

BACKLEG WINDINGS

F. Pallas

January 1968

Collider Accelerator Department
Brookhaven National Laboratory

U.S. Department of Energy

USDOE Office of Science (SC)

Notice: This technical note has been authored by employees of Brookhaven Science Associates, LLC under Contract No.AT-30-2-GEN-16 with the U.S. Department of Energy. The publisher by accepting the technical note for publication acknowledges that the United States Government retains a non-exclusive, paid-up, irrevocable, world-wide license to publish or reproduce the published form of this technical note, or allow others to do so, for United States Government purposes.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

Accelerator Department
BROOKHAVEN NATIONAL LABORATORY
Associated Universities, Inc.
Upton, L.I. N.Y.

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 (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 increase in flux tends to bend the accelerated beam inward. Conversely, the decrease in flux bends the accelerated beam outwards away from the center of the accelerator ring.

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 x 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 feet. Approximately 1000 feet was used.

BACKLEG WINDINGS

Magnet	No. Turns	Winding Length	Cooling Water Required			Electrical		
			Velocity	Flow	Pressure	Resistance	Power	Voltage
E6	5	89.68 ft	2.7 ft/sec.	0.93 gal/min.	6.2 psi	0.0027 ohms	2.7 kW	2.7 Volts
E7	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
F1	6	92.62	2.7	0.93	6.2	0.0027	2.7	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	2.7
G9	6	92.62	2.7	0.93	6.2	0.0027	2.7	2.7
Total	43	726.26	21.6	7.44	49.6	0.0216	21.6	21.6

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

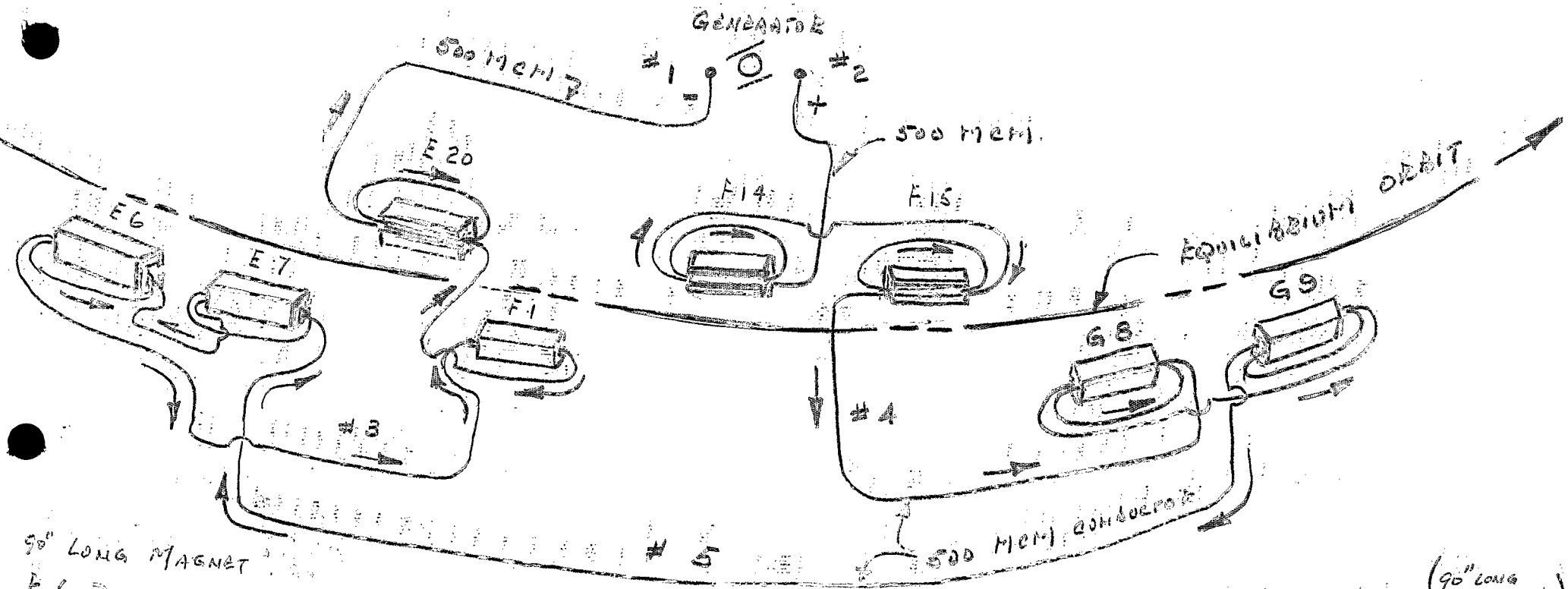
Distribution: J. Spiro
I. Polk
J. Grisoli
E. Forsyth
A. Soukas
W. Gefers
M. Barton
R. Blumberg
E. Raka
U. Vogel
M. Czaja

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

BACK LAG WINDING INSTALLATION

30 JANUARY 1968.

1000 AMPERE POWER SUPPLY SERIES WOUNDS.



90" LONG MAGNET

E6 } 5 TURNS
E7 }

BANDS BEAM

INWARD.

75" SHORT MAGNET

F20 } 6 TURNS
F1 }

BANDS BEAM

OUTWARD

90" LONG MAGNET

F14 } 5 TURNS
F15 }

BANDS BEAM

OUTWARD

G8 - 5 TURNS (90" LONG MAGNET)

G9 6 TURNS (75" SHORT MAGNET)

BANDS BEAM

INWARD