AUSTRALIAN NATIONAL UNIVERSITY

DEPARTMENT OF NUCLEAR PHYSICS

14 UD TANK OPENING REPORT # 97

14 to 21 Jan 2005

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

REASON FOR TANK OPENING

The planning whiteboard in the technician's lab was used, as is the custom, to plan the tasks for tank opening #96. One task titled "Close all openings" was noted in the new Ion Pump installation list of things to be done.
The crew certainly took the item literally because the shorting rods would not pass through the mid section after the pump installation. When the shorting rods failed to proceed it was surmised that the new Ion Pump was blocking the shorting rod hole at the mid section.
Embarrassing but true, the main task for this opening was to move the Ion Pump.

The LE Mid-Section Pump current readout had failed so this was to be rectified.

The Gas Stripper Ion Pump was overloaded during the baking of the gas stripper turbo pump exhaust traps and had not functioned since closure so this was to be confirmed and the pump replaced.

The one new Column Post and seven refurbished ones, that hadn't made it into the tank last time, would be installed during this opening.

The oxygen level monitor was borrowed from the ANU OH&S section.

PUMP OUT 13-01-05

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

SUMMARY OF WORK 14-01 to 21-01-05, Photos in main body of report.

- 14-01-05
- The initial cruise down the column found the top half of the machine was very clean.
- The column was wiped down with RBS and water and the HV gap test found there to be no problems with the rings and resistors.
- The Mid Section was opened and the interference of the pump with the shorting rods confirmed.
- Breakdown products again adhered to the up side pick off and lower casting of chain #1 and although very slight indicated that the problems with "breakdown products" persisted.
- It was decided to replace the column posts next and U 23 and 24 were selected as recipients. U 24, gap 4 was found to have an eccentric banana plug. The resister appeared to be broken at the brass end and was replaced.

17 to 21-01-05

- The posts in U 23 did not require machining for new longer ring screws so 0.375" long screws were used. U 24 used the usual longer 0.417" long screws.
- Chain #1 idlers and petals were removed for cleaning and to facilitate the cleaning of the castings.
- Work on the LE Mid-Section Pump current readout proceeded chasing red herrings.
- Chain #1 was removed to the clean room and washed using the high pressure water spray and alcohol rinse
- The castings of the HE end were cleaned using water and RBS and then blown off with compressed air.
- Chain #1 was reinstalled.
- U 6, Tubes 1,2,3 were HV gap tested at 5 kV and found to be normal.
- The column was blown down, wiped with RBS and water then HV gap tested. U 23 was found to have higher than usual current readings. The rings were removed and posts checked individually. The new post behaved weirdly and this was thought to be due to moisture.
  The post was heated using a heat gun and it improved. There have been no operational problems.

COLUMN POSTS

Eight column posts were replaced. The table records numbers versus position.

Unit 23	#out	#in
Post A	306	354
Post B	322	286
Post C	307	new 2518
Post D	2343	235
Unit 24		
Post A	287	260
Post B	347	332
Post C	331	264
Post D	240	J3

CHARGING CHAIN # 1

The chain was removed to the clean room, pressure washed with deionized water, rinsed in a bath of alcohol and left to dry in the hot Australian sun.

This chain is now the most washed chain ever in the 14 UD but that probably says that often it is the dirtiest. It must be sanforised – it didn't shrink.

POWDER BUILD-UP ON CHAIN #1 PICK OFF. Note the lighter blue wear band on the tyre lip.

CHAIN PULLEY #1 LOWER

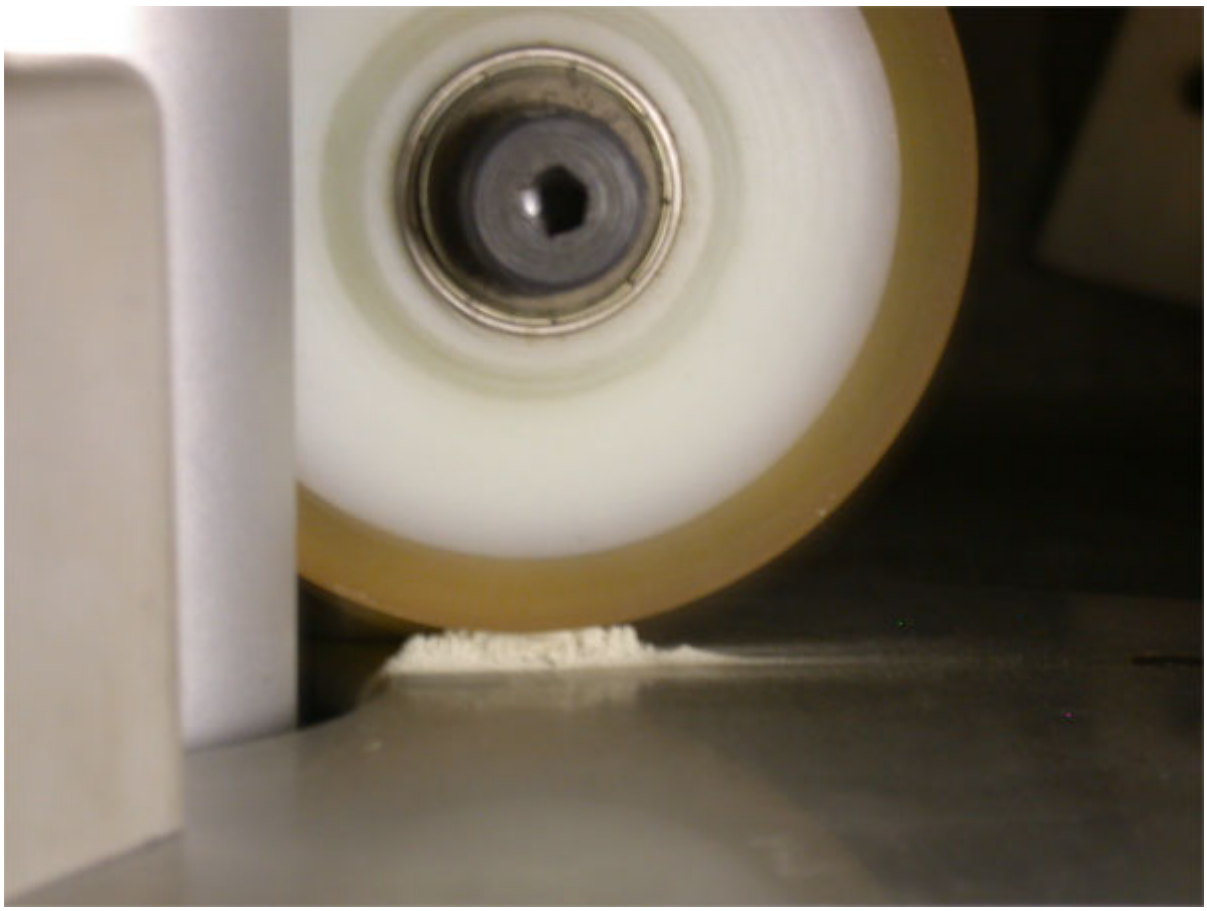
We found the lower pulley tyre drive surface to be worn asymmetrically.

The lip on the side closest to the centre of the column was approximately 4mm smaller than the outside lip.

A replacement on hand was a black anti-static tyre left over from the tyre fiasco of 1987 (TOR 56/3) and 1988 (TOR 61/9)

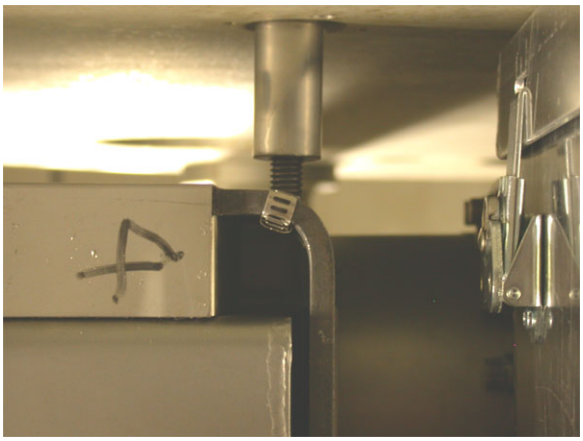
New shim stocks were fitted to the bottom black-tyred pulley and the existing blue-tyred pulley in the terminal.

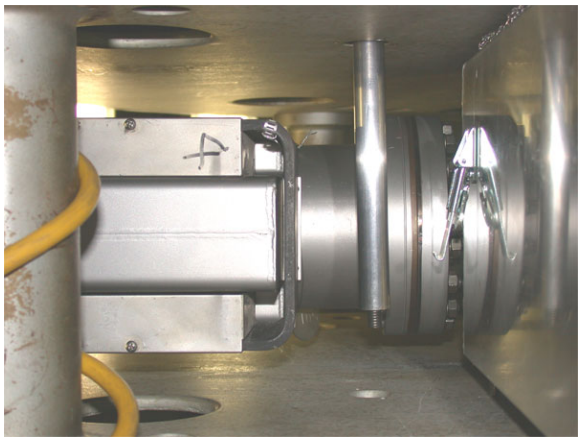
IDLERS
The Chain #1 idlers and petal assemblies were removed for a thorough clean with RBS and water.



TYPICAL POWDER BUILD-UP FROM CHAIN #1 AT CASTING IDLER

LE MID SECTION ION PUMP REPOSITION
The accelerator tube was let up to dry nitrogen and the mid section ion pump was removed.
The new longer nipple was installed and the pump reinstalled.
The photos show the shorting rod hitting the pump before alteration and clearing it afterwards.





SHORTING ROD STRIKING PUMP MAGNET, THEN CLEARING

TERMINAL 20 l/s ION PUMP

The terminal Ion Pump was found to be almost shorted, as suspected, and was replaced. Note that only the LE tube was vented.

The ion pump had been overloaded during the baking of the gas stripper turbo pump exhaust traps last opening at the time of the installation of the Mid Section Ion Pump. The traps were baked while the system was closed so the gas stripper ion pump pumped all the material evolved by the traps. The correct procedure would have been to leave the ion pump off during the baking of the traps. This has been noted for next time.

INITIAL PERFORMANCE:

The machine first showed conditioning at 13.4 MV ten minutes after the tank reached full SF6 pressure. This amply vindicates the care used this time in venting and pumping the tube.

Although Chain #1 tested fine before the tank was closed, on first use with the machine closed, had pernicious positive self-charge of up to 38 μA, which could only be temporarily reduced by oiling. Fortunately, the experimental program called for low terminal volts, which could be achieved with chain #1 off. The 14UD was to be opened as soon as practicable. See (TOR 98).