

AUSTRALIAN NATIONAL UNIVERSITY
DEPARTMENT OF NUCLEAR PHYSICS

14 UD TANK OPENING REPORT # 105

7th to 11th May 2007

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REASON FOR TANK OPENING

- Further enhance spark protection of the Mid Section upgrade (TOR 102,103,104).
- Replenish terminal stripper foils.
- Check programming of the terminal stripper CPU.
- Upgrade Group 3 controller.
- Fit reconditioned Column Posts.
- Change the HE 20 l/s pump.
- Inspect the black pulley tires on Chain #1.
- Full inspection of mechanical systems and column electrical components.
Note to check URS bearing in Unit 5.
- Inspect Triode needles.

PUMP OUT 7-05-07

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

SUMMARY OF WORK 8-05-07 to 11-05-07

- The Oxygen monitor was used to check the atmosphere within the tank prior to entry.

- After purging air through the tank overnight, the platform was deployed.
- Initial inspection found the machine clean.

8-05-07

- No faults were found during the 30 kV column gap test.
- The column was wiped using RBS and water.
- Mechanical and electrical tests were performed.
- Chain #1 had a noisy bearing at U16 down.
- Chain #2 had bearing noise in the terminal and a rattle on idler set U25 up.
- Chain #3 sounded satisfactory.
- Upper and Lower rotating shafts sounded satisfactory.
- Resistor leads were visually found to be satisfactory.
- The terminal was opened and the Foil Changer was removed. (On foil position 266).
- He Mid Section was opened.
- David Kelly checked the Terminal Foil Group 3 controller and found that it already counts to 282 positions.

9-05-07

- Chain # 2 Terminal bearings and plumber blocks were replaced.
- Upper Rotating Shaft in Unit 5 was found to have an accumulation of “crud” adjacent to the coupling bearing. The shaft was run and nothing untoward was evident. This will be examined again next opening.
- Chain #1 and 2 terminal pulley bearings were checked while unloaded and found to be serviceable.
- Unit 5 was chosen for refurbished post replacement but this was aborted when the replacement posts were found to be off specification.
- The terminal Foil Changer was reinstalled.

10-05-07

- The HE Mid Section Alternator cable box conduit was removed and Pi section filters were installed between the Alternator box and the Control box.
- Chain stretch was measured and recorded. Chain #1 44mm, Chain #2 43mm, Chain #3 43 mm, measured between the stop leg and the tank floor.
- One metering cable stand off was repaired using a new double sided foam pad.
- The inductors were cleaned and set using the gauge.
- Oilers 2 and 3 were topped up.

- It was noted that there was a slight build up of powder, assumed to be tyre material, on Chain #1.
- Mid section foils were at #313.
- Idlers were removed from Unit 16, Chain #1 for inspection. It was thought that they were set too tightly against the chain. No problem found. Reinstalled and tested.
- L5 isolation valve bellows was replaced.
- Chain pulley insulation was tested using a Mega to ground.
- The accelerator tube was vented from Level 5.

11-05-07

- The aluminium valve seats were replaced in the “Weisser” valve.
- The second stripper in the Mid Section was wound back to Zero after repopulation with new foils and the counter and motor were connected.
- Testing of all functions found both the terminal and mid section to be working correctly.
- The machine was cleaned, the usual charge and metering tests done and the machine was closed.

MID SECTION

The aluminium deck was fitted with a baffle designed to block “line of sight” through the outer Group 3 shield box EMI/RF vent.



BAFFLE IN DECK



CONDUIT CONNECTOR

Pi filters were fitted into the conduit connector between the alternator junction box and the outer Group 3 shield box at the wall of the latter.

These measures should finalise spark protection of all Mid Section control equipment. Time will tell.

It was decided during the opening that the foil changer should be reloaded while accessible and this was done.

TERMINAL CHAIN PULLEY BEARINGS

During routine machinery running tests it was discovered that the Chain #2 terminal pulley had noisy bearings.

The chain was lifted and the pulley removed. New bearings and plumber blocks were fitted.

Chains 1 and 3 were lifted from their pulleys and the bearing condition checked unloaded. These were found to be serviceable and the chains were reinstalled. Insulation from ground was checked using a Mega.

COLUMN POST REFURBISHMENT

Unit 5 was selected for post replacement.

The post in position B was removed (292) and refurbished post (295) was put in place.

It was soon discovered that the bolts did not line up with the holes in the casting. After some investigation it was found that the post had been machined out of square. Both ends were parallel but the ends were not square to the post axis. The casting sets are very accurately aligned and will not tolerate positional errors greater than approximately 0.1 mm.

It was thought that the machine fixture had been set up with an dividing head index error of 1 hole in 20 and this is geared at 40:1 ratio. This is an error of 0.45 deg post axis. The error across axis would be 0.151". I recall it being much less than that. I suggest that it was more likely due to a small set up error that would be repeated, after indexing 180 deg, leading to parallel ends.

CHAIN #1 BLACK TYRES

There was a light dusting of, presumably, tyre material adhered to the charging chain. Other than that, all was well and it will be checked again next opening.

Based on performance so far, black tyres for the other chains can't be fitted soon enough. It would be nice to retire the oilers before the older, or even the younger author, do.



FOILS

The terminal and mid section foil changers were loaded as per foil log,
“FOILED 17” 8th May 2007

RECORDS - Note that the LE Shaft meter remains faulty, second digit did not roll over 55000

Machine meter hours as of 5- 08-06.

Chain #1, 1500.	Chain #2, 1500.	Chain #3, 1500.
LE Shaft, 2972.	HE Shaft, 2972	Charge volts, 1697

INITIAL PERFORMANCE

The machine ran up to 13.3 Mv with a few conditioning sparks from 12.7 Mv.
The machine has been very stable and reliable.