

October 28, 2011



### Verification of In-Line Inspection Results

On Aug. 12, 2011 a 114.3 millimetre outside diameter (NPS 4) pipeline transporting sour natural gas containing 17 per cent hydrogen sulphide (H<sub>2</sub>S) failed due to internal corrosion. The failure released a small quantity of sour natural gas as well as approximately 450 litres of a corrosion inhibitor identified as Cortron. The pipeline is situated in a remote area and there were no complaints of odours associated with the failure. The released products have since been recovered and remediation is ongoing.

The pipeline that failed had been inactive since May 2007 and had been deactivated in accordance with the requirements of CSA Z662 Oil and Gas Pipeline Systems (CSA Z662) at that time. The permit holder recently undertook a program for reactivation including the use of a magnetic flux in-line inspection tool.

The tool, run in July 2011, identified 4,356 metal loss features. The dimensional data from these features was analyzed using the modified ASME B31G method. The results of the analysis indicated that the pipeline could safely be returned to service.

Based solely on the in-line inspection results, the pipeline was returned to service (reactivated). Three verification digs for corrosion and one dig to assess a dent were scheduled for after Nov. 1, 2011 if the pipeline was still in operation.

The BC Oil and Gas Commission (Commission) notes that no pressure test or confirmatory excavations were undertaken prior to the determination by the permit holder to return the pipeline to service.

#### Analysis

Pipeline permit holders in British Columbia are required to operate their pipelines in accordance with an integrity management program that meets the requirements of Annex N of CSA Z662, as amended from time to time. The current and previous editions of CSA Z662 require pipeline permit holders to assess all indications of imperfections obtained through indirect measurement methods such as in-line pipeline inspection tools unless they have undertaken an engineering assessment to determine that certain imperfections are not likely to be associated with defects requiring repair. These requirements are reproduced below for convenience:

##### *N.13.2 Evaluation of indications of imperfections*

###### *N.13.2.1*

*Except as allowed by Clause N.13.2.2, pipeline systems with indications of imperfections shall be subject to detailed visual inspection, mechanical measurement, nondestructive inspection, as appropriate, for the type of pipeline system and evaluation as specified in Clause 10.10.*

###### *N.13.2.2*

*An engineering assessment in accordance with Clause 3.3 may be performed to establish that indications of imperfections are not associated with defects and shall take the following additional items into consideration:*

- (a) knowledge and experience of the performance capabilities and limitations of the inspection method;*
- (b) the types of imperfection that might correspond to the reported indications;*
- (c) the accuracy of reported dimensions and characteristics needed for evaluating such imperfections;*
- (d) the likelihood of unreported defects (e.g., cracking) being associated with an imperfection indication;*
- (e) the piping design and material properties; and*
- (f) service conditions.*

*Notes:*

- (1) The principles described in Clauses D.6 to D.10 for assessing indications of corrosion imperfections detected by in-line inspection should be considered for evaluating other types of imperfection indications detected by in-line inspection.*
- (2) DNV-RP-F101 describes evaluation methods that include uncertainties in the values of reported depth and length measurements for corroded pipe.*

In this case, the pipeline permit holder based their engineering assessment on data obtained from an in-line pipeline inspection tool but made no efforts to verify the accuracy of that data prior to reactivation. The Commission notes that confirmatory digs were planned for November.

The Commission reminds all permit holders of the mandatory requirements of the Pipeline and Liquefied Natural Gas Facility Regulations and CSA Z662. Subsequent investigation by the permit holder has found significant inaccuracies in the reported data. This failure could have been prevented had confirmatory or “calibration” digs been conducted in advance of reactivation.

**If you have any questions regarding this Safety Advisory, please contact:**

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