

National Energy
Board



Office national
de l'énergie

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To: All Companies under National Energy Board Jurisdiction

**National Energy Board (Board) Safety Advisory
NEB SA 2009-01**

As a result of an incident that occurred on a Midwestern United States pipeline undergoing maintenance in November of 2007, and in order to minimize the risk of a similar incident occurring in Canada, the Board has issued the following safety advisory regarding the hazards associated with installation of weldable compression couplings.

In the event that these couplings are used by your company, the Board directs your attention to the attached safety advisory and expects that this advisory will be given wide circulation to company personnel and contractors involved in pipeline maintenance and operation on your pipeline. If any of the factors contributing to the incident change such that the preventive actions require updating, the Board will amend and reissue this safety advisory accordingly.

If you have any questions regarding this advisory please call either Mr. Patrick Smyth (403-221-3014) or Mr. Ken Fortin (403-299-3195) of the Board's Operations Business Unit.

Yours truly,

A handwritten signature in black ink, appearing to read "Claudine Dutil-Berry".

Claudine Dutil-Berry
Secretary of the Board

Attachments

cc: Canadian Energy Pipeline Association, Facsimile 403-221-8760
Canadian Association of Petroleum Producers, Facsimile 403-266-3123
Occupational Health and Safety Agencies and Other Interested Parties
(List Attached)



Fatalities During Installation of Compression Couplings

Purpose of the Safety Advisory

As a result of an incident that occurred on a Midwestern United States pipeline undergoing maintenance in November of 2007, and in order to minimize the risk of a similar incident occurring in Canada, the National Energy Board (Board) has issued this safety advisory regarding the hazards associated with installation of weldable compression couplings.

In the event that weldable compression couplings are used by your company, the Board directs your attention to this safety advisory and expects that this advisory will be given wide circulation to company personnel and contractors involved in pipeline maintenance and operations on your pipeline. If any of the factors contributing to the incident change such that the preventive actions require updating, the Board will amend and reissue this safety advisory accordingly.

Incident Description

On 28 November 2007 two workers were fatally injured in a fire that occurred on a 34-inch diameter pipeline in the Midwestern United States. At the time of the incident, the pipeline company was conducting repair work, which included the excavation and replacement of a section of pipeline and installation of two compression couplings.

The compression couplings used in the repair are of a type that use radial bolts (clamp screws) to attach the coupling to the surface of the pipeline. Once attached, longitudinal bolts apply pressure to a steel ring and neoprene seal which expands, providing a compressive seal between the coupling and exterior surface of the pipe. The couplings are designed to be fillet welded to the pipe surface after bolting and sealing, making them a permanent welded repair.

The proximity of welding adjacent to the neoprene seals raises the possibility of damaging or melting the seals during welding. Common practice is to restore flow under reduced pressure in the pipeline prior to welding in order to dissipate heat from the welding operation, thereby protecting the neoprene seal. In this instance, the pipeline company was pressuring the pipeline to a predetermined pressure of 2800 kilopascals when the coupling failed at 1950 kilopascals.

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Most of the company employees on site were taking a break during the repressurization of the pipeline and were not necessarily observing the repressurization. During repressurization crude oil started to spray from the end of a coupling and subsequently ignited, causing a fireball that engulfed vehicles and equipment located adjacent to the excavation. Two workers were unable to escape the area and were fatally injured.

Factors Contributing to the Incident

The U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration has identified the following factors which it believes contributed to the incident:

- The company had made modifications to the fittings. Approximately 50% of the clamp screws used to attach the fittings to the pipe surface were removed from the coupling prior to installation;
- The remaining clamp screws on the fittings were not tightened in accordance with the manufacturer's recommendations. The clamp screws were not checked to ensure the correct torque values had been reached;
- The pipeline was not anchored in accordance with company and manufacturer procedures prior to repressurization of the pipeline;
- The targeted flow pressure for the fillet welding exceeded the design pressure of the coupling for the specific joint and materials used for unrestrained pipe;
- Ignition sources were not removed from the immediate area prior to pressurization of the pipeline;
- Workers were not appropriately qualified and did not receive proper training in the installation of the compression couplings installed.

Preventive Actions

Steps in a compression coupling installation program should include, but not be limited to, the following:

- Conducting a task hazard analysis prior to starting the job and when process changes occur.
- Verifying that procedures and protocols are complete, adequate and are followed.
- Obtaining approval from the manufacturer for any modifications to compression couplings and ensuring the modifications are supported by qualified and defensible engineering design and analysis.
- Conducting flexibility and stress analyses whenever pipelines are exposed to ensure proper support of pipelines during excavation.
- Considering anchor conditions of the pipeline when determining allowable stresses and pressures for installation of compression couplings.
- Calculating maximum pressures to be applied to compression couplings prior to welding to meet manufacturer specifications.

- Managing ignition hazards during pressurization of compression couplings and in all situations where the escape of flammable pipeline fluids is possible.
- Identifying and restricting access to hazard zones during pressurization of exposed pipelines.
- Providing training and any required certification to persons installing compression couplings.

Further Information

For further information regarding this advisory please call either Mr. Patrick Smyth (403-221-3014) or Mr. Ken Fortin (403-299-3195) of the National Energy Board's Operations Business Unit.