

<b>E&amp;B Oilfield Services Inc.</b>	Activity: <b>Pipeline Technition / Pipeline Pigging</b> <b>Stuck Pigs</b>		Doc No:	HAZ-ID
			Initial Issue Date	4/1/2015
			Revision Date:	4/1/2016
<b>HAZARD IDENTIFICATION AND ASSESSMENT</b>			Revision No.	1
			Next Revision Date:	4/1/2017
Preparation: Kayden Kennedy	Authority: Danny Abegglen	Issuing Dept: Safety	Page:	1 of 3

## Purpose

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- **Stuck Pigs**

## Key Responsibilities

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- Stuck pigs often create dangerous situations.
- It is up to you or your supervisor to find out where the pig is and what dangers are involved.
- Every person should know how to find a pig and evaluate what should happen after the pig is found.
- If you don't know how to find a pig get with your E&B supervisor/lead and have he/she show you, every situation is different so there is no exact way to find every pig.

## Hazard and Risk Identification

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Pig that get lodged in the line can create many dangerous situations (including) but not limited to.

- **Trapped psi**, this is when the line is dead on both ends but there is still psi in the line that the pig has trapped that cannot get out.
- **Hydro carbon freeze**, this is when the pig is stuck but not blocking all psi and there is gas moving around the pig. When the gas is restricted its molecules are forced closer together, this makes the gas colder and can freeze liquid in front or behind the pig and create an ice blockage, even if the temperature outside is hot.
- **Blocked psi**, is when the pig has lodged itself in a manner that stopped all gas movement and the psi behind of in front of the pig cannot move, it will just continue to build.
- **Too much differential psi in the line**. This is when the pig has blocked all gas movement in the line and the psi on either side of the pig exceeds the psi rating of the line on one side or other of the pig.

## Risk Assessment

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Hazards are classified and ranked based on severity. The program identifies hazards are classified/prioritized and addressed based on the risk associated with the task. (See the risk analysis matrix outlining severity and probability).

Stuck pigs are common to pipeline maintenance. Each stuck pig presents unique challenges and dangers. Even two pigs stuck in the same place can present different dangers based on the different pressures involved.

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**E&B OILFIELD SERVICES INC. RISK ASSESSMENT MATRIX - NOISE**

CONSEQUENCE					PROBABILITY				
Severity	People	Assets	Environment	Reputation	A	B	C	D	E
					Not Done	Rarely	Once a week	Several Times in a Week	Multiple Times in a Day
0	No health effect	No damage	No effect	No impact					<b>X</b>
1	Slight health effect	Slight damage	Slight effect	Slight impact		<b>X</b>			
2	Minor health effect	Minor damage	Minor effect	Limited impact		<b>X</b>			
3	Major health effect	Localized damage	Localized effect	Considerable impact		<b>X</b>			
4	Single fatality	Major damage	Major effect	National impact	<b>X</b>				
5	Multiple fatalities	Extensive damage	Massive effect	Global impact	<b>X</b>				

<b>Key</b>	Manage for continuous improvement (Low)	Incorporate risk reduction measures (Medium)	Intolerable (High)
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**Risk Controls/Methods to Ensure Identified Hazards Are Addressed and Mitigated**

The following describes how identified hazards are addressed and mitigated:

- Go from location to location and check the line pressure, this will determine wear your pig is based on the line psi.
- Determine if the pig has blocked all gas movement or is letting some psi past it.
- If the pig is stopped all psi then be extra careful when walking by the gas line, know the exact psi on both sides of the pig.
- If the psi on either side of the pig is too high then go to a blow down point in the gas and relieve the presser safely.
- If the pig has created a carbon freeze, you will be able to see ice forming on the outside of the line, this is usually whatever way the gas is flowing, in that situation the best thing is to try and get the pig moving and put methanol in front and behind the pig.
- Any time a pig is stuck and you are blowing the line dead to dislodge the pig. Never trust gauges that the line is dead. The pig could have created trapped pressure, this could give way and seriously injure you.

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### JSA Sample

The following describes how identified hazards are addressed and mitigated:

Basic Job Step	Potential Injury or Hazards	Mitigation / Tools
Pig getting stuck	Trapped/blocked psi.	Always assume the pig has trapped psi, never trust gauges. Never step on line or over line with blocked psi in it.

### Other Info

Case study:

A worker was killed operating on a natural gas pipeline. At a receiver station the man intended to pick up two so called cleaning pigs, each weighing about 303 lbs, diameter 20 inch. For this purpose the gas pressure in the pig trap was let off by a valve, manometer controlled. According to an eyewitness's statement, the receiver pressure was equal to outside air pressure before the accident. The victim stood right in front of the flap of the receiver when he began to unfix the screws of the flap. Whilst working, the flap snapped out driven by the two cleaning pigs. The man and the devices were flung through a wire-netting fence and dropped down on a nearby field at a distance of 88 feet, 95 feet and 124 feet, respectively, from the receiver. The man died on the scene of the accident. The forensic autopsy ordered by the prosecution revealed signs of massive blunt trauma on the head, thorax and abdomen. In the criminological and forensic reconstruction of the accident the external injuries of the victim were found to be consistent with the front surface of the cleaning pig flung out first. It was determined that the second pig had got stuck in the receiver and that gas pressure had built up behind the pigs due to a leaky valve. As a consequence the pigs were expelled at a velocity of approximately 136 miles per hour causing a pattern of injury comparable to that of a fall from a great height.

