

INCIDENT TYPE:

ELECTRIC SHOCK TO SW OPERATIVE AT LOCHCARRON WTW

During the commissioning phase of the handover process at Lochcarron WTW, a SW operative received an electric shock whilst trying to top up a calibration pot on a newly installed Ammonium Sulphate dosing skid.

Investigation into this incident showed the following. Fig 1 refers

Both the bulk and day tanks contained water from the offline commissioning. The bulk tank was emptied first. Once empty it was then filled with the necessary 10:1 mix of ammonium sulphate solution and the static mixer on the tank switched on. The day tank and all the interconnecting pipework were then also emptied of water. The transfer pump between the bulk tank and the day tank was switched on to fill up the day tank with the mixed solution. With the draining of all the pipework there was a need to re-prime the pump and with the pump still running, the union coupling on the discharge pipe from the pump was loosened. This successfully bled the air but when the solution came out at the joint the SW operative felt a small shock and jumped back. At the time it was not thought that the shock came from the electrics and it was put down to static electricity. The fitting was tightened up and the day tank started to fill with solution. The transfer pump was switched off once the day tank was full.

The outlet valve on the day tank was opened to fill the calibration pot and it was found that due to the location of the pot it was only possible to half fill the pot. It was then advised that the SW operative should take the solution from the bulk tank to top up the level in the calibration pot. The SW operative inserted a plastic jug into the bulk tank solution and when his hand touched the solution, he received a greater shock than the previous one. This caused his arm to be kicked back against the side of the tank opening and he immediately jumped back from the dosing rig. The mixer was stopped at the HMI and removed its plug from the socket.

After lengthy investigation, it was discovered that the low level float switch on the bulk storage tank was faulty (fig 2). This switch is operated at 110v. In normal operation it is completely submerged within the bulk tank.

Where the 110v cable enters the float switch, it was found that cable outer sheath was outside of the gland and the inner live cores were exposed. This effectively made the entire contents of the bulk tank live.



Because the tanks and associated pipework are plastic, there is no way of earthing them, therefore the RCD for the switch failed to trip.

How the inner core came to be exposed has not been established.

The switch is made by Prominent and is part of an SWS Signature design. It was installed by Proshield. Proshield are now recommending that all future switches are operated on 24v. This is currently being discussed within SWS.

All previously installed equipment of this type must now be checked to ensure that the glands on the float switches are intact and that the electrical integrity of the plant is maintained.