

Pump alert system protects key systems

Electrical apprentice Lisa McKenzie uses a laptop to program various PLCs into the control systems of the drilling rig, including the new Pump Alert.

■ By Brian Zinchuk
Pipeline News

Estevan – When you start your car or truck, the first thing that happens when you turn the ignition is the lighting of the instrument panel warning lights. These “idiot lights,” as they’re often called, warn you if something wrong with your vehicle, be it the brakes or oil pressure. It’s a universal technology that has been used for decades in the automotive world.

Yet when it comes to drilling rigs, that basic technology has not been present for monitoring key equipment on the machine – the very heart of the rig’s circulatory mud system – the mud pump.

That’s now changed with the introduction of the Pump Alert, a system designed and installed by Devon, Alta.-based Mustang Controls. Their first implementation of this system has been on Stampede Drilling’s Rigs 1 and 2. Rig 2 was nearing completion in Estevan on Jan. 29, when Pipeline News was able to catch up with Mustang owner Bruce McKenzie.

“We did the driller’s console, accumulator, BOPS, Crown Alert system and the new Pump Alert system,” he said.

“It’s brand new. We’ve got the patent pending and trademark on the gizmo,” he said.

Describing Pump Alert, he said, “It protects the mud pumps. Most rigs have one or two, offshore rigs have up to four.

“It’ll protect the engine, gearbox, pump fluid end and power end. There are temperature, pressure, oil level and flow sensors.

“What they normally have is a gauge – one pump is worth in excess of \$100,000.”

To monitor the health of the system, a rig hand would have to walk up to the equipment and eyeball the gauges. If he wasn’t looking at those gauges, he wouldn’t know if something was wrong. And therein lies the problem with the old system, according to McKenzie.

“The bit technology has increased the ROP (rate of penetration) three times. The same number of rig hands, same machine, is going three times as fast. Quite honestly, they don’t have time to check pump pressure. The wells are 10 times as complex.

“When they have a failure on the rig because they didn’t see that temperature or pressure, it was because they were too busy.

“It’s a driller’s assistant,” he said.

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External monitoring system for drilling rig pumps

◀ *Previous page* The system has sensors that monitor temperature and oil pressure to ensure the pump is getting lubrication, indicated by a pressure transducer that sends a signal to the Pump Alert. Similarly, the liner washer of the pump has a flow sensor. There are also sensors on the massive Caterpillar engine that drives the pump, as well as the Rouse Industries clutch. The engine connections parallel the engine light's operation.

If any of these sensors indicate parameters out of normal operation, a siren and system of lights are activated.

On the outside of the pumphouse, on the roof corner nearest the drill floor, two lights are found in explosion-proof housings. It's a simple concept. The green light indicates all is well. The red light indicates a problem. The lights are set up to be in the driller's line of sight as he looks up from his station towards the drill floor.

"They have to go to the pump to silence the alarm. That's done on purpose. It's easy to forget," McKenzie said.

If a pump piles up due to lack of lubrication, it can be very costly to rebuild – costly enough that one might want to consider simply replacing it. The Pump Alert is meant to catch any failures before they become catastrophic. McKenzie calls it "a highly economical insurance policy."

The system has been field tested. "Every time you start the pump, you test it," he said, noting it has a self-diagnostic function.

As for its origins, McKenzie said, "Bill Devins came to us and asked, 'If you could build some sort of system to watch our pumps, it would be much appreciated.'"

Devins is one of the principals behind Stampede Drilling.

"We're customer-driven, with open ears. It's worked for us." McKenzie said.

McKenzie said 90 per cent of rigs have a similar set-up, and this system can be retrofitted to existing rigs quite easily. As for the "We can't do it until spring," comment, he noted, "I think we can walk up to a mud pump at the start of a cement job and be done in six to eight hours."

That's a downtime for mud pumps, as they are not used during cementing operations. The system takes two people to install.

The company's Crown Alert system had a similar development path. Previous designs, he noted, "didn't work."

"It's rig crews who say 'Can you do something for us?'" McKenzie said.

The system itself is PLC (programmable logic controller) driven. "Lisa builds them," he said, speaking of his 20-year-old daughter who is a third-year electrical apprentice. She's one of the 20 people who works with Mustang Controls.

Lisa works under senior automation manager Corey Grajowski. "I'm his trainee," she said.

"I started here a year ago. I worked for a different company first."

McKenzie said, "Her mom and I thought it was good for her to work somewhere else first. It was the smartest thing we ever did."

Having experience outside the family business was very important to

gather outside, more worldly experiences.

That's important, because Mustang works all over. On this day, they were in Estevan. The next day, somewhere else. Asked where they were based, McKenzie said, "We're based in the hotel we're in."

"We've got a guy on a plane to Singapore tomorrow. We're worldwide."



Bruce McKenzie's eyeline leads to a red and green light system for the Pump Alert, easily visible from the driller's station. Green means good. Red, of course, means stop!

When all else fails, hit the red button



When all else fails, hit the red button to shut down the rig.

Things are going badly, and in a hurry. How do you shut down the rig quickly?

One option is to hit the big red button – the Emergency Shut Down (ESD), a product that has been offered by Mustang Controls for the last three years.

This panic button is designed to shut down the primary functions of the rig right away, before something really bad happens.

Bruce McKenzie, owner of Mustang Controls, said, "There have been quite a few accidents. One that comes to mind is a worker was standing in the doghouse, and a young fellow was on the drill floor. He got wrapped up in the Kelly with the pressure washer hose. Someone could have saved his life, but they couldn't shut it down in time."

The system has three buttons. "There's one in the doghouse, the driller has one, and there's one in the accumulator," McKenzie said.

The accumulator is where the crew can control the blowout preventer system (BOPS) to shut down the well. "It's the final stand if the rig is going to burn," he said.

"(The ESD) kills the mud pump, floor motor and applies the crown saver. It's electric over pneumatic. We're applying the air shut-offs with this button."

"We've done it for quite a few contractor rigs. They were first implemented on Ensign rigs three years ago. Ensign came to us and asked us if we could do this."

It's become a common feature for most of the recent rigs Mustang has worked on, but not all. "People are starting to realize its value," McKenzie said.



Bruce and Lisa McKenzie of Mustang Controls were on hand in the final days before Stampede Drilling Rig 2 when out. Among the controls they installed was the Pump Alert.