

National Energy
Board



Office national
de l'énergie

File 3750-A000-8
3 December 2003

To: All Companies under NEB Jurisdiction, Canadian Energy Pipeline Association,
Canadian Association of Petroleum Producers and Provincial Regulators

Dear Sir or Madam:

National Energy Board Safety Advisory

Attached for your information and consideration is a safety advisory regarding several incidents reported to the NEB that were attributed to vibration fatigue failure on piping adjacent to compressor/pump units.

Please circulate this advisory to personnel directly involved with pipeline design and pipeline operation within your organization.

If you have questions or concerns regarding this advisory, please contact Leo Jansen at
(403) 299-2777

Yours truly,

A handwritten signature in black ink, appearing to read 'Mantha'.

Michel L. Mantha
Secretary

Attachment

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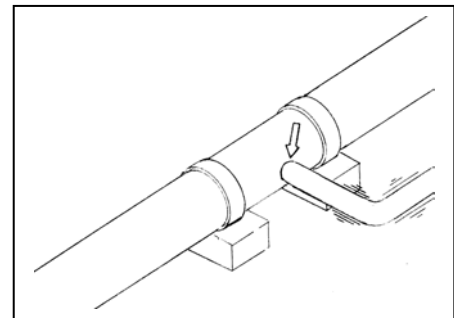
Vibration fatigue failure of piping

Incident Description

Since 1997, sixteen (16) incidents attributed to vibration fatigue failure of piping within compressor stations and pump stations were reported to the National Energy Board. The fractures associated with these incidents typically initiated near welded junctions where small diameter pipe (NPS 2 or smaller) was tied into a larger pipe. The typical location where this occurred is on the discharge piping immediately downstream of a compressor/pump unit. The consequences of these failures include facilities shutdown, worker injuries, loss of product and site contamination.

Cause of the Incidents

Although vibration fatigue has been deemed to be the immediate cause of all these failures, poor design and lack of effective piping support is considered the basic cause of the incidents. Designs included poor support for the smaller pipe components, sizing (length, diameter and thickness) of the piping itself, and lack of consideration for additional stresses on the pipe-to-pipe junction in situations where a valve or regulator was installed at the remote end of the small diameter pipe. This resulted in bending stresses at the junction being increased to the point of failure.



Preventive Actions

Vibration levels imparted to the piping adjacent to compressor/pump units should be monitored and managed. Piping configurations potentially at risk such as the one described above, should be investigated and modified to manage any vibration which may impact the pipe and associated junctions.

Remedial actions may include:

1. Replacement of inadequately sized components.
 - consider replacing existing piping with that of higher schedule.
 - consider modifying the component altogether such as removing a nipple and installing the valve directly at a weld-o-let, thereby shifting the weight of the valve closer to the compressor/pump unit's discharge piping
2. Additional support of piping.
3. Vibration source attenuation.

Companies are advised to refer to CSA Z662-03 Section 4 and ASME section B31-3 for guidance in managing vibration and loading issues for piping systems.