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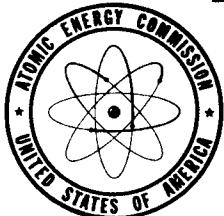
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CALCULATIONS ON U²³⁵ FISSION PRODUCT DECAY
CHAINS

By
J. M. West

May 1952

Reactor Engineering Division
Argonne National Laboratory
Lemont, Illinois



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Technical Information Division

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I. L. Faller, * T. S. Chapman, ** and J. M. West

Introduction

Calculations have been made on the U²³⁵ fission product decay schemes. The results for a typical example, that of a reactor operating at 1000 kilowatts for 180 days, have been tabulated and graphed. General formulae have been used so that the results can be applied for any power level and any time of irradiation.

Method of Calculation

The decay chains, half-life values, and fission yields were taken chiefly from the National Nuclear Energy Series.¹ The decay chains are enumerated in the appendix. References 2 to 10 list data differing from those in reference 1, with the pertinent chain shown in parentheses.

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¹Appendices A and B, National Nuclear Energy Series, Div. IV, Vol. 9. New York, McGraw-Hill Book Company, 1951.

²A. C. G. Mitchell and A. B. Smith, Phys. Rev. 85 153 (1952). (Chain 77).

³I. Bergström, M. Siegbahn Commemorative Volume, p. 307. Uppsala, 1951. (Chain 85).

⁴Hudgens and Lyon, Phys. Rev. 75 206 (1949). (Chain 95).

⁵Duffield and Langer, Phys. Rev. 81 203 (1951). (Chain 105).

⁶Martell and Libby, Phys. Rev. 80 977 (1950). (Chain 115).

⁷A. C. Wahl and N. A. Bonner, Phys. Rev. 85 570 (1952). (Chain 115).

⁸C. M. Nelson, B. H. Ketelle and G. E. Boyd, Studies on the Nuclear Chemistry of Tin, ORNL-828, (November 10, 1950). (Chain 125).

⁹J. W. Barnes and A. J. Freedman, Phys. Rev. 84 365 (1951). (Chains 126, 127).

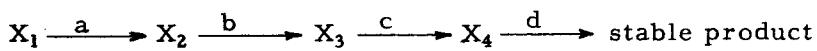
¹⁰NP-3151, MIT Progress Report, May 31, 1951, p. 67. (Chains 128, 131, 132, 133, 134).

When no yields were given, values were read from the fission-mass curve¹ for the fission of U²³⁵ by thermal neutrons.

Each member of a chain will have a different fission yield, since the independent yield of each nuclide will vary with its position relative to the most probable charge of the fission fragment of given mass number.¹¹ For most chains, experimental yields for one or two members only are available. The yield-mass curve gives the yield for a member near stability and thus closely represents the total yield of the chain. These yields, applied to the remaining members, will give an upper limit for the number of atoms produced. In order to permit an estimate of the deviation from the more accurate value, calculation has been made for chain 140, determining the predicted percentage yields along the chain by the method described in the addendum to reference 11 and using the experimental 12.80d Ba yield. Comparison of results are listed.

Chain	Method	Nuclide			
		Xe	Cs	Ba	La
140	This report	4.430×10^{16}	1.825×10^{17}	3.063×10^{21}	3.988×10^{20}
140	Ref. 11	2.348×10^{16}	1.665×10^{17}	3.063×10^{21}	3.988×10^{20}

The following are generalized equations¹² for the radioactive decay of the elements in a decay chain



where a, b, c, and d are characteristic decay constants for species 1, 2, 3, and 4, respectively.

$$\begin{aligned} a &= \ln 2 / (\text{half-life of isotope 1}) \\ &= 0.69315 / (\text{half-life of isotope 1}) \end{aligned} \quad (1)$$

$$N_1(t) = N_1^0 e^{-at} \quad (2a)$$

$$N_2(t) = N_2^0 e^{-bt} + N_1^0 \frac{a}{b-a} (e^{-at} - e^{-bt}) \quad (2b)$$

$$\begin{aligned} N_3(t) &= N_3^0 e^{-ct} + N_2^0 \frac{b}{c-b} (e^{-bt} - e^{-ct}) \\ &+ N_1^0 \left[\frac{a}{b-a} \frac{b}{c-a} e^{-at} + \frac{a}{a-b} \frac{b}{c-b} e^{-bt} + \frac{a}{a-c} \frac{b}{b-c} e^{-ct} \right] \end{aligned} \quad (2c)$$

¹¹Paper 52, reference 1.

¹²E. Rutherford, J. Chadwick and C. D. Ellis, Radiations from Radioactive Substances, pp. 10 seq. Cambridge University Press, 1930.

$$\begin{aligned}
N_4(t) &= N_4^0 e^{-dt} + N_3^0 \frac{c}{d-c} (e^{-ct} - e^{-dt}) \\
&+ N_2^0 \left[\frac{b}{c-b} \frac{c}{d-b} e^{-bt} + \frac{b}{b-c} \frac{c}{d-c} e^{-ct} + \frac{b}{b-d} \frac{c}{c-d} e^{-dt} \right] \\
&+ N_1^0 \left[\frac{a}{b-a} \frac{b}{c-a} \frac{c}{d-a} e^{-at} + \frac{a}{a-b} \frac{b}{c-b} \frac{c}{d-b} e^{-bt} + \frac{a}{a-c} \frac{b}{b-c} \frac{c}{d-c} e^{-ct} \right. \\
&\left. + \frac{a}{a-d} \frac{b}{b-d} \frac{c}{c-d} e^{-dt} \right]
\end{aligned} \tag{2d}$$

where $N_i(t)$ = number of atoms of isotope i remaining at time t after the material has been removed from the pile. ($i = 1, 2, 3, \dots$)

$$N_i^0 = \frac{(\text{Power in kw})(3.1 \times 10^{13} \text{ fissions/kws})(\text{Yield}) F_i^0}{\text{Decay constant of isotope } i \text{ in sec}^{-1}} \tag{3a}$$

$$= \frac{(\text{Power in kw})(1.12 \times 10^{17} \text{ fissions/kwh})(\text{Yield}) F_i^0}{\text{Decay constant of isotope } i \text{ in hr}^{-1}} \tag{3b}$$

In the tables, the fission yield in per cent appears in parentheses below the symbol for the isotope.

The F_i^0 factors give the fraction of saturation¹³ and are included in the equation for N_i^0 only when the period of reactor operation is less than five times the half-life of the isotope or any of its ancestors. The time of irradiation is indicated as t' .

$$F_1^0 = 1 - e^{-at'} \tag{4a}$$

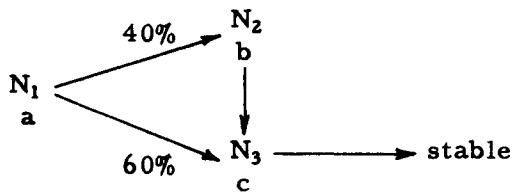
$$F_2^0 = \frac{b}{b-a} (1 - e^{-at'}) - \frac{a}{b-a} (1 - e^{-bt'}) \tag{4b}$$

$$\begin{aligned}
F_3^0 &= \frac{b}{b-a} \frac{c}{c-a} (1 - e^{-at'}) + \frac{a}{a-b} \frac{c}{c-b} (1 - e^{-bt'}) \\
&+ \frac{a}{a-c} \frac{b}{b-c} (1 - e^{-ct'}) \tag{4c}
\end{aligned}$$

$$\begin{aligned}
F_4^0 &= \frac{b}{b-a} \frac{c}{c-a} \frac{d}{c-a} (1 - e^{-at'}) + \frac{a}{a-b} \frac{c}{c-b} \frac{d}{d-b} (1 - e^{-bt'}) \\
&+ \frac{a}{a-c} \frac{b}{b-c} \frac{d}{d-c} (1 - e^{-ct'}) + \frac{a}{a-d} \frac{b}{b-d} \frac{c}{c-d} (1 - e^{-dt'}) \tag{4d}
\end{aligned}$$

¹³P. R. Gillette, Activity of Fission Products, HW-17415 (April 14, 1950).

In these calculations, branched chains are frequently involved. The calculations are then somewhat more complicated. A typical example is shown below.



$$N_1(t) = N_1^0 e^{-at}$$

$$N_2(t) = N_2^0 e^{-bt} + \frac{0.40 N_1^0 a}{b-a} (e^{-at} - e^{-bt})$$

$$N_3(t) = N_3^0 e^{-ct} + \frac{0.60 N_1^0 a}{c-a} (e^{-at} - e^{-ct}) + 0.40 N_1^0 \left[\frac{a}{b-a} \frac{b}{c-a} e^{-at} + \frac{a}{a-b} \frac{b}{c-b} e^{-bt} + \frac{a}{a-c} \frac{b}{b-c} e^{-ct} \right] + \frac{N_2^0 b}{c-b} \left[e^{-bt} - e^{-ct} \right]$$

It is realized that the calculations have been carried out to more places than the original data warrant. No more than two figures are significant in any case and in some instances only one. No calculations have been made beyond 10^5 hours (11.4 years).

Notation in Tables

Longer expressions appearing in equations (2) are designated in the table headings as follows.

$$S_{ab} = \frac{a}{b-a} (e^{-at} - e^{-bt})$$

$$S_{abc} = \left[\frac{a}{b-a} \frac{b}{c-a} e^{-at} + \frac{a}{a-b} \frac{b}{c-b} e^{-bt} + \frac{a}{a-c} \frac{b}{b-c} e^{-ct} \right]$$

$$S_{abcd} = \left[\frac{a}{b-a} \frac{b}{c-a} \frac{c}{d-a} e^{-at} + \frac{a}{a-b} \frac{b}{c-b} \frac{c}{d-b} e^{-bt} + \frac{a}{a-c} \frac{b}{b-c} \frac{c}{d-c} e^{-ct} + \frac{a}{a-d} \frac{b}{b-d} \frac{c}{c-d} e^{-dt} \right]$$

$$\begin{aligned}
 S_{abcde} = & \left[\frac{a}{b-a} \frac{b}{c-a} \frac{c}{d-a} \frac{d}{E-a} e^{-at} + \frac{a}{a-b} \frac{b}{c-b} \frac{c}{d-b} \frac{d}{E-d} e^{-bt} \right. \\
 & + \frac{a}{a-c} \frac{b}{b-c} \frac{c}{d-c} \frac{d}{E-c} e^{-ct} + \frac{a}{a-d} \frac{b}{b-d} \frac{c}{c-d} \frac{d}{E-d} e^{-dt} \\
 & \left. + \frac{a}{a-E} \frac{b}{b-E} \frac{c}{c-E} \frac{d}{d-E} e^{-Et} \right]
 \end{aligned}$$

Symbols having different subscripts represent terms in which the indicated substitutions have been made; e.g.,

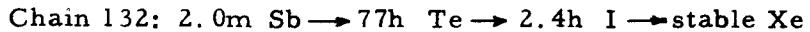
$$S_{bc} = \frac{b}{c-b} (e^{-bt} - e^{-ct})$$

Uses of the Tables

The calculations can be of use in the following instances:

1. When a random sample of fission products is removed from the reactor and then kept in a closed container, determination can be made of the percentage of each isotope remaining at any given time after removal.
2. In the case of a reactor which becomes "runaway" after 180 days operation at 1000 kw, the exact amount of each fission product can be determined if all remain in a closed container.
3. If the runaway should occur so as to allow escape of volatile products into the atmosphere, determination can be made of the amounts of all volatile fission products present at the time of the runaway, which would be subject to immediate release if the fuel melted. The nonvolatile parents of volatile isotopes can also be calculated. The rate of formation of new atoms of the volatile isotope after the runaway is then readily obtained. The volatile fission products are bromine, krypton, iodine, and xenon.

Example:



In this chain, the amounts of the 2.0m Sb, its daughter 77h Te, and 2.4h I present at the instant of the runaway would be calculated. The decay of the initial 2.4h I would then follow the exponential relationship of equation (2a). The amount of new 2.4h I would be calculated from equation (2c). In this case, where the new I is treated separately, $N_3^0 = 0$.

4. If any isotope should be isolated from the reactor, it is possible to obtain the relative amounts of it and of each daughter present at a given time t after removal from the reactor. The following example is illustrative of the method:

Chain 14I:



If the $18m$ Ba is isolated, it is possible to determine the relative amounts of $18m$ Ba and $3.7h$ La at any time by using the following columns:

$$\frac{\text{I}}{t \text{ (hrs)}} \quad \frac{\text{II}}{e^{-bt}} \quad \frac{\text{III}}{N_2^0 S_{bc}}$$

Column II gives the fraction of $18m$ Ba remaining at any time t after the sample has been removed from the reactor. Column III (after dividing by N_2^0) gives the fraction of the $18m$ Ba originally present at time $t = 0$ which remains at any time $t = t$ in the form of $3.7h$ La.

If the $18m$ Ba had been isolated, and it were of interest to know the relative amounts of $3.7h$ La and $30d$ Ce which would be present, then the following method is to be used:

$$\frac{\text{I}}{e^{-bt}} \quad \frac{\text{II}}{N_2^0 S_{bc}} \quad \frac{\text{III}}{N_2^0 S_{bcd}}$$

Column I gives the fraction of the original amount of $18m$ Ba isolated from the reactor which is present as $18m$ Ba at any time t after removal from the reactor.

Column II (after dividing by N_2^0) gives the fraction of the original amount of $18m$ Ba which is present as $3.7h$ La at any time t .

Column III (after dividing by N_2^0) gives the fraction of the original amount of $18m$ Ba which is present as $30d$ Ce at any time t .

5. The number of curies emitted by any isotope at any time t after removal from the reactor can be calculated from the following formula:

$$\text{curies} = \frac{\lambda_i N_i(t)}{1.36 \times 10^{14}}$$

where λ_i ($=a, b, c$ for $i = 1, 2, 3$ respectively) is the characteristic decay constant (in hours $^{-1}$) and $N_i(t)$ is the number of atoms present at any time t after removal from the reactor.

6. The data in the graphs and tables can be used for other power levels and for other irradiation periods by substituting suitable values of N_i^0 and F_i^0 , respectively.

APPENDIX

DECAY CHAINS

TABLE NO.	MASS NO.	CHAIN
1	(72)	$49.0\text{H ZN} \rightarrow 14.25\text{H GA} \rightarrow \text{STABLE GE}$
2	73	$[\leq 2\text{M}] \text{ ZN} \rightarrow 5.0\text{H GA} \rightarrow \text{STABLE GE}$
3	75	$(82\text{M}) \text{ GE} \rightarrow \text{STABLE AS}$
4	77	$(59\text{s}) \text{ GE} \xrightarrow{\downarrow} 12\text{-H GE}$ $\xrightarrow{\quad} 40\text{H As} \xrightarrow{\quad} \begin{matrix} (17.5\text{s}) \text{ SE} \\ \xrightarrow{<2\%} \end{matrix}$ $\xrightarrow{>98\%} \text{STABLE SE}$
5	78	$2.1\text{H GE} \rightarrow 90\text{M AS} \rightarrow \text{STABLE SE}$
6	79	$(9\text{M}) \text{ AS} \rightarrow 6.5 \times 10^4 \text{Y SE} \rightarrow \text{STABLE BR}$
7	81	$[\leq 10\text{M}] \text{ AS} \xrightarrow{\quad} \begin{matrix} 57\text{M SE} \\ \xrightarrow{\quad} 13.6\text{M SE} \end{matrix}$ $\xrightarrow{\quad} \text{STABLE BR}$
8	82	$\text{STABLE SE} \quad 36.0\text{H BR} \rightarrow \text{STABLE KR}$
9	83	$<10\% \xrightarrow{\quad} 25\text{MSE}$ $>90\% \xrightarrow{\quad} 2.4\text{H BR} \xrightarrow{\quad} \begin{matrix} 108\text{M KR} \\ \xrightarrow{\quad} \text{STABLE KR} \end{matrix}$
10	84	$\sim 2\text{M SE} \rightarrow 33\text{M BR} \rightarrow \text{STABLE KR}$
11	85	$3.00 \text{M BR} \xrightarrow{\quad} \begin{matrix} 4.36\text{ H KR} \\ \xrightarrow{23\%} 9.4\text{Y KR} \end{matrix}$ $\xrightarrow{\quad} 77\% \xrightarrow{\quad} \text{STABLE Rb}$
12	86	$\text{STABLE KR} \xleftarrow{B+} 19.5\text{D Rb} \rightarrow \text{STABLE Sr}$
13	87	$\text{STABLE KR} \xrightarrow{N} \text{INSTANT KR}$ $\sim 2\% \xrightarrow{\quad} 55.6\text{ s BR} \xrightarrow{\quad} \begin{matrix} (6.0 \times 10^{10} \text{Y}) \text{ Rb} \\ \xrightarrow{\quad} \text{STABLE SR (2.7)} \end{matrix}$ $\sim 98\% \xrightarrow{\quad} 78\text{M KR} \xrightarrow{\quad} (2.7\text{H}) \text{ SR}$

TABLE No.	MASS No.	CHAIN
14	88	15.5s BR → 2.77H KR → 17.8M RB → STABLE Y
15	89	4.51s BR → 2.6M KR → 15.4M RB → 53D SR → STABLE Y
16	90	~33s KR → [SHORT] RB → 19.9Y SR → 61H Y → STABLE ZR
17	91	9.8s KR → [SHORT] RB → 9.7H SR → 51.0 M Y 40% 60% 57D Y → STABLE ZR
18	92	3.0s KR → [SHORT] RB → 2.7H SR → 3.5H Y → STABLE ZR
19	93	2.0s KR → [SHORT] RB → 7M SR → 10.0H Y → ~5 × 10 ⁶ Y ZR → STABLE NB
20	94	1.4s KR → [SHORT] RB → 2.0 M SR → 16.5 M Y → STABLE ZR
21	95	(10.5M) Y → 65D ZR → 1.4% 90H Nb 98.6% 35D Nb → STABLE Mo
22	97	~1s KR → 17.0H ZR → 95% 60s Nb <5% 74M Nb → STABLE Mo
23	99	67H Mo → 5.9H Tc 87% 13% 2.12 × 10 ⁵ Y Tc → STABLE Ru
24	101	14.6M Mo → 16.5M Tc → STABLE Ru
25	(102)	11M Mo → <25 s Tc → STABLE Ru
26	103	42D Ru → >95% 57M Rh <5% STABLE Rh
27	105	~5M Mo → [SHORT] Tc → 4.5H Ru → 45s Rh 36.5H Rh → STABLE PD
28	106	1.0Y Ru → 30s Rh → STABLE PD
29	(107)	[<1.5 M] Tc → 4M Ru → 26M Rh ... 5 × 10 ⁶ Y PD → (44.3s) Ag STABLE AG

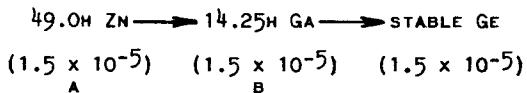
TABLE NO.	MASS NO.	CHAIN
30	(108)	9H RH → STABLE PD
31	109	[< 1H] RH → 13H PD → 39.2s AG → STABLE AG
32	111	26M PD → 7.6D AG → 48.6M CD → STABLE CD
33	112	21H PD → 3.2H AG → STABLE CD
34	113	5.3H AG → (2.3M) CD → STABLE CD
35	114	2M AG → STABLE CD
36	115	21M AG → 91% 53L CD → 4.5H IN → ~94% STABLE SN 9% 43D CD → ~10 ¹⁵ Y IN → (14.5d) SN → STABLE SN
37	117	2.83 H CD → 1.95 H IN → (14.5d) SN → STABLE SN
38	118	(4.5M) IN → STABLE SN
39	119	(17.5M) IN → (>100d) SN → STABLE SN
40	121	26.4H SN → STABLE SB
41	123	130D SN → STABLE SB (40M) SN → STABLE SB
42	125	10D SN → ~2.7Y SB → 58D TE 9.8M SN → STABLE TE
43	(126)	50 M SN → 9H SB → STABLE TE
44	127	93H SB → 16% 90D TE 84% 9.3H TE → STABLE I

TABLE NO.	MASS NO.	CHAIN
45	(128)	1.1H Sb → STABLE Te
46	129	4.2H Sb → 32D Te → 70M Te → ~3 × 10 ⁷ Y I → STABLE Xe
47	131	23.1M Sb → 30H Te (15%) → 25M Te (85%) → 8.0d I → ~12D Xe (1%) → STABLE Xe (99%)
48	132	2.0M Sb → 77H Te → 2.4H I → STABLE Xe
49	133	4.4M Sb → 63M Te (82%) → 22.4H I (18%) → 5.27D Xe (~2D Xe) → STABLE Cs
50	134	[< 10M] Sb → 44.5M Te → 52.5M I → STABLE Xe
51	135	[< 2M] Te → 6.68H I → 15.3 M Xe (30%) → 9.2H Xe (70%) → 2.1 × 10 ⁶ Y Cs → STABLE Ba
52	(136)	86s I → STABLE Xe 13.7*D Cs → STABLE Ba
53	137	22.0s I → 3.9M Xe (~94%) → STABLE Xe (~6%) → INST. XE → 33Y Cs → 2.63M Ba (95%) → STABLE Ba (5%)
54	138	5.9s I → 17M Xe → 32.9M Cs → STABLE Ba
55	139	2.7s I → 41s Xe → 9.5 M Cs → 85.0 M Ba → STABLE La
56	140	16s Xe → 66s Cs → 12.80d Ba → 40.0h La → STABLE Ce
57	141	3s Xe → [SHORT] Cs → 18m Ba → 3.7h La → 30d Ce → STABLE Pr
58	(142)	~1m Cs → 6m Ba → 74m La → STABLE Ce
59	143	1s Xe → [SHORT] Cs → [< 0.5M] Ba → 19m La → 33h Ce → 13.7d Pr → STABLE Nd
60	144	~1s Xe → [SHORT] Cs → [SHORT] Ba → [SHORT] La → 275d Ce → 17.5m Pr → STABLE Nd
61	(145)	0.8s Xe → [SHORT] Cs → [SHORT] Ba → [SHORT] La → 1.8h Ce → 4.5h Pr → STABLE Nd
62	(146)	14.6m Ce → 25m Pr → STABLE Nd

TABLE NO.	MASS NO.	CHAIN
63	147	11.0D ND → ~4Y PM → STABLE SM
64	(149)	(2.0H) ND → 47H PM → STABLE SM
65	(151)	[SHORT] ND → (12M) PM → ~1000Y* SM → STABLE Eu
66	153	[<5M] PM → 47H SM → STABLE Eu
67	155	[<5M] PM → 25M SM → 2.0Y Eu → STABLE Gd
68	156	[<5M] PM → ~10 H SM → 15.4 D Eu → STABLE Gd
69	(157)	15.4H Eu → STABLE Gd
70	(158)	60M Eu → STABLE Gd

*MASS ASSIGNMENT CERTAIN

TABLE 1 - (CHAIN 72)



CONSTANTS:

$$A = 0.01416$$

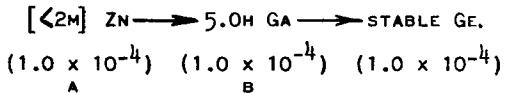
$$B = 0.04864$$

$$N_1^0 = 1.186 \times 10^{15}$$

$$N_2^0 = 3.453 \times 10^{14}$$

τ (HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-15}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-14}$	$N_2^0 S_{AB} \times 10^{-14}$	$N_2(\tau) \times 10^{-14}$	% SATU-RATION
0	1	1.186	1	3.453	0	3.453	100
.0005	1	1.186	1	3.453	0	3.453	100
.001	1	1.186	0.9999	3.453	0.000487	3.453	100
.002	1	1.186	.9999	3.453	.000487	3.453	100
.004	0.9999	1.186	.9998	3.452	.000487	3.453	100
.008	.9999	1.186	.9996	3.452	.001461	3.453	100
.01	.9999	1.186	.9995	3.451	.001949	3.453	100
.02	.9997	1.186	.9990	3.450	.003410	3.453	100
.04	.9994	1.185	.9980	3.446	.006820	3.453	100
.08	.9989	1.185	.9961	3.440	.01364	3.453	100
.1	.9986	1.184	.9951	3.436	.01704	3.453	100
.2	.9972	1.183	.9903	3.420	.03361	3.453	100
.4	.9943	1.179	.9807	3.386	.06625	3.452	100
.8	.9887	1.173	.9618	3.321	.1311	3.452	100
1	.9859	1.169	.9526	3.289	.1622	3.451	99.9
2	.9721	1.153	.9074	3.133	.3151	3.448	99.9
4	.9450	1.121	.8231	2.842	.5937	3.436	99.5
8	.8934	1.060	.678	2.341	1.047	3.388	98.1
10	.8680	1.029	.615	2.124	1.232	3.356	97.2
20	.7539	0.8941	.378	1.305	1.831	3.136	90.8
40	.568	.6736	.143	0.4938	2.070	2.569	74.4
80	.322	.3819	.0205	.07079	1.466	1.537	44.5
100	.243	.2882	.0077	.02659	1.140	1.167	33.8
200	.0591	.07009	.00006	.000207	0.2870	0.2872	8.32
400	.0035	.004151			.01708	.01708	0.495

TABLE 2 - (CHAIN 73)



CONSTANTS:

$$A = 20.79$$

$$B = 0.1386$$

$$N_1^0 = 5.387 \times 10^{12}$$

$$N_2^0 = 8.081 \times 10^{14}$$

T(HRS)	e^{-AT}	$N_1^0 e^{-AT}$ $\times 10^{-12}$	e^{-BT}	$N_2^0 e^{-BT}$ $\times 10^{-14}$	$N_1^0 S_{AB}$ $\times 10^{-12}$	$N_2(\tau)$ $\times 10^{-14}$	% SATU- RATION
0	1	5.387	1	8.081	0	8.08	100
.0005	0.9896	5.331	0.9999	8.080	0.0560	8.08	100
.001	.9795	5.277	.9999	8.080	.1104	8.08	100
.002	.9593	5.168	.9997	8.079	.2193	8.08	100
.004	.9200	4.956	.9994	8.076	.4309	8.08	100
.008	.8468	4.562	.9989	8.072	.8253	8.07	99.8
.01	.8126	4.377	.9984	8.068	1.008	8.07	99.8
.02	.6600	3.555	.9972	8.058	1.829	8.06	99.7
.04	.435	2.343	.9945	8.037	3.038	8.04	99.5
.08	.189	1.018	.9889	7.991	4.342	7.99	98.8
.10	.126	0.679	.9862	7.969	4.665	7.97	98.6
.20	.0156	.084	.9726	7.860	5.191	7.86	97.2
.40	.00024	.001	.9462	7.646	5.132	7.65	94.6
.80	0		.895	7.23	4.854	7.23	89.4
1.0			.872	7.05	4.730	7.05	87.2
2.0			.758	6.13	4.110	6.13	75.8
4.0			.575	4.65	3.119	4.65	57.5
8.0			.331	2.67	1.794	2.67	33.0
10			.250	2.02	1.358	2.02	25.0
20			.063	0.509	.342	0.509	6.30
40			.0039	.0315	.021	.0315	0.39
80			0	0	0	0	

TABLE 3 - (CHAIN 75)
 (82M) GE \longrightarrow STABLE AS
 (1×10^{-3})
 A

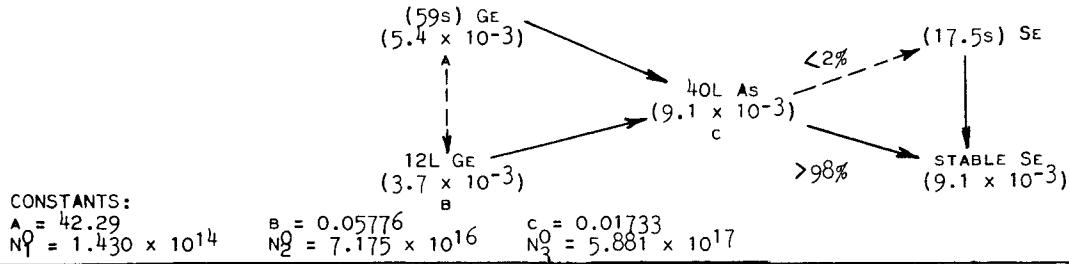
CONSTANTS:

$$A = 0.5072$$

$$N_1^0 = 2.208 \times 10^{15}$$

T(HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-15}$
0	1	2.208
.0005	0.9997	2.207
.001	.9995	2.207
.002	.9990	2.206
.004	.9980	2.204
.008	.9959	2.200
.01	.9949	2.197
.02	.9899	2.186
.04	.9799	2.164
.08	.9602	2.120
.1	.9506	2.099
.2	.9036	1.995
.4	.816	1.802
.8	.666	1.471
1	.602	1.329
2	.363	0.8015
4	.132	.2915
8	.0173	.03820
10	.0063	.01391
20	0	0

TABLE 4 - (CHAIN 77)



τ (HRS)	$e^{-\alpha t}$	$N_1^0 e^{-\alpha t} \times 10^{-14}$	$e^{-\beta t}$	$N_2^0 e^{-\beta t} \times 10^{-16}$	$e^{-\gamma t}$	$N_3^0 e^{-\gamma t} \times 10^{-17}$	$N_2^0 S_{BC} \times 10^{-17}$	$N_1^0 S_{AC} \times 10^{-14}$	$N_3(\tau) \times 10^{-17}$	% SATURATION
0	1	1.430	1	7.175	1	5.881	0	0	5.881	100
.0005	0.9791	1.400	1	7.175	1	5.881	0	0.0299	5.881	100
.001	.9585	1.371	0.9999	7.174	1	5.881	.000103	0.0593	5.881	100
.002	.9189	1.314	.9999	7.174	1	5.881	.000103	0.116	5.881	100
.004	.844	1.207	.9998	7.174	0.9999	5.880	.000103	0.223	5.881	100
.008	.713	1.020	.9995	7.171	.9999	5.880	.000410	0.410	5.881	100
.01	.645	0.922	.9992	7.169	.9998	5.880	.000615	0.508	5.881	100
.02	.428	0.612	.9988	7.166	.9997	5.879	.000923	0.818	5.881	100
.04	.184	0.263	.9977	7.158	.9993	5.877	.001640	1.165	5.880	100
.08	.0340	0.04860	.9954	7.142	.9986	5.873	.003281	1.38	5.878	99.9
.1	.0142	0.0203	.9944	7.135	.9983	5.871	.003999	1.41	5.876	99.9
.2	.00021	0.00030	.9885	7.092	.9965	5.860	.008201	1.425	5.870	99.8
.4			.9771	7.011	.9931	5.840	.01640	1.420	5.858	99.6
.8			.9548	6.851	.9856	5.796	.03158	1.409	5.829	99.1
1.0			.9440	6.773	.9828	5.780	.03979	1.405	5.821	99.0
2.0			.891	6.393	.9659	5.680	.07692	1.381	5.758	97.9
4.0			.794	5.697	.9329	5.486	.1425	1.334	5.630	95.7
8.0			.630	4.520	.8700	5.116	.2461	1.244	5.363	91.2
10			.561	4.025	.8410	4.946	.2871	1.203	5.234	89.0
20			.315	2.260	.706	4.152	.4009	1.010	4.554	77.4
40			.098	0.7032	.499	2.935	.4111	0.714	3.347	56.9
80			.0098	.07032	.2500	1.470	.2461	0.358	1.716	29.2
100			.0031	.0222	.176	1.035	.1774	0.252	1.213	20.6
200					.0310	0.182	.0318	0.044	0.214	3.64
400					.00095	.00559	.000976	0.0014	0.00657	0.112

TABLE 5 - (CHAIN 78)

2.1H GE \longrightarrow 90M As \longrightarrow STABLE SE(0.02) (0.02) (0.02)
A B

CONSTANTS:

$A = 0.3301$

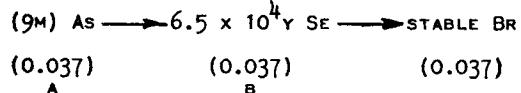
$B = 0.4621$

$N_1^0 = 6.786 \times 10^{16}$

$N_2^0 = 4.847 \times 10^{16}$

T(HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-16}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-16}$	$N_2^0 S_{AB} \times 10^{-16}$	$N_2(\tau) \times 10^{-16}$	% SATU-RATION
0	1	6.786	1	4.847	0	4.847	100
.0005	0.9998	6.785	0.9998	4.846	0	4.847	100
.001	.9997	6.784	.9995	4.845	0.003393	4.847	100
.002	.9993	6.781	.9991	4.843	.003393	4.847	100
.004	.9987	6.777	.9981	4.838	.01018	4.847	100
.008	.9974	6.768	.9963	4.829	.01866	4.847	100
.01	.9967	6.764	.9954	4.825	.02205	4.847	100
.02	.9934	6.741	.9908	4.802	.04412	4.846	100
.04	.987	6.698	.9815	4.757	.08489	4.841	99.9
.08	.974	6.610	.9637	4.671	.1697	4.841	99.9
.1	.967	6.562	.955	4.629	.2036	4.833	99.7
.2	.936	6.352	.912	4.420	.4073	4.827	99.6
.4	.876	5.945	.830	4.023	.7804	4.803	99.1
.8	.768	5.212	.692	3.354	1.290	4.644	95.8
1	.718	4.872	.630	3.054	1.494	4.548	93.8
2	.516	3.502	.397	1.924	2.020	3.944	81.4
4	.267	1.812	.157	0.7610	1.867	2.628	54.2
8	.0715	0.4852	.025	.1212	0.7974	0.9186	19.0
10	.0367	.2490	.0098	.0475	.4566	.5041	10.4
20	.0014	.00950	.0001	.0004847	.02206	.02254	0.465

TABLE 6 - (CHAIN 79)



CONSTANTS:

$A = 4.621$

$B = 1.217 \times 10^{-9}$

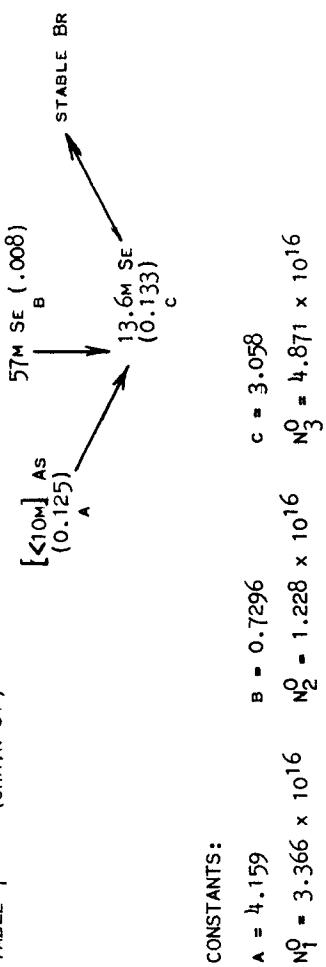
$N_1^0 = 8.968 \times 10^{15}$

$N_2^0 = 1.790 \times 10^{20}$

T(HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-15}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-20}$	$N_1^0 S_{AB} \times 10^{-15}$	$N_2(\tau) \times 10^{-20}$	% RE-MAINING ¹
0	1	8.968	1	1.790	0	1.790	100
.0005	.9977	8.987	1	1.790	0.0206	1.790	100
.001	.9954	8.927	1	1.790	.0412	1.790	100
.002	.9908	8.885	1	1.790	.0824	1.790	100
.004	.9816	8.803	1	1.790	.1648	1.790	100
.008	.9636	8.642	1	1.790	.3264	1.790	100
.01	.9547	8.562	1	1.790	.4063	1.790	100
.02	.9115	8.174	1	1.790	.7937	1.790	100
.04	.831	7.452	1	1.790	1.516	1.790	100
.08	.691	6.197	1	1.790	2.771	1.790	100
.1	.630	5.650	1	1.790	3.318	1.790	100
.2	.396	3.551	1	1.790	5.417	1.790	100
.4	.157	1.408	1	1.790	7.56	1.790	100
.8	.025	0.224	1	1.790	8.74	1.790	100
1	.0098	.0879	1	1.790	8.880	1.790	100
2	.0001	.0008	1	1.790	8.967	1.790	100
8×10^6			0.9903	1.773	8.881	1.773	99.0

¹ % SATURATION = 5.26×10^{-6} (% REMAINING)

TABLE 7 - (CHAIN 81)



τ (hrs)	$e^{-\lambda T}$	$N_1^0 e^{-\lambda T} \times 10^{-16}$	$N_2^0 e^{-\lambda T} \times 10^{-16}$	$e^{-\lambda T}$	$N_2^0 e^{-\lambda T} \times 10^{-16}$	$e^{-\lambda T}$	$N_3^0 e^{-\lambda T} \times 10^{-16}$	$N_1^0 S_{AC} \times 10^{-16}$	$N_2^0 S_{AC} \times 10^{-16}$	$N_3(\tau) \times 10^{-16}$	% SATURATION
0	1	3.366	1	1.228	1	4.871	0	0	0	4.871	100
.0005	.9979	3.359	0.9996	1.228	0.9985	4.864	0.000424	0.00764	4.871	100	
.001	.9958	3.352	.9993	1.227	.9969	4.856	0.000924	0.0140	4.871	100	
.002	.9917	3.338	.9986	1.226	.9939	4.841	.001809	0.0280	4.871	100	
.004	.9835	3.310	.9971	1.224	.9878	4.812	.00358	0.0547	4.870	100	
.008	.9671	3.255	.9942	1.221	.9757	4.753	.007120	0.1093	4.869	100	
.01	.9591	3.228	.9927	1.219	.9698	4.724	.008813	0.1360	4.869	100	
.02	.9200	3.097	.9855	1.210	.9403	4.580	.01740	0.2581	4.855	99.7	
.04	.8416	2.848	.9711	1.193	.884	4.306	.03352	0.4830	4.823	99.0	
.08	.7116	2.410	.9430	1.158	.783	3.814	.06157	0.8519	4.727	97.0	
.1	.659	2.218	.9295	1.141	.736	3.585	.07466	0.9788	4.639	95.2	
.2	.434	1.461	.864	1.061	.541	2.635	.1243	1.360	4.119	84.6	
.4	.188	0.633	.746	0.9161	.293	1.427	.1744	1.335	2.936	60.3	
.8	.036	0.121	.556	.6828	.086	0.419	.1809	0.6358	1.236	25.4	
1	.015	0.0505	.482	.5919	.046	.224	.1677	0.3942	0.7859	16.1	
2	.00024	0.00081	.232	.2849	.0021	.0102	.08854	0.0242	0.1229	2.52	
4			.054	.0663			.02078		0.02078	0.427	
8			.0029	.00356			.00112		0.00112	0.023	

TABLE 8 - (CHAIN 82)
 STABLE SE 36.0H BR → STABLE KR
 (0.20) (3.5×10^{-5}) (3.5×10^{-5})
 A

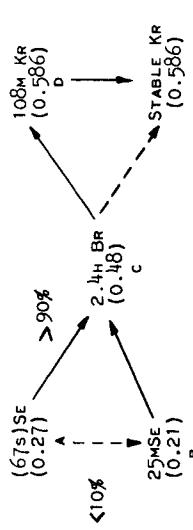
CONSTANTS:

$$A = 0.01925$$

$$N_1^0 = 2.036 \times 10^{15}$$

τ (HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-15}$
0	1	2.036
.0005	1	2.036
.001	1	2.036
.002	1	2.036
.004	0.9999	2.036
.008	.9998	2.036
.01	.9998	2.036
.02	.9996	2.035
.04	.9992	2.034
.08	.9985	2.033
.1	.9979	2.032
.2	.9961	2.028
.4	.9923	2.020
.8	.9847	2.005
1	.9809	1.997
2	.9622	1.959
4	.9258	1.885
8	.857	1.745
10	.825	1.680
20	.680	1.384
40	.462	0.9406
80	.214	.4357
100	.146	.2973
200	.0213	.0434
400	.00046	.00094

TABLE 9 - (CHAIN 83)



CONSTANTS:

$\Delta = 37.25$

$B = 1.664$

$N_1^0 = 8.118 \times 10^{15}$

$N_2^0 = 1.412 \times 10^{17}$

$N_3^0 = 1.861 \times 10^{18}$

$N_4^0 = 1.704 \times 10^{18}$

$D = 0.3851$

$t(\text{hrs})$	$e^{-\Delta t}$	$N_1^0 e^{-\Delta t} \times 10^{-15}$	$N_2^0 e^{-\Delta t} \times 10^{-17}$	$N_3^0 e^{-\Delta t} \times 10^{-18}$	$N_4^0 e^{-\Delta t} \times 10^{-18}$	$N_3(1) \times 10^{-18}$	$e^{-\Delta t}$	$N_4(1) \times 10^{-18}$	$N_2^0 e^{-\Delta t} \times 10^{-16}$	$N_3^0 e^{-\Delta t} \times 10^{-17}$	$N_4^0 e^{-\Delta t} \times 10^{-16}$	$N_1^0 e^{-\Delta t} \times 10^{-15}$	$N_2^0 e^{-\Delta t} \times 10^{-16}$	$N_3^0 e^{-\Delta t} \times 10^{-17}$	$N_4^0 e^{-\Delta t} \times 10^{-18}$		
0	1	8.118	1	1.412	1	1.861	0	0	1.861	100	0.9998	1.704	0	0	0	1.704	
.0005	0.9816	7.969	0.9992	1.411	0.9999	1.861	0.0120	0.1498	1.861	100	0.9998	1.704	0.00558	0	0	1.704	
.001	.9634	7.821	.9983	1.410	.9997	1.860	.0239	.2970	1.861	100	.9996	1.703	.00558	0	0	1.704	
.002	.9283	7.536	.9967	1.407	.9994	1.860	.0461	.5818	1.861	100	.9992	1.703	.01117	0	0	1.704	
.004	.8617	6.995	.9934	1.403	.9988	1.859	.09226	1.122	1.861	100	.9985	1.701	.01675	0	0	1.703	
.008	.7420	6.024	.9868	1.393	.9977	1.857	.1862	2.092	1.861	100	.9969	1.699	.04166	0	0	1.703	
.01	.689	5.593	.9835	1.389	.9971	1.856	.2324	2.521	1.861	100	.9961	1.697	.05283	0	0	1.703	
.02	.474	3.848	.9676	1.366	.9942	1.850	.4545	4.256	1.859	99.9	.9923	1.691	.1061	0	0	1.702	
.04	.225	1.827	.9356	1.321	.9885	1.840	.9038	6.251	1.855	99.7	.9847	1.678	.2122	0	0.03247	1.699	
.08	.0507	0.4116	.8752	1.236	.9772	1.819	1.742	7.581	1.844	99.1	.9697	1.652	.4187	0	0.1137	1.694	
.1	.0241	.1956	.8468	1.196	.9716	1.808	2.132	7.753	1.837	98.7	.9623	1.640	.5192	0.0282	0.1542	1.692	
.2	.00058	.001708	.7162	1.011	.9439	1.757	3.890	7.719	1.804	96.9	.9259	1.578	1.005	.1130	0.3734	1.680	
.4			.5130	0.7244	.8909	1.658	6.457	7.290	1.730	93.0	.8572	1.461	1.881	.3954	0.7631	1.654	
.8			.2640	.3728	.794	1.478	9.055	6.498	1.575	84.6	.7342	1.251	3.350	1.243	1.412	1.600	
1			.1890	.2669	.750	1.396	9.585	6.137	1.498	80.5	.680	1.159	3.908	1.709	1.672	1.569	
2			.0358	.05055	.561	1.044	8.970	4.591	1.138	61.1	.462	0.7872	5.527	3.431	2.394	1.377	80.8
4			.00128	.001807	.315	0.5862	5.364	2.578	0.6424	34.5	.214	.3647	5.639	4.349	2.463	0.9746	57.2
8			.0560	.1042	.0560	0.9568	0.4582	0.1142	0.2019	10.8	.0458	.07804	2.970	2.550	1.303	0.4018	23.6
10			.0031	.005769	.05296	0.02537	0.00632	0.34	.000441	.007515	0.1507	.000441	.007515	0.1487	0.0523	0.2183	14.6
20															0.0241	1.41	

TABLE 10 - (CHAIN 84)

$\sim 2M\ SE \longrightarrow 33M\ BR \longrightarrow \text{STABLE KR}$
 (0.65) (0.65) (1.09)
 A B

CONSTANTS:

$A = 20.79$

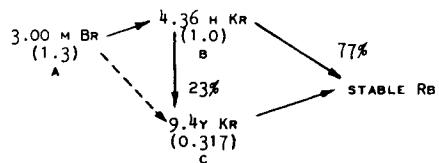
$B = 1.260$

$N_1^0 = 3.939 \times 10^{16}$

$N_2^0 = 5.778 \times 10^{17}$

T(HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-16}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-17}$	$N_1^0 S_{AB} \times 10^{-16}$	$N_2(\tau) \times 10^{-17}$	% SATURATION
0	1	3.939	1	5.778	0	5.778	100
.0005	0.9897	3.898	0.9994	5.775	0.04069	5.778	100
.001	.9794	3.858	.9987	5.770	.08095	5.778	100
.002	.9593	3.779	.9975	5.764	.1602	5.778	100
.004	.9202	3.625	.9950	5.749	.3138	5.778	100
.008	.8468	3.336	.9899	5.720	.6003	5.778	100
.01	.8123	3.200	.9875	5.706	.7350	5.778	100
.02	.659	2.596	.9752	5.635	1.327	5.768	99.8
.04	.435	1.713	.9509	5.494	2.206	5.715	98.9
.08	.189	0.7445	.904	5.223	3.000	5.523	95.6
.1	.125	.4924	.882	5.096	3.176	5.414	93.7
.2	.0155	.0611	.777	4.490	3.193	4.809	83.2
.4	.00024	.000945	.604	3.490	2.534	3.743	64.8
			.364	2.103	1.527	2.256	39.0
			.284	1.641	1.192	1.760	30.5
			.080	0.4622	0.3356	0.4958	8.58
			.0064	.03700	.02686	.0397	0.687

TABLE 11 - (CHAIN 85)



CONSTANTS:

$$\begin{aligned} \alpha &= 13.86 & B &= 0.1590 & C &= 8.418 \times 10^{-6} \\ N_1^0 &= 1.051 \times 10^{17} & N_2^0 &= 7.045 \times 10^{18} & N_3^0 &= 1.534 \times 10^{21} \end{aligned}$$

T(HRS)	e-AT	N ₁ ⁰ e-AT x 10 ⁻¹⁷	e-BT	N ₂ ⁰ e-BT x 10 ⁻¹⁸	N ₂ ⁰ S _{AB} x 10 ⁻¹⁷	N ₂ (T) x 10 ⁻¹⁸	% MAX- IMUM	e-CT	N ₃ ⁰ e-BT x 10 ⁻²¹	N ₂ ⁰ S _{BC} x 10 ⁻¹⁸	N ₂ ⁰ S _{ABC} x 10 ⁻¹⁶	N ₃ (T) x 10 ⁻²¹	% MAX ₁ IMUM ¹
0	1	1.051	1	7.045	0	7.045	100	1	1.534	0	0	1.534	99.9
.0005	0.9931	1.044	0.9999	7.044	0.0072	7.045	100						
.001	.9861	1.036	.9998	7.044	.0146	7.045	100						
.002	.974	1.024	.9997	7.043	.0273	7.046	100						
.004	.946	0.9942	.9994	7.041	.0568	7.047	100						
.008	.890	.9354	.9987	7.036	.1157	7.048	100						
.01	.872	.9165	.9984	7.034	.1345	7.047	100						
.02	.758	.7967	.9968	7.022	.2541	7.047	100						
.04	.575	.6043	.9937	7.001	.4455	7.046	100						
.08	.333	.3500	.9873	6.956	.6962	7.026	99.7						
.1	.250	.2628	.984	6.932	.781	7.010	99.5						
.2	.0625	.0657	.970	6.834	.965	6.930	98.3						
.4	.0032	.00336	.940	6.622	.997	6.722	95.4						
.8			.881	6.207	.937	6.301	89.4						
1			.852	6.002	.907	6.093	86.5	1	1.534	0.240	0.334	1.534	99.9
2			.728	5.129	.775	5.207	73.9	1	1.534	0.441	0.637	1.534	99.9
4			.530	3.734	.564	3.790	53.8	1	1.534	0.761	1.121	1.535	99.9
8			.280	1.973	.298	2.003	28.4	0.9999	1.534	1.166	1.732	1.535	99.9
10			.204	1.437	.217	1.459	20.7	.9999	1.534	1.290	1.918	1.535	99.9
20			.0417	0.2938	.0444	0.2982	4.23	.9998	1.534	1.552	2.314	1.536	100
40			.00174	.01226	.00185	.01244	0.177	.9997	1.534	1.617	2.411	1.536	100
80								.9993	1.533	1.619	2.415	1.535	99.9
100								.9992	1.533	1.619	2.415	1.535	99.9
200								.9983	1.531	1.617	2.413	1.533	99.8
400								.9966	1.529	1.614	2.409	1.531	99.7
800								.9933	1.524	1.609	2.401	1.526	99.3
1000								.9916	1.521	1.606	2.397	1.523	99.2
2000								.9832	1.508	1.593	2.376	1.510	98.3
4000								.9668	1.483	1.566	2.337	1.485	96.7
8000								.9345	1.434	1.514	2.259	1.436	93.5
10000								.9190	1.410	1.489	2.221	1.412	91.9
20000								.844	1.295	1.367	2.040	1.296	84.4
40000								.714	1.095	1.157	1.726	1.096	71.4
80000								.509	0.7808	0.825	1.230	0.7816	50.9
100000								.430	.6596	0.697	1.039	0.6603	43.0

¹ 1% SATURATION = 0.0364 (% MAXIMUM)

TABLE 12 - (CHAIN 86)
 STABLE KR ← 19.5D RB → STABLE SR
 (2.09) (3.1×10^{-5}) (3.1×10^{-5})
 A

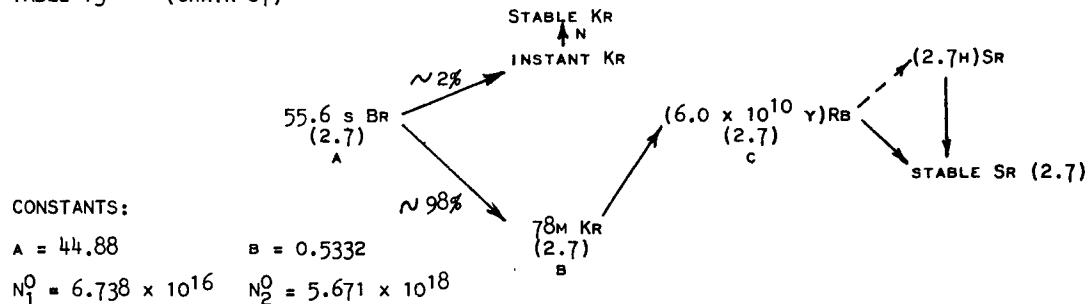
CONSTANTS:

$$\text{A} = 1.481 \times 10^{-3}$$

$$N_1^0 = 2.344 \times 10^{16}$$

τ (HRS)	$e^{-\text{AT}}$	$N_1^0 e^{-\text{AT}}$ $\times 10^{-16}$
0	1	2.344
0.0005	1	2.344
0.001	1	2.344
0.002	1	2.344
0.004	1	2.344
0.008	1	2.344
0.01	1	2.344
0.02	1	2.344
0.04	1	2.344
0.08	0.9999	2.344
0.1	0.9998	2.344
0.2	0.9997	2.343
0.4	0.9994	2.343
0.8	0.9988	2.341
1.0	0.9985	2.340
2.0	0.9971	2.337
4.0	0.9941	2.330
8.0	0.9882	2.316
10.0	0.9852	2.309
20.0	0.971	2.28
40.0	0.942	2.21
80.0	0.890	2.09
100.0	0.862	2.02
200.0	0.744	1.74
400.0	0.554	1.30
800.0	0.306	0.717
1000.0	0.227	.532
2000.0	0.0515	.121
4000.0	0.0026	.061

TABLE 13 - (CHAIN 87)



τ (HRS)	e^{-AT}	$N_1^0 - AT \times 10^{-16}$	e^{-BT}	$N_2^0 - BT \times 10^{-18}$	$0.98 N_1^0 S_{AB} \times 10^{-16}$	$N_2(\tau) \times 10^{-18}$	% SATU-RATION
0	1	6.738	1	5.671	0	5.671	100
.0005	0.9979	6.589	0.9997	5.669	0.1459	5.671	100
.001	.9560	6.442	.9995	5.668	.2905	5.671	100
.002	.9140	6.159	.9989	5.665	.5672	5.671	100
.004	.836	5.633	.9979	5.659	1.083	5.669	100
.008	.698	4.703	.9957	5.647	1.994	5.667	99.9
.01	.638	4.299	.9947	5.641	2.384	5.665	99.9
.02	.408	2.749	.9893	5.610	3.883	5.649	99.6
.04	.166	1.119	.9788	5.551	5.434	5.605	98.8
.08	.028	0.1887	.9581	5.433	6.213	5.495	96.9
.1	.011	.0741	.9478	5.375	6.260	5.438	95.9
.2	.00013	.000876	.898	5.093	6.002	5.153	90.9
.4			.808	4.582	5.401	4.636	81.7
.8			.652	3.697	4.358	3.741	66.0
1			.586	3.323	3.916	3.362	59.3
2			.344	1.951	2.298	1.974	34.8
4			.118	0.6692	0.7858	0.6771	11.9
8			.014	.07939	.09376	.08029	1.42
10			.0048	.0272	.03209	.02762	0.487
20							
40							

TABLE 14 - (CHAIN 88)

15.5s Br \longrightarrow 2.77H Kr \longrightarrow 17.8M Rb \longrightarrow STABLE Y

$N_1^0 = 2.643 \times 10^{16}$	$B = 0.2502$	$c = 2.336$
$(3.8)_A$	$(3.8)_B$	$(3.8)_C$

CONSTANTS:

$A = 161.0$

$B = 0.2502$

$c = 2.336$

$N_2^0 = 1.701 \times 10^{19}$

$N_3^0 = 1.822 \times 10^{18}$

τ (hrs)	$e^{-\Lambda\tau}$	$N_1^0 e^{-\Lambda\tau}$ $\times 10^{-16}$	$e^{-B\tau}$	$N_2^0 e^{-B\tau}$ $\times 10^{-19}$	$N_1^0 S_{AB}$ $\times 10^{-16}$	$N_2(\tau)$ $\times 10^{-19}$	$\% SATU-$ $RATION$	$e^{-C\tau}$	$N_3^0 e^{-C\tau}$ $\times 10^{-19}$	$N_2^0 S_{BC}$ $\times 10^{-19}$	$N_3(\tau)$ $\times 10^{-18}$	$\% SATU-$ $RATION$
0	1	2.643	1	1.701	0	1.701	100	1	0.1822	0	0	1.822
.0005	0.9226	2.438	0.9999	1.701	0.2053	1.701	100	0.9988	.1820	0.0002364	0.002613	1.822
.001	.851	2.219	.9997	1.700	.3938	1.701	100	.9977	.1818	.0004079	.002613	1.822
.002	.725	1.916	.9995	1.700	.7268	1.701	100	.9953	.1813	.0008566	.002613	1.822
.004	.526	1.390	.9990	1.699	1.253	1.700	99.9	.9907	.1805	.001693	.007929	1.822
.008	.276	0.7295	.9980	1.698	1.912	1.700	99.9	.9815	.1788	.003365	.01850	1.822
.01	.200	.5286	.9975	1.697	2.112	1.699	99.9	.9768	.1780	.004222	.03436	1.822
.02	.040	.1057	.9950	1.692	2.532	1.695	99.6	.9542	.1739	.008321	.09515	1.822
.04	.0016	.004229	.9900	1.684	2.618	1.687	99.2	.9108	.1659	.01615	.2141	1.822
.08		.9802	1.667	2.596	1.670	98.2	.830	.1512	.03064	.4440	.4440	1.822
.1		.9752	1.659	2.583	1.662	97.7	.793	.1445	.03717	.5471	.5471	1.822
.2		.9511	1.618	2.519	1.621	95.3	.627	.1142	.06610	.1004	.1004	1.813
.4		.905	1.539	2.397	1.541	90.6	.394	.07179	.1042	.1607	.1607	1.778
.8		.819	1.393	2.169	1.395	82.0	.150	.02733	.1364	.2118	.2118	1.658
1		.778	1.323	2.060	1.325	77.9	.096	.01749	.1391	.2161	.2161	1.588
2		.606	1.031	1.605	1.033	60.7	.0094	.001713	.1218	.893	.893	1.254
4		.367	0.6243	0.9718	0.6253	36.8	.000089	.0000162	.07484	1.165	1.165	0.7603
8		.135	.2296	.3576	.2300	13.5			.02754	0.4284	0.4284	.2797
10		.083	.1412	.2199	.1414	8.31			.01692	.2635	.2635	.1718
20		.0067	.0114	.01773	.0114	0.067			.001366	.02128	.02128	.01387

TABLE 15 - (CHAIN 89)

CONSTANTS:		(4.6) ^A		(4.6) ^B		(4.6) ^C		(4.6) ^D		(4.6)		STABLE Y	
$\Delta = 553$		$B = 16.0$		$c = 2.70$		$d = 5.500 \times 10^{-4}$		$N_1^0 = 8.670 \times 10^{21}$		$N_2^0 = 1.908 \times 10^{18}$		$N_3^0 = 3.220 \times 10^{17}$	
$N_1^0 = 9.316 \times 10^{15}$		$N_2^0 = 3.194 \times 10^{15}$		$N_3^0 = 1.908 \times 10^{15}$		$N_4^0 = 8.670 \times 10^{21}$		$N_1^0 = 9.316 \times 10^{15}$		$N_2^0 = 3.194 \times 10^{15}$		$N_3^0 = 1.908 \times 10^{15}$	
t (hrs)	e-AT	$N_1^0 e^{-AT}$	e-BT	$N_2^0 e^{-BT}$	e-CT	$N_3^0 e^{-CT}$	e-DT	$N_4^0 e^{-DT}$	e-ET	$N_1^0 e^{-ET}$	$N_2^0 e^{-ET}$	$N_3^0 e^{-ET}$	$N_4^0 e^{-ET}$
0	1	9.316	1	3.220	0	3.220	100	1	1.908	0	0	1.908	100
.0005	0.759	7.071	0.9920	3.194	2.236	3.216	99.9	0.9987	1.906	0.002595	0.009316	1.906	100
.001	.575	5.357	.9841	3.169	3.922	3.208	99.6	.9973	1.903	.005113	.03126	1.908	100
.002	.331	3.084	.9685	3.119	6.121	3.180	98.7	.9946	1.898	.01011	.1118	1.908	100
.004	.110	1.025	.9380	3.020	7.947	3.099	96.2	.9893	1.888	.01987	.3447	1.908	100
.008	.012	0.1118	.880	2.834	8.359	2.917	90.6	.9787	1.867	.03822	.8664	1.906	99.9
.01	.004	.0373	.852	2.743	8.133	2.824	87.7	.9734	1.857	.04701	.1127	1.905	99.8
.02			.726	2.338	6.968	2.408	74.8	.9475	1.868	.08549	.2292	1.895	99.3
.04			.527	1.697	5.059	1.748	54.3	.8976	1.713	.1435	.4025	.361	97.5
.08			.278	0.8952	2.664	0.9218	28.6	.8058	1.537	.2083	.5867	.1751	91.8
.1			.202	.6504	1.938	.6668	20.8	.763	1.456	.2173	.6262	.1679	88.0
.2			.041	.1320	0.3931	.1359	4.22	.582	1.110	.2096	.6.081	.1.326	69.5
.4				.00165	.00531	.01584	.00547	0.170	.339	.0.6468	.1305	.3.800	.0.7811
.8								.115	.2194	.04453	.1.295	.2652	.13.9
1								.0670	.1278	.02959	.0.7546	.1.546	.8.10
2								.0045	.008596	.001743	.0.50668	.0.1038	.0.544
4													.9978
8													.9956
10													.9945
20													.9891
40													.9783
80													.9700
100													.9645
200													.8998
400													.8025
800													.644
1000													.577
2000													.332
4000													.111
8000													.0122
10000													.0041

 $\% \text{ SATURATION} = 0.917 (\% \text{ REMAINING})$

TABLE 16 - (CHAIN 90)

$\sim 33s$ KR \longrightarrow [SHORT] RB \longrightarrow 19.9Y SR \longrightarrow 61H Y \longrightarrow STABLE ZR

(5.0) A	(5.0)	(5.0) B	(5.0) C	(5.0)
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CONSTANTS:

$A = 75.62$

$B = 3.98 \times 10^{-6}$

$C = 0.0114$

$N_1^0 = 7.405 \times 10^{16}$

$N_2^0 = 2.392 \times 10^{22}$

$N_3^0 = 8.203 \times 10^{18}$

τ (HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-16}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-22}$	$N_3^0 S_{AB} \times 10^{-16}$	$N_2(\tau) \times 10^{-22}$	% RE-MAINING ¹	e^{-CT}	$N_3^0 e^{-CT} \times 10^{-18}$	$N_2^0 S_{BC} \times 10^{-18}$	$N_1^0 S_{ABC} \times 10^{-12}$	$N_3(\tau) \times 10^{-18}$	% RE-MAINING ²
0	1.000	7.405	1	2.392	0	2.392	100	1	8.203	0	0	8.203	100
.0005	0.9628	7.130	1	2.392	0.2755	2.392	100	1	8.203	0	0	8.203	100
.001	.9270	6.864	1	2.392	.5406	2.392	100	1	8.203	0	0	8.203	100
.002	.8597	6.366	1	2.392	1.039	2.392	100	1	8.203	0	0	8.203	100
.004	.739	5.472	1	2.392	1.933	2.392	100	1	8.203	0	0	8.203	100
.008	.546	4.043	1	2.392	3.362	2.392	100	0.9999	8.202	0.000837	0	8.203	100
.01	.470	3.480	1	2.392	3.925	2.392	100	.9999	8.202	.000837	0	8.203	100
.02	.220	1.629	1	2.392	5.776	2.392	100	.9998	8.201	.00167	0.00741	8.203	100
.04	.0481	0.3562	1	2.392	7.049	2.392	100	.9995	8.199	.00419	.01481	8.203	100
.08	.0024	.01777	1	2.392	7.387	2.392	100	.9991	8.196	.00751	.02222	8.203	100
.1	.0005	.00370	1	2.392	7.401	2.392	100	.9989	8.194	.00919	.02962	8.203	100
.2	0	0	1	2.392	7.405	2.392	100	.9977	8.184	.0192	.05924	8.203	100
.4			1	2.392	7.405	2.392	100	.9954	8.165	.0384	.1185	8.203	100
.8			1	2.392	7.405	2.392	100	.9909	8.128	.0760	.2370	8.203	100
1			1	2.392	7.405	2.392	100	.9887	8.110	.0944	.2888	8.203	100
2			1	2.392	7.405	2.392	100	.9774	8.018	.1887	.5850	8.203	100
4			1	2.392	7.405	2.392	100	.9552	7.836	.3741	1.155	8.203	100
8			1	2.392	7.405	2.392	100	.912	7.481	.7348	2.273	8.203	100
10			1	2.392	7.405	2.392	100	.892	7.317	.9018	2.792	8.203	100
20			0.9999	2.392	7.404	2.392	100	.796	6.530	1.704	5.272	8.203	100
40			.9998	2.392	7.404	2.392	100	.634	5.201	3.057	9.086	8.203	100
80			.9997	2.391	7.403	2.391	100	.400	3.281	5.011	15.51	8.203	100
100			.9996	2.391	7.402	2.391	99.9	.320	2.625	5.679	17.57	8.203	100
200			.9992	2.390	7.399	2.390	99.9	.102	0.8367	7.489	23.19	8.203	100
400			.9984	2.388	7.393	2.388	99.9	.0101	.08285	8.252	25.55	8.203	100
800			.9968	2.384	7.381	2.384	99.6	.0001	.00082	8.322	25.77	8.203	100
1000			.9960	2.382	7.375	2.382	99.6			8.317	25.75	8.203	100
2000			.9920	2.373	7.346	2.373	99.2			8.283	25.64	8.203	100
4000			.9842	2.354	7.288	2.354	98.4			8.267	25.44	8.203	100
8000			.9686	2.317	7.172	2.317	96.9			8.087	25.04	8.087	98.6
10000			.9609	2.298	7.115	2.298	96.1			8.025	24.84	8.025	97.8
20000			.9232	2.208	6.836	2.208	92.3			7.709	23.87	7.709	94.0
40000			.853	2.040	6.316	2.040	85.3			7.123	22.05	7.123	86.8
80000			.727	1.739	5.383	1.739	72.7			6.071	18.79	6.071	74.0
100000			.671	1.605	4.969	1.605	67.1			5.602	17.34	5.602	68.3

¹ % SATURATION = 0.0170 (% REMAINING)² % SATURATION = 0.0167 (% REMAINING)

TABLE 17 - (CHAIN 91)

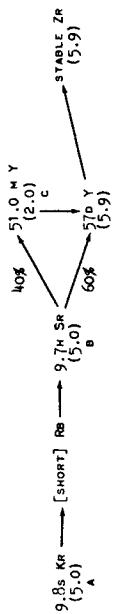


TABLE 18 - (CHAIN 92)

3.0S KR → [SHORT] RB → 2.7H SR → 3.5H Y → STABLE ZR_o

	(5.0) _A	(5.0) _B	(5.0) _C	(5.0)
--	-----------------------	-----------------------	-----------------------	-------

CONSTANTS:

$$A = 8.31$$

$$B = 0.2567$$

$$N_2^0 = 2.180 \times 10^{19}$$

$$c = 0.1980$$

$$N_3^0 = 2.83 \times 10^{19}$$

τ (HRS)	$e^{-\alpha\tau}$	$N_1^0 e^{-\alpha\tau} \times 10^{-15}$	$e^{-\beta\tau}$	$N_2^0 e^{-\beta\tau} \times 10^{-19}$	$N_1^0 S_{AB} \times 10^{-15}$	$N_2^0 (\tau) \times 10^{-19}$	% SATU-RATION	$e^{-\gamma\tau}$	$N_3^0 e^{-\gamma\tau} \times 10^{-19}$	$N_2^0 S_{BC} \times 10^{-19}$	$N_1^0 S_{ABC} \times 10^{-15}$	$N_3(\tau) \times 10^{-19}$	% SATU-RATION
0	1	6.74	1	2.180	0	2.180	100	1	2.83	0	0	0	100
0.0005	0.6660	4.448	0.9999	2.179	2.284	2.179	100	0.9999	2.83	0	0	0	2.83
.001	.435	2.931	.9997	2.179	3.801	2.179	100	.9998	2.83	0	0	0	2.83
.002	.189	1.273	.9995	2.178	5.459	2.178	99.9	.9996	2.83	0	0	0	2.83
.004	.0360	.2426	.9990	2.177	6.490	2.177	99.9	.9992	2.83	0	0	0	2.83
.008	.0013	.008762	.9979	2.175	6.717	2.175	99.8	.9985	2.83	0.009533	0.00674	2.83	100
.01	.0004	.002696	.9974	2.174	6.719	2.174	99.7	.9981	2.82	.009533	.01348	2.83	100
.02			.9979	2.168	6.705	2.168	99.4	.9961	2.82	.01907	.02696	2.83	100
.04			.9897	2.157	6.670	2.157	98.9	.9921	2.81	.02860	.09436	2.83	100
.08			.980	2.136	6.605	2.136	98.0	.9842	2.78	.03813	.1146	2.82	99.6
.1			.975	2.125	6.571	2.125	97.5	.980	2.77	.04767	.1415	2.82	99.6
.2			.950	2.071	6.403	2.071	95.0	.960	2.72	.09533	.2898	2.82	99.6
.4			.904	1.970	6.092	1.970	90.4	.925	2.62	.2002	.6133	2.82	99.6
.8			.815	1.776	5.493	1.776	81.5	.852	2.41	.3527	1.085	2.76	97.5
1			.774	1.687	5.216	1.687	77.4	.820	2.32	.4385	1.355	2.76	97.5
2			.598	1.303	4.030	1.303	59.8	.674	1.91	.7245	2.231	2.63	93.0
4			.359	.7826	2.419	.7826	35.9	.450	1.27	.8675	2.682	2.14	75.6
8			.128	.2790	0.8627	.2790	12.8	.205	0.580	.7340	2.265	1.314	46.4
10			.0764	.1665	.5149	.1665	7.64	.138	0.391	.5910	1.813	0.982	34.7
20			.00588	.01281	.03963	.01281	0.588	.0191	0.0541	.1239	.3896	0.1780	6.29
40								.00036	0.00102	.00343	.01058	0.00405	0.270

TABLE 19 - (CHAIN 93)

2.05 KR → [SHORT] Rb → 7M Sr → 10.0H Y → ~5 × 10⁶Y Zr → STABLE Nb

(6.0) A	(6.0)	(6.0) B	(6.0) C	(6.0)	(6.0)
------------	-------	------------	------------	-------	-------

CONSTANTS:

$A = 1247$

$B = 5.941$

$C = 0.069315$

$N_1^0 = 5.389 \times 10^{15}$

$N_2^0 = 1.131 \times 10^{18}$

$N_3^0 = 9.695 \times 10^{19}$

τ (HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-15}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-18}$	$N_1^0 S_{AB} \times 10^{-15}$	$N_2(\tau) \times 10^{-18}$	% SATURATION	e^{-CT}	$N_3^0 e^{-CT} \times 10^{-19}$	$N_2^0 S_{BC} \times 10^{-19}$	$N_1^0 S_{ABC} \times 10^{-15}$	$N_3(\tau) \times 10^{-19}$	% SATURATION
0	1	5.389	1	1.131	0	1.131	100	1	9.695	0	0	9.695	100
.0005	0.536	2.889	0.9970	1.128	2.502	1.131	100	1	9.695	0.000343	0.005389	9.695	100
.001	.287	1.547	.9941	1.124	3.829	1.128	99.7	0.9999	9.694	.000664	.01078	9.695	100
.002	.0826	0.4451	.9881	1.118	4.904	1.123	99.3	.9999	9.694	.00135	.03772	9.695	100
.004	.0069	.03718	.975	1.103	5.242	1.108	98.0	.9997	9.692	.00172	.1078	9.695	100
.008	0	0	.955	1.080	5.172	1.085	95.9	.9994	9.689	.00504	.2156	9.695	100
.01	0	0	.940	1.063	5.091	1.068	94.4	.9993	9.688	.00675	.2964	9.695	100
.02			.888	1.004	4.809	1.009	89.2	.9986	9.681	.0127	.5820	9.694	100
.04			.790	0.8935	4.279	.8978	79.4	.9972	9.668	.0237	1.110	9.692	100
.08			.622	.7035	3.369	0.7069	62.5	.9945	9.642	.0427	2.010	9.685	99.9
.1			.552	.6243	2.990	.6273	55.5	.9931	9.628	.0505	2.393	9.679	99.8
.2			.305	.3450	1.652	.3467	30.7	.9861	9.560	.0779	3.706	9.638	99.4
.4			.0935	.1057	0.5064	.1062	9.39	.9722	9.425	.1006	4.790	9.526	98.3
.8			.00870	.00984	.04712	.00989	0.874	.945	9.162	.1071	5.106	9.270	95.6
1			.00271	.00307	.01468	.00308	.272	.930	9.016	.1061	5.057	9.123	94.1
2								.871	8.444	.0997	4.750	8.544	88.1
4								.756	7.329	.0865	4.123	7.416	76.5
8								.577	5.594	.0660		5.660	58.4
10								.506	4.848	.0572		4.905	50.6
20								.249	2.414	.0285		2.443	25.2
40								.0617	0.5982	.00706		0.6053	6.24
80								.00397	.0385	.00454		.0630	0.650
100								.00009	.00087	.000010		.00088	0.0091

TABLE 20 - (CHAIN 94)

1.4S KR → [short] R_B → 2.0 M SR → 16.5 M Y → STABLE ZR

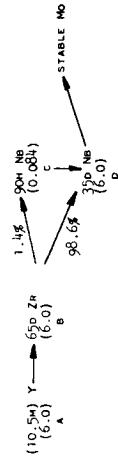
(5.0)
A
(5.0)
B
(5.0)
C

CONSTANTS:

$$\begin{aligned} A &= 1.782 \times 10^3 & B &= 20.79 & C &= 2.521 \\ N_1^0 &= 3.14 \times 10^{15} & N_2^0 &= 2.698 \times 10^{17} & N_3^0 &= 2.22 \times 10^{18} \end{aligned}$$

τ (HRS)	$e^{-\alpha\tau}$	$N_1^0 e^{-\alpha\tau} \times 10^{-14}$	$e^{-\beta\tau}$	$N_2^0 e^{-\beta\tau} \times 10^{-17}$	$N_1^0 S_{AB} \times 10^{-15}$	$N_2^0 S_{AB} \times 10^{-17}$	$N_2(\tau) \times 10^{-17}$	% SATU-RATION	$e^{-c\tau}$	$N_3^0 e^{-c\tau} \times 10^{-18}$	$N_2^0 S_{BC} \times 10^{-17}$	$N_3(\tau) \times 10^{-18}$	% SATU-RATION
0	1	31.4	1	2.698	0	2.698	100	100	1	2.22	0	0.006280	2.220
0.0005	0.4107	12.89	0.9896	2.669	1.839	2.687	99.6	0.9988	2.217	0.02824	0.01570	2.220	
0.001	0.1686	5.294	0.980	2.644	2.580	2.670	99.0	0.9975	2.214	0.05330	0.03768	2.220	
0.002	0.0284	0.8917	0.958	2.584	2.955	2.614	96.9	0.9950	2.208	0.1136	0.1036	2.219	
0.004	0.0008	0.02512	0.922	2.487	2.929	2.516	93.3	0.9899	2.197	0.2089	0.1821	2.218	
0.008			0.844	2.277	2.681	2.304	85.4	0.980	2.175	0.4179	0.4584	2.217	
0.01			0.811	2.188	2.576	2.214	82.1	0.975	2.164	0.5037	0.5589	2.214	
0.02			0.657	1.772	2.087	1.793	66.5	0.950	2.109	0.9003	1.026	2.200	
0.04			0.436	1.176	1.385	1.190	44.1	0.905	2.009	1.441	1.664	2.155	
0.08			0.190	0.5126	0.6035	0.5186	19.2	0.818	1.815	1.929	2.241	2.010	
0.1			0.125	0.3372	0.3972	0.3412	12.6	0.779	1.729	2.009	2.336	1.932	
0.2			0.0156	0.04208	0.04954	0.04258	1.58	0.606	1.345	1.813	2.113	1.528	
0.4			0.00025	0.0006745	0.000794	0.0006824	0.0253	0.364	0.8080	1.118	1.303	0.9211	
0.8								0.134	0.2974	0.4117	0.4794	0.3391	
1.0								0.080	0.1776	0.2458	0.2863	0.2025	
2.0								0.0067	0.01487	0.02058	0.02398	0.01695	

TABLE 21 - (CHAIN 9)



CONSTANTS:

$$\alpha = 3.961 \quad b = 1.443 \times 10^{-4} \quad c = 7.702 \times 10^{-3} \quad d = 8.252 \times 10^{-4}$$

$$N_1^0 = 1.697 \times 10^{18} \quad N_2^0 = 1.292 \times 10^{22} \quad N_3^0 = 1.105 \times 10^{19} \quad N_4^0 = 5.814 \times 10^{21}$$

$$N_5^0 = 1.292 \times 10^{22} \times 10^{-18} \times 10^{-22} \quad N_6^0 = 1.292 \times 10^{19} \times 10^{-18} \times 10^{-22}$$

$$N_7^0 = 1.292 \times 10^{19} \times 10^{-18} \times 10^{-22} \quad N_8^0 = 1.292 \times 10^{19} \times 10^{-18} \times 10^{-22}$$

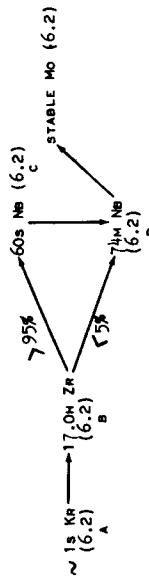
$$N_9^0 = 1.292 \times 10^{19} \times 10^{-18} \times 10^{-22} \quad N_{10}^0 = 1.292 \times 10^{19} \times 10^{-18} \times 10^{-22}$$

t (hrs)	$e^{-\Delta t}$	$N_1^0 e^{-\Delta t}$	$N_2^0 e^{-\Delta t}$	$N_3^0 e^{-\Delta t}$	$N_4^0 e^{-\Delta t}$	$\frac{\% \text{ RE-MAINING}}{e^{-\Delta t}}$	$N_5^0 e^{-\Delta t}$	$N_6^0 e^{-\Delta t}$	$N_7^0 e^{-\Delta t}$	$N_8^0 e^{-\Delta t}$	$N_9^0 e^{-\Delta t}$	$N_{10}^0 e^{-\Delta t}$	$N_1(t)$	$N_2(t)$	$N_3(t)$	$N_4(t)$	$N_5(t)$	$N_6(t)$	$N_7(t)$	$N_8(t)$	$N_9(t)$	$N_{10}(t)$	
0	1	1.697	1	1.292	0	1.292	100	1	1.105	0	0	1.105	100	1	1.105	100	1	5.814	0	0	0	5.814	97.5
.0005	.9980	1.694	1	1.292	.0003394	1.292	100	1	1.105	0	0	1.105	100	1	1.105	100	1	5.814	0	0	0	5.814	97.5
.001	.9960	1.690	1	1.292	.006788	1.292	100	1	1.105	0	0	1.105	100	1	1.105	100	1	5.814	0	0	0	5.814	97.5
.002	.9921	1.684	1	1.292	.01341	1.292	100	1	1.105	0	0	1.105	100	1	1.105	100	1	5.814	0	0	0	5.814	97.5
.004	.9843	1.670	1	1.292	.02664	1.292	100	1	1.105	0	0	1.105	100	1	1.105	100	1	5.814	0	0	0	5.814	97.5
.008	.9688	1.664	1	1.292	.0595	1.292	100	1	0.9999	1.105	.001107	0	1.105	100	1	5.814	0	0.00124	0	5.814	97.5		
.01	.9612	1.631	1	1.292	.06384	1.292	100	1	0.9999	1.105	.001107	0	1.105	100	1	5.814	0	0.00124	0	5.814	97.5		
.02	.9238	1.568	1	1.292	.1293	1.292	100	1	0.9998	1.105	.002214	0	1.105	100	1	5.814	0	.00248	0	5.814	97.5		
.04	.8538	1.449	1	1.292	.2481	1.292	100	1	0.9997	1.105	.003353	0	1.105	100	1	5.814	0	.00371	0	5.814	97.5		
.08	.7282	1.236	1	1.292	.4612	1.292	100	1	0.9994	1.104	.006644	0	1.105	100	1	0.9999	5.813	.00619	0.01485	5.814	97.5		
.1	.673	1.112	1	1.292	.5549	1.292	100	1	0.9992	1.104	.008860	0	1.105	100	1	0.9999	5.813	.00866	.01485	5.814	97.5		
.2	.453	0.7687	0.9999	1.292	.9283	1.292	100	1	0.9985	1.103	.01550	.000238	1.105	100	1	0.9998	5.813	.01608	.01485	5.814	97.5		
.4	.206	.3196	.9998	1.292	1.347	1.292	100	1	0.9969	1.102	.03211	.01901	1.105	100	1	0.9997	5.812	.03164	.01485	5.813	97.5		
.8	.042	.07127	.9996	1.291	1.626	1.291	100	1	0.9938	1.098	.06424	.05702	1.104	99.9	1	0.9993	5.810	.06804	.01456	5.814	97.5		
1	.019	.03224	.9996	1.291	1.665	1.291	100	1	0.9923	1.096	.08981	.07811	1.104	99.9	1	0.9992	5.809	.08535	.01942	5.815	97.5		
2	.00336	.000611	.9991	1.291	1.695	1.291	99.9	1	0.9847	1.088	.1706	.1806	1.104	99.9	1	0.9993	5.804	.1682	.1188	5.816	97.6		
4			.9982	1.290	1.694	1.290	99.8	1	0.9696	1.071	.3168	.3873	1.102	99.7	1	0.9967	5.795	.3352	.2228	0	5.817	97.6	
8			.9964	1.287	1.691	1.287	99.6	1	0.9402	1.039	.6225	.7912	1.101	99.6	1	0.9934	5.776	.6381	.4456	.00018	5.821	97.7	
10			.9956	1.286	1.690	1.286	99.6	1	0.9259	1.023	.9719	.9881	1.100	99.5	1	0.9917	5.766	.8339	.5793	.00118	5.825	97.7	
20			.9911	1.281	1.682	1.281	99.1	1	0.8773	0.9473	1.482	1.922	1.096	99.2	1	0.9836	5.719	1.562	1.114	.00118	5.832	97.8	
40			.9823	1.269	1.667	1.269	98.2	1	0.8112	0.8112	2.735	3.578	1.086	98.3	1	0.9675	5.625	2.876	2.199	.00336	5.848	98.1	
80			.9651	1.247	1.638	1.247	96.5	1	0.7402	1.039	.6225	.7912	1.101	96.7	1	0.9361	5.442	.900	.4307	.0163	5.879	98.6	
100			.9566	1.236	1.623	1.236	95.7	1	0.653	0.512	5.470	7.166	1.059	95.8	1	0.9268	5.354	.663	.5318	.0235	5.894	98.9	
200			.9148	1.182	1.552	1.182	91.5	1	0.215	0.238	7.752	10.17	1.013	91.7	1	0.8450	4.930	7.83	9.923	.0742	5.938	99.6	
400			.837	1.081	1.420	1.081	83.7	1	.0460	0.0508	8.761	11.50	0.9269	83.9	1	0.719	4.181	8.33	17.53	.1845	5.961	100.	
800			.701	0.9057	1.190	1.247	70.1	1	.0021	0.0023	7.741	10.17	0.7764	70.3	1	.517	3.01	6.317	27.33	.3599	5.784	97.0	
1000			.643	.8388	1.091	.8309	68.3	1	.00045	0.00050	7.120	9.345	0.7126	64.5	1	.438	2.55	5.42	30.45	.4030	5.641	94.6	
2000			.412	.5323	.6932	.5324	41.2	1	.4562	5.5992	4.563	41.3	.1872	16.9	1	.192	1.12	.0369	1.4712	4.138	74.5		
4000			.169	.2183	.2868	.2183	16.9	1	.0460	0.0508	2.159	2.159	0.1872	16.9	1	.0215	0.436	19.61	.2934	2.206	37.0		
6000			.0888	.03121	.04887	.03121	2.86	1	.03189	.03189	4.189	4.189	0.0319	2.89	1	.0017	0.0099	4.026	.06096	0.4186	7.02		
10000			.0120	.01550	.02036	.01550	1.20	1	.01329	.01329	.1746	.0133	1.20	.00026	1	.0015	0.0032	1.738	.02628	0.178	2.99		
20000			.00014	.000181	.000238	.000181	0.014	1	.001062	.001062	.000204	.0001	0.09	.0001	1	.0008	.00031	.00031	.00033	0.39	0.39		

$\frac{1}{2} \text{ SATURATION} = 0.853 (\% \text{ REMAINING})$

$\frac{3}{2} \text{ SATURATION} = 0.714 (\% \text{ REMAINING}), \text{ THE } \frac{1}{2} \text{ BRANCH OF EQUATION (2c) FOR THE } 90.6\% \text{ BRANCH AND EQUATION (2b) FOR THE } 1.4\% \text{ BRANCH WERE OMITTED SINCE THE MAXIMUM VALUES ARE } 4.3 \times 10^{-3} \text{ AND } 6.2 \times 10^{-3}, \text{ RESPECTIVELY.}$

TABLE 22 - (CHAIN 97)



CONSTANTS:

$$\Delta = 2495$$

$$N_1^0 = 2.783 \times 10^{15}$$

$$N_2^0 = 1.703 \times 10^{20}$$

$$c = 41.59$$

$$d = 0.5332$$

$$N_3^0 = 1.670 \times 10^{17}$$

$$N_4^0 = 1.302 \times 10^{19}$$

$$e^{-\Delta t} = 0.04077$$

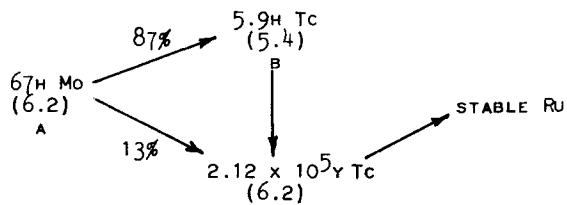
$$N_2^0 e^{-\Delta t} = 1.703 \times 10^{20}$$

$$N_3^0 e^{-\Delta t} = 1.670 \times 10^{17}$$

$$N_4^0 e^{-\Delta t} = 0.04077$$

$t(\text{hrs})$	$e^{-\Delta t}$		$N_2^0 e^{-\Delta t}$		$N_3^0 e^{-\Delta t}$		$N_4^0 e^{-\Delta t}$		$N_2^0(\tau)$		$N_3(\tau)$		$\% \text{ SATURATION}$		$e^{-\sigma t}$		$N_2^0 e^{-\sigma t}$		$N_3^0 e^{-\sigma t}$		$N_4^0 e^{-\sigma t}$	
	$\times 10^{-15}$	$\times 10^{-20}$	$\times 10^{-15}$	$\times 10^{-20}$	$\times 10^{-15}$	$\times 10^{-20}$	$\times 10^{-15}$	$\times 10^{-20}$	$\times 10^{-17}$	$\times 10^{-17}$	$\times 10^{-12}$	$\times 10^{-17}$	$\times 10^{-17}$	$\times 10^{-17}$	$\times 10^{-19}$	$\times 10^{-19}$	$\times 10^{-18}$	$\times 10^{-18}$	$\times 10^{-14}$	$\times 10^{-19}$		
0	1	2.783	1	1.703	0	1.703	100	1	1.670	0	0	1.670	100	1	1.302	0	0	0	1.302	93.4		
.0005	0.286	0.7959	1	1.703	1.987	1.703	100	0.97594	1.636	0.0344	0.021	1.670	100	0.9997	1.302	0.0343	0	0	1.302	93.4		
.001	.083	.2310	1	1.703	2.552	1.703	100	.9533	1.662	0.0680	0.070	1.670	100	.9995	1.301	0.0680	0	0	1.302	93.4		
.002	.0068	.01892	0.9992	1.703	2.764	1.703	100	.9202	1.537	0.1332	0.175	1.670	100	.9989	1.301	0.1332	0	0	1.302	93.4		
.004	0	0	.9998	1.703	2.782	1.703	100	.8468	1.444	0.2557	0.378	1.670	100	.9979	1.299	0.2557	0	0	1.302	93.4		
.008			.9997	1.702	2.782	1.702	100	.717	1.197	0.473	0.739	1.670	100	.9957	1.296	0.472	0.00791	0.0011	1.302	93.4		
.01			.9996	1.702	2.782	1.702	100	.659	1.101	0.570	0.899	1.670	100	.9947	1.295	0.569	.01187	.0014	1.302	93.4		
.02			.9992	1.702	2.781	1.702	99.9	.435	0.765	0.942	1.520	1.669	100	.9894	1.288	0.937	.04748	.0095	1.302	93.4		
.04			.9984	1.700	2.779	1.700	99.8	.189	.3156	1.352	2.201	1.668	99.9	.9789	1.275	1.337	.1622	.023	1.305	93.6		
.08			.9967	1.697	2.774	1.697	99.7	.0360	.06012	1.606	2.622	1.666	99.8	.9583	1.248	1.561	.4472	.0351	1.308	93.8		
.1			.9959	1.696	2.772	1.696	99.6	.0155	.02589	1.538	2.676	1.664	99.6	.9482	1.235	1.578	.5955	.0838	1.310	94.0		
.2			.9918	1.689	2.760	1.689	99.2	.00024	.00040	1.657	2.708	1.657	99.2	.899	1.170	1.521	.1341	.189	1.319	94.6		
.4			.9838	1.675	2.738	1.675	98.4			1.644	2.686	1.644	98.4	.868	1.052	1.37	.2720	.4105	1.338	96.0		
.8			.9679	1.648	2.694	1.648	96.8			1.617	2.643	1.617	96.8	.652	0.8489	1.10	.5049	.7102	1.365	97.9		
1			.9600	1.635	2.672	1.635	96.0			1.604	2.622	1.604	96.0	.586	.7630	0.992	.6017	.8463	1.375	98.6		
2			.9218	1.570	2.555	1.570	92.2			1.540	2.517	1.540	92.2	.344	.4479	0.582	.9406	1.323	1.394	100		
4			.8193	1.446	2.364	1.446	84.9			1.419	2.319	1.419	85.0	.119	.1549	0.201	.11.95	.1681	1.352	97.0		
8			.722	1.230	2.009	1.230	72.2			1.21	1.971	1.21	72.5	.0140	.01823	0.0237	.11.61	.1633	1.179	84.6		
10			.664	1.131	1.848	1.131	66.4			1.11	1.813	1.11	66.5	.0048	.006250	0.0081	.10.81	.1520	1.087	78.0		
20			.442	0.7527	1.230	0.7527	44.2			0.739	1.207	0.739	44.3				7.248	1.019	.0725	52.0		
40			.196	.3338	0.5455	.3338	19.6			0.328	0.5352	0.328	19.6				3.214	0.4520	0.321	23.0		
80			.0381	.06488	.1060	.06488	3.81			0.0637	0.1040	0.0637	3.81				.6247	0.0879	0.0655	4.48		
100			.0168	.02861	.04675	.02861	1.68			0.0281	0.04286	0.0281	1.68				.2754	0.0387	0.0275	1.97		
200			.00028	.000477	.000779	.000477	0.03			0.00047	0.00077	0.00047	0.028				.000459	0.0006	0.0005	0.04		

TABLE 23 - (CHAIN 99)



CONSTANTS:

$A = 0.01035$

$B = 0.1175$

$N_1^0 = 6.709 \times 10^{20}$

$N_2^0 = 5.147 \times 10^{19}$

T(HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-20}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-19}$	$N_2^0 S_{AB} \times 10^{-19}$	$N_2(\tau) \times 10^{-19}$	% SATU-RATION
0	1	6.709	1	5.147	0	5.147	100
.0005	1	6.709	0.9999	5.146	0.000564	5.147	100
.001	1	6.709	.9999	5.146	.000564	5.147	100
.002	1	6.709	.9998	5.146	.001128	5.147	100
.004	1	6.709	.9995	5.144	.002820	5.147	100
.008	0.9999	6.709	.9991	5.142	.004513	5.147	100
.01	.9999	6.709	.9988	5.141	.006205	5.147	100
.02	.9998	6.708	.9976	5.135	.01241	5.147	100
.04	.9996	6.707	.9953	5.123	.02426	5.147	100
.08	.9992	6.704	.9906	5.099	.04851	5.147	100
.1	.9990	6.703	.9882	5.086	.06094	5.147	100
.2	.9979	6.695	.976	5.023	.1241	5.147	100
.4	.9959	6.682	.955	4.915	.2313	5.146	100
.8	.9917	6.654	.912	4.694	.4513	5.146	100
1	.9896	6.640	.889	4.576	.5697	5.146	100
2	.979	6.569	.790	4.066	1.066	5.132	99.7
4	.960	6.441	.625	3.217	1.889	5.106	99.2
8	.921	6.186	.390	2.007	2.996	5.003	97.2
10	.902	6.052	.308	1.585	3.350	4.935	95.9
20	.813	5.455	.0953	0.491	4.050	4.541	88.2
40	.660	4.428	.00909	0.0468	3.672	3.719	72.3
80	.437	2.932	.000083	0.0004	2.465	2.465	47.9
100	.355	2.382			2.003	2.003	38.9
200	.126	0.8454			.7109	0.7109	13.8
400	.0159	.1066			.08989	0.0899	1.75
800	.00025	.001677			.00141	0.0014	0.027

TABLE 24 - (CHAIN 101)

14.6M Mo \longrightarrow 16.5M Tc \longrightarrow STABLE Ru(4.9)
A(4.9)
B

(4.9)

CONSTANTS:

$A = 2.849$

$B = 2.521$

$N_1^0 = 1.925 \times 10^{18}$

$N_2^0 = 2.175 \times 10^{18}$

τ (HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-18}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-18}$	$N_1^0 S_{AB} \times 10^{-18}$	$N_2(\tau) \times 10^{-18}$	% SATU-RATION
0	1	1.925	1	2.175	0	2.175	100
.0005	0.9985	1.922	0.9988	2.172	0.005014	2.172	99.9
.001	.9971	1.919	.9975	2.169	.006687	2.169	99.7
.002	.9943	1.914	.9950	2.164	.01170	2.164	99.5
.004	.9886	1.903	.9899	2.153	.02173	2.153	99.0
.008	.9772	1.881	.980	2.131	.05014	2.131	98.0
.01	.972	1.871	.976	2.122	.06687	2.122	97.6
.02	.946	1.821	.950	2.066	.06687	2.066	95.0
.04	.892	1.720	.905	1.968	.1504	1.968	90.5
.08	.796	1.532	.815	1.772	.3176	1.772	81.5
.1	.752	1.447	.777	1.689	.4179	1.689	77.7
.2	.567	1.091	.604	1.313	.6185	1.313	60.4
.4	.320	0.6160	.364	0.7917	.7355	0.7917	36.4
.8	.103	.1963	.133	.2892	.5182	.2892	13.3
1	.0578	.1112	.0804	.1748	.3778	.1748	8.04
2	.00335	.006448	.00673	.01463	.05649	.01463	0.671

TABLE 25 - (CHAIN (102))

11M Mo \longrightarrow 25 s Tc \longrightarrow STABLE Ru(4.2)
A (4.2)
B

CONSTANTS:

$A = 3.781$

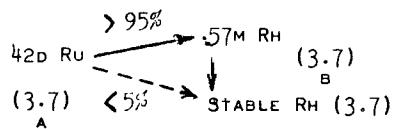
$B = 99.81$

$N_1^0 = 1.243 \times 10^{18}$

$N_2^0 = 4.713 \times 10^{16}$

T(HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-18}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-16}$	$N_1^0 S_{AB} \times 10^{-16}$	$N_2(\tau) \times 10^{-16}$	% SATU-RATION
0	1	1.243	1	4.713	0	4.713	100
0.0005	0.9981	1.240	0.951	4.482	0.2299	4.712	100
0.001	0.9962	1.238	.905	4.265	.4453	4.710	99.9
0.002	0.9924	1.233	.819	3.860	.8467	4.707	99.9
0.004	0.9849	1.224	.671	3.162	1.536	4.698	99.7
0.008	0.970	1.205	.448	2.111	2.554	4.665	99.6
0.01	0.964	1.198	.368	1.734	2.917	4.651	99.5
0.02	0.928	1.153	.137	0.6457	3.870	4.516	95.8
0.04	0.860	1.068	.0185	.08719	4.115	4.202	89.2
0.08	0.738	0.9173	.00033	.001084	3.612	3.613	76.7
0.1	0.685	.8514	.00004	.0002	3.352	3.352	71.1
0.2	0.470	.5842			2.299	2.299	48.8
0.4	0.2209	.2745			1.081	1.081	22.9
0.8	0.0488	.06065			.2387	0.2387	5.06
1.0	0.0228	.02834			.1115	.1115	2.37
2.0	0.0005	.00062			.002446	.002446	0.0519

TABLE 26 - (CHAIN 103)



CONSTANTS:

$$\begin{aligned} A &= 6.876 \times 10^{-4} & B &= 7.296 \times 10^{-1} \\ N_1^0 &= 5.713 \times 10^{21} & N_2^0 &= 5.384 \times 10^{18} \end{aligned}$$

T(HRS)	e-AT	$N_1^0 e^{-AT} \times 10^{-21}$	e-BT	$N_2^0 e^{-BT} \times 10^{-18}$	$N_{AB}^0 \times 10^{-18}$	$N_2(\tau) \times 10^{-18}$	% REMAINING
0	1	5.713	1	5.384	0	5.384	100
.0005	1	5.713	0.9996	5.382	0.002156	5.384	100
.001	1	5.713	.9993	5.380	0.003772	5.384	100
.002	1	5.713	.9985	5.376	0.008083	5.384	100
.004	1	5.713	.9971	5.368	0.01563	5.384	100
.008	1	5.713	.9942	5.353	0.03126	5.384	100
.01	1	5.713	.9927	5.345	0.03934	5.384	100
.02	1	5.713	.9854	5.305	0.07868	5.384	100
.04	1	5.713	.9721	5.234	0.1504	5.384	100
.08	1	5.713	.9430	5.077	0.3072	5.384	100
.1	1	5.713	.9292	5.003	0.3815	5.384	100
.2	1	5.713	.873	4.700	0.6844	5.384	100
.4	1	5.713	.746	4.016	1.368	5.384	100
.8	0.9994	5.710	.556	2.994	2.387	5.381	99.9
1	.9993	5.709	.483	2.600	2.781	5.381	99.9
2	.9989	5.707	.232	1.249	4.132	5.381	99.9
4	.9972	5.697	.054	0.2907	5.082	5.373	99.8
8	.9945	5.682	.0028	.01508	5.344	5.359	99.5
10	.9931	5.674	.00067	.003607	5.348	5.352	99.4
20	.9862	5.634			5.315	5.315	98.7
40	.9728	5.558			5.242	5.242	97.4
80	.9462	5.406			5.099	5.099	94.7
100	.9332	5.331			5.029	5.029	93.4
200	.872	4.982			4.699	4.699	87.3
400	.759	4.336			4.090	4.090	76.0
800	.576	3.291			3.104	3.104	57.6
1000	.503	2.874			2.711	2.711	50.3
2000	.253	1.445			1.363	1.363	25.3
4000	.064	0.3656			0.3449	0.3449	6.41
8000	.0040	.02285			0.02156	0.02156	0.400
00000	.0010	.00571			0.00539	0.00539	0.001

¹ % SATURATION = 0.948 (% REMAINING)



TABLE 27 - (CHAIN 105)

CONSTANTS

TABLE 28 - (CHAIN 106)

1.0Y Ru \longrightarrow 30s RH \longrightarrow STABLE PD

(0.52) (0.52) (0.52)

CONSTANTS:

$A = 7.912 \times 10^{-5}$

$B = 83.18$

$N_1^0 = 2.127 \times 10^{21}$

$N_2^0 = 2.358 \times 10^{15}$

τ (HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-21}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-15}$	$N_1^0 S_{AB} \times 10^{-15}$	$N_2(\tau) \times 10^{-15}$	% REMAINING ¹
0	1	2.127	1	2.358	0.	2.358	100
1.	0.9999	2.127	0.959	2.261	0.08293	2.344	99.4
2.	0.9998	2.127	.921	2.172	0.1598	2.332	98.9
4.	0.9997	2.126	.844	1.990	0.3154	2.305	97.8
8.	0.9994	2.126	.719	1.695	0.5683	2.263	96.0
10.	0.9992	2.125	.517	1.219	0.9771	2.196	93.1
20.	0.9985	2.124	.436	1.028	1.141	2.169	92.0
40.	0.9968	2.120	.190	0.4480	1.639	2.087	88.5
80.	0.9937	2.114	.036	0.08489	1.950	2.035	86.3
100.	0.9921	2.110	.0012	0.00283	2.021	2.024	85.8
200.	0.985	2.095	.00024	0.000566	2.023	2.024	85.8
400.	0.968	2.059			2.023	2.023	85.8
800.	0.939	1.997			2.023	2.023	85.8
1000.	0.923	1.963			2.023	2.023	85.8
2000.	0.852	1.812			2.023	2.023	85.8
4000.	0.726	1.544			2.023	2.023	85.8
8000.	0.532	1.132			2.023	2.023	85.8
10000.	0.454	0.965			2.022	2.022	85.7
20000.	0.206	0.438			2.022	2.022	85.7
40000.	0.0424	0.0902			2.020	2.020	85.7
80000.	0.0018	0.0038			2.017	2.017	85.5
100000.	0.00037	0.00079			2.010	2.010	85.2
					2.007	2.007	85.1
					1.993	1.993	84.5
					1.958	1.958	83.0
					1.900	1.900	80.6
					1.867	1.867	79.2
					1.724	1.724	73.1
					1.469	1.469	62.3
					1.076	1.076	45.6
					0.9184	0.9184	38.9
					0.4167	0.4167	17.7
					0.08578	0.08578	3.64
					0.003641	0.003641	0.00154
					0.000748	0.000748	0.00032

¹ % SATURATION = 0.289 (% REMAINING)

TABLE 29 - (CHAIN (107))

$[<1.5 \text{ m}]_{TC} \rightarrow 4M_{RU} \rightarrow 26M_{RH} \dots 5 \times 10^6_{PD} \dashrightarrow \rightarrow (44.3s)_{AG}$

CONSTANTS:

TABLE 30 - (CHAIN (108))

9H RH → STABLE PD

(0.08) (0.08)
A

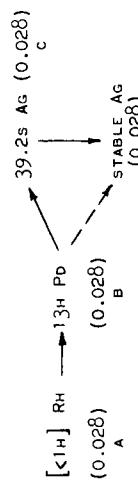
CONSTANTS:

$A = 0.07702$

$N_1^0 = 1.163 \times 10^{18}$

T(HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-18}$
0	1	1.163
0.0005	0.9999	1.163
0.001	0.9999	1.163
0.002	0.9998	1.163
0.004	0.9997	1.163
0.008	0.9994	1.162
0.01	0.9992	1.162
0.02	0.9985	1.161
0.04	0.9969	1.159
0.08	0.9937	1.156
0.1	0.9923	1.154
0.2	0.9848	1.145
0.4	0.9696	1.128
0.8	0.9405	1.094
1.0	0.926	1.077
2.0	0.857	0.9967
4.0	0.735	.8548
8.0	0.540	.6280
10.0	0.464	.5396
20.0	0.215	.2500
40.0	0.046	.0535
80.0	0.0022	.0026
100.0	0.00045	.00052

TABLE 31 - (CHAIN 109)



CONSTANTS:

$$A = 0.6931$$

$$N_1^0 = 4.53 \times 10^{16}$$

$$B = 0.05332$$

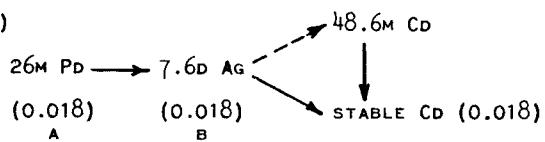
$$N_2^0 = 5.88 \times 10^{17}$$

$$c = 63.65$$

$$N_3^0 = 4.93 \times 10^{14}$$

t (hrs)	e^{-At}		$N_1^0 e^{-At}$ $\times 10^{-16}$		e^{-Bt}		$N_2^0 e^{-Bt}$ $\times 10^{-17}$		$N_1^0 S_{AB}$ $\times 10^{-16}$		$N_2(t)$ $\times 10^{-17}$		% SATU- RATION		$N_3^0 e^{-Ct}$ $\times 10^{-14}$		$N_2^0 S_{BC}$ $\times 10^{-13}$		$N_1^0 S_{ABC}$ $\times 10^{-12}$		$N_3(t)$ $\times 10^{-14}$		% SATU- RATION	
0	1	4.53	1	5.88	0	5.88	100	5.88	100	0.968	4.772	1.575	0	0	4.93	100	4.93	100	4.93	100	4.93	100	4.93	100
0.0005	0.9997	4.528	1	5.88	0.00145	5.88	100	5.88	100	.939	4.629	3.002	0	0	4.93	100	4.93	100	4.93	100	4.93	100	4.93	100
0.001	0.9993	4.526	0.9999	5.88	.00294	5.88	100	5.88	100	.878	4.328	6.003	0	0	4.93	100	4.93	100	4.93	100	4.93	100	4.93	100
0.002	0.9986	4.523	.9999	5.88	.00639	5.88	100	5.88	100	.779	3.840	10.88	0.0453	4.93	100	4.93	100	4.93	100	4.93	100	4.93	100	
0.004	0.9972	4.517	.9998	5.88	.0128	5.88	100	5.88	100	.600	2.958	19.69	.0906	4.93	100	4.93	100	4.93	100	4.93	100	4.93	100	
0.008	0.9915	4.505	.9997	5.88	.0255	5.88	100	5.88	100	.527	2.598	23.28	.0906	4.93	100	4.93	100	4.93	100	4.93	100	4.93	100	
0.01	0.9931	4.498	.9995	5.877	.0314	5.88	100	5.88	100	.481	1.385	35.34	.272	4.93	100	4.93	100	4.93	100	4.93	100	4.93	100	
0.02	0.9866	4.466	.9989	5.873	.0639	5.88	100	5.88	100	.421	1.385	45.28	.770	4.92	99.8	4.92	99.8	4.92	99.8	4.92	99.8	4.92	99.8	
0.04	0.9712	4.403	.9979	5.867	.1277	5.88	100	5.88	100	.385	48.72	1.68	4.92	99.8	4.92	99.8	4.92	99.8	4.92	99.8	4.92	99.8	4.92	99.8
0.08	0.946	4.285	.9957	5.854	.2455	5.88	100	5.88	100	.066	.02958	48.72	48.72	4.92	99.8	4.92	99.8	4.92	99.8	4.92	99.8	4.92	99.8	
0.1	0.933	4.226	.9947	5.848	.3040	5.88	100	5.88	100	.0117	.00838	48.87	48.87	2.13	4.92	99.8	4.92	99.8	4.92	99.8	4.92	99.8	4.92	99.8
0.2	0.869	3.936	.9893	5.817	.5889	5.88	100	5.88	100	.006	.02958	48.72	48.72	4.58	4.92	99.8	4.92	99.8	4.92	99.8	4.92	99.8	4.92	99.8
0.4	0.756	3.424	.9787	5.754	1.094	5.86	99.7	5.86	99.7	.004	.02958	48.72	48.72	8.88	4.91	99.6	4.91	99.6	4.91	99.6	4.91	99.6	4.91	99.6
0.8	0.577	2.613	.9573	5.628	1.864	5.81	98.8	5.81	98.8	.001	.00838	47.12	47.12	15.4	4.87	98.8	4.87	98.8	4.87	98.8	4.87	98.8	4.87	98.8
1.0	0.502	2.274	.947	5.568	2.183	5.79	98.5	5.79	98.5	.000	.00838	46.60	46.60	18.1	4.84	98.2	4.84	98.2	4.84	98.2	4.84	98.2	4.84	98.2
2.0	0.249	1.127	.896	5.268	3.174	5.59	95.1	5.59	95.1	.000	.00838	44.10	44.10	26.5	4.68	94.9	4.68	94.9	4.68	94.9	4.68	94.9	4.68	94.9
4.0	0.063	0.2853	.811	4.768	3.670	5.14	87.4	5.14	87.4	.000	.00838	39.91	39.91	30.7	4.06	82.4	4.06	82.4	4.06	82.4	4.06	82.4	4.06	82.4
8.0	0.0010	.01812	.651	3.827	3.174	4.14	70.4	4.14	70.4	.000	.00838	32.04	32.04	26.6	3.26	66.1	3.26	66.1	3.26	66.1	3.26	66.1	3.26	66.1
10.0	0.0010	.004230	.589	3.463	2.885	3.75	63.8	3.75	63.8	.000	.00838	28.99	28.99	24.2	2.95	59.8	2.95	59.8	2.95	59.8	2.95	59.8	2.95	59.8
20		.343	2.016	1.683	2.18	3.17	37.1	37.1	37.1	.000	.00838	16.88	16.88	14.1	1.72	34.9	1.72	34.9	1.72	34.9	1.72	34.9	1.72	34.9
40		.119	0.6997	0.5839	0.758	12.9	5.856	5.856	5.856	.000	.00838	5.89	5.89	4.89	0.587	11.9	0.587	11.9	0.587	11.9	0.587	11.9	0.587	11.9
80		.0139	.08173	.0682	.0886	1.51	0.6838	0.6838	0.6838	.000	.00838	0.571	0.571	0.695	1.41	1.41	0.695	1.41	0.695	1.41	0.695	1.41	0.695	1.41
100		.0049	.02881	.02404	.0312	0.531	.2411	.2411	.2411	.000	.00838	.202	.202	.02452	.0497	.0497	.02452	.0497	.02452	.0497	.02452	.0497	.02452	.0497

TABLE 32 - (CHAIN 111)



CONSTANTS:

$A \approx 1.599$

$B = .003800$

$N_1^0 = 1.260 \times 10^{16}$

$N_2^0 = 5.305 \times 10^{18}$

T(HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-16}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-18}$	$N_1^0 S_{AB} \times 10^{-16}$	$N_2(\tau) \times 10^{-18}$	% SATU-RATION
0	1	1.259	1	5.305	0	5.305	100
.0005	0.9992	1.259	1	5.305	0.001010	5.305	100
.001	.9984	1.258	1	5.305	.002019	5.305	100
.002	.9968	1.256	1	5.305	.004038	5.305	100
.004	.9936	1.252	1	5.305	.008076	5.305	100
.008	.9872	1.244	1	5.305	.01615	5.305	100
.01	.9842	1.240	1	5.305	.01994	5.305	100
.02	.9686	1.220	0.9999	5.304	.03951	5.305	100
.04	.9380	1.182	.9998	5.304	.07802	5.305	100
.08	.880	1.109	.9997	5.303	.1511	5.305	100
.1	.852	1.074	.9996	5.302	.1864	5.304	100
.2	.726	0.915	.9992	5.300	.3449	5.303	100
.4	.528	.665	.9985	5.297	.5940	5.303	100
.8	.278	.350	.9970	5.289	.9077	5.298	99.9
1	.202	.255	.9962	5.284	1.003	5.294	99.8
2	.041	.0517	.9924	5.264	1.201	5.276	99.5
4	.00106	.00134	.985	5.225	1.242	5.237	98.7
8			.970	5.145	1.225	5.157	97.2
10			.9628	5.107	1.215	5.119	96.5
20			.927	4.917	1.170	4.928	92.9
40			.859	4.556	1.084	4.567	86.1
80			.738	3.915	0.9316	3.924	74.0
100			.684	3.628	.8634	3.637	68.6
200			.468	2.482	.5908	2.488	46.9
400			.219	1.161	.2764	1.164	21.9
800			.048	0.2546	.0606	0.2552	4.81
1000			.022	.1167	.02777	.1169	2.20
2000			.0005	.00265	.00063	.00266	0.050

TABLE 33 - (CHAIN 112)

21H PD → 3.2H AG → STABLE CD

(0.0083) (0.0083)
A B

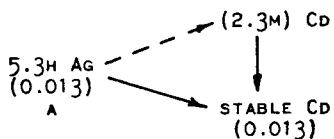
CONSTANTS:

A = 0.03300 B = 0.2166

$N_1^0 = 2.817 \times 10^{17}$ $N_2^0 = 4.292 \times 10^{16}$

T(HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-17}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-16}$	$N_2^0 S_{AB} \times 10^{-16}$	$N_2(\tau) \times 10^{-16}$	% SATU-RATION
0	1	2.817	1	4.292	0	4.292	100
0.0005	1	2.817	0.9999	4.292	0.0005062	4.292	100
0.001	1	2.817	.9998	4.291	.001012	4.292	100
0.002	1	2.817	.9996	4.290	.002024	4.292	100
0.004	0.9999	2.816	.9991	4.288	.004048	4.292	100
0.008	0.9997	2.816	.9983	4.285	.007084	4.292	100
0.01	0.9997	2.816	.9978	4.283	.009617	4.292	100
0.02	0.9993	2.815	.9957	4.274	.01822	4.292	100
0.04	0.9987	2.813	.9913	4.255	.03743	4.292	100
0.08	0.9974	2.809	.983	4.219	.07084	4.290	99.9
0.1	0.9967	2.807	.978	4.198	.09110	4.289	99.9
0.2	0.9934	2.798	.958	4.112	.1771	4.289	99.9
0.4	0.9868	2.779	.917	3.936	.3490	4.285	99.8
0.8	0.974	2.743	.841	3.610	.6732	4.283	99.8
1.0	0.9675	2.725	.805	3.455	.8200	4.275	99.6
2.0	0.934	2.631	.648	2.781	1.447	4.228	98.5
4.0	0.876	2.467	.420	1.803	2.308	4.111	95.8
8.0	0.768	2.163	.176	0.755	2.994	3.749	87.3
10.0	0.719	2.025	.115	0.494	3.056	3.550	82.7
20.0	0.516	1.453	.013	0.056	2.546	2.602	60.6
40.0	0.266	.7493	.00018	0.0008	1.346	1.347	31.4
80.0	0.072	.2028			0.3642	0.3642	8.49
100.0	0.037	.1042			.1872	0.1872	4.36
200.0	0.0014	.003943			.007084	0.0071	0.165

TABLE 34 - (CHAIN 113)



CONSTANTS:

$$\alpha = 0.1307$$

$$N_1^0 = 1.1114 \times 10^{17}$$

T(HRS)	$e^{-\alpha T}$	$N_1^0 e^{-\alpha T} \times 10^{-17}$
0	1	1.1114
0.0005	1	1.1114
0.001	0.9999	1.1113
0.002	0.9997	1.1113
0.004	0.9995	1.1113
0.008	0.9989	1.1112
0.01	0.9987	1.1112
0.02	0.9974	1.1111
0.04	0.9948	1.108
0.08	0.9895	1.102
0.1	0.987	1.099
0.2	0.974	1.085
0.4	0.949	1.057
0.8	0.900	1.002
1.0	0.878	.9780
2.0	0.770	.8577
4.0	0.593	.6606
8.0	0.352	.3921
10.0	0.270	.3007
20.0	0.074	.08243
40.0	0.0054	.00602

TABLE 35 - (CHAIN 114)
 $2M\text{ Ag} \longrightarrow \text{STABLE Cd.}$

(0.012) (0.012)
 A

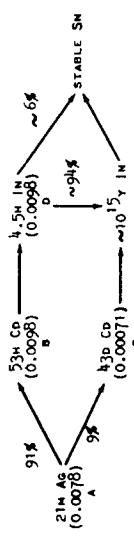
CONSTANTS:

$$A = 20.79$$

$$N_1^0 = 6.464 \times 10^{14}$$

$T(\text{HRS})$	e^{-AT}	$N_1^0 e^{-AT}$ $\times 10^{-14}$
0	1	6.464
0.0005	0.9895	6.396
0.001	0.9795	6.331
0.002	0.959	6.198
0.004	0.920	5.946
0.008	0.846	5.468
0.01	0.812	5.248
0.02	0.660	4.266
0.04	0.435	2.811
0.08	0.190	1.228
0.1	0.125	.8080
0.2	0.0155	.1002
0.4	0.00025	.001616

TABLE 36 - (CHAIN 115)



CONSTANTS:

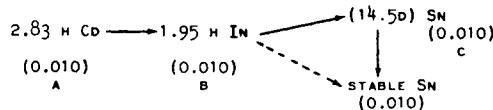
$$\alpha = 1.980 \quad b = 0.01398 \quad c = 6.7177 \times 10^{-4} \quad d = 0.1540$$

$$N_1^0 = 4.412 \times 10^{15} \quad N_2^0 = 8.391 \times 10^{17} \quad N_3^0 = 1.119 \times 10^{18} \quad N_4^0 = 7.127 \times 10^{16}$$

τ (hrs)	$e^{-\lambda t}$	$N_1 e^{-\lambda t}$	$N_2 e^{-\lambda t}$	$N_3 e^{-\lambda t}$	$N_4 e^{-\lambda t}$	% SATUR.	$e^{-\sigma t}$	$N_1 e^{-\sigma t}$	$N_2 e^{-\sigma t}$	$N_3 e^{-\sigma t}$	$N_4 e^{-\sigma t}$	% SATUR.	$e^{-\sigma t}$	$N_1 e^{-\sigma t}$	$N_2 e^{-\sigma t}$	$N_3 e^{-\sigma t}$	$N_4 e^{-\sigma t}$	% REMAINING	
0	1	4.412	1	8.391×10^{-17}	8.391×10^{-15}	100	1	7.127	0	0	7.127	100	1	1.119	0	1.119×10^{-18}	1.119	100	
.0005	0.9990	4.408	1	8.391	0	100	0.9999	7.126	0.0008	0	7.127	100	1	1.119	0.0040	1.119	1.119	100	
.001	0.9880	4.403	1	8.391	.0081	100	0.9998	7.126	.0016	0	7.127	100	1	1.119	.0079	1.119	1.119	100	
.002	0.9960	4.394	1	8.391	.0162	100	0.9997	7.125	.0023	0	7.127	100	1	1.119	.0159	1.119	1.119	100	
.004	0.9921	4.377	1	8.391	.0319	100	0.9994	7.123	.0047	0	7.127	100	1	1.119	.0314	1.119	1.119	100	
.008	0.9844	4.343	1	8.391	.0630	100	0.9988	7.118	.0093	0	7.127	100	1	1.119	.0620	1.119	1.119	100	
.01	0.9804	4.326	0.9999	8.390	.0788	8.391	100	0.9995	7.116	.011	0	7.127	100	1	1.119	.0779	1.119	1.119	100
.02	0.9612	4.241	.9997	8.388	.156	8.390	100	0.9969	7.105	.022	0	7.127	100	1	1.119	.1542	1.119	1.119	100
.04	0.9237	4.075	.9995	8.387	.306	8.390	100	0.9938	7.083	.044	0	7.127	100	1	1.119	.3031	1.119	1.119	100
.08	0.8538	3.767	.9990	8.383	.5868	8.389	100	0.9877	7.039	.0880	.0003	7.127	100	0.9999	1.119	.5805	1.119	100	
.1	0.8203	3.619	.9987	8.380	.7209	8.387	100	0.9807	7.018	.109	.0004	7.127	100	.9999	1.119	.7136	1.119	100	
.2	.673	2.97	.9974	8.369	1.31	8.382	99.9	0.9697	6.911	.216	.017	7.127	100	.9999	1.119	1.299	1.119	100	
.4	.453	2.00	.9948	8.347	2.19	8.369	99.7	0.9402	6.701	.425	.063	7.127	100	.9997	1.119	2.17	1.119	100	
.8	.206	0.909	.9895	8.303	3.18	8.335	99.3	0.8810	6.300	.8218	.200	7.124	100	.9995	1.118	3.155	1.118	99.9	
1	.138	0.609	.9869	8.281	3.43	8.315	99.1	0.8573	6.110	1.010	.278	7.123	99.9	.9993	1.118	3.421	1.118	99.9	
2	.019	0.384	.9742	8.175	3.86	8.214	97.9	0.735	5.24	1.86	.69	7.11	99.8	.9987	1.118	3.894	1.118	99.9	
4	.00036	0.0016	.9491	7.964	3.83	8.002	95.4	0.540	3.85	3.19	1.38	7.05	98.9	.9973	1.116	3.961	1.116	99.7	
8		.901	7.56	7.60	90.6	0.292	2.08	4.74	2.20	6.84	.200	7.124	100	.9946	1.113	3.952	1.113	99.5	
10		.878	7.37	7.55	7.41	88.3	0.214	1.53	5.17	2.42	.672	94.3	.9933	1.113	3.946	1.113	99.5		
20		.770	6.46	3.11	6.49	77.3	0.0460	0.328	5.64	2.70	.600	84.2	.9867	1.104	3.920	1.104	98.7		
40		.593	4.98	2.40	5.00	59.6	0.0021	0.015	4.60	2.21	4.64	65.1	.9735	1.089	3.868	1.089	97.3		
80		.352	2.95	1.42	2.96	35.3		2.74	1.32	2.75	.38.6	94.6	.9461	1.061	3.766	1.061	94.8		
100		.271	2.27	1.10	2.28	21.2		2.11	1.02	2.12	.29.7	93.5	.9046	1.046	3.71	1.046	93.5		
200		.077	0.646	0.31	0.649	7.73		0.600	0.289	0.603	.846	.874	.9798	3.47	0.978	3.47	87.4		
400		.0054	0.045	0.022	0.045	0.54		0.042	0.020	0.042	.059	.765	.8956	3.04	0.856	3.04	76.5		
800											.595	.655	2.32	0.655	58.5				
1000											.512	.573	2.03	0.573	51.2				
2000											.261	.292	1.04	0.292	26.1				
4000											.068	.076	0.270	0.076	6.8				
8000											.0046	.0051	0.0183	0.0051	0.46				
10000											.0013	.0015	0.0052	0.0015	0.13				

¹% SATURATION = 0.945 (% REMAINING)

TABLE 37 - (CHAIN 117)



CONSTANTS:

$A = 0.2449$

$B = 0.3554$

$C = 0.001991$

$N_1^0 = 4.573 \times 10^{16}$

$N_2^0 = 3.151 \times 10^{16}$

$N_3^0 = 5.625 \times 10^{18}$

τ (HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-16}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-16}$	$N_1^0 S_{AB} \times 10^{-16}$	$N_2(\tau) \times 10^{-16}$	% SATURATION	e^{-CT}	$N_3^0 e^{-CT} \times 10^{-18}$	$N_2^0 S_{BC} \times 10^{-16}$	$N_1^0 S_{ABC} \times 10^{-16}$	$N_3(\tau) \times 10^{-18}$	% SATURATION
0	1	4.573	1	3.151	0	3.151	100	1	5.625	0	0	5.625	100
0.0005	0.9999	4.572	0.9998	3.150	0.001013	3.151	100	1	5.625	0.000634		5.625	100
0.001	0.9997	4.571	0.9997	3.150	0.001013	3.151	100	1	5.625	0.000951		5.625	100
0.002	0.9995	4.570	0.9993	3.148	0.002026	3.150	100	1	5.625	0.002218		5.625	100
0.004	0.9990	4.568	0.9986	3.146	0.004053	3.150	100	1	5.625	0.004436		5.625	100
0.008	0.9981	4.564	0.9972	3.142	0.009118	3.150	100	1	5.625	0.008873		5.625	100
0.01	0.9976	4.562	0.9964	3.139	0.01215	3.150	100	1	5.625	0.01140		5.625	100
0.02	0.9951	4.550	0.9929	3.128	0.02229	3.150	100	1	5.625	0.02250		5.625	100
0.04	0.9902	4.529	0.9858	3.106	0.04459	3.150	100	0.9999	5.624	0.04468		5.624	100
0.08	0.9805	4.483	0.972	3.062	0.08610	3.150	100	0.9998	5.623	0.08813		5.624	100
0.1	0.976	4.463	0.965	3.040	0.11114	3.150	100	0.9998	5.623	0.1102		5.624	100
0.2	0.952	4.353	0.931	2.933	0.2127	3.146	99.8	0.9996	5.622	0.2174	0.004573	5.624	100
0.4	0.907	4.147	0.867	2.731	0.4053	3.136	99.5	0.9992	5.620	0.4187	0.01829	5.624	100
0.8	0.822	3.759	0.753	2.372	0.6886	3.060	97.1	0.9984	5.616	0.7776	0.1143	5.624	100
1.0	0.783	3.580	0.702	2.212	0.8203	3.032	96.2	0.9980	5.613	0.9380	0.1646	5.623	100
2.0	0.614	2.807	0.491	1.547	1.246	2.793	88.6	0.9960	5.602	1.600	0.5121	5.623	100
4.0	0.376	1.719	0.241	0.7593	1.367	2.126	67.5	0.9921	5.580	2.380	1.477	5.619	99.9
8.0	0.142	0.6493	0.058	0.1827	0.8510	1.034	32.8	0.984	5.535	2.935	3.045	5.594	99.4
10.0	0.087	0.3978	0.029	0.09137	0.5876	0.6790	21.5	0.9803	5.514	3.014	3.548	5.579	99.2
20.0	0.0075	0.03429	0.00081	0.002522	0.06786	.07038	2.23	0.961	5.405	3.046	4.348	5.478	97.4
40.0	0.00006	0.000274						0.9235	5.194	2.927	4.280	5.266	93.6
80.0								0.8515	4.789	2.699	3.948	4.855	86.3
100.0								0.820	4.612	2.599	3.801	4.676	83.1
200.0								0.672	3.780	2.130	3.116	3.832	68.1
400.0								0.452	2.542	1.432	2.095	2.577	45.8
800.0								0.204	1.147	0.6465	0.9456	1.162	20.7
1000.0								0.136	0.7650	0.4310	0.6306	0.7756	13.8
2000.0								0.019	0.1068	0.06021	0.08807	0.1083	1.93
4000.0								0.00035	0.001968	0.001109	0.001622	0.001995	.035

TABLE 38 - (CHAIN 118)

(4.5M) IN → STABLE SN
 (0.01)
 A

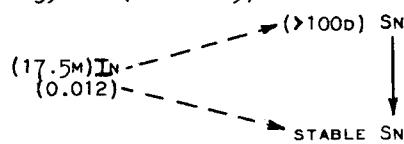
CONSTANTS:

$$A = 9.242$$

$$N_1^0 = 1.212 \times 10^{15}$$

T(HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-15}$
0	1	1.212
.0005	0.9954	1.206
.001	.9908	1.201
.002	.9817	1.190
.004	.9636	1.168
.008	.9288	1.126
.01	.9118	1.105
.02	.8311	1.007
.04	.691	0.8375
.08	.477	.5781
.1	.397	.4812
.2	.158	.1915
.4	.0249	.03018
.8	.0006	.000727
1	.00009	.000109

TABLE 39 - (CHAIN 119)



CONSTANTS:

$$\Lambda = 2.377$$

$$N_1^0 = 5.654 \times 10^{-15}$$

T(HRS)	$e^{-\Lambda T}$	$N_1^0 e^{-\Lambda T} \times 10^{-15}$
0	1	5.654
.0005	0.9988	5.647
.0010	.9976	5.640
.002	.9952	5.627
.004	.9905	5.600
.008	.9811	5.547
.01	.9764	5.521
.02	.9535	5.391
.04	.909	5.139
.08	.826	4.670
.1	.788	4.455
.2	.621	3.511
.4	.385	2.177
.8	.149	0.842
1.0	.092	.520
2.0	.0086	.0486
4.0	0	0

TABLE 40 - (CHAIN 121)
 $^{26,4}\text{H Sn} \longrightarrow \text{STABLE Sb}$

(0.014)

^A

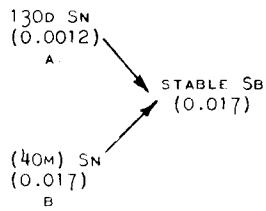
CONSTANTS:

$$A = 2.626 \times 10^{-2}$$

$$N_1^0 = 5.971 \times 10^{17}$$

T(HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-17}$
0	1	5.971
.0005	1	5.971
.001	1	5.971
.002	0.9999	5.970
.004	.9999	5.970
.008	.9998	5.970
.01	.9997	5.969
.02	.9995	5.968
.04	.9989	5.964
.08	.9979	5.958
.1	.9974	5.955
.2	.9947	5.939
.4	.9895	5.908
.8	.9792	5.847
1	.9740	5.816
2	.9485	5.663
4	.900	5.374
8	.810	4.837
10	.769	4.592
20	.591	3.529
40	.349	2.084
80	.122	0.7285
100	.072	.4299
200	.0051	.03045

TABLE 41 - (CHAIN 123)



CONSTANTS:

$$A = 2.222 \times 10^{-4}$$

$$N_1^0 = 3.732 \times 10^{18}$$

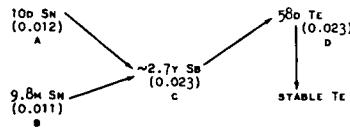
$$B = 1.040$$

$$N_2^0 = 1.831 \times 10^{16}$$

τ (HRS)	$e^{-\alpha\tau}$	$N_1^0 e^{-\alpha\tau} \times 10^{-18}$	$e^{-\beta\tau}$	$N_2^0 e^{-\beta\tau} \times 10^{-16}$
0	1	3.732	1	1.831
.0005	1	3.732	0.9995	1.831
.001	1	3.732	.9990	1.829
.002	1	3.732	.9979	1.827
.004	1	3.732	.9958	1.823
.008	1	3.732	.9917	1.816
.01	1	3.732	.9896	1.812
.02	1	3.732	.9793	1.793
.04	1	3.732	.9591	1.756
.08	1	3.732	.9200	1.685
.1	1	3.732	.901	1.650
.2	1	3.732	.812	1.487
.4	0.9999	3.732	.658	1.205
.8	.9998	3.731	.434	0.7947
1	.9998	3.731	.353	.6463
2	.9996	3.731	.125	.2289
4	.9991	3.729	.015	.0275
8	.9982	3.725	.00024	.00044
10	.9978	3.724		
20	.9956	3.716		
40	.9912	3.700		
80	.9822	3.666		
100	.9780	3.650		
200	.9565	3.570		
400	.9148	3.414		
800	.837	3.124		
1000	.801	2.989		
2000	.642	2.396		
4000	.411	1.534		
8000	.168	0.6270		
10000	.108	.4031		
20000	.012	.04478		
40000	.00014	.000522		

% SATURATION = 0.617 (% REMAINING)

TABLE 42 - (CHAIN 125)



CONSTANTS:

$$\begin{aligned}
 A &= 2.888 \times 10^{-3} & B &= 4.244 & C &= 2.931 \times 10^{-5} & D &= 4.980 \times 10^{-4} \\
 N_1^0 &= 4.654 \times 10^{18} & N_2^0 &= 2.903 \times 10^{15} & N_3^0 &= 1.056 \times 10^{20} & N_4^0 &= 3.140 \times 10^{18}
 \end{aligned}$$

τ (HRS)	$e^{-\lambda T}$	$N_1^0 e^{-\lambda T}$ $\times 10^{-18}$	$e^{-\lambda T}$	$N_2^0 e^{-\lambda T}$ $\times 10^{-15}$	$e^{-\lambda T}$	$N_3^0 e^{-\lambda T}$ $\times 10^{-20}$	$N_2^0 S_{\text{AC}}$ $\times 10^{-15}$	$N_1^0 S_{\text{AC}}$ $\times 10^{-18}$	$N_3(\tau)$ $\times 10^{-20}$	% RE- MAINING	$e^{-\lambda T}$	$N_1^0 e^{-\lambda T}$ $\times 10^{-18}$	$N_3^0 S_{\text{CD}}$ $\times 10^{-18}$	$N_2^0 S_{\text{BCD}}$ $\times 10^{-13}$	$N_1^0 S_{\text{ACD}}$ $\times 10^{-16}$	$N_4(\tau)$ $\times 10^{-18}$	% MAX _E IMUN _E
0	1	4.654	1	2.903	1	1.056	0	0	1.056	100	1	3.140	0	0	0	3.140	57.9
.0005	1	4.654	0.9979	2.897	1	1.056	0.00610	0	1.056	100	1	3.140	0	0	0	3.140	57.9
.001	1	4.654	.9958	2.891	1	1.056	.01219	0	1.056	100	1	3.140	0	0	0	3.140	57.9
.002	1	4.654	.9915	2.878	1	1.056	.02468	0	1.056	100	1	3.140	0	0	0	3.140	57.9
.004	1	4.654	.9831	2.854	1	1.056	.04906	0	1.056	100	1	3.140	0	0	0	3.140	57.9
.008	1	4.654	.9665	2.806	1	1.056	.09725	0	1.056	100	1	3.140	0	0	0	3.140	57.9
.01	1	4.654	.9584	2.782	1	1.056	.1208	0	1.056	100	1	3.140	0	0	0	3.140	57.9
.02	0.9999	4.654	.9185	2.666	1	1.056	.2366	0.0005	1.056	100	1	3.140	0	0	0	3.140	57.9
.04	.9999	4.654	.844	2.450	1	1.056	.4529	.0005	1.056	100	1	3.140	0	0	0	3.140	57.9
.08	.9998	4.653	.712	2.067	1	1.056	.8361	.0009	1.056	100	1	3.140	0	0	0	3.140	57.9
.1	.9997	4.653	.654	1.899	1	1.056	1.004	.0014	1.056	100	1	3.140	0	0	0	3.140	57.9
.2	.9994	4.650	.428	1.242	1	1.056	1.661	.0028	1.056	100	0.9999	3.140	0.00065	0.002903	0	3.140	57.9
.4	.9988	4.648	.184	0.5342	1	1.056	2.369	.0056	1.056	100	.9998	3.139	.00132	.002903	0	3.140	57.9
.8	.9977	4.643	.034	.0987	1	1.056	2.804	.0108	1.056	100	.9996	3.139	.00264	.00871	0	3.141	57.9
1	.9971	4.641	.014	.0406	1	1.056	2.862	.0136	1.056	100	.9995	3.138	.00331	.00871	0	3.141	57.9
2	.9942	4.627	.00021	.00061	0.9999	1.056	2.902	.0268	1.056	100	.9990	3.137	.00595	.0145	0	3.143	58.0
4	.9884	4.600			0.9999	1.056	2.903	.0541	1.056	100	.9980	3.134	.01255	.0348	0	3.147	58.1
8	.9771	4.547			0.9998	1.056	2.902	.1067	1.056	100	.9960	3.127	.02509	.0697	0.001	3.152	58.1
10	.9715	4.521			0.9997	1.056	2.902	.1326	1.056	100	.9950	3.124	.03104	.0842	0.001	3.155	58.2
20	.9438	4.392			0.9994	1.055	2.901	.2614	1.056	100	.9900	3.109	.06207	.1713	0.001	3.171	58.5
40	.891	4.147			0.9988	1.055	2.900	.5077	1.056	100	.9802	3.079	.1228	.3367	0.003	3.202	59.1
80	.794	3.695			0.9977	1.054	2.896	.9590	1.055	99.9	.9608	3.017	.2436	.6706	.012	3.261	60.2
100	.749	3.49			0.9971	1.053	2.895	1.166	1.054	99.8	.9512	2.987	.3031	.8332	.018	3.290	60.7
200	.560	2.61			0.9941	1.050	2.886	2.040	1.052	99.6	.9050	2.842	.5883	1.617	.163	3.432	63.3
400	.314	1.46			0.9883	1.044	2.869	3.168	1.047	99.1	.819	2.572	1.118	3.074	.207	3.692	68.1
800	.099	0.461			0.9769	1.032	2.836	4.127	1.036	98.1	.671	2.107	2.020	5.553	.569	4.133	76.2
1000	.055	0.256			0.9711	1.025	2.819	4.306	1.029	97.4	.607	1.906	2.405	6.607	.752	4.319	79.7
2000	.0031	0.0144			0.9430	0.996	2.738	4.419	0.996	94.3	.369	1.159	3.790	10.42	1.476	4.964	91.6
4000					.889	0.939	2.581	4.179	0.939	88.9	.136	0.427	4.973	13.67	2.136	5.421	100
8000					.791	0.835	2.296	3.718	0.835	79.1	.019	0.0597	5.097	14.01	2.259	5.180	95.6
10000					.746	0.788	2.166	3.507	0.788	74.6	.0068	0.0214	4.880	13.42	2.169	4.923	90.8
20000					.556	0.587	1.614	2.614	0.587	55.6	.00002	0.00006	3.672	10.09	1.635	3.688	68.0
40000					.310	0.387	0.9000	1.457	0.327	31.0			2.047	5.626	0.911	2.056	37.9
80000					.096	0.101	.2787	0.451	0.101	9.56			0.6339	1.743	0.282	0.6367	11.7
100000					.054	0.057	.1568	0.254	0.057	5.40			0.3566	0.9803	0.159	0.3582	6.61
200000					.0028	0.0030	.0813	0.0132	0.0030	0.28			0.01849	0.0508	0.0082	0.01857	0.343

¹% SATURATION = 0.1202 (% REMAINING)²% SATURATION = 0.0607 (% REMAINING)

TABLE 43 - (CHAIN (126))

50 M SN \longrightarrow 9H Sb \longrightarrow STABLE TE(0.1)
A (0.1)
B

CONSTANTS:

$A = 0.8318$

$B = 0.07702$

$N_1^0 = 1.346 \times 10^{17}$

$N_2^0 = 1.454 \times 10^{18}$

τ (HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-17}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-18}$	$N_1^0 S_{AB} \times 10^{-17}$	$N_2(\tau) \times 10^{-18}$	% SATURATION
0	1.000	1.346	1	1.454	0	1.454	100
0.0005	0.9996	1.345	1	1.454	0.0006	1.454	100
.001	0.9992	1.345	0.9999	1.454	.0011	1.454	100
.002	0.9983	1.344	0.9998	1.454	.0022	1.454	100
.004	0.9967	1.342	0.9997	1.454	.0044	1.454	100
.008	0.9934	1.337	0.9994	1.453	.0089	1.454	100
.01	0.9917	1.335	0.9992	1.453	.0111	1.454	100
.02	0.9835	1.324	0.9985	1.452	.0222	1.454	100
.04	0.9672	1.302	0.9969	1.449	.0440	1.454	100
.08	0.9356	1.259	0.9938	1.445	.0863	1.454	100
.1	0.9200	1.238	0.9923	1.443	.1072	1.454	100
.2	0.8470	1.140	0.9847	1.432	.2042	1.452	99.9
.4	0.717	0.965	0.9697	1.410	.375	1.448	99.6
.8	0.514	0.692	0.9402	1.367	.632	1.430	98.3
1	0.436	0.587	0.9258	1.346	.727	1.419	97.6
2	0.190	0.256	0.8573	1.247	.989	1.346	92.6
4	0.036	0.048	0.735	1.07	1.037	1.17	80.5
8	0.0013	0.0017	0.540	0.785	.799	0.865	59.5
10	0.00024	0.00032	0.463	0.673	.687	0.742	51.0
20			0.214	0.311	.317	0.343	23.6
40			0.046	0.067	.068	0.074	5.1
80			0.0021	0.0031	.0031	0.0034	0.23
100			0.00045	0.00065	.00067	0.00072	0.050

TABLE 44 - (CHAIN 127)

CONSTANTS:		$\alpha = 0.4621$	$\beta = 0.007453$	$c = 0.0003209$	$d = 0.07453$	$N_1^0 = 2.273 \times 10^{17}$	$N_2^0 = 1.413 \times 10^{19}$	$N_3^0 = 8.521 \times 10^{19}$	$N_4^0 = 2.886 \times 10^{18}$
τ (hrs)		$N_1 e^{-\alpha t}$	$N_2 e^{-\beta t}$	$N_3 e^{-ct}$	$N_4 e^{-dt}$	$N_1^0 e^{-\alpha t}$	$N_2^0 e^{-\beta t}$	$N_3^0 e^{-ct}$	$N_4^0 e^{-dt}$
0	1	2.278×10^{-17}	1.413×10^{-19}	8.521×10^{-19}	2.886×10^{-18}	2.278×10^{-17}	1.413×10^{-19}	8.521×10^{-19}	2.886×10^{-18}
.0005	0.9998	2.278	1	1.413	0.0005	2.278	1	1.413	0.0005
.001	0.9995	2.277	1	1.413	.0012	2.277	1	1.413	.0012
.002	0.9991	2.276	1	1.413	.0021	2.276	1	1.413	.0021
.004	0.9981	2.274	1	1.413	.0044	2.274	1	1.413	.0044
.008	0.9963	2.270	1	1.413	.0086	2.270	1	1.413	.0086
.01	0.9954	2.268	0.9999	1.413	.0104	2.268	0.9999	1.413	.0104
.02	0.9908	2.257	.9998	1.413	.0288	2.257	.9998	1.413	.0288
.04	.9817	2.236	.9997	1.413	.0417	2.236	.9997	1.413	.0417
.08	.9637	2.195	.9994	1.412	.0826	2.195	.9994	1.412	.0826
.1	.9548	2.175	.9992	1.412	.1028	2.175	.9992	1.412	.1028
.2	.9117	2.077	.9985	1.411	.2009	2.077	.9985	1.411	.2009
.4	.8313	1.894	.9970	1.409	.3836	1.894	.9970	1.409	.3836
.8	.691	1.574	.9910	1.405	.7014	1.574	.9910	1.405	.7014
1	.630	1.435	.9925	1.402	.8392	1.435	.9925	1.402	.8392
2	.397	.904	.9832	1.392	1.362	.904	.9832	1.392	1.362
4	.158	.360	.9705	1.371	1.390	.158	.9705	1.371	1.390
8	.0250	.0570	.9420	1.331	2.123	.0250	.0570	1.331	2.123
10	.0098	.0233	.9280	1.311	2.126	.0098	.0233	1.311	2.126
20	.0001	.0002	.862	1.218	1.996	.0001	.0002	1.218	1.996
40			.742	1.048	1.718			.742	1.048
80			.550	0.7772	1.273			.550	0.7772
100			.474	.6698	1.097			.474	.6698
200			.225	.3179	0.521			.225	.3179
400			.050	.0707	0.116			.050	.0707
800			.0026	.00367	0.0602			.0026	.00367
1000			.00057	.00081	0.00132			.00057	.00081
2000									
4000									
8000									
10000									
20000									

¹ % SATURATION = 0.740 (% REMAINING)
² % SATURATION = 0.960 (% REMAINING)

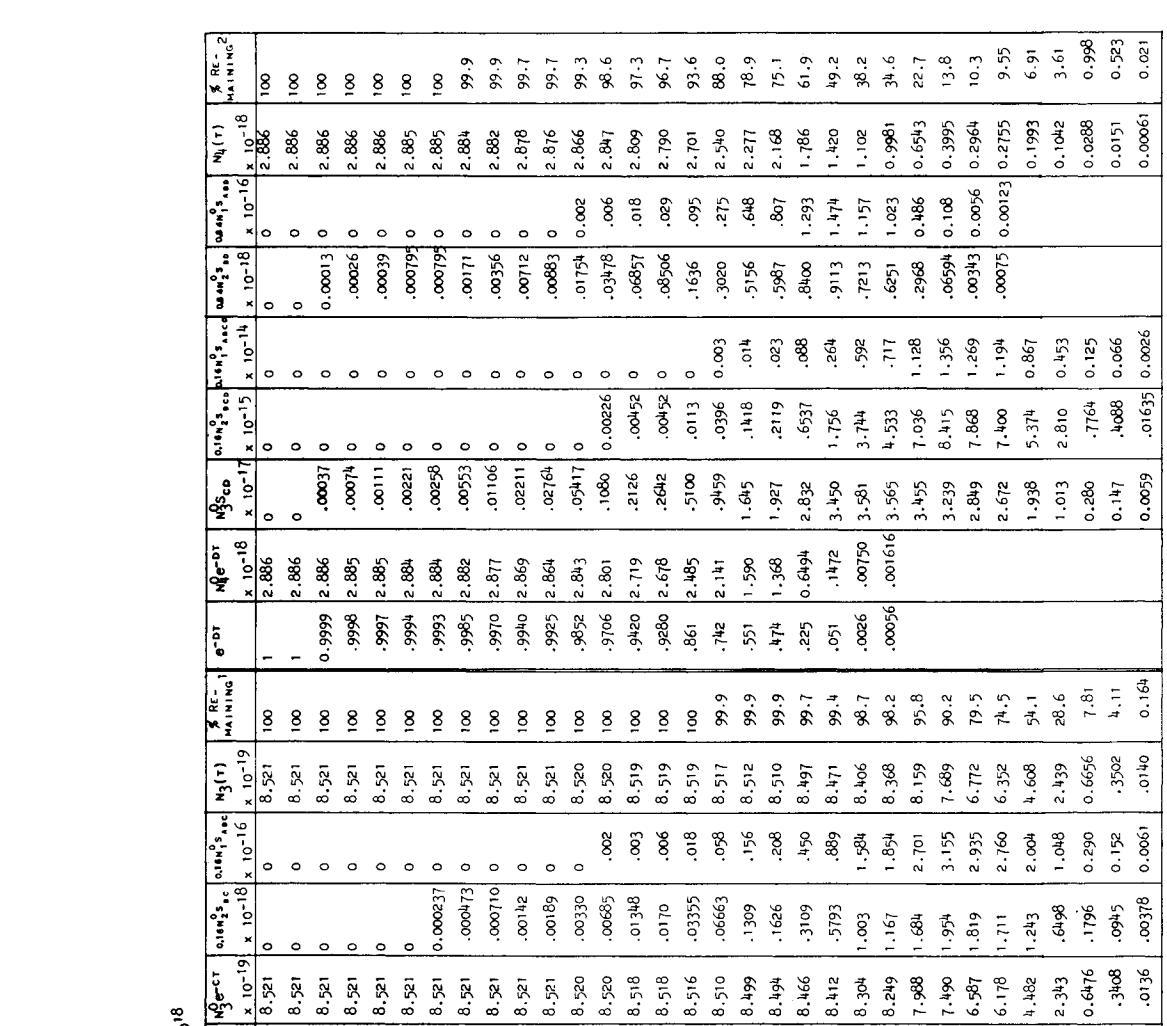


TABLE 45 - (CHAIN (128))

1.1H SB → STABLE TE
 (0.1)
 A

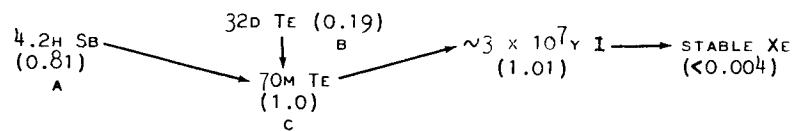
CONSTANTS:

$$A = 0.6301$$

$$N_1^0 = 1.777 \times 10^{17}$$

T (HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-17}$
0	1	1.777
.0005	0.9997	1.776
.001	.9994	1.776
.002	.9987	1.775
.004	.9975	1.773
.008	.9950	1.768
.01	.9937	1.766
.02	.9874	1.755
.04	.9750	1.733
.08	.9508	1.690
.1	.9388	1.668
.2	.881	1.566
.4	.777	1.381
.8	.604	1.073
1	.531	0.944
2	.284	0.505
4	.080	0.142
8	.0065	0.0116
10	.0018	0.0032

TABLE 46 - (CHAIN 129)



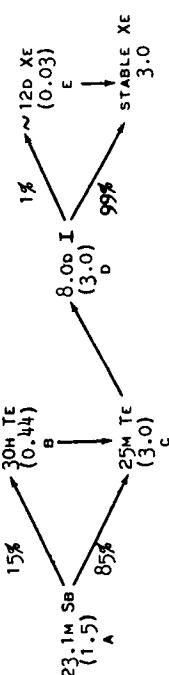
CONSTANTS:

$$A = 0.1650 \quad B = 9.025 \times 10^{-4} \quad C = 0.5941$$

$$N_1^0 = 5.498 \times 10^{18} \quad N_2^0 = 2.358 \times 10^{20} \quad N_3^0 = 1.885 \times 10^{18}$$

T (HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-18}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-20}$	e^{-CT}	$N_3^0 e^{-CT} \times 10^{-18}$	$N_2^0 S_{BC} \times 10^{-18}$	$N_1^0 S_{AC} \times 10^{-18}$	$N_3(\tau) \times 10^{-18}$	% SATURATION
0	1	5.498	1	2.358	1	1.885	0	0	1.885	100
.0005	0.9999	5.497	1	2.358	0.9997	1.884	0.000108	0.000423	1.885	100
.001	.9998	5.497	1	2.358	.9994	1.884	.000215	.000847	1.885	100
.002	.9997	5.496	1	2.358	.9988	1.883	.000432	.001902	1.885	100
.004	.9993	5.494	1	2.358	.9976	1.880	.000861	.00360	1.885	100
.008	.9987	5.491	1	2.358	.9952	1.876	.001721	.00742	1.885	100
.01	.9983	5.489	1	2.358	.9941	1.874	.002115	.00885	1.885	100
.02	.9967	5.480	1	2.358	.9881	1.863	.004268	.0182	1.885	100
.04	.9934	5.462	1	2.358	.9764	1.841	.008465	.0360	1.885	100
.08	.9868	5.425	1	2.358	.9532	1.797	.01679	.0709	1.885	100
.1	.9836	5.408	0.9999	2.358	.9421	1.776	.02073	.0877	1.885	100
.2	.9674	5.319	.9998	2.358	.888	1.674	.04009	.1679	1.882	99.8
.4	.936	5.146	.9996	2.357	.788	1.485	.07588	.3129	1.874	99.4
.8	.876	4.816	.9993	2.356	.621	1.171	.1357	.5391	1.846	97.9
1	.848	4.662	.9991	2.356	.551	1.039	.1607	.6279	1.828	97.0
2	.718	3.948	.9982	2.354	.304	0.5730	.2490	.8753	1.697	90.0
4	.516	2.837	.9964	2.350	.092	.1734	.3245	.8962	1.395	74.0
8	.266	1.462	.9928	2.341	.0085	.01602	.3530	.5443	0.9133	48.4
10	.191	1.050	.9910	2.337	.0026	.00490	.3544	.3973	.7566	40.1
20	.037	0.2034	.9820	2.316			.3523	.07824	.4305	22.8
40	.0013	.00715	.9644	2.274			.3459	.002749	.3487	18.5
80			.930	2.193			.3337		.3337	17.7
100			.913	2.153			.3275		.3275	17.4
200			.835	1.969			.2995		.2995	15.9
400			.696	1.641			.2497		.2497	13.2
800			.485	1.144			.1739		.1739	9.22
1000			.405	0.955			.1453		.1453	7.71
2000			.164	.387			.05881		.05881	3.12
4000			.027	.0637			.009684		.009684	0.514
8000			.00072	.00170			.000259		.000259	0.0137
10000			.00012	.000283			.000042		.000042	0.0022

TABLE 47 - (CHAIN 131)



CONSTANTS:

$$A = 1.800 \quad B = 0.02311 \quad N_1^0 = 9.328 \times 10^{17} \quad N_2^0 = 2.132 \times 10^{19} \quad N_3^0 = 2.019 \times 10^{18}$$

$$c = 1.664 \quad D = 0.003610 \quad E = 0.002407$$

$$N_4^0 = 9.307 \times 10^{20} \quad N_5^0 = 1.396 \times 10^{19}$$

$$N_6^0 = 9.307 \times 10^{18} \quad N_7^0 = 1.396 \times 10^{17}$$

$$N_8^0 = 9.307 \times 10^{17} \quad N_9^0 = 1.396 \times 10^{16}$$

$$N_{10}^0 = 9.307 \times 10^{16} \quad N_{11}^0 = 1.396 \times 10^{15}$$

$$N_{12}^0 = 9.307 \times 10^{15} \quad N_{13}^0 = 1.396 \times 10^{14}$$

$$N_{14}^0 = 9.307 \times 10^{14} \quad N_{15}^0 = 1.396 \times 10^{13}$$

$$N_{16}^0 = 9.307 \times 10^{13} \quad N_{17}^0 = 1.396 \times 10^{12}$$

$$N_{18}^0 = 9.307 \times 10^{12} \quad N_{19}^0 = 1.396 \times 10^{11}$$

$$N_{20}^0 = 9.307 \times 10^{11} \quad N_{21}^0 = 1.396 \times 10^{10}$$

$$N_{22}^0 = 9.307 \times 10^{10} \quad N_{23}^0 = 1.396 \times 10^{9}$$

$$N_{24}^0 = 9.307 \times 10^{9} \quad N_{25}^0 = 1.396 \times 10^{8}$$

$$N_{26}^0 = 9.307 \times 10^{8} \quad N_{27}^0 = 1.396 \times 10^{7}$$

$$N_{28}^0 = 9.307 \times 10^{7} \quad N_{29}^0 = 1.396 \times 10^{6}$$

$$N_{30}^0 = 9.307 \times 10^{6} \quad N_{31}^0 = 1.396 \times 10^{5}$$

$$N_{32}^0 = 9.307 \times 10^{5} \quad N_{33}^0 = 1.396 \times 10^{4}$$

$$N_{34}^0 = 9.307 \times 10^{4} \quad N_{35}^0 = 1.396 \times 10^{3}$$

$$N_{36}^0 = 9.307 \times 10^{3} \quad N_{37}^0 = 1.396 \times 10^{2}$$

$$N_{38}^0 = 9.307 \times 10^{2} \quad N_{39}^0 = 1.396 \times 10^{1}$$

$$N_{40}^0 = 9.307 \times 10^{1} \quad N_{41}^0 = 1.396 \times 10^{0}$$

$$N_{42}^0 = 9.307 \times 10^{0} \quad N_{43}^0 = 1.396 \times 10^{-1}$$

$$N_{44}^0 = 9.307 \times 10^{-1} \quad N_{45}^0 = 1.396 \times 10^{-2}$$

$$N_{46}^0 = 9.307 \times 10^{-2} \quad N_{47}^0 = 1.396 \times 10^{-3}$$

$$N_{48}^0 = 9.307 \times 10^{-3} \quad N_{49}^0 = 1.396 \times 10^{-4}$$

$$N_{50}^0 = 9.307 \times 10^{-4} \quad N_{51}^0 = 1.396 \times 10^{-5}$$

$$N_{52}^0 = 9.307 \times 10^{-5} \quad N_{53}^0 = 1.396 \times 10^{-6}$$

$$N_{54}^0 = 9.307 \times 10^{-6} \quad N_{55}^0 = 1.396 \times 10^{-7}$$

$$N_{56}^0 = 9.307 \times 10^{-7} \quad N_{57}^0 = 1.396 \times 10^{-8}$$

$$N_{58}^0 = 9.307 \times 10^{-8} \quad N_{59}^0 = 1.396 \times 10^{-9}$$

$$N_{60}^0 = 9.307 \times 10^{-9} \quad N_{61}^0 = 1.396 \times 10^{-10}$$

$$N_{62}^0 = 9.307 \times 10^{-10} \quad N_{63}^0 = 1.396 \times 10^{-11}$$

$$N_{64}^0 = 9.307 \times 10^{-11} \quad N_{65}^0 = 1.396 \times 10^{-12}$$

$$N_{66}^0 = 9.307 \times 10^{-12} \quad N_{67}^0 = 1.396 \times 10^{-13}$$

$$N_{68}^0 = 9.307 \times 10^{-13} \quad N_{69}^0 = 1.396 \times 10^{-14}$$

$$N_{70}^0 = 9.307 \times 10^{-14} \quad N_{71}^0 = 1.396 \times 10^{-15}$$

$$N_{72}^0 = 9.307 \times 10^{-15} \quad N_{73}^0 = 1.396 \times 10^{-16}$$

$$N_{74}^0 = 9.307 \times 10^{-16} \quad N_{75}^0 = 1.396 \times 10^{-17}$$

$$N_{76}^0 = 9.307 \times 10^{-17} \quad N_{77}^0 = 1.396 \times 10^{-18}$$

$$N_{78}^0 = 9.307 \times 10^{-18} \quad N_{79}^0 = 1.396 \times 10^{-19}$$

$$N_{80}^0 = 9.307 \times 10^{-19} \quad N_{81}^0 = 1.396 \times 10^{-20}$$

$$N_{82}^0 = 9.307 \times 10^{-20} \quad N_{83}^0 = 1.396 \times 10^{-21}$$

$$N_{84}^0 = 9.307 \times 10^{-21} \quad N_{85}^0 = 1.396 \times 10^{-22}$$

$$N_{86}^0 = 9.307 \times 10^{-22} \quad N_{87}^0 = 1.396 \times 10^{-23}$$

$$N_{88}^0 = 9.307 \times 10^{-23} \quad N_{89}^0 = 1.396 \times 10^{-24}$$

$$N_{90}^0 = 9.307 \times 10^{-24} \quad N_{91}^0 = 1.396 \times 10^{-25}$$

$$N_{92}^0 = 9.307 \times 10^{-25} \quad N_{93}^0 = 1.396 \times 10^{-26}$$

$$N_{94}^0 = 9.307 \times 10^{-26} \quad N_{95}^0 = 1.396 \times 10^{-27}$$

$$N_{96}^0 = 9.307 \times 10^{-27} \quad N_{97}^0 = 1.396 \times 10^{-28}$$

$$N_{98}^0 = 9.307 \times 10^{-28} \quad N_{99}^0 = 1.396 \times 10^{-29}$$

$$N_{100}^0 = 9.307 \times 10^{-29} \quad N_{101}^0 = 1.396 \times 10^{-30}$$

$$N_{102}^0 = 9.307 \times 10^{-30} \quad N_{103}^0 = 1.396 \times 10^{-31}$$

$$N_{104}^0 = 9.307 \times 10^{-31} \quad N_{105}^0 = 1.396 \times 10^{-32}$$

$$N_{106}^0 = 9.307 \times 10^{-32} \quad N_{107}^0 = 1.396 \times 10^{-33}$$

$$N_{108}^0 = 9.307 \times 10^{-33} \quad N_{109}^0 = 1.396 \times 10^{-34}$$

$$N_{110}^0 = 9.307 \times 10^{-34} \quad N_{111}^0 = 1.396 \times 10^{-35}$$

$$N_{112}^0 = 9.307 \times 10^{-35} \quad N_{113}^0 = 1.396 \times 10^{-36}$$

$$N_{114}^0 = 9.307 \times 10^{-36} \quad N_{115}^0 = 1.396 \times 10^{-37}$$

$$N_{116}^0 = 9.307 \times 10^{-37} \quad N_{117}^0 = 1.396 \times 10^{-38}$$

$$N_{118}^0 = 9.307 \times 10^{-38} \quad N_{119}^0 = 1.396 \times 10^{-39}$$

$$N_{120}^0 = 9.307 \times 10^{-39} \quad N_{121}^0 = 1.396 \times 10^{-40}$$

τ (hrs)	$N_1^0 e^{-\alpha t}$	$N_2^0 e^{-\alpha t}$	$N_3^0 e^{-\alpha t}$	$N_4^0 e^{-\alpha t}$	$N_5^0 e^{-\alpha t}$	$N_6^0 e^{-\alpha t}$	$N_7^0 e^{-\alpha t}$	$N_8^0 e^{-\alpha t}$	$N_9^0 e^{-\alpha t}$	$N_{10}^0 e^{-\alpha t}$	$N_{11}^0 e^{-\alpha t}$	$N_{12}^0 e^{-\alpha t}$	$N_{13}^0 e^{-\alpha t}$	$N_{14}^0 e^{-\alpha t}$	$N_{15}^0 e^{-\alpha t}$	$N_{16}^0 e^{-\alpha t}$	$N_{17}^0 e^{-\alpha t}$	$N_{18}^0 e^{-\alpha t}$	$N_{19}^0 e^{-\alpha t}$	$N_{20}^0 e^{-\alpha t}$	$N_{21}^0 e^{-\alpha t}$	$N_{22}^0 e^{-\alpha t}$	$N_{23}^0 e^{-\alpha t}$	$N_{24}^0 e^{-\alpha t}$	$N_{25}^0 e^{-\alpha t}$	$N_{26}^0 e^{-\alpha t}$	$N_{27}^0 e^{-\alpha t}$	$N_{28}^0 e^{-\alpha t}$	$N_{29}^0 e^{-\alpha t}$	$N_{30}^0 e^{-\alpha t}$	$N_{31}^0 e^{-\alpha t}$	$N_{32}^0 e^{-\alpha t}$	$N_{33}^0 e^{-\alpha t}$	$N_{34}^0 e^{-\alpha t}$	$N_{35}^0 e^{-\alpha t}$	$N_{36}^0 e^{-\alpha t}$	$N_{37}^0 e^{-\alpha t}$	$N_{38}^0 e^{-\alpha t}$	$N_{39}^0 e^{-\alpha t}$	$N_{40}^0 e^{-\alpha t}$	$N_{41}^0 e^{-\alpha t}$	$N_{42}^0 e^{-\alpha t}$	$N_{43}^0 e^{-\alpha t}$	$N_{44}^0 e^{-\alpha t}$	$N_{45}^0 e^{-\alpha t}$	$N_{46}^0 e^{-\alpha t}$	$N_{47}^0 e^{-\alpha t}$	$N_{48}^0 e^{-\alpha t}$	$N_{49}^0 e^{-\alpha t}$	$N_{50}^0 e^{-\alpha t}$	$N_{51}^0 e^{-\alpha t}$	$N_{52}^0 e^{-\alpha t}$	$N_{53}^0 e^{-\alpha t}$	$N_{54}^0 e^{-\alpha t}$	$N_{55}^0 e^{-\alpha t}$	$N_{56}^0 e^{-\alpha t}$	$N_{57}^0 e^{-\alpha t}$	$N_{58}^0 e^{-\alpha t}$	$N_{59}^0 e^{-\alpha t}$	$N_{60}^0 e^{-\alpha t}$	$N_{61}^0 e^{-\alpha t}$	$N_{62}^0 e^{-\alpha t}$	$N_{63}^0 e^{-\alpha t}$	$N_{64}^0 e^{-\alpha t}$	$N_{65}^0 e^{-\alpha t}$	$N_{66}^0 e^{-\alpha t}$	$N_{67}^0 e^{-\alpha t}$	$N_{68}^0 e^{-\alpha t}$	$N_{69}^0 e^{-\alpha t}$	$N_{70}^0 e^{-\alpha t}$	$N_{71}^0 e^{-\alpha t}$	$N_{72}^0 e^{-\alpha t}$	$N_{73}^0 e^{-\alpha t}$	$N_{74}^0 e^{-\alpha t}$	$N_{75}^0 e^{-\alpha t}$	$N_{76}^0 e^{-\alpha t}$	$N_{77}^0 e^{-\alpha t}$	$N_{78}^0 e^{-\alpha t}$	$N_{79}^0 e^{-\alpha t}$	$N_{80}^0 e^{-\alpha t}$	$N_{81}^0 e^{-\alpha t}$	$N_{82}^0 e^{-\alpha t}$	$N_{83}^0 e^{-\alpha t}$	$N_{84}^0 e^{-\alpha t}$	$N_{85}^0 e^{-\alpha t}$	$N_{86}^0 e^{-\alpha t}$	$N_{87}^0 e^{-\alpha t}$	$N_{88}^0 e^{-\alpha t}$	$N_{89}^0 e^{-\alpha t}$	$N_{90}^0 e^{-\alpha t}$	$N_{91}^0 e^{-\alpha t}$	$N_{92}^0 e^{-\alpha t}$	$N_{93}^0 e^{-\alpha t}$	$N_{94}^0 e^{-\alpha t}$	$N_{95}^0 e^{-\alpha t}$	$N_{96}^0 e^{-\alpha t}$	$N_{97}^0 e^{-\alpha t}$	$N_{98}^0 e^{-\alpha t}$	$N_{99}^0 e^{-\alpha t}$	$N_{100}^0 e^{-\alpha t}$	$N_{101}^0 e^{-\alpha t}$	$N_{102}^0 e^{-\alpha t}$	$N_{103}^0 e^{-\alpha t}$	$N_{104}^0 e^{-\alpha t}$	$N_{105}^0 e^{-\alpha t$

TABLE 48 - (CHAIN 132)

2.0M SB → 77H TE → 2.4H I → STABLE XE

(4.4) A	(4.4) B	(4.4) C	(4.4)
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CONSTANTS:

$A = 20.79$

$B = .009002$

$C = .2881$

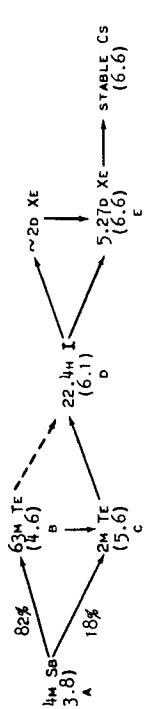
$N_1^0 = 2.370 \times 10^{17}$

$N_2^0 = 5.474 \times 10^{20}$

$N_3^0 = 1.711 \times 10^{19}$

T(HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-17}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-20}$	$N_1 S_{AB} \times 10^{-17}$	$N_2(\tau) \times 10^{-20}$	% SATU-RATION	e^{-CT}	$N_3^0 e^{-CT} \times 10^{-19}$	$N_2 S_{BC} \times 10^{-20}$	$N_1 S_{ABC} \times 10^{-17}$	$N_3(\tau) \times 10^{-19}$	% SATU-RATION
0	1	2.370	1	5.474	0	5.474	100	1	1.711	0	0	1.711	100
.0005	0.9896	2.345	1	5.474	0.02465	5.474	100	0.9999	1.711	0.0000180	0	1.711	100
.001	.9795	2.321	1	5.474	.04859	5.474	100	.9997	1.710	0.0000530	0	1.711	100
.002	.9593	2.274	1	5.474	.07276	5.474	100	.9994	1.710	.0001060	0	1.711	100
.004	.9200	2.180	1	5.474	.1896	5.474	100	.9988	1.709	.0002120	0	1.711	100
.008	.8468	2.007	0.9999	5.473	.3628	5.474	100	.9977	1.707	.0003890	0	1.711	100
.01	.8126	1.926	.9999	5.473	.4439	5.474	100	.9971	1.706	.0004590	0	1.711	100
.02	.6600	1.564	.9998	5.473	.8053	5.474	100	.9942	1.701	.0009910	.000119	1.711	100
.04	.435	1.031	.9996	5.472	1.338	5.473	100	.9886	1.691	.00194	.000237	1.711	100
.08	.189	0.4479	.9993	5.470	1.920	5.472	100	.9772	1.672	.00390	.000853	1.711	100
.1	.126	.2986	.9991	5.469	2.069	5.471	99.9	.9716	1.662	.004855	.00119	1.711	100
.2	.0156	.03697	.9982	5.464	2.329	5.466	99.9	.9440	1.615	.009580	.00315	1.711	100
.4	.00024	.000569	.9964	5.454	2.361	5.456	99.7	.891	1.525	.01853	.00709	1.711	100
.8			.9928	5.435	2.353	5.437	99.3	.794	1.359	.03513	.0144	1.711	100
1			.9910	5.425	2.349	5.427	99.1	.750	1.283	.04254	.0176	1.708	99.8
2			.9822	5.377	2.328	5.379	98.3	.562	0.9616	.07417	.0315	1.704	99.6
4			.9646	5.280	2.286	5.282	96.5	.315	.5390	.1147	.0493	1.677	98.0
8			.9306	5.094	2.206	5.096	93.1	.100	.1711	.1467	.0634	1.639	95.8
10			.9140	5.003	2.166	5.005	91.4	.056	.0958	.1515	.0655	1.622	94.8
20			.8352	4.572	1.979	4.574	83.6	.0031	.0053	.1469	.0636	1.475	86.2
40			.697	3.815	1.533	3.817	69.7			.1231	.0533	1.231	71.9
80			.486	2.660	1.152	2.661	48.6			.08578	.0372	0.8582	50.2
100			.403	2.206	0.9551	2.207	40.3			.07116	.0308	.7119	41.6
200			.165	0.9039	.3911	0.9041	16.5			.02912	.0126	.2913	17.0
400			.0271	.1483	.06423	.1483	2.71			.004784	.00207	.04786	2.80
800			.00073	.00400	.00073	.004001	0.073			.001286	.000056	.01286	0.752
1000			.000104	.000569	.000246	.000569	.0104			.000019	.000008	.00019	.0111

TABLE 49 - (CHAIN 133)



CONSTANTS:

τ (hrs)	$e^{-\lambda t}$	$N_2^0 e^{-\lambda t}$	$N_3^0 e^{-\lambda t}$	$N_4^0 e^{-\lambda t}$	$N_5^0 = 3.017 \times 10^{17}$	$N_6^0 = 7.805 \times 10^{18}$	$c = 20.79$	$D = 0.03094$	$\epsilon = 0.005480$
0	1	4.503	1	7.805	100	1	3.017	0	0
.0005	0.9953	4.482	0.9997	7.803	0.001716	7.805	0.9896	2.208	0.005480
.001	0.9905	4.460	0.9993	7.800	.003493	7.803	0.9794	2.208	0.005480
.002	0.9812	4.418	0.9987	7.795	.006945	7.802	100	2.208	0.005480
.004	0.9629	4.336	0.9974	7.785	.01369	7.799	99.9	2.208	0.005480
.008	0.9210	4.174	0.9947	7.764	.02687	7.791	99.8	2.208	0.005480
.01	0.9095	4.095	0.9934	7.753	.03330	7.786	99.8	2.208	0.005480
.02	0.828	3.728	0.9869	7.703	.06506	7.766	99.5	2.208	0.005480
.04	0.685	3.085	0.9740	7.602	.1147	7.717	98.9	2.208	0.005480
.08	0.469	2.112	0.9486	7.404	.1904	7.594	97.3	2.208	0.005480
.1	0.388	1.747	0.9361	7.306	.2175	7.524	96.4	2.208	0.005480
.2	0.151	0.680	0.876	6.837	.2878	7.125	91.3	2.208	0.005480
.4	.023	.104	0.768	5.994	.2957	6.290	80.6	2.208	0.005480
.8	.00552	.00234	0.590	4.605	.2338	4.839	62.0	2.208	0.005480
1	.00007	.000315	0.516	4.027	.2048	4.232	54.2	2.208	0.005480
2				.267	2.084	.1060	2.190	2.208	0.005480
4				.072	0.5620	.02858	0.5906	2.208	0.005480
8				.0051	.0398	.00203	.04182	2.208	0.005480
10				.0014	.0109	.000557	.01146	2.208	0.005480
20								2.208	0.005480
40								2.208	0.005480
80								2.208	0.005480
100								2.208	0.005480
200								2.208	0.005480
400								2.208	0.005480
800								2.208	0.005480
1000								2.208	0.005480

τ (hrs)	$e^{-\lambda t}$	$N_2^0 e^{-\lambda t}$	$N_3^0 e^{-\lambda t}$	$N_4^0 e^{-\lambda t}$	$N_5^0 = 1.319 \times 10^{21}$	$N_6^0 = 2.208 \times 10^{20}$	$c = 20.79 \times 10^{21}$	$D = 0.03094 \times 10^{21}$	$\epsilon = 0.005480 \times 10^{21}$
0	1	4.503	1	7.805	100	1	3.017	0	0
.0005	0.9953	4.482	0.9997	7.803	0.001716	7.805	0.9896	2.208	0.005480
.001	0.9905	4.460	0.9993	7.800	.003493	7.803	0.9794	2.208	0.005480
.002	0.9812	4.418	0.9987	7.795	.006945	7.802	100	2.208	0.005480
.004	0.9629	4.336	0.9974	7.785	.01369	7.799	99.9	2.208	0.005480
.008	0.9210	4.174	0.9947	7.764	.02687	7.791	99.8	2.208	0.005480
.01	0.9095	4.095	0.9934	7.753	.03330	7.786	99.8	2.208	0.005480
.02	0.828	3.728	0.9869	7.703	.06506	7.766	99.5	2.208	0.005480
.04	0.685	3.085	0.9740	7.602	.1147	7.717	98.9	2.208	0.005480
.08	0.469	2.112	0.9486	7.404	.1904	7.594	97.3	2.208	0.005480
.1	0.388	1.747	0.9361	7.306	.2175	7.524	96.4	2.208	0.005480
.2	0.151	0.680	0.876	6.837	.2878	7.125	91.3	2.208	0.005480
.4	.023	.104	0.768	5.994	.2957	6.290	80.6	2.208	0.005480
.8	.00552	.00234	0.590	4.605	.2338	4.839	62.0	2.208	0.005480
1	.00007	.000315	0.516	4.027	.2048	4.232	54.2	2.208	0.005480
2				.267	2.084	.1060	2.190	2.208	0.005480
4				.072	0.5620	.02858	0.5906	2.208	0.005480
8				.0051	.0398	.00203	.04182	2.208	0.005480
10				.0014	.0109	.000557	.01146	2.208	0.005480
20								2.208	0.005480
40								2.208	0.005480
80								2.208	0.005480
100								2.208	0.005480
200								2.208	0.005480
400								2.208	0.005480
800								2.208	0.005480
1000								2.208	0.005480

TABLE 50 - (CHAIN 134)

[$\times 10^4$] S_B ————— $44.5M TE$ ————— $52.5M I$ ————— STABLE X_E

(5.7) _A	(5.7) _B	(5.7) _C
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CONSTANTS:

$$A = 4.159$$

$$B = 0.9346$$

$$N_1^0 = 1.535 \times 10^{18}$$

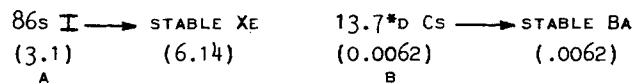
$$N_2^0 = 6.831 \times 10^{18}$$

$$N_3^0 = 8.059 \times 10^{18}$$

$$c = 0.7922$$

τ (HRS)	$e^{-\alpha\tau}$	$N_2^0 e^{-\alpha\tau}$ $\times 10^{-18}$	$e^{-\beta\tau}$	$N_2^0 e^{-\beta\tau}$ $\times 10^{-18}$	$N_3^0 S_{AB}$ $\times 10^{-18}$	$N_2(\tau)$ $\times 10^{-15}$	% SATU- RATION	$e^{-c\tau}$	$N_3^0 e^{-c\tau}$ $\times 10^{-18}$	$N_2^0 S_{AC}$ $\times 10^{-18}$	$N_1^0 S_{ABC}$ $\times 10^{-18}$	$N_3(\tau)$ $\times 10^{-18}$	% SATU- RATION
0	1	1.535	1	6.831	0	6.831	100	1	8.059	0	0	0	100
.0005	0.9979	1.532	0.9995	6.828	0.00316	6.831	100	0.9996	8.056	0.00448	0	8.060	100
.001	.9958	1.529	0.9991	6.825	.00654	6.831	100	.9992	8.053	.00448	0	8.060	100
.002	.9917	1.522	.9981	6.818	.01268	6.831	100	.9984	8.046	.01346	0	8.060	100
.004	.9835	1.510	.9963	6.806	.02533	6.831	100	.9968	8.033	.0241	0	8.060	100
.008	.9671	1.484	.9925	6.780	.05030	6.830	100	.9937	8.008	.05383	0	8.060	100
.01	.9591	1.472	.9906	6.767	.06232	6.829	99.9	.9921	7.995	.06722	0	8.060	100
.02	.9198	1.412	.9814	6.704	.1220	6.826	99.8	.9843	7.932	.1298	0	8.060	100
.04	.846	1.299	.9632	6.580	.2321	6.812	99.6	.9687	7.807	.2466	0	8.054	99.9
.08	.717	1.099	.9279	6.338	.4197	6.758	99.0	.9385*	7.563	.4754	0.0107	8.049	99.9
.1	.659	1.012	.911*	6.223	.4990	6.722	98.2	.9238	7.445	.5738	.0153	8.034	99.7
.2	.435	0.6677	.829	5.663	.7802	6.443	94.2	.853	6.874	1.076	.0798	8.020	99.5
.4	.188	.2886	.688	4.700	.9901	5.690	81.9	.728	5.867	1.793	.2180	7.878	97.7
.8	.036	.05526	.474	3.238	.8673	4.105	60.1	.528	4.255	2.421	.4283	7.105	88.2
1	.015	.0230	.392	2.678	.7465	3.425	50.1	.452	3.643	2.690	.5357	6.870	85.2
2	.00024	.000369	.154	1.052	.3050	1.357	19.8	.205	1.652	2.286	.5495	4.488	55.7
4													
8													
10													

TABLE 52 - (CHAIN(136))



CONSTANTS:

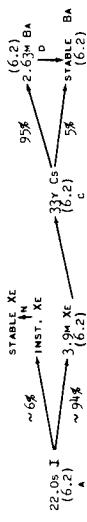
$$A = 29.02 \qquad B = 2.108 \times 10^{-3}$$

$$N_1^0 = 1.196 \times 10^{17} \qquad N_2^0 = 3.294 \times 10^{18}$$

τ (HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-17}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-18}$
0	1	1.196	1	3.294
.0005	0.9855	1.179	1	3.294
.001	.9712	1.162	1	3.294
.002	.9435	1.128	1	3.294
.004	.890	1.064	1	3.294
.008	.792	0.9472	1	3.294
.01	.747	.8934	1	3.294
.02	.558	.6674	1	3.294
.04	.312	.3732	0.9999	3.294
.08	.097	.1160	.9998	3.293
.1	.054	.0646	.9998	3.293
.2	.0030	.00359	.9996	3.293
.4			.9992	3.291
.8			.9983	3.288
1			.9979	3.287
2			.9958	3.280
4			.9916	3.266
8			.9832	3.239
10			.9791	3.225
20			.9588	3.158
40			.9189	3.027
80			.844	2.780
100			.810	2.668
200			.655	2.158
400			.430	1.416
800			.185	0.6094
1000			.120	.3953
2000			.015	.0494
4000			.00021	.000692

#MASS ASSIGNMENT CERTAIN.

TABLE 53 - (CHAIN 137)



CONSTANTS:

$$\begin{aligned} \alpha &= 113.4 & b &= 10.66 & c &= 2.398 \times 10^{-6} & d &= 18.08 \\ N_1^0 &= 6.123 \times 10^{16} & N_2^0 &= 6.448 \times 10^{17} & N_3^0 &= 2.983 \times 10^{22} & N_4^0 &= 3.956 \times 10^{15} \\ \end{aligned}$$

 $\tau = 2.398 \times 10^{-6}$ $\tau = 10.66$ $\tau = 18.08$ $\tau = 2.983 \times 10^{22}$ $\tau = 3.956 \times 10^{15}$

τ (hrs)	$e^{-\lambda t}$	$N_1^0 e^{-\lambda t}$	$N_2^0 e^{-\lambda t}$	$N_3^0 e^{-\lambda t}$	$N_4^0 e^{-\lambda t}$	$\frac{N_2^0}{N_1^0}$ RATIO	$\frac{N_3^0}{N_2^0}$ RATIO	$\frac{N_4^0}{N_3^0}$ RATIO	$N_3(1)$	$\frac{d}{dt} Re_{MAINING}$	$e^{-\lambda t}$	$N_4^0 e^{-\lambda t}$	$\frac{N_4^0}{N_1^0}$ RATIO	$N_4(1)$	$\frac{d}{dt} Re_{MAINING}$		
0	1	6.123	1	6.448	0	6.448	100	1	2.983	0	2.983	100	1	3.956	0	0	
.0005	0.9449	5.786	0.9947	6.444	0.3165	6.444	100	1	2.983	0.03417	2.983	100	0.9910	3.920	0.03381	0	
.001	.8929	5.467	.9893	6.379	.6124	6.440	99.9	1	2.983	.06899	2.983	100	.9821	3.885	.06728	0	
.002	.797	4.888	.9789	6.312	1.156	6.428	99.7	1	2.983	.1361	2.983	100	.9645	3.816	.1334	0	
.004	.636	3.894	.9583	6.179	2.046	6.384	99.0	1	2.983	.06605	2.983	100	.9303	3.680	.2619	0	
.008	.404	2.474	.9182	5.985	3.267	6.312	97.9	1	2.983	.5274	2.983	100	.8854	3.424	.5059	0.04288	
.01	.322	1.972	.8990	5.797	6.164	95.6	1	2.983	.6512	.2574	2.983	100	.8350	3.303	.6201	.01679	
.02	.104	0.6368	.8081	5.211	4.474	5.658	87.7	1	2.983	1.237	.6332	2.983	100	.697	2.757	.139	.2573
.04	.0108	.06661	.6903	4.193	4.064	4.599	71.3	1	2.983	2.255	1.630	2.983	100	.486	1.923	.1932	.9189
.08	.00012	.000735	.4261	2.747	3.018	46.8	1	2.983	3.018	3.018	2.983	100	.236	0.9316	.2871	2.444	
.1			.344	2.218	2.186	2.437	37.8	1	2.983	4.230	3.570	2.983	100	.164	.6488	3.143	3.222
.2			.119	0.7673	0.7563	0.8129	1.31	1	2.983	5.681	5.000	2.983	100	.027	.1068	3.656	6.0177
.4			.0141	.0992	.0992	.0992	0.155	1	2.983	6.664	5.666	2.983	100	.00072	.00085	3.755	7.84
.8			.0002	.001290	.001272	.001117	.0022	1	2.983	6.447	5.755	2.983	100			3.758	7.010
1			0	0	0	0		1	2.983	6.448	5.756	2.983	100			3.758	7.158
2								1	2.983	6.448	5.756	2.983	100			3.758	7.251
4								1	2.983	6.448	5.756	2.983	100			3.758	7.251
8								1	2.983	6.448	5.756	2.983	100			3.758	7.251
10								1	2.983	6.448	5.756	2.983	100			3.758	7.251
20								1	2.983	6.448	5.756	2.983	100			3.758	7.251
40								1	2.983	6.447	5.755	2.983	100			3.758	7.251
80								1	2.983	6.447	5.755	2.983	100			3.758	7.251
100								1	2.983	6.447	5.755	2.983	100			3.758	7.251
200								1	2.983	6.445	5.753	2.982	100			3.758	7.251
400								1	2.980	6.442	5.750	2.980	99.9			3.755	7.251
800								1	2.980	6.436	5.745	2.977	99.8			3.749	7.159
1000								1	2.976	6.433	5.742	2.976	99.8			3.749	7.159
2000								1	2.969	6.417	5.728	2.969	99.5			3.741	7.117
4000								1	2.954	6.386	5.701	2.954	99.0			3.721	7.043
8000								1	2.910	6.326	5.647	2.926	98.1			3.687	7.014
10000								1	2.912	6.295	5.620	2.912	97.6			3.670	7.001
20000								1	2.844	6.147	5.487	2.844	95.3			3.582	6.912
40000								1	2.710	5.859	5.230	2.710	90.8			3.415	6.589
80000								1	2.638	5.325	4.753	2.638	82.8			3.193	6.708
100000								1	2.345	5.068	4.564	2.345	78.6			2.953	5.698

1% SATURATION $\times 0.0103$ (% REMAINING)

TABLE 54 - (CHAIN 138)

5.9s I → 17^m Xe → 32.9^m Cs → STABLE Ba
 (6.4)_A (6.4)_B (6.4)_C

CONSTANTS:

$$A = 422.9$$

$$N_1^0 = 1.695 \times 10^{16}$$

$$B = 2.446$$

$$N_2^0 = 2.930 \times 10^{18}$$

$$c = 1.264$$

$$N_3^0 = 5.671 \times 10^{18}$$

τ (HRS)	$e^{-\alpha\tau}$	$N_1^0 e^{-\alpha\tau} \times 10^{-16}$	$N_2^0 e^{-\beta\tau} \times 10^{-18}$	$N_3^0 e^{-\gamma\tau} \times 10^{-18}$	$\frac{N_1^0 S_{AB}}{N_2^0} \times 10^{-16}$	$\frac{N_2^0 (\tau)}{N_3^0} \times 10^{-18}$	$\% \text{ SATU-RATION}$	$e^{-\epsilon\tau}$	$N_3^0 e^{-\epsilon\tau} \times 10^{-18}$	$\frac{N_1^0 S_{BC}}{N_2^0} \times 10^{-18}$	$N_2^0 (\tau) \times 10^{-18}$	$\% \text{ SATU-RATION}$	
0	1	1.695	1	2.930	0	2.930	100	1	5.671	0	0	5.671	100
.0005	0.8098	1.373	0.9988	2.926	0.3222	2.929	100	0.9994	5.668	0.003633	0	5.671	100
.001	.655	1.110	.9975	2.923	.5841	2.929	100	.9987	5.664	.007275	0	5.671	100
.002	.429	.7272	.9951	2.916	.9653	2.925	99.8	.9975	5.657	.01455	0.003339	5.671	100
.004	.184	.3119	.9902	2.901	1.375	2.915	99.5	.9949	5.642	.02849	.00678	5.670	100
.008	.0339	.05746	.9806	2.873	1.614	2.889	98.6	.9899	5.614	.05637	.02204	5.670	100
.01	.0146	.02475	.9738	2.859	1.639	2.875	98.1	.9875	5.600	.07094	.03051	5.670	100
.02	.00021	.0003560	.9523	2.790	1.623	2.806	95.8	.9751	5.530	.1382	.06950	5.669	100
.04			.9068	2.657	1.546	2.672	91.2	.9506	5.391	.2655	.1441	5.658	99.8
.08			.8224	2.410	1.402	2.424	82.7	.9038	5.125	.4934	.2780	5.621	99.1
.1			.7829	2.294	1.335	2.307	78.7	.8812	4.997	.5960	.3373	5.596	98.7
.2			.613	1.796	1.045	1.806	61.6	.777	4.406	.9941	.5695	.406	95.3
.4			.376	1.102	0.6412	1.108	37.8	.603	3.420	1.376	.7941	.804	84.7
.8			.142	0.4161	.2422	0.4163	14.2	.364	2.064	1.346	.7794	.418	60.3
1			.086	.2520	.1467	.2521	8.60	.282	1.599	1.188	.6885	.794	49.3
2			.0075	.02198	.01271	.02211	0.755	.080	0.4537	.4395	.2549	.8957	15.8
4			.00006	.000176	.000102	.000177	.00604	.0063	.03573	.03759	.02195	.07354	1.30
8													
10													

TABLE 55.—(CHAIN 139)

CONSTANTS:

TABLE 56.—(CHAIN 140)

LOS ALLOS US 12,000 DA 40,000 LA STABLE CP

ECONSTANTS:

TABLE 57 - (CONTINUED)
 3s Xr → [short] Cs → 18m Ba → 3.7H La → 300 Ce → STABLE PR

CONSTANTS:

$\Delta = 831.8$
 $N^0 = 6.194 \times 10^{15}$
 $N_2^0 = 2.229 \times 10^{16}$
 $N_3^0 = 2.751 \times 10^{19}$
 $N_4^0 = 6.31 \times 10^{21}$

$c = 0.1873$
 $\eta = 0.0009627$
 $N_3^0 = 2.751 \times 10^{19}$
 $N_4^0 = 6.31 \times 10^{21}$

3s Xr → [short] Cs → 18m Ba → 3.7H La → 300 Ce → STABLE PR

(4.6) (4.6) (4.6) (4.6) (5.7)

A A C

τ (hrs)		N_3^{e-AT}	N_2^{e-BT}	N_1^{e-C}	$N_3^{SATURATION}$	$N_2^{SATURATION}$	$N_1^{SATURATION}$	$N_3^{(t)}$	$N_2^{(t)}$	$N_1^{(t)}$	e^{-DT}	N_3^{e-OT}	N_2^{e-OT}	N_1^{e-OT}	N_3^{SACO}	N_2^{SACO}	N_1^{SACO}	$\% SATU-$	$N_4^{(t)}$	$N_3^{(t)}$	$N_2^{(t)}$	$N_1^{(t)}$	$\% SATU-$	N_4^{SACO}	N_3^{SACO}	N_2^{SACO}	N_1^{SACO}	$\% SATU-$		
0	1	6.194	1	2.229	2.111	2.229	100.3	1	2.751	0	2.751	100	1	2.751	0	0	0	0	6.631	100	0	0	0	0	6.631	100	0	0	0	
.0005	0.659	3.837	0.9988	2.226	3.496	2.228	99.9	0.9999	2.751	0.00267	0	2.751	100	1	6.631	0.0002760	0	0	6.631	100	0	0	0	0	6.631	100	0	0	0	
.001	4.33	2.694	.9977	2.224	5.015	2.227	99.9	.9998	2.750	.00508	0.006194	2.751	100	1	6.631	.0005530	0	0	6.631	100	0	0	0	0	6.631	100	0	0	0	
.002	1.164	.9952	2.218	5.932	2.223	99.7	.9996	2.750	.01058	.01858	2.751	100	1	6.631	.0010600	0	0	6.631	100	0	0	0	0	6.631	100	0	0	0		
.004	.036	0.2230	.9908	2.208	6.091	2.214	99.3	.9992	2.749	.02037	.03116	2.751	100	1	6.631	.0022120	0	0	6.631	100	0	0	0	0	6.631	100	0	0	0	
.008	.0013	.00805	.9817	2.188	6.069	2.194	98.4	.9985	2.747	.04015	.09289	2.751	100	1	6.631	.0044490	0	0	6.631	100	0	0	0	0	6.631	100	0	0	0	
.01	.00024	.00149	.9771	2.178	5.932	2.184	98.0	.9981	2.746	.05093	.1239	2.751	100	1	6.631	.0052540	0	0	6.631	100	0	0	0	0	6.631	100	0	0	0	
.02			.9748	2.128	5.663	2.134	95.7	.9962	2.741	.1004	.2601	2.751	100	1	6.631	.0105100	0	0	6.631	100	0	0	0	0	6.631	100	0	0	0	
.04			.9115	2.032	5.163	2.038	91.4	.9925	2.730	.1964	.5327	2.750	100	1	6.631	.020740	0	0	6.631	100	0	0	0	0	6.631	100	0	0	0	
.08			.831	1.852	4.933	1.857	83.3	.9851	2.710	.3736	1.022	2.747	99.9	0.9999	6.630	.040910	0.00223	0	0.006194	6.631	100	0	0	0	0	6.631	100	0	0	0
.1			.794	1.770	3.914	1.775	79.6	.9814	2.700	.4536	1.251	2.745	99.8	.9999	6.630	.051140	.00446	.01239	6.631	100	0	0	0	0	6.631	100	0	0	0	
.2			.630	1.104	2.460	1.408	63.2	.9631	2.649	.8076	2.236	2.730	99.2	.9998	6.630	.1015	.01783	.01955	6.631	100	0	0	0	0	6.631	100	0	0	0	
.4			.396	0.8827	0.9594	0.8832	39.7	.9278	2.552	1.290	3.574	2.681	97.5	.9996	6.628	.1985	.05795	.1610	6.630	100	0	0	0	0	6.630	100	0	0	0	
.8			.156	.3477	.6151	.3487	15.6	.861	2.369	1.710	4.718	2.540	92.3	.9992	6.626	.3821	.1710	.4751	6.630	100	0	0	0	0	6.630	100	0	0	0	
1			.099	.2207	.06159	.2213	9.93	.829	2.281	1.770	4.918	2.458	89.3	.9990	6.624	.4701	.2376	.6609	6.629	100	0	0	0	0	6.629	100	0	0	0	
2			.0099	.02207	.006213	.02213	0.993	.888	1.893	1.644	4.703	2.957	74.8	.9981	6.618	.8572	.5615	.1560	6.627	99.9	0	0	0	0	6.627	99.9	0	0	0	
4			.0001	.000223			.010	.473	1.301	1.147	3.187	1.416	51.5	.9961	6.605	1.446	.0179	3.998	6.620	99.8	0	0	0	0	6.620	99.8	0	0	0	
8							.223	.6135	0.5408	1.503	0.6676	24.3	.9923	6.590	2.127	1.680	5.668	6.603	99.6	0	0	0	0	6.603	99.6	0	0	0		
10							.154	.4237	.3736	1.038	.1611	16.8	.9904	6.567	2.312	1.844	5.123	6.592	99.4	0	0	0	0	6.592	99.4	0	0	0		
20							.024	.06602	.05620	0.1617	.07182	2.61	.9802	6.500	2.644	2.137	5.939	6.527	98.4	0	0	0	0	6.527	98.4	0	0	0		
40							.00055	.001511	.001333	.003704	.00164	0.060	.9621	6.380	2.658	2.154	5.985	6.409	96.7	0	0	0	0	6.409	96.7	0	0	0		
80													.9258	6.139	2.560	2.074	5.763	6.167	93.0	0	0	0	0	6.167	93.0	0	0	0		
100													.908	6.021	2.510	2.034	5.652	6.048	91.2	0	0	0	0	6.048	91.2	0	0	0		
200													.884	5.464	2.278	1.846	5.129	5.489	82.8	0	0	0	0	5.489	82.8	0	0	0		
400													.880	4.599	1.880	1.523	4.233	4.530	68.3	0	0	0	0	4.530	68.3	0	0	0		
800													.462	3.064	1.277	1.035	2.876	3.078	46.4	0	0	0	0	46.4	46.4	0	0	0		
1000													.381	2.566	1.053	0.855	2.372	2.538	38.3	0	0	0	0	38.3	38.3	0	0	0		
2000													.145	0.9615	0.4008	0.3248	0.9619	1.155	14.5	0	0	0	0	14.5	14.5	0	0	0		
4000													.021	.1393	.05605	.04705	.1394	.210	2.10	0	0	0	0	2.10	2.10	0	0	0		
6000													.00045	.00298	.00124	.00101	.00280	.0045	0.045	0	0	0	0	0.045	0.045	0	0	0		
10000													.00006	.000398	.000166	.000134	.00031	.000398	.000398	.006	0	0	0	0	0.006	0.006	0	0	0	

TABLE 58 - (CHAIN (142))

$\sim 1^m$ CS \longrightarrow 6^m BA \longrightarrow 7^{14m} LA \longrightarrow STABLE CE

(5.7) $N_2^0 = 9.209 \times 10^{17}$ $c = 0.5620$

(5.7) $N_3^0 = 1.136 \times 10^{19}$

(5.7) $N_1^0 = 1.535 \times 10^{17}$

CONSTANTS:

τ (HRS)	$e^{-\alpha\tau}$	$N_1^0 e^{-\alpha\tau}$	$N_2^0 e^{-\alpha\tau}$	$N_3^0 e^{-\alpha\tau}$	$N_1^0 S_{AB}$	$N_2^0 S_{BC}$	$N_3^0 S_{AC}$	$\% \text{ SATU-} \atop \text{RATION}$	$N_3(t)$	$\% \text{ SATU-} \atop \text{RATION}$
		$\times 10^{-17}$	$\times 10^{-17}$	$\times 10^{-17}$	$\times 10^{-17}$	$\times 10^{-17}$	$\times 10^{-18}$	$\times 10^{-19}$	$\times 10^{-18}$	$\times 10^{-19}$
0	1	1.535	1	9.209	0	9.209	100	1	1.136	0
.0005	0.9794	1.503	0.9965	9.177	0.03150	9.209	100	0.9997	1.136	0.00307
.001	.9593	1.472	.9931	9.145	.06226	9.207	100	.9994	1.135	.006312
.002	.9202	1.412	.9862	9.082	.1216	9.204	99.9	.9989	1.135	.01273
.004	.8468	1.300	.9727	8.958	.2319	9.190	99.8	.9978	1.134	.02515
.008	.717	1.100	.9461	8.713	.4218	9.135	99.2	.9955	1.131	.04950
.01	.659	1.011	.9331	8.593	.5047	9.098	98.8	.9944	1.130	.06141
.02	.435	0.6676	.8655	7.970	.7939	8.764	95.2	.9889	1.123	.1237
.04	.189	.2900	.7580	6.980	1.048	8.028	87.2	.9778	1.111	.2202
.08	.0360	.05516	.574	5.286	0.9910	6.277	68.2	.9560	1.086	.3827
.1	.0155	.02369	.500	4.605	.8915	5.497	59.7	.9454	1.074	.4459
.2	.00024	.000268	.250	2.302	.4605	2.763	30.0	.8937	1.015	.6453
.4					.0650	0.5986	11.97	0.7183	7.80	.9065
.8					.0039	.03592	.007184	.04310	0.468	.7248
1					.00098	.009025	.001805	.01083	.1176	.6475
2									.570	.7344
4									.324	.3681
8									.105	.1193
10									.0111	.01261

ABLE 59 - (CHAIN 143)	1s XE → [SHORT] CS → [$<0.5\text{H}$] BA → 19HIA → ^{33}H CE → 13.7P → STABLE ND
(3.8) A	(3.8) B (3.8) C (3.8) D (3.8) E (5.4) F (5.4) G (5.4) H

TABLE 60 - (CHAIN 144)
 $\sim 1s Xe \rightarrow [SHORT] Cs \rightarrow [SHORT] Ba \rightarrow [SHORT] La \rightarrow 2750 Ce \rightarrow 17.5M Pr \rightarrow$ STABLE ND
 (5.3) (5.3) (5.3) (5.3) (5.3) (5.3) (4.64)
 A B C

CONSTANTS:

$$A = 2495 \quad B = 1.050 \times 10^{-4} \quad C = 3.961$$

$$N_1^0 = 2.379 \times 10^{15} \quad N_2^0 = 2.058 \times 10^{22} \quad N_3^0 = 5.456 \times 10^{17}$$

T(HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-15}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-22}$	$N_1^0 S_{AB} \times 10^{-15}$	$N_2(\tau) \times 10^{-22}$	% RE- MAINING ¹	e^{-CT}	$N_3^0 e^{-CT} \times 10^{-17}$	$N_2^0 S_{BC} \times 10^{-17}$	$N_1^0 S_{ABC} \times 10^{-10}$	$N_3(\tau) \times 10^{-17}$	% RE- MAINING ¹
0	1	2.379	1	2.058	0	2.058	100	1	5.456	0	0	5.456	100
.0005	0.288	0.6852	1	2.058	1.694	2.058	100	0.9980	5.445	0.01091	0	5.456	100
.001	.0827	.1967	1	2.058	2.182	2.058	100	.9960	5.434	.02181	0.01427	5.456	100
.002	.0068	.01618	1	2.058	2.363	2.058	100	.9921	5.413	.04301	.03806	5.456	100
.004	0	0	1	2.058	2.379	2.058	100	.9843	5.370	.08565	.08802	5.456	100
.008			1	2.058	2.379	2.058	100	.9688	5.286	.1702	.1856	5.456	100
.01			1	2.058	2.379	2.058	100	.9612	5.244	.2118	.2331	5.456	100
.02			1	2.058	2.379	2.058	100	.9238	5.040	.4157	.4687	5.456	100
.04			1	2.058	2.379	2.058	100	.8536	4.657	.7987	.9135	5.456	100
.08			1	2.058	2.379	2.058	100	.728	3.972	1.484	1.706	5.456	100
.1			1	2.058	2.379	2.058	100	.673	3.672	1.784	2.055	5.456	100
.2			1	2.058	2.379	2.058	100	.453	2.472	2.984	3.540	5.456	100
.4			1	2.058	2.379	2.058	100	.205	1.118	4.338	5.010	5.456	100
.8			1	2.058	2.379	2.058	100	.042	0.2292	5.227	6.040	5.456	100
1	0.9999	2.058	2.379	2.058	100			.0190	.1037	5.351	6.185	5.455	99.9
2	.9998	2.058	2.379	2.058	100			.00036	.00196	5.452	6.302	5.454	99.9
4	.9996	2.057	2.378	2.057	100					5.454	6.304	5.454	99.9
8	.9992	2.056	2.377	2.056	99.9					5.452	6.302	5.452	99.9
10	.9989	2.056	2.376	2.056	99.9					5.450	6.300	5.450	99.9
20	.9979	2.054	2.374	2.054	99.8					5.443	6.292	5.443	99.7
40	.9958	2.049	2.369	2.049	99.6					5.433	6.281	5.443	99.5
80	.9916	2.041	2.359	2.041	99.2					5.410	6.254	5.410	99.1
100	.9895	2.036	2.354	2.036	99.0					5.398	6.240	5.378	98.9
200	.9792	2.015	2.330	2.015	97.9					5.343	6.176	5.343	97.9
400	.9589	1.973	2.281	1.973	95.9					5.231	6.047	5.231	95.9
800	.9195	1.892	2.187	1.892	92.0					5.017	5.800	5.017	91.9
1000	.902	1.856	2.146	1.856	90.2					4.921	5.688	4.921	90.2
2000	.811	1.669	1.929	1.669	81.1					4.425	5.115	4.425	81.1
4000	.657	1.352	1.563	1.352	65.7					3.585	4.144	3.585	65.7
8000	.432	0.8891	1.028	0.8891	43.2					2.356	2.724	2.356	43.2
10000	.350	.7203	0.8327	.7203	35.0					1.910	2.207	1.910	35.0
20000	.122	.2511	.2902	.2511	12.2					0.6656	0.7694	0.6656	12.2
40000	.015	.03087	.0357	.03087	1.50					.08185	.09461	.08185	1.50
80000		.000022	.000453	.000052	.000453	0.0022				.000120	.000139	.000120	0.00220

¹ % SATURATION = 0.364 (% REMAINING)

TABLE 61 - (CHAIN (145))

0.8_H X_E → [SHORT] CS → [SHORT] BA → [SHORT] LA → 1.8_H CE → 4.5_H PR → STABLE ND
 (3.62)_A (3.62)_B (3.62)_C

CONSTANTS:

$$\begin{aligned}
 A &= 3.119 \times 10^3 & B &= 0.3851 & C &= 0.1540 \\
 N_1^0 &= 1.300 \times 10^{15} & N_2^0 &= 1.053 \times 10^{19} & N_3^0 &= 2.633 \times 10^{19}
 \end{aligned}$$

τ (HRS)	$e^{-\alpha\tau}$	$N_1^0 e^{-\alpha\tau} \times 10^{-15}$	$N_2^0 e^{-\beta\tau} \times 10^{-19}$	$N_3^0 e^{-\gamma\tau} \times 10^{-19}$	$N_2^0 S_{AB} \times 10^{-15}$	$N_2^0 (r) \times 10^{-19}$	% SATU-RATION	$e^{-\alpha\tau}$	$N_3^0 e^{-\alpha\tau} \times 10^{-19}$	$N_2^0 S_{BC} \times 10^{-18}$	$N_1^0 S_{ABC} \times 10^{-15}$	$N_3^0 (r) \times 10^{-19}$	% SATU-RATION
0	1	1.300	1	1.053	0	1.053	100	1	2.633	0	0	2.633	100
.0005	0.210	0.273	0.998	1.053	1.027	1.053	100	0.9999	2.633	0.00176	0	2.633	100
.001	.045	0.0585	.996	1.053	1.241	1.053	100	.9998	2.632	0.00351	0.0013	2.633	100
.002	.002	0.0026	.992	1.052	1.296	1.052	99.9	.9997	2.632	0.00877	.0013	2.633	100
.004			.9985	1.051	1.298	1.051	99.8	.9994	2.631	0.01578	.0013	2.633	100
.008			.9969	1.050	1.296	1.050	99.7	.9988	2.630	0.03333	.0039	2.633	100
.01			.9961	1.049	1.295	1.049	99.6	.9985	2.629	0.04210	.0052	2.633	100
.02			.9923	1.045	1.290	1.045	99.2	.9969	2.625	0.08070	.0104	2.633	100
.04			.9847	1.037	1.280	1.037	98.5	.9938	2.617	0.1596	.0195	2.633	100
.08			.9697	1.021	1.261	1.021	97.0	.9877	2.601	0.3158	.0390	2.633	100
.1			.9622	1.013	1.251	1.013	96.2	.9847	2.593	0.3948	.0494	2.632	99.9
.2			.9259	0.9750	1.204	0.9750	92.6	.9697	2.553	0.7684	.0949	2.630	99.9
.4			.857	0.902	1.114	0.902	85.7	.9402	2.476	1.459	.179	2.622	99.6
.8			.735	0.774	0.956	0.774	73.5	.8840	2.328	2.614	.322	2.589	98.3
1			.680	0.716	0.884	0.716	68.0	.8572	2.257	3.105	.384	2.568	97.5
2			.463	0.488	0.602	0.488	46.3	.735	1.935	4.772	.720	2.412	91.6
4			.215	0.226	0.280	0.226	21.5	.540	1.422	5.702	.704	1.992	75.7
8			.046	0.048	0.060	0.048	4.56	.291	0.766	4.298	.531	1.196	45.4
10			.021	0.022	0.027	0.022	2.09	.214	0.563	3.385	.418	0.902	34.3
20			.00045	0.00047	0.00059	0.00047	0.0460	0.121	0.8070	0.988	.00455	0.202	7.67
40								.0021	0.0055	0.03684	.00455	0.0092	0.35

TABLE 62 - (CHAIN (146))

14.6M CE \longrightarrow 25M PR \longrightarrow STABLE Nd(4.0) (4.0) (2.81)
A B

CONSTANTS:

$A = 2.849$

$B = 1.664$

$N_1^0 = 1.572 \times 10^{18}$

$N_2^0 = 2.692 \times 10^{18}$

T(HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-18}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-18}$	$N_{AB}^0 \times 10^{-18}$	$N_2(\tau) \times 10^{-18}$	% SATURATION
0	1	1.572	1	2.692	0	2.692	100
.0005	0.9984	1.569	0.9992	2.690	0.003018	2.692	100
.001	.9971	1.567	.9983	2.687	.004535	2.692	100
.002	.9943	1.563	.9967	2.683	.009070	2.691	100
.004	.9887	1.554	.9933	2.674	.01739	2.691	100
.008	.9775	1.537	.9868	2.656	.03515	2.691	100
.01	.9719	1.528	.9835	2.648	.04384	2.691	100
.02	.9446	1.485	.9672	2.604	.08541	2.689	99.9
.04	.8922	1.403	.9356	2.519	.1640	2.683	99.7
.08	.7963	1.252	.8752	2.356	.2982	2.654	98.6
.1	.7520	1.182	.8469	2.280	.3586	2.639	98.0
.2	.566	0.8898	.717	1.930	.5706	2.501	92.9
.4	.320	.5030	.514	1.384	.7332	2.117	78.6
.8	.103	.1619	.264	0.7107	.6084	1.319	49.0
1	.0580	.09118	.189	.5088	.4950	1.004	37.3
2	.0034	.00534	.036	.09691	.1247	0.2216	8.23
4			.0013	.003500	.004913	.0084	0.312

TABLE 63 - (CHAIN 147)

11.0D ND → ~4Y PM → STABLE SM

(2.6)
A(2.6)
B

(2.6)

CONSTANTS:

$$A = 2.626 \times 10^{-3} \quad B = 1.978 \times 10^{-5}$$

$$N_1^0 = 1.109 \times 10^{21} \quad N_2^0 = 1.102 \times 10^{22}$$

τ (HRS)	$e^{-\alpha\tau}$	$N_1^0 e^{-\alpha\tau} \times 10^{21}$	$e^{-\beta\tau}$	$N_2^0 e^{-\beta\tau} \times 10^{-21}$	$N_1^0 S_{AB} \times 10^{-21}$	$N_2(\tau) \times 10^{-21}$	% MAXIMUM
0	1	1.109	1	11.02	0	11.02	93.2
.0005	1	1.109	1	11.02	0	11.02	93.2
.001	1	1.109	1	11.02	0	11.02	93.2
.002	1	1.109	1	11.02	0	11.02	93.2
.004	1	1.109	1	11.02	0	11.02	93.2
.008	1	1.109	1	11.02	0	11.02	93.2
.01	1	1.109	1	11.02	0	11.02	93.2
.02	1	1.109	1	11.02	0	11.02	93.2
.04	0.9999	1.109	1	11.02	.00011	11.02	93.2
.08	.9998	1.109	1	11.02	.00022	11.02	93.2
.1	.9997	1.109	1	11.02	.00033	11.02	93.2
.2	.9995	1.108	1	11.02	.00055	11.02	93.2
.4	.9989	1.108	1	11.02	.0012	11.02	93.2
.8	.9979	1.107	1	11.02	.0023	11.02	93.2
1	.9974	1.106	1	11.02	.00288	11.02	93.2
2	.9947	1.103	1	11.02	.00588	11.03	93.3
4	.9895	1.097	1	11.02	.0118	11.03	93.3
8	.9792	1.086	0.9999	11.02	.0232	11.04	93.4
10	.9740	1.080	.9998	11.02	.0288	11.05	93.5
20	.9485	1.052	.9996	11.02	.0571	11.08	93.7
40	.900	0.9981	.9992	11.01	.1109	11.12	94.1
80	.810	.8983	.9984	11.00	.2106	11.21	94.8
100	.769	.8528	.9980	11.00	.2560	11.26	95.3
200	.591	.6554	.9960	10.98	.4527	11.43	96.7
400	.349	.3870	.9920	10.93	.7187	11.65	98.6
800	.122	.1353	.9843	10.85	.9639	11.81	99.9
1000	.072	.0798	.9804	10.80	1.016	11.82	100
2000	.0051	.00566	.9611	10.59	1.069	11.66	98.6
4000			.9235	10.18	1.032	11.21	94.8
8000			.853	9.400	.9535	10.35	87.6
10000			.820	9.036	.9167	9.953	84.2
20000			.672	7.405	.7512	8.156	69.0
40000			.452	4.981	.5053	5.486	46.4
80000			.205	2.259	.2291	2.488	21.0
100000			.138	1.521	.1543	1.675	14.2

¹% SATURATION = 0.0749 (% MAXIMUM)

TABLE 64 - (CHAIN (149))

(2.0H) ND \longrightarrow 47H PM \longrightarrow STABLE SM(1.3)
A(1.3)
B

(1.3)

CONSTANTS:

$A = 0.3466$

$B = 0.01475$

$N_1^0 = 4.201 \times 10^{18}$

$N_2^0 = 9.871 \times 10^{19}$

T(HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-18}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-19}$	$N_1^0 S_{AB}$	$N_2(\tau) \times 10^{-19}$	% SATU-RATION
0	1	4.201	1	9.871	0	9.871	100
.0005	0.9998	4.200	1	9.871	0.0000862	9.871	100
.001	.9997	4.200	1	9.871	.000130	9.871	100
.002	.9993	4.198	1	9.871	.000265	9.871	100
.004	.9986	4.195	0.9999	9.871	.000571	9.871	100
.008	.9972	4.189	.9999	9.871	.00118	9.871	100
.01	.9965	4.186	.9999	9.871	.00141	9.871	100
.02	.9931	4.172	.9997	9.869	.00289	9.871	100
.04	.9862	4.143	.9994	9.866	.00580	9.871	100
.08	.9726	4.086	.9988	9.860	.01151	9.871	100
.1	.9658	4.057	.9985	9.857	.01433	9.871	100
.2	.9328	3.919	.9970	9.842	.02815	9.870	100
.4	.870	3.655	.9941	9.814	.05444	9.868	100
.8	.758	3.184	.9883	9.756	.1009	9.857	99.9
1	.706	2.966	.9853	9.727	.1224	9.849	99.8
2	.499	2.096	.9709	9.585	.2070	9.792	99.2
4	.250	1.050	.9425	9.304	.3039	9.334	94.6
8	.062	0.2605	.8900	8.786	.3631	9.149	92.7
10	.031	.1302	.863	8.520	.3649	8.885	90.0
20	.00095	.0040	.744	7.345	.3259	7.671	77.7
40			.554	5.469	.2430	5.712	57.9
80			.306	3.021	.1342	3.155	32.0
100			.228	2.251	.1000	2.351	23.8
200			.055	0.543	.02412	0.5671	5.75
400			.0027	.0267	.00118	.0279	0.283
			0	0	0	0	0

TABLE 65 - (CHAIN (151))

[SHORT] ND \longrightarrow (12M) PM \longrightarrow $\sim 1000Y$ SM \longrightarrow STABLE EU.

(0.445)	(0.445) A	(0.445) B
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CONSTANTS:

$$A = 3.466 \quad B = 7.913 \times 10^{-8}$$

$$N_1^0 = 1.438 \times 10^{17} \quad N_2^0 = 2.151 \times 10^{20}$$

τ (HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-17}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-20}$	$N_1^0 S_{AB} \times 10^{-17}$	$N_2(\tau) \times 10^{-20}$	% RE-MAINING ¹
0	1	1.438	1	2.151	0	2.151	100
.0005	0.9983	1.436	1	2.151	0.0024	2.151	100
.001	.9965	1.433	1	2.151	.0050	2.151	100
.002	.9931	1.428	1	2.151	.0099	2.151	100
.004	.9862	1.418	1	2.151	.0198	2.151	100
.008	.9726	1.399	1	2.151	.0394	2.151	100
.01	.9658	1.389	1	2.151	.0492	2.151	100
.02	.9328	1.341	1	2.151	.0966	2.151	100
.04	.870	1.251	1	2.151	.187	2.151	100
.08	.757	1.089	1	2.151	.349	2.151	100
.1	.706	1.015	1	2.151	.425	2.151	100
.2	.499	0.718	1	2.151	.720	2.152	100
.4	.250	.360	1	2.151	1.079	2.152	100
.8	.062	.089	1	2.151	1.349	2.152	100
1	.031	.045	1	2.151	1.393	2.152	100
2	.00095	.0014	1	2.151	1.437	2.152	100
4			1	2.151	1.438	2.152	100
8			1	2.151	1.438	2.152	100
100,000			0.9921	2.134	1.427	2.135	99.2

¹% SATURATION = 3.42×10^{-5} (% REMAINING)

TABLE 66 - (CHAIN 153)

[$\text{^{45}M}$] PM \longrightarrow $\text{^{47}H}$ SM \longrightarrow STABLE EU(0.15)
A (0.15)
B (0.15)

CONSTANTS:

$A = 8.318$

$B = 0.01475$

$N_1^0 = 2.020 \times 10^{16}$

$N_2^0 = 1.139 \times 10^{19}$

τ (HRS)	e^{-AT}	$N_1^0 e^{-AT}$ $\times 10^{-16}$	e^{-BT}	$N_2^0 e^{-BT}$ $\times 10^{-19}$	$N_1^0 S_{AB}$ $\times 10^{-16}$	$N_2(\tau)$ $\times 10^{-19}$	% SATU- RATION
0	1	2.020	1	1.139	0	1.139	100
.0005	0.9958	2.012	1	1.139	0.00850	1.139	100
.001	.9917	2.003	1	1.139	.01679	1.139	100
.002	.9834	1.986	1	1.139	.03359	1.139	100
.004	.9672	1.954	0.9999	1.139	.06618	1.139	100
.008	.9353	1.889	.9999	1.139	.1307	1.139	100
.01	.9200	1.858	.9999	1.139	.1617	1.139	100
.02	.846	1.709	.9997	1.139	.3117	1.139	100
.04	.716	1.446	.9994	1.138	.5727	1.139	100
.08	.514	1.038	.9988	1.138	.9815	1.139	100
.1	.434	0.8767	.9985	1.137	1.143	1.138	99.9
.2	.188	.3797	.9970	1.136	1.637	1.138	99.9
.4	.036	.0727	.9941	1.132	1.939	1.134	99.6
.8	.0012	.00242	.9883	1.126	1.998	1.128	99.0
1	.00024	.000485	.9853	1.122	1.994	1.124	98.7
2			.9709	1.106	1.965	1.108	97.3
4			.9425	1.074	1.907	1.076	94.5
8			.8900	1.014	1.801	1.016	89.2
10			.863	0.9830	1.746	0.9847	86.5
20			.744	.8474	1.506	.8489	74.5
40			.554	.6310	1.121	.6321	55.5
80			.306	.3485	0.6193	.3491	30.6
100			.228	.2597	.4614	.2602	22.8
200			.055	.0626	.1113	.0627	5.50
400			.0027	.00308	.00545	.0038	0.3
800		0	0	0	0	0	

TABLE 67 - (CHAIN 155)

[C^{54} PM] \longrightarrow 25M Sm \longrightarrow 2.0y Eu \longrightarrow STABLE GD.

(0.031) A	(0.031) B	(0.03) C	(.03)
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CONSTANTS:

$A = 8.318$

$B = 1.664$

$C = 3.956 \times 10^{-5}$

$N_1^0 = 4.174 \times 10^{15}$

$N_2^0 = 2.087 \times 10^{16}$

$N_3^0 = 1.333 \times 10^{20}$

T(HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-16}$	e^{-BT}	$N_2^0 e^{-BT} \times 10^{-16}$	$N_1^0 S_{AB} \times 10^{-16}$	$N(T) \times 10^{-16}$	% SATURATION	e^{-CT}	$N_3^0 e^{-CT} \times 10^{-20}$	$N_2^0 S_{BC} \times 10^{-16}$	$N_1^0 S_{ABC} \times 10^{-16}$	$N_3(\tau) \times 10^{-20}$	% RE- ¹ MAINTAINING	
0	1	0.4174	1	2.087	0	2.087	100	1	1.333	0	0	1.333	100	
.0005	0.9958	.4156	0.9992	2.085	0.00177	2.087	100	1	1.333	0.0017	0	1.333	100	
.001	.9917	.4139	.9983	2.083	.00344	2.087	100	1	1.333	.0035	0	1.333	100	
.002	.9834	.4105	.9967	2.080	.00693	2.087	100	1	1.333	.0069	0	1.333	100	
.004	.9672	.4037	.9933	2.073	.01361	2.087	100	1	1.333	.0140	0	1.333	100	
.008	.9353	.3903	.9867	2.059	.02684	2.086	100	1	1.333	.0278	0.0004	1.333	100	
.01	.9200	.3840	.9835	2.053	.03314	2.086	100	1	1.333	.0344	.0004	1.333	100	
.02	.846	.3531	.9671	2.018	.06303	2.081	99.7	1	1.333	.0687	.0013	1.333	100	
.04	.716	.2989	.9353	1.952	.1144	2.066	99.0	1	1.333	.1350	.0042	1.333	100	
.08	.514	.2145	.875	1.826	.1882	2.014	96.5	1	1.333	.2609	.0142	1.333	100	
.1	.434	.1812	.848	1.770	.2160	1.986	95.2	1	1.333	.3172	.0205	1.333	100	
.2	.188	.0785	.716	1.494	.2755	1.770	84.8	1	1.333	.5927	.0634	1.333	100	
.4	.036	.0150	.514	1.073	.2494	1.322	63.3	1	1.333	1.014	.1528	1.333	100	
.8	.0012	.00050	.264	0.5510	.1372	0.6882	33.0	1	1.333	1.536	.2797	1.333	100	
1	.00024	.000100	.188	.3924	.0981	.4905	23.5	1	1.333	1.695	.3193	1.333	100	
2			.036	.07513	.0188	.0939	4.50	0.9999	1.333	2.012	.3986	1.333	100	
4				.0013	.0027	.000678	.0095	0.455	.9998	1.333	2.084	.4166	1.333	100
8									.9997	1.333	2.086	.4173	1.333	100
10									.9996	1.332	2.086	.4172	1.332	100
20									.9992	1.332	2.085	.4171	1.332	99.9
40									.9984	1.331	2.084	.4167	1.331	99.8
80									.9968	1.329	2.080	.4161	1.329	99.7
100									.9960	1.328	2.079	.4157	1.328	99.6
200									.9921	1.322	2.071	.4141	1.322	99.2
400									.9843	1.312	2.054	.4108	1.312	98.4
800									.9687	1.291	2.022	.4043	1.291	96.9
1000									.9610	1.281	2.006	.4011	1.281	96.1
2000									.9237	1.231	1.928	.3856	1.231	92.4
4000									.853	1.137	1.780	.3560	1.137	85.3
8000									.728	0.9704	1.519	.3039	0.9704	72.8
10000									.673	.8971	1.405	.2809	.8971	67.3
20000									.452	.6025	0.9433	.1887	.6025	45.2
40000									.205	.2733	.4278	.0856	.2733	20.5
80000									.042	.05599	.0877	.0175	.05599	4.20
100000									.019	.02533	.0397	.0079	.02533	1.90

¹ % SATURATION = 0.157 (% REMAINING)

TABLE 68 - (CHAIN 156)

[<5M] PM → ~10 H SM → 15.4 d EU → STABLE Gd.

(0.012) (0.012) (0.013) (0.013)
A B C

CONSTANTS:

$A = 8.318$

$B = 0.06932$

$C = 1.875 \times 10^{-3}$

$N_1^0 = 1.616 \times 10^{15}$

$N_2^0 = 1.940 \times 10^{17}$

$N_3^0 = 7.765 \times 10^{18}$

τ (HRS)	$e^{-\alpha\tau}$	$N_1^0 e^{-\alpha\tau} \times 10^{-15}$	$e^{-\beta\tau}$	$N_2^0 e^{-\beta\tau} \times 10^{-17}$	$N_{1SAB}^0 \times 10^{-17}$	$N_2(\tau) \times 10^{-17}$	% SATURATION	$e^{-\gamma\tau}$	$N_3^0 e^{-\gamma\tau} \times 10^{-18}$	$N_{2SBC}^0 \times 10^{-18}$	$N_{1SABC}^0 \times 10^{-15}$	$N_3(\tau) \times 10^{-18}$	% SATURATION
0	1	1.616	1	1.940	0	1.940	100	1	7.765	0	0	7.765	100
.0005	0.9958	1.609	1	1.940	0.000068	1.940	100	1	7.765	0	0	7.765	100
.001	.9917	1.603	0.9999	1.940	.000134	1.940	100	1	7.765	.00002	0	7.765	100
.002	.9834	1.589	.9999	1.940	.000268	1.940	100	1	7.765	.00002	0	7.765	100
.004	.9672	1.563	.9997	1.939	.000530	1.940	100	1	7.765	.000060	0	7.765	100
.008	.9353	1.511	.9994	1.939	.00104	1.940	100	1	7.765	.000120	0	7.765	100
.01	.9200	1.487	.9993	1.939	.00129	1.940	100	1	7.765	.000140	0	7.765	100
.02	.846	1.367	.9986	1.937	.00249	1.940	100	1	7.765	.000279	0	7.765	100
.04	.716	1.157	.9972	1.935	.00458	1.940	100	.9999	7.764	.000539	.000162	7.765	100
.08	.514	0.8306	.9944	1.929	.00782	1.937	99.8	.9998	7.763	.001077	.00323	7.765	100
.1	.434	.7013	.9931	1.927	.00911	1.936	99.8	.9998	7.763	.001336	.00485	7.765	100
.2	.188	.3038	.9862	1.913	.01300	1.926	99.3	.9996	7.762	.002673	.0129	7.765	100
.4	.036	.0582	.9726	1.887	.01526	1.902	98.0	.9992	7.759	.005304	.0307	7.764	100
.8	.0012	.0019	.9459	1.835	.01539	1.850	95.4	.9985	7.753	.01049	.0743	7.764	100
1.0	.00024	.00039	.9328	1.810	.01519	1.826	94.1	.9981	7.750	.01302	.0969	7.763	100
2.0			.870	1.688	.01417	1.702	87.7	.9962	7.735	.02516	.199	7.760	99.9
4.0			.757	1.469	.01233	1.481	76.3	.9925	7.707	.04697	.381	7.754	99.9
8.0			.574	1.114	.00935	1.123	57.9	.9850	7.649	.08197	.675	7.732	99.6
10			.499	0.9681	.00813	0.976	50.3	.9812	7.619	.09613	.795	7.716	99.4
20			.249	.4831	.00406	.488	25.2	.9631	7.478	.1424	1.118	7.622	98.2
40			.062	.1203	.00101	.121	6.24	.9275	7.202	.1727	1.44	7.376	95.0
80			.0038	.00737	.000062	.0075	.387	.861	6.686	.1709	1.37	6.858	88.3
100			.00095	.0018	.000016	.0018	.093	.829	6.437	.1651	1.37	6.603	85.0
								.686	5.327	.1368	1.14	5.465	70.4
								.472	3.665	.09413	0.783	3.760	48.4
								.223	1.732	.04446	0.370	1.777	22.9
								.154	1.196	.03071	0.255	1.227	15.8
								.023	.179	.00458	0.0381	.1836	2.36
								.00015	.00116	.04291	0.00025	.00119	.0153

TABLE 69 - (CHAIN (157))

15.4^H EU \longrightarrow STABLE GD
 (0.0074) (0.0150)
 A

CONSTANTS:

$$A = 4.501 \times 10^{-2}$$

$$N_1^0 = 1.841 \times 10^{17}$$

T(HRS)	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-17}$
0	1	1.841
.0005	1	1.841
.001	1	1.841
.002	.9999	1.841
.004	.9998	1.841
.008	.9996	1.840
.01	.9995	1.840
.02	.9991	1.839
.04	.9982	1.838
.08	.9964	1.834
.1	.9955	1.833
.2	.9910	1.824
.4	.9821	1.808
.8	.9646	1.776
1.0	.9559	1.760
2.0	.9138	1.682
4.0	.835	1.537
8.0	.697	1.283
10	.636	1.171
20	.406	.7474
40	.165	.3038
80	.027	.0497
100	.011	.0203
200	.00012	.00022

TABLE 70 - (CHAIN (158))

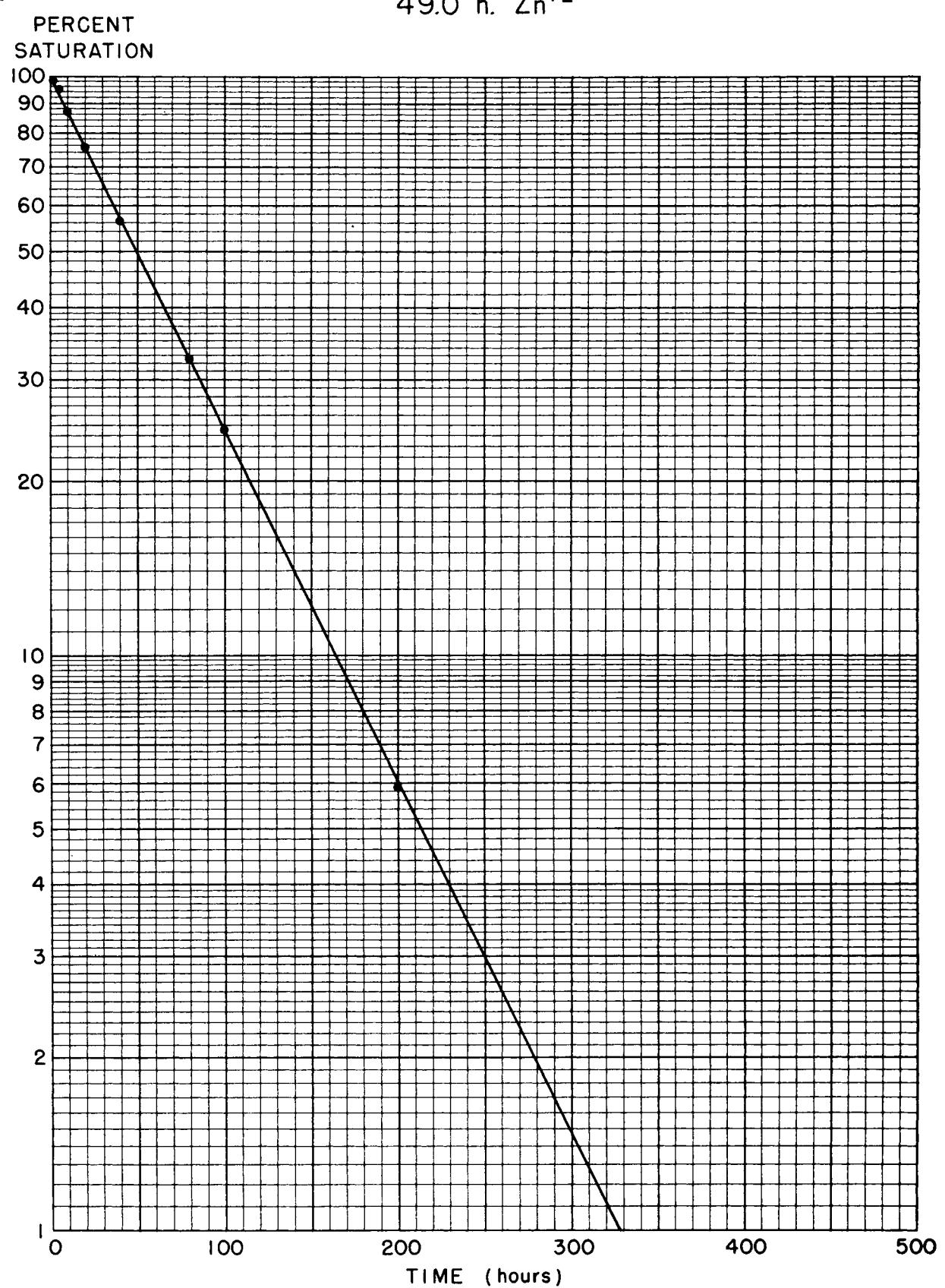
60M Eu \longrightarrow STABLE Gd
 (0.002)
 A

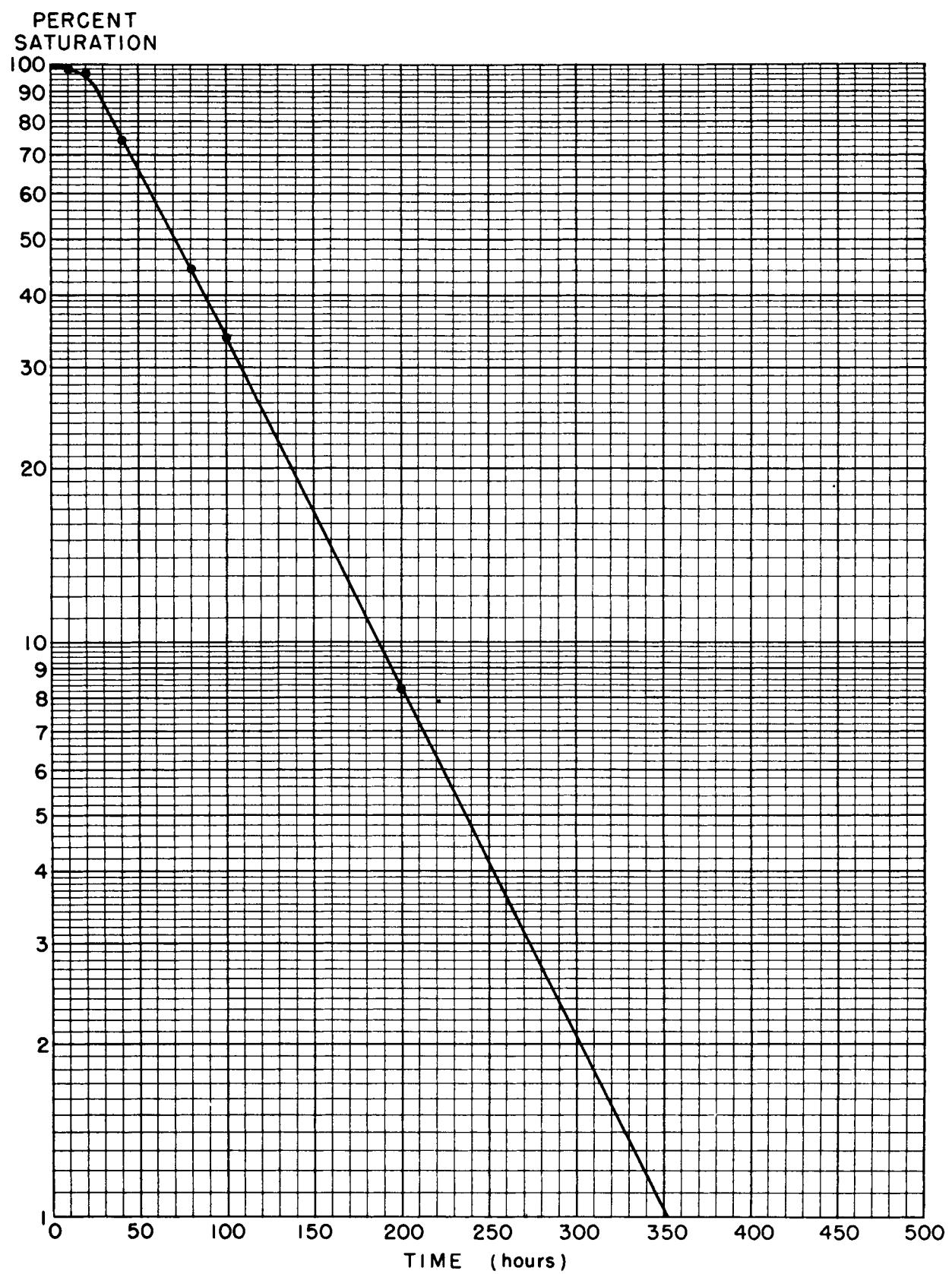
CONSTANTS:

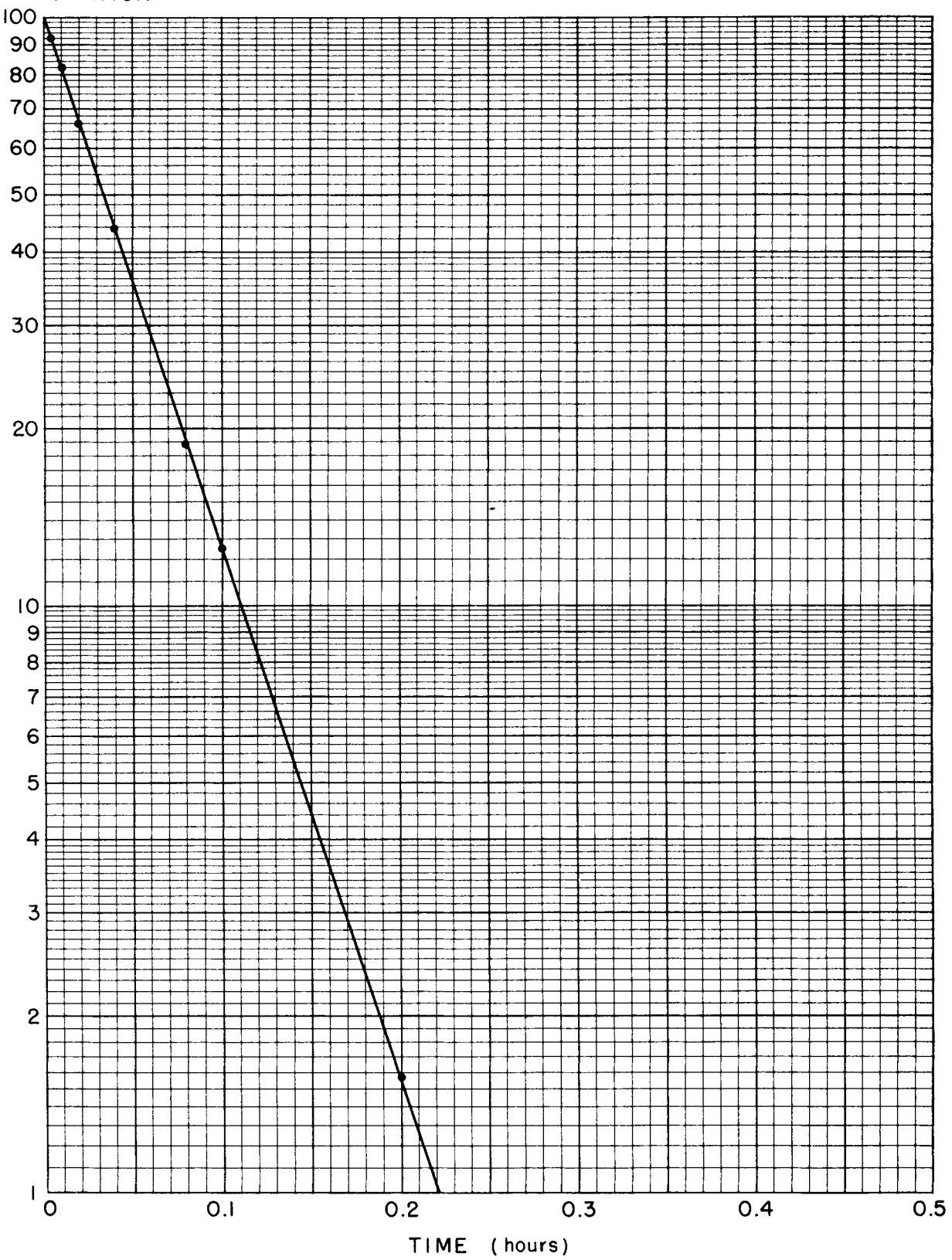
$$A = 0.69315$$

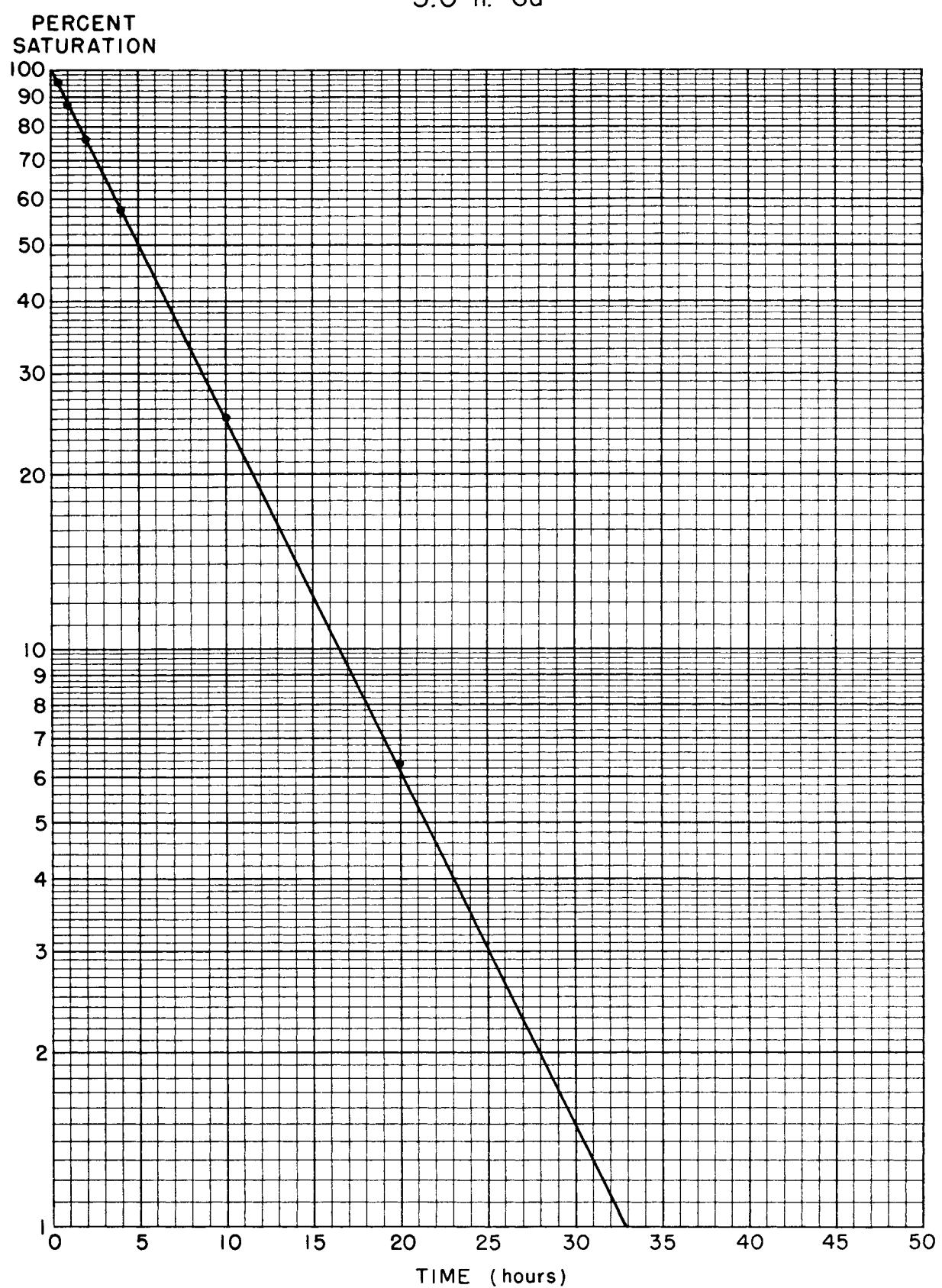
$$N_1^0 = 3.232 \times 10^{15}$$

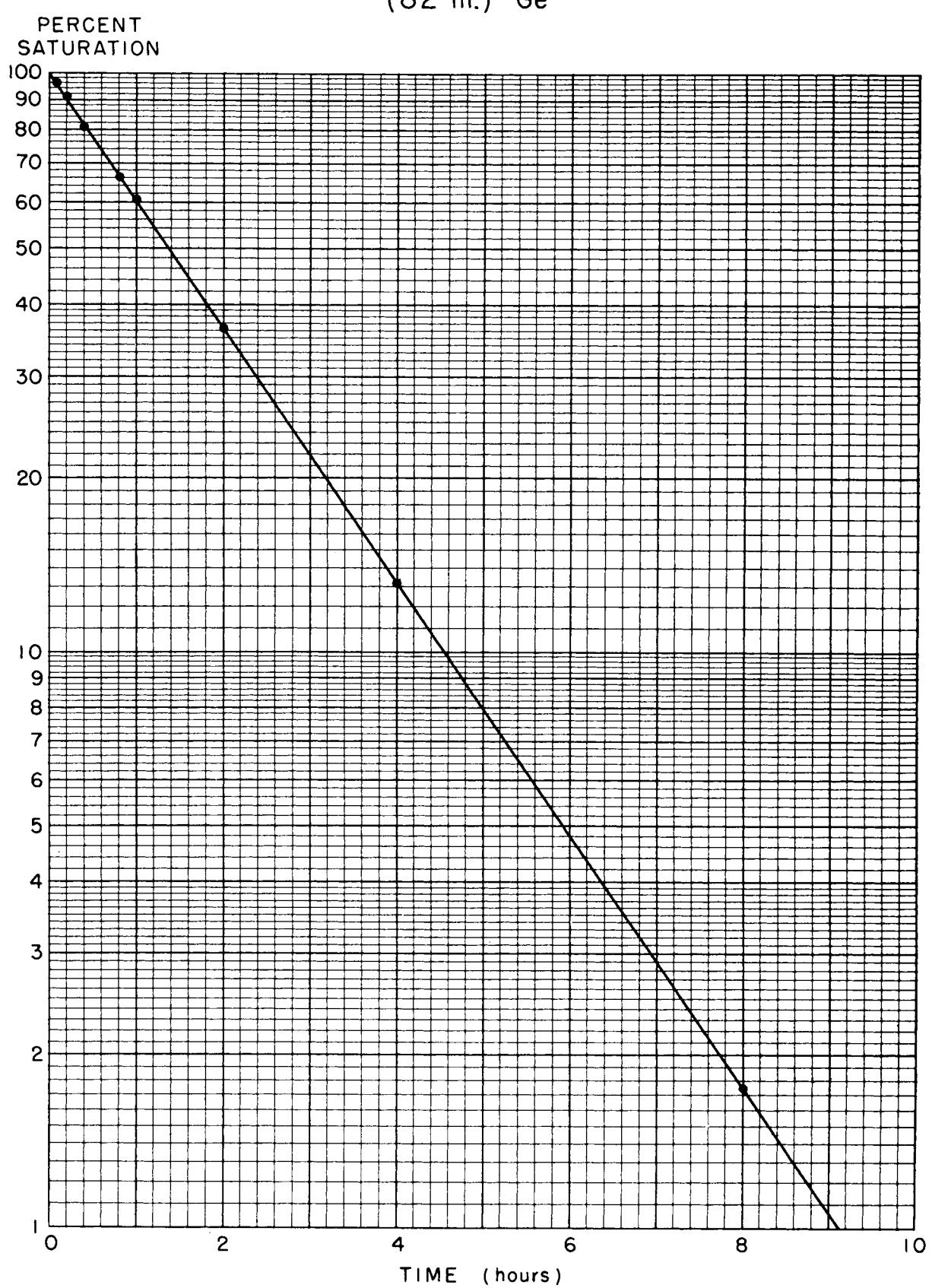
$T(\text{HRS})$	e^{-AT}	$N_1^0 e^{-AT} \times 10^{-15}$
0	1	3.232
.0005	0.9997	3.231
.001	0.9993	3.230
.002	0.9984	3.227
.004	0.9972	3.223
.008	0.9944	3.214
.01	0.9931	3.210
.02	0.9862	3.187
.04	0.9727	3.144
.08	0.9459	3.057
.1	0.9328	3.015
.2	0.870	2.812
.4	0.757	2.447
.8	0.574	1.855
1	0.499	1.613
2	0.249	0.8048
4	0.062	0.2004
8	0.0038	0.01228
10	0.00095	0.00307

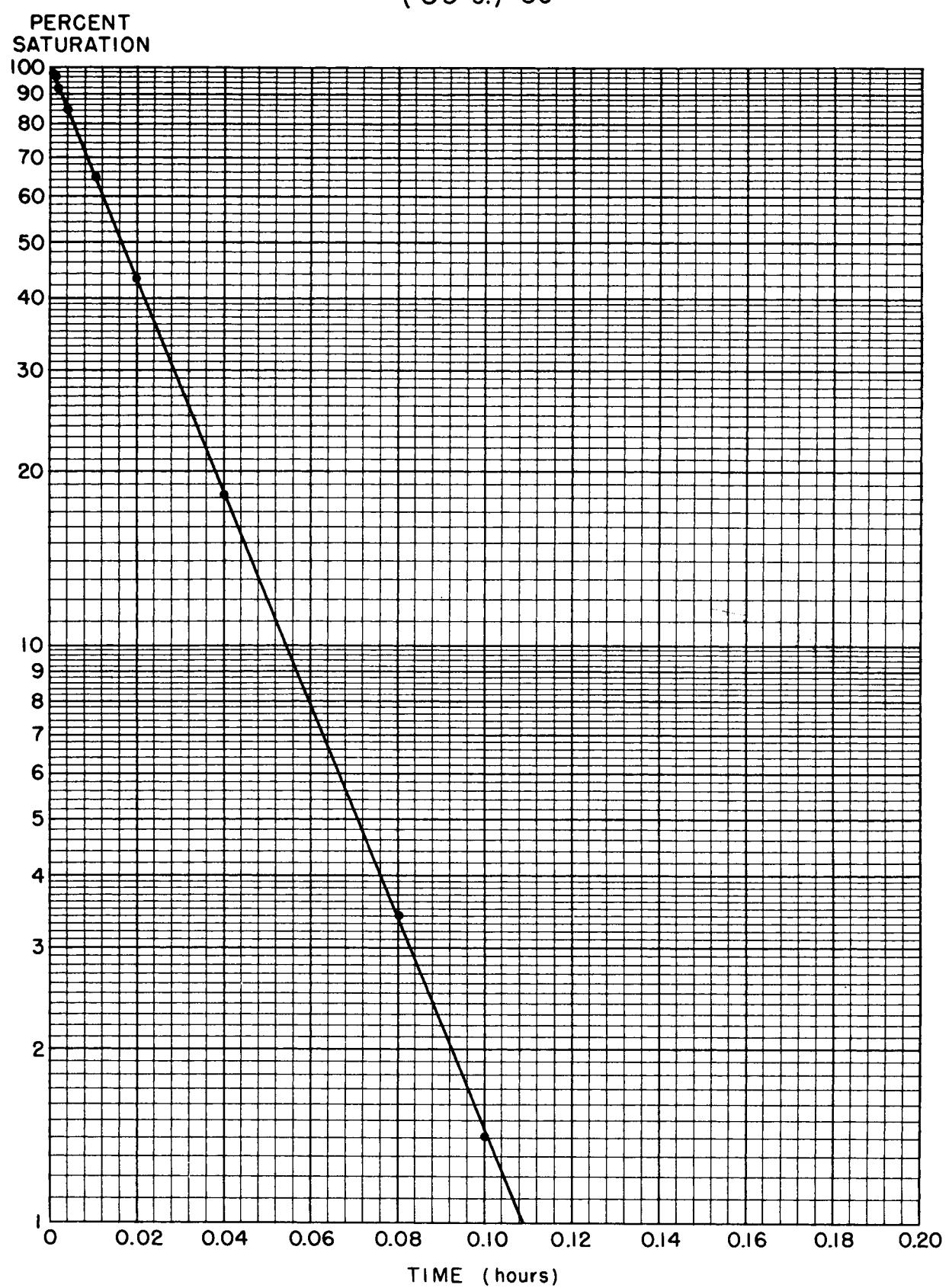




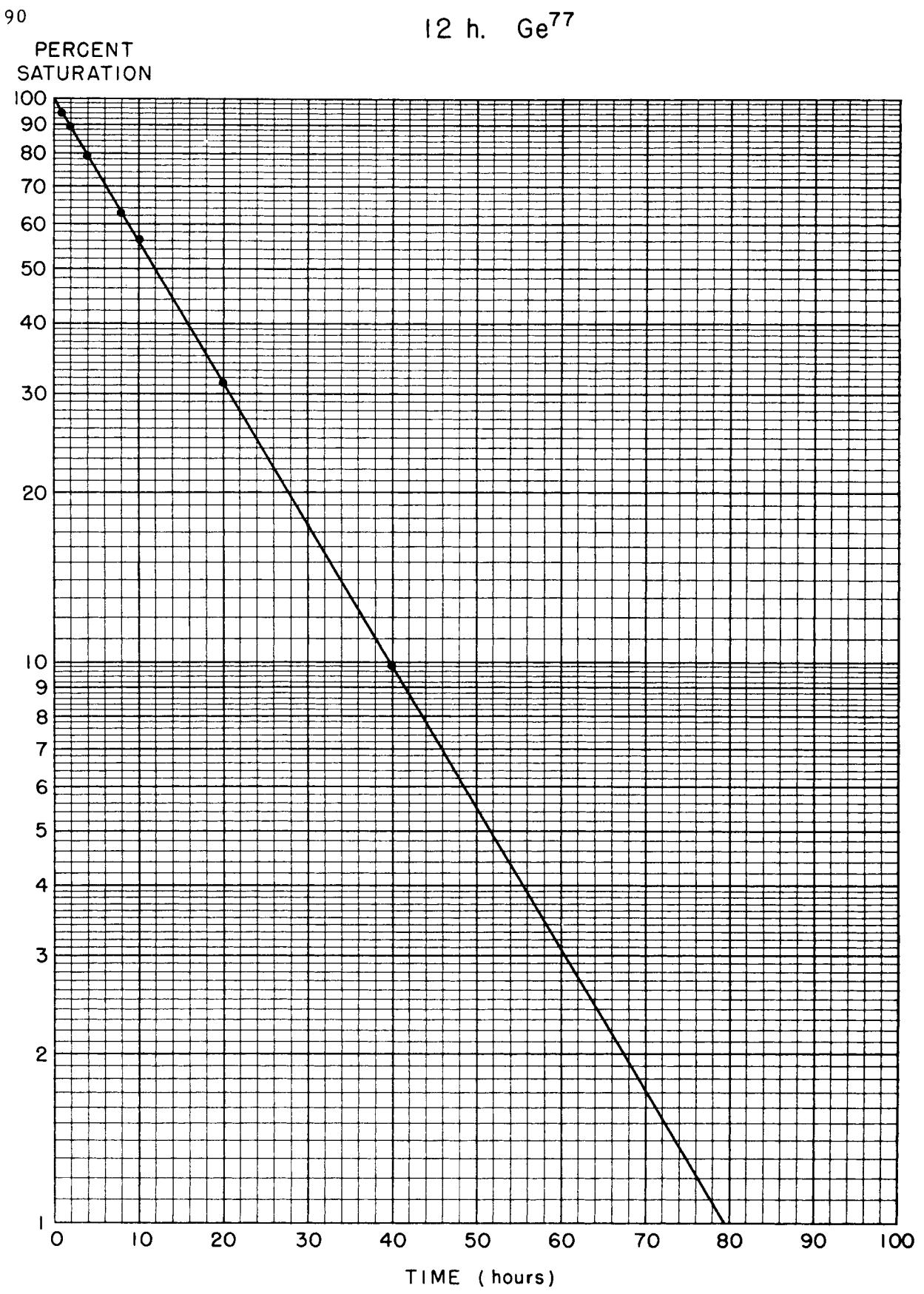
$[< 2 \text{ m.}] \text{ Zn}^{73}$ PERCENT
SATURATION

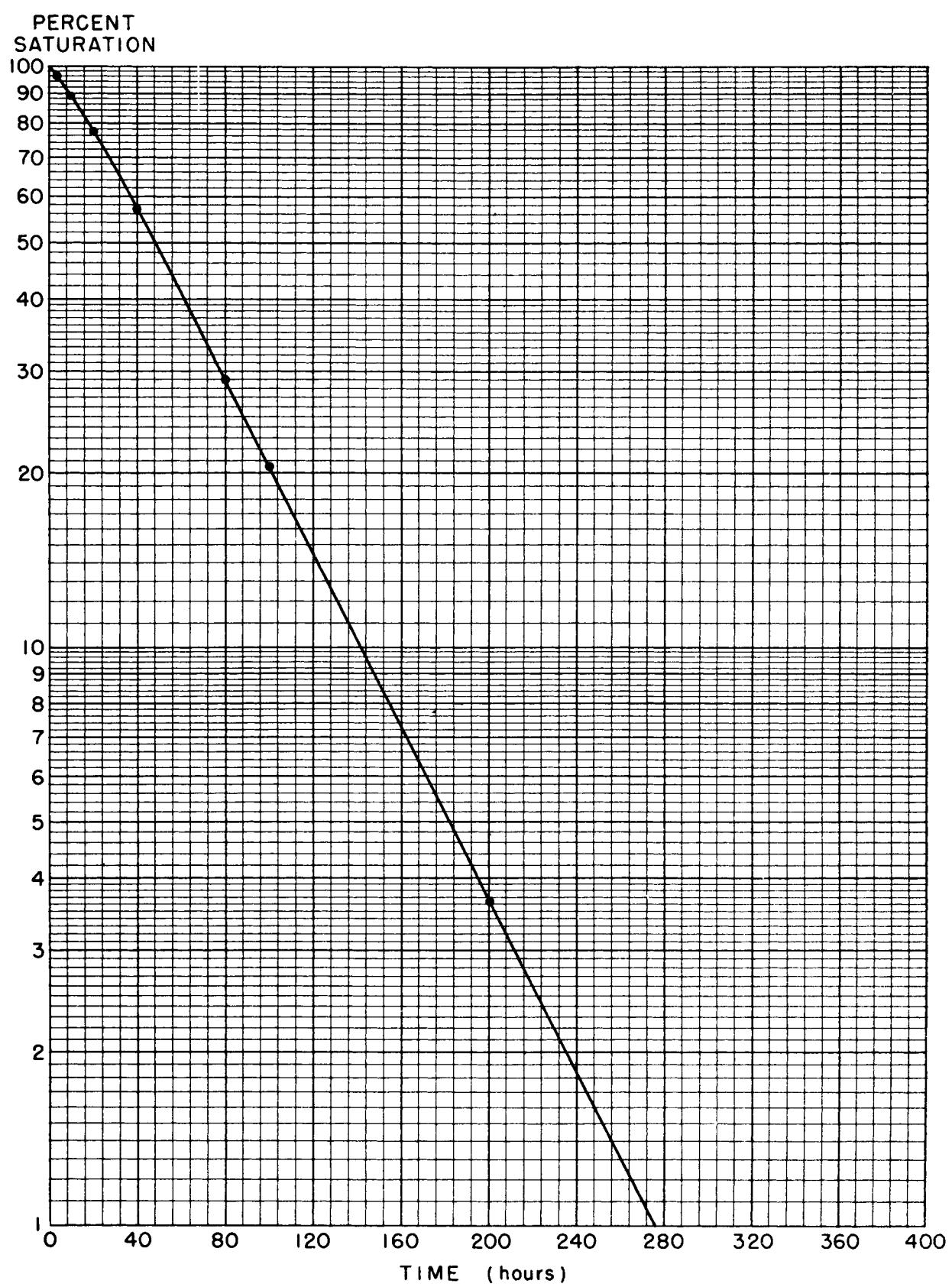


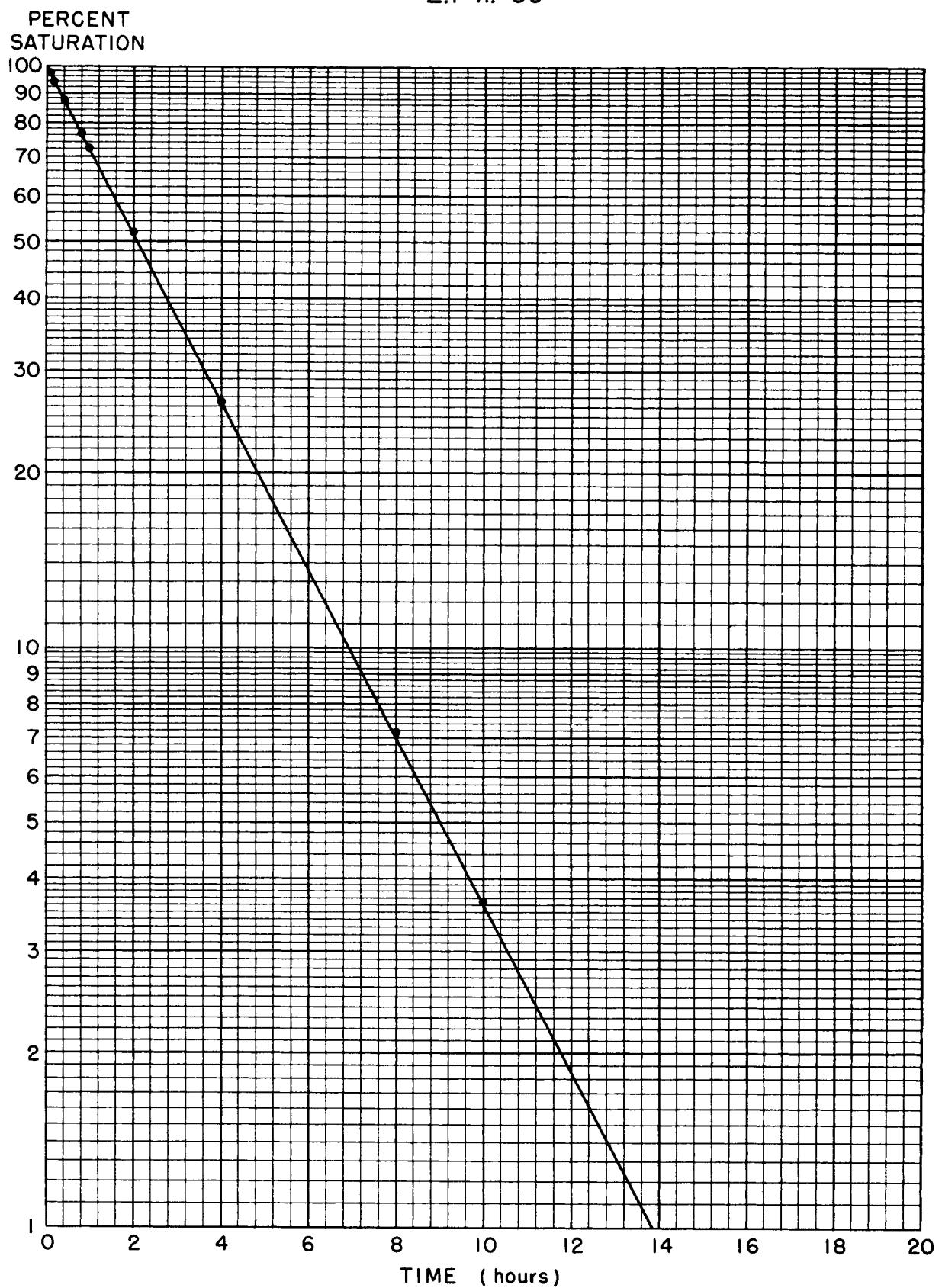
(82 m.) Ge^{75} 

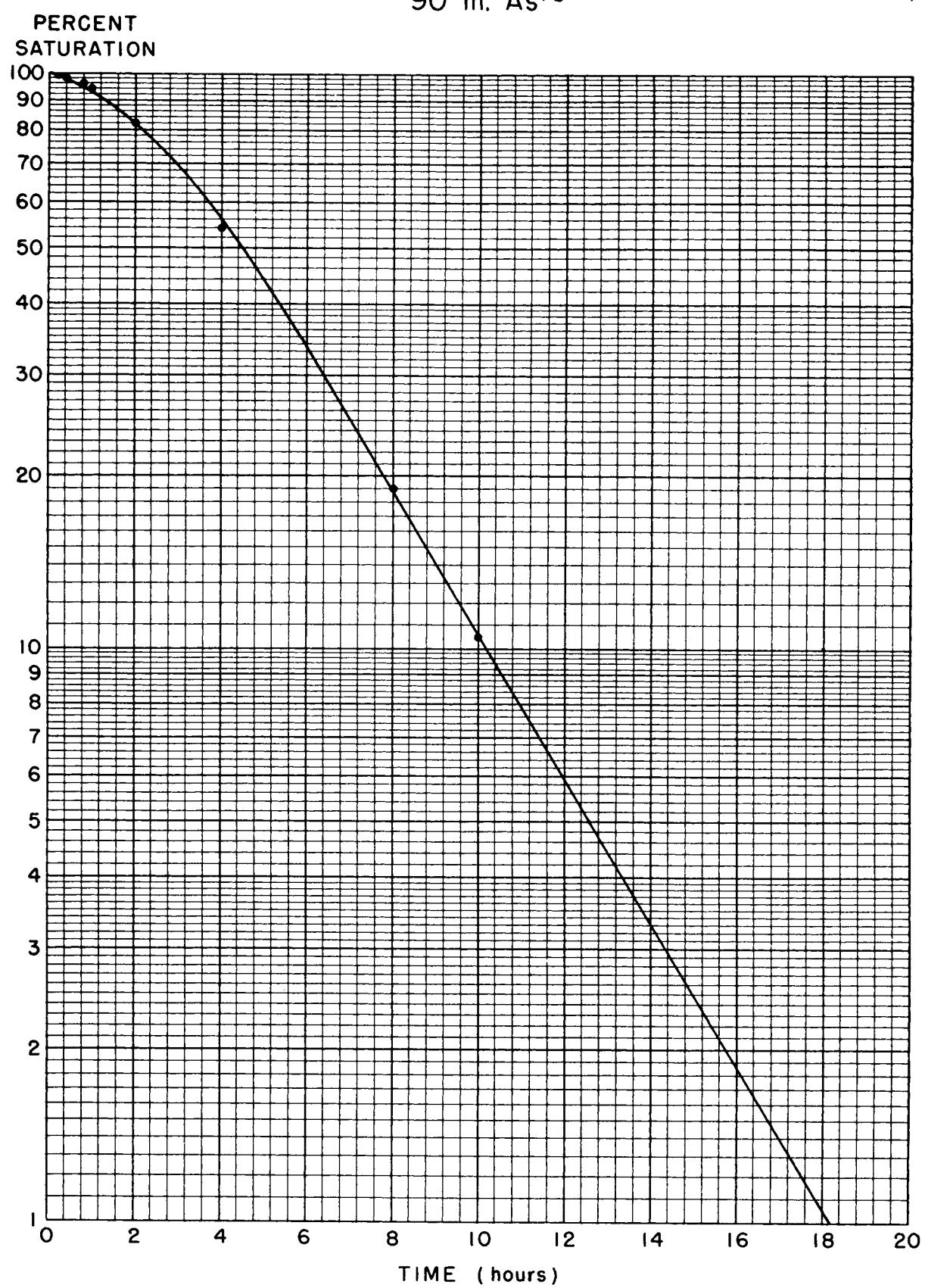


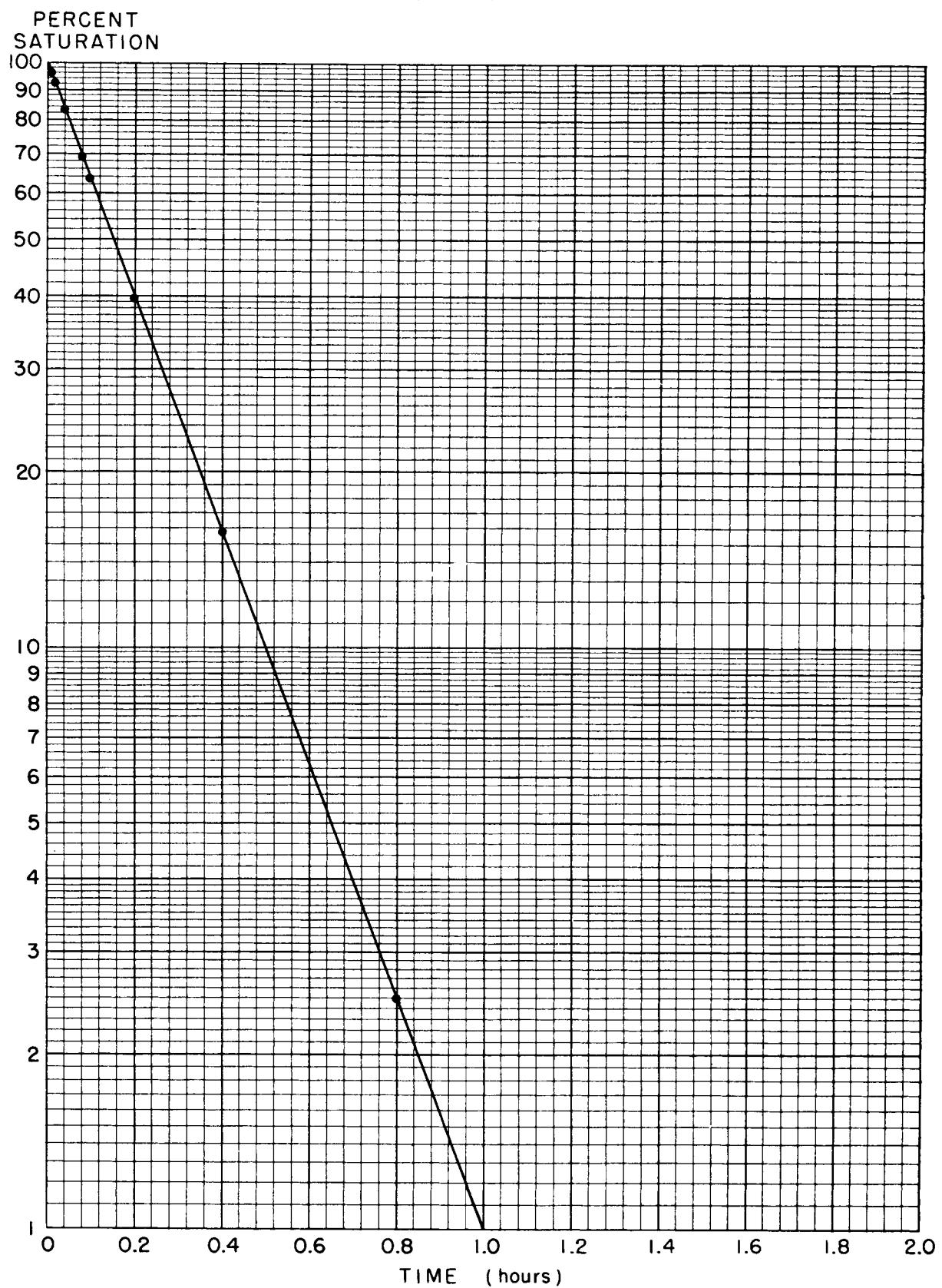
12 h. Ge⁷⁷

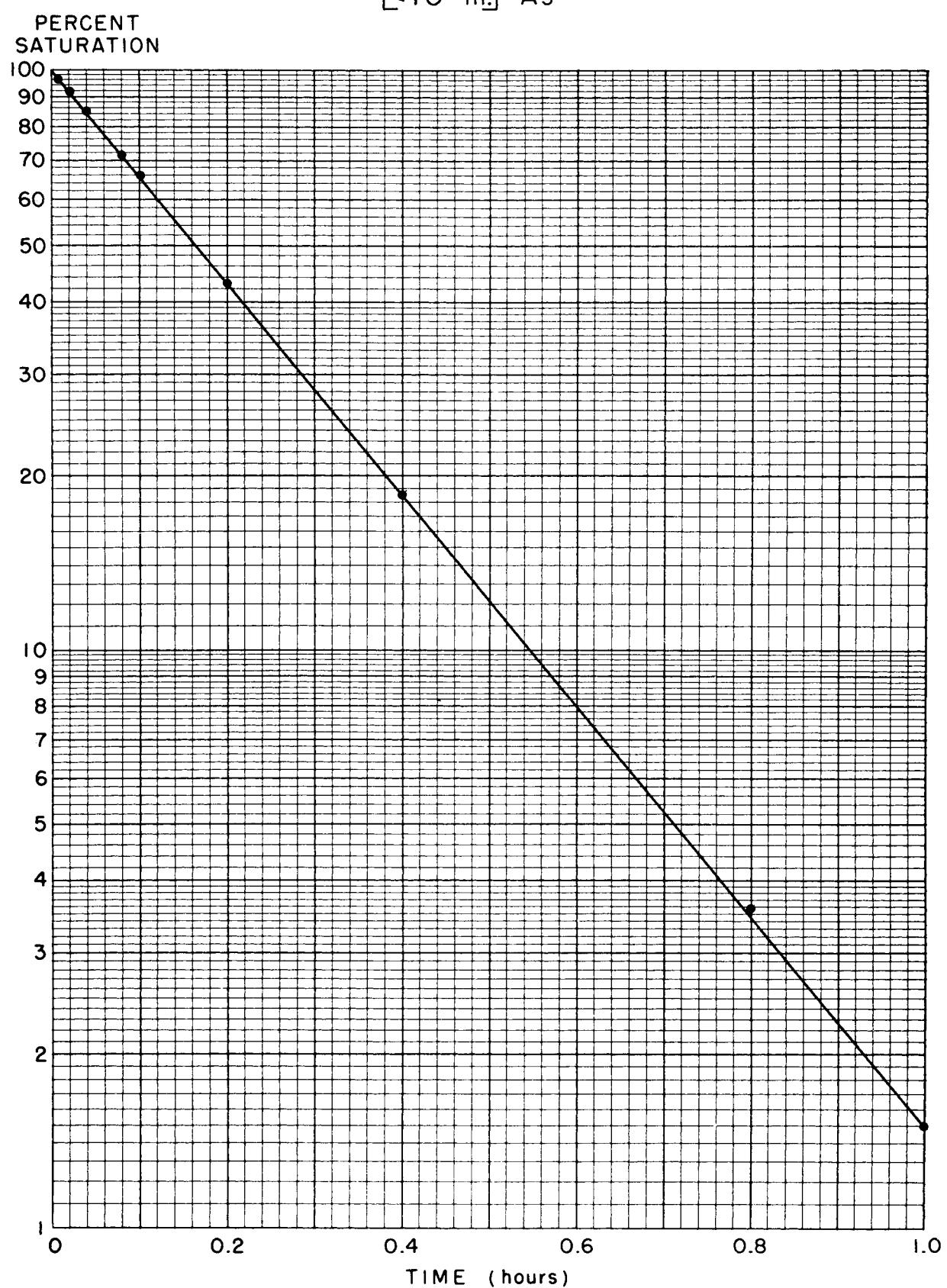


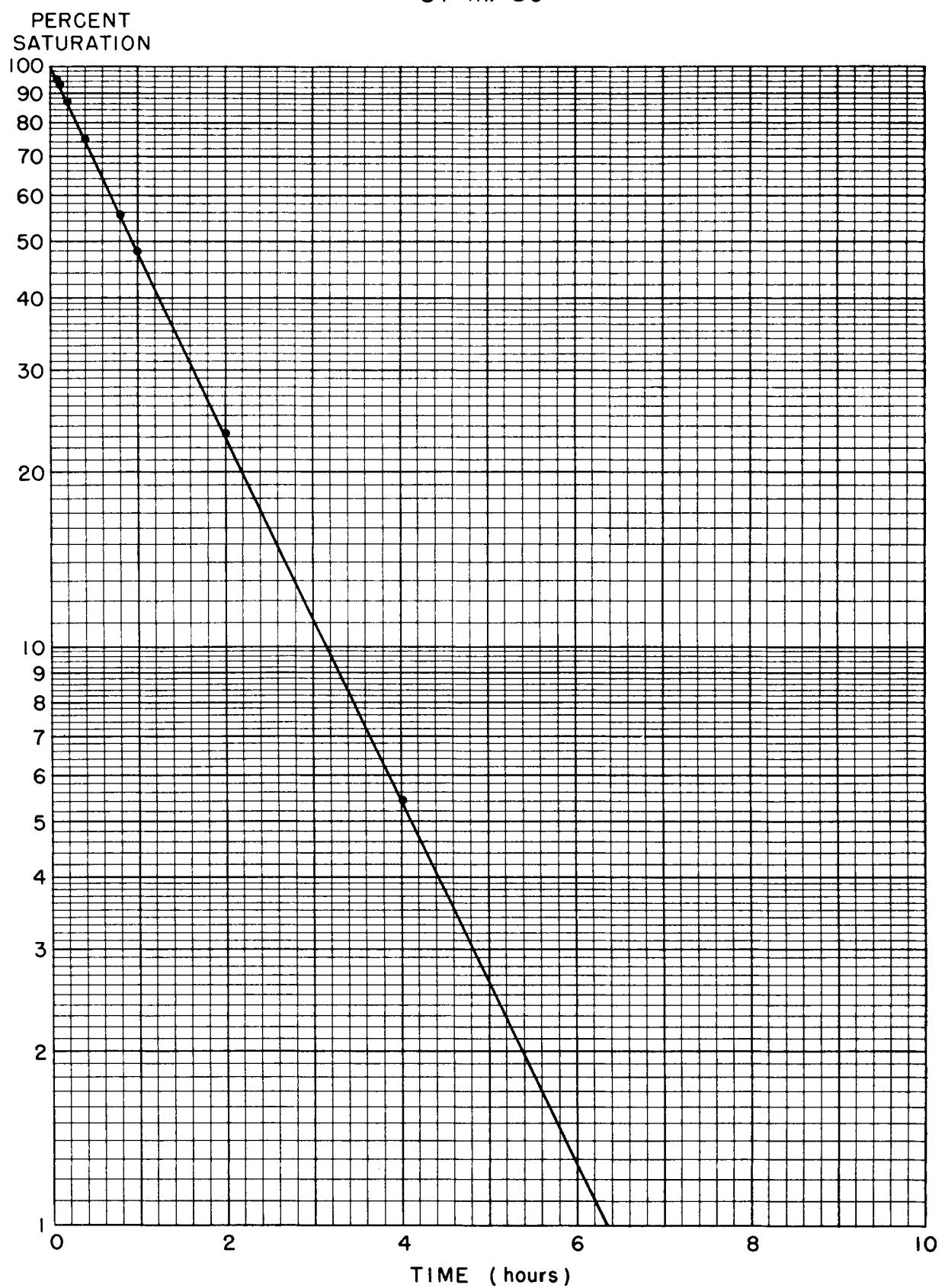


2.1 h. Ge⁷⁸

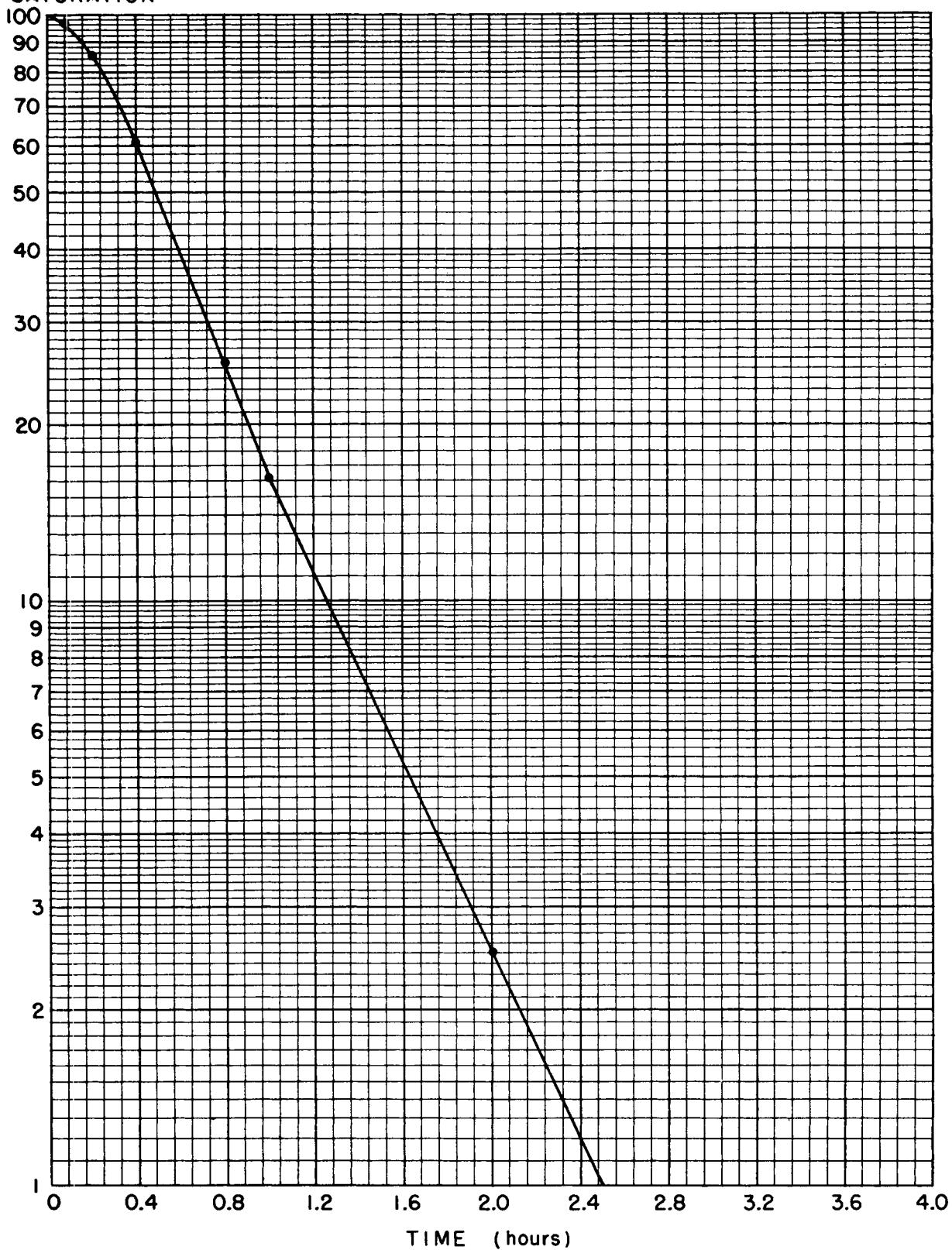


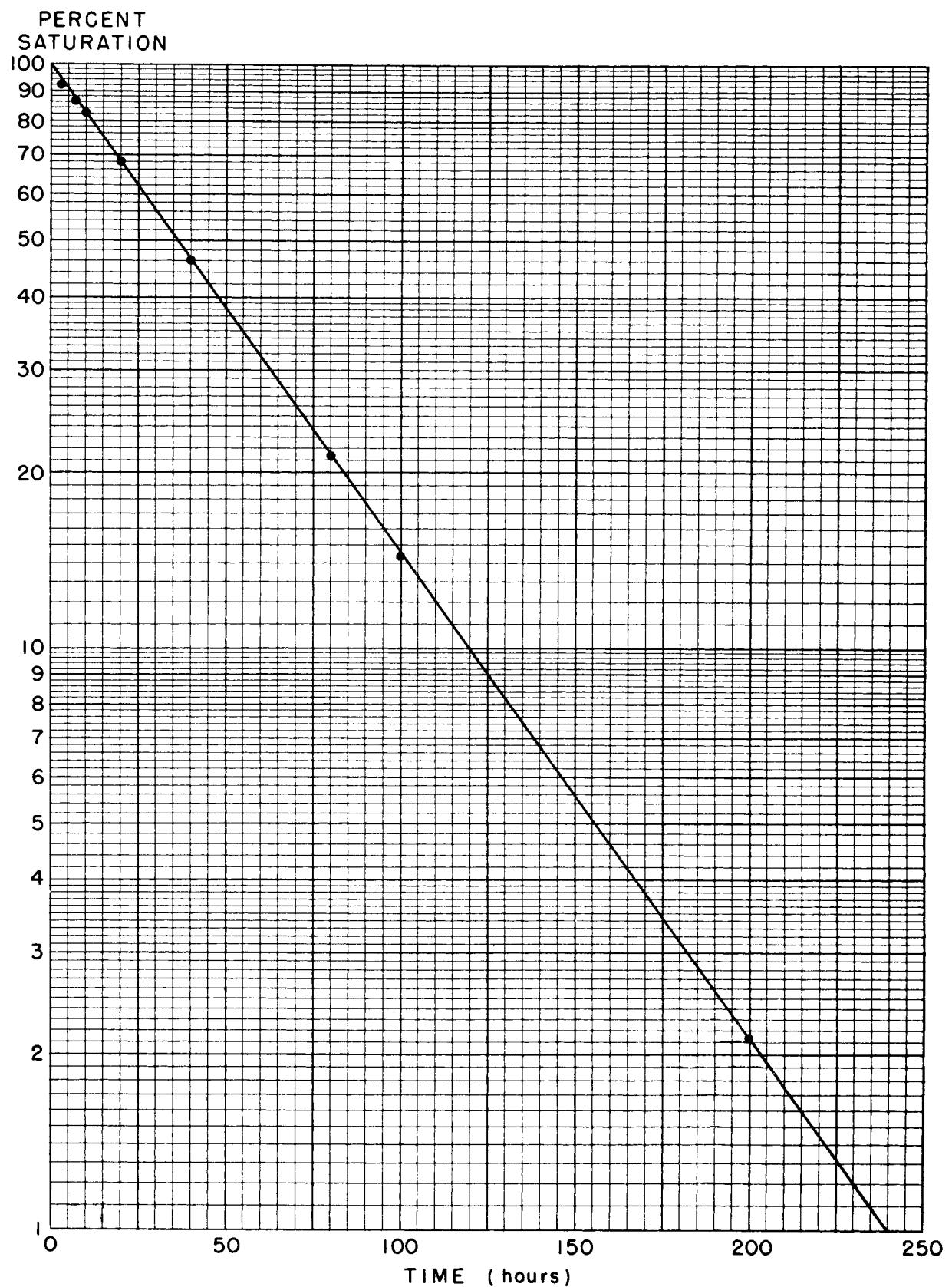


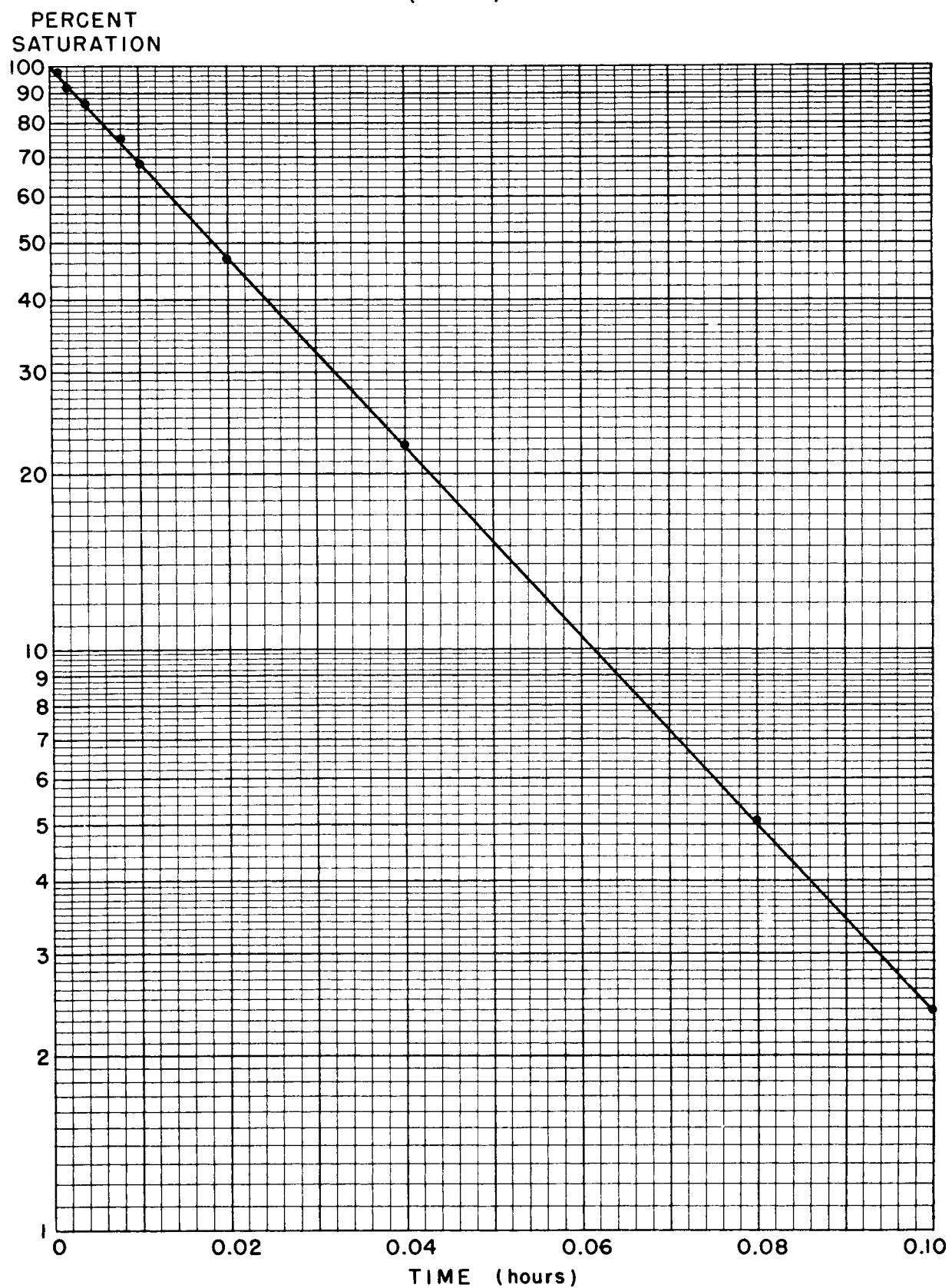




PERCENT
SATURATION

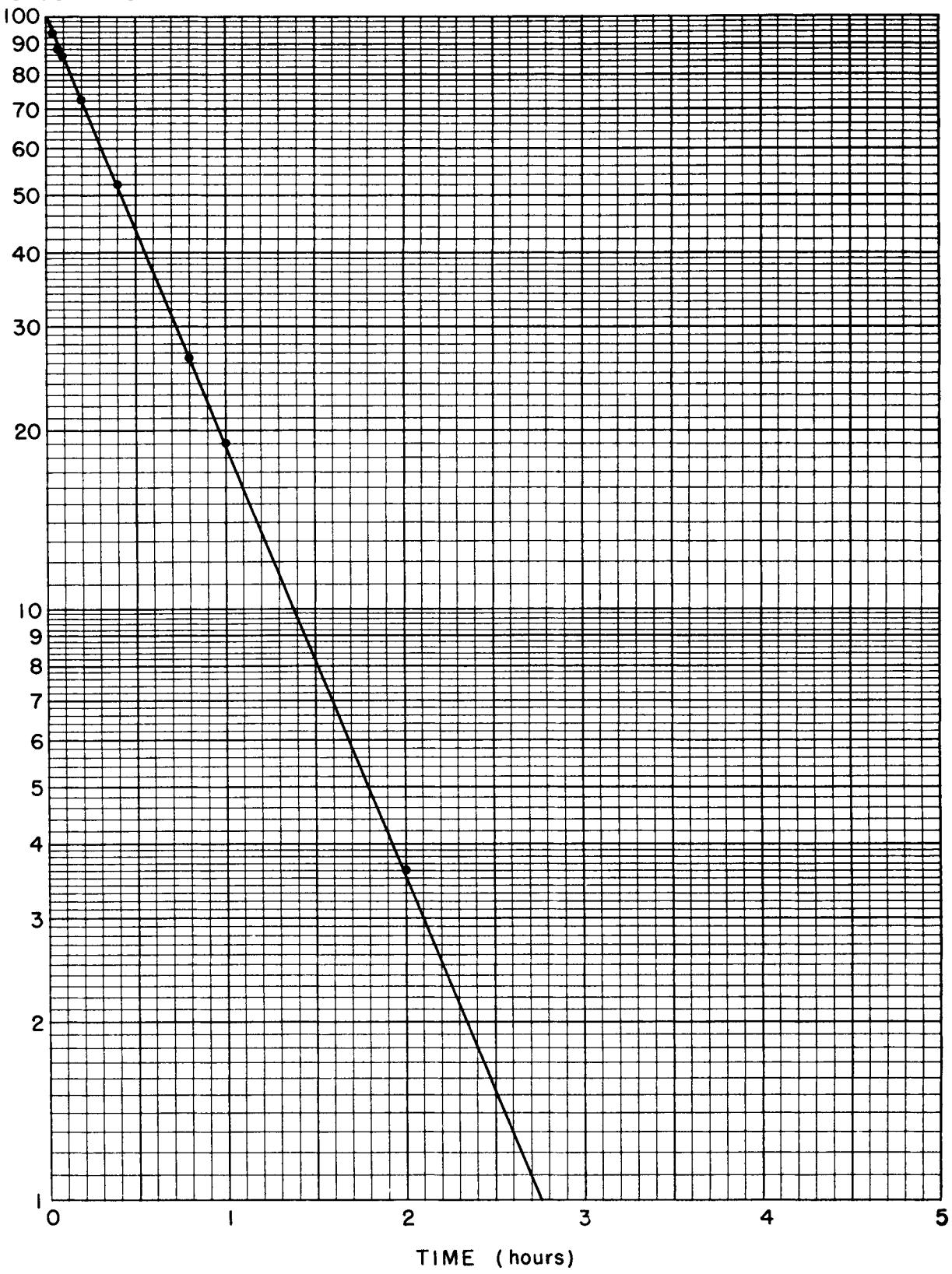


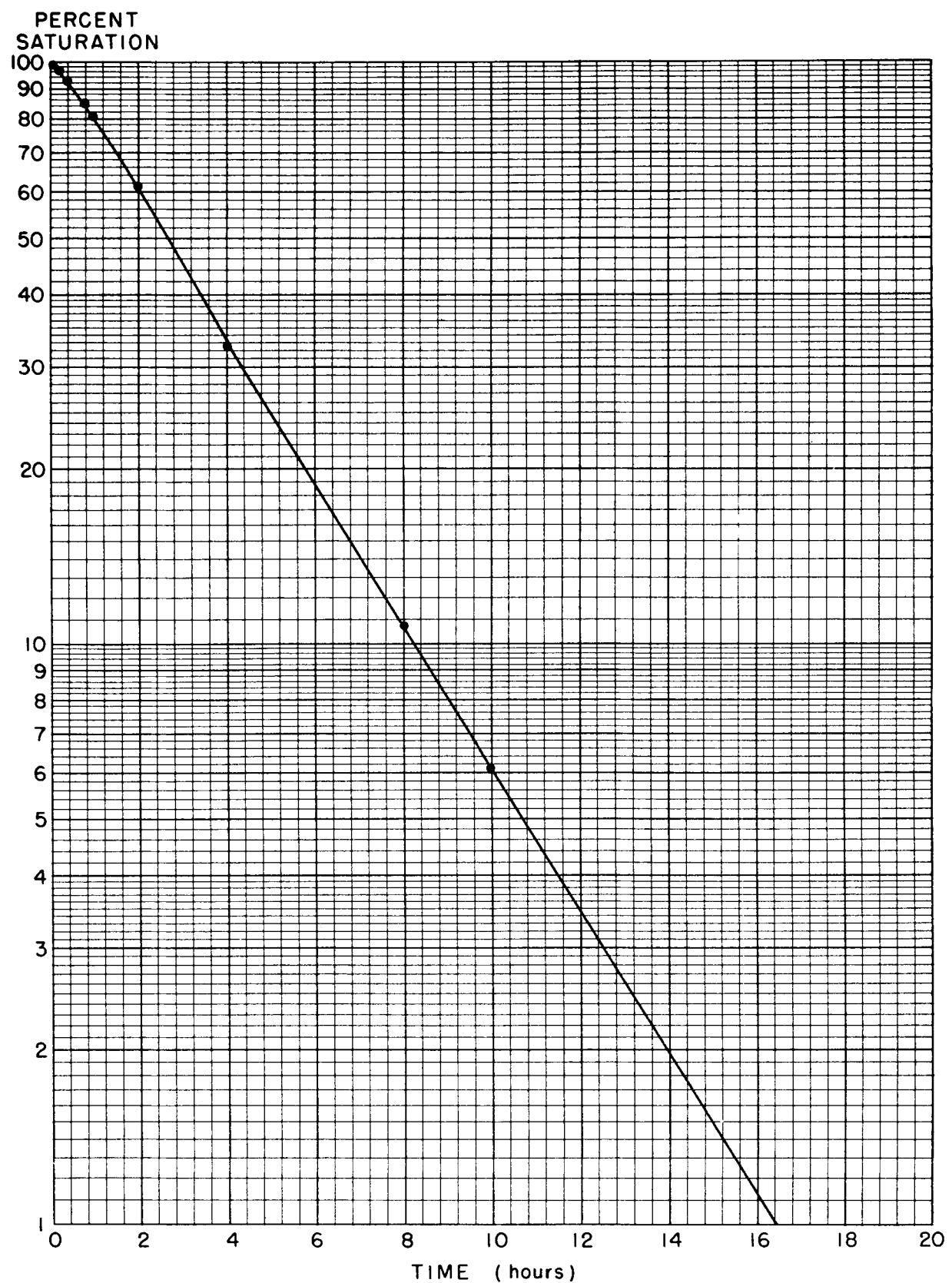
36.0 h. Br⁸²



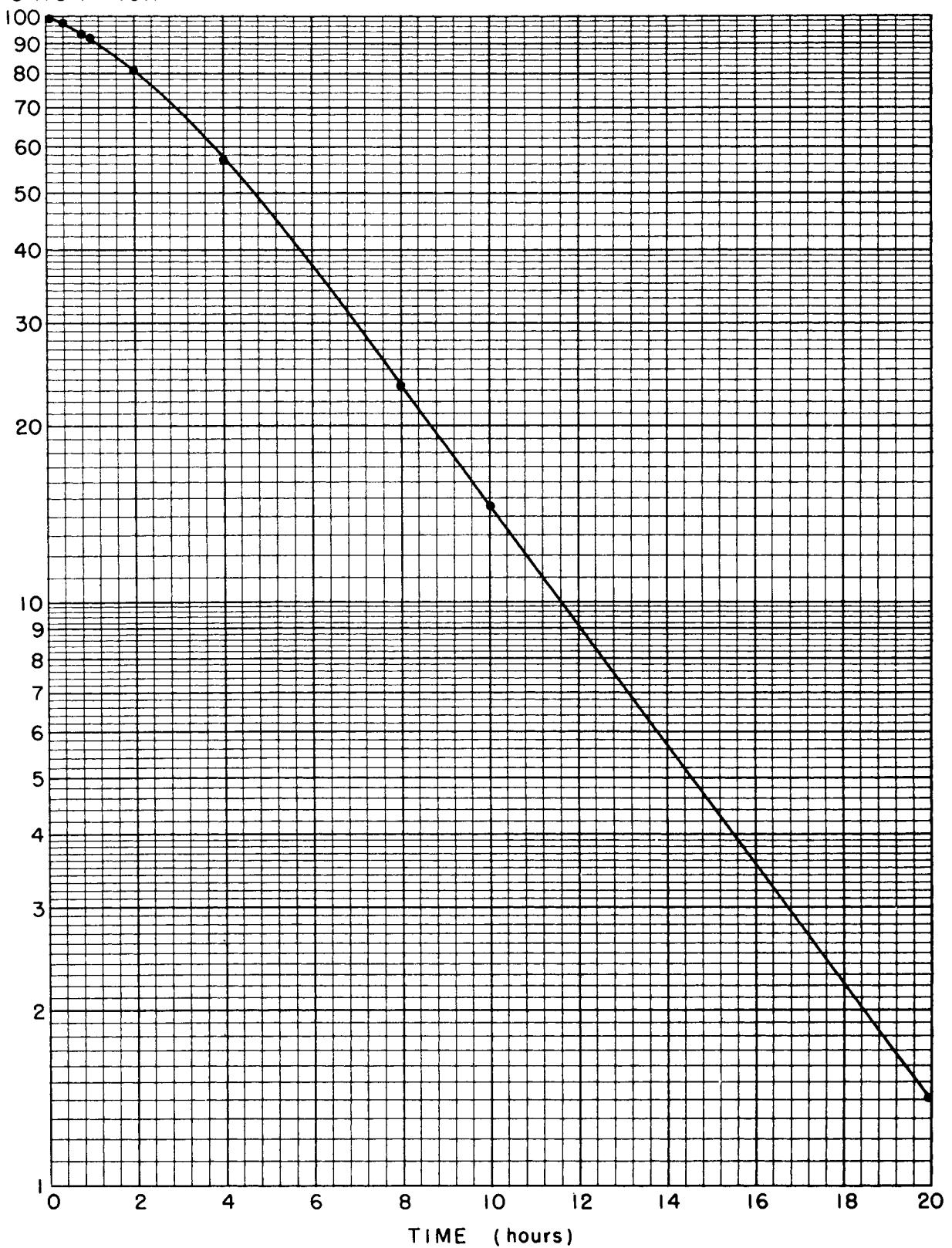
25 m. Se^{83}

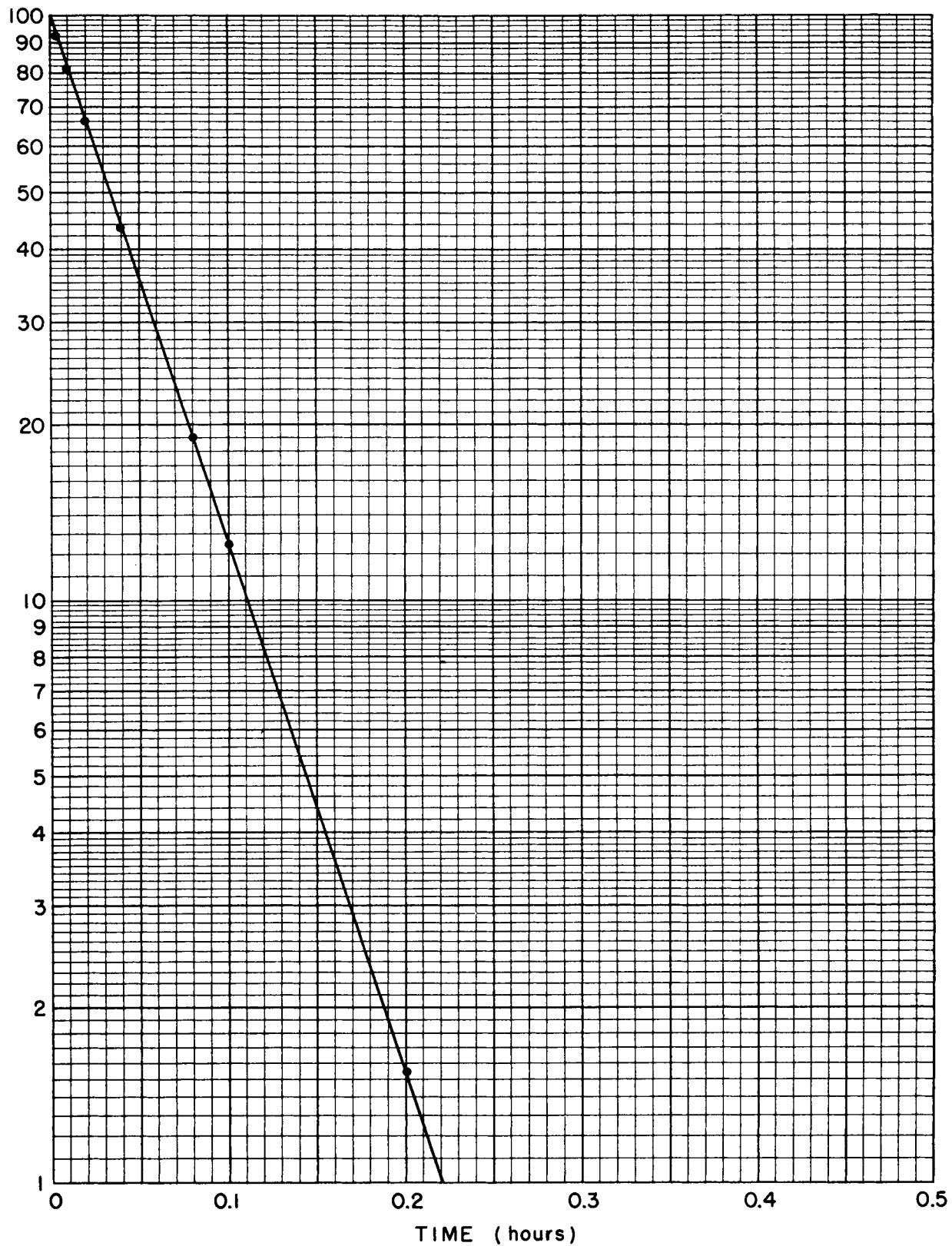
PERCENT
SATURATION



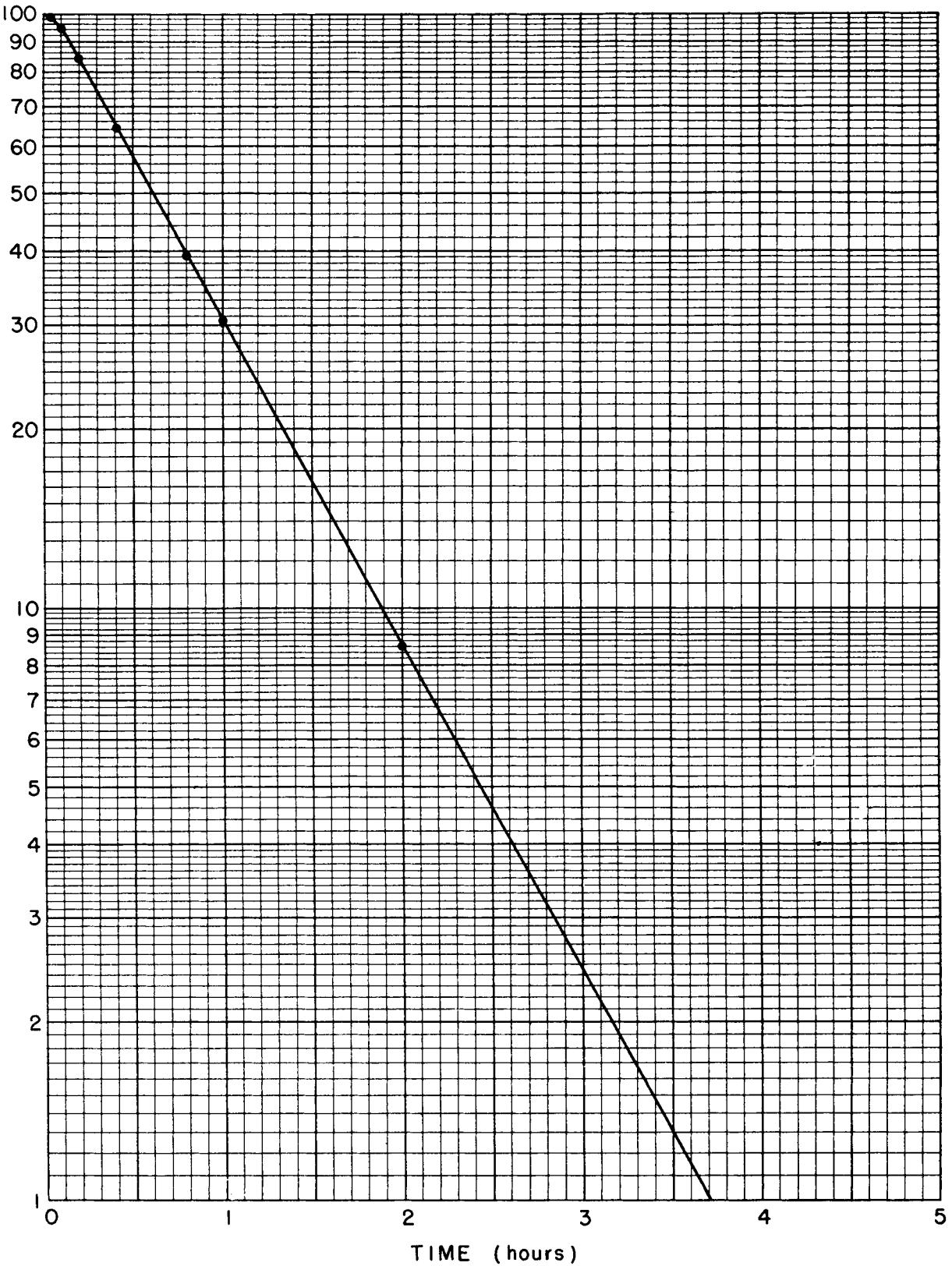


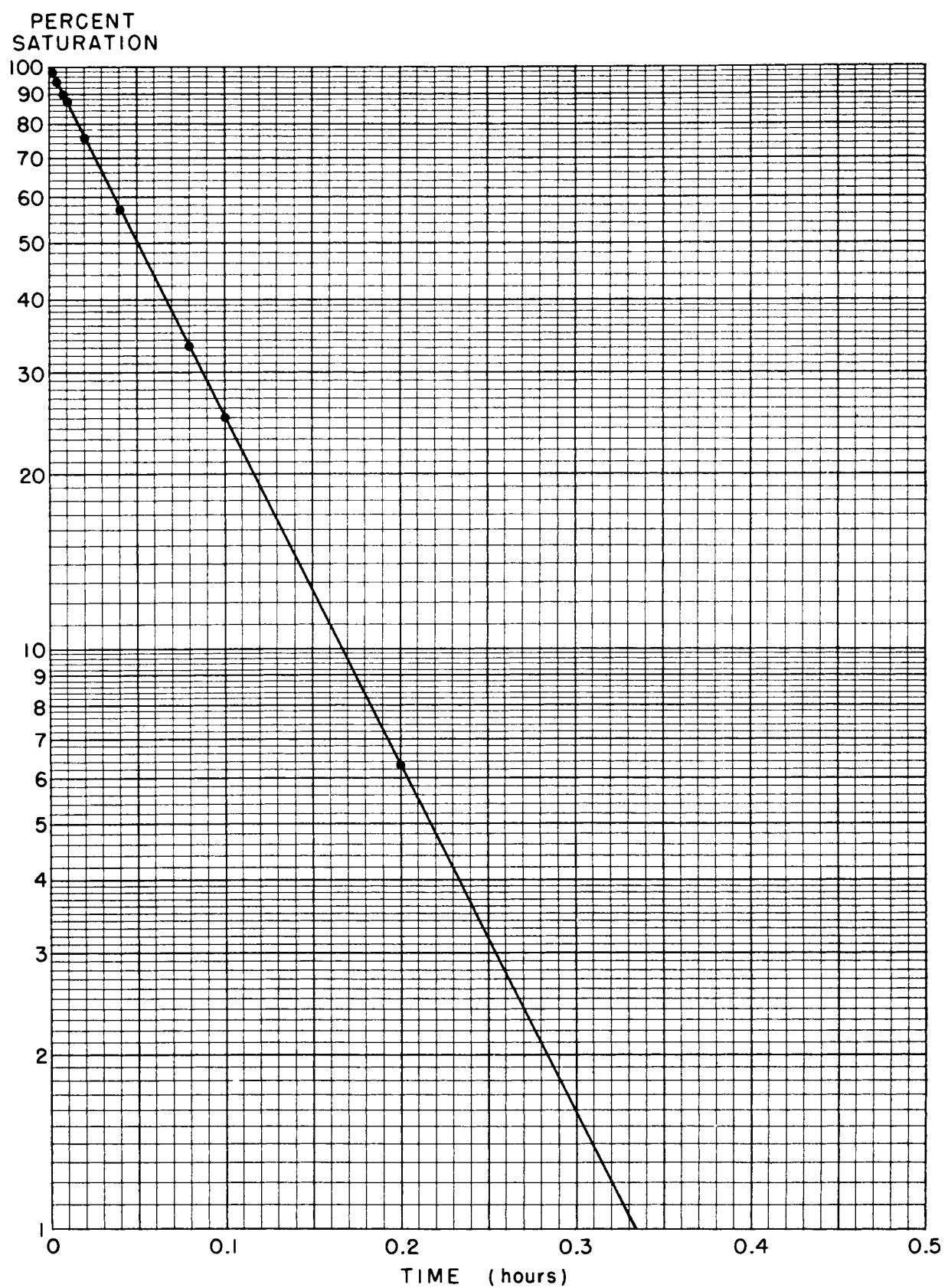
102

108 m. Kr⁸³PERCENT
SATURATION

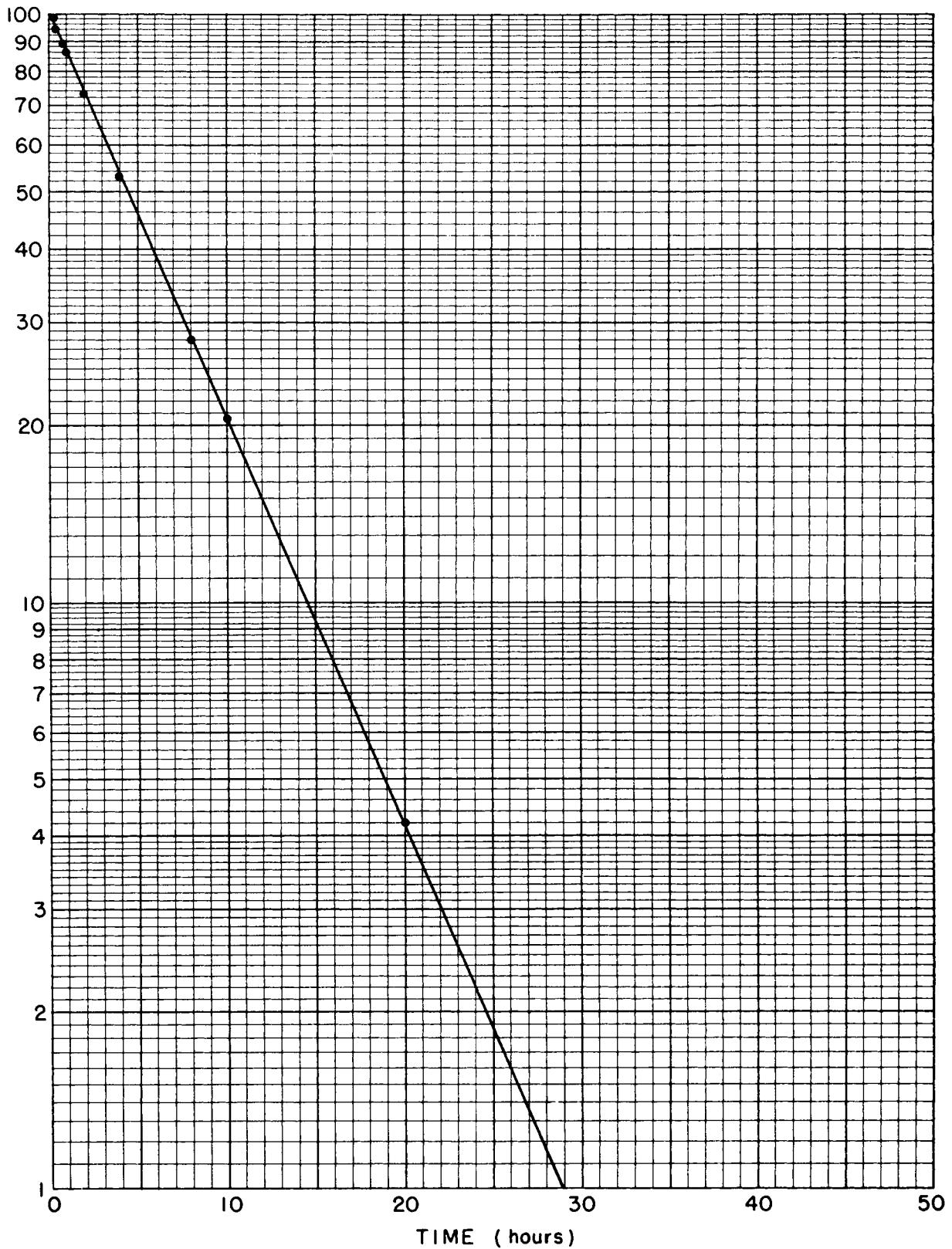
PERCENT
SATURATION

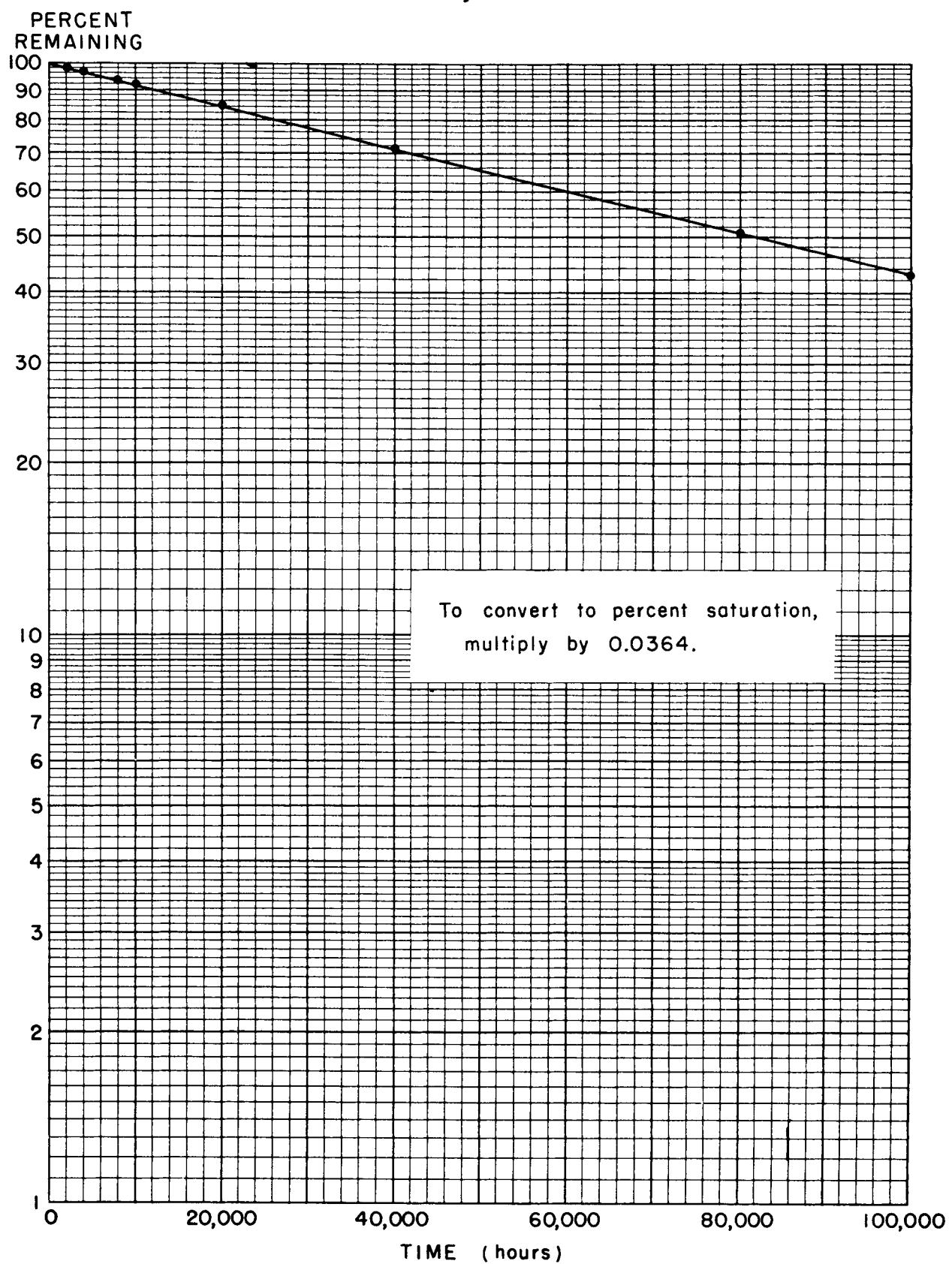
104

33 m. Br⁸⁴PERCENT
SATURATION

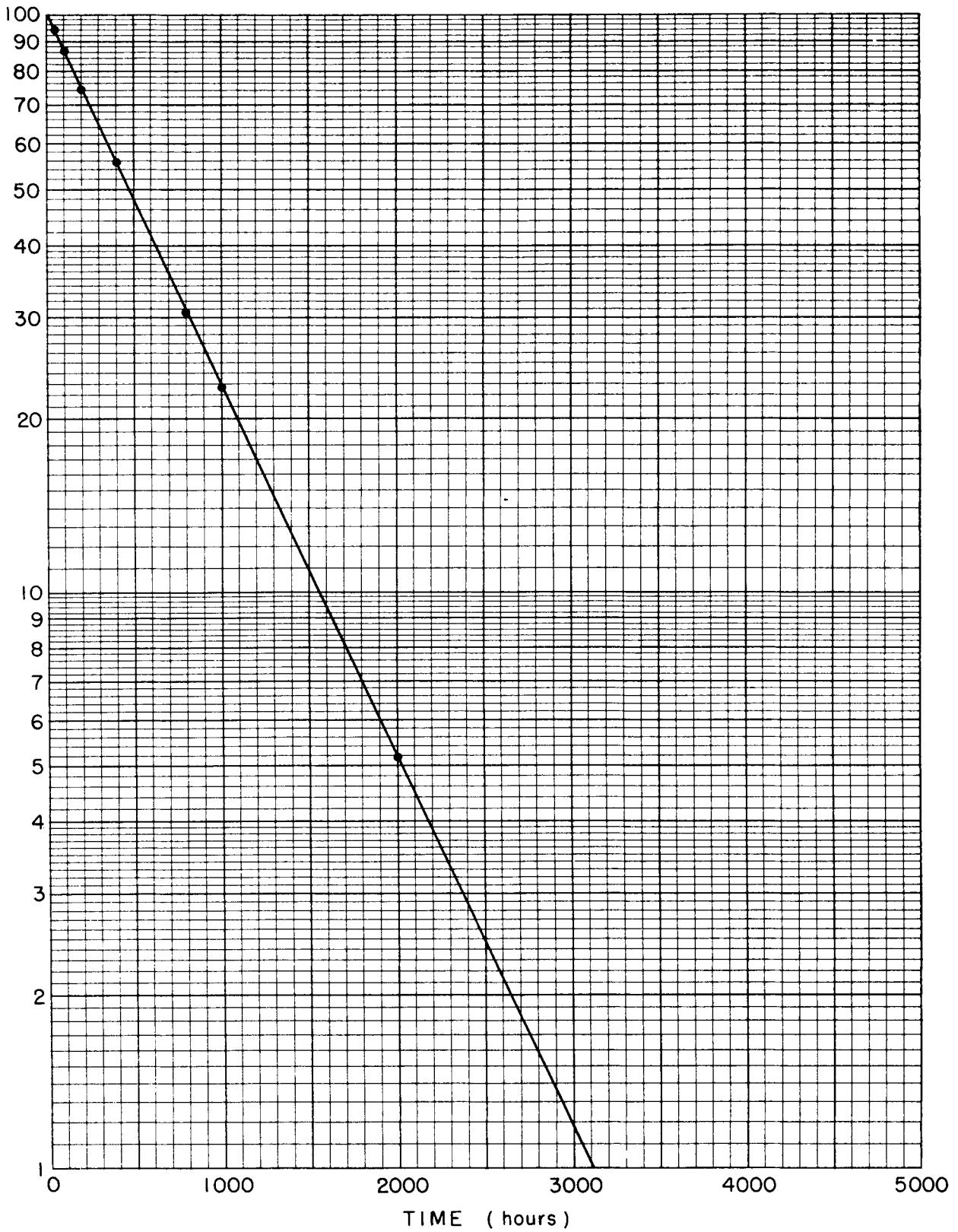


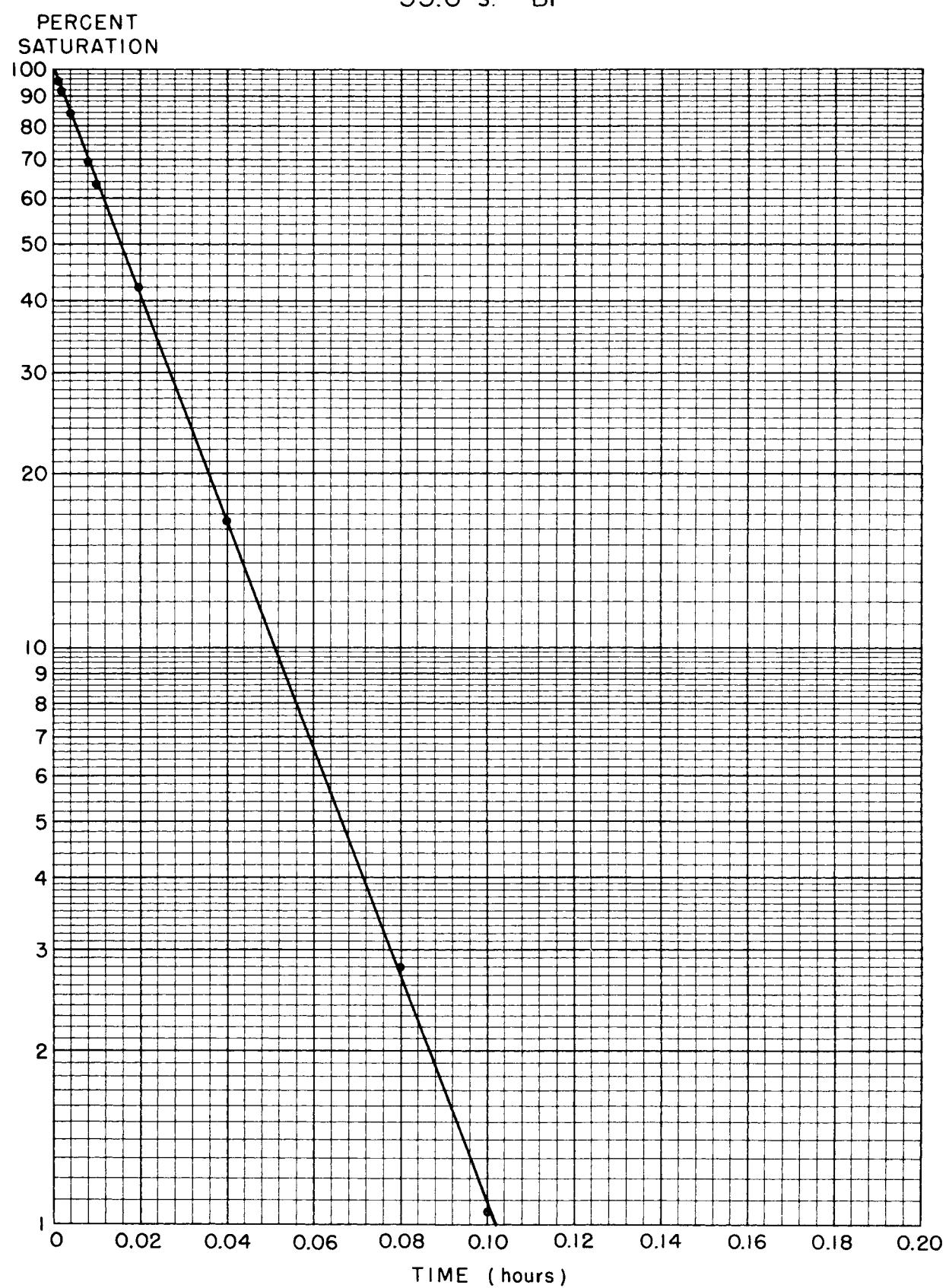
106

4.36 h. Kr^{85} PERCENT
SATURATION

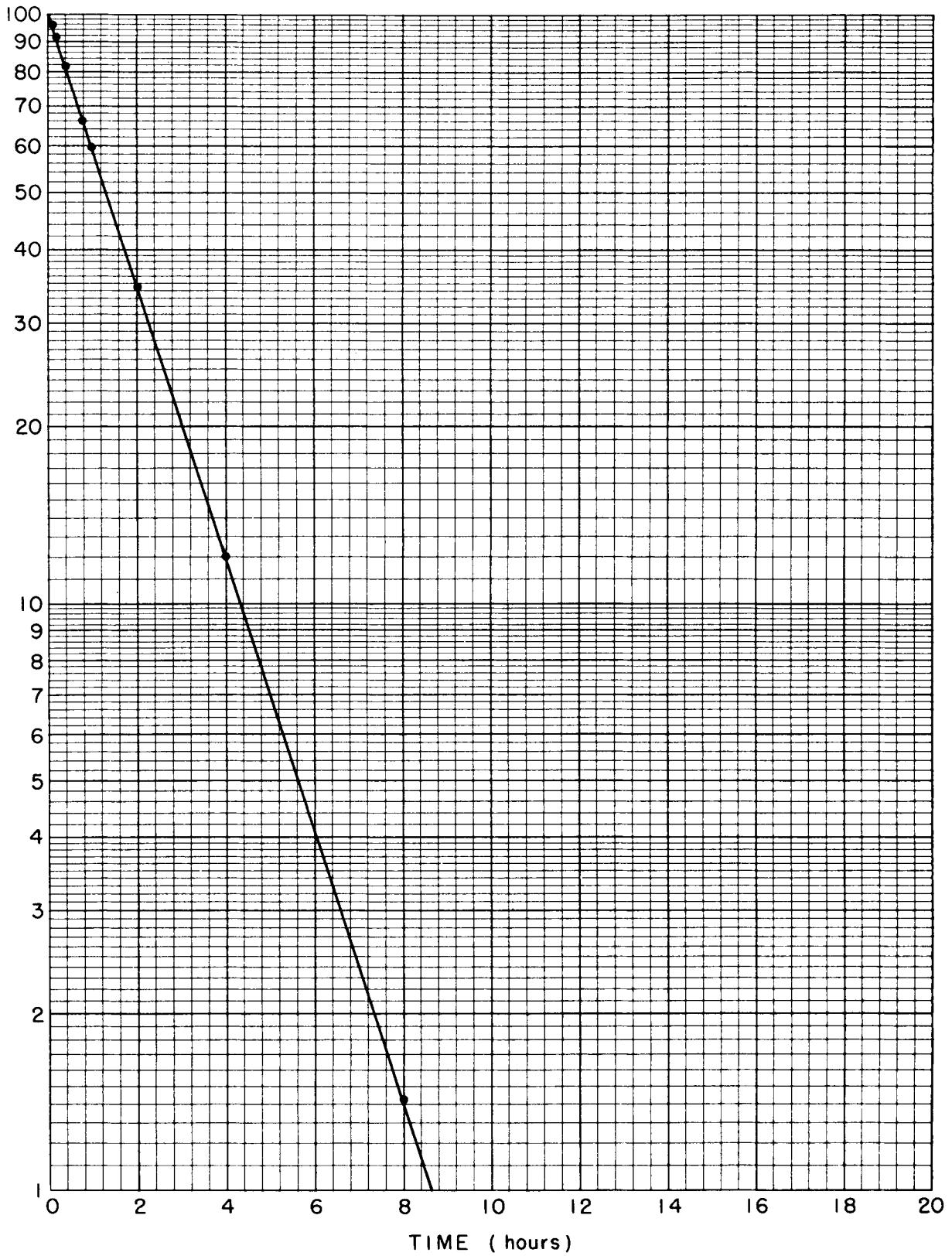


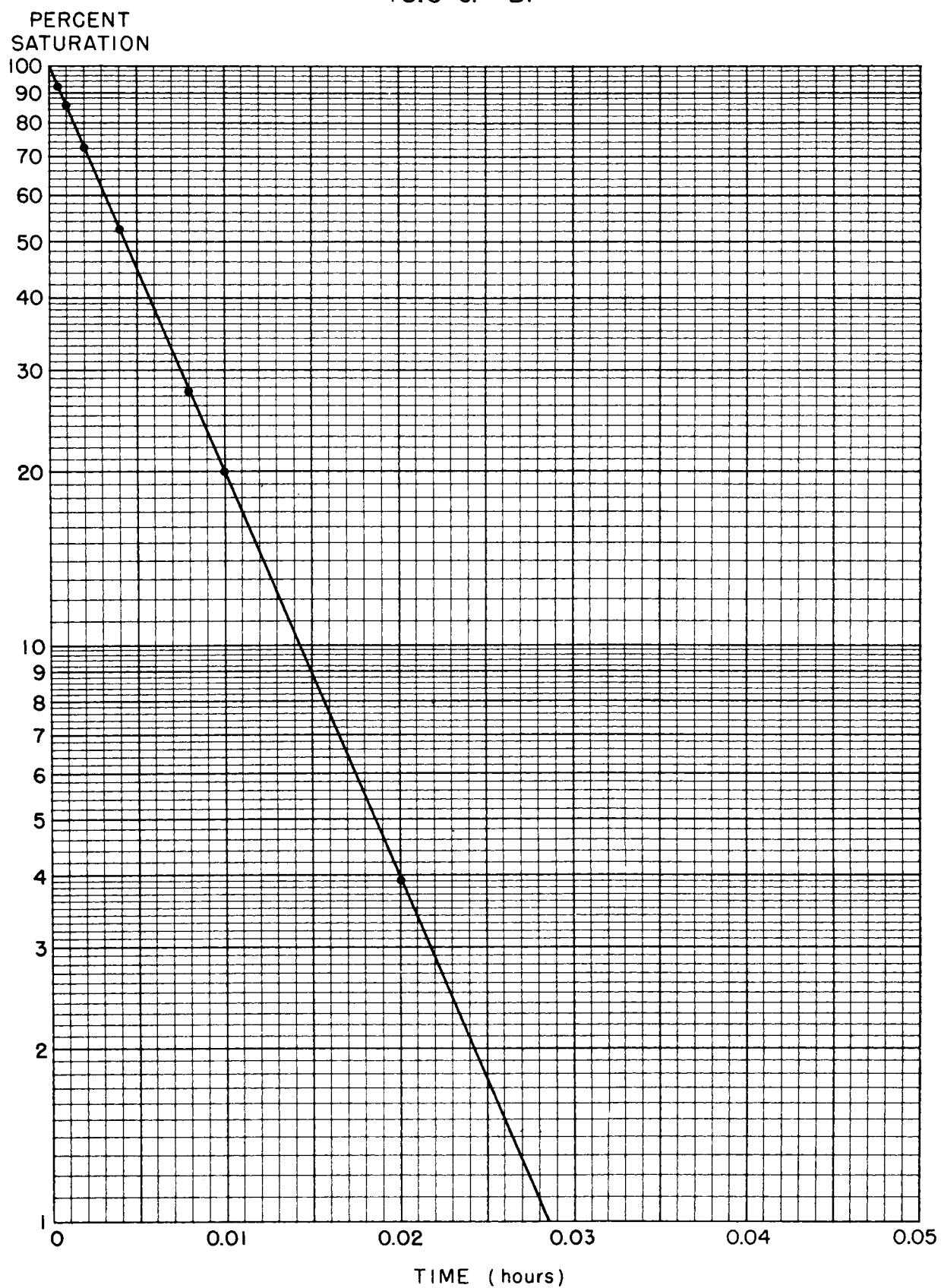
108

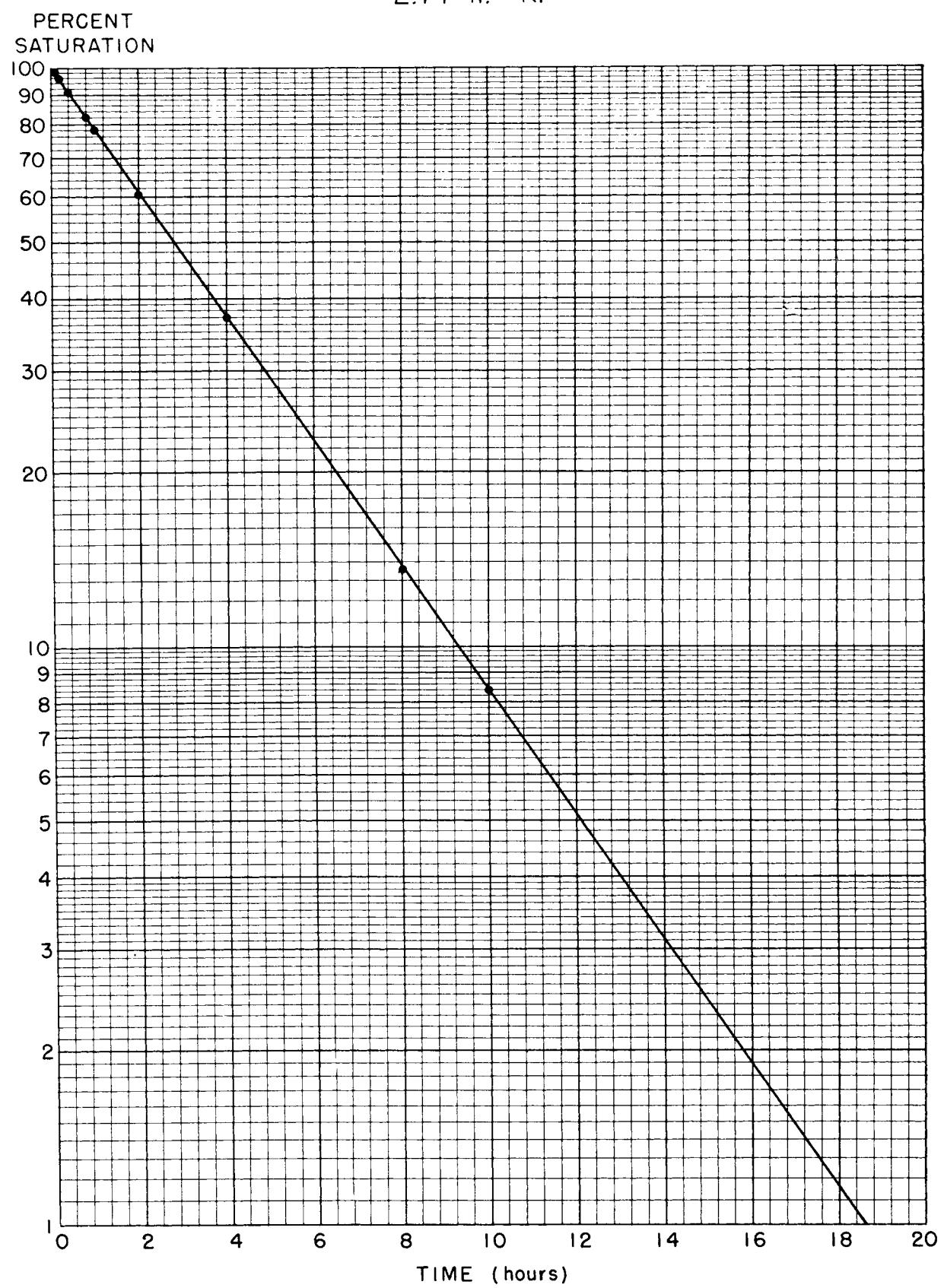
19.5 d. Rb⁸⁶PERCENT
SATURATION

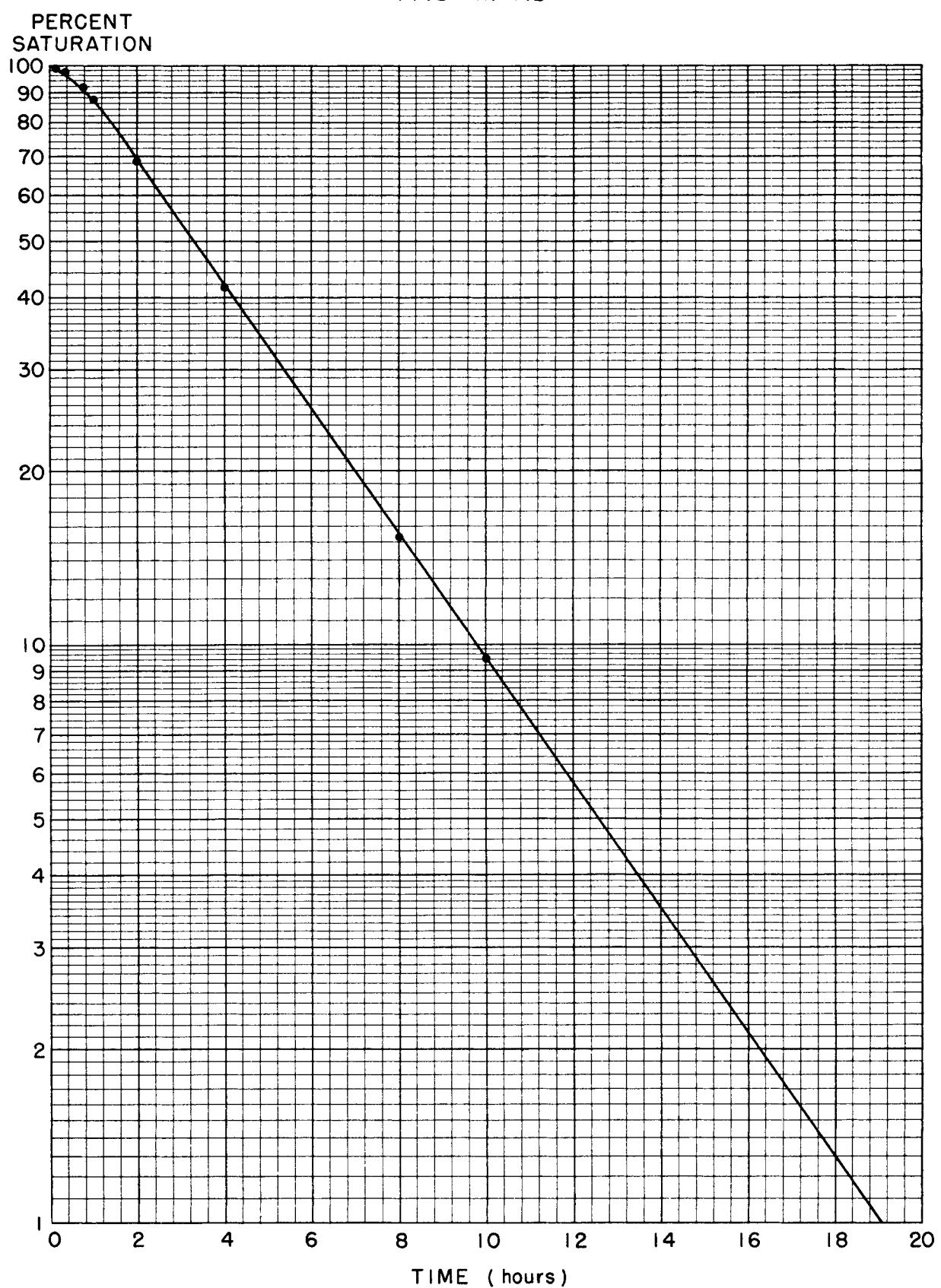


110

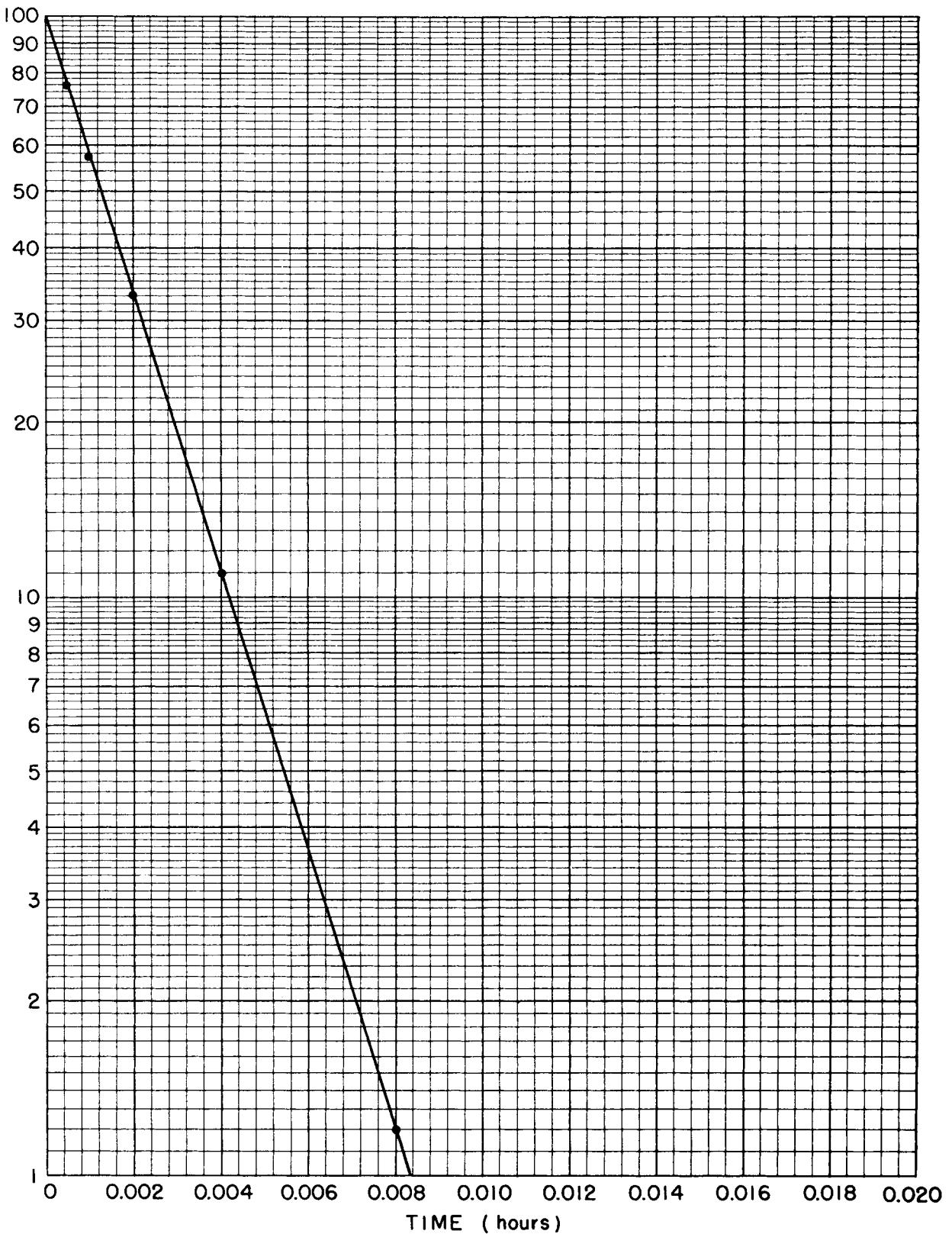
78 m. Kr⁸⁷PERCENT
SATURATION

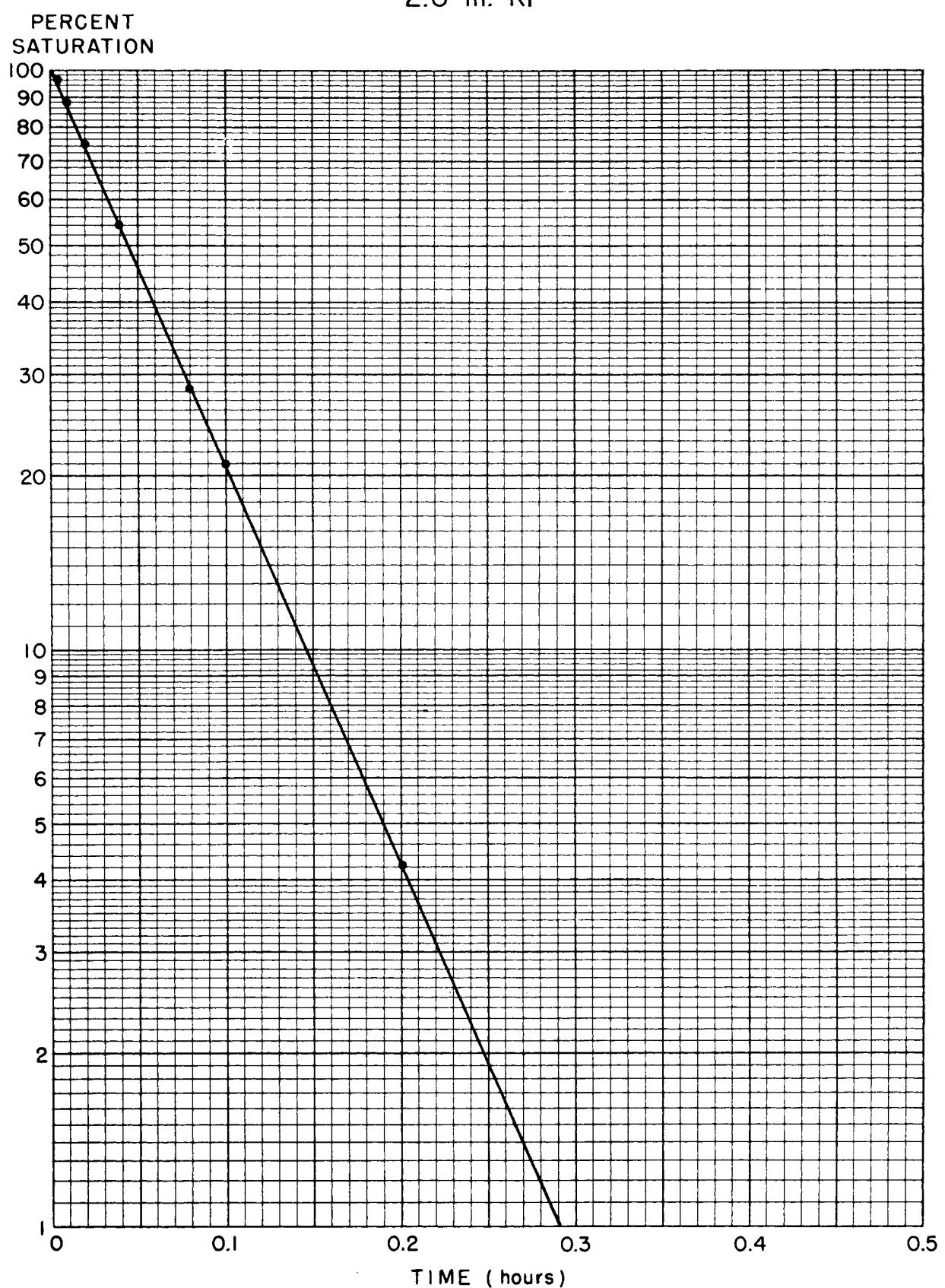


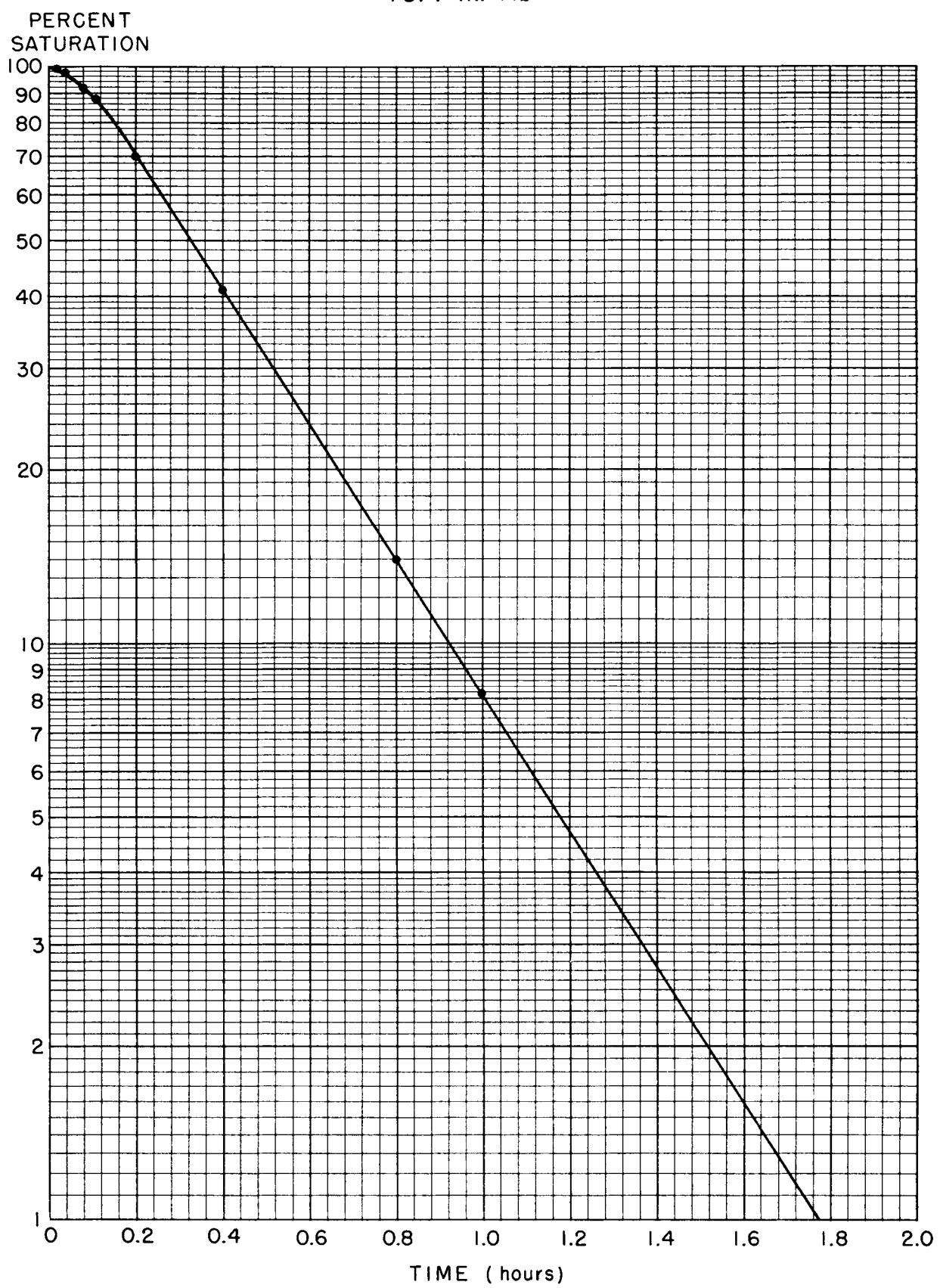


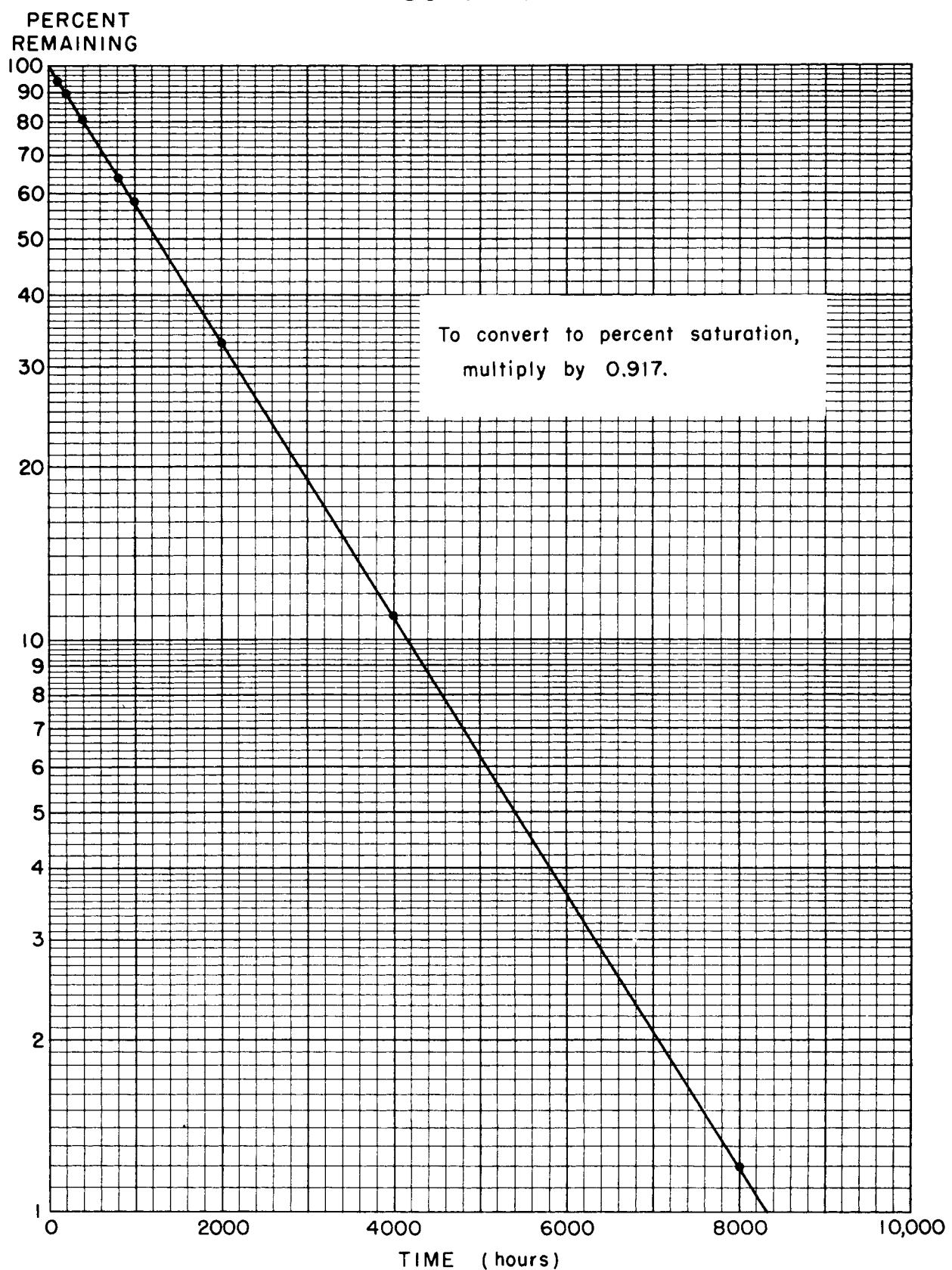


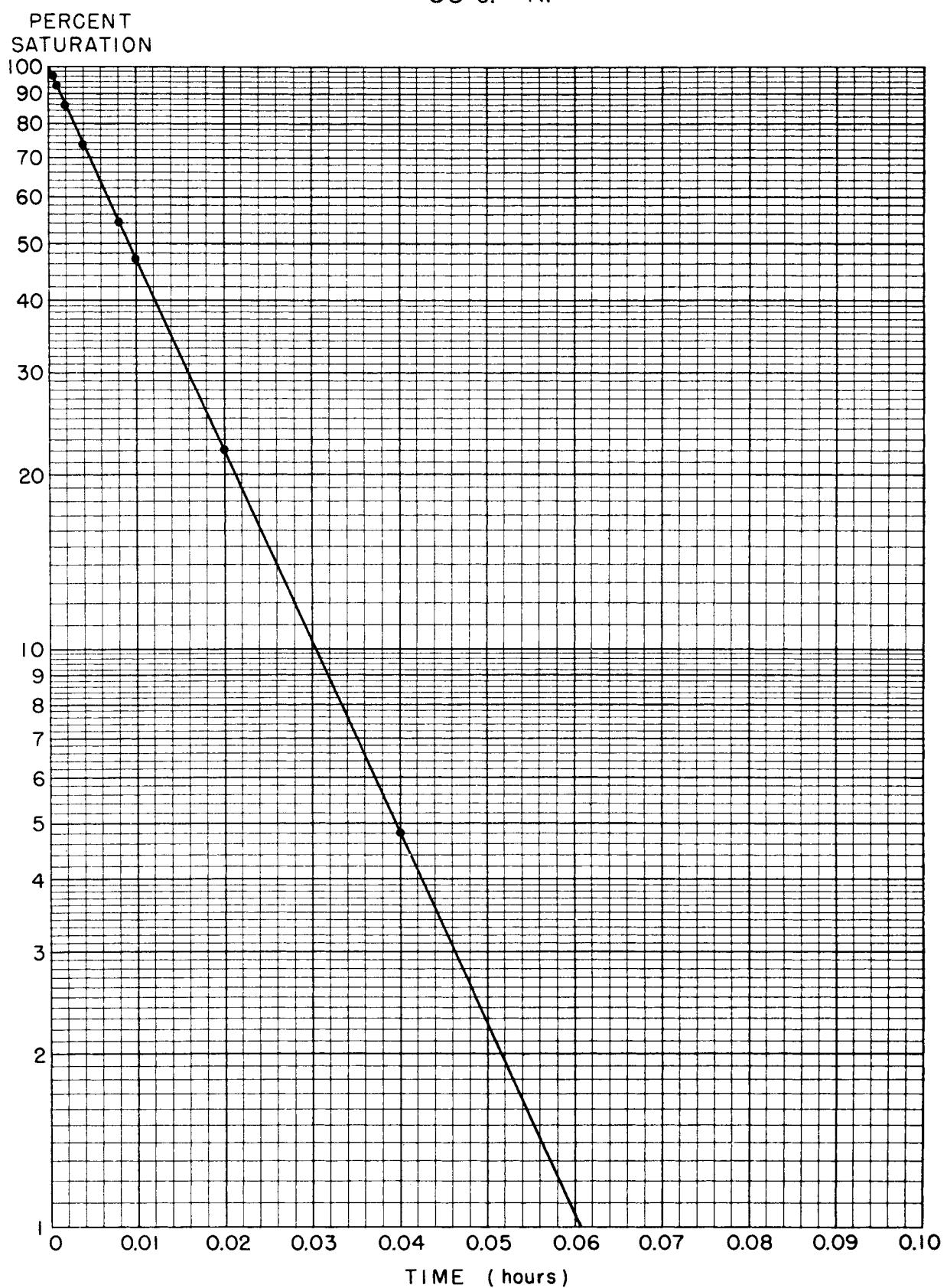
PERCENT
SATURATION

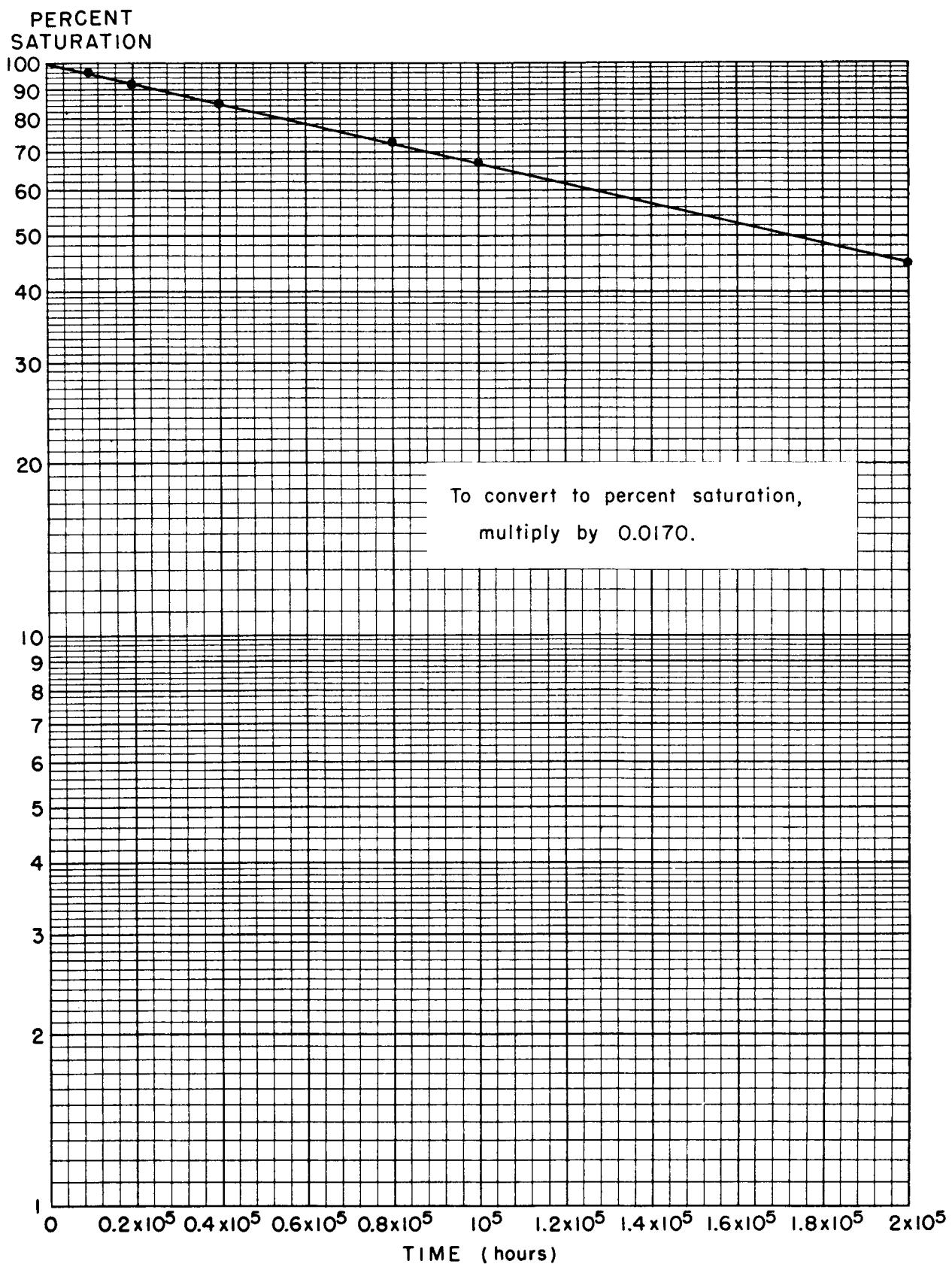




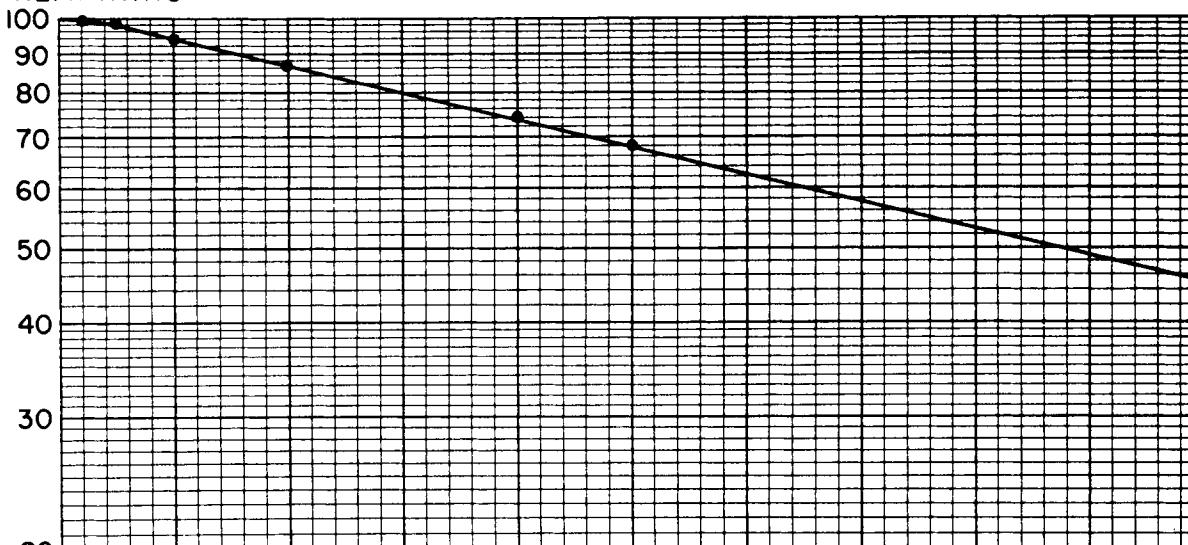




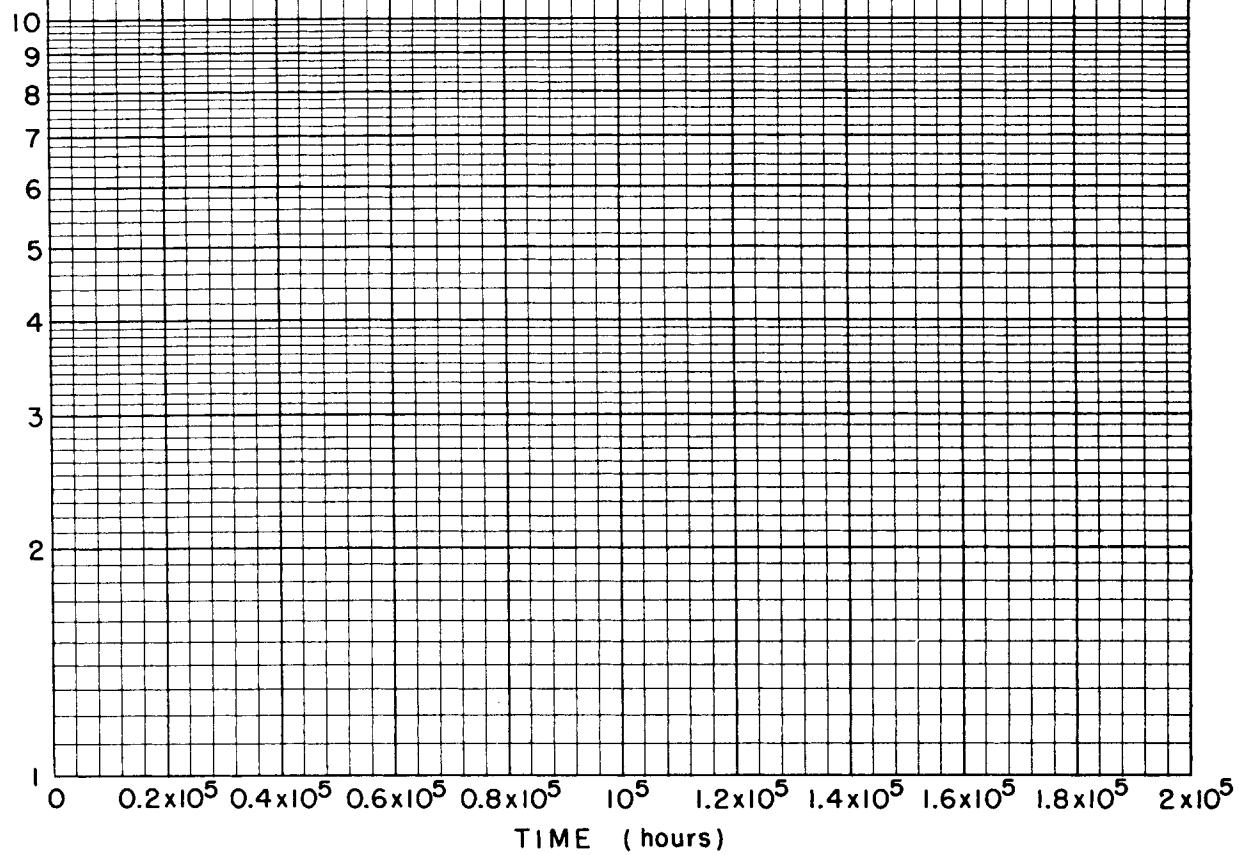
~ 33 s. Kr^{90} 

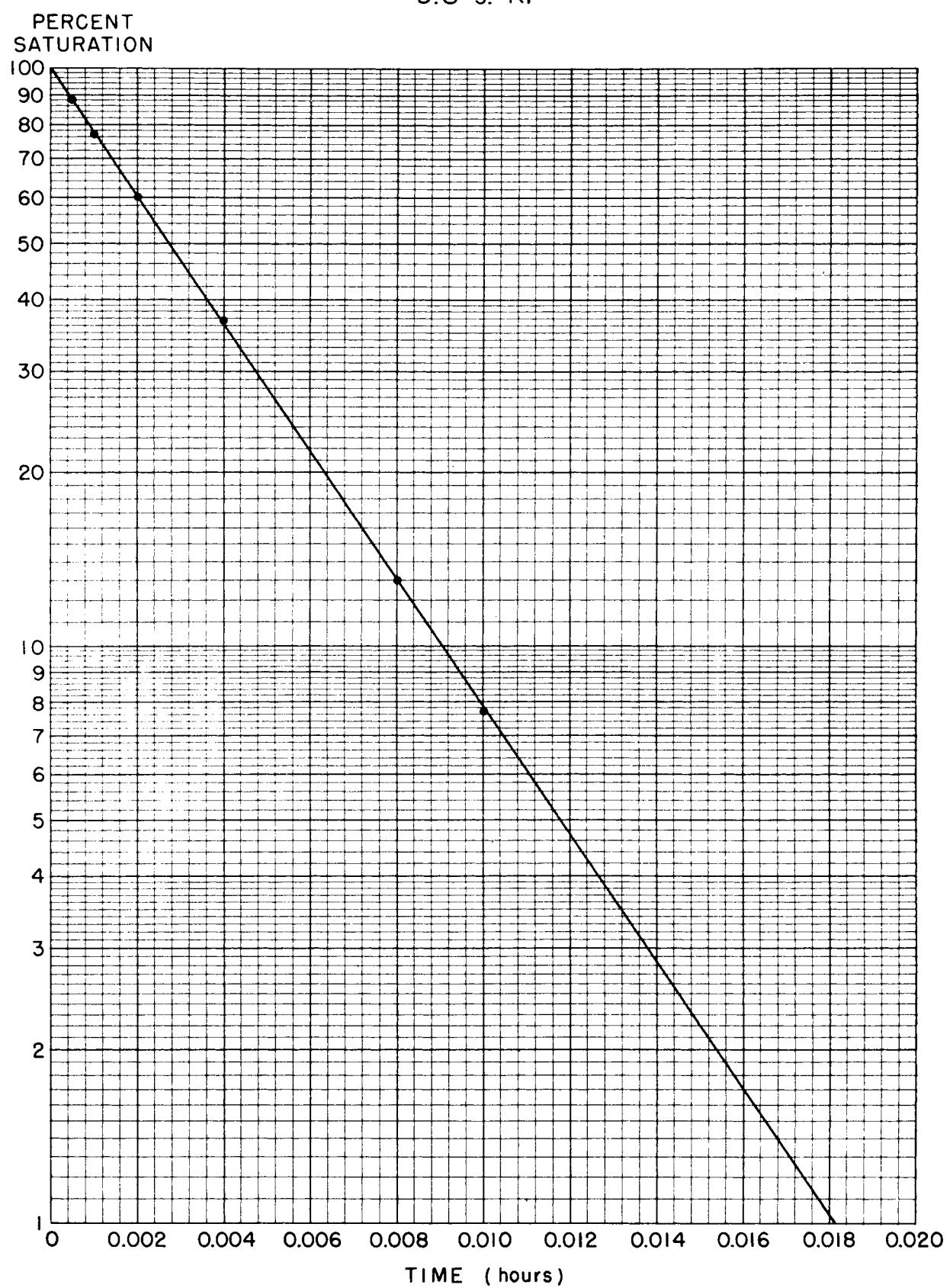


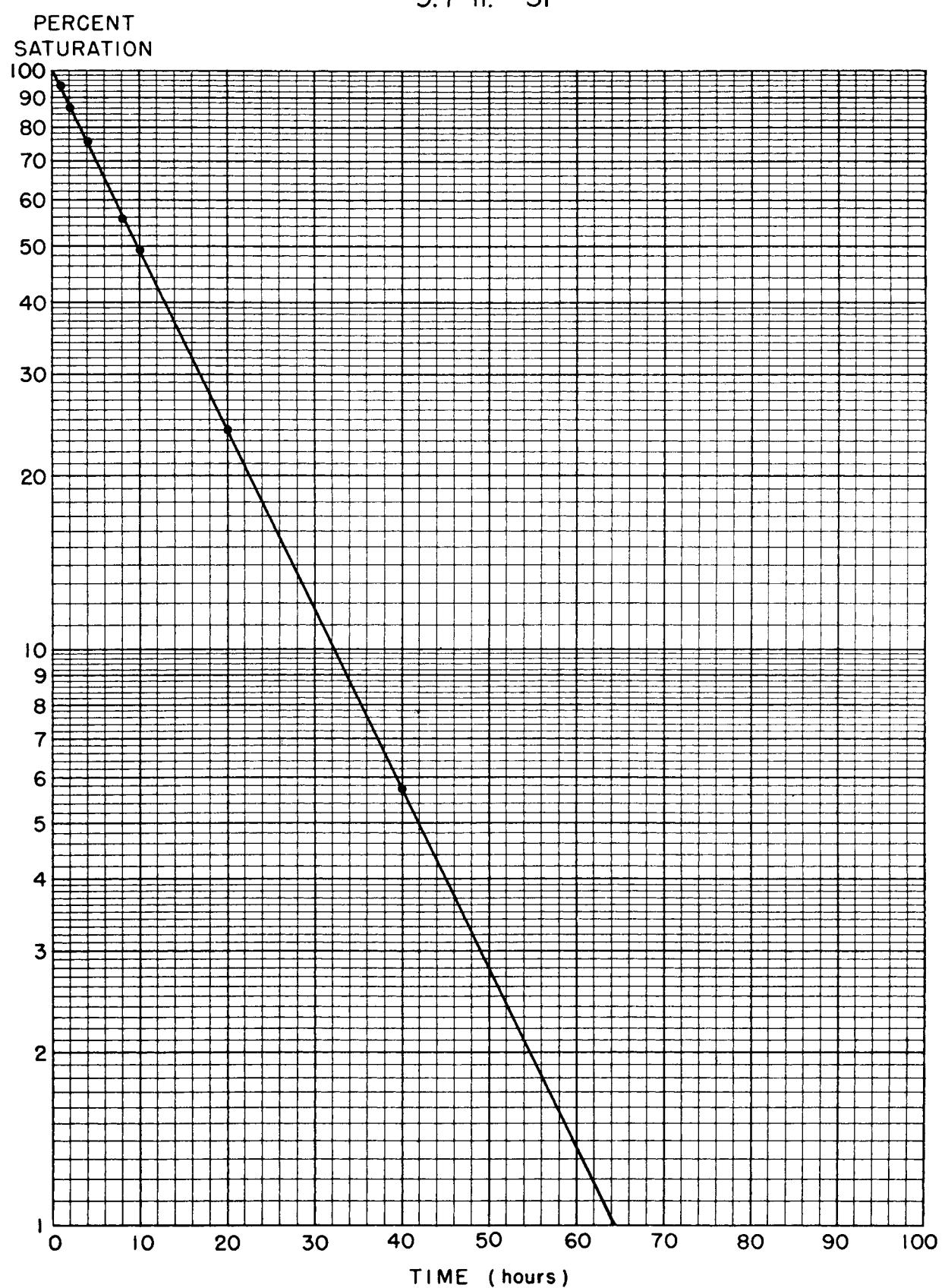
120

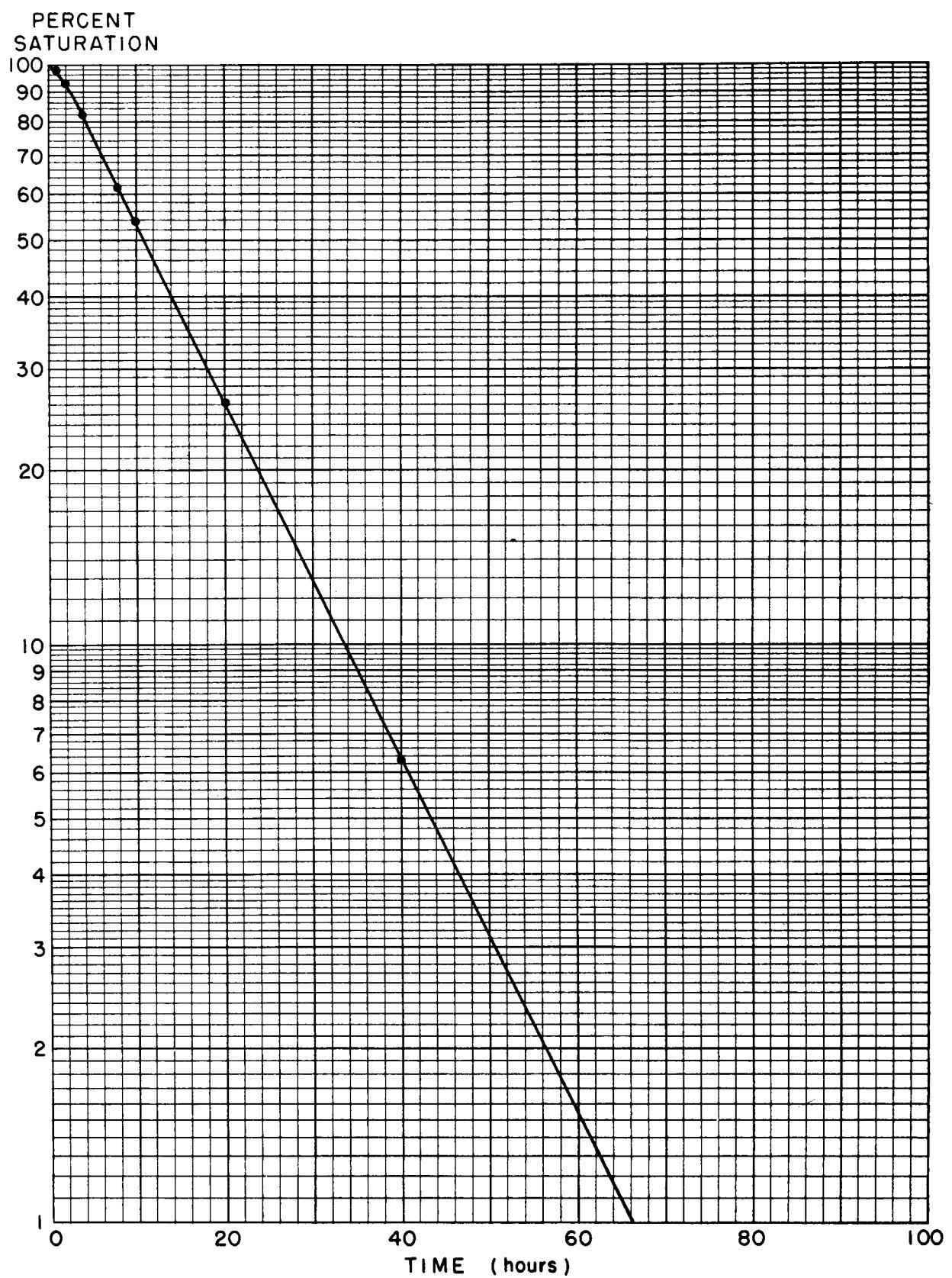
61 h. Y^{90} PERCENT
REMAINING

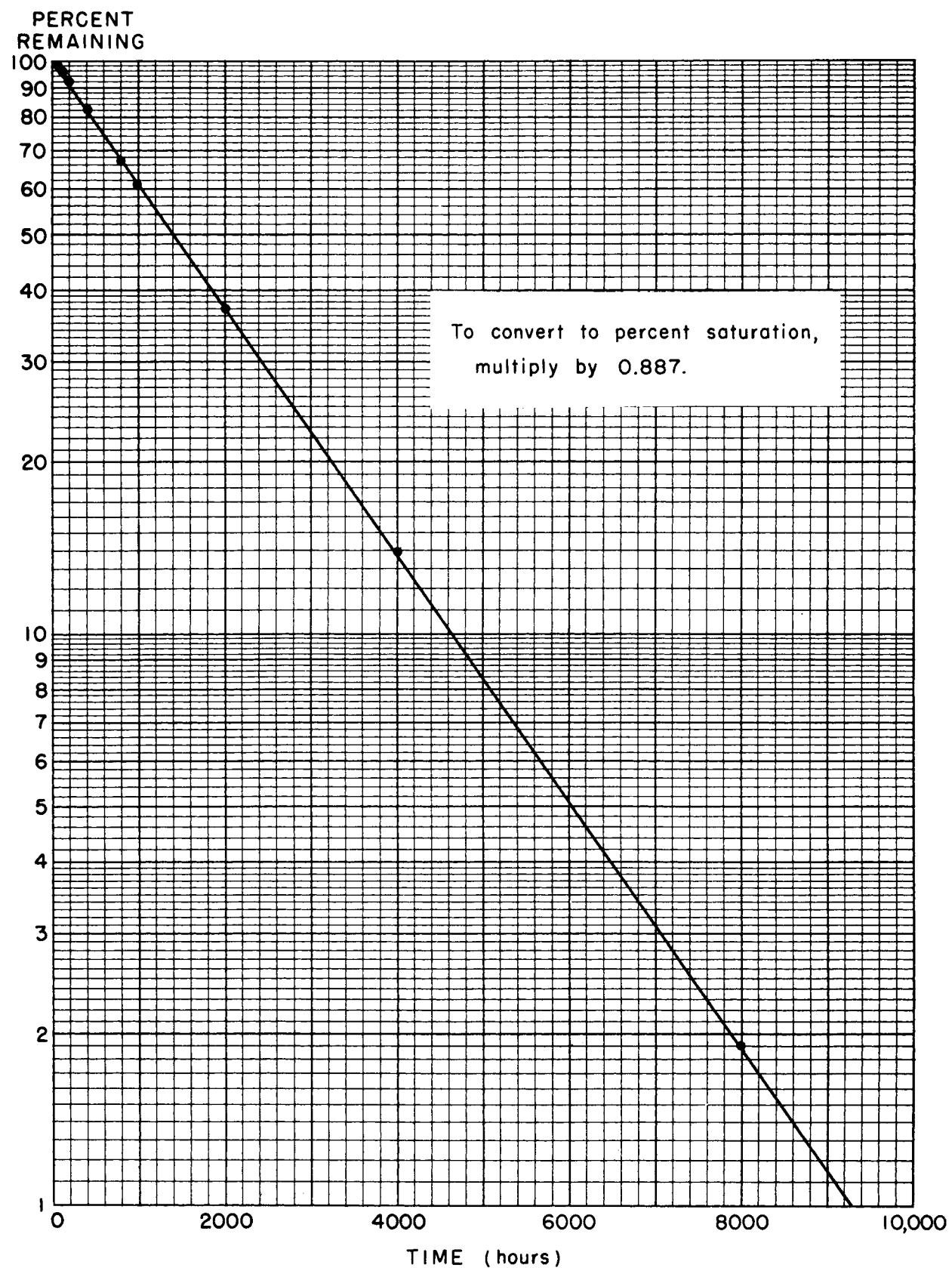
To convert to percent saturation,
multiply by 0.0167.



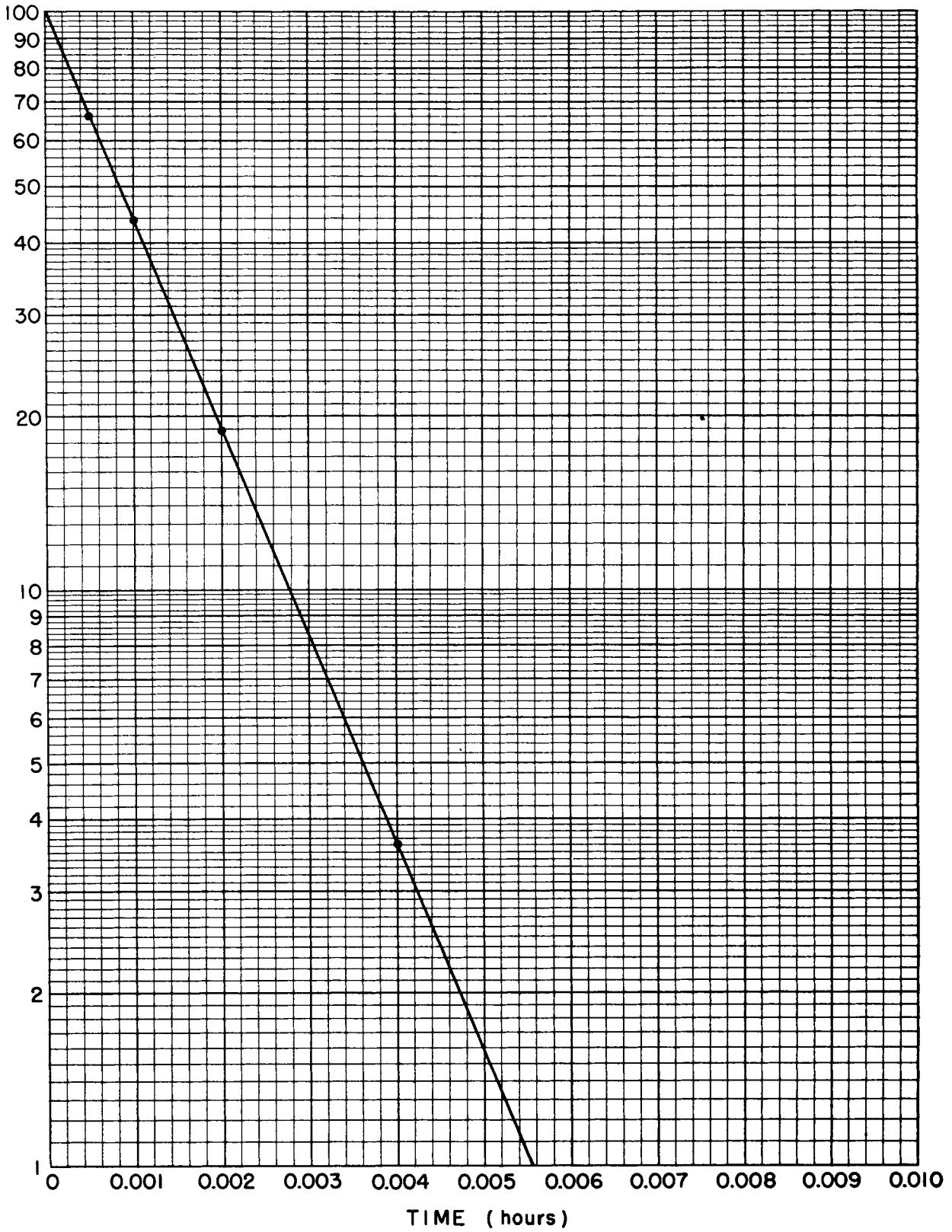


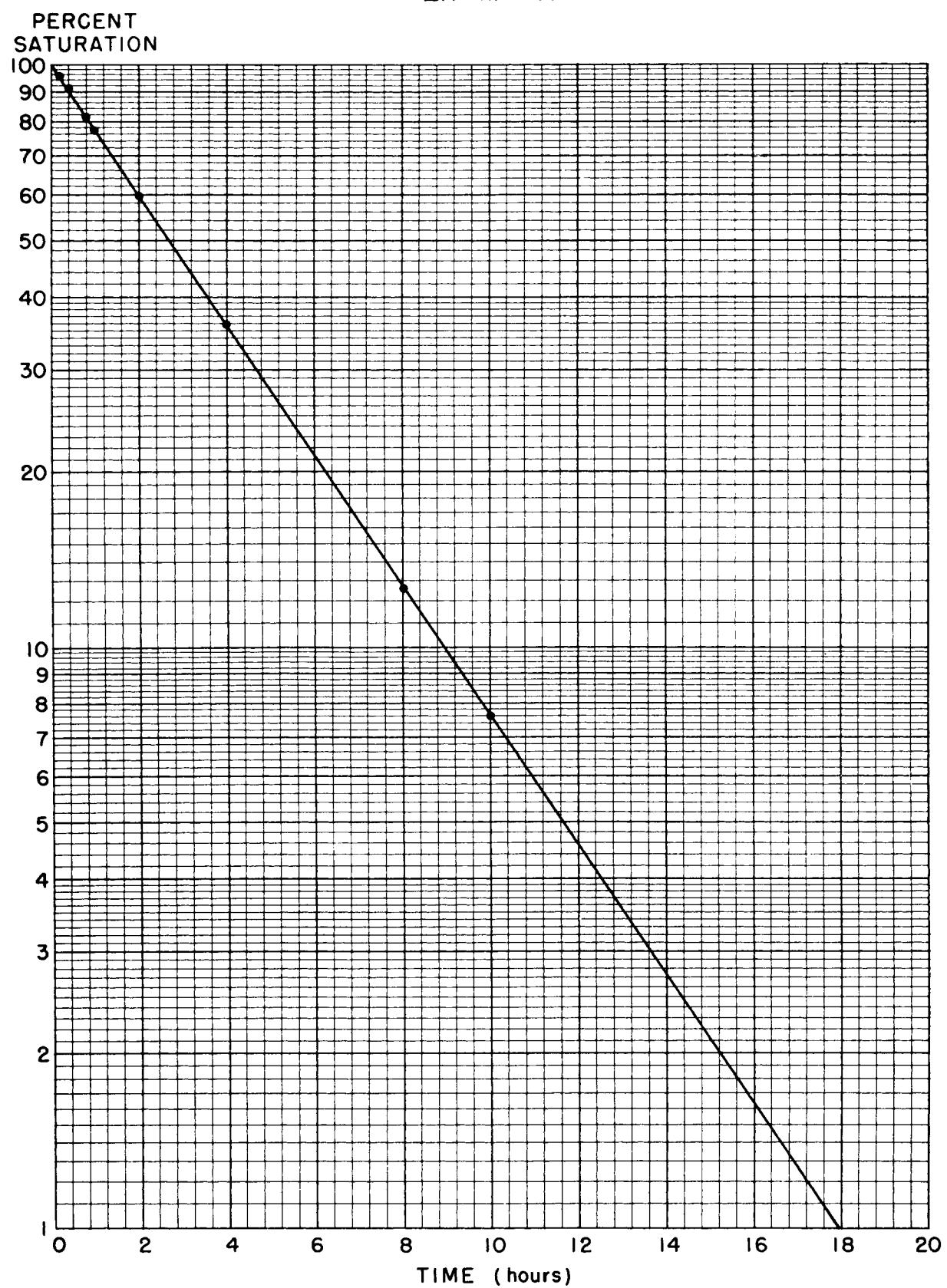




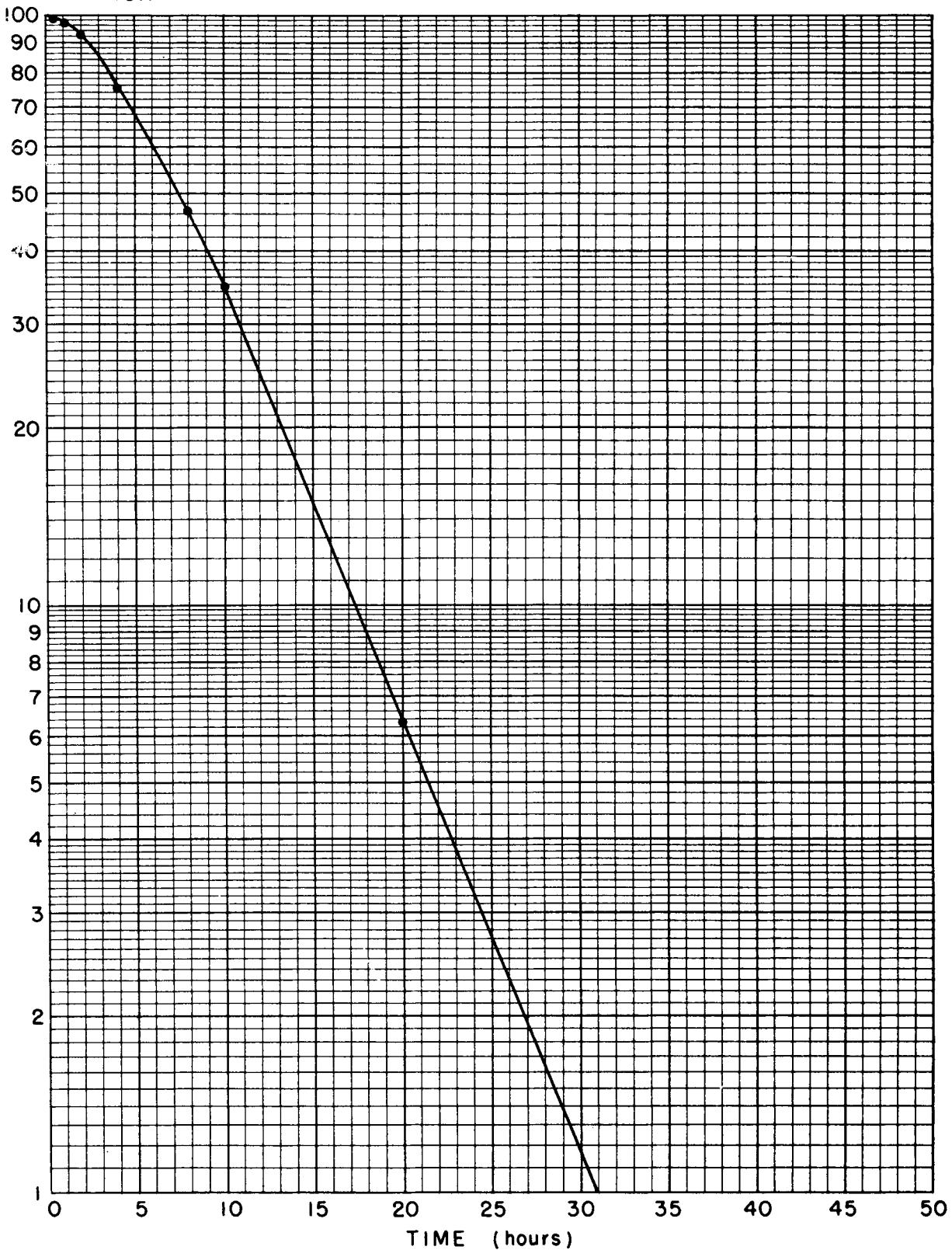


PERCENT
SATURATION

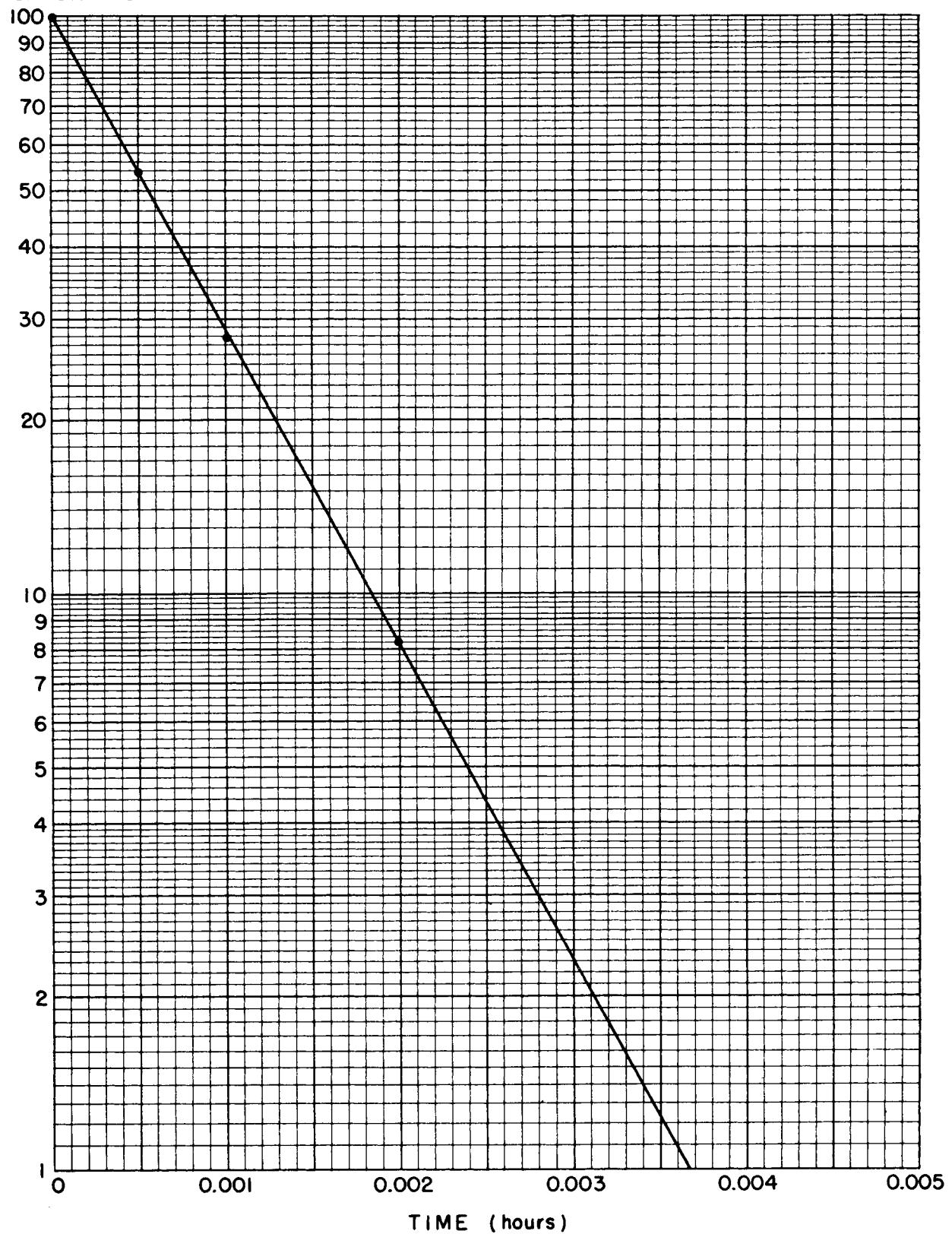




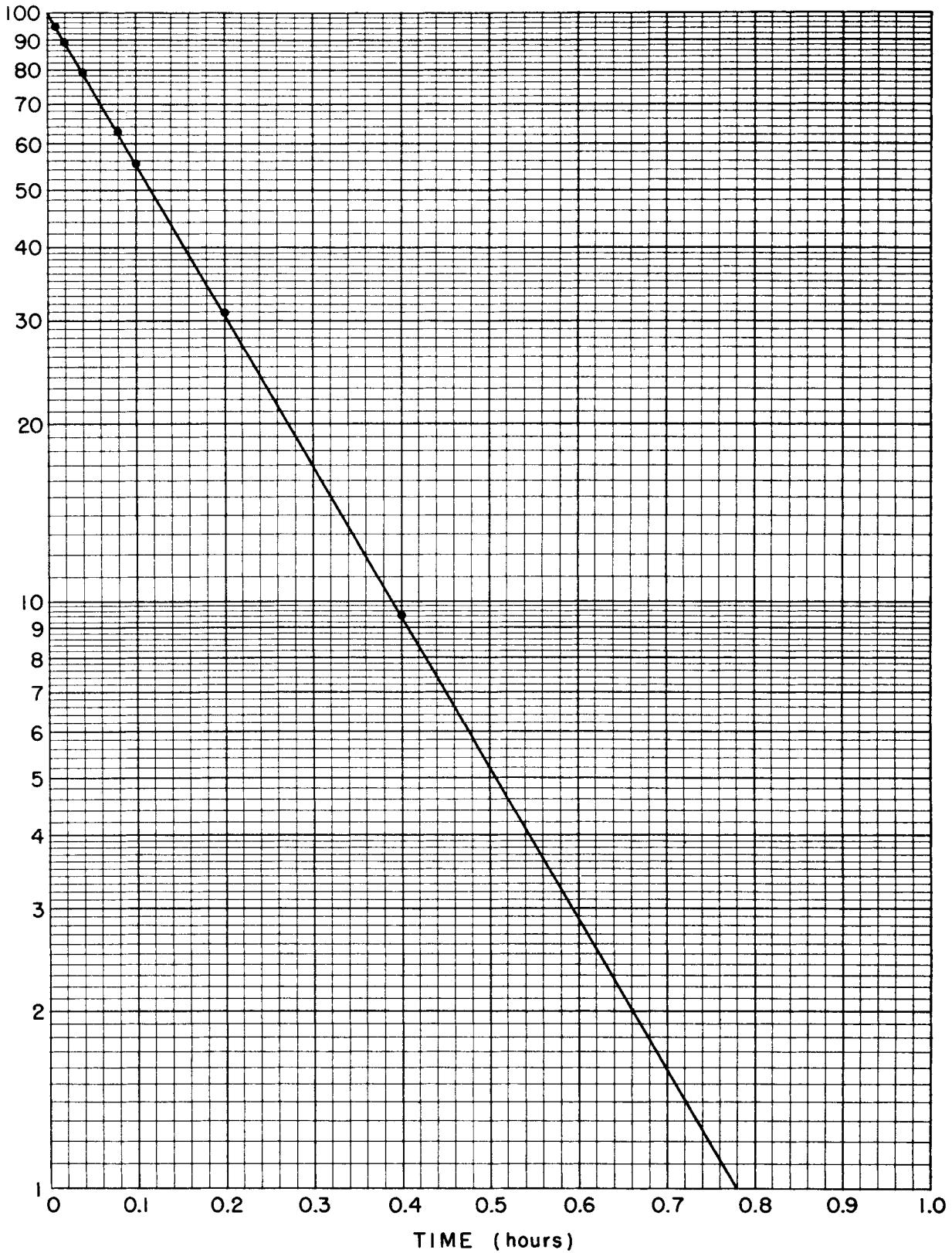
PERCENT
SATURATION



PERCENT
SATURATION



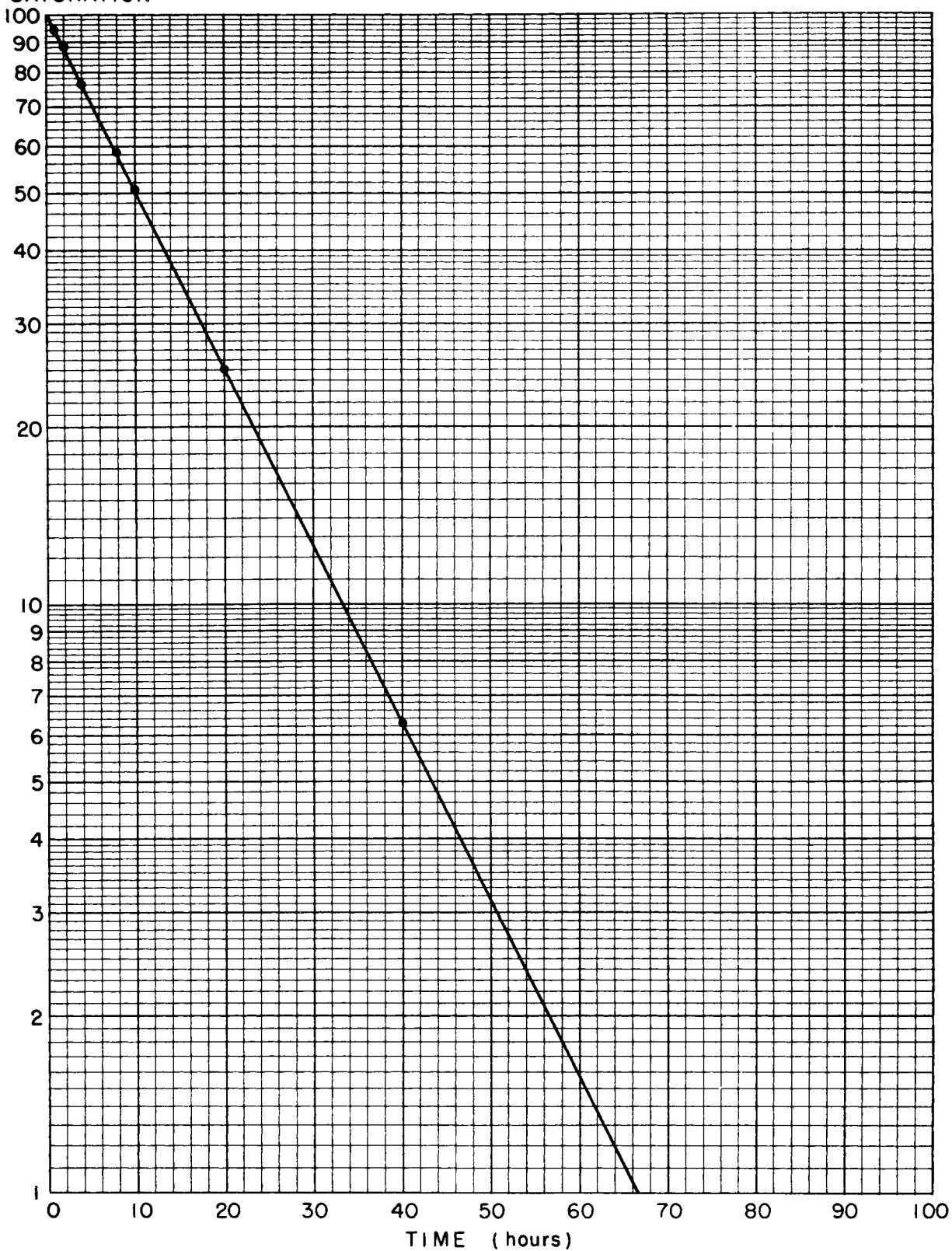
130

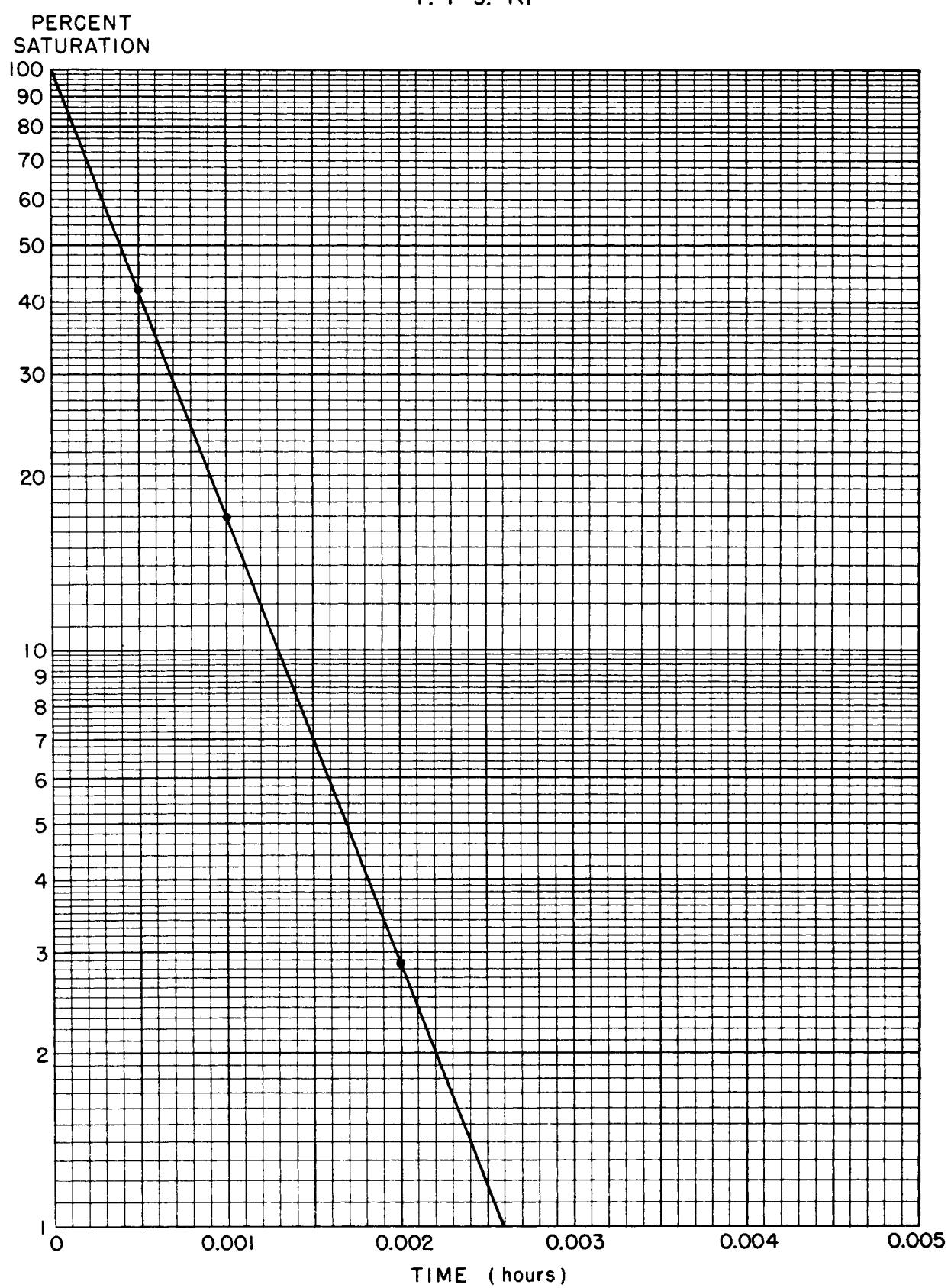
7 m. Sr⁹³PERCENT
SATURATION

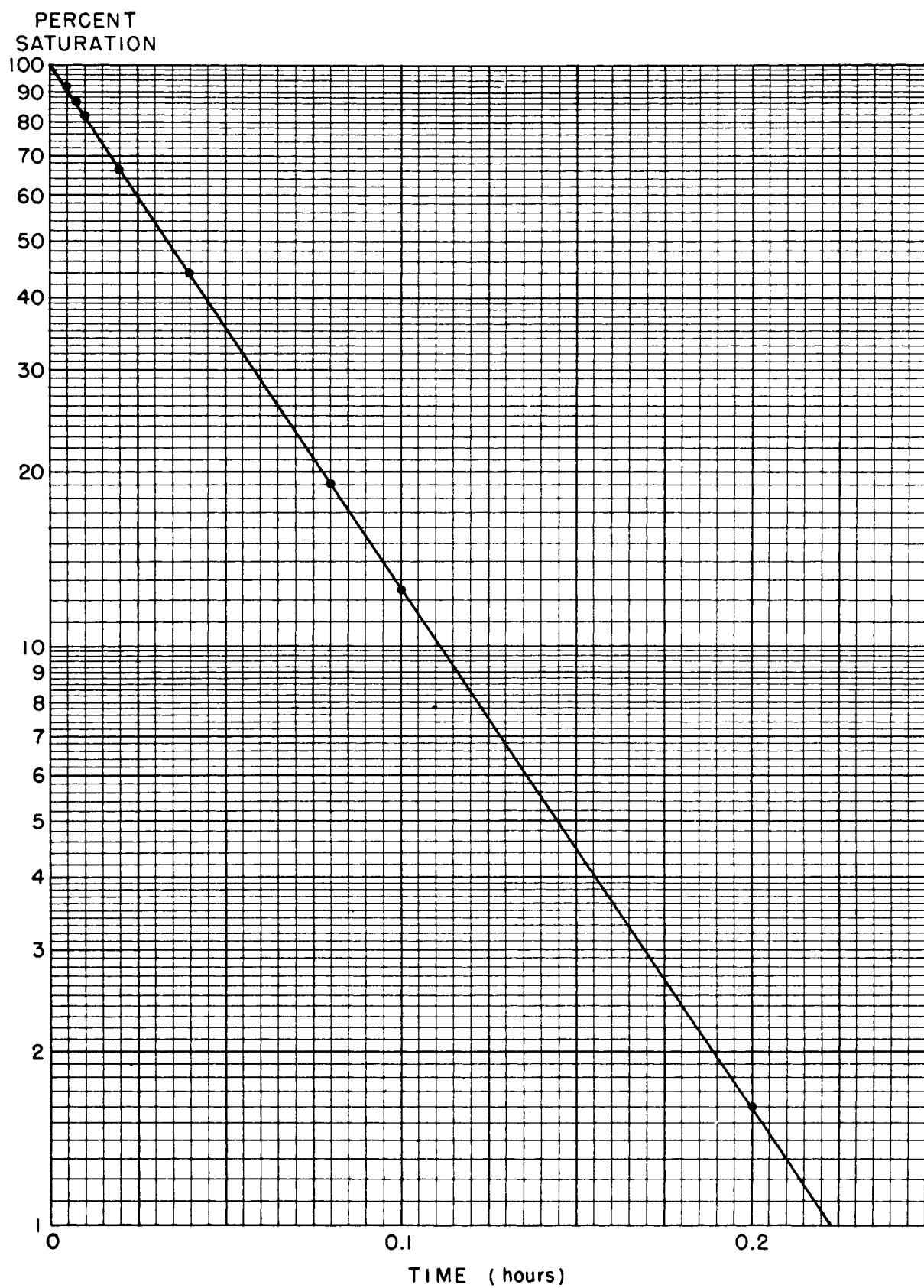
10.0 h. γ^{93}

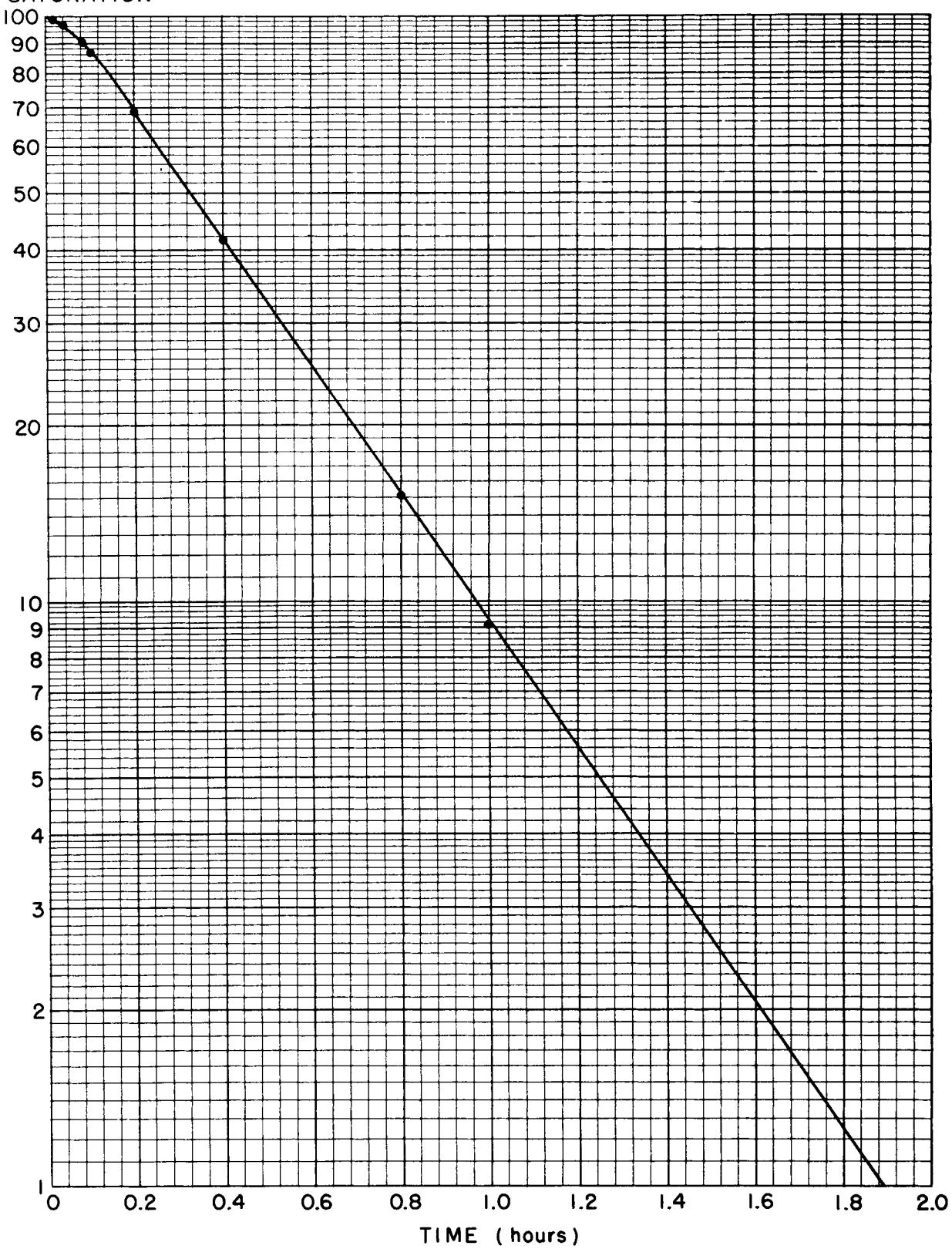
131

PERCENT
SATURATION

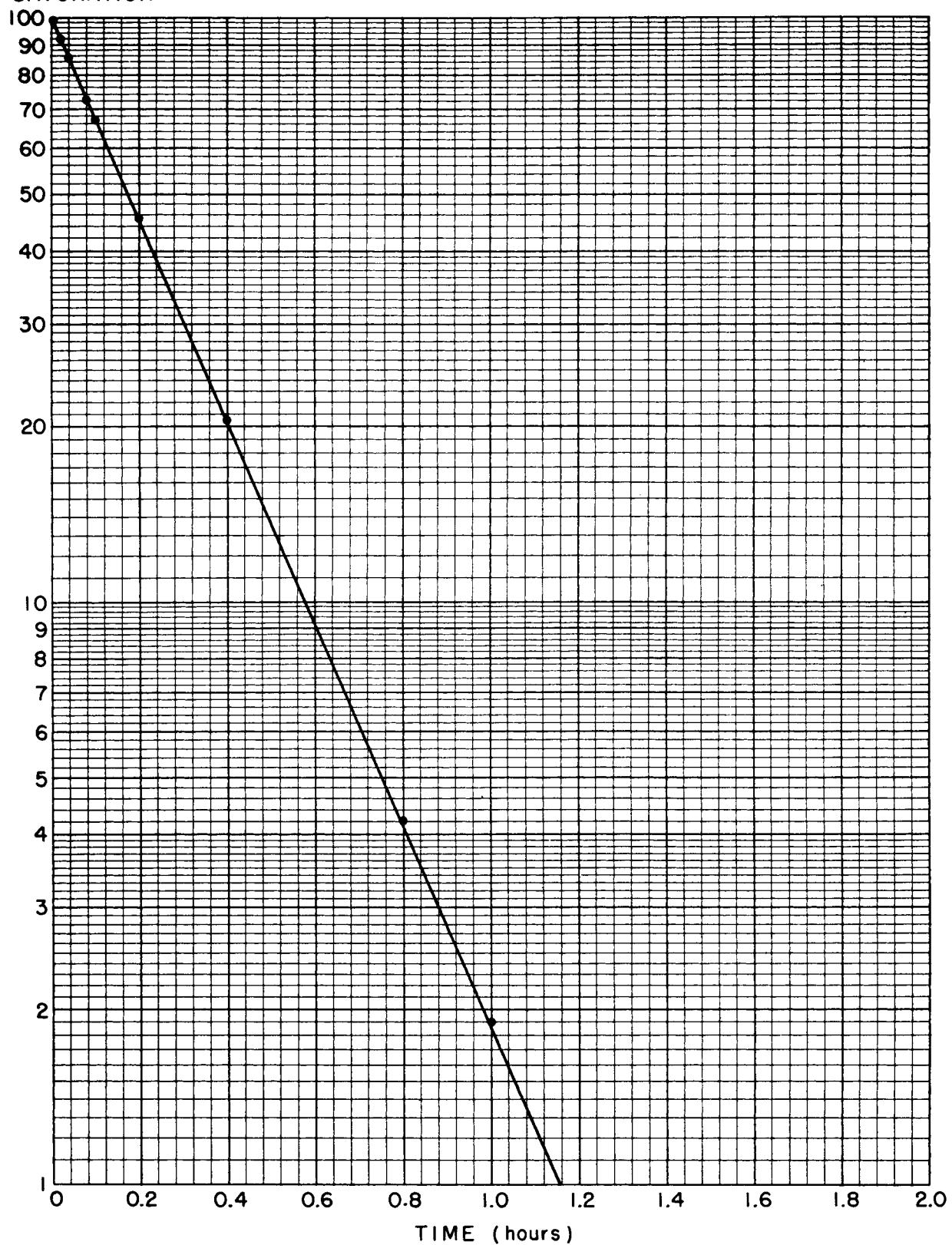




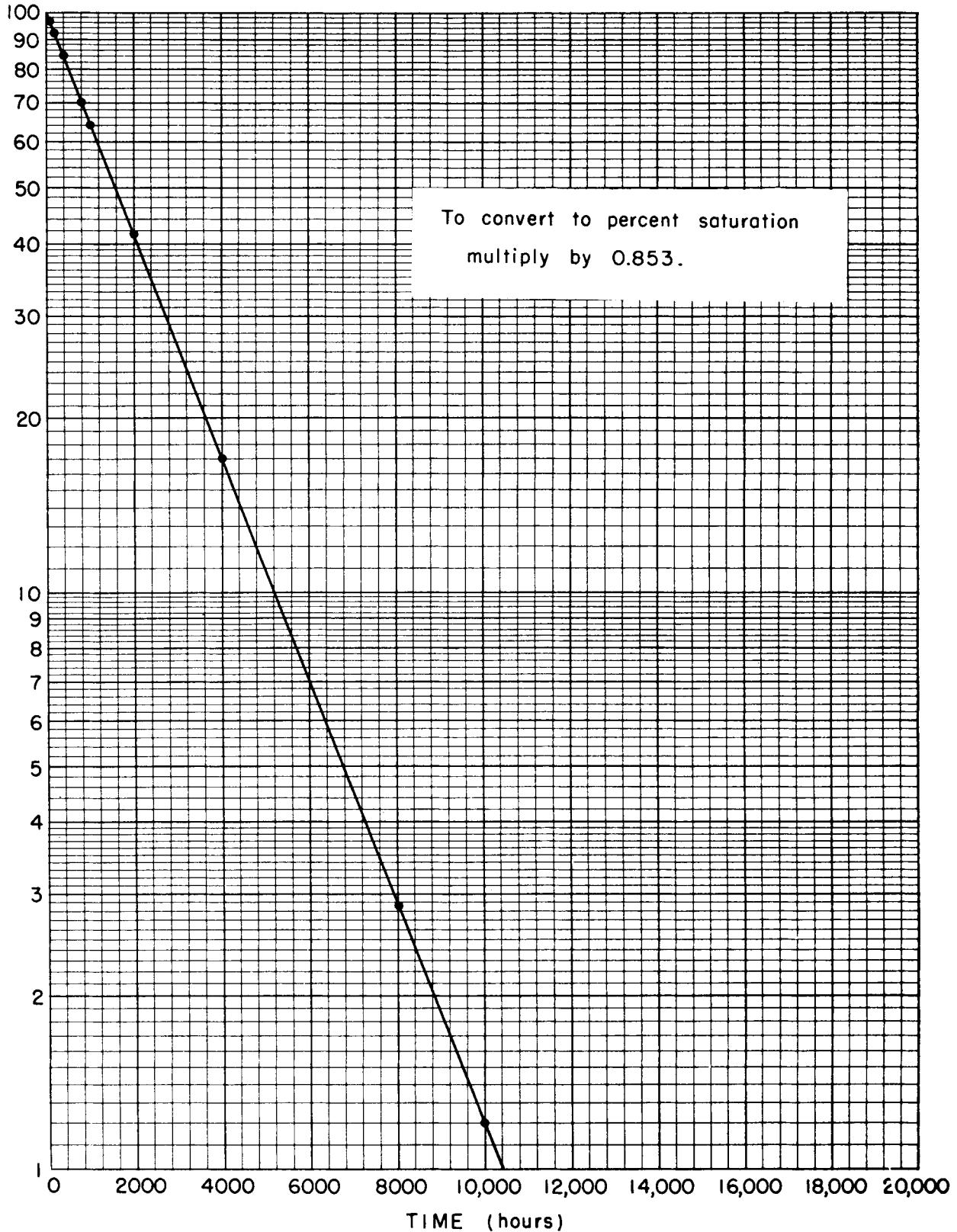


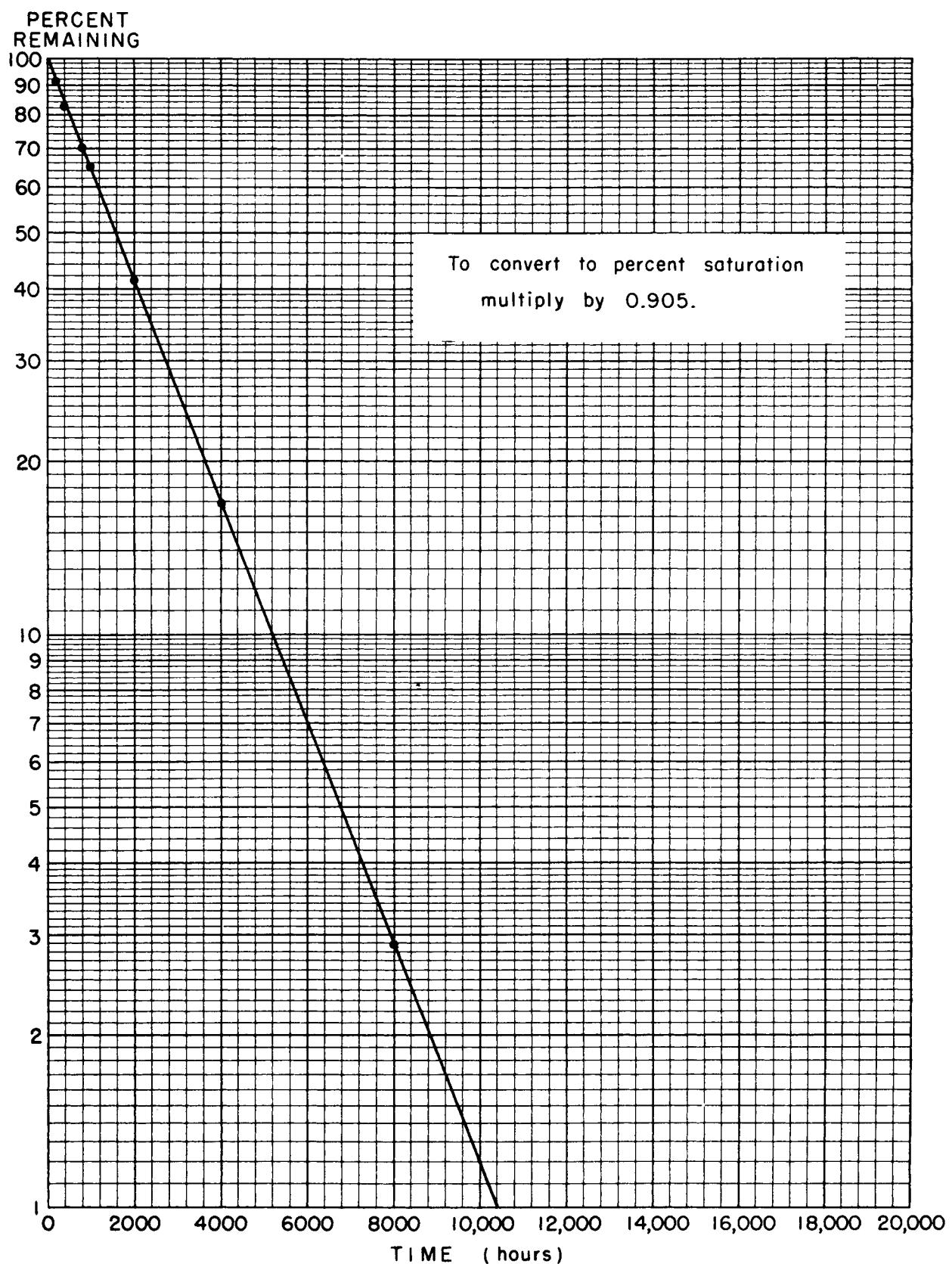
16.5 m. γ^{94} PERCENT
SATURATION

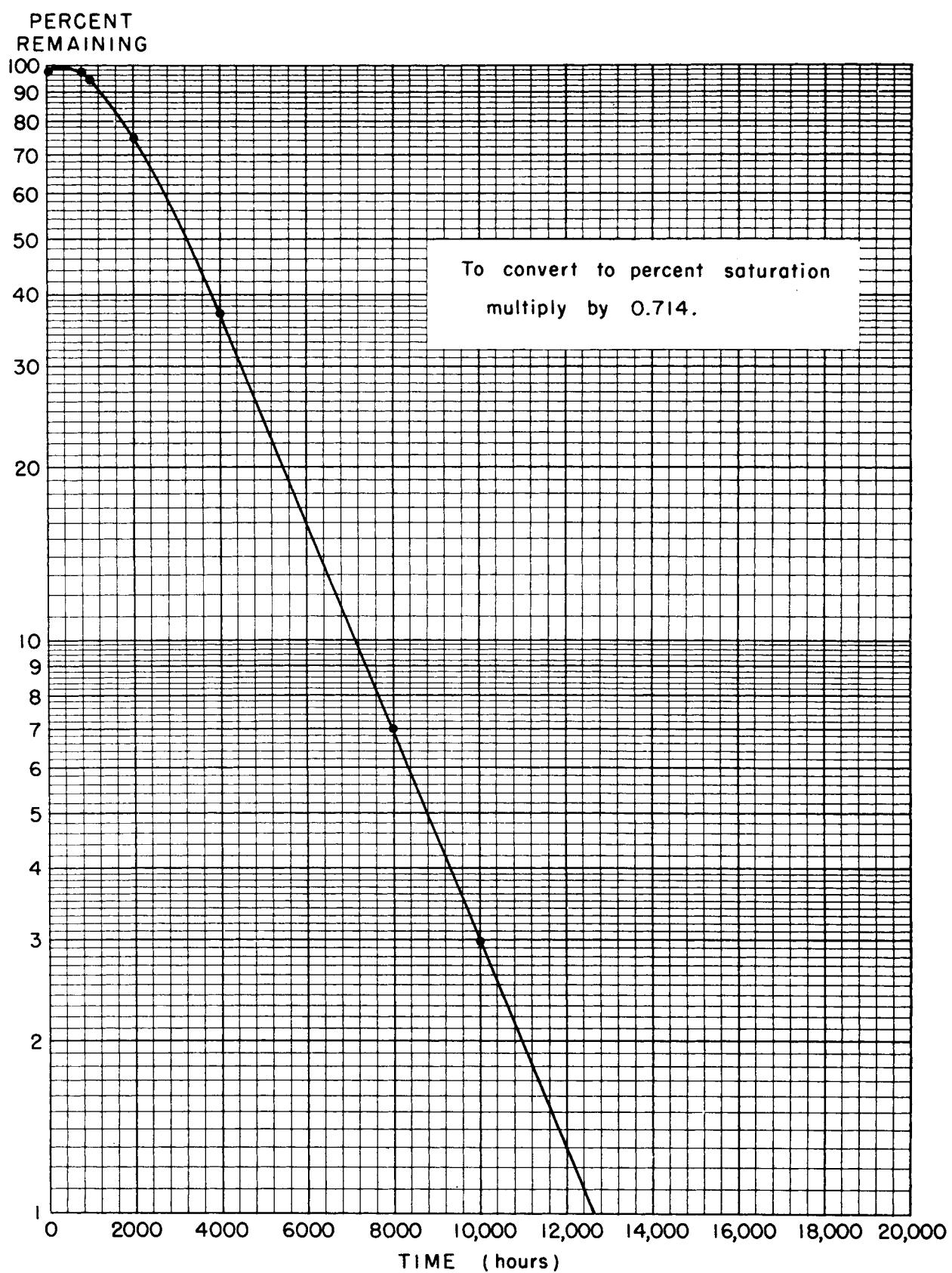
PERCENT
SATURATION

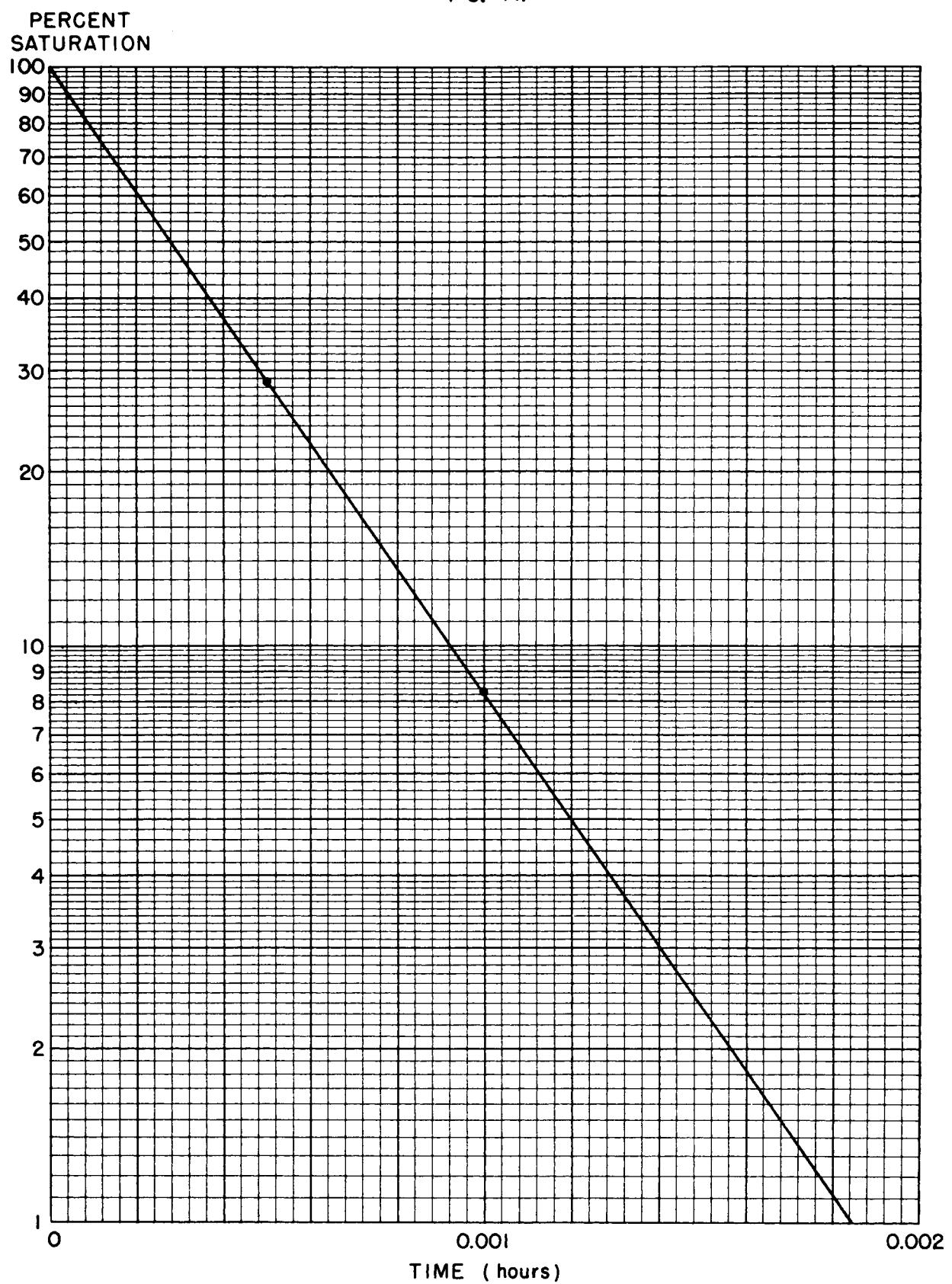


PERCENT
REMAINING

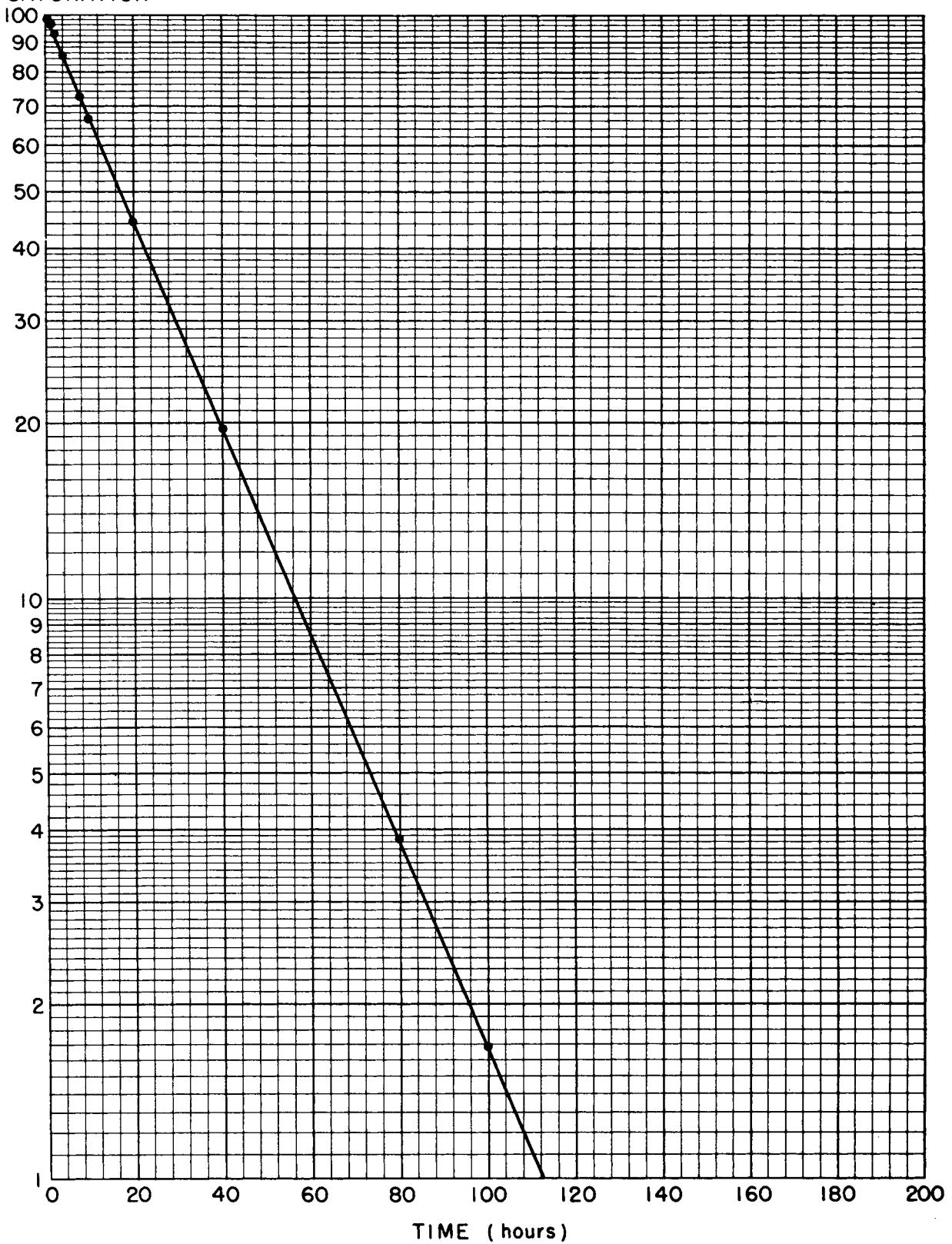


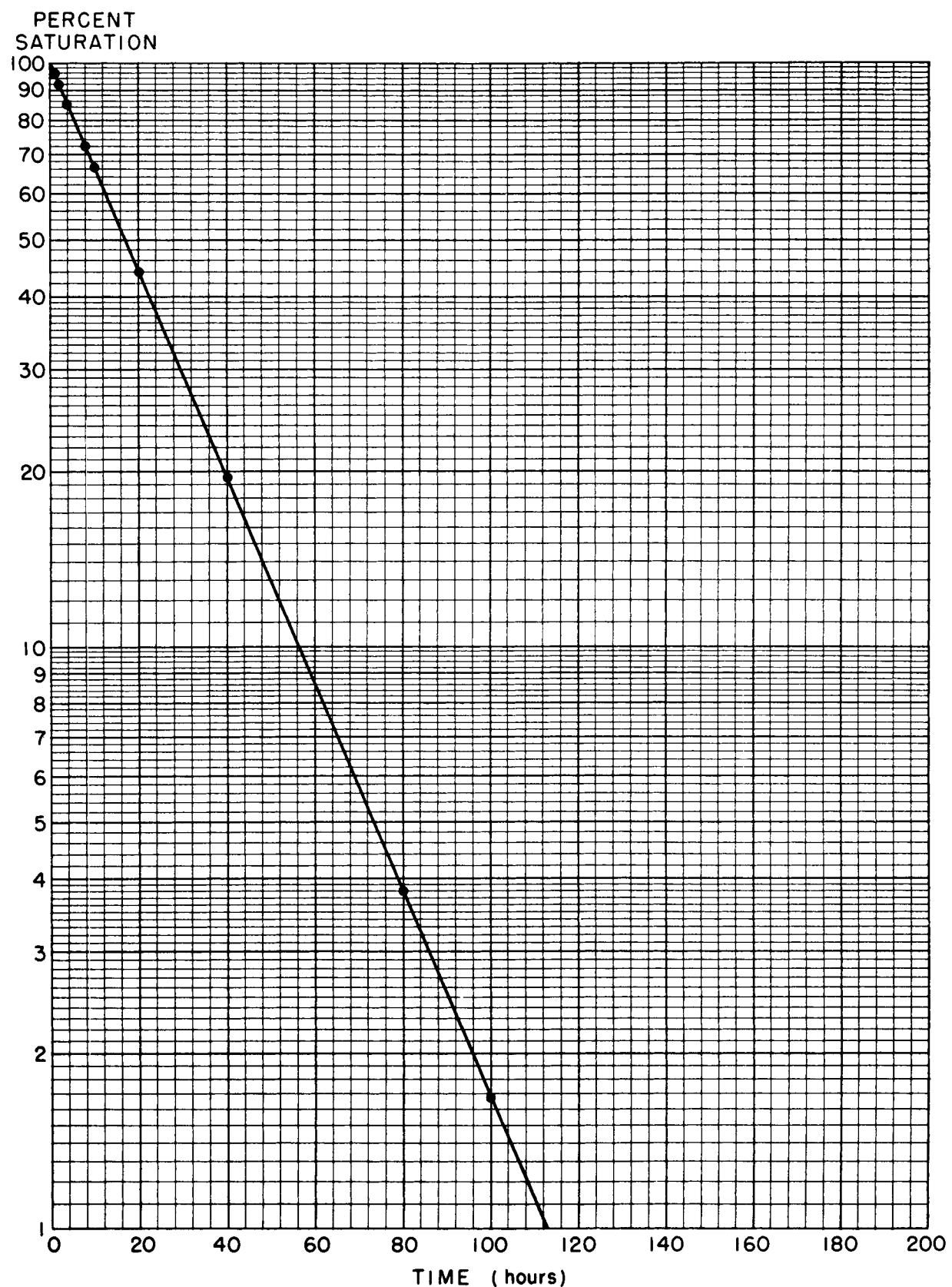




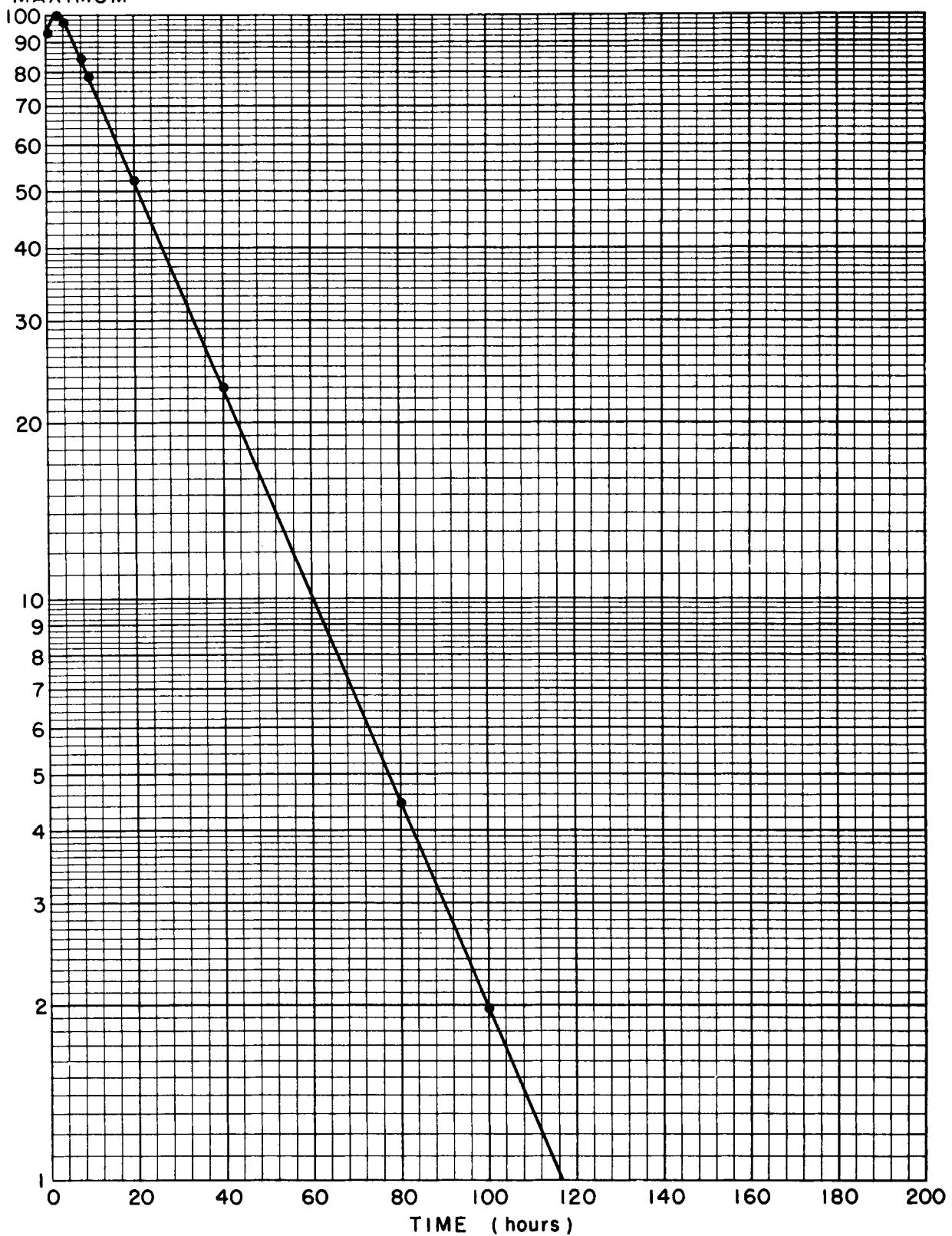


140

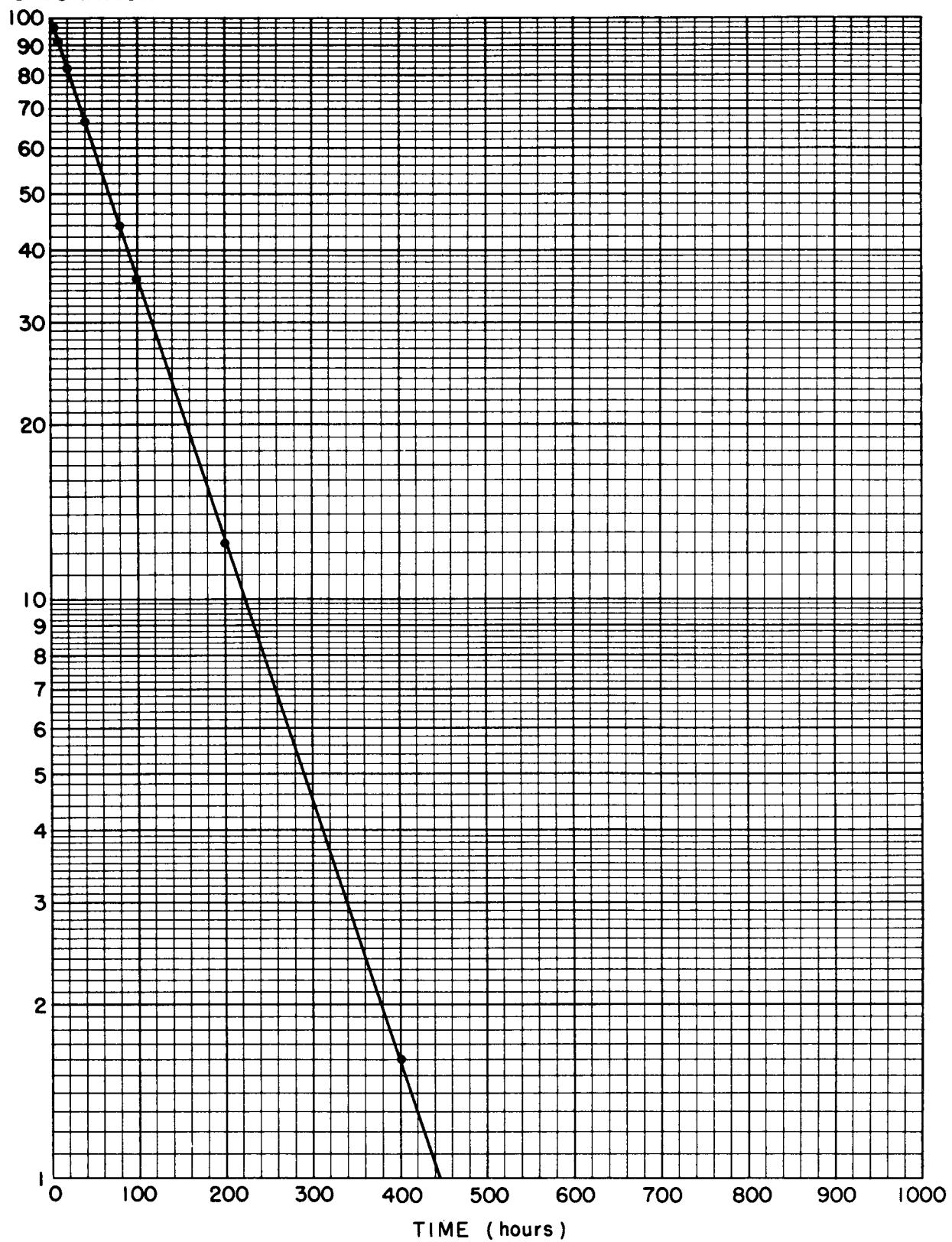
17.0 h. Zr⁹⁷PERCENT
SATURATION



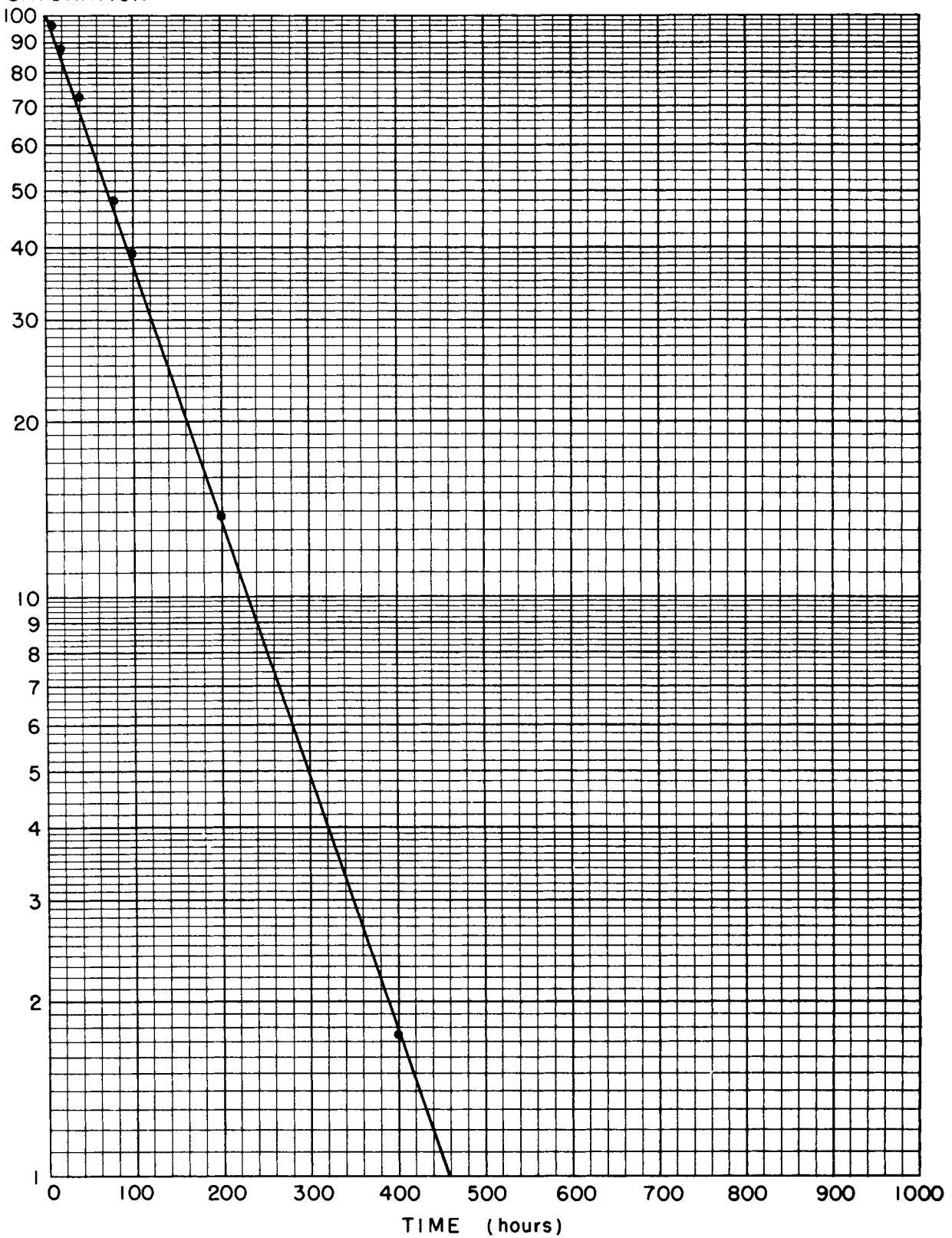
PERCENT
MAXIMUM

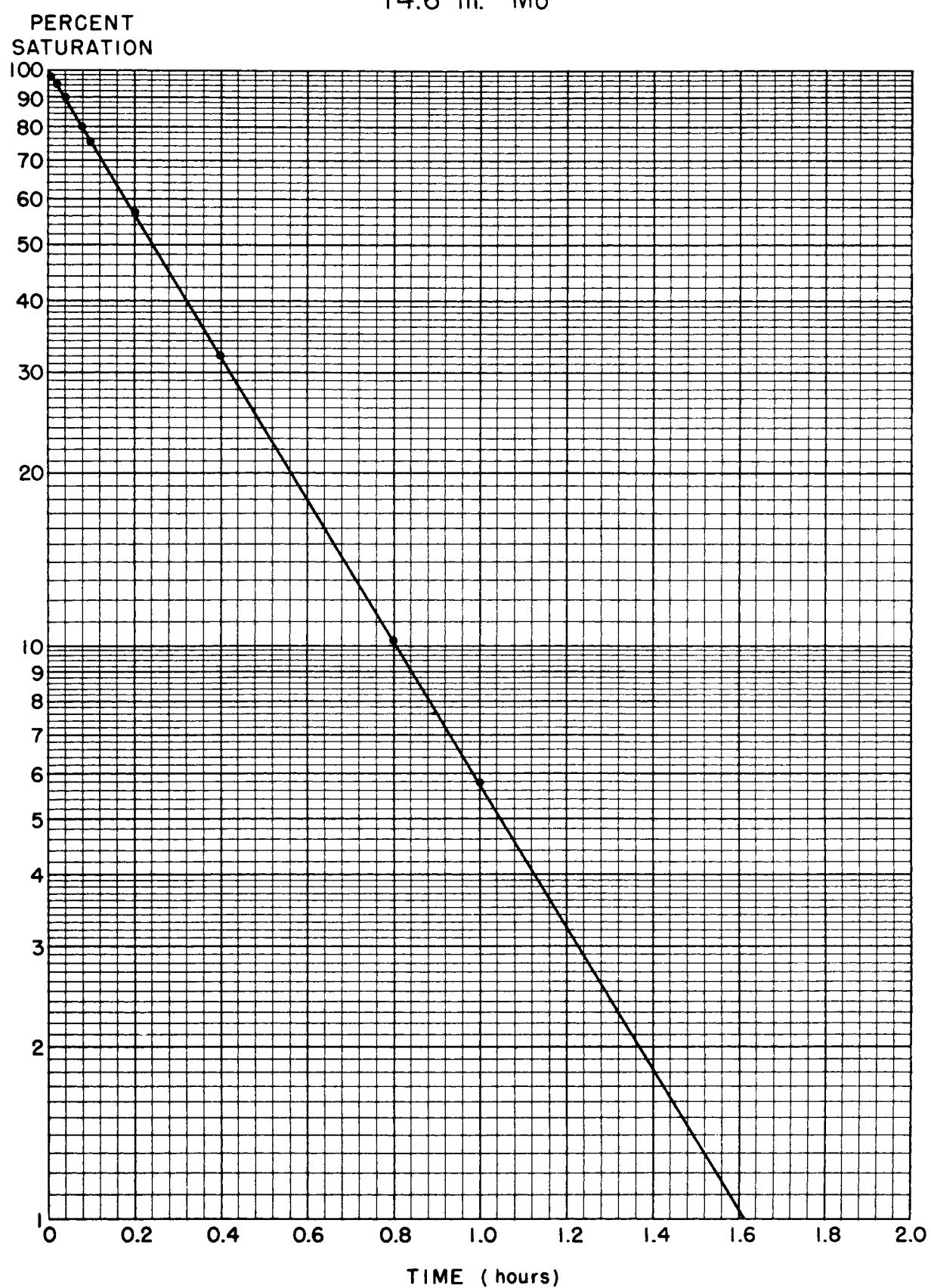


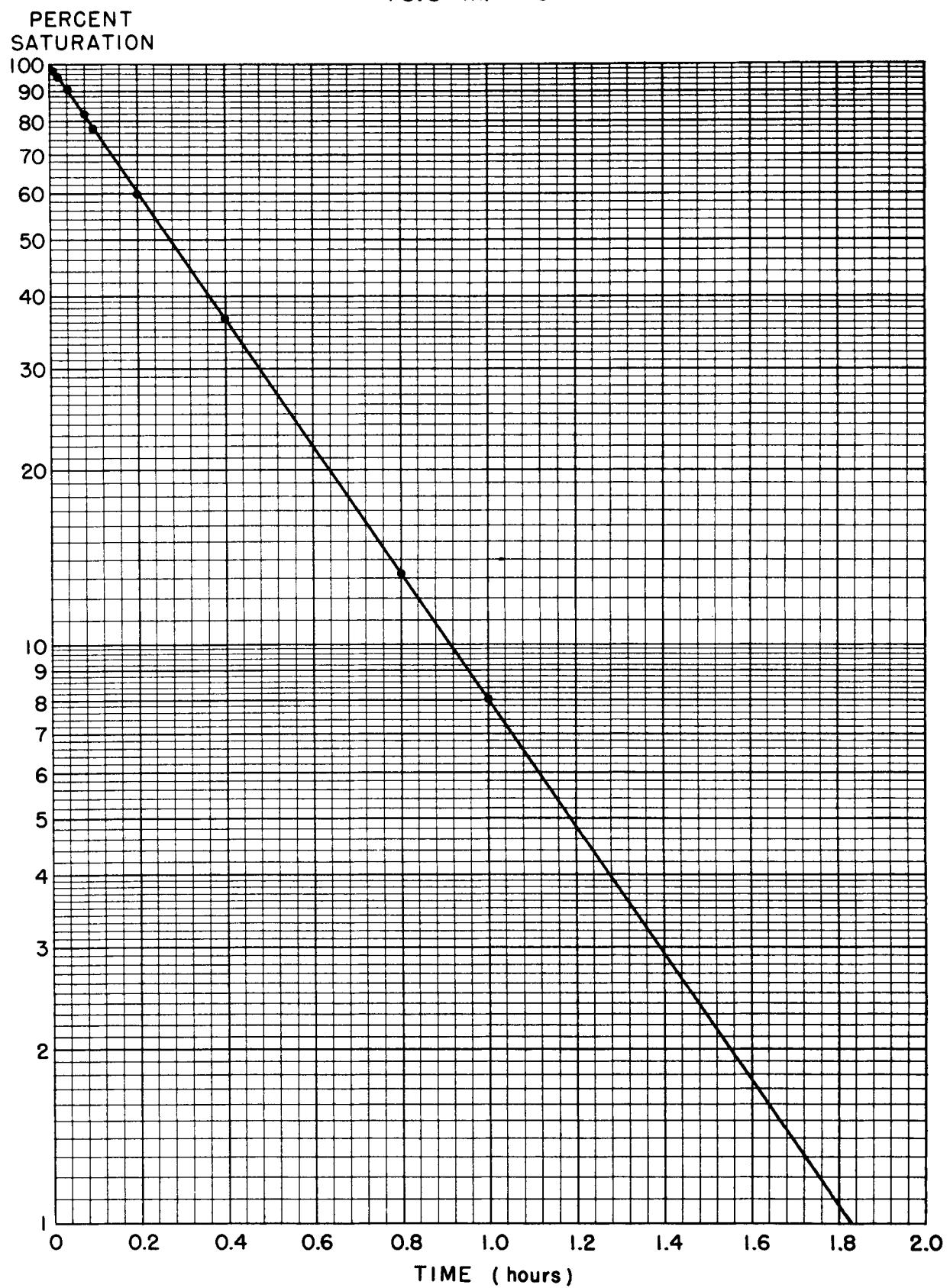
PERCENT
SATURATION



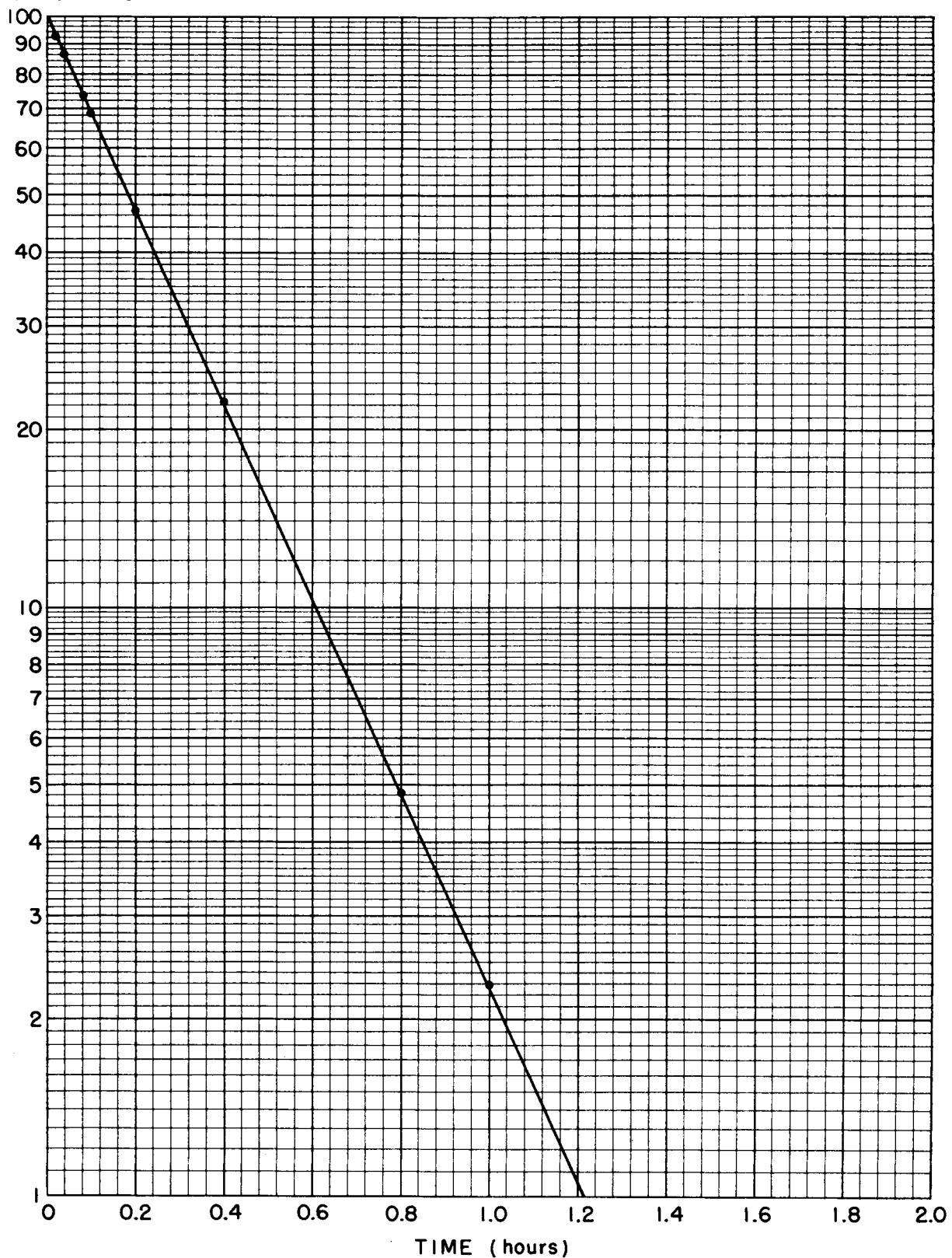
PERCENT
SATURATION

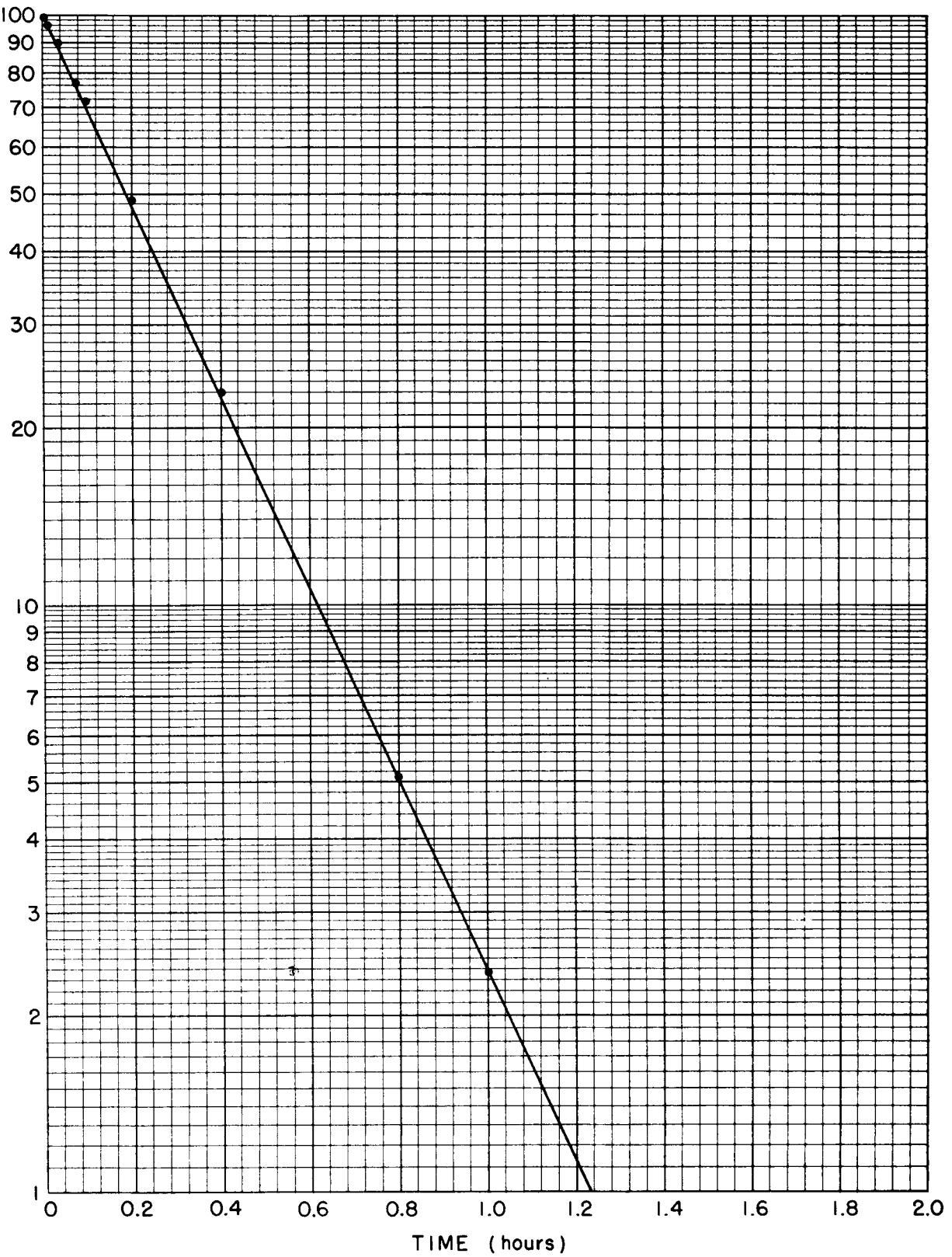


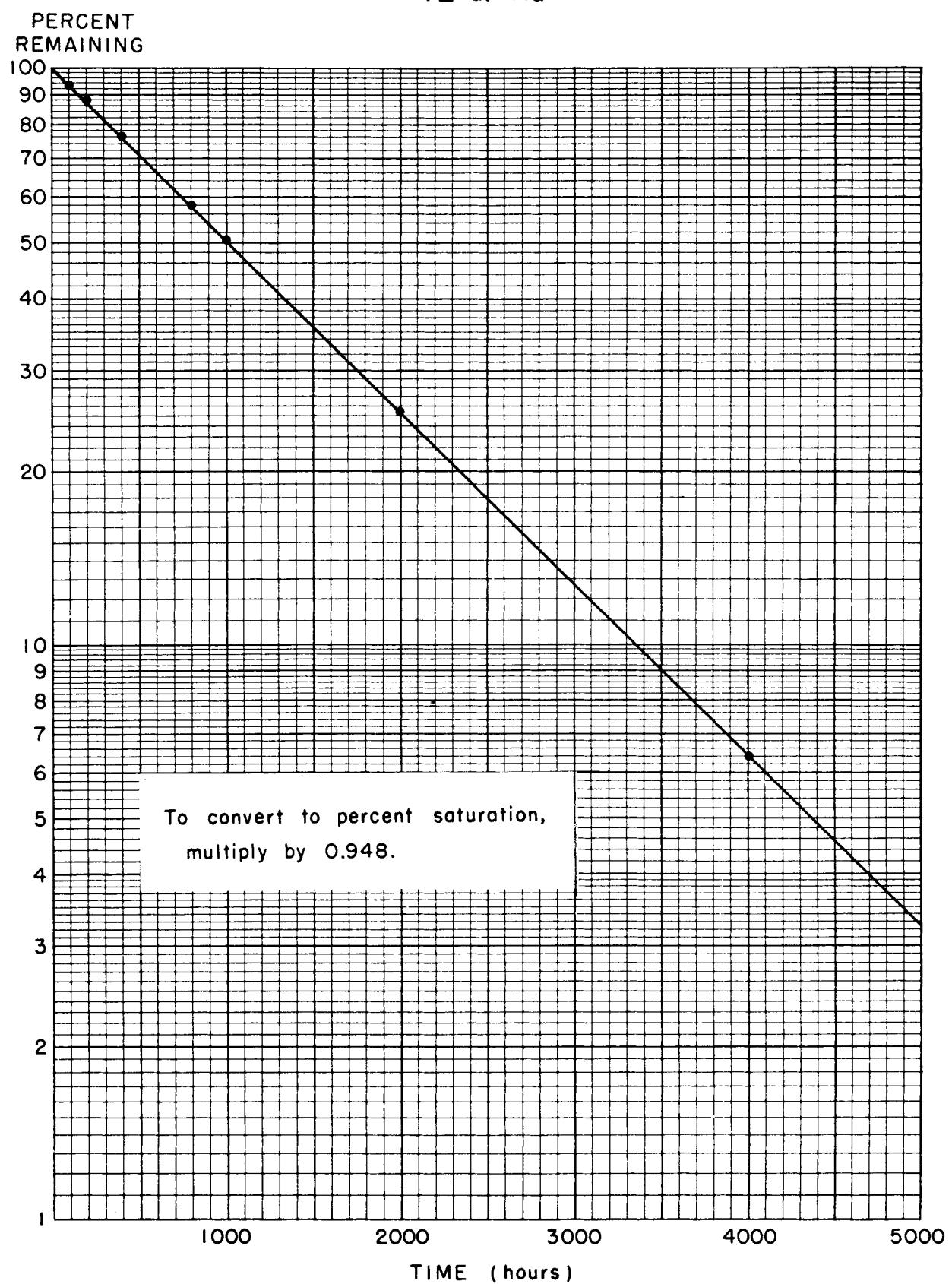


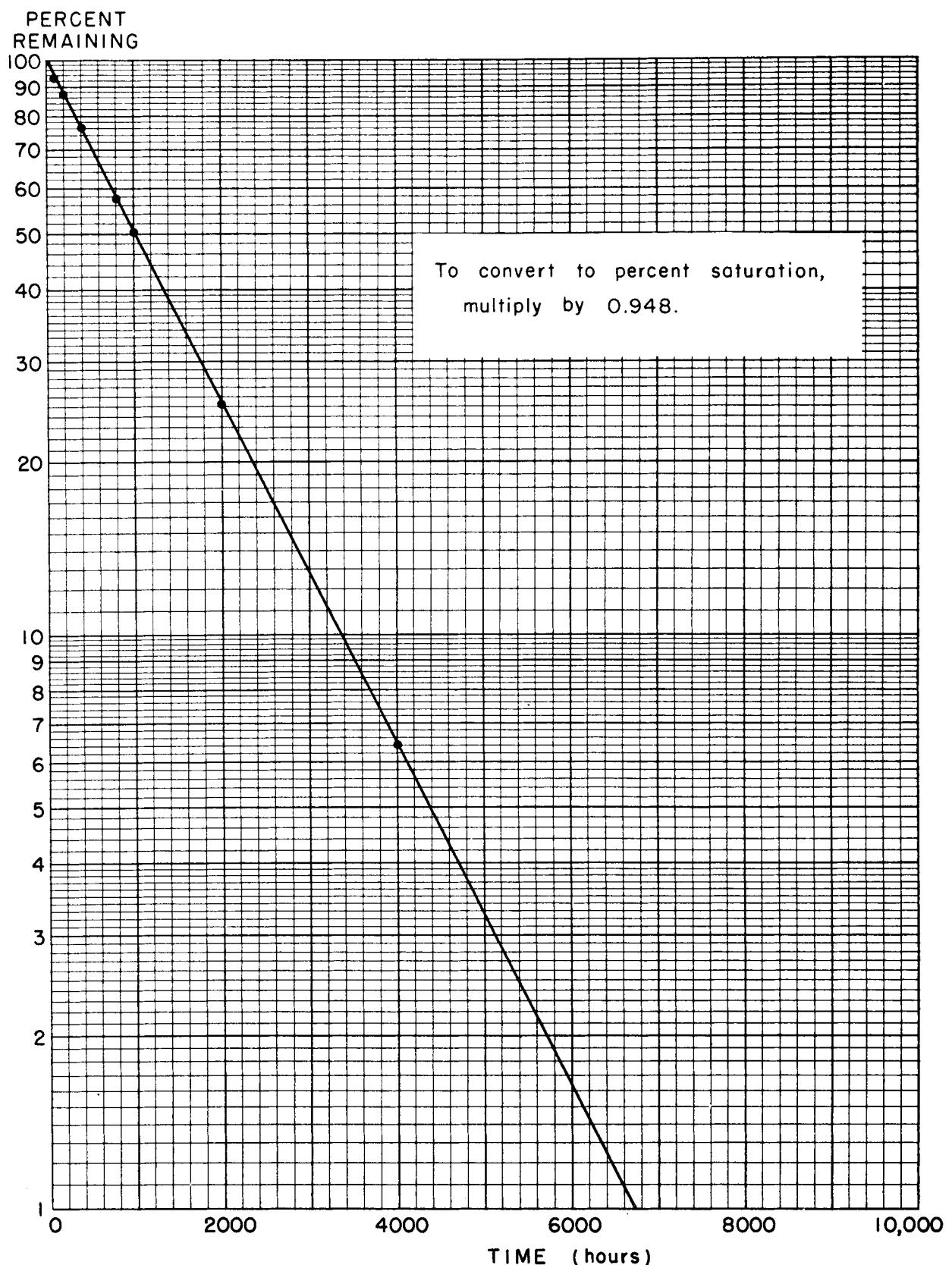


PERCENT
SATURATION



$< 25 \text{ s. } T_c^{102}$ PERCENT
SATURATION

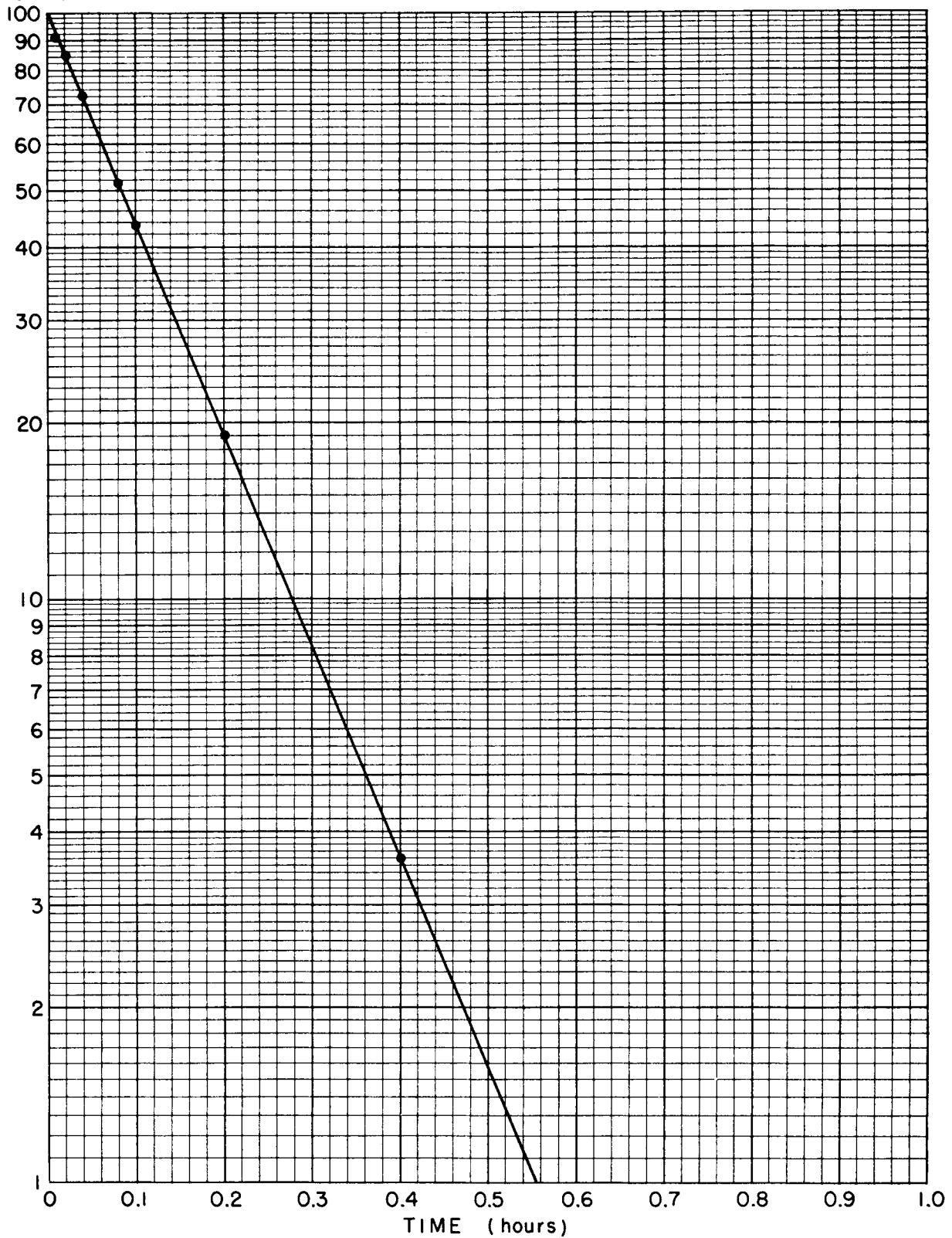




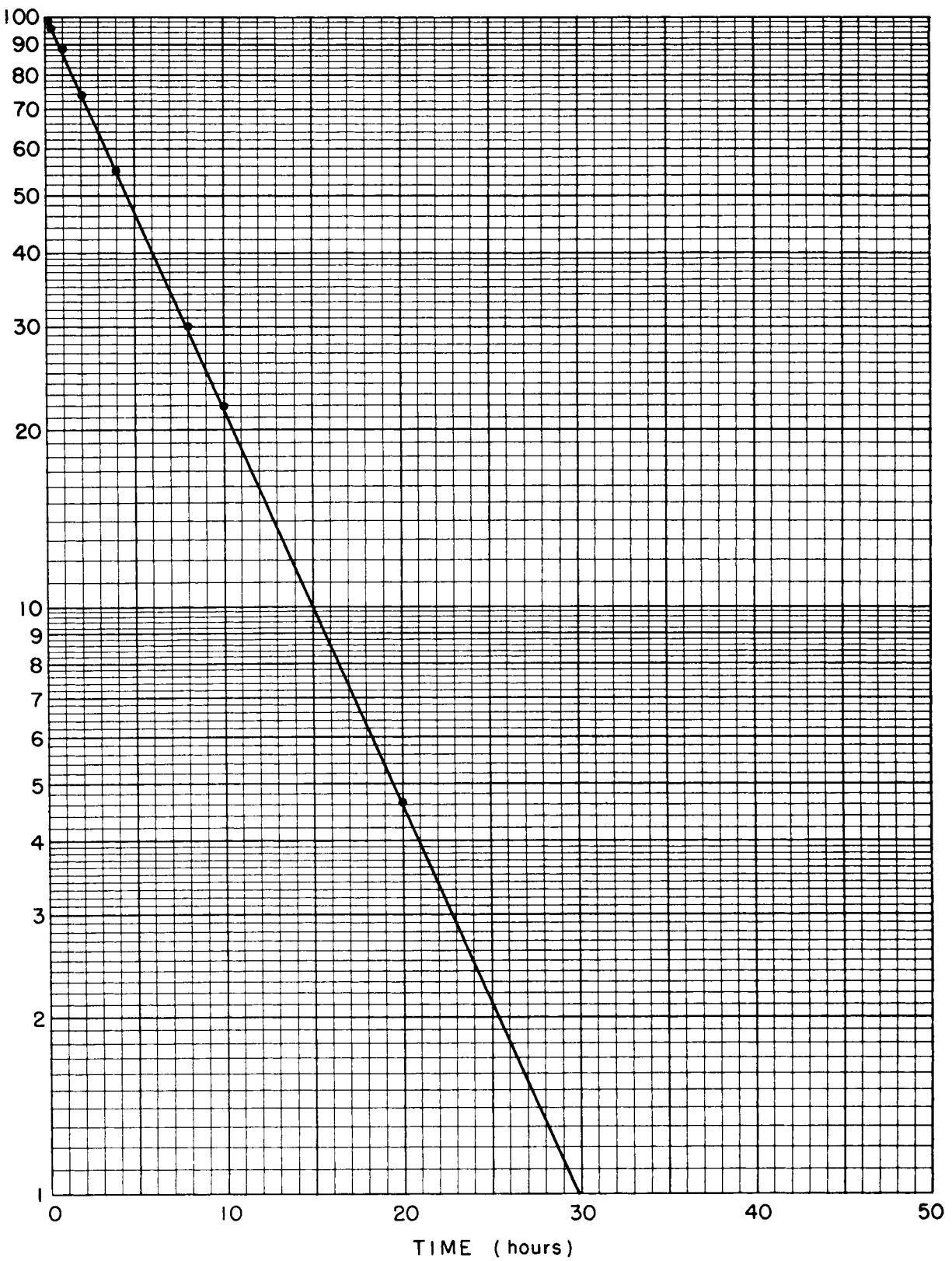
~ 5 m. Mo¹⁰⁵

151

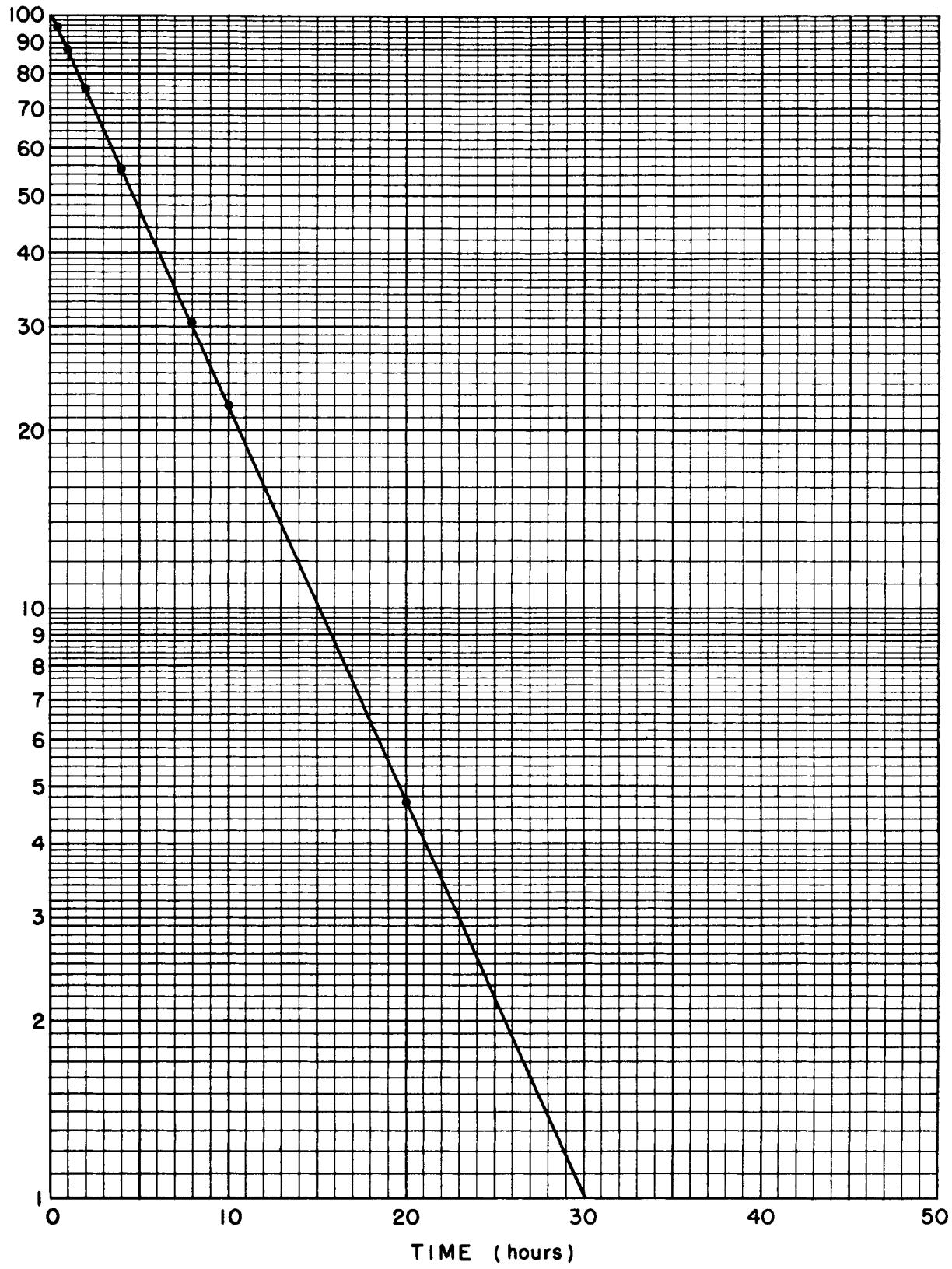
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SATURATION



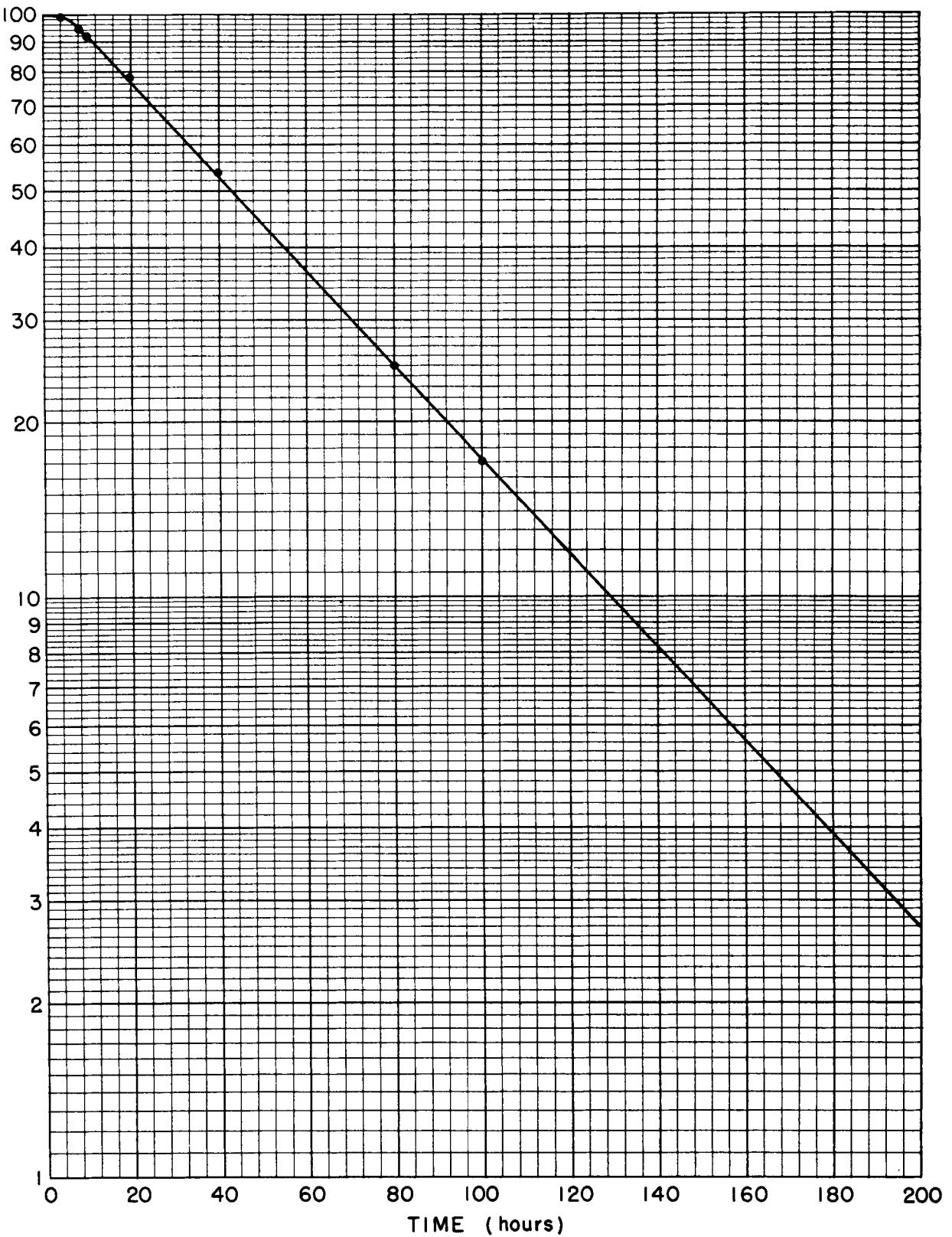
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SATURATION

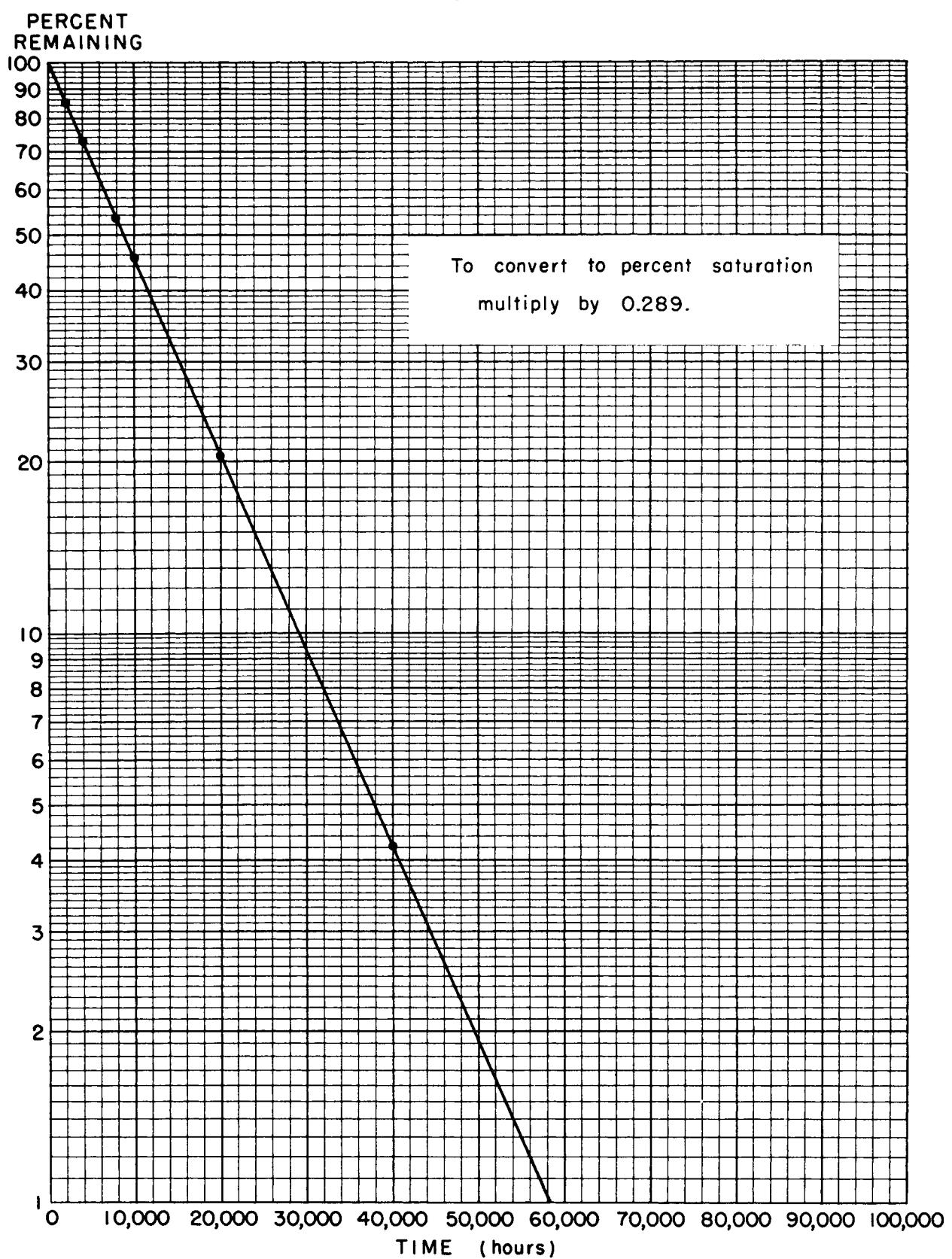


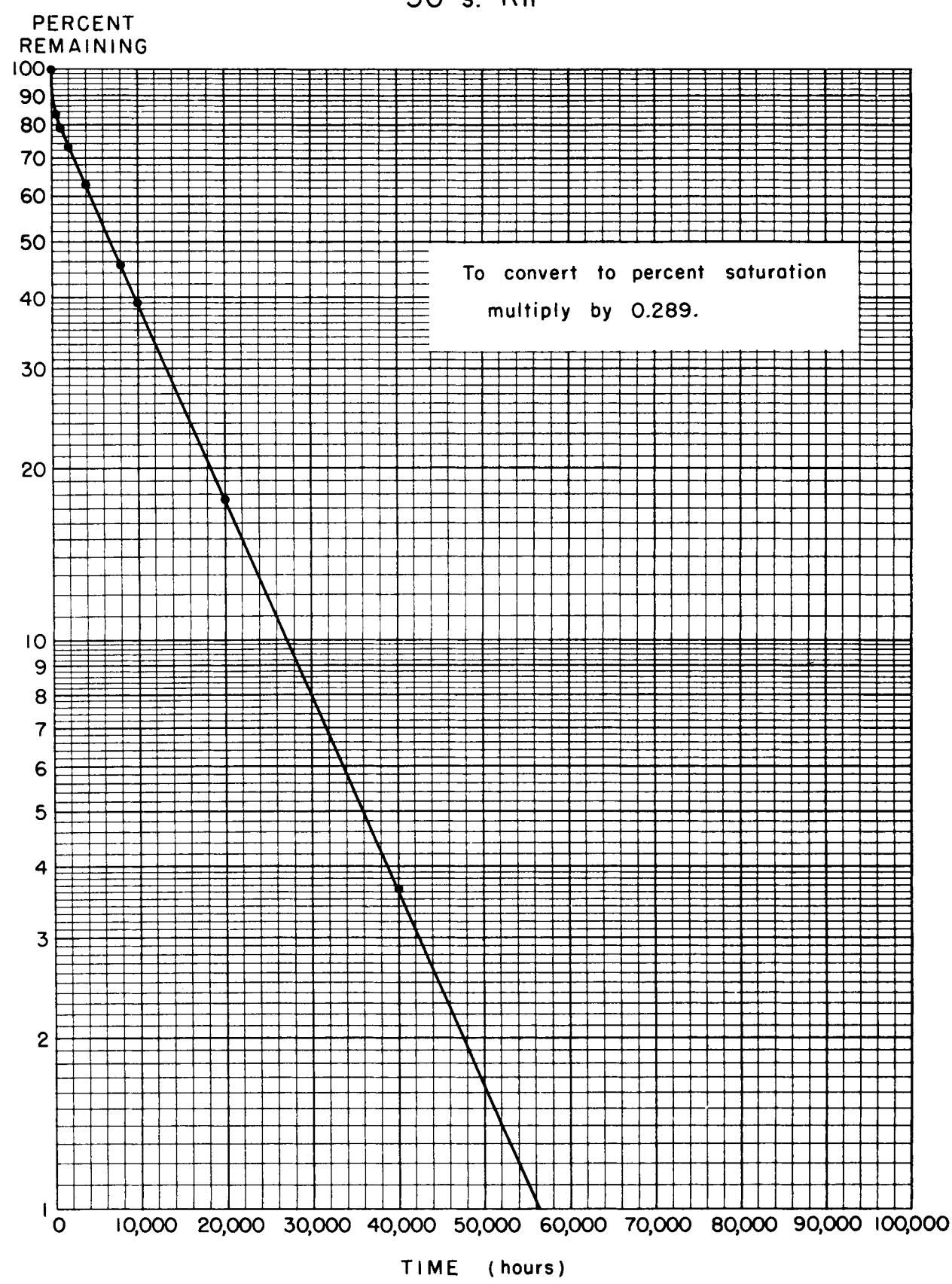
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SATURATION

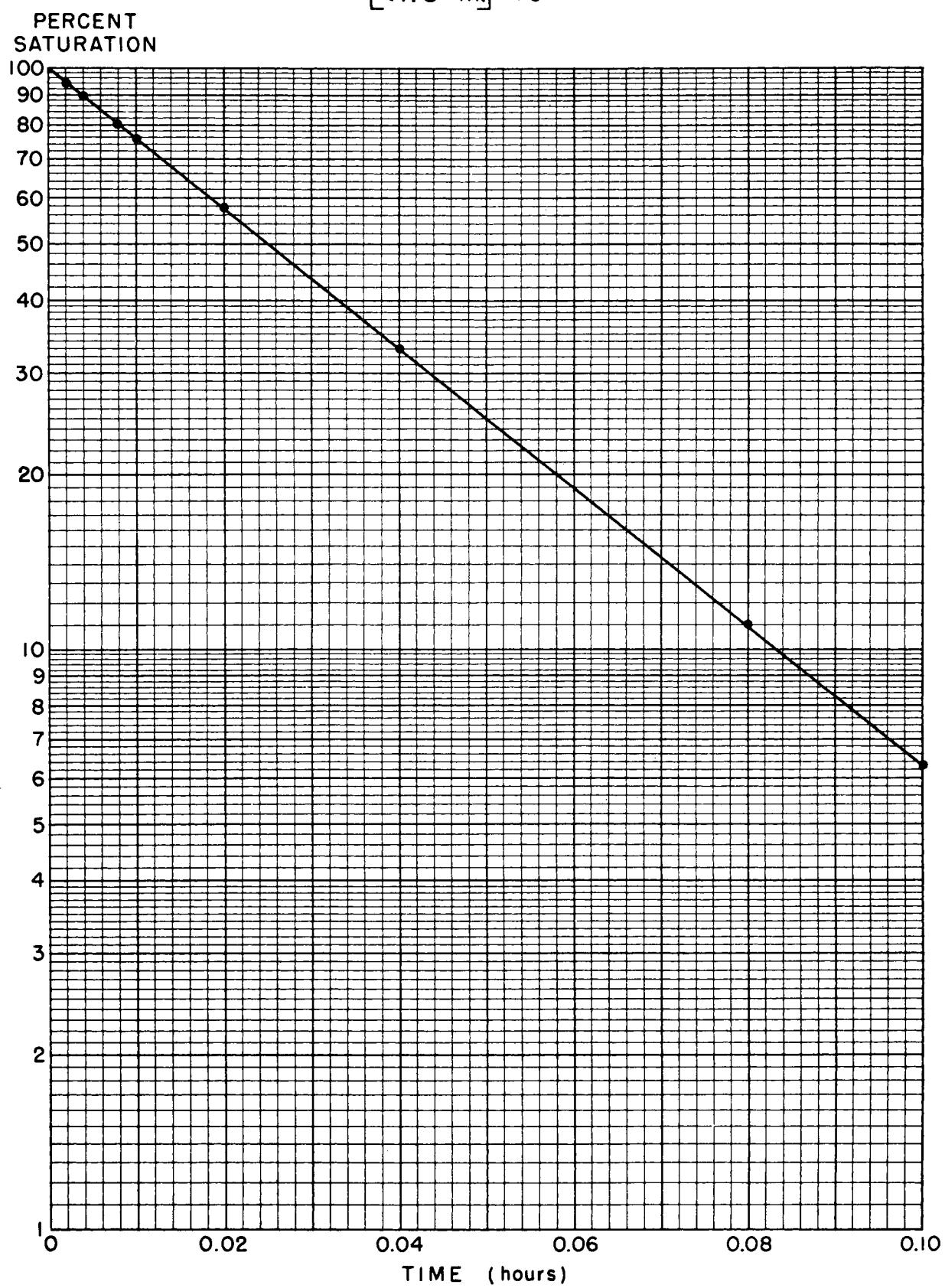


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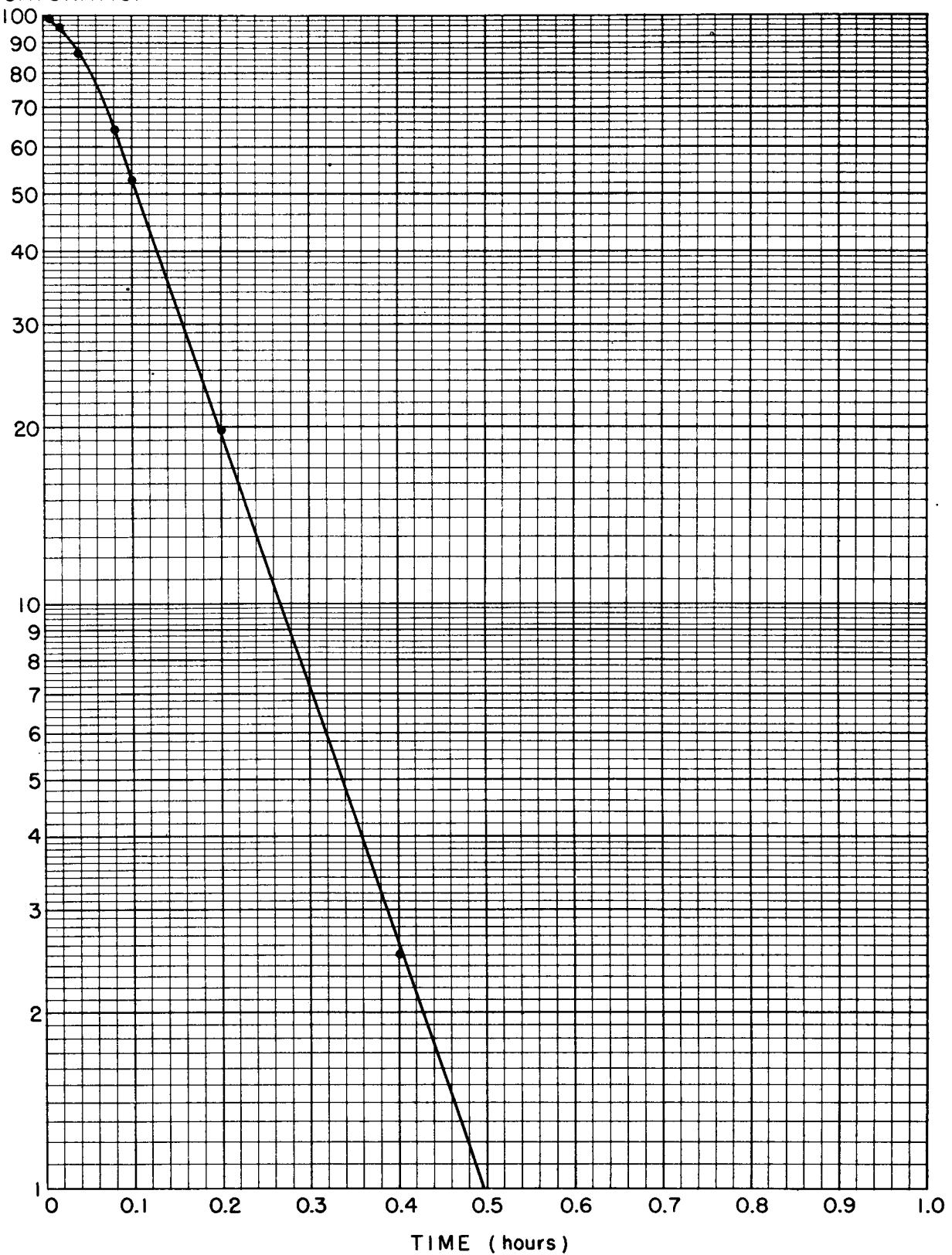
36.5 h. Rh¹⁰⁵PERCENT
SATURATION



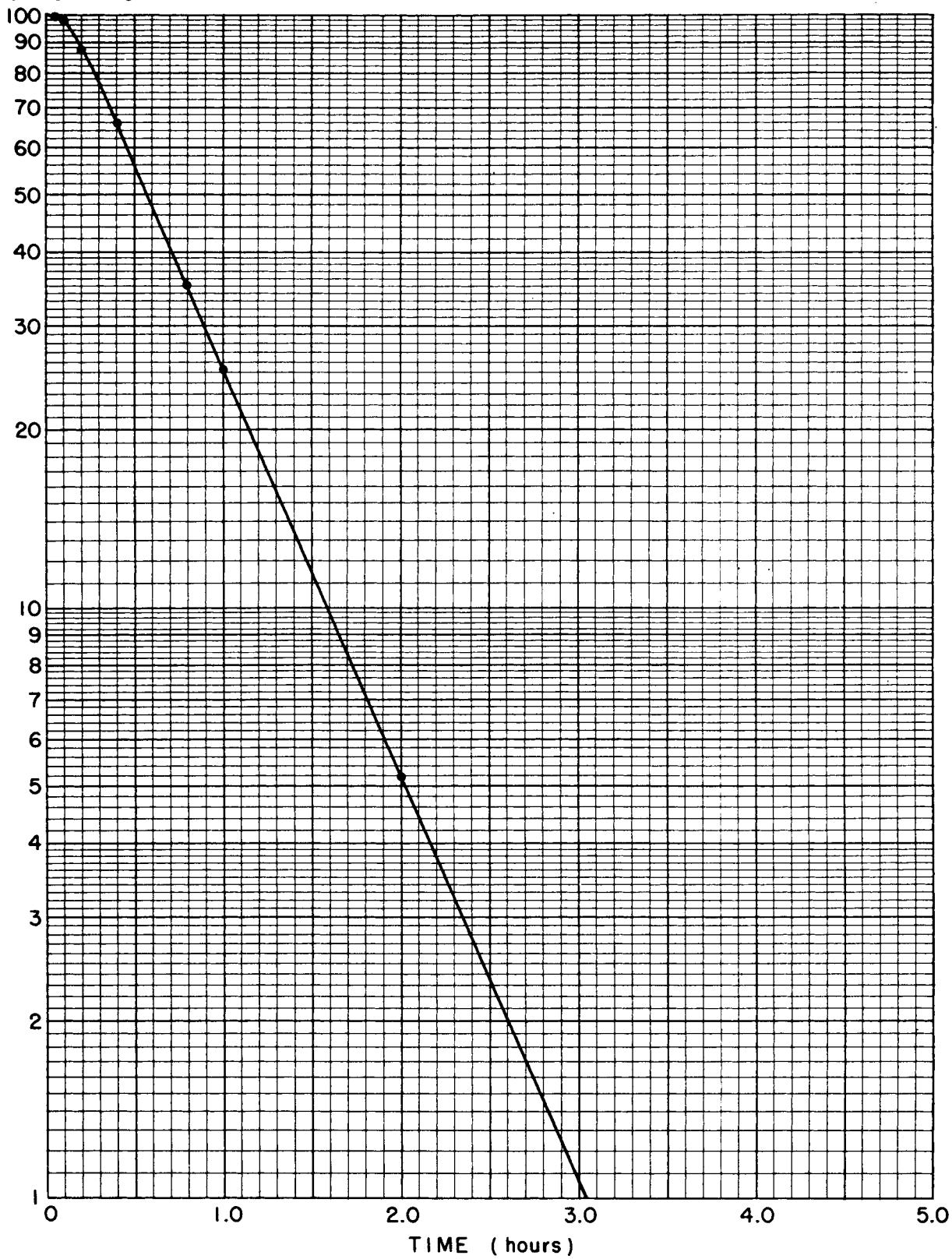
30 s. Rh¹⁰⁶

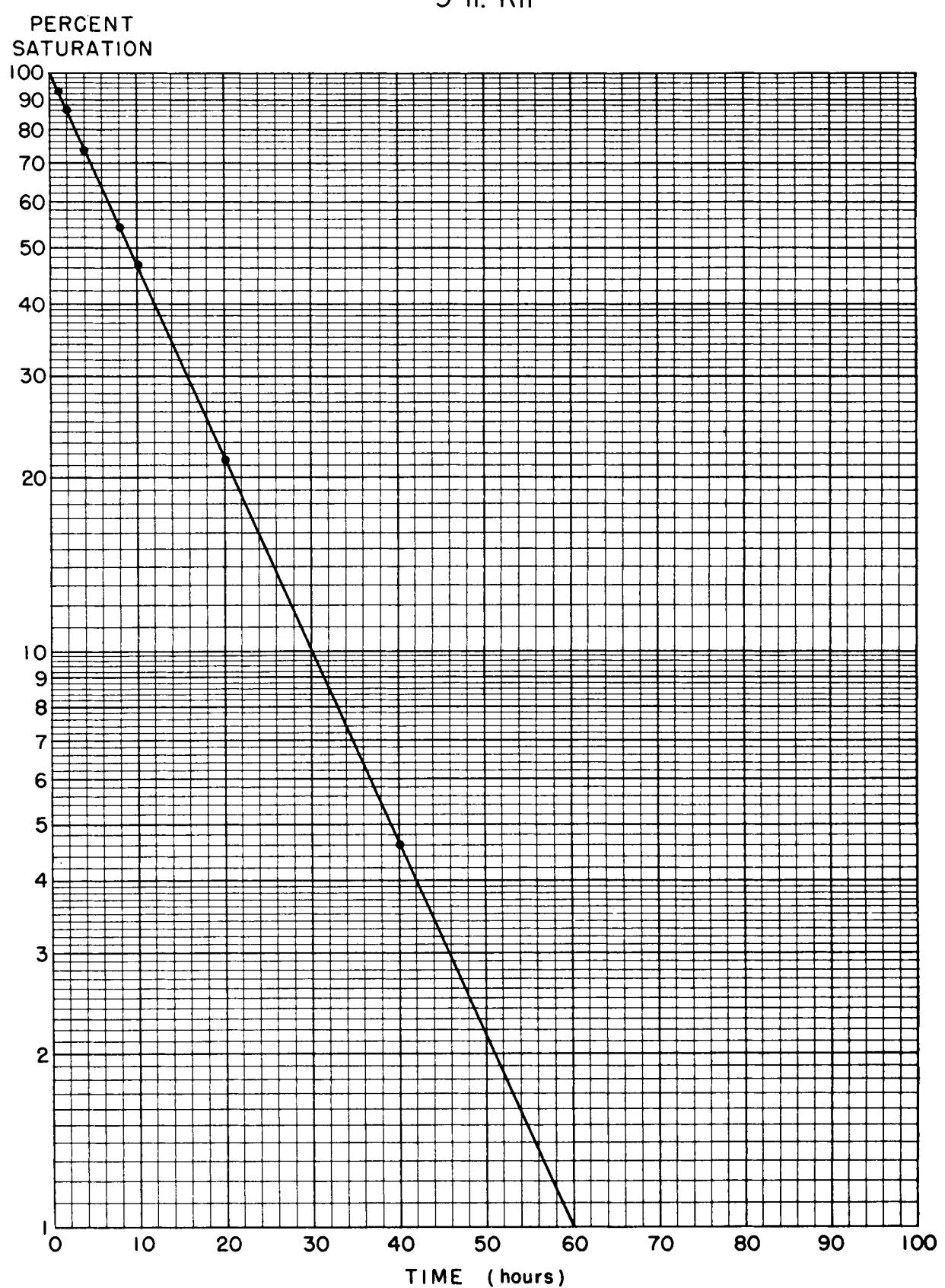


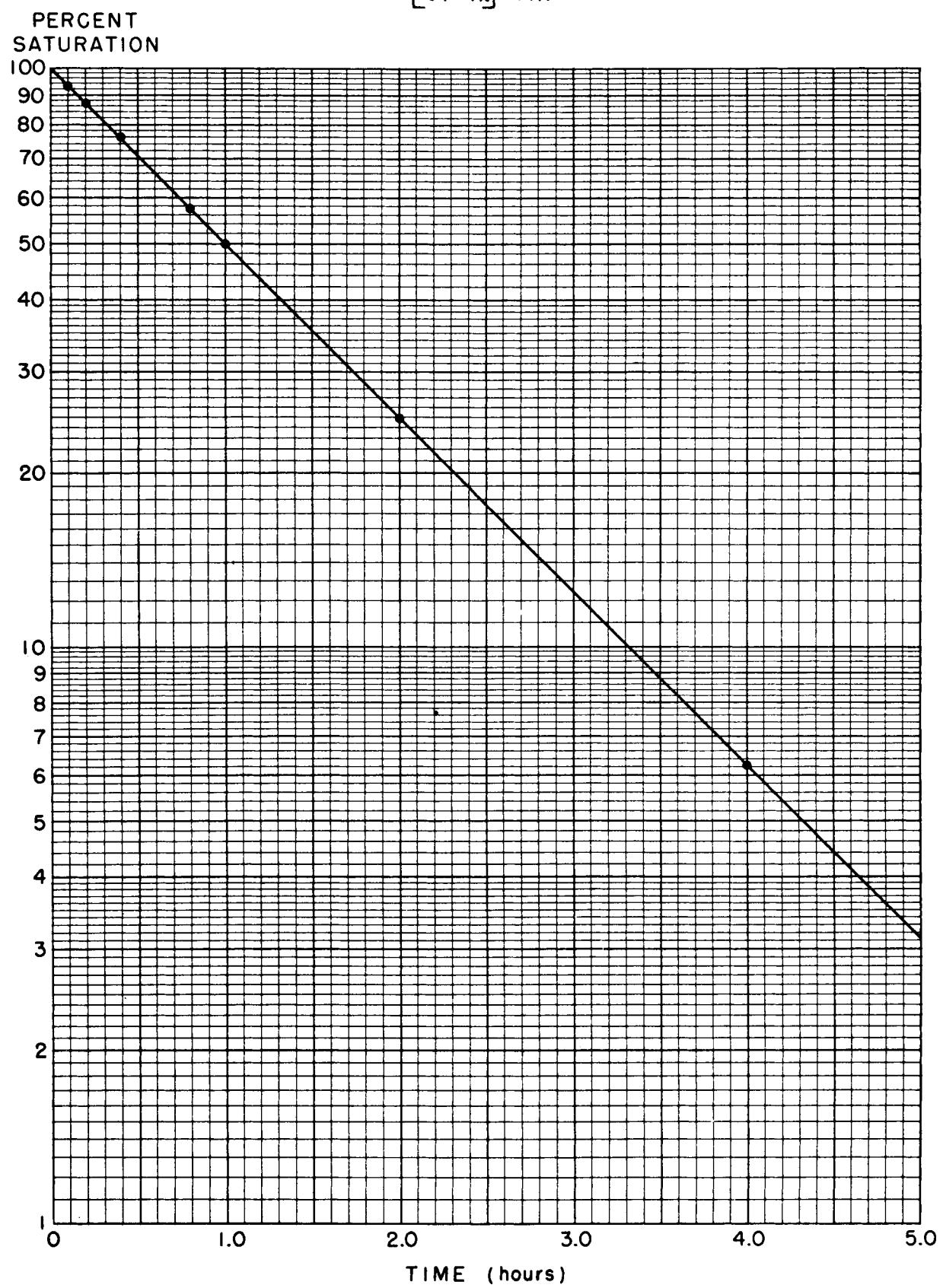
PERCENT
SATURATION

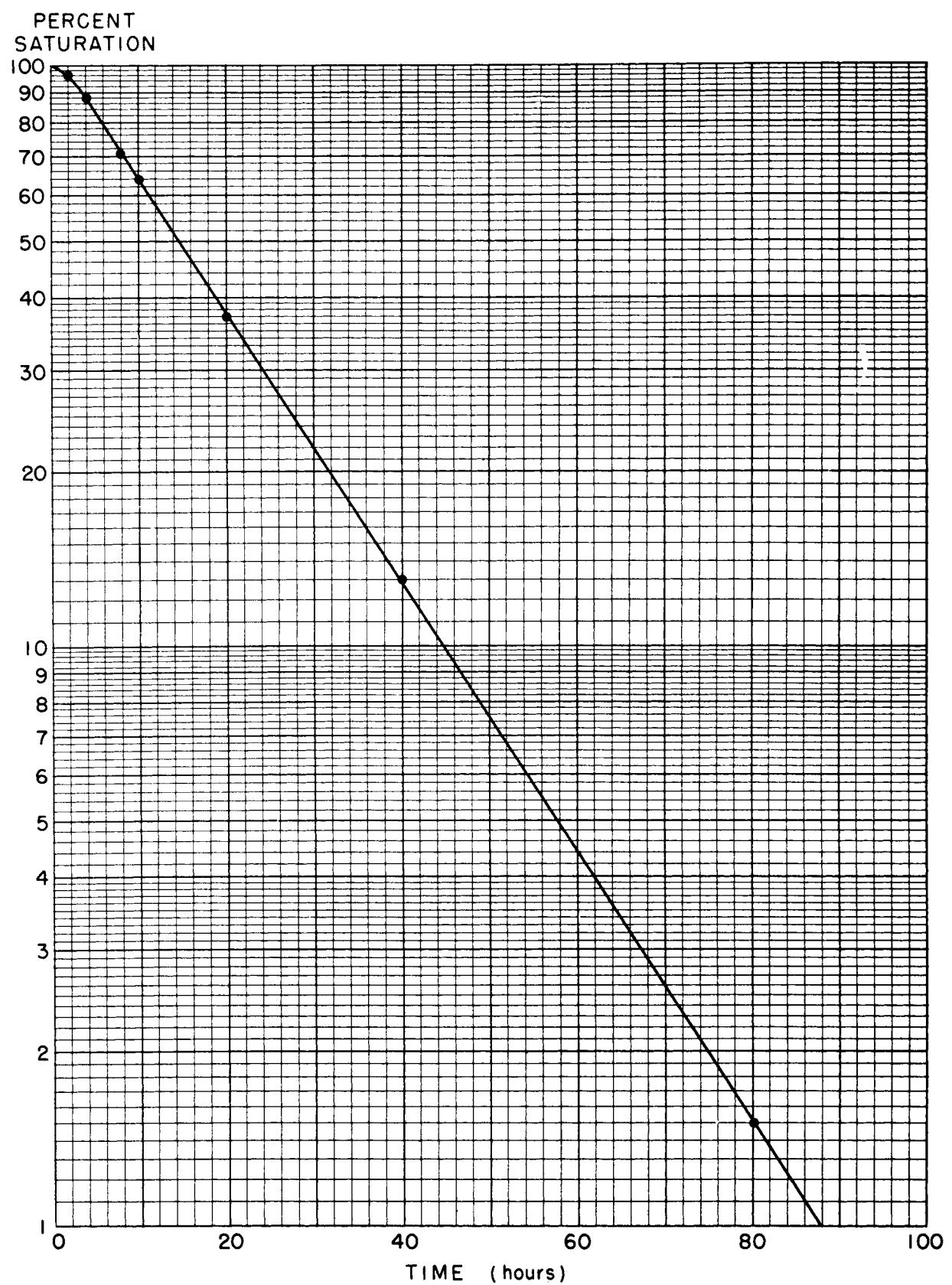


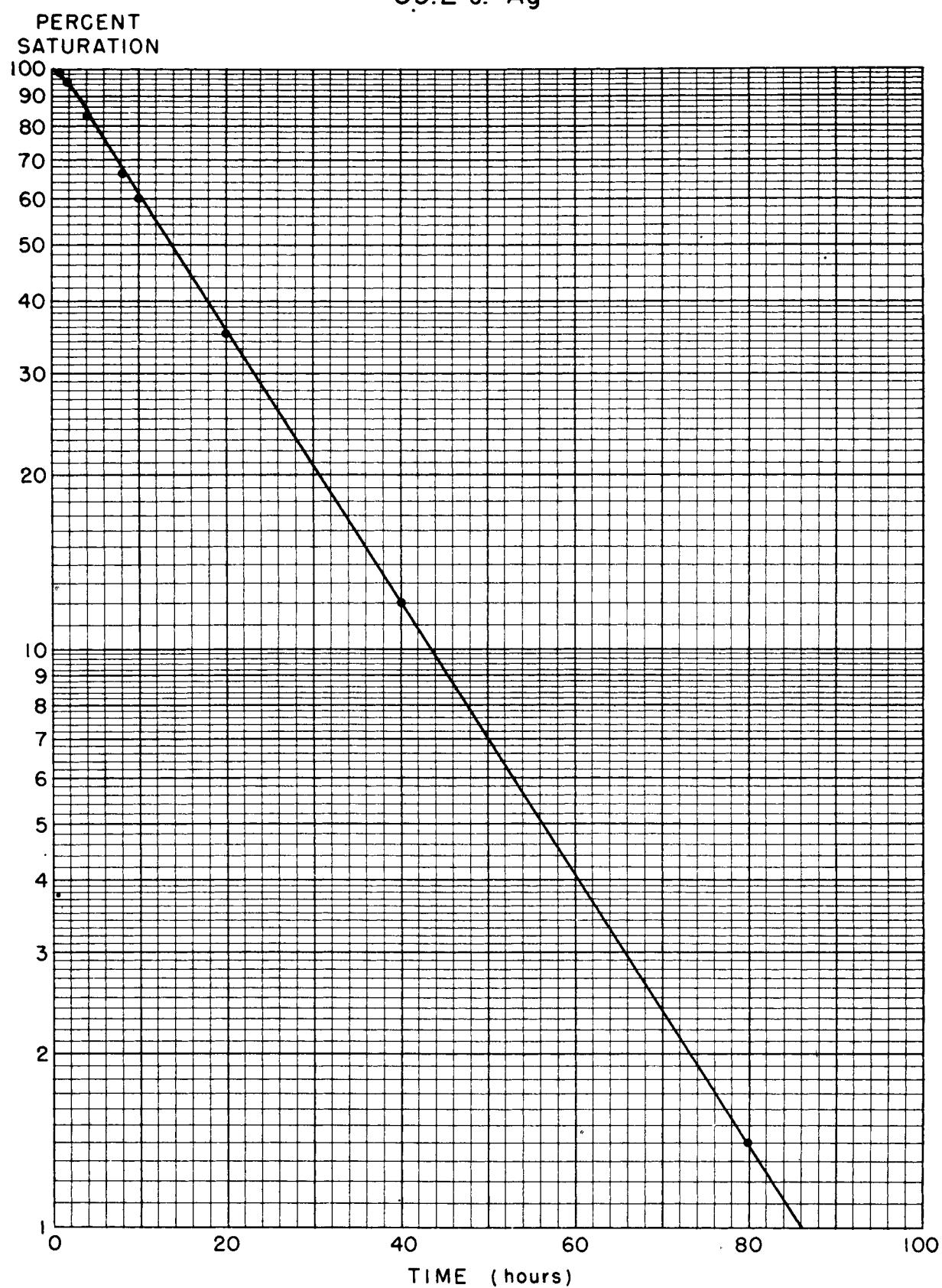
PERCENT
SATURATION



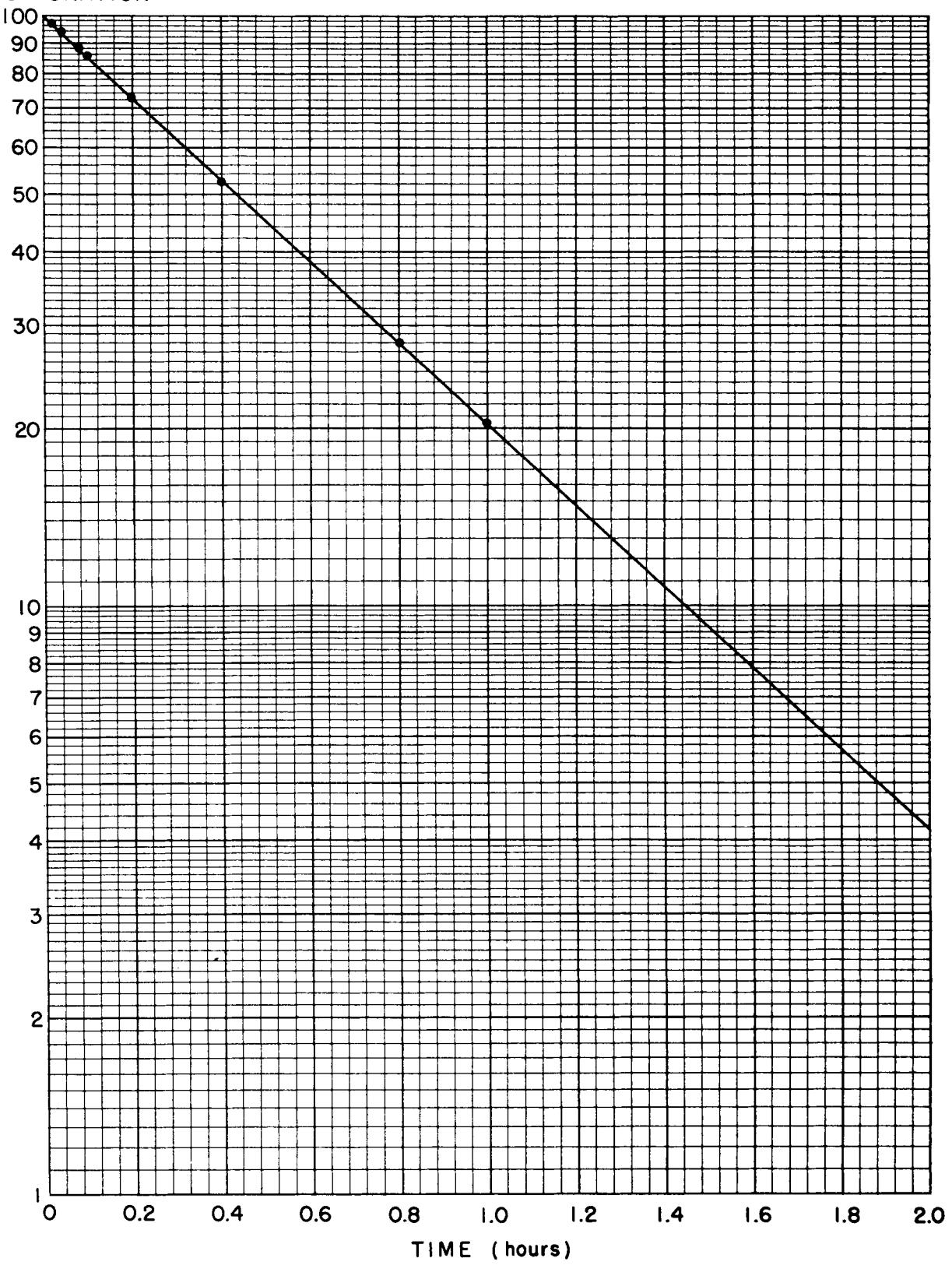
9 h. Rh¹⁰⁸

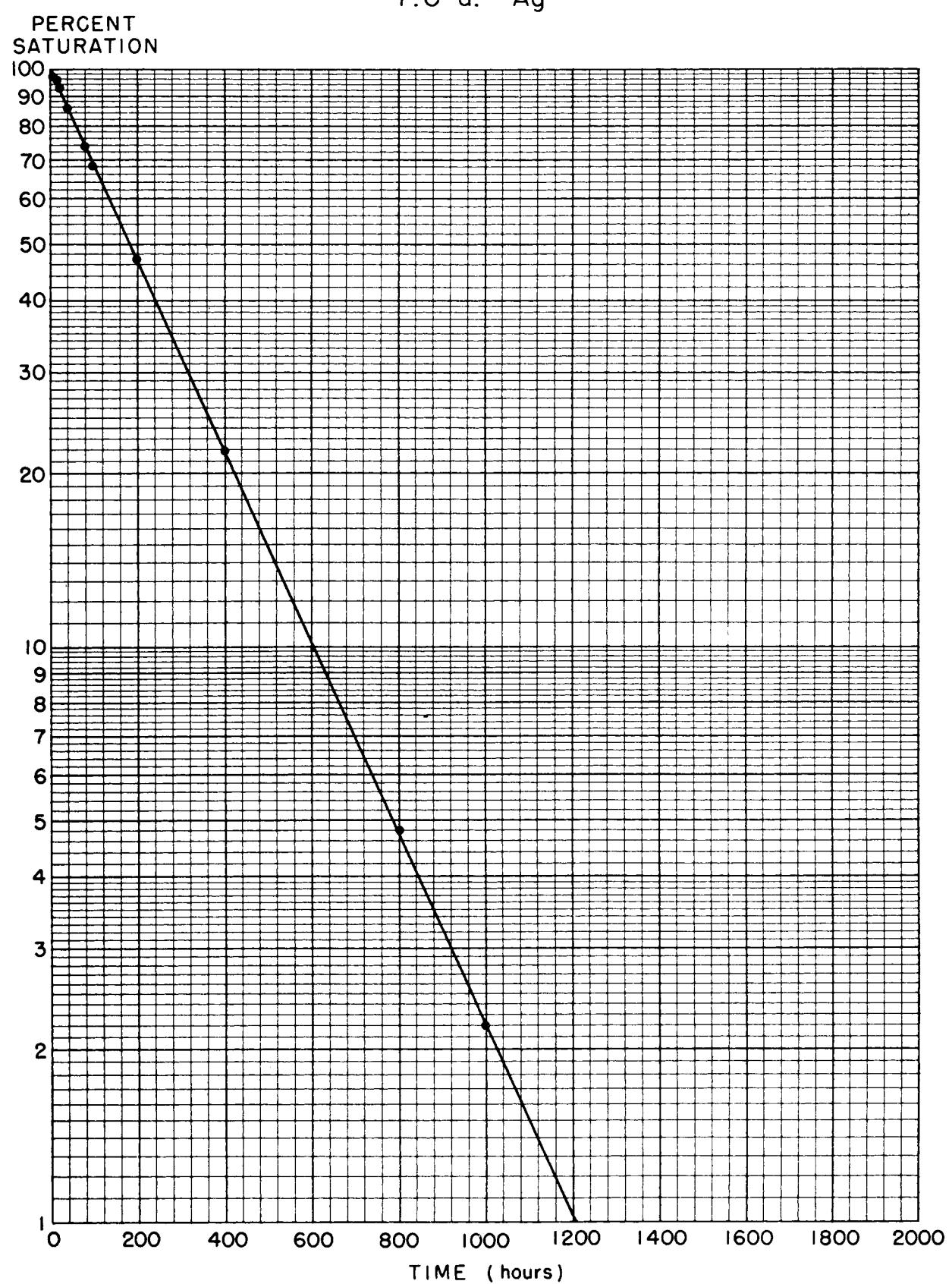


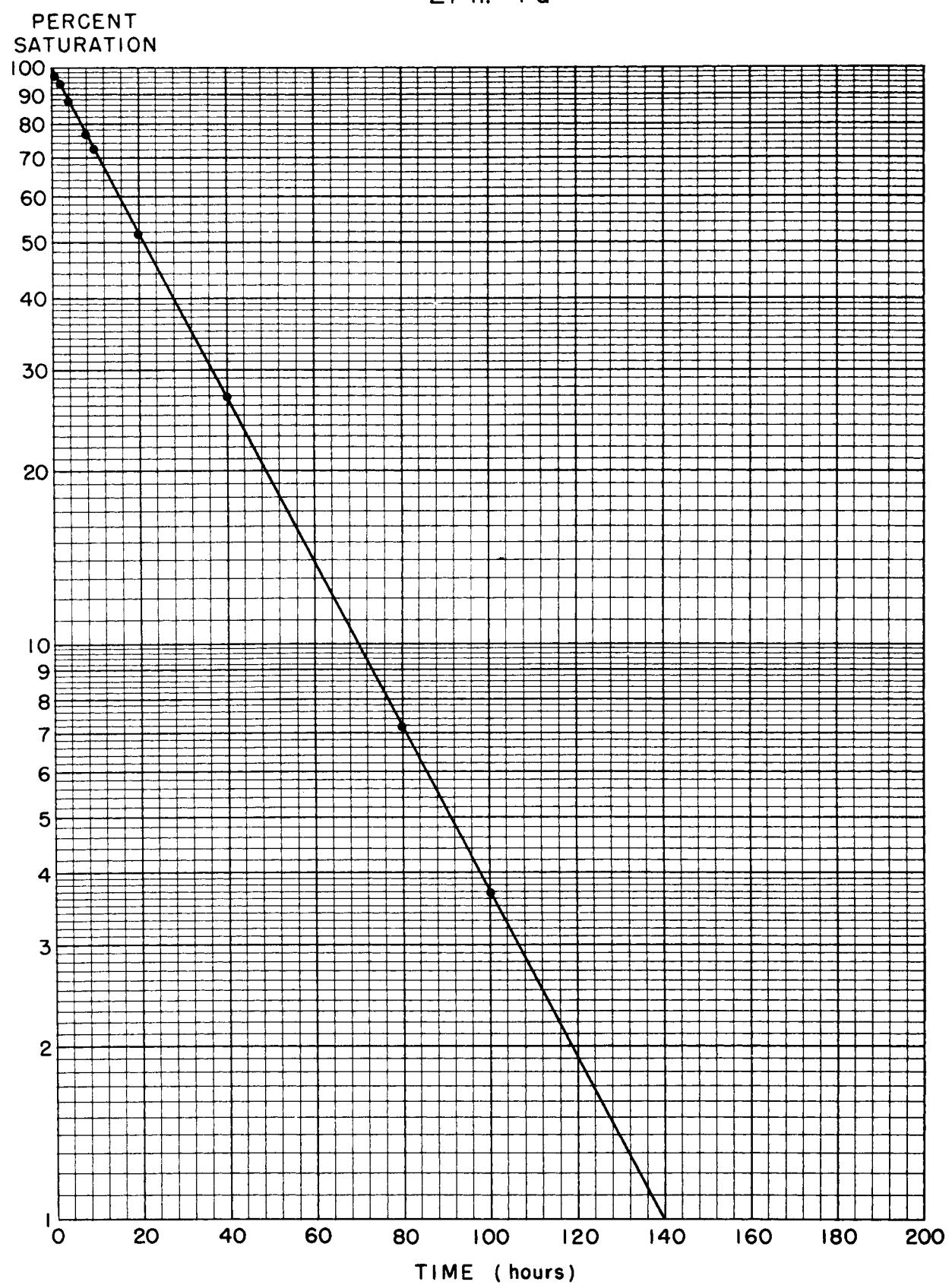




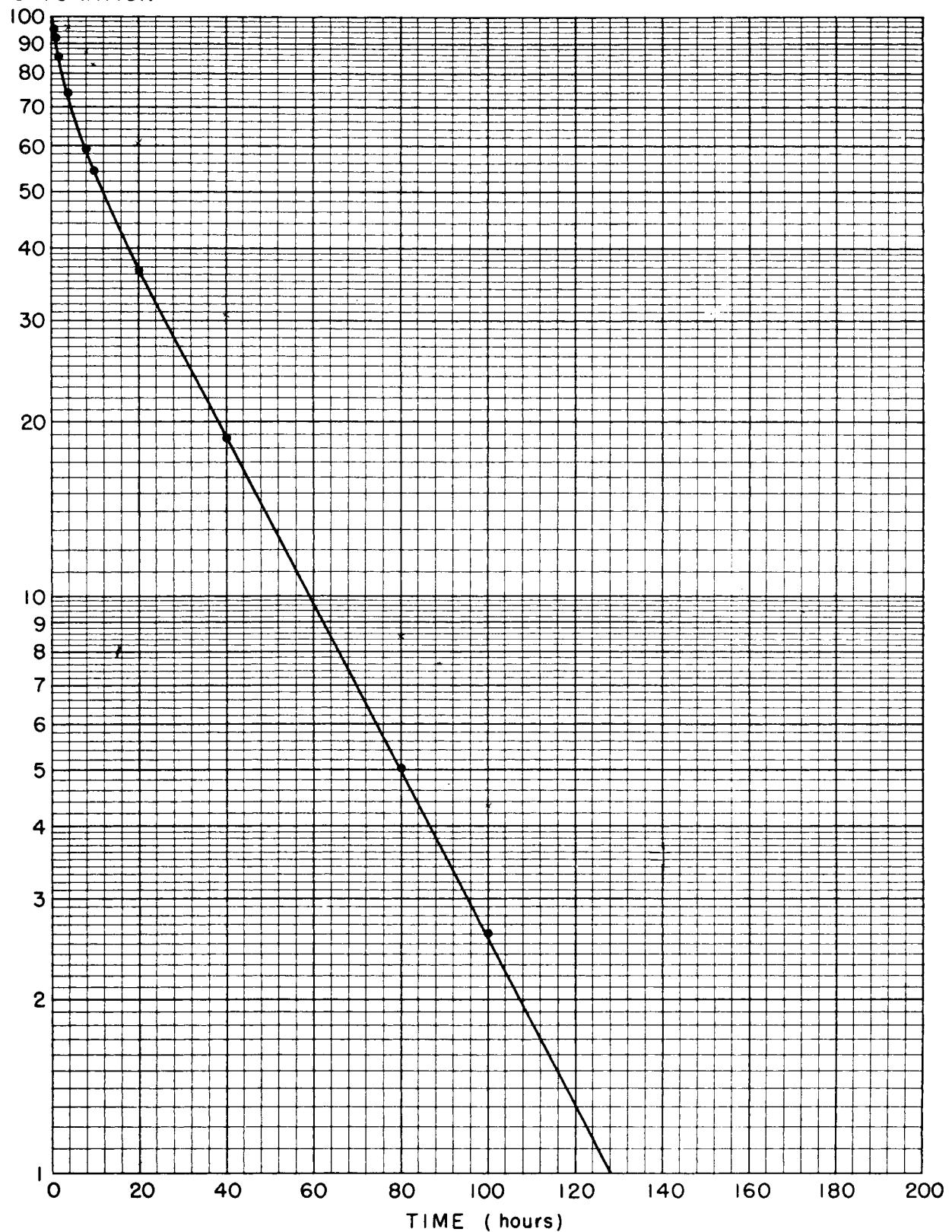
PERCENT
SATURATION

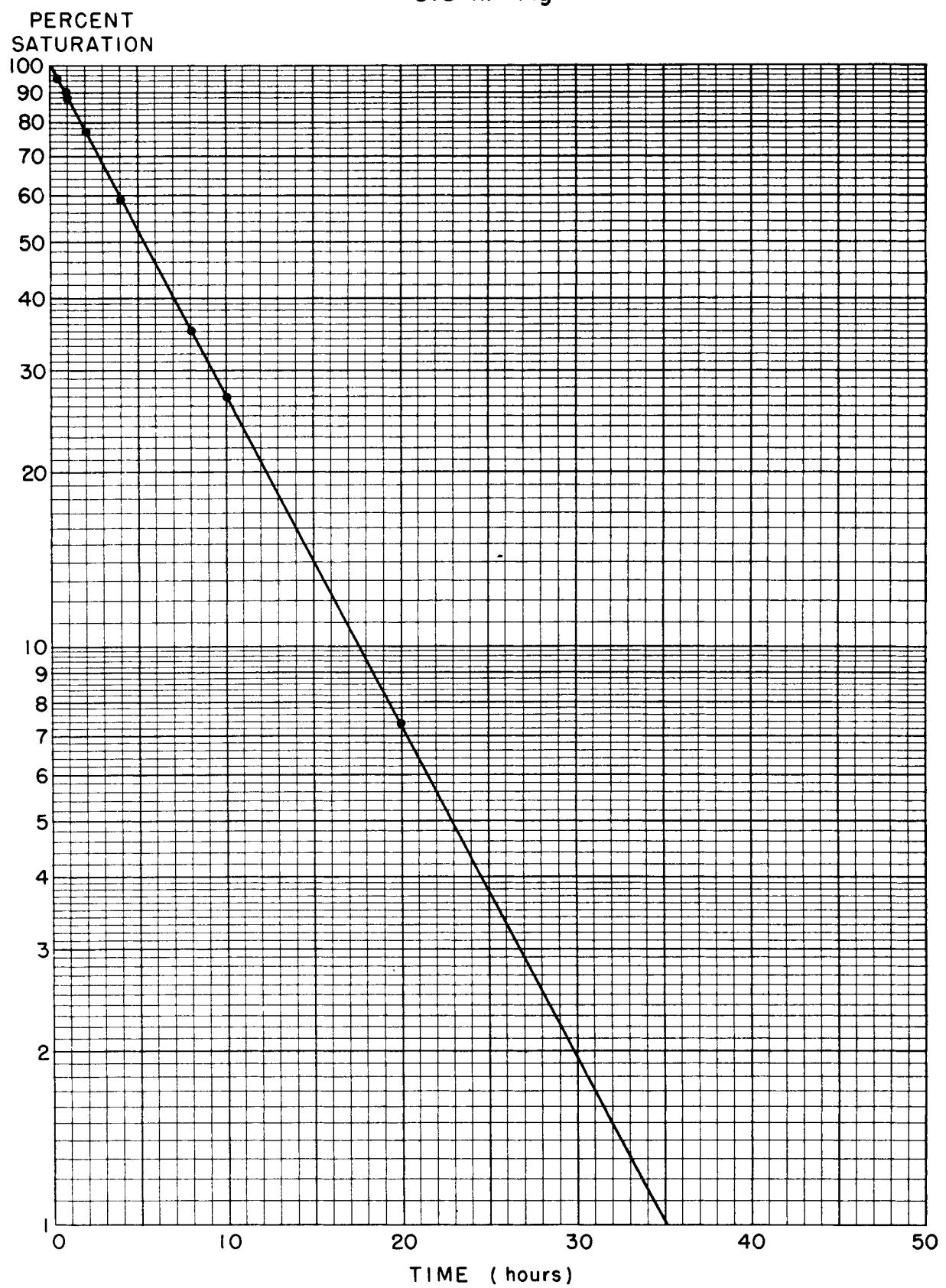


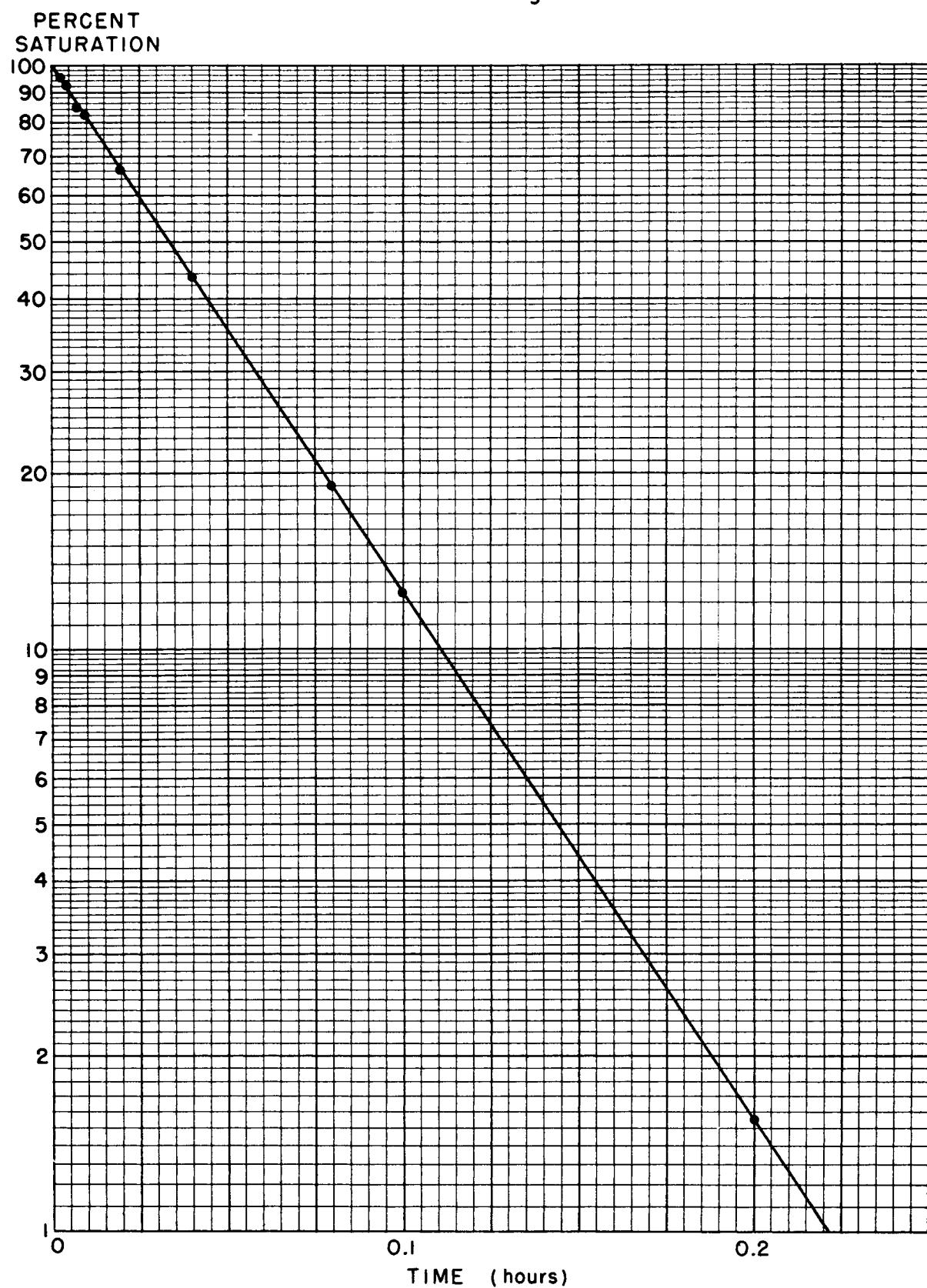


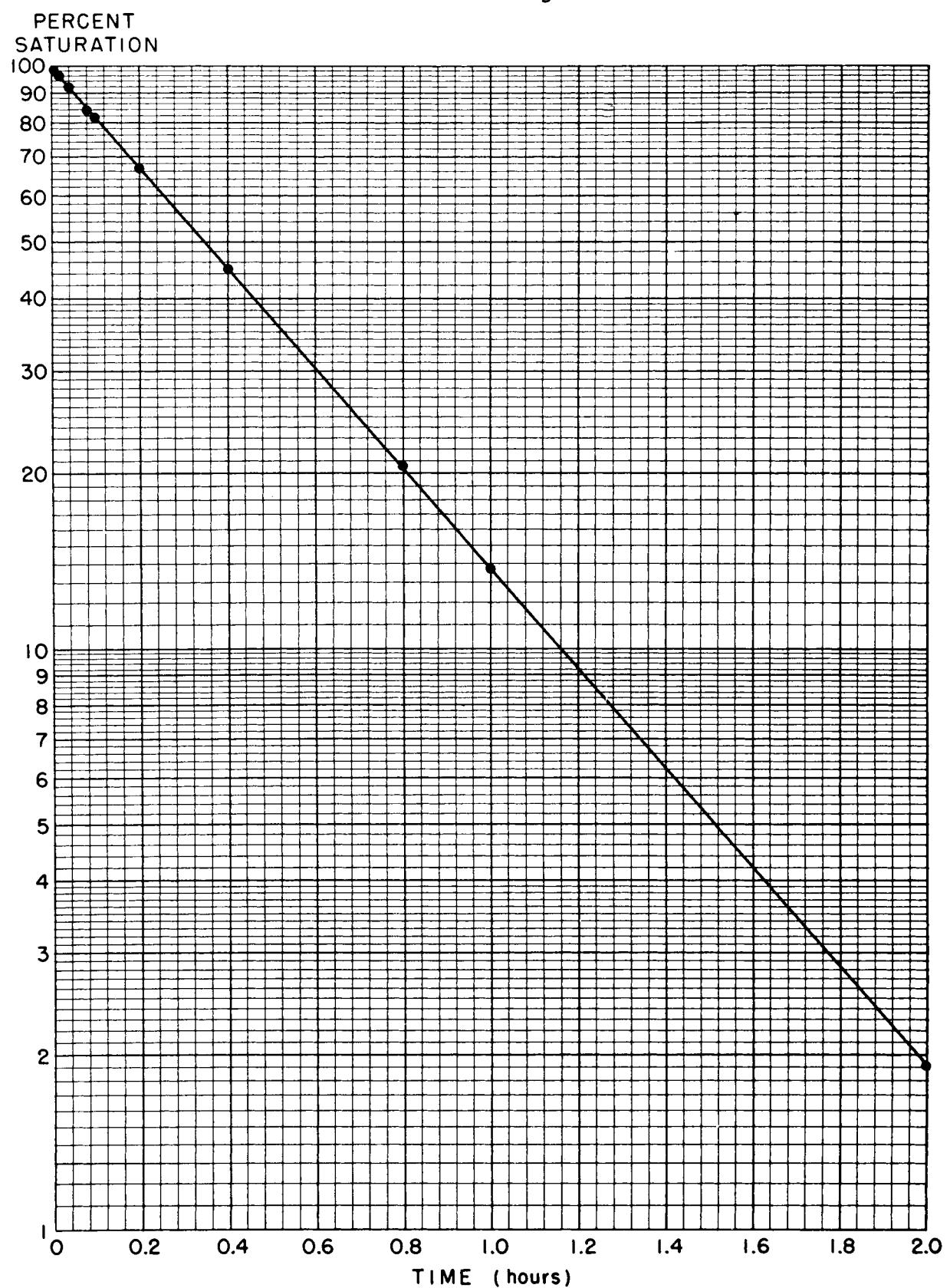
21 h. Pd^{112} 

PERCENT
SATURATION

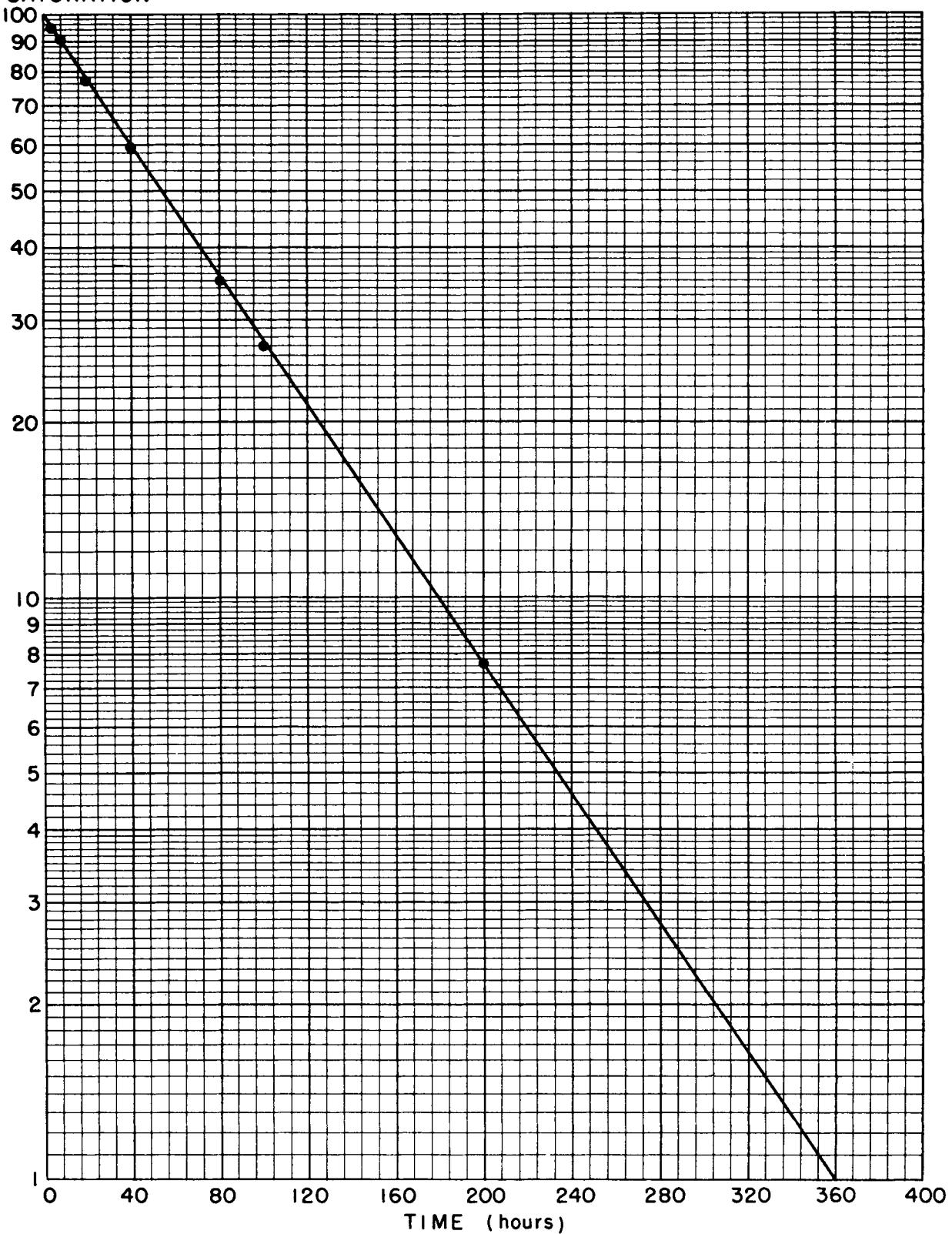


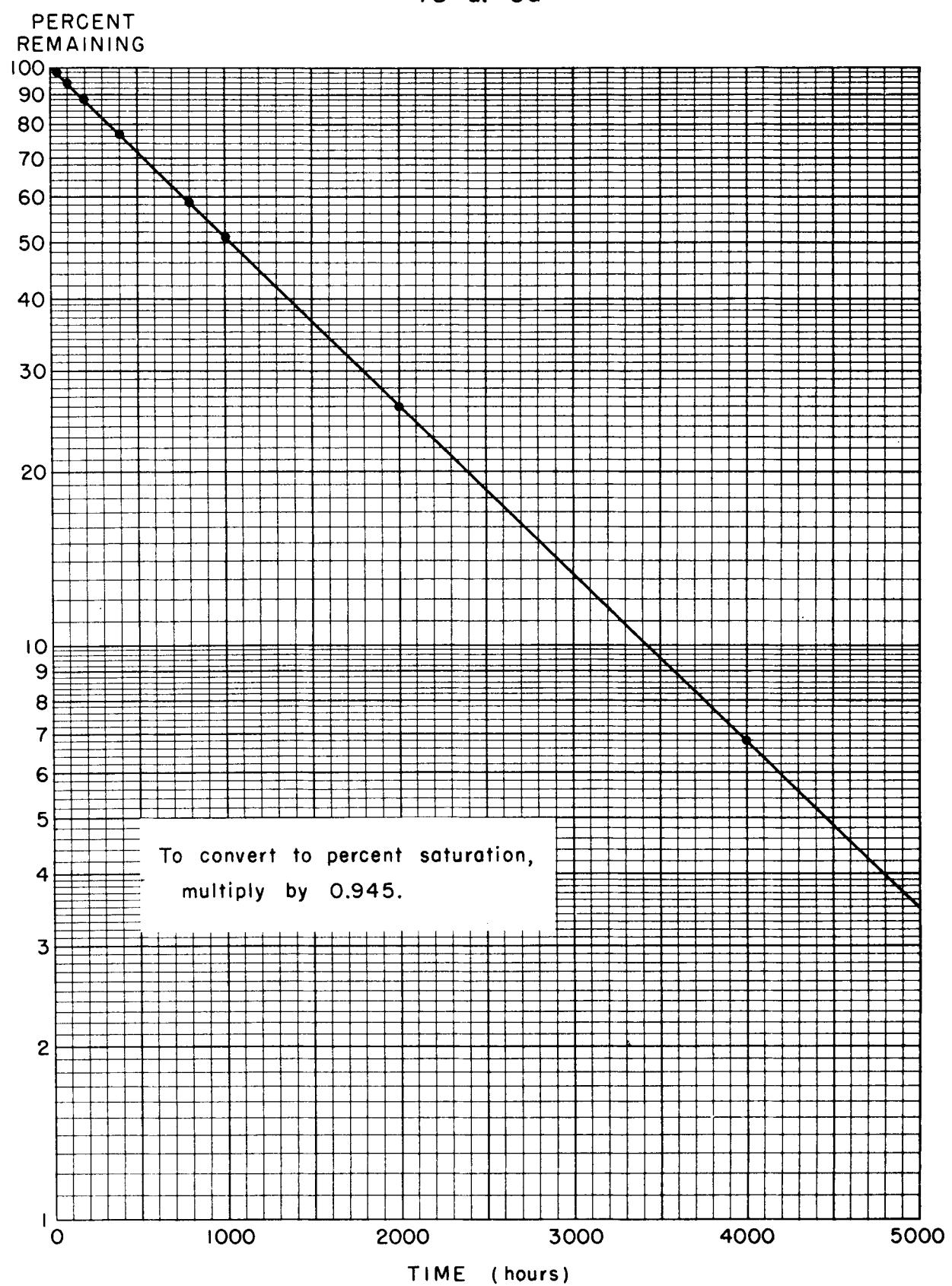
5.3 h. Ag^{113} 

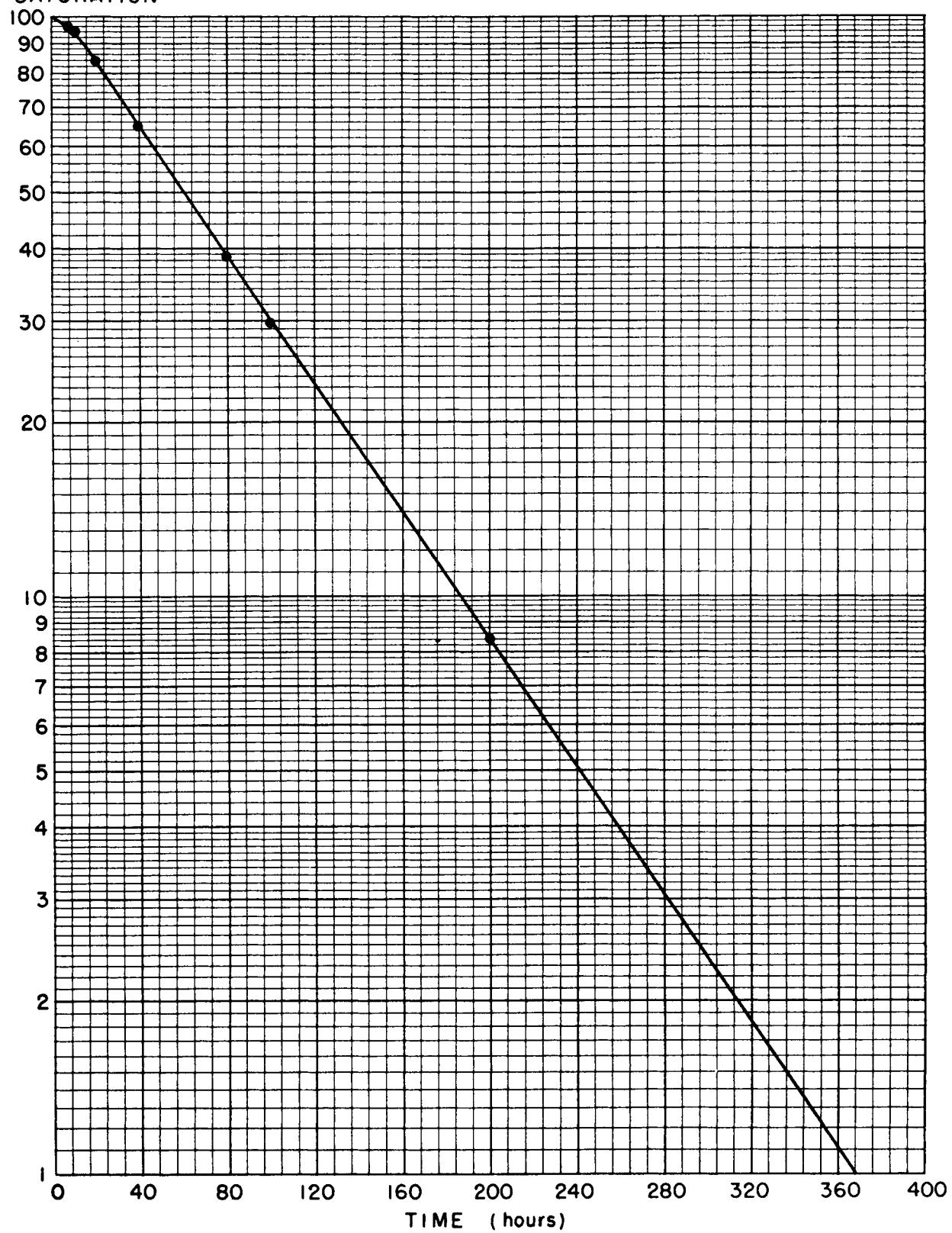




PERCENT
SATURATION



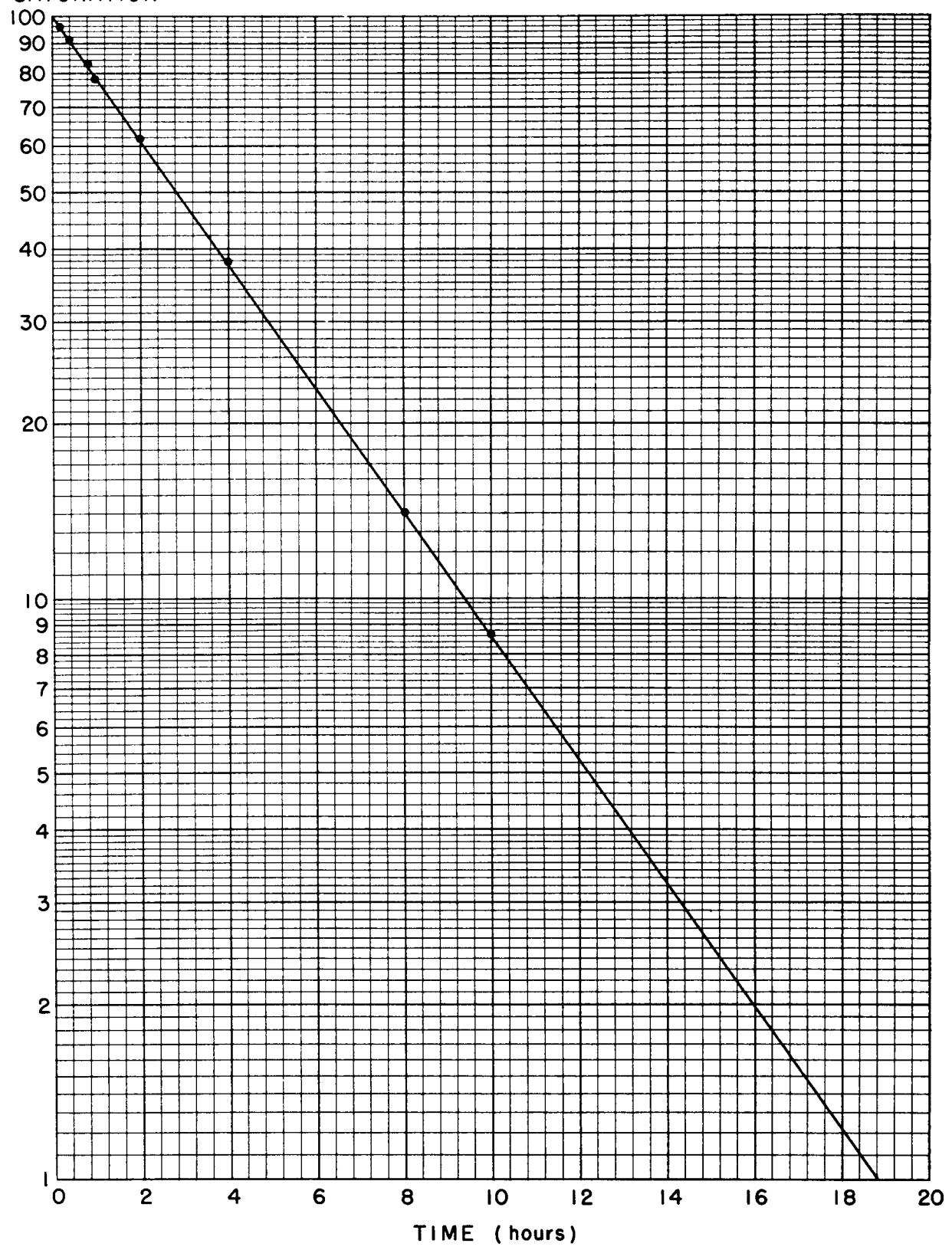


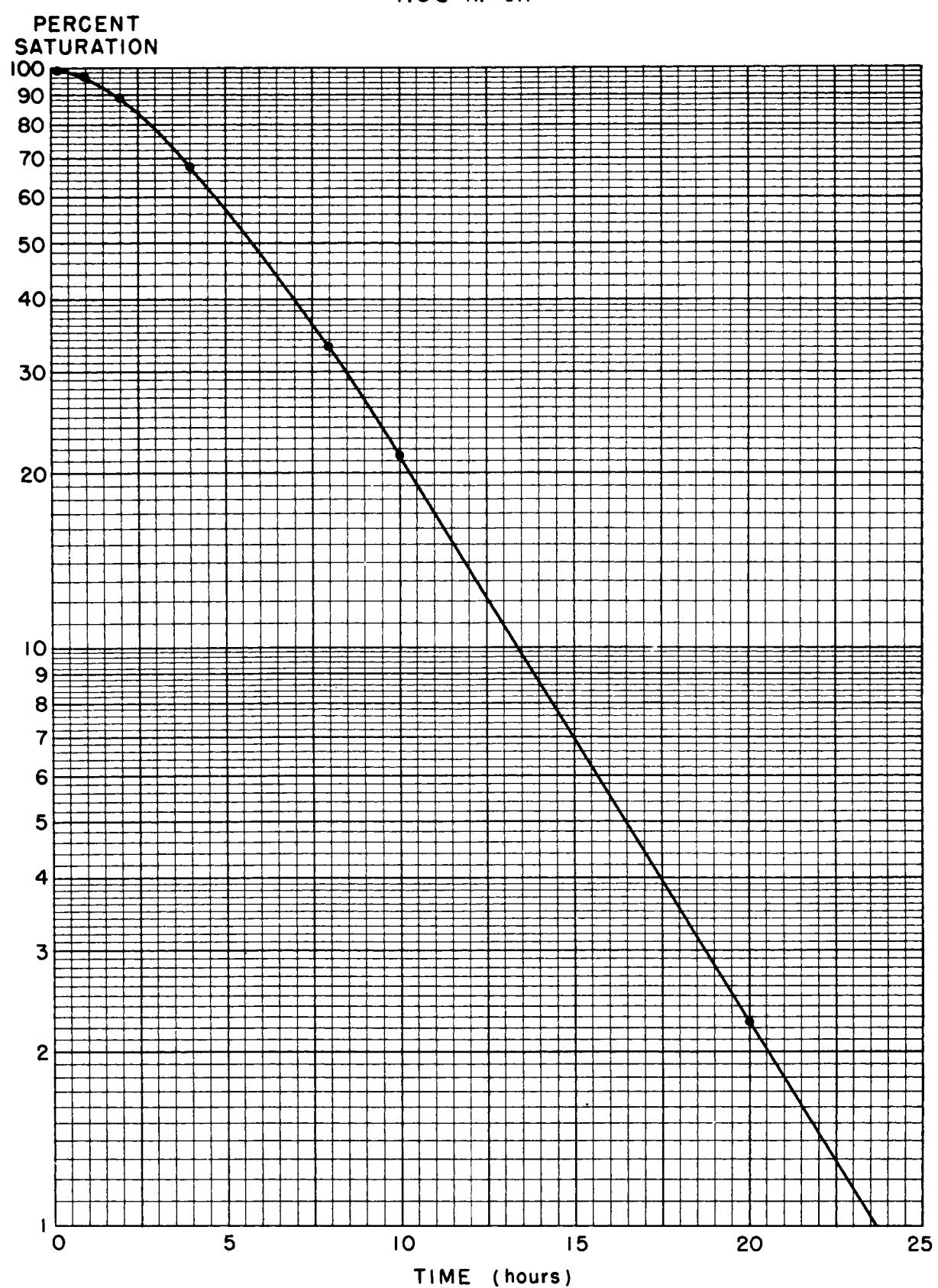
4.5 h. In¹¹⁵PERCENT
SATURATION

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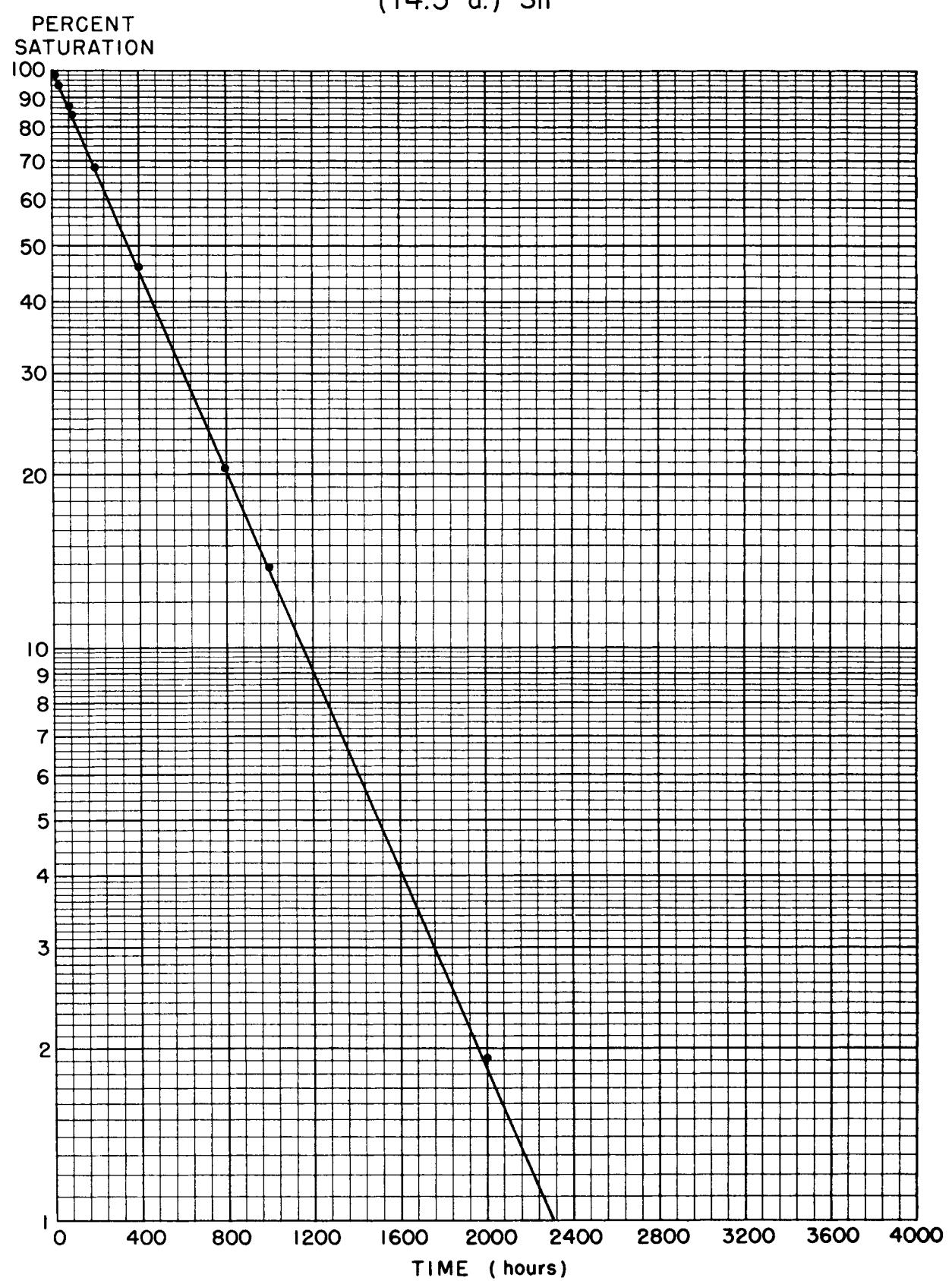
2.83 h. Cd^{117}

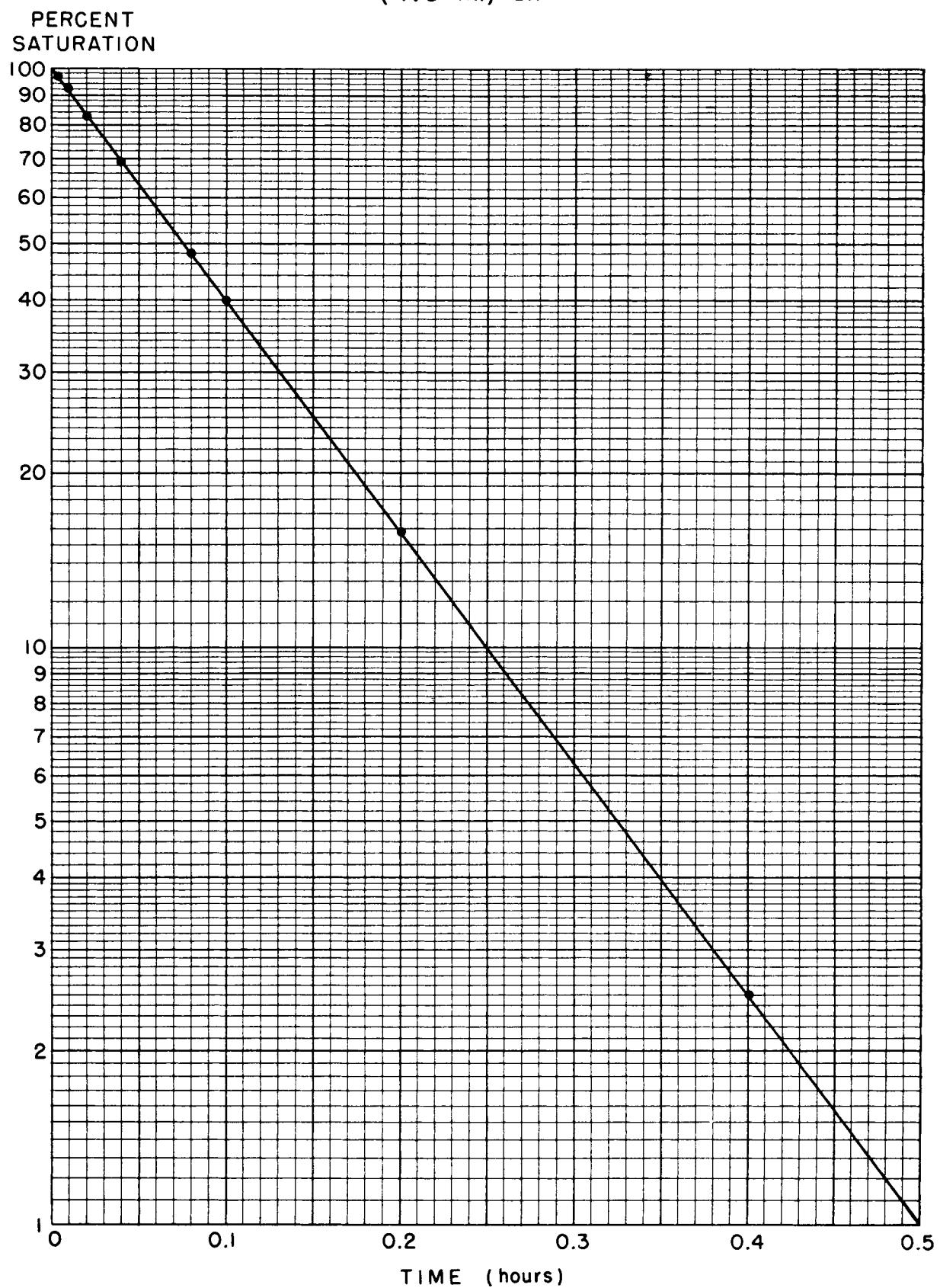
PERCENT
SATURATION

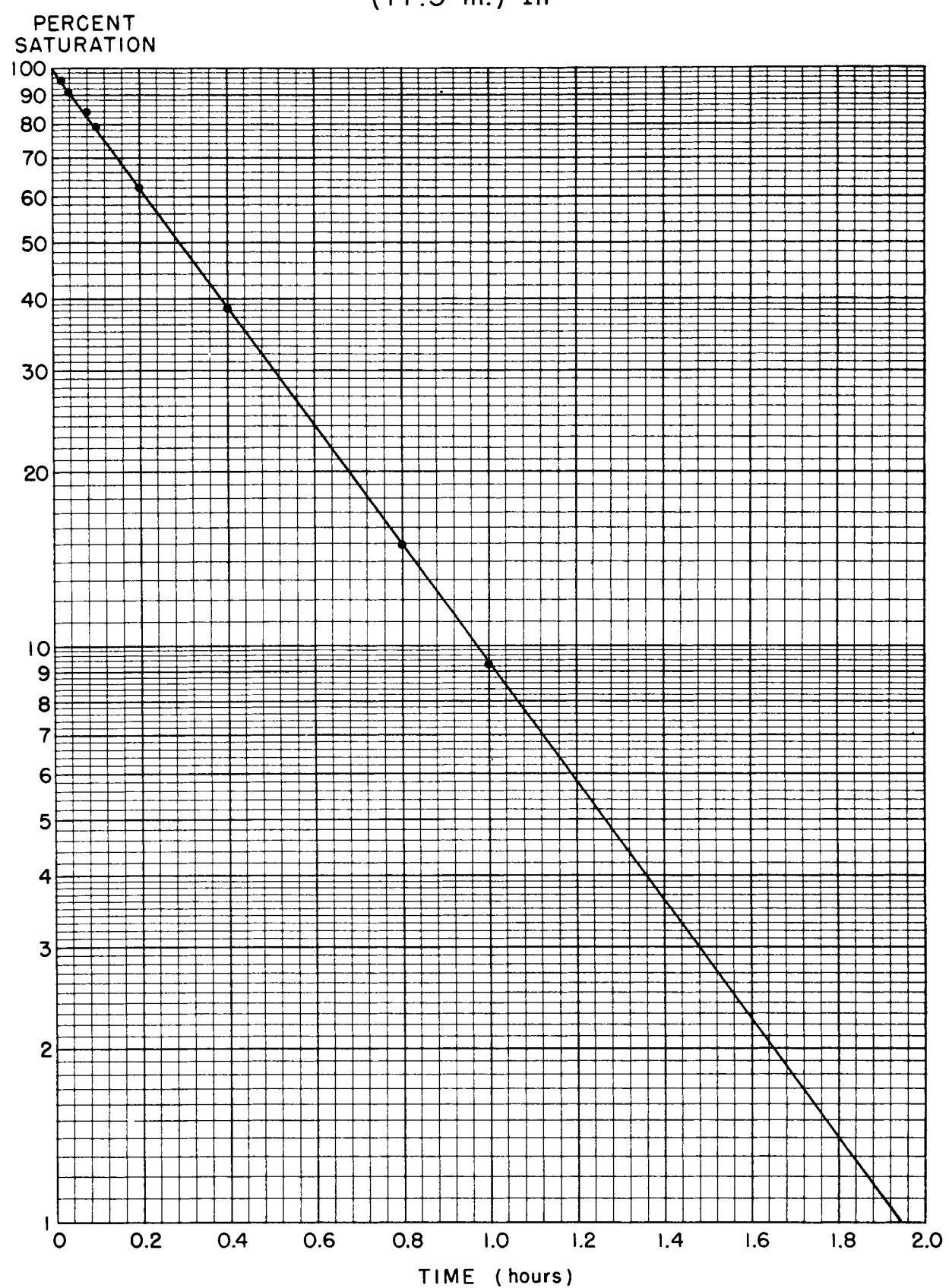


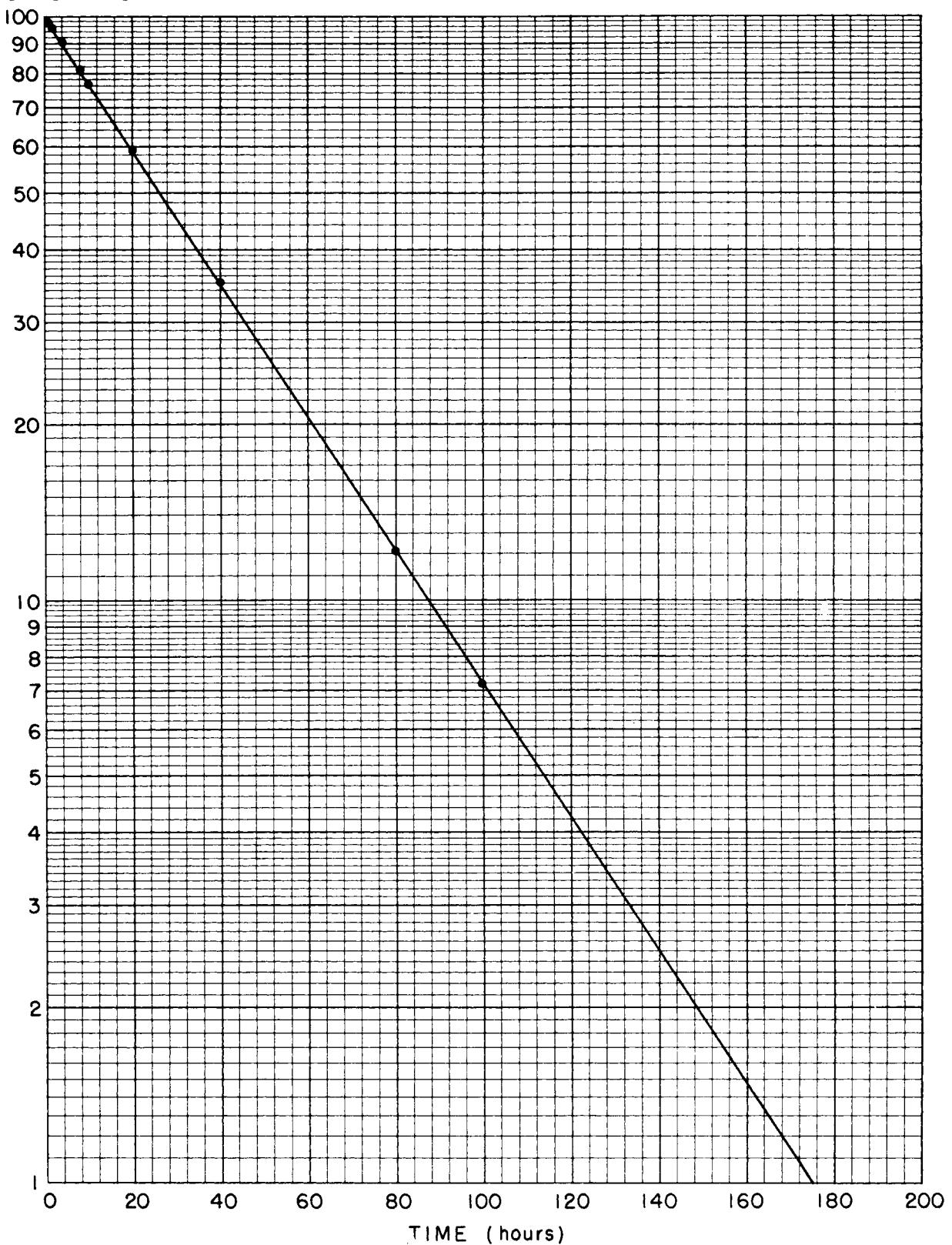


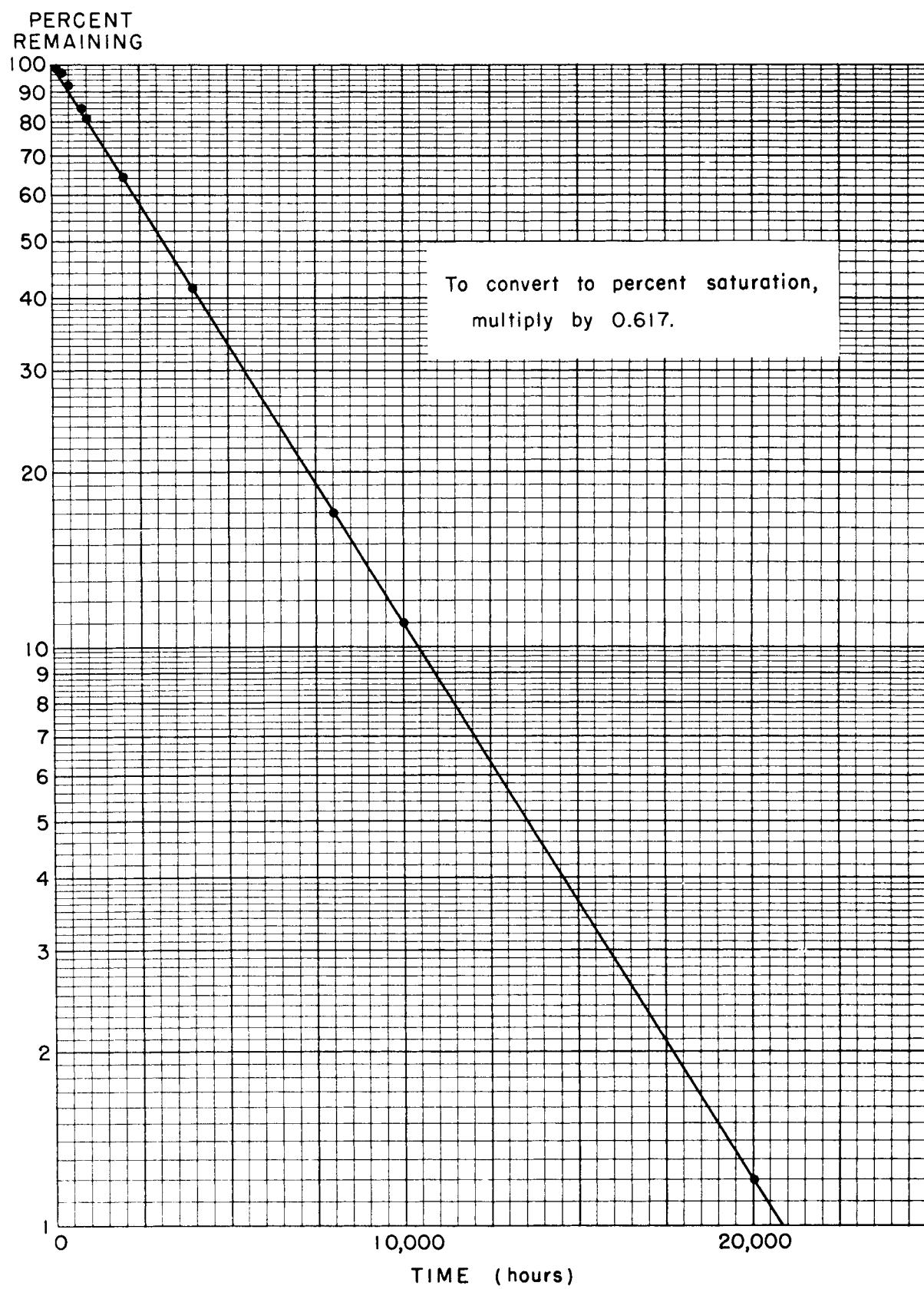
176

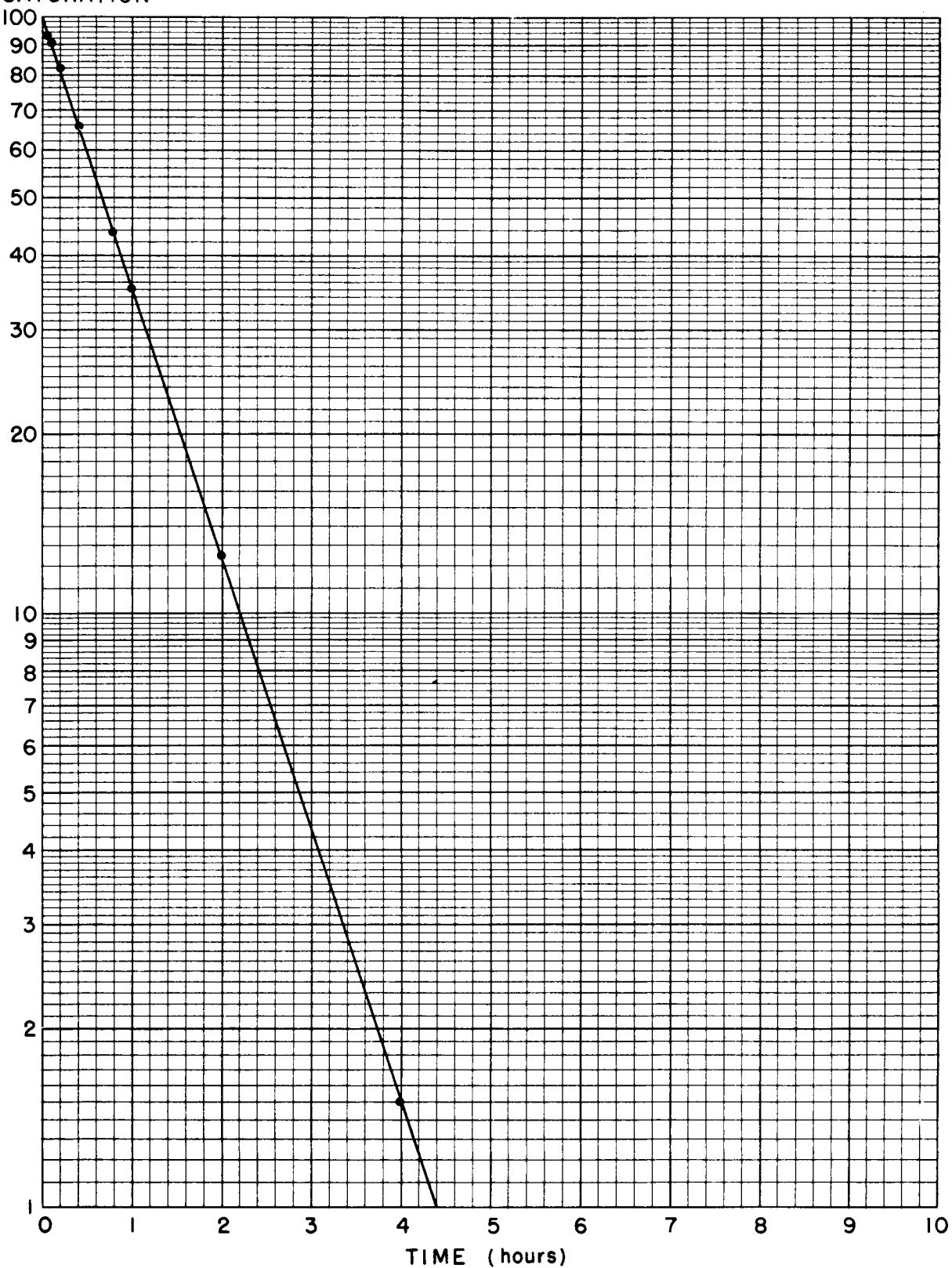
(14.5 d.) Sn^{117} 

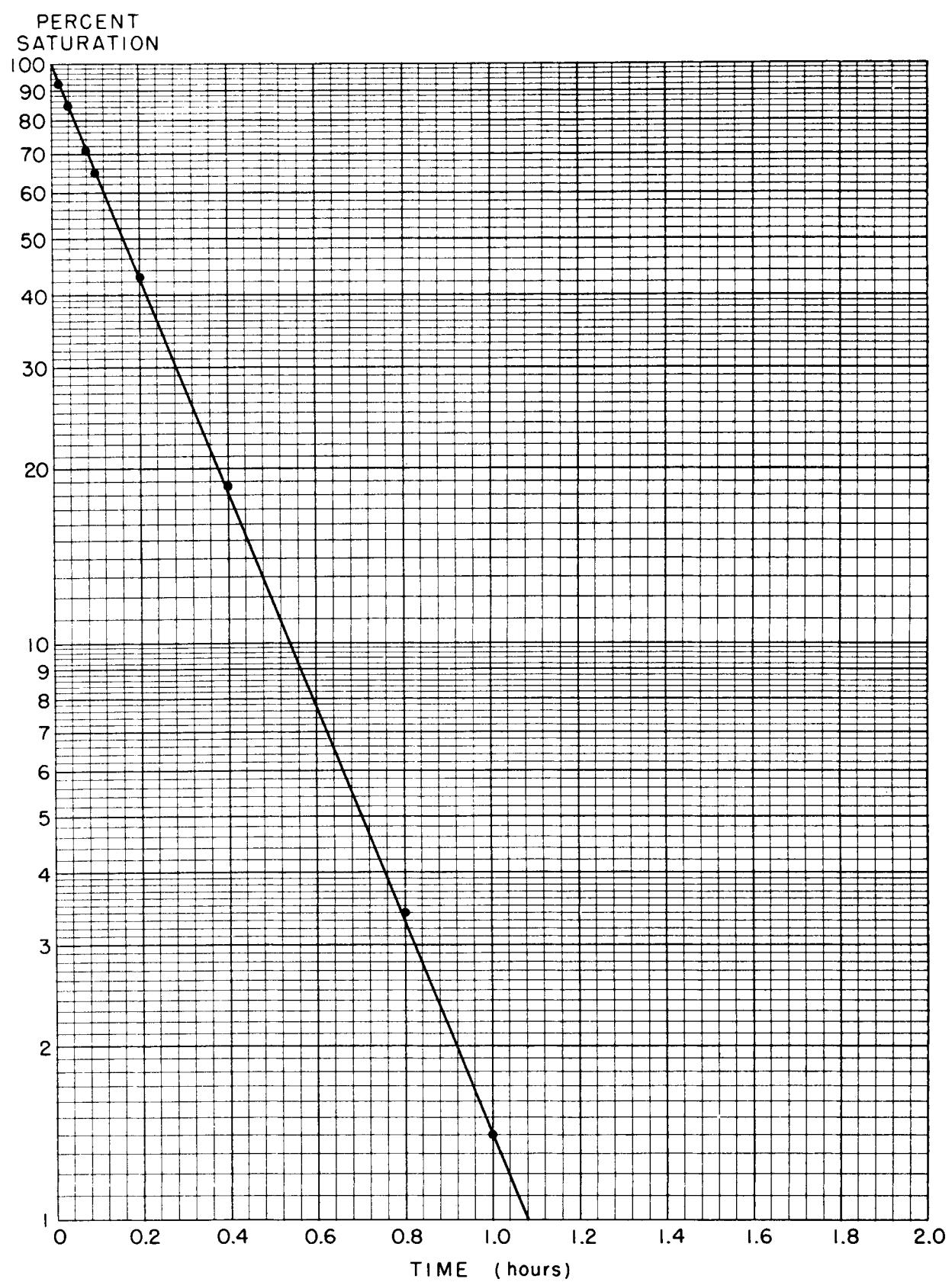


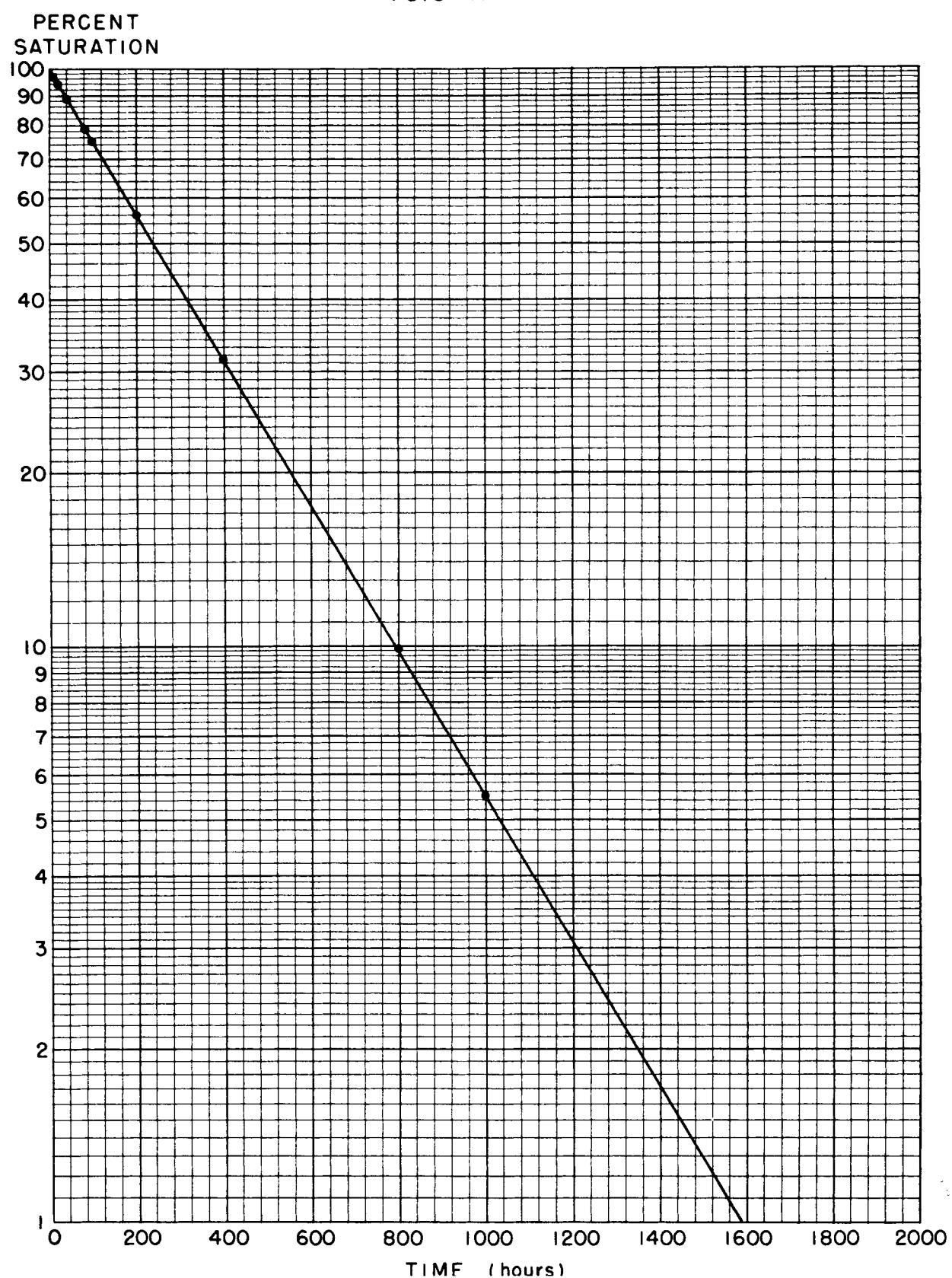


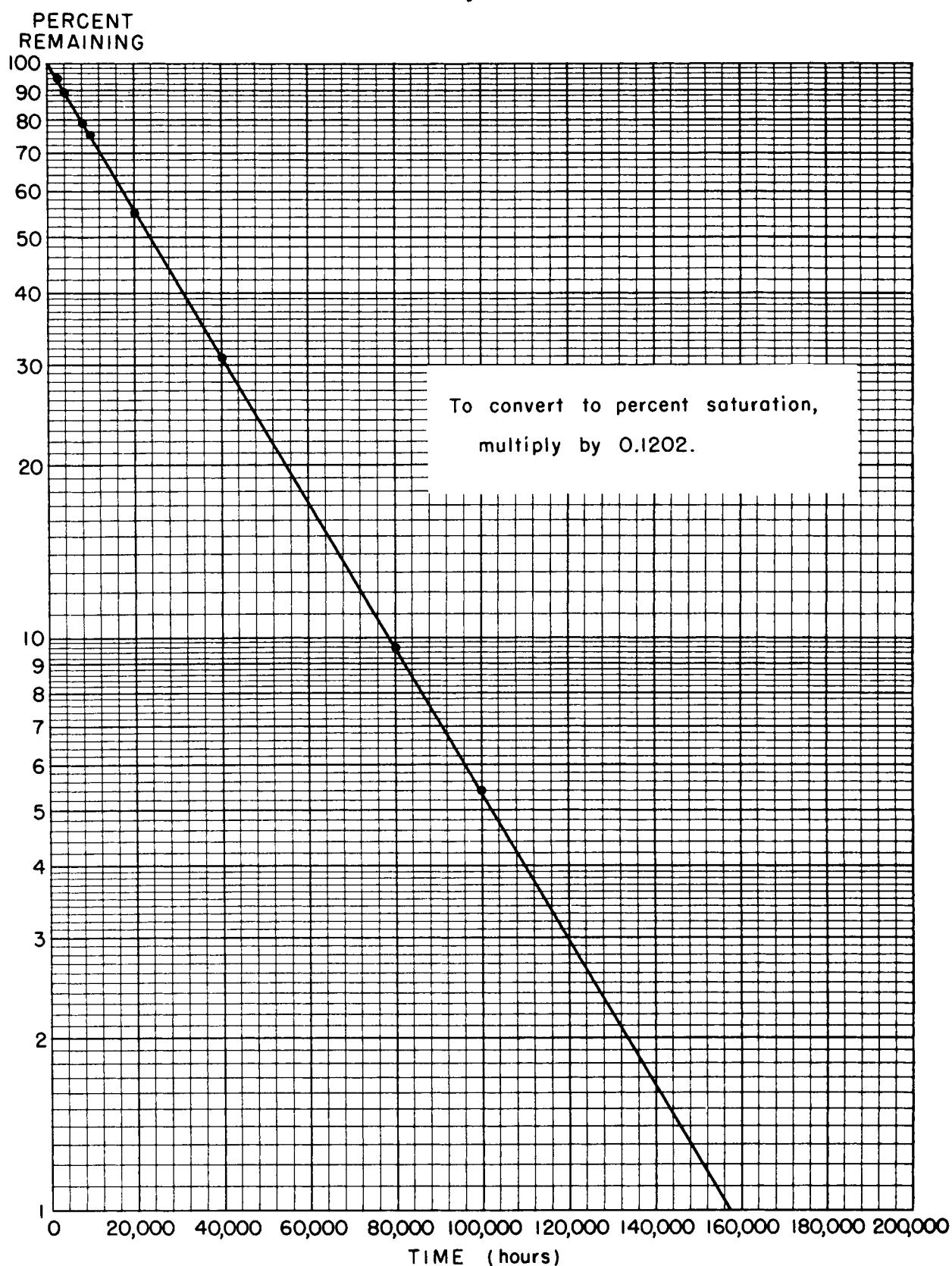
26.4 h. Sn¹²¹PERCENT
SATURATION

130 d. Sn¹²³

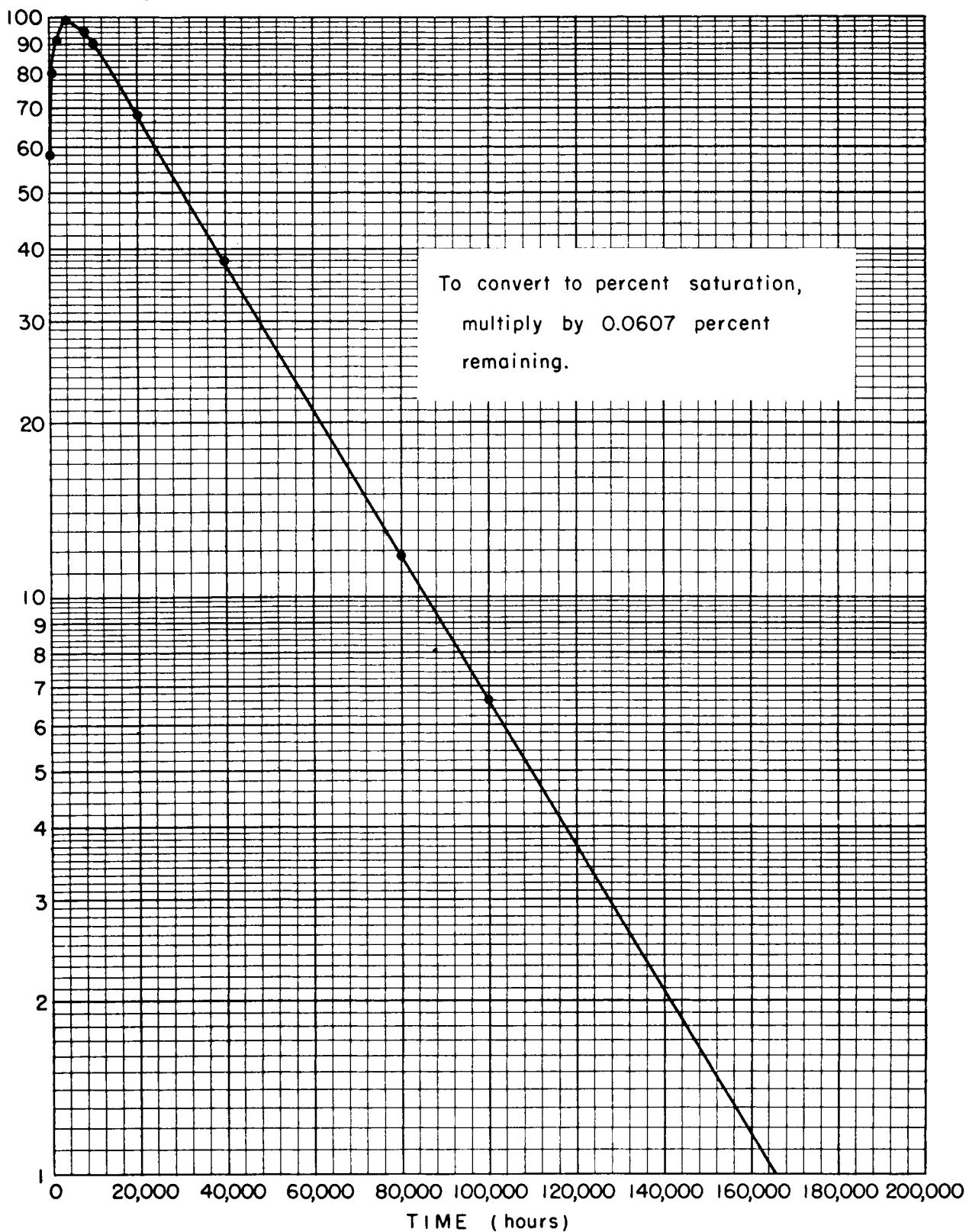
(40 m.) Sn^{123} PERCENT
SATURATION

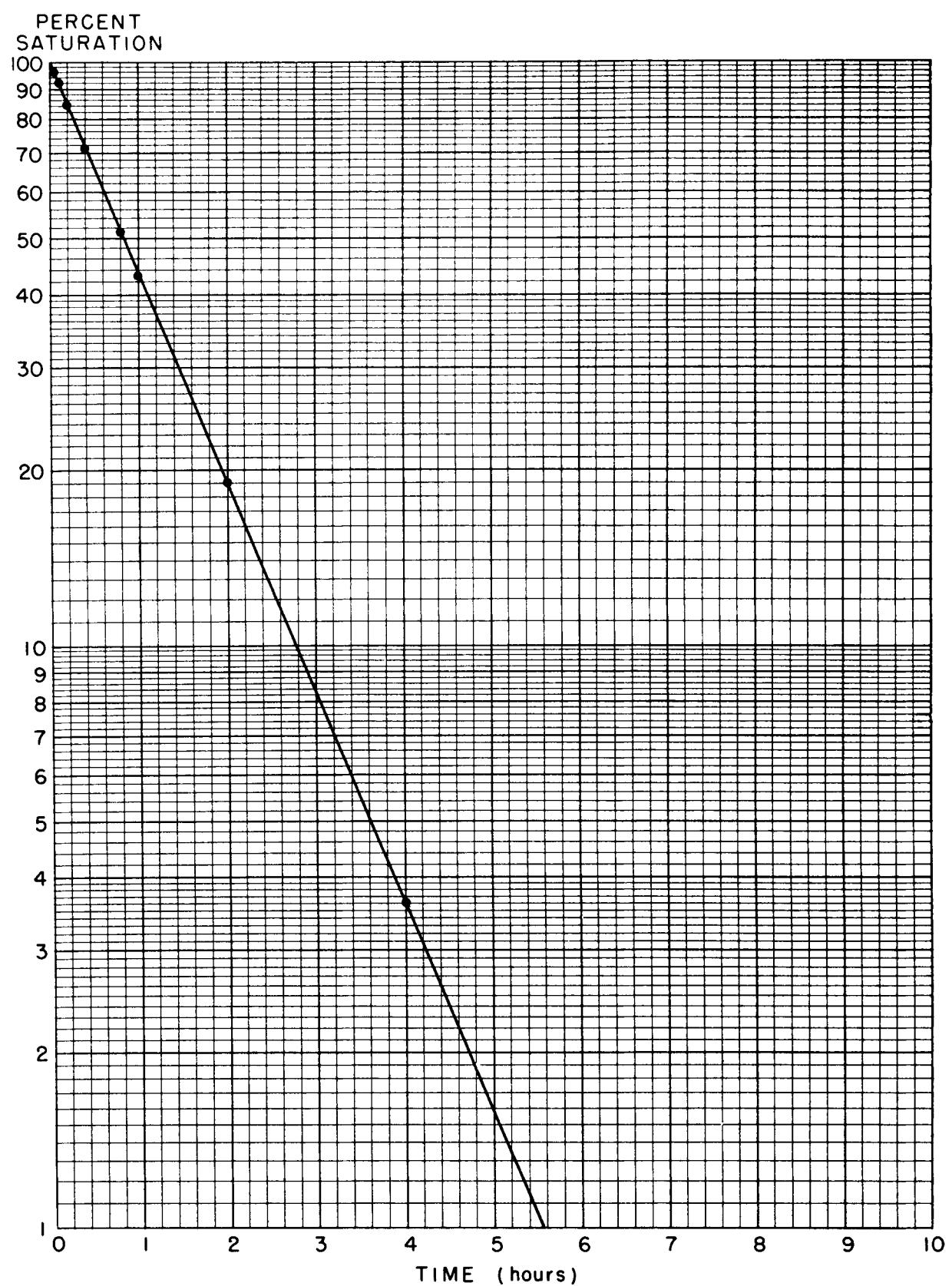


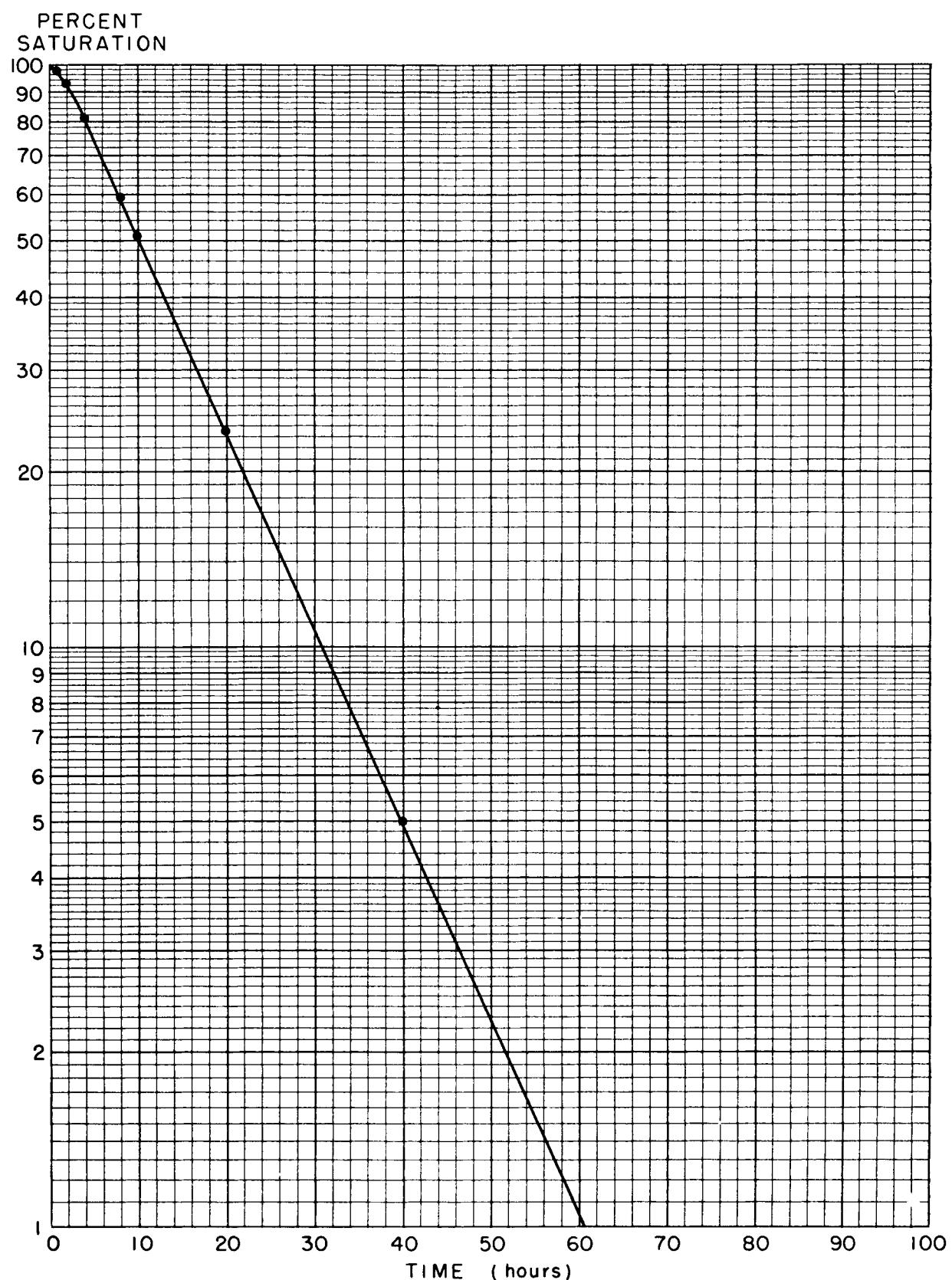
10.0 d. Sn¹²⁵

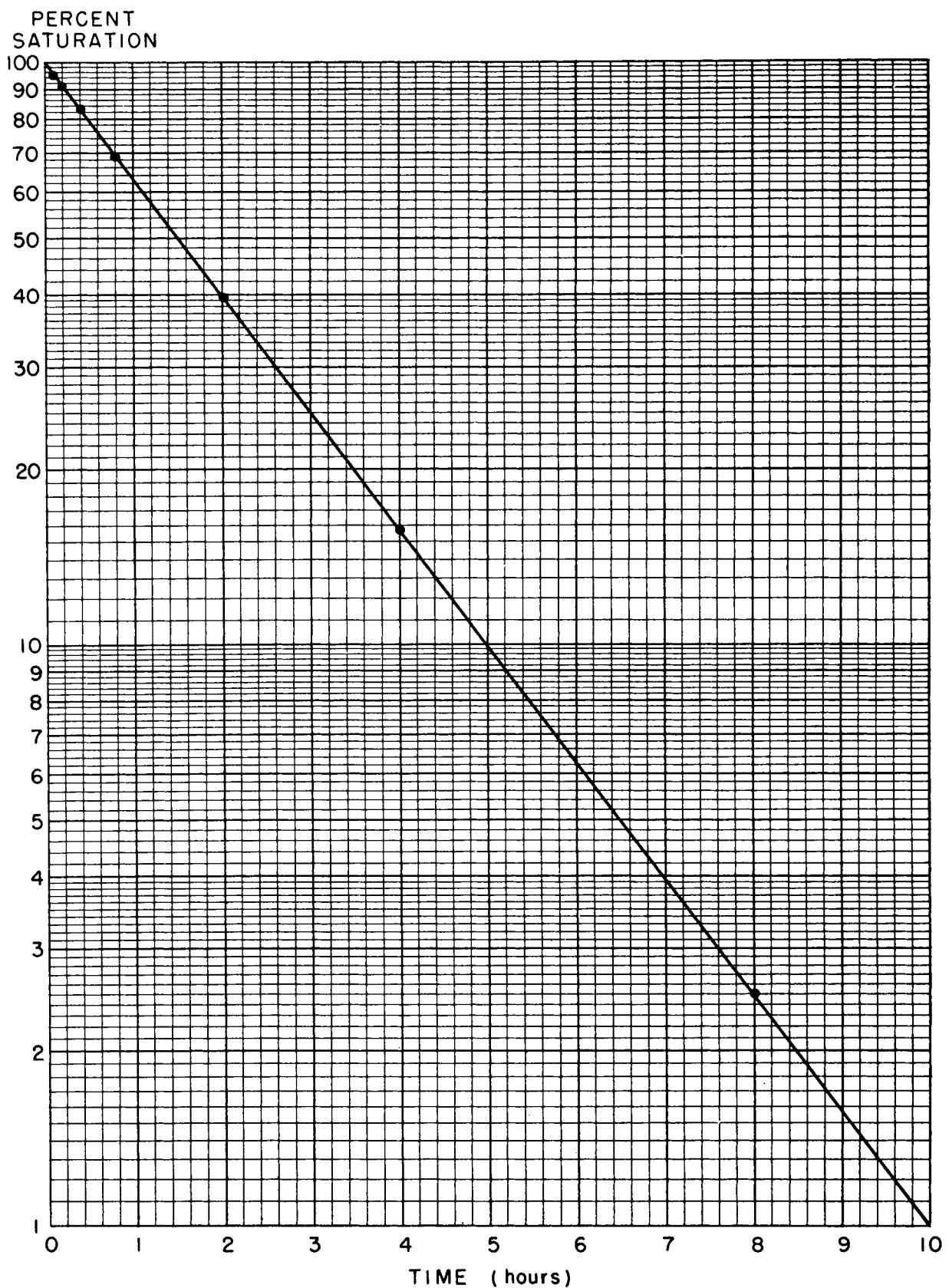


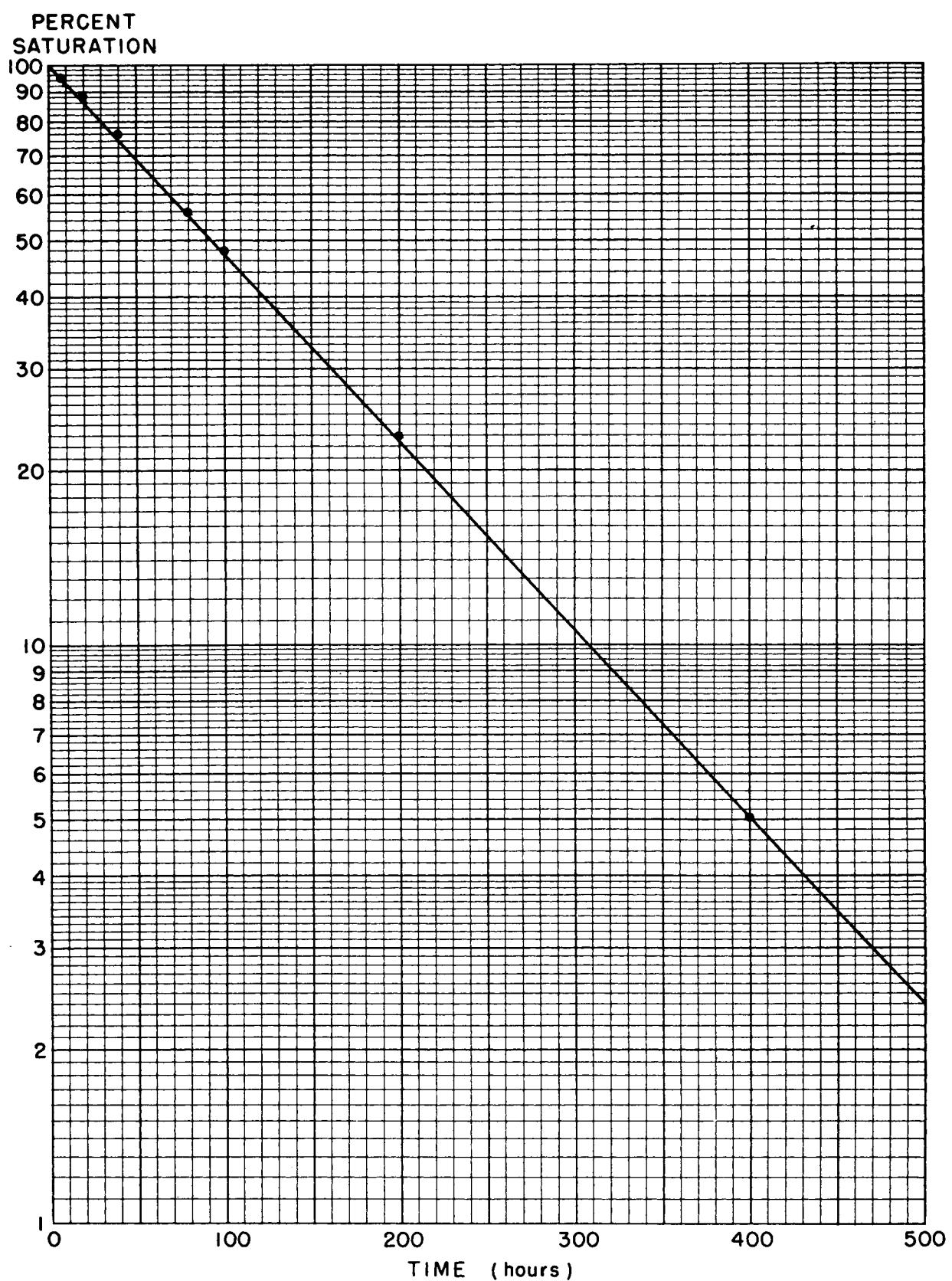
PERCENT
OF MAXIMUM

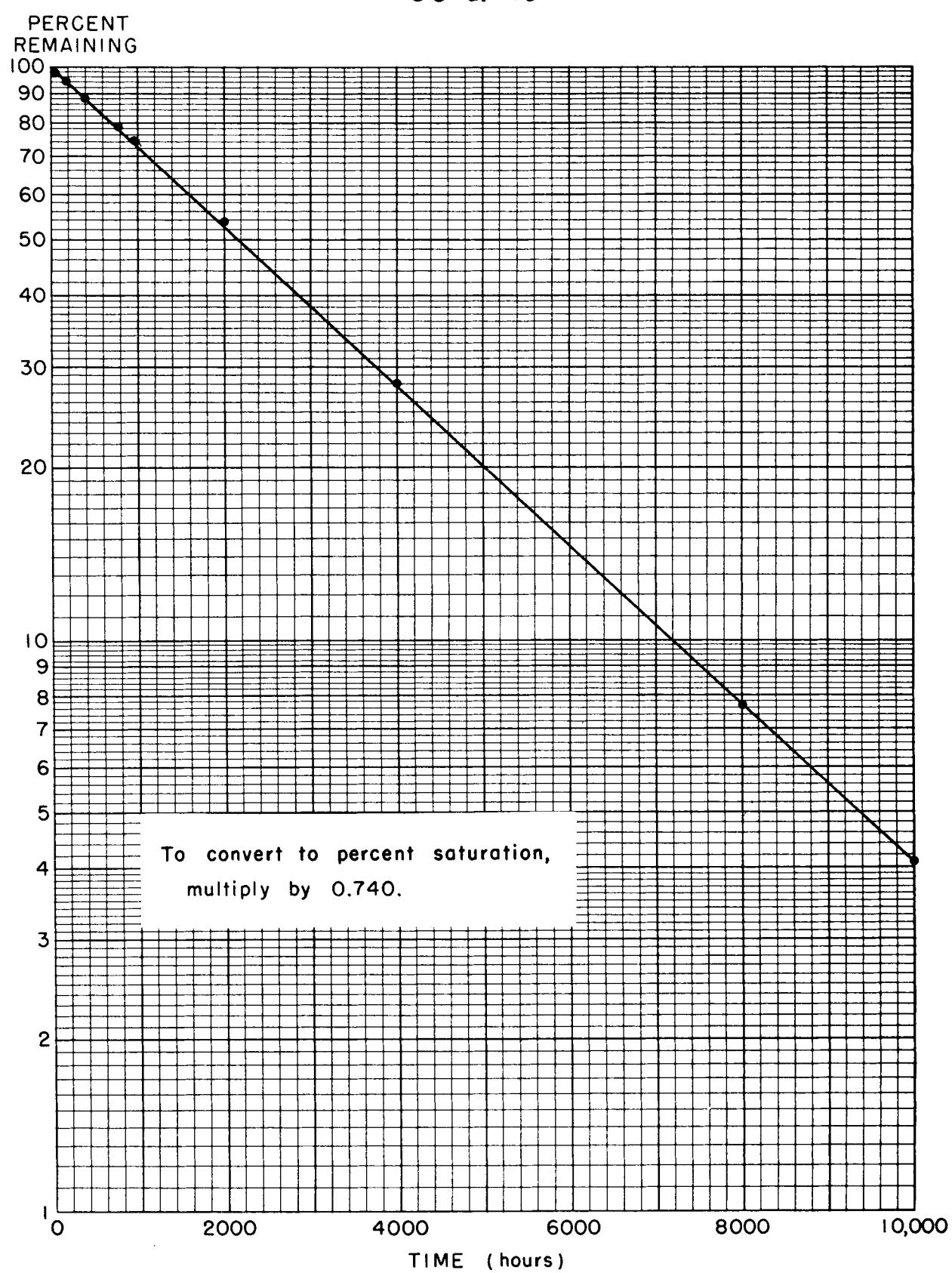


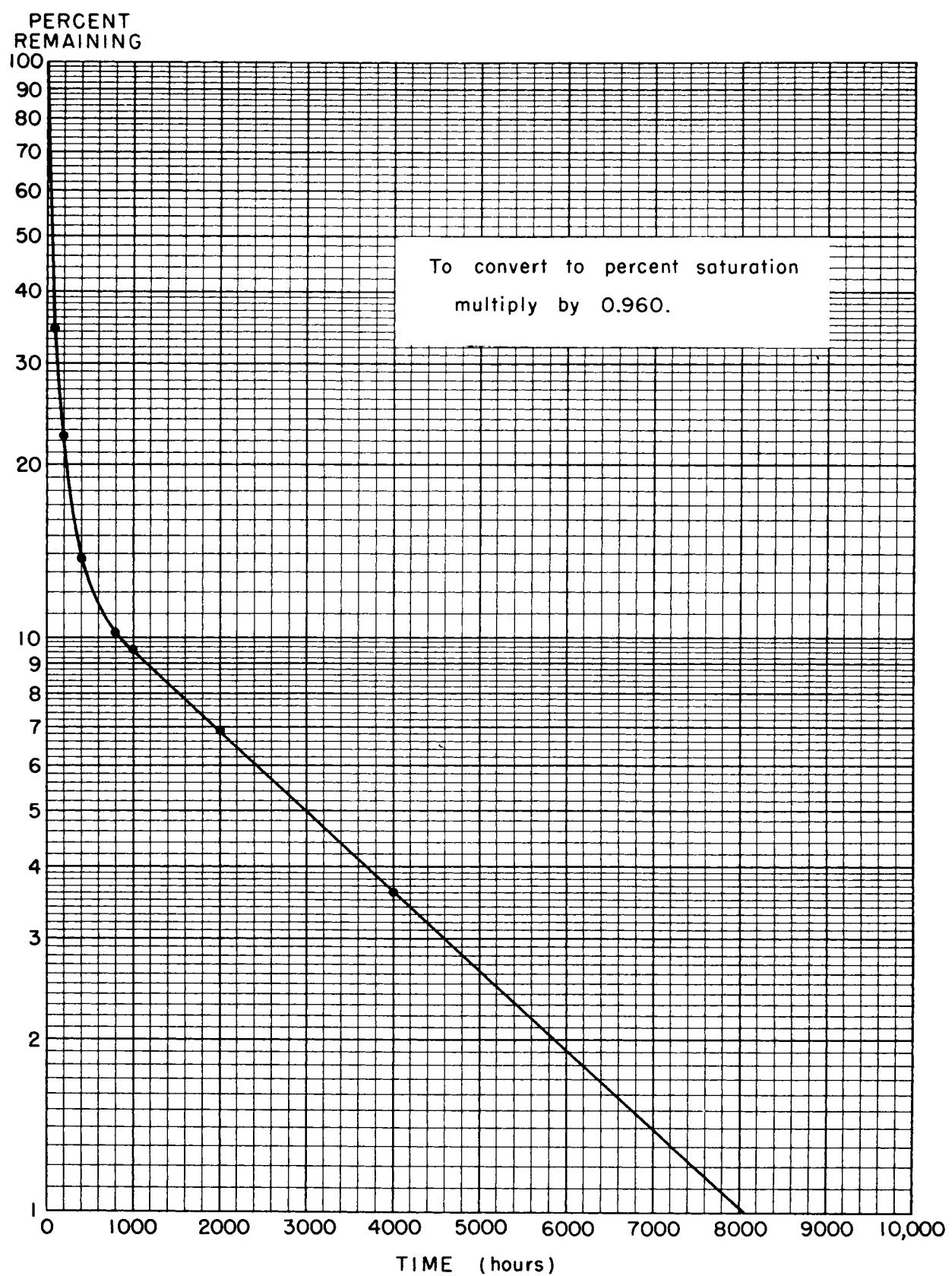


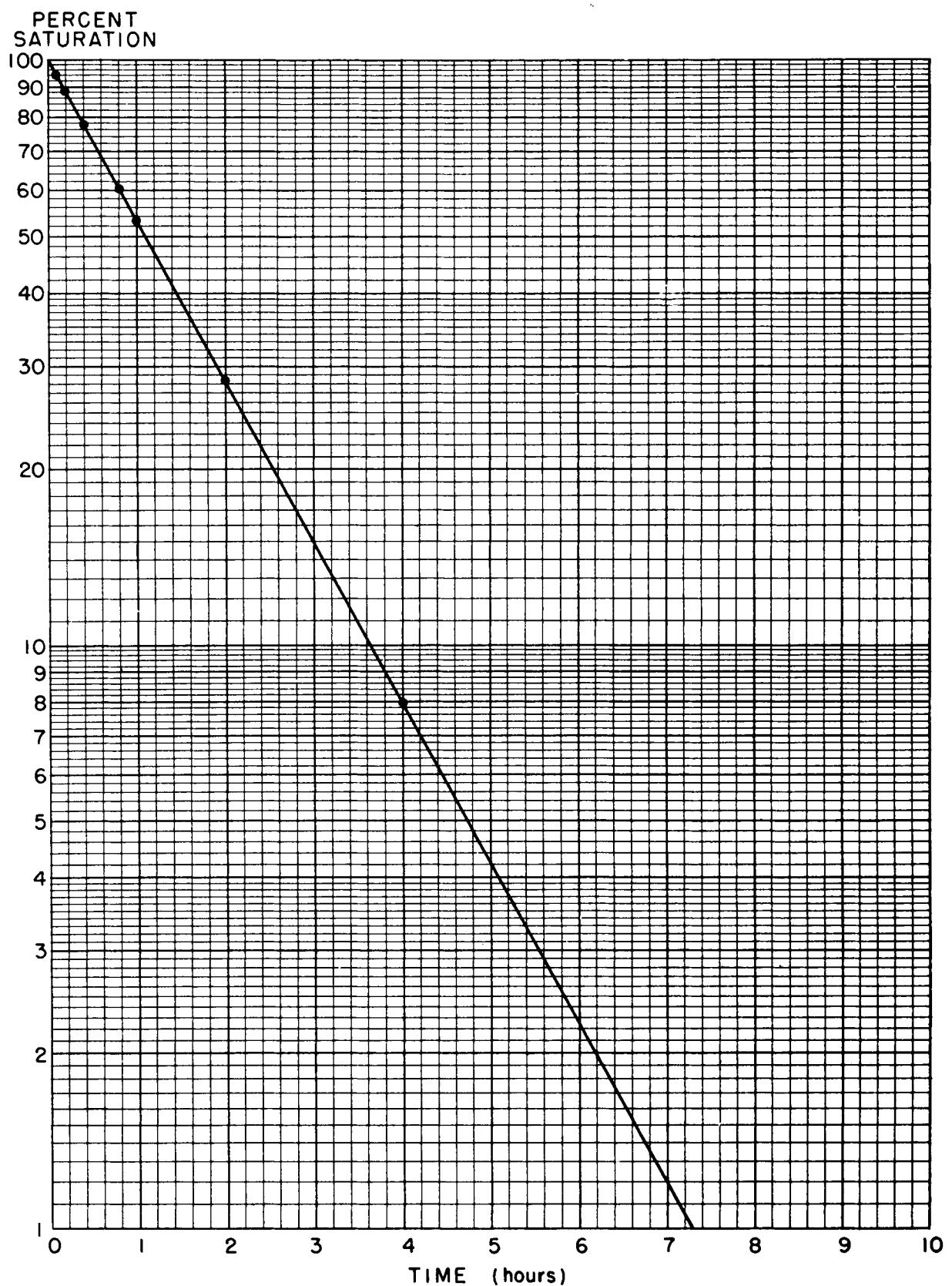




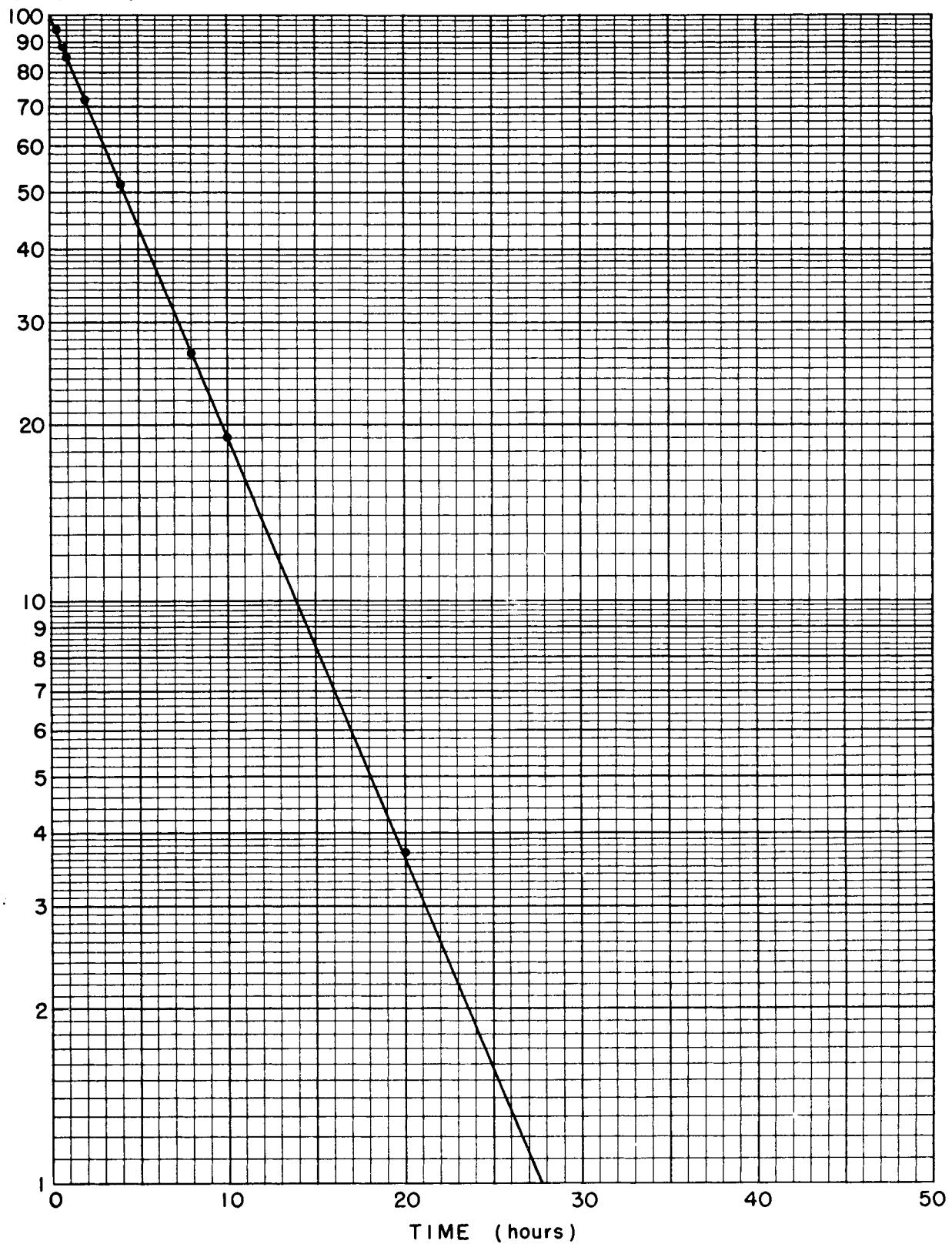


90 d. Te^{127} 

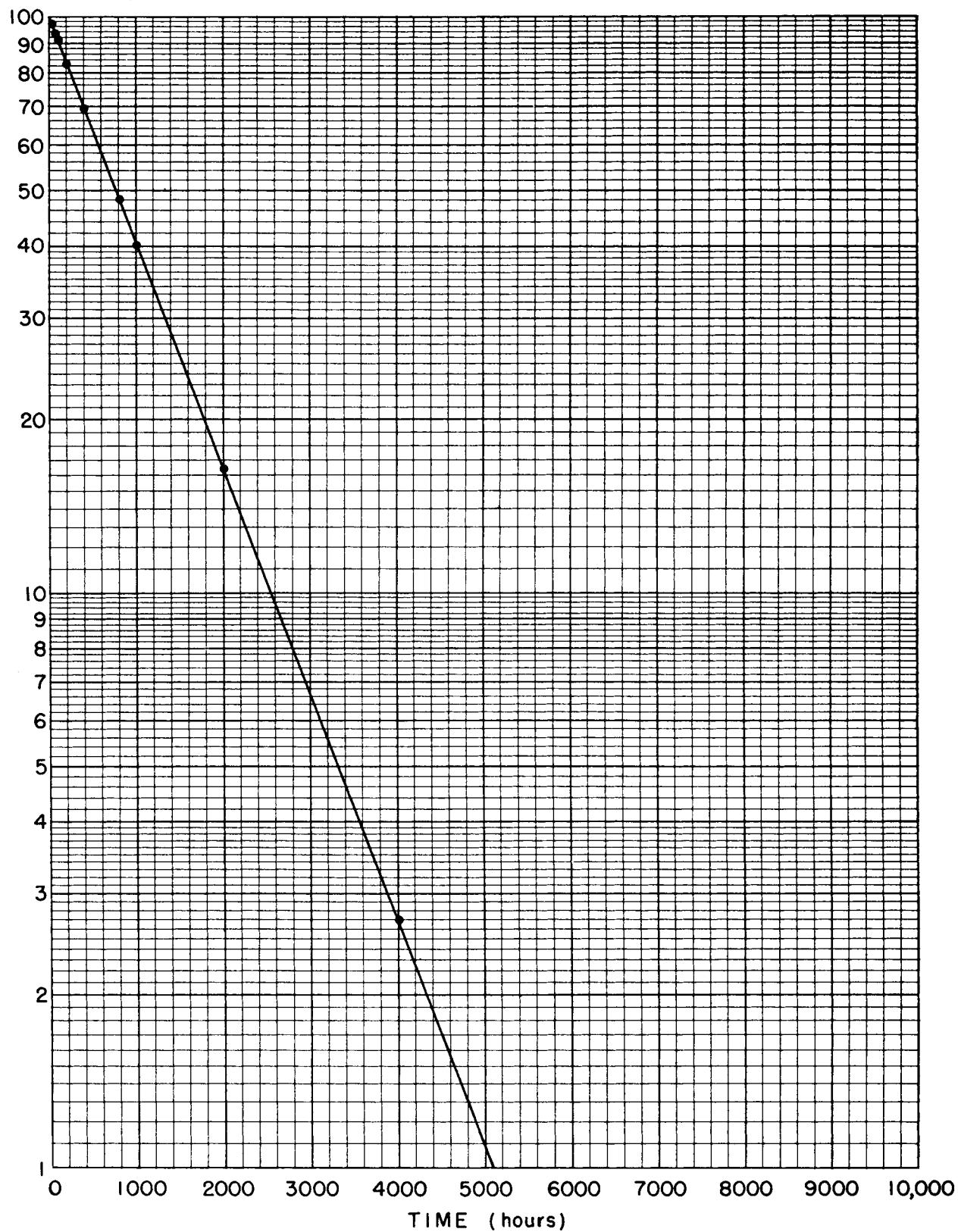
9.3 h. Te¹²⁷



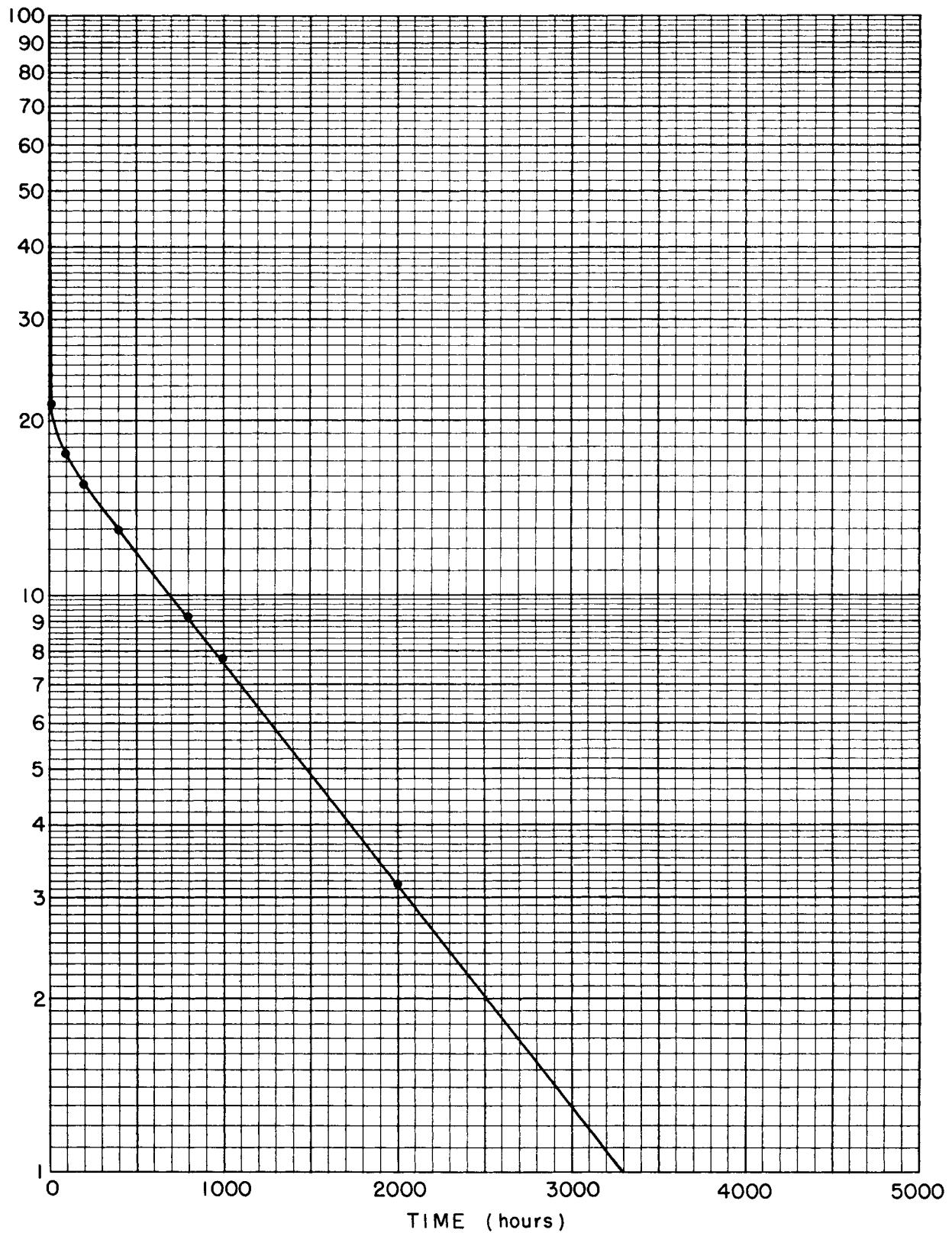
PERCENT
SATURATION



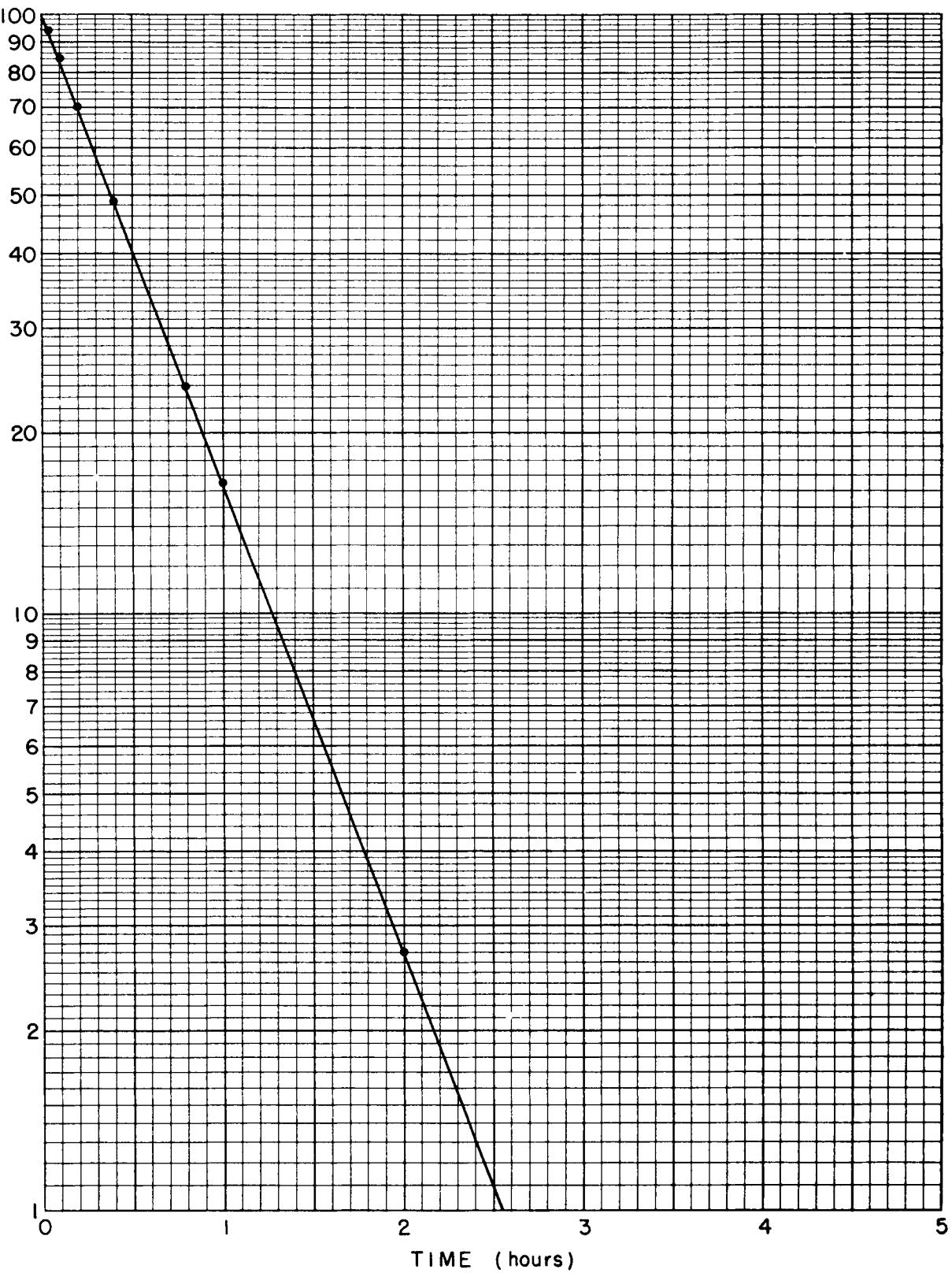
PERCENT
SATURATION

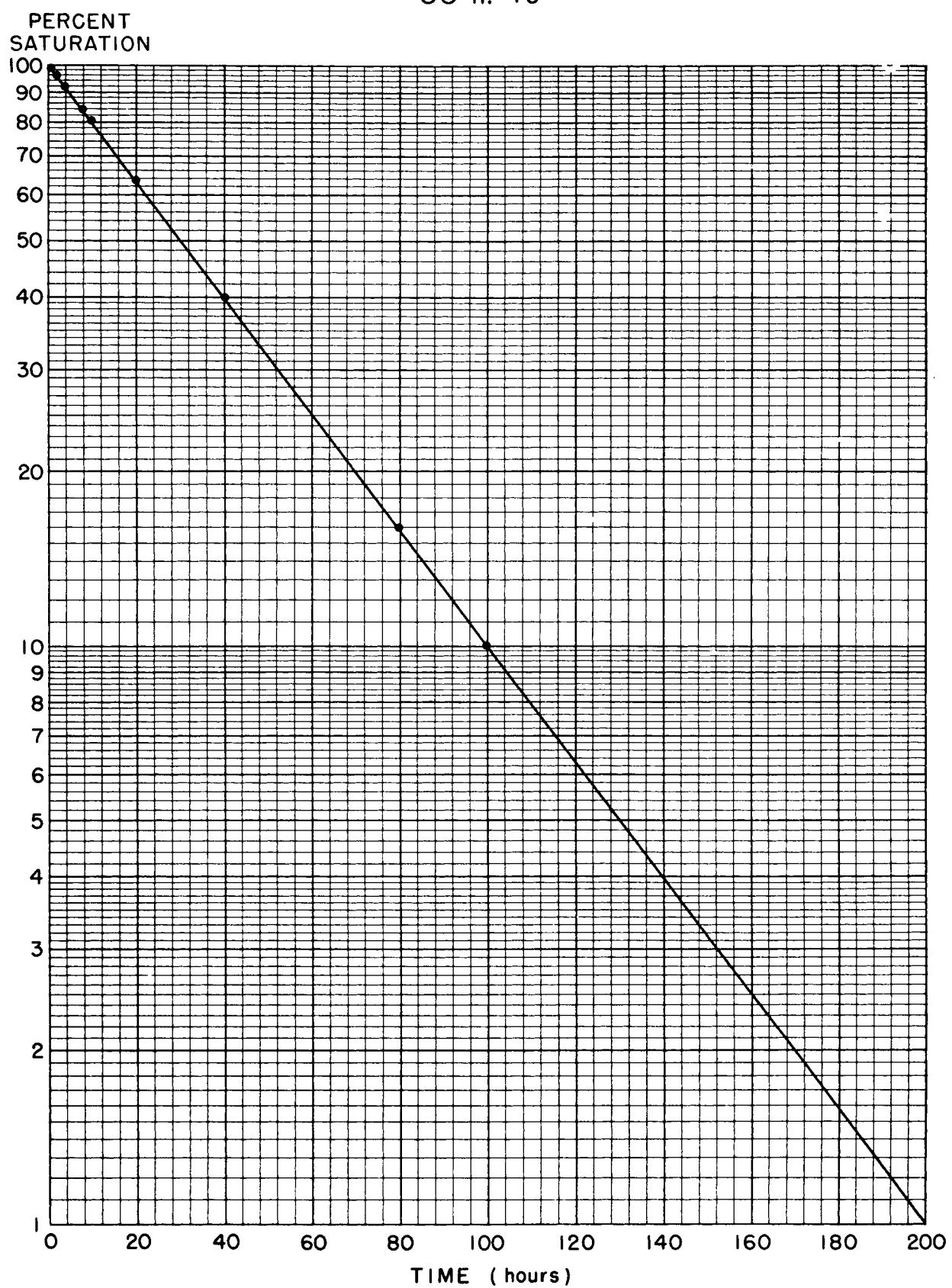


PERCENT
SATURATION

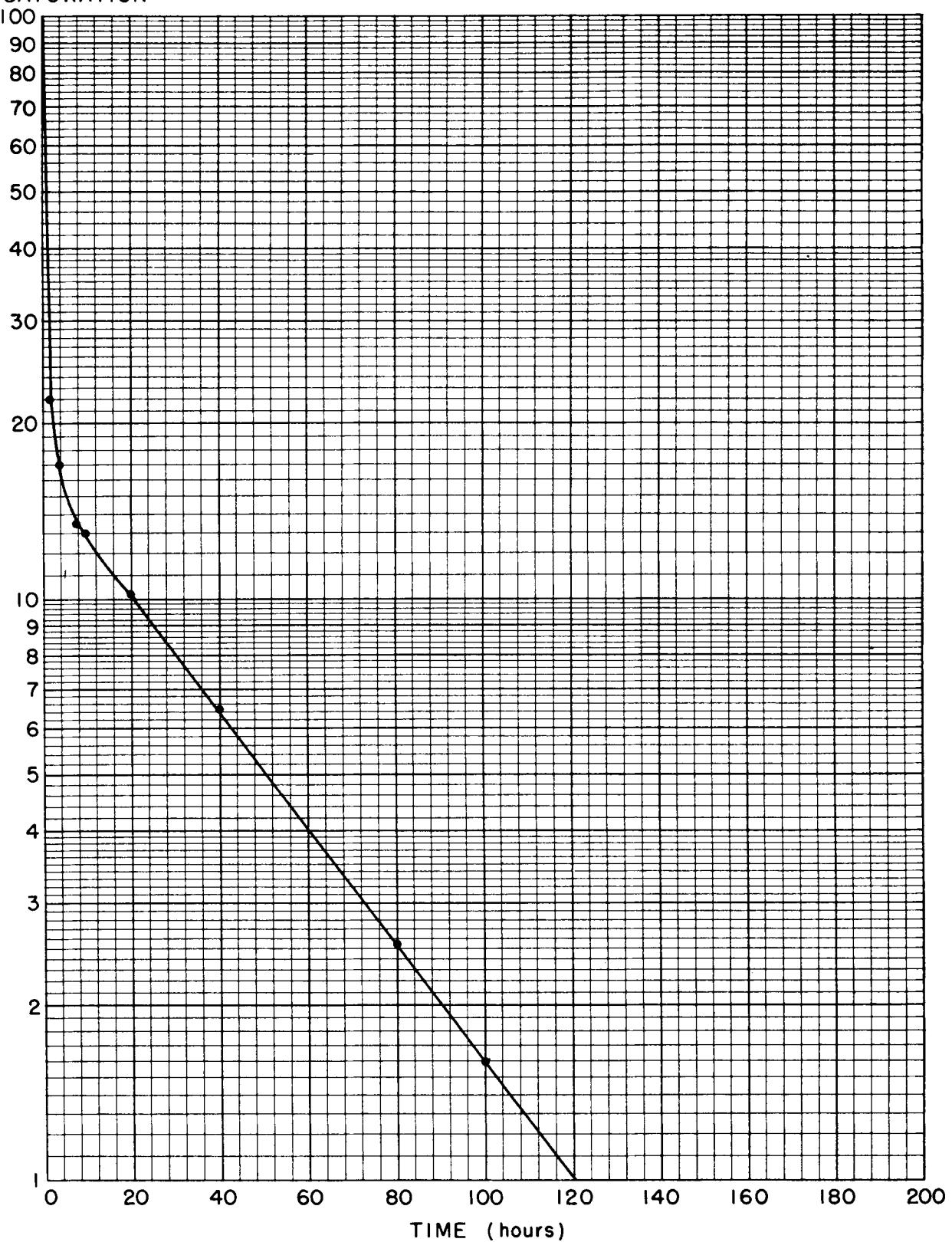


PERCENT
SATURATION

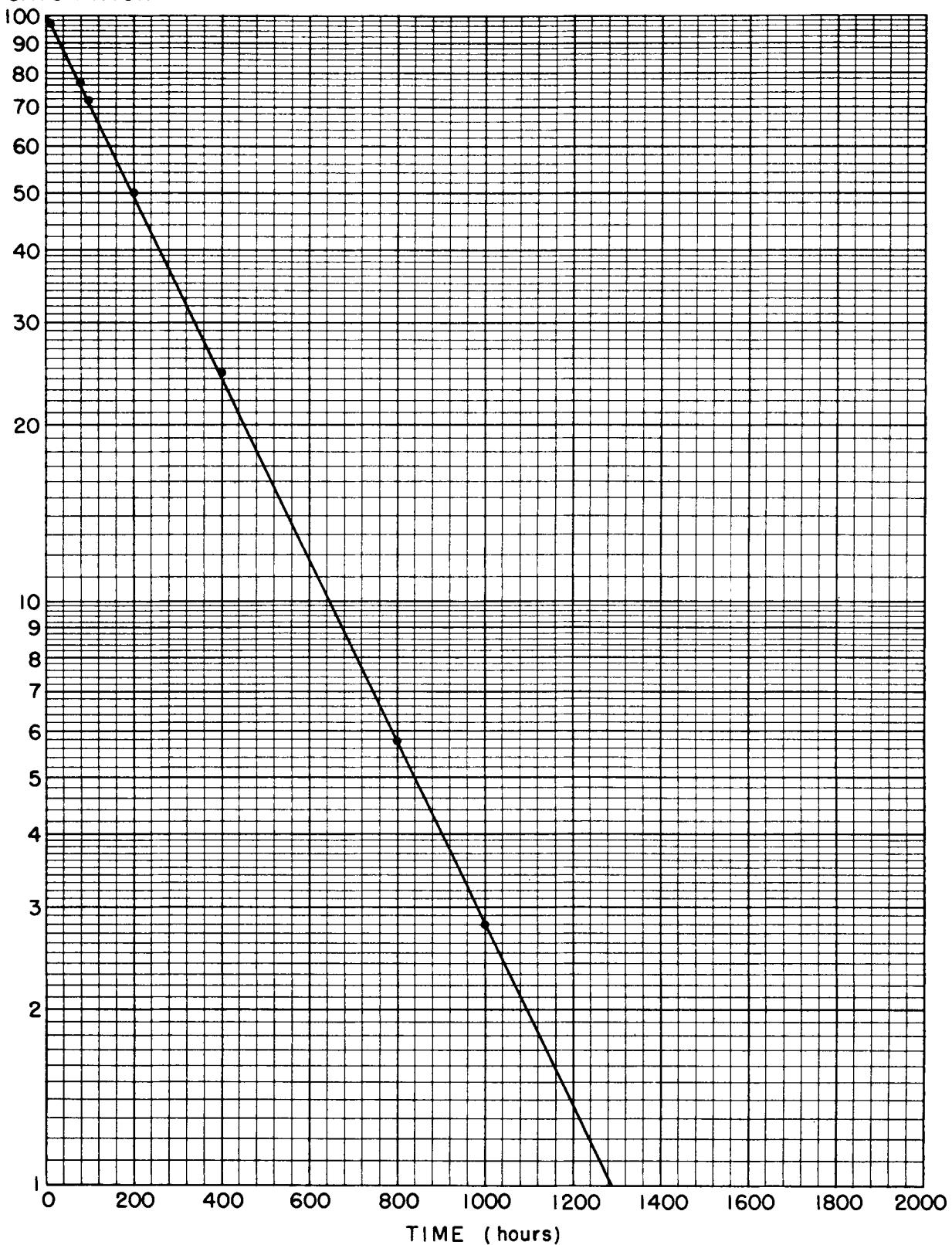




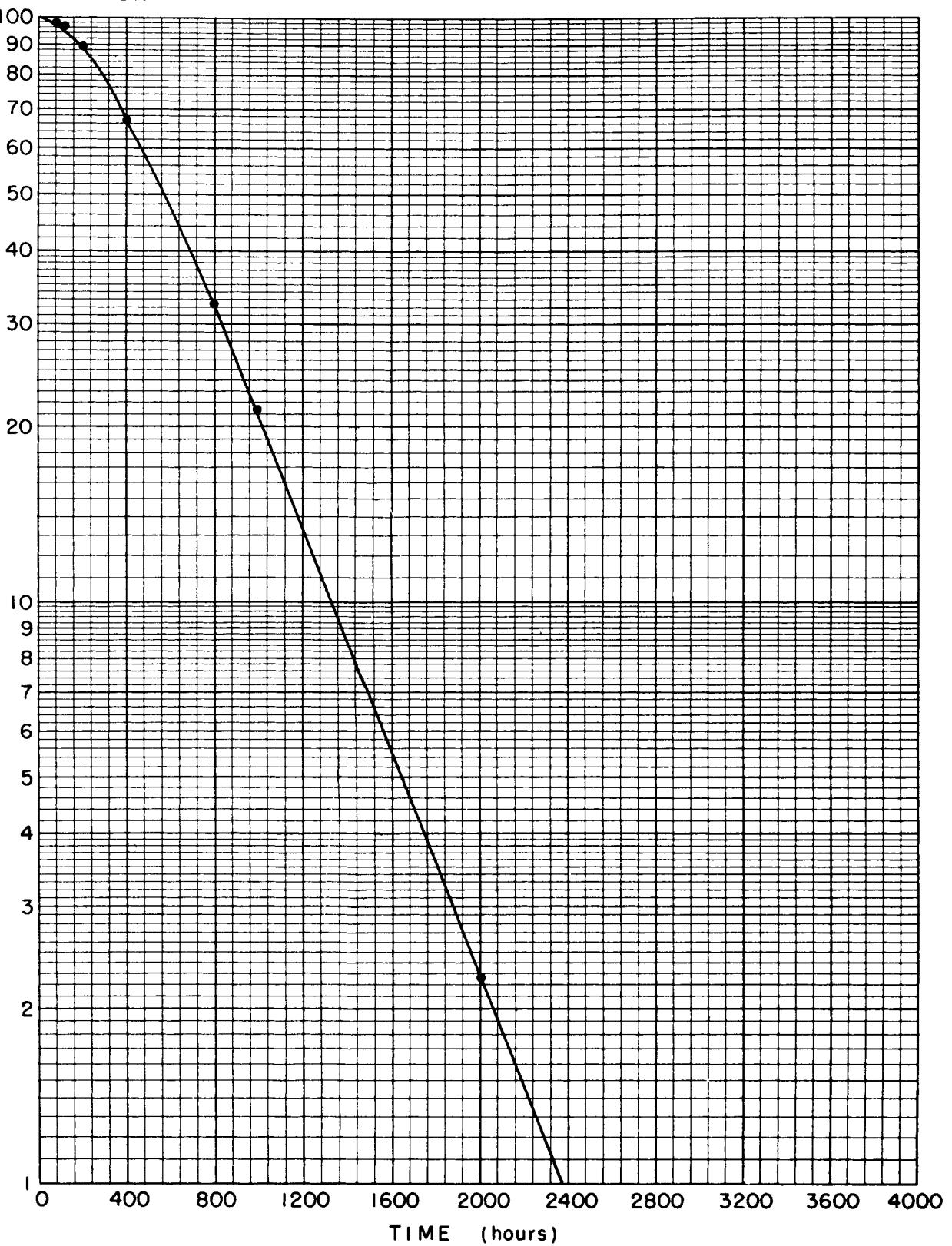
PERCENT
SATURATION



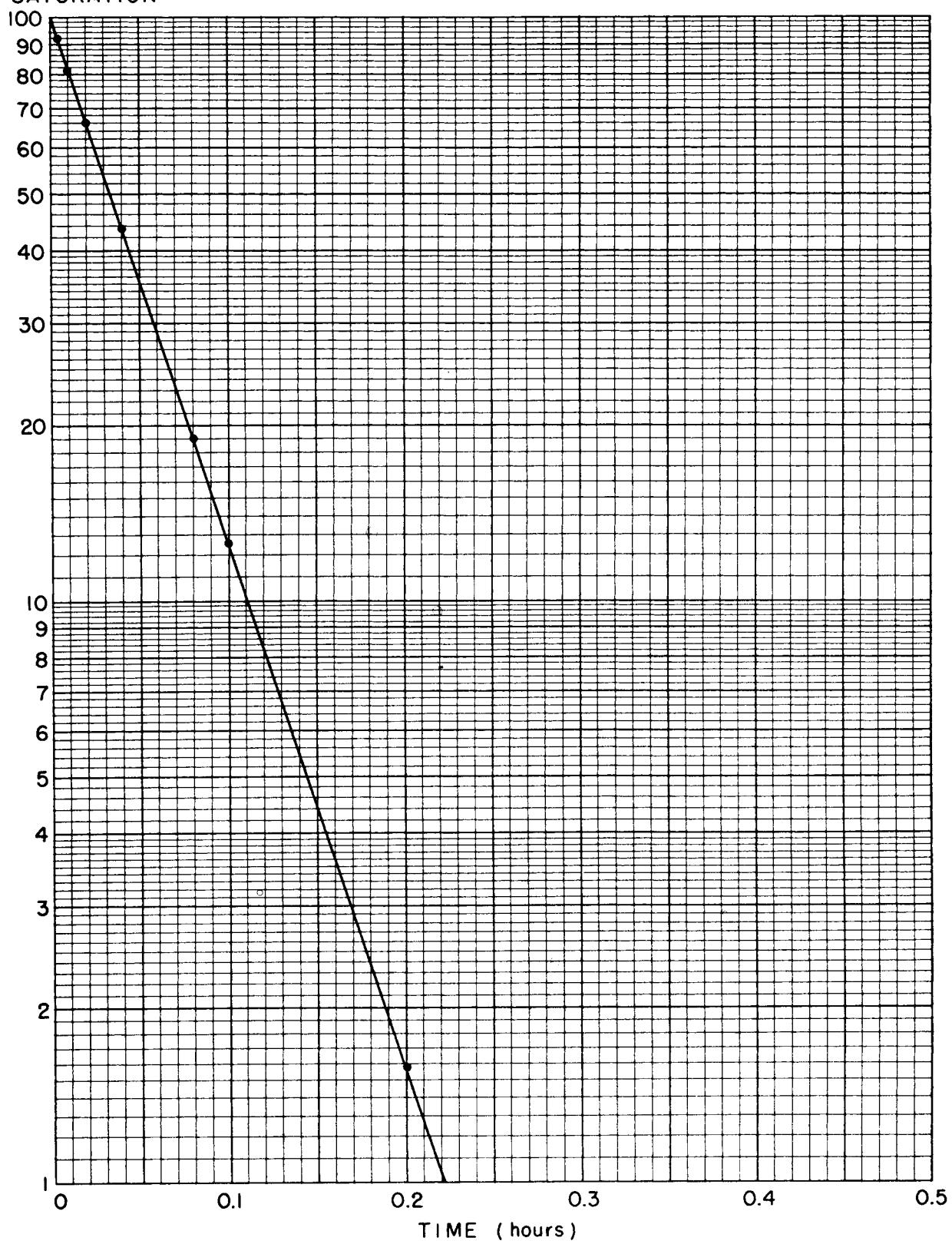
PERCENT
SATURATION



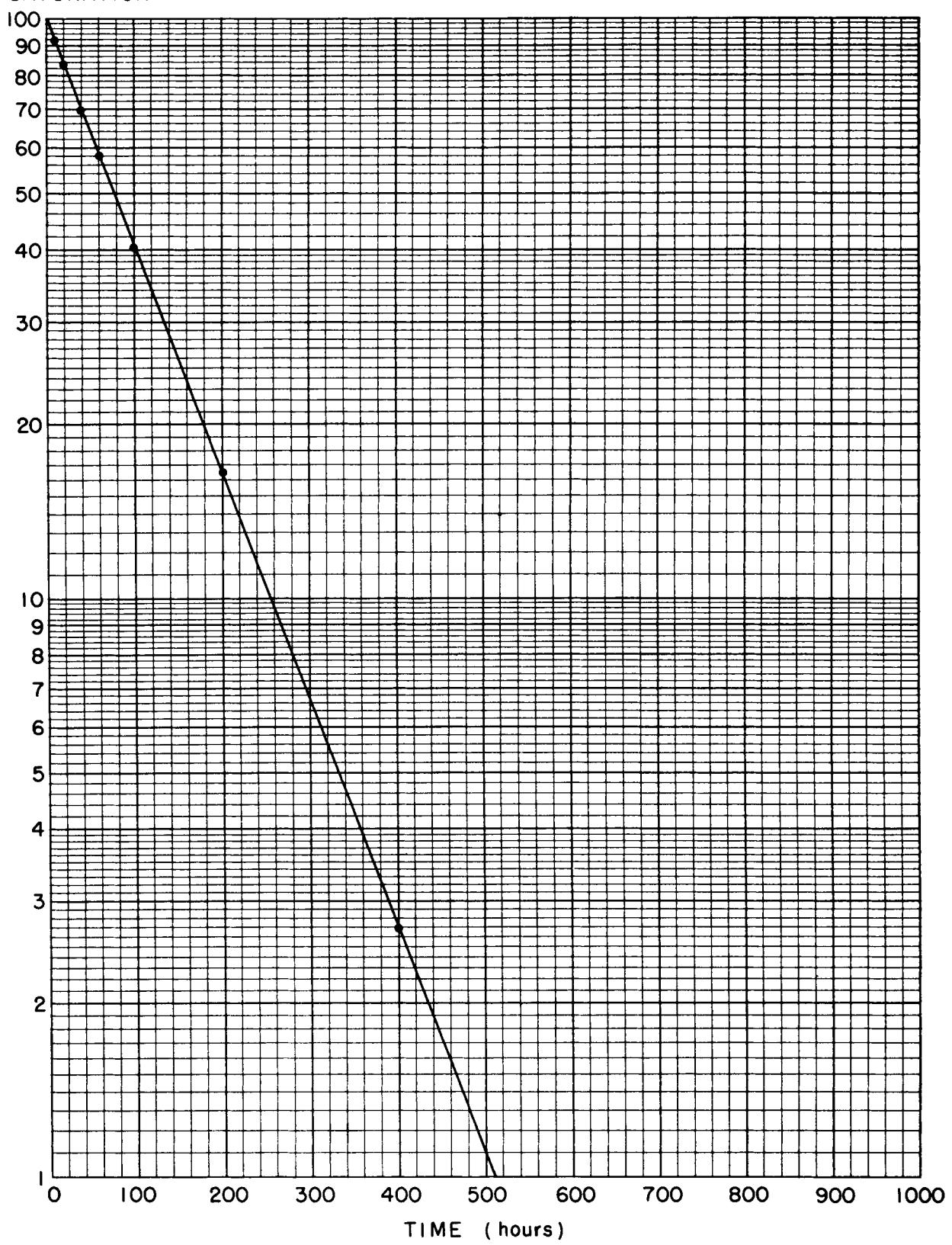
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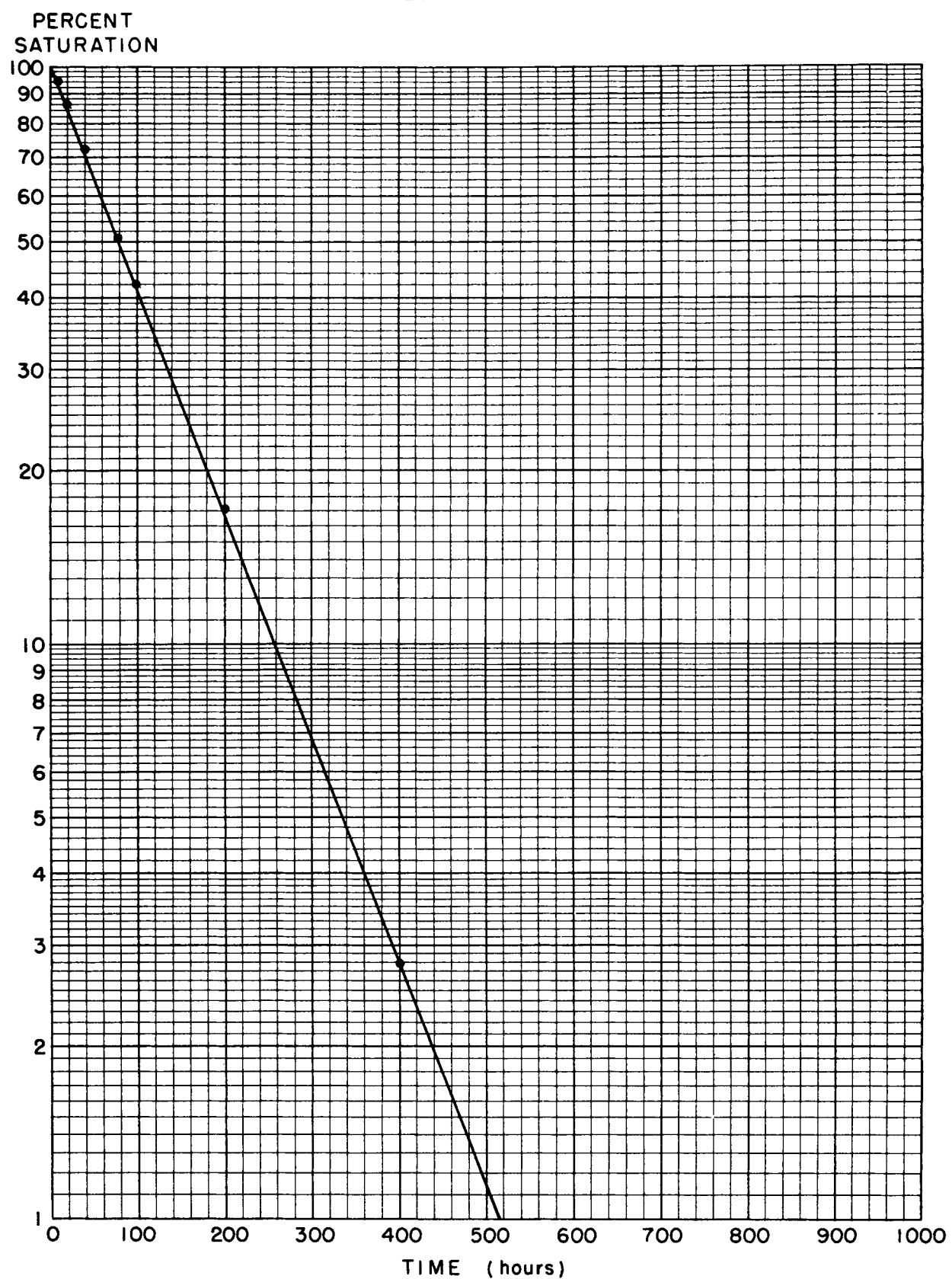
 ~ 12 d. Xe^{131} PERCENT
SATURATION

PERCENT
SATURATION

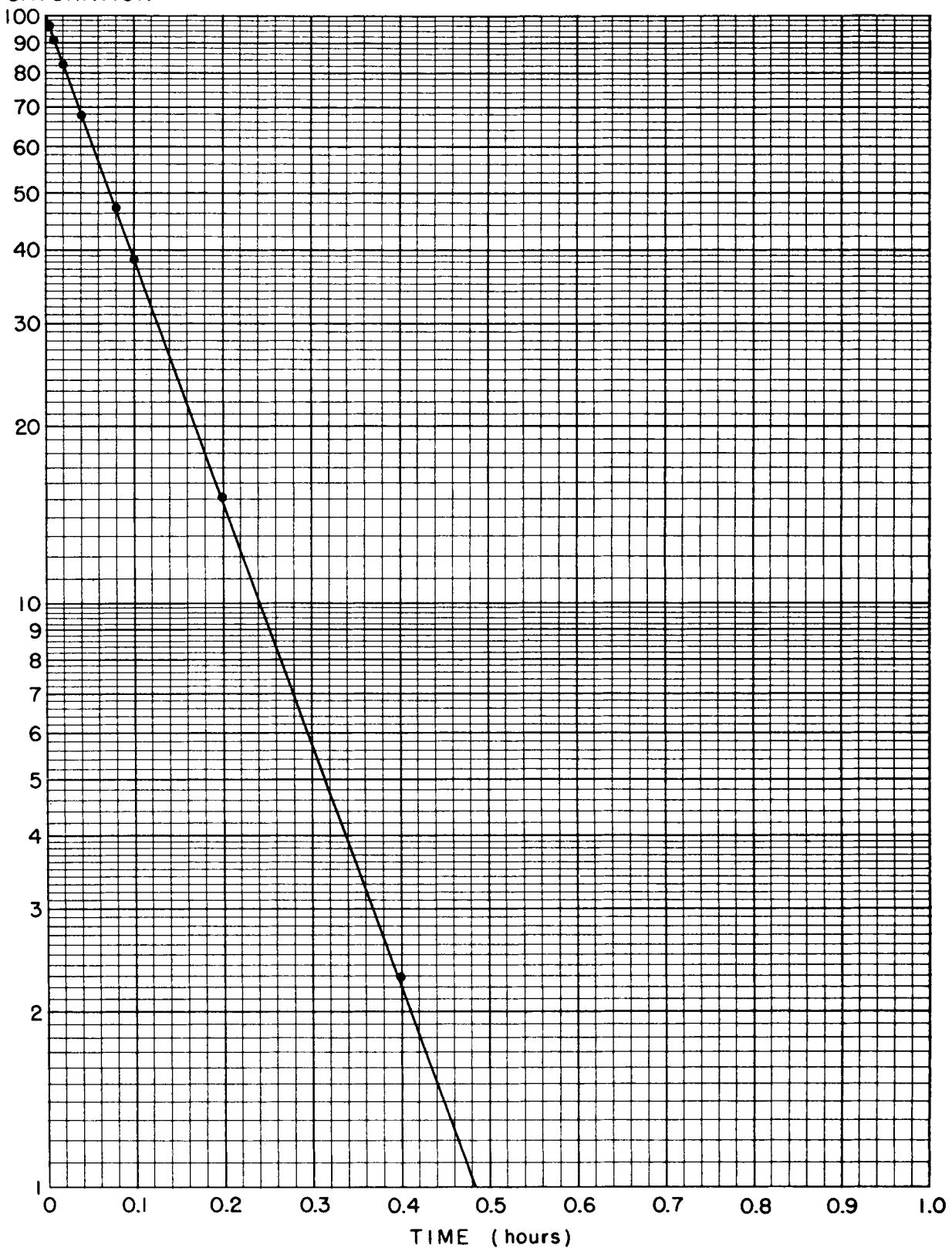


PERCENT
SATURATION

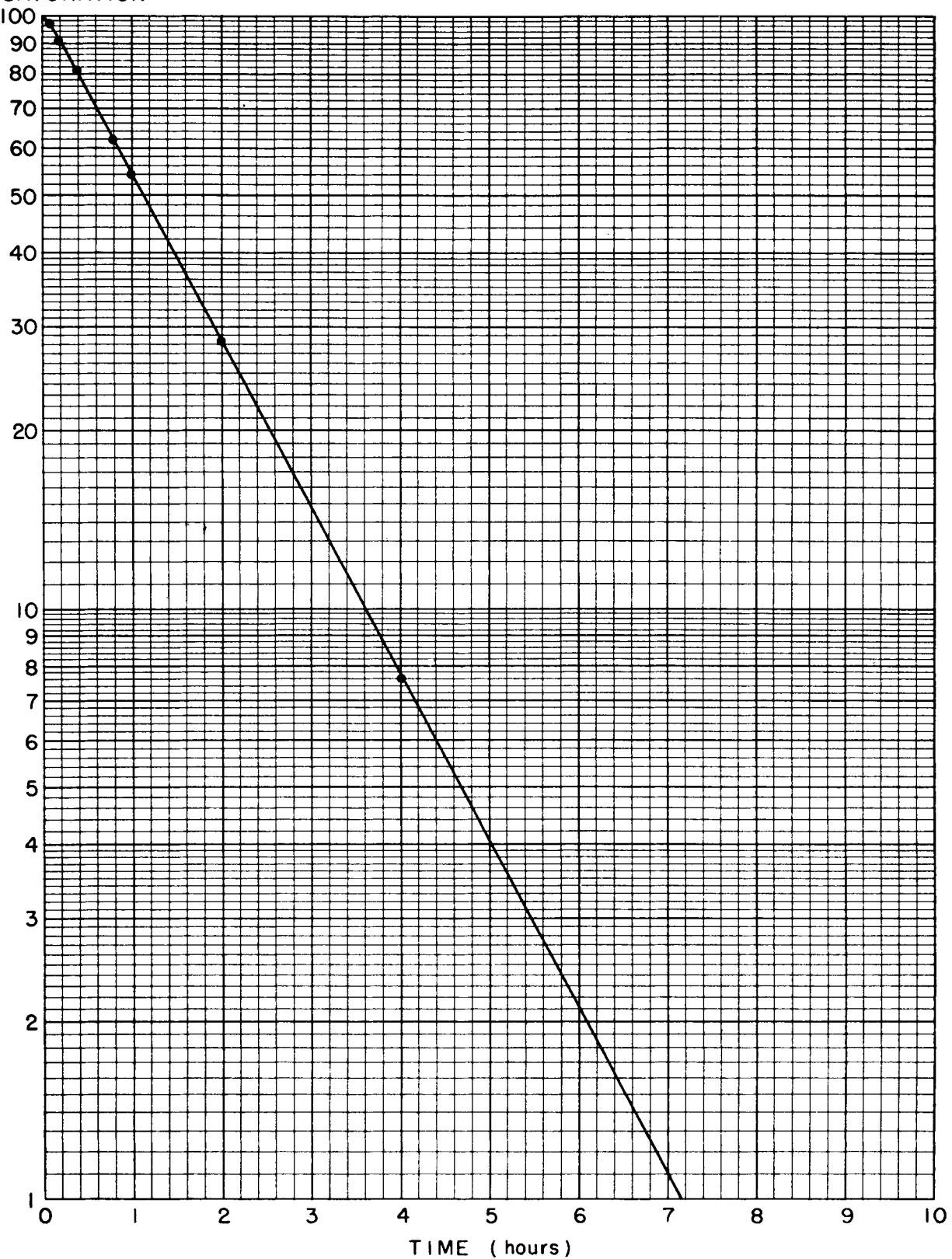


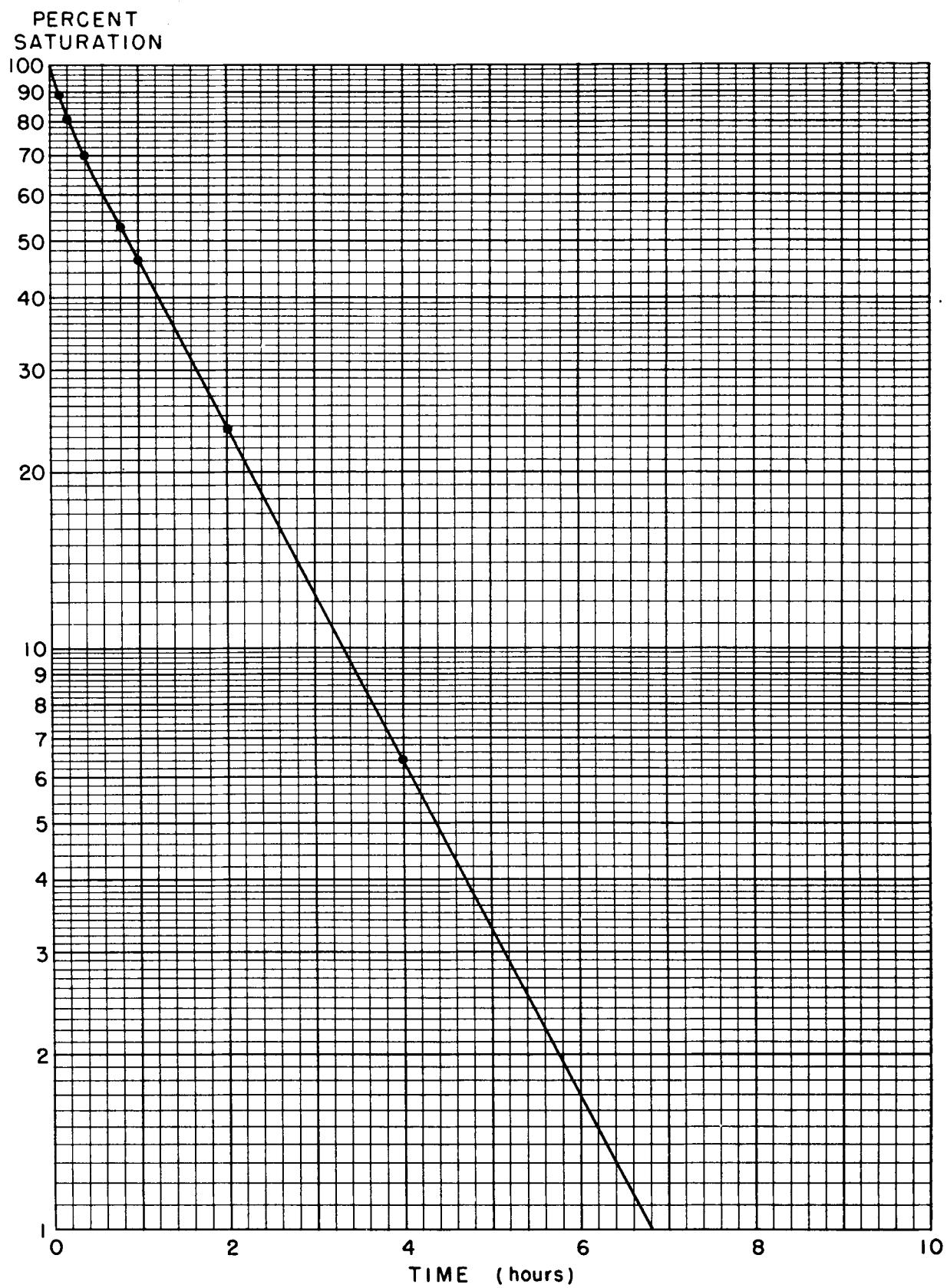


PERCENT
SATURATION

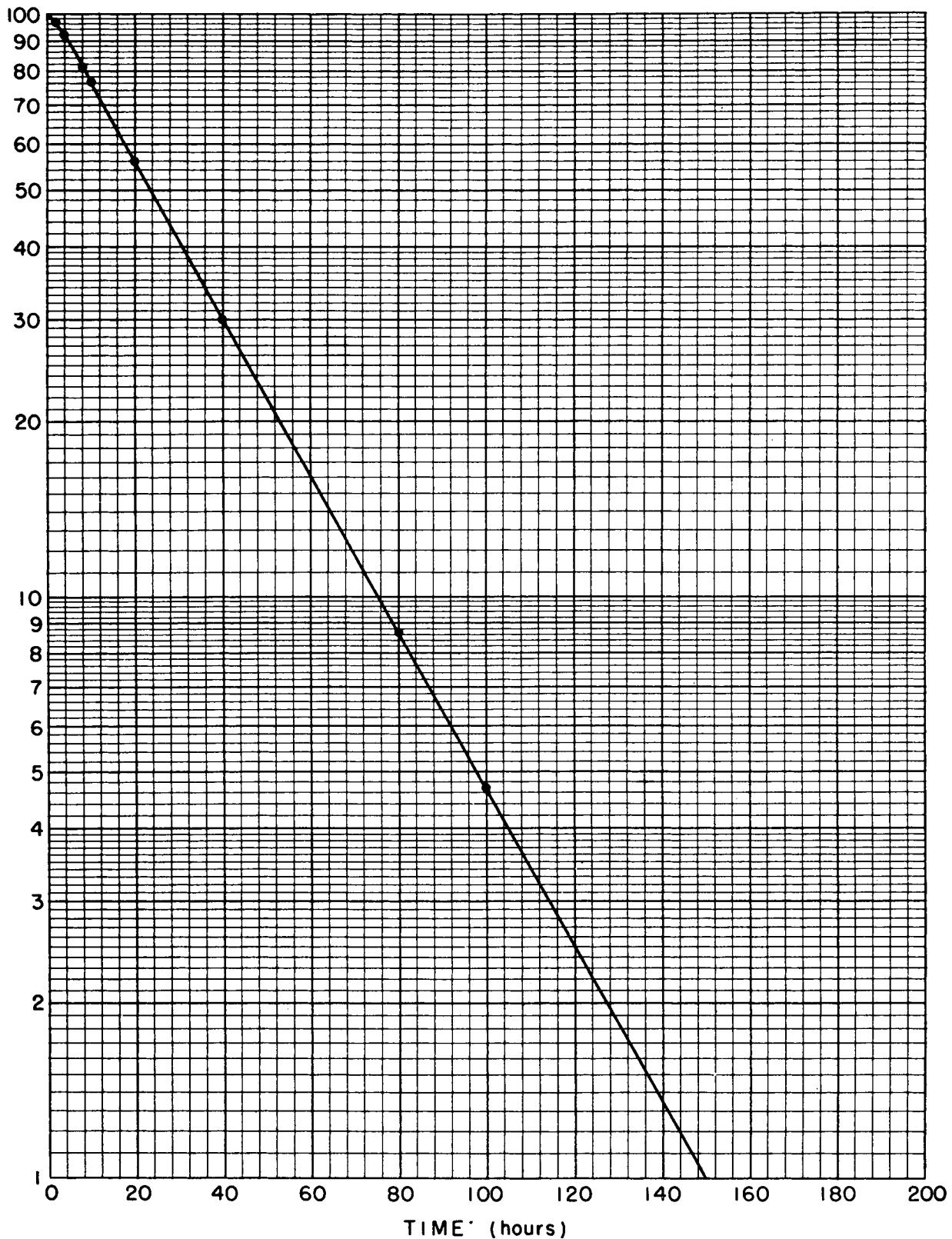


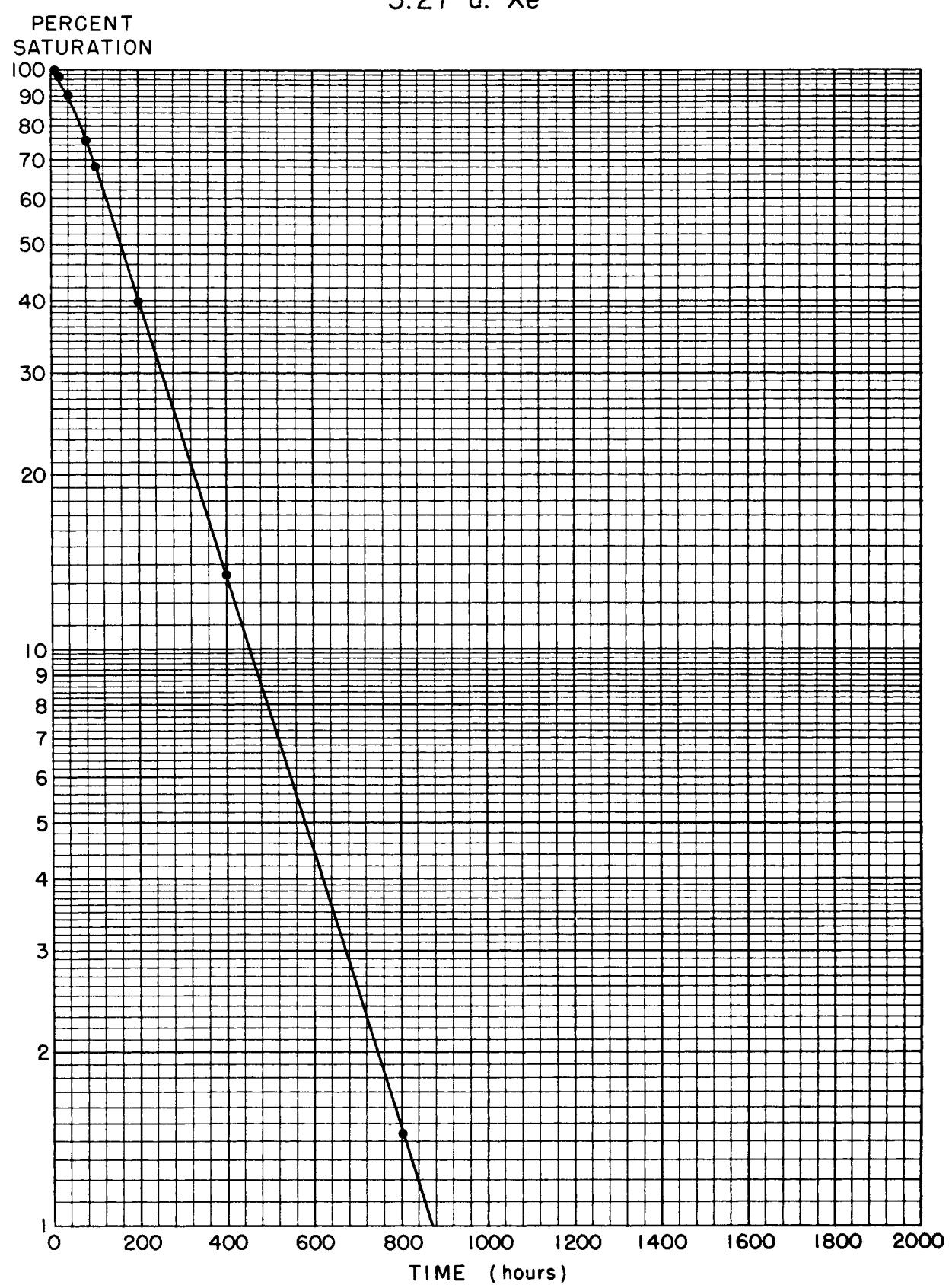
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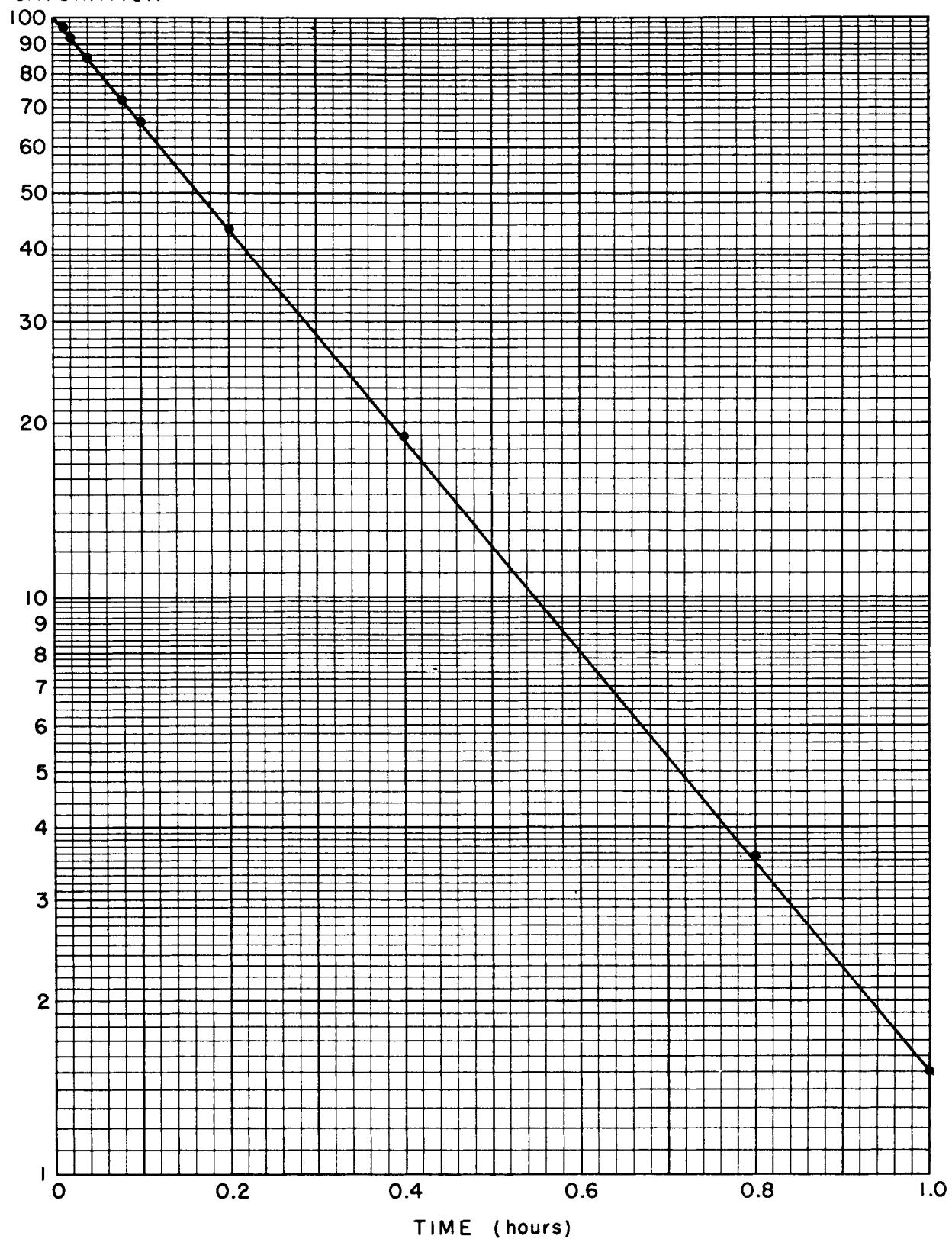




PERCENT
SATURATION



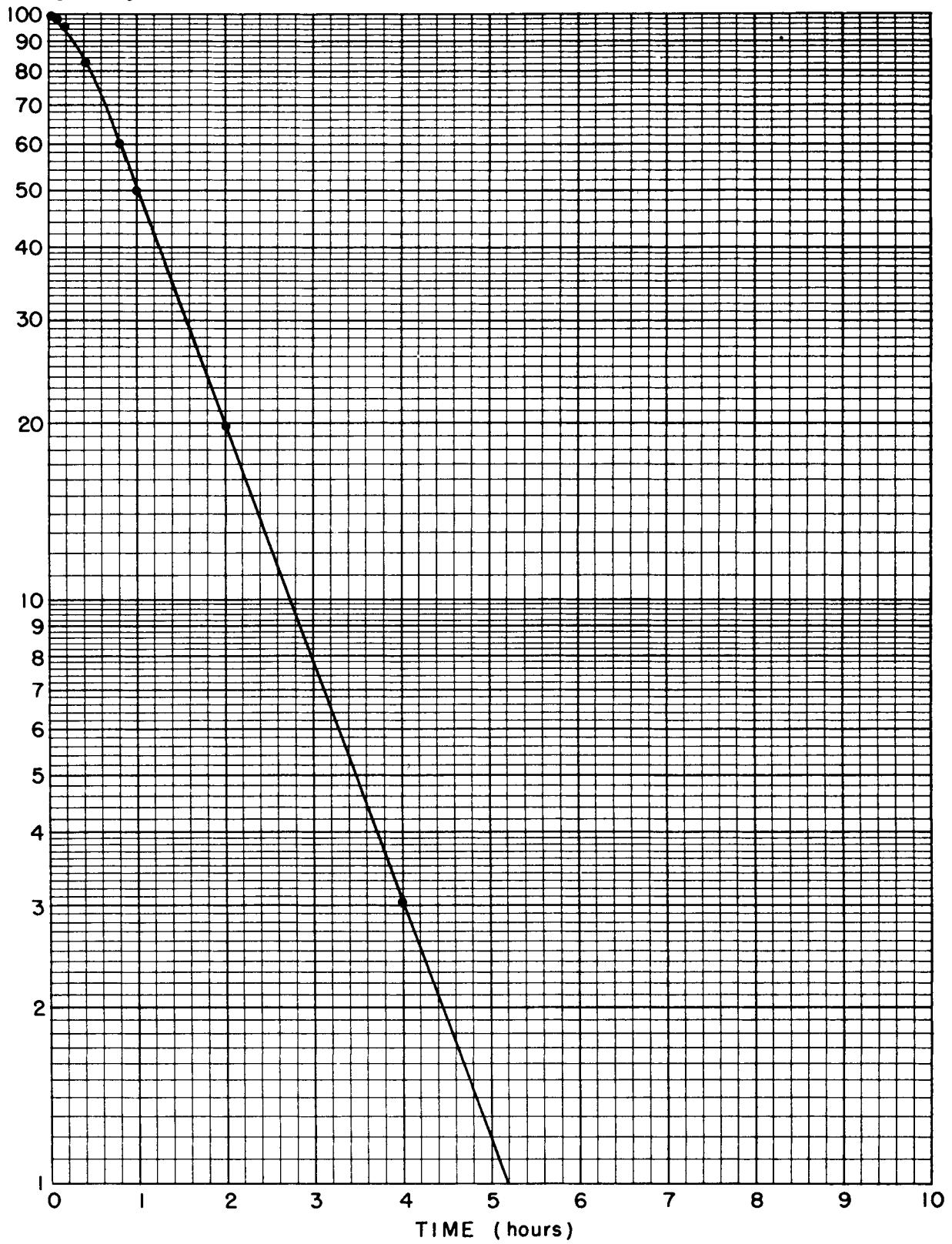


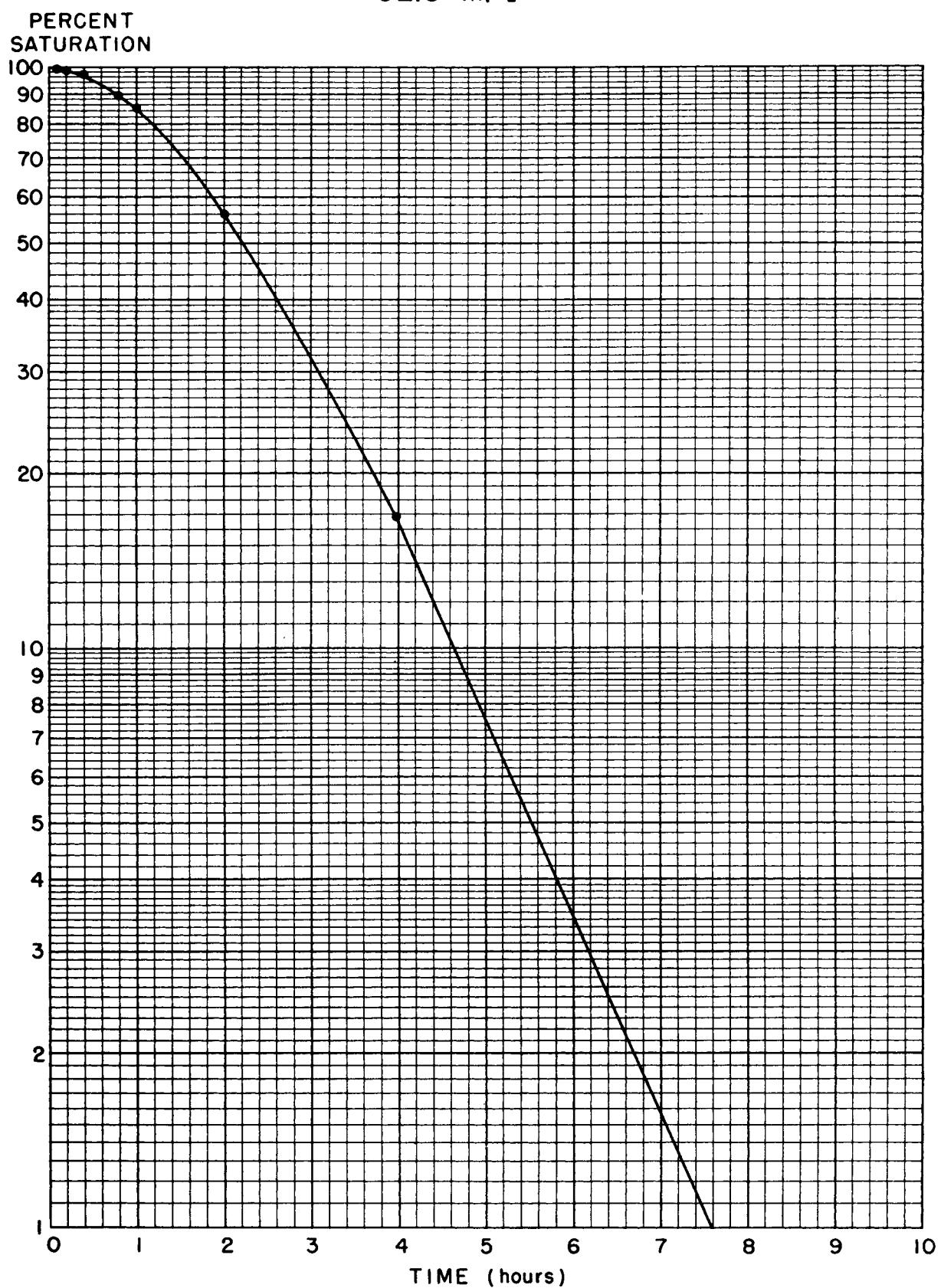
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SATURATION

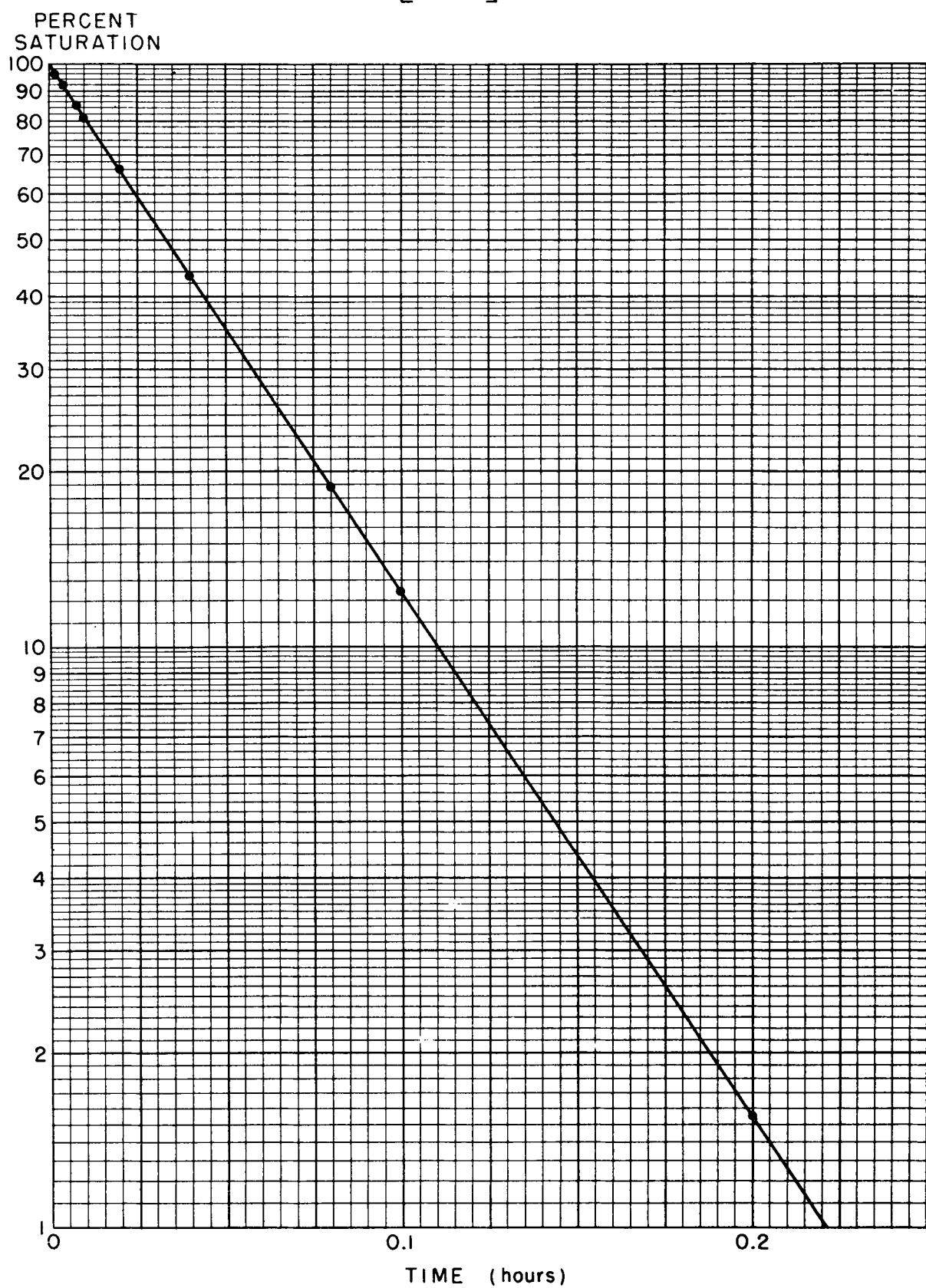
210

44.5 m. Te^{134}

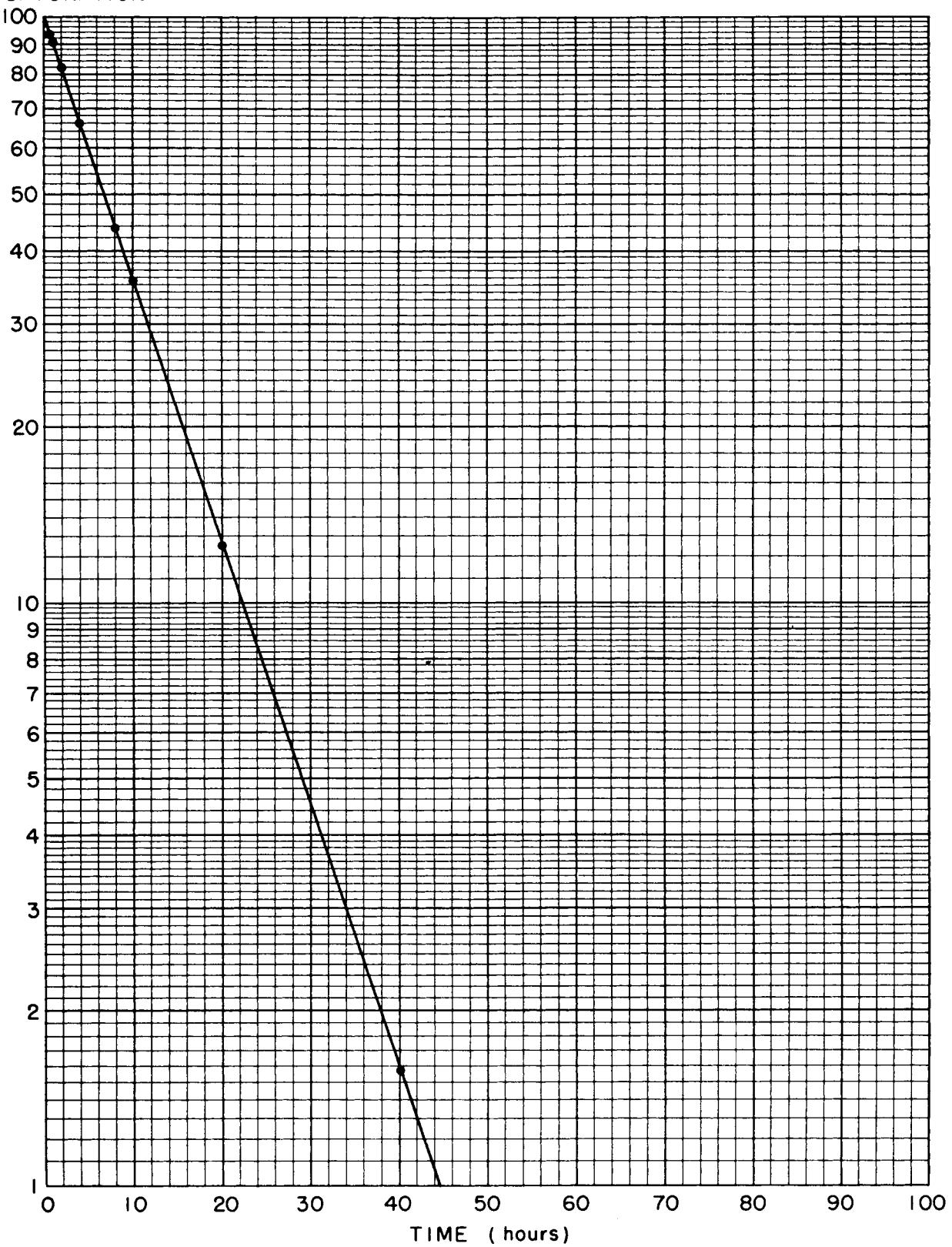
PERCENT
SATURATION

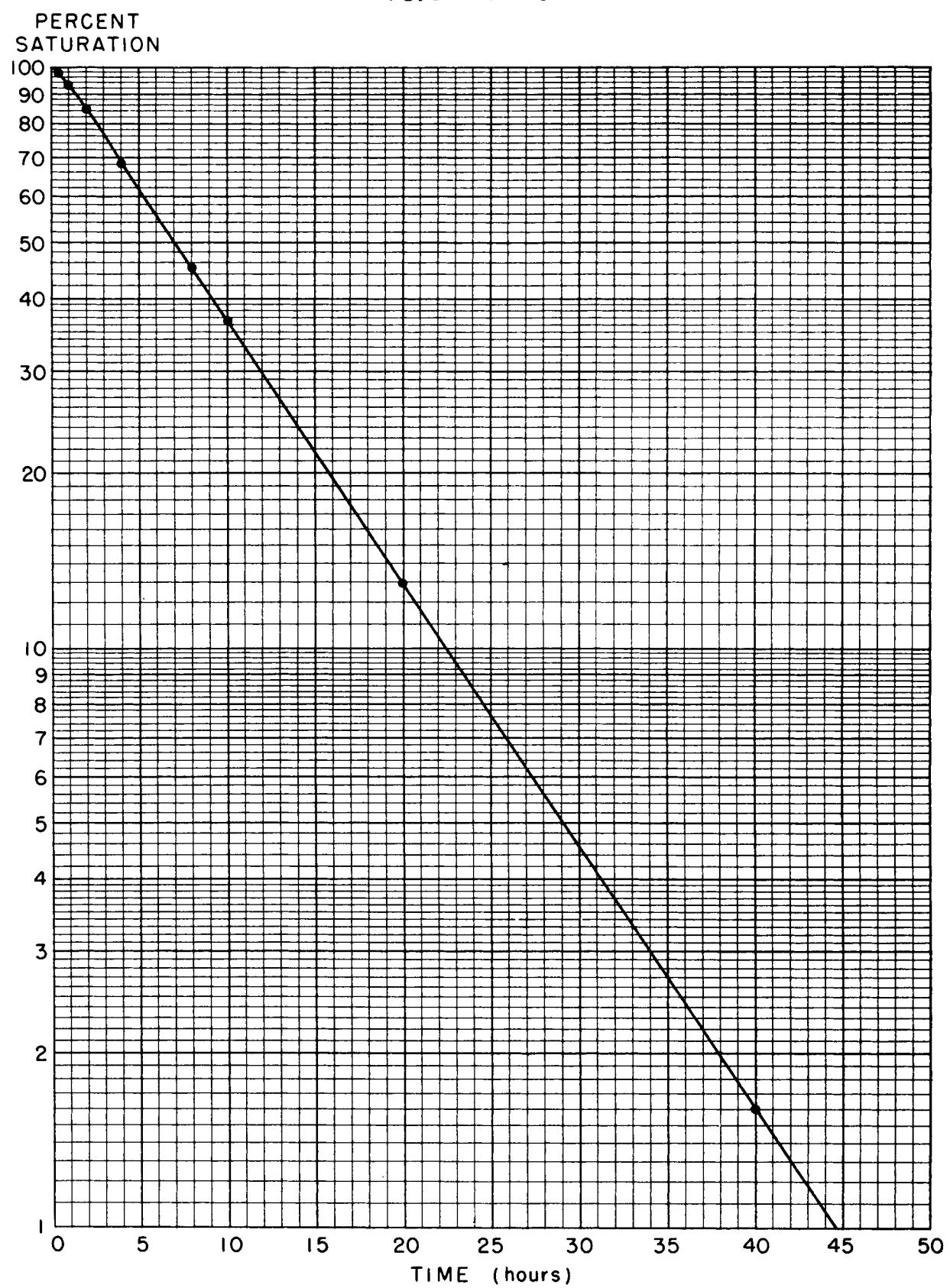


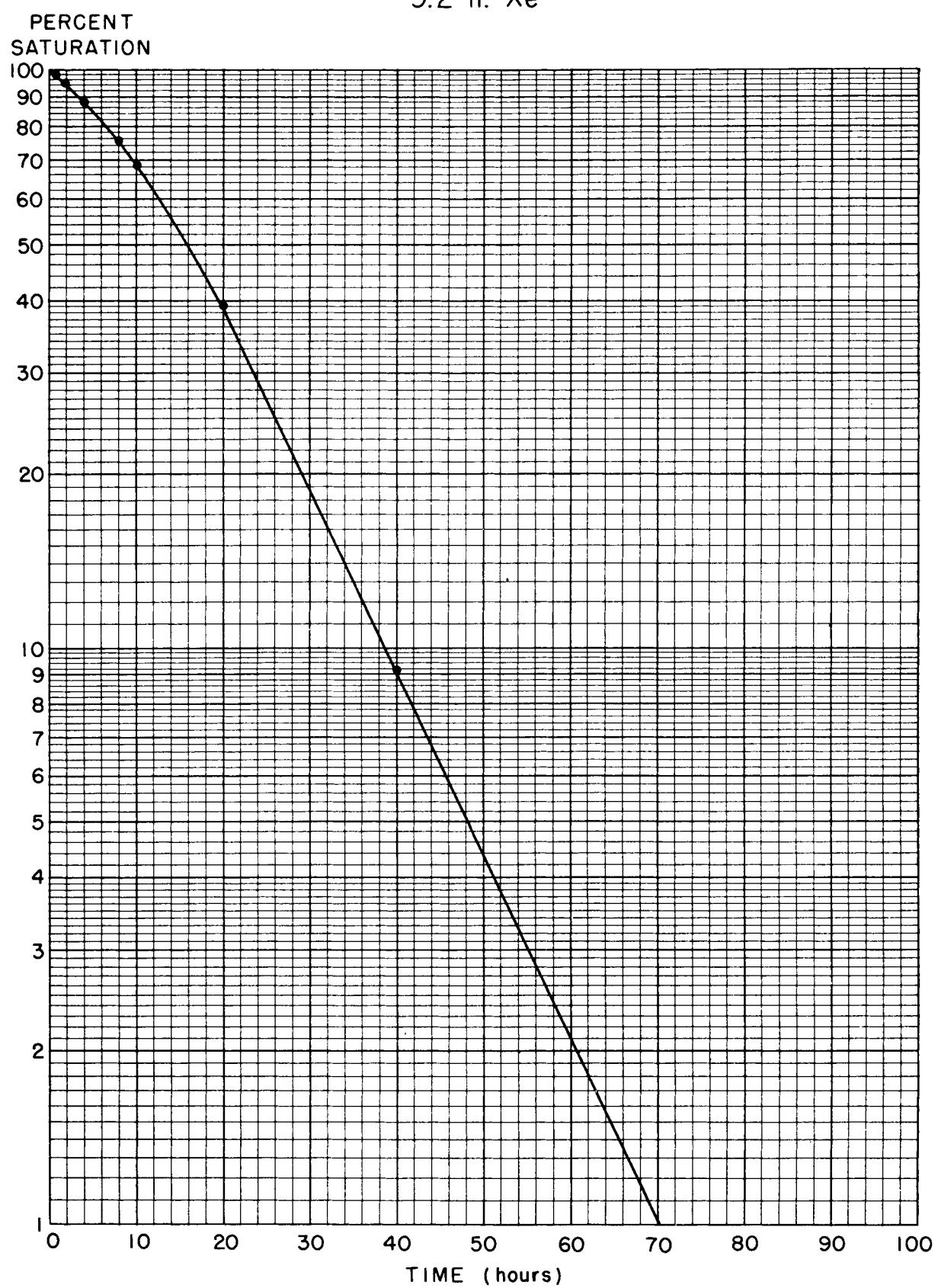


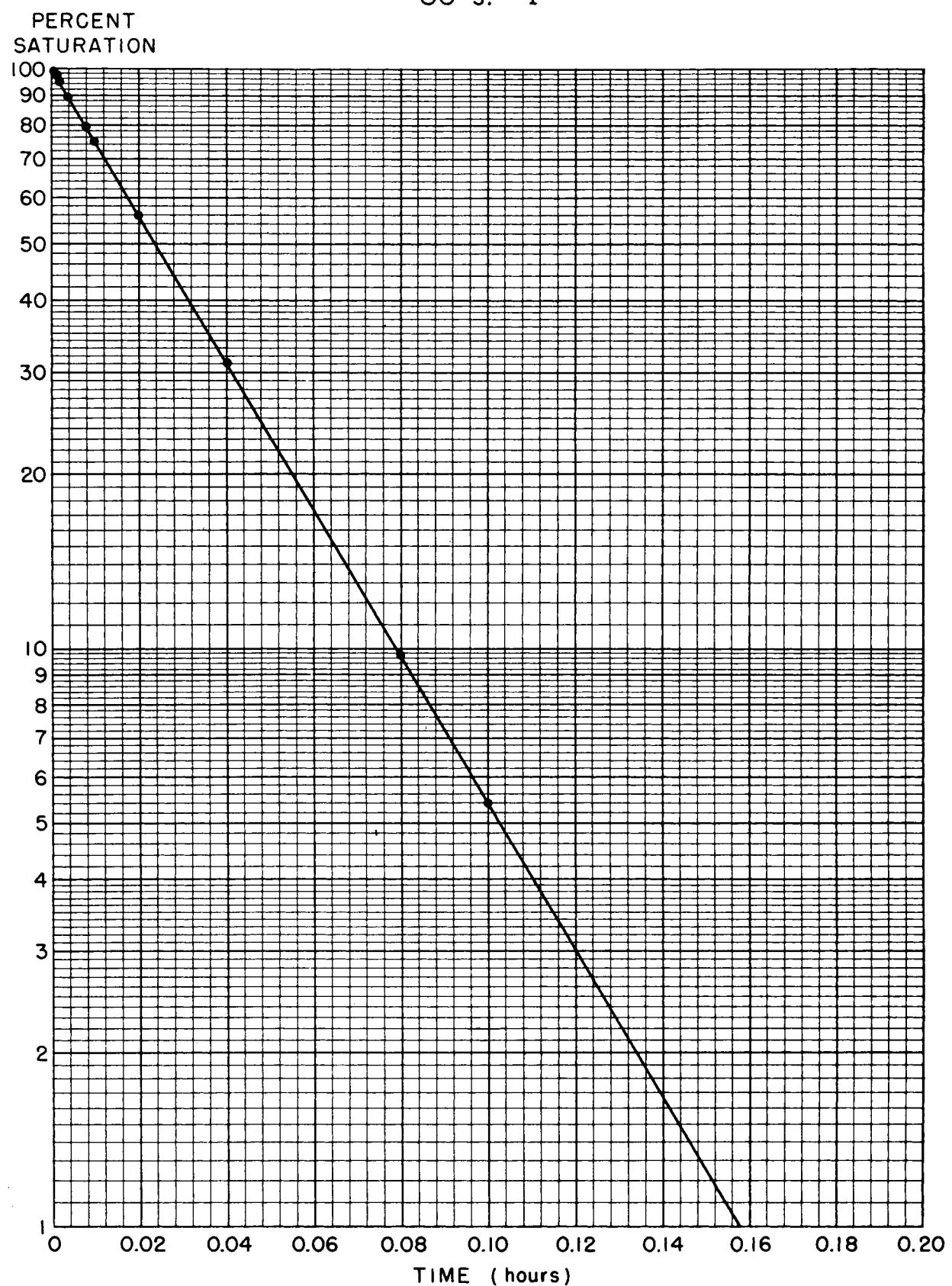
$[<2 \text{ m.}] \text{ Te}^{135}$ 

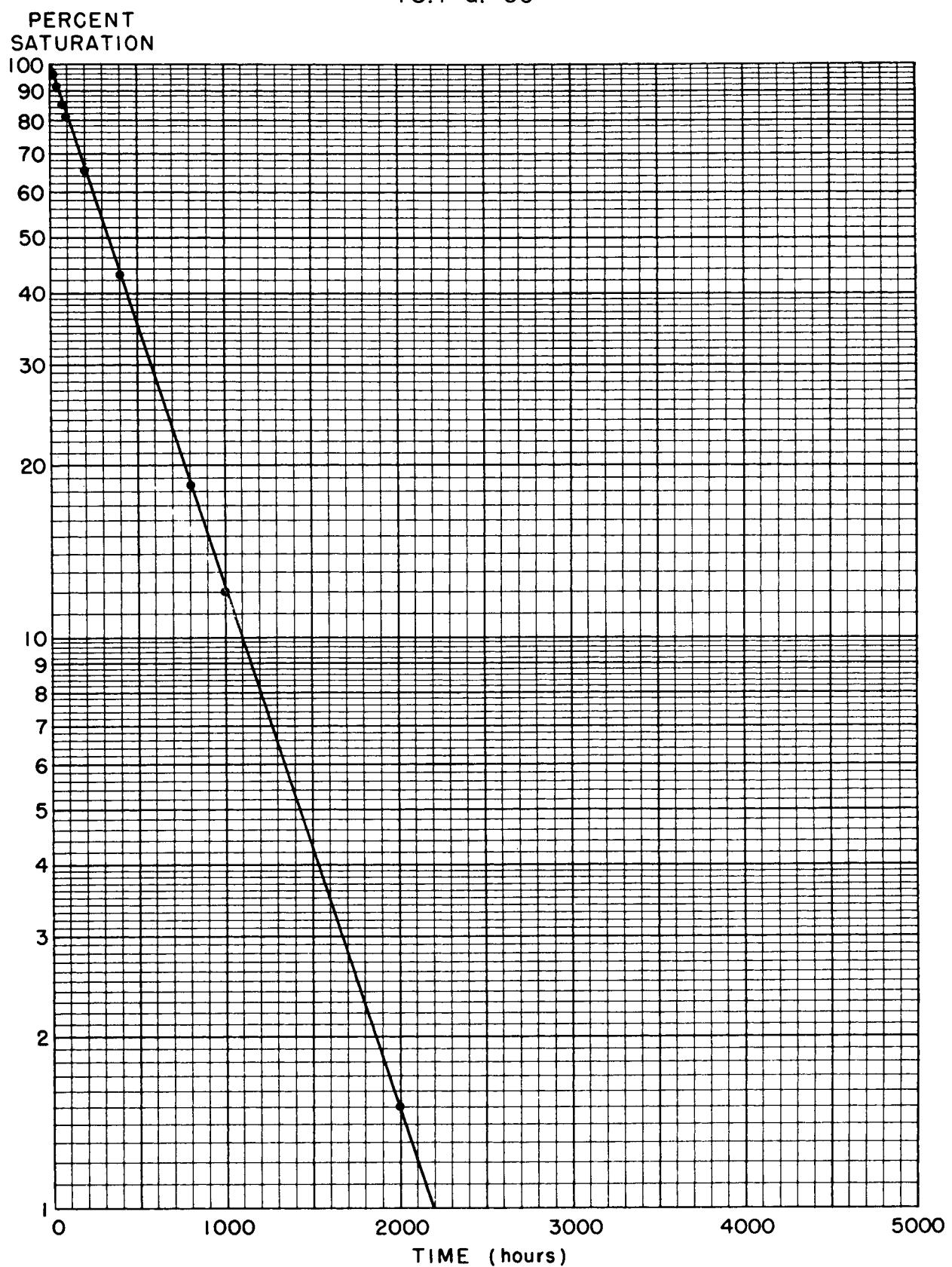
PERCENT
SATURATION



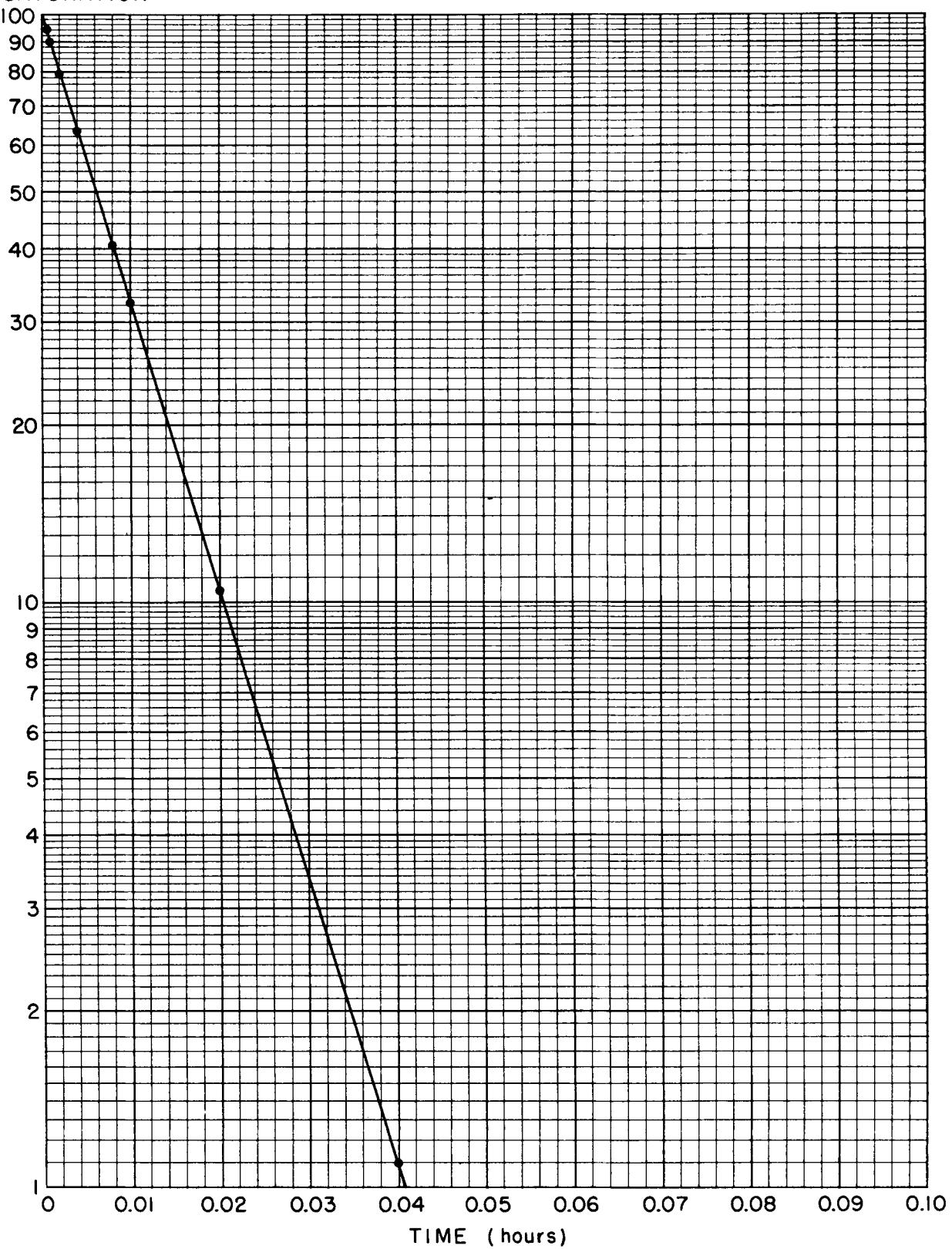




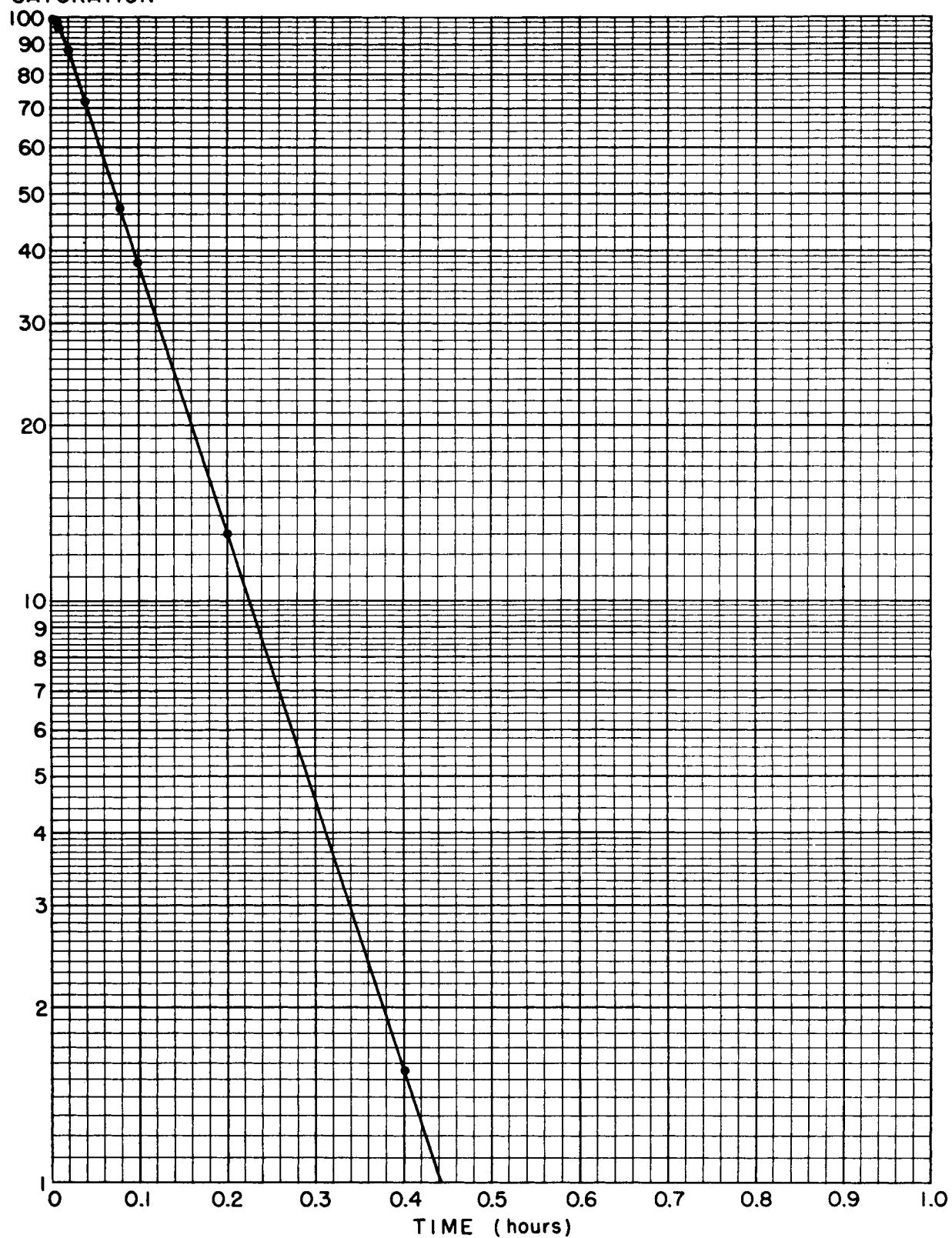


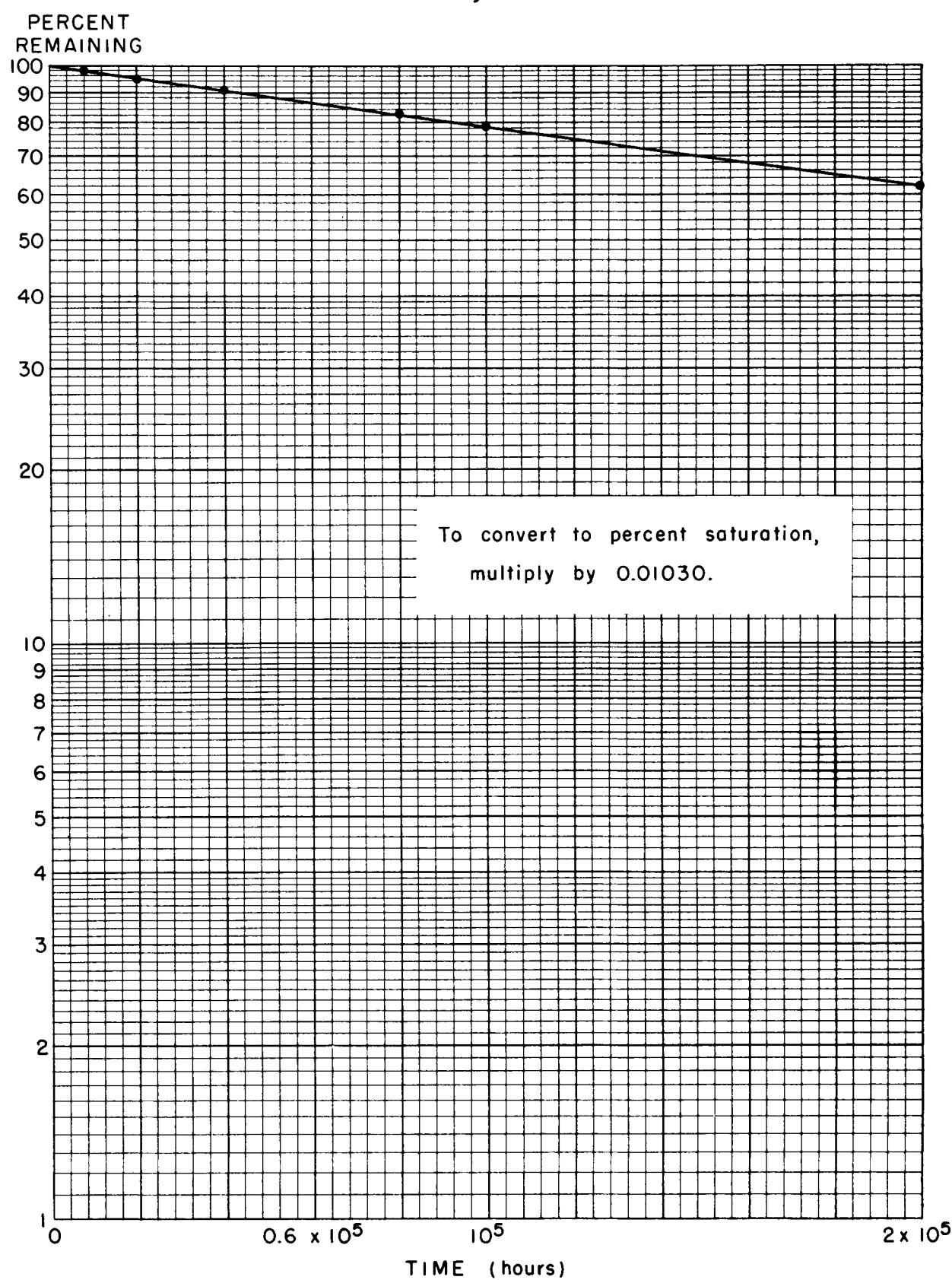


PERCENT
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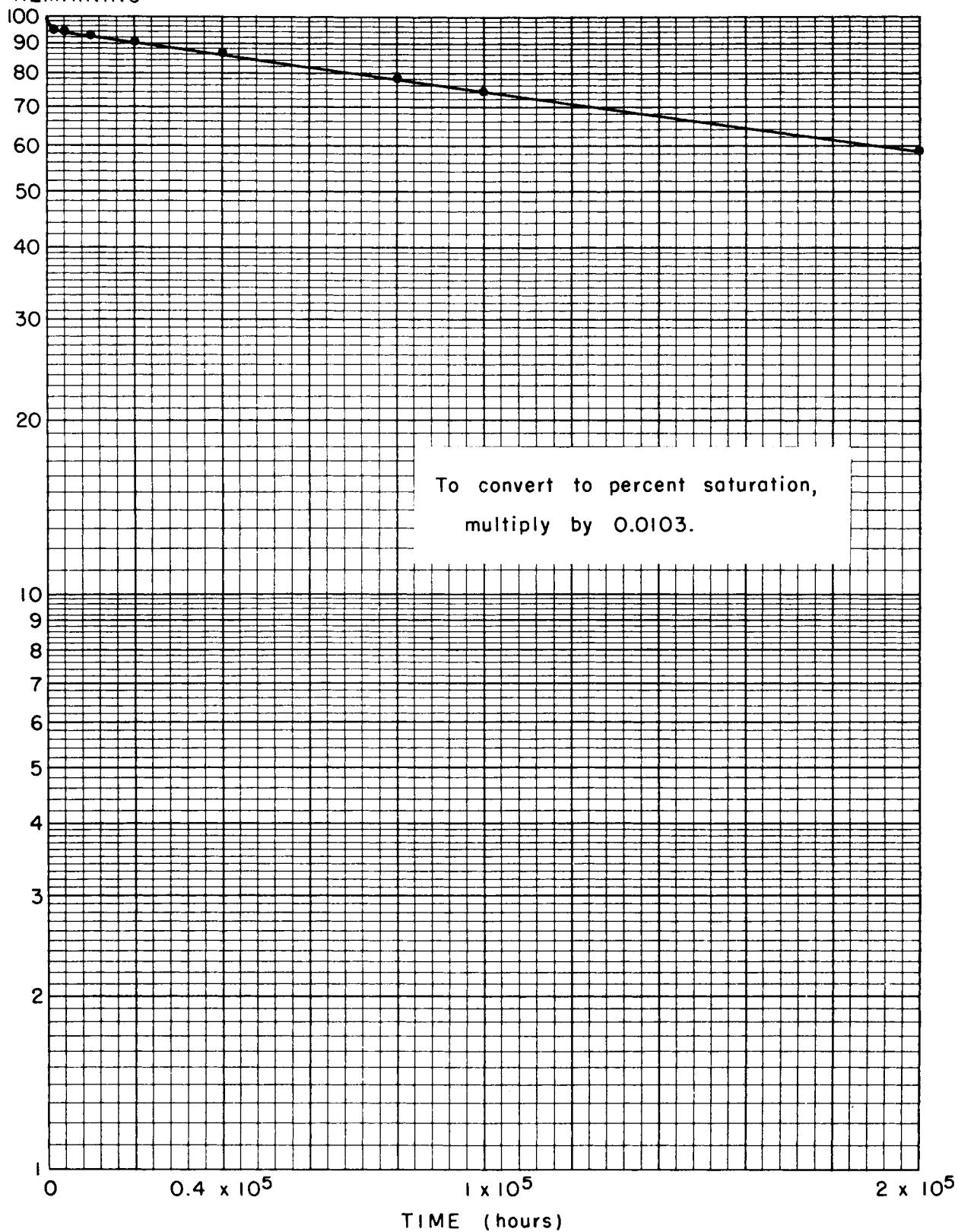


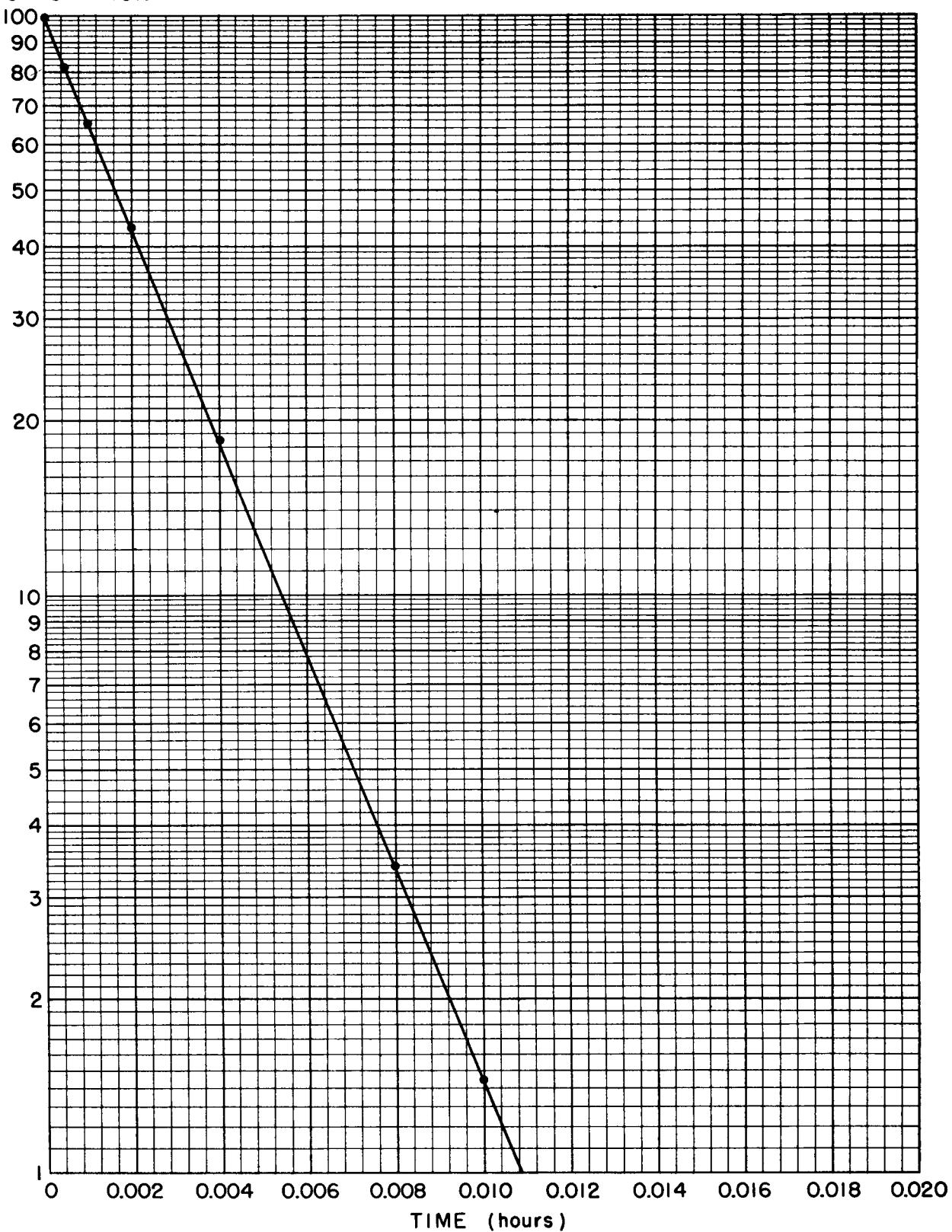
PERCENT
SATURATION



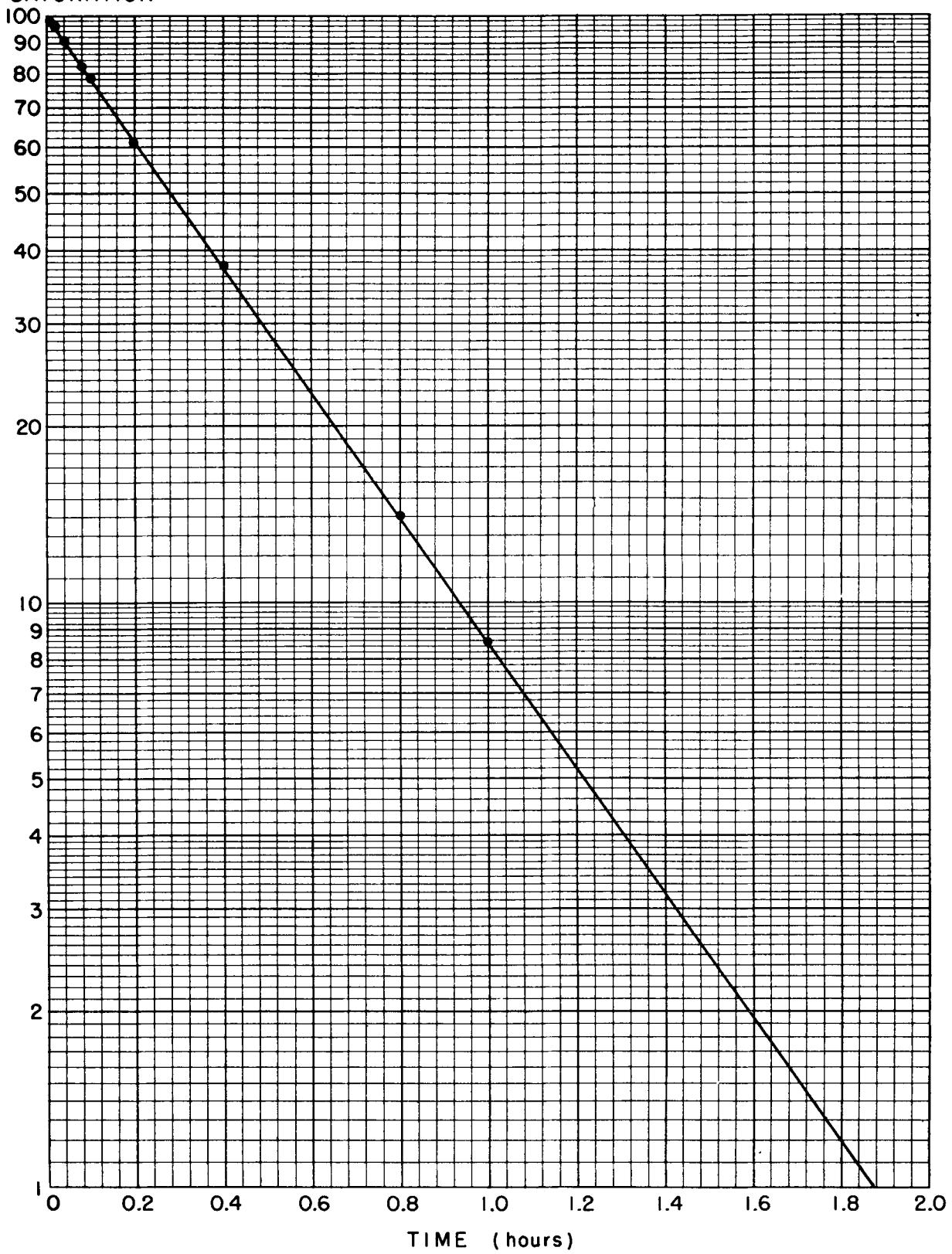


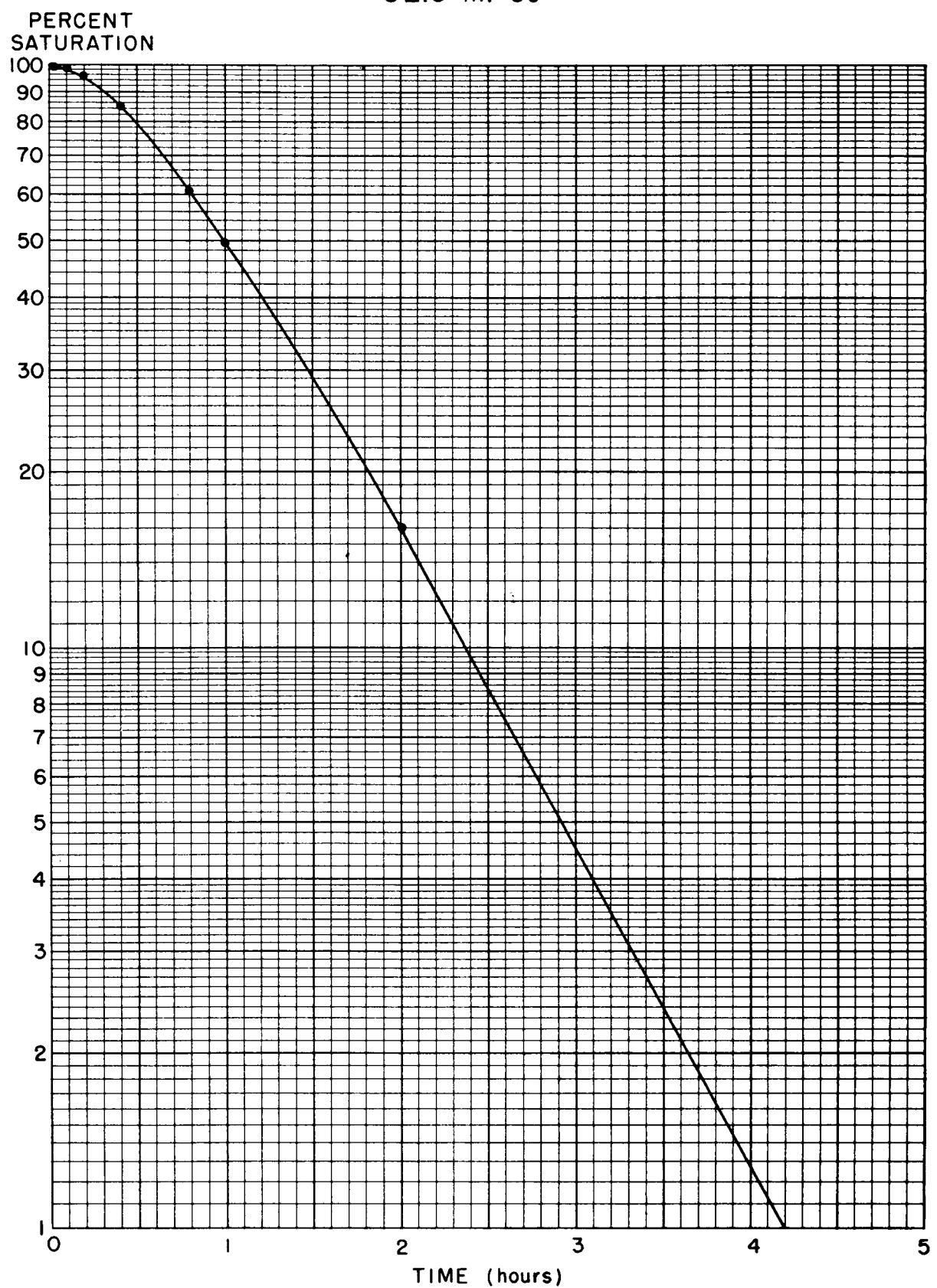
PERCENT
REMAINING



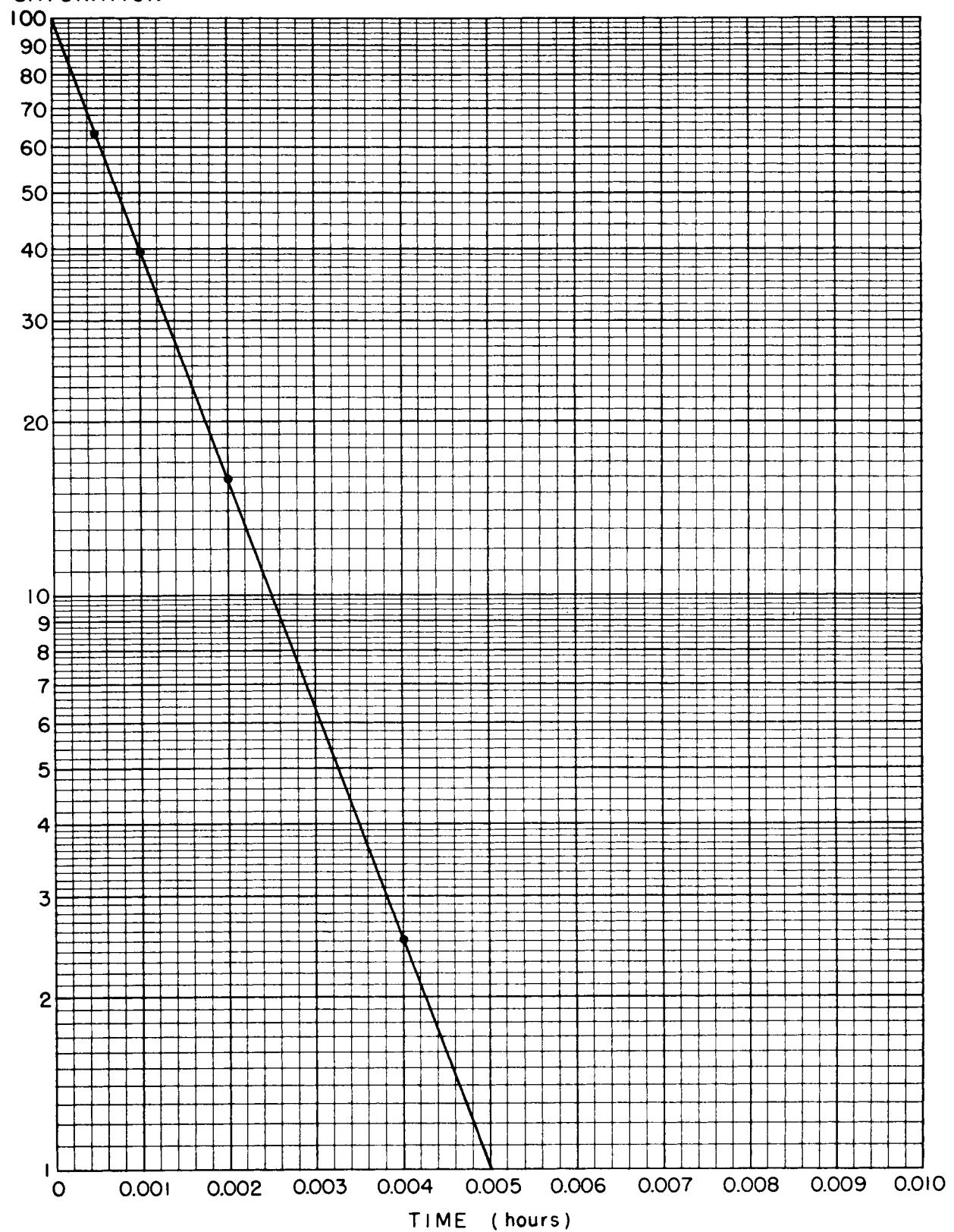
5.9 s. I^{138} PERCENT
SATURATION

PERCENT
SATURATION

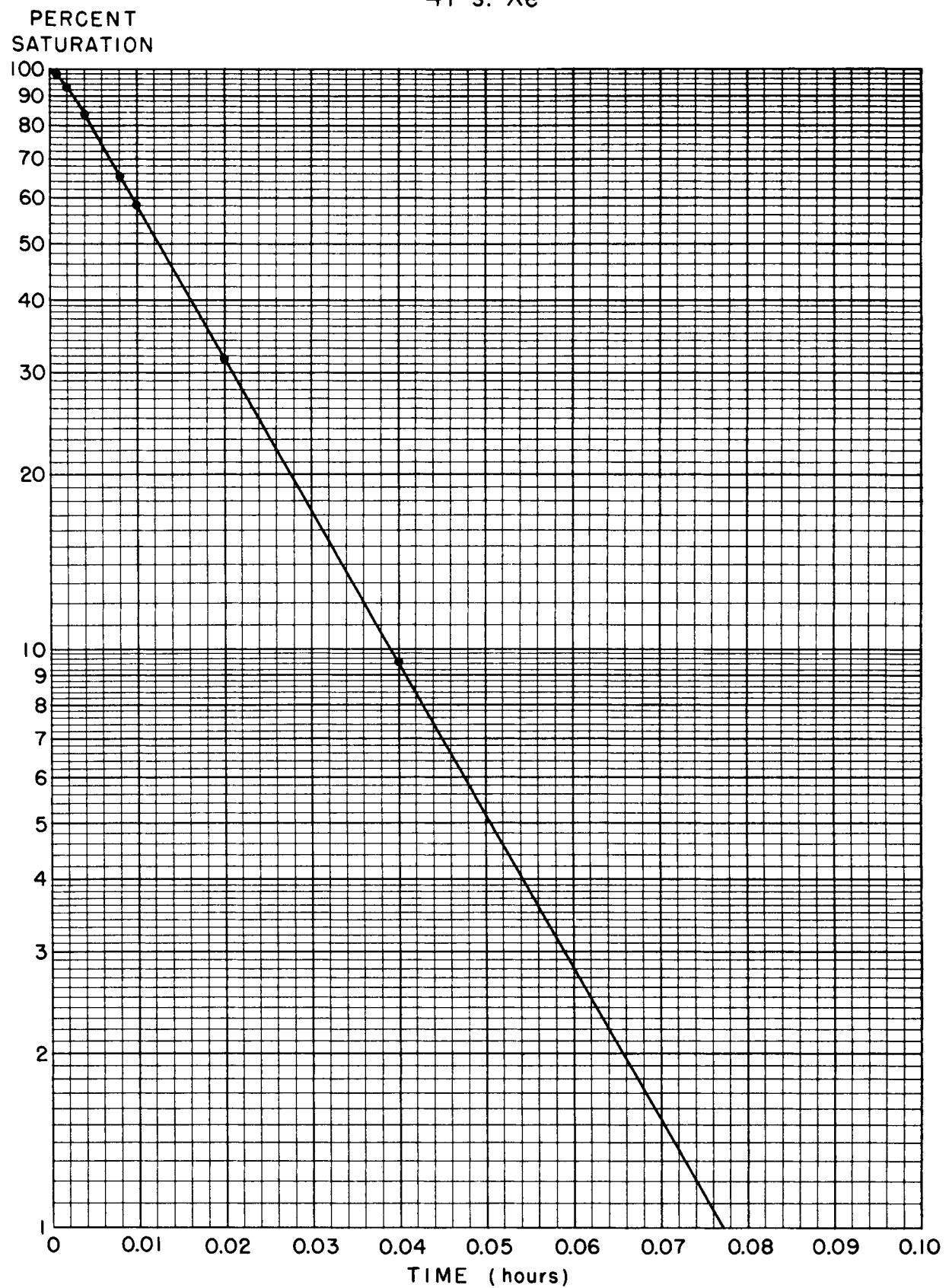




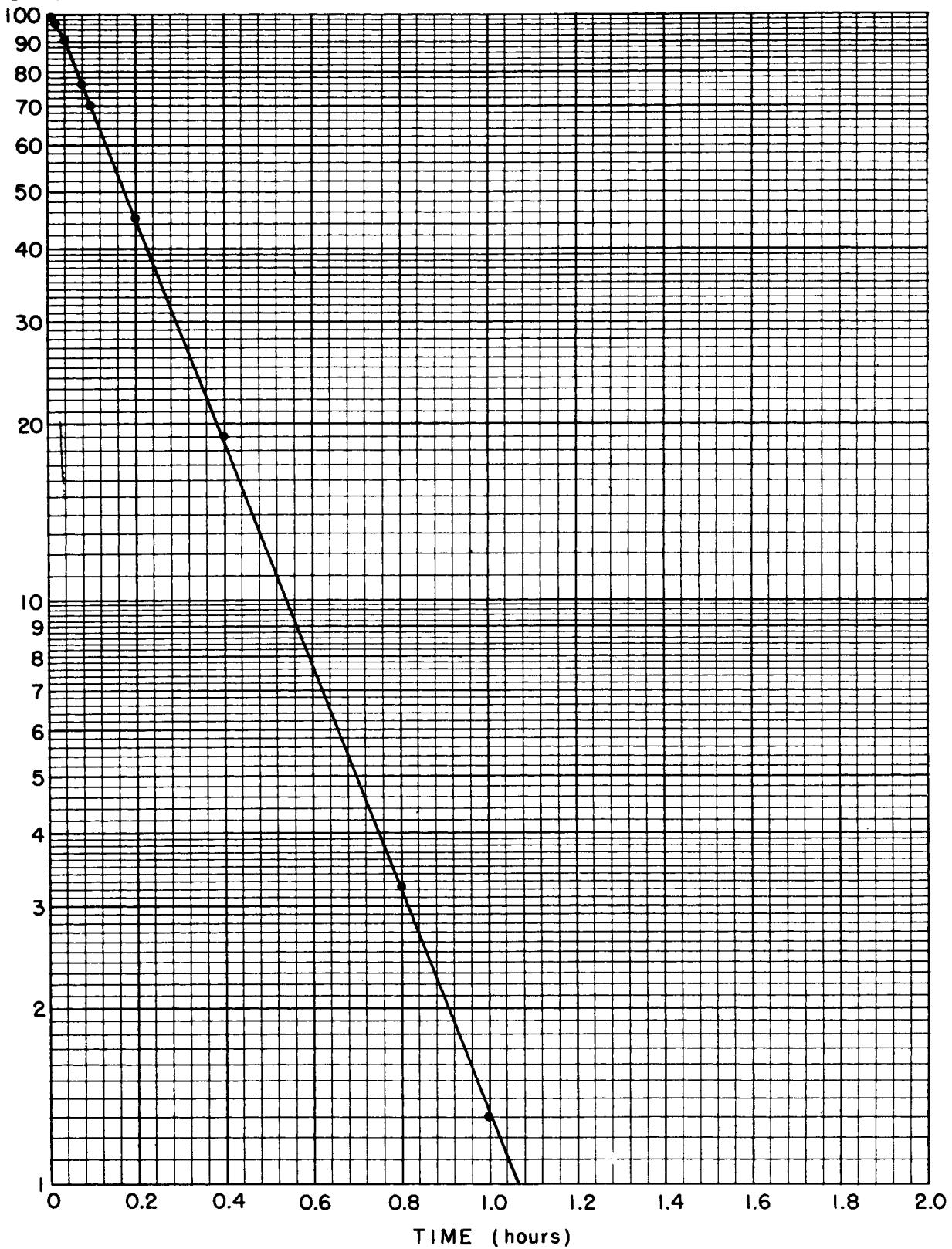
PERCENT
SATURATION



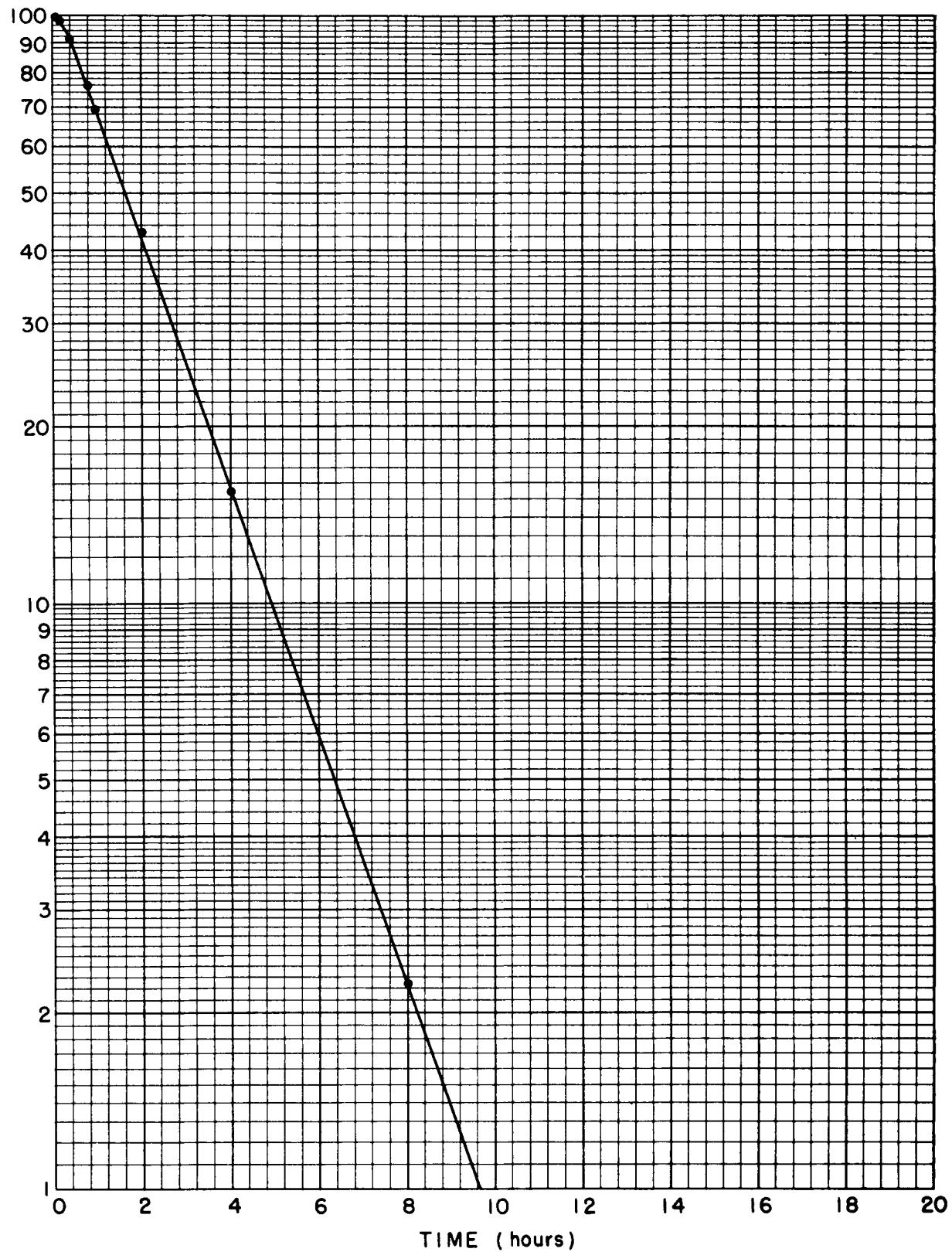
41 s. Xe¹³⁹



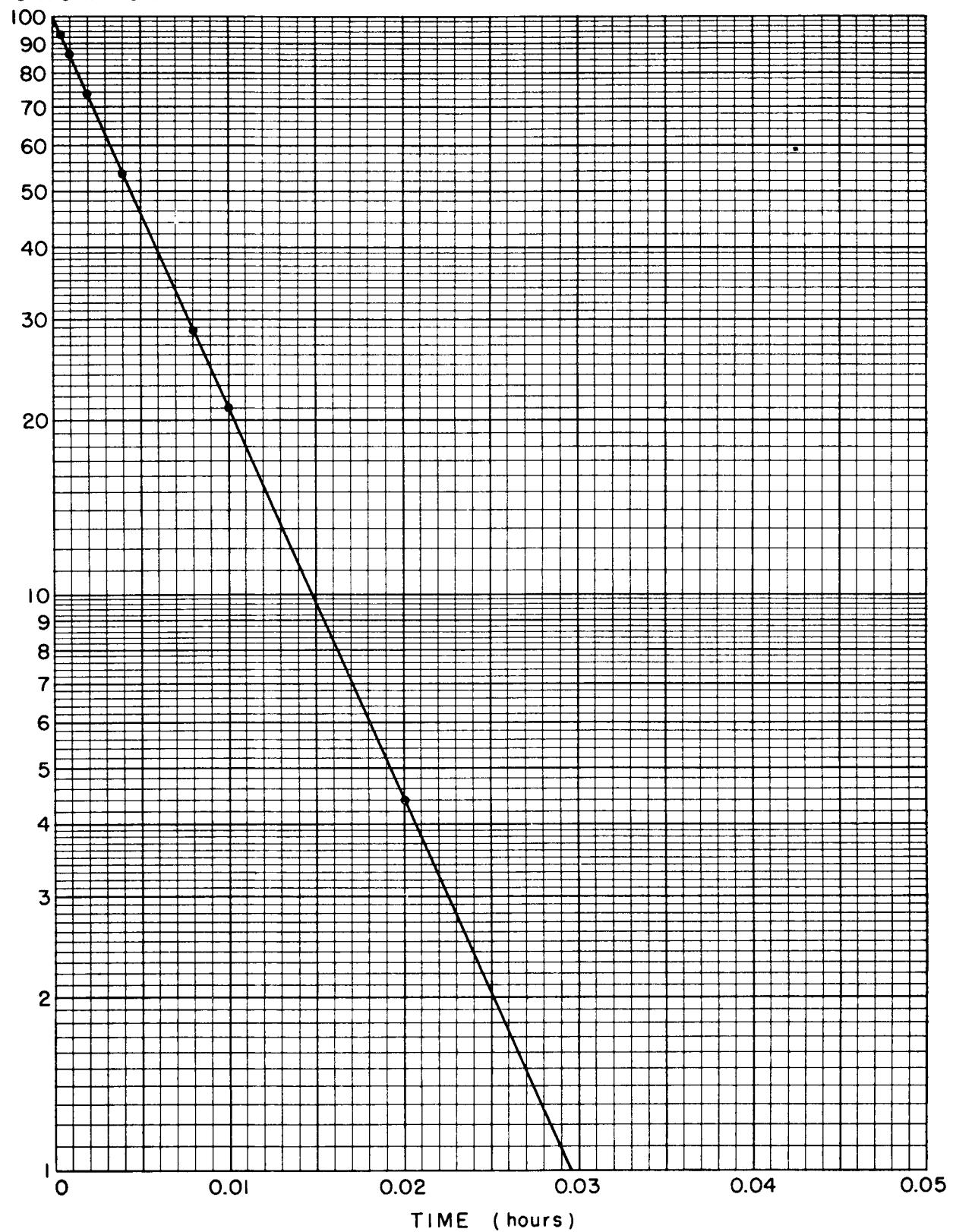
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SATURATION



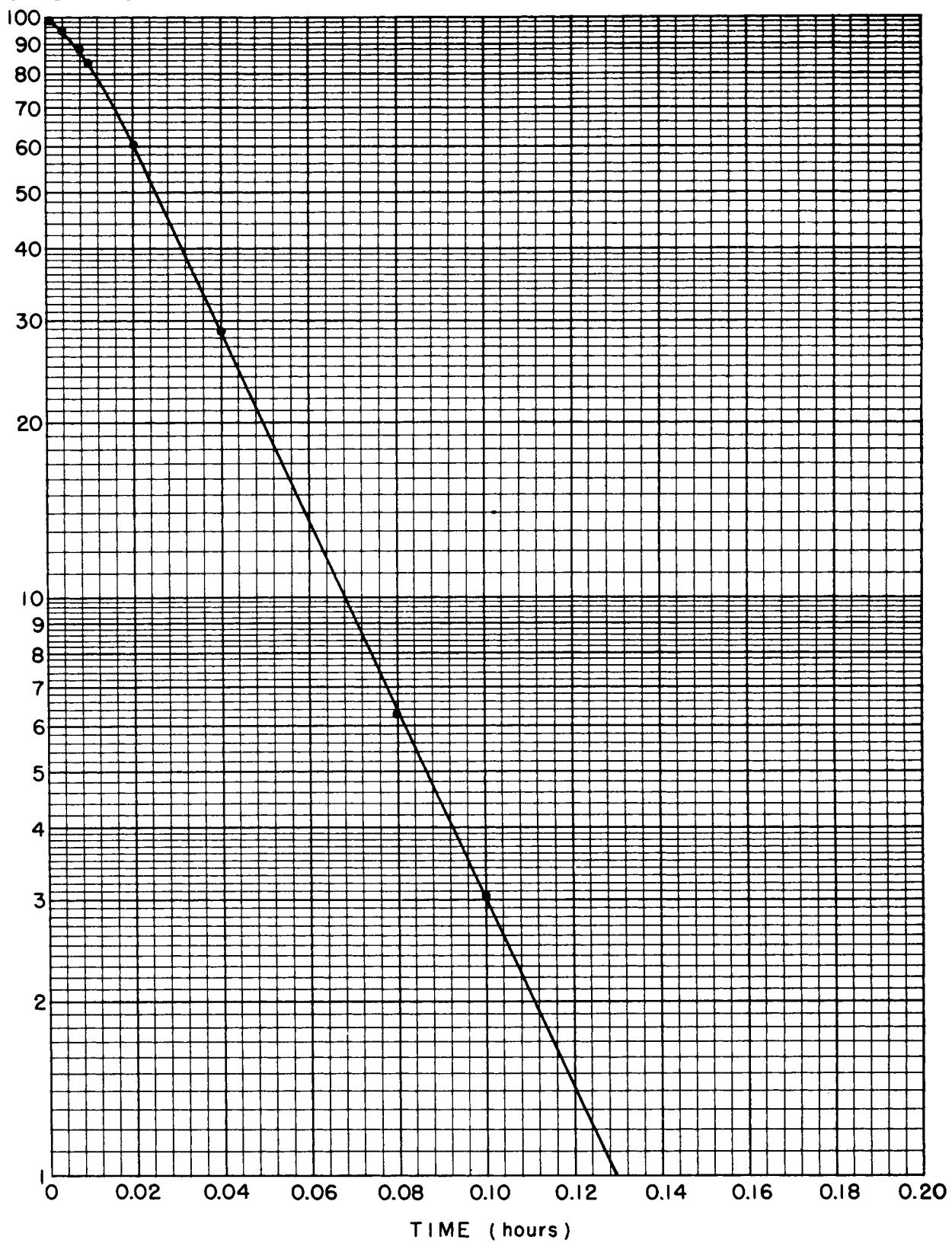
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SATURATION



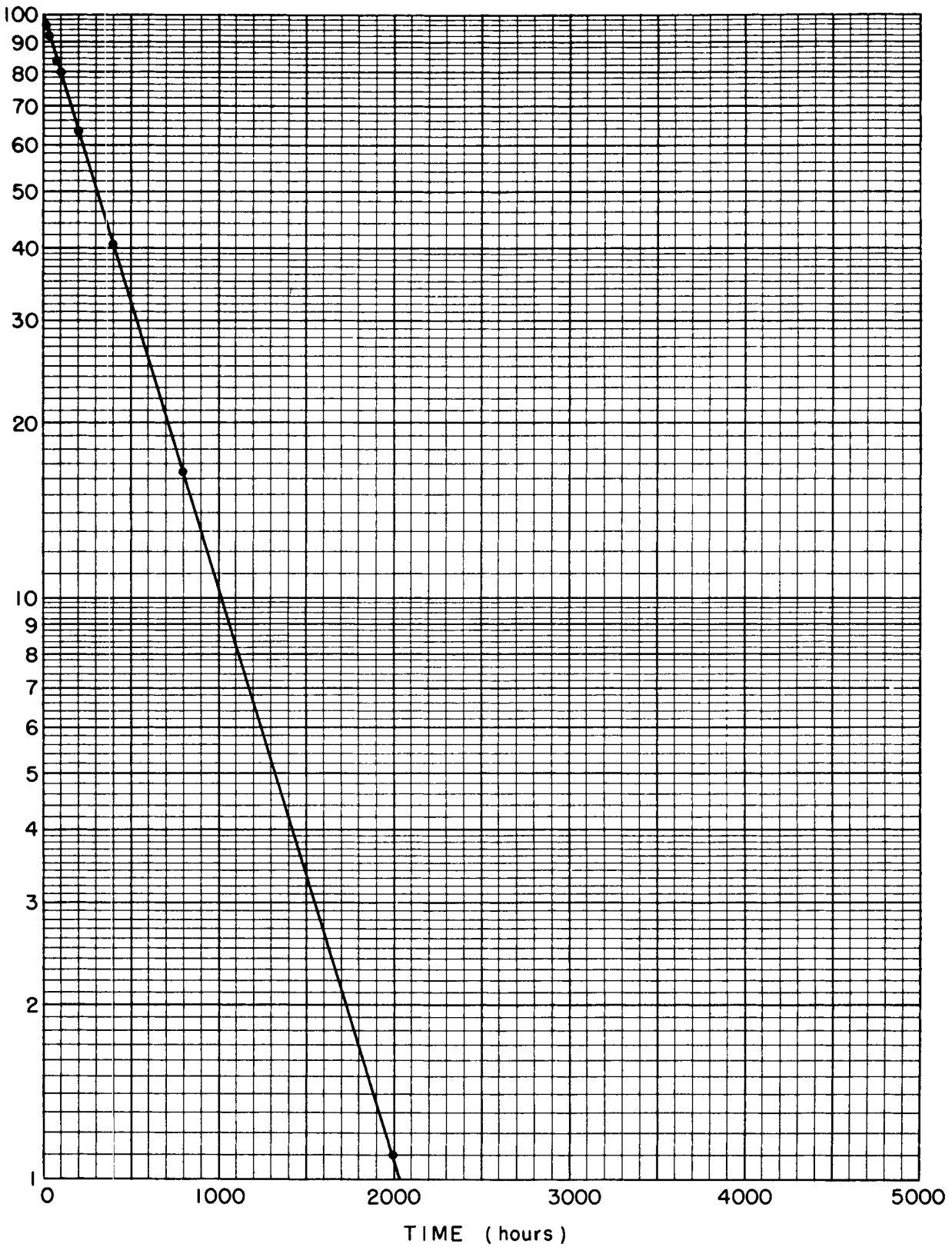
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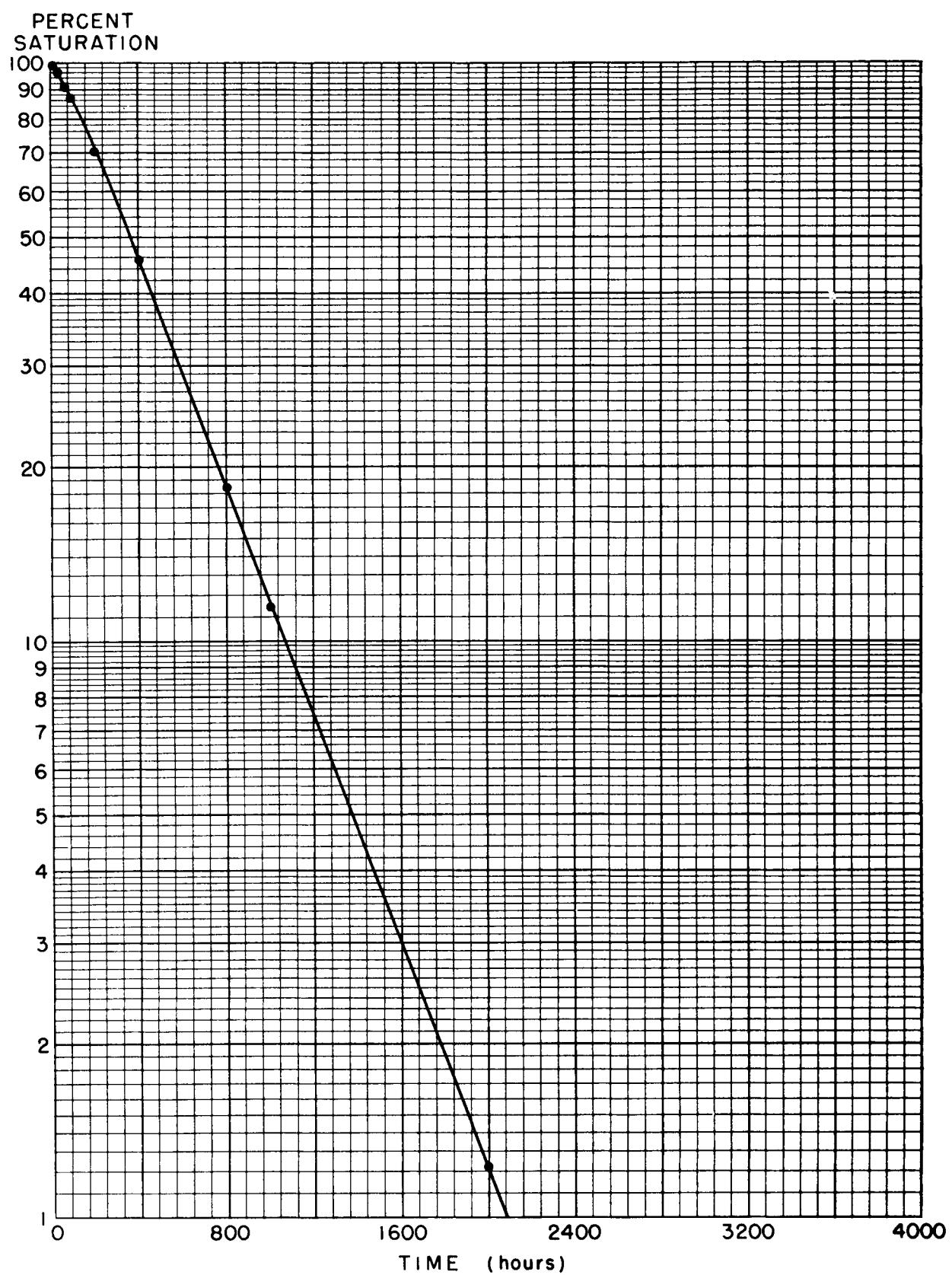


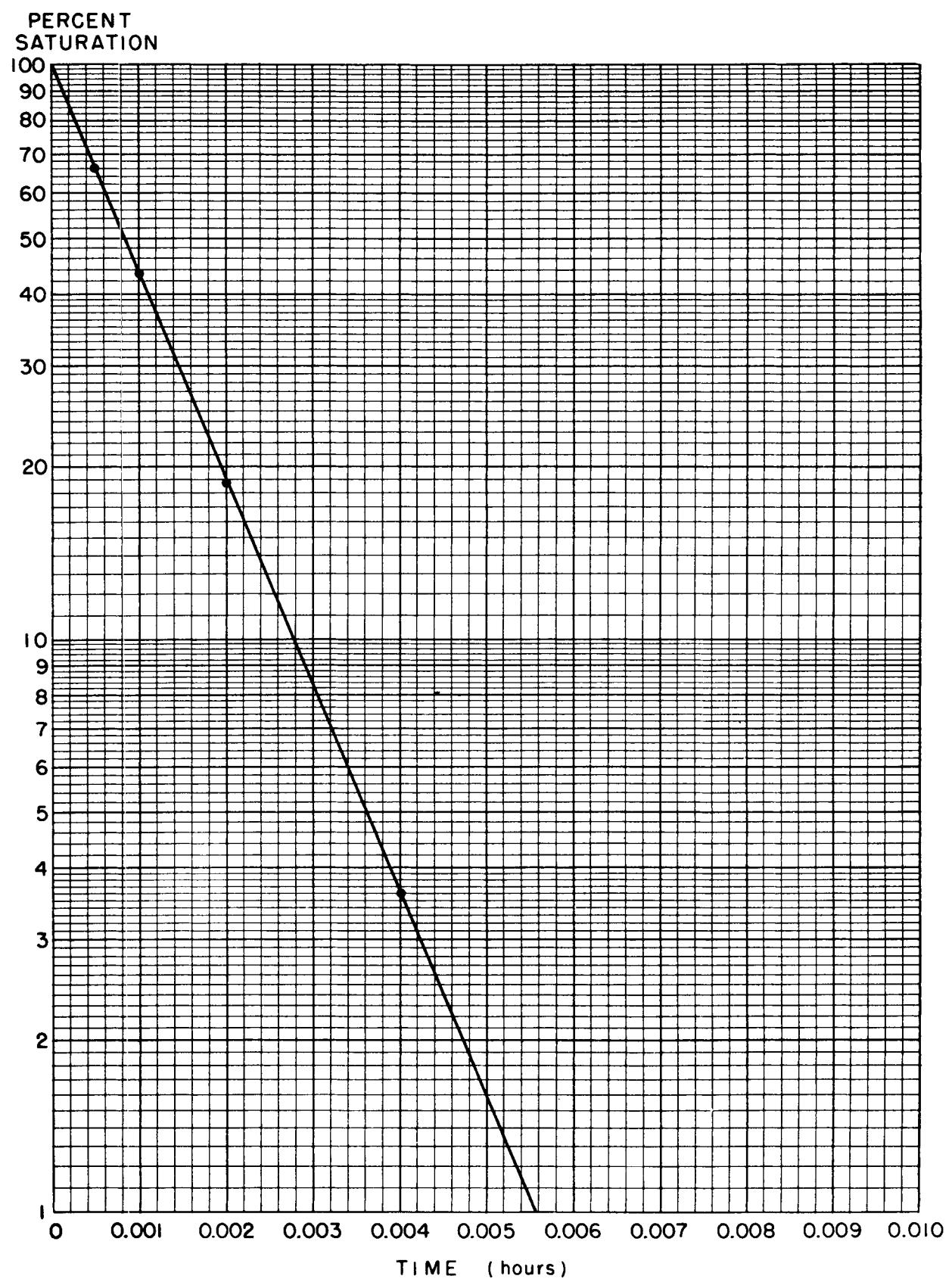
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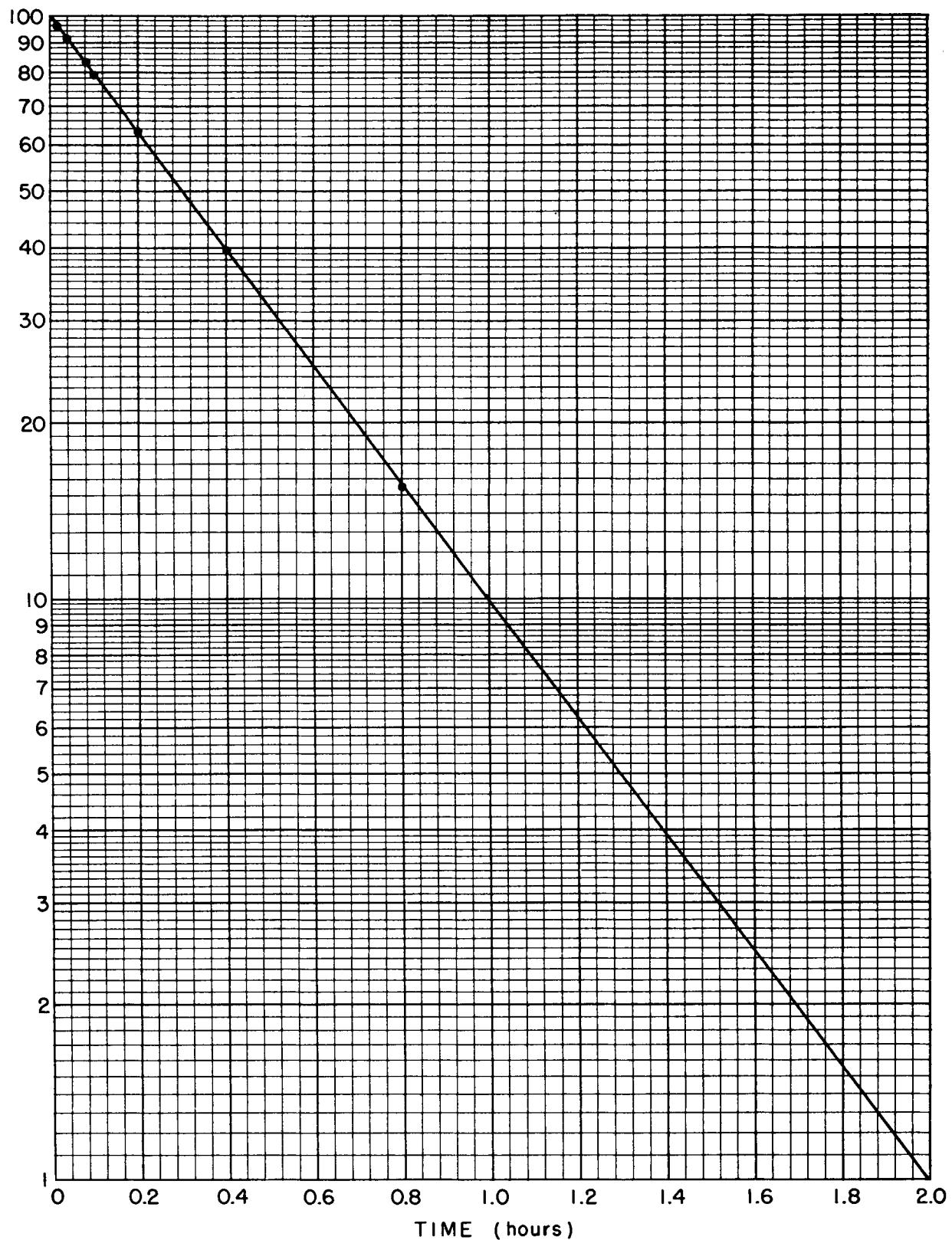
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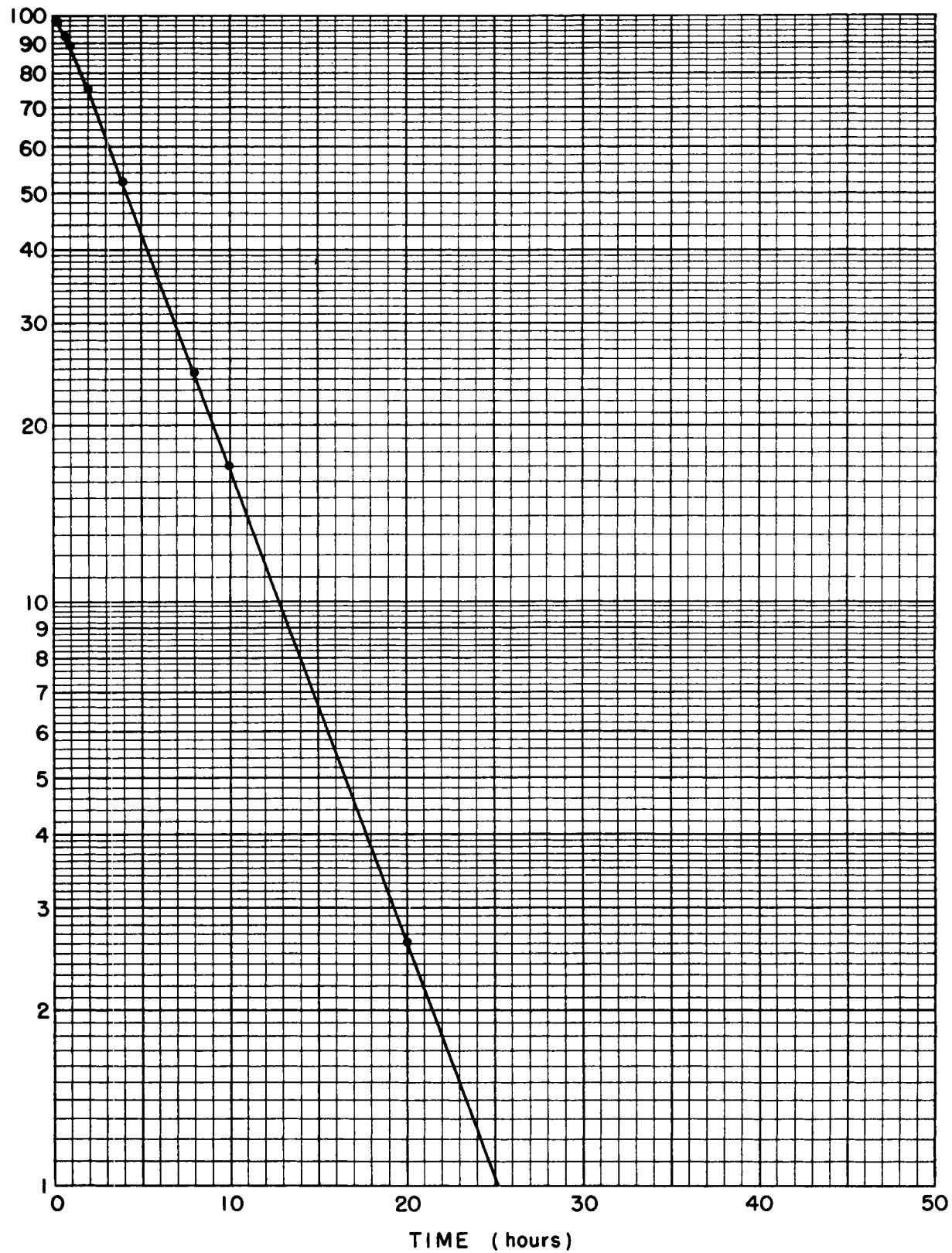




PERCENT
SATURATION



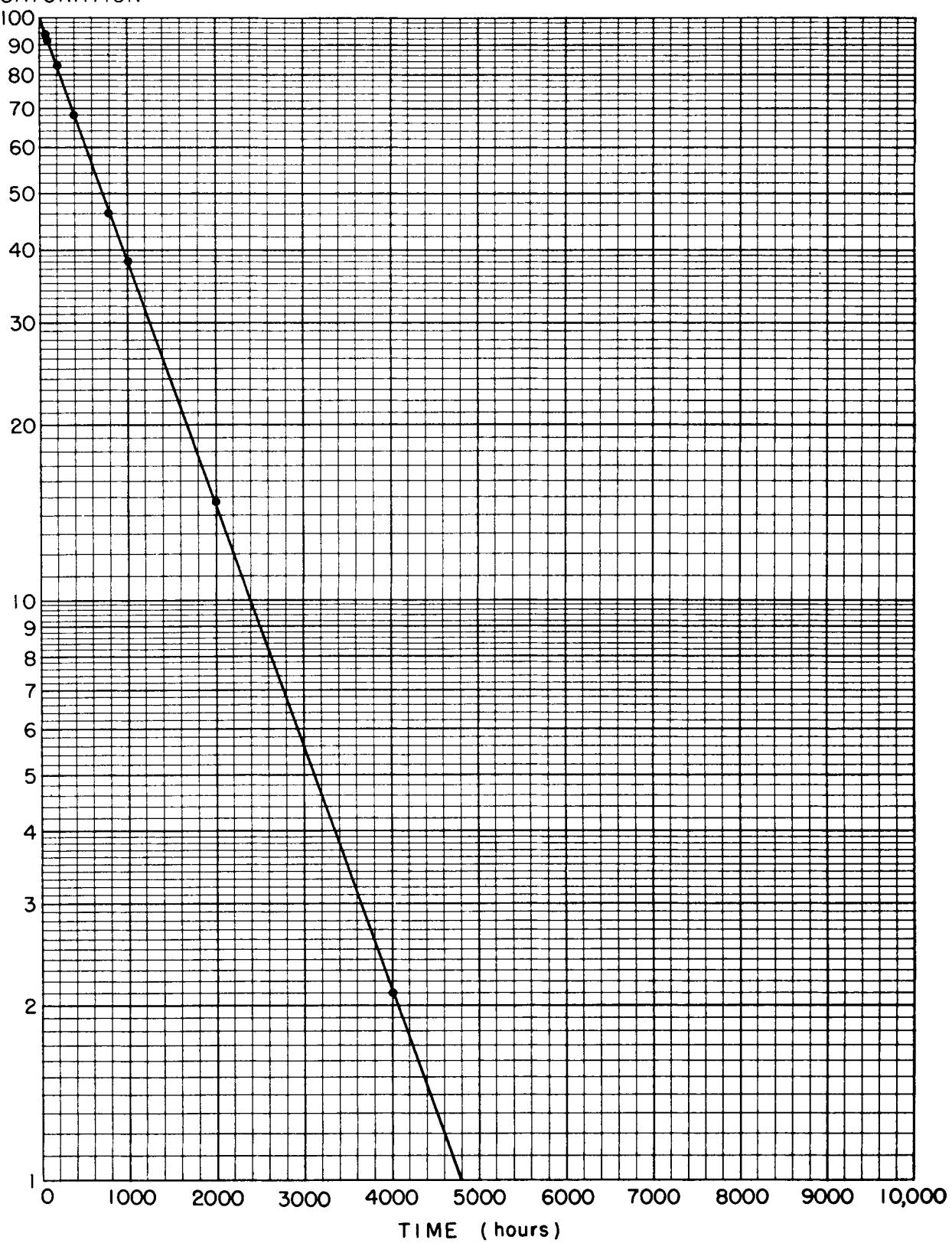
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SATURATION



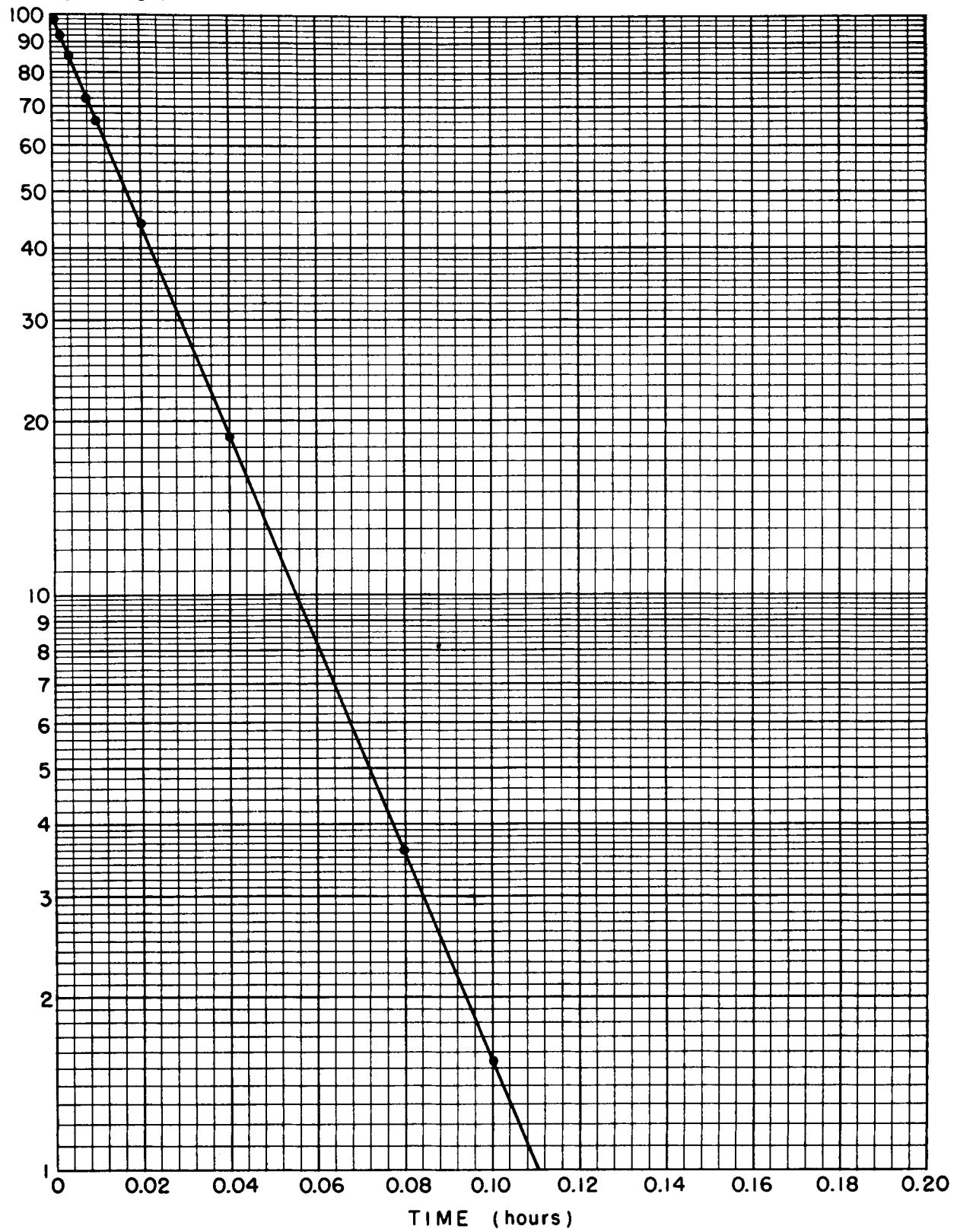
²³⁶

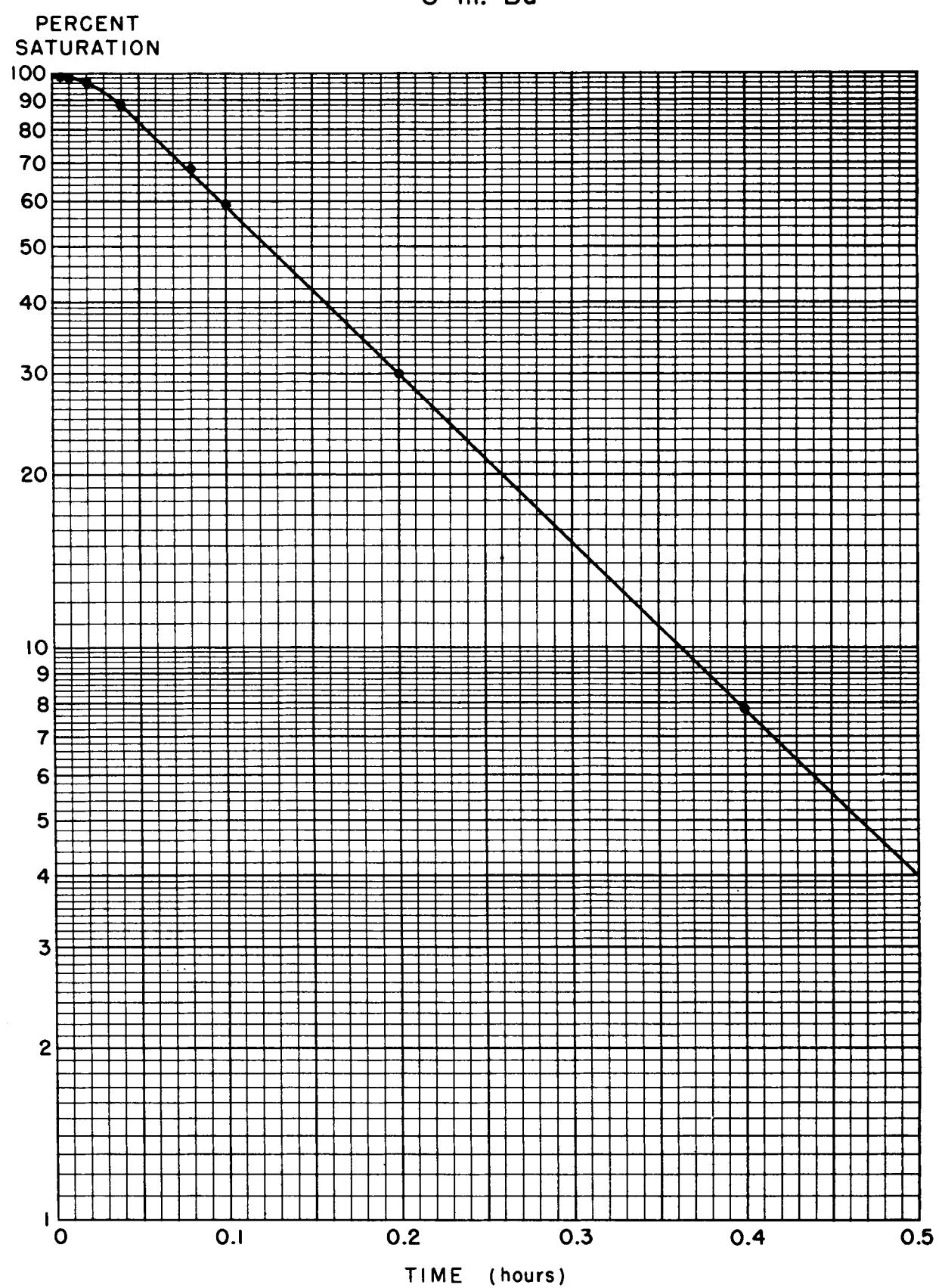
30 d. Ce¹⁴¹

PERCENT
SATURATION

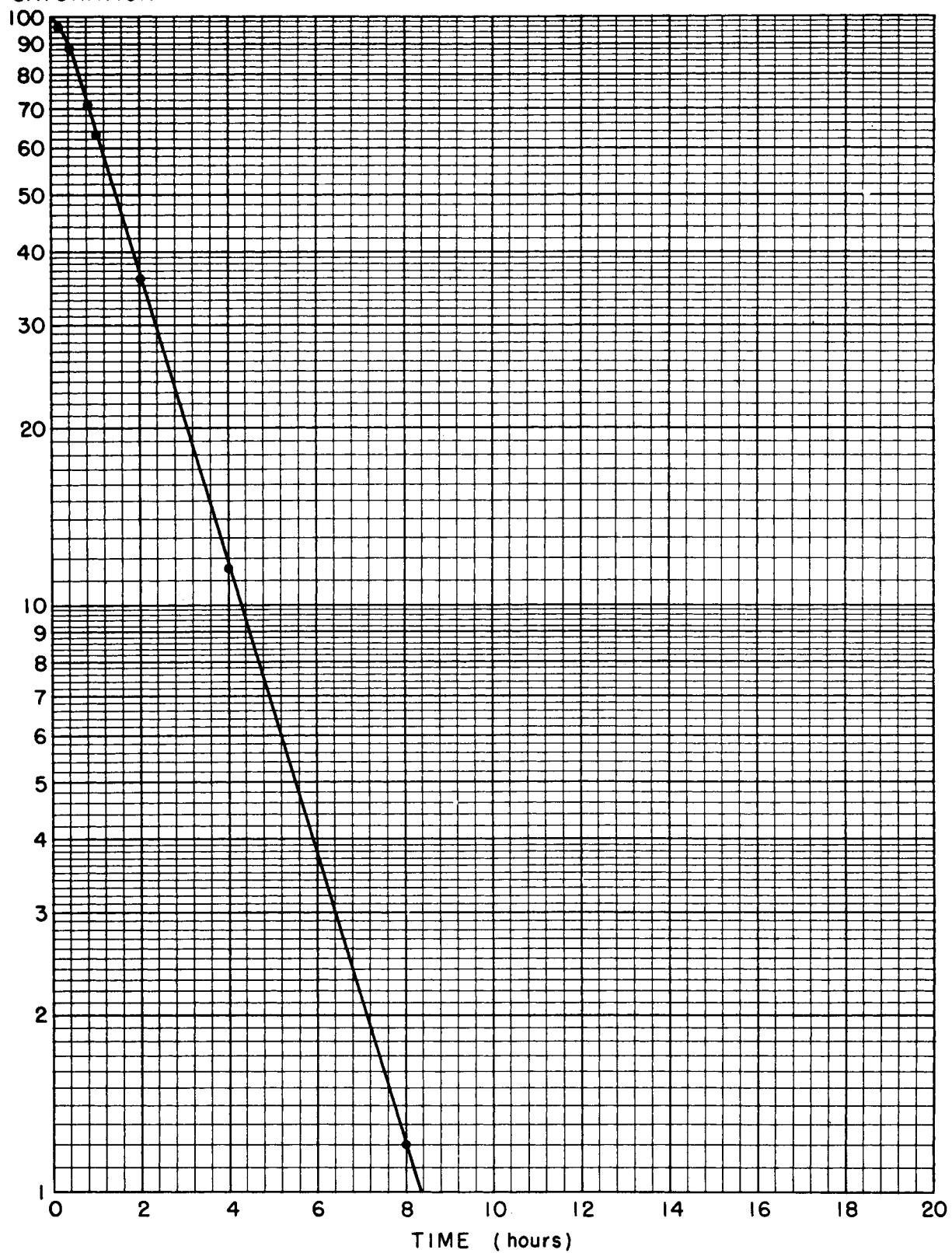


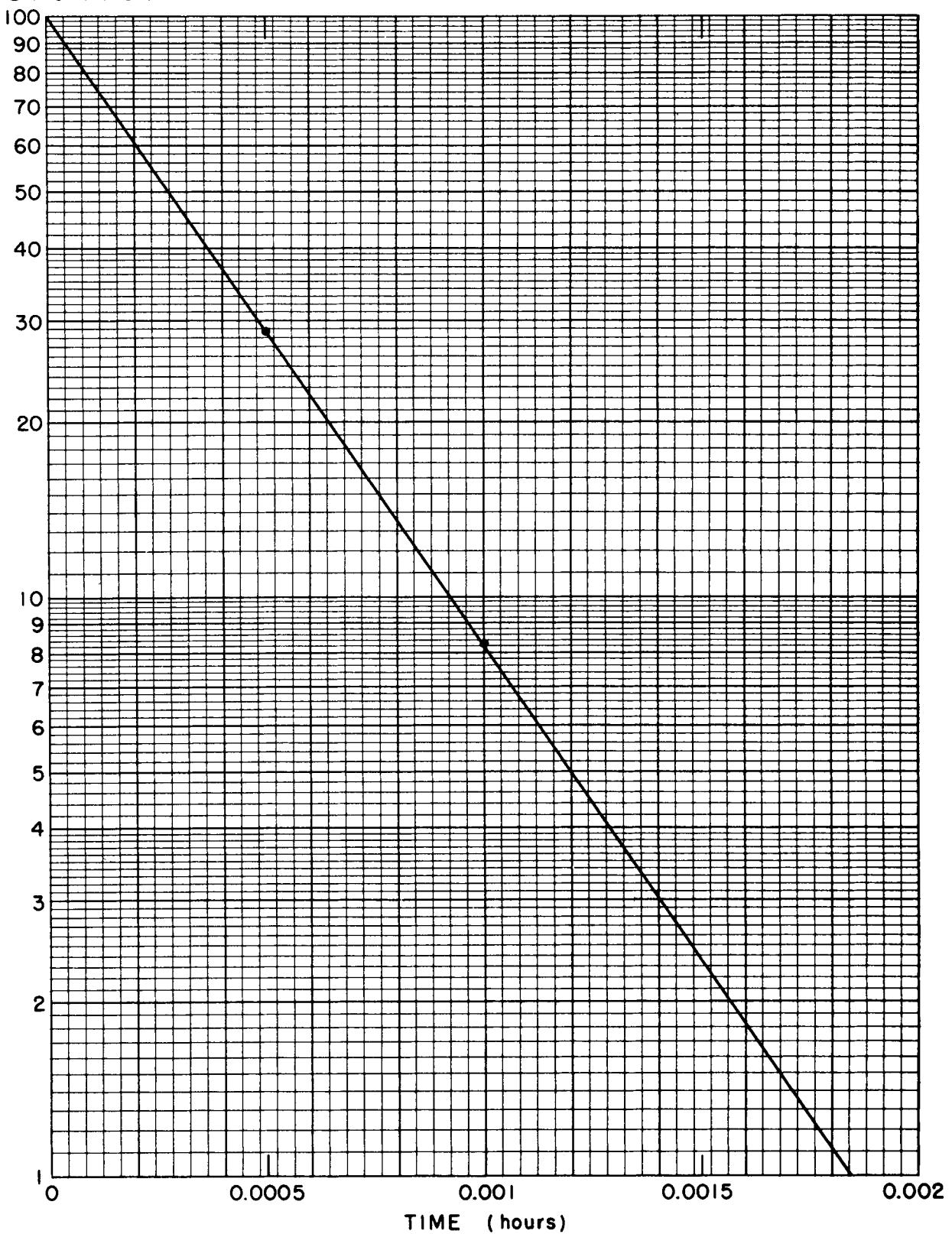
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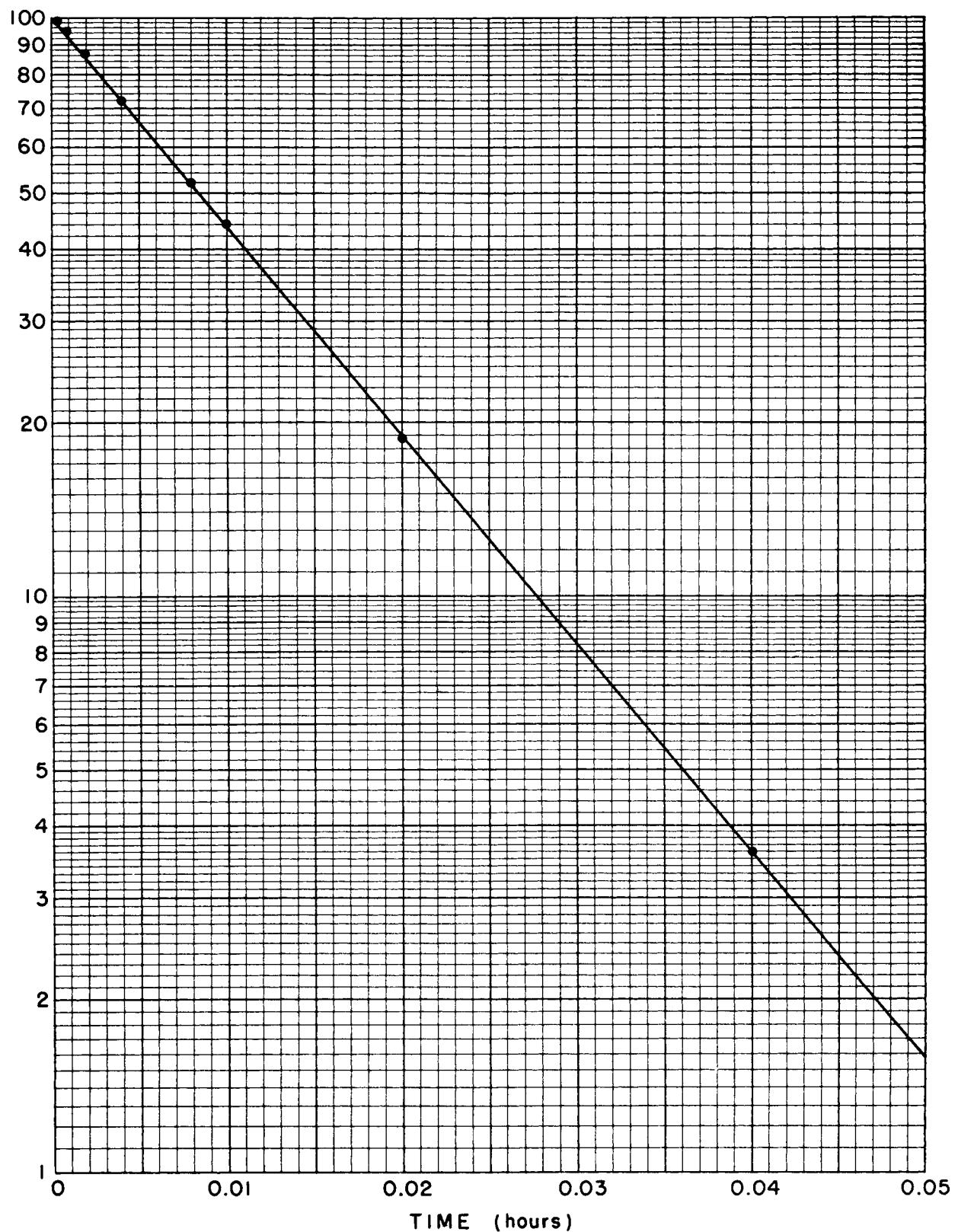


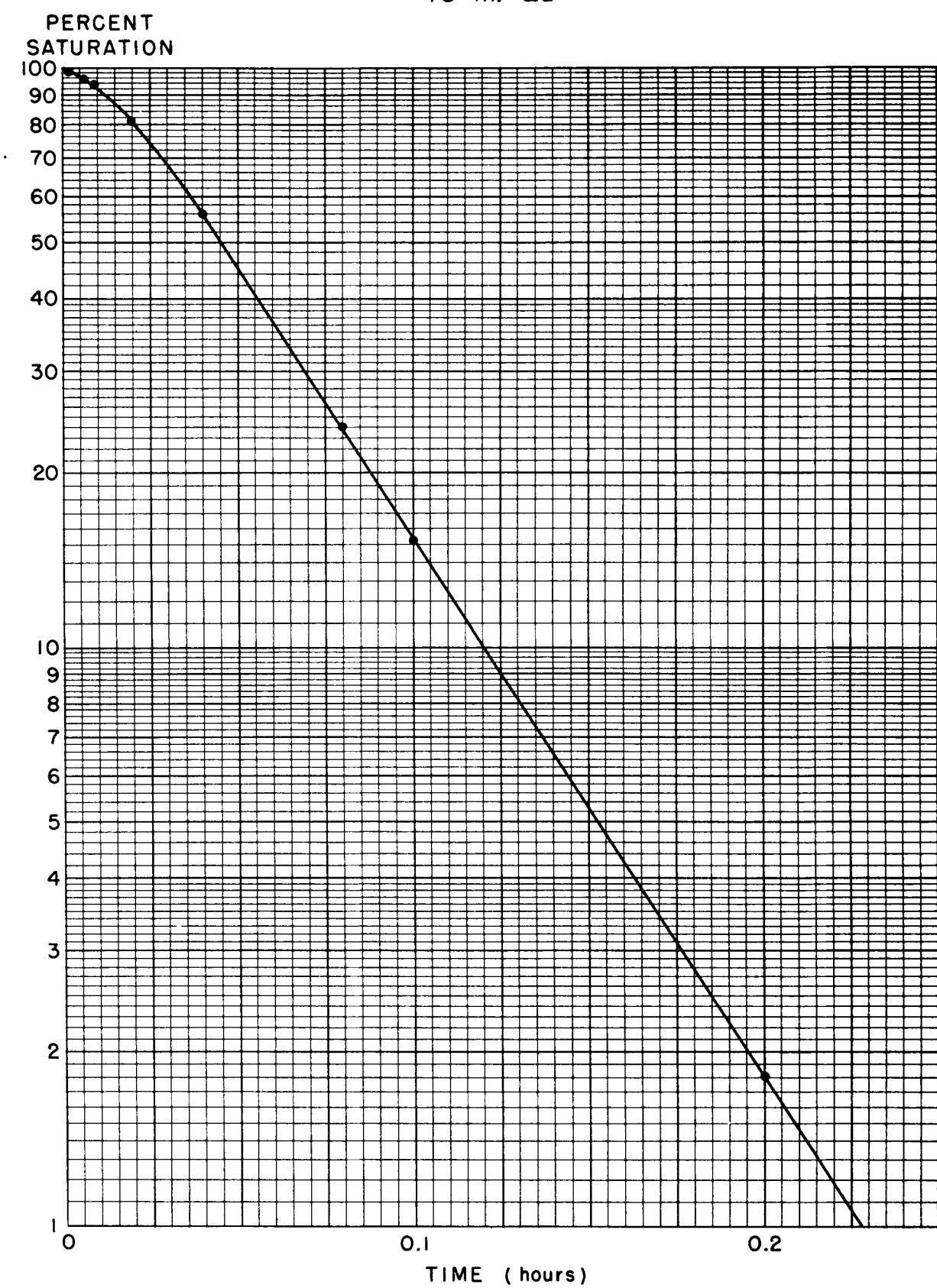
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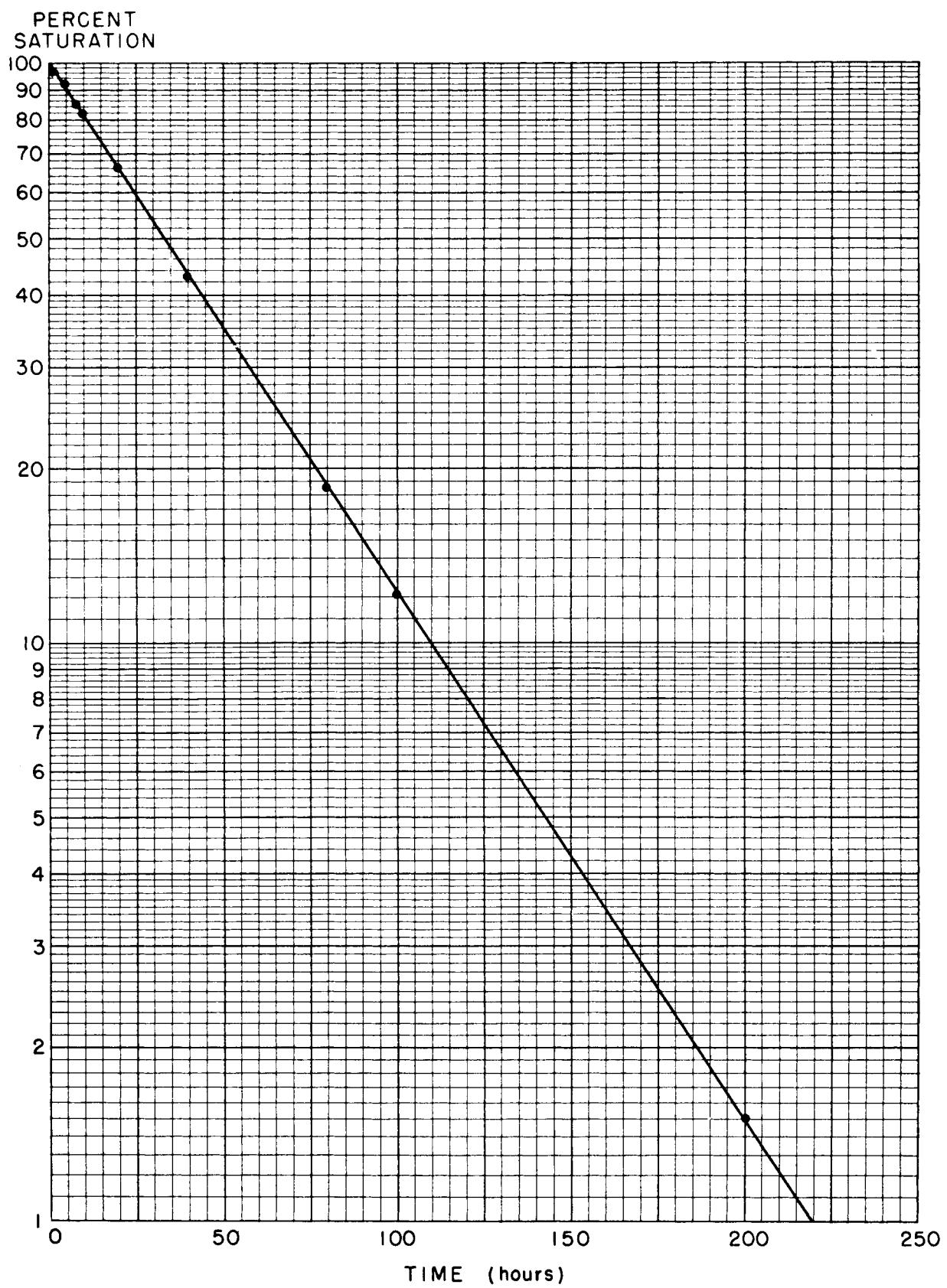


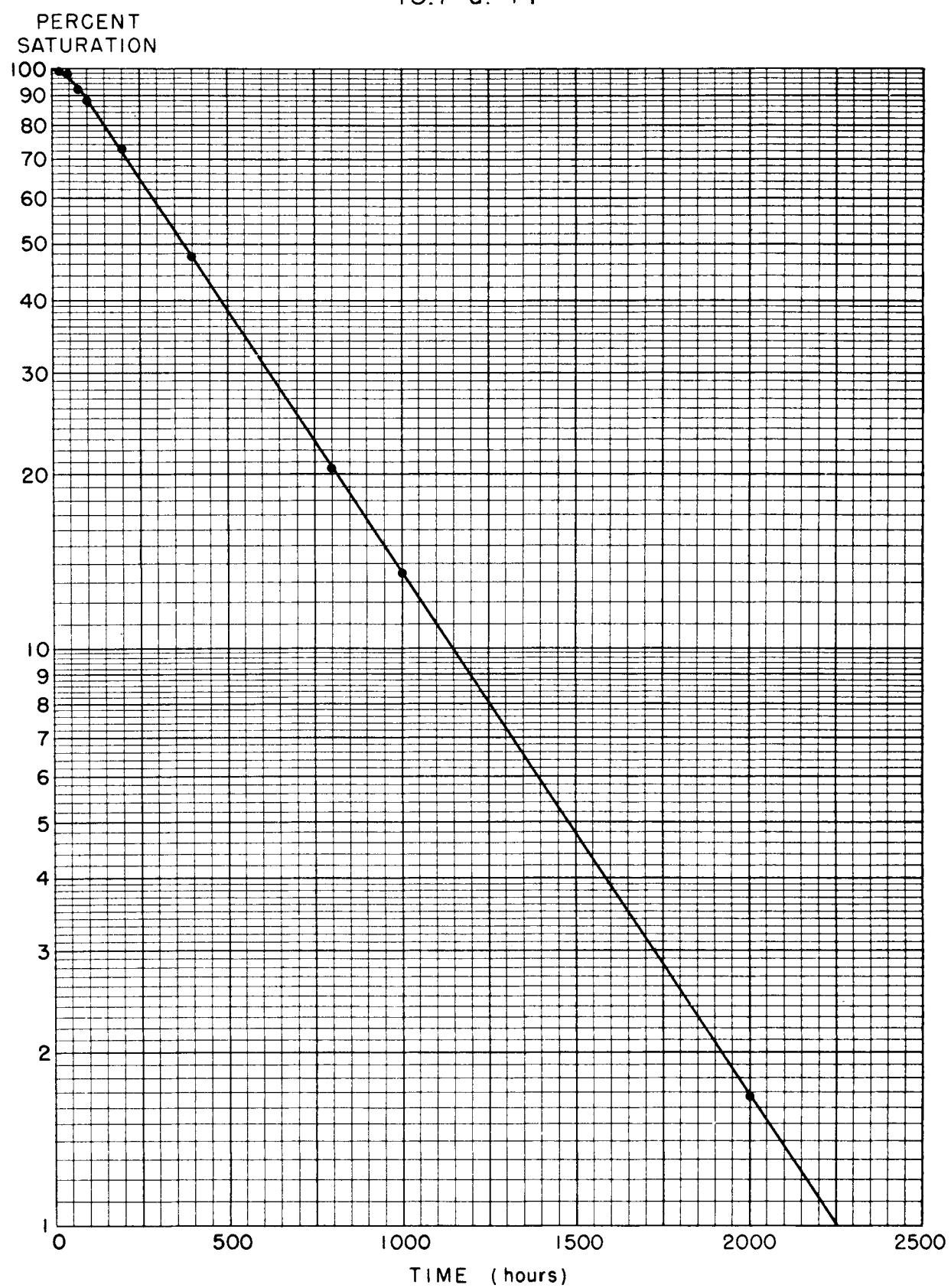
$\sim 1.0 \text{ s. } \text{Xe}^{143}$ PERCENT
SATURATION

PERCENT SATURATION





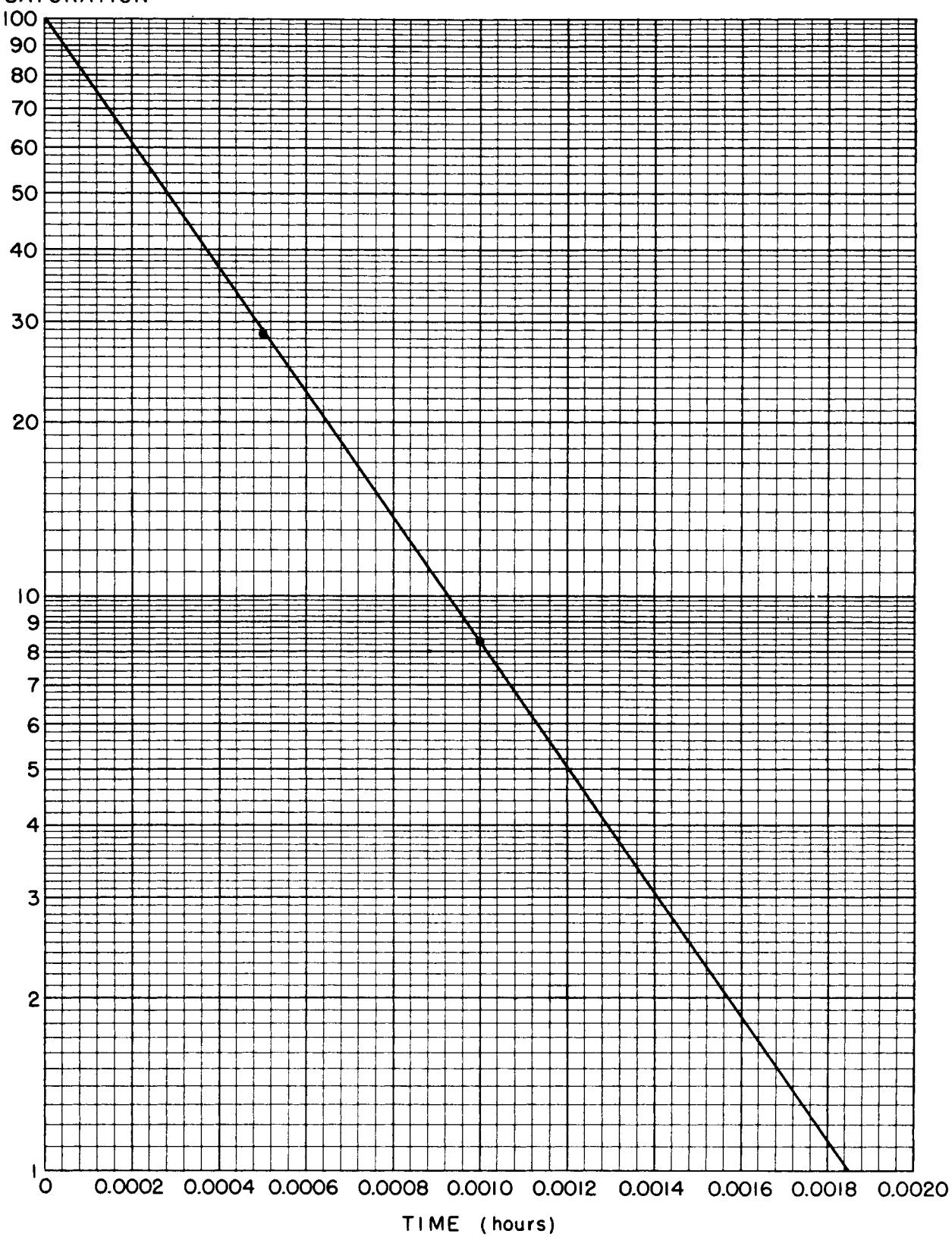


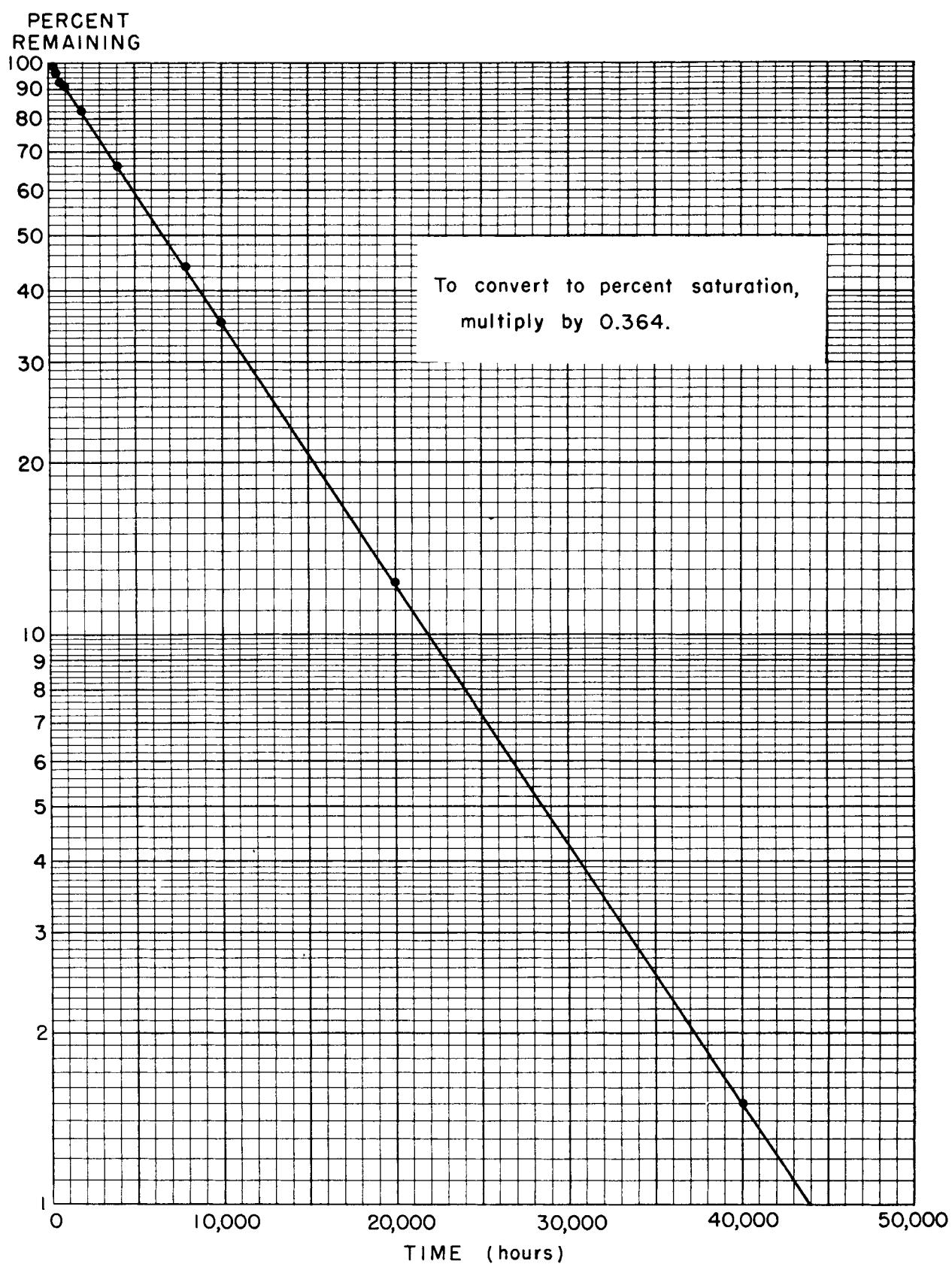


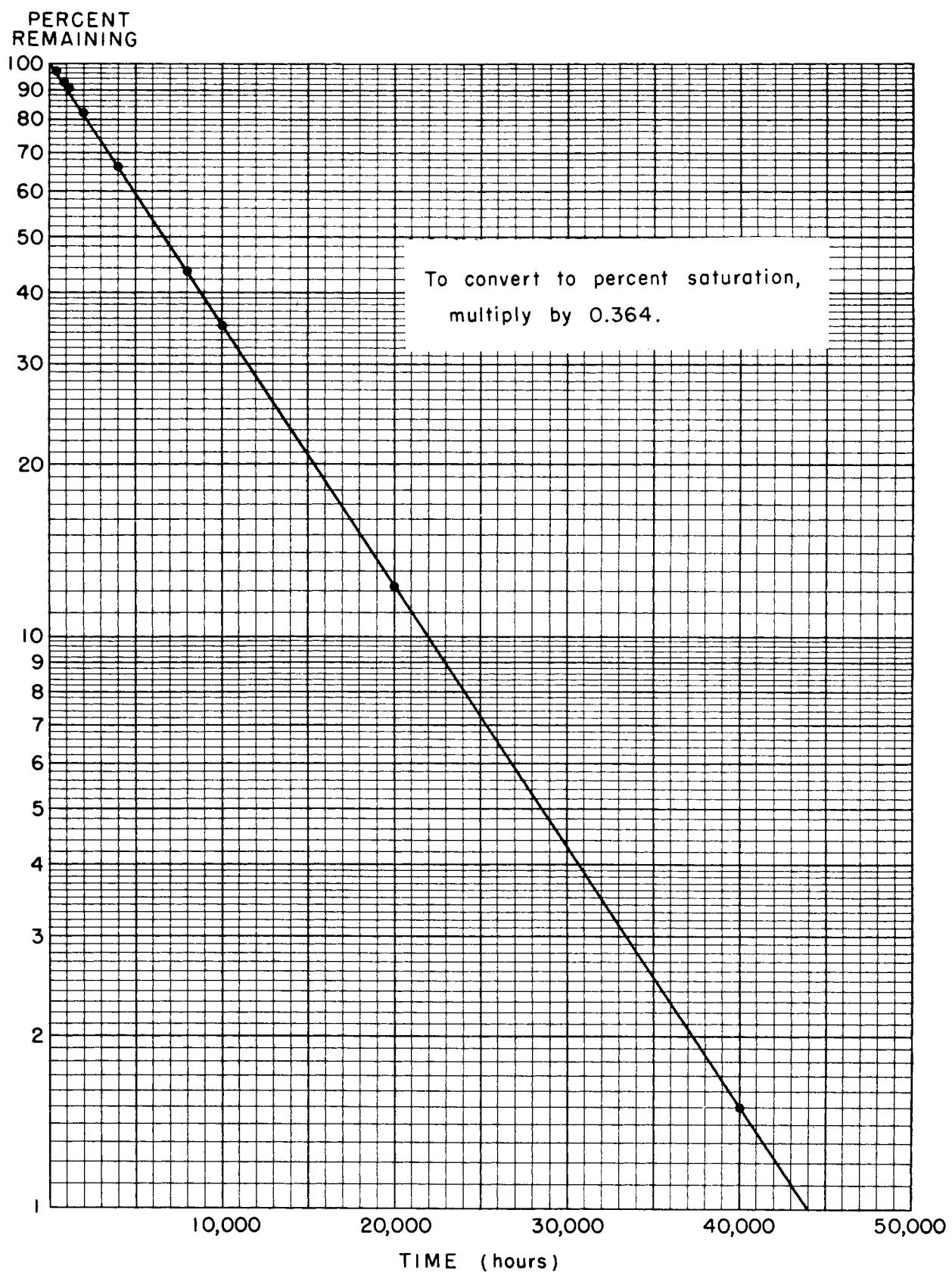
~ 1.0 s. Xe^{144}

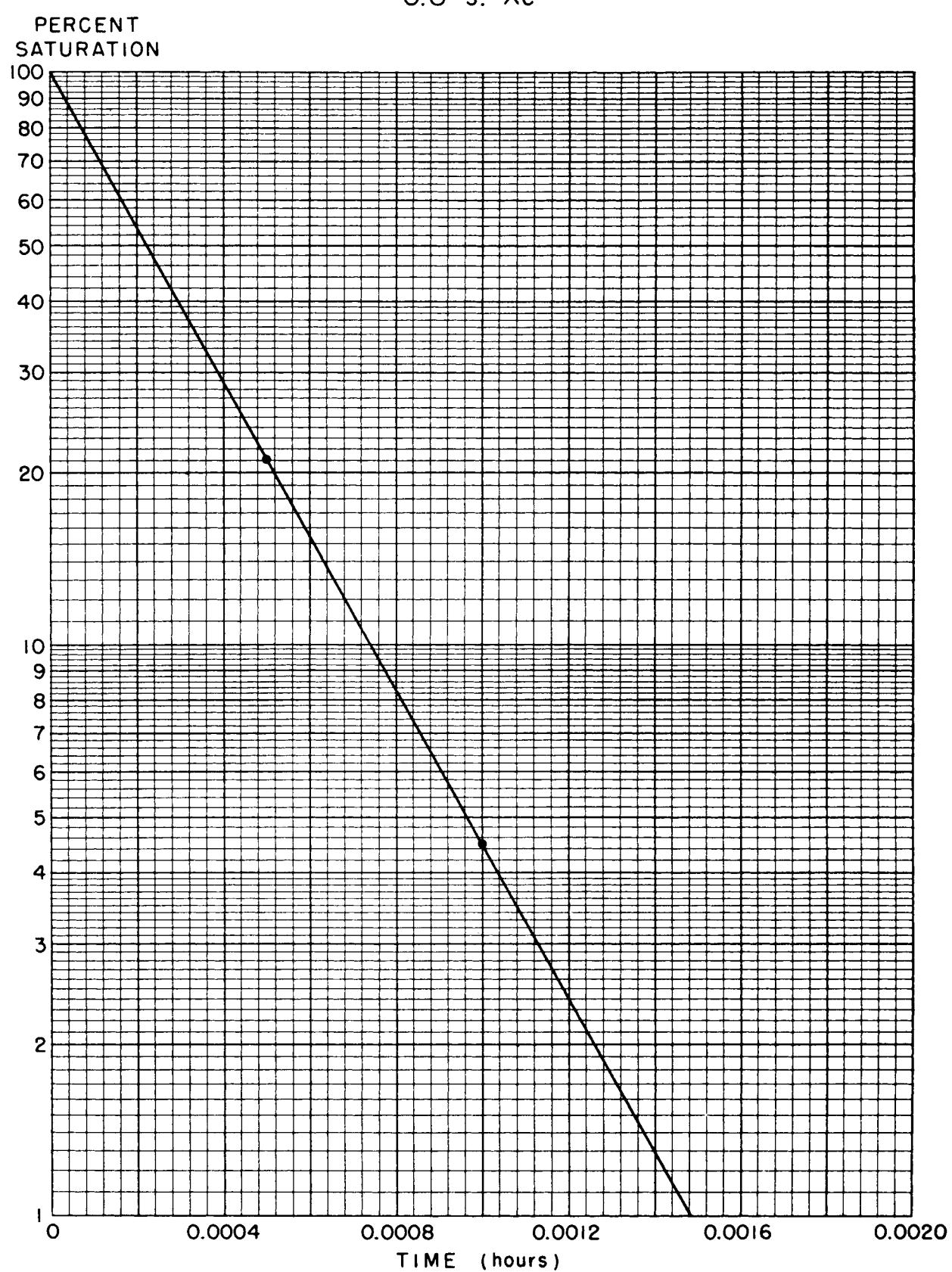
245

PERCENT
SATURATION

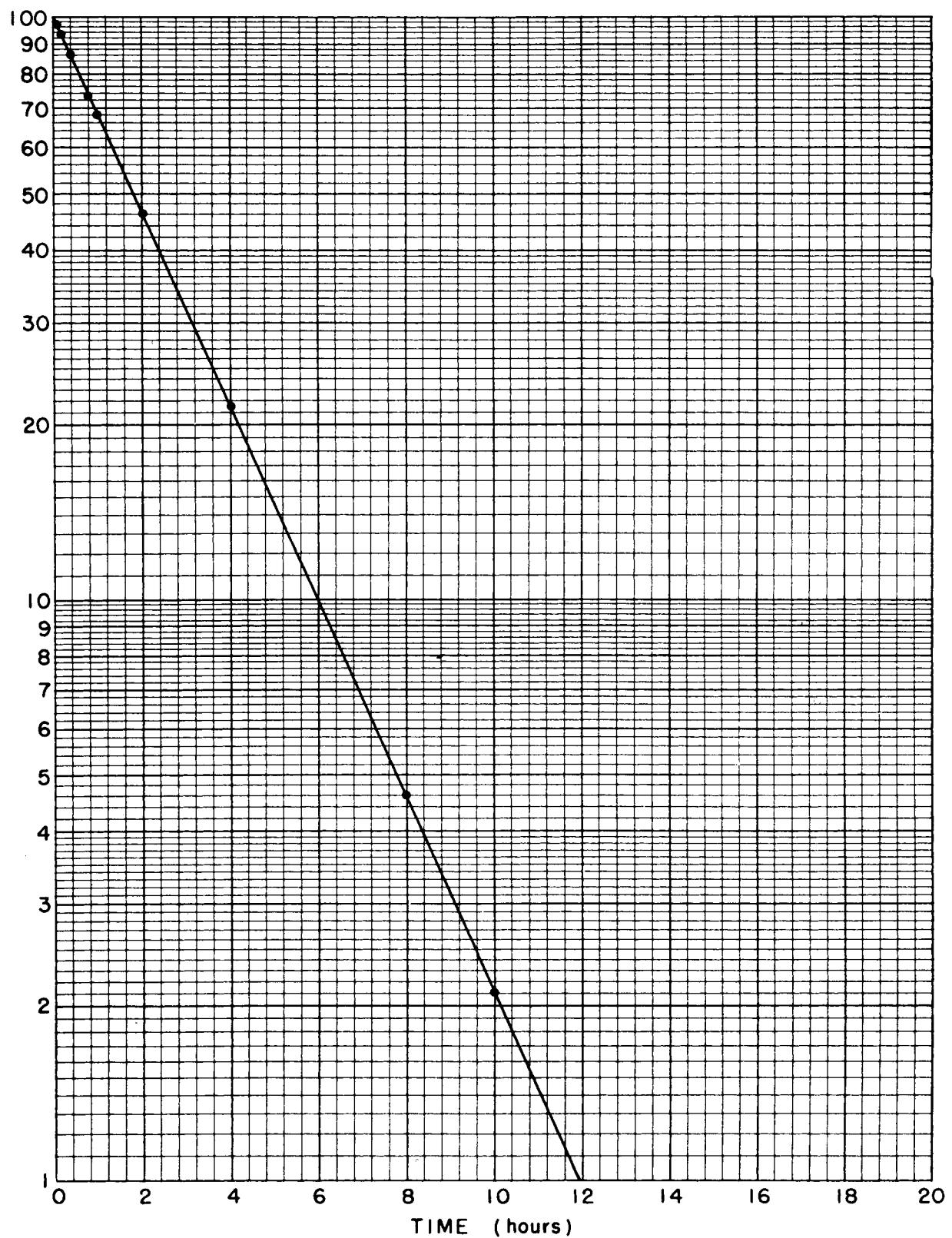




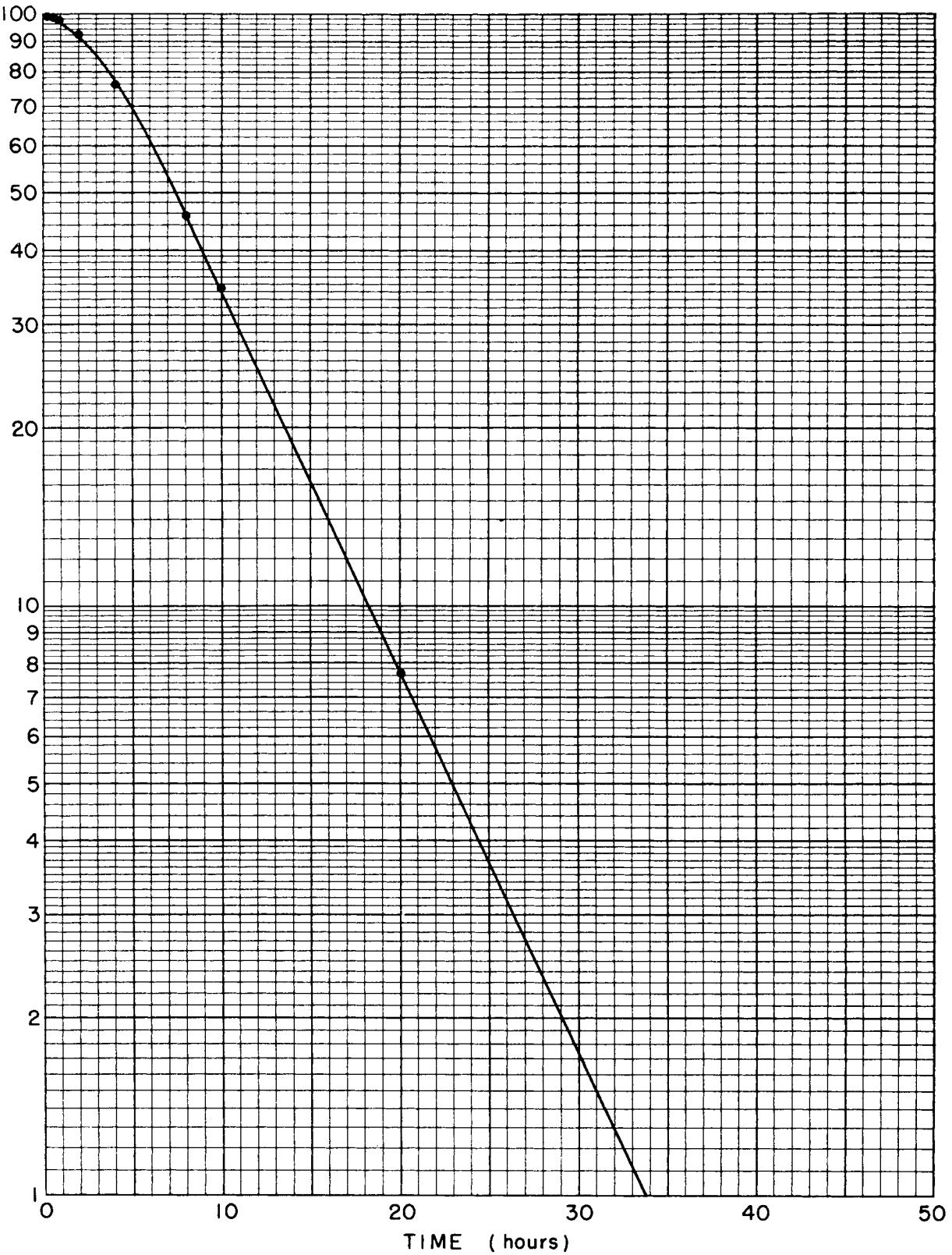


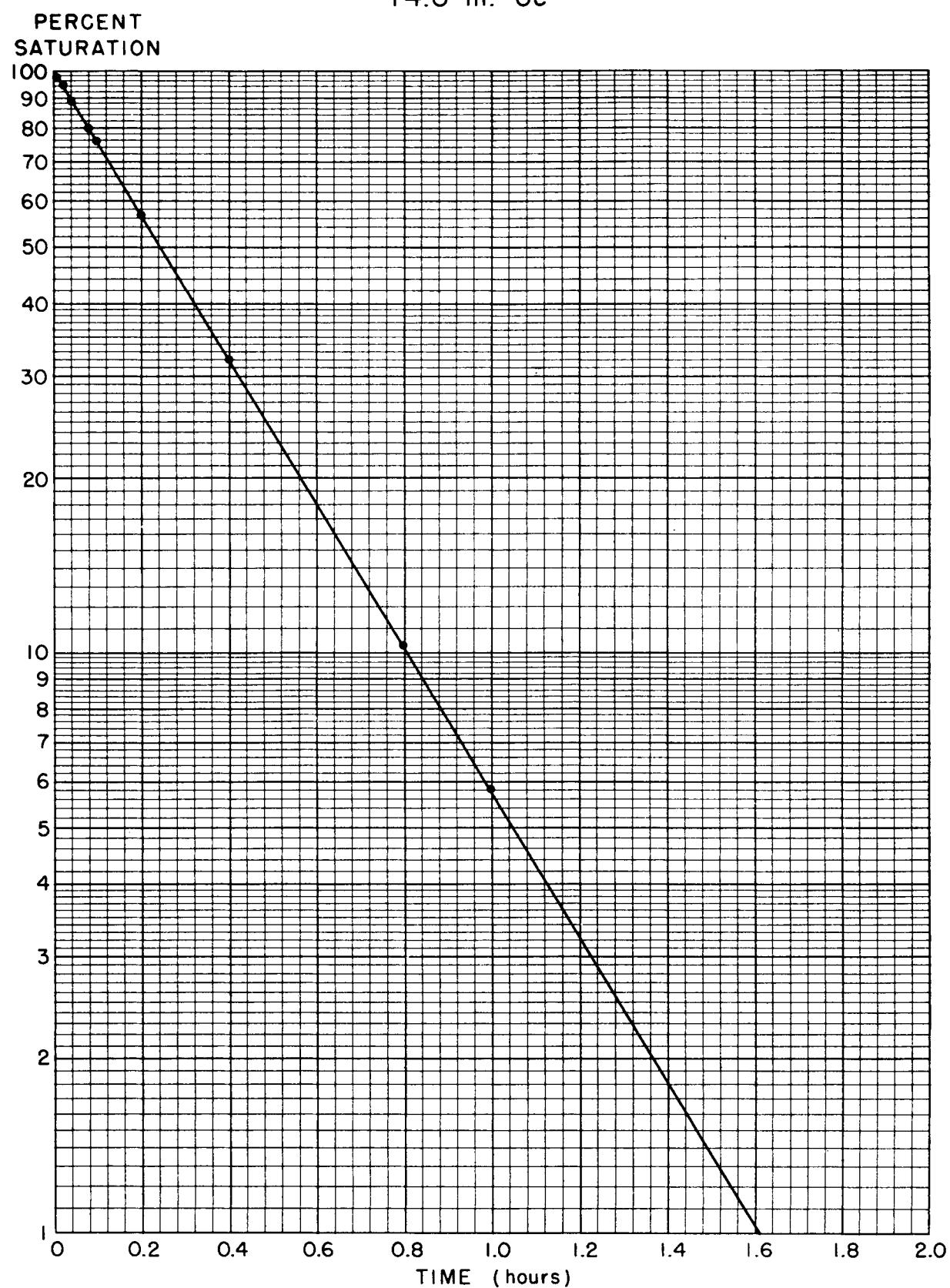


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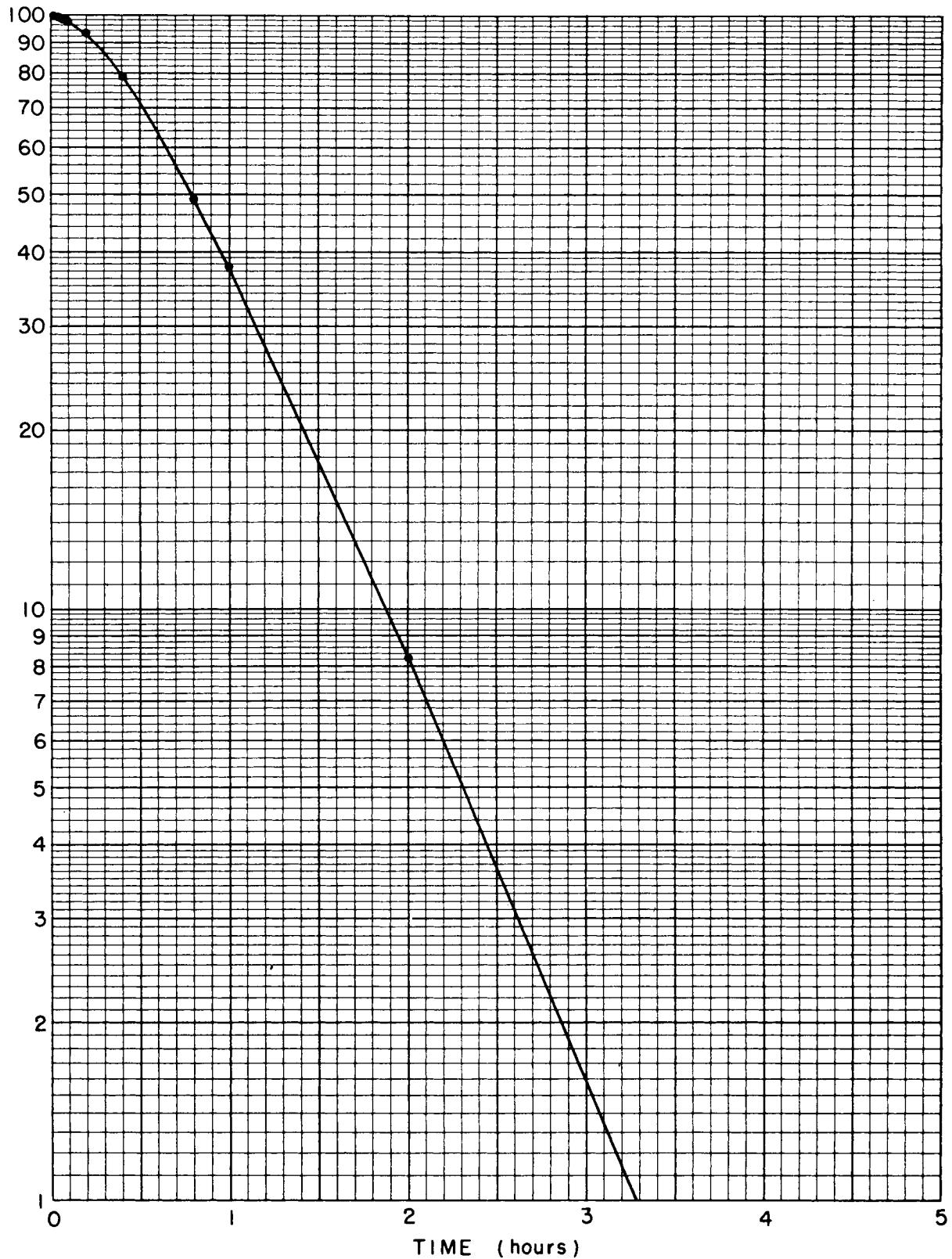


250

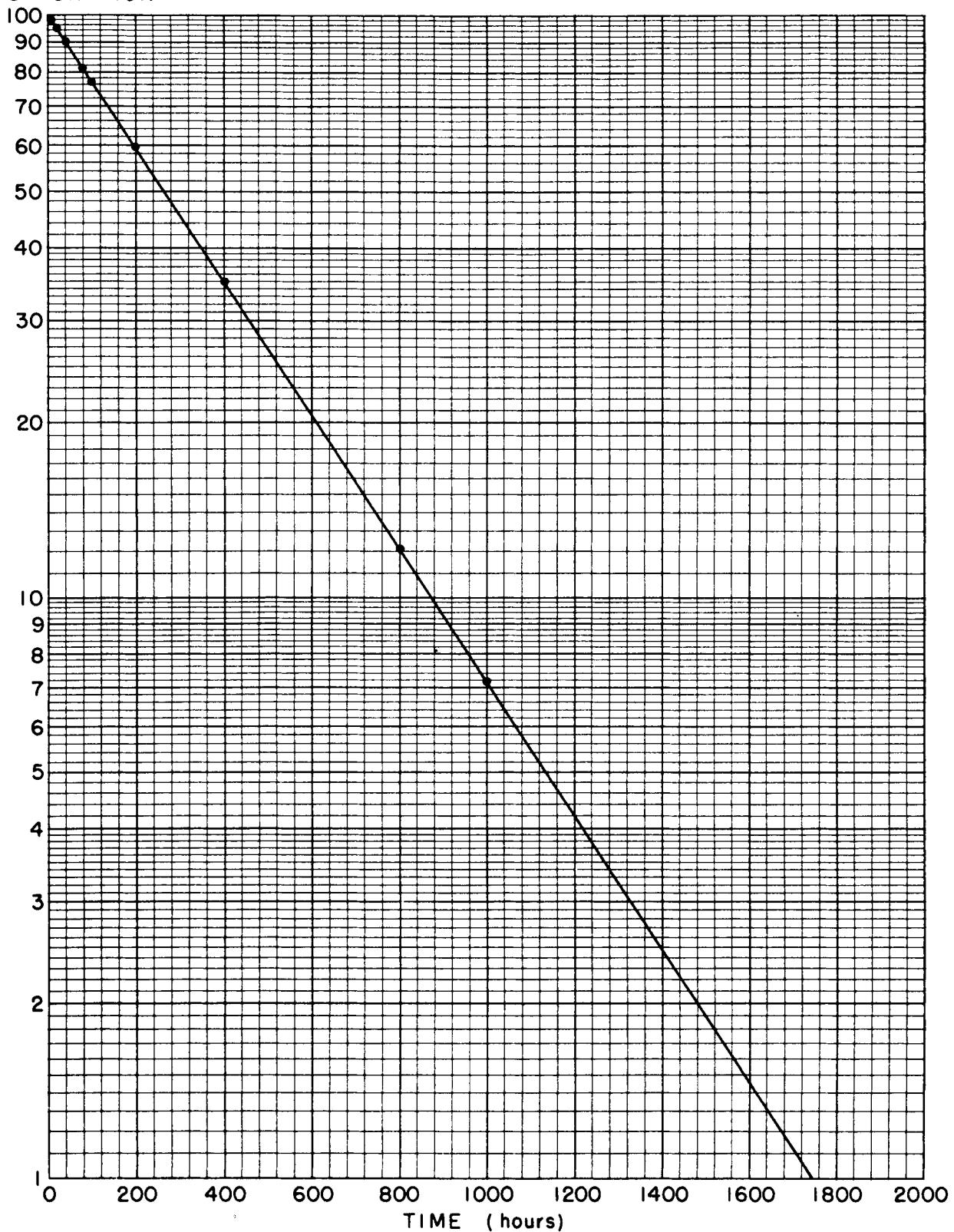
4.5 h. Pr^{145} PERCENT
SATURATION

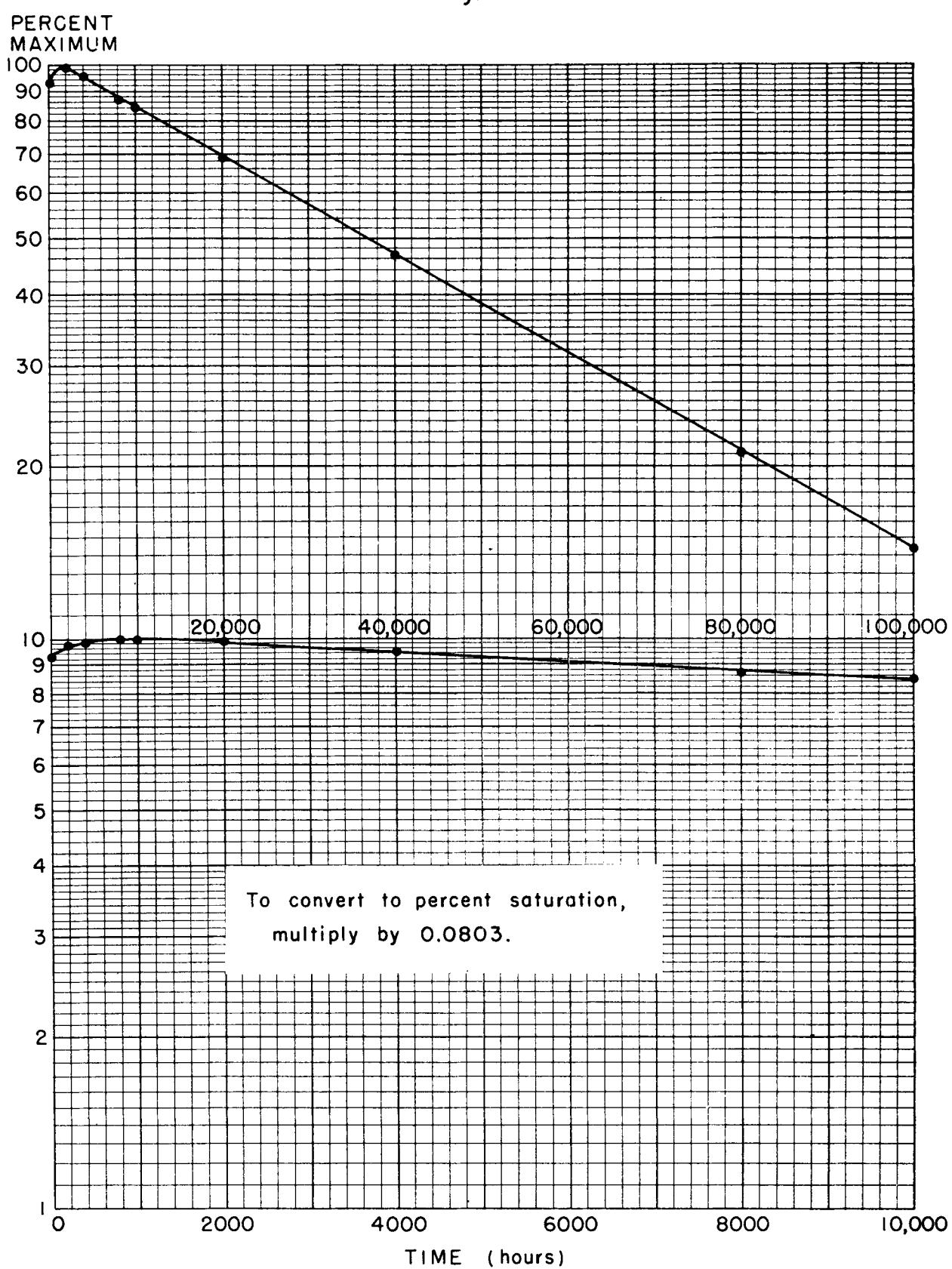


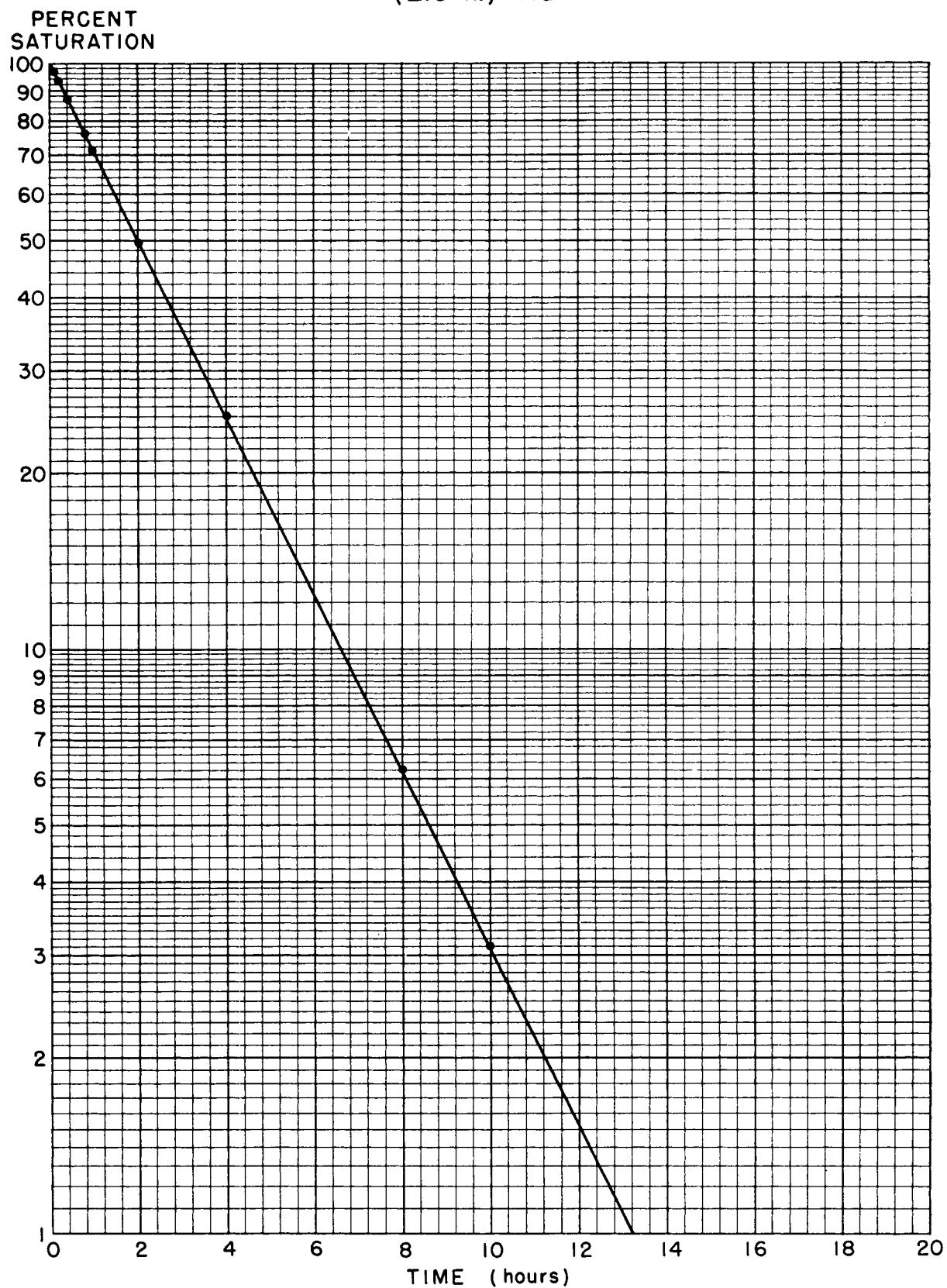
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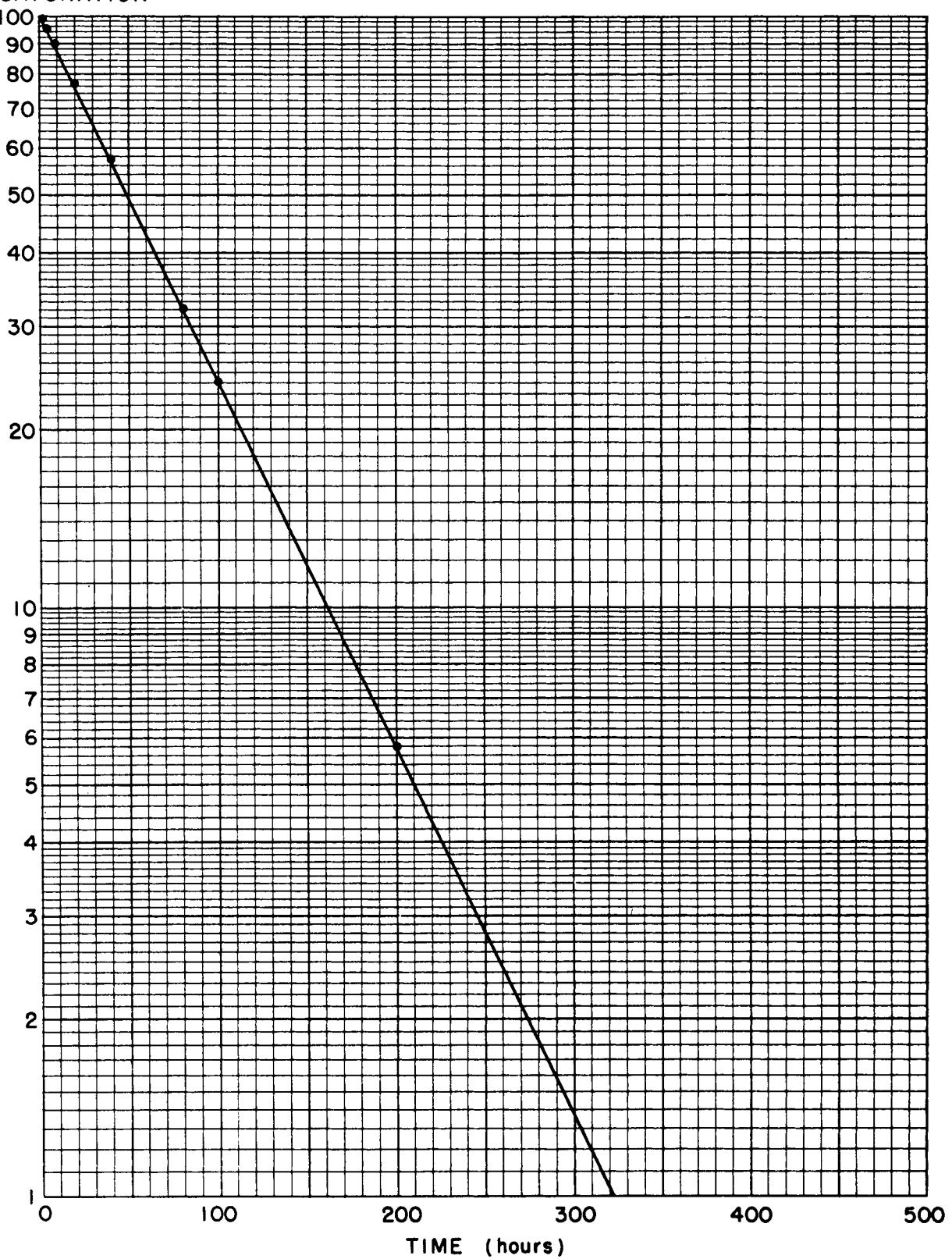
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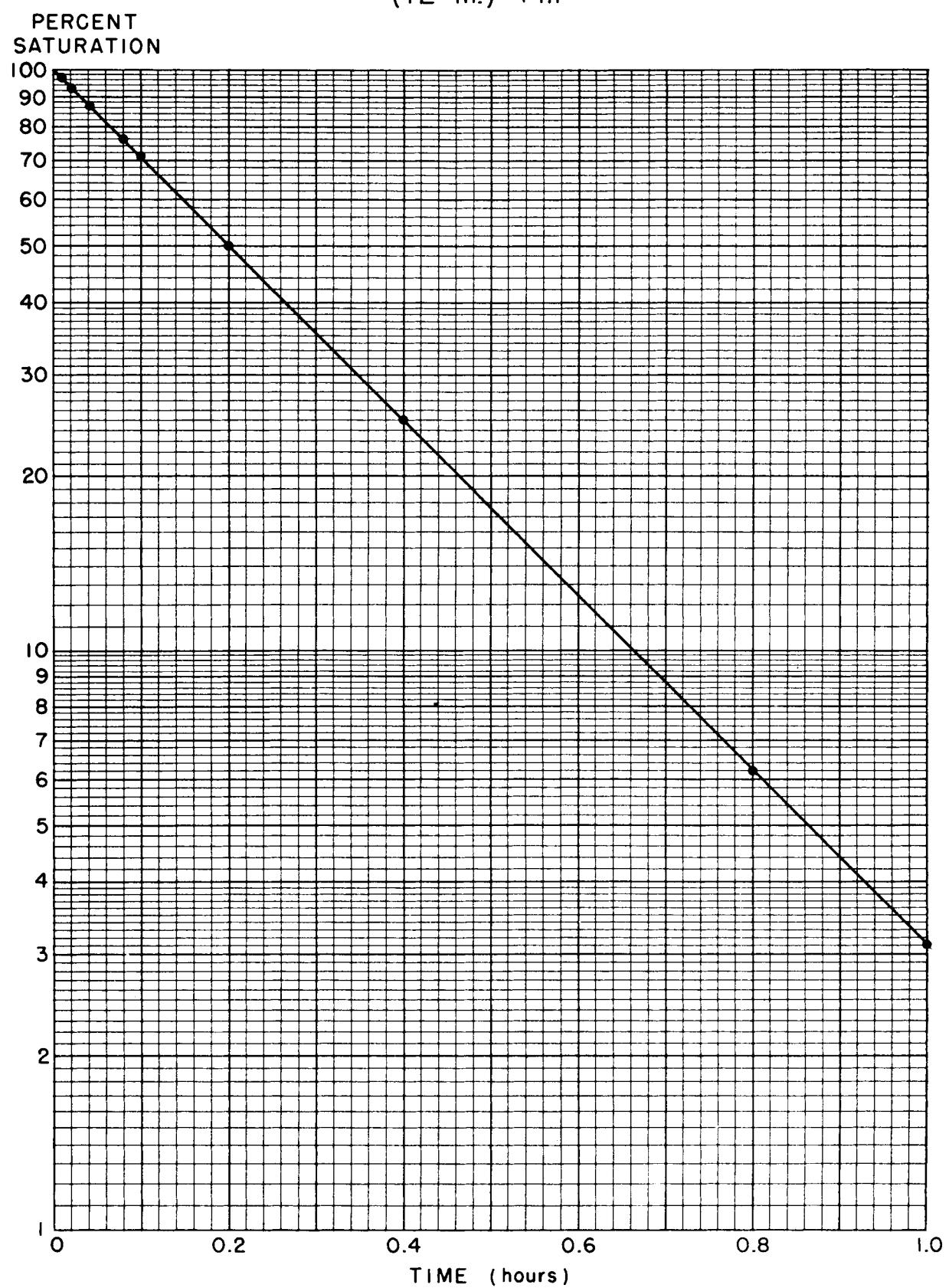


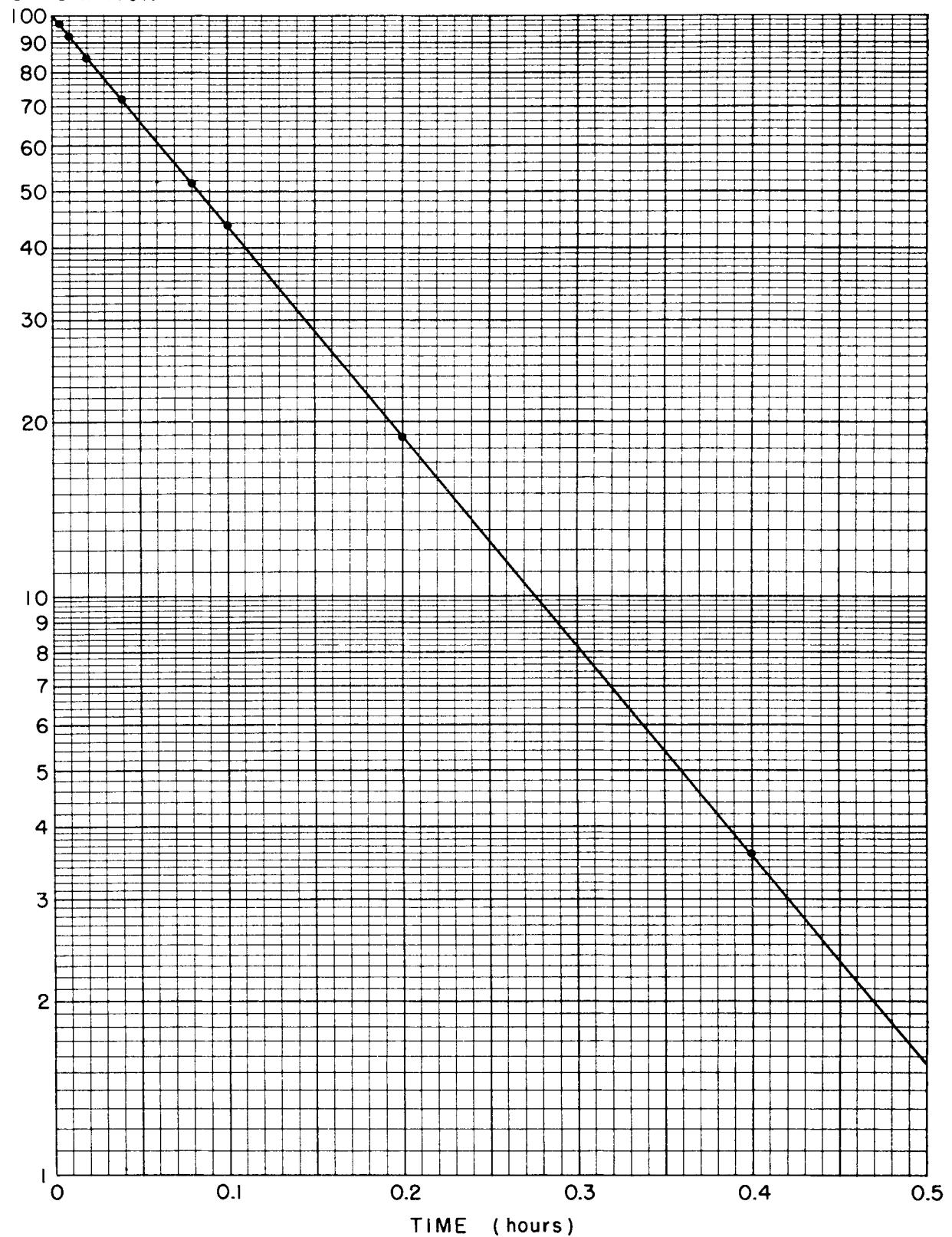
256

47 h. Pm^{149} PERCENT
SATURATION

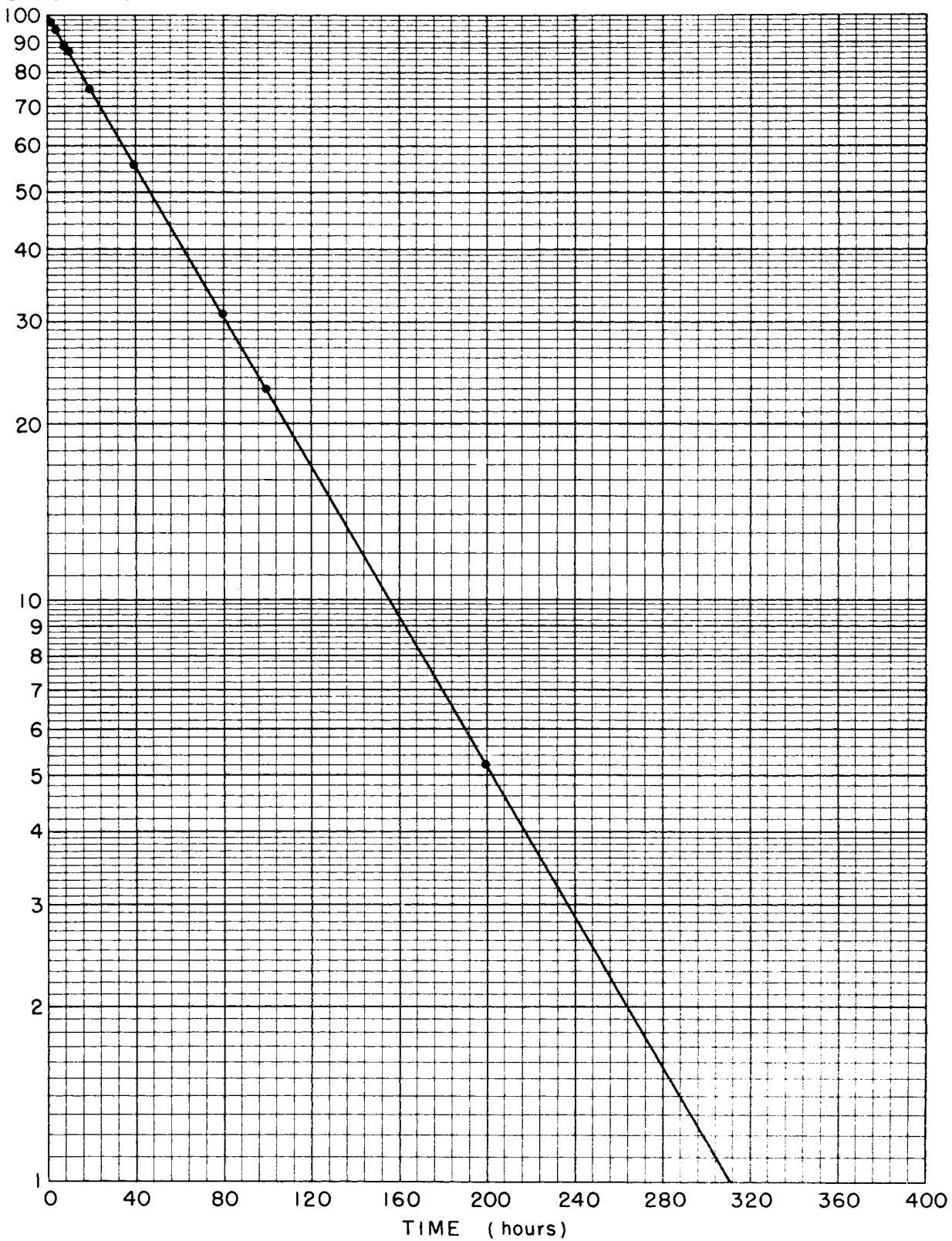
(12 m.) Pm^{151}

257

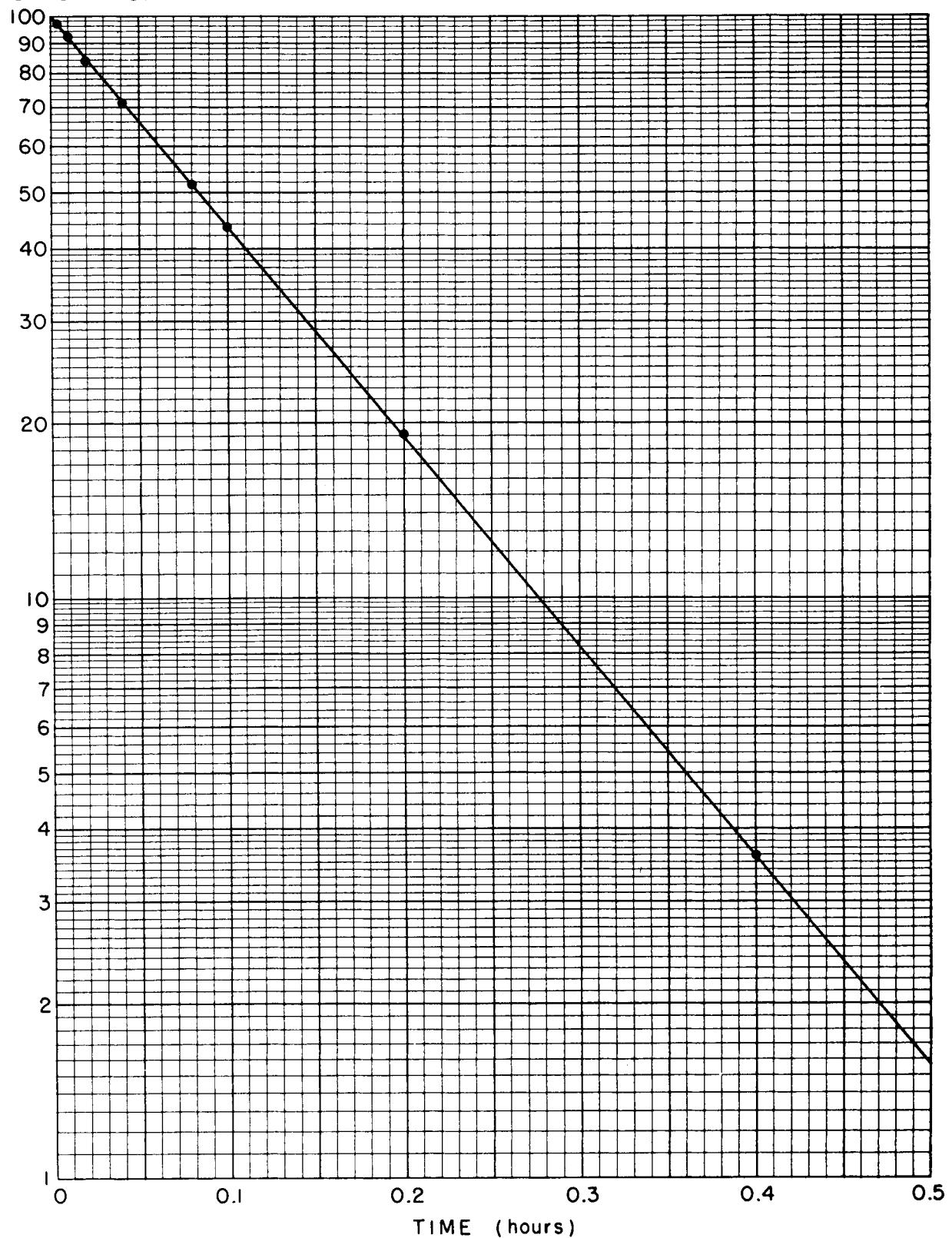


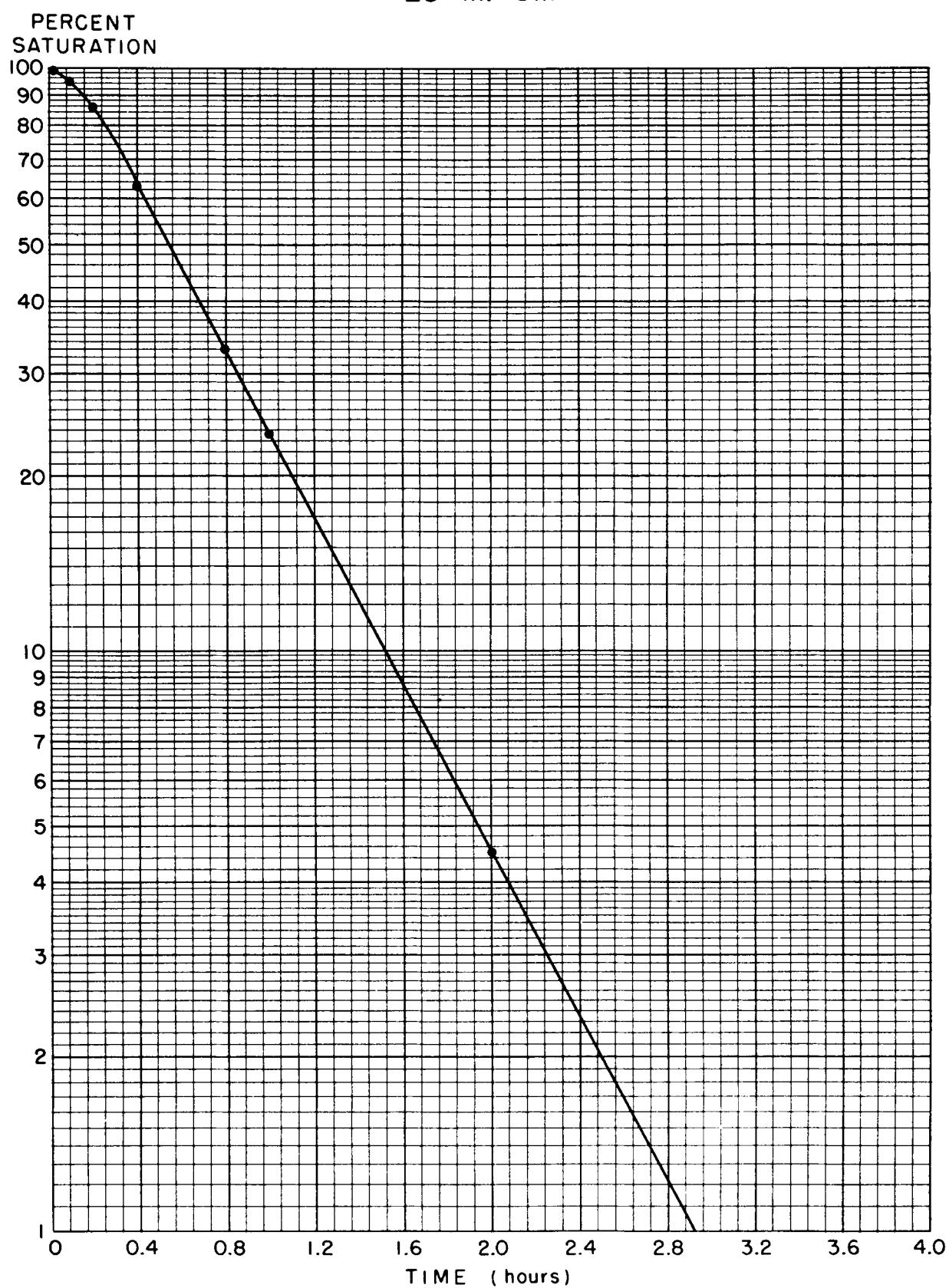
PERCENT
SATURATION

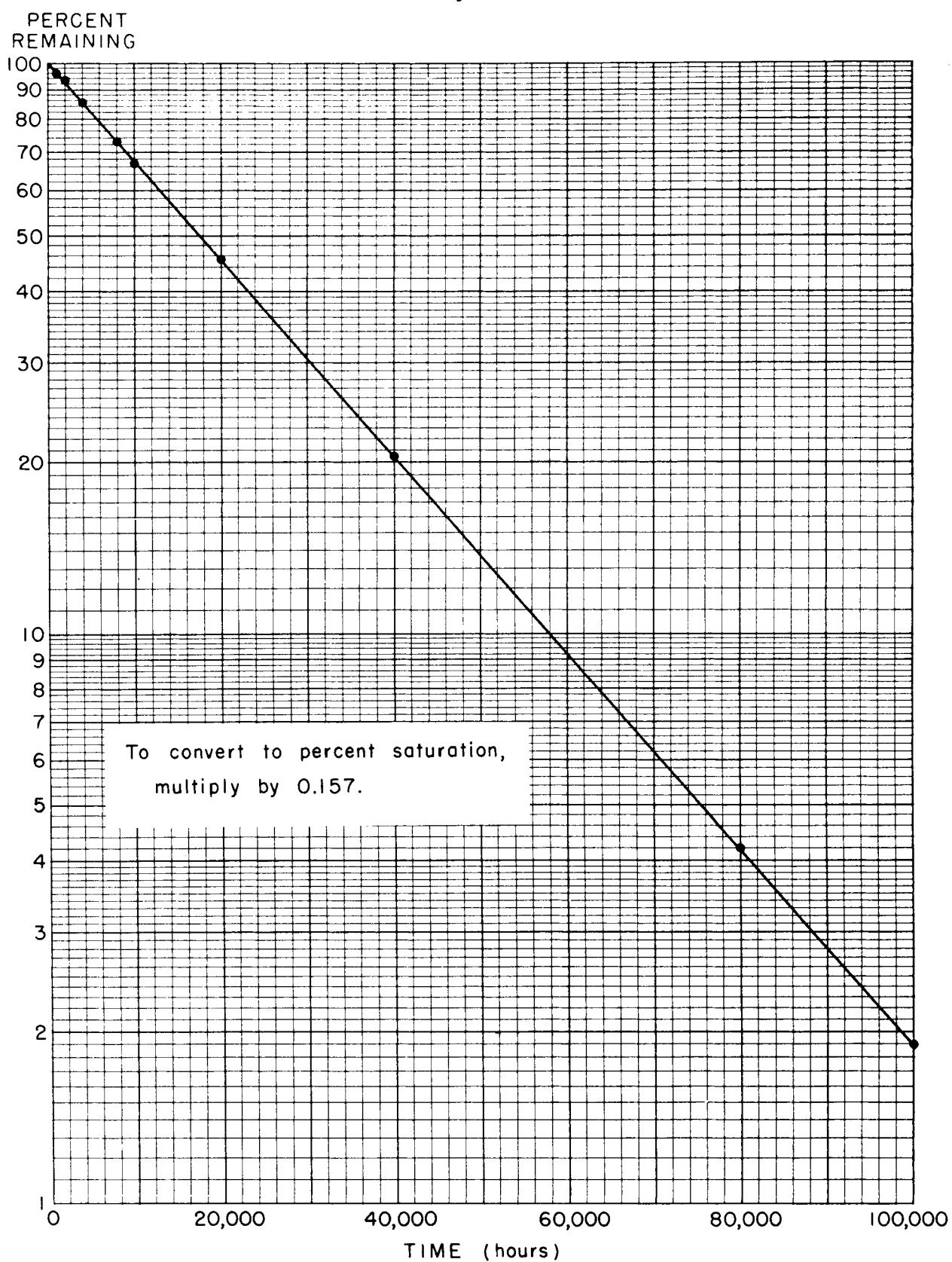
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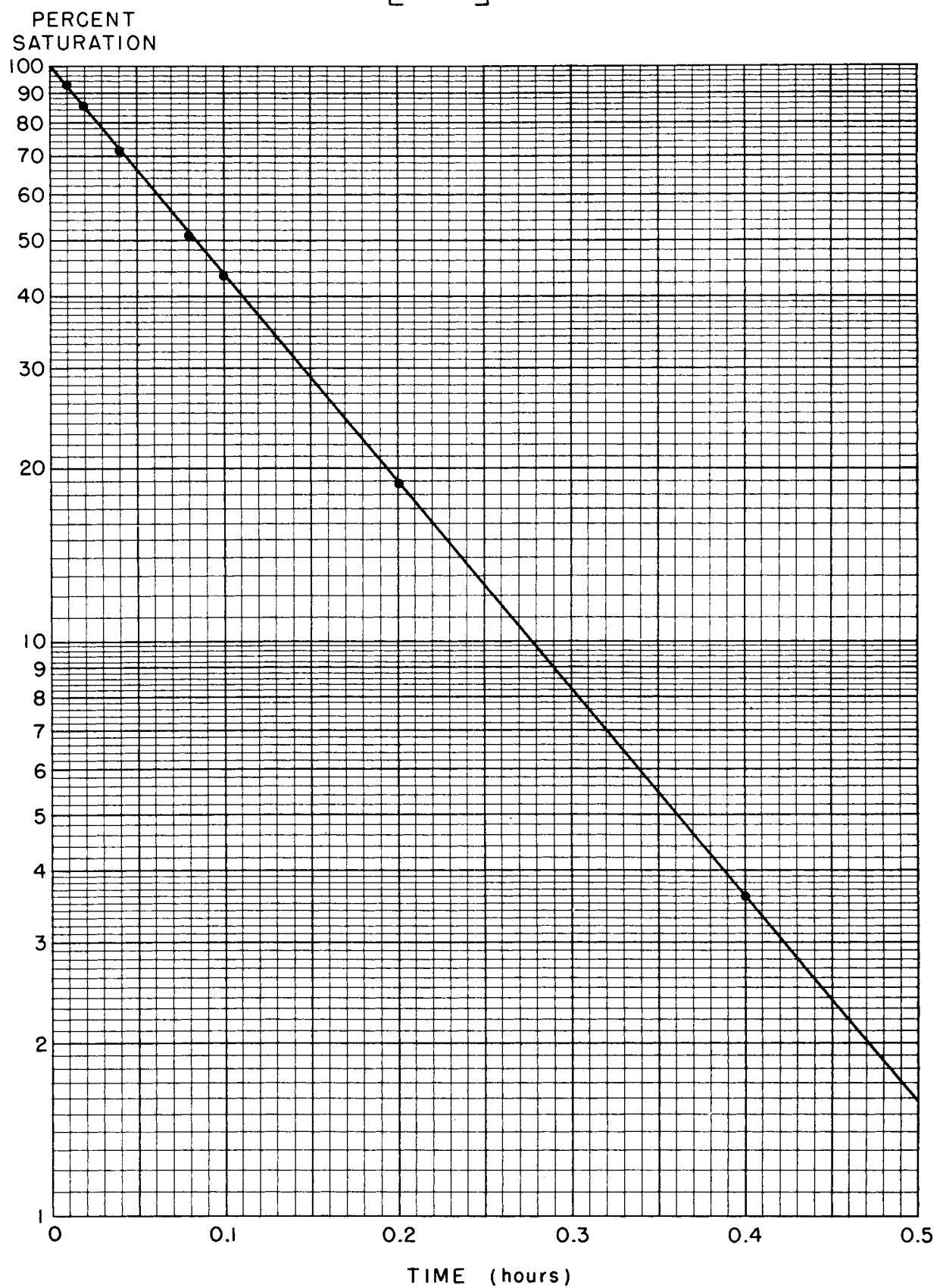


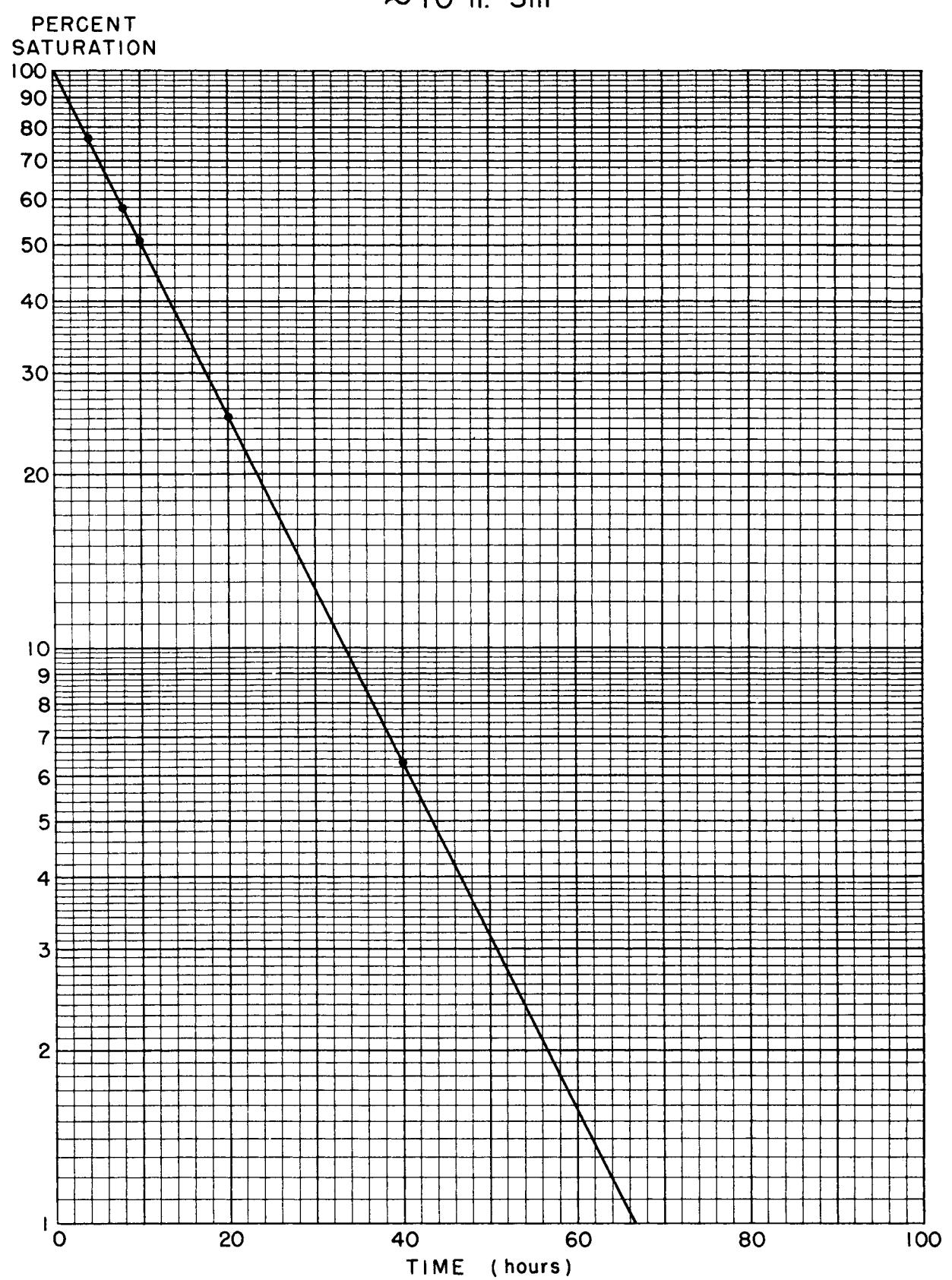
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SATURATION



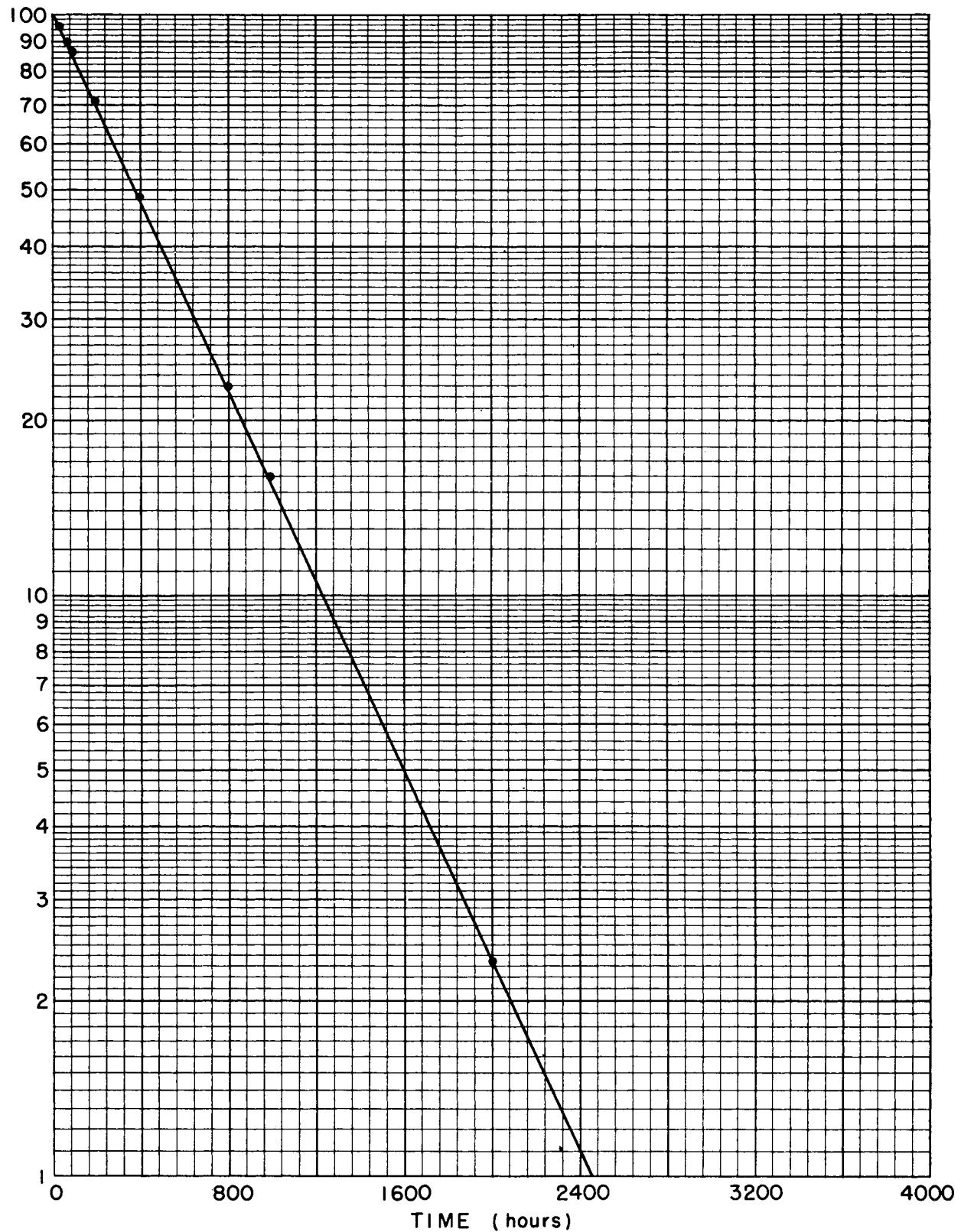




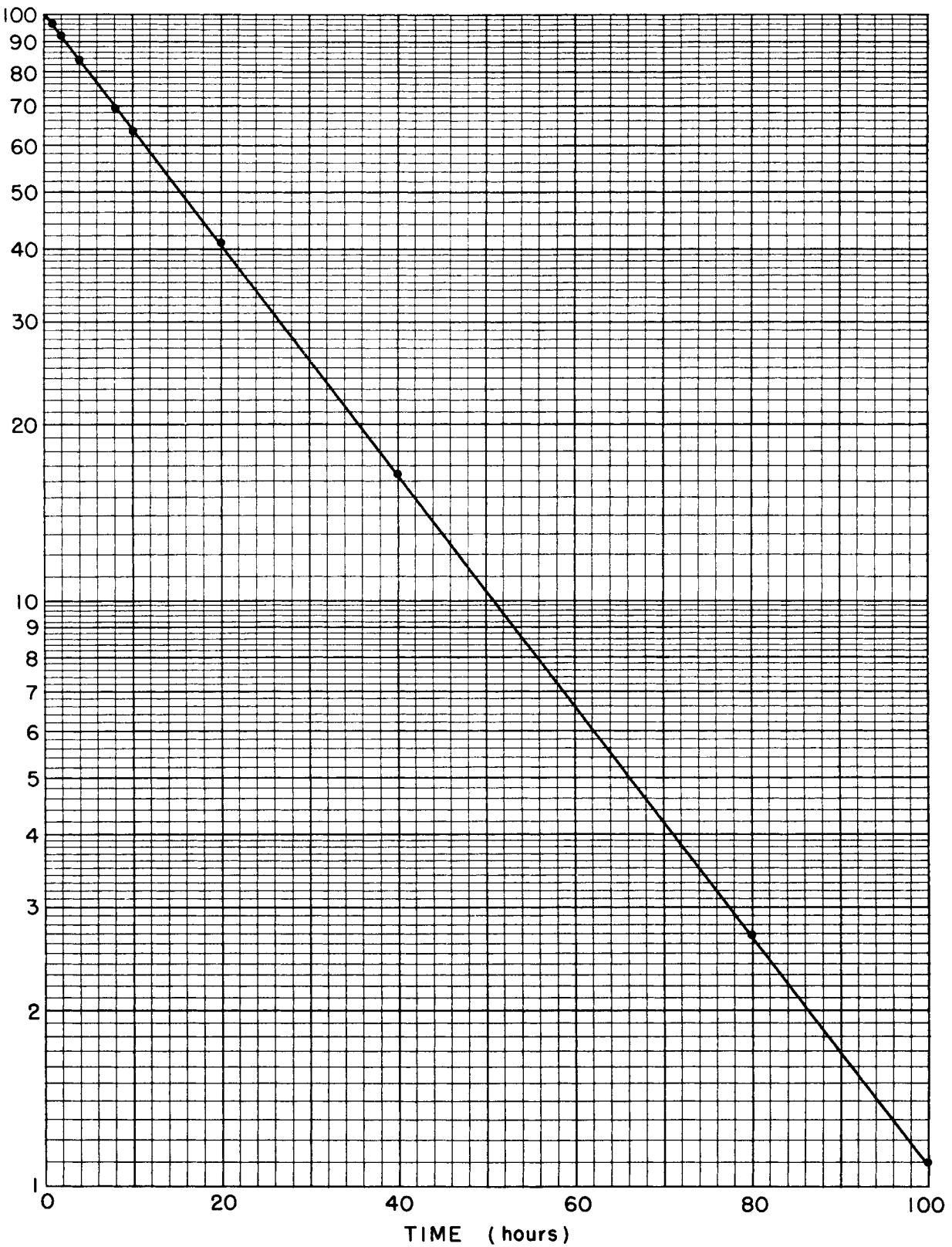




PERCENT
SATURATION



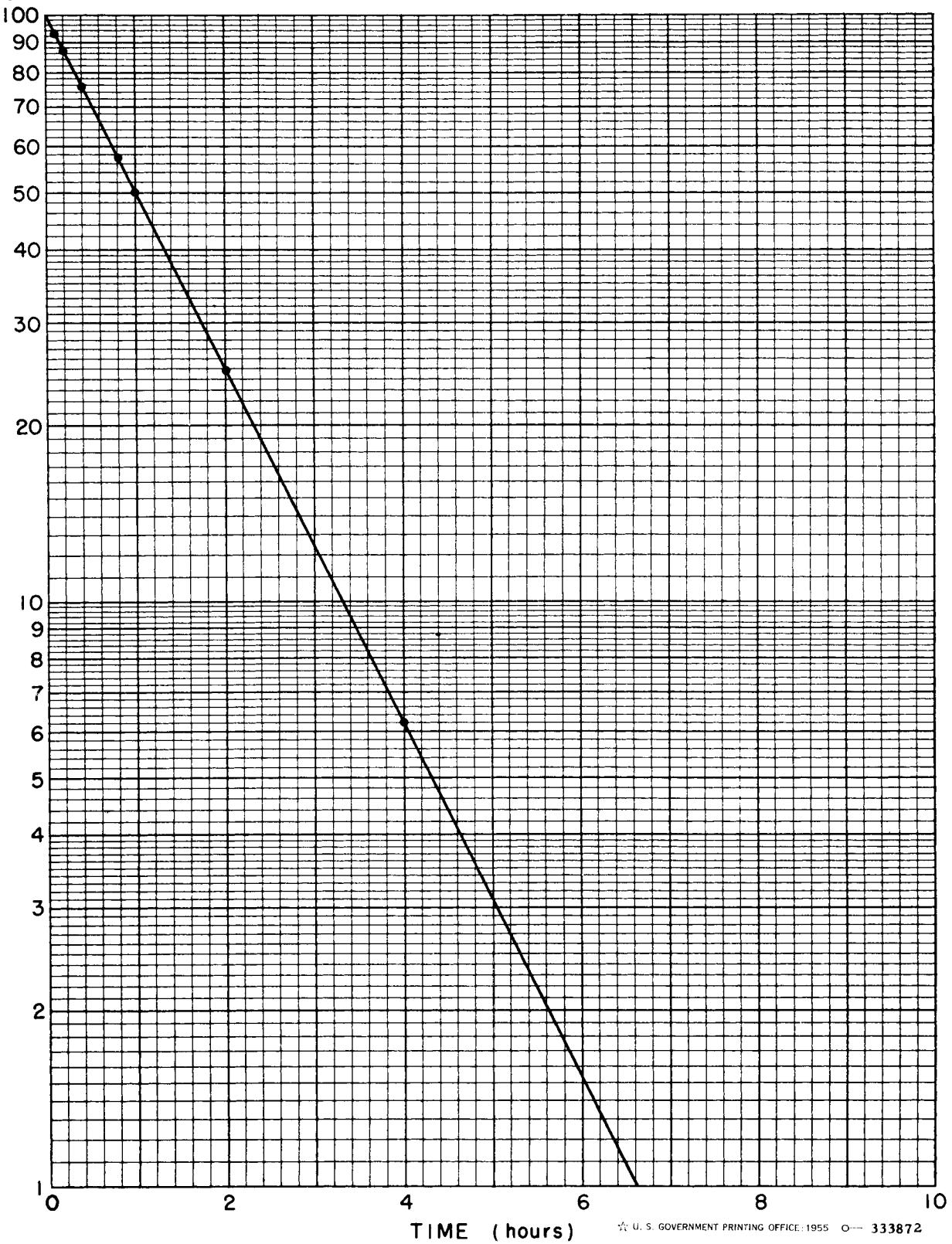
PERCENT
SATURATION



60 m. Eu¹⁵⁸ stable

267

PERCENT
SATURATION



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