

AUSTRALIAN NATIONAL UNIVERSITY
DEPARTMENT OF NUCLEAR PHYSICS
14 UD TANK OPENING REPORT # 78

13 MAY - 17 MAY 1996

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REASON FOR TANK OPENING

The main tasks for this opening were to replace terminal stripper foils and measure/plan for the installation of the gas stripper assembly.

PUMP OUT 13-05-96
Pumped out tank and opened doors.

SUMMARY OF WORK
14-05-96

We performed the usual tour to look for any obvious problems. The machine was clean and, apart from the usual light brown stain on the terminal, all appeared OK. The column received it's usual four person wipe down with RBS detergent and water. Next all three terminal spinnings were shifted and the foil changer was removed for refilling. The gas stripper crew took over the machine for the rest of the day, whilst the tank crew attended to maintenance outside the machine. We overhauled the shorting rod clutches and found a short, outside the tank, which had stopped the LE column metering. Another short inside gave more trouble later.

15-05-96
The first half of day two was devoted to close inspection of chains, inductors, bearings and shafts. No problems were found. The gas stripper crew used the rest of the day.

16-05-96
We refitted the foil changer and, on testing, found the reverse direction was operating very slowly. Reverse had a history of laziness but it seemed worse than before. We found a split nylon gas tube in Unit 15 and replaced a section of the tube. The terminal triplet was tested for ripple and the results noted in the platform book and below in this report.

17-05-96
The column was wiped and resistors inspected prior to closing the column. During HV testing of the resistors, we found that column post 14C was breaking down across gap 12, where there was a visible crack in the ceramic. Fortunately we had one reconditioned post in storage and were able to replace it right there and then. We then continued with chain and metering tests prior to closing the doors at 6PM.

COLUMN POST

This is the first time that we have found a cracked post during routine HV resistor tests. The gap sparked in the same way as if it were dusty but, when the resistor leads and rings were removed, the faulty gap continued to draw current and a crack was seen in the ceramic. We thought we had found a universal method for crack detection but tests outside the tank appear to refute this. The HV tester we use is DANBRIDGE DENMARK 30kV non-destructive ionisation tester JP30A. It has three current ranges; 1UA, 10UA AND 100UA
We located two posts which had been removed from the

machine, in the past, due to cracked ceramics. (OLD POST1, serial # 254 and old post 2, position 2a)
 The old posts had only one visible crack each and drew no current at up to 7kV. The recent post had three visibly cracked gaps, all of which showed some current flow.

GAPS @ 7kV	CURRENT UA		
	OLD POST 1	OLD POST 2	RECENT POST
UNCRACKED	0	0	0
VISIBLY	0	0	9 2.4
CRACKED			0.1

We conclude that we cannot reliably detect cracks in ceramic sections electrically. We invite comment.

TERMINAL FOIL CHANGER

We found that the foil changer was slower than usual in the reverse direction.

Fitting a digital pressure gauge to both forward and reverse, in turn, showed that reverse had low gas pressure. Forward operated at 0.5 bar whilst reverse read as low as 0.3 bar. We began checking the whole gas supply starting with the solenoids outside the tank. Nothing showed up there but, as with many problems, the glitch was in the simplest part.

The black high pressure nylon tube, which delivers the gas to the actuator, had split axially within Unit 15. During the testing procedure, we found the supply tube to the lower terminal sublimator switch was also split in unit 15.

We replaced the one Unit of each tube by fitting plastic quick connect joiners within casting space #15.

The tubes were last replaced during the opening of 8-10-85, and was reported in TOR 48.

TERMINAL TRIPLET

The terminal triplet was tested to see if it was contributing to or causing problems in the performance of Chopper 2.

We tested for ripple but found none. Results noted in platform book.

X- & Y+ showed some noise when connected to their vacuum feed-through. This may condition away. But since it occurs at 12kV, and we need to run at 24kV, it may well cause unstable focussing during normal running. The electrodes will need to be inspected during the gas stripper installation process.

GAS STRIPPER

We measured and photographed the terminal so that the necessary preparations for the gas stripper installation can proceed whilst the tank is closed. A full size mock up of the terminal will be made so that accurate development of the installation can be accomplished outside the machine. This complements 3D Autocad work.

SPARK MARKS

UNIT	FLAT CAST COVR	ROUND CAST COVR	RINGS
19	1		
14			4
13		2	3
12		2	3
11		2	2

TERMINAL UPPER
3

MIDDLE
1

LOWER
3

CHAIN CHARGING TEST

kV	UA		
	1	2	3
0	0	0	2

2	5	6	6
4	11	13	13
6	18	18	19
7	21	19	22
8	24	21	26
9	26	24	29

INITIAL PERFORMANCE

There were some sparks from 11MV to 15MV over the period 20-5 to 30-5, see table.

DATE	TIME	MV
20th	18.10	11
20th	19.40	11
22nd	----	12.5
28th	13.00	14.5
30th	14.46	15.2
30th	14.50	14.8

Our fix of the LE column current metering was only temporary. The intermittent shorting to ground, of the lead from the last LE column section to the tank wall feed through, recurred.

Example of running parameters taken 25th MAY during conditioning.

TIME	MV	TORR		UA								
		LE	HE	CH1	CH2	CH3	LC	TUBE	COL	TUBE	COL	
11.53	13	4.4-8	1.4-8	63	58	64	60	45	--	42	32	
15.15	14	4.5-8	1.6-8	72	70	76	65	48	--	46	34	

* LC included the shorted LE column current.