AUSTRALIAN NATIONAL UNIVERSITY

DEPARTMENT OF NUCLEAR PHYSICS

14 UD TANK OPENING REPORT # 103

24th to 26th June 2006

A.K.COOPER **D.C.WEISSER**

REASON FOR TANK OPENING

- During gas up (TOR102), the volts were run up with only 25 psia of SF6 and, unsurprisingly, the machine sparked at 6.5 MV. It was a stupid mistake to run up to that voltage with so little SF6 in the machine. The safe operating voltage at 25 psia is 3.5 MV!!
- Later it was noticed that control of the second stripper had been lost. This was attributed to the effect of the pressure change so, it was decided to re-open the machine immediately.

PUMP OUT 23-06-06

- Pump out tank, open doors and start ventilation system.
- The ventilation system ran overnight.

SUMMARY OF WORK 24-06-06 to 26-06-06

- The Oxygen monitor was used to check the atmosphere within the tank prior to entry.
- The service platform and equipment were deployed.
- After purging air through the tank overnight, the platform was deployed and diagnosis began.
- After initial inspection, within the machine, the 24 VDC power supply and the Group 3 unit were removed, placed in a chamber and subjected to

evacuation and pressurisation while monitored for electrical function. No faults were found.
- It was realised that pressure was most probably not involved and that the cause might actually be due to the tank spark prior to the failure.
- The Group 3 board was replaced because we had one in stock anyway.
- The 24 VDC power supply was changed for a transformer that was much simpler having fewer parts.

26-06-06
- The HE Mid section was reassembled and the machine closed for evacuation.

MID SECTION
The tank pressure was at approximately 60 PSIA when it was realised that control of the mid section had been lost and that temperature, pressure and foil position readback had been lost in the terminal.
It had been assumed, wrongly as it turned out, that because the fault had occurred during gas up that the tank pressure change had been the cause.

Even though the mid section and Terminal shared the fibre optic loop the Mid Section, was thought to be the most likely place to find a fault since the terminal had been reliable for ten years. The Mid Section was opened to look for visible damage to electrical or electronic components.
Since there was no visible damage the Group 3 board and the 24 VDC power supply were removed for closer inspection. Both checked out electrically so they were placed in an improvised pressure vessel and powered up while subjected to vacuum and pressure changes. They continued to function perfectly.
It was then realised that, most probably, pressure change was not involved but that spark energy had stunned the Group 3 board.
Spark protection had not been of the same high standard as used in the terminal 10 years ago but little could be done in the short term to rectify this.
The Group 3 board was replaced with a spare and the 24 VDC supply was replaced with a transformer, which is simpler having fewer parts.
The mid section was closed and, with little confidence that anything had been achieved, the machine was also closed.

PLANNING FOR TANK OPENING 104
Planning modifications and their installation were scheduled to be done for an opening within four to eight weeks. A detailed comparison of the terminal and the mid section with regard to layout and spark protection was commenced even as the tank was being gassed up.

INITIAL PERFORMANCE

The machine ran up to 10.42 MV before the first spark caused loss of foil position memory. The Group 3 control functions remained unaffected. This had been anticipated and experimenters requiring second stripping had been warned that they may need to reschedule experiments until further modifications were completed.

It was soon discovered, however, that control was restored by turning the lower shaft off and then back on, effectively, rebooting the electronics. Experimenters then found that quite long periods of uninterrupted operation were possible so second stripping was used with only the occasional reboot being required.