

# H<sub>2</sub>S Knock Downs

Safety Alert

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## Enform

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## Description of Incident:

Workers were involved in conducting a 500 litre, 15% hydrochloric acid tubing pickle on a sweet well. The tubing used in this sweet well had previously been used in a sour well. During reverse circulation from the well to an open top rig tank, four workers were on top of the tank to watch the returns. A fifth worker, the derrickhand, was in full chemical personal protective equipment (PPE) including self-contained breathing apparatus (SCBA) preparing to add soda ash into the trough to neutralize the acid returning to the tank.

After pumping approximately four cubic metres of water down the casing, returns came back dark and gassy. As the degasser line was opened, the rig four-head lower explosive limit (LEL) monitor and the workers' personal H<sub>2</sub>S monitors alarmed. All personnel on the tank initiated an evacuation of the area; however, three of the five workers were rendered unconscious after reaching ground level.

A man down alarm was initiated. The derrickhand, already using an SCBA, commenced rescue. The well was shut in and other crew members donned SCBA's for rescue. The three workers regained consciousness on their own. Workers were treated by the onsite medic and transported to a regional medical facility for evaluation and released to full duties the same day.

## What Caused It?

- Scale in the tubing contained iron sulphide (FeS) and reacted with the acid pumped through the tubing (see photo of tubing on page 2). As a result, H<sub>2</sub>S gas was released to the atmosphere when the returns reached the rig tank.
- Three workers on the rig tank were not wearing adequate PPE to protect them from the hazards.

## Contributing Factors:

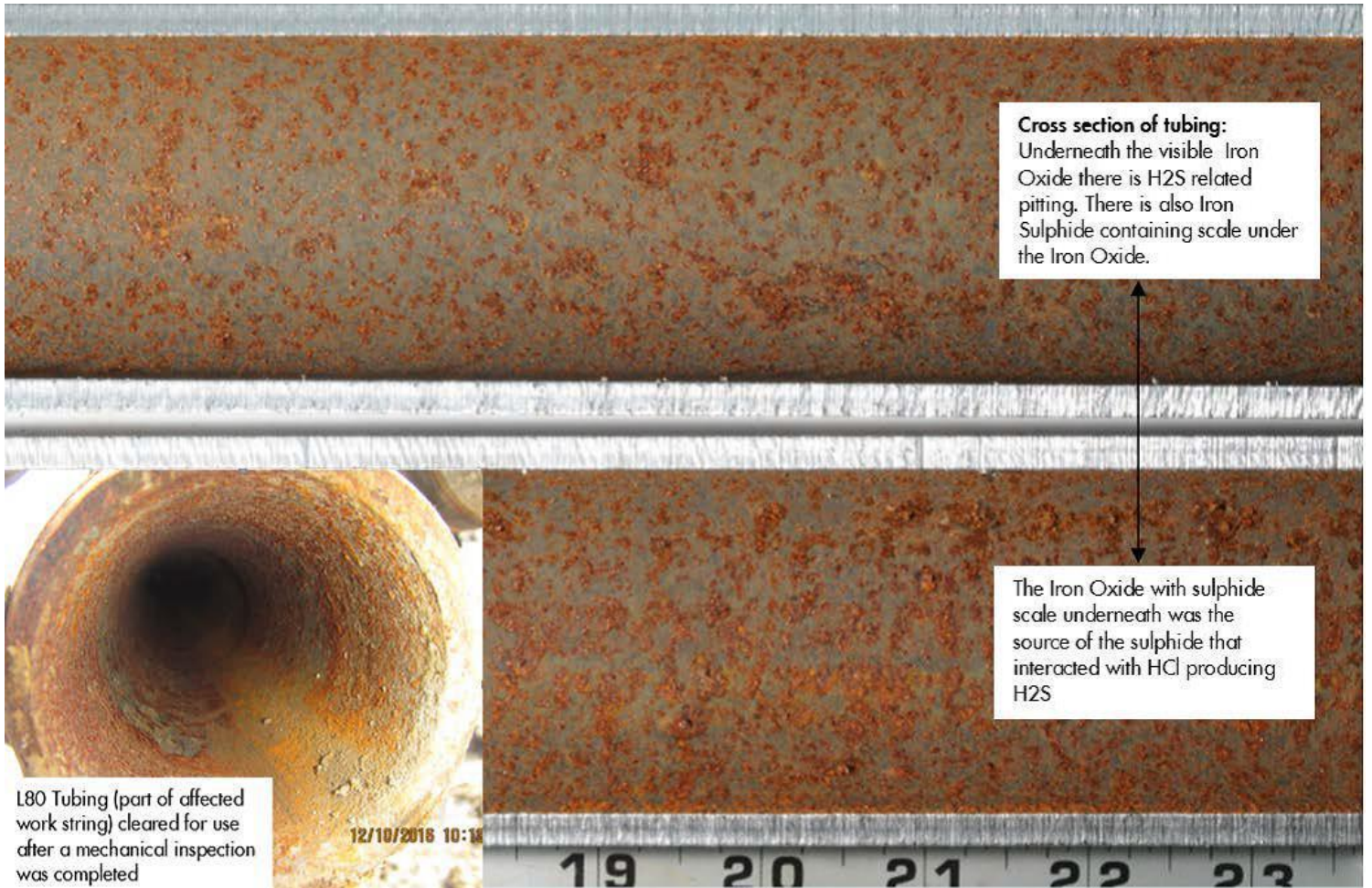
- The potential for H<sub>2</sub>S was not recognized as a hazard as the sour zones in this sweet well were confirmed to be isolated.
- The risk of the acid reacting with iron sulphide and generating H<sub>2</sub>S was not considered.
- The crew was not aware that the tubing was previously used in a sour well.

## Corrective/Preventative Actions:

- Ensure Standard Operating Procedures (SOP) for conducting an acid pickle includes information about the potential for the acid to react in the tubing, creating H<sub>2</sub>S.
- Enquire where the work string of tubing came from to help identify potential hazards.
- Ensure a detailed Exposure Control Plan covers all potential chemical exposures to workers on and around open rig tanks, which specifies the minimum protective equipment required and procedures workers must follow.

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L80 Tubing (part of affected work string) cleared for use after a mechanical inspection was completed

**Photo of tubing and iron oxide and sulphide scale and pitting**

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