

Fluid Injection Incidents and Near Misses
From 1/2/2002 to 1/10/2003

**Common Causes: L/W. Longwall: O/C. Open Cut Mine: H&F. Hose & Fitting failure: I. Isolation:
 HE. Human Error: M. Maintenance: FFP. Fit for Purpose: T. Training.**

Fluid Injection / Near Miss	UG/OC Location	Description	Causal Effects	Actions
1. Fluid Injection in back of leg.	Hunter Area U/G Longwall Boot End.	A 3/8"BSPP fitting stripped on a 320Bar constant pressure line. Fitting had hoses, filters, tee piece etc hanging from the fitting and hoses were dragging on the ground. No guard or clamp to restrain the hose.	L/W: FFP Longwall high pressure This fitting not suitable for the function.	Relocate the hoses to have a hose end directly coupled to the valve bank. Remount the filters; tee piece etc back on the boot end. Guard the area around the valve bank to protect the operator. Install Emergency switch on the valve bank. Review the Risk Assessment hazard & controls to identify if these areas are considered. Include the changes into the Mines Longwall Management Plan and / or Standards of Engineering Practice.
2. Fluid Injection in the hand	O/C Work area.	The porta power hose had some damage near the end of the hose. The protection sheath had moved back from the hose end exposing the damaged section. When the pump applied pressure, oil escaped through a pinhole in the damaged section	O/C: H&F: M The protection sheath had become dislodged and moved back from the end. The hose was damaged.	Set up a maintenance and inspection program to identify the condition of the Porta Power equipment. Also set up a pre use inspection to check equipment before use. The hoses and

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		producing a jet of oil, which penetrated the operators gloved hand.	Maintenance and inspection of the porta power equipment. The operator failed to identify the damage to the hose and sheath had become dislodged from its correct location.	fitting to be suitable for the duty. Up to 10 000 psi. Auditing of contractors equipment Ensure appropriate training of inspection of hydraulic equipment porta powers. Review the Risk Assessment hazard & controls to identify if these areas are considered. Include the changes into the Mines Longwall Management Plan and / or Standards of Engineering Practice.
3. Fluid Injection to the buttocks area.	Hunter Area U/G. Longwall roof support.	A 350 bar constant pressure hose blew off the hose end DN13 hose. The fluid was released as the hose was whipping around, and a chock operator received oil injection into the anus. The employee was dispatched to Hospital, OK.	L/W: H&F: M Hose end and swage were badly corroded due to the hose end lying in damp coal fines. The hose was identified as being > 5-6 years old. Pressure filters and side shield valve banks lying in coal fines not mounted.	Full inspection / audit of all face hoses and their condition. Replace defective hoses. Remount pressure filters and side shield valve banks out of the coal fines. Regularly inspect the hose condition above there normal inspection, and monitor hose wear. Review the Risk Assessment hazard & controls to identify if these areas are considered. Include the

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				changes into the Mines Longwall Management Plan and / or Standards of Engineering Practice.
4. Fitter hit with Solcenic fluid at the pump station.	Hunter Area U/G. Longwall Pump Station	The mine planned to carry out a monorail section removal on the day shift. On the N/S this job was brought forward. The fitter and fed carried out a JSA (verbal) and isolated the electric's on the pump station, water air and hydraulics, the water and air were depressurises. The longwall hydraulics depressurisation was carried out on the chocks. When trying to remove the super stecko staple was difficult and very tight. They turned the valves on the pump outlet manifold and listen for any sounds. The fitter decided to check for hydraulic pressure at the pump outlet manifold, by removing the side cover from the manifold. On part removal the cover became partly dislodged allowing oil under pressure to escape, which fit the fitter in the rib and chest area. The fitter was dispatched to hospital for treatment.	L/W: I: HE: T: Op Adequate procedures not available to carry out the work. A change of the plan not managed in a controlled fashion. Fitter did not understand the longwall hydraulics and electric's good enough, as the tranny power was stopped which activated the dump valve holding pressure in the monorail hoses. Isolation procedures not adequate for the task. Fitter was trained but could not remember the correct pump isolation as this job normally carried out on day shift.	Develop new operational procedure to include specific isolation steps to be followed. Information to be located on the equipment (pump station). Retrain the employees on the hydraulics and electric's so they have a clear understanding of the operation. Develop function specification for the hydraulics to assist with the above training. Work instruction to be given by persons with the appropriate knowledge and skill for the work required.

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5. Fitter hit with Longwall hydraulic fluid.	Hunter Area U/G Longwall	A fitter was asked to replace a burst hose. The hose was in two sections with a physical break. The fitter started to remove one end, which was difficult due to corrosion and decided to remove the other end, by positioning himself on the other side of the leg. There were two hoses on the leg bottom port manifold. He removed the staple of the hose and the hose blew out spraying him with oil. The fitter noticed he received a cut, he was unsure if the cut was caused from the oil or the hose end etc? He was dispatched to hospital. The cut was not caused by fluid injection.	L/W: H&F, M: I: HE. The fitter picked the wrong hose to remove on the cylinder leg, He was distracted & frustrated he could not remove the first end. Hose inspection should have picked up the hose needs replacing. He did know the isolation procedure, which was demonstrated by a second fitter U/G.	Maintenance regimes to inspect the hose condition and identify any for replacement. Review the Risk Assessment hazard & controls to identify if these areas are considered. Include the changes into the Mines Longwall Management Plan and / or Standards of Engineering Practice.
6. Near Miss oil sprayed into the walkway	Hunter Area U/G Longwall	Oil sprayed out from the top (power down) port block on the leg cylinder. The oil sprayed / leaked out the welded area between the port block and the cylinder housing.	L/W; HE; M When the chocks were overhauled new port block was fitted to the cylinder by welding the block to the cylinder. Slag inclusion and insufficient fusion on the weld ends causing a pathway for the oil to escape.	When changes and improvements to equipment. Check the repairer has correct repair procedures and monitoring and inspection of the repair is carried out. Quality control procedures. Remember the time constraints the mine usually places on the repairer. Review the Risk Assessment hazard & controls to identify if

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				these areas are considered. Include the changes into the Mines Longwall Management Plan and / or Standards of Engineering Practice.
7. Near miss. Leg raise hose burst	Hunter Area U/G. Longwall	The chock operator was advancing the chocks by adjacent controls. The chock became stuck and raised the pontoons. The operator then operated the chock in manual mode (on board the chock) lowering the chock to free the chock, as it was jammed into a lip in the roof. When lowering the front legs the power lower hose blew out	L/W; H&F; M. Hose route under the walkway covers and up to the power down leg port, the hose was wearing the outer cover and braiding causing a weak point in the hose. Also allowing water onto the braiding and allowing corrosion to start.	The hose routing to be improved to eliminate wear from the floor plate on the hose. Hose protection in this area and modifying the floor plate to eliminate the wear. Review the Risk Assessment hazard & controls to identify if these areas are considered. Include the changes into the Mines Longwall Management Plan and / or Standards of Engineering Practice.
8. Fitting failure	South Coast. Longwall	A fitter was adjusting the unloader relief valve on a longwall pump station a fitting between the pump and the accumulator on the pump sled failed and the hose whipped around violently, hitting the fitter.	L/W; H&F; M; FFP. Unloader adjustment procedure. Layout of the hoses, accumulator set up on the sled encouraged people walking on the hose causing stress to the fitting. Fitting material suspect.	Replace all suspect hoses and fittings and to remount the hose end manifolds. Procedure required replacing and adjusting the relief and unloader valve. Unloader valves to be overhauled and preset. Guard and protect the accumulator fittings. Review the Risk Assessment

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			Hose and fitting not supported / mounting.	hazard & controls to identify if these areas are considered. Include the changes into the Mines Longwall Management Plan and / or Standards of Engineering Practice.
9. Fitter hit by hose under pressure.	O/C Steering accumulator hose on a dump truck	A fitter was working on the steering circuit of a dump truck. The truck had been shut down using the emergency stop and isolated and locked on the previous shift. The fitter removed the hose going to the accumulator and he was hit with the hose and fluid under pressure.	O/C: I, HE. Normally a timer drains off the steering pressure after say eg 30sec. As the truck was shut down on emergency stop this also disabled the electrics and the timer trapping pressure in the steering circuit. The fitter did not verify the isolation and dissipation of hydraulic energy.	Review and update the isolation procedures. Reinforce the training on hydraulic circuits to include the depressurising the hydraulic circuit and testing for residual pressure in the accumulator circuit. Review the Risk Assessment hazard & controls to identify if these areas are considered. Include the changes into the Mines Longwall Management Plan and / or Standards of Engineering Practice.
10. Leg intensification	Hunter Area. L/W Chock Leg intensification splitting the cylinder.	A chock operator noticed oil leaking from the behind the rear cylinder leg. A fitter investigated the oil leak and found the second stage leg split for approx 300mm x 20mm wide.	L/W: FFP, M. The cylinder leg was manufactured with different material than the OEM spec. The return port was blocked by a poppet jammed and a broken spring.	Strip inspect all manifold block to inspect and renew suspect poppets and springs. Set a maintenance inspection of the poppets and spring and hydraulic controls. Install yield valves set to 420 bar relief on the power down (top port) side of the cylinder

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			<p>Maintenance not sufficient to identify the poppet and spring problem. These areas have not been considered for maintenance. Leg cylinders have a low Factor of Safety on the hoop stress. A burst disk was installed on the cylinder leg.</p>	<p>leg, in addition to the burst disc / hydrafuse. Conduct a FMEA on the hydraulic circuit to identify similar circumstances as above. Test the hydraulic circuit (cylinder leg fitted with yield valve and hydrafuse then intensify in a controlled environment) to prove that the legs and employees are protected. Replace old equipment with newer equipment, and new technology. Review the Risk Assessment hazard & controls to identify if these areas are considered. Include the changes into the Mines Longwall Management Plan and / or Standards of Engineering Practice.</p>
11. Near miss	Hunter Area. Longwall chock leg cylinder rapid yield activated.	The longwall takes weight and the legs rapid yield valve activates to protect the leg. Oil was released and an operator was hit by oil or coal projected by oil in the leg above the ankle. The operator was covered in	<p>L/W: FFP The equipment operated as intended. Positioning of the rapid yield valve exhaust port.</p>	<p>Installing diffusion covers on to the rapid yield valve to divert and dissipate the fluid away from employees on the walkway. Review the Risk Assessment</p>

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		oil. The oil / coal generated a hole in the rubber boot and caused welting on the employees leg.		hazard & controls to identify if these areas are considered. Include the changes into the Mines Longwall Management Plan and / or Standards of Engineering Practice.
12. Fitter hit by fluid.	Hunter Area. Longwall	The mine utilises the Power Take Off (PTO) to remove and install chocks on the longwall face. On removal the mine removes the caps and plugs from the PTO ports on the chocks. To install the chocks a pressure line is connected to the PTO pressure line and the return is exhausted to atmosphere. Some chocks have been dispatched to the OEM's for repair, The OEM return the chocks fitted with caps and plugs in the PTO porting. The fitter on the installation face was installing the chock (raising to the roof) when the return 50mm 80bar interchock hose burst, and the fluid hit the fitter in the left thigh.	L/W: H&F, I, HE, FFP, T, Op. Changes to the installation sequence, chocks being delivered from the recovery face and then from the repairer. Blocking off the return port allowing intensification of the return circuit from the leg cylinder. Installation procedure did not cover this specific step.	Installation procedure to state the fitter to check the return line is free to atmosphere. Identify any changes to the normal sequence to identify any hazards that may arise from the changes. Lower the installation pump pressure to reduce the potential hazard. Review the Risk Assessment hazard & controls to identify if these areas are considered. Include the changes into the Mines Longwall Management Plan and / or Standards of Engineering Practice.

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Incident Location:

L/W.	Longwall:	10
O/C.	Open Cut Mine:	2

Common Causes:

H&F.	Hose & Fitting failure:	6
I.	Isolation:	4
HE.	Human Error:	5
M.	Maintenance:	7
FFP.	Fit for Purpose:	5
T.	Training:	2
Op.	Operational:	2