

**FLEXIBLE PIPE SECTION RUPTURES AND
STRIKES WORKER IN LEG**

Type of Incident: Fatality

Date of Incident: March 6, 2012

SECTION 1.0 DATE AND TIME OF INCIDENT

1.1 The incident occurred on March 6, 2012 at approximately 8:05 a.m.

SECTION 2.0 NAME AND ADDRESS OF PRINCIPAL PARTIES

2.1 Owner/Employer

2.1.1 MEG Energy Corp.
 8th Floor
 520-3rd Avenue S.W.
 Calgary, Alberta
 T2P 0R3

2.2 Worker

2.2.1 *****

SECTION 3.0 DESCRIPTIONS OF PRINCIPAL PARTIES

- 3.1 MEG Energy Corp. (MEG) is a Canadian oil sands company focused on the development and production of bitumen recovery through in-situ technology. MEG operates the multi-phased Christina Lake Project located in the southern Athabasca oil sands region of Alberta which uses steam assisted gravity drainage (SAGD) to extract bitumen from oil sands deposits.

SECTION 4.0 LOCATION OF INCIDENT

- 4.1 The incident occurred at Wellpad B ('B Pad') at the MEG Energy Christina Lake Regional Project, Phase II is located approximately 150kms south of Fort McMurray. LSD # 11-16-77-05 W4M.

SECTION 5.0 EQUIPMENT, MATERIAL AND OBSERVATIONS

5.1 Equipment and Material

- 5.1.1 B Pad uses steam assisted gravity drainage technology for extracting bitumen from oil sands deposits. B Pad has six producing horizontal well pairs with each pair comprising a top steam injection well and a bottom bitumen, or 'emulsion,' recovery well.
- 5.1.2 Steam supply for all well pads is provided by heat recovery steam generators (HRSGs) located at the main plant facility east of B Pad. The produced steam is transported by pipeline from the main plant to the pad boundaries by a 24" diameter high pressure pipe line. Each individual pad location is serviced with steam by a 16" diameter high pressure pipe line which comes off the main 24" steam line. At the junction of the two pipe-lines, there are two 24" block valves known as 'boundary valves.' These valves are used to isolate steam supply to B Pad.
- 5.1.3 As steam enters B Pad, there is a condensate drain system which is used to remove condensate from the steam header into a storage tank, known as a 'pop tank'. Removal of condensate during start-up activities is vital in order to prevent water hammer from occurring which can severely damage piping systems.

- 5.1.4 There are three 2” globe valves on the drain line (valves A, B and C) located upstream of the pop tank which are used to control the flow of condensate into the pop tank. At the time of the incident, these valves were enclosed within an insulating box known as an ‘utilidor’.
- 5.1.5 Located at the inlet of the pop tank there is a fourth valve (valve D) that is sealed open in normal operations with a loop of thin braided steel, known as a ‘car seal.’ The reason this valve is sealed open is to prevent over pressurization to the condensate drain system.
- 5.1.6 In between the globe valves (A,B,C) and the pop tank inlet valve (D) there is a section of ‘flexible hose’ piping. The purpose of the flexible hose section is to account for lateral movement of the pop tank.

5.2 Observations

- 5.2.1 At the time of the initial investigation on March 6, 2012 at approximately 3:34 p.m., Occupational Health and Safety investigators found the scene barricaded with tape and noted that B Pad had been isolated from the main plant steam supply.
- 5.2.2 The Occupational Health and Safety investigators observed that a section of inlet piping had ruptured and was damaged. Several pieces of corrugated cladding sections were found in the vicinity of the pop tank.
- 5.2.3 The Occupational Health and Safety investigators observed that the pop tank inlet valve D was in a closed position. There was no car seal in place on the valve at this time.
- 5.2.4 Weather data was obtained for the Lac La Biche region at the time of the incident. At 8:00 a.m. the ambient temperature was minus 14 degrees Celsius. Upon arrival at incident scene, the ambient temperature was observed to be approximately minus 9 degrees Celsius with light wind and snow fall.

SECTION 6.0 NARRATIVE DESCRIPTION OF THE INCIDENT

- 6.1 On March 6, 2012 at approximately 1:30 a.m. an alarm was tripped in the Vapour Recovery Unit Building (VRU) in the main plant area which resulted in an automated emergency plant shutdown by the distributed control system (DCS). An interstage pump had failed causing a release of hydrocarbons which, in turn, triggered the alarm. The MEG maintenance department proceeded to repair the pump overnight and MEG’s operators then began to restart the plant. Steam flow was re-established to B Pad before the start of dayshift at 6:00 a.m.

- 6.2 During the plant restart, operators identified that a drain line at B Pad was plugged with ice.
- 6.3 Knowledge of the frozen drain line at B Pad was passed to day shift personnel at shift change shortly after 6:00 a.m. At the same time a Jason's Mobile Steam truck employee was informed of the ice plug at B Pad by MEG operations and given direction to work with operations to thaw the line.
- 6.4 At approximately 7:30 a.m. the steam truck operator met the MEG operator at B Pad in order to thaw out the ice plug. Together, they removed some pipe insulation and the steam truck operator applied his steam wand to valve 'C' first. He then applied his steam wand to valve 'B' and finally to valve 'A.' The two workers were aware that valves A, B and C were partially open, as they expected steam to vent out of the pop tank once the ice plug was thawed.
- 6.5 The steam truck operator then began to steam the section of bare pipe immediately upstream and adjacent to valve 'D' and finally the valve itself. At this point, no steam was observed venting out of the pop tank. The MEG operator then directed the steam truck operator to insert his steam wand into the hatch above valve C where it was left steaming. While the thawing process was occurring, the two workers proceeded to the nearby building in order to warm up.
- 6.6 Shortly after 8:00 a.m. high pressure steam began to flow through the drain line and vent out of the top of the pop tank. The MEG operator exited the building and began to close valve D, the pop tank inlet valve.
- 6.7 As the MEG operator was closing valve D, the flexible pipe section located upstream of the valve over pressured and ruptured, striking the MEG Operator.
- 6.8 The steam truck operator observed the MEG operator crawling out of the steam and assisted him towards the nearby trailer. The steam truck operator called 'emergency' over the radio. He noted that the MEG Operator had a laceration to the back of his right leg. The steam truck operator pulled the MEG Operator approximately 25 meters away from the steam.
- 6.9 At approximately 8:10 a.m. two MEG operators responded to B Pad and observed steam venting out of the pop tank at high velocity and the MEG Operator receiving CPR from the steam truck operator. One of the responding operators assisted the steam truck operator with resuscitation efforts. The other operator began to initiate efforts to isolate the flow of steam to B Pad.

- 6.10 At approximately 8:15 a.m. two Emergency Response Technicians arrived at B Pad and took over resuscitation efforts from the steam truck operator.
- 6.11 Shortly thereafter, an ambulance proceeded to transport the MEG Operator from B Pad to Lac La Biche Hospital where he succumbed to his injuries.

SECTION 7.0 ANALYSIS

7.1 Direct Cause

- 7.1.1 The MEG Operator closed the pop tank inlet valve, causing the flex hose to over-pressure and rupture. The ruptured hose struck the worker in the right leg causing fatal injuries.

SECTION 8.0 FOLLOW-UP/ ACTION TAKEN

8.1 Industry

- 8.1.1 MEG Energy demonstrated that controls have been put in place to prevent a recurrence of this incident.
- 8.1.2 MEG Energy conducted an investigation in the circumstances surrounding the incident

8.2 Additional Measures

- 8.2.1 There were no additional measures taken.

SECTION 9.0 SIGNATURES

Original Report Signed
Lead Investigator

Date

Original Report Signed
Manager, Investigations

Date

Original Report Signed
Director, Investigations and Mining Programs

Date

SECTION 10.0 ATTACHMENTS:

Attachment A	Map
Attachment B	N/A
Attachment C	Photographs

Attachment A



Incident Location

The incident occurred at the MEG Energy Christina Lake Regional Project, located approximately 150kms south of Fort McMurray

Attachment B

N/A

Attachment C



A

B

C

Photograph #1

Incident Scene

- A- Valves located inside the utilidor
- B- Storage tank "pop tank"
- C- Nearby building



A

B

Photograph # 2

Incident Scene

- A- Storage tank "pop tank"
- B- Remains of damaged piping



A

B

C

Photograph # 3

View from the steam header

- A- Valves located inside the utilidor
- B- Remains of damaged piping
- C- Storage tank "pop tank"