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22 July 1964

To: V. Webb

From: [redacted]

Subject: RECOMMENDED EXPOSURE FOR MISSION 1009

The evaluation of Mission 1006 has shown that the quality of the panoramic photography was superior to all recent missions. The photographic quality is a subjective judgement of the edges of objects recorded by the camera and is, therefore, insensitive to scale. The edge quality observed was not affected by emulsion grain which has normally determined the resolution threshold in other missions.

The improvement in photographic quality was demonstrated by the enlargements made by the customer. Normally, 40X enlargements are the maximum used as further magnification produces the grain inherent in the original negative. The enlargements made with Mission 1006 original negatives were generally 60X and ranged up to 100X.

Preliminary evaluation of Mission 1006 engineering material at A/P shows that exposure times were shorter than originally predicted. This reduces the predicted V/h error and reduces the sensitivity of the system to IMC error to an extent that the calculated errors are generally below the tolerable limit.

The improved photographic quality observed in the mission material is attributed to the unusually short exposure time generally experienced throughout the mission. This resulted in a better exposure on the processed original negative as the camera exposure time and processing level approached a nominal match.

The evaluation of Mission 1007 showed a return to the conditions of exposure and processing which resulted in the photographic quality limit being determined by emulsion grain.

In order to achieve the improved performance of Mission 1006 during Mission 1009, it is recommended that a 0.150 inch wide slit be installed in both panoramic cameras in place of the 0.200 inch wide slit. This will produce the nominal exposure-processing conditions for the mission orbital

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parameters. The reduction in exposure time will significantly reduce the sensitivity of the system to IMC errors thus allowing the nominal recording of the finer detail inherent with the improved photographic quality.

The nominal exposure times of the camera system, based on the solar elevation, for the "Full", "Intermediate" and "Primary" levels of processing have been plotted against latitude in Figures 1 through 8. The exposure times resulting from the planned orbital parameters are also plotted against latitude using a 0.150 inch and 0.200 inch wide slit. These values have been plotted for Pass 8, 64, 128 and 144 at 2300Z and 2400Z launch times.

The quadrant and latitude at which nominal exposures can not be achieved are listed in Table I for both the tangency area and the equitorial area. The limits are tabulated for the planned orbital conditions, a plus and minus 3 sigma shift in perigee latitude, and a low perigee that would result in a constant exposure time at the top of the V/h programmer.

The risk involved in using the 0.150 inch wide slit is considered nominal. There is the possibility that some detail may be occassionally lost in shadow areas. The anticipated overall gain far outweighs the probable loss.

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Manager, Adv. Proj.

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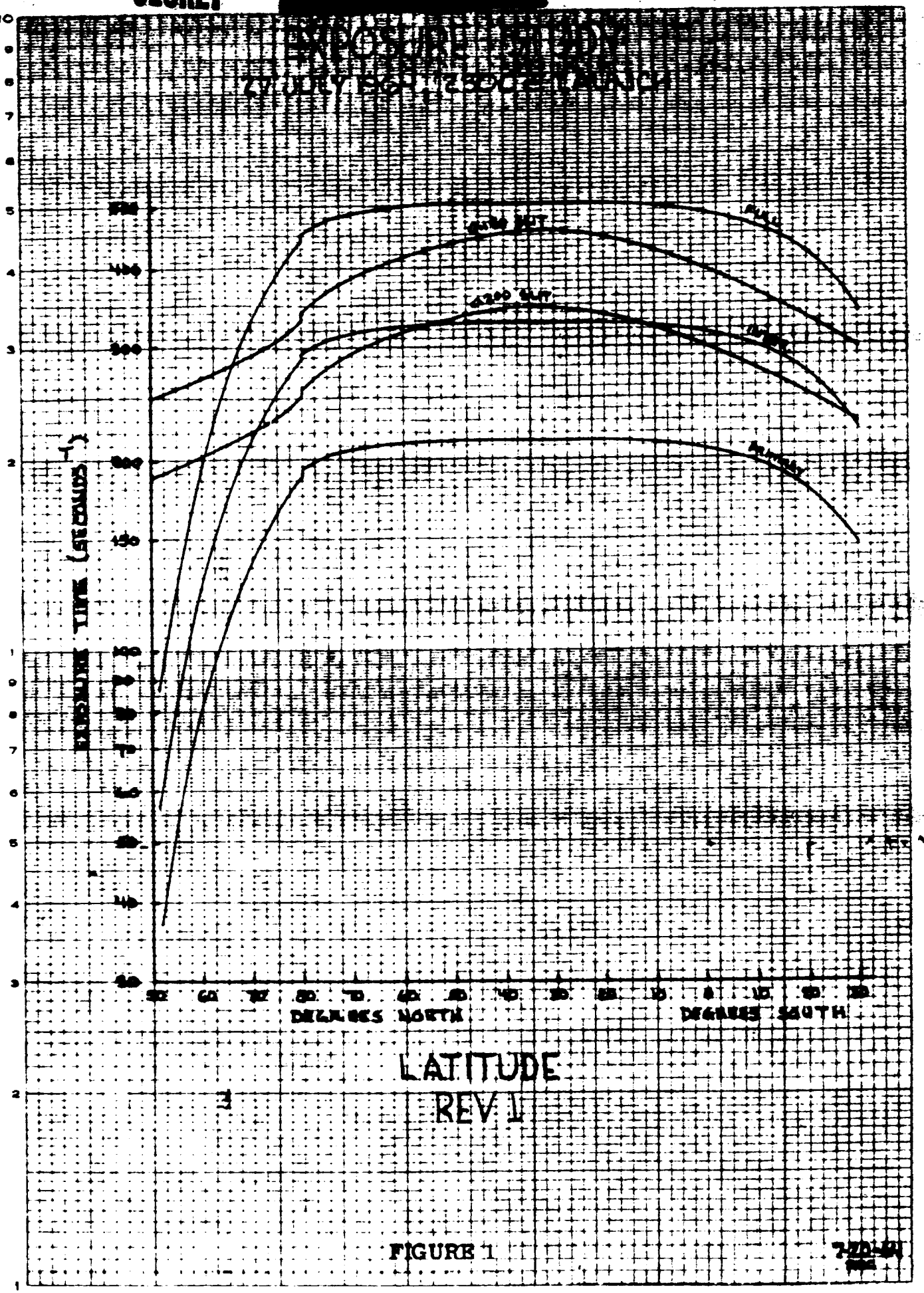
EXPOSURE TIME (SECONDS)
DEGREES NORTH
DEGREES SOUTH
LATITUDE
REV 1

FIGURE 1

[redacted]

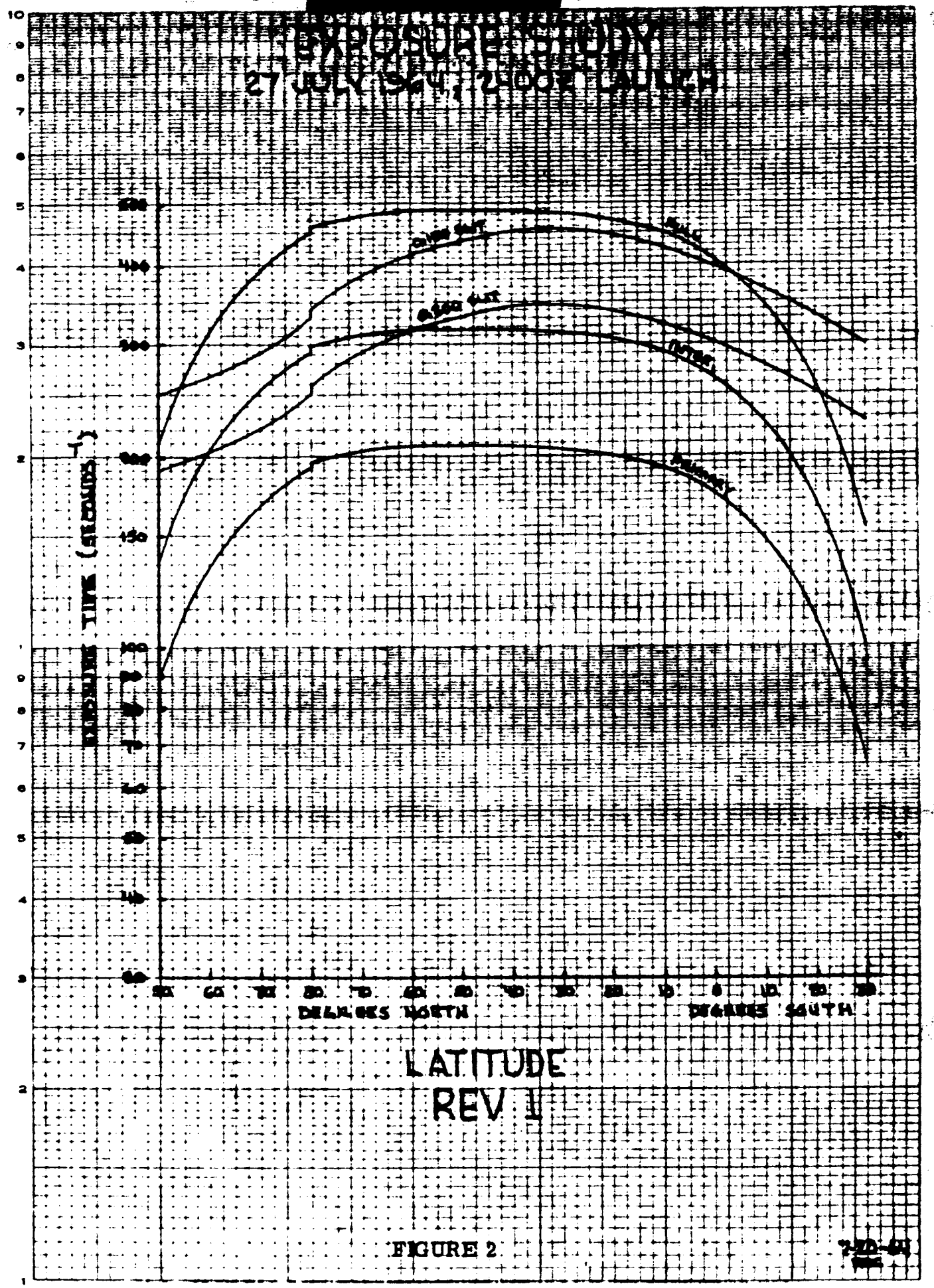

FIGURE 2

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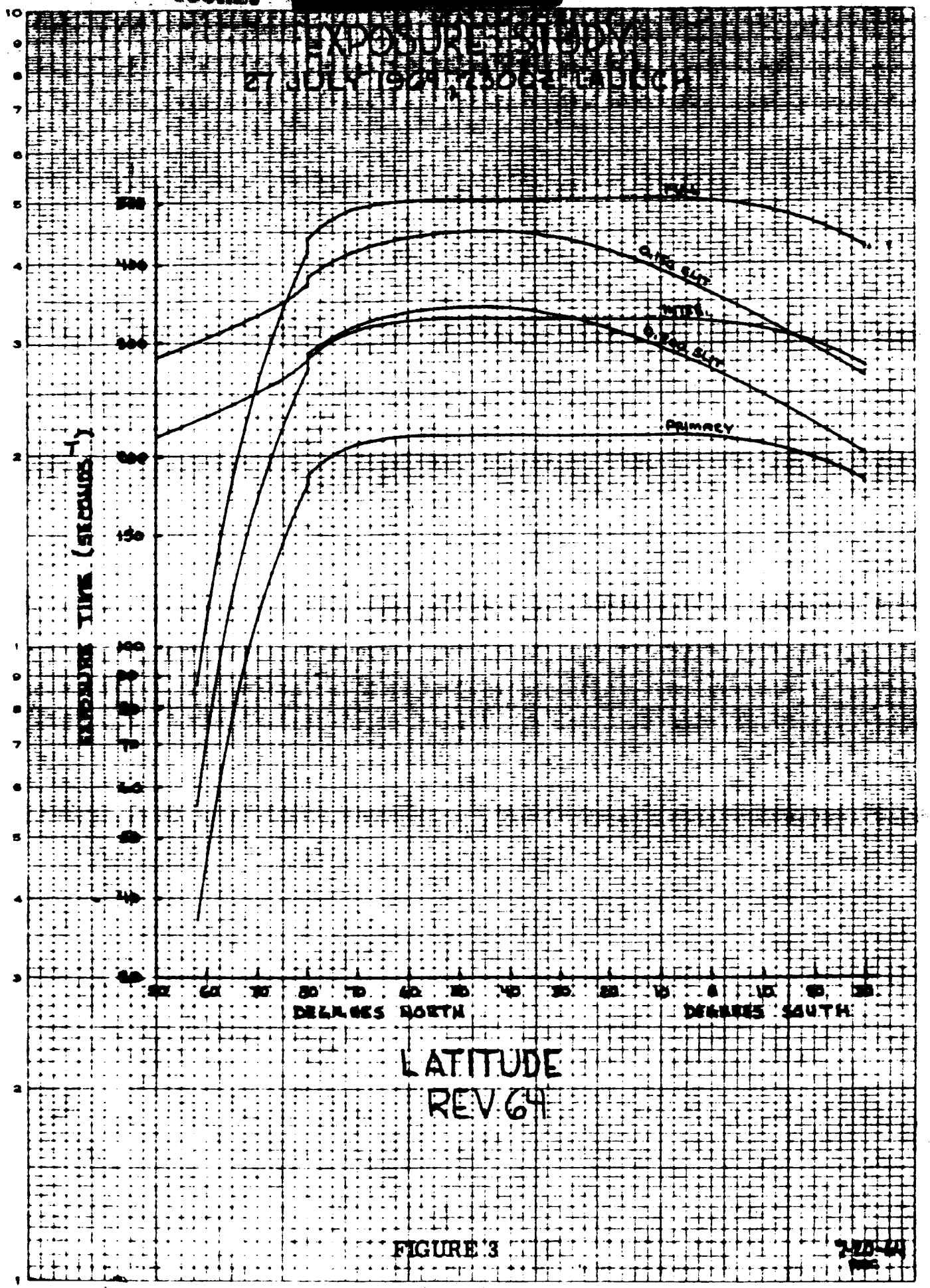

FIGURE 3

EUGENE DIETZGEN CO.
MADE U.S.A.

NO. 340R L210 DIETZGEN GRAPH PAPER
SEMI-LOGARITHMIC
2 CYCLES X 10 DIVISIONS PER INCH

[redacted]

[redacted]

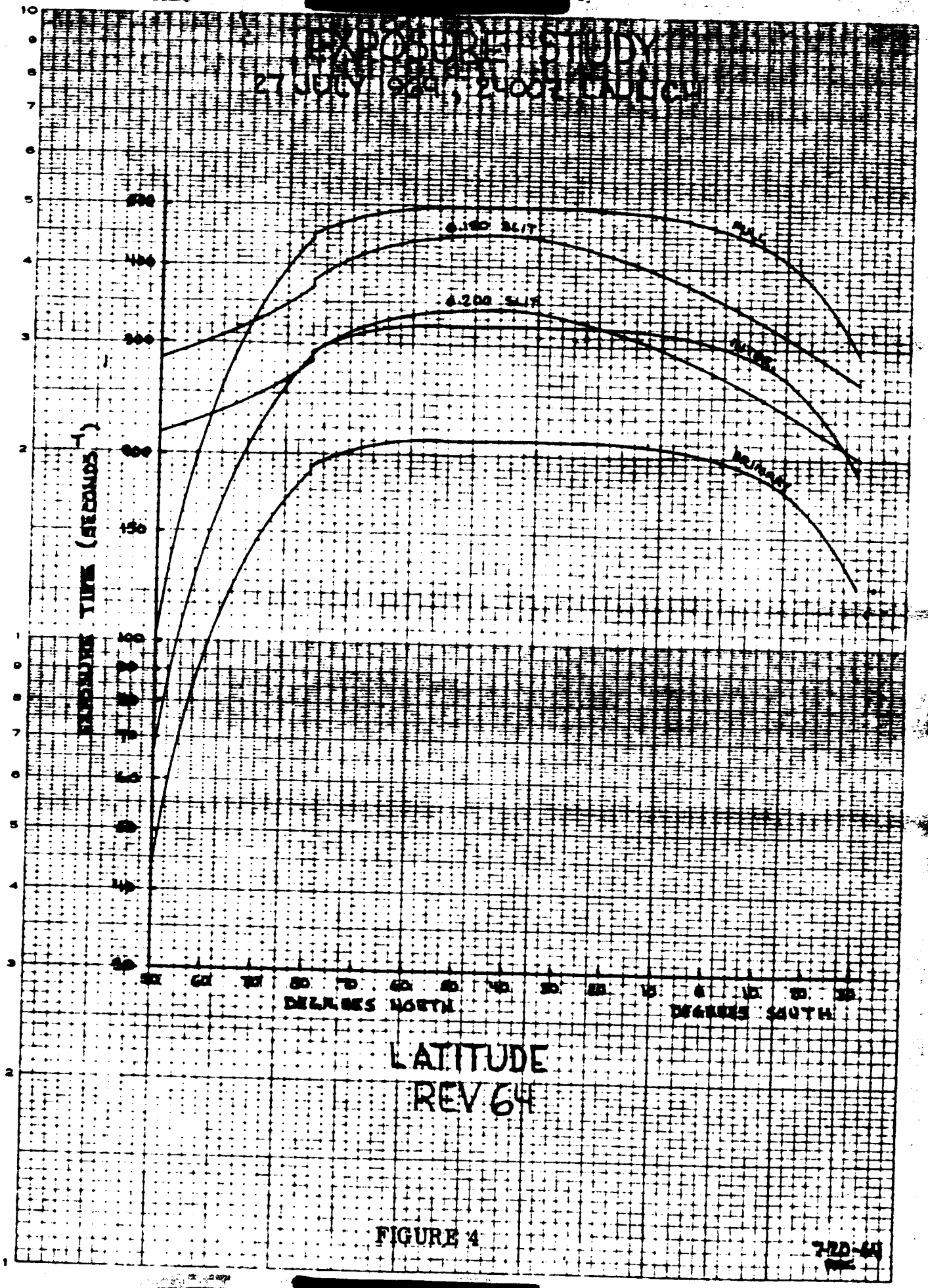

FIGURE 4

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[redacted]

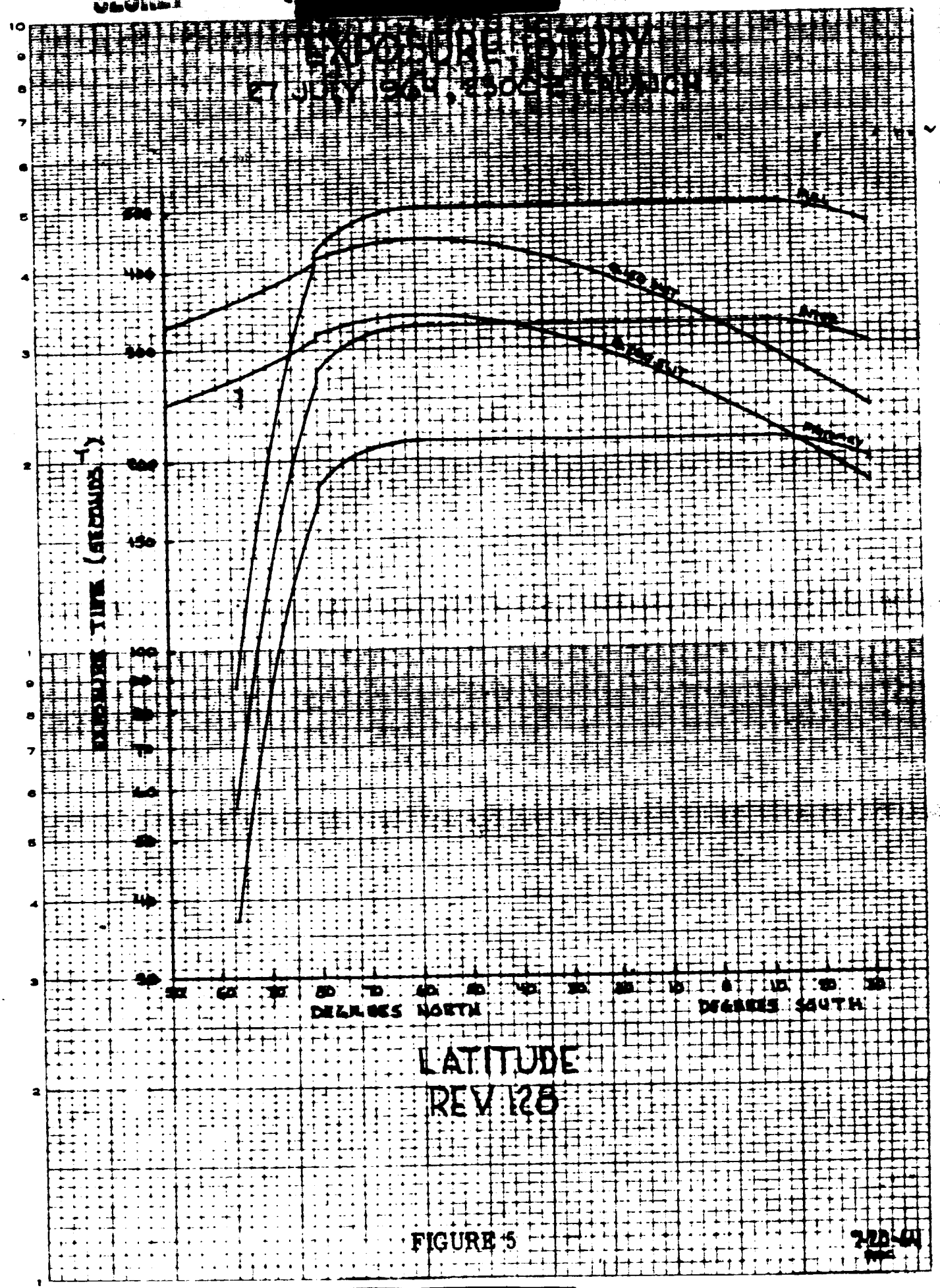

FIGURE 5

7-20-64

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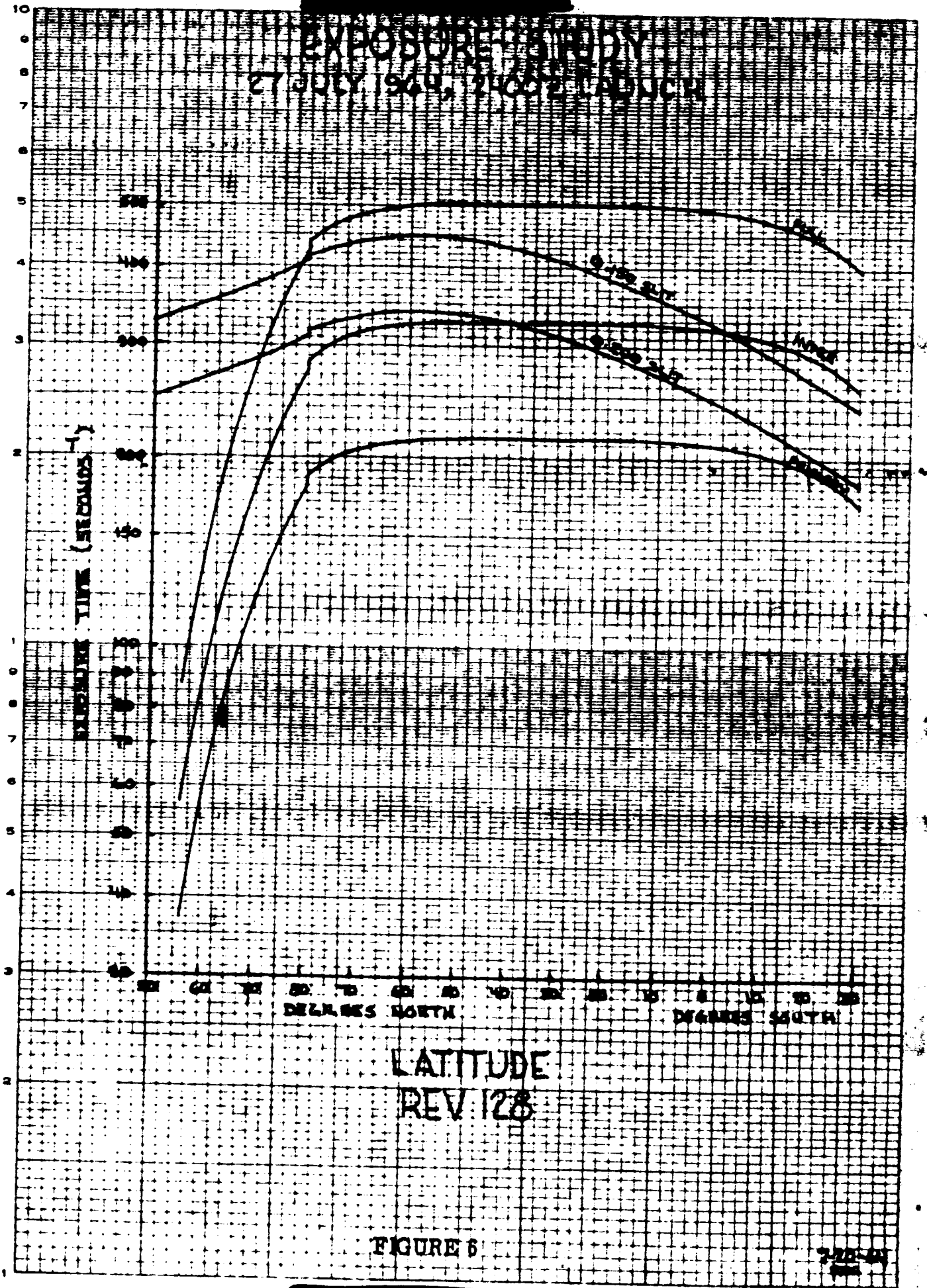

FIGURE 6

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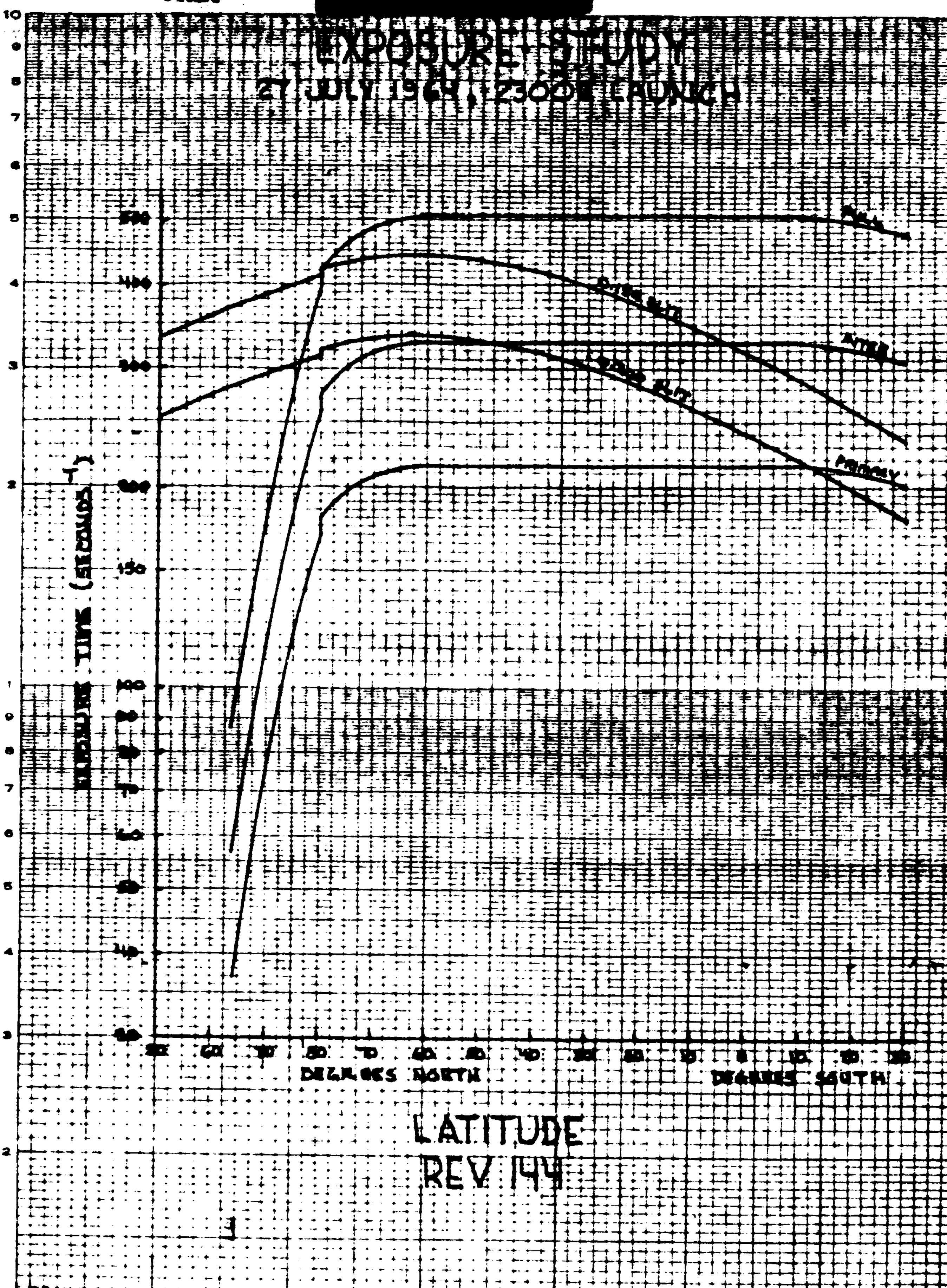

FIGURE 7

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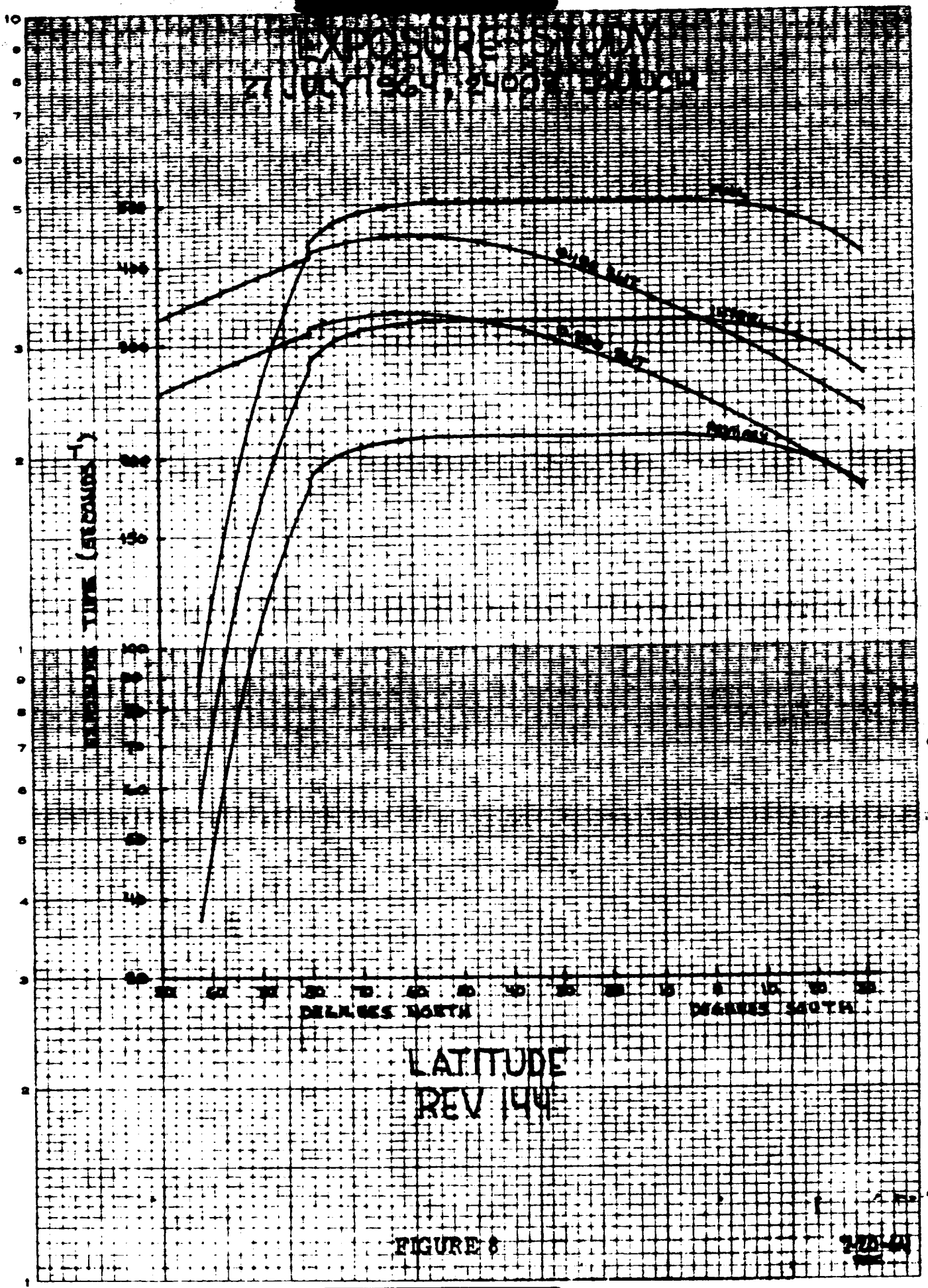

FIGURE 8

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TABLE I

	LAUNCH TIME	ORBIT	LATITUDE LIMIT TANGENCY .150"	TANGENCY .200"	EQUATORIAL .150"	EQUATORIAL .200"
REV 1	2300	Normal Orbit	166	161	330	330
		+3σ Perigee	173	162	330	330
		-3σ Perigee	164	150	330	330
		Low Perigee	278	171	310	329
	2400	Normal Orbit	154	150	305	321
		+3σ Perigee	158	150	323	330
		-3σ Perigee	150	150	205	317
		Low Perigee	180	164	214	321
REV 64	2300	Normal Orbit	176	169	330	330
		+3σ Perigee	180	173	330	330
		-3σ Perigee	173	167	330	318
		Low Perigee	277	176	330	330
	2400	Normal Orbit	168	160	330	330
		+3σ Perigee	177	163	330	330
		-3σ Perigee	165	150	328	330
		Low Perigee	278	170	303	323
REV 128	2300	Normal Orbit	180	175	330	315
		+3σ Perigee	278	176	330	303
		-3σ Perigee	177	173	330	330
		Low Perigee	276	177	330	330
	2400	Normal Orbit	178	170	330	330
		+3σ Perigee	180	173	330	307
		-3σ Perigee	175	168	330	330
		Low Perigee	277	175	316	330
REV 144	2300	Normal Orbit	180	176	330	312
		+3σ Perigee	278	177	330	300
		-3σ Perigee	179	175	330	330
		Low Perigee	275	178	330	330
	2400	Normal Orbit	180	172	330	325
		+3σ Perigee	278	174	330	302
		-3σ Perigee	177	171	330	330
		Low Perigee	277	176	321	330

K·E 10 X 10 TO THE INCH 359-5
KEUFFEL & ESSER CO. MADE IN U.S.A. [redacted]

1009

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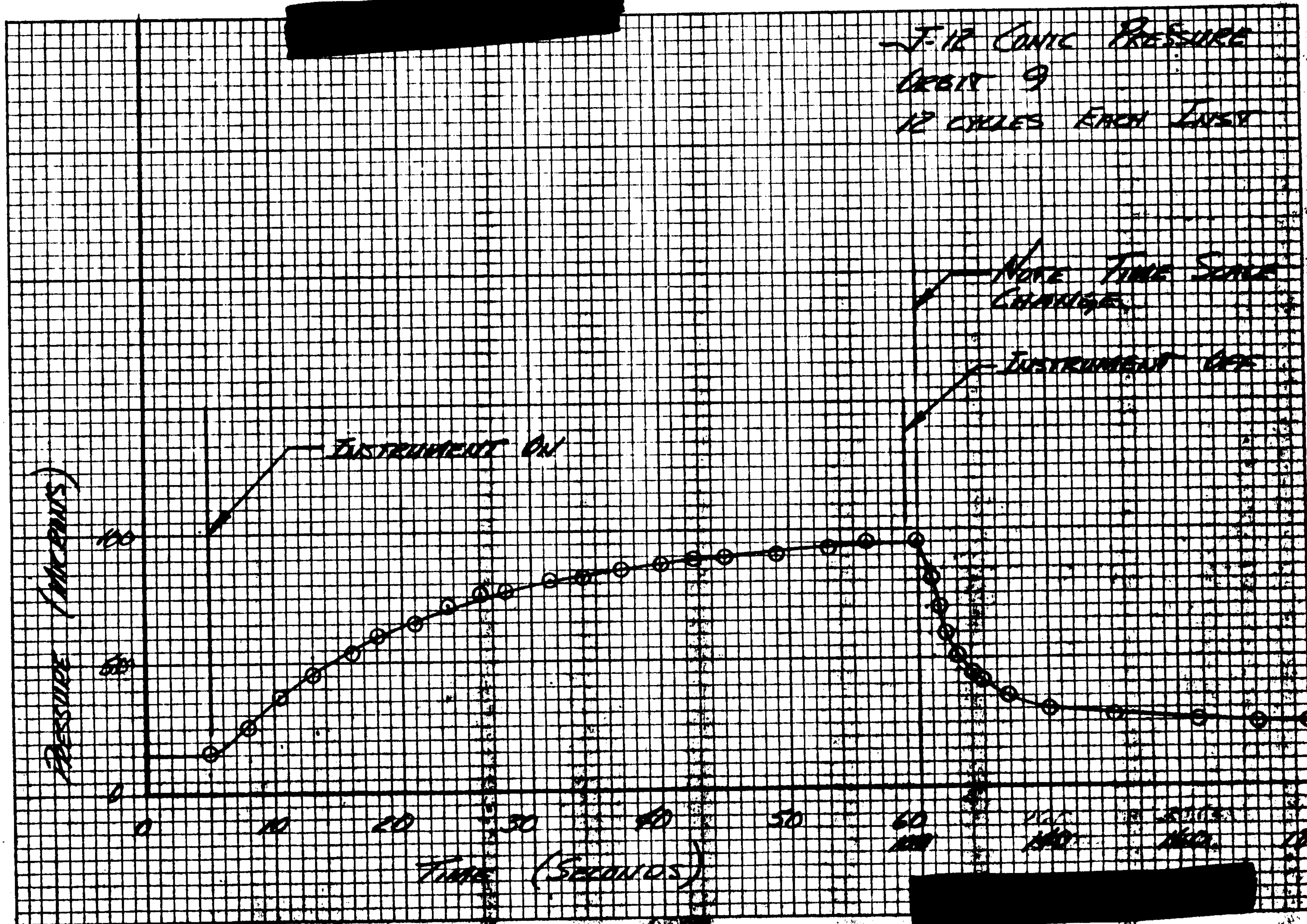

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