

Hydrogen Sulphide Fatality

Type of Incident: Fatality

Date of Incident: January 11, 2012

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SECTION 1.0 DATE AND TIME OF INCIDENT

1.1 The incident occurred January 11, 2012 at approximately 8:55 AM

SECTION 2.0 NAMES AND ADDRESS OF PRINCIPAL PARTIES

2.1 Owner / Prime Contractor

2.1.1 Sinopec Daylight Energy Ltd.
2700 112- 4th Ave SW
Calgary, Alberta
T2P 0H3

2.2 Employer

2.2.1 Rezone Well Servicing Ltd.
8071 Edgar Industrial Drive
Red Deer, Alberta
T4P 3R2

2.3 Contractors

2.3.1 Ozoroff Consulting Ltd.
Well Site Supervisor: (***** *)
430 El Carlo Road
Kelowna, BC V1X 2R4

2.3.2 Wespro Production Testing Ltd.
Pressure Tester: (***** *)
6605 46 Ave
Ponoka, AB T4J 1J8

2.4 Supplier

2.4.1 Scott Safety Supply Services Inc.
Box 1983
5012 Caxton Street West
Whitecourt, Alberta T7S 1P7

2.5 Workers

2.5.1 Floor-hand (***** *)
*** ***** **
*** ***** **
*** **

2.5.2 Rig manager (*****)

2.5.3 Driller (*****)

2.5.4 Derrick-hand (*****)

2.5.5 Snubber (*****)

SECTION 3.0 DESCRIPTION OF PRINCIPAL PARTIES

- 3.1 Daylight Energy Ltd. (Sinopec) was an oil and natural gas company, focused on exploiting its land base in the Deep Basin of Alberta and northeast British Columbia. The company had a balanced mix of crude oil, liquids-rich natural gas and resource play natural gas. Sinopec was a wholly owned indirect subsidiary of Sinopec International Petroleum Exploration and Production Corporation.
- 3.2 Rezone Well Servicing Ltd. was an Alberta based company that performed well servicing operations on oil & gas wells to repair and enhance production, or prepare wells for abandonment.
- 3.3 Ozoroff Consulting Ltd. provided well site supervision services to the oil industry.
- 3.4 Wespro Testing provided oil and gas well testing services to Western Canada, since 1986. Wespro had teams available with well testing equipment for: production well testing, frac flow backs, inline testing, and under-balanced drilling on sweet and high-pressure critical sour wells. They had a head office in Ponoka, Alberta.
- 3.5 Scott Safety Supply Services Inc. was an Alberta owned and operated company that provided safety services and equipment to the oil and gas industry. Safety services included fire protection, emergency planning and response, H₂S safety services, and emergency medical services. Equipment included emergency mobile showers, fire extinguisher sales and service, and gas detection. They had offices in Whitecourt,

Calgary, and Fort Nelson.

SECTION 4.0 LOCATION OF INCIDENT

- 4.1 The incident occurred on a lease site at 16-20-59-14 W5M registered to Sinopec Daylight Energy Ltd. The lease was approximately 41 km southwest of Whitecourt. (Attachment A – Map).

SECTION 5.0 EQUIPMENT, MATERIAL AND OBSERVATIONS

5.1 Equipment and Material

- 5.1.1 Sinopec scheduled a natural gas well, located 16-20-59-14 W5M, for suspension. In December 2011 Sinopec prepared a suspension plan for this well. The suspension plan identified that the well contained 11% (110,000 parts per million (ppm)) hydrogen sulphide.
- 5.1.2 Hydrogen Sulphide (*chemical formula - H₂S; CAS #7783-06-4*) is a colourless gas with a strong odour of rotten eggs. H₂S is immediately dangerous to life and health (IDLH) at a concentration equal to or greater than 100 ppm. The Alberta Occupational Exposure Limit (OEL) for an eight hour shift is 10 ppm, with a ceiling limit of 15 ppm.
- 5.1.3 Rezone Well Servicing Ltd Service Rig #6 was manufactured by B.W. Rig a Division of Hyduke Energy Services Inc.
- 5.1.4 Blind Rams are part of the blowout preventer (BOP) that is secured on the well head to control the well before it is being worked on. The blind rams are solid and are used to close off the well when tubing is not present.
- 5.1.5 A Pup Joint is tubing that passes through the BOP and is attached to the tubing inside the well. The pup joint is inserted into the top of the BOP, through the annular preventer and into the well. The blind rams on the BOP needed to be opened so the pup joint could pass through the blind rams.
- 5.1.6 A Tubing Hanger is a device attached to the topmost tubing joint in the wellhead to support the tubing string.
- 5.1.7 Trailer Unit A-17 was a rented trailer from Scott Safety Supply Services Ltd. on the lease site at the time of the incident. It contained eight high pressure breathing air cylinders, two self-contained breathing apparatus (SCBA), six supplied air breathing apparatus (SABA) air hoses and various pieces of emergency equipment. The trailer had a manifold system that was capable of providing breathing air to multiple

workers wearing SABA in potentially toxic or oxygen deficient atmospheres.

5.2 Observations

- 5.2.1 When OHS investigating Officers arrived at the lease site the well was secure and access to the lease site was restricted.
- 5.2.2 The sky was slightly overcast, the daytime temperatures ranged from -5° to -15° Celsius. The lease was covered with a mix of ice, snow and dirt. Ice covered work areas had a grit material spread around for traction when walking.
- 5.2.3 The service rig was observed over top of the well. Also on the lease were a consultant trailer, doghouse, boiler skid, water truck, coiled tubing unit, snubbing unit multiple pick-up trucks, emergency transport vehicle, pressure testing equipment and other process equipment.

SECTION 6.0 NARRATIVE DESCRIPTION OF THE INCIDENT

- 6.1 On January 5, 2012 the Rezone Well Servicing Ltd. service rig #6 was moved on to the lease located at 16-20-59-14 W5M. The intended work was to suspend the well at this location.
- 6.2 On January 6, 2012 Trailer Unit A-17 was delivered to the lease site by Scott Safety. The delivery driver positioned the Scott Air Trailer near the end of the catwalk across from the Well Site Supervisor's trailer. The driver then assisted in obtaining a sample of gas from the wellhead. H₂S was detected in the sample.
- 6.3 Between January 6, 2012 and January 10, 2012 recurring difficulties/problems were encountered while suspending the well. As a result Sinopec hired additional well services: wireline, coiled tubing, and snubbing units were brought to the lease to work on the well at various stages.
- 6.4 At approximately 7:15 a.m. on January 11, 2012 a safety meeting was held in the Rezone Well Servicing Ltd. doghouse at the lease site. The meeting minutes outlined work that would be carried out that day, and identified H₂S as one of the hazards.
- 6.5 At 7:30 a.m. the well pressure was approximately 4000 kPa.
- 6.6 At 8:30 a.m. the well pressure was reduced (flow lines were connected and tubing/casing pressure bled down) to approximately 3 - 4 kPa.
- 6.7 The site supervisor instructed the rig manager and others in the immediate area to insert a pup joint through the power tongs past the BOP and thread it into the tubing hanger in the well.

- 6.8 The driller, derrick-hand, snubber, rig manager, and floor-hand were positioned on the rig floor as the pup joint was prepared to be installed. The driller opened the blind ram on the BOP and the pup joint was lowered into the well.
- 6.9 On the rig floor, the pup joint was being aligned by the floor-hand and snubber. The pup joint went through a seal and there was a smell of something in the air. The floor-hand and snubber tightened the pup joint into the connection by hand. The floor-hand then left the rig floor.
- 6.10 The rig manager exited the rig floor, walked down the stairs past another worker to the end of the catwalk. A short time later, the floor-hand ran down the rig stairs, past another worker, knelt/laid down on the catwalk and then rolled off the side of catwalk onto the ground.
- 6.11 The derrick-hand stepped in and used a wrench to tighten the pup joint into the hanger; his gas monitor started to alarm.
- 6.12 At no time during the task were workers using supplied breathing air systems, despite available SABA/SCBA units on site.
- 6.13 The driller, derrick-hand, and snubber all exited the area. The derrick-hand then ran to the Rezone doghouse and put on a SCBA.
- 6.14 The floor-hand was placed onto a stretcher and removed from the area beside the catwalk. First Aid was provided and he was placed in the emergency vehicle for transport to hospital. Their vehicle was met by EMS while enroute to the hospital.
- 6.15 The floor-hand worker was transported to Whitecourt hospital where he passed away a short time later.
- 6.16 The rig manager and derrick-hand reported effects from the H₂S exposure, were taken to the Whitecourt hospital where they were treated and released the same day.
- 6.17 The driller and snubber who were in the area at the time of the incident reported no effects from the H₂S exposure, were evaluated at Whitecourt hospital and released the same day.

SECTION 7.0 ANALYSIS

7.1 Direct Cause

- 7.1.1 H₂S gas was released from the well when the blind rams on the BOP were opened and the pup joint installed into the tubing hanger.

SECTION 8.0 SIGNATURES

ORIGINAL REPORT SIGNED

Lead Investigator

May 25, 2016

Date

ORIGINAL REPORT SIGNED

Manager

May 26, 2016

Date

ORIGINAL REPORT SIGNED

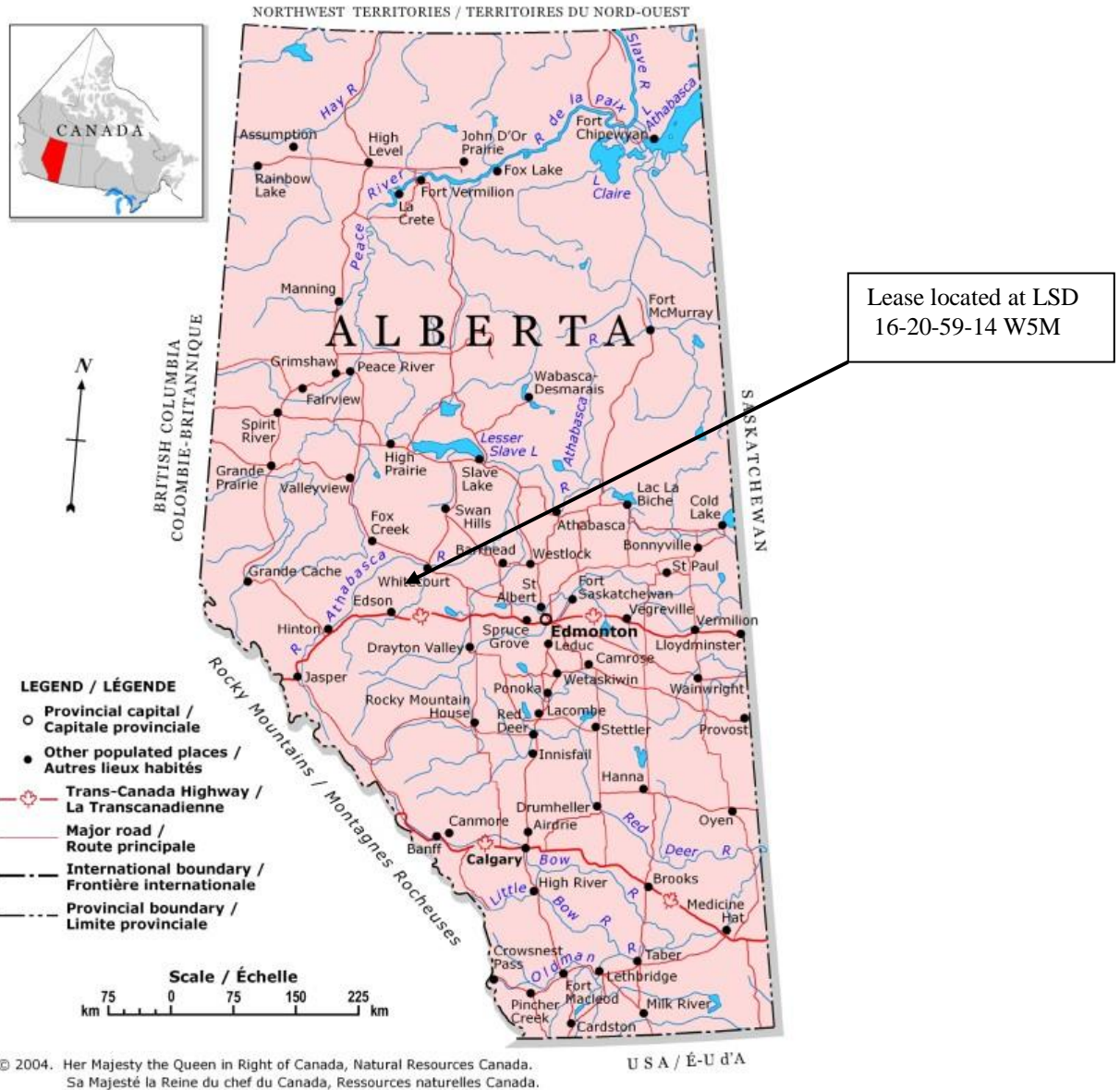
Director of Investigations

May 26, 2016

Date

ATTACHMENTS:

Attachment A	Map
Attachment B	Diagrams or Sketch
Attachment C	Photographs



Arrow indicates the location where the incident occurred, approximately 41 km southwest of Whitecourt. (Source: Natural Resources Canada website)

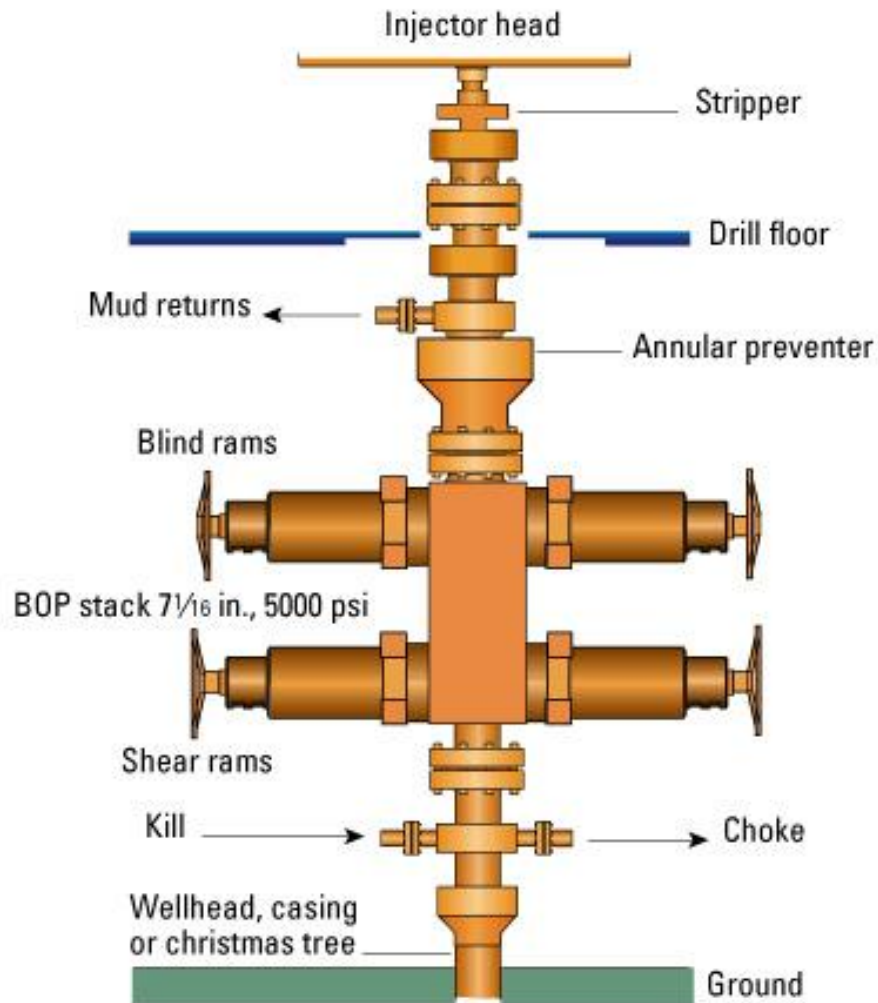


Diagram of a blowout preventer (typical for well size of 4 in. or greater)
Source: Schlumberger website -
<http://www.glossary.oilfield.slb.com/en/Terms/b/bop.aspx>



Photograph #1

Photograph showing the position of equipment at the lease site.



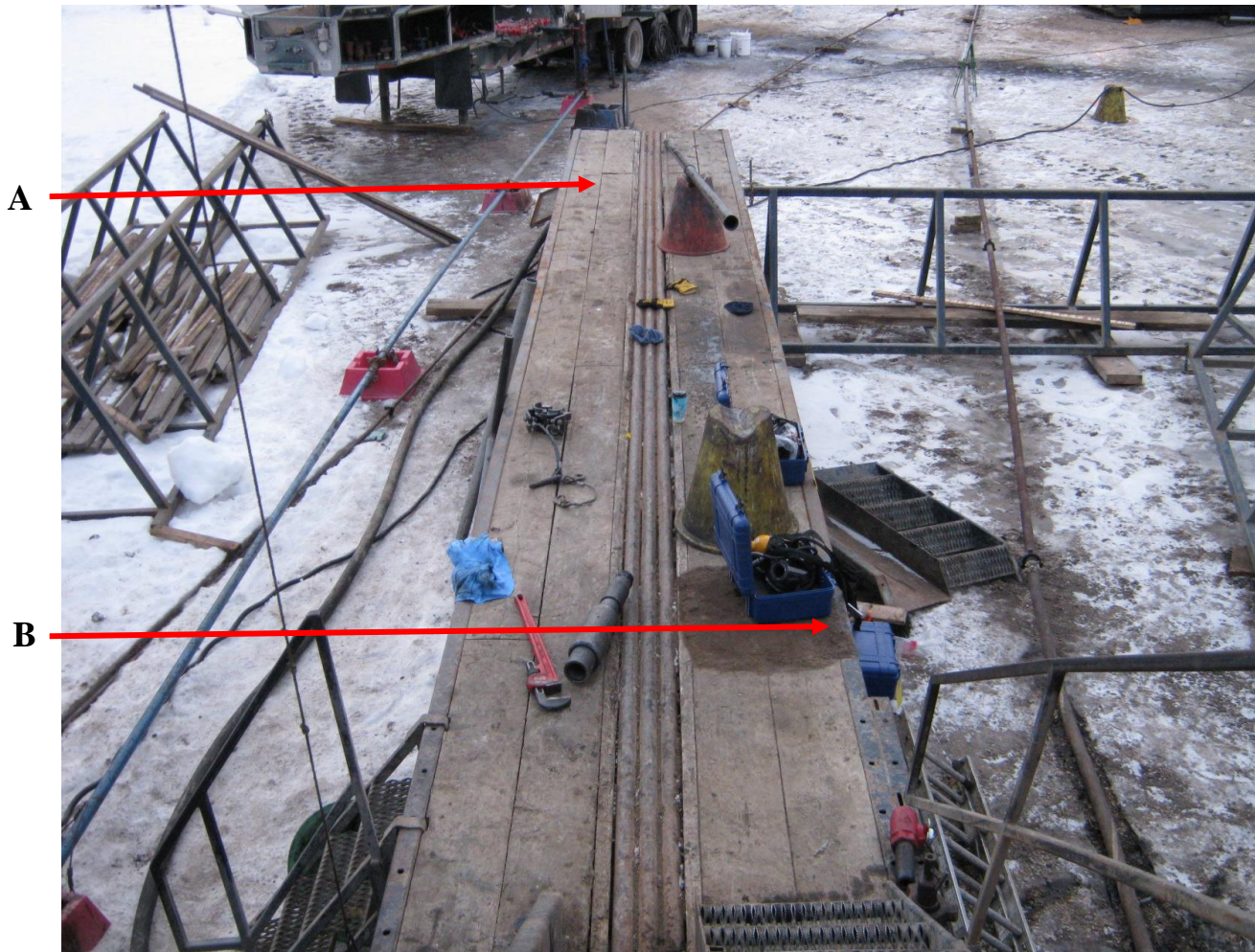
Photograph #2

Photograph shows the rig floor where the workers were connecting the pup joint when the incident happened. The steps and V-door in the picture were used by both the rig manager and the fatally injured worker to exit the work area.



Photograph #3

Rig floor where the workers were working when the incident occurred.
A – pup joint that was being lifted is visible in the center of the rig floor.



Photograph #4

Catwalk where the rig manager and the fatally injured worker were located immediately after the release of gas. The rig manager ran to the far end of the catwalk. The fatally injured worker stumbled, fell and rolled off the left side of the catwalk.

A – approximate location where floor-hand laid down and fell from catwalk

B – SABA kit



Photograph # 5

Supplied Air Breathing unit trailer (A) available at the worksite