

AUSTRALIAN NATIONAL UNIVERSITY

DEPARTMENT OF NUCLEAR PHYSICS

14UD TANK OPENING REPORT NO.16

May 2nd and 3rd, 1979 (1½ days open).

The machine was last closed on April 10th and Report No.15 was circulated for that tank opening.

Soon after the closure the first of a few troubles became apparent: the lights in the terminal which illuminate the foil counter and metering of the ion pump current did not light up when the lower shaft was run; if this was because of no power, then the pump would not work either, nor the terminal lens. When beam was put through the machine the lens controls had no effect on it.

Report No.15, pages 2 and 4, refers to extensive changes made to the low energy beam transport. Some bit of trouble was experienced at this end when beam was first put through the machine. The LE steerers, which had been dismantled in order to get them past the flanges on new lengths of beam tube, were suspect, and were checked for current, polarity etc. but nothing was very evident beyond the fact that excessive Y2 steering was essential if the beam was to be put completely through the machine, though it could be maximized at the Tank Cup by playing off one steerer against another and ending up with very little total steering.

After nearly two weeks lost charge reappeared and machine stability, which had returned to "eerie" immediately after button-up, became very poor, and consistent with breakdown products playing their characteristic part on machine performance. Control was only possible when the triode needles were run far out, drawing only 15 microamps instead of the conventional 50.

The first thing to come to mind was the condition of the insulating gas. Since the recirculator had been running without reactivation for the two weeks since button-up we thought it very advisable to reactivate. This was carried out by someone unfamiliar with a recent updating of the recirculating system and this hesitant operator, functioning on a public holiday, turned off reactivation when the temperature had apparently risen too high.

Following the attempt at reactivation the excessive lost charge of 25 microamps or so was still there after recirculating had continued for about 24 hours.

A few days later a complete reactivation was carried out in accordance with up to date procedures. Following it the evidence of the odour of the effluent confirmed that the first reactivation had not been effective. After some hours of recirculation of gas through correctly reactivated alumina the lost charge began to decrease and the triode needles could be run closer in; however the lost charge did not completely disappear.

In addition to the problem with power in the terminal, affecting the lens, and lights illuminating the stripper counter, we found that oiling had no effect on the negative self-charge of Chain 3.

A brief tank opening was scheduled.

THE TANK OPENING

TERMINAL POWER:

In the terminal we found that the neutral from the lower main alternator was off its barrier strip, though tucked tidily away behind another wire. At the last opening a number of wires had been removed in the terminal connection box to trace leakage to local ground; tests of all functions were carried out with both alternators running after the repair had been effected, but no checks, unfortunately, were made after the wiring had been neatened up a bit.

EVIDENCE OF GAS PROBLEMS:

There was considerably more brown deposit on the blank (positive) surfaces of the corona point assemblies, though, as usual, the points on the tube were much less

affected. The deposit was not flaking, as happened during severe breakdown product problems in the past, (Report 11, page 4 and Report 12, pages 3, 5 and 6), and there is no need as yet to remove and wash all the assemblies. Surprisingly the brown patch on the terminal was very slight.

The "mushroom" on the stabilizing triode assembly was removed and polished, though it bore no evidence of the gas problems.

All rings had particulate deposits on them and possibly these were the source of charge lost to the tank wall at high gradient. All the material was removed from the rings during the usual taccragging stage of final cleanup. We have no explanation which links 1) lack of prompt reactivation; 2) unstable lost charge and 3) the appearance of particulate deposits.

X-RAYS

For some time we have observed high x-ray counts when the machine is not beam loaded and attributed the effect to hot spots on the heater plate of Unit 11. We disconnected the primary of the heater transformer in this unit to test the idea. (After button-up, when the machine was run to full volts, the x-rays had been reduced by a factor of 100.)

OILERS:

The oiler for Chain 3 was dismantled. A partial blockage by a displaced gasket was cleared and the oiling rate adjusted to compare with the others.

VACUUM:

The routine test of terminal sublimers currents revealed intermittent currents of 110 amps on the lower pump. The sublimers in question was isolated so that it could not be switched in again, but the feedthrough came under suspicion.

MISCELLANEOUS.

The lower and centre terminal spinnings were not removed, nor were any rings.

The usual metering and charging tests were made.

BUTTON-UP

The entire column was blown with nitrogen and taccragged.

TESTS

The 14UD lost no conditioning as a result of the tank opening and went immediately to 13.6 MV as soon as all the gas was in.

There was no lost charge and eerie stability was back with us.

D.C. WEISSER

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May 6th, 1979.