Title
MEASUREMENTS OF SMCo5 BLOCKS - 1ST SHIPMENT

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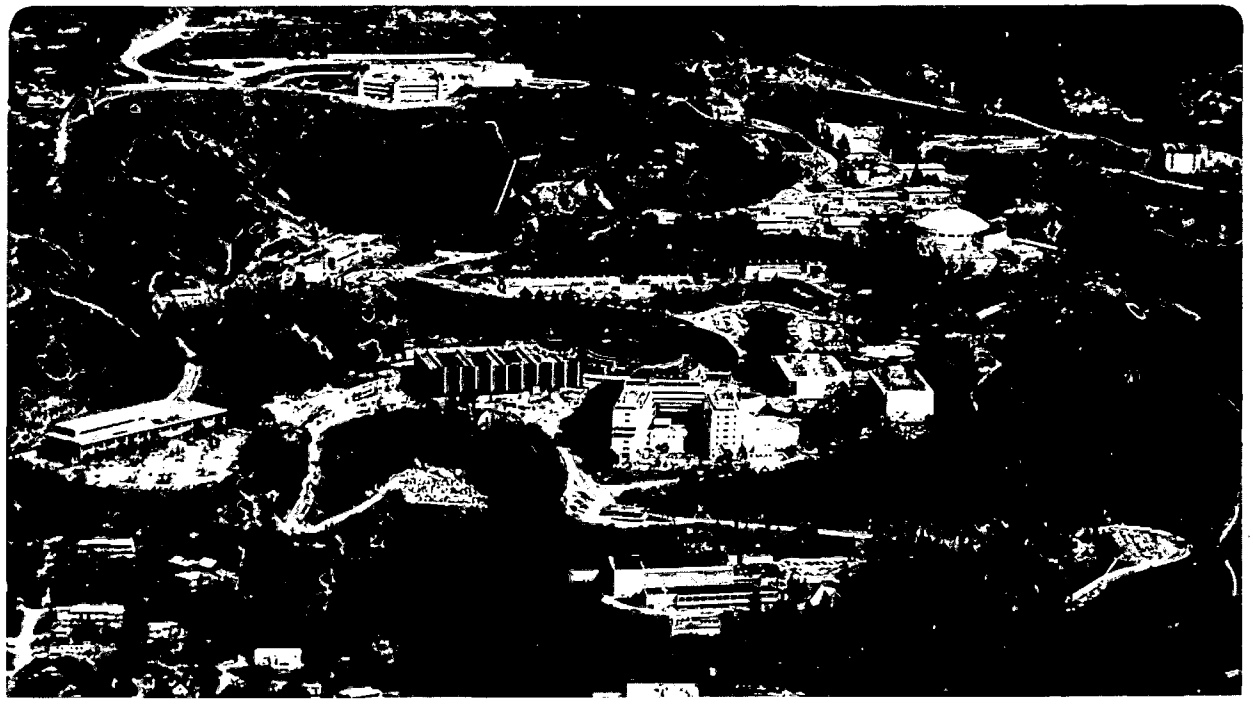
For Reference

Not to be taken from this room



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ENGINEERING NOTE

CODE	SERIAL	PAGE
SL0601	M 5938	1 OF 5

AUTHOR	DEPARTMENT	LOCATION	DATE
J. CHIN | E. HOYER			6/23/82

PROGRAM — PROJECT — JOB

SLF - WIGGLER | BEAM LINE III

WIGGLER - SmCo5 BLOCKS

TITLE

MEASUREMENTS OF SmCo5 BLOCKS - 1ST SHIPMENT

MAGNETIC MOMENT READINGS:

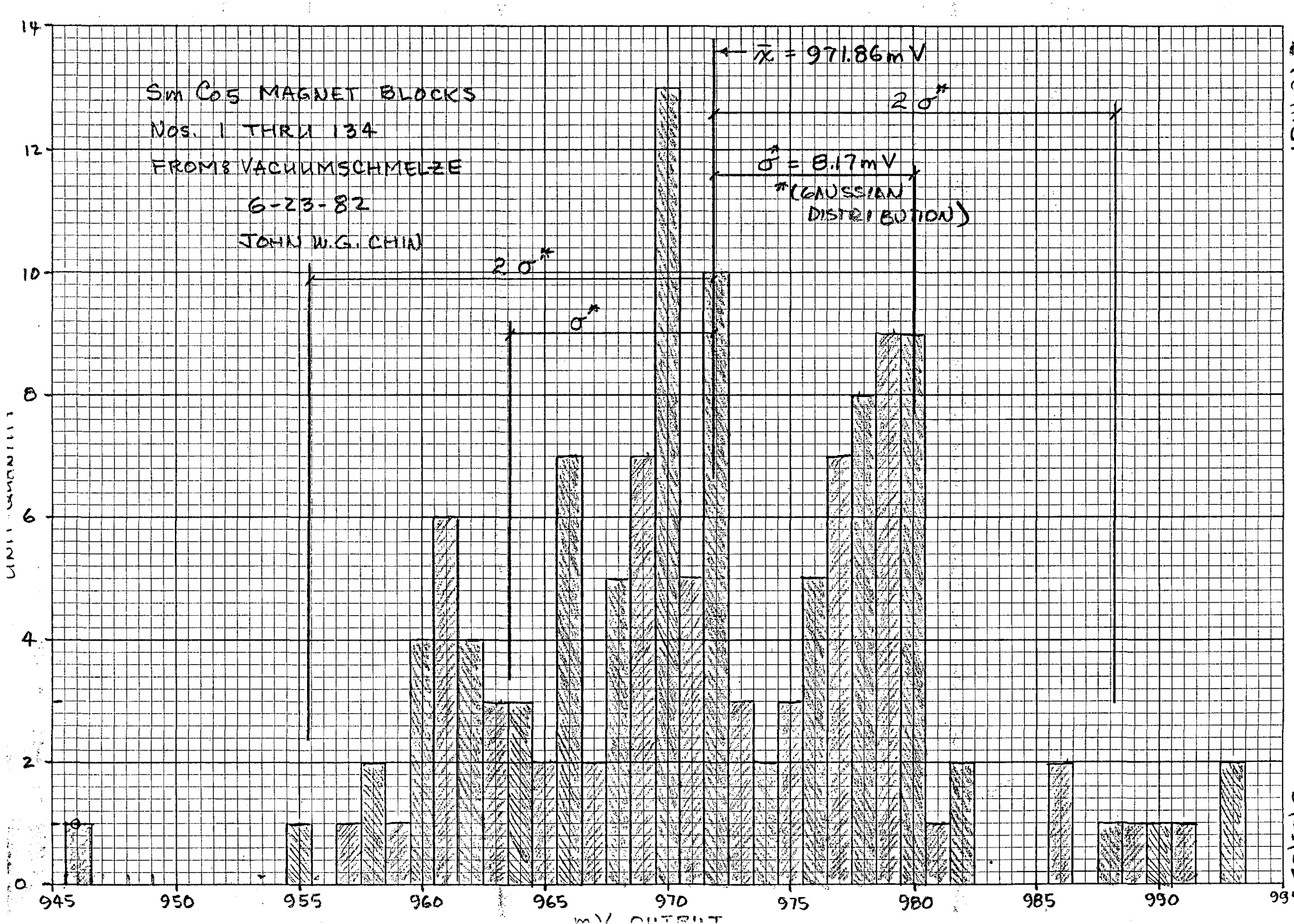
mV READING	QUANTITY	mV READING	QUANTITY	mV READING	QUANTITY
946	1	969	7	992	~~0~~
947	~~0~~	970	13	993	2
948	~~0~~	971	5		
949	~~0~~	972	10	Σ	134
950	~~0~~	973	3		
951	~~0~~	974	2		
952	~~0~~	975	3		
953	~~0~~	976	5		
954	~~0~~	977	7		
955	1	978	8		
956	~~0~~	979	9		
957	1	980	9		
958	2	981	1		
959	1	982	2		
960	4	983	~~0~~		
961	6	984	~~0~~		
962	4	985	~~0~~		
963	3	986	2		
964	3	987	~~0~~		
965	2	~~988~~ 988	1		
966	7	989	1		
967	2	990	1		
968	5	991	1		

Σ = 134 (6/23/82 J. CHIN)

$\bar{x}$ = 971.86

δ = 8.17

mV TOTAL = 130229



J. CHIA.
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SHEET 5

MAGNETIC MOMENT VARIATION:

ALLOWABLE: (±2.5%)

$(971.86)(0.975) = 947.6$

$(971.86)(1.025) = 996.1$

ACTUAL VARIATION:

946 – 993 (1 JUST OUT OF TOLERANCE)

MAGNETIC MOMENT:

PER HALBACH

$M_1 = B_1 - H_1$

$$M_1 = \frac{V_{OUT}\ (\text{VOLTS})}{\tau\ (m^3)} \frac{\tau\ (\text{SEC})}{N\ (\text{TURNS})} rm \left(1 + (1/2)^2\right)^{\frac{3}{2}}$$

FOR:

$r = 0.10023\ m$

$N = 49$

$\tau = 10.0929 \times 10^{-3}$ sec

$V = (1.1176\ cm)(5.080\ cm)(5.334\ cm) = 30.283\ cm^3$ (±1.67%)

$M_1 = 0.9528\ V_{OUT}\ (\text{VOLTS})$ (TESLAS) (±1.67%)

NOMINAL VALUE FOR BLOCKS:

$M_1 = (.9528)(.97186) = 0.926$ TESLAS (±1.67%)

PERMEABILITY:

FROM JOUBERT'S DATA: (SEE PAGE 5)

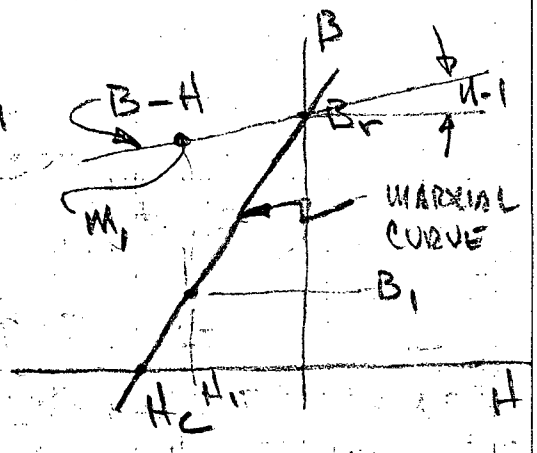
$$\mu = \frac{(9.6\ \text{TES})}{7.35\ \frac{\text{KA}}{\text{cm}}}\left(\frac{2.0213\ \text{A}}{\text{G-IN}}\right)\left(\frac{10^6}{\text{TES}}\right)\left(\frac{\text{KA}}{10^3\ \text{A}}\right)\left(\frac{\text{IN}}{2.54\ \text{cm}}\right)$$

$$= 1.039$$

COERCIVE FORCE & REMANENT FIELD

PER HALBACH:

$$B = B_r + \mu H \quad ; \quad H_c = -B_r/\mu$$



$$M_1 = B_1 - H_1$$

$$= B_1 - \left(\frac{B_1 - B_r}{\mu}\right)$$

$$M_1 = \frac{B_r}{\mu} + B_1\left(1 - \frac{1}{\mu}\right)$$

$$B_r = M_1\mu - B_1\left(1 - \frac{1}{\mu}\right)$$

$$H_c = -\frac{B_r}{\mu} = -\left(M_1 - B_1\left(1 - \frac{1}{\mu}\right)\right)$$

THE AVERAGE SURFACE FIELD (B_1) IS $\sim$ .2 TES

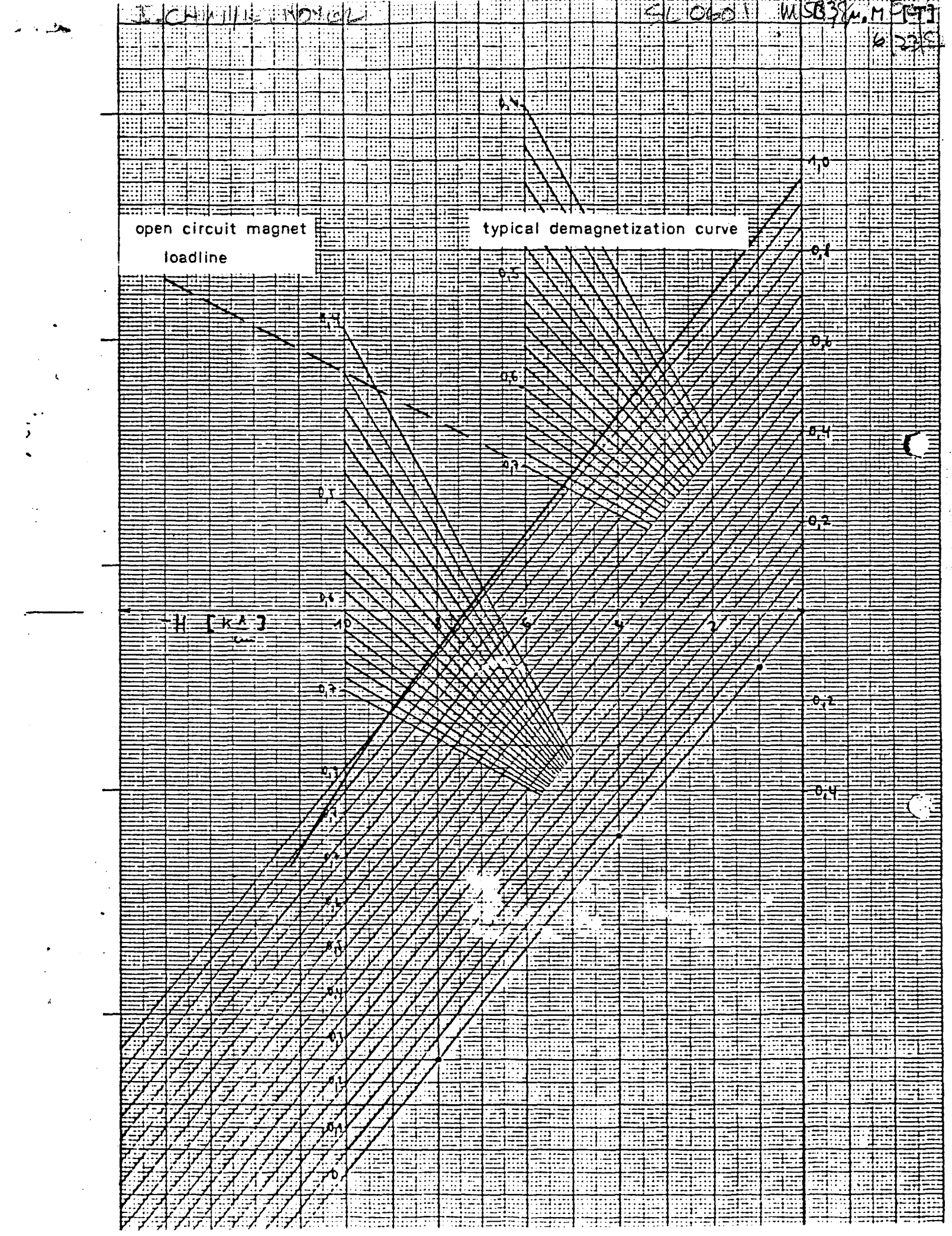
$$\therefore B_r = (.926\ \text{TES})(1.039) - .2\ \text{TES}\left(1 - \frac{1}{1.039}\right) \quad (.0075)$$

$$= 0.956\ \text{TES} \qquad (\pm 1.67\%)$$

$$H_c = -\left(.926 - (.2)\left(1 - \frac{1}{1.039}\right)\right) \quad (.0015)$$

$$= -0.919\ \text{TES} \rightarrow 9190\ \text{OERSTEDS} \quad (\pm 1.67\%)$$

(LOOKS GOOD)


open circuit magnet loadline
typical demagnetization curve
-H [kA/m]
1,0
0,8
0,6
0,4
0,2
0,4
0,2
10
8
6
4
2

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