of all crude oil deliveries in 1969.[27]

[26] Trans Mountain Oil Pipe Line Company, *Annual Report*, 1957, 3.
[27] These figures were derived from throughput summaries in Trans Mountain annual reports for the years 1965-1975; in 1969, the company reported average daily crude oil deliveries to Washington refineries of 215,654 bpd. Trans Mountain Oil Pipe Line Company, *Annual Report*, 1969, 4.

3.5. The company's operations were often directly influenced by global commodity prices and events in international affairs. For example, in 1956 during the Suez Canal crisis, the closure of the canal and suspension of tanker shipments from Middle East oil producers created a market opportunity for Trans Mountain to commence crude oil tanker shipments for the first time. In 1957, the company supplied crude oil from Alberta to markets in California and central Canada, shipping more than 7 million barrels from its Westridge facilities on Burrard Inlet. In the years immediately after the crisis, however, Trans Mountain saw declines in its export business as cheaper Middle East supplies of crude oil rendered Alberta's oil uncompetitive.[28]

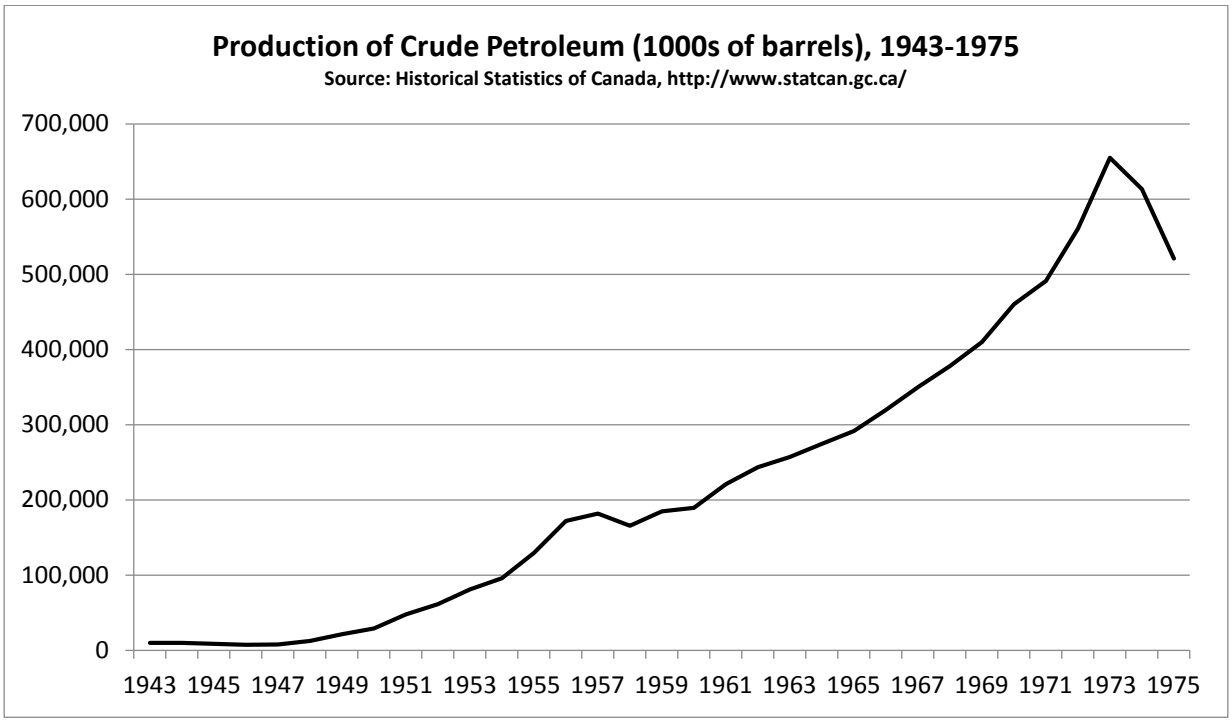

Table 2

3.6. The period of growth and expansion for Trans Mountain came to an end in 1973, in part, because of the outbreak of the Yom Kippur War in the Middle East and the decision of the Organization of Arab Petroleum Exporting Countries to impose a trade embargo against Canada, the US, and other Western industrialized nation-states. This led to a rapid spike in global oil prices and fundamentally disrupted the market. While the embargo was a temporary boon for Trans

[28] Trans Mountain Oil Pipe Line Company, *Annual Report*, 1957, 2-3.

Mountain's tanker shipping operations at Westridge (which were used to supply oil to markets in central Canada during the embargo), it led to changes in NEB policies and restrictions on oil exports.[29] In 1973, the NEB set quotas that capped the total volume of oil exports from Canada.[30] These export restrictions began to severely curtail throughput on the Trans Mountain pipeline.[31] This was particularly problematic for Trans Mountain because the company had just completed a major expansion of the pipeline system, bringing its total capacity up to 410,000 bpd. As company president E.C. Hurd wrote to shareholders in 1973, "Although this additional capacity had been built primarily to provide additional supplies to the connected refineries in the State of Washington, at about the time of completion of this expansion restrictions were imposed on the exportation of crude oil from Canada and as a consequence our throughput was curtailed by about 10%."[32] Throughput continued to decline on the Trans Mountain pipeline for almost the remainder of the decade. In 1977, average daily deliveries of petroleum products dipped below 200,000 bpd and did not rebound until 1992.[33]

3.7. The period of 1973 to 1991 was one of decline and stagnation for Trans Mountain. During these years, the company characterized the pipeline as "underutilized."[34] In addition to export restrictions, North American demand for crude oil had diminished due to a combination of energy conservation measures, new fuel-efficiency standards for automobiles, and a general economic recession.[35] In 1981, the company attributed low throughput to "The dramatic decrease in consumption of crude oil in the United States."[36] When the NEB liberalized its prior export restrictions in the mid-1980s, oil deliveries on the Trans Mountain pipeline failed to return to previous peak levels due to the depletion of conventional crude oil resources in Alberta and a drop

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[29] In 1974, Trans Mountain shipped 16,255,000 barrels of crude oil by tanker from its Westridge facilities. The year before, it had only shipped 3,370,000 barrels. Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1974, 16.
[30] National Energy Board, *Annual Report*, 1973, 1.
[31] Trans Mountain Pipeline Company, Ltd. *Annual Report*, 1973, 2.
[32] Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1973, 2.
[33] In 1977, crude oil deliveries totalled just 54,654,000 barrels, down from the company's historic peak of 139,383,000 in 1972. See Table 1 for daily average (barrels) of liquid hydrocarbon deliveries. Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1977, 16
[34] Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1979, 3.
[35] Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1982, 4.
[36] Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1981, 3.

in global oil prices. This forced the company to reduce its operating capacity, closing twelve pump stations between 1973 and 1983.[37]

3.8. The decrease in supply and demand for Alberta oil led Trans Mountain to experiment with new pipeline projects in the late 1970s and early 1980s. It attempted to construct a reverse-flow pipeline from Washington to Edmonton as infrastructure to import foreign oil to Canada and the US. Before the project could achieve regulatory approval, however, Trans Mountain withdrew its application when it realized that North American oil consumption had dropped too low to make the project economically sustainable.[38] Trans Mountain also participated in experimental pipeline studies to determine the feasibility of constructing a Subarctic pipeline from the Mackenzie Valley to Edmonton. Trans Mountain even led a short-lived oil and gas exploration enterprise in northern BC.[39] In addition to seeking out new pipeline projects and exploring for new energy resources, the company experimented with transporting a more diverse range of petroleum products. In the 1980s and early 1990s, the company began to ship semi-refined and refined petroleum, methanol, methyl tertiary butyl ether (MTBE), and heavy crude oil. Diversification of its operations led Trans Mountain to seek approval from the NEB in 1987-88 for its first expansion project since 1972-73 as part of a two-stage project to increase system capacity.[40]

3.9. In the years between 1992 and 2010, the Trans Mountain pipeline began to experience increased throughput, returning to daily average delivery rates exceeding 200,000 bpd for the first time since the 1970s. Much of this growth was attributable to increases in heavy crude oil shipments from the development of bitumen resources in northern Alberta. This activity continues into the present.

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[37] Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1983, 8.
[38] Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1979, 3-4; 1981, 2.
[39] Trans Mountain Oil Pipe Line Company, *Annual Report*, 1969, 2; Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1985, 5.
[40] National Energy Board, *Annual Report*, 1987, 25; 1987, 3.

3.10. The volatility of operations on the Trans Mountain pipeline can be observed in the record of tanker shipments from the company's Westridge dock facilities in Vancouver. Between 1954 and 1982, the company shipped crude oil via tankers from Westridge in a sporadic fashion, often in response to international crises (Table 3).[41] Between 1954 and 1982, crude oil tanker shipments operated out of Westridge in only ten years during this period. For most of its history, Trans Mountain used the Westridge facility to transport relatively small shipments of propane to Japan. It was only with the advent of heavy crude oil exports beginning in the mid-1980s that the company started to regularly ship large volumes of crude oil from Westridge. According to Trans Mountain annual reports, the company began to ship heavy crude oil on a regular basis in 1986. It was this increase in the transportation of heavy crude oil that led the company to seek an expansion of its capacity in 1987.[42]

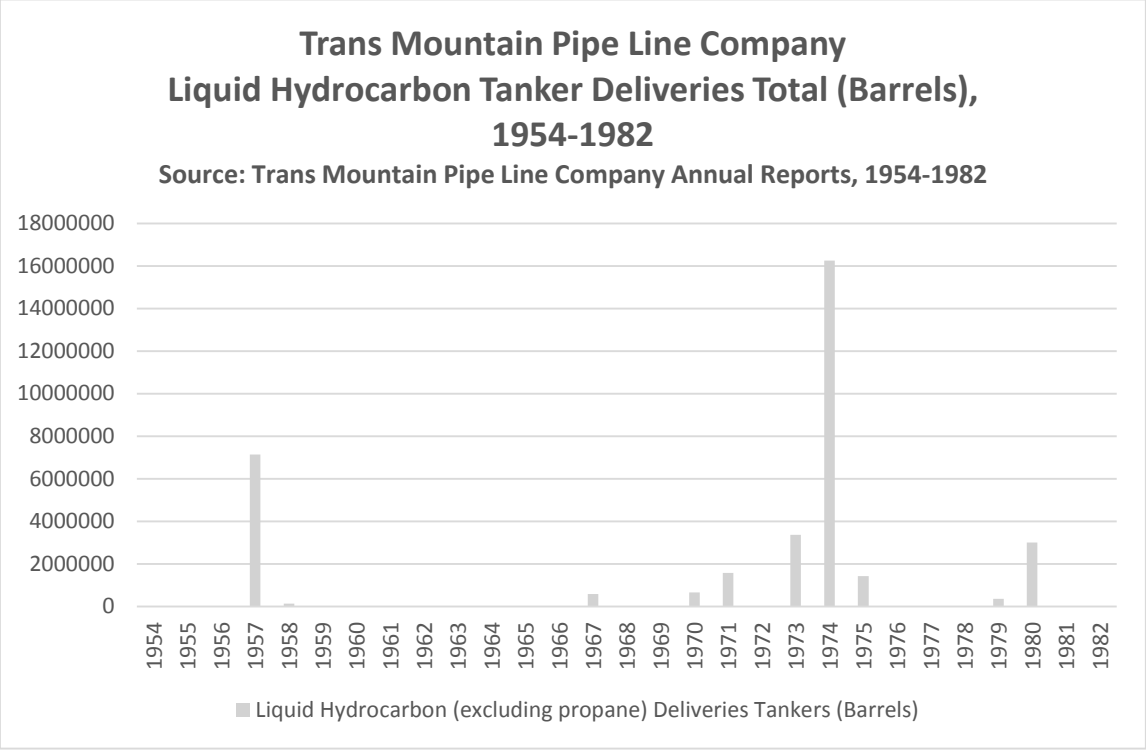

Table 3

3.11. The employment history of Trans Mountain similarly reflects the volatility of operations on the pipeline. For example, following the spike in shipments during the Suez Canal crisis, the company

[41] These figures were derived from throughput summaries in Trans Mountain annual reports for the years 1954-1982.
[42] Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1987, 3.

experienced a temporary decline in throughput. As a result, according to its 1958 annual report, "The drop in business, which commenced in the second half of 1957, and the consequent reduction in the number of stations operated, made it necessary to reduce staff from a peak of 326 to 224."[43] During its period of decline and stagnation, the total number of employees for the company decreased to fewer than 200 hundred for nearly a decade from 1977 to 1986 (Table 4).[44] The company reduced its staff from 231 in 1974 to a low of 175 people in 1978. According to annual shareholder reports, Trans Mountain did not increase its total number of employees to more than 1974 levels until 1990.

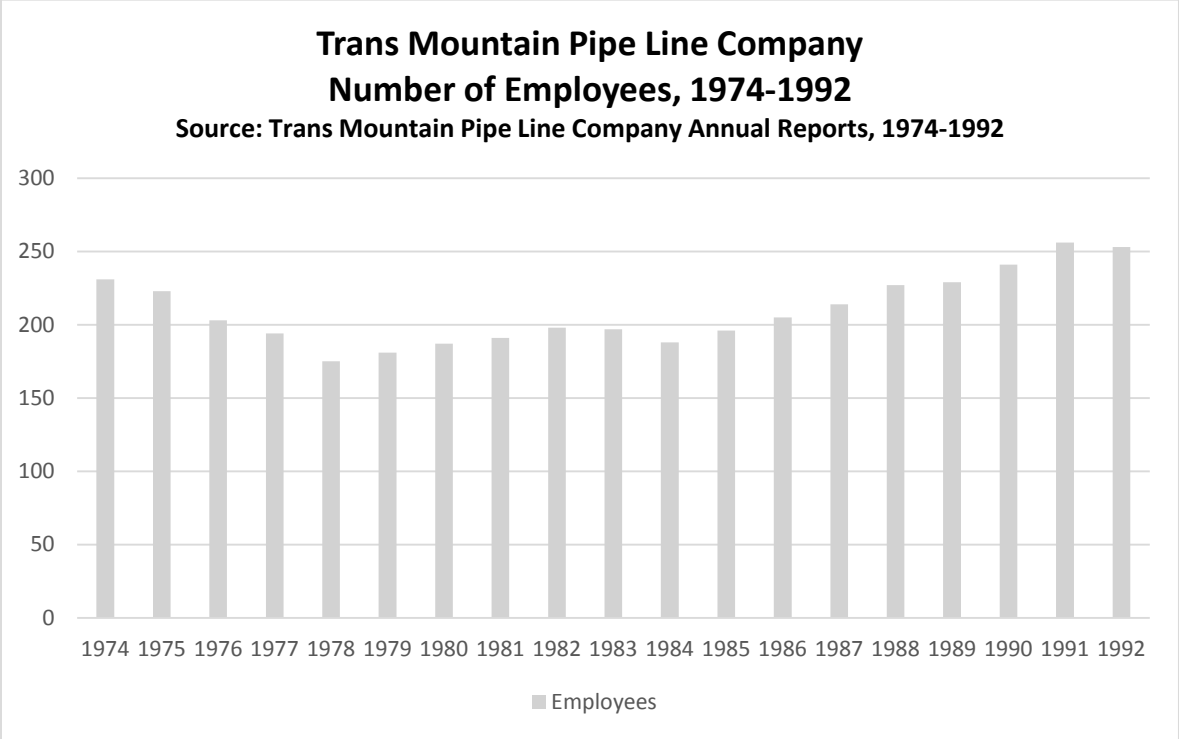

Table 4

[43] Trans Mountain Oil Pipe Line Company, Ltd. *Annual Report*, 1958, 3.
[44] These figures were derived from throughput summaries in Trans Mountain annual reports for the years 1977-1986.

4.0 Incidents and Oil Spills on the Trans Mountain Pipeline

Section Summary:

- **Between 1961 and 2013, Trans Mountain reported 81 liquid hydrocarbon spill incidents to the NEB, an average annual rate of 1.53**
- **Between 1961 and 2013, Trans Mountain reported the "uncontained spillage" of approximately 5,799,700 litres of liquid hydrocarbons**
- **Nearly 57% of the total oil spill volume since 1961 occurred in just three years: 1966, 1977, and 1985**
- **Oil spills on the Trans Mountain pipeline have occurred in a random and sporadic fashion, often the result of accidents, material failures or unforeseen causes**
- **The most environmentally disastrous oil spills in the history of the Trans Mountain pipeline were caused by faulty welds and other construction defects, human error, and forces of nature**
- **First known oil spill on Trans Mountain pipeline occurred on October 15, 1953, the day the pipeline was supposed to begin operation**
- **Between 1961 and 1996, 79% of all reported oil spills on the Trans Mountain pipeline occurred at pump stations and tank farms while 21% occurred on the mainline**
- **Between 1961 and 1996, mainline oil spills on the Trans Mountain pipeline accounted for more than 60% of the total volume of oil spilled**
- **From 1961 to 1992, 0.001% of the total throughput of liquid hydrocarbons spilled from the Trans Mountain pipeline and its facilities; this constituted a total spill volume of 4,743,900 litres of liquid hydrocarbons released into the environment**

4.1. Since it began operation in 1953, the Trans Mountain pipeline system has suffered numerous oil spills. As with the operation of nearly all long-distance oil pipelines in Canada, Trans Mountain has a long history of oil spills and other incidents. The causes of such spills range from operator error to corrosion to landslides. Overall, there is no identifiable pattern of oil spills on the Trans Mountain pipeline in its more than sixty-year history. Instead, oil spills along the pipeline have

occurred in a random and sporadic fashion, often the result of accidents, material failures or unforeseen causes.

4.2. Pipeline testing and monitoring was part of Trans Mountain's corporate operations from the outset. Prior to the opening of the pipeline in October 1953, the company ran hydrostatic pressure tests of the entire system to ensure that all welds on the pipeline were properly sealed. In spite of vigorous efforts to ensure that each weld was complete, those first hydrostatic tests ran water through the system and resulted in five leaks. Four of the leaks were minor in nature, but they were difficult to locate. The company resorted to the use of "sonic leak detectors" in order to locate the faulty welds. One leak north of Blue River, BC in an isolated and roadless segment of the route resulted in a complete rupture of water from the line. The company had great difficulty locating the leak, as its sonic leak detector was useless under rainy conditions. For three weeks, Engineers failed to locate the leak as it gushed 12-15 barrels per hour. Eventually, they resorted to filling that section of the line with a fluorescent dye and removing each segment piece by piece until the leak could be located.[45]

4.3. Following the hydrostatic tests, the pipeline was thought to be ready for operation. On October 15,1953, Trans Mountain held a ceremony at its Burnaby Mountain tank farm to dedicate the new pipeline. To celebrate the completion of the project, Burnaby Reeve W.R. Beamish unveiled a commemorative plaque at the ceremony that featured a carved map of the pipeline curving through the Rocky Mountains on its way to the Lower Mainland. The company held a reception and banquet later that same night at the Hotel Vancouver where Justice Kearny was invited to be a guest speaker. In his speech, he likened the completion of the pipeline to the accomplishments of eighteenth- and nineteenth-century fur traders, Alexander Mackenzie and Simon Fraser.[46] Members of the BC government joined Trans Mountain executives for dinner, drinks, and speeches. Unfortunately, the event was marred by the failure of the pipeline to deliver any crude

[45] Wilson and Taylor. *The Building of Trans Mountain*, 67-69.
[46] *Ibid*, 76.

oil earlier that day. "Alberta to BC Pipeline Unveiled But Still No Oil" read the headline in the *Globe and Mail*. The pipeline had incurred its first oil spill somewhere near Valemount, BC. The spill delayed the opening of the pipeline for another two days.[47]

4.4. Oil spills would continue to be a challenge for engineers and maintenance crews on the Trans Mountain pipeline. Historical data regarding incidents on the Trans Mountain pipeline system is limited due to record-keeping practices and availability of public records from the NEB.[48] As stated above, the NEB only began to keep regular records of incidents on interprovincial and international pipelines in 1961. Consistent detailed records for all reported incidents on the Trans Mountain pipeline are available for the years 1961 to 1996 and 2000 to 2012.[49] Further records relating only to pipelines spills are available from the NEB and Trans Mountain's own public disclosure of records for the remaining years 1997-1999 and 2013. These sources provide a broad overview of the history of oil spills on the Trans Mountain pipeline system (Table 5).

[47] "$93 Million Oil Line Dedicated" *Vancouver Sun*, 16 October 1953, 23; "Alberta to BC Pipeline Unveiled But Still No Oil" *Globe and Mail*, 16 October 1953, 3.

[48] The records of the National Energy Board at Library and Archives Canada are held under restricted access and are not available to the public. The author is currently investigating the possibility of obtaining access to these records through the Access to Information process. General pipeline incident data covering a period from 1961 to 1996 were, however, discovered in the NEB library in Calgary. For more details, see the section on methodology and sources above.

[49] The author was able to find evidence of some oil spills and other pipeline incidents prior to 1961 from historical newspaper records and the annual reports of Trans Mountain.

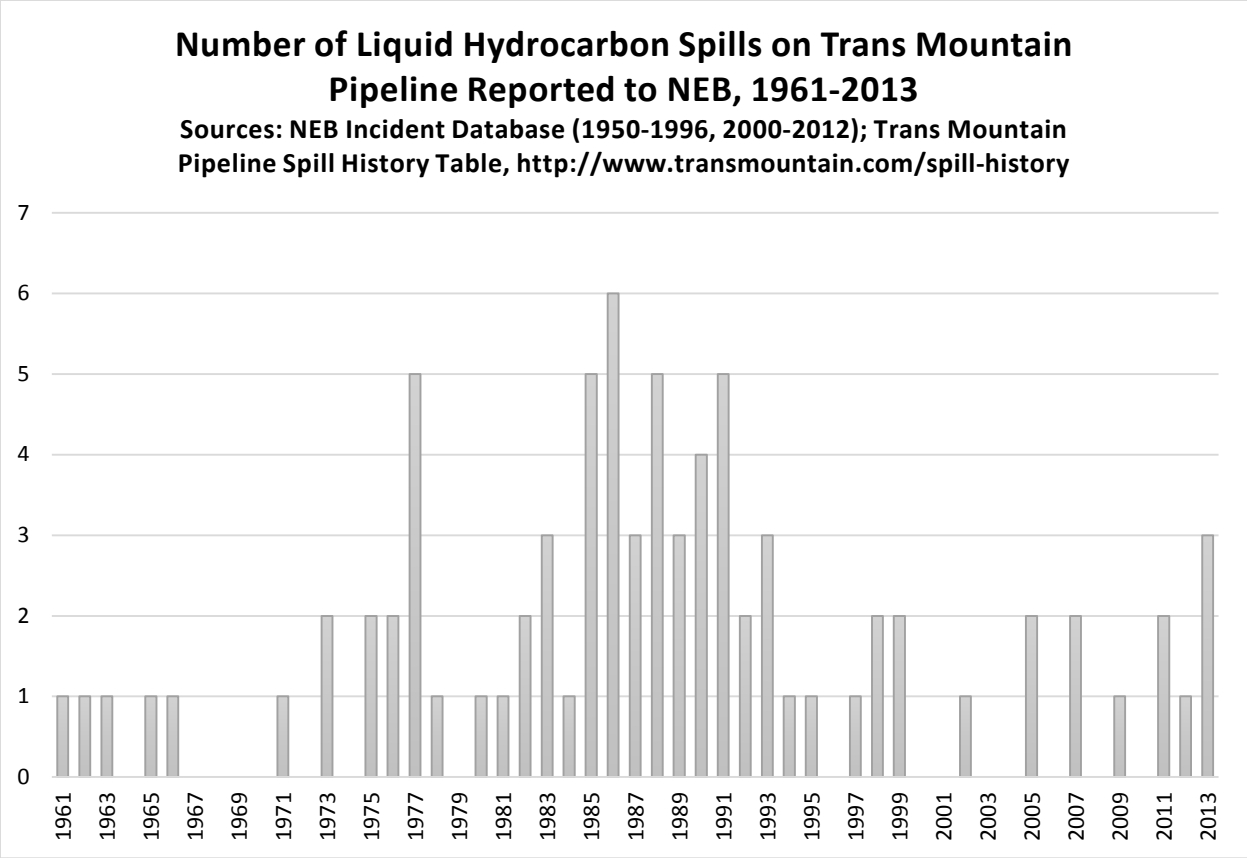

Table 5

4.5. Between 1961 and 1996, Trans Mountain reported a total of 91 incidents to the NEB, 34% of which were reported to have caused some kind of environmental damage.[50] This included a range of incident types indicated in Table 6. Over this period, 62% of all reported incidents were categorized as "uncontained spillage" and nearly all of those involved low vapour pressure products, usually crude oil. Of those incidents, about 79% occurred at Trans Mountain facilities, including tank farms and pump stations and 21% occurred on the mainline. More than half of all reported incidents between 1961 and 1996 occurred in BC.[51] Combining all known spill data from 1961 to 2013 reveals a total of 81 liquid hydrocarbon spill events on the Trans Mountain pipeline, averaging 1.53 spills per year. The volume of reported liquid hydrocarbons spilled between 1961 and 2013 totals 5,799,700 litres.

[50] This figure was derived from the NEB pipeline incident database described in the methodology and sources section above. That database includes information on all pipeline incidents that company's reported to the NEB between 1961 and 1996. It indicates whether or not an incident resulted in environmental damage.

[51] Again, these figures were derived from the NEB pipeline incident database, which indicates the location of all oil spills reported to the NEB between 1961 and 1996.

4.6. In spite of the relatively regular frequency of oil spills on the Trans Mountain pipeline system, the volume of released liquid hydrocarbons has always been proportionally small relative to the total throughput of the system. For example, in 1985, the year Trans Mountain experienced its largest oil spill by volume, the 1,158,300 litre crude oil spill at the Edmonton tank farm constituted just 0.00125% of the approximately 92,301,353,900 litres of petroleum product delivered that year.[52] The successful delivery rate of the pipeline is very high. Over the course of the period from 1961 to 1992, just 0.001% of liquid hydrocarbons spilled from the pipeline and its facilities. However, this constituted a total spill volume of 4,743,900 litres of liquid hydrocarbons released into the environment.

[52] Total throughput calculated from figures in Trans Mountain's annual report for 1985.

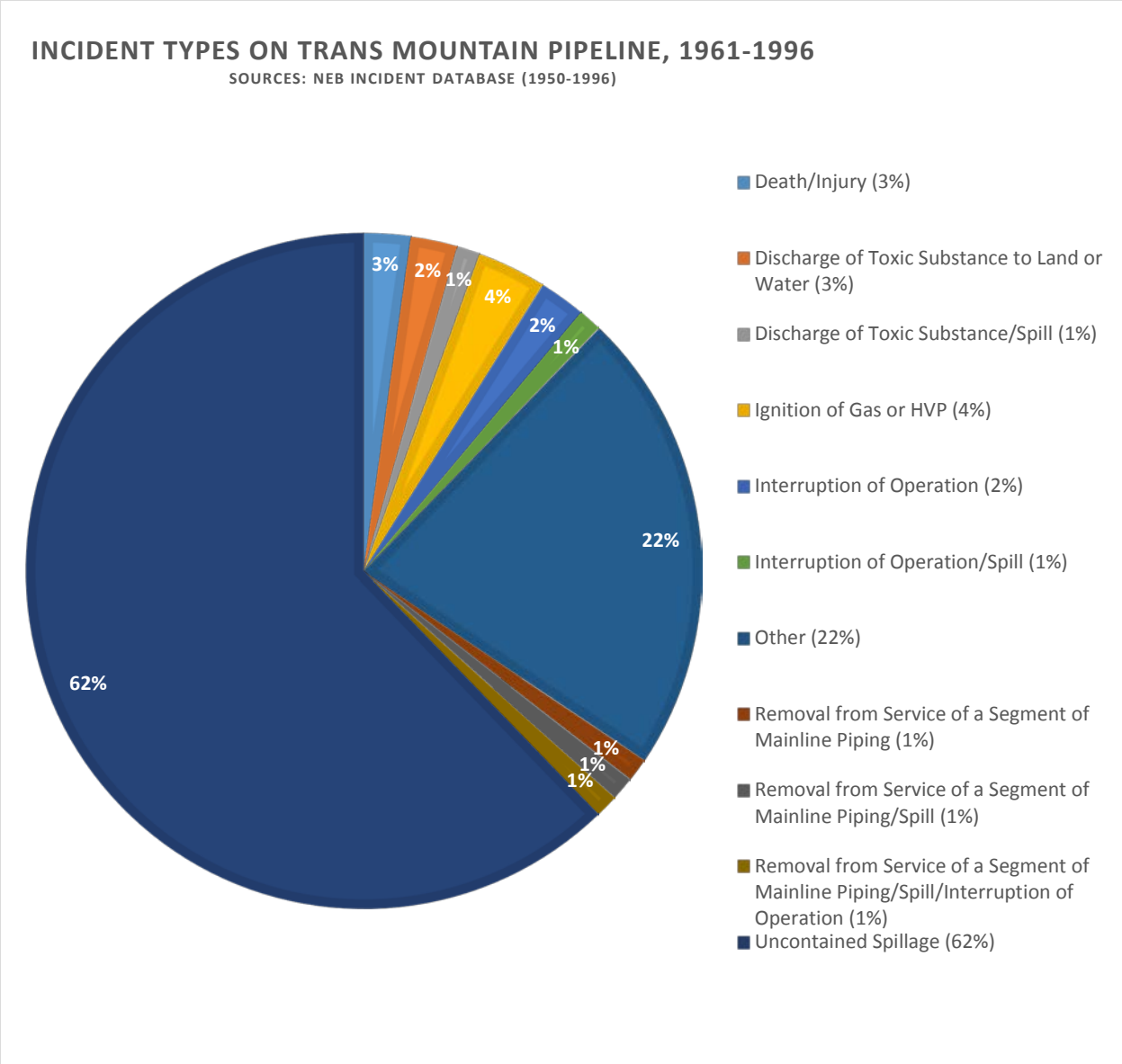

Table 6

4.7. The aggregate data of the total number of oil spills on the Trans Mountain pipeline system, however, does not necessarily provide a clear picture of the scale of these events. To better understand the history of oil spills on the system, one must also look at the volume of oil spilled over time (Table 7). Nearly 57% of the total oil spill volume since 1961 occurred in just three years: 1966, 1977, and 1985.[53] All three of these incidents involved uncontained spillage of crude

[53] The three largest spills by volume all resulted in uncontrolled release of more than 1 million litres of crude oil each in 1966 (1,110,000L), 1977 (1,033,000L), and 1985 (1,155,000L). A few of the oil spill incident reports in NEB records do not include a total spill volume, even when the description of the event suggests that the spill volume was

oil totalling more than 1 million litres apiece. These spills all occurred in Alberta, the first two on the mainline and the third at the Edmonton tank farm. Oil spills on the mainline tended to spill greater volumes than those that occurred at Trans Mountain tank farms and pump stations. Although 21% of all oil spill incidents on the system between 1961 and 1996 occurred on the mainline, this accounted for more than 60% of the total volume spilled.[54]

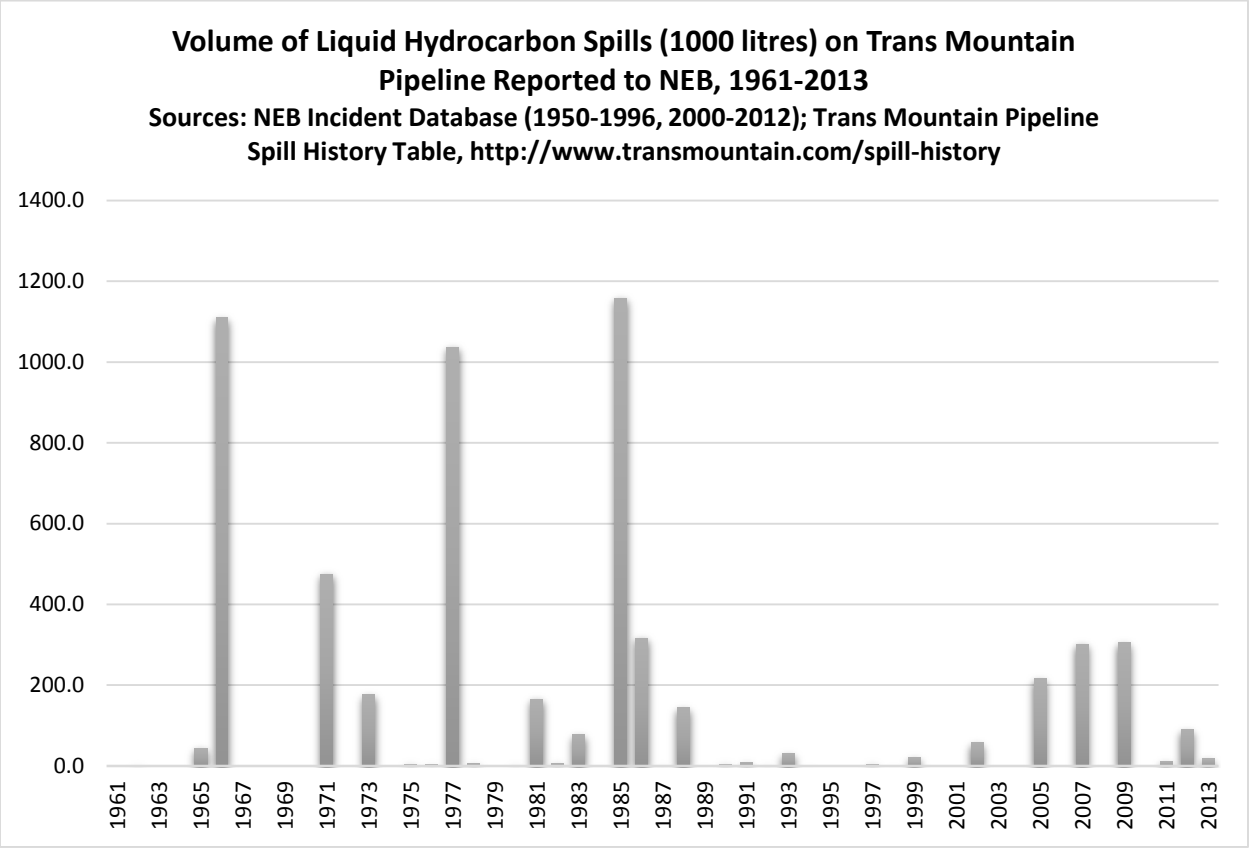

Table 7

4.8. A few of the oil spill incident reports in NEB records do not include a total spill volume, even when the description of the event suggests that the spill volume was likely very high. For example, a spill recorded on February 19, 1963 included no total spill volume data, but the report described the event as resulting in a spill rate of 3,200 litres per hour. Another two reported spills in April

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likely very high. For example, a spill recorded on February 19, 1963 included no total spill volume data, but the report described the event as resulting in a spill rate of 3,200 litres per hour. Another two reported spills in April 1989 at the Edmonton tank farm include no total spill volume, but merely explain that the spill was contained on company property by the dike surrounding the tank.

[54] This figure was also derived from the NEB pipeline incident database described in the methodology and sources section above. The database includes information on the total volume of crude oil spilled in each reported incident.

1989 at the Edmonton tank farm include no total spill volume, but merely explain that the spill was contained on company property by the dike surrounding the tank.[55]

4.9. Oil spills on the Trans Mountain pipeline cannot be attributed to any single predominant cause. In fact, the historical data reveal that there was a wide variety of causes and occasionally unpredictable events (Table 8).[56] The largest category type for causes of reported oil spills between 1961 and 1996 was "hardware failure" (28%). While hardware failures caused the greatest number of spills on the system, these incidents tended to be relatively small in volume. The largest oil spill caused by hardware failure occurred in June 1978 when a coupling gasket on a tank line at the Blackpool pump station failed and released 6,400 litres of crude oil.[57] The second largest category type was "miscellaneous" (20%). However, most of the spill incidents categorized as "miscellaneous" should more appropriately have been categorized as various types of hardware failures and operator or third-party errors.[58] For example, on December 3, 1991, one of the tanks at the Edmonton terminal leaked an estimated 2,800 litres of oil due to a crack in a frozen roof drain. On another occasion on August 13, 1994, about 757 litres of fuel spilled from a contractor's truck at the Sumas pump station when the driver struck a rock. 19% of all spills on the Trans Mountain system were caused by corrosion and these events typically occurred at the tank farms.[59] One of the worst such incidents occurred on August 20, 1981 when internal corrosion on a tank caused 165,000 litres of crude oil to spill from a redundant pipe at the Edmonton tank farm.[60]

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[55] "Pipeline related incidents under N.E.B. jurisdiction," Trans Mountain Pipe Line Company Limited, National Energy Board Library, TN 879.5/C16, p. 2, 9.
[56] The NEB pipeline incident database includes information about known causes of all incidents, including oil spills. These include a range of causes, all of which are indicated in Table 8.
[57] "Pipeline related incidents under N.E.B. jurisdiction," Trans Mountain Pipe Line Company Limited, National Energy Board Library, TN 879.5/C16, p. 3 of 14.
[58] In addition to providing a type of cause, the NEB incident database also includes short written descriptions of each incident. Based on these descriptions, many of the incidents categorized as "miscellaneous" could also have been categorized as "hardware failure" or some kind of operator or third-party error.
[59] "Pipeline related incidents under N.E.B. jurisdiction," Trans Mountain Pipe Line Company Limited, National Energy Board Library, TN 879.5/C16, p. 11-13.
[60] *Ibid*, p. 3 of 14.

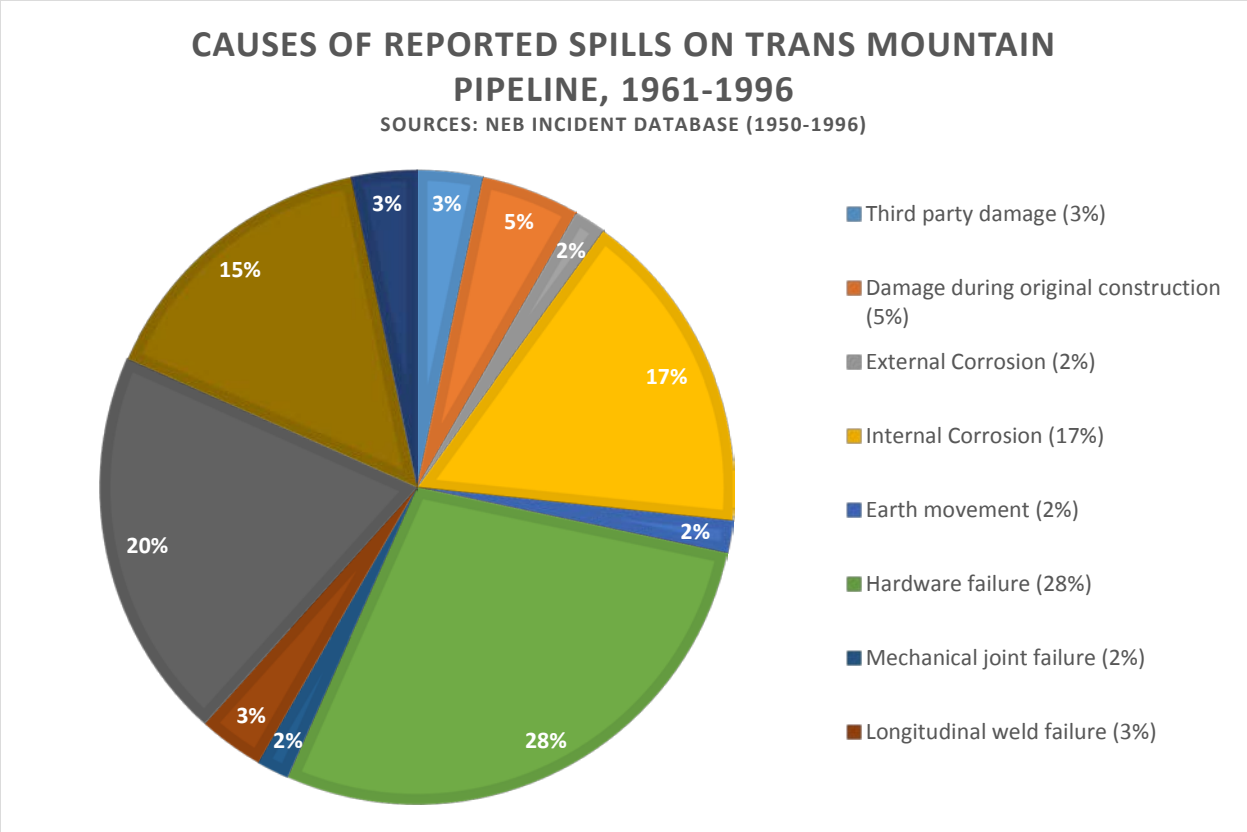

Table 8

4.10. The most environmentally disastrous oil spills in the history of the Trans Mountain pipeline (in terms of volume and location) tended to be caused by faulty welds and other construction defects, human error, and forces of nature. On April 29, 1966, the mainline at mile 239 west of Edmonton ruptured when a large rock struck an exposed portion of the pipeline as a result of highway construction blasting operations. The rupture resulted in a crude oil spill of approximately 1,110,000 litres.[61] This was one of the three biggest oil spills on the Trans Mountain pipeline by volume. Smaller spills could cause more public risk and concern depending on the location. For instance, Trans Mountain had long expressed anxieties about the vulnerability of the pipeline to heavy rain and landslides near river crossings. In 1954, the company reported one such event:

[61] *Ibid*, p. 1 of 14.

> Winter snows combined with spring runoffs and summer rains are a source of concern as they cause landslides and washouts which can endanger the line itself. During the past year a landslide caused a line break which, in addition to washouts at or near several river crossings, resulted in some major repairs and replacements.[62]

4.11. A similar line break occurred in April 1971, when the community of Merritt, BC found itself exposed to a nearby 475,000 litre crude oil spill on the Trans Mountain pipeline. Days of heavy rains caused landslides that uncovered up to 200 feet of a buried portion of the pipeline, "which eventually buckled and cracked," according to the company's report to the NEB.[63] After spotting the breach by helicopter patrol, the company hastily built an earthen dike to try to contain the spill to prevent oil from pouring into the Coldwater River, a tributary of the Nicola River and an important salmon spawning run. Landslides continued to threaten rivers along the mainline as the company experienced a close call near the Coquihalla River on December 27, 1980 when a washout caused by heavy rains exposed the mainline at four separate locations in the valley. While the line did not break and no oil leaked, several falling boulders struck and dented the pipeline.[64] The North Thompson River, however, was directly exposed to traces of crude oil five years later in October 1985 when a hydrostatic test failed and broke the pipeline, spilling 520,000 litres of water with crude oil that left a sheen on the surface of the river.[65] On another occasion, early in the morning on June 25, 1973, a Canadian National Railway worker spotted an oil spill on the Trans Mountain pipeline just inside the borders of Jasper National Park about 150 yards from the Athabasca River. For 12 hours, the pipeline leaked crude oil undetected, ultimately releasing approximately 125,000 litres over an estimated 200 square foot area of the park. According to newspaper accounts, the seepage was too slow to be registered by the company's electronic monitoring equipment. The company attributed the spill to a gouge "Most likely made during

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[62] Trans Mountain Oil Pipe Line Company, Ltd. *Annual Report*, 1954, 3.
[63] "Pipeline related incidents under N.E.B. jurisdiction," Trans Mountain Pipe Line Company Limited, National Energy Board Library, TN 879.5/C16, p. 1 of 14,; "Dike Holds Back B.C. Oil Spill" *Edmonton Journal*, 29 April 1971, 2.
[64] Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1980, 2.
[65] "Pipeline related incidents under N.E.B. jurisdiction," Trans Mountain Pipe Line Company Limited, National Energy Board Library, TN 879.5/C16, p. 5 of 14.

initial construction in 1952."[66] Bruce Wilson, park superintendent for Jasper, described the situation as "pretty lucky." He was thankful that the spill did not reach the river, but he told a *Calgary Herald* reporter, "We can't help but feel that where it can happen once, it can happen again."[67] Four years later in 1977, the mainline ruptured and suffered another spill roughly 267 kilometres to the east due to a faulty longitudinal weld. A 2-metre long rupture spilled approximately 1,033,000 litres of crude oil into the surrounding environment.[68] Finally, at the Edmonton tank farm in 1985 the system experienced its largest oil spill by volume. Stress and corrosion caused the floor plates of Tank #5 to fail and release approximately 1,155,000 litres of crude oil. The spill was contained within the dikes surrounding the tanks.[69]

4.12. In the recent past, there have been three substantial oil spills on the Trans Mountain pipeline. On July 8, 2005, a resident of the Abbotsford, BC area complained about acrid odours just outside the Sumas tank farm. Trans Mountain was in the midst of a delivery of crude oil from Sumas to its storage facilities in Puget Sound, Washington. Trans Mountain employees investigated the complaint but could not determine the source of the odour. More residents began to complain and report odours in the same area. One week later on July 15 at 10:30am, a company employee discovered a release of crude oil in the nearby Kilgard Creek. Excessive local landfill operations and shifting peat surrounding the Trans Mountain pipeline caused it to buckle and crack, spilling about 210,000 litres of crude oil, covering 5,755 square metres of land and affecting 14,300 square metres.[70] According to a Transportation Safety Board (TSB) investigation, the spill affected local wetlands and a fish-bearing watercourse. The wetlands "support amphibians, shrews, deer, garter snakes, and various birds."[71] TSB also found that "The response to the leak was delayed because of a lack of an effective leak detection system and an effective response to odour complaints" and that "The delays in emergency response, as well as the time taken to identify the leak, increased the

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[66] "Pipeline related incidents under N.E.B. jurisdiction," Trans Mountain Pipe Line Company Limited, National Energy Board Library, TN 879.5/C16, p. 2 of 14.
[67] "Oil spill in national park causes serious concern" *Calgary Herald*, 28 June 1973, 34.
[68] "Pipeline related incidents under N.E.B. jurisdiction," Trans Mountain Pipe Line Company Limited, National Energy Board Library, TN 879.5/C16, p. 1 of 14.
[69] *Ibid*, p. 5-6 of 14.
[70] Transportation Safety Board of Canada. *Pipeline Investigation Report, P05H0044*, 15 July 2005, p. 2-4.
[71] *Ibid*, 4.

severity of the accident."[72] City of Abbotsford Police and Fire Rescue Service arrived within an hour after the discovery of the oil spill. By 1:10pm that same afternoon, the company informed the emergency response personnel that the spill contained crude oil with benzene, a potentially hazardous material. Crews quickly retreated to a safe distance and the RCMP cordoned off the area and evacuated local residents.

4.13. On July 24, 2007, a City of Burnaby contractor operating a backhoe accidently struck and punctured the Westridge Dock Transfer Line spilling approximately 234,000 litres of crude oil along Inlet Drive in Burnaby, BC. The spill occurred in a densely populated urban area, covered nearby homes and drained into Burrard Inlet via storm sewers. For twenty-five minutes, crude oil sprayed twelve to fifteen metres into the air. Eleven houses were directly sprayed with heavy synthetic crude oil and 250 residents voluntarily evacuated their homes. Two members of the public were also directly sprayed and covered with oil. In total, fifty homes and properties were affected by the spill and crude oil leaked into the storm drain system, sewers, and surrounding soil.[73] The TSB found that the contractor, who had been working on a new sewer line, had mistakenly hit the oil pipeline because "The field location of the Westridge Pipeline was not accurately indicated on design drawings, which were based on a 1957 drawing, resulting in an alignment conflict with the trench of the proposed sewer line."[74]

4.14. Finally at 10:00pm on May 6, 2009, while cleaning one of tanks at the Burnaby Terminal a contractor reported the failure of a one-inch fitting on a suction pump that led to the release of approximately 277,000 litres of light sweet crude oil into the primary containment area. According to a CTVNews.ca report, twenty ducks and twenty-five amphibians were exposed to oil.[75]

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[72] *Ibid*, 16.
[73] Transportation Safety Board of Canada. *Pipeline Investigation Report, P07H0040*, 24 July 2007, p. 2-7.
[74] *Ibid*, 12.
[75] Darcy Wintonyk, "Major oil spill at Kinder Morgan B.C. facility" CTVNews.ca, http://bc.ctvnews.ca/major-oil-spill-at-kinder-morgan-b-c-facility-1.396578

5.0 Analysis of Trans Mountain's Public Representation of the Pipeline and its Relationship to the Environment

Section Summary:

- **Trans Mountain's attitude and approach toward environmental matters has changed over the course of its more than sixty year history**
- **At various moments since the 1960s, Tran Mountain adjusted its public representation of the pipeline and its relationship to the environment in response to public concerns over environmental hazards and key environmental disasters**
- **Trans Mountain did not begin to directly address environmental protection in its annual reports until the late 1980s and early 1990s**

5.1. Trans Mountain's attitude and approach toward environmental matters has changed over the course of its more than sixty year history. At the outset, the environment was an engineering challenge, something to be overcome through ingenuity and the application of advanced technology. As Canadians came to express greater concerns over environmental conditions and the risks associated with on-shore and off-shore oil spills, the company responded in its public representations of the pipeline and its relationship to the surrounding environment. It attempted to portray the pipeline as safe, environmentally benign, and technologically sophisticated.

5.2. During the construction of the Trans Mountain pipeline and the first years of its operations, the company tended to address environmental concerns as engineering challenges or obstacles. It often emphasized its technological prowess as a means of conquering a wild and untamed natural environment, particularly the mountainous terrain of Alberta and BC. For example, in his foreword to the company's 1954 book on the building of the Trans Mountain pipeline, the company president J.G. Spratt wrote, "Those who have watched its builders in the conquest of nature, space, time, and numerous other obstacles consider Trans Mountain a sound example of industrial vision, engineering skill and business resourcefulness."[76] Authors Neill C. Wilson and Frank J. Taylor went on to describe the construction of the pipeline as a historical achievement of

[76] Wilson and Taylor. *The Building of Trans Mountain*, x.

man over nature, situating it in comparison to the work of eighteenth-century fur traders and nineteenth-century railway workers. They placed particular emphasis on the difficulties encountered in the Coquihalla Canyon, which they characterized as a "scenically lovely but engineeringly unlovely landscape."[77] They described the steep cliffs of the canyon as a dangerous obstacle overcome only by the clever method of dangling heavy equipment by cable to finish the job (Appendix C, Figure 3). In its 1958 annual report to shareholders, the Board of Directors boasted that "From this beginning, the 780-mile Trans Mountain system wends its way westward, crossing over two mighty mountain ranges which provide some of the most rugged terrain traversed by any pipeline in the world."[78] From an engineering perspective, the Trans Mountain pipeline was an effort to overcome and subdue powerful natural forces.

5.3. This perspective of the pipeline and its relationship with the natural environment faded from the company's annual reports as concerns about adverse environmental effects began to surface. Beginning in the 1960s, Trans Mountain's annual reports portrayed the pipeline as a seamless and invisible component of the landscape. To emphasize this point, the company published a photograph of a remediated farmer's field somewhere along the right-of-way (Appendix C, Figure 4) in its 1963 annual report accompanied by the assurance that "Following installation of a pipe line in the right-of-way acquired from landowners, the land is soon restored to its normal appearance and usefulness."[79] Earlier that same year, on February 19, 1963, the company reported a crude oil leak of an undisclosed total volume in an agricultural area east of Edmonton. A faulty weld resulted in a crack in a loop line and a crude oil spill rate estimated to be approximately 3,200 litres per hour.[80] Trans Mountain resurrected this motif of the remediated agricultural landscape, unaffected by the pipeline, several times in its annual reporting. For instance, in 1970, a full-colour image of a prairie field (Appendix C, Figure 5) appeared on the back cover of the company's annual report with the following caption:

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[77] *Ibid*, 72.
[78] Trans Mountain Oil Pipe Line Company, Ltd. *Annual Report*, 1958, 6.
[79] Trans Mountain Oil Pipe Line Company, Ltd. *Annual Report*, 1963, 6.
[80] "Pipeline related incidents under N.E.B. jurisdiction," Trans Mountain Pipe Line Company Limited, National Energy Board Library, TN 879.5/C16, p. 1 of 14.

> The Trans Mountain pipe line runs under this field. A silent river of crude petroleum, flowing in controlled movement, from the oilfields of Western Canada to the growing markets of the Pacific Northwest.[81]

Trans Mountain continued to use this metaphor of the pipeline as a "silent river" several times throughout the 1970s.

5.4. In the years after the Merritt spill in 1971 and the Jasper spill in 1973, Trans Mountain's annual reports regularly deployed imagery of mountain and lake landscapes to further emphasize the invisibility of the pipeline. In the first annual report after the 1973 Jasper spill, the company featured a front cover image of two red fox cubs that were born on its property at the Sumas pump station. The photograph was submitted as an entry in a photography contest in the company's employee magazine *The Manifold*. On the back cover of the 1973 annual report (Appendix C, Figure 6) was a spectacular image of snow-capped mountains in Jasper National Park, "On the path of the pipeline."[82] The report did not include any information about the 125,000-litre crude oil spill in the park that had occurred earlier that same year. This type of imagery recurred in 1979 in a series of landscape photographs from Alberta and BC in the company's annual report under the theme "...on the path of the pipe line." Photos included McCleod River, Jasper National Park, Moose Lake, Clearwater, the Coquihalla Canyon, and even Stanley Park (which does not lie on the Trans Mountain right-of-way) (Appendix C, Figure 7). The images were accompanied by a report that emphasized the safety of the company's operations. "Where safety is concerned," read the 1979 operations report, "both from the standpoint of personal injuries and damage to property, pipelines have an excellent record. Statistics prove the safety record of fluid pipelines is tops in transportation methods."[83] Just one year earlier, the company had experienced a catastrophic test failure on the mainline in BC when the pipeline broke, spilling 1,525,000 litres of water during a hydrostatic test. The company reported the failure to the NEB and speculated

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[81] Trans Mountain Oil Pipe Line Company, Ltd. *Annual Report*, 1970, back cover.
[82] Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1973, back cover.
[83] *Ibid*, 7.

that the break was the result of mechanical damage incurred at the time of original construction. One month later, crews tested the pipeline again and the line split along a weak circumferential weld and released more water.[84] In the preface to its report to shareholders in 1978, the company asserted that,

> Oddly enough in the case of Trans Mountain (after delivering nearly two billion barrels) authoritative conjecture indicates that after 25 years of successful operation if the construction of the line was proposed today it likely would never be built. The paramount reasons being the present-day maze of environmental restrictions and regulations and the fact that construction costs now would require a tariff over three times the existing one to make it economically feasible.[85]

Trans Mountain also repeated this statement about the "maze of environmental restrictions and regulations" in its 1979 annual report.

5.5. During this period of anxiety over environmental regulation, Trans Mountain continuously highlighted its use of technology to ensure the safety and efficiency of the pipeline. Helicopters, radio, computers, and various other technologies were profiled throughout the decades in the company's public reports. As early as 1958, Trans Mountain featured photographs (Appendix C, Figure 8) and descriptions of helicopter patrols that kept "a constant watch of the line and its right-of-way."[86] The 1959 annual report reassured shareholders that in spite of a highway construction accident that resulted in a break in the pipeline and an oil spill, "Trained crews of technicians and pipe line maintenance men are located along the route to keep the plant in prime condition and safeguard against any breakdown."[87] The report also showed photographs of divers in the Fraser River inspecting the pipeline crossing (Appendix C, Figure 9). Helicopter air patrols

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[84] "Pipeline related incidents under N.E.B. jurisdiction," Trans Mountain Pipe Line Company Limited, National Energy Board Library, TN 879.5/C16, p. 4 of 14.
[85] Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1978, 1.
[86] Trans Mountain Oil Pipe Line Company, Ltd. *Annual Report*, 1958, 13.
[87] Trans Mountain Oil Pipe Line Company, Ltd. *Annual Report*, 1959, 12.

appeared in numerous safety profiles in Trans Mountain reports. In 1963, the company claimed that "a chartered helicopter patrol is systematically carried on from one end of the line to the other throughout the year."[88] In 1974, it assured shareholders that "A helicopter is used to patrol the pipeline right-of-way between Edmonton and the Pacific coast. The Kamloops-based aircraft makes alternate trips east and west each week."[89] And in 1980, Trans Mountain celebrated its 27th year of "eye in the sky" weekly helicopter patrols on the pipeline (Appendix C, Figure 10).[90]

5.6. In 1977, the same year the company suffered its second largest on-shore oil spill, Trans Mountain highlighted what it referred to as "a sophisticated inspection device" called a Linalog (Appendix C, Figure 11).[91] In a detailed description of the device, the report explained how the Linalog could be inserted into the pipeline and travel its length in search of defects in the metal. Even in a year when the pipeline accidentally spilled 1,033,000 litres of crude oil into the environment, the use of this kind of advanced technology gave Trans Mountain the confidence to declare, "In 1977, the 24th year of continuous operation, the record of safe, efficient operation by Trans Mountain speaks for itself."[92]

5.7. In the late 1980s and the early 1990s, Trans Mountain began for the first time to make explicit references in its annual reports to environmental protection, rather than just pipeline safety. This was a response to conflict with local environmental groups in North Burnaby and the Corporation of the District of Burnaby when they attempted to block the company's 1987-88 application to the NEB to expand the capacity of the pipeline by roughly 56,000 bpd in order to facilitate greater volumes of methyl tertiary butyl ether (MTBE) and heavy crude oil exports. The NEB dismissed the appeals of both the District of Burnaby and Burnaby Citizens for Environmental Protection. In its annual reports, Trans Mountain made several assertions and declarations about its

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[88] Trans Mountain Oil Pipe Line Company, Ltd. *Annual Report*, 1963, 5.
[89] Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1974, 5.
[90] Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1980, 16.
[91] Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1977, 6.
[92] *Ibid*, 3.

commitment to environmental protection. For instance, in 1988, the report to shareholders included a full-page spread of images emphasizing safety and stating that "One of the Company's corporate objectives is its commitment to maintain a safe environment."[93] The following year's report declared on its cover (Appendix C, Figure 12) that "All of our activities reflect our corporate commitment to preserve and protect the natural environment in which we operate…"[94] And in 1990, once again presenting the image of a harmonious agricultural landscape (Appendix C, Figure 13), the company proclaimed that "Preserving the natural environment is one of Trans Mountain's top priorities."[95] In that same year, Trans Mountain attempted to address local environmental concerns by completing the construction of a short trail along Shellmont Street at the base of Burnaby Mountain adjacent to its tank farm, which it claimed had "quickly become a popular addition to Burnaby's growing system of pedestrian pathways."[96]

5.8. Trans Mountain was also concerned that the 1988 *Nestucca* barge oil spill and the 1989 *Exxon Valdez* oil spill would impede its pipeline expansion and tanker export plans. In their joint annual letter to shareholders, Chairman of the Board, Ronald L. Cliff and President and Chief Executive Officer, Richard B. Stokes warned that "Incidents such as the Exxon Valdez and Nestucca spills have precipitated industry, federal and provincial reviews of all aspects of energy exploration, development and transportation, and particularly those associated with tanker traffic." They expressed confidence, however, that the company would not face regulatory restrictions because "Throughout its 36-year operating history the Company has an exemplary record of prudent and environmentally safe operation."[97]

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[93] Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1988, 8.
[94] Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1989, front cover.
[95] Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1990, 11.
[96] *Ibid*, 1.
[97] Trans Mountain Pipe Line Company, Ltd. *Annual Report*, 1989, 6.

6.0 Conclusions

The history of the Trans Mountain pipeline reveals several important conclusions for consideration:

6.1. The original rationale for the construction of the pipeline mainly focused on the creation of new markets for recently discovered crude oil resources in Alberta. These included both domestic and international markets for crude oil. However, all parties involved in the decision to approve the pipeline's construction in 1951 emphasized the contributions the project would make to the economic development of BC through the provision of cheap, accessible oil.

6.2. The original rationale for the Trans Mountain pipeline quickly changed as a result of global commodity price fluctuations and events in international relations. What began as a 75,000 bpd oil pipeline intended to primarily service BC refineries for domestic consumption expanded to a 410,000 bpd pipeline that mostly serviced Washington refineries for foreign consumption. This rapid expansion was the result of incredible growth in both the production and consumption of oil in Canada and the US in the years between 1953 and 1973.

6.3. The Trans Mountain pipeline has always been regulated by the federal government of Canada, first under the auspices of the Board of Transport Commissioners and then the National Energy Board. Safety reporting requirements have changed minimally since the NEB first started to keep records in 1961. As such, the NEB pipeline incident databases provide relevant and usable historical data about reported pipeline incidents. The period between 1953 and 1960, however, remains unclear although newspaper records and the annual reports of the Trans Mountain Oil Pipeline Company do indicate at least three on-shore oil spills during this period and a number of other incidents.

6.4. The operation of the Trans Mountain pipeline has experience significant changes as a result of fluctuations in global commodity prices and events in international relations. The 1973 Yom Kippur War and OPEC embargo disrupted global oil prices and precipitated regulatory changes that led Trans Mountain into a period of stagnation and decline between 1973 and 1991.

Following these events, decline in North American oil consumption, a prevailing economic recession, and the depletion of conventional crude oil resources in Alberta contributed to the prolonged period of low throughput on the Trans Mountain pipeline.

6.5. Regular tanker shipments of crude oil from the Westridge dock facilities on Burrard Inlet are a relatively recent phenomenon. Between 1953 and 1982, Trans Mountain only shipped crude oil by tanker in ten out of nearly thirty years. Crude oil shipments only began on a regular basis in the mid-1980s when the company started to export larger volumes of heavy crude oil from Alberta's northern bitumen mining region.

6.6. Oil spills have been a regular occurrence on the Trans Mountain pipeline system since it began operations in 1953. Between 1961 and 2013, the company has reported 81 oil spill events to the NEB, totalling a volume of nearly 5.8 million litres. This is an annual average of 1.53 spills. Although a majority of those spills occurred at Trans Mountain pump stations and tank farms, spills from the mainline constituted more than 60% of the total volume of liquid hydrocarbon releases since 1961.

6.7. Oil spills on the Trans Mountain system reveal no identifiable pattern over the course of its more than sixty year history. Instead, oil spills along the pipeline have occurred in a random and sporadic fashion, often the result of accidents, material failures or unforeseen causes.

6.8. Trans Mountain's public representations of the pipeline and its relationship to the natural environment have changed over time in response to public concerns about environmental hazards and key environmental disasters. Since the 1950s, the company has attempted to portray the pipeline as safe, environmentally benign, and technologically sophisticated.

Appendix A

Sean Kheraj

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Education:

York University, Toronto, Ontario
Ph.D., History (2003-2008)

Field Specializations: Canadian history; environmental history; social history; Canadian legal history
Dissertation: "Inventing Nature's Past: An Environmental History of Stanley Park"
Supervisor: H.V. Nelles, L.R. Wilson Professor of Canadian History, McMaster University and Distinguished Research Professor Emeritus, York University

York University, Toronto, Ontario
M.A., History (2002-2003)

University of British Columbia, Vancouver, British Columbia
B.A. Honours, History (1998-2002)

Research Grants, Prizes, and Awards:

Writing Prizes
2014 Winner of Canadian Historical Association Clio Prize for Best Book in British Columbia History for *Inventing Stanley Park: An Environmental History*
2014 Honourable Mention for British Columbia Historical Federation, Lieutenant-Governor's Medal for Historical Writing for *Inventing Stanley Park: An Environmental History*
2014 Finalist for BC Book Prizes, Roderick Haig-Brown Regional Prize for *Inventing Stanley Park: An Environmental History*
2014 Finalist for Basil Stuart-Stubbs Prize for Outstanding Scholarly Book on British Columbia for *Inventing Stanley Park: An Environmental History*
2013 Finalist for City of Vancouver Book Award for *Inventing Stanley Park: An Environmental History*
2007 Winner of *Canadian Historical Review* Prize for best article of the year for "Restoring Nature: Ecology, Memory, and the Storm History of Vancouver's Stanley Park"

Teaching Awards
2011-12 Nominated for Ian Greene Award for Teaching Excellence, Faculty of Liberal Arts and Professional Studies, York University

Major Research Fellowships & Grants
2013-2014: Petro Canada Young Innovator Award - $5,000

2012-2014: SSHRC Insight Development Grant - $41,716
2012-2013: CFHSS Award to Scholarly Publishing Program Grant
2012-2013: SSHRC Public Outreach Grant - $36,795
2011-2012: Mount Royal University Internal Research Grant - $4,000
2010-2011: University of British Columbia, Faculty of Arts Postdoctoral Teaching Fellowship (declined) - $50,000
2008-2010: SSHRC Postdoctoral Research Fellowship - $80,500

2004-2007: SSHRC Canada Graduate Scholarship - $105,000
2004-05: Ontario Graduate Scholarship (declined) - $15,000
2002- 2003: York University Scholarship - $6,000

Scholarships, Grants, & Awards
2010: Network in Canadian History & Environment Small Projects Grant
2010: Mount Royal University, Faculty Development Grant
2009: Canadian Historical Association Travel Grant
2008: Network in Canadian History & Environment Small Projects Grant
2008: Network in Canadian History and Environment Travel Grant
2008: Canadian Historical Association Travel Grant
2008: Symons Trust Fund in Canadian Studies Research Grant
2008: CUPE local 3908 Professional Development Fund Grant
2007: American Society for Environmental History Travel Grant
2006: Ramsay Cook Research Fellowship
2006: Canadian Historical Association Travel Grant
2005: CUPE Research Costs Fund Grant
2005: Canadian Historical Association Travel Grant

2003: Canadian Women's Historical Society Award
2001: Women's Canadian Club of Vancouver Scholarship in Canadian History
1999: David J. Rose Scholarship
1998-2002: UBC Outstanding Student Initiative Scholarship
1998: B.C. Provincial Exam Scholarship

Publications:

Books

Kheraj, Sean. *Inventing Stanley Park: An Environmental History*. Vancouver: UBC Press, 2013.

Refereed Journal Articles

Kheraj, Sean. "Borders and Ideas of Nature: Intersections in the Environmental Histories of Canada and the United States" *Canadian Historical Review* 95, no. 4 (2014): 604-609.

Kheraj, Sean. "Demonstration Wildlife: Negotiating the Animal Landscape of Vancouver's Stanley Park, 1888-1996" *Environment and History*, 18, no. 4 (2012): 497-527. Reprinted in *Themes in Environmental History: Animals*. Ed. Sarah Johnson. Cambridge, UK: White Horse Press, 2014. Pgs. 293-322.

Kheraj, Sean. "Improving Nature: Remaking Stanley Park's Forest, 1888-1931" *BC Studies* 158 (2008): 63-90.

Kheraj, Sean. "Restoring Nature: Ecology, Memory, and the Storm History of Vancouver's Stanley Park" *Canadian Historical Review* 88, no. 4 (2007): 577-612. (Awarded the 2007 Canadian Historical Review Prize for best article of the year).

Kheraj, Sean. "Plaque Build-up: Commemorating the Buxton Settlement, 1950-2000" *Problématique: Journal of Political Studies* 9 (2003): 5-21.

Chapters in Books

Kheraj, Sean. "Animals and Urban Environments: Managing Domestic Animals in Nineteenth-Century Winnipeg" in *Eco-Cultural Networks and the British Empire: New Views on Environmental History*. Eds. James Beattie, Edward Melillo, and Emily O'Gorman. London: Bloomsbury, 2015. Pgs. 263-288.

Kheraj, Sean. "Living and Working with Domestic Animals in Nineteenth-Century Toronto" in *Urban Explorations: Environmental Histories of the Toronto Region*. Eds. L. Anders Sandberg, Stephen Bocking, Colin Coates, and Ken Cruikshank. Hamilton: L.R. Wilson Institute for Canadian History, 2013. Pgs. 120-140.

Review Essays

Kheraj, Sean. "Scholarship and Environmentalism: The Influence of Environmental Advocacy on Canadian Environmental History" *Acadiensis* 43.1 (Winter/Spring 2014): 195-206.

Kheraj, Sean. "The Unnatural History of Stanley Park Exhibit, Vancouver Museum" *BC Studies* (161) 2009: 115-124.

Non-Refereed Publications

Study Support Materials, J.M. Bumsted. *A History of the Canadian Peoples*, Fourth Edition. Toronto: Oxford University Press, 2011.

"Historical Overview of Stanley Park" in *State of the Park Report for the Ecological Integrity of Stanley Park*. Vancouver: Stanley Park Ecology Society, 2010 (http://www.stanleyparkecology.ca/programs/conservation/SoPRfEI/SOP_A20_HistoricalOverviewOfStanleyPark.pdf).

"City and Suburban Parks" in *The Encyclopedia of American Environmental History: Volume I*. Editor, Kathleen A. Brosnan. New York: Facts on Files, 2010.

"African-American Settlements in Upper Canada/Canada West" in *Encyclopedia of the African Diaspora*, Editor, Carol Boyce-Davies. Santa Barbara: ABC-Clio, 2008. pgs. 246-247.

"Mitchell Hepburn" in *The Home Front Encyclopedia: United States, Britain, and Canada in World Wars I and II*. Vol. 2. Editor, James Ciment, Contributing Editor, Thaddeus Russell. Santa Barbara: ABC-Clio, 2007. pgs. 615-617.

"Archibald Morrison Carmichael" (pg. 42), "Oliver Robert Gould" (pg. 91), "Andrew Knox" (pg. 123-124) in *Saskatchewan Politicians: Lives Past and Present*. Series Editor, Brian Mlazgar, Volume Editor, Brett Quiring. Regina: University of Regina, Canadian Plains Research Center, 2004.

Book Reviews

Rodgers, Kathleen. *Welcome to Resisterville: American Dissidents in British Columbia*. Vancouver: UBC Press, 2014 reviewed in *BC Studies* (2014) http://bcstudies.com/book-reviews/welcome-resisterville-american-dissidents-british-columbia
Alagona, Peter S. *After the Grizzly: Endangered Species and the Politics of Place in California*. Berkeley: University of California Press, 2013 reviewed in *H-Net Roundtable Reviews* 4.4 (2014): 13-15.

https://networks.h-net.org/peter-s-alagona-after-grizzly-endangered-species-and-politics-place-california-roundtable-review-vol
Campbell, Claire Elizabeth. Ed. *A Century of Parks Canada, 1911-2011*. Calgary: University of Calgary Press, 2011 reviewed in *University of Toronto Quarterly* 82.3 (2013): 637-638.
Forkey, Neil S. *Canadians and the Natural Environment to the Twenty-First Century*. Toronto: University of Toronto Press, 2012 reviewed in *Histoire Sociale/Social History* 46.91 (2013): 233-235.
Castonguay, Stéphane and Michèle Dagenais. Ed. *Metropolitan Natures: Environmental Histories of Montreal*. Pittsburgh: University of Pittsburgh Press, 2011 reviewed in *Urban History Review* 41.1 (2012): 71-72.
Falck, Zachary J.S. *Weeds: An Environmental History of Metropolitan America*. Pittsburgh: University of Pittsburgh Press, 2010 reviewed in H-Net Reviews, 2011 http://www.h-net.org/reviews/showrev.php?id=33258
Kirsch, Sharon. *What Species of Creature: Animal Relations from the New World*. Vancouver: New Star Books, 2009 reviewed in H-Net Reviews, 2010 http://www.h-net.org/reviews/showrev.php?id=30743
MacLaren, I.S. ed. *Culturing Wilderness in Jasper National Park: Studies in Two Centuries of Human History in the Upper Athabasca River Watershed*. Edmonton: University of Alberta Press, 2007 reviewed in *Journal of the West* 48 (3) 2009: 90-91.
Young, Terrence. *Building San Francisco's Parks, 1850-1930*. Balitmore: Johns Hopkins University Press, 2004 reviewed in H-Net Reviews, 2009 http://www.h-net.org/reviews/showpdf.php?id=23980
Lipin, Lawrence M.. *Workers and the Wild: Conservation, Consumerism, and Labor in Oregon, 1910-1930*. Urbana: University of Illinois Press, 2007 reviewed in *Left History* 13 (1) 2008: 164-166.
Loo, Tina. *States of Nature: Conserving Canada's Wildlife in the Twentieth Century*. Vancouver: UBC Press, 2006 reviewed in *Journal of the West* 47 (1) 2008: 115.
Evenden, Matthew D. *Fish versus Power: An Environmental History of the Fraser River*. Cambridge: Cambridge University Press, 2004 reviewed in *Historical Geography* 35 2007: 288-290.

Barman, Jean. *Stanley Park's Secret: The Forgotten Families of Whoi Whoi, Kanaka Ranch and Brockton Point*. Vancouver: Harbour, 2005 reviewed in *BC Studies* (148) 2006: 113-115.

Witzig, Fred T.. *Voyageurs National Park: The Battle to Create Minnesota's National Park*. Minneapolis: University of Minnesota Press, 2004 reviewed in *Environmental History* 10 (1) 2005: 133-135.

Invited Research Lectures and Presentations:

"The Great Epizootic of 1872-1873" invited speaker for the 2014 Shannon Lectures in History, Carleton University (November 2014)

"Living and Working with Domestic Animals in Nineteenth-Century Toronto" invited speaker for Toronto Public Library Thought Exchange series (October 2014)

"Canadian Historians and the Media: A Roundtable Discussion" invited panelist at the Annual Meeting of the Canadian Historical Association (May 2014)

"An Environmental History of Oil Pipeline Spills in Canada, 1949-2013" invited speaker for Toronto Public Library Thought Exchange series (May 2014)

"Provenance and Prejudice" invited panelist for Conscious Consumption series at the Textile Museum of Canada (May 2014)

"An Environmental History of Oil Pipeline Spills in Canada" invited speaker for "Public Engagement for a Just and Sustainable World" Research Celebration, York University (April 2014)

"Symbiotic Cities: Animals and Urban Environments in Nineteenth-Century Canada" invited speaker for UBC Okanagan Urban Studies graduate program (February 2014)

"Inventing Stanley Park: Nature, Memory, and History" invited speaker for the 125th anniversary celebrations for Stanley Park (August 2013)

"The New History Wars?: Avoiding the Fights of the Past" invited speaker for the Montreal History Group May Day Colloquium, Department of History, McGill University (April 2013)

"Active Historians, Authority, and Relevance" invited panelist for York University Graduate Programme in History, New Frontiers in Graduate History Conference (February 2013)

"My History Museum: A to Zed" invited panelist for public consultation event regarding the establishment of a Canadian Museum of History (December 2012)

"Citizenship and the Environment in Canadian History" invited panelist for "What's the Use of History? Citizenship and History in Canada's Past and Present" part of Toronto Public Library "Thought Exchange" series co-sponsored by ActiveHistory.ca (October 2012)

"Frontiers of Ecological Imperialism: A History of European Biological Expansion in Canada" invited speaker for York @ U of T speaker series, Department of History, University of Toronto (October 2012)

"Macro-Theories of Canadian History: A Roundtable on the Staples, Metropolitan, and Laurentian Theses" invited panelist at the Annual Meeting of the Canadian Historical Association (2012)

"The Academic and the Internet: Navigating Professional Development Online" invited speaker for Annual Meeting of the American Society for Environmental History professional development workshop for environmental history graduate students (2012)

"Environment as Interpretive Framework for Historical Analysis" invited panelist for York University Graduate Programme in History, New Frontiers in Graduate History Conference (February 2012)

"A Balance between Naturalness and Tidiness: Windstorms and the History of Stanley Park" invited speaker for Simon Fraser University, Teck Gallery (December 2011)

"Order and Animals in Nineteenth-Century Toronto" invited speaker for the L.R. Wilson Institute for Canadian History, McMaster University (November 2011).

"Wildlife on Display: Animals, Parks, and the Urban Environment of Vancouver, 1888-1996" invited speaker for the Mount Royal University, Department of Humanities Colloquium speaker series (November 2010).

"Symbiotic Cities: The Regulation of Domestic Animals in Nineteenth-Century Canadian Cities" invited speaker for the University of Alberta, Department of History and Classics Colloquium lecture series (October 2010).

"Urbs in Horto: Urban Nature in Europe and North America" invited panelist at the American Society for Environmental History annual meeting sponsored by the Urban History Association (March 2010)

"Inventing Stanley Park: An Environmental History" guest speaker for the Friends of the Vancouver Archives, Vancouver Museum (October 2009)

"A Park and Its City: History, Ecology, and the Future of Stanley Park" guest speaker for the Simon Fraser University, Urban Studies lecture series (October 2008)

"Improving Nature: Remaking Stanley Park's Forest, 1888-1931" guest speaker for the Nature/History/Society series, University of British Columbia (September 2008)

Media Appearances and Interviews:

Fumano, Dan. "Secrets of Stanley Park: A Look at What – and Who – Call it Home" *The Province*, 28 August 2014, http://blogs.theprovince.com/2014/08/28/secrets-of-stanley-park-a-look-at-what-and-who-call-it-home/

Interview about oil pipeline spill history in Canada on CHRY 105.5FM, 2 June 2014.

Invited panelist on *The Agenda with Steve Paikin*, "Does History Matter" 8 January 2014, TVO http://theagenda.tvo.org/episode/198877/does-history-matter

Goff, Teresa. "Review: *Inventing Stanley Park*" *Trek Magazine: A Publication of Alumni UBC*, December 2013, http://trekmagazine.alumni.ubc.ca/2013/dec-2013/departments/books-dec-2013/

Smith, Emma. "Park lovers debate as silt fills Stanley Park's Beaver Lake" *Globe and Mail*, 25 November 2013, http://www.theglobeandmail.com/news/british-columbia/park-lovers-debate-as-silt-fills-stanley-parks-beaver-lake/article15580565/

Donaldson, Jesse. "An Unnatural History of Stanley Park" *The Tyee*, 27 September 2013, http://thetyee.ca/Life/2013/09/27/Unnatural-History-of-Stanley-Park/

Obee, Dave. "Review: A Valuable Record of the History of Vancouver's Crown Jewel" *Victoria Times-Colonist*, 23 September 2013, http://www.timescolonist.com/entertainment/review-a-valuable-record-of-the-history-of-vancouver-s-crown-jewel-1.634955

Kheraj, Sean. "On its 125th Anniversary, Reflections on the Lasting Power of Stanley Park" *Globe and Mail*, 24 August 2013, http://www.theglobeandmail.com/news/british-columbia/on-its-125th-anniversary-reflections-on-the-lasting-power-of-stanley-park/article13942124/

Interview about history of Stanley Park and its 125th anniversary on CBC Radio One, *BC Almanac*, 23 August 2013, http://podcast.cbc.ca/mp3/podcasts/bcalmanac_20130823_17116.mp3

Kheraj, Sean. "The Man-Made History of Stanley Park" *Vancouver Magazine*, 20 August 2013, http://www.vanmag.com/News_and_Features/Stanley_Park_turns_125_Years_Old

Sherlock, Tracy. "Stanley Park: Looking Back at Our Favourite Park" *Vancouver Sun*, 19 August 2013, http://www.vancouversun.com/news/Stanley+Park+Looking+back+favourite+park/8806903/story.html

Mackie, John. "Stanley Park, The Natural Wonder of Vancouver, Was Shaped By Humans" *Vancouver Sun*, 17 August 2013, http://www.vancouversun.com/technology/Stanley+Park+natural+wonder+Vancouver+shaped+humans/8799931/story.html

Krugel, Laura. "Pipelines as Nation-Builders? Historians Dubious of Railway Comparisons" *Ottawa Citizen*, 17 August 2013, http://www.ottawacitizen.com/technology/Pipelines+nation+builders+Historians+dubious+railway+comparisons/8801931/story.html

Interviews about oil transportation safety and Lac Mégantic disaster on CBC Radio One syndication, 8 July 2013:

- "Points North" Sudbury 99.9 FM (CBCS-FM)
- "Mainstreet" Cape Breton 1140 AM (CBI)
- "Radio West" Kelowna 88.9 FM (CBTK-FM)
- "Mainstreet" Halifax 90.5 FM (CBHA-FM)
- "Here and Now" Toronto 99.1 FM (CBLA-FM)
- "Mainstreet PEI" Charlottetown 96.1 FM (CBCT-FM)
- "On the Coast" Vancouver 690 AM, 88.1 FM (CBU)
- "Up to Speed" Winnipeg 89.3 FM (CBW)
- "Voyage North" Thunder Bay 88.3 FM (CBQT-FM)

O'Neil, Peter. "Oil Spills Are Rare and Getting Rarer" *Vancouver Sun*, 28 May 2013, http://www.vancouversun.com/business/energy/Moving+Spills+rare+getting+rarer/8445685/story.html?__lsa=c29e-0162

Casselman, Anne. "Will Canada's Proposed Tar Sands Oil Pipeline Muck Up Its Pacific Coast?" *Scienfitic American Online*, 5 March 2013, http://www.scientificamerican.com/article.cfm?id=gateway-pipeline-poses-unknown-environmental-threat

Interviews about oil pipeline safety and regulation history on CBC Radio One syndication, 18 October 2012, http://www.seankheraj.com/?p=1345

- "Ontario Morning" London 93.5 FM (CBCL-FM)
- "Quebec AM" Quebec City 104.7 FM (CBVE-FM)
- "Morning North" Sudbury 99.9 FM (CBCS-FM)
- "Superior Morning" Thunder Bay 88.3FM (CBQT-FM)
- "Quilliq" Iqaluit 1230AM (CFFB)
- "West Coast Morning Show" Corner Brook 990 AM (CBY)
- "On the Island" Victoria 90.5 FM (CBCV-FM)
- "Daybreak South" Kelowna 88.9 FM (CBTK-FM)
- "The Morning Edition (Saskatchewan)" Regina 102.5FM (CBKR-FM); 540AM (CBK)
- "Daybreak Kamloops" Kamloops 94.1 FM (CBYK-FM)
- "The Early Edition" Vancouver 88.1FM (CBU); 690AM

Interview about Canadian oil pipeline spill history on "The World Today" CKNW 980AM Vancouver, 7 August 2012, http://www.seankheraj.com/?p=1319

Tieleman, Bill. "Piping Crude? 'There is no leak proof system'" *The Tyee*, 7 August 2012, http://thetyee.ca/Opinion/2012/08/07/No-Leak-Proof-System/

Tieleman, Bill. "Alberta Oil Spill Record a Lesson for B.C." *24 Hours: Vancouver*, 7 August 2012, http://vancouver.24hrs.ca/Columnists/NewsViewsAttitude/

Nikiforuk, Andrew. "It Just Gets Worse: The NTSB's Final Flaying of Enbridge" *The Tyee*, 1 August 2012, http://thetyee.ca/News/2012/08/01/NTSB-Flays-Enbridge/

Interview about Alberta oil pipeline spill history on "Radio Active" CBC Radio One Edmonton 93.9FM (CBX2-FM), 27 July 2012

"Pipeline Controversy Spikes" Interview about oil pipeline spill controversies and history on Radio Canada International, 16 July 2012, http://www.rcinet.ca/english/daily/reports-2012/12-38_2012-07-16-pipeline-controversy-spikes/

Interviews about oil pipeline spill history on CBC Radio One syndication, 11 July 2012, http://www.seankheraj.com/?p=1304

- "The Early Shift" Windsor 97.5FM (CBE)
- "Ottawa Morning" Ottawa 91.5FM (CBO-FM)
- "Superior Morning" Thunder Bay 88.3FM (CBQT-FM)
- "Radio Noon Manitoba" Winnipeg 89.3FM (CBW)
- "Quilliq" Iqaluit 1230AM (CFFB)
- "The Morning Edition (Saskatchewan)" Regina 102.5FM (CBKR-FM); 540AM (CBK)
- "Daybreak North" Prince George/Prince Rupert 91.5FM (CBYG-FM); 860AM (CFPR)
- "The Early Edition" Vancouver 88.1FM (CBU); 690AM

Audette, Trish. "How safe are pipelines?" *Edmonton Journal*, 6 July 2012, http://www.edmontonjournal.com/news/safe+pipelines/6895424/story.html

Fernandez-Blance, Katherine. "Canadian flag born of identity crisis" *Toronto Star*, 1 July 2012, http://www.thestar.com/news/gta/article/1219958--canadian-flag-born-of-identity-crisis

Wood, James and Chris Varcoe. "Pipeline leak near Sundre takes toll on Gateway project" *Calgary Herald*, 17 June 2012, http://www.calgaryherald.com/news/politics/Pipeline+leak+near+Sundre+takes+toll+Gateway+project/6795380/story.html

Hume, Stephen. "Pipeline spills are not the exception in Alberta, they are an oily reality" *Vancouver Sun*, 14 June 2012, http://www.vancouversun.com/news/Pipeline+spills+exception+Alberta+they+oily+reality/6780124/story.html

Weber, Bob. "Alberta pressured to include leaks in environmental monitoring plan" *Financial Post*, 14 June 2012, http://business.financialpost.com/2012/06/14/alberta-pressured-to-include-leaks-in-environmental-monitoring-plan/?__lsa=54f3edb2

Interview with 660AM News Calgary about Red Deer River oil pipeline spill, 8 June 2012, http://www.seankheraj.com/?p=1265

"Stanley Park Opened in Vancouver" *Today in Canadian History*, 27 September 2010. CJSW 90.9FM

"Disasters of the Century" episode 44, on History Television (First aired October 2006)

Panels, Colloquia, Workshops & Seminar Series Organization:

Organized special public lecture in European environmental history at York University, "Making a Multidisciplinary Environmental History of the Baltic Sea" by Professor Simo Laakkonen (November 2014)

Co-organized 2014 Canadian History and Environment Summer School, York University (2014)

Organized the Melville-Nelles-Hoffmann Environmental History lecture (2011-present)

Organized the York University, Department of History, "History and Computing" workshop series (2012-present)

Co-organized (with Professor Mark Humphries) the Mount Royal University, Department of Humanities Colloquium speaker series (2010-2011)

Co-organized (with NiCHE New Scholars Group) environmental history virtual field trip "Walking the Commodity Chain: A Virtual Field Trip to Explore Automobility" (October 2010) (funded by the Network in Canadian History & Environment)

Co-organized (with NiCHE New Scholars Group) environmental history conference "Place and Placelessness: A Virtual Environmental History Workshop for Graduate Students" (October 2010) (funded by the Network in Canadian History & Environment)

Co-organized (with Adam Crymble) environmental history graduate workshop on writing for a popular audience, University of British Columbia (March 2010) (funded by the Network in Canadian History & Environment)

Co-organized (with Professors Neil Safier and Matthew Evenden) seminar and research lecture by Professor Dean Bavington on scientific management of the Atlantic Canadian cod fishery for Nature/History/Society series, University of British Columbia (March 2010)

Co-organized (with Professors Tina Loo and Matthew Evenden) seminar and research lecture by Professor Liza Piper on the environmental history of the Canadian north for Nature/History/Society series, University of British Columbia (November 2009)

Co-organized (with Dr. Jocelyn Thorpe) special lecture by Professor Joanna Dean (Carleton University) and seminar series on urban environmental history for Nature/History/Society series, University of British Columbia (April 2009)

Conference Papers:

"Online Digital Communication and Environmental History" presented at the Second World Congress of Environmental History (2014)

"Making Environmental History Public Through Digital Technologies" presented at the Annual Meeting of the National Council for Public History (2013)

"The 1872-73 Canadian Horse Distemper" presented at the Annual Meeting of the American Society for Environmental History (2013)

"Borders, Ideas, and Ecological Commons: Intersections in the Environmental Histories of Canada and the United States" presented at the Annual Meeting of the American Society for Environmental History (2013)

"From the Red River Colony to the City of Winnipeg: Empire, Animals, and Urban Environments" presented at the Quelques Arpents de Neige Workshop (2012)

"Animals and the Urban Food Supply: The Central Public Market in Winnipeg, 1876-1908" presented at the Annual Meeting of the Canadian Historical Association (2012)

"Cities as Multi-species Habitat: A Historical Perspective of Winnipeg" presented at Cross-Pollination: Seeding New Ground for Environmental Thought and Activism Across the Arts and Humanities, University of Alberta (2011)

"Teaching Digital History Skills" presented at Mount Royal University History Education Conference, Mount Royal University (2011)

"Demonstration Wildlife: Negotiating the Animal Landscape of Vancouver's Stanley Park, 1888-1996" presented at the Historical and Global Perspectives on Provincial and Local/Regional Parks in Canada Symposium, University of Saskatchewan (2010).

"A Multi-Species Metropolis: Managing Animals in Nineteenth-Century Winnipeg" presented at the Annual Meeting of the Canadian Historical Association (2009)

"Animal Citizenry: Early Regulation of Urban Animals, Vancouver, British Columbia" presented at the Annual Meeting of the Canadian Historical Association (2008)

"Creature Comforts: Remaking the Animal Landscape of Vancouver's Stanley Park, 1887-1911" presented at the Canadian Parks for Tomorrow Conference (2008)

"Animal Citizenry: Regulating Animals on the Northwest Coast, Vancouver, British Columbia" presented at the Annual Meeting of the Organization of American Historians (2008)

"Inventing Nature's Past: Memory and Ecology in Vancouver's Stanley Park" presented at the Annual Meeting of the American Society for Environmental History (2007)

"Disturbing Nature: Dialectics of Disaster in Vancouver's Stanley Park" presented at the Annual Meeting of the Canadian Historical Association (2006)

"No Man Owns the Island, Entire of Itself: Land, Law, and the Clear-cut of Deadman's Island, 1899-1924" presented at the Annual Meeting of the Canadian Historical Association (2005)

"'The Aristocracy of Crime': Criminal Prosecution of Homicide in Toronto, 1885-1920" presented at the Annual Meeting of the Canadian Historical Association (2004)

"Hanging in There: The Failure to Abolish Capital Punishment in Canada, 1966" presented at the Policy History Conference at St. Louis University (2004)

"Park it Somewhere Else: Stanley Park's Squatter Eviction Trials, 1923-1925" presented at the New Frontiers Conference in Graduate History at York University (2004)

"Criminal Prosecution of Homicide in Toronto, 1885-1920" presented at the Two Days of Canada Conference: Crime in Canada Law and Dis/order at Brock University (2003)

"Going National: Commemorating the Buxton Settlement" presented at the Great Lakes History Conference at Grand Valley State University (2003)

Digital Publications:

Podcasts:

Kheraj, Sean. "Episode 45: The St. Lawrence Seaway and Power Project" *Nature's Past: Canadian Environmental History Podcast*. 29 October 2014.

Kheraj, Sean. "Episode 44: The Second World Congress for Environmental History" *Nature's Past: Canadian Environmental History Podcast*. 24 September 2014.

Kheraj, Sean. "Episode 43: Environmental Scholarship and Environmental Advocacy" *Nature's Past: Canadian Environmental History Podcast*. 2 July 2014.

Kheraj, Sean. "Episode 42: The Right to a Healthy Environment" *Nature's Past: Canadian Environmental History Podcast*. 17 March 2014.

Kheraj, Sean. "Episode 41: Closing Federal Libraries" *Nature's Past: Canadian Environmental History Podcast*. 3 February 2014.

Kheraj, Sean. "Episode 40: Environmental History of Atlantic Canada" *Nature's Past: Canadian Environmental History Podcast*. 5 November 2013.

Kheraj, Sean. "Episode 39: The Environmental History of Stanley Park" *Nature's Past: Canadian Environmental History Podcast*. 30 September 2013.

Kheraj, Sean, Stacy Nation-Knapper, and Andrew Watson. "Episode 38: Histories of Canadian Environmental Issues, Part VIII – Tar Sands" *Nature's Past: Canadian Environmental History Podcast*. 29 May 2013.

Kheraj, Sean, Stacy Nation-Knapper, and Andrew Watson. "Episode 37: Histories of Canadian Environmental Issues, Part VII – Agri-food Systems II" *Nature's Past: Canadian Environmental History Podcast*. 5 May 2013.

Kheraj, Sean, Stacy Nation-Knapper, and Andrew Watson. "Episode 36: Histories of Canadian Environmental Issues, Part VI – Agri-food Systems I" *Nature's Past: Canadian Environmental History Podcast*. 31 March 2013.

Kheraj, Sean, Stacy Nation-Knapper, and Andrew Watson. "Episode 35: Histories of Canadian Environmental Issues, Part V - Fisheries, Regulation, and Science" *Nature's Past: Canadian Environmental History Podcast*. 28 February 2013.

Kheraj, Sean, Stacy Nation-Knapper, and Andrew Watson. "Episode 34: Histories of Canadian Environmental Issues, Part III – The Canadian Environmental Movement II" *Nature's Past: Canadian Environmental History Podcast*. 21 January 2013.

Kheraj, Sean, Stacy Nation-Knapper, and Andrew Watson. "Episode 33: Histories of Canadian Environmental Issues, Part III – The Canadian Environmental Movement I" *Nature's Past: Canadian Environmental History Podcast*. 27 November 2012.

Kheraj, Sean, Stacy Nation-Knapper, and Andrew Watson. "Episode 32: Histories of Canadian Environmental Issues, Part II – Health and Environmental Issues in Aboriginal History" *Nature's Past: Canadian Environmental History Podcast*. 29 October 2012.

Kheraj, Sean, Stacy Nation-Knapper, and Andrew Watson. "Episode 31: Histories of Canadian Environmental Issues, Part 1 – Global Warming" *Nature's Past: Canadian Environmental History Podcast*. 26 September 2012.

Kheraj, Sean. "Episode 30: Environmental Histories of Montreal" *Nature's Past: Canadian Environmental History Podcast*. 1 May 2012.

Kheraj, Sean. "Episode 29: The Contributions of Environmental History" *Nature's Past: Canadian Environmental History Podcast*. 22 March 2012.

Kheraj, Sean. "Episode 28: Winnipeg Beach" *Nature's Past: Canadian Environmental History Podcast*. 22 February 2012.

Kheraj, Sean. "Episode 27: Wildlife Histories" *Nature's Past: Canadian Environmental History Podcast*. 24 January 2012.

Kheraj, Sean. "Episode 26: Environmental History as Public History" *Nature's Past: Canadian Environmental History Podcast*. 29 November 2011.

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Kheraj, Sean. "Episode 23: The Next Chapter of Canadian Environmental History" *Nature's Past: Canadian Environmental History Podcast*. 26 May 2011.

Kheraj, Sean. "Episode 22: A Century of Parks Canada" *Nature's Past: Canadian Environmental History Podcast*. 16 May 2011.

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Kheraj, Sean. "Episode 14: Management of the Newfoundland Cod Collapse." *Nature's Past: Canadian Environmental History Podcast*. 20 April 2010.

Kheraj, Sean. "Episode 13: New Directions in Urban Environmental History & Abandoned Mines." *Nature's Past: Canadian Environmental History Podcast*. 3 March 2010.

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Kheraj, Sean. "Episode 5: The Storm History of Stanley Park." *Nature's Past: Canadian Environmental History Podcast*. 22 April 2009.

Kheraj, Sean. "Episode 4: Environmental Justice on the Hamilton Waterfront." *Nature's Past: Canadian Environmental History Podcast*. 16 March 2009.

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Blog Articles:

"Best Practices for Writing History on the Web" *Active History: History Matters*, 16 October 2014, http://activehistory.ca/2014/10/best-practices-for-writing-history-on-the-web/

"Parks and Ecology: Stanley Park Nature and History Walk Guides, 1990" *The Otter: Canadian Environmental History*, 17 September 2014, http://niche-canada.org/2014/09/17/parks-and-ecology-stanley-park-nature-and-history-walk-guides-1990/

"A Brief History of the Laptop Ban" *Active History: History Matters*, 31 July 2014, http://activehistory.ca/2014/07/a-brief-history-of-the-laptop-ban/

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"Oil Pipeline Spill History at the National Energy Board of Canada Library" *Active History: History Matters*, 9 May 2014, http://activehistory.ca/2014/05/oil-pipeline-spill-history-at-the-national-energy-board-of-canada-library/

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"Tracking Canada's History of Oil Pipeline Spills" *The Otter: Canadian Environmental History*, 8 November 2013, http://niche-canada.org/2013/11/08/tracking-canadas-history-of-oil-pipeline-spills/

"125 Years of Stanley Park: Before and After" *Active History: History Matters*, 24 September 2013, http://activehistory.ca/2013/09/125-years-of-stanley-park-before-and-after/

"Five Stanley Park Photographs I Wish I Had Included in My Book" *The Otter: Canadian Environmental History*, 8 September 2013, http://niche-canada.org/node/10719

"Ten Other Things You Might Not Have Known About 20th-Century Aboriginal History in Canada" *Active History: History Matters*, 25 July 2013, http://activehistory.ca/2013/07/ten-other-things-you-might-not-have-known-about-20th-century-aboriginal-history-in-canada-3/

"CHESS 2013: Island Insights" *The Otter: Canadian Environmental History*, 24 June 2013, http://niche-canada.org/node/10679

"The New History Wars? Avoiding the Fights of the Past" *Active History: History Matters*, 7 May 2013, http://activehistory.ca/2013/05/11059/

"More Canadian History, More Better" *Active History: History Matters*, 13 February 2013, http://activehistory.ca/2013/02/more-canadian-history-more-better/

"Academics, the Public, and Podcasts: Nature's Past Four Years On" *The Otter: Canadian Environmental History*, 27 January 2013, http://niche-canada.org/node/10579

"The 1872-73 Epizootic or the Canadian Horse Distemper" *The Otter: Canadian Environmental History*, 14 January 2013, http://niche-canada.org/node/10566

"Environment and Citizenship in Canadian History" *Active History: History Matters*, 20 November 2012, http://activehistory.ca/2012/11/environment-and-citizenship-in-canadian-history/

"Exploring the Geography of Urban Animals in Nineteenth-Century Toronto" *The Otter: Canadian Environmental History*, 19 August 2012, http://niche-canada.org/node/10452

"Alberta Oil Pipeline Spills Past and Present: The Enbridge Athabasca Pipeline Heavy Crude Oil Spill" *The Otter: Canadian Environmental History*, 24 June 2012, http://niche-canada.org/node/10425

"The History of Oil Pipeline Spills in Alberta, 2006-2012" *Active History: History Matters*, 12 June 2012, http://activehistory.ca/2012/06/the-history-of-oil-pipeline-spills-in-alberta-2006-2012/

"Seizing Canada's Past: Politics and the Reinvention of Canadian History" *Active History: History Matters*, 17 May 2012, http://activehistory.ca/2012/05/seizing-canadas-past-politics-and-the-reinvention-of-canadian-history/

"The Shafia Murders, Immigration, and Misrepresenting Canadian Violence Against Women" *Active History: History Matters*, 16 February 2012, http://activehistory.ca/2012/02/the-shafia-murders-immigration-and-misrepresenting-canadian-violence-against-women/

"Active History in an Age of Austerity" *Active History: History Matters*, 17 November 2011, http://activehistory.ca/2011/11/active-history-in-an-age-of-austerity/

"Changing the Wheat Board, Part I: The First Time the Conservative Part Eliminated the Canadian Wheat Board" *The Otter: Canadian Environmental History*, 20 February 2012, http://niche-canada.org/node/10305

"Environmental History Mobile: Curation and Syndication" *The Otter: Canadian Environmental History*, 25 September 2011, http://niche-canada.org/node/10136

"Alberta's Oil Spill History" *The Otter: Canadian Environmental History*, 9 May 2011, http://niche-canada.org/node/9992

"Environmental History's Interdisciplinary Challenge: The Arts and Humanities" *The Otter: Canadian Environmental History*, 11 April 2011, http://niche-canada.org/node/9944

Application Development:

"EH Mobile" iOS mobile application co-developed with Dr. Jim Clifford, Robarts Centre for Canadian Studies postdoctoral research fellow (published on iTunes App Store, January 2012), http://niche-canada.org/envhist

Teaching Experience:

Assistant Professor, York University, Department of History (2011-present)

- Designed and taught junior and senior undergraduate courses in Canadian and North American environmental history
- Designed and taught North American environmental history graduate seminar

Assistant Professor (term-limited), Mount Royal University, Department of Humanities (2010-2011)
- taught and designed undergraduate courses in Canadian history at all levels, including introductory Canadian history, Canadian social history, environmental history, and Western Canadian history
- maintained active research agenda in Canadian environmental history and active university service record

Course Instructor, Kwantlen Polytechnic University, Department of History (2010)
- lectured for introductory survey course in post-Confederation Canadian history

Course Instructor and SSHRC Postdoctoral Research Fellow, University of British Columbia, Department of History (2008-10)
- lectured and designed senior course in North American environmental history
- lectured and designed senior course in Western Canadian history

Curriculum Developer and Instructor, Thompson Rivers University, Open Learning (2009-2010)
- designed and taught online pilot course in North American environmental history

Course Instructor, University of Toronto, Department of History (2008)
- lectured for survey courses in pre- and post-Confederation Canadian history and worked with teaching assistants to manage weekly discussion tutorials

Course Instructor, Trent University, Department of Canadian Studies (2007-08)
- lectured and led tutorials for introductory course in Ontario history, "'Empire Ontario': 1867-1945"
- led upper-level research seminar in the history of Canadian social policy, "Studies in Canadian Social Policy"

Graduate Supervision:

Doctoral Supervision (In progress):
2013-present: Cynthia Walker, York University (Putative supervisor)

MA Supervision (In progress):
2013-present: Brandon LeBlanc, York University (MA supervisor)

MA Supervision (Completed):
2012-13: Cynthia Walker, York University (Secondary Reader)

Examiner:
2014: Chair, PhD Dissertation Oral Defence, Andrew Watson, Topic: "Poor Soils and Rich Folks: Household Economics and Sustainability in Muskoka, 1850 -1920"

Academic Service:

Canadian Federation for the Humanities and Social Sciences

Award to Scholarly Publications Program Adjudication Committee, Canadian Federation of the Humanities and Social Sciences (2012-present)

American Society for Environmental History

Chair of Digital Communications Steering Committee, American Society for Environmental History (2012-present)

Canadian Historical Association

Nominating Committee, Canadian Historical Association (2013-present)

Network in Canadian History and Environment

Editor-in-Chief, Network in Canadian History & Environment, http://niche-canada.org (2014-present)

Podcast Producer, Network in Canadian History & Environment, *Nature's Past: Canadian Environmental History Podcast* http://niche-canada.org/naturespast (2008-present)

Chair, Canadian History and Environment Summer School Organizing Committee, 2014

Editor & Producer, Network in Canadian History & Environment, *EHTV: Live from the Field* http://niche-canada.org/ehtv (2011-present)

Editor, Network in Canadian History & Environment, *Notes on Knowledge Mobilization* http://niche-canada.org/knowmob (2009-2011)

New Scholars in Canadian History & Environment Advisory Committee, Network in Canadian History & Environment, (2008-11)

Coordinator, New Scholars in Canadian History & Environment Reading Group (2009-present) http://niche-canada.org/new-scholars/reading-group

Editor, New Scholars in Canadian History & Environment Comprehensive Exams Reading List (2008-2011) http://environmental-history-comps-list.wikispot.org/

Active History

Editorial Board Member, Active History (2009-present) [www.activehistory.ca]

York University

Executive Committee, Department of History, York University (2014-2015)

Executive Committee, Robarts Centre for Canadian Studies, York University (2012-present)

Academic Petitions Committee, Faculty of Liberal Arts and Professional Studies, York University (2011-present)

Tenure and Promotion Adjudication Committee, Department of History, York University (2011-2012)

Melville-Nelles-Hoffmann Environmental History Lecture Committee, Department of History, York University (2011-present)

Computer Coordinator, Department of History, York University (2012-present)

Canadian History Search Committee (Contractually Limited Appointment), Department of History, York University (2012)

Mount Royal University

Canadian Studies Minor Steering Committee, Mount Royal University, (2010-2011)

Undergraduate Research Standing Committee, Mount Royal University, (2010-2011)

Appendix B

Sources:

Calgary Herald

Debates of the House of Commons

Edmonton Journal

Fisher, Robin. "Regulating Fuels in the Depression: The Coal and Petroleum Control Board of British Columbia" *BC Studies* 66 (Summer 1985): 3-27.

Globe and Mail

National Energy Board Annual Reports, 1959-2012

National Energy Board Act, 1959

National Energy Board "Pipeline related incidents under N.E.B. jurisdiction," National Energy Board Library, TN 879.5/C16

Pipe Lines Act, 1949

Report of the Board of Transport Commissioners, Vol. 41, no. 20, 15 January 1952

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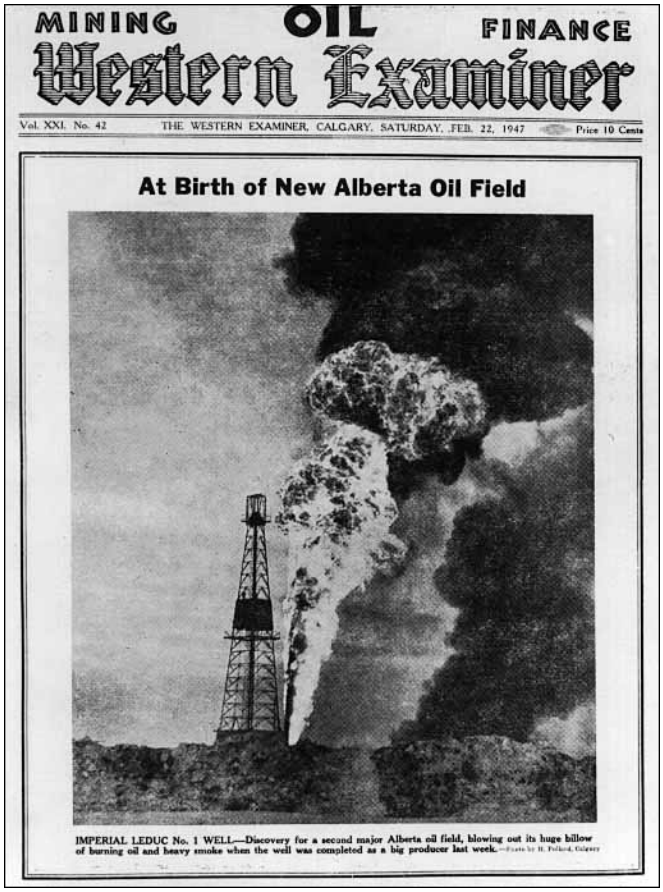
Unger, Richard W. and John Thistle, *Energy Consumption in Canada in the 19th and 20th Centuries* (2013)

Vancouver Sun

Wilson, Neill C. and Frank J. Taylor. *The Building of Trans Mountain: Canada's First Oil Pipeline Across the Rockies*. Vancouver: Trans Mountain Oil Pipe Line Company, 1954

Appendix C


MINING OIL FINANCE

Western Examiner

Vol. XXI. No. 42 THE WESTERN EXAMINER, CALGARY, SATURDAY, FEB. 22, 1947 Price 10 Cents

At Birth of New Alberta Oil Field

IMPERIAL LEDUC No. 1 WELL—Discovery for a second major Alberta oil field, blowing out its huge billow of burning oil and heavy smoke when the well was completed as a big producer last week.—Photo by H. Pollard, Calgary

Figure 1.) Imperial Leduc no. 1 on cover of *Western Examiner*, 1947. Source: *Western Examiner*, 22 February 1947.

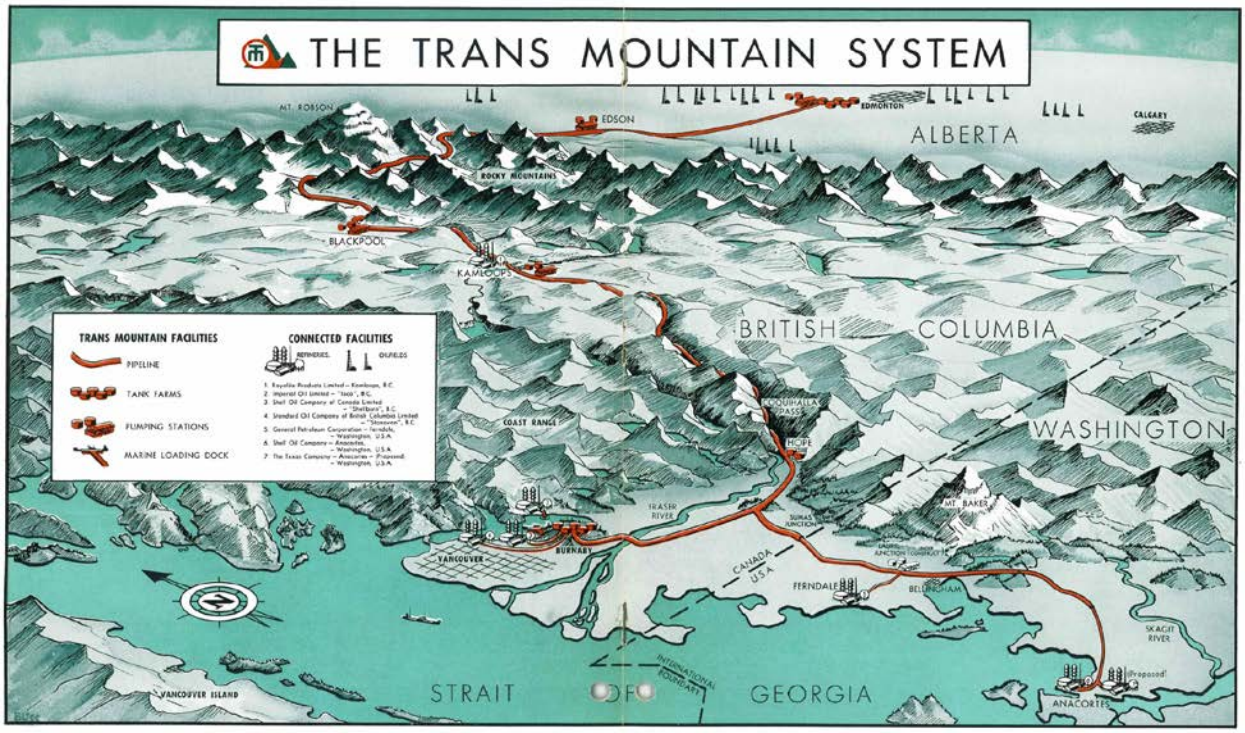


Figure 2.) Trans Mountain System Map, 1955. Source: Trans Mountain Pipe Line Company. *Annual Report.* 1955, 6-7.

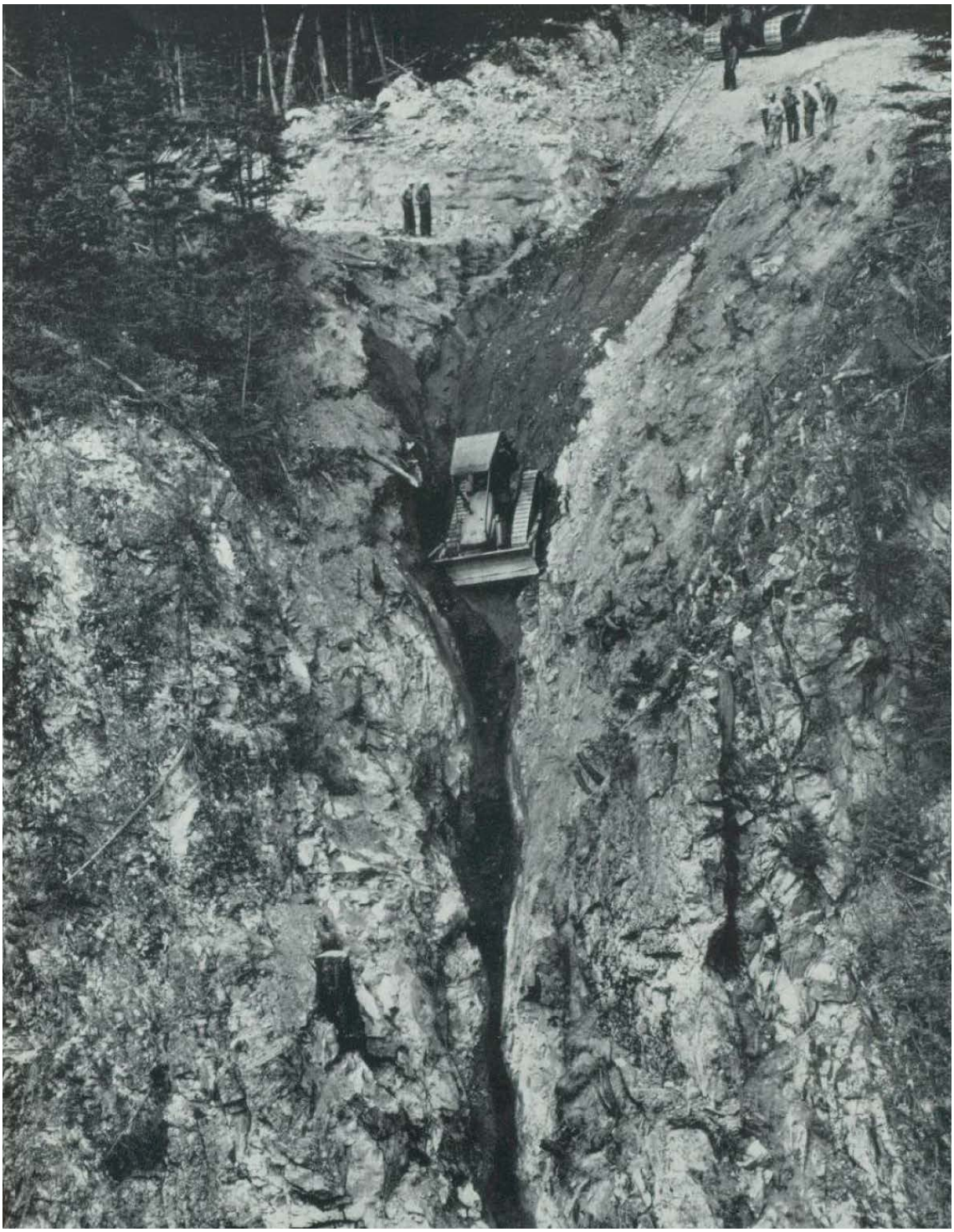
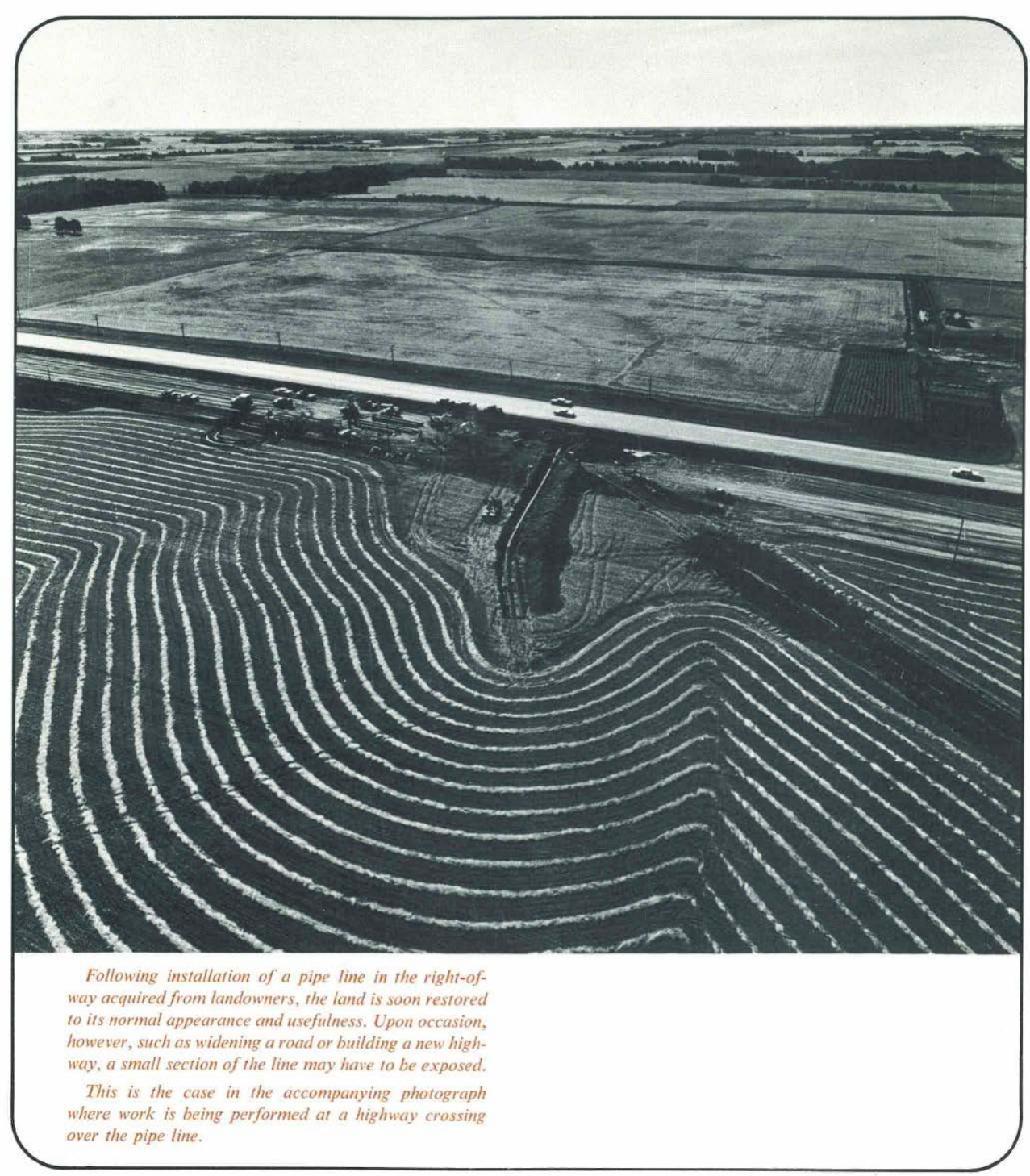


Figure 3.) Trans Mountain crews lower a small tractor by steel cable to clear a ditch along the side of the Coquihalla Canyon, 1952-53. Source: Neill C. Wilson and Frank J. Taylor. *The Building of Trans Mountain: Canada's First Oil Pipeline Across the Rockies*. (Vancouver: Trans Mountain Oil Pipe Line Company, 1954)



Following installation of a pipe line in the right-of-way acquired from landowners, the land is soon restored to its normal appearance and usefulness. Upon occasion, however, such as widening a road or building a new highway, a small section of the line may have to be exposed.

This is the case in the accompanying photograph where work is being performed at a highway crossing over the pipe line.

Figure 4.) A remediated farmer's field along Trans Canada right-of-way, 1963. Source: Trans Mountain Pipe Line Company. *Annual Report.* 1963, 6.

Figrue 5.) Back cover of 1970 Trans Mountain annual report. "The Trans Mountain pipe line runs under this field. A silent river of crude petroleum, flowing in controlled movement, from the oilfields of Western Canada to the growing markets of the Pacific Northwest." Source: Trans Mountain Pipe Line Company. *Annual Report.* 1970, back cover.

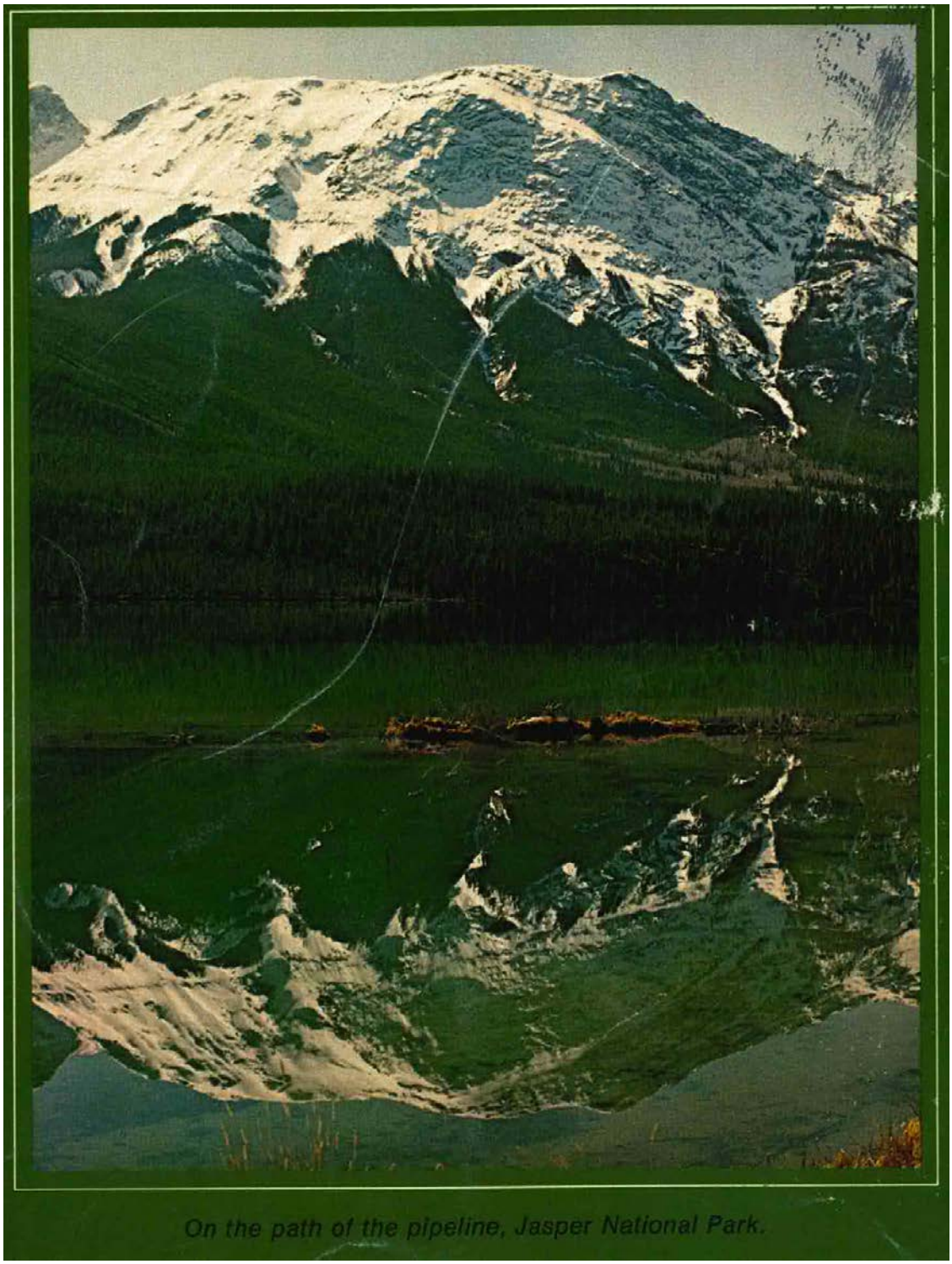


Figure 6.) "On the path of the pipeline, Jasper National Park" [1973]. Source: Trans Mountain Pipe Line Company. *Annual Report.* 1973, back cover.

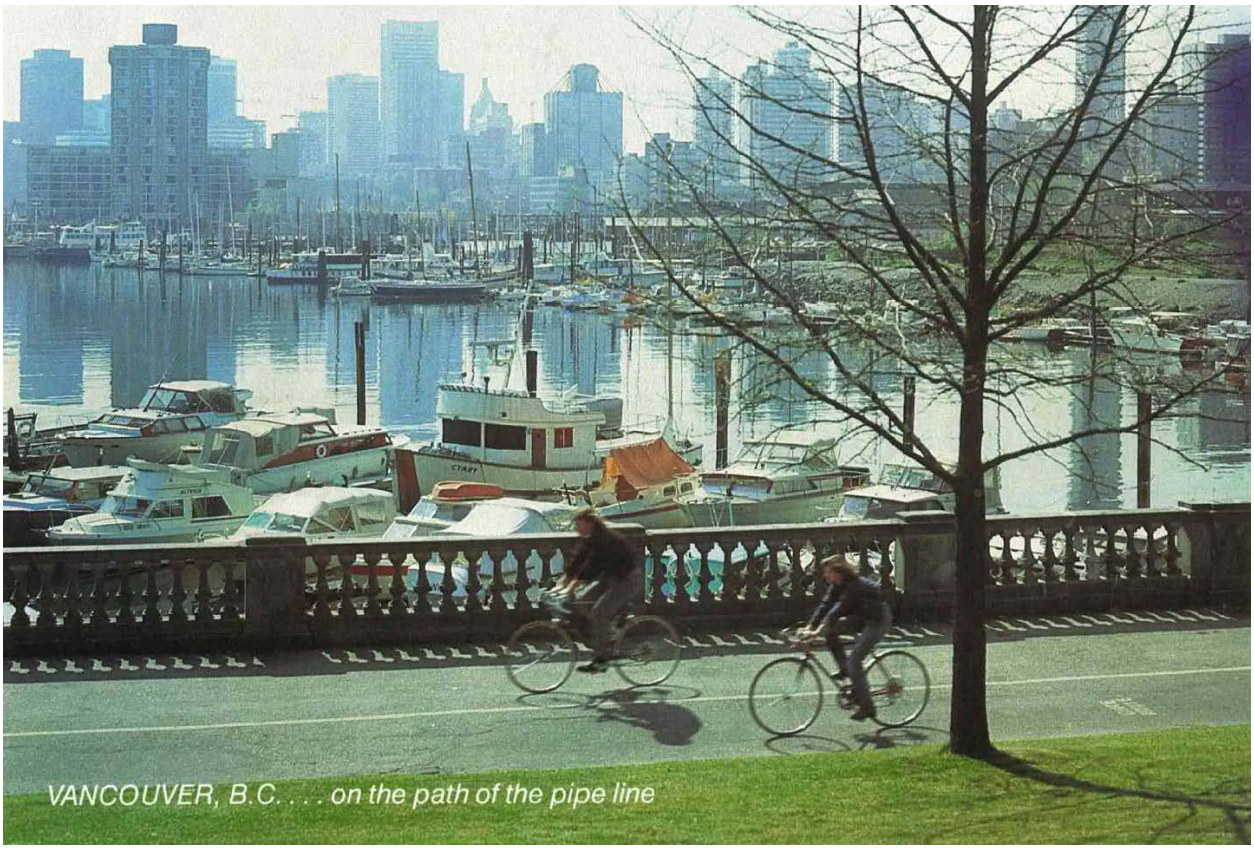


Figure 7.) "VANCOUVER, B.C.....on the path of the pipe line" Source: Trans Mountain Pipe Line Company. *Annual Report.* 1979, back cover.

Figure 8.) Trans Mountain Helicopter Air Patrol, 1958. Source: Trans Mountain Pipe Line Company. *Annual Report.* 1958, 13.

One such function of pipeline maintenance is keeping the inside of the pipe clean. Many crude oils are waxy and the inside of the pipe can gradually become coated with wax. Cleaning the inside wall of the pipe at regular intervals maintains an efficient operating condition at full capacity. This is done by the use of scrapers which are injected into the line and forced along by the flowing oil. As a scraper passes through the pipe it removes the waxy material from the walls and eventually is taken from the line at one of the several traps especially designed for the purpose. This whole scraper operation is performed without interrupting the main oil flow.

Protection of the pipe against corrosion, a continuous battle with nature to stabilize the right-of-way, and top-working conditions of station equipment are included in the many requirements of a good maintenance programme.

Good communication is a very necessary link in the chain of operation. A network of landline and radio facilities provides this service. While many automatic safety features are built into the system, the alertness and prompt action of station operators and dispatchers are still most important.

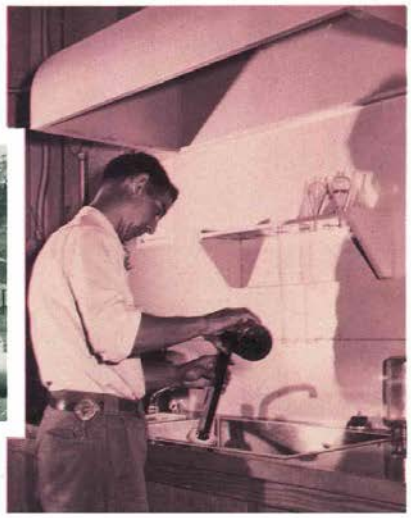
A prevalent type of line operation is the so-called "batch" movement. This refers to the movement of several grades of crude oil in segregated batches in succession through the line. It is accomplished without the use of separators and without undue mixing of adjoining batches. In a line as long as Trans Mountain's as many as ten to twenty different batches may be enroute simultaneously, although these may include only four or five grades. Their progress through the line is checked by change-of-gravity observations at intermediate stations. Samples are drawn off and tested at frequent intervals until the results indicate the arrival and passage of the interface.

Consignees are supplied with the required grades in proper quantity at the arranged time. Accomplishment of this result is the purpose of the Company. It is brought about by good equipment and the coordinated effort of human endeavour.

FIRE DRILL . . . safety is a paramount consideration of the pipe line operatic

FRASER RIVER INSPECTION . . . pipe line maintenance includes keeping a watchful eye on river crossings

GRAVITY TESTING . . . the progress of batches is checked by testing oil samples



DIESEL STATION OPERATOR . . . adjusting automatic control instruments at Edson Station

SCRAPER TRAP AT JASPER STATION . . . the batch plug type scrapers are injected into the pipe to clean the line

Figure 9.) Safety on TMPL, 1959. Source: Trans Mountain Pipe Line Company. *Annual Report.* 1959, 13.

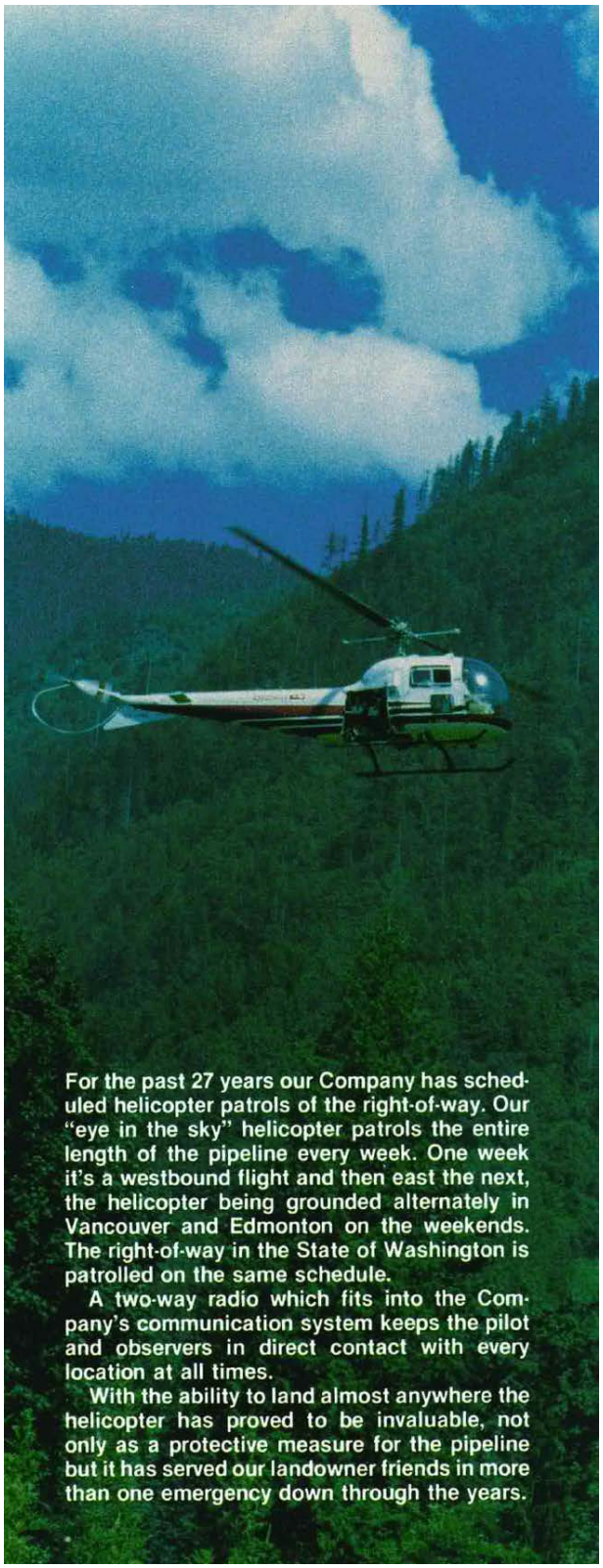


Figure 10.) Trans Mountain helicopter air patrol, 1980. Source: Trans Mountain Pipe Line Company. *Annual Report.* 1980, 16.

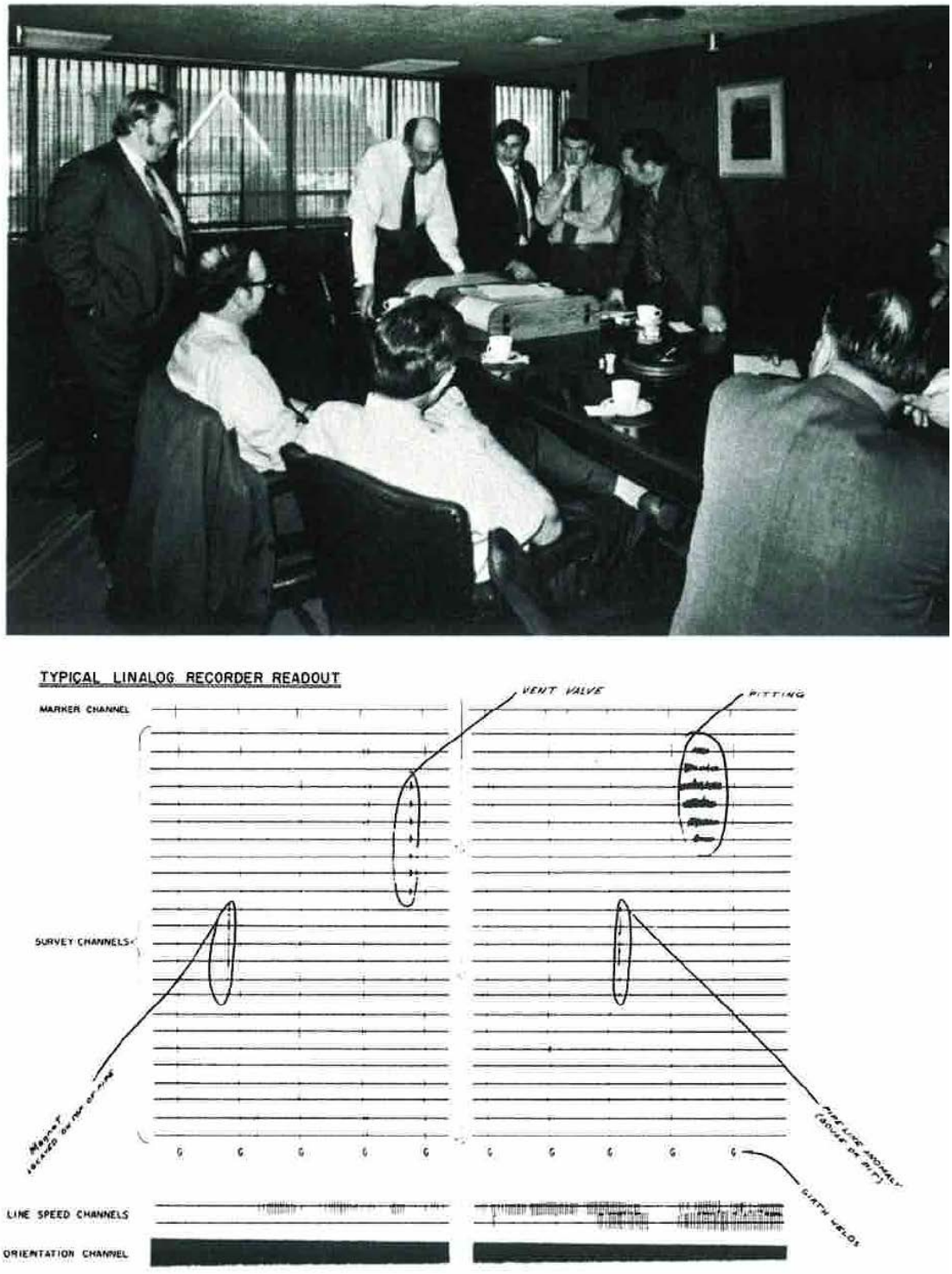


Figure 11.) Trans Mountain Linalog study, 1977. Source: Trans Mountain Pipe Line Company. *Annual Report.* 1977, 7.

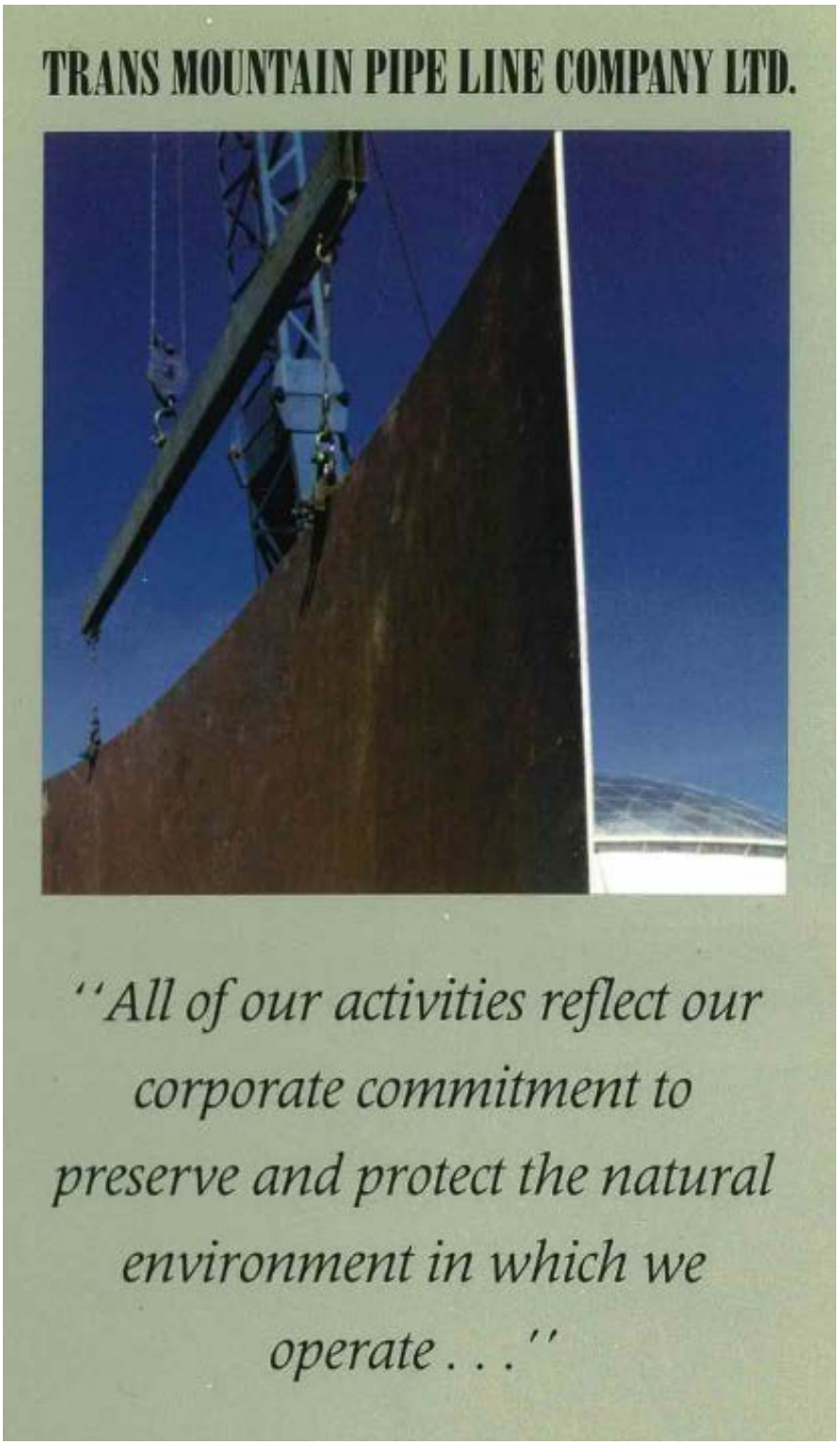


Figure 12.) "All of our activities reflect our corporate commitment to preserve and protect the natural environment in which we operate..." Source: Trans Mountain Pipe Line Company. *Annual Report.* 1989, front cover.

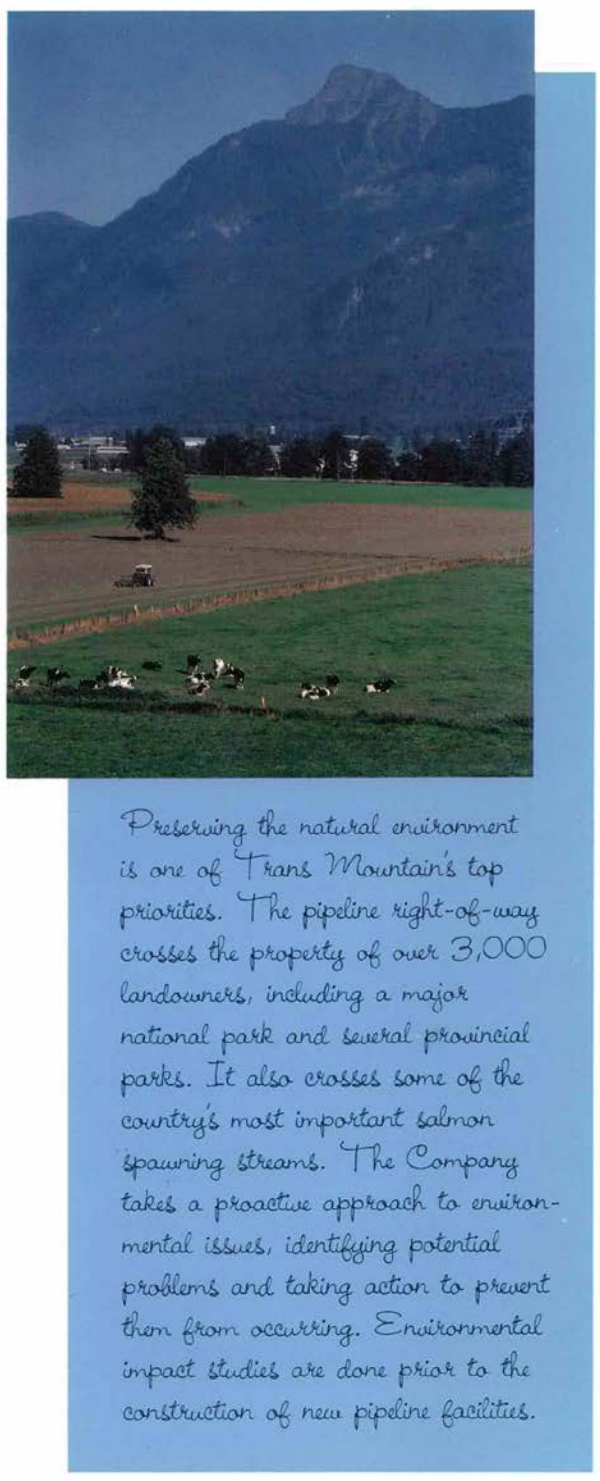


Figure 13.) "Preserving the natural environment is one of Trans Mountain's top priorities." Source: Trans Mountain Pipe Line Company. *Annual Report.* 1990, 11.

Appendix D

Trans Mountain Pipe Line Company
Liquid Hydrocarbon Deliveries Daily Average (Barrels), 1954-2010*

Source: Trans Mountain Pipe Line Company Annual Reports, 1954-1992; National Energy Board, Reasons for Decision: Trans Mountain Pipeline Company Ltd. RHW 2-96, March 1996; Report prepared by Purvin and Gertz Inc. "Firm Service Capacity on the Trans Mountain Pipeline System" November 2010

***No data available for 1993-1995, 1997-2001**

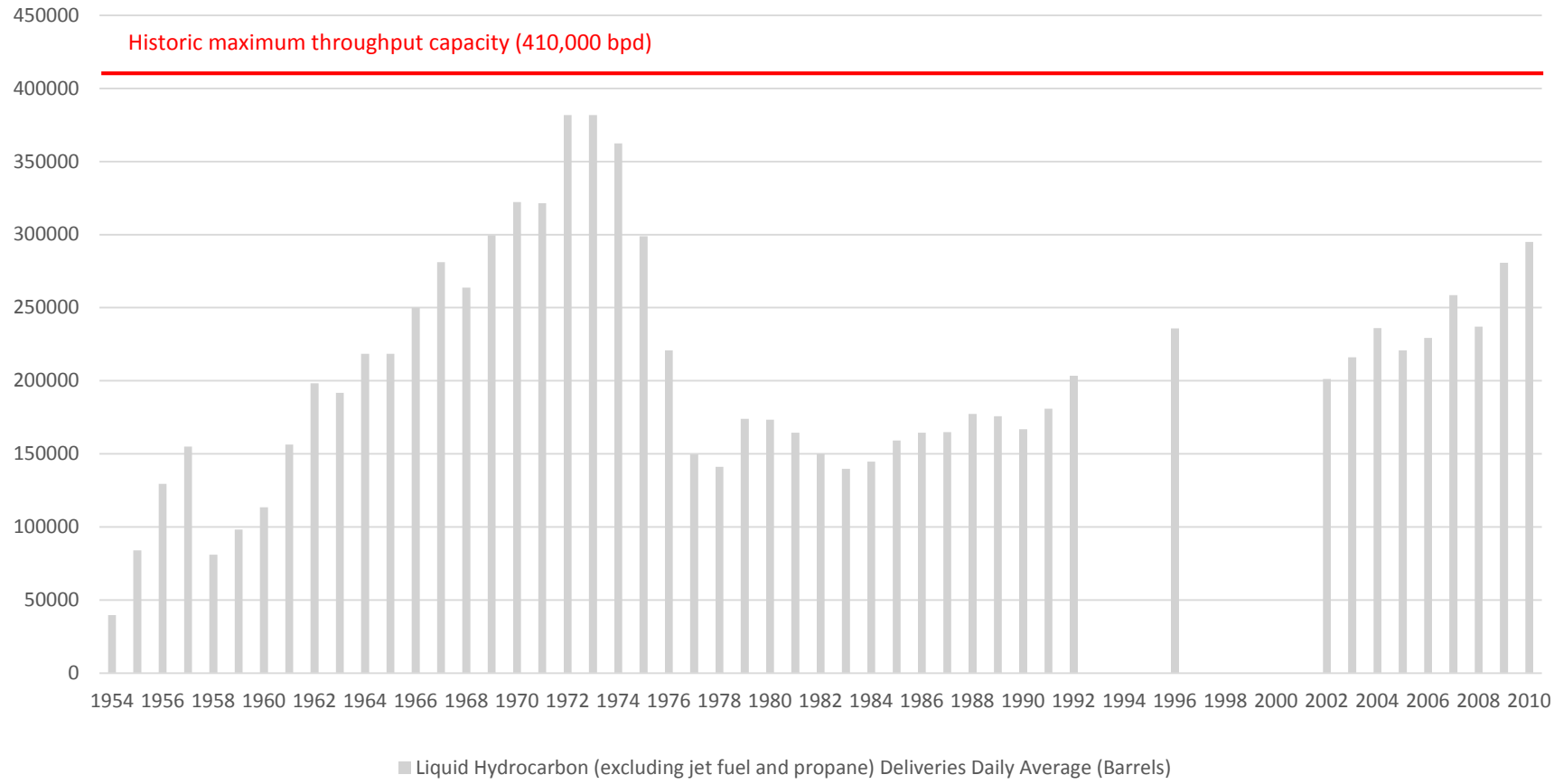
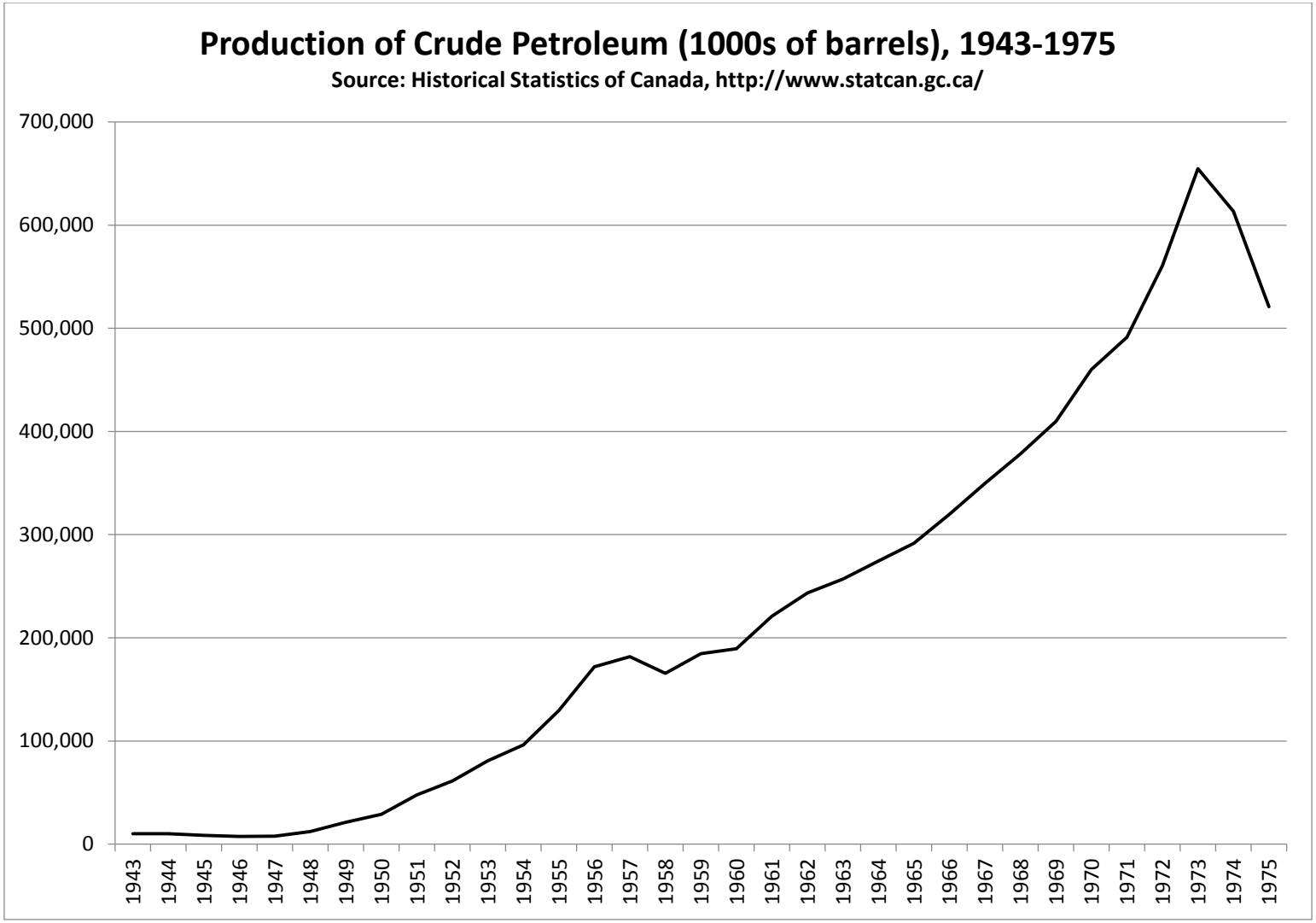


Table 1


Production of Crude Petroleum (1000s of barrels), 1943-1975
Source: Historical Statistics of Canada, http://www.statcan.gc.ca/
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
1943
1944
1945
1946
1947
1948
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1951
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1975

Table 2

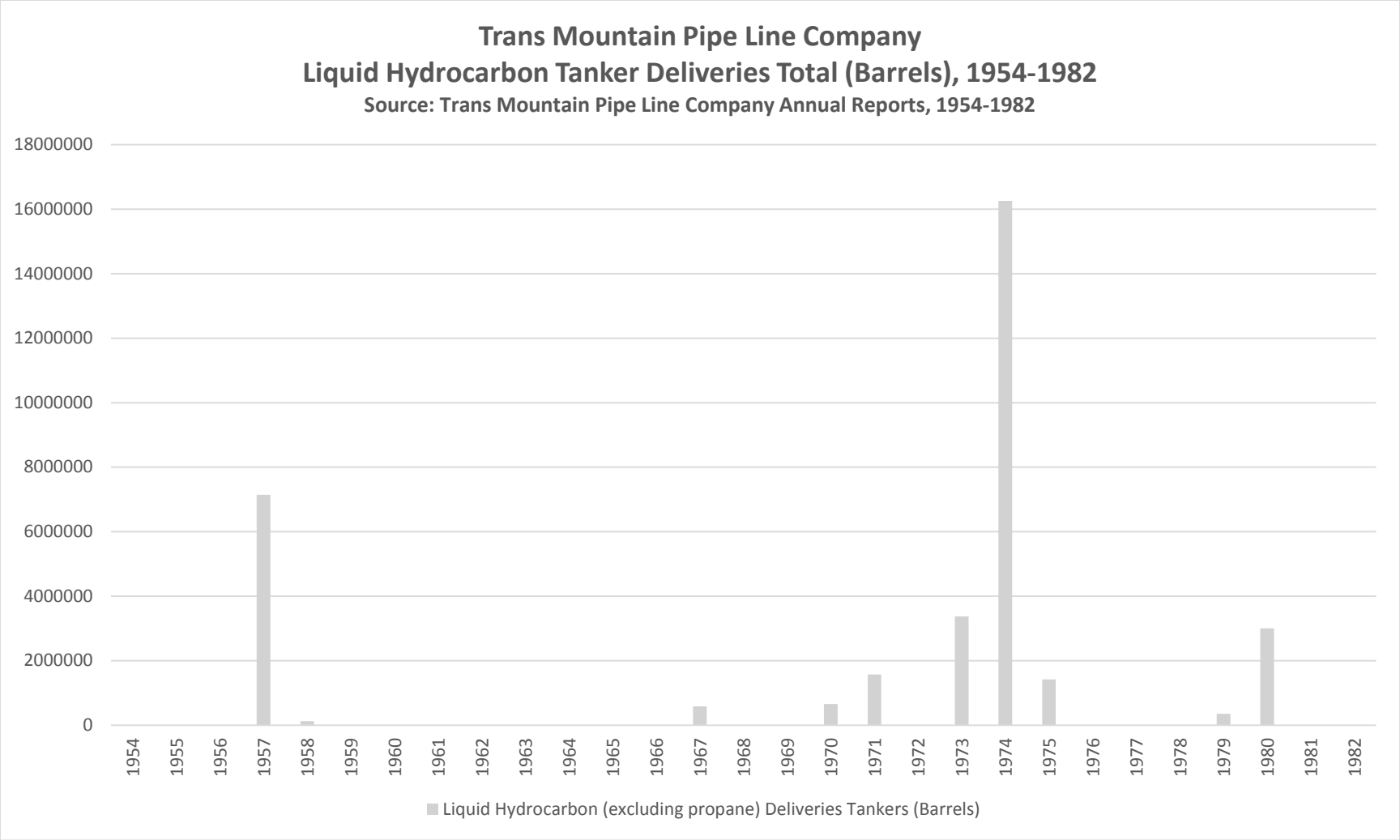
Trans Mountain Pipe Line Company
Liquid Hydrocarbon Tanker Deliveries Total (Barrels), 1954-1982
Source: Trans Mountain Pipe Line Company Annual Reports, 1954-1982
18000000
16000000
14000000
12000000
10000000
8000000
6000000
4000000
2000000
0
1954
1955
1956
1957
1958
1959
1960
1961
1962
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
Liquid Hydrocarbon (excluding propane) Deliveries Tankers (Barrels)

Table 3

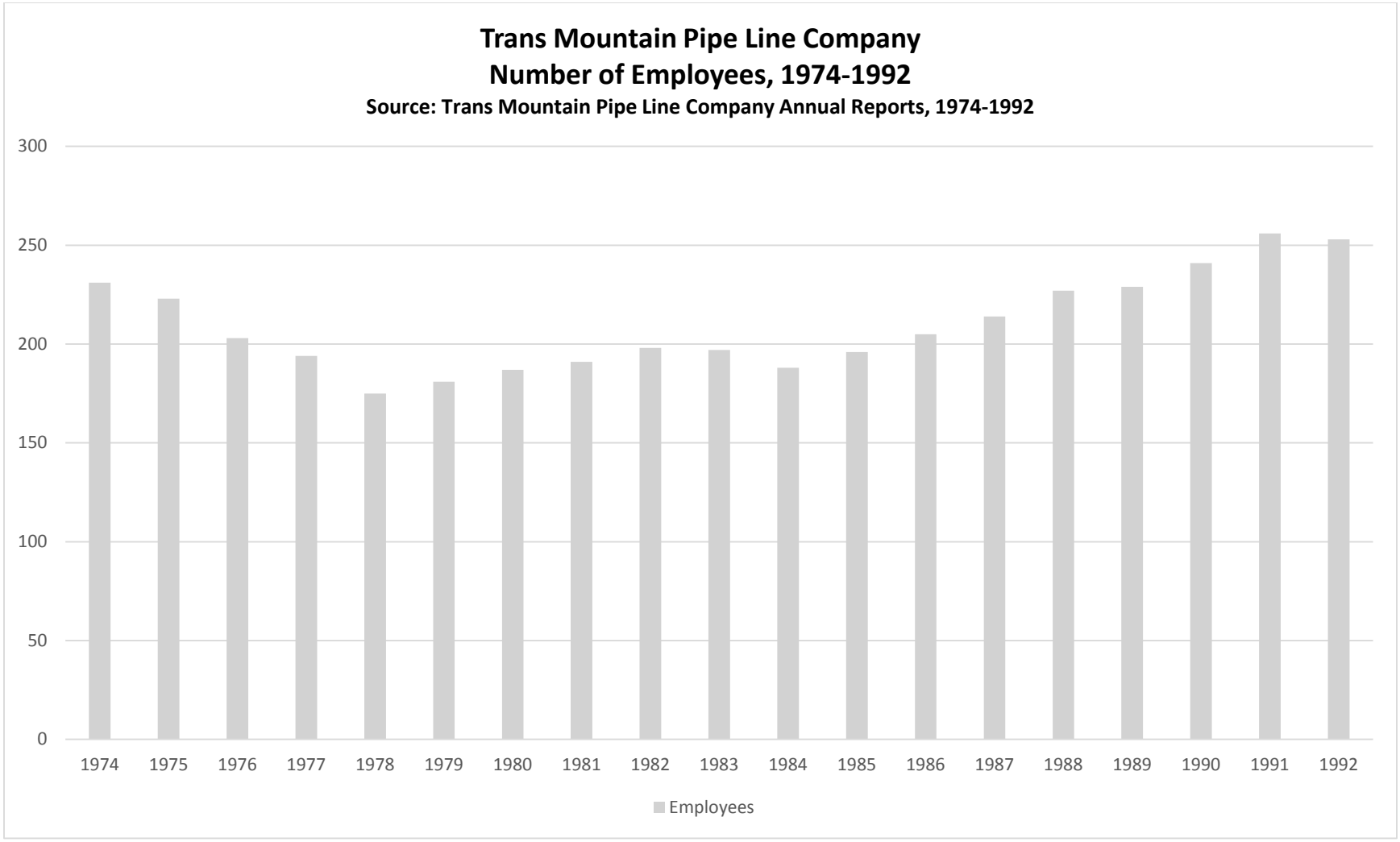
Trans Mountain Pipe Line Company
Number of Employees, 1974-1992
Source: Trans Mountain Pipe Line Company Annual Reports, 1974-1992
300
250
200
150
100
50
0
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
Employees

Table 4

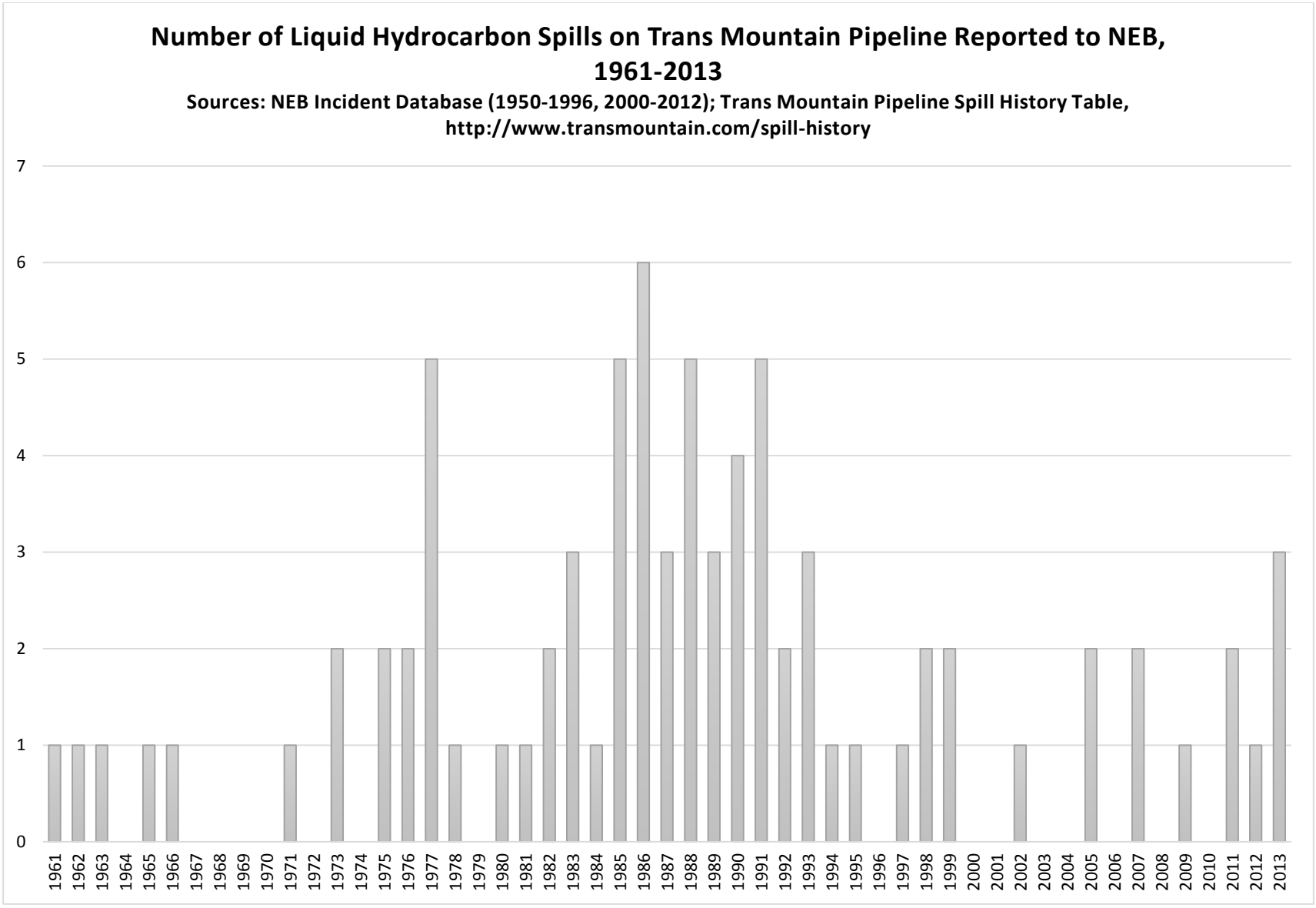
Number of Liquid Hydrocarbon Spills on Trans Mountain Pipeline Reported to NEB, 1961-2013
Sources: NEB Incident Database (1950-1996, 2000-2012); Trans Mountain Pipeline Spill History Table, http://www.transmountain.com/spill-history
0
1
2
3
4
5
6
7
1961 1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013

Table 5

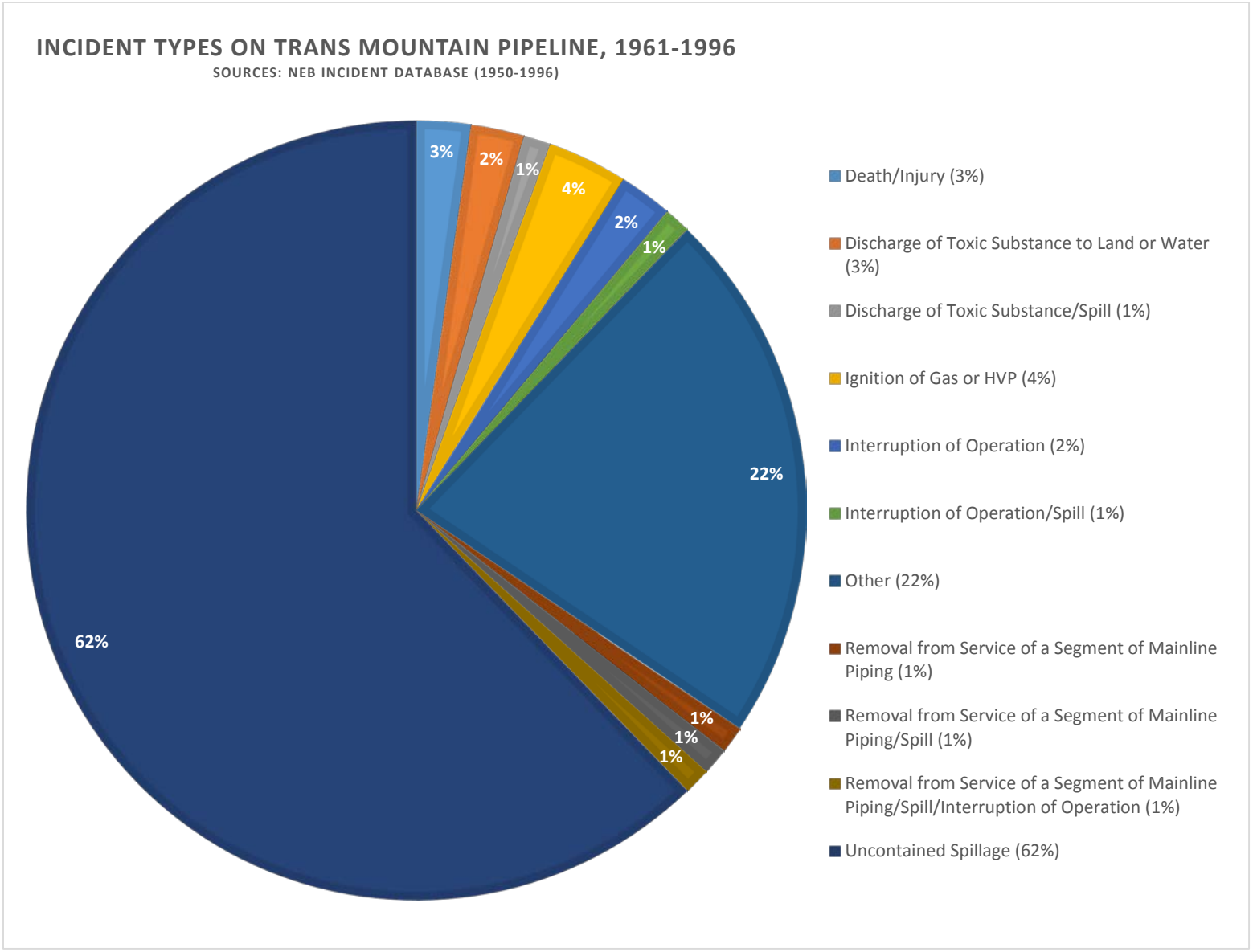
INCIDENT TYPES ON TRANS MOUNTAIN PIPELINE, 1961-1996
SOURCES: NEB INCIDENT DATABASE (1950-1996)
3%
2%
1%
4%
2%
1%
22%
1%
1%
1%
62%
Death/Injury (3%)
Discharge of Toxic Substance to Land or Water (3%)
Discharge of Toxic Substance/Spill (1%)
Ignition of Gas or HVP (4%)
Interruption of Operation (2%)
Interruption of Operation/Spill (1%)
Other (22%)
Removal from Service of a Segment of Mainline Piping (1%)
Removal from Service of a Segment of Mainline Piping/Spill (1%)
Removal from Service of a Segment of Mainline Piping/Spill/Interruption of Operation (1%)
Uncontained Spillage (62%)

Table 6

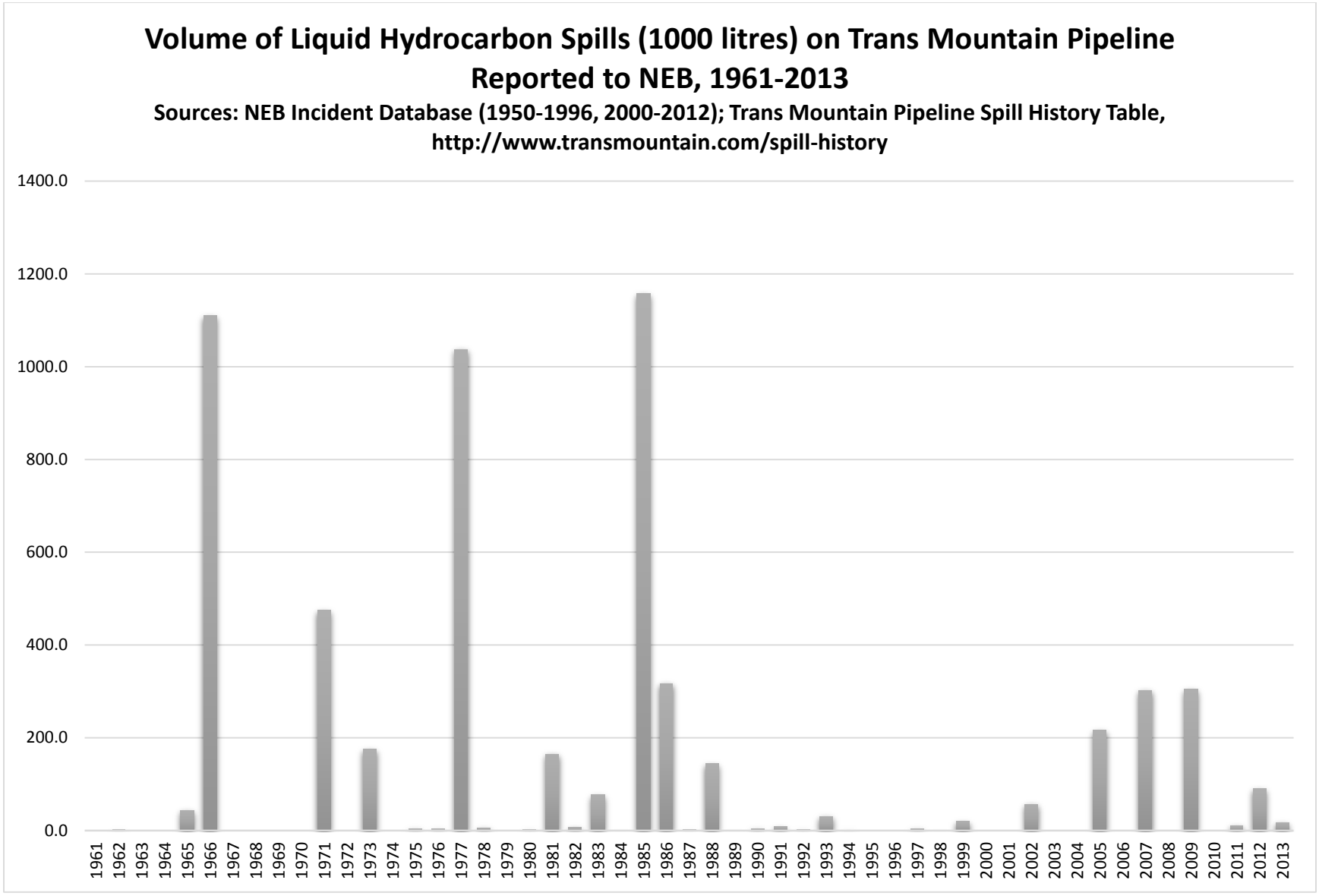
Volume of Liquid Hydrocarbon Spills (1000 litres) on Trans Mountain Pipeline Reported to NEB, 1961-2013
Sources: NEB Incident Database (1950-1996, 2000-2012); Trans Mountain Pipeline Spill History Table, http://www.transmountain.com/spill-history
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
1961 1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013

Table 7

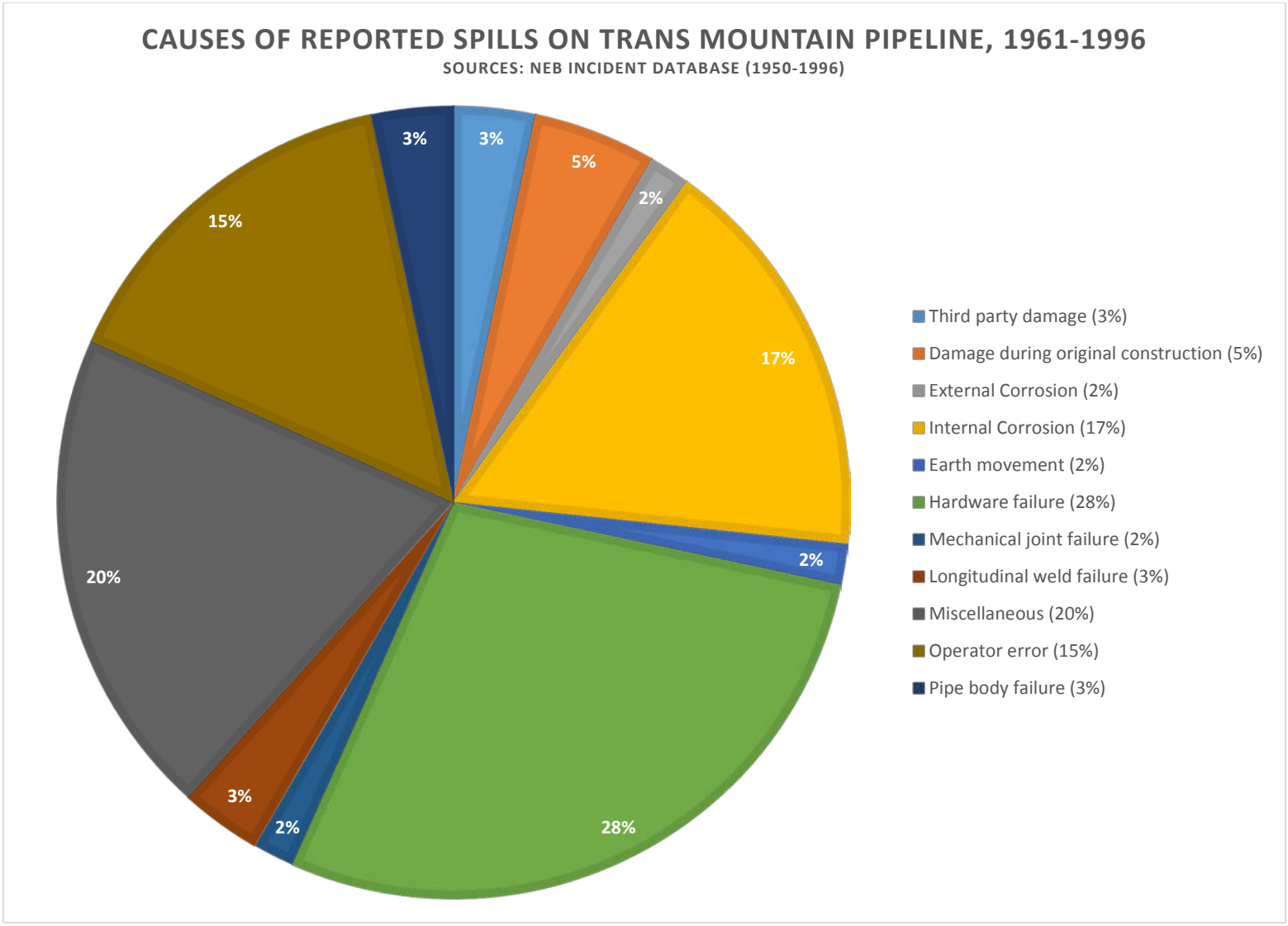
CAUSES OF REPORTED SPILLS ON TRANS MOUNTAIN PIPELINE, 1961-1996
SOURCES: NEB INCIDENT DATABASE (1950-1996)
3%
5%
2%
17%
2%
28%
2%
3%
20%
15%
3%
Third party damage (3%)
Damage during original construction (5%)
External Corrosion (2%)
Internal Corrosion (17%)
Earth movement (2%)
Hardware failure (28%)
Mechanical joint failure (2%)
Longitudinal weld failure (3%)
Miscellaneous (20%)
Operator error (15%)
Pipe body failure (3%)

Table 8