AUSTRALIAN NATIONAL UNIVERSITY
DEPARTMENT OF NUCLEAR PHYSICS
14UD TANK OPENING REPORT NO 66

19 MAY – 23 MAY 1989

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Reason for Tank Opening

Broken shorting rod in Unit 28.

Preamble

The machine was closed on 8 May 1989 and had sparking problems in the HE end immediately. All units were run up to at least 1 MV/unit. There was sparking in Units 15 and 26 and so the machine was run with these two units shorted out.

Following sparking at 11.8 MV on 17 May 1989, the machine behaved erratically with ticking on the NMR trace at 8.6 MV. After 4 hours of conditioning, the machine ran with 11.0 MV terminal without any problems. This occurrence made us wonder if the problem was the same as in units 15 and 26. To test the idea, we decided to remove all rods from the machine. It was whilst doing this that we discovered the broken nylon rod.

Tank Opening 19 May 1989

Gas was taken out of the tank on 18 May. It was valved off and left under vacuum overnight. We vented the tank by 9.20 am on 19 May. By doing this, the resistors in the machine are exposed to moisture for the shortest possible time and is intended to check electrically resistor assemblies before machine alters the measurement.

Putting 30 kV between stringers with all rings in place in the HE end we picked up an open circuit resistor in Unit 15. All other resistors read correctly including those in Unit 26.

Shorting Rods

The most obvious fault we found in the machine was associated with the shattered nylon shorting rods in Units 27 and 28. The rods were still joined in Unit 27 and 28 and sitting in the correct position in the bottom casting of Unit 27. But half of the rod nearest casting 26 and likewise nearest 28 had been spark damaged away.

The shorting rod contact block in the top of Units 26 and 27 as well as the bottom of Unit 26 were detached from the casting. They were supported by the remains of the nylon rod.

A further 7 contact blocks in the HE and one in the LE were loose. These were all replaced with exterior surface mounted contactor blocks replacing the failed ones which had been mounted on the uneven inside of the casting.

Chains

Chain number 3 was shortened by 2 metal pellets. All chains were wiped down in situ with alcohol and wipes. No inspection of links was done.

DC Idlers

The bottom spinning was lowered and idlers checked. There was one contactor spring missing from the down side idler on chain number 3. This was replaced.

Resistors

All resistors in Unit 26 were individually checked at 5 kV and 3 volts expressly for the purpose of detecting any open circuits or large discrepancy. None were found.

One tube resistor each in Units 1 and Unit 9 were found without their titanium spark gap hats fitted. Although these 2 resistors measured correctly they were replaced with new resistors and the assemblies made complete before reinstalling.

Whilst checking for missing spark gap electrodes in resistor, two frayed and electrical damaged resistor leads were found. The plugs either end of the leads were blackened and so we replaced the leads as well as the aluminium sockets. This failure may have originally occurred during the troubles with too long leads and were not detected then.

Castings

When looking along the tops of castings in the LE end, with a light behind the column, we could see halos on the surface of the castings. The halos appeared to be associated with resistors. For example the resistor in Unit 1 that had a missing spark gap was at the level of the casting and there was a halo on the casting around the end of the resistor.

Other halos were on castings in Units 2, 3, 4, 6, 10, 11, 12 and 14 and were all around the post carrying the resistors. No halos could be seen in the HE end of the machine because of the oil laying on the castings.

Cleaning

We had found nylon from the spark damaged nylon rod in Units 27 and 28 spread as far as the terminal. Because of this, considerable care was taken in blowing down the column, in particular blowing out every resistor tube assembly.

Charging Test

Our standard charging test was done and everything was as normal. The test for checking for electrical problems by running the terminal to 1.5 MV without shorting strap was not done.

26 June 1989