



## **ATCO Gas and Pipelines Ltd. (South)**

### **Southwest Edmonton Connector Pipeline**

**January 14, 2016**

**Alberta Utilities Commission**

Decision 20512-D01-2016

ATCO Gas and Pipelines Ltd. (South)

Southwest Edmonton Connector Pipeline

Proceeding 20512

Applications 20512-A001 and 20512-A002

January 14, 2016

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Fifth Avenue Place, Fourth Floor, 425 First Street S.W.

Calgary, Alberta

T2P 3L8

Telephone: 403-592-8845

Fax: 403-592-4406

Website: [www.auc.ab.ca](http://www.auc.ab.ca)

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## **1 Introduction**

1. In this decision, the Alberta Utilities Commission must decide whether it is in the public interest to approve two applications by ATCO Gas and Pipelines Ltd. (South) (ATCO) for a new high-pressure pipeline in southwest Edmonton. The proposed pipeline, which ATCO refers to as the Southwest Edmonton Connector (SWEC), would be approximately 21 kilometres in length and located in southwest Edmonton within the Edmonton transportation and utility corridor (TUC) and along the Whitemud Drive road allowance.

2. The Chinatown Multi-level Care Foundation (the Foundation) owns land that is adjacent to the TUC and in an area where the pipeline is proposed to be located. The Foundation intends to begin construction of a new long-term care facility for seniors at that location and objects to ATCO's application on grounds of risk and safety. The map, attached to this decision as [Appendix C](#), shows the proposed pipeline route.

## **2 Background**

### **2.1 ATCO's Urban Pipeline Replacement Project**

3. Most of ATCO's high-pressure gas transmission pipelines currently located in Edmonton and Calgary were constructed prior to 1970 in rural areas on the outskirts of each city. Since the original installation, urban development has surrounded the previously installed rural network of transmission pipelines, such that many pipelines are now located in highly developed, densely populated areas.

4. In 2011, ATCO initiated a program for the replacement of these urban pipelines through a series of applications to the Commission. ATCO identified 12 individual replacement projects, four in Edmonton and eight in Calgary, designed to move many of its existing pipelines into the Edmonton and Calgary TUCs. ATCO referred to the project collectively as the Urban Pipeline Replacement Project (UPR project). In July 2012, the Commission directed ATCO to file a single application with it describing the need for the UPR project.

5. In its UPR application, ATCO described why the project was necessary, the three other alternatives it considered, and why it believed that its proposed UPR project was the best alternative.

6. The Commission held a public hearing in the fall of 2013 to consider the need for the UPR project and the alternatives developed by ATCO. Following the hearing the Commission issued Decision 2014-010<sup>1</sup> in which it approved ATCO's UPR application. The Commission

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<sup>1</sup> Decision 2014-010: ATCO Pipelines, a division of ATCO Gas and Pipelines Ltd. – Urban Pipeline Replacement Project, Proceeding 1995, Application 1608617, January 17, 2014. Errata issued on February 21, 2014.

decided that the risk of continued long-term operation of the existing Edmonton and Calgary pipeline systems was unacceptable and determined that ATCO's UPR proposal to move the systems primarily into the TUCs was in the public interest. The Commission concluded that the UPR proposal was superior to the other alternatives, having regard to risk management, system integrity, reliability of supply, public disruption, technical feasibility and siting.

7. Following the Commission's approval of the need for the UPR project, ATCO began to file applications for the individual pipeline projects that were described in its UPR application. The SWEC project is the fifth UPR project to be considered by the Commission.

## 2.2 The Southwest Edmonton Connector applications

8. ATCO filed its applications for the SWEC (applications 20512-A001 and 20512-A002) with the Commission on June 2, 2015. The applications were filed pursuant to Section 11 of the *Pipeline Act* and Section 4.1 of the *Gas Utility Act* and were assigned to Proceeding 20512. The SWEC project consists of a new 20.79-kilometre long, 508-millimetre pipeline to be constructed from Stoney Plain Road to 127 Street S.W. within the Edmonton TUC; four lateral pipelines; and other minor connecting pipelines. A detailed description of the project is found in Section 5 of this decision.

9. The Commission issued a notice of application on June 15, 2015. This notice was mailed directly to approximately 5,000 land title holders and occupants within 200 metres of the proposed pipeline and notification was automatically emailed to eFiling System users that had chosen to be notified of notices of application issued by the Commission. The notice was also published in the Edmonton Journal and Edmonton Sun on June 19, 2015, and on the AUC website.

10. Six persons or groups responded to the notice of application: the Consumers Coalition of Alberta, the Chinatown Multi-level Care Foundation, Arvid Pederson, S. J. Laba, David Salopek, and Marge Adolph. On August 26, 2015, the Commission wrote to these parties and advised that only the Foundation had satisfied the test for standing set out in Section 9 of the *Alberta Utilities Commission Act*. Notwithstanding this finding, the Commission stated that the Consumers Coalition of Alberta, Arvid Pederson, S. J. Laba and Marge Adolph could all make brief presentations at the public hearing. The Commission also found that the concerns described by David Salopek in his statement of intent to participate had been resolved.<sup>2</sup>

11. The Commission issued a notice of hearing on August 26, 2015. The notice was sent to registered and interested parties by email and mailed directly to approximately 5,000 land title holders and occupants within 200 metres of the proposed pipeline. Notification was also automatically emailed to eFiling System users that had chosen to be notified of notices of hearing issued by the Commission.

12. The Commission held the public hearing at its office in Edmonton, Alberta on November 17 and 18, 2015. The Commission considers the close of record for Proceeding 20512 to be November 18, 2015.

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<sup>2</sup> Exhibit 20512-X0077, AUC Ruling on Standing, August 26, 2015.

### 3 The statutory scheme for the approval of new gas utility pipelines in Alberta

13. The Commission's authority to approve applications for the construction and operation of a new gas utility pipeline is found in the *Gas Utilities Act* and the *Pipeline Act* and its regulations.

14. Section 4.1(1) of the *Gas Utilities Act* states:

**4.1(1)** In addition to the jurisdiction of the Commission with respect to gas utility pipelines under this Act, the Commission has jurisdiction with respect to gas utility pipelines and exercises all the powers, functions and duties of the Alberta Energy Regulator set out in the *Pipeline Act* with respect to gas utility pipelines.

15. Section 3.1(2) of the *Pipeline Act* mirrors Section 4.1 of the *Gas Utilities Act* and states:

**(2)** The Alberta Utilities Commission has jurisdiction with respect to gas utility pipelines and exercises all the powers, functions and duties of the Regulator with respect to gas utility pipelines.

16. Sections 6 and 16 of the *Pipeline Act* provide that no person shall construct and operate a pipeline or any part of a pipeline without a licence issued pursuant to that act.

17. Section 17(1) of the *Alberta Utilities Commission Act* provides direction to the Commission regarding the approval of new gas utility pipelines and reads in part as follows:

**17(1)** Where the Commission conducts a hearing or other proceeding on an application to construct or operate ... a gas utility pipeline under the *Gas Utilities Act*, it shall, in addition to any other matters it may or must consider in conducting the hearing or other proceeding, give consideration to whether construction or operation of the proposed ... gas utility pipeline is in the public interest, having regard to the social and economic effects of the... pipeline and the effects of the ... pipeline on the environment.

18. Section 9 of the *Pipeline Act* provides that the Commission may grant a licence for a gas utility pipeline subject to any terms and conditions that it considers necessary.

19. The *Pipeline Rules* (a regulation under the *Pipeline Act*) set out the design requirements for pipelines in Alberta. Section 9(3) of those rules provides that unless otherwise specified, the minimum requirements for the design, construction, testing, operation, maintenance, repair and leak detection of pipelines are set out in Canadian Standards Association Z662-15 - *Oil and Gas Pipeline Systems* (CSA Z662).

20. CSA Z662 establishes design requirements for pipelines and uses class location designations as a protective measure in pipeline design. Class location designations are determined on the basis of class location assessment areas (400 metres (200 metres wide on each side of a pipeline) and 1.6 kilometres long) and the buildings, dwelling units, places of public assembly, and industrial installations contained therein.

21. CSA Z662 sets out four class location designations, ranging from Class 1 for pipelines in sparsely populated, rural areas with no more than 20 dwellings in the class location assessment

area, to Class 4 for pipelines located in densely populated areas with multi-storey buildings.<sup>3</sup> CSA Z662 specifies that a class location assessment area containing institutions from which rapid evacuation could be difficult (e.g. hospitals, nursing homes) would be considered a Class 3 location, unless the class location assessment area under consideration would otherwise be considered a Class 4 location.

22. CSA Z662 specifies design requirements for all classes of pipelines, including maximum operating pressures, pipe thickness, minimum yield strength, isolation valve spacing, and depth of cover. Class 4 pipelines have the most stringent design requirements because they are designed to be operated in densely populated areas. For example, Class 4 pipelines must be designed to ensure that the maximum stress level for the pipeline is generally 44 per cent of specified minimum yield strength. The maximum stress level for a Class 1 pipeline, on the other hand, is generally 80 per cent of specified minimum yield strength. Mr. Radke, ATCO's senior manager of projects, explained this difference in his testimony during the hearing:

And put it (sic) very simply and basic terms, the difference between 40 per cent and 80 per cent, your steel is either going to be twice as thick or stronger or combination of the two. So that can be done by use of grade change and strength of steel or the wall thickness or a combination.<sup>4</sup>

23. ATCO's expert, Mr. James Mihell, addressed how the class-based design reflected in CSA Z662 incorporates the concept of risk as follows:

It's a risk consideration that where you have higher potential for impacting the public - in other words, where you have higher societal risk levels or higher societal consequence levels, you try to offset that by reducing the failure likelihood so that philosophically - and I don't know if it's true mathematically, but philosophically you try to maintain constant risk by means of the class-based design.

You reduce the failure likelihood by reducing the operating stress level at higher class locations to compensate for the higher population densities.<sup>5</sup>

24. Depth of cover requirements are also discussed in CSA Z662, which states that in all class locations, unless otherwise stated, the minimum allowable depth of cover for buried gas pipelines is 0.60 metres. However, Section 20(1) of the *Pipeline Rules* states that the minimum depth of cover for any pipeline outside of a road or highway right-of-way shall be the greater of 0.8 metres and that specified in CSA Z662.

25. CSA Z662 requires a pipeline owner to have operational controls, including a risk management process that identifies, assesses and manages the hazards and associated risks for the life cycle of the pipeline. Annex B of CSA Z662, which is described as an informative (non-mandatory) section of the standard, provides guidelines on the application of a risk assessment. CSA Z662, however, does not expressly prescribe quantitative risk assessment criteria for new pipelines.

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<sup>3</sup> For a Class 4 pipeline the class location assessment area must contain a higher count of four (or more) storied buildings intended for human occupancy than of three - (or fewer) storied buildings intended for human occupancy.

<sup>4</sup> Transcript, Volume 1, page 95.

<sup>5</sup> Transcript, Volume 1, pages 239-240.



## 4 The Edmonton transportation and utility corridor

### 4.1 History of the Edmonton transportation and utility corridor

26. As described earlier, the SWEC project is proposed to be constructed almost entirely within the Edmonton TUC. ATCO's proposal to relocate its existing high-pressure pipelines in Edmonton and Calgary to their respective TUCs was a material factor in the Commission's approval of the UPR project. In paragraph 223 of Decision 2014-010, the Commission stated:

The Commission is of the view that the TUC presents a unique opportunity to relocate infrastructure of this type away from densely populated areas and into a restricted development and use corridor designed to accommodate pipelines of this type.<sup>6</sup>

27. The Edmonton TUC is located within the Edmonton Restricted Development Area and the Sherwood Park West Restricted Development Area which were established in 1974 by two separate regulations. The *Government Organization Act* describes the purposes for which these restricted development areas were established. Two of the listed purposes are to confine activities that are potentially harmful to the environment within the restricted development areas and to separate these activities from other operations or activities on adjacent lands.<sup>7</sup>

28. The Commission extensively reviewed the history and development of the Edmonton TUC in paragraphs 683 to 707 of Decision 2011-436.<sup>8</sup> In that decision, the Commission observed that plans for formal transportation and utility corridors in Edmonton and Calgary were completed in 1979 and that those plans allotted space for major power lines, pipelines, municipal services and other related facilities. The Commission also noted that a TUC policy document published by Alberta's Department of Infrastructure in 2004 described the objective of the TUC program as follows:

The objective of the TUC Program is to facilitate the development of the cities of Calgary and Edmonton, their surrounding regions, and the province by accommodating within the TUCs the development of ring roads, storm water management facilities, major pipelines and power lines, and municipal services...

The TUCs were established on the principle that long-term planning for the accommodation of a ring road and major utilities within a TUC can maximize its use. The TUCs protect ring roads and utility alignments from advancing urban development and offer a long-term solution to many of the land use problems associated with developing major linear facilities in urban areas.<sup>9</sup>

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<sup>6</sup> Decision 2014-010 (Errata).

<sup>7</sup> *Government Organization Act*, Schedule 5, Subsections 5(e) and (f).

<sup>8</sup> Paragraphs 22 to 34 are substantially reproduced from Decision 2011-436: AltaLink Management Ltd. and EPCOR Distribution & Transmission Inc. – Heartland Transmission Project at paragraphs 685 to 698, *mutatis mutandis*.

<sup>9</sup> Decision 2011-436: AltaLink Management Ltd. and EPCOR Distribution & Transmission Inc. – Heartland Transmission Project at paragraph 698.

29. While Decision 2011-436 related to a 500-kilovolt transmission line, its findings with respect to the routing of that line within the Edmonton TUC are relevant to the Commission's consideration of ATCO's application which is proposed for the same corridor. Those findings were as follows:

705. The Commission understands that one of the underlying motivations for establishing the restricted development area was to contain environmentally harmful activities. That purpose, as reflected in the 1977 amendments to the legislation and regulations, has been found to be valid by both levels of Alberta's courts.

706. In accordance with this purpose, the government of Alberta has obtained title to almost all of the lands within the restricted development areas at considerable expense. Additionally, since 1979 the government of Alberta has engaged in an ongoing planning process for establishing a transportation and utility corridor within the restricted development area. Highways have been constructed in accordance with those plans, as have a large number of pipelines and five high voltage overhead transmission lines.<sup>10</sup>

#### **4.2 The approval process for pipelines in the Edmonton transportation utility corridor**

30. The regulations for both the Edmonton and Sherwood Park West restricted development areas provide that the Commission, a "government agency" as that term is defined therein, cannot issue permits and licences permitting the construction of transmission facilities within either restricted development area without the written consent of the Minister of Infrastructure.

31. Section 4(2) of the *Edmonton Restricted Development Area Regulations* states:<sup>11</sup>

(2) No Minister of the Crown, government official or government agency shall, without the written consent of the Minister of Infrastructure, exercise any power under the *Municipal Government Act*, the *Pipeline Act*, the *Water Resources Act* or any other Act to order, authorize, approve, permit or consent to any operation or activity that causes, is likely to cause or will cause a surface disturbance of any land in the Area, or issue or cause to be issued any order, authorization, approval, permit, licence or consent instrument for that purpose.

32. Having regard to the clear wording of both regulations, and in accordance with its previous decisions, the Commission is satisfied that it has the jurisdiction to approve the SWEC applications on the condition that ATCO provide it with the written consent of the Minister of Infrastructure. However, the Commission recognizes that it may not issue a permit and licence for the construction and operation of the SWEC project until it receives the Minister of Infrastructure's written consent.

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<sup>10</sup> Decision 2011-436: AltaLink Management Ltd. and EPCOR Distribution & Transmission Inc. – Heartland Transmission Project paragraphs 704-707.

<sup>11</sup> Section 4(2) of the *Sherwood Park West Restricted Development Area Regulations* is similarly structured and is not reproduced here.

## 5 Project description

33. ATCO explained in its application that the Southwest Edmonton Connector project consists of the following major components:

- A new 20.79-kilometre, 508-millimetre pipeline which would connect to the existing 610-millimetre Homeglen pipeline, through an above-ground connection at a proposed facility named the South Edmonton Control Station, which will be located east of 12th Street S.W. and north of Ellerslie Road in SW 30-51-24-W4M. The pipeline would proceed north within the Edmonton TUC to a proposed above-ground facility named the West Edmonton Control Station, to be located east of Anthony Henday Drive and north of Stoney Plain Road in SW 5-53-25-W4M. It is at this location where the proposed Southwest connector would become integrated with the existing 508-millimetre N.W. Edmonton Connector pipeline.
- A 323.9-millimetre lateral, 130 metres in length, that would provide a connection between the new 508-millimetre SWEC pipeline and the proposed Terwillegar Gate Station. This lateral would connect to the 508-millimetre proposed SWEC pipeline through an above-ground valve assembly located in SE 34-51-25-W4M. From that point it will be routed north and will terminate in an above-ground connection to the proposed Terwillegar Gate Station, which will be located on the east side of the TUC, south of Terwillegar Drive in NE 34-51-25-W4M.
- A 168.3-millimetre lateral, 190 metres in length, that would provide a connection between the new 508-millimetre SWEC pipeline and the existing Cameron Heights Gate Station. This lateral would connect to the 508-millimetre SWEC pipeline through an above-ground valve assembly located in NE 4-52-25-W4M. From that point it would be routed northwest and terminate in an above-ground connection to the existing Cameron Heights Gate Station, which is located north of Anthony Henday Drive and east of E. L. Smith Road.
- A 323.9-millimetre lateral, 60 metres in length, that would provide a connection between the new 508-millimetre SWEC pipeline and the proposed Whitemud Gate Station. This lateral would connect to the 508-millimetre SWEC pipeline through an above-ground valve assembly located in SW 20-52-25-W4M. From that point it would be routed west and terminate in an above-ground connection to the proposed Whitemud Gate Station, which would be located on the west side of the transportation utility corridor, just north of 69th Avenue in SW 20-52-25-W4M.
- A 323.9-millimetre lateral, 1.76-kilometres in length, that would provide a connection between the new 508-millimetre SWEC pipeline and the existing 323.9-millimetre Swan Hills pipeline (Licence 3861). This lateral would connect to the new 508-millimetre SWEC pipeline through an above-ground connection at a proposed ATCO facility named the Swan Hills Connector Control Station, which would be located within the same surface lease as the Whitemud Gate Station. From that point it would be routed north within the TUC, parallel to the 508-millimetre SWEC pipeline for one kilometre, then turn west and run within the Whitemud Drive road allowance to its termination point at a below-ground connection to the existing 323.9-millimetre Swan Hills pipeline (Licence 3861), which is located south of Whitemud Drive and east of Guardian Road in NW 19-52-25-W4M.

34. ATCO stated the pipelines and facilities associated with the SWEC project are fully contained within the Edmonton TUC, except for a 0.76-kilometre portion of the proposed 323.9-millimetre Swan Hills Lateral, which would be constructed within the city of Edmonton's road allowance for Whitemud Drive.

35. At the hearing ATCO explained its consultation process with Alberta Infrastructure regarding the location of the SWEC pipeline. It stated that it approached Alberta Infrastructure early in the design process and worked with it, the City of Edmonton, and another pipeline proponent in finalizing the route for the SWEC pipeline in the TUC.

36. ATCO summarized its co-ordination with Alberta Infrastructure in a letter that was attached to its reply evidence.<sup>12</sup> In that letter ATCO explained that the SWEC pipeline would be the first of five pipelines to be placed in the pipeline component of the southwest Edmonton portion of the TUC. It stated that Alberta Infrastructure directed ATCO to use the outside 10 metres of the pipeline component as the right-of-way for the SWEC pipeline because access to the pipeline would come from Anthony Henday Drive. Alberta Infrastructure stated that development in this manner would avoid the need for future pipeline construction to occur across or over existing pipelines and confirmed this configuration in a letter to ATCO dated October 28, 2015.<sup>13</sup>

37. ATCO explained in its reply evidence that it was unable to move the SWEC pipeline to the south side of the TUC, as requested by the Foundation, because Alberta Infrastructure had designated the area between the TUC boundary and Anthony Henday Drive as a buffer component to be held in reserve should additional ring road rights-of-way be required.

## 5.1 Pipeline design standards

38. ATCO stated that it designed the proposed SWEC pipeline as a Class 4 pipeline under CSA Z662, although it arguably could have been designed to a Class 3 standard given the current dwelling limit density along the proposed route. ATCO added that CSA Z662 states that consideration be given to designating areas that contain buildings from which rapid evacuation can be difficult, for example, hospitals or nursing homes, as Class 3 locations. ATCO decided to exceed these CSA Z662 design requirements in designing the SWEC pipeline to Class 4 specifications.<sup>14</sup>

39. ATCO stated that the purpose of CSA Z662 is to ensure that the pipeline is installed safely given the population density around it. Therefore, if a pipeline is designed to the Class 4 standard, CSA Z662 does not impose any setback requirements for the pipeline. ATCO added that, while it does not allow development on the right-of-way, it does not require any additional setbacks outside of the right-of-way. It submitted that designing to Class 4 requirements ensures that the pipeline is safe for the area of use, taking into account the existing and future population density.<sup>15</sup>

40. ATCO stated that its pipe procurement program sets out specific measures that are targeted at line pipe quality, including the use of a line pipe manufacturing specification that

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<sup>12</sup> Exhibit 20512-X0104, Reply Evidence of ATCO Pipelines, November 6, 2015, PDF pages 23-24.

<sup>13</sup> Exhibit 20512-X0104, Reply Evidence of ATCO Pipelines, November 6, 2015, PDF page 21.

<sup>14</sup> Transcript, Volume 1, page 23, lines 3-15.

<sup>15</sup> Transcript, Volume 1, pages 32-33.

exceeds the requirements of the CSA Z245.1 - *Steel Pipe*<sup>16</sup> standard, and the use of third-party auditors. It explained that other factors that mitigate the threat of manufacturing defects are low operating stress levels and a pre-commissioning hydrostatic test of 1.40 times maximum operating pressure to provide adequate assurance that any sub-critical manufacturing flaws will remain stable in a natural gas service environment.<sup>17</sup>

41. ATCO further stated that welders and welding procedures for the SWEC project will be qualified in accordance with CSA Z662. It explained that it will exceed the non-destructive testing requirements of CSA Z662 by applying non-destructive testing to 100 per cent of welds, as opposed to 15 per cent, which is required by CSA Z662.

42. ATCO stated that its ditching, lowering-in, and backfilling procedures include measures to ensure that objects that could damage or dent pipe are not in contact with the pipe. ATCO also clarified that it would run a high resolution caliper tool immediately after the hydrostatic test to detect dents that may have occurred during installation, backfilling or hydrostatic testing.<sup>18</sup>

## 5.2 Valves and valve spacing

43. ATCO proposed to install remote operated valves for this project, not automated or automatic valves. ATCO's witness, Mr. Radke, explained the difference between these two types of valves at the hearing:

So generally speaking, an automatic valve is referred to as a valve that can control itself. So whether there's a computer on site or your SCADA [supervisory control and data acquisition] system has a computer that does calculations or infers results from the information it's getting, but it's generally something that it does not require human interface to close. Whereas a remote-controlled valve, which is the valve that we are proposing to install on this pipeline, or the types of valves that we're proposing to install on this pipeline, is a valve. While it can have the same physical attributes and will look the same on site, requires that human interface for opening and closing.<sup>19</sup>

44. ATCO explained that its Alberta pipeline system does not have any valves that would be categorized as automatic shutdown valves with the exception of where the system interconnects with receipt point facilities with gas that may contain H<sub>2</sub>S. It stated that the valves it intends to use for the SWEC project will have open/close functionality based on a control signal sent from ATCO's control centre.<sup>20</sup>

45. ATCO stated that its proposal to use remote-operated control valves was a purposeful design decision that it made for all components of its pipeline system, including the UPR program. It emphasized that one benefit of the UPR program, which essentially encircles the two cities in their respective TUCs, is that ATCO can isolate sections of the pipelines for maintenance and still maintain flows to each gate station utilizing the valve configurations at those stations. It was with consideration of this remote operational capability that automated

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<sup>16</sup> CSA Z245.1 Steel Pipe is the Canadian Standards Association standard that covers seamless pipe, electric-welded pipe and submerged-arc-welded pipe intended for use in oil or gas pipeline systems.

<sup>17</sup> Exhibit 20512-X0101, ATCO Threat Assessment, November 3, 2015, PDF page 35.

<sup>18</sup> Exhibit 20512-X0101, ATCO Threat Assessment, November 3, 2015, PDF page 19.

<sup>19</sup> Transcript, Volume 1, pages 104 and 105.

<sup>20</sup> Exhibit 20512-X0086, AP Responses to CMLCF - 2015-09-28, CMLCF-ATCO-2015SEP21-002, page 4.

systems are subject to malfunction and the associated concern about relinquishing system control that ATCO chose remote capability as opposed to an automated valve system.<sup>21</sup>

46. ATCO explained that isolation valves on natural gas pipelines must be spaced no more than 13 kilometres apart in a Class 3 location and no more than eight kilometres apart in a Class 4 location. ATCO proposed to install remote operated isolation valves approximately 5.1 kilometres apart for the section of the proposed pipeline that is adjacent to the Foundation's land.<sup>22</sup>

### 5.3 Integrity management

47. ATCO provided an in-depth explanation of its proposed integrity management program for the SWEC pipeline at the hearing. ATCO explained that the tool it would use for in-line inspections on the SWEC pipeline is a combination tool that incorporates a caliper, a magnetic flux leakage tool (MFL) and an inertial mapping tool (IMU). ATCO explained that the caliper tool, sometimes referred to as a high resolution deformation tool, is used to detect any dents in the pipe resulting from construction damage. ATCO stated that the MFL tool uses a magnetic field to detect physical metal loss on the pipe wall and provides information regarding the pipe wall thickness at all locations around the pipe for its entire length. The IMU tool maps the location of the pipeline itself in all three directions.

48. At the hearing, Mr. Radke explained the importance of gathering baseline information prior to the commissioning of the pipeline:

What that enables you to do on the baseline specifically is two things: If there is a gouge for any construction damage -- so metal has physically been removed from the pipe -- it will pick that up, and as well the caliper will pick up the dent that would likely be associated with that gouge.

But it will also pick up any minor manufacturing effects on the pipe. So as you can imagine, there's a specified wall thickness, but there is a tolerance range within that.

So what the MFL tool will do on the baseline is give you a very specific readout of that entire route. How that helps is on the subsequent run on this pipeline, which will likely be at the 10-year period, you then have a very specific map to compare to, and you're not left guessing if something that you're seeing might be the start of a corrosion feature or might have just always been there as a manufacturing anomaly from the get-go.<sup>23</sup>

49. ATCO stated that its in-line inspection process involves running a gauge plate tool followed by a cleaning tool,<sup>24</sup> and then the inspection tools. Following the inspection process, ATCO would analyze the data from the tools and, if any critical defects are found, address them as soon as possible. In order to address defects and confirm tool data accuracy, ATCO would then select verification digs based on the tool data. Verification digs are typically completed in the year following the in-line inspection, or earlier if required. The data obtained from the inspection tools and verification digs would then be used as part of the risk assessment of the pipeline for future work prioritization.

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<sup>21</sup> Transcript, Volume 1, pages 34.

<sup>22</sup> Transcript, Volume 1, page 257.

<sup>23</sup> Transcript, Volume 1, pages 100-101.

<sup>24</sup> Gauge plate tools are used to confirm that the ILI tools will pass safely through the pipeline. Cleaning tools clean the pipeline to ensure quality data is retrieved by the inspection tools.

50. ATCO submitted that it intends to conduct in-line inspections on the SWEC pipeline at a frequency of five to 10 years, depending upon the condition of the pipeline. In-line inspection frequency would be increased if past inspections indicate the need for further investigations.

51. ATCO stated that it would also conduct flame ionization surveys twice a year to search for potential leaks on the SWEC system (and all of its other Class 3 and 4 pipelines). It explained that, during these surveys, trained personnel walk the pipeline alignment using flame ionization units to identify the presence of natural gas in the air, which could be caused by natural gas leaking from the pipeline. The flame ionization device is very sensitive and is capable of detecting pinhole size leaks. If a potential leak is identified, the pipeline is exposed for confirmation and repair, as required.

#### 5.4 Emergency response

52. ATCO explained that pipeline pressure data for the SWEC project will be continuously monitored at its control centre which receives that data from ATCO's Supervisory Control and Data Acquisition (SCADA) system. A rupture on the pipeline would result in a quick pressure drop that would be detected by its SCADA system which, in turn, would trigger an alarm at the control centre. ATCO noted that, because of the ring design of the UPR project, the decision to shut-in a section of the pipeline system is not overly difficult because it would not result in an interruption of supply to the city.

53. ATCO stated that, once a decision to shut-in a section of the pipeline is made, a valve closure command is remotely implemented, after which it takes approximately 60 seconds for the valve to close. Although isolating a particular segment of pipeline may require multiple valve closures, such valves can be closed concurrently.

54. ATCO has a corporate emergency response plan which covers its entire system. In response to an information request from the Foundation, ATCO confirmed that it regularly conducts emergency response exercises for its system and that in 2014, it conducted 16 table-top emergency response exercises, a corporate emergency response exercise and a joint exercise with AltaGas Ltd., Alberta Health Services, the Edmonton Police, Edmonton Fire Department, HAZMAT, the Alberta Energy Regulator, and the Edmonton Ethane Extraction Plant in south Edmonton.

55. ATCO stated that it has in place numerous safety procedures and protocols that are applicable to the proposed pipeline. ATCO indicated that its emergency management program meets the requirements established by the Canadian Standards Association in CSA Z731 - *Emergency Preparedness and Response*, and CSA Z1600 - *Emergency Management and Business Continuity Programs*, as well as the requirements established by the Alberta Energy Regulator in Directive 071: *Emergency Preparedness and Response Requirements for the Petroleum Industry*.

56. ATCO's safety procedures and protocol documentation are considered confidential because the public disclosure of such documentation has the potential to create security risks to the line. However, ATCO conceded that it may be willing to discuss or disclose certain aspects of those procedures and protocols with the Foundation, if the Foundation has specific questions.<sup>25</sup>

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<sup>25</sup> Exhibit 20512-X0086, AP Responses to CMLCF, CMLCF-ATCO-2015sep21-001, Response (a), PDF page 2.

57. ATCO is willing to meet and discuss its emergency response protocols with any landowners adjacent to its pipelines who have concerns that are specific to emergency response. It also confirmed, in a response to a question from Commission counsel, that it is willing to conduct a joint emergency response exercise with the Foundation in the future.<sup>26</sup>

## 6 The Foundation's proposed long-term seniors' care facility

58. The Foundation is a registered non-profit organization incorporated under the *Societies Act*. It purchased land adjacent to the TUC and the proposed SWEC route in 2012<sup>27</sup> for development into a health care and long-term care facility to provide housing and care for seniors (the Care Centre).<sup>28</sup> The Care Centre is a multi-phase development consisting of phases 1 and 2.

59. Construction for Phase 1 is proposed to commence in July 2016 with completion in May 2018, and anticipated residential occupancy in July 2018.<sup>29</sup> A construction schedule for Phase 2 was not finalized at the time of the hearing.<sup>30</sup> The Foundation's land was rezoned by the City of Edmonton on January 30, 2012, to allow for the development of the Care Centre, and a development permit was granted by the City of Edmonton on September 11, 2014. It is unclear if any consideration was given to the presence of the TUC when the application for rezoning was submitted to the city, however the sketch plan annexed as Schedule A to the approved DC2 Zoning Bylaw provided by the Foundation indicates the presence of the TUC adjacent to the Foundation's lands.<sup>31</sup>

60. Phase 1 of the Care Centre will house 80 long-term care residents and 40 dementia patients, and provide office space for Care Centre medical and administrative staff.<sup>32</sup> Phase 1 will consist of a four-story building with an additional developed basement level, outdoor patios, amenity space, recreational space for patients, and office space for staff. The rear outdoor patio will face the TUC.<sup>33</sup> Phase 2 will be a second multi-storey building with a developed basement that will connect to the Phase 1 basement. Phase 2 will have an outdoor patio facing the TUC,<sup>34</sup> and will also include an additional single-storey multi-use building that will connect Phase 1 to Phase 2.<sup>35</sup> Phase 2 is anticipated to house 120 or more residents, including long-term care and

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<sup>26</sup> Transcript, Volume 1, pages 122-123.

<sup>27</sup> Exhibit 20152-X0097, Information Responses of the Chinatown Multi-Level Care Foundation to ATCO, October 30, 2015, Appendix A Land Title Certificate for lands owned by Chinatown Multi-Care Level Foundation (Lot 5 Block 20 Plan 0729861), PDF page 18.

<sup>28</sup> Exhibit 20152-X0097, Information Responses of the Chinatown Multi-Level Care Foundation to ATCO, October 30, 2015, PDF page 4.

<sup>29</sup> Exhibit 20152-X0097, Information Responses of the Chinatown Multi-Level Care Foundation to ATCO, October 30, 2015, PDF page 4.

<sup>30</sup> Exhibit 20152-X0097, Information Responses of the Chinatown Multi-Level Care Foundation to ATCO, October 30, 2015, PDF page 4.

<sup>31</sup> Exhibit 20512-X0098, Attachment to Information Response CMLCF-ATCO-2015OCT23-006a, October 30, 2015, PDF page 4.

<sup>32</sup> Transcript, Volume 1, page 144.

<sup>33</sup> Transcript, Volume 1, pages 150-151.

<sup>34</sup> Exhibit 20152-X0093, Submission of Chinatown Multi-Level Care Foundation, October 13, 2015, PDF pages 4-5.

<sup>35</sup> Exhibit 20152-X0097, Information Responses of the Chinatown Multi-Level Care Foundation to ATCO, October 30, 2015, PDF page 6.



dementia patients.<sup>36</sup> At its completion, the Foundation estimated that, on a high-traffic day, the Care Centre could see 500 people, including patients, staff and visitors.<sup>37</sup>

61. The Foundation estimated that the centre of the proposed pipeline will be located approximately 55 metres from the Phase 1 building, approximately 27 metres from the Phase 2 building, and approximately 39 metres from the multi-use building that will connect phases 1 and 2.<sup>38</sup> At the closest point, the Foundation's land is approximately 12 metres from the proposed pipeline right-of-way and approximately 17 metres from the proposed pipeline.<sup>39</sup>

## 7 Risk assessment

62. The primary issue raised in this proceeding is whether the risk associated with operating the proposed SWEC pipeline in close proximity to the Foundation's proposed Care Centre would be acceptable. To that end, both ATCO and the Foundation retained expert assistance in preparing risk assessment reports for the SWEC pipeline.

63. ATCO retained Dynamic Risk Assessment Systems Inc. (Dynamic). Dynamic's Chief Engineer, Mr. James Mihell, prepared ATCO's quantitative risk assessment report<sup>40</sup> and appeared at the hearing as a witness for ATCO.

64. The Foundation retained Dr. Brian W. Zelt, of Zelt Professional Services Inc., to prepare a risk assessment report.<sup>41</sup> Dr. Zelt appeared at the hearing as a witness for the Foundation.

65. Both Dr. Zelt and Mr. Mihell agreed that the two most likely hazards from the SWEC pipeline to the Foundation's Care Centre were a fireball and a trench or jet fire caused by a rupture of the SWEC pipeline and ignition of the escaping gas. They explained that in the event of rupture and ignition, the fireball would occur first and would last between 8 to 30 seconds. This would then be followed by a trench or jet fire which would degrade over time as the pipeline depressurized.

66. In each of their reports, Mr. Mihell and Dr. Zelt referenced various criteria for the measurement of risk. Those criteria were the MIACC guidelines, the modified MIACC guidelines, and the Health and Safety Executive (HSE) societal risk criteria.

67. The MIACC guidelines, published by the Major Industrial Accidents Council of Canada in 1995, provide a risk-based approach to land-use planning, and essentially assign acceptable risk levels to specific land uses. For example, these guidelines set the acceptable annual risk for:

- manufacturing, warehouses and open spaces at 100 in a million ( $10^{-4}$ )
- commercial, offices, and low density residential at 10 in a million ( $10^{-5}$ )
- all other uses including institutions, high density residential etc. at 1 in a million ( $10^{-6}$ )

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<sup>36</sup> Exhibit 20152-X0093, Submission of Chinatown Multi-Level Care Foundation, October 13, 2015, PDF pages 7.

<sup>37</sup> Transcript, Volume 1, page 172.

<sup>38</sup> Transcript, Volume 1, pages 145-146.

<sup>39</sup> Exhibit 20152-X0093, Submission of Chinatown Multi-Level Care Foundation, October 13, 2015, PDF page 5.

<sup>40</sup> Exhibit 20152-X0100, Quantitative Risk Assessment prepared by Dynamic Risk, November 3, 2015, Exhibit 20152-X101, Threat assessment ATCO Pipelines Southwest Edmonton Connector, prepared by Dynamic Risk, November 3, 2015.

<sup>41</sup> Exhibit 20152-X0092, Report of Zelt PSI, October 13, 2015.

68. In 2008, the Canadian Society for Chemical Engineering proposed modifications to the 1995 MIACC guidelines. It added a new category of land-use for sensitive institutions such as hospitals, schools, child care facilities and aged care housing developments for which the acceptable annual risk was set at 0.3 in a million ( $0.3 \times 10^{-6}$ ). Other changes introduced in the modified MIACC guidelines included the provision to take into account the range of permitted land uses proximal to the proposed development so that risk assessments are not based solely on existing uses, and the recommendation to include a cumulative risk assessment for an area where several hazardous facilities already exist and additional potentially hazardous facilities are proposed.

69. Dr. Zelt and Mr. Mihell both confirmed in their testimony that while the use of the MIACC and modified MIACC guidelines in risk assessments is not a regulatory or statutory requirement, these guidelines are widely accepted risk assessment tools in Canada.

70. The HSE societal risk criteria were developed by the United Kingdom Health and Safety Executive. The HSE approach to determining acceptable societal risk is to set upper and lower limits for acceptable risk using what is known as an F-N curve. The F-N curve plots cumulative frequency against N or more fatalities. The criteria essentially provide that activities that fall below the lower limit are broadly acceptable, activities that are above the upper limit are of serious concern, and activities that fall between the two limits may be pursued where steps are taken to reduce risk to “as low as reasonably possible” using best engineering practices. Mr. Mihell explained the HSE criteria at the hearing as follows:

And under those criteria, there are basically two standards of acceptability. One, to 10 to the minus 6th, an individual risk value of 10 to the minus 6. And another, 10 to the minus 4. If you're less than 10 to the minus 6, then you are acceptable for all land uses. If you are greater than 10 to the minus 4, then you are unacceptable regardless of land use. And in between, you're in a region called "ALARP," -- A-L-A-R-P -- which stands for "as low as reasonably practicable."<sup>42</sup>

71. Mr. Mihell later explained that ALARP essentially means “do what you can to reduce the risk as much as possible”.<sup>43</sup> Dr. Zelt agreed with this description of ALARP.

## 7.1 Dynamic’s quantitative risk assessment reports

72. Dynamic’s risk assessment consisted of two parts. The first part assessed the potential failure modes or mechanisms for the SWEC pipeline.<sup>44</sup> The second part consisted of Dynamic’s quantitative risk assessment report, which looked at the potential failure frequencies for the viable threats identified in the first part and assessed the risk associated with the pipeline based on its estimated failure frequencies.<sup>45</sup>

73. Dynamic defined individual risk as “the likelihood or probability of a fatality of an unprotected person at a specific location resulting from an accident on an adjacent facility occurring over the course of a year”, and societal risk as “the relationship between cumulative frequency and the number of people suffering from a specified level of harm in a given population from the realization of specified hazards.”

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<sup>42</sup> Transcript, Volume 1, pages 233 and 234.

<sup>43</sup> Transcript, Volume 1, page 294.

<sup>44</sup> Exhibit 20512-101, ATCO Threat Assessment, November 3 2015.

<sup>45</sup> Exhibit 20512-100, ATCO Southwest Edmonton Connector QRA Report\_Nov\_3.

74. Dynamic identified the following potential threats to the SWEC pipeline: external metal loss, internal metal loss, stress corrosion cracking, manufacturing defects, construction defects, equipment failure, third-party damage, incorrect operations, geotechnical hydro-technical forces and concomitant failures.

75. As a result of its first stage analysis, Dynamic concluded that, given the design of the proposed pipeline, the product it is intended to carry (sweet, dry natural gas) and the location of the proposed pipeline in the TUC, internal corrosion, stress corrosion cracking and geotechnical and hydro-technical forces could be eliminated as potential failure mechanisms. Because Dynamic's risk assessment focused on that segment of the SWEC pipeline that was immediately adjacent to the Foundation's land, Dynamic also eliminated threats from the possibility of equipment failure relating to fittings such as flanges, valves and instrumentation because no such equipment would be used on that segment.

76. For the remaining failure frequency modes, Dynamic employed a combination of reliability analysis and analysis based on filtered data from the United States Department of Transportation - Pipeline and Hazardous Materials Safety Administration failure incident database (the PHMSA database). For the purposes of its analysis, Dynamic stated that it adopted the conservative assumption that any failure characterized as a rupture was treated as a full-bore, guillotine-type failure of the pipeline.<sup>46</sup>

77. Dynamic used data from ATCO's existing 508-millimetre South East Edmonton Pipeline which was installed in 1997 because that pipeline has the same coating type, cathodic protection, and other operating standards as the proposed SWEC pipeline.<sup>47</sup> Based on that data, Dynamic concluded that rupture frequency due to external corrosion for the SWEC pipeline would be negligible.<sup>48</sup>

78. Dynamic used data from the PHMSA database to assess the rupture frequency for material and construction defects. Dynamic stated that it applied filters to that data to ensure that it was representative of technologies, practices and materials similar to those of current pipeline installations.<sup>49</sup>

79. Dynamic also used filtered data from the PHMSA database to assess the failure frequency for incorrect operations, which it defined as failure to follow set procedures during the operation of a pipeline, including first party damage during maintenance and other operations. Dynamic characterized all failures as either leaks or ruptures. Dynamic then applied further adjustments to the data to specifically incorporate features of the SWEC pipeline.<sup>50</sup>

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<sup>46</sup> Exhibit 20512-X0100, ATCO SWEC QRA Report, Nov 3, PDF page 10.

<sup>47</sup> Exhibit 20512-X0100, ATCO SWEC QRA Report, Nov 3, PDF page 17.

<sup>48</sup> Exhibit 20512-X0100, ATCO SWEC QRA Report, Nov 3, PDF page 23.

<sup>49</sup> Exhibit 20512-X0100, ATCO SWEC QRA Report, Nov 3, PDF pages 38-39.

<sup>50</sup> Exhibit 20512-X0100, ATCO SWEC QRA Report, Nov 3, PDF pages 40-41.

80. A significant factor in Dynamic's analysis of rupture frequency from third-party damage was its proposed location in the TUC where there are restrictions to any activities involving ground disturbance, making ground disturbance unlikely. Accordingly, Dynamic assumed that the excavation frequency within the transportation utility corridor approximates that of a remote location. Dynamic also took into account several other factors such as:

- having signs at all crossings and intermittently along the route
- the use of a right-of-way agreement
- the damage resistance characteristics of the pipe
- the use of semi-annual patrols
- the use a depth of cover of 1.5 metres
- the level of adjacent activity
- the history of vandalism and incidents due to third-party damage
- the planning of initial and subsequent in-line inspections using a caliper tool to identify possible locations of third-party damage

81. Dynamic explained that individual or location risk is the product of the probability of pipeline failure over the course of a year and the associated probability of a fatality. Because the impact severity of accidents usually decreases with distance from the risk source, Dynamic noted that the individual risk of fatality will decrease with distance. It stated that the variation of individual risk around a facility is usually presented on a map in terms of constant risk lines or contours. Having regard to its conclusions regarding failure frequencies, Dynamic calculated the maximum individual risk for the 766-metre segment of the SWEC pipeline adjacent to the Foundation's land to be approximately  $0.27 \times 10^{-06}$  per year. Dynamic therefore concluded that the individual risk is acceptable for all land uses.<sup>51</sup>

82. In reaching this conclusion, Dynamic used the unmodified MIACC criteria in its evaluation of the individual risk associated with the SWEC pipeline. Mr. Mihell stated that he decided to rely on the unmodified guidelines because the status of the modified criteria's adoption is unclear. He indicated that he was aware of recent risk assessments submitted to regulators that have used both the modified and unmodified criteria. Mr. Mihell acknowledged that the Foundation's proposed Care Centre would be a sensitive institution, as that phrase is defined in the modified MIACC guidelines, and that a risk level of 0.3 in a million would apply to it under those guidelines.

83. Dynamic also addressed the issue of the use of automatic valves versus remote activated valves and the issue of valve spacing in its risk assessment. It was Dynamic's view that automatic valves that sense pressure drop are not common on gas transmission lines and do not contribute to safety in the way they were originally perceived to by regulators in the United States. Mr. Mihell explained this perspective at the hearing:

...yes, you have a decompression wave that moves down the pipeline at the acoustic velocity of the gas inside the pipe, which is very quick.

And in the meantime, you have a hazard -- a public safety hazard, which is very transient, occurs very quickly. And the biggest part of that hazard is over with within -- within --

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<sup>51</sup> Exhibit 20512-X0100, ATCO SWEC QRA Report, Nov 3, PDF pages 43-44.

within a minute. So the valve config (sic)- -- under those circumstances, it's very difficult to mitigate that by means of additional valves.<sup>52</sup>

## 7.2 Dr. Zelt's quantitative risk assessment reports

84. Dr. Zelt filed his initial quantitative risk assessment report as part of the Foundation's evidence on October 13, 2015.<sup>53</sup> Dr. Zelt later updated his report on October 30, 2015, in a response to an information request from the Commission.<sup>54</sup> Dr. Zelt explained at the hearing that his report was intended to be a screening level report and characterized the work he carried out on behalf of the Foundation as follows:

I guess I'm taking the approach where I'm looking to see whether there are any issues and to raise any issues or concerns, as opposed to doing a full and complete detailed risk assessment, as I might do if I was working on behalf of the company.

So I had limited time and perhaps not always complete information to initiate the complete assessment.

So within the time allotted, I tried to identify the major issues that would lead to a hazard and identify the consequence. I guess missing from my report would be the combination of hazard and consequence is often used to identify an emergency planning zone.<sup>55</sup>

85. Dr. Zelt defined location (or individual) risk as the annual chance of fatality at a given receptor location, due to potential events at a nearby risk source. When asked if his definition of risk was consistent with Dynamic's definition, Dr. Zelt agreed that it was.

86. Like Dynamic, Dr. Zelt identified potential failure mechanisms for the proposed SWEC pipeline. He identified the following failure mechanisms: internal corrosion, external corrosion, damage by others, weld, construction damage, over pressure, pipe, joint, earth movement, valve fittings, and other causes which include failures at pipeline installations such as compressor stations, meter stations, and pumps; erosion, vandalism, lightning, flooding, animals, operator error, and situations where the pipe cannot be exposed or examined. Dr. Zelt assessed failure frequencies for each of the failure mechanisms and used the resultant information to perform consequence modelling to estimate the individual or location risks and societal risk associated with the SWEC pipeline. His consequence modelling took into account meteorological conditions and probabilities for fireballs, jet fires and flash fires.

87. Based on his initial assessment, Dr. Zelt concluded that scenario location risk levels for a full rupture of the SWEC pipeline leading to a fireball/jet fire "exceed the [modified MIACC] guidelines for residential high density and sensitive (hospitals, schools, aged care facilities) to a distance of 140 m ( $1 \times 10^{-6}$ ) and 190 m ( $3 \times 10^{-7}$ ), respectively." With respect to societal risk, Dr. Zelt concluded that the SWEC pipeline would fall into the ALARP zone between the upper and lower limits set out in the HSE guidelines.

88. In a response to an information request on how he calculated failure frequencies in his initial report, Dr. Zelt stated that he used pipeline data from the Alberta Energy Regulator (AER)

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<sup>52</sup> Transcript, Volume 1, page 260.

<sup>53</sup> Exhibit 20512-X0092, Report of Zelt PSI.

<sup>54</sup> Exhibit 20512-X0096, Chinatown Multi-Level Care Foundation Information Responses to AUC Information Requests.

<sup>55</sup> Transcript, Volume 1, page 186.

that had been filtered to reflect only pipelines that carry sweet natural gas with diameters between NPS<sup>56</sup> 8 and NPS 16 (219.1-millimetres and 406.4-millimetres).<sup>57</sup>

89. In his updated assessment filed with the Commission on October 30, 2015, Dr. Zelt adjusted the leak and rupture frequencies by applying a 50 per cent reduction in failure for both internal and external corrosion. He also made adjustments to his consequence modelling by adding meteorological cases.

90. As a result of his updated assessment, Dr. Zelt revised his initial assessment regarding location or individual risk and societal risk and re-estimated that scenario location risk levels for a full rupture of the SWEC pipeline leading to a fireball/jet fire would not exceed the modified MIACC guidelines for residential high density ( $1 \times 10^{-6}$ ) but would exceed the modified MIACC guidelines for sensitive institutions ( $3 \times 10^{-7}$ ) for a development that is located closer than 60 metres from the pipeline.

91. Dr. Zelt also amended his assessment on societal risk and estimated that the societal risk for pipelines between 219.1-millimetres and 406.4-millimetres in diameter would be less than the HSE lower limit for a density of 30 persons per hectare. When questioned at the hearing, Dr. Zelt stated that the line could be extrapolated for a density of 100 persons per hectare. In other words, this would move the line from under the HSE Lower Limit to a point close to, or slightly above, the HSE Lower Limit in the ALARP zone.

92. When asked about the consequences of an estimation of societal risk in the ALARP zone, Dr. Zelt responded as follows:

So if you're above that, that red upper limit, serious concern, there would be reason for not going. In between it would be under -- fully understanding the risks and moving forward.<sup>58</sup>

93. One of the measures considered by Dr. Zelt to reduce the risk associated with the SWEC pipeline was the installation of fast operating automatic shut-off valves. He also recommended that ATCO conduct valve sensitivity analysis showing the effects of valve spacing. When questioned on what he envisioned in terms of sensitivity analysis, Dr. Zelt explained that the initial release will occur whether or not a valve is in place, but noted that valves can control the amount of the gas actually released. He went on to state:

...if you're looking at the fireball/jet fire sequence and your ability to respond or the thermal effects, typically when you're doing a risk assessment, your thermal effects, you only include the first 40 seconds, and after that -- you either killed the person or he's escaped.

So from a valve timing point of view that pressure wave, that sonic wave, that first 40 seconds is going to be difficult to mediate with respect to valves. So, again, you're looking at setback distance, am I protective -- or the CSA standards or the population densities within there [sic] protective of that, as opposed to valve timings. So it's a can of worms.<sup>59</sup>

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<sup>56</sup> Nominal Pipe Size refers to pipe sizes using Imperial units.

<sup>57</sup> Exhibit 20512-X0096, CMLCF-AUC-2015Oct23-003(a), PDF pages 5 and 6.

<sup>58</sup> Transcript, Volume 1, page 293.

<sup>59</sup> Transcript, Volume 1, page 259.

### 7.3 ATCO's response to the Zelt quantitative risk assessment

94. ATCO stated the historical data used by Dr. Zelt in his report, his analysis of that data and his conclusions were not representative of the SWEC pipeline. ATCO submitted that the AER data Dr. Zelt relied upon generally reflected gathering pipeline infrastructure, as opposed to transmission pipeline infrastructure and was unsuitable for estimating failure frequency for sweet, dry, natural gas transmission pipelines. ATCO asserted that the gathering infrastructure represented by the AER data was subject to the following conditions, which create an environment that is responsible for the internal corrosion that causes 53 per cent of all natural gas pipeline failures:

- aggressive product stream compositions containing untreated product (including water, sediment, wax, CO<sub>2</sub>, etc.)
- intermittent flow conditions
- highly-networked configurations that do not lend themselves to internal inspection

95. ATCO observed that the AER data used by Dr. Zelt did not account for the age of the pipelines and that Dr. Zelt made no adjustments to account for the fact that the SWEC pipeline would incorporate modern construction practices and materials, would be continuously monitored, and would be subject to an In-Line Inspection (ILI) program run on a regular basis.

96. ATCO emphasized that the location of the SWEC pipeline in the TUC is unique because it is a controlled environment where development of any sort is strictly regulated by Alberta Infrastructure. ATCO stated that this factor was also not reflected in the historical data used by Dr. Zelt, and observed that third-party damage had the highest failure rate in his rupture frequency analysis by an order of magnitude.

97. ATCO also emphasized that the proposed SWEC pipeline would incorporate a number of measures to mitigate or reduce risk in its design that were not accounted for by Dr. Zelt in his report, such as:

- the non-destructive inspection of pipeline welds
- the use of high quality steel and coatings
- the pipeline would be ILI inspectable
- routine ILI inspections
- the use of remote-operated isolation valves
- the location of the pipeline within the TUC
- the pipeline would be designed to meet CSA Z662 design requirements

### 7.4 Commission findings with respect to risk assessment

98. The Commission finds, for the reasons that follow, that the risk associated with operating the SWEC pipeline at its proposed location within the Edmonton TUC is acceptable, and concludes that the pipeline can be operated safely in that location given the pipeline's design as a Class 4 pipeline under CSA Z662 and ATCO's comprehensive integrity management program and emergency response protocols.

99. The Commission found the evidence filed by Dynamic and Dr. Zelt to be very helpful in assessing the risk levels associated with the proposed SWEC pipeline. The utility of that information was further enhanced by having Dr. Zelt and Mr. Mihell sit together as a panel when

answering questions from Commission counsel and the Commission. This allowed the Commission to better understand each expert's perspective and to appreciate that their evidence was not as conflicting as it first appeared.

100. In response to a question from Commission counsel, Dr. Zelt made the following observation about the two risk assessments: “[i]f you take my answer as a high value or overly conservative and if you take this answer [Dynamic’s] as another extreme, we’ve -- we’ve perhaps bracketed the possible solution.”<sup>60</sup> The Commission agrees with his characterization.

101. The Commission finds that Dr. Zelt’s screening level assessment was helpful in identifying the potential hazards posed by the proposed pipeline and provided a good starting point for assessing the associated risk to adjacent property holders. The Commission recognizes that there were some limitations associated with the AER data used by Dr. Zelt. One important limitation identified at the hearing was that two-thirds of the pipelines included in the dataset were NPS 8 pipelines and less than five per cent of the pipelines in the filtered data were for NPS 14 or NPS 16 pipelines. By way of contrast, the proposed pipeline is considerably larger at NPS 20.

102. A second limitation associated with the AER data used by Dr. Zelt was that the product carried by the lines in the filtered dataset was likely to be “dirtier”, i.e. wetter and more corrosive than the sweet, dry, natural gas that would be carried by the SWEC pipeline. In the Commission’s view, the effect of Dr. Zelt’s use of this particular dataset was to introduce additional conservatism into his assessment which had the effect of overstating the potential risk.

103. In addition, Dr. Zelt’s conclusions did not take into account ATCO’s integrity management program, which he said would also reduce failure frequency.<sup>61</sup> This, in turn, added a further degree of conservatism to Dr. Zelt’s analysis. Finally, additional conservatism was added by not taking into account the proposed location of the SWEC pipeline in the TUC, a controlled area where the potential for third-party damage is expected to be substantially reduced as compared to locations outside the TUC where such controls do not exist.

104. Despite this additional conservatism, Dr. Zelt concluded, in his updated assessment, that the proposed pipeline would not exceed the MIACC guidelines for residential high density, although it would exceed the modified MIACC guidelines for sensitive institutions closer than 60 metres from the pipeline. Dr. Zelt further concluded that, in terms of societal risk for population densities of 100 persons per hectare, the SWEC pipeline would be marginally in the ALARP zone based on his modified analysis, but close to the HSE’s lower limit of societal risk.

105. As explained by both Dr. Zelt and Mr. Mihell, when the societal risk associated with projects falls within the HSE’s upper and lower limits (the ALARP zone) the recommended approach is to take steps to fully understand the risks and/or failure frequencies and then move forward.

106. The Commission finds that the risk assessments filed provide a reasonable and effective understanding of the risks associated with the proposed pipeline. The assessments, in conjunction with the information contained in ATCO’s application, also accurately set out the steps ATCO intends to take to reduce those risks.

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<sup>60</sup> Transcript, Volume 1, page 275.

<sup>61</sup> Transcript, Volume 1, page 286.



107. In the Commission's view, one of the most important measures taken by ATCO was to design the SWEC pipeline to a Class 4 standard under CSA Z662. The Commission observes that this exceeds the CSA Z662 standard for sensitive institutions which has a specified design criteria of a Class 3 standard. ATCO took a number of other steps to mitigate risks associated with the proposed pipeline, including:

- The proposed SWEC pipeline will be constructed primarily within the TUC which has limited third-party access which will in turn reduce the potential for third-party disturbances and pipeline strikes.
- 100 per cent of all pipeline welds will be non-destructively inspected using radiography to ensure weld integrity.
- The pipeline will be made of high-quality steel, consistent with modern pipe manufacturing processes.
- ATCO will use a high-quality coating, such as fusion bond epoxy.
- The standard depth of cover for the pipeline will be 1.5 metres to the top of pipeline, which exceeds the general requirements in Alberta of 0.8 metres for general depth of cover and 1.4 under highways.
- The pipeline will be hydro-tested prior to operation by filling it with water and increasing the pressure to 1.4 times the maximum operating pressure of the pipeline.
- The pipeline will be fully inspectable by in-line inspection methods and a comprehensive base-line inspection will be conducted prior to the pipeline being operated.
- The pipeline will be subject to comprehensive, in-line inspections at appropriate time intervals.
- The isolation valves on the pipeline will have remote control capabilities.
- Once operating, the pipeline will be continuously monitored by ATCO at its central operations control room.
- ATCO will conduct flame ionization surveys on the SWEC pipeline twice a year to detect potential leaks.

108. Having regard to the foregoing, the Commission is satisfied that the risks associated with the SWEC pipeline are acceptable and finds that the pipeline can be operated safely and effectively on the route proposed in ATCO's applications. The Commission continues to be of the view that the Edmonton TUC provides a unique opportunity to replace aging pipeline infrastructure with modern, fully-inspectable pipelines and move them into a utility corridor specifically acquired to accommodate such infrastructure.

109. The Commission considers it unfortunate that the Foundation failed to appreciate that the lands it purchased for its Care Centre were directly adjacent to the pipeline component of the Edmonton TUC. The TUC is marked and information regarding the location of present and

future infrastructure, including the location of the pipeline component within the TUC, is readily available from Alberta Transportation.

## **8 Other matters**

### **8.1 Conditions requested by the Foundation**

110. The Foundation proposed a number of conditions that it recommended the Commission apply, should it decide to approve the SWEC project.

111. The Foundation requested that ATCO provide it and the Commission with other potential routing alignments that would minimize the impacts on the Foundation lands by increasing the distance from these lands to the proposed SWEC pipeline.

112. As stated above, the Commission is satisfied that the risk associated with the SWEC pipeline at its proposed location is acceptable and that the pipeline can be operated safely given its design and ATCO's comprehensive integrity management and emergency response protocols. Based on this finding, the Commission does not consider it necessary to require ATCO to consider alternate routing requirements.

113. Further, the Commission finds that ATCO took reasonable steps in its consultation with Alberta Infrastructure in determining the location of the pipeline within the pipeline component. In the Commission's view, Alberta Infrastructure's decision to require pipeline development from the outside-in is reasonable in the circumstances. The Commission accepts that, by developing the pipeline component of the TUC in this manner, the potential for third-party damage to the SWEC pipeline from future facility construction will be limited to the highest extent possible. The Commission also considers that such an approach is consistent with the long-term planning principles that Alberta Infrastructure and its predecessors have applied within the TUC because it will allow for the maximum, safe development of the pipeline component in the utility corridor.

114. The Foundation requested that ATCO consider the need for barriers, blast walls, or other such design features to increase resident and community safety in the event of a leak, explosion, fire, or other event associated with the SWEC pipeline.

115. The Commission is satisfied that the proposed design of the SWEC pipeline, which is consistent with the requirements of CSA Z662 for a Class 4 pipeline, incorporates the necessary design features to protect area residents. It is also satisfied that those integral safety features will be enhanced by ATCO's integrity management program and the location of the pipeline within the TUC.

116. The Foundation requested ATCO to consider incorporating automated isolation valves into the design of the SWEC pipeline at locations in close proximity on either side of its property.

117. The Commission finds that the evidence in the proceeding does not support the Foundation's request for the use of the automatic isolation valves or the requested spacing. In this regard, the evidence of both Dr. Zelt and Mr. Mihell is that the dominant hazard associated with the proposed pipeline, a transient fireball/trench/jet fire, is difficult to mitigate through valve configuration or spacing.

118. The Foundation expressed the need for clear and visible safety signage for the SWEC pipeline; barrier fencing for the SWEC project, including the pipeline and other facilities and infrastructure associated with the project; frequent visits and inspections of the project by ATCO staff, and security cameras, surveillance, and leak detection sensors.

119. Part 6 the *Pipeline Rules* sets out the requirements for pipeline warning signs. The Commission is confident that ATCO will meet these requirements. Regarding inspections and monitoring, the Commission is satisfied that the ATCO inspection program, which includes two flame ionization surveys per year and 24 hour monitoring from the ATCO control centre, will provide appropriate and effective monitoring of the SWEC pipeline. Those measures, in concert with ATCO's comprehensive in-line inspection program will allow ATCO to operate the SWEC pipeline in a safe and responsible manner.

120. The Foundation expressed the need for ongoing engagement and communication from ATCO regarding its safety protocols, hazard protocols, emergency response planning, and emergency exercises.

121. ATCO expressed its willingness to work with the Foundation and other adjacent landowners on matters related to emergency response and expressed its willingness to conduct an emergency response exercise with the Foundation once the Care Centre is in operation. Such an exercise would be beneficial to both ATCO and the Foundation so that each may better understand the other's requirements from an emergency response perspective. Accordingly, the Commission will make it a condition of its approval of the SWEC pipeline that ATCO conduct a table-top emergency response exercise with the Foundation within 12 months of the SWEC pipeline becoming operational. In accordance with this condition, ATCO will be required to advise the Commission in writing when it has satisfied this condition.

122. The Foundation requested that ATCO provide a detailed safety, risk and emergency response plan with sufficient safety measures acceptable to the Foundation. The Foundation felt that the emergency response plan should include a direct ATCO contact and contact information for its personnel or response team.

123. The Commission agrees that ATCO should provide the Foundation with a direct contact who can address the Foundation's questions with respect to emergency response. Further, the Commission expects that ATCO will meet with the Foundation, and any other stakeholder with concerns regarding emergency management and response, to explain its emergency response protocols. The Commission is not prepared, however, to direct ATCO to provide the Foundation with a copy of its emergency response plan because that plan may contain confidential information that, if revealed, could have adverse implications for the security of the SWEC pipeline.

## **8.2 Mr. Pederson's concerns regarding trees along the proposed pipeline route**

124. Mr. Arvid Pederson filed a statement of intent to participate with the Commission in which he expressed concern that the proposed project could result in the destruction of a treed area in the TUC where he and other nearby residents like to walk. Mr. Pederson attended the hearing and explained his concerns to the Commission. As part of his presentation, Mr. Pederson provided a number of photographs of the treed area in question and proposed that the destruction of the trees could be avoided altogether by extending the directional drill under 87th Avenue.

125. The Commission understands that ATCO met with Mr. Pederson prior to the hearing to discuss his concerns. Following that meeting, ATCO proposed to revise its working space in the area to minimize impacts to the trees. ATCO also committed to working with the contractor during construction to attempt to minimize the impact to the trees still affected under the revised plans by narrowing the working space, if and where practical.<sup>62</sup>

126. ATCO estimated that Mr. Pederson's suggestion to extend the directional drill under 87th Avenue to avoid the treed area would add approximately \$450,000 to the project's cost and submitted that such an expense would not be prudent.

127. The Commission finds that ATCO has taken reasonable steps to mitigate the impacts to the treed area that is of concern to Mr. Pederson. The Commission is not satisfied that an additional cost of \$450,000 is justified in the circumstances and finds that requiring ATCO to extend its directional drill to avoid the trees is not in the public interest. ATCO is encouraged to continue to work with Mr. Pederson and other interested stakeholders to reasonably mitigate the impact to the treed area.

## 9 Decision

128. Having regard to the foregoing, the Commission finds that approval of ATCO's two applications for the SWEC pipeline is in the public interest and should be approved subject to two conditions set out in the order below. The Commission finds that the risk associated with the SWEC pipeline is acceptable and is satisfied that the pipeline can be operated safely. In coming to this conclusion, the Commission had regard for the following factors: the pipeline will be constructed almost exclusively in the TUC, it will meet or exceed the specification for Class 4 pipeline under CSA Z662, it will be subject to comprehensive in-line testing, and will be monitored constantly from ATCO's 24-hour control centre.

129. The Commission cannot issue a licence for the construction and operation of the SWEC project within the Edmonton TUC corridor without the prior written consent of the Minister of Infrastructure. Accordingly, ATCO must advise the Commission in writing once it has obtained that consent. Once it has been so advised, the Commission will issue the necessary licences for the SWEC pipeline.

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<sup>62</sup> Exhibit 20512-X0066, paragraphs 3-6.

**10 Order**

130. Pursuant to Section 11 of the *Pipeline Act* and Section 4.1 of the *Gas Utilities Act*, the Commission approves the amendments to Licence 3861 and Licence 13452 subject to the conditions listed below. It is hereby ordered that:

- (1) ATCO shall conduct a table-top emergency response exercise with the Foundation within 12 months of the SWEC pipeline becoming operational. ATCO shall advise the Commission in writing when it has satisfied this condition.
- (2) ATCO shall obtain written consent from the Minister of Infrastructure for the construction and operation of the SWEC project within the Edmonton TUC and provide the Commission with written confirmation of that consent. Upon receipt of that consent, the Commission will issue the necessary licences.

Dated on January 14, 2016.

**Alberta Utilities Commission**

*(original signed by)*

Anne Michaud  
Panel Chair

*(original signed by)*

Patrick Brennan  
Acting Commission Member

*(original signed by)*

Clifford Goerz  
Acting Commission Member



**Appendix A – Proceeding participants**

<b>Name of organization (abbreviation) counsel or representative</b>
ATCO Gas and Pipelines Ltd. (South) L. Radke P. Bain  Counsel Bennett Jones LLP S. Munro B. Williams
A. Pederson
A. and M. Adolph
Consumers' Coalition of Alberta J. Wachowich J. Jodoin
Chinatown Multi-Level Care Foundation B. Leung P. Chung  Counsel Ackroyd LLP R. Secord Y. Cheng
S. J. Laba

Alberta Utilities Commission  Commission Panel A. Michaud, Panel Chair P. Brennan, Acting Commission Member C. Goerz, Acting Commission Member  Commission Staff JP Mousseau (Commission Counsel) L. Mosher T. Davison
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**Appendix B – Oral hearing – registered appearances**

Name of organization (abbreviation) counsel or representative	Witnesses
ATCO Gas and Pipelines Ltd. (South) S. Munro (Bennett Jones LLP) B. Williams (Bennett Jones LLP)	P. Bain L. Radke J. Mihell
Chinatown Multi-Level Care Foundation Y. Cheng (Ackroyd LLP)	B. Leung P. Chung Dr. B. Zelt
A. Pederson	A. Pederson

<p>Alberta Utilities Commission</p> <p>Commission Panel</p> <ul style="list-style-type: none"> <li>A. Michaud, Panel Chair</li> <li>P. Brennan, Acting Commission Member</li> <li>C. Goerz, Acting Commission Member</li> </ul> <p>Commission Staff</p> <ul style="list-style-type: none"> <li>JP Mousseau (Commission Counsel)</li> <li>L. Mosher</li> <li>T. Davison</li> <li>B. Yanchula</li> </ul>
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### Appendix C – Proposed route for the Southwest Connector Pipeline

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