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BACKLEG WINDINGS

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Collider Accelerator Department Brookhaven National Laboratory

U.S. Department of Energy

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AGS DIVISION TECHNICAL NOTE

No. 44

, Fred Pallas

January 31, 1968

BACKLEG WINDINGS

(Description and locations of backleg windings on the Alternating Gradient Synchrotron)

Insulated (fibreglas and epoxy) copper windings are installed on eight a (8) of the backlegs of the main ring magnets of the Alternating Gradient Synchrotron. These windings are designed to either increase or decrease the flux generated by the main ring magnet windings. The <u>increase</u> in flux tends to bend the accelerated beam <u>inward</u>. Conversely, the <u>decrease</u> in flux bends the accelerated beam <u>outwards</u> away from the center of the accel-

The purpose of these windings is to create an orbit "bump" toward the outside radius of the machine.

These windings are used in conjunction with additional external beam equipment for the ejection of a slow external beam from the accelerator.

The backleg windings are fabricated from hollow OFHC copper conductors, $5/8 \ge 5/8$ inches square cross section with a 3/8 in. diameter water passage. Net cross sectional area of 0.2861 ins ² equivalent to 344,205 cir mils.

Connecting bus between magnets and to 1000 amp power supply is 500 MCM rubber sheathed copper conductor with a resistance of 0.021 ohms/thousand in feet. Approximately 1000 feet was used.

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			Cooling Water Required		Electrical			
Magnet	No. Turns	Winding Length	Velocity	Flow	Pressure	Resistance	Power	Voltage
E6	5	89.68 ft	2.7	0.93	6.2	0.0027	2.7	2.7
			ft/sec.	gal/min.	psi	ohms	kW	Volts
E7	e :: 5:	89.68	2.7	0.93	6.2	0.0027	2.7	2.7
E20	6	92.62	2.7	0.93	6.2	0.0027	2.7	2.7
Flager	6	92.62	2.7	0.93	6.2	0.0027		2.7
F14	5	89.68	2.7	0.93	6.2	0.0027	2.7	2.7
F15	5	89.68	2.7	0.93	6.2:	0.0027	2.7	2.7
G8	5	89.68	2.7	0.93	6.2	0.0027	2.7	š 🏯 2 . 7
G9	6	92.62	2.7	0.93	6.2	0.0027	2.7	2.7
Total	<u>-</u>	726.26	21.6	7.44	49.6	0.0216	21.6	21.6
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Windings are connected in series with 500 MCM copper conductor.

Windings are water cooled, series connected in pairs. Each pair independently connected to supply line.

Design power = 1000 amps

Temperature rise $\Delta t = 20^{\circ} F$.

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Operations Engineers (8) M.E. (AGS) (Ring Conversion)

Pg. 3 BACK LEG WINDING INSTALLATION 30 JANUARY 1968. 1000 AMAZZE DOWER SUBALY SLEIES WOONS. GENERATOE 530 19 611 8 -1-10 + - Joo Meri. FOUL ABIUM ORBIT \$ 20 F.15 F14 G9 500 Merol ash Locro to 90" LONG MAGNET G 8 - 5 TURMS (90" LONG 172 GMG - 5 TURMS (75" SHDAT) G 9 6 TURMS (75" SHDAT) E 6 7 5 TURHS 75 SHORT FAGALLY 90" Long MAGNET. 620 BENDS BEAM F14 Z F15 S 5 TURNS 6 TURNS BENES BEAM INWARD. BANDS BAAH BANDS BEAM IN WARD OURWARD OUTWARD A D. .