

February 1st 1959

N.I.(GP)(59) 10

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

GENERAL PURPOSES COMMITTEE

D.C. GENERATORS FOR MAGNET TESTING AND BUBBLE CHAMBER

Note by Dr. Pickavance

1. Tenders for the D.C. generators referred to at the last meeting (N.I.(GP)(58)18) have now been obtained. It will be recalled that these generators are required permanently to supply power for the magnet of the large hydrogen bubble chamber, but they will not be required for this purpose until January 1961, and will previously be temporarily used, from January 1960 for about a year, for testing magnet octants for the 7 GeV proton synchrotron.

2. For magnet testing currents up to 8000 amps are required at 100 - 120 volts.

For the bubble chamber 8000 amps at 500 volts is required.

3. To meet these two requirements it is proposed to buy four motor-generator sets each capable of 250 volts, 4000 amps; two of these operating in parallel would be sufficient for magnet testing and four in series-parallel would be suitable for supplying the power to the bubble chamber magnets.

4. The cheapest form of drive is the squirrel cage induction motor with direct on starting and since a current surge of 4 to 5 times full load current is permissible at the Rutherford Laboratory, this type of motor and starting equipment has been specified.

5. It has been ascertained that the speed variations due to voltage fluctuations produced by the proton-synchrotron machines, will not upset the steady D.C. voltage on the bubble chamber magnet.

6. The voltage of the generator is to be controlled with the help of amplidyne generators, which will be the subject of a separate contract.

7. Tenders were invited from all the known British electrical firms capable of making machines of this size and type and Appendix I gives a precis of the tenders received.

8. When tenders were requested, there was some doubt as to whether 250 volt or 500 volt generators would be more suitable, and quotations were obtained for 500 volts also. (see Appendix 2). It is now known that 250 volt machines are needed.

9. It is recommended that the lowest offer of £52,897 made by the General Electric Co. be accepted; and that two sets be ordered for delivery in December 1959 and two further sets for delivery in October 1960.

APPENDIX I

4 MOTOR GENERATOR SETS

OUTPUT 1000 KW. 250 volts D.C.

<u>MANUFACTURER</u>	<u>SPEED</u> <u>R.P.M.</u>	<u>RIPPLE</u> <u>%</u>	<u>STARTING</u> <u>CURRENT</u> <u>x F.L.</u>	<u>EXCITATION</u>		<u>EFFICIENCY</u> <u>%</u>	<u>PRICE</u> <u>£</u>	<u>DELIVERY</u>
				<u>Volts</u>	<u>Amperes</u>			
G.E.C.	740	1.25	5	100	25	92.9	52897	Commence in 40 weeks 1/week
E.E.	742	1	-	110	25	93.0	62422	45 weeks
BRUSH	740	1	5	220	20	-	56689	13 months
BRUSH	740	1	4.5	220	20	-	57149	13 months
BRUSH	740	1	4	220	20	-	58177	13 months
LANCASHIRE DYNAMO & CRYPTO	742	1.5	-	400	10	-	74816	15 months
ELECTRIC CONSTRUCTION COY.	738	2	-	250	30	-	67058	24 months
A.E.I.	739	1	4	170	18	95.3	77534	18 months
A.E.I.	739	1	5	170	18	95.3	75838	18 months

APPENDIX II

4 MOTOR GENERATOR SETS

OUTPUT 1000 KW. 500 volts D.C.

<u>MANUFACTURER</u>	<u>SPEED</u> R.P.M.	<u>RIPPLE</u> %	<u>STARTING</u> <u>CURRENT</u> x F.L.	<u>EXCITATION</u>		<u>EFFICIENCY</u> %	<u>PRICE</u> £	<u>DELIVERY</u>
				Volts	Amps.			
G.E.C.	985	1.25	5	98	20	94	45,514	Commence 40 weeks 1 per wk.
GROMPTON PARKINSON	980	0.75	4.5	160	22.5	-	58,337	Commence 40 weeks 1 per 2 wks.
E.E.	992	1.0	-	137	18.3	94.5	54,463	Dec. 1959 order mid Jan. 1959.
BRUSH	740	1.0	5	220	20	89.5	52,033	12 months
"	"	"	4.5	"	"	"	52,497	"
"	"	"	4	"	"	"	53,525	"
LANCASHIRE DYNAMO AND CRYPTO	742	1.5	-	400	10	-	55,606	15 months
E.C.C.	738	2	-	Exciter Included 250 30		89.5	52,157	24 months
A.E.I.	985	1	4	120	17.5	95.3	54,898	18 months
"	"	"	5	"	"	"	53,334	"