PNE-3012(Vol. 2)

1968

STATISTICAL ANNEX OF THE ECONOMETRIC STUDY OF SMALL AND INTERMEDIATE SIZE DIAMETER DRILLING COST FOR THE UNITED STATES

DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited

Prepared for
U. S. Atomic Energy Commission
Washington, D. C.

M A T H E M A T I C A
One Palmer Square
Princeton, New Jersey

20000908 124

LEGAL NOTICE

This report was prepared as an account of Government sponsored work. Neither the United States, nor the Commission, nor any person acting on behalf of the Commission:

A. Makes any warranty or representation, expressed or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or

B. Assumes any liabilities with respect to the use of, or for damages resulting from the use of any information, apparatus, method, or process disclosed in this report.

As used in the above, "person acting on behalf of the Commission" includes any employee or contractor of the Commission, or employee of such contractor, to the extent that such employee or contractor of the Commission, or employee of such contractor prepares, disseminates, or provides access to, any information pursuant to his employment or contract with the Commission, or his employment with such contractor.

This report has been reproduced directly from the best available copy.

Printed in USA. Price $3.00. Available from the Clearinghouse for Federal Scientific and Technical Information, National Bureau of Standards, U. S. Department of Commerce, Springfield, Virginia 22151.

USAEC Division of Technical Information Extension, Oak Ridge, Tennessee

PNE-3012(Vol. 2)

NUCLEAR EXPLOSIONS-PEACEFUL
APPLICATIONS (TID-4500)

STATISTICAL ANNEX OF THE ECONOMETRIC STUDY OF SMALL AND INTERMEDIATE SIZE DIAMETER DRILLING COST FOR THE UNITED STATES

Prepared for

U. S. Atomic Energy Commission
Washington, D. C. 20585

under

Contract Number AT(04-3)-744

MATHEMATICA
Princeton, New Jersey

CONTENT

SECTION I. SMALL SIZE DIAMETER DRILLING COST FUNCTIONS:

A) PER STATES

I. A. Average Drilling Estimated Cost Functions Per State: Tables 1 to 54 and their corresponding figures.

Total and Marginal Costs Per State: Tables 1. a to 54 a.*

B) PER REGIONS

I. B. 1. Average Drilling Estimated Cost Functions Per Geological Region: Tables 55 to 63 and their corresponding figures.

Total and Marginal Costs Per Region: Tables 55. a to 63 a.

SECTION II. INTERMEDIATE SIZE DIAMETER DRILLING COST FUNCTIONS:

II. 1. Mud Costs: Table 1

II. 2. Cutter Costs: Tables 2 to 6

II. 3. Casing Costs: Table 7

II. 4. Cementing Costs: Table 8

II. 5. Rig Costs: Tables 9 to 13

II. 6. Total Fixed Costs: Table 14

II. 7. Total and Average Costs for Cased Wells: Tables 15 to 19 and the corresponding figures for average costs both as a function of Depth and Diameter.

II. 8. Total and Average Costs for Uncased Wells: Tables 20 to 24 and the corresponding figures for average costs both as a function of depth and diameter.

II. 9. Difference of Total Drilling Costs Between Cased and Uncased Wells: Tables 25 to 29.

II. 10. Marginal Drilling Costs for Cased Wells: Tables 30 to 34.

II. 11. Marginal Drilling Costs for Uncased Wells: Tables 35 to 39.

II. 12. Estimated Drilling Time Function for Gomez Field (Texas): Tables 40 to 42.

II. 13. Estimated Drilling Time Function for Aggregated Lockridge and South Pyote (Texas): Tables 43 to 44.

*Tables 6.a, 11-13.a, 28.a, 29.a, and 44.a, were excluded since in these cases the coefficient of the independent variable (depth) is equal to the marginal costs.

SECTION I: ESTIMATED DRILLING COST FUNCTIONS FOR SMALL SIZE DIAMETER HOLES

ESTIMATED DRILLING COST FUNCTIONS PER STATE

Includes Average Drilling Estimated Cost Functions (Tables 1 to 54 and their Correspond Figures) and Total Marginal Costs (Tables 1.a to 54.a).

Table 1

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN ALABAMA

$$\hat{Y} = 9 - 0.16(10^{-2})X_1 + 0.19(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	789.	622521.	8.0500	7.8255	0.2245
2	1756.	3083536.	6.5500	6.7082	-0.1582
3	2841.	8071281.	5.7700	5.8859	-0.1159
4	6012.	36144144.	5.9000	6.0969	-0.1969
5	8512.	72454144.	9.4500	9.0097	0.4403
6	11012.	121264144.	14.1500	14.3438	-0.1938

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.90054826E 01	0.37140264E-00	0.24247222E 02	0.09999999E 01	0.
-0.16484000E-02	0.17231981E-03	-0.95659336E 01	0.51536666E 04	0.75709767E 00
0.19371361E-06	0.14509948E-07	0.13350400E 02	0.40273295E 08	0.88172356E 00

RSQ = 0.9929
R = 0.9965
F(2, 3)= 210.8145
SUMUSQ = 0.3591
DURBIN-W.= 2.6819

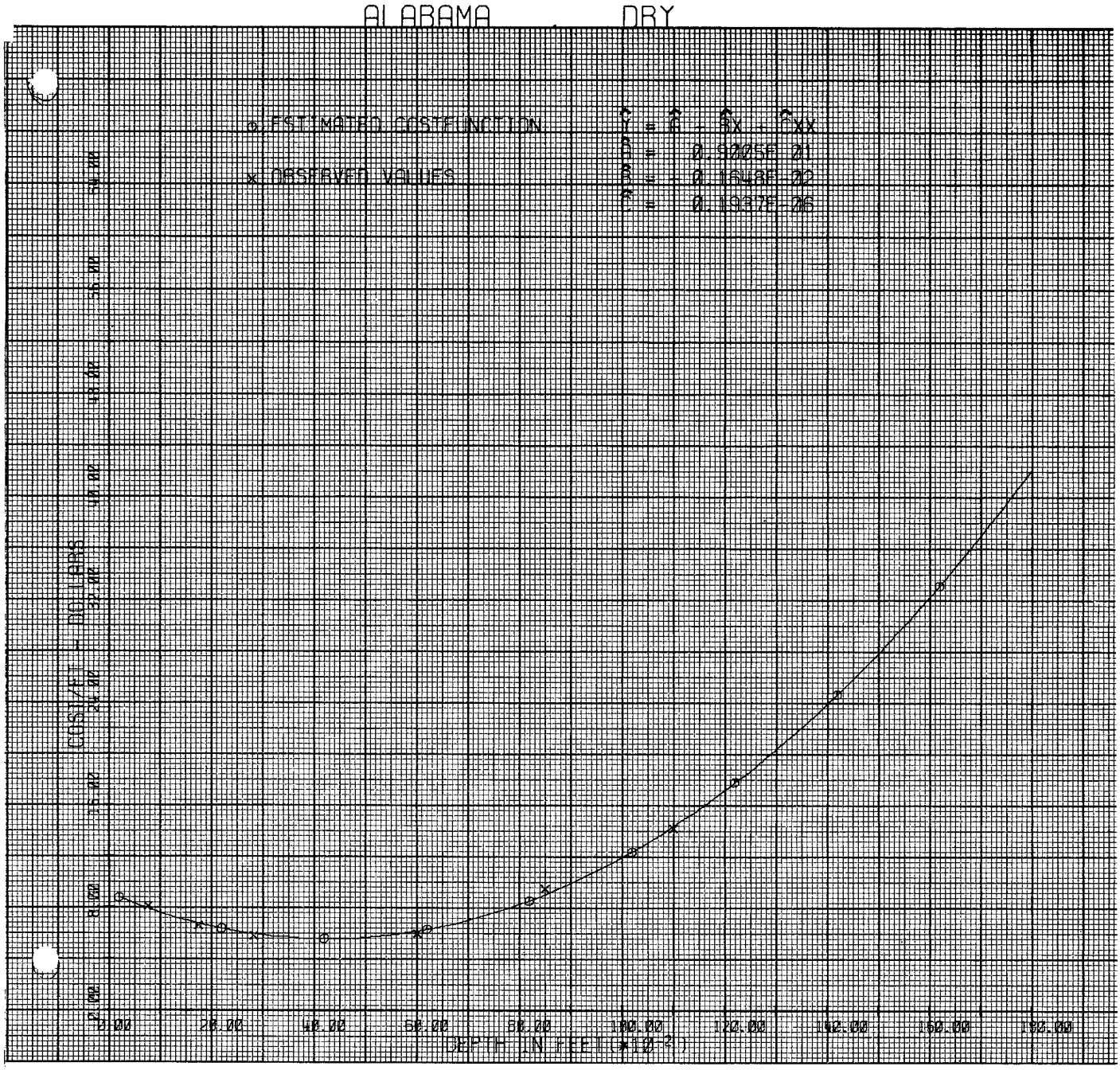

ALABAMA DRY
o ESTIMATED COST FUNCTION
x OBSERVED VALUES
$\hat{C} = \hat{\beta}_X - \hat{C}_{XX}$
$\hat{\beta}_X$ = 0.92025E 01
$\hat{C}_{XX}$ = -0.1543E-02
$\hat{C}$ = 0.1337E-06
COST/FT - DOLLARS
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10^-2)

Table 1a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN ALABAMA

(in dollars)

DEPTH	
13000. feet	
TOTAL COST	
	7550.69990
	12967.60000
	17412.90000
	22048.80000
	28037.50000
	36541.20100
	48722.10000
	65742.40200
	88764.30100
	118950.00000
	157461.70000
	205461.60000
	264111.90000
	334574.80000
	418012.50000
	515587.21000
	628461.11000
	757796.41000
MINIMUM AVERAGE COST DEPTH	
	4254. feet
MINIMUM MARGINAL COST DEPTH	
	2836. feet
MARGINAL COST	
	6.29010
	4.73740
	4.34690
	5.11860
	7.05250
	10.14860
	14.40690
	19.82740
	26.41010
	34.15500
	43.06210
	53.13140
	64.36290
	76.75660
	90.31250
	105.03060
	120.91090
	137.95340
POINT OF INFLECTION	
	23395.74300
MINIMUM AVERAGE COST	
	5.49970
MINIMUM MARGINAL COST	
	4.33127

Table 2

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN ARKANSAS

$\hat{Y} = 9.46 - 0.19(10^{-2})X_1 + 0.27(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	1137.	1292769.	8.2300	7.6410	0.5890
2	2373.	5631129.	5.7000	6.4569	-0.7569
3	3530.	12460900.	5.6600	6.0948	-0.4348
4	4777.	22819729.	6.9900	6.5126	0.4774
5	6799.	46226401.	9.2600	8.9717	0.2883
6	9689.	93876721.	16.1500	16.3130	-0.1630

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.94574813E 01	0.97804947E 00	0.96697371E 01	0.09999999E 01	0.
-0.19041104E-02	0.43140002E-03	-0.44137929E 01	0.47175000E 04	0.82178795E 00
0.26954950E-06	0.38514859E-07	0.69985846E 01	0.30384608E 08	0.92713635E 00

RSQ = 0.9813
R = 0.9906
F(2, 3)= 78.5521
SUMUSQ = 1.4465
DURBIN-W.= 2.0649

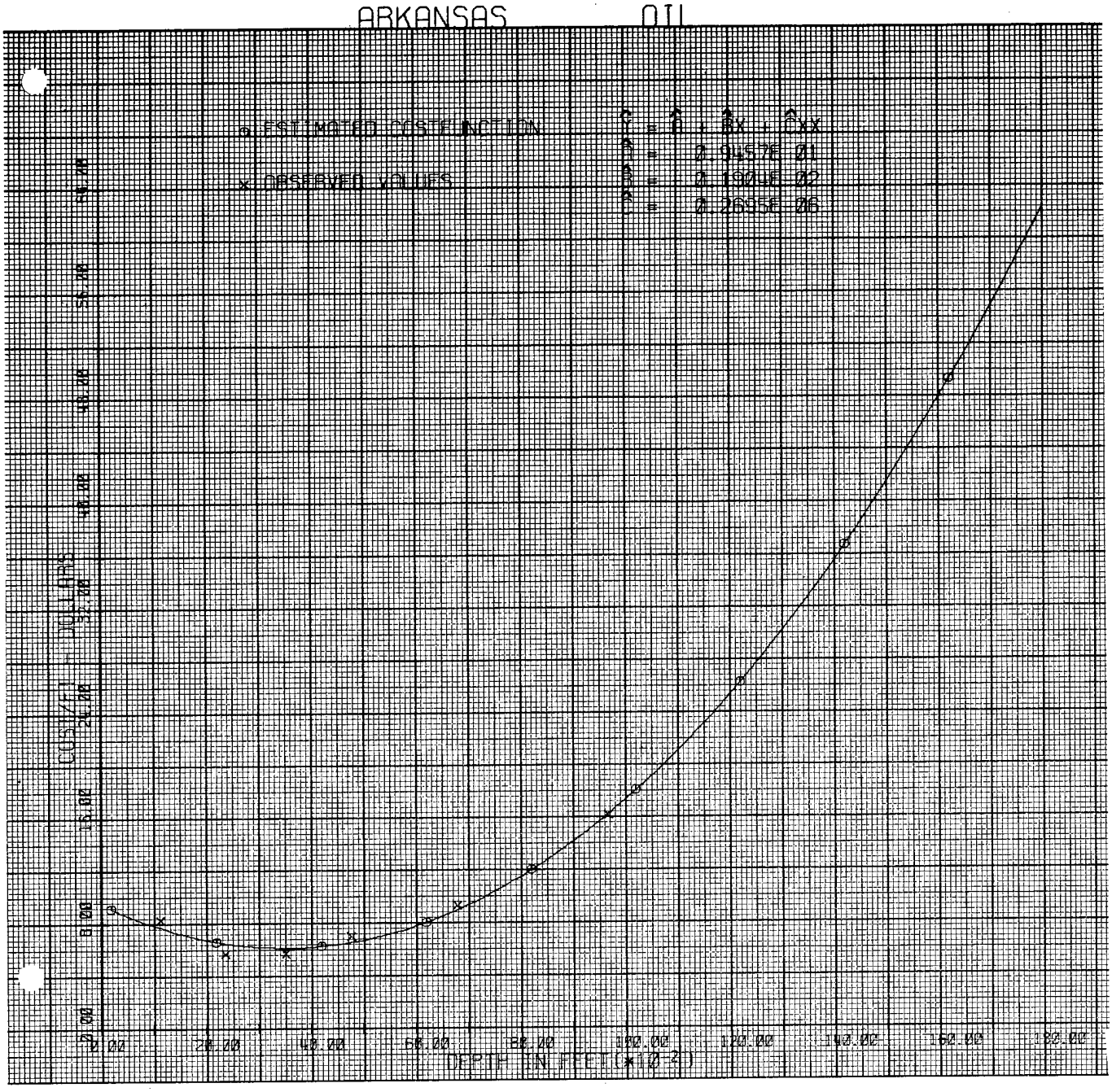

ARKANSAS OIL
o ESTIMATED COST FUNCTION
x OBSERVED VALUES
$\hat{C} = \hat{\beta} + \hat{\beta}X + \hat{C}XX$
$\hat{\beta}$ = 0.9457E Ø1
$\hat{\beta}$ = 0.1ØØ4E Ø2
$\hat{C}$ = 0.2695E Ø6
COST/FT (DOLLARS)
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET(×10^2)

Table 2a

TOTAL AND MARGINAL DRILLING COSTS FOR OIL WELLS IN ARKANSAS

(in dollars)

DEPTH	
18000.feet	
TOTAL COST	
	7822.50000
	13454.00000
	18511.50000
	24612.00000
	33372.50100
	46410.00100
	65341.50100
	91784.00200
	127354.50000
	173670.00000
	232347.50000
	305004.00000
	393256.51000
	498722.01000
	623017.51000
	767760.01000
	934566.51000
	1125054.00000
MINIMUM AVERAGE COST DEPTH	
	3532.feet
MINIMUM MARGINAL COST DEPTH	
	2355.feet
MARGINAL COST	
	6.45750
	5.07500
	5.30950
	7.16100
	10.62950
	15.71500
	22.41750
	30.73700
	40.67350
	52.22700
	65.39750
	80.18500
	96.58950
	114.61100
	134.24950
	155.50500
	178.37750
	202.86700
POINT OF INFLECTION	
	21527.17800
MINIMUM AVERAGE COST	
	6.09409
MINIMUM MARGINAL COST	
	4.97312

Table 3

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN ARKANSAS

$$\hat{Y} = 9.11 - 0.2(10^{-2})X_1 + 0.23(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	1065.	1134225.	7.6000	7.2468	0.3532
2	2102.	4418404.	5.8200	5.9330	-0.1130
3	3315.	10989225.	4.4900	5.0280	-0.5380
4	4584.	21013056.	4.8300	4.8105	0.0195
5	6679.	44609041.	6.3500	6.0831	0.2669
6	8760.	76737600.	9.4500	9.3592	0.0908
7	11780.	169384200.	17.6400	17.6800	-0.0400
8	14011.	198154060.	26.5000	26.5393	-0.0393

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.91144027E 01	0.33206112E-00	0.27447967E 02	0.09999999E 01	0.
-0.20001819E-02	0.11244711E-03	-0.17787756E 02	0.65369999E 04	0.87115944E 00
0.23152085E-06	0.73346759E-08	0.31565247E 02	0.61747258E 08	0.96053169E 00

RSQ = 0.9988
R = 0.9994
F(2, 5)= 2074.3122
SUMUSQ = 0.5100
DURBIN-W.= 1.6042

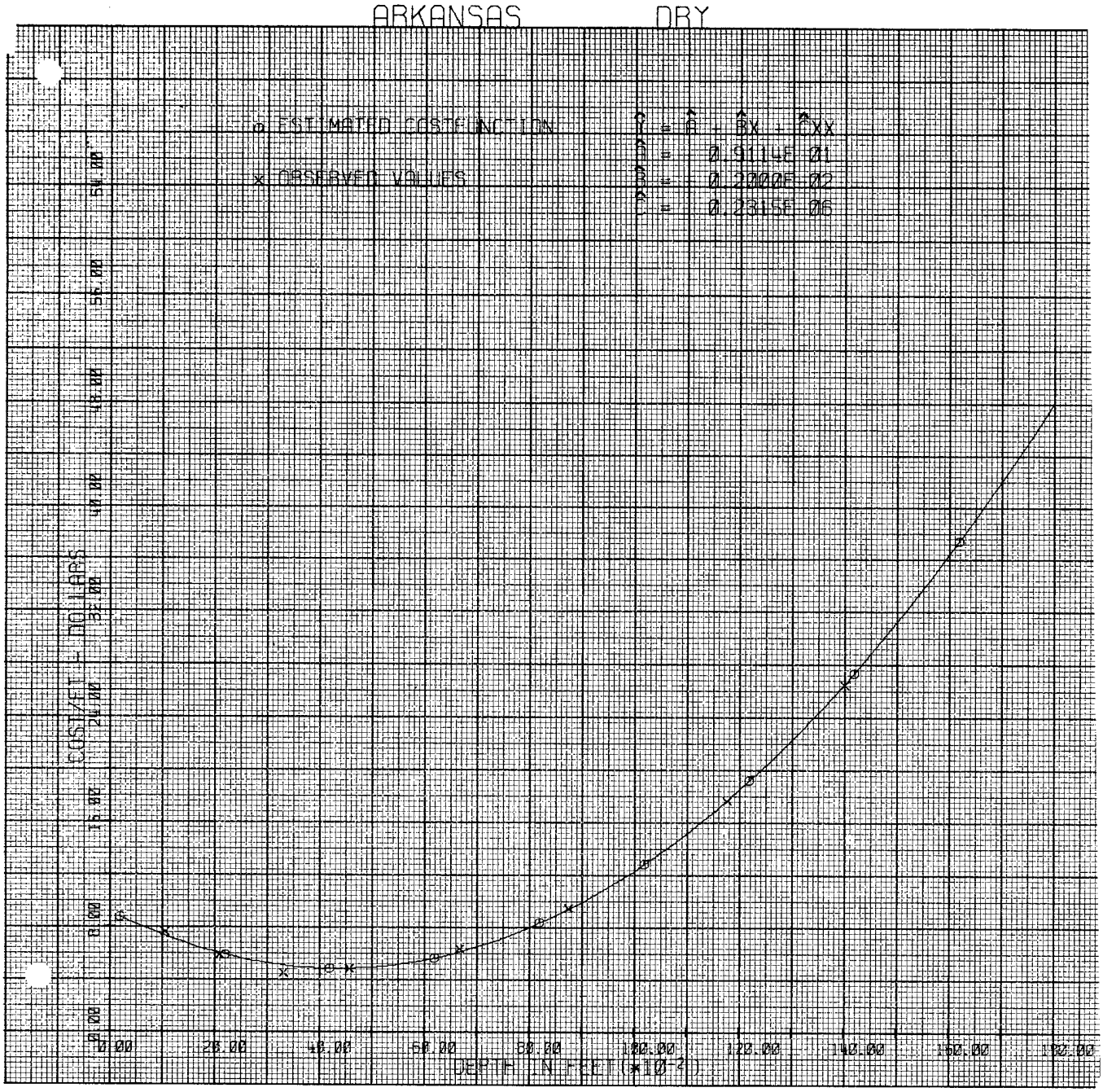

ARKANSAS DRY
o ESTIMATED COST FUNCTION
x OBSERVED VALUES
$\hat{C}_{XX} = \hat{\beta} + \hat{\beta}X + \hat{\gamma}XX$
$\hat{\beta}$ = 0.9114E 01
$\hat{\beta}$ = 0.2200E 02
$\hat{\gamma}$ = 0.2315E 06
COST/FT - DOLLARS
8.000
16.00
24.00
32.00
40.00
48.00
56.00
64.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10^-2)

Table 3a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN ARKANSAS

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	7345.50010
	12080.00000
	15592.50000
	19272.00100
	24507.50100
	32688.00100
	45202.50100
	63440.00100
	88789.50400
	122640.00000
	166380.51000
	221400.00000
	289087.51000
	370832.00000
	468022.51000
	582048.01000
	714297.52000
	866160.02000
MINIMUM AVERAGE COST DEPTH	
4320. feet	
MINIMUM MARGINAL COST DEPTH	
2880. feet	
MARGINAL COST	
	5.80850
	3.89200
	3.36450
	4.22600
	6.47650
	10.11600
	15.14450
	21.56200
	29.36850
	38.56400
	49.14850
	61.12200
	74.48450
	89.23600
	105.37650
	122.90600
	141.82450
	162.13200
POINT OF INFLECTION	
20709.91600	
MINIMUM AVERAGE COST	
4.79435	
MINIMUM MARGINAL COST	
3.35446	

Table 4

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR GAS WELLS IN APPALACHIAN

$$\hat{Y} = 16.96 - 0.28(10^{-2})X_1 + 0.40(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	798.	636804.	15.6000	15.0103	0.5897
2	1871.	3500641.	13.5600	13.1789	0.3811
3	3192.	10188864.	10.3600	12.1848	-1.8248
4	4270.	18232900.	11.5800	12.4044	-0.8244
5	6118.	37429924.	17.4800	14.9363	2.5437
6	8552.	73136704.	21.5600	22.4255	-0.8655

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.16967462E 02	0.24796499E 01	0.68426846E 01	0.09999999E 01	0.
-0.27707126E-02	0.12759406E-02	-0.21715058E 01	0.41334999E 04	0.66553251E 00
0.39861197E-06	0.13217060E-06	0.30158897E 01	0.23854306E 08	0.80290894E 00

RSQ = J.8618
R = 0.9284
F(2, 3)= 9.3565
SUMUSQ = 11.7221
DURBIN-W.= 2.4635

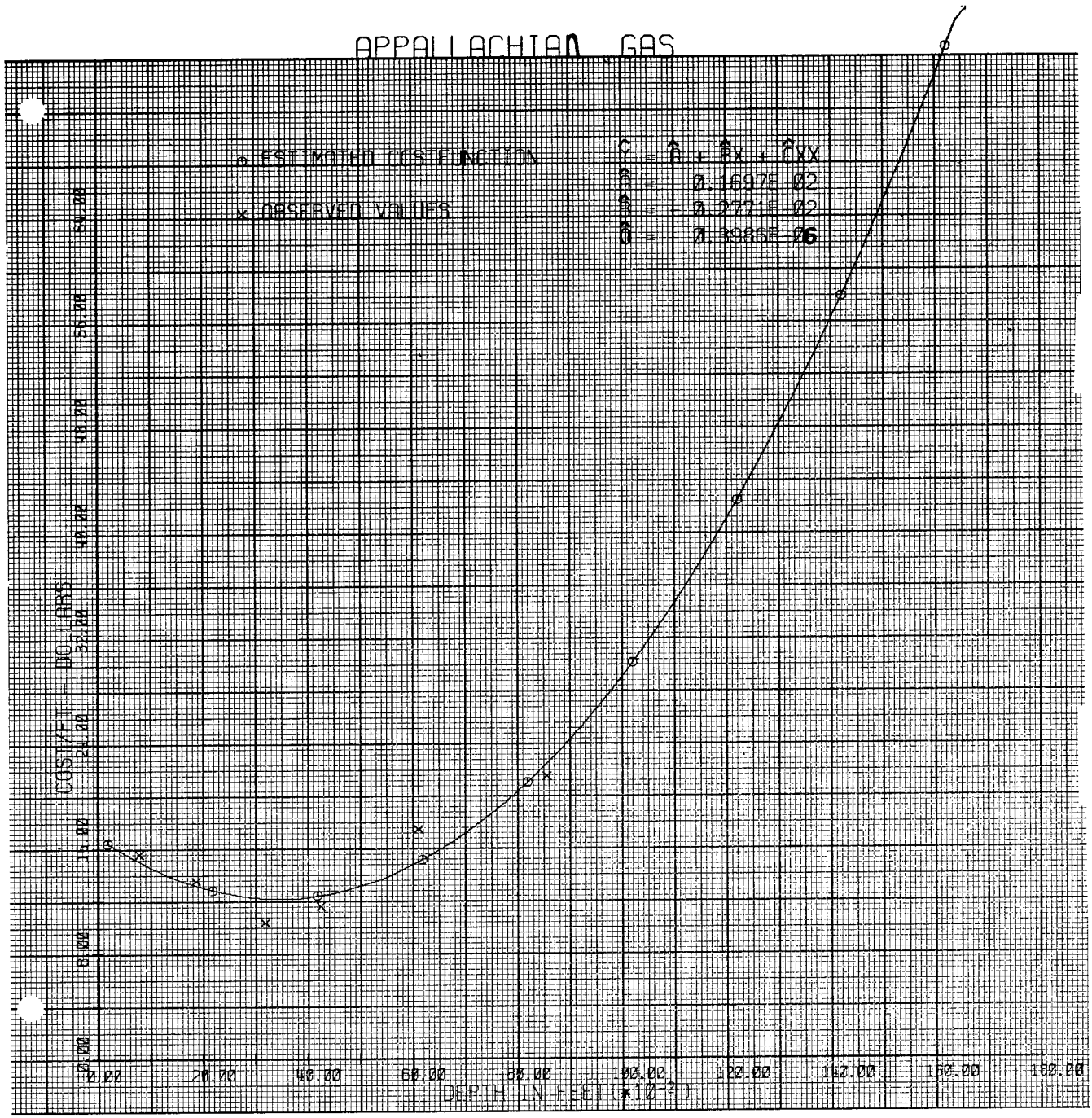

APPALACHIAN GAS
ESTIMATED COST FUNCTION
OBSERVED VALUES
$\hat{C} = \hat{\beta} + \hat{\beta}x + \hat{\beta}xx$
$\hat{\beta}$ = Ø.1697E Ø2
$\hat{\beta}$ = Ø.2721E Ø2
$\hat{\beta}$ = Ø.1985E Ø6
COST/FT - DOLLARS
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10^-2)

Table 4a

TOTAL AND MARGINAL DRILLING COSTS FOR GAS WELLS IN APPALACHIAN

(in dollars)

DEPTH	
18000.feet	
TOTAL COST	
	14597.60000
	26044.80000
	36733.20000
	49054.40000
	65400.00100
	88161.60100
	119730.80000
	162499.20000
	218858.40000
	291200.00000
	381915.60000
	493396.80000
	628035.20000
	788222.39000
	976350.00000
	1194809.60000
	1445992.80000
	1732291.20000
MINIMUM AVERAGE COST DEPTH	
	3476. feet
MINIMUM MARGINAL COST DEPTH	
	2317. feet
MARGINAL COST	
	12.62380
	10.66920
	11.10620
	13.93480
	19.15500
	26.76680
	36.77020
	49.16520
	63.95180
	81.13000
	100.69980
	122.66120
	147.01420
	173.75880
	202.89500
	234.42280
	268.34221
	304.65321
POINT OF INFLECTION	
	42246.69300
MINIMUM AVERAGE COST	
	12.15412
MINIMUM MARGINAL COST	
	10.54883

Table 5

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN APPALACHIAN

$$\hat{Y} = 7 - 0.10(10^{-2})X_1 + 0.27(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

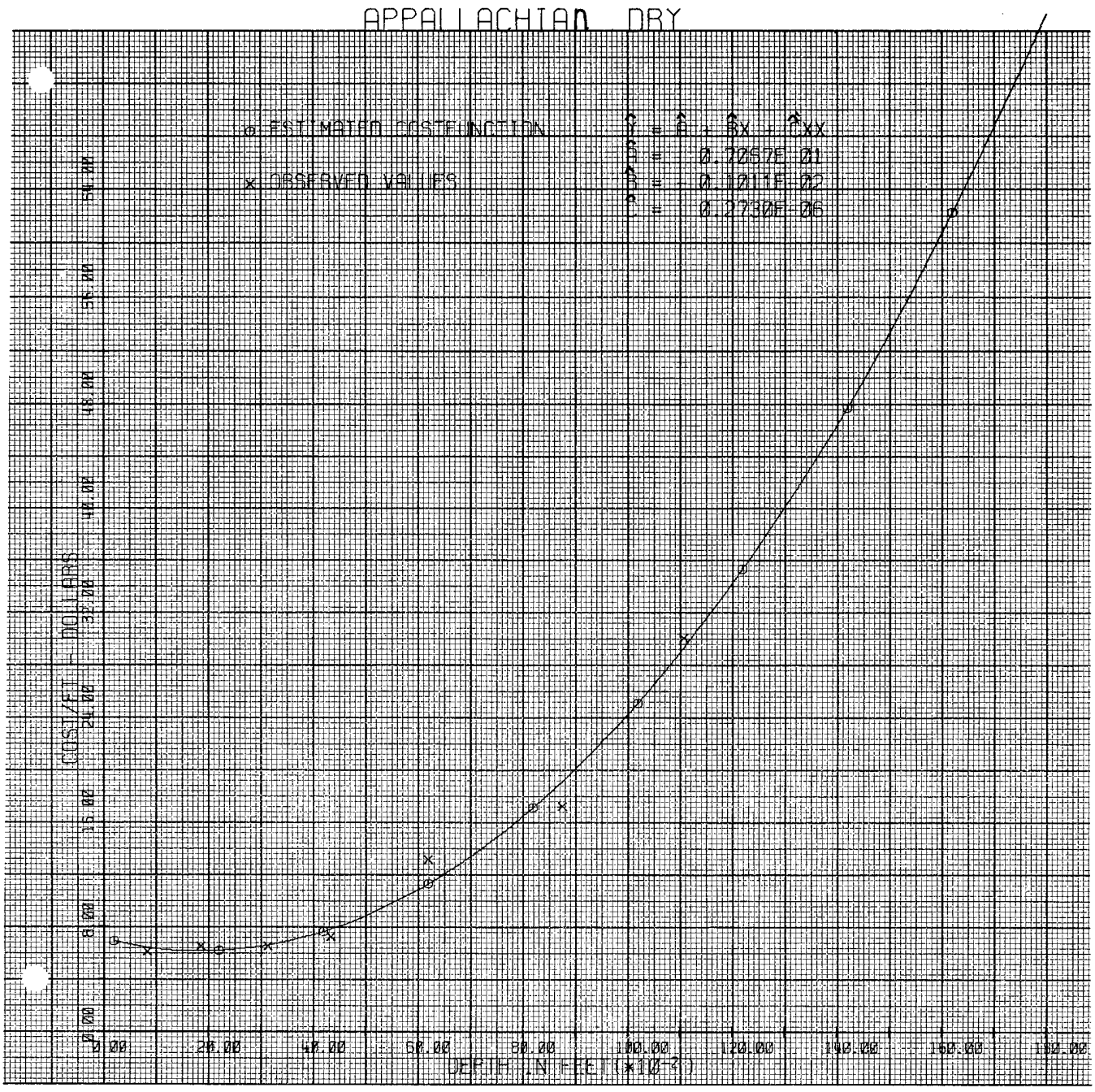
X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	849.	720801.	6.1200	6.4050	-0.2850
2	1867.	3485689.	6.4700	6.1301	0.3399
3	3144.	9884736.	6.5200	6.5851	-0.0651
4	4341.	18844281.	7.1800	7.8200	-0.6400
5	6195.	38378025.	13.1500	11.2766	1.8734
6	8755.	76650025.	17.1800	19.1338	-1.9538
7	11074.	122633476.	30.0700	29.3396	0.7304

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.70669841E 01	0.16078386E 01	0.43953314E 01	0.09999999E 01	0.
-0.10114302E-02	0.67878664E-03	-0.14900562E 01	0.51750000E 04	0.93483800E 00
0.27295288E-06	0.55596265E-07	0.49095543E 01	0.38656718E 08	0.98594870E 00

RSQ = 0.9821
R = 0.9910
F(2, 4)= 109.4536
SUMUSQ = 8.4710
DURBIN-W.= 3.4299


APPALACHIAN DRY
ø ESTIMATED COST FUNCTION
× OBSERVED VALUES
$\hat{C} = \hat{\beta} + \hat{\beta}X + \hat{\gamma}XX$
$\hat{\beta}$ = Ø.7267E Ø1
$\hat{\gamma}$ = Ø.1011E Ø2
$\hat{\beta}$ = Ø.2730E Ø6
COST/FT. IN DOLLARS
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET(×10^-2)

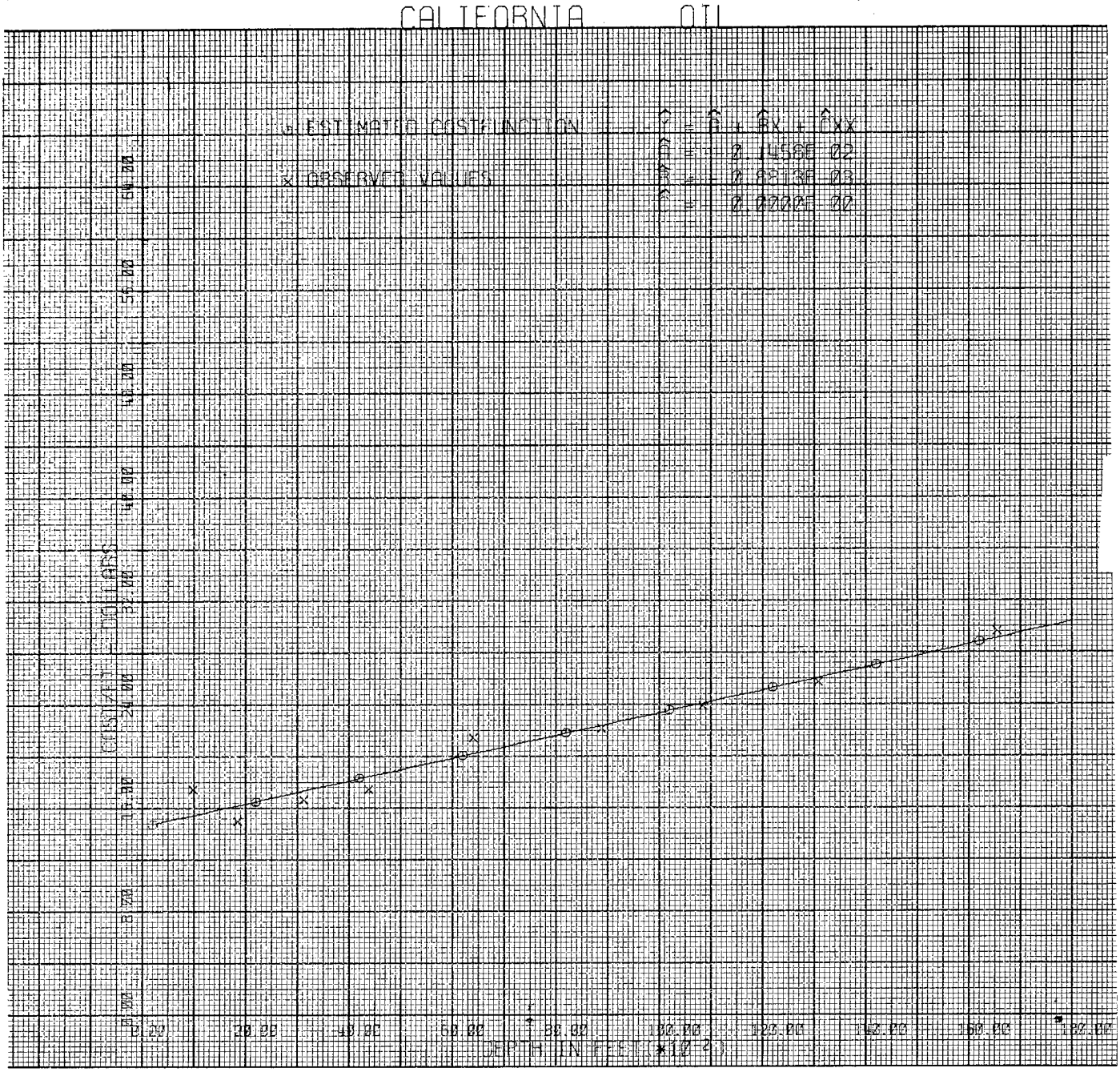

CALIFORNIA OIL
ESTIMATED COST FUNCTION
OBSERVED VALUES
$\hat{C} = \hat{\beta} + \hat{\beta}X + \hat{\zeta}XX$
$\hat{\beta} = 0.11586E 02$
$\hat{\beta} = 0.85136E 03$
$\hat{\zeta} = 0.02005E 00$
CRUDE OIL COST - DOLLARS
DEPTH IN FEET ($\times 10^{-2}$)

Table 7

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN CALIFORNIA

$$\hat{Y} = 10 - 0.11(10^{-2})X_1 + 0.15(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	848.	719104.	10.5800	9.3871	1.1929
2	1893.	3583449.	8.1800	8.6865	-0.5065
3	3085.	9517225.	7.7600	8.2813	-0.5213
4	4367.	19070689.	7.2600	8.3139	-1.0539
5	6134.	37625956.	8.4000	9.1547	-0.7547
6	8707.	75811849.	14.3100	12.0284	2.2816
7	11033.	121727089.	17.0400	16.3094	0.7306
8	13890.	196466050.	21.6200	23.7548	-2.1348
9	16333.	233383444.	32.8000	32.0339	0.7661

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.10192630E 02	0.13777641E 01	0.73979501E 01	0.09999999E 01	0.
-0.10752305E-02	0.41833092E-03	-0.25702869E 01	0.73655555E 04	0.90509595E 00
0.14770563E-06	0.24128724E-07	0.61215682E 01	0.80861593E 08	0.97343295E 00

RSQ = 0.9750
R = 0.9874
F(2, 6)= 117.2245
SUMUSQ = 14.5157
DURBIN-W.= 2.1709

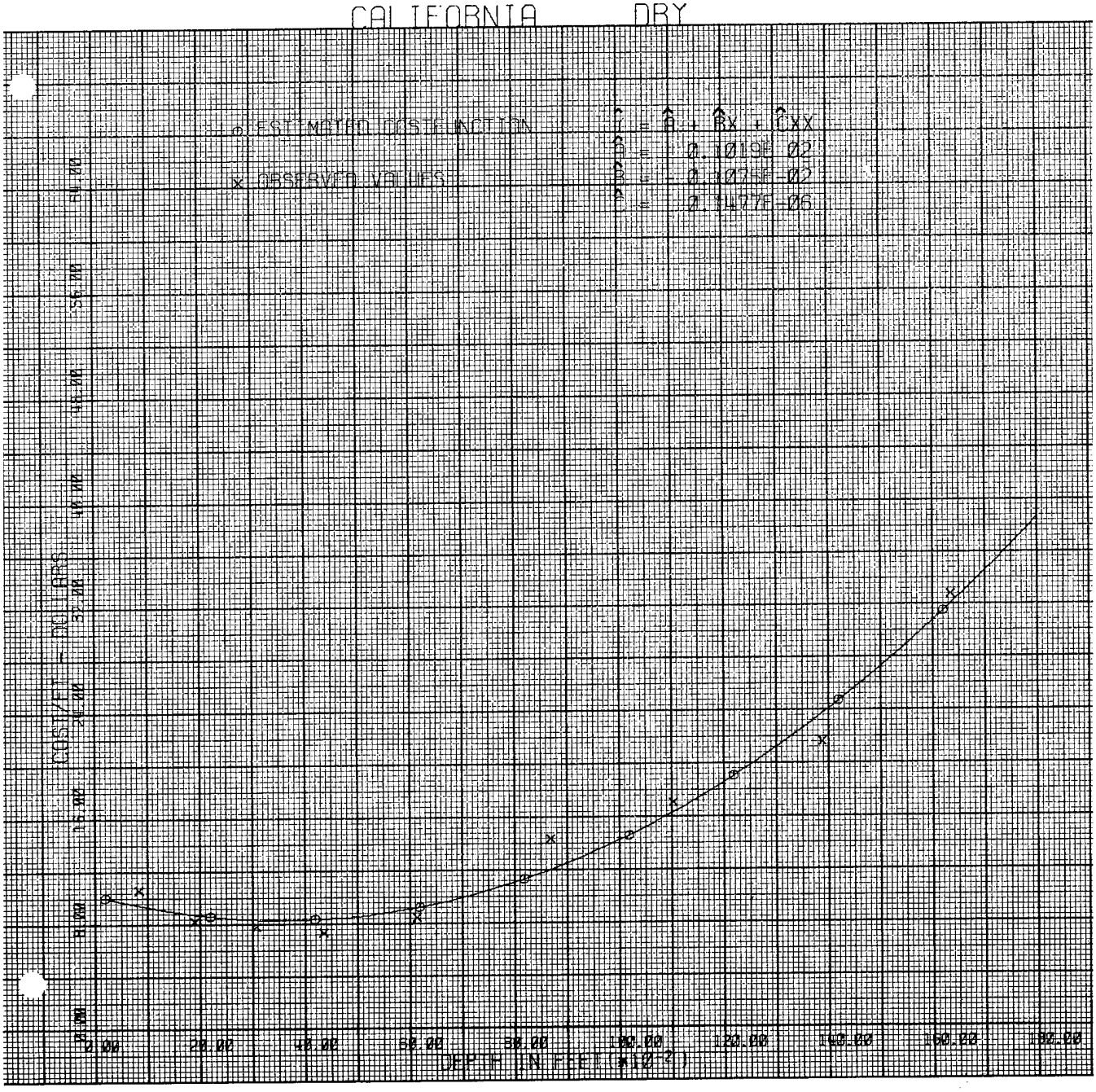

CALIFORNIA DRY
ø ESTIMATED COST FUNCTION
x OBSERVED VALUES
Ĉ = Â + B̂X + ĈXX
Â = 0.1019E 02
B̂ = -0.1075E-02
Ĉ = 0.1147E-06
COST/FT - DOLLARS
DEPTH IN FEET (*10-2)

Table 7a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN CALIFORNIA

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	9262.69990
	17261.60000
	24882.90100
	33012.80000
	42537.50100
	54343.20100
	69316.10000
	88342.40100
	112303.30000
	142100.00000
	178603.70000
	222705.60000
	275291.90000
	337248.80000
	409462.51000
	492819.20000
	588205.11000
	696506.41000
MINIMUM AVERAGE COST DEPTH	
	3639. feet
MINIMUM MARGINAL COST DEPTH	
	2426. feet
MARGINAL COST	
	8.48310
	7.66240
	7.72790
	8.67960
	10.51750
	13.24160
	16.85190
	21.34840
	26.73110
	33.00000
	40.15510
	48.19640
	57.12390
	66.93760
	77.63750
	89.22360
	101.69590
	115.05440
POINT OF INFLECTION	
	29964.50000
MINIMUM AVERAGE COST	
	8.23397
MINIMUM MARGINAL COST	
	7.58195

Table 8

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN COLORADO

$\hat{Y} = 22 - 0.6(10^{-2})X_1 + 0.78(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	727.	528529.	17.1000	18.2468	-1.1468
2	1705.	2907025.	15.0500	14.1729	0.8771
3	2955.	8732025.	12.5500	11.1543	1.3957
4	4283.	18344089.	10.4300	10.6374	-0.2074
5	5867.	34421689.	12.1400	13.6452	-1.5052
6	8409.	70711281.	27.3000	26.7133	0.5867

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.22249128E 02	0.17869822E 01	0.12450670E 02	0.09999999E 01	0.
-0.60764775E-02	0.95227242E-03	-0.63810284E 01	0.39910000E 04	0.49876572E-00
0.78574805E-06	0.10132395E-06	0.77548098E 01	0.22607439E 08	0.69269755E 00

RSQ =	0.9643
R =	0.9820
F(2, 3)=	40.5223
SUMUSQ =	6.6853
DURBIN-W.=	1.9439

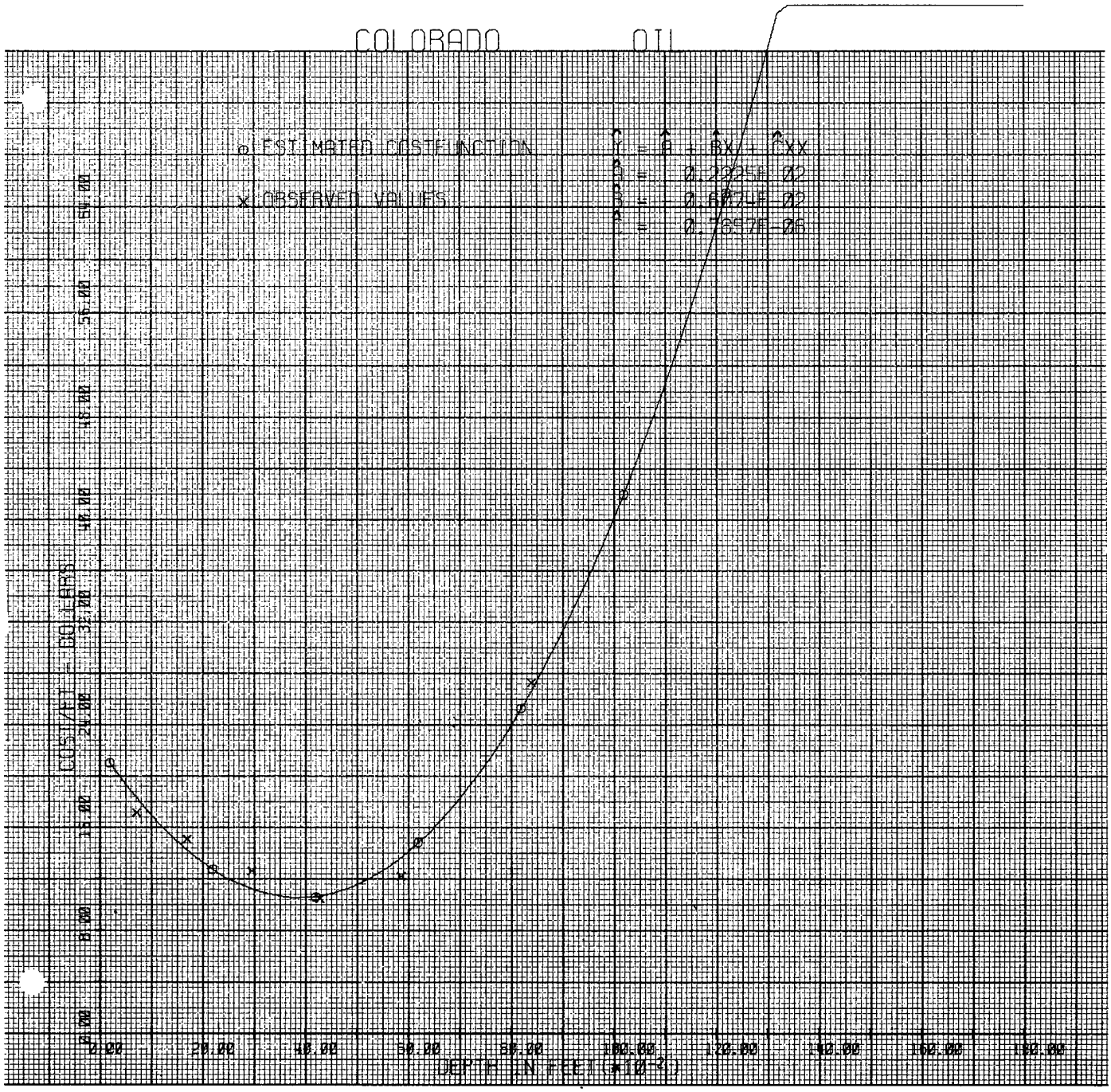

COLORADO OIL
o ESTIMATED COST FUNCTION
x OBSERVED VALUES
$\hat{Y} = \hat{\beta} + \hat{\beta}X + \hat{\beta}XX$
$\hat{\beta}$ = 0.2222E 02
$\hat{\beta}$ = 0.6827-E-02
$\hat{\beta}$ = 0.7697E-06
COST/FT - DOLLARS
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10-2)

Table 8a

TOTAL AND MARGINAL DRILLING COSTS FOR OIL WELLS IN COLORADO

(in dollars)

DEPTH	
18000.feet	
TOTAL COST	
	16961.70000
	26489.60000
	33297.90000
	42100.80000
	57612.50100
	84547.20000
	127619.10000
	191542.40000
	281031.30000
	400800.01000
	555562.70000
	750033.60000
	983926.90000
	1276956.80000
	1618837.50000
	2019283.20000
	2483008.10000
	3014726.50000
MINIMUM AVERAGE COST DEPTH	
	3865.feet
MINIMUM MARGINAL COST DEPTH	
	2577.feet
MARGINAL COST	
	12.45910
	7.38240
	7.01990
	11.37160
	20.43750
	34.21760
	52.71190
	75.92040
	103.84310
	136.48000
	173.83110
	215.89640
	262.67590
	314.16960
	370.37750
	431.29960
	496.93590
	567.28640
POINT OF INFLECTION	
	40628.44000
MINIMUM AVERAGE COST	
	10.51095
MINIMUM MARGINAL COST	
	6.59794

Table 9

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN COLORADO

$\hat{Y} = 20 - 0.57\,(10^{-2})X_1 + 0.59(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	740.	547600.	15.6900	16.0885	-0.3985
2	1637.	2679769.	12.2500	12.2221	0.0279
3	2922.	8538084.	9.2900	8.3504	0.9396
4	4157.	17280649.	6.2900	6.4797	-0.1897
5	5795.	33582025.	6.3200	6.7965	-0.4765
6	8493.	72131049.	14.2700	14.2737	-0.0037
7	10753.	115627009.	27.3000	27.1991	0.1009

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.19998342E 02	0.60396262E 00	0.33111887E 02	0.09999999E 01	0.
-0.57235704E-02	0.26784114E-03	-0.21369272E 02	0.49281428E 04	0.53758558E 00
0.59455232E-06	0.22768743E-07	0.26112653E 02	0.35769454E 08	0.72282435E 00

RSQ = 0.9959
R = 0.9979
F(2, 4)= 480.3265
SUMUSQ = 1.3157
DURBIN-W.= 1.9800

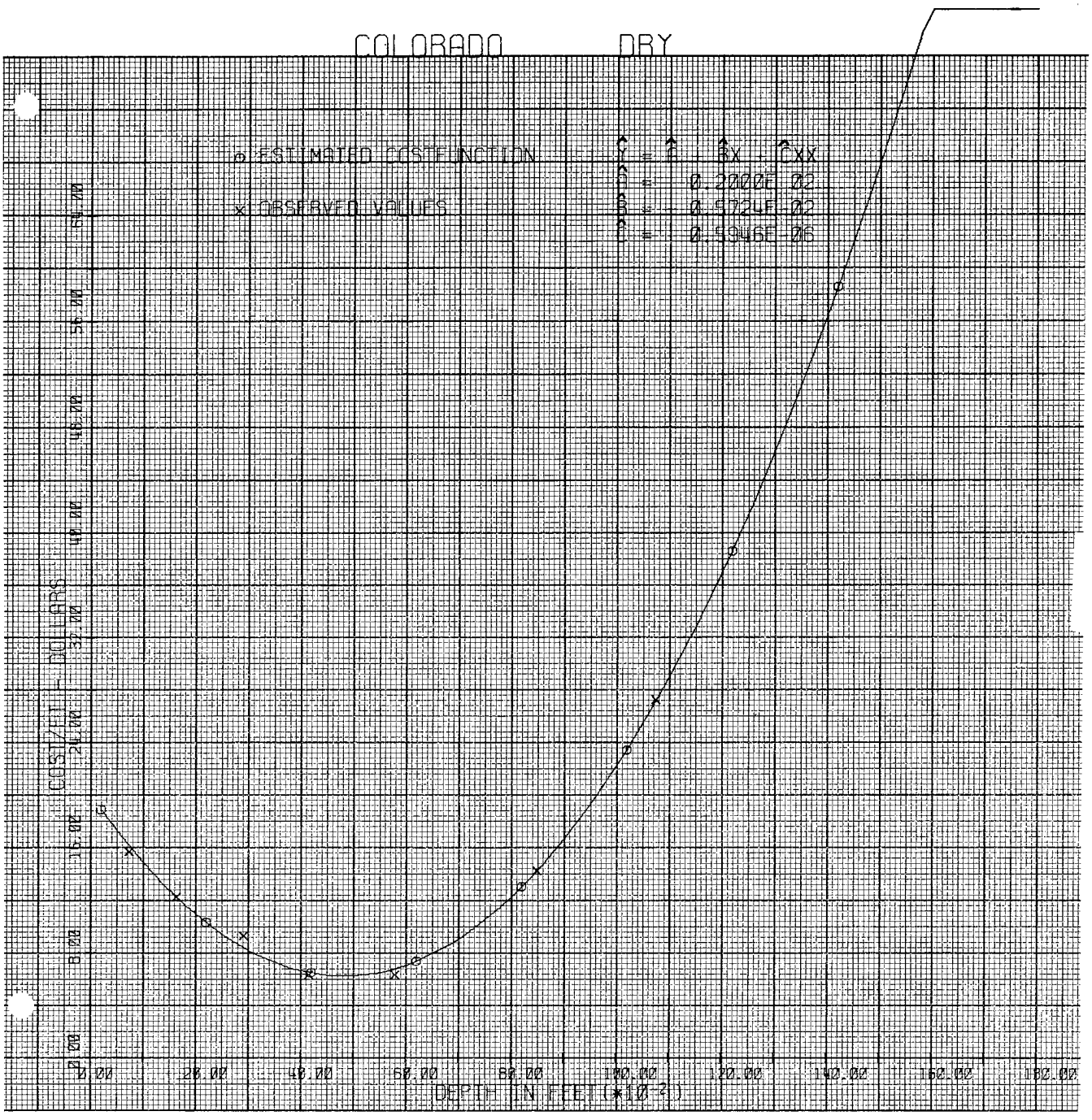

COLORADO DRY
ESTIMATED COST FUNCTION
OBSERVED VALUES
$\hat{Y} = \hat{\beta} + \hat{\beta}X + \hat{\beta}XX$
$\hat{\beta} = 0.2200E\ 02$
$\hat{\beta} = 0.5724E-02$
$\hat{\beta} = 0.5946E-06$
COST/FT - DOLLARS
DEPTH IN FEET (*10^-2)
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00

Table 9a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN COLORADO

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	14870.60000
	21860.80000
	24538.20000
	26470.40000
	31224.99900
	42369.59900
	63471.79700
	98099.19900
	149819.40000
	222200.00000
	318808.59000
	443212.80000
	598980.20000
	789678.39000
	1018875.00000
	1290137.60000
	1607033.80000
	1973131.20000
MINIMUM AVERAGE COST DEPTH	
4813. feet	
MINIMUM MARGINAL COST DEPTH	
3209. feet	
MARGINAL COST	
	10.33580
	4.23920
	1.71020
	2.74880
	7.35500
	15.52880
	27.27020
	42.57920
	61.45580
	83.90000
	109.91180
	139.49120
	172.63820
	209.35280
	249.63500
	293.48480
	340.90220
	391.88720
POINT OF INFLECTION	
29959.44200	
MINIMUM AVERAGE COST	
6.22428	
MINIMUM MARGINAL COST	
1.63237	

Table 10

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN KENSAS

$$\hat{Y} = 8.60 - 0.80(10^{-3})X_1 + 0.20(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	870.	756900.	8.0100	8.0591	-0.0491
2	1881.	3538161.	7.9200	7.8246	0.0954
3	3127.	9778129.	8.0900	8.1173	-0.0273
4	4369.	19088161.	9.0100	9.0484	-0.0384
5	6012.	36144144.	11.2800	11.2606	0.0194

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.85994167E 01	0.13854218E-00	0.62070745E 02	0.09999999E 01	0.
-0.80106035E-03	0.95110872E-04	-0.84223846E 01	0.32517999E 04	0.89016402E 00
0.20687184E-06	0.13474621E-07	0.15352701E 02	0.13861099E 08	0.96762513E 00

RSQ = 0.9983
R = 0.9991
F(2, 2)= 571.4864
SUMUSQ = 0.0141
DURBIN-W.= 2.7928

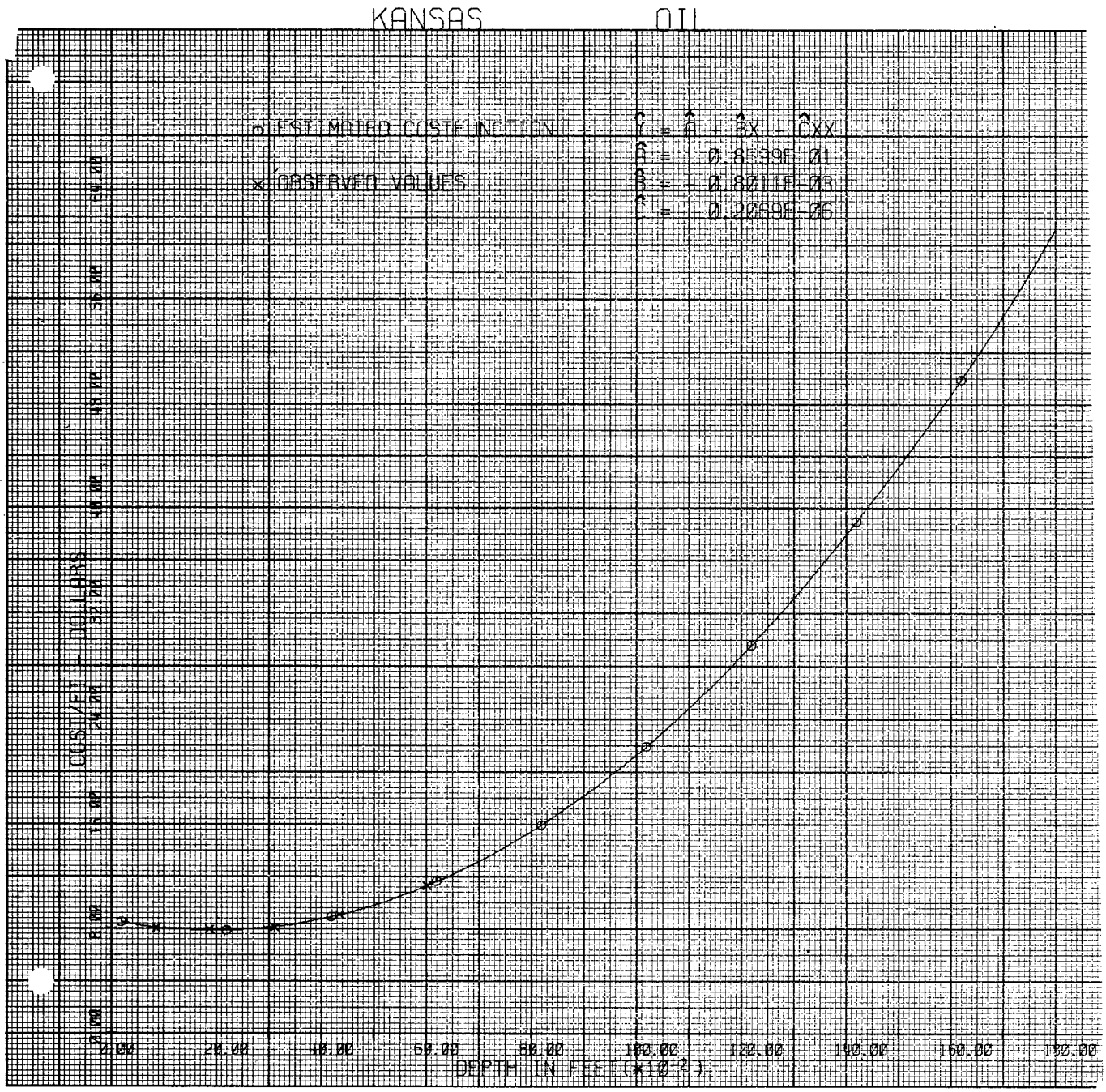

KANSAS OIL
o ESTIMATED COST FUNCTION
× OBSERVED VALUES
$\hat{Y} = \hat{A} + \hat{B}X + \hat{C}XX$
$\hat{A}$ = Ø.8539E Ø1
$\hat{B}$ = Ø.8211E-Ø3
$\hat{C}$ = Ø.2269E-Ø6
COST/FT. IN DOLLARS
DEPTH IN FEET (*10^2)
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00

Table 10a

TOTAL AND MARGINAL DRILLING COSTS FOR OIL WELLS IN KANSAS

(in dollars)

DEPTH	TOTAL COST	MARGINAL COST
18000. feet	8004.80010	
	15648.80000	7.61750
	24173.40000	7.87740
	34820.00000	9.37870
	48830.00100	12.12140
	67444.80100	16.10550
	91905.80100	21.33100
	123454.40000	27.79790
	163332.00000	35.50620
	212780.00000	44.45590
	273039.80000	54.64700
	345352.80000	66.07950
	430960.40000	78.75340
	531104.00000	92.66870
	647025.00000	107.82540
	779964.80000	124.22350
	931164.81000	141.86300
	1101866.40000	160.74390
		180.86620

MINIMUM AVERAGE COST DEPTH
1936. feet

MINIMUM MARGINAL COST DEPTH
1291. feet

POINT OF INFLECTION
15146.07800

MINIMUM AVERAGE COST
7.82355

MINIMUM MARGINAL COST
7.56507

Table 11

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN KENTUCKY

$\hat{Y} = 3.80 + 0.27(10^{-2})X$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X = Depth

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X	Y	$\hat{Y}$	$Y - \hat{Y}$
1	836.	7.8200	6.0582	1.7618
2	1819.	5.0600	8.7244	-3.6644
3	3019.	13.5000	11.9791	1.5209
4	4295.	16.4000	15.4399	0.9601
5	6090.	19.7300	20.3084	-0.5784

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.37907695E 01	0.23210088E 01	0.16332421E 01	0.09999999E 01	0.
0.27122580E-02	0.62635265E-03	0.43302410E 01	0.32117999E 04	0.92848005E 00

RSQ = 0.8621
R = 0.9285
F(1, 3)= 18.7510
SUMUSQ = 20.1010
DURBIN-W.= 2.9358

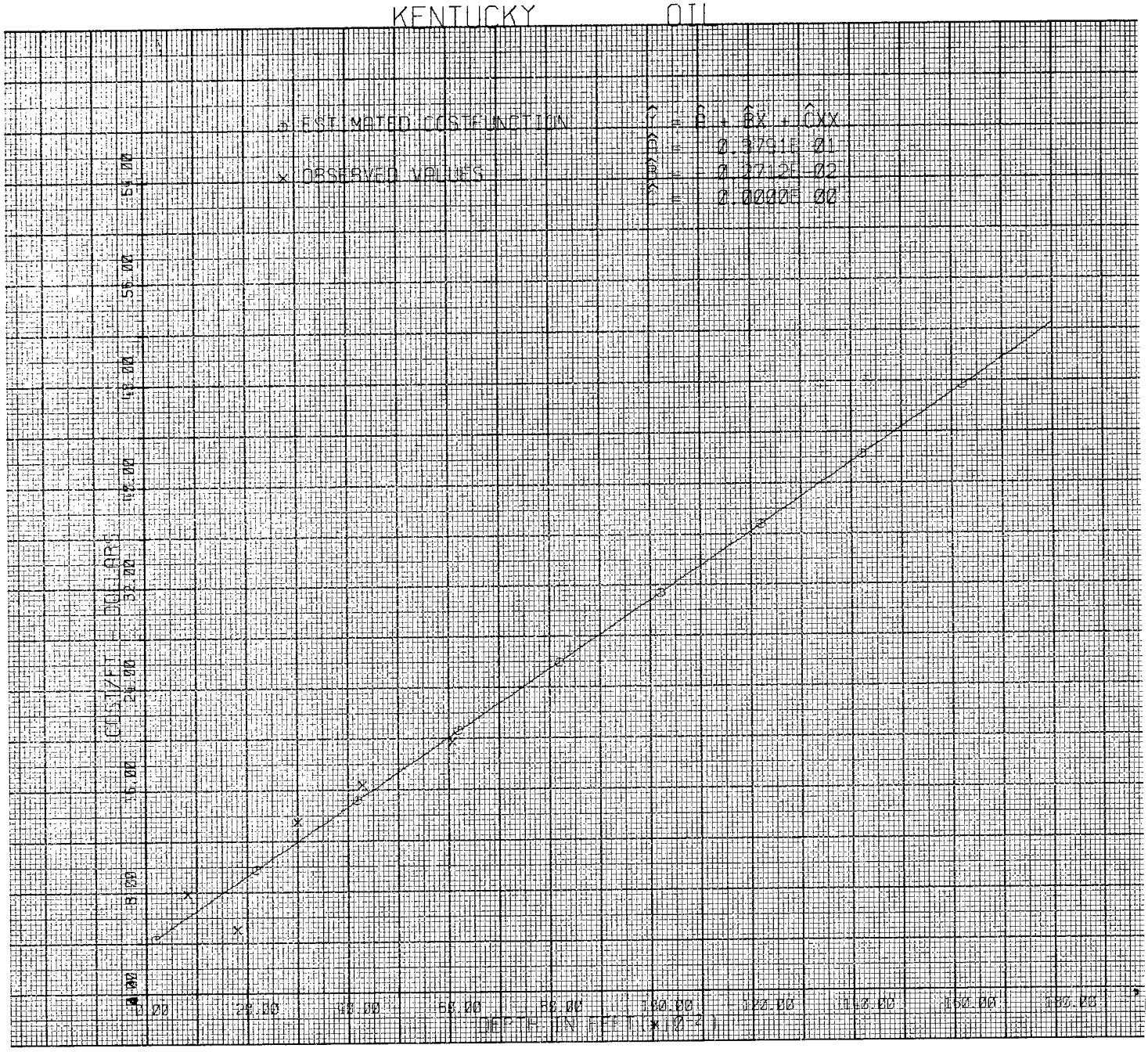

KENTUCKY OIL
ESTIMATED COST FUNCTION
OBSERVED VALUES
$\hat{Y} = \hat{B} + \hat{B}X + \hat{C}XX$
$\hat{B}$ = 0.37911E 01
$\hat{B}$ = 0.37121E 02
$\hat{C}$ = 0.00000E 00
COST/FT DOLLARS
DEPTH IN FEET (X 10^2)

Table 12

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN KENTUCKY

$\hat{Y} = 5.04 + 0.53(10^{-3})\ X$

Where:

$\hat{Y}$ = **Estimated drilling cost per foot**

X = **Depth**

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X	Y	$\hat{Y}$	$Y - \hat{Y}$
1	816.	5.9000	5.4839	0.4161
2	1814.	5.4300	6.0180	-0.5880
3	3028.	6.4600	6.6678	-0.2078
4	4171.	7.7500	7.2795	0.4705
5	6677.	8.5300	8.6208	-0.0908

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.50471625E 01	0.43850111E-00	0.115100336 02	0.09999999E 01	0.
0.53521071E-03	0.11314147E-03	0.47304554E 01	0.33012000E 04	0.93903343E 00

RSQ = 0.8818
R = 0.9390
F(1, 3)= 22.3772
SUMUSQ = 0.7917
DURBIN-W.= 2.4352

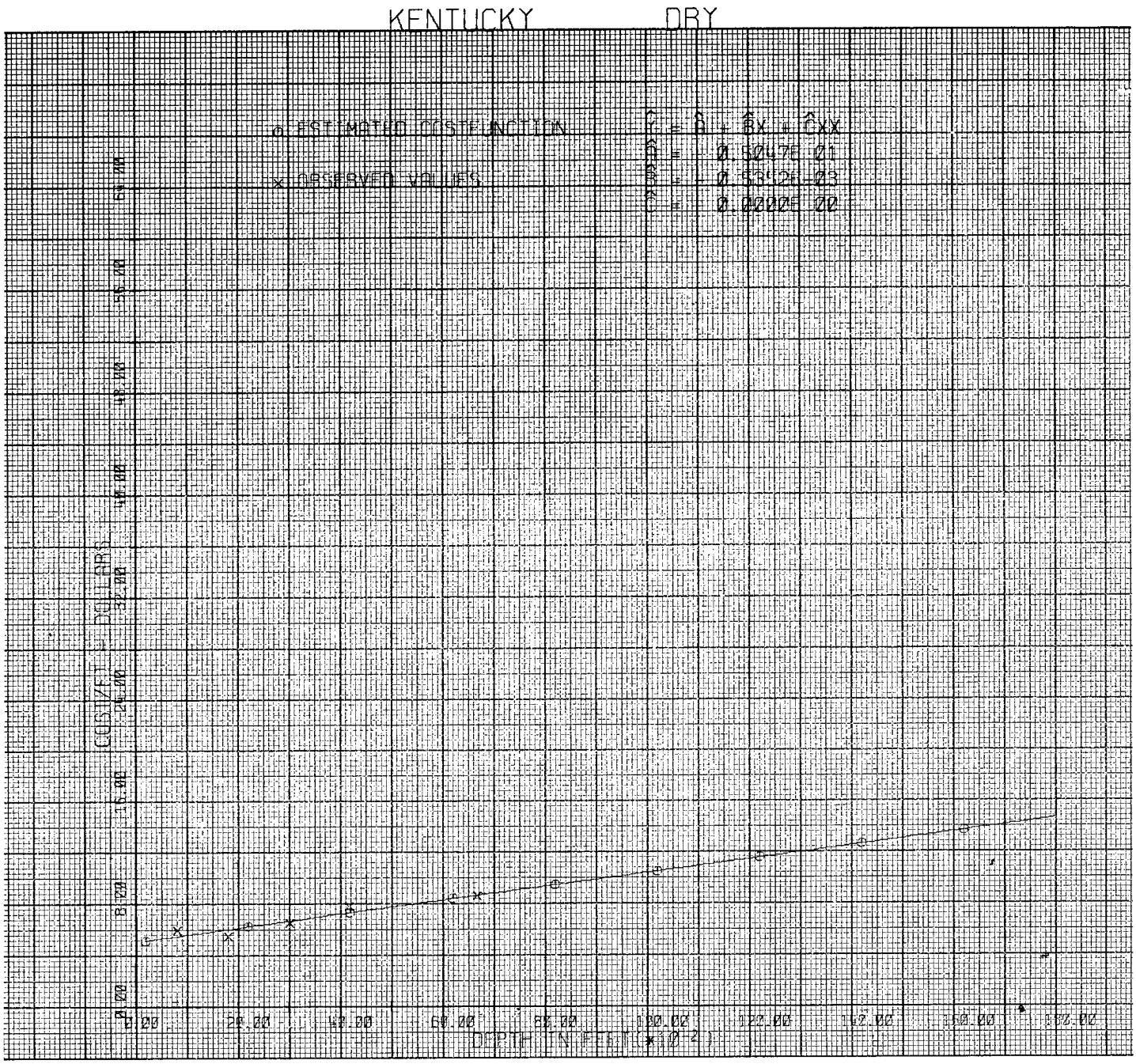

KENTUCKY DRY
o ESTIMATED COST FUNCTION
x OBSERVED VALUES
$\hat{C} = \hat{B} + \hat{B}X + \hat{C}XX$
$\hat{B}$ = Ø.5Ø47E Ø1
$\hat{B}$ = Ø.53Ø2E-Ø3
$\hat{C}$ = Ø.ØØØØE ØØ
COST/FT. DOLLARS
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10^2)

Table 13

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN NORTH DAKOTA

$\hat{Y} = 3.2 + 0.13(10^{-2})X$

Where:

$\hat{Y}$ = **Estimated drilling cost per foot**

X = **Depth**

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X	Y	$\hat{Y}$	$Y - \hat{Y}$
1	3294.	8.1200	7.5852	0.5348
2	4442.	9.3700	9.1045	0.2655
3	6603.	10.0000	11.9645	-1.9645
4	8720.	17.5400	14.7663	2.7737
5	11403.	15.3900	18.3171	-2.9271
6	14588.	23.8500	22.5323	1.3177

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.32257318E 01	0.22263015E 01	0.14489195E 01	0.09999999E 01	0.
0.13234578E-02	0.24558997E-03	0.53888918E 01	0.81750000E 04	0.93751547E 00

RSQ = 0.8789
R = 0.9375
F(1, 4)= 29.0402
SUMUSQ = 22.2136
DURBIN-W.= 3.5120

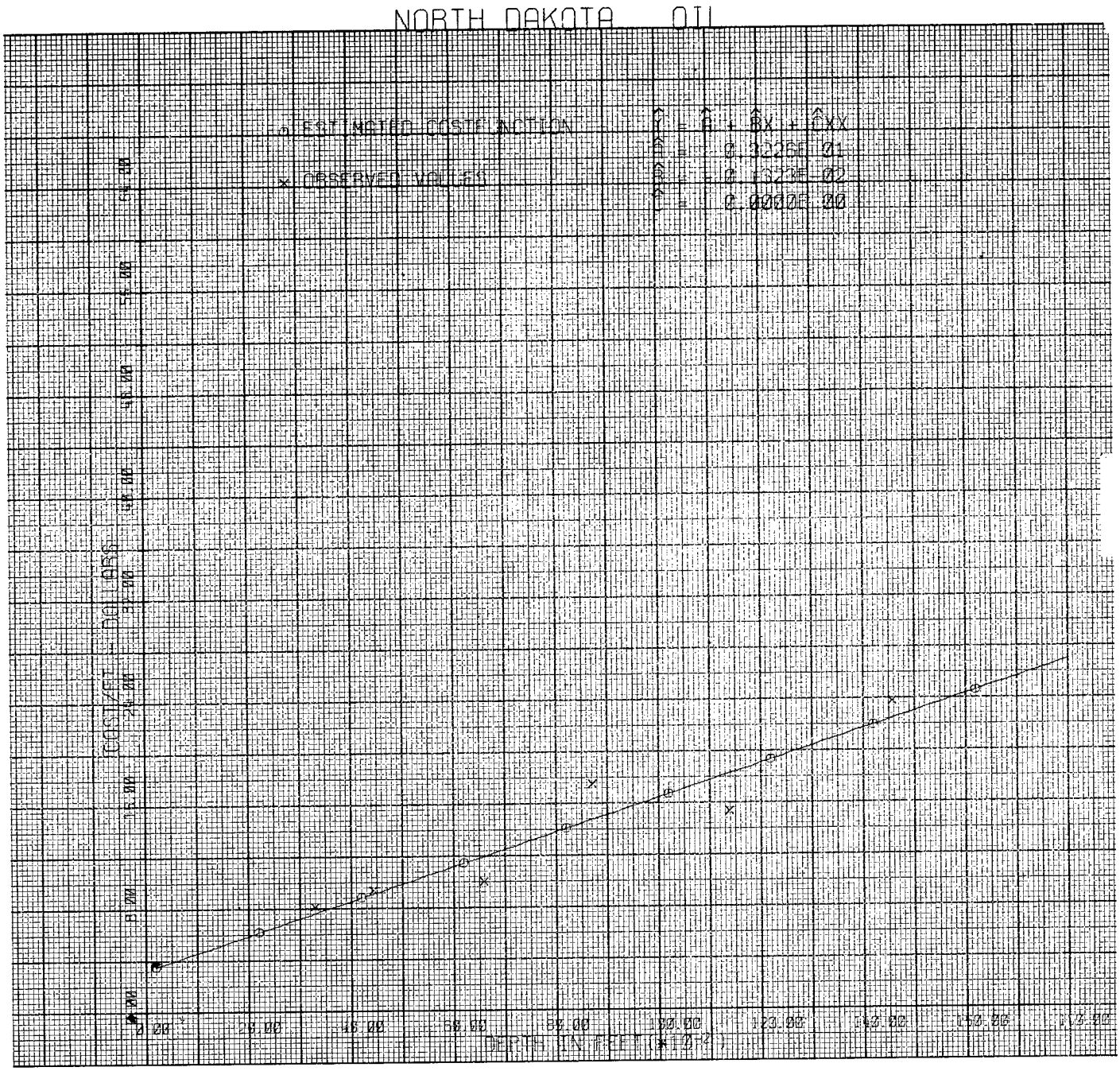

NORTH DAKOTA OIL
o ESTIMATED COST FUNCTION
× OBSERVED VALUES
$\hat{C} = \hat{\beta} + \hat{\beta}X + \hat{\gamma}XX$
$\hat{\beta} = 0.32266 \text{ Ø1}$
$\hat{\gamma} = -0.13236 \text{ Ø2}$
$\hat{\gamma} = 0.00000 \text{ Ø0}$
COST/FEET - DOLLARS
DEPTH IN FEET (*10^-2)

Table 14

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN NORTH LOUISIANA

$\hat{Y} = 8.2 - 0.15(10^{-2})X_1 + 0.26(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	800.	640000.	6.4800	7.1263	-0.6463
2	1770.	3132900.	5.9200	6.2702	-0.3502
3	3064.	9388096.	6.8200	5.8923	0.9277
4	4378.	19166884.	8.1300	6.4024	1.7276
5	6151.	37834801.	7.2800	8.5183	-1.2383
6	8515.	72505225.	12.5800	13.8905	-1.3105
7	10683.	114126489.	22.2700	21.3801	0.8899

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.82016734E 01	0.15830246E 01	0.51810145E 01	0.09999999E 01	0.
-0.15529329E-02	0.69183334E-03	-0.22446632E 01	0.50515714E 04	0.87199655E 00
0.26083722E-06	0.58970150E-07	0.44232077E 01	0.36684912E 08	0.95293786E 00

RSQ = 0.9593
R = 0.9795
F(2, 4)= 47.1706
SUMUSQ = 8.4284
DURBIN-W.= 1.8988

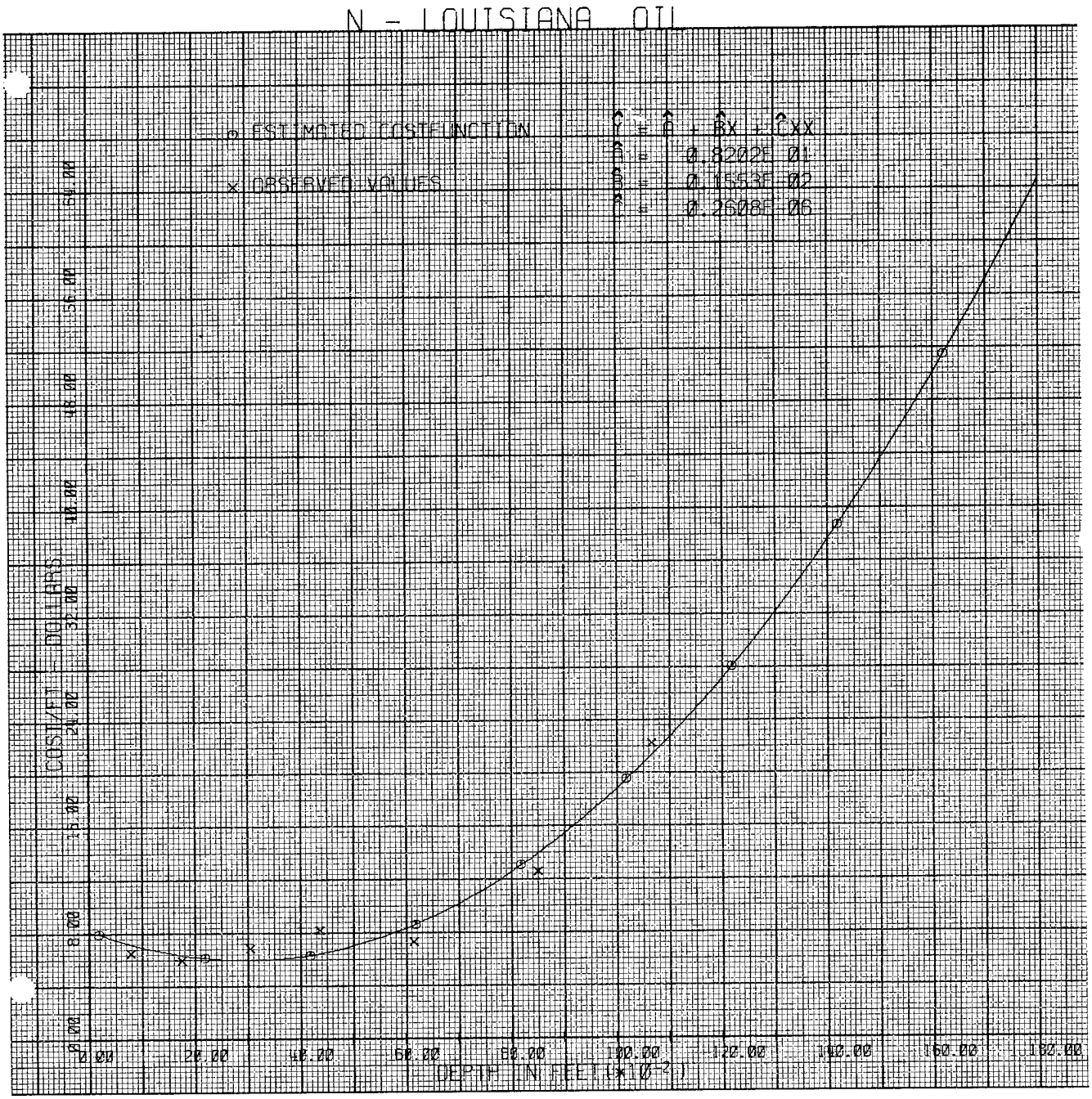

N - LOUISIANA OIL
ESTIMATED COST FUNCTION
OBSERVED VALUES
$\hat{Y} = \hat{B} + \hat{B}X + \hat{C}XX$
$\hat{B} = 0.8202E\ 01$
$\hat{B} = 0.1553E\ 02$
$\hat{C} = 0.2608E\ 06$
COST/FT. DOLLARS
DEPTH IN FEET (x10^-2)

Table 14a

TOTAL AND MARGINAL DRILLING COSTS FOR OIL WELLS IN NORTH LOUISIANA

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	6909.80000
	12278.40000
	17670.60000
	24651.20000
	34785.00100
	49636.80000
	70771.40000
	99753.59900
	138148.20000
	187520.00000
	249433.80000
	325454.40000
	417146.60000
	526075.19000
	653805.00000
	801900.79000
	971927.40000
	1165449.60000
MINIMUM AVERAGE COST DEPTH	
2977. feet	
MINIMUM MARGINAL COST DEPTH	
1985.feet	
MARGINAL COST	
	5.87840
	5.11960
	5.92560
	8.29640
	12.23200
	17.73240
	24.79760
	33.42760
	43.62240
	55.38200
	68.70640
	83.59560
	100.04960
	118.06840
	137.65200
	158.80040
	181.51360
	205.79160
POINT OF INFLECTION	
17536.95000	
MINIMUM AVERAGE COST	
5.89007	
MINIMUM MARGINAL COST	
5.11942	

Table 15

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR GAS WELLS IN NORTH LOUISIANA

$$\hat{Y} = 7.4 - 0.11(10^{-2})X_1 + 0.25(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	992.	984064.	6.9500	6.5269	0.4231
2	2131.	4541161.	5.9200	6.1124	-0.1924
3	3216.	10342656.	5.9000	6.3300	-0.4300
4	4526.	20484676.	7.1300	7.3891	-0.2591
5	6635.	44023225.	11.3500	10.9246	0.4254
6	9165.	83997225.	18.6800	18.1451	0.5349
7	10320.	106502400.	22.0200	22.5218	-0.5018

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.74245929E 01	0.68403053E 00	0.10854183E 02	0.09999999E 01	0.
-0.11567045E-02	0.30028611E-03	-0.38520079E 01	0.52835714E 04	0.94054385E 00
0.25383826E-06	0.25575846E-07	0.99249212E 01	0.38696486E 08	0.98934136E 00

RSQ = 0.9955
R = 0.9977
F(2, 4)= 442.2111
SUMUSQ = 1.1869
DURBIN-W.= 1.7017

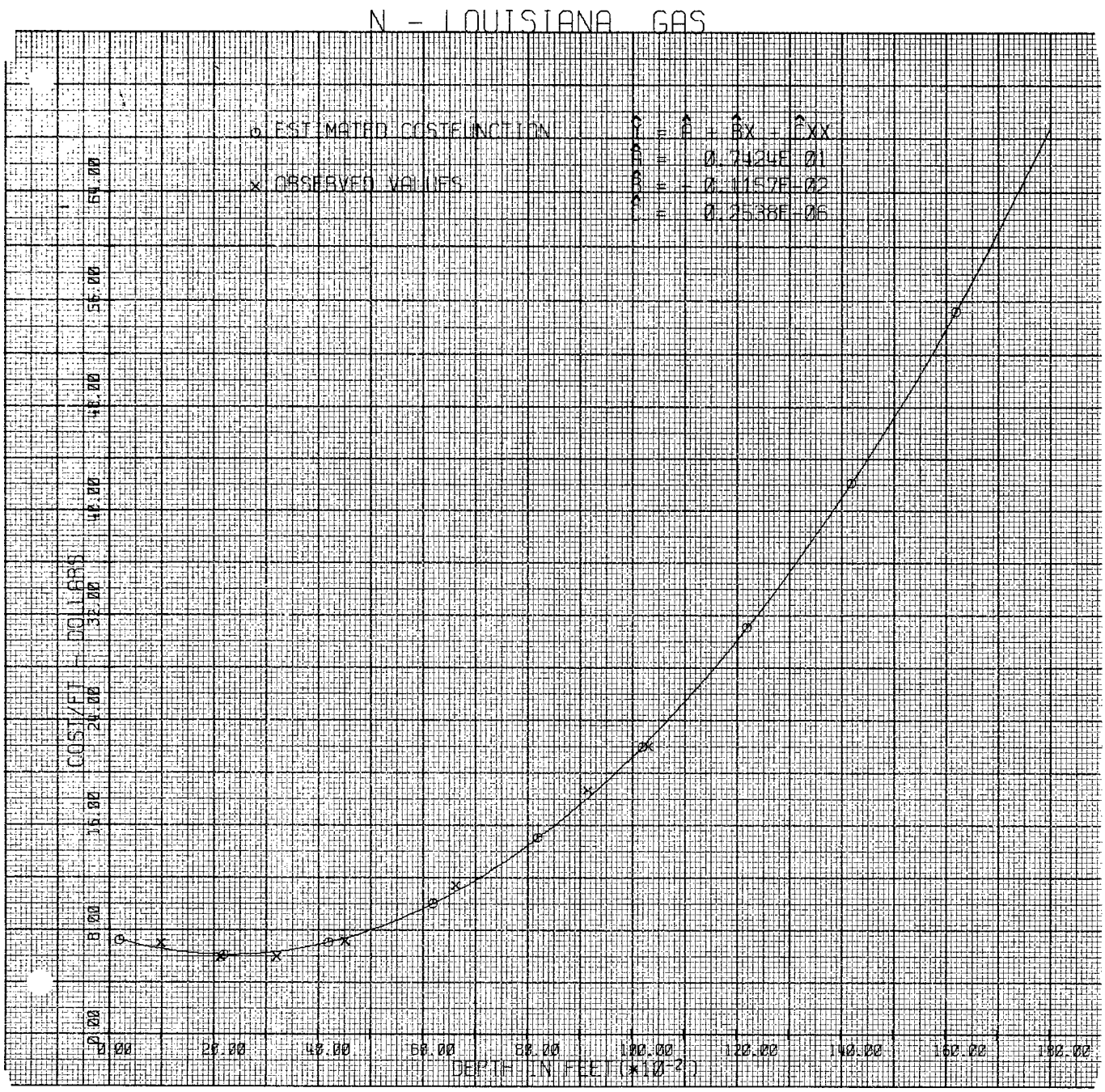

N - LOUISIANA GAS
o ESTIMATED COST FUNCTION
x OBSERVED VALUES
$\hat{Y} = \hat{B} + \hat{B}X + \hat{C}XX$
$\hat{B}$ = 0.7424E 01
$\hat{B}$ = -0.1157E-02
$\hat{C}$ = 0.2536E-06
COST/FT - DOLLARS
64.00
56.00
48.00
40.00
32.00
24.00
16.00
8.00
0.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10^-2)

Table 15a

TOTAL AND MARGINAL DRILLING COSTS FOR GAS WELLS IN NORTH LOUISIANA

(in dollars)

```
   DEPTH
    18000. feet
  TOTAL COST
          6520.80000
         12250.40000
         18711.60000
         27427.20000
         39920.00100
         57712.80100
         82328.40100
        115289.60000
        158119.20000
        212340.00000
        279474.81000
        361046.41000
        458577.61000
        573591.20000
        707610.01000
        862156.81000
       1038754.40000
       1238925.60000
MINIMUM AVERAGE COST DEPTH
               2279. feet
MINIMUM MARGINAL COST DEPTH
               1520. feet
MARGINAL COST
             5.87140
             5.84160
             7.33460
            10.35040
            14.88900
            20.95040
            28.53460
            37.64160
            48.27140
            60.42400
            74.09940
            89.29760
           106.01860
           124.26240
           144.02900
           165.31840
           188.13061
           212.46560
POINT OF INFLECTION
        13916.35300
MINIMUM AVERAGE COST
             6.10539
MINIMUM MARGINAL COST
             5.66586
```

Table 16

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN SOUTH LOUISIANA

$$\hat{Y} = 16.40 - 0.11(10^{-2})X_1 + 0.12(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	1093.	1194649.	13.6500	15.2997	-1.6497
2	1955.	3822025.	16.6100	14.6395	1.9705
3	2997.	8982009.	12.6600	14.0774	-1.4174
4	4528.	20502784.	15.1200	13.7200	1.4000
5	6206.	38514436.	14.8900	13.9686	0.9214
6	8420.	70896400.	14.4200	15.3212	-0.9012
7	11314.	128006596.	19.0200	18.8471	0.1729
8	13669.	193420780.	21.8200	23.1863	-1.3663
9	16611.	268981330.	31.3300	30.4601	0.8699

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.16390815E 02	0.14387243E 01	0.11392603E 02	0.09999999E 01	0.
-0.11282787E-02	0.42787471E-03	-0.26369370E 01	0.74214444E 04	0.85232950E 00
0.11891313E-06	0.24236657E-07	0.49063338E 01	0.81631752E 08	0.93924233E 00

RSQ = 0.9454
R = 0.9723
F(2, 6)= 51.9695
SUMUSQ = 14.8878
DURBIN-W.= 2.9954

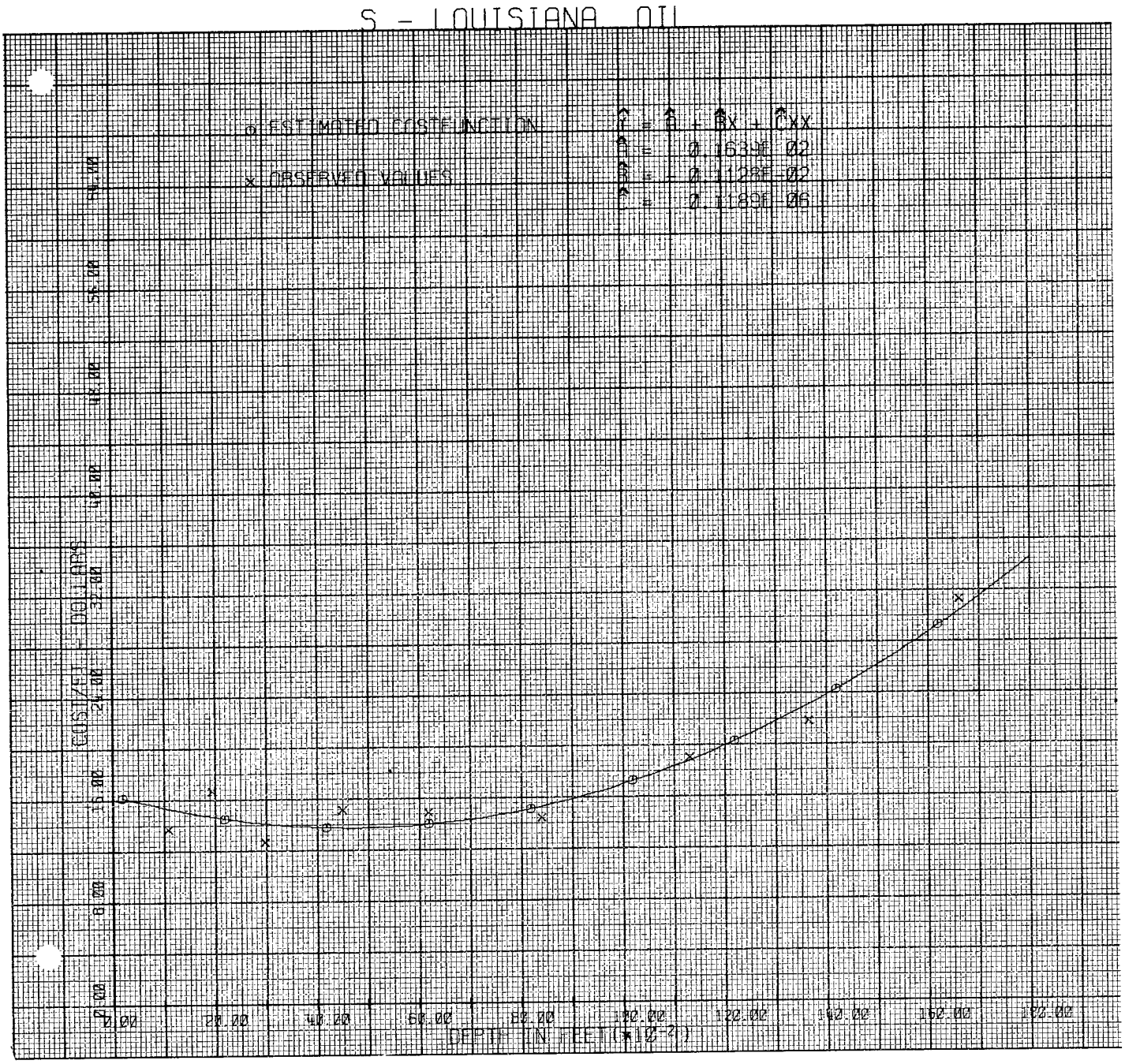

S - LOUISIANA OIL
o ESTIMATED COST FUNCTION
x OBSERVED VALUES
$\hat{C} = \hat{\alpha} + \hat{\beta}x + \hat{\gamma}xx$
$\hat{\alpha}$ = Ø.1634E Ø2
$\hat{\beta}$ = -Ø.1123E-Ø2
$\hat{\gamma}$ = Ø.1189E Ø6
COST/FT - DOLLARS
DEPTH IN FEET (*10^-2)

Table 16a

TOTAL AND MARGINAL DRILLING COSTS FOR OIL WELLS IN SOUTH LOUISIANA

(in dollars)

DEPTH	TOTAL COST	MARGINAL COST
18000. feet		
	15380.90000	
	29219.20000	14.49070
	42228.30000	13.30480
	55121.60000	12.83230
	68612.50100	13.07320
	83414.40100	14.02750
	100240.70000	15.69520
	119804.80000	18.07630
	142820.10000	21.17080
	170000.00000	24.97870
	202057.90000	29.50000
	239707.20000	34.73470
	283661.30000	40.68280
	334633.60000	47.34430
	393337.50000	54.71920
	460486.40000	62.80750
	536793.70000	71.60920
	622972.80000	81.12430
		91.35280

MINIMUM AVERAGE COST DEPTH
4743. feet

MINIMUM MARGINAL COST DEPTH
3162. feet

POINT OF INFLECTION
65055.31900

MINIMUM AVERAGE COST
13.71468

MINIMUM MARGINAL COST
12.82290

Table 17

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR GAS WELLS IN SOUTH LOUISIANA

$$\hat{Y} = 20 - 0.25(10^{-2})X_1 + 0.22(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	1156.	1336336.	16.5000	17.4281	-0.9281
2	2207.	4870849.	15.6000	15.6140	-0.0140
3	3457.	11950849.	14.8500	14.0926	0.7574
4	4708.	22165264.	14.3000	13.2622	1.0378
5	6879.	47320641.	13.3700	13.4645	-0.0945
6	9327.	86992929.	15.9900	16.1940	-0.2040
7	11409.	130165281.	19.1300	20.6019	-1.4719
8	13952.	197329152.	29.4500	28.5876	0.8624
9	16633.	269164172.	40.1600	40.1050	0.0550

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.19987895E 02	0.91288817E 00	0.21895229E 02	0.09999999E 01	0.
-0.24700807E-02	0.26293816E-03	-0.93941503E 01	0.77475555E 04	0.82127405E 00
0.22121986E-06	0.14754975E-07	0.14992899E 02	0.86235237E 08	0.93116445E 00

RSQ = 0.9915
R = 0.9958
F(2, 6)= 351.5016
SUMUSQ = 5.4761
DURBIN-W.= 1.9196

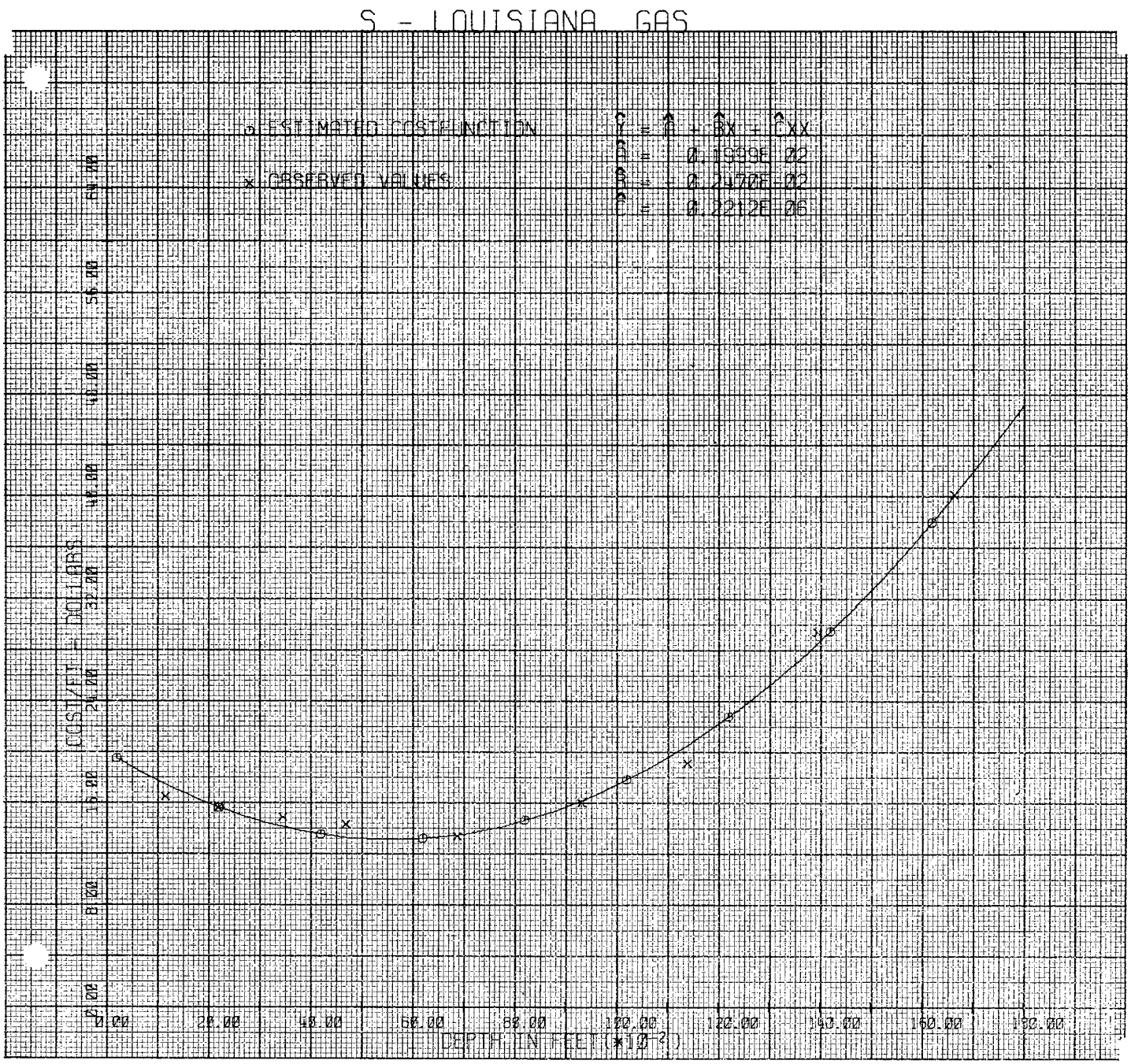

S - LOUISIANA GAS
ESTIMATED COST FUNCTION
OBSERVED VALUES
Ŷ = Â + B̂X + ĈXX
Â = 0.1939E 02
B̂ = 0.2472E-02
Ĉ = 0.2212E-06
COST/FT. - DOLLARS
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (×10⁻²)

Table 17a

TOTAL AND MARGINAL DRILLING COSTS FOR GAS WELLS IN SOUTH LOUISIANA

(in dollars)

DEPTH
18000. feet
TOTAL COST
17741.20000
31869.60000
43712.40000
54596.80100
65850.00000
78799.20000
94771.60100
115094.40000
141094.80000
174100.00000
215437.20000
266433.60000
328416.40000
402712.80000
490650.00000
593555.20000
712755.61000
849578.41000
MINIMUM AVERAGE COST DEPTH
5583. feet
MINIMUM MARGINAL COST DEPTH
3722. feet
MARGINAL COST
15.71360
12.76440
11.14240
10.84760
11.88000
14.23960
17.92640
22.94040
29.28160
36.95000
45.94560
56.26840
67.91840
80.89560
95.20000
110.83160
127.79040
146.07640
POINT OF INFLECTION
73110.48900
MINIMUM AVERAGE COST
13.09477
MINIMUM MARGINAL COST
10.79636

Table 18

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN SOUTH LOUISIANA

$$\hat{Y} = 14.30 - 0.26(10^{-2})X_1 + 0.23(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	767.	588289.	11.3500	12.4427	-1.0927
2	1872.	3504384.	9.6400	10.2058	-0.5658
3	3018.	9108324.	10.3500	8.4712	1.8788
4	4288.	18386944.	7.4000	7.2453	0.1547
5	6187.	38278969.	7.1800	6.7778	0.4022
6	8750.	76562500.	9.1500	8.7421	0.4079
7	11611.	167407660.	13.0500	14.4562	-1.4062
8	13550.	191801250.	19.6700	20.4410	-0.7710
9	16411.	267330230.	33.3800	32.3880	0.9920

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.14321256E 02	0.10611146E 01	0.13496427E 02	0.09999999E 01	0.
-0.26232614E-02	0.32528242E-03	-0.80645654E 01	0.73837777E 04	0.77349409E 00
0.22693018E-06	0.18878084E-07	0.12020827E 02	0.81574238E 08	0.90021742E 00

RSQ = 0.9840
R = 0.9920
F(2, 6)= 184.3259
SUMUSQ = 8.9522
DURBIN-W.= 1.7974

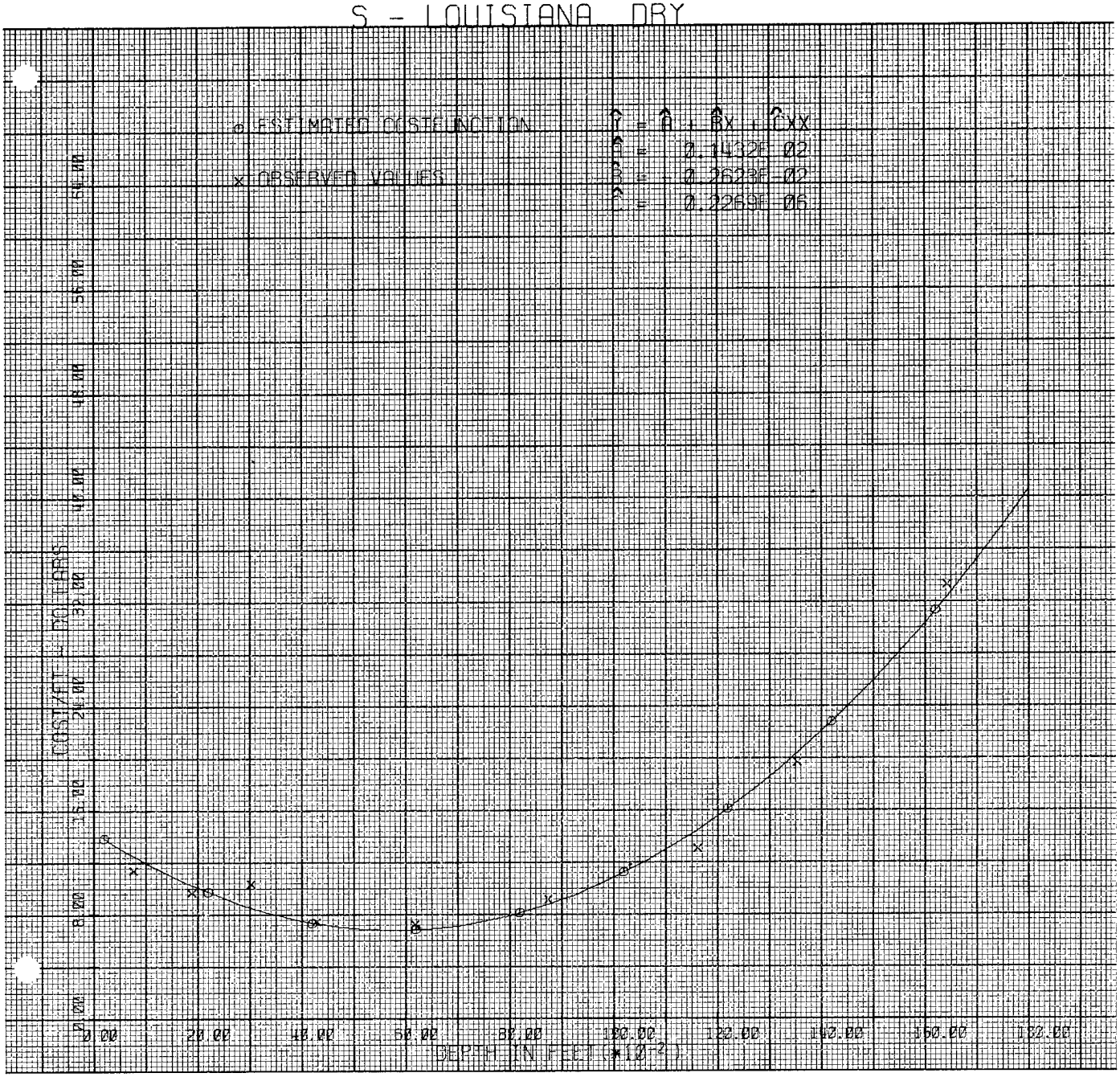

S - LOUISIANA DRY
ESTIMATED COST FUNCTION
OBSERVED VALUES
Ŷ = Â + B̂X + ĈXX
Â = 2.1432E 02
B̂ = -2.2623E-02
Ĉ = 2.2269E-06
COST/FT - DOLLARS
DEPTH IN FEET (*10^-2)
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
8.000
16.00
24.00
32.00
40.00
48.00
56.00

Table 18 a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN SOUTH LOUISIANA

(in dollars)

DEPTH
18000. feet
TOTAL COST
11923.90000
19963.20000
25479.30000
29833.60000
34387.50000
40502.40100
49539.70100
62860.80100
81827.10200
107800.00000
142140.90000
186211.20000
241372.30000
308985.60000
390412.50000
487014.41000
600152.70000
731188.82000
MINIMUM AVERAGE COST DEPTH
5780.feet
MINIMUM MARGINAL COST DEPTH
3853. feet
MARGINAL COST
9.75470
6.55080
4.70830
4.22720
5.10750
7.34920
10.95230
15.91680
22.24270
29.93000
38.97870
49.38880
61.16030
74.29320
88.78750
104.64320
121.86030
140.43880
POINT OF INFLECTION
38954.41700
MINIMUM AVERAGE COST
6.73943
MINIMUM MARGINAL COST
4.21257

Table 19

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN MICHIGAN

$\hat{Y} = 9 - 0.23(10^{-2})X_1 + 0.44(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	830.	688900.	7.0500	7.3901	-0.3401
2	1829.	3345241.	6.5500	6.2708	0.2792
3	3069.	9418761.	6.5200	6.1010	0.4190
4	4338.	18818244.	7.1600	7.3256	-0.1656
5	6157.	37908649.	11.2000	11.5482	-0.3482
6	8657.	74943649.	22.2500	22.0943	0.1557

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.89867935E 01	0.53324708E 00	0.16852963E 02	0.09999999E 01	0.
-0.22882996E-02	0.27413914E-03	-0.83472192E 01	0.41466666E 04	0.87588058E 00
0.43922728E-06	0.28082716E-07	0.15640483E 02	0.24187240E 08	0.96522795E 00

RSQ = 0.9972
R = 0.9986
F(2, 3)= 530.2631
SUMUSQ = 0.5421
DURBIN-W.= 1.9039

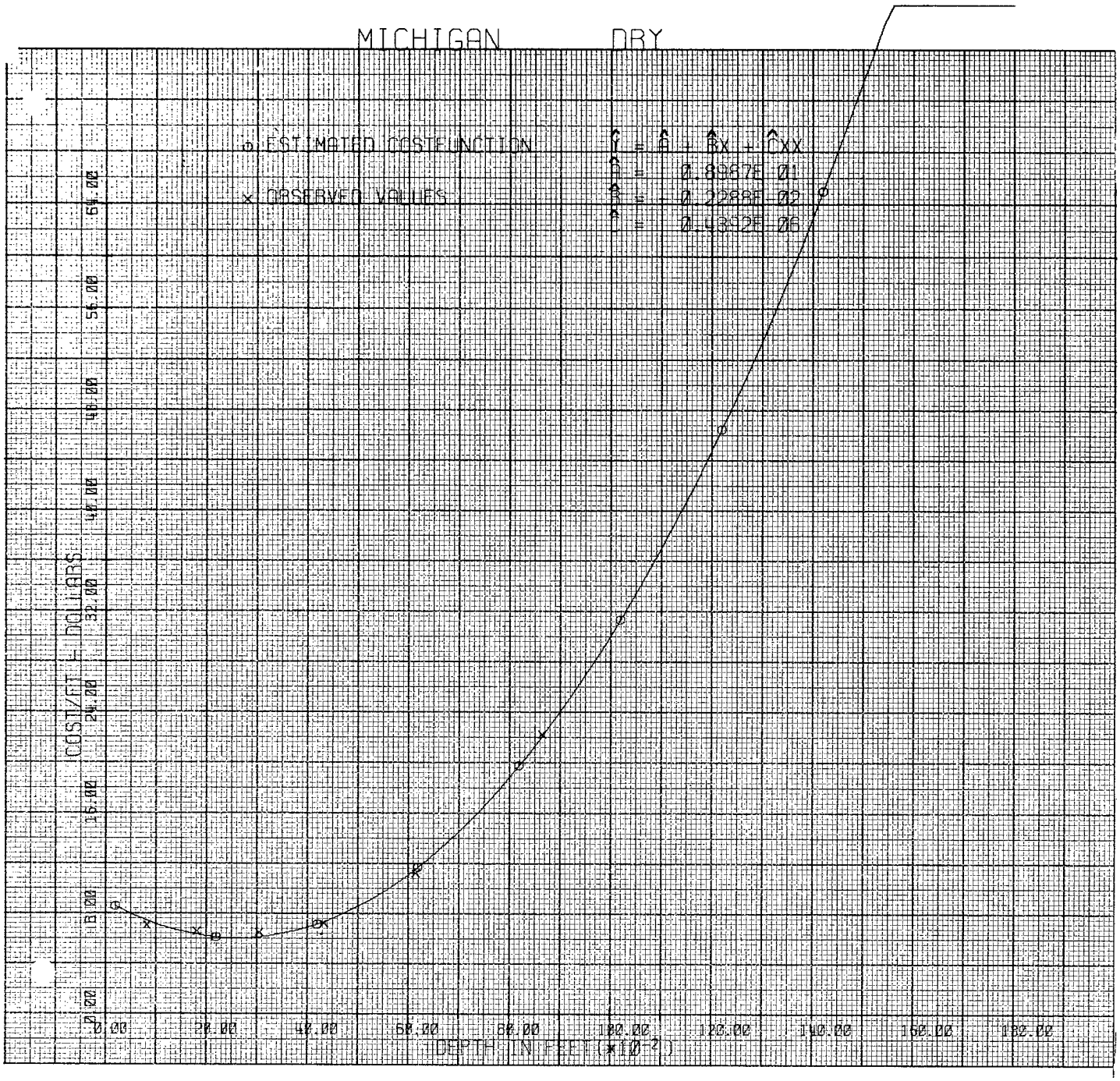

MICHIGAN DRY
ø ESTIMATED COST FUNCTION
× OBSERVED VALUES
Ŷ = Â + B̂X + ĈXX
Â = Ø.89875E Ø1
B̂ = -Ø.2288E Ø2
Ĉ = Ø.4312E Ø6
COST/FT. DOLLARS
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10⁻²)

Table 19a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN MICHIGAN

(in dollars)

DEPTH	TOTAL COST	MARGINAL COST
18000. feet		
	7138.20000	
	12335.60000	5.72860
	18227.40000	5.10540
	27448.80000	7.11740
	42635.00100	11.76460
	66421.20100	19.04700
	101442.60000	28.96460
	150334.40000	41.51740
	215731.80000	56.70540
	300270.01000	74.52860
	406584.20000	94.98700
	537309.61000	118.08060
	695081.41000	143.80940
	882534.81000	172.17340
	1102305.00000	203.17260
	1357027.20000	236.80700
	1649336.60000	273.07660
	1981868.40000	311.98140
		353.52140

MINIMUM AVERAGE COST DEPTH
2605. feet

MINIMUM MARGINAL COST DEPTH
1736. feet

POINT OF INFLECTION
15647.12300

MINIMUM AVERAGE COST
6.00718

MINIMUM MARGINAL COST
5.01391

Table 20

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN MISSISSIPPI

$$\hat{Y} = 20 - 0.31(10^{-2})X_1 + 0.21(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	4632.	21455424.	9.3300	9.9412	-0.6112
2	6754.	45616516.	8.7700	8.4047	0.3653
3	9034.	81613156.	10.0100	8.8991	1.1109
4	11557.	133564249.	12.0300	12.0362	-0.0062
5	14345.	162889512.	16.4200	18.6677	-2.2477
6	16303.	232893904.	26.7000	25.3112	1.3888

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.19981811E 02	0.52512776E 01	0.38051333E 01	0.09999999E 01	0.
-0.31577088E-02	0.11098828E-02	-0.28450829E 01	0.10437500E 05	0.86967392E 00
0.21374012E-06	0.52177312E-07	0.40964187E 01	0.12563603E 09	0.92915692E 00

RSQ = 0.9630
R = 0.9813
F(2, 3)= 39.0895
SUMUSQ = 8.7221
DURBIN-W.= 2.4084

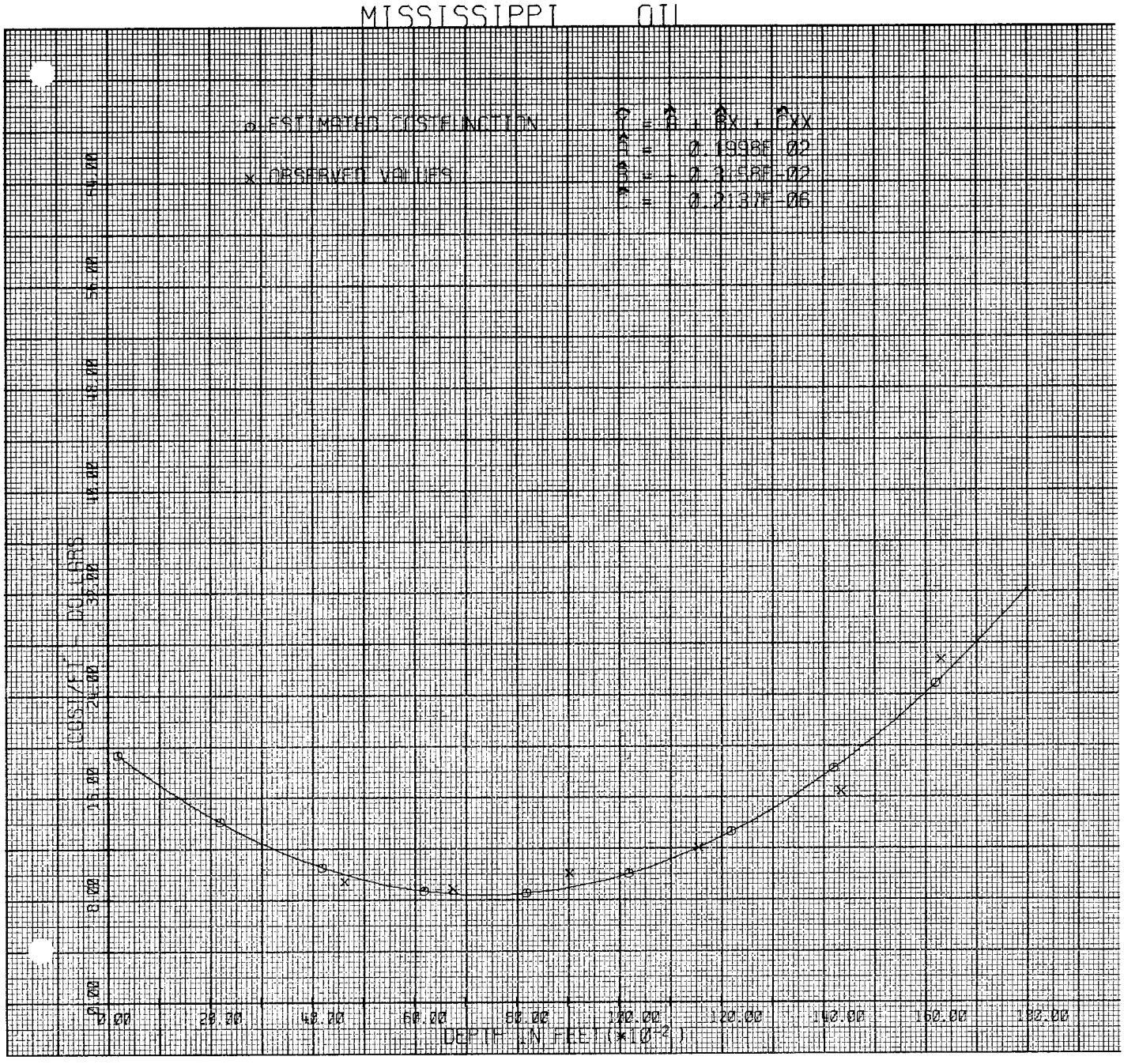

MISSISSIPPI OIL
o ESTIMATED COST FUNCTION
x OBSERVED VALUES
$\hat{Y} = \hat{B} + \hat{B}X + \hat{C}XX$
$\hat{B}$ = Ø.1998E Ø2
$\hat{B}$ = -Ø.3.58E-Ø2
$\hat{C}$ = Ø.213ZE-Ø6
COST/FT DOLLARS
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10^-2)

Table 20a

TOTAL AND MARGINAL DRILLING COSTS FOR OIL WELLS IN MISSISSIPPI

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	17035.70000
	29037.60000
	37287.90000
	43068.80000
	47662.50000
	52351.20000
	58417.10000
	67142.40100
	79809.30100
	97700.00000
	122096.70000
	154281.60000
	195536.90000
	247144.80000
	310387.50000
	386547.20000
	476906.11000
	582746.41000
MINIMUM AVERAGE COST DEPTH	
7389. feet	
MINIMUM MARGINAL COST DEPTH	
4926. feet	
MARGINAL COST	
	14.30510
	9.91240
	6.80190
	4.97360
	4.42750
	5.16360
	7.18190
	10.48240
	15.06510
	20.93000
	28.07710
	36.50640
	46.21790
	57.21160
	69.48750
	83.04560
	97.88590
	114.00840
POINT OF INFLECTION	
61423.51000	
MINIMUM AVERAGE COST	
8.31299	
MINIMUM MARGINAL COST	
4.42398	

Table 21

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR GAS WELLS IN MISSISSIPPI

$$\hat{Y} = 15.80 - 0.30(10^{-2})X_1 + 0.25(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	2789.	7778521.	8.6000	9.3148	-0.7148
2	4830.	23328900.	7.4500	7.0182	0.4318
3	5310.	28196100.	7.2600	6.7795	0.4805
4	8057.	64915249.	7.9500	7.6222	0.3278
5	10786.	116337796.	12.3000	12.1825	0.1175
6	13590.	192344050.	19.3400	20.7332	-1.3932
7	16500.	268062500.	34.5000	33.7496	0.7504

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.15809097E 02	0.16335370E 01	0.96778321E 01	0.09999999E 01	0.
-0.30233748E-02	0.40200010E-03	-0.75208309E 01	0.88374285E 04	0.88199981E 00
0.24913208E-06	0.20519195E-07	0.12141415E 02	0.99642094E 08	0.95455401E 00

RSQ = 0.9941
R = 0.9971
F(2, 4)= 338.9050
SUMUSQ = 3.5535
DURBIN-W.= 2.3249

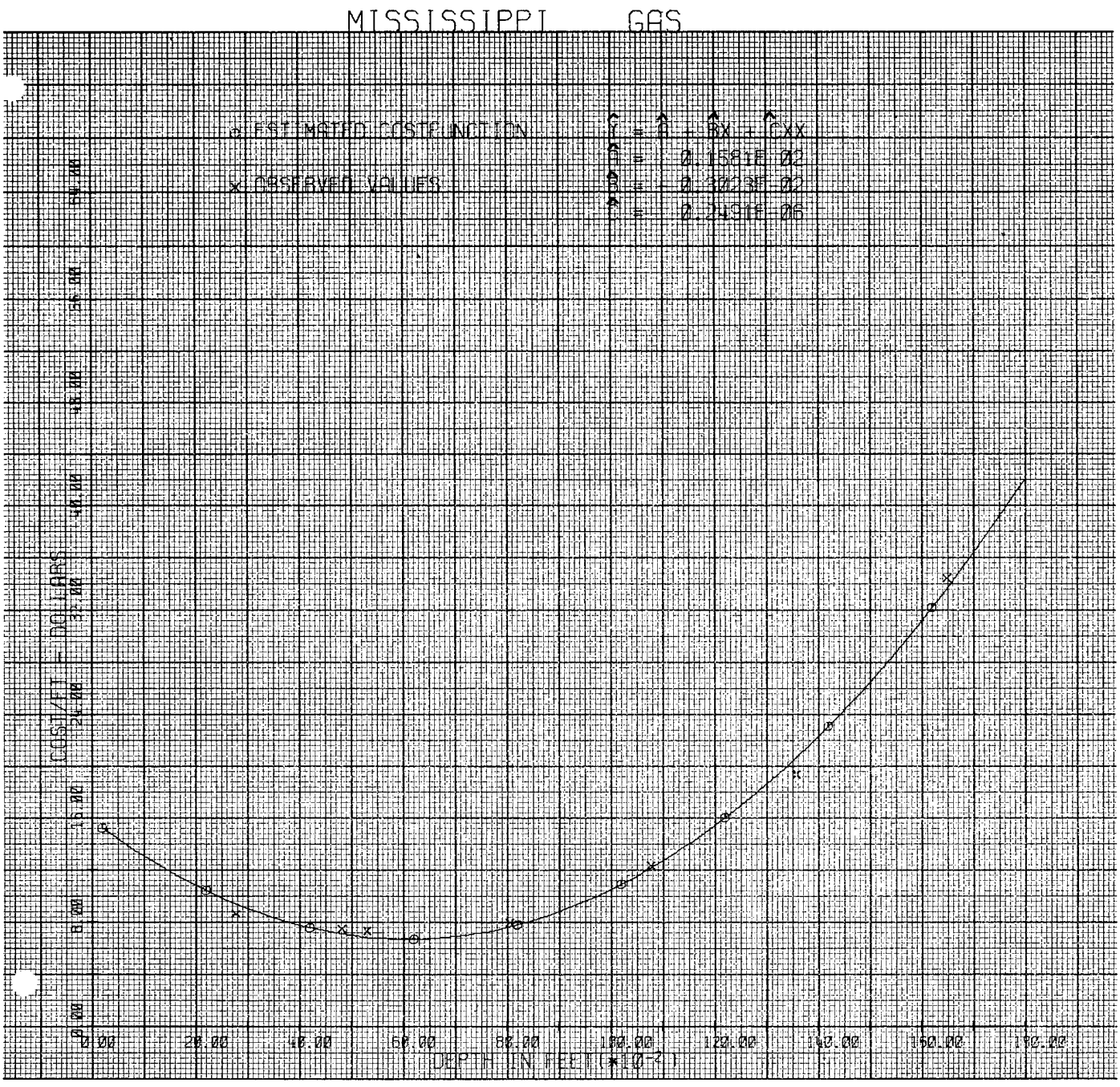

MISSISSIPPI GAS
ESTIMATED COST FUNCTION
OBSERVED VALUES
Ĉ = Â + B̂X + ĈXX
Â = 0.1581E 02
B̂ = -0.3023E 02
Ĉ = 0.2491E-06
COST/FT. F DOLLARS
DEPTH IN FEET (*10-2)

Table 21a

TOTAL AND MARGINAL DRILLING COSTS FOR GAS WELLS IN MISSISSIPPI

(in dollars)

```
   DEPTH
    18000. feet
  TOTAL COST
          13036.10000
          21520.80000
          26948.70000
          30814.40000
          34612.50000
          39837.59900
          47984.29800
          60547.19900
          79020.89900
         104900.00000
         139679.10000
         184852.80000
         241915.70000
         312362.39000
         397687.49000
         499385.60000
         618951.31000
         757879.19000
MINIMUM AVERAGE COST DEPTH
                6068.feet
MINIMUM MARGINAL COST DEPTH
                4045. feet
MARGINAL COST
             10.51130
              6.70720
              4.39770
              3.58280
              4.26250
              6.43680
             10.10570
             15.26920
             21.92730
             30.08000
             39.72730
             50.86920
             63.50570
             77.63680
             93.26250
            110.38280
            128.99770
            149.10720
POINT OF INFLECTION
          40281.10200
MINIMUM AVERAGE COST
              6.63845
MINIMUM MARGINAL COST
              3.58127
```

Table 22

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN MISSISSIPPI

$$\hat{Y} = 9.16 - 0.73(10^{-2})X_1 + 0.11(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	933.	870489.	8.8500	8.0306	0.8194
2	1899.	3606201.	7.4000	7.0613	0.3387
3	3149.	9916201.	5.9000	6.1180	-0.2180
4	4411.	19456921.	4.8700	5.5216	-0.6516
5	6331.	40081561.	4.2200	5.3001	-1.0801
6	8798.	77404804.	5.3700	6.2307	-0.8607
7	11226.	126023076.	8.3200	8.4808	-0.1608
8	13763.	194710084.	16.3300	12.2462	4.0838
9	16663.	269413892.	16.0500	18.3206	-2.2706

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.91657085E 01	0.18142848E 01	0.50519677E 01	0.09999999E 01	0.
-0.13213772E-02	0.53833065E-03	-0.24545828E 01	0.74636666E 04	0.71780948E 00
0.11227234E-06	0.30572493E-07	0.36723319E 01	0.82714998E 08	0.83717223E 00

RSQ = 0.8507
R = 0.9224
F(2, 6)= 17.0991
SUMUSQ = 25.0244
DURBIN-W.= 2.3915

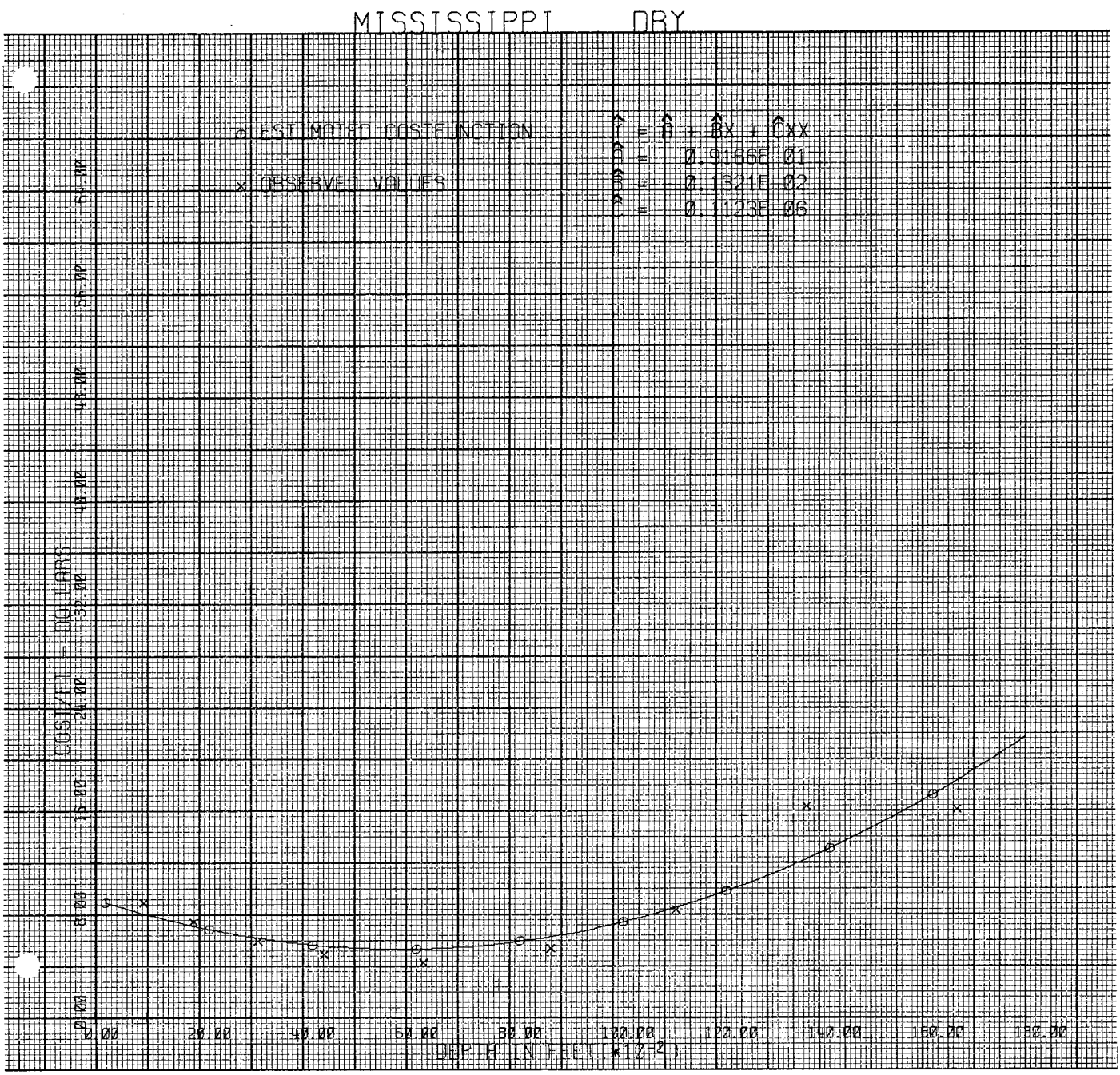

MISSISSIPPI DRY
ESTIMATED COSTFUNCTION
OBSERVED VALUES
$\hat{C} = \hat{A} + \hat{B}x + \hat{C}xx$
$\hat{A}$ = 0.9166E 01
$\hat{B}$ = 0.1321E 02
$\hat{C}$ = 0.1123E 06
COST/FT. - DOLLARS
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10-2)

Table 22a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN MISSISSIPPI

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	7957.30000
	13946.40000
	18641.10000
	22715.20000
	26842.50000
	31696.80000
	37951.89900
	46281.59900
	57359.69900
	71859.99900
	90456.29900
	113822.40000
	142632.10000
	177559.20000
	219277.50000
	268460.80000
	325782.90000
	391917.60000
MINIMUM AVERAGE COST DEPTH	
	5850. feet
MINIMUM MARGINAL COST DEPTH	
	3921. feet
MARGINAL COST	
	6.86090
	5.22960
	4.27210
	3.98840
	4.37850
	5.44240
	7.18010
	9.59160
	12.67690
	16.43600
	20.86890
	25.97560
	31.75610
	38.21040
	45.33850
	53.14040
	61.61610
	70.76560
POINT OF INFLECTION	
	31061.87900
MINIMUM AVERAGE COST	
	5.28122
MINIMUM MARGINAL COST	
	3.98630

Table 23

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN MONTANA

$\hat{Y} = 13.60 - 0.14(10^{-2})X_1 + 0.16(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	2021.	4084441.	11.8800	11.3876	0.4924
2	2946.	8678916.	10.5100	10.8083	-0.2983
3	4727.	22344529.	9.6700	10.4568	-0.7868
4	6475.	41925625.	11.5700	11.0897	0.4803
5	8738.	76352644.	13.5800	13.3479	0.2321
6	12836.	182381448.	21.4500	21.5695	-0.1195

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.13597228E 02	0.10186199E 01	0.13348676E 02	0.09999999E 01	0.
-0.14136806E-02	0.33179527E-03	-0.42607014E 01	0.62904999E 04	0.86654340E 00
0.15852043E-06	0.21943840E-07	0.72239147E 01	0.53024841E 08	0.95105937E 00

RSQ = 0.9865
R = 0.9932
F(2, 3)= 109.2674
SUMUSQ = 1.2493
DURBIN-W.= 2.1249

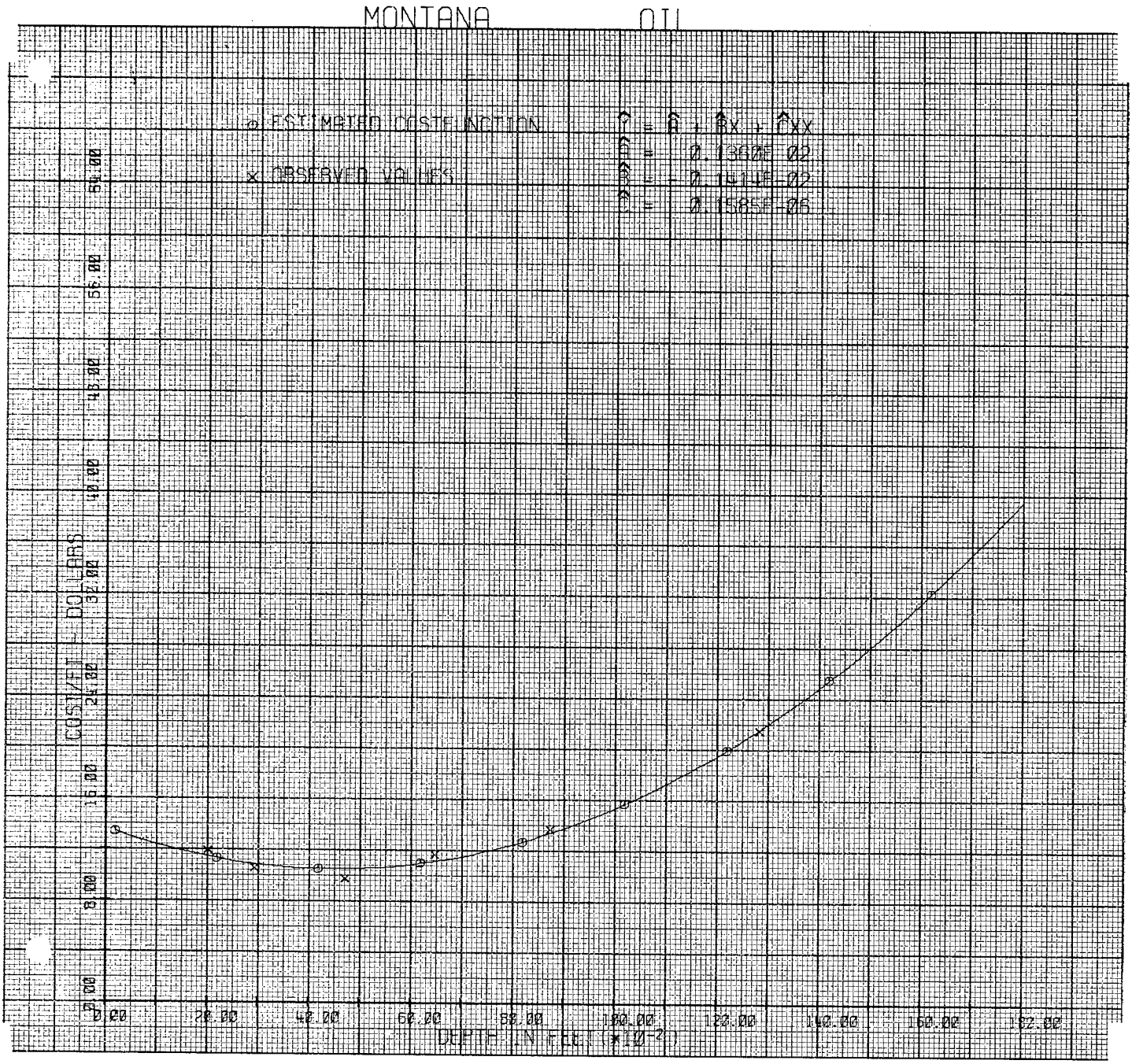

MONTANA OIL
ø ESTIMATED COST FUNCTION
x OBSERVED VALUES
$\hat{Y} = \hat{A} + \hat{B}X + \hat{C}XX$
$\hat{A}$ = 0.1360E 02
$\hat{B}$ = -0.1414E-02
$\hat{C}$ = 0.1585E-06
COST/FT - DOLLARS
DEPTH IN FEET (*10-2)
0.00
8.000
16.00
24.00
32.00
40.00
48.00
56.00
64.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00

Table 23a

TOTAL AND MARGINAL DRILLING COSTS FOR OIL WELLS IN MONTANA

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	12344.50000
	22812.00000
	32353.50000
	41920.00000
	52462.50000
	64932.00100
	80279.50100
	99456.00100
	123412.50000
	153100.00000
	189469.50000
	233472.00000
	286058.50000
	348180.00000
	420787.51000
	504832.01000
	601264.51000
	711036.02000
MINIMUM AVERAGE COST DEPTH	
	4461. feet
MINIMUM MARGINAL COST DEPTH	
	2974. feet
MARGINAL COST	
	11.24750
	9.84600
	9.39550
	9.89600
	11.34750
	13.75000
	17.10350
	21.40800
	26.66350
	32.87000
	40.02750
	48.13600
	57.19550
	67.20600
	78.16750
	90.08000
	102.94350
	116.75800
POINT OF INFLECTION	
	46596.78000
MINIMUM AVERAGE COST	
	10.44638
MINIMUM MARGINAL COST	
	9.39517

Table 24

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN MONTANA

$\hat{Y} = 11.40 - 0.22(10^{-2})X_1 + 0.24(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	817.	667489.	10.7900	9.7501	1.0399
2	2063.	4255969.	7.0100	7.8935	-0.8835
3	2915.	8497225.	5.9800	7.0476	-1.0676
4	4439.	19704721.	6.5400	6.3930	0.1470
5	6010.	36120100.	7.7200	6.8706	0.8494
6	8533.	72812089.	10.7400	10.0862	0.6538
7	10815.	116964225.	14.4500	15.5937	-1.1437
8	12648.	179985952.	22.2100	21.8054	0.4046

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.11367012E 02	0.10909040E 01	0.10419808E 02	0.09999999E 01	0.
-0.21727429E-02	0.41103370E-03	-0.52860457E 01	0.60300000E 04	0.79376312E 00
0.23703717E-06	0.29775370E-07	0.79608471E 01	0.52374215E 08	0.90651380E 00

RSQ = 0.9729
R = 0.9864
F(2, 5)= 89.9137
SUMUSQ = 5.6439
DURBIN-W.= 2.0142

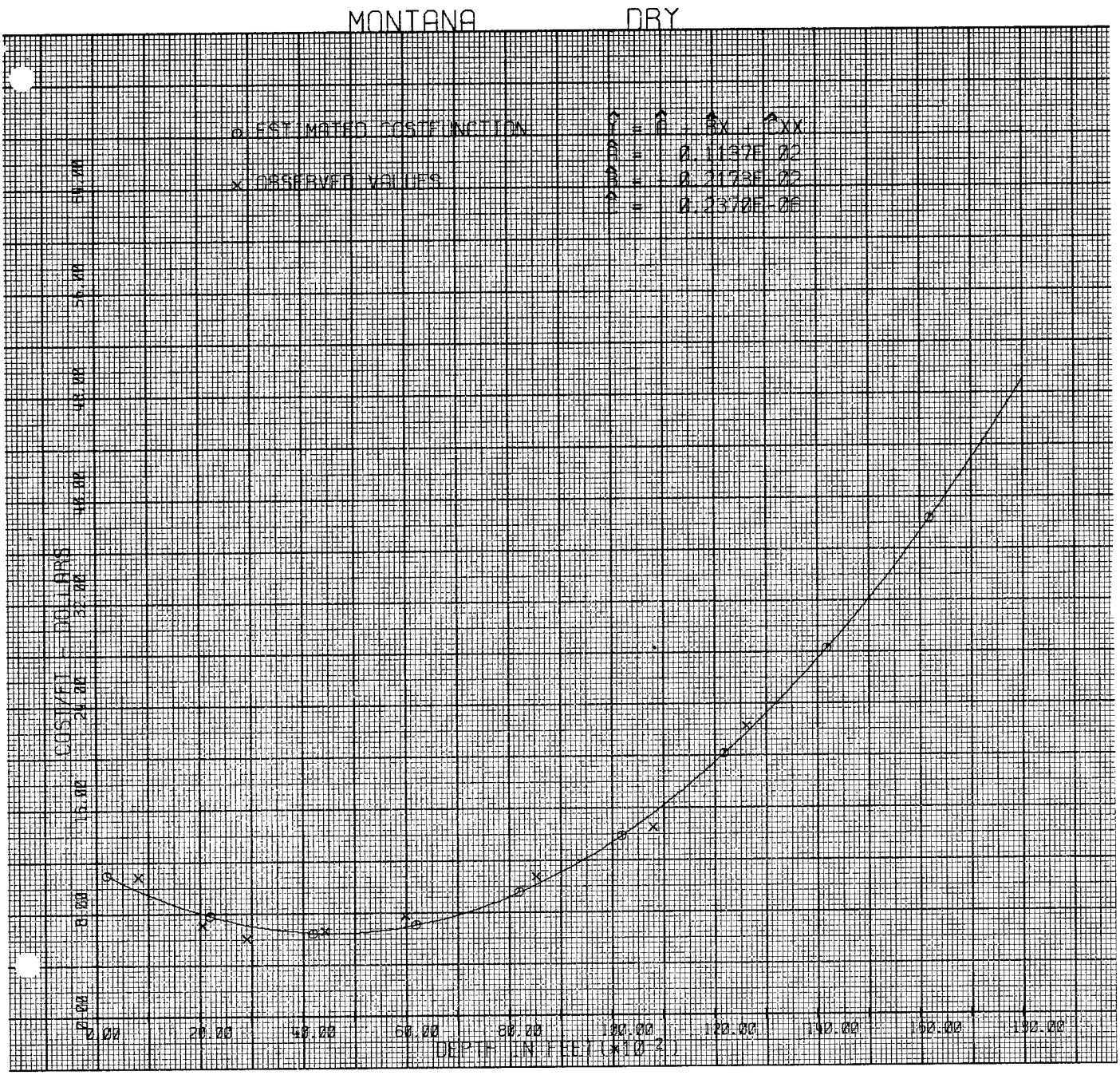

MONTANA DRY
ESTIMATED COST FUNCTION
OBSERVED VALUES
$\hat{Y} = \hat{\beta}_0 + \hat{\beta}_X + \hat{\beta}_{XX}$
$\hat{\beta}_0$ = 0.1137E 02
$\hat{\beta}_X$ = 0.2173E 02
$\hat{\beta}_{XX}$ = 0.2370E-06
COST/FT - DOLLARS
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
72.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (X10-2)

Table 24a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN MONTANA

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	9433.99990
	15944.00000
	20952.00000
	25880.00000
	32150.00100
	41184.00100
	54404.00100
	73232.00000
	99090.00200
	133400.00000
	177584.00000
	233064.00000
	301262.00000
	383600.01000
	481500.01000
	596384.00000
	729674.01000
	882792.01000
MINIMUM AVERAGE COST DEPTH	
4584. feet	
MINIMUM MARGINAL COST DEPTH	
3056. feet	
MARGINAL COST	
	7.73500
	5.52200
	4.73100
	5.36200
	7.41500
	10.89000
	15.78700
	22.10600
	29.84700
	39.01000
	49.59500
	61.60200
	75.03100
	89.88200
	106.15500
	123.85000
	142.96700
	163.50600
POINT OF INFLECTION	
29289.94200	
MINIMUM AVERAGE COST	
6.38906	
MINIMUM MARGINAL COST	
4.72875	

Table 25

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN EAST NEW MEXICO

$\hat{Y} = 20 - 0.26(10^{-2})X_1 + 0.20(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	839.	703921.	19.2800	17.8047	1.4753
2	1958.	3833764.	15.2800	15.5295	-0.2495
3	3267.	10673289.	12.4700	13.4976	-1.0276
4	4446.	19766916.	10.2600	12.2486	-1.9886
5	6509.	42367081.	12.2000	11.3882	0.8118
6	9047.	81848209.	13.8600	12.6429	1.2171
7	11324.	128232976.	16.6900	15.9406	0.7494
8	13495.	191057512.	20.0100	20.9979	-0.9879

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.19835980E 02	0.14740152E 01	0.13457106E 02	0.09999999E 01	0.
-0.25873333E-02	0.52562203E-03	-0.49224216E 01	0.63606250E 04	0.29467937E-00
0.19810522E-06	0.36019492E-07	0.54999449E 01	0.58692648E 08	0.49271436E-00

RSQ = 0.8705
R = 0.9330
F(2, 5)= 16.8007
SUMUSQ = 10.9272
DURBIN-W.= 1.4411

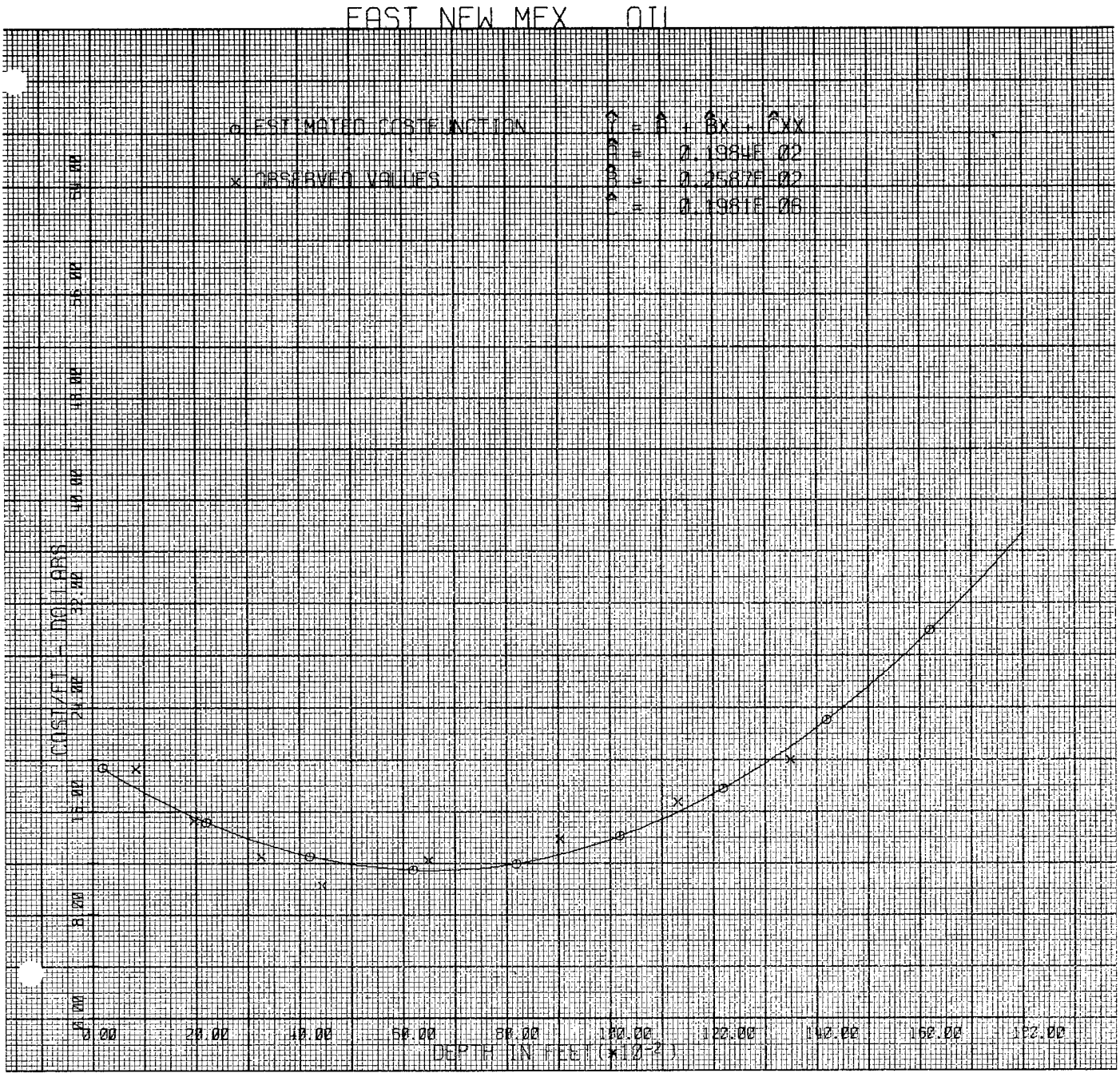

EAST NEW MEX OIL
o ESTIMATED COST FUNCTION
x OBSERVED VALUES
Ĉ = Â + B̂X + ĈXX
Â = Ø.1984E Ø2
B̂ = -Ø.2587E Ø2
Ĉ = Ø.1981E Ø6
COST/FT. DOLLARS
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (×10⁻²)

Table 25a

TOTAL AND MARGINAL DRILLING COSTS FOR OIL WELLS IN EAST NEW MEXICO

(in dollars)

DEPTH	TOTAL COST	MARGINAL COST
1800Ø. feet	17451.10000	15.26030
	30916.80000	11.86920
	41585.70000	9.66670
	50646.40000	8.65280
	59287.50000	8.82750
	68697.59900	10.19080
	80065.30000	12.74270
	94579.20000	16.48320
	113427.90000	21.41230
	137800.00000	27.53000
	168884.10000	34.83630
	207868.80000	43.33120
	255942.70000	53.01470
	314294.40000	63.88680
	384112.50000	75.94750
	466585.60000	89.19680
	562902.31000	103.63470
	674251.21000	119.26120

MINIMUM AVERAGE COST DEPTH
6530.feet

MINIMUM MARGINAL COST DEPTH
4353. feet

POINT OF INFLECTION
74397.81100

MINIMUM AVERAGE COST
11.39405

MINIMUM MARGINAL COST
8.57874

Table 26

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR GAS WELLS IN EAST NEW MEXICO

$$\hat{Y} = 17.90 - 0.18(10^{-2})X_1 + 0.20(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	1794.	3218436.	17.7500	15.3505	2.3995
2	3044.	9265936.	13.2000	14.3439	-1.1439
3	4294.	18438436.	11.4000	13.9743	-2.5743
4	6003.	36036009.	13.5800	14.4999	-0.9199
5	8346.	69655716.	19.5200	17.1560	2.3640
6	11427.	130576329.	24.9000	24.0556	0.8444
7	14050.	198701250.	32.0100	32.9797	-0.9697

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.17908543E 02	0.32559638E 01	0.55002276E 01	0.09999999E 01	0.
-0.17916169E-02	0.10145777E-02	-0.17658744E 01	0.69940000E 04	0.87080166E 00
0.20386449E-06	0.62919205E-07	0.32400995E 01	0.66370480E 08	0.93879110E 00

RSQ = 0.9333
R = 0.9661
F(2, 4)= 27.9917
SUMUSQ = 21.7808
DURBIN-W.= 1.5483

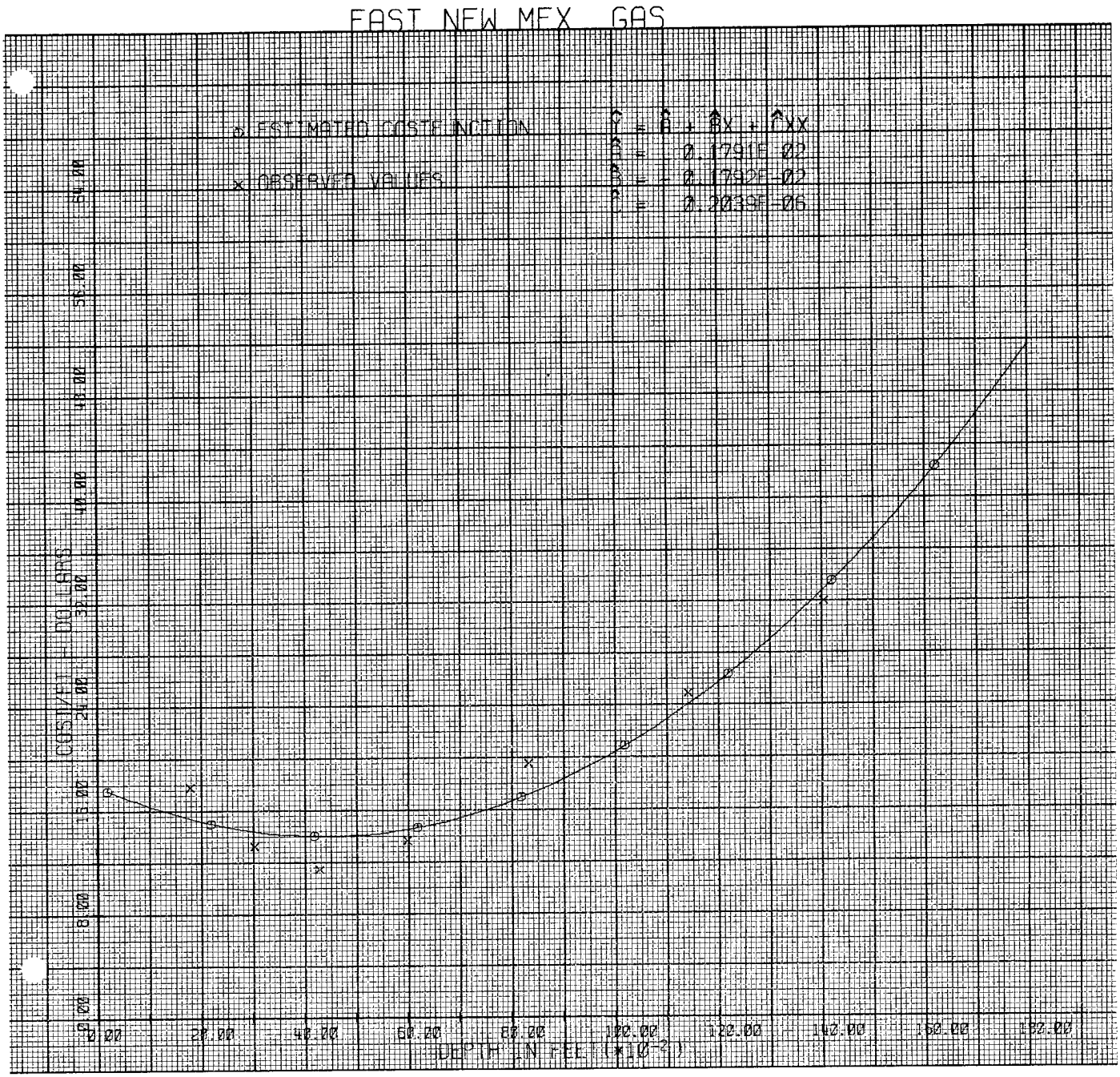

EAST NEW MEX GAS
ESTIMATED COST FUNCTION
OBSERVED VALUES
$\hat{C} = \hat{B} + \hat{B}X + \hat{C}XX$
$\hat{B} = 0.1791E\ 02$
$\hat{C} = -0.1792E-02$
$\hat{C} = 0.2039E-06$
COST/FT - DOLLARS
0.00
8.000
16.00
24.00
32.00
40.00
48.00
56.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10^-2)

Table 26a

TOTAL AND MARGINAL DRILLING COSTS FOR GAS WELLS IN EAST NEW MEXICO

(in dollars)

DEPTH	TOTAL COST	MARGINAL COST
1800Ø. feet	16321.90000	14.93770
	30283.20000	13.18880
	43107.30100	12.66330
	56017.60100	13.36120
	70237.50000	15.28250
	86990.40200	18.42720
	107499.70000	22.79530
	132988.80000	28.38680
	164681.10000	35.20170
	203800.00000	43.24000
	251568.90000	52.50170
	309211.20000	62.98680
	377950.30000	74.69530
	459009.60000	87.62720
	553612.50000	101.78250
	662982.40000	117.16120
	788342.71000	133.76330
	930916.81000	151.58880

MINIMUM AVERAGE COST DEPTH
4394. feet

MINIMUM MARGINAL COST DEPTH
2930. feet

POINT OF INFLECTION
61400.37700

MINIMUM AVERAGE COST
13.97270

MINIMUM MARGINAL COST
12.66026

Table 27

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN EAST NEW MEXICO

$\hat{Y} = 15.90 - 0.22(10^{-2})X_1 + 0.20$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	811.	657721.	14.0200	14.1973	-0.1773
2	1694.	2869636.	11.4100	12.6699	-1.2599
3	3086.	9523396.	11.0600	10.8939	0.1661
4	4309.	18567481.	10.0200	9.9716	0.0484
5	6069.	36832761.	12.6400	9.6921	2.9479
6	8815.	77704225.	11.9100	11.7249	0.1851
7	11075.	122655625.	14.5200	15.6555	-1.1355
8	13603.	192520804.	20.4200	22.4675	-2.0475
9	17649.	277871800.	39.9500	38.6773	1.2727

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.15874351E 02	0.14125227E 01	0.11238297E 02	0.09999999E 01	0.
-0.22296798E-02	0.40207100E-03	-0.55454878E 01	0.74567778E 04	0.79669463E 00
0.19954126E-06	0.21927875E-07	0.90998905E 01	0.85037738E 08	0.92132134E 00

RSQ = 0.9753
R = 0.9876
F(2, 6)= 118.5623
SUMUSQ = 17.4744
DURBIN-W.= 1.8804

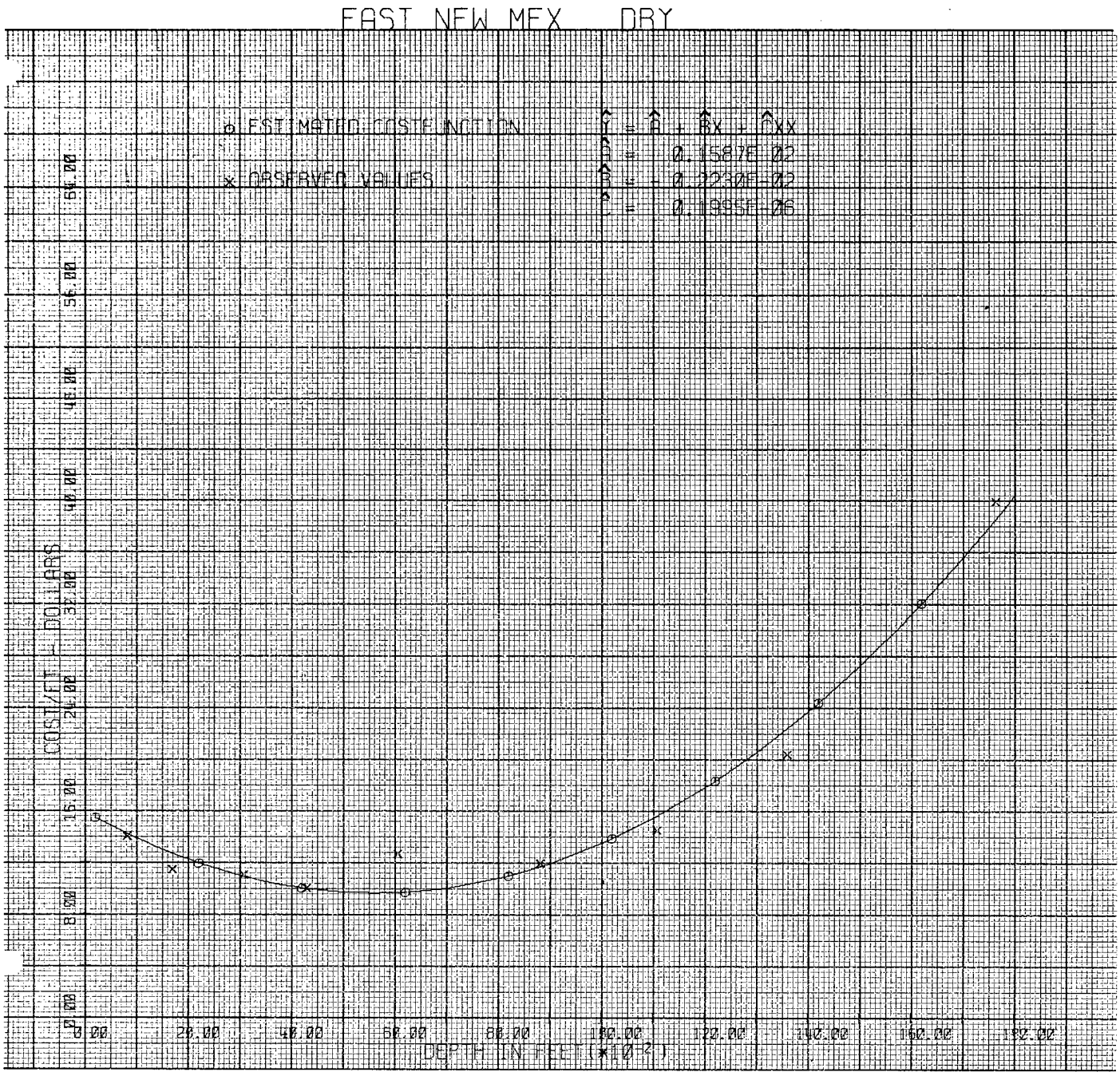

EAST NEW MEX DRY
o ESTIMATED COST FUNCTION
× OBSERVED VALUES
$\hat{Y} = \hat{B} + \hat{B}x + \hat{B}xx$
= 0.1587E 02
= -0.2230E-02
= 0.1995E-06
COST/FT - DOLLARS
64.00
56.00
48.00
40.00
32.00
24.00
16.00
8.000
0.000
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (×10^2)

Table 27a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN EAST NEW MEXICO

(in dollars)

DEPTH
18000. feet
TOTAL COST
13839.50000
24416.00000
32926.50000
40568.00000
48537.50000
58032.00000
70248.49900
86384.00100
107635.50000
135200.00000
170274.50000
214056.00000
267741.50000
332528.00000
409612.50000
500192.00000
605463.51000
726624.00000
MINIMUM AVERAGE COST DEPTH
5589. feet
MINIMUM MARGINAL COST DEPTH
3726. feet
MARGINAL COST
12.00850
9.34400
7.87650
7.60600
8.53250
10.65600
13.97650
18.49400
24.20850
31.12000
39.22850
48.53400
59.03650
70.73600
83.63250
97.72600
113.01650
129.50400
POINT OF INFLECTION
53868.17000
MINIMUM AVERAGE COST
9.63830
MINIMUM MARGINAL COST
7.56106

Table 28

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN WEST NEW MEXICO

$\hat{Y} = 10 + 0.10(10^{-2})X$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X = Depth

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X	Y	$\hat{Y}$	$Y - \hat{Y}$
1	973.	12.5000	10.9555	1.5445
2	1637.	11.4000	11.6296	-0.2296
3	2510.	10.7000	12.5158	-1.8158
4	6660.	17.1500	16.7285	0.4215
5	7854.	18.0200	17.9406	0.0794

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.99678132E 01	0.10850479E 01	0.91865180E 01	0.09999999E 01	0.
0.10151232E-02	0.22530238E-03	0.45056037E 01	0.39268000E 04	0.93340631E 00

RSQ = 0.8712
R = 0.9334
F(1. 3)= 20.3005
SUMUSQ = 5.9191
DURBIN-W.= 1.8222

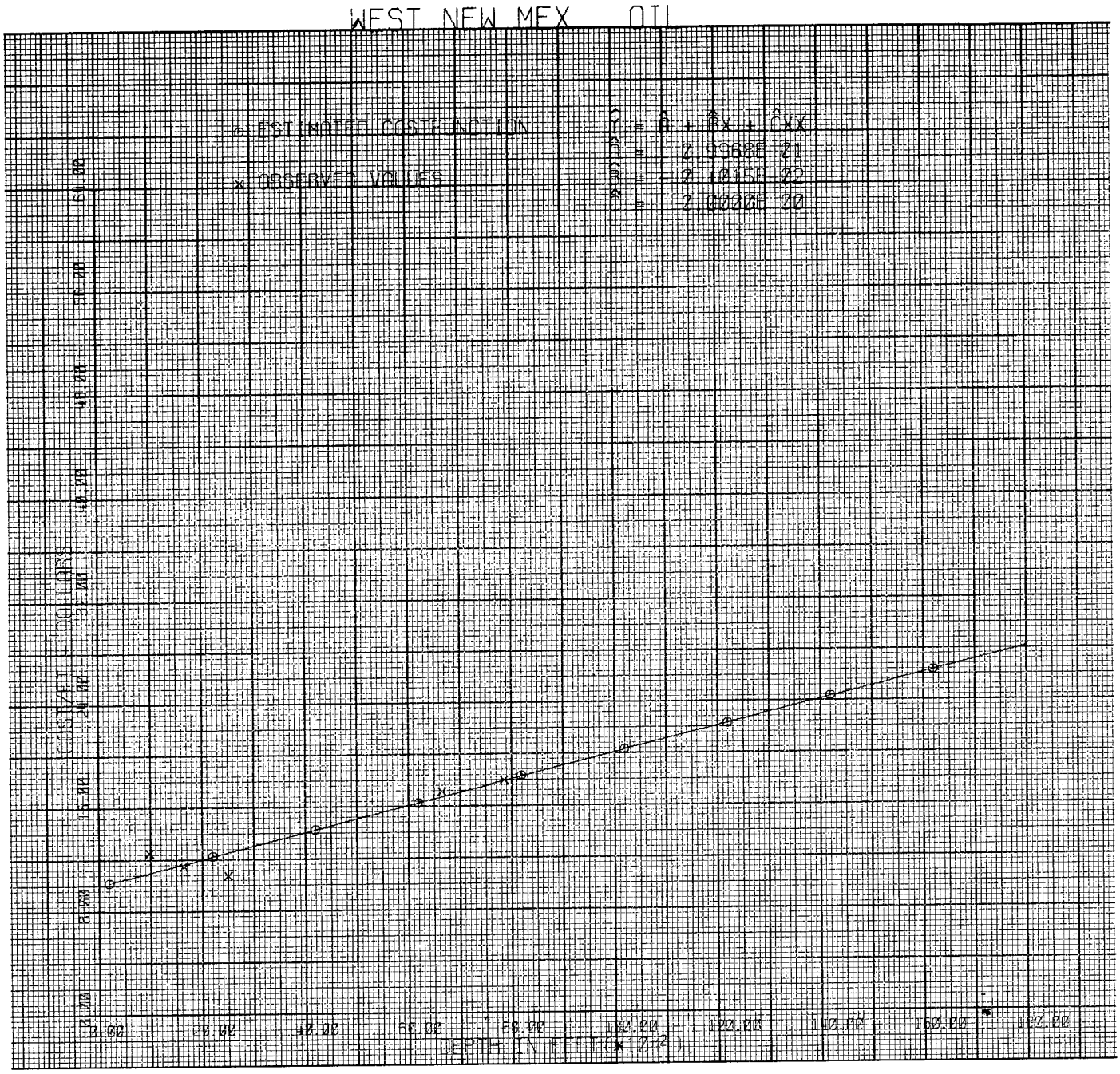

WEST NEW MEX OIL
ESTIMATED COST FUNCTION
OBSERVED VALUES
$\hat{C} = \hat{B} + \hat{B}X + \hat{C}XX$
$\hat{B}$ = 0.9588E 01
$\hat{B}$ = 0.1015E 02
$\hat{C}$ = 0.0202E 00
COST/FT - DOLLARS
DEPTH - IN FEET (X10**2)

Table 29

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR GAS WELLS IN WEST NEW MEXICO

$\hat{Y} = 7.50 + 0.82(10^{-3})X_1$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X = Depth

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X	Y	$\hat{Y}$	$Y - \hat{Y}$
1	2299.	10.5900	9.3531	1.2369
2	3066.	9.2500	9.9814	-0.7314
3	4037.	10.0200	10.7767	-0.7567
4	6654.	12.5100	12.9203	-0.4103
5	7836.	14.5500	13.8885	0.6615

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.74700503E 01	0.11460935E 01	0.65178340E 01	0.09999999E 01	0.
0.81909180E-03	0.21922079E-03	0.37363781E 01	0.47783999E 04	0.90725884E 00

RSQ = 0.8231
R = 0.9073
F(1, 3)= 13.9605
SUMUSQ = 3.2434
DURBIN-W.= 1.5858

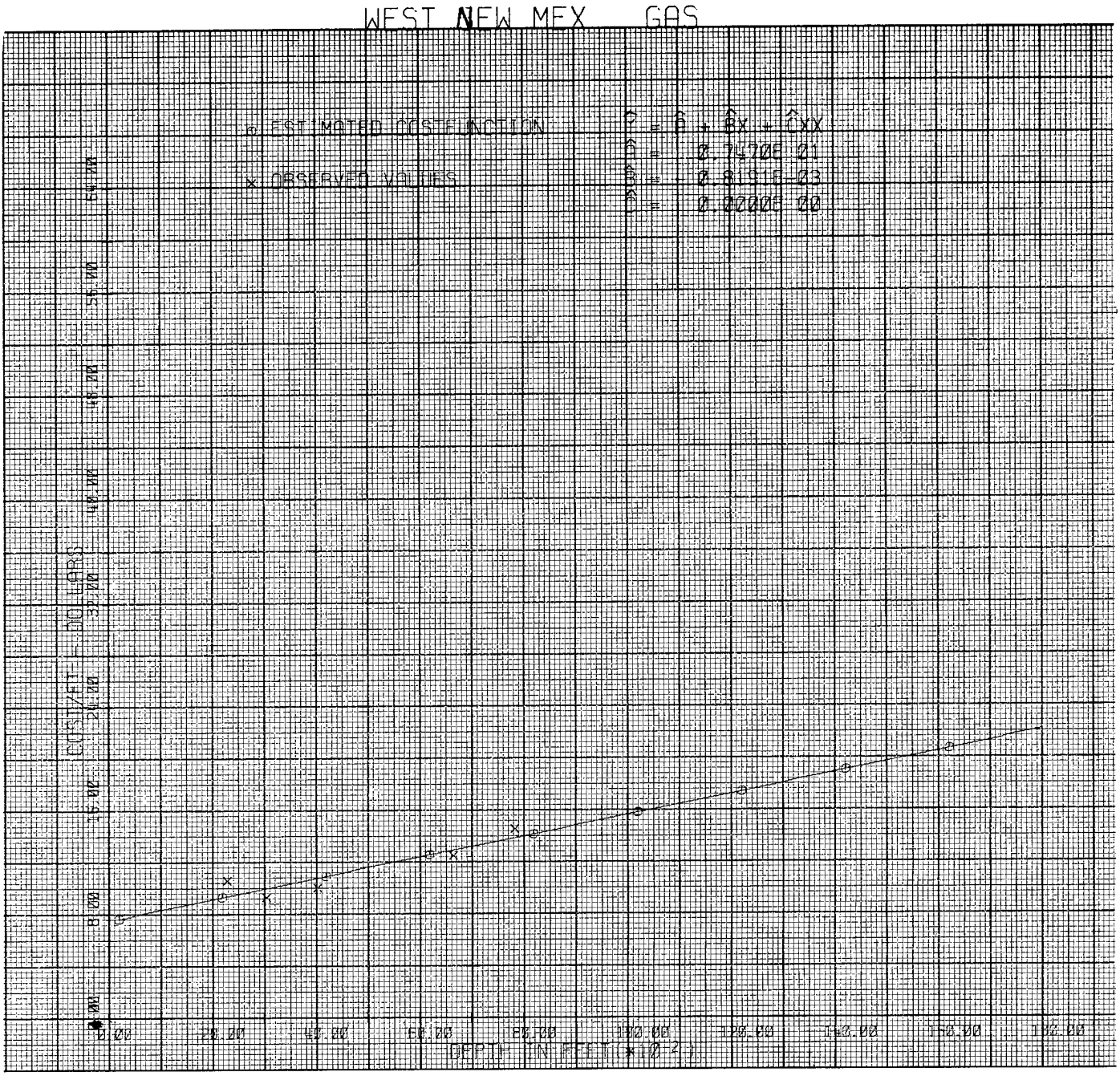

WEST NEW MEX GAS
ESTIMATED COST FUNCTION
X OBSERVED VALUES
$\hat{C} = \hat{\beta} + \hat{\beta}X + \hat{C}XX$
$\hat{\beta}$ = 0.7470E 01
$\hat{\beta}$ = 0.8191E-03
$\hat{C}$ = 0.2000E 00
COST/FT - DOLLARS
DEPTH IN FEET (*10^2)
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00

Table 30

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN WEST NEW MEXICO

$$\hat{Y} = 14.50 - 0.36(10^{-2})X_1 + 0.49(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	857.	734449.	11.7200	11.7756	-0.0556
2	1711.	2927521.	9.3800	9.7559	-0.3759
3	3260.	10627600.	9.1100	7.9152	1.1948
4	4528.	20502784.	7.5000	8.1574	-0.6574
5	6172.	38093584.	10.4500	10.8155	-0.3655
6	7811.	61011721.	16.3600	16.1003	0.2597

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.14520332E 02	0.11317559E 01	0.12829915E 02	0.09999999E 01	0.
-0.36223447E-02	0.63695540E-03	-0.56869674E 01	0.40565000E 04	0.49628913E-00
0.48964477E-06	0.72320512E-07	0.67704826E 01	0.22316276E 08	0.67424250E 00

RSQ = 0.9537
R = 0.9766
F(2, 3)= 30.8999
SUMUSQ = 2.2052
DURBIN-W.= 2.9370

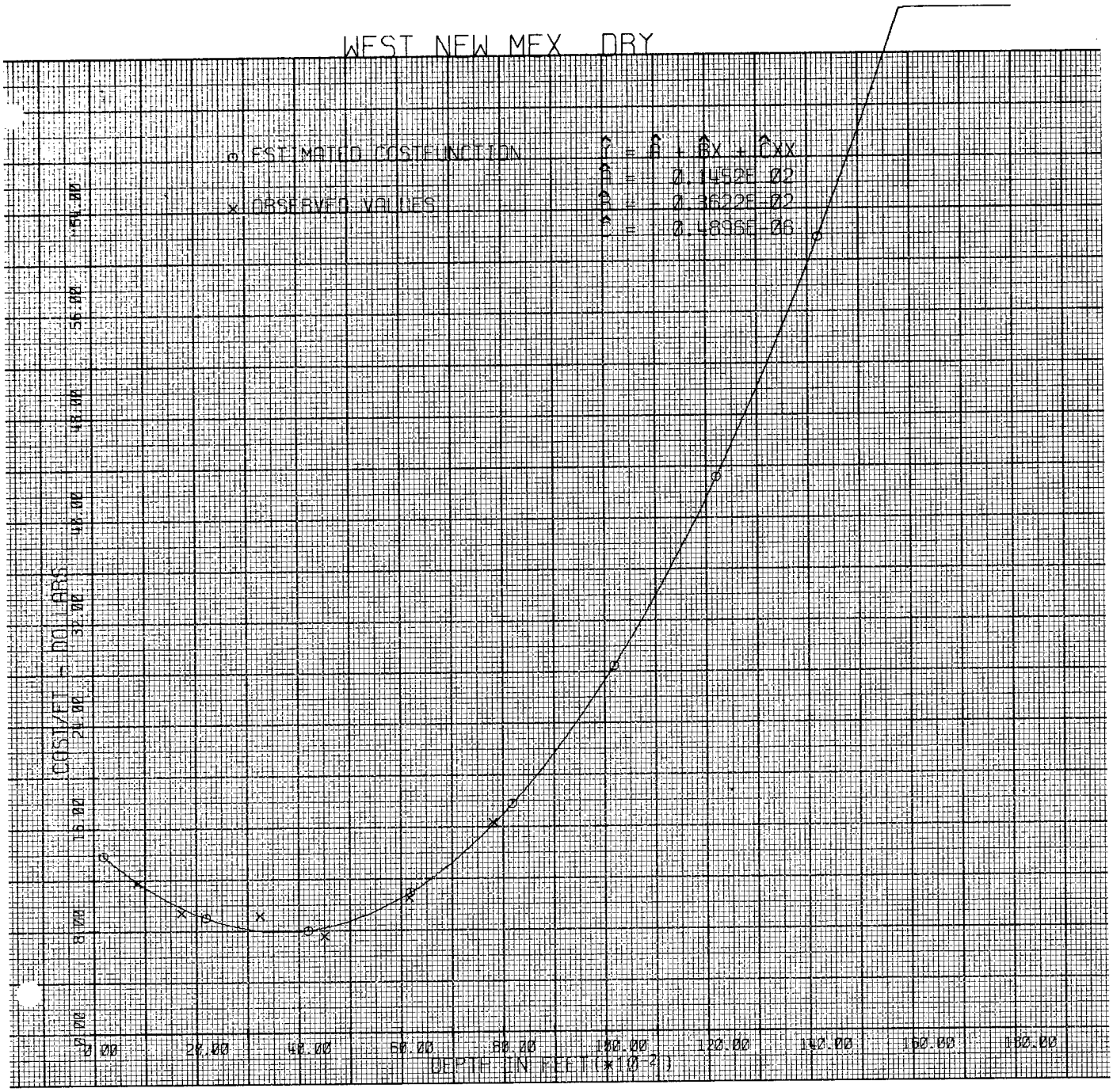

WEST NEW MEX DRY
o ESTIMATED COST FUNCTION
x OBSERVED VALUES
$\hat{Y} = \hat{B} + \hat{B}X + \hat{C}XX$
$\hat{B} = \emptyset.1452E\ \emptyset2$
$\hat{B} = -\emptyset.3622E-\emptyset2$
$\hat{C} = \emptyset.4896E-\emptyset6$
COST/FT - DOLLARS
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10^-2)

Table 30a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN WEST NEW MEXICO

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	11387.60000
	18468.80000
	24181.20000
	31462.40000
	43250.00100
	62481.60200
	92094.80100
	135027.20000
	194216.41000
	272600.01000
	373115.61000
	498700.81000
	652293.20000
	836830.41000
	1055250.00000
	1310439.60000
	1605486.80000
	1943179.20000
MINIMUM AVERAGE COST DEPTH	
3699. feet	
MINIMUM MARGINAL COST DEPTH	
2466. feet	
MARGINAL COST	
	8.74480
	5.90720
	6.00720
	9.04480
	15.02000
	23.93280
	35.78320
	50.57120
	68.29680
	88.96000
	112.56080
	139.09920
	168.57520
	200.98880
	236.34000
	274.62881
	315.85521
	360.01921
POINT OF INFLECTION	
28930.22000	
MINIMUM AVERAGE COST	
7.82122	
MINIMUM MARGINAL COST	
5.58830	

Table 31

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN OKLAHOMA

$$\hat{Y} = 11 - 0.12(10^{-2})X_1 + 0.18(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	881.	776161.	8.6300	10.1257	-1.4957
2	1908.	3640464.	8.7400	9.3956	-0.6556
3	3115.	9703225.	10.3800	9.0360	1.3440
4	4401.	19368801.	11.3900	9.2455	2.1445
5	6504.	42302016.	11.6800	10.9053	0.7747
6	8718.	76003524.	12.4900	14.4194	-1.9294
7	11119.	123632161.	20.1800	20.2783	-0.0983
8	13463.	190626184.	27.1600	28.0539	-0.8939
9	17108.	273170916.	44.9900	44.1802	0.8098

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.11062604E 02	0.13609909E 01	0.81283459E 01	0.09999999E 01	0.
-0.12263358E-02	0.39188837E-03	-0.31292987E 01	0.74685555E 04	0.91344202E 00
0.18483342E-06	0.21865149E-07	0.84533346E 01	0.83262486E 08	0.98297115E 00

RSQ = 0.9872
R = 0.9936
F(2, 6)= 230.8398
SUMUSQ = 14.8592
DURBIN-W.= 1.4417

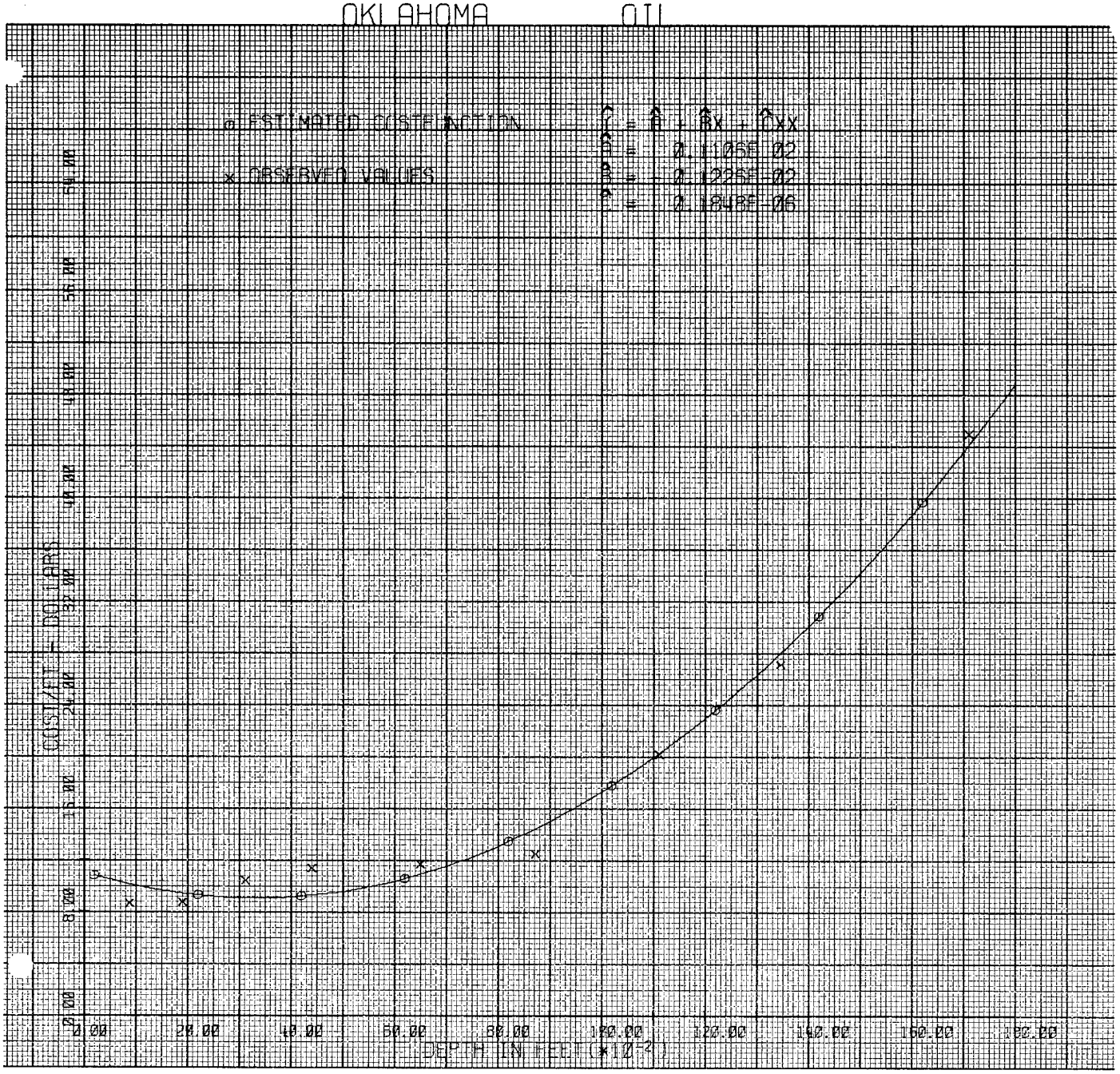

OKLAHOMA OIL
o ESTIMATED COST FUNCTION
× OBSERVED VALUES
$\hat{C}_{cap} = \hat{\beta} + \hat{\beta}X + \hat{\beta}xx$
$\hat{\beta} = 0.1106E\ 02$
$\hat{\beta} = 0.1226E\ 02$
$\hat{\beta} = 0.1848E\ 06$
COST/FT. IN DOLLARS
DEPTH IN FEET (×10⁻²)

Table 3la

TOTAL AND MARGINAL DRILLING COSTS FOR OIL WELLS IN OKLAHOMA

(in dollars)

```
  DEPTH
   18000.feet
 TOTAL COST
         10018.80000
         18694.40000
         27135.60000
         36451.20100
         47750.00100
         62140.80000
         80732.39900
        104633.60000
        134953.20000
        172800.00000
        219282.80000
        275510.40000
        342591.60000
        421635.20000
        513750.00000
        620044.81000
        741628.41000
        879609.61000
MINIMUM AVERAGE COST DEPTH
                3317.feet
MINIMUM MARGINAL COST DEPTH
                2211.feet
MARGINAL COST
              9.16240
              8.37360
              8.69360
             10.12240
             12.56000
             16.30640
             21.06160
             26.92560
             33.89840
             41.98000
             51.17040
             61.46960
             72.87760
             85.39440
             99.02000
            113.75440
            129.59760
            146.54960
POINT OF INFLECTION
         29942.19100
MINIMUM AVERAGE COST
              9.02662
MINIMUM MARGINAL COST
              8.34882
```

Table 32

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR GAS WELLS IN OKLAHOMA

$$\hat{Y} = 12.90 - 0.12(10^{-2})X_1 + 0.16(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	648.	419904.	11.3000	12.1455	-0.8455
2	1504.	2262016.	10.3700	11.3914	-1.0214
3	2878.	8282884.	13.4700	10.6642	2.8058
4	4116.	16941456.	9.5200	10.5188	-0.9988
5	6114.	37380996.	11.6300	11.3038	0.3262
6	8413.	70778569.	14.3500	13.7647	0.5853
7	10857.	117874449.	19.2400	18.2087	1.0313
8	13753.	194572504.	21.7100	25.9132	-4.2032
9	16296.	232779808.	37.1800	34.8596	2.3204

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.12869987E 02	0.19877251E 01	0.64747317E 01	0.09999999E 01	0.
-0.12202635E-02	0.61850923E-03	-0.19729108E 01	0.71754444E 04	0.87304425E 00
0.15768608E-06	0.36310789E-07	0.43426786E 01	0.78738321E 08	0.95151040E 00

RSQ = 0.9426
R = 0.9709
F(2, 6)= 49.2698
SUMUSQ = 35.1922
DURBIN-W.= 2.8737

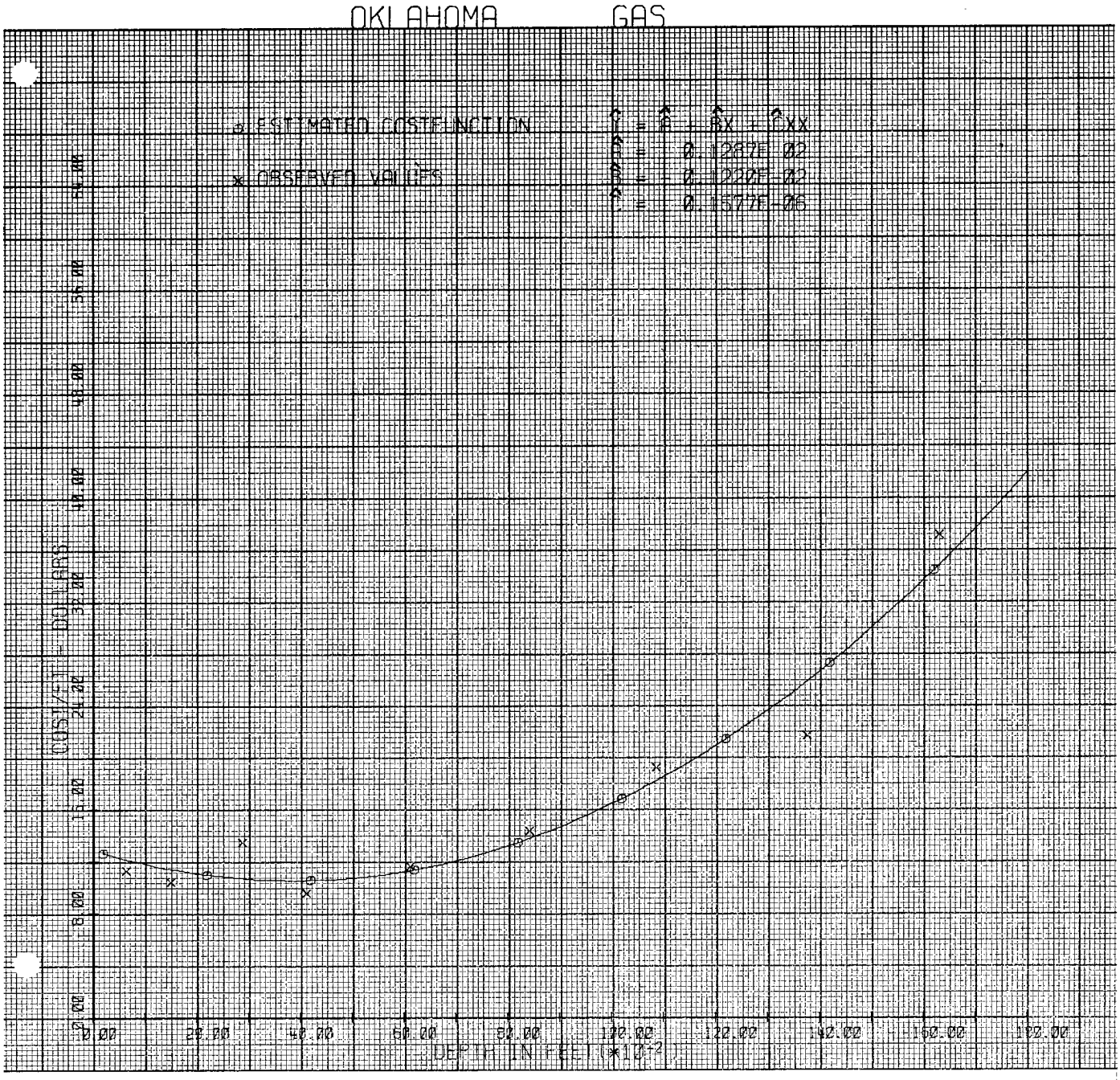

OKLAHOMA GAS
ESTIMATED COST FUNCTION
OBSERVED VALUES
Ĉ = β̂ + β̂X + ĉXX
β̂ = Ø.1267E ØØ
ĉ = Ø.1222E-Ø2
ĉ = Ø.1577E-Ø6
COST/FT DOLLARS
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10**2

Table 32a

TOTAL AND MARGINAL DRILLING COST FOR GAS WELLS IN OKLAHOMA

(in dollars)

```
  DEPTH
   18000. feet
 TOTAL COST
         11807.70000
         22121.60000
         31887.90000
         42052.80100
         53562.50100
         67363.20100
         84401.10000
        105622.40000
        131973.30000
        164400.00000
        203843.70000
        251265.60000
        307596.90000
        373788.80000
        450787.50000
        539539.20000
        640990.11000
        756086.41000
MINIMUM AVERAGE COST DEPTH
              3868.feet
MINIMUM MARGINAL COST DEPTH
              2579. feet
MARGINAL COST
            10.90310
             9.88240
             9.80790
            10.67960
            12.49750
            15.26160
            18.97190
            23.62840
            29.23110
            35.78000
            43.27510
            51.71640
            61.10390
            71.43760
            82.71750
            94.94360
           108.11590
           122.23440
POINT OF INFLECTION
         40655.53900
MINIMUM AVERAGE COST
            10.51046
MINIMUM MARGINAL COST
             9.72394
```

Table 33

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN OKLAHOMA

$$\hat{Y} = 8.10 - 0.10(10^{-2})X_1 + 0.18(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	888.	788544.	7.4200	7.3431	0.0769
2	1873.	3508129.	6.7100	6.8020	-0.0920
3	3167.	10029889.	7.0500	6.6236	0.4264
4	4414.	19483396.	7.4500	7.0237	0.4263
5	6351.	40335201.	8.5800	8.7587	-0.1787
6	8753.	76615009.	11.4700	12.7919	-1.3219
7	11095.	123099025.	15.6500	18.7302	-3.0802
8	13686.	193653298.	34.0000	27.6075	6.3925
9	16509.	268136770.	37.3900	40.0391	-2.6491

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.81312618E 01	0.27870822E 01	0.29174817E 01	0.09999999E 01	0.
-0.10478366E-02	0.83194815E-03	-0.12594974E 01	0.74151111E 04	0.90912658E 00
0.18054339E-06	0.47688852E-07	0.37858617E 01	0.81523651E 08	0.96709346E 00

RSQ = 0.9488
R = 0.9741
F(2, 6)= 55.5996
SUMUSQ = 59.5264
DURBIN-W.= 2.9658

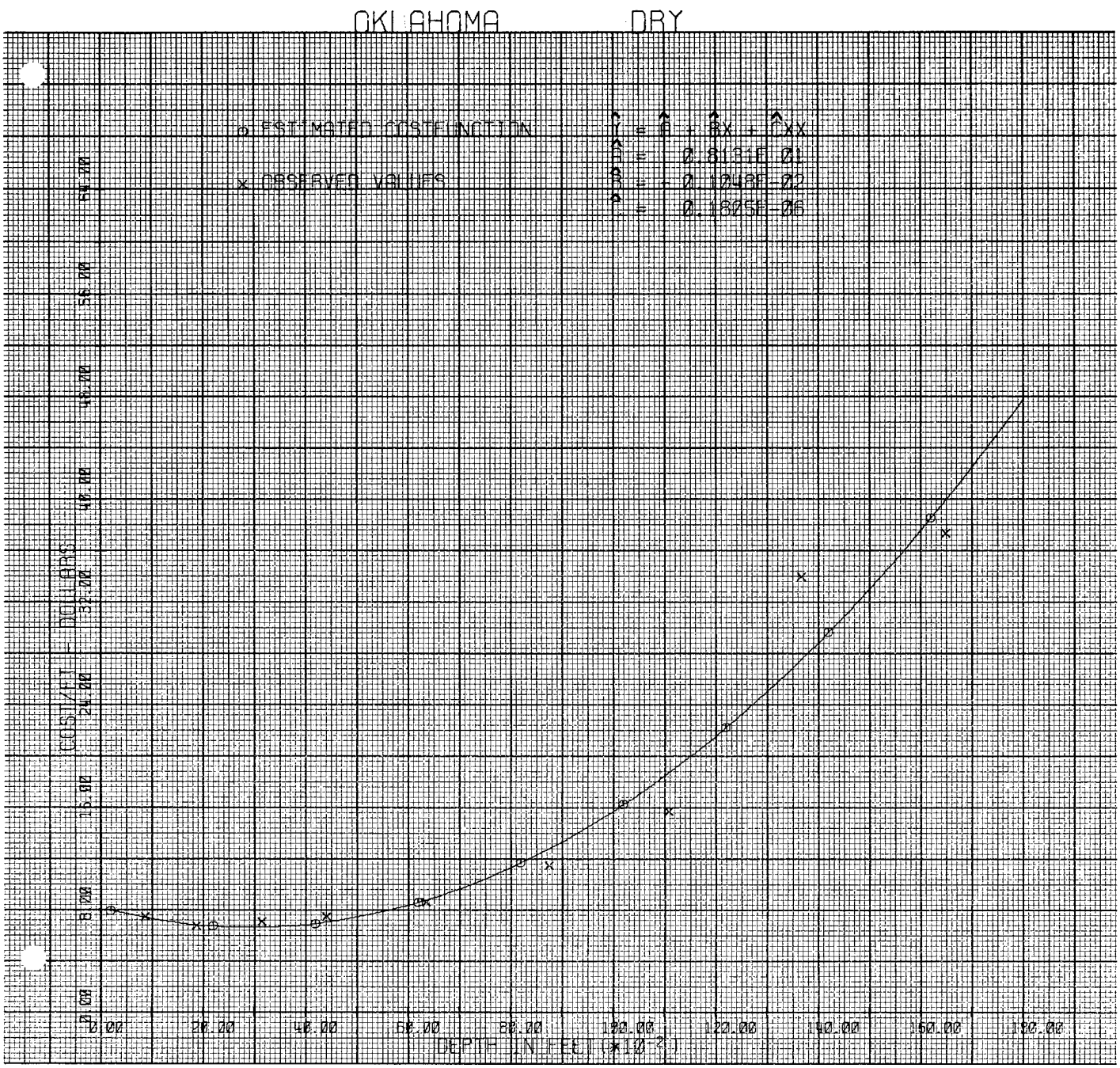

OKLAHOMA DRY
ESTIMATED COST FUNCTION
OBSERVED VALUES
$\hat{Y} = \hat{\beta} + \hat{\beta}X + \hat{\gamma}XX$
$\hat{\beta} = 0.8131E\ 01$
$\hat{\beta} = 0.1248E\ 02$
$\hat{\gamma} = 0.1805E-06$
COST/FT - DOLLARS
DEPTH IN FEET (*10^-2)
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00

Table 33a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN OKLAHOMA

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	7263.50000
	13514.00000
	19834.50000
	27308.00000
	37017.50000
	50046.00000
	67476.50000
	90392.00100
	119875.50000
	157010.00000
	202878.50000
	258564.00000
	325149.50000
	403718.00000
	495352.50000
	601136.00000
	722151.51000
	859482.00000
MINIMUM AVERAGE COST DEPTH	
	2903. feet
MINIMUM MARGINAL COST DEPTH	
	1935. feet
MARGINAL COST	
	6.57650
	6.10500
	6.71650
	8.41100
	11.18850
	15.04900
	19.99250
	26.01900
	33.12850
	41.32100
	50.59650
	60.95500
	72.39650
	84.92100
	98.52850
	113.21900
	128.99250
	145.84900
POINT OF INFLECTION	
	19188.57000
MINIMUM AVERAGE COST	
	6.60980
MINIMUM MARGINAL COST	
	6.10274

Table 34

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN EAST TEXAS

$$\hat{Y} = 13.50 + 0.32(10^{-2})X_1 + 0.38(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	671.	450241.	12.4700	11.4760	0.9940
2	1917.	3674889.	7.7500	8.6651	-0.9151
3	3210.	10304100.	6.2600	6.9972	-0.7372
4	4378.	19166884.	6.3900	6.5841	-0.1941
5	6376.	40653376.	9.3100	8.2840	1.0260
6	8755.	76650025.	14.4200	14.2696	0.1504
7	10972.	120384784.	23.4000	23.7241	-0.3241

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.13479058E 02	0.10050416E 01	0.13411442E 02	0.09999999E 01	0.
-0.32404959E-02	0.42793664E-03	-0.75723730E 01	0.51827142E 04	0.72599754E 00
0.38044441E-06	0.35654625E-07	0.10670269E 02	0.38754899E 08	0.86824593E 00

RSQ =	0.9839
R =	0.9919
F(2, 4)=	122.6010
SUMUSQ =	3.5870
DURBIN-W.=	1.7987

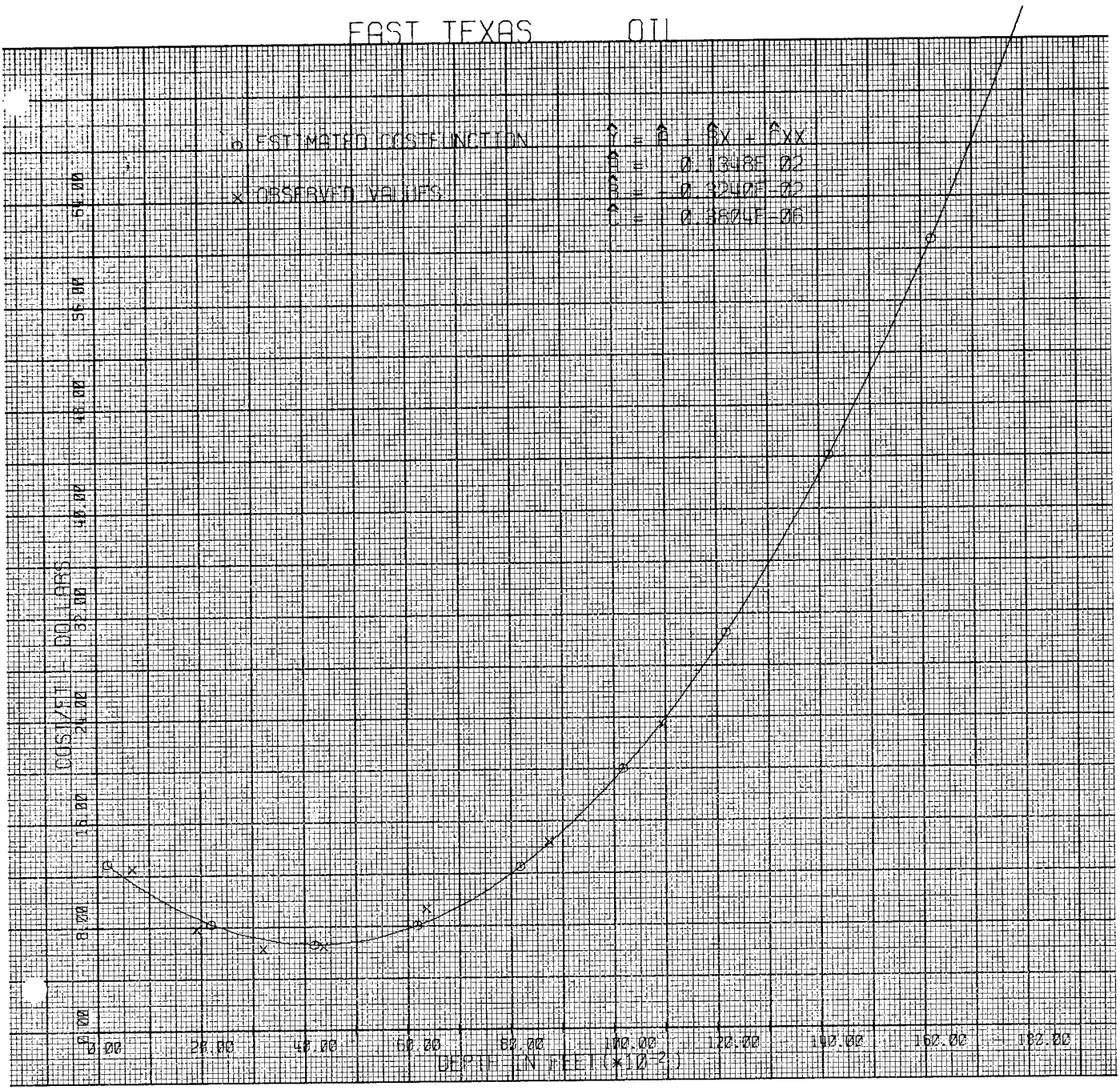

EAST TEXAS OIL
ESTIMATED COST FUNCTION
OBSERVED VALUES
$\hat{Y} = \hat{B} + \hat{B}X + \hat{C}XX$
$\hat{B} = 0.1348E\ 02$
$\hat{B} = +0.3240E-02$
$\hat{C} = 0.3804E-06$
COST/FT. DOLLARS
8.00
16.00
24.00
32.00
40.00
48.00
56.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (×10⁻²)

Table 34 a

TOTAL AND MARGINAL DRILLING COSTS FOR OIL WELLS IN EAST TEXAS

(in dollars)

```
    DEPTH
     18000.feet
   TOTAL COST
           10620.40000
           17043.20000
           21550.80000
           26425.60000
           33950.00000
           46406.40000
           66077.19800
           95244.80000
          136191.60000
          191200.00000
          262552.40000
          352531.20000
          463418.81000
          597497.59000
          757050.01000
          944358.39000
         1161705.20000
         1411372.80000
 MINIMUM AVERAGE COST DEPTH
                 4259.feet
 MINIMUM MARGINAL COST DEPTH
                 2839.feet
 MARGINAL COST
               8.14120
               5.08480
               4.31080
               5.81920
               9.61000
              15.68320
              24.03880
              34.67680
              47.59720
              62.80000
              80.28520
             100.05280
             122.10280
             146.43520
             173.05000
             201.94720
             233.12680
             266.58881
 POINT OF INFLECTION
          28026.11200
 MINIMUM AVERAGE COST
               6.58095
 MINIMUM MARGINAL COST
               4.28126
```

Table 35

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR GAS WELLS IN EAST TEXAS

$$\hat{Y} = 10.60 - 0.14(10^{-2})X_1 + 0.21(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	761.	579121.	11.0000	9.6100	1.3900
2	1772.	3139984.	8.5000	8.7090	-0.2090
3	3023.	9138529.	7.1000	8.1825	-1.0825
4	4345.	18879025.	7.0700	8.3334	-1.2634
5	6177.	38155329.	10.1100	9.7438	0.3662
6	8648.	74787904.	13.5300	13.8569	-0.3269
7	11102.	123254404.	23.2300	20.4546	2.7754
8	13440.	190316800.	27.4200	29.0698	-1.6498

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.10568593E 02	0.16756748E 01	0.63070674E 01	0.09999999E 01	0.
-0.14178455E-02	0.60850254E-03	-0.23300567E 01	0.61584999E 04	0.88423499E 00
0.20791855E-06	0.42208633E-07	0.49259722E 01	0.56070987E 08	0.96034689E 00

RSQ = 0.9627
R = 0.9812
F(2, 5)= 64.5825
SUMUSQ = 15.4097
DURBIN-W.= 2.3165

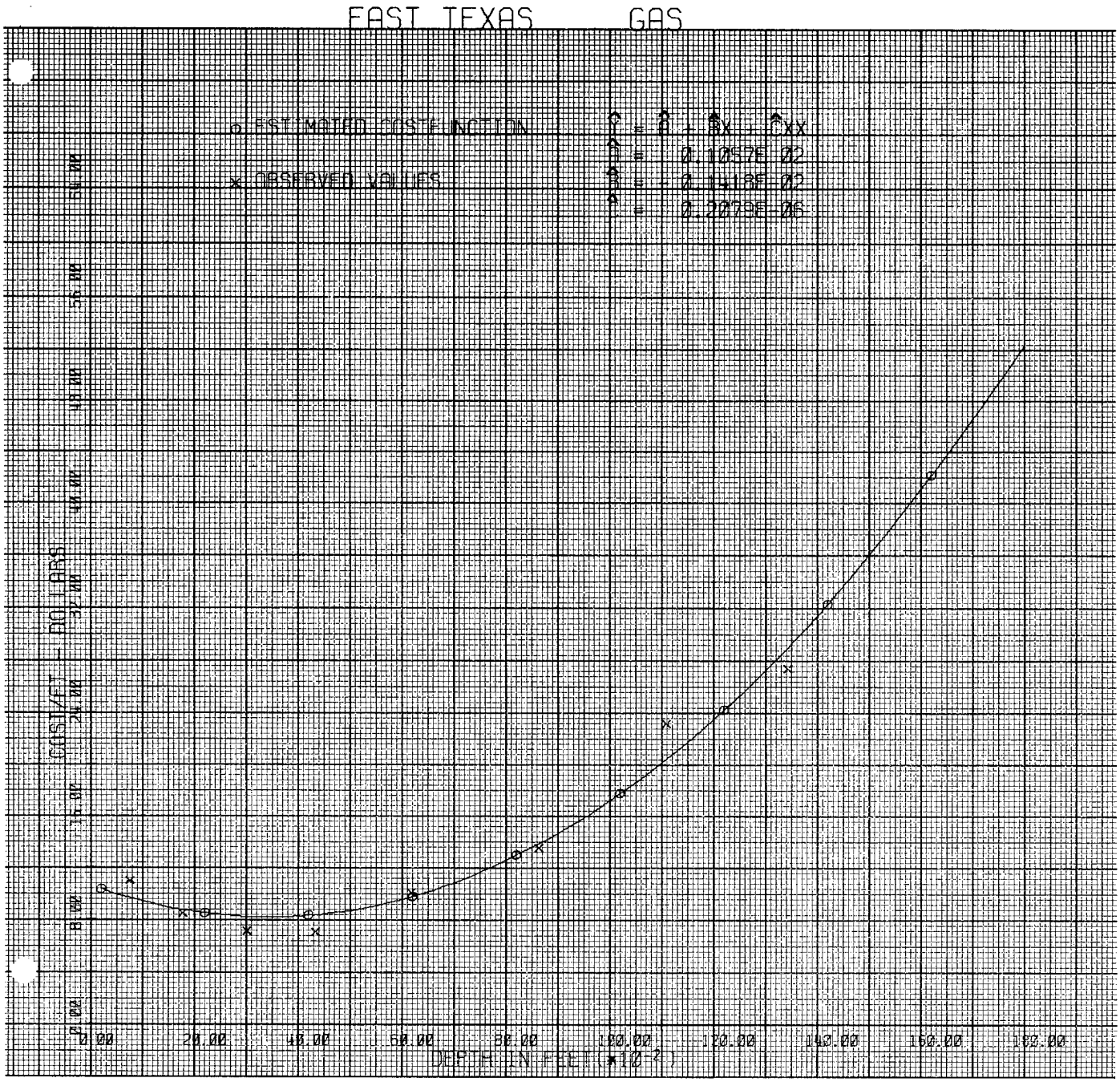

EAST TEXAS GAS
o ESTIMATED COST FUNCTION
x OBSERVED VALUES
Ĉ = Â + B̂x + Ĉxx
Â = 0.10572E 02
B̂ = 0.19413E 02
Ĉ = 0.20279E 06
COST/FT - DOLLARS
DEPTH IN FEET (*10^-2)

Table 35a

TOTAL AND MARGINAL DRILLING COSTS FOR GAS WELLS IN EAST TEXAS

(in dollars)

DEPTH	TOTAL COST	MARGINAL COST
1?000. feet		
	9359.90000	
	17131.20000	8.35770
	24561.30000	7.39280
	32897.60000	7.67530
	43387.50100	9.20520
	57278.40100	11.98250
	75817.69900	16.00720
	100252.80000	21.27930
	131831.10000	27.79880
	171800.00000	35.56570
	221406.90000	44.58000
	281899.20000	54.84170
	354524.30000	66.35080
	440529.59000	79.10730
	541162.50000	93.11120
	657670.40000	108.36250
	791300.71000	124.86120
	943300.80000	142.60730
		161.60080

MINIMUM AVERAGE COST DEPTH
3410. feet

MINIMUM MARGINAL COST DEPTH
2274. feet

POINT OF INFLECTION
27801.06000

MINIMUM AVERAGE COST
8.15210

MINIMUM MARGINAL COST
7.34614

Table 36

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN GULF COAST TEXAS

$\hat{Y} = 9.40 - 0.19(10^{-3})X_1 + 0.89(10^{-7})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	945.	893025.	8.3500	9.3102	-0.9602
2	1910.	3648100.	8.8700	9.3760	-0.5060
3	3205.	10272025.	10.4600	9.7253	0.7347
4	4396.	19324816.	12.4500	10.3104	2.1396
5	6235.	38875225.	11.8200	11.7104	0.1096
6	8783.	77141089.	12.8800	14.6465	-1.7665
7	11343.	128663649.	18.2100	18.7619	-0.5519
8	13996.	197944008.	25.0600	24.2594	0.8006

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.94065246E 01	0.14281049E 01	0.65867181E 01	0.09999999E 01	0.
-0.18620212E-03	0.49382114E-03	-0.37706387E-00	0.63516250E 04	0.93873595E 00
0.89127411E-07	0.32672875E-07	0.27278716E 01	0.59338243E 08	0.97514541E 00

RSQ = 0.9523
R = 0.9758
F(2, 5)= 49.8734
SUMUSQ = 10.3739
DURBIN-W.= 1.4136

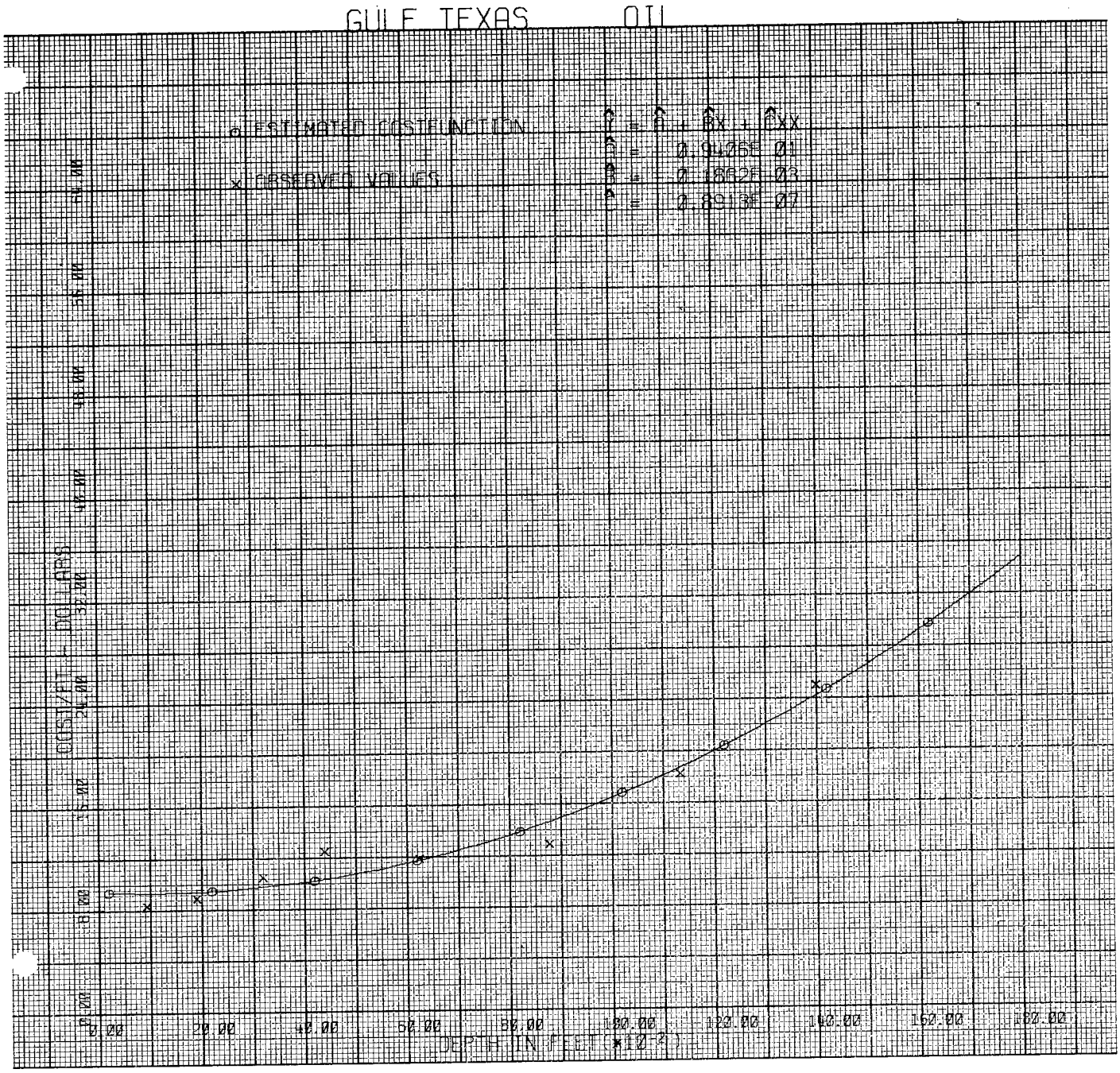

GULF TEXAS OIL
o ESTIMATED COST FUNCTION
x OBSERVED VALUES
Ĉ = Â + B̂X + ĈXX
Â = Ø.9426E Ø1
B̂ = Ø.1862E Ø3
Ĉ = Ø.8913E Ø7
COST/FT. - DOLLARS
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10^2)

Table 36a

TOTAL AND MARGINAL DRILLING COSTS FOR OIL WELLS IN GULF COAST TEXAS

(in dollars)

DEPTH
18000. feet
TOTAL COST
9308.93000
18780.24000
28948.71000
40349.12000
53516.25100
68984.88000
87289.79100
108965.76000
134547.57000
164570.00000
199567.83000
240075.84000
286628.81000
339761.52000
400008.76000
467905.29000
543985.90000
628785.36000
MINIMUM AVERAGE COST DEPTH
1045. feet
MINIMUM MARGINAL COST DEPTH
696. feet
MARGINAL COST
9.30099
9.73076
10.69531
12.19464
14.22875
16.79764
19.90131
23.53976
27.71299
32.42100
37.66379
43.44136
49.75371
56.60084
63.98275
71.89944
80.35091
89.33716
POINT OF INFLECTION
9723.38050
MINIMUM AVERAGE COST
9.30875
MINIMUM MARGINAL COST
9.27634

Table 37

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR GAS WELLS IN GULF COAST TEXAS

$\hat{Y} = 13.90 - 0.15(10^{-2})X_1 + 0.19(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	1090.	1188100.	9.7900	12.3611	-2.5711
2	1751.	3066001.	12.4500	11.6719	0.7781
3	2986.	8916196.	12.3000	10.8312	1.4688
4	4281.	18326961.	11.8200	10.5749	1.2451
5	5995.	35940025.	11.7600	11.2199	0.5401
6	8523.	72641529.	13.5300	14.2179	-0.6879
7	10898.	118766404.	18.6800	19.2567	-0.5767
8	13745.	194462512.	26.7400	28.1342	-1.3942
9	16528.	268293696.	41.0000	39.8023	1.1977

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.13861742E 02	0.14313317E 01	0.96845064E 01	0.09999999E 01	0.
-0.15847757E-02	0.43205734E-03	-0.36679754E 01	0.73107778E 04	0.89256857E 00
0.19084370E-06	0.24656942E-07	0.77399582E 01	0.80105002E 08	0.96952811E 00

RSQ = 0.9815
R = 0.9907
F(2, 6)= 159.0757
SUMUSQ = 15.3991
DURBIN-W.= 1.3733

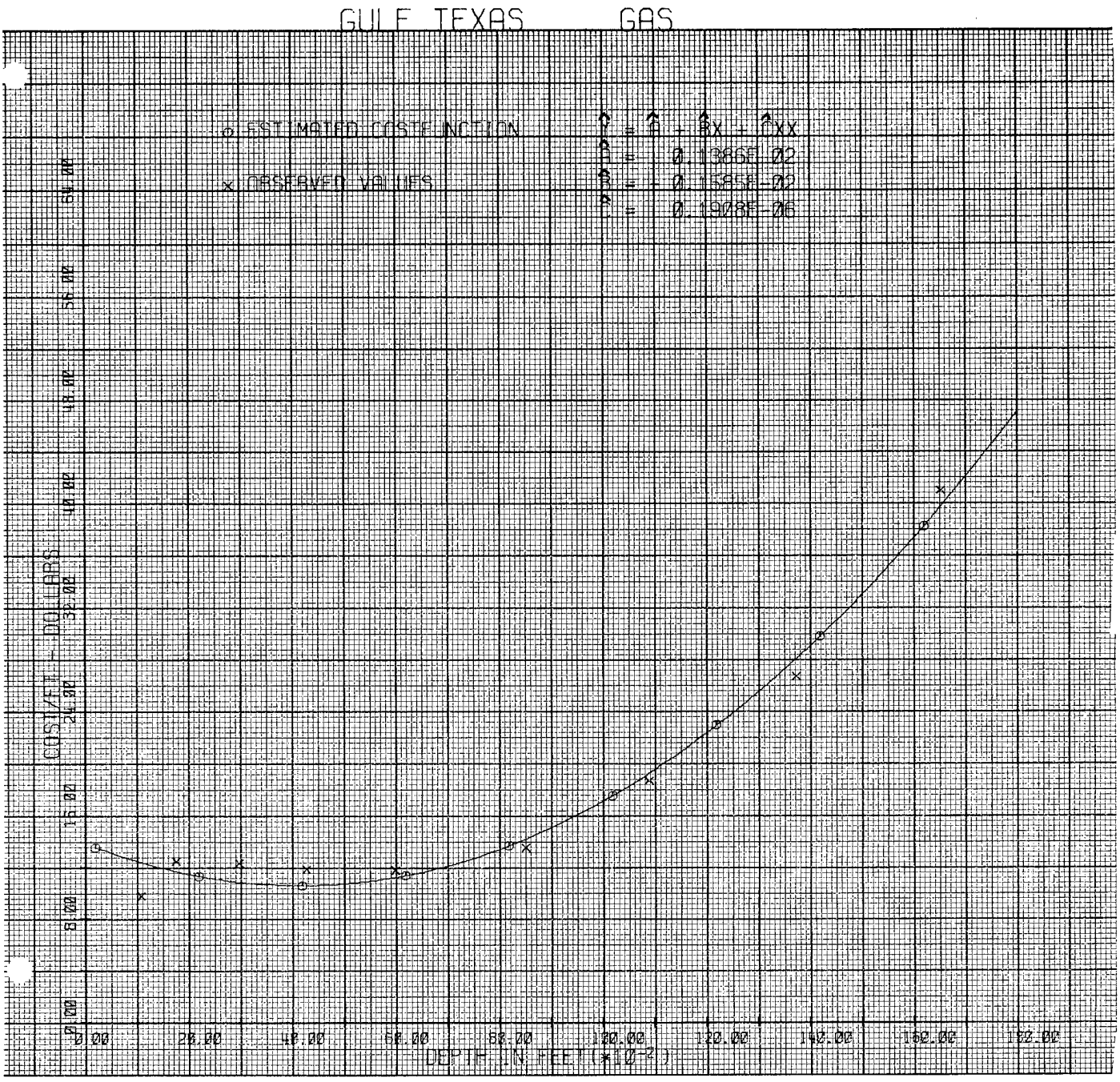

GULF TEXAS GAS
Ø ESTIMATED COST FUNCTION
× OBSERVED VALUES
Ŷ = Â + B̂X + ĈXX
Â = Ø.1386E Ø2
B̂ = -Ø.1585E-Ø2
Ĉ = Ø.1908E-Ø6
COST/FT - DOLLARS
Ø.ØØ
8.ØØ
16.ØØ
24.ØØ
32.ØØ
4Ø.ØØ
48.ØØ
56.ØØ
64.ØØ
Ø.ØØ
2Ø.ØØ
4Ø.ØØ
6Ø.ØØ
8Ø.ØØ
1ØØ.ØØ
12Ø.ØØ
14Ø.ØØ
16Ø.ØØ
18Ø.ØØ
DEPTH IN FEET(×1Ø-2)

Table 37a

TOTAL AND MARGINAL DRILLING COSTS FOR GAS WELLS IN GULF COAST TEXAS

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	12465.80000
	22906.40000
	32466.60000
	42291.20000
	53525.00100
	67312.80100
	84799.40100
	107129.60000
	135448.20000
	170900.00000
	214629.80000
	267782.40000
	331502.60000
	406935.20000
	495225.01000
	597516.81000
	714955.41000
	848685.61000
MINIMUM AVERAGE COST DEPTH	
	4154. feet
MINIMUM MARGINAL COST DEPTH	
	2769. feet
MARGINAL COST	
	11.26240
	9.80960
	9.50160
	10.33840
	12.32000
	15.44640
	19.71760
	25.13360
	31.69440
	39.40000
	48.25040
	58.24560
	69.38560
	81.67040
	95.10000
	109.67440
	125.39360
	142.25760
POINT OF INFLECTION	
	43896.11200
MINIMUM AVERAGE COST	
	10.56830
MINIMUM MARGINAL COST	
	9.47107

Table 38

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN GULF COAST TEXAS

$\hat{Y} = 13.80 - 0.28(10^{-2})X_1 + 0.28(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	840.	705600.	10.5600	11.6226	-1.0626
2	1730.	2992900.	10.0200	9.7686	0.2514
3	3031.	9186961.	8.4800	7.8599	0.6201
4	4287.	18378369.	7.7800	6.9203	0.8597
5	6004.	36048016.	7.2400	7.0709	0.1691
6	8535.	72846225.	9.7400	10.3159	-0.5759
7	10942.	119727364.	16.1900	16.7438	-0.5538
8	13458.	190558882.	26.9500	26.9454	0.0046
9	16664.	269422224.	45.3900	45.1025	0.2875

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.13781044E 02	0.61281663E 00	0.22488038E 02	0.09999999E 01	0.
-0.28057200E-02	0.18384600E-03	-0.15261251E 02	0.72767778E 04	0.84535801E 00
0.28116363E-06	0.10523650E-07	0.26717310E 02	0.79854676E 08	0.95146515E 00

RSQ = 0.9976
R = 0.9988
F(2, 6)= 1258.1919
SUMUSQ = 3.0657
DURBIN-W.= 1.0909

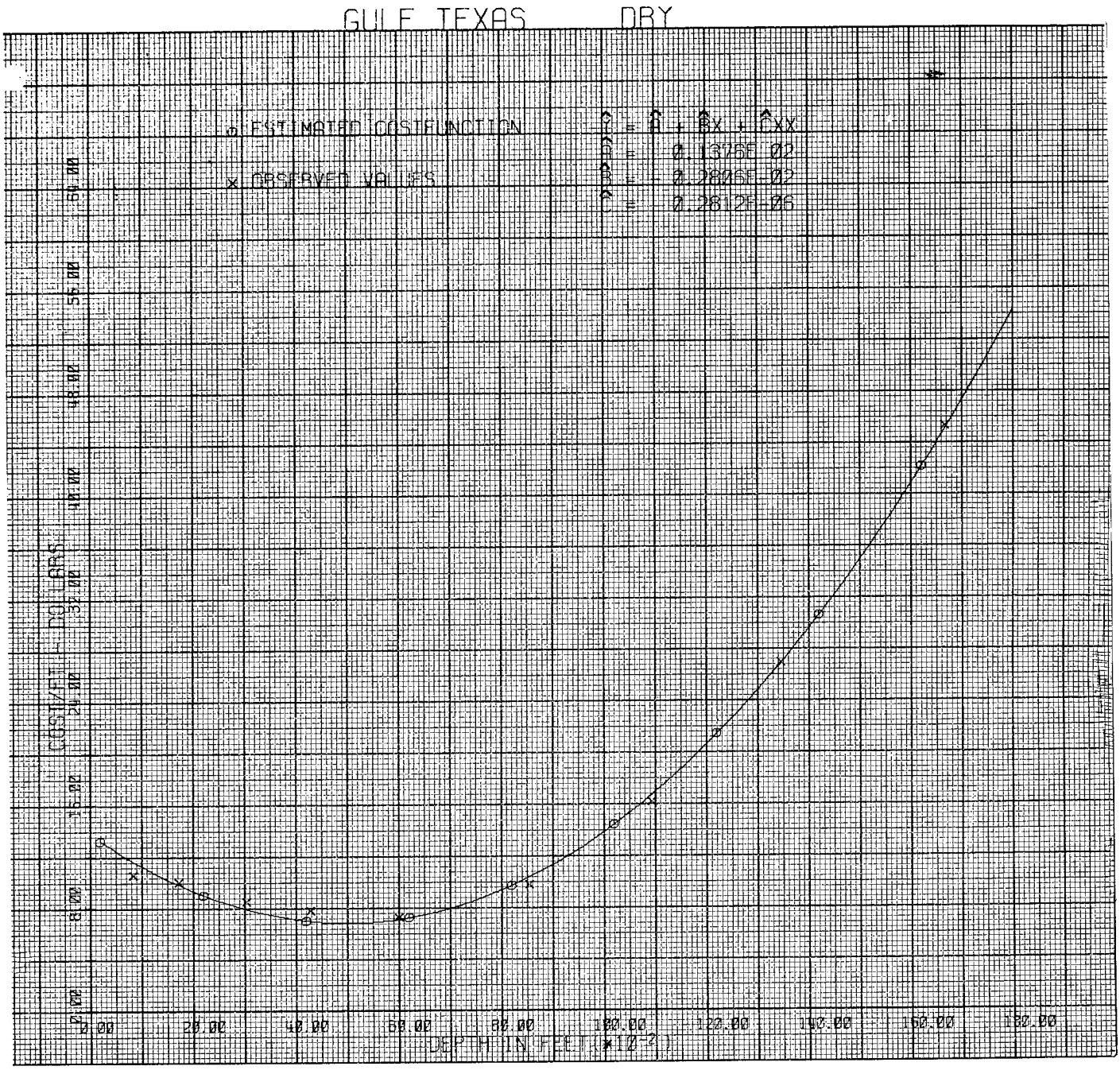

GULF TEXAS DRY
ESTIMATED COST FUNCTION
OBSERVED VALUES
$\hat{C}_{COST} = \hat{A} + \hat{B}X + \hat{C}XX$
$\hat{A}$ = Ø.1375E Ø2
$\hat{B}$ = Ø.2806E Ø2
$\hat{C}$ = Ø.2812E-Ø6
COST/FT. DOLLARS
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10⁻²)

Table 38a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN GULF COAST TEXAS

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	11255.20000
	18585.60000
	23678.40000
	28220.80000
	33900.00100
	42403.20000
	55417.60100
	74630.40100
	101728.80000
	138400.00000
	186331.20000
	247209.60000
	322722.41000
	414556.80000
	524400.01000
	653939.20000
	804861.61000
	978354.42000
MINIMUM AVERAGE COST DEPTH	
4989. feet	
MINIMUM MARGINAL COST DEPTH	
3326. feet	
MARGINAL COST	
	9.01160
	5.93040
	4.53640
	4.82960
	6.81000
	10.47760
	15.83240
	22.87440
	31.60360
	42.02000
	54.12360
	67.91440
	83.39240
	100.55760
	119.41000
	139.94960
	162.17640
	186.09040
POINT OF INFLECTION	
33827.50800	
MINIMUM AVERAGE COST	
6.77997	
MINIMUM MARGINAL COST	
4.44662	

Table 39

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN NORTH CENTRAL TEXAS

$\hat{Y} = 5.95 + 0.29(10^{-3})X_1 + 0.43(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	825.	680625.	6.4000	6.2246	0.1754
2	1792.	3211264.	6.4600	6.6170	-0.1570
3	3038.	9229444.	7.0700	7.2424	-0.1724
4	4320.	18662400.	8.0700	8.0265	0.0435
5	6095.	37149025.	9.5400	9.3477	0.1923
6	8546.	73034116.	11.5400	11.6219	-0.0819

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.59539565E 01	0.26165964E-00	0.22754585E 02	0.09999999E 01	0.
0.29219873E-03	0.13634574E-03	0.21430719E 01	0.41026666E 04	0.98674266E 00
0.43415127E-07	0.14159883E-07	0.30660654E 01	0.23661146E 08	0.99190383E 00

RSQ = 0.9936
R = 0.9968
F(2, 3)= 233.9064
SUMUSQ = 0.1307
DURBIN-W.= 1.9482

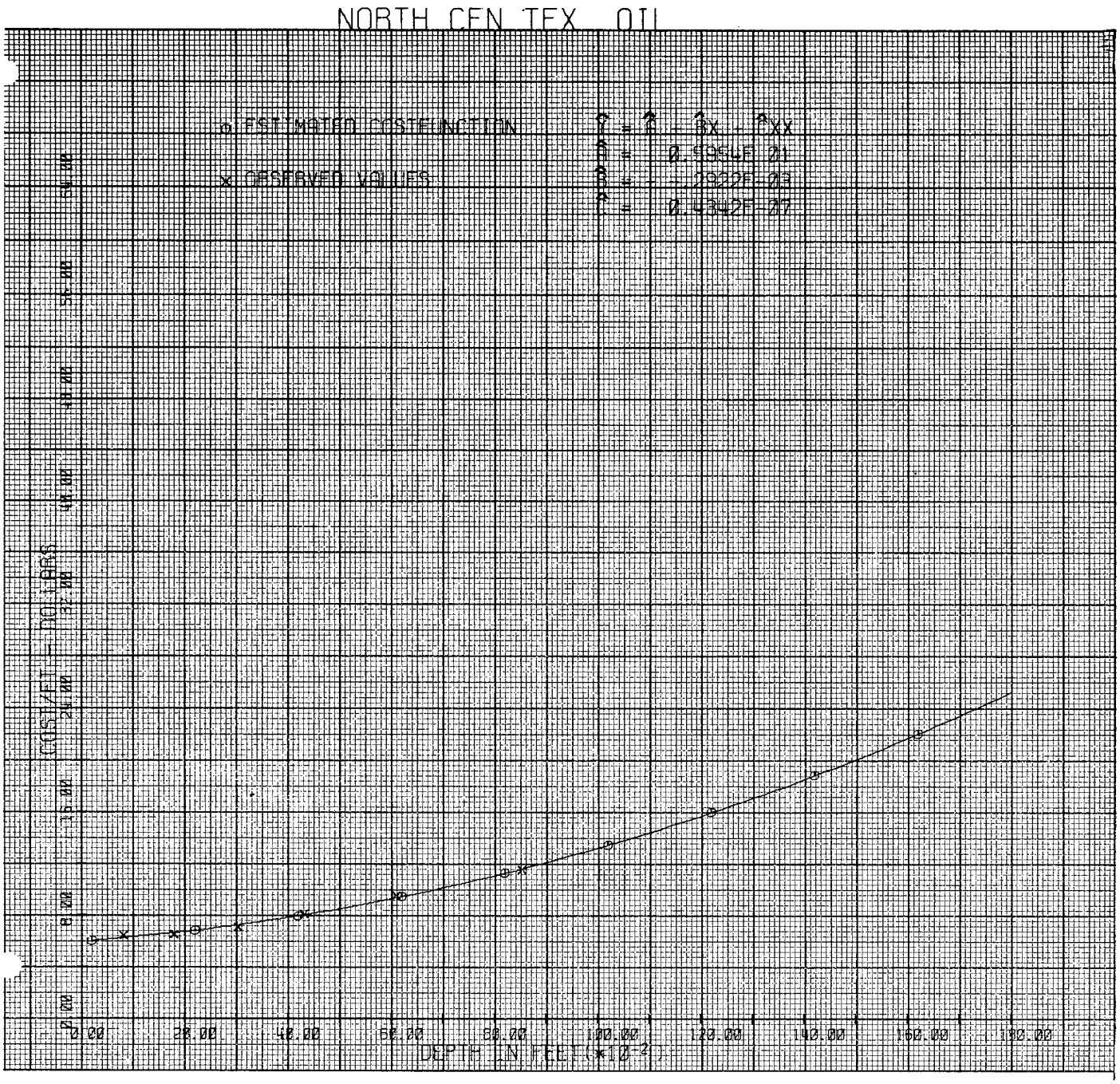

NORTH CEN TEX OIL
o ESTIMATED COST FUNCTION
x OBSERVED VALUES
$\hat{Y} = \hat{\beta} - \hat{\beta}X - \hat{\beta}XX$
$\hat{\beta} = 0.1954E 01$
$\hat{\beta} = -.1922E-03$
$\hat{\beta} = 0.4342E 07$
COST/FT - DOLLARS
8.00
16.00
24.00
32.00
40.00
48.00
56.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10^-2)

Table 39a

TOTAL AND MARGINAL DRILLING COSTS FOR OIL WELLS IN NORTH CENTRAL TEXAS

(in dollars)

DEPTH	TOTAL COST	MARGINAL COST
18000. feet	6289.62000	6.66866
	13424.16000	7.64384
	21664.14000	8.87954
	31270.08000	10.37576
	42502.50000	12.13250
	55621.92100	14.14976
	70888.86000	16.42754
	88563.84100	18.96584
	108907.38000	21.76466
	132180.00000	24.82400
	158642.22000	28.14386
	188554.56000	31.72424
	222177.54000	35.56514
	259771.68000	39.66656
	301597.51000	44.02850
	347915.52000	48.65096
	398986.26000	53.53394
	455070.25000	58.67744

MINIMUM AVERAGE COST DEPTH
-3365. feet

MINIMUM MARGINAL COST DEPTH
-2243. feet

POINT OF INFLECTION
-18379.93600

MINIMUM AVERAGE COST
5.46240

MINIMUM MARGINAL COST
5.29854

Table 40

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR GAS WELLS IN NORTH CENTRAL TEXAS

$\hat{Y} = 16.16 - 0.34(10^{-2})X_1 + 0.36(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	882.	777924.	13.8500	13.4533	0.3967
2	1807.	3265249.	11.0300	11.2095	-0.1795
3	3069.	9418761.	8.4400	9.1412	-0.7012
4	4337.	18809569.	8.3200	8.2173	0.1027
5	6141.	37711881.	9.6100	8.8965	0.7135
6	8131.	66113161.	12.0300	12.3621	-0.3321

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.16166199E 02	0.87815559E 00	0.18409266E 02	0.09999999E 01	0.
-0.33931397E-02	0.47503795E-03	-0.71428811E 01	0.40611666E 04	-0.20348234E-00
0.35976984E-06	0.51499553E-07	0.69858827E 01	0.22682757E 08	0.18915436E-01

RSQ = 0.9445
R = 0.9718
F(2, 3)= 25.5200
SUMUSQ = 1.3112
DURBIN-W.= 2.0720

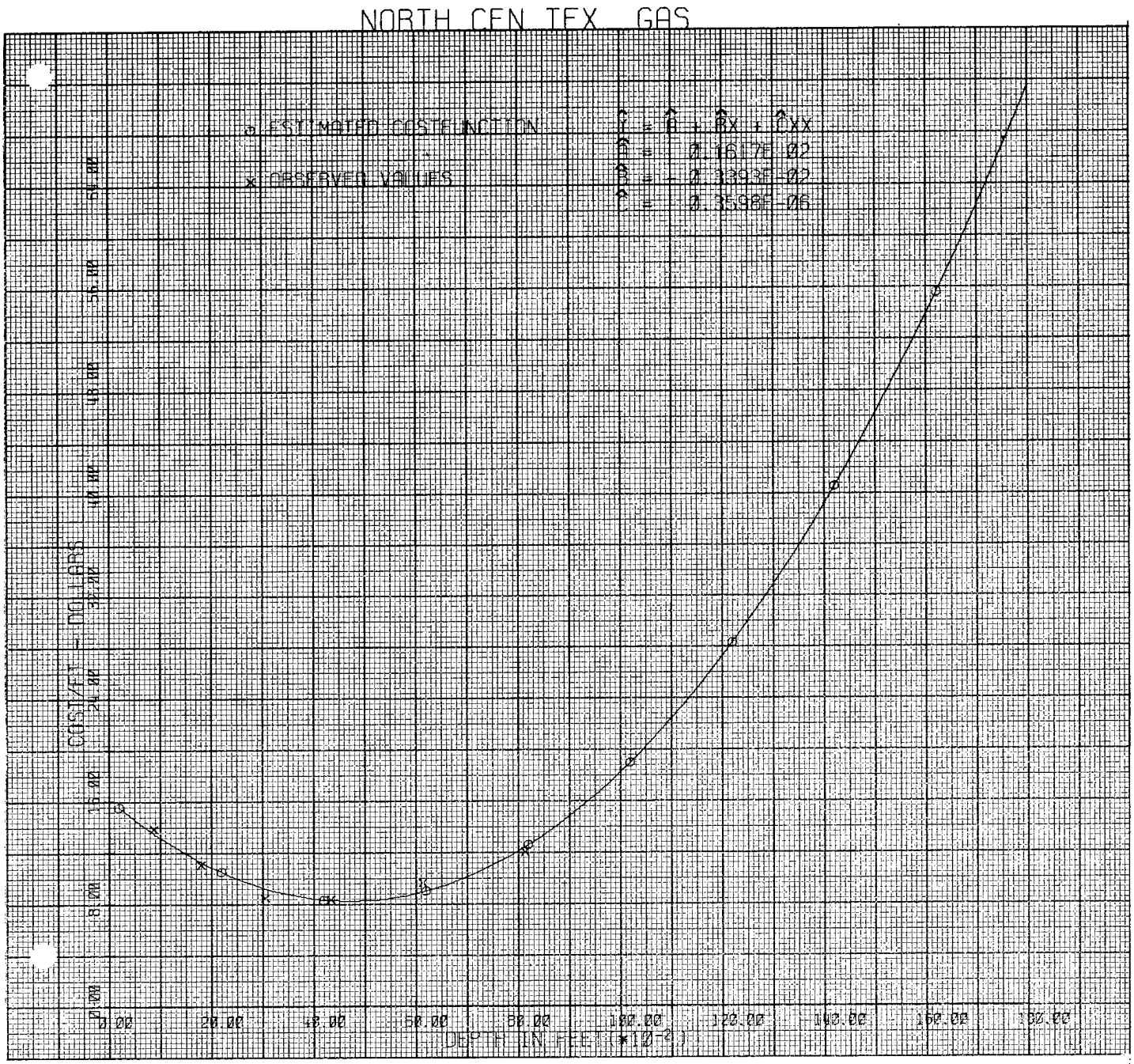

NORTH CEN TEX GAS
EST METHD COST FUNCTION
OBSERVED VALUES
$\hat{Y} = \hat{B} + \hat{B}X + \hat{C}XX$
$\hat{B} = 0.1617E\ 02$
$\hat{B} = -0.3393E-02$
$\hat{C} = 0.3598E-06$
COST/FT - DOLLARS
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10-2)

Table 40a

TOTAL AND MARGINAL DRILLING COSTS FOR GAS WELLS IN NORTH CENTRAL TEXAS

(in dollars)

DEPTH	TOTAL COST	MARGINAL COST
1800Ø. feet		
	13136.8ØØØØ	
	21646.4Ø1ØØ	1Ø.463ØØ
	27687.6ØØØØ	6.915ØØ
	33419.2Ø1ØØ	5.526ØØ
	41ØØØ.ØØØØØ	6.296ØØ
	52588.8ØØØØ	9.225ØØ
	7Ø344.4Ø2ØØ	14.312ØØ
	96425.6Ø3ØØ	21.558ØØ
	132991.2ØØØØ	3Ø.963ØØ
	182ØØ.ØØØØØ	42.527ØØ
	246210.8ØØØØ	56.25ØØØ
	327182.4ØØØØ	72.131ØØ
	427273.61ØØØ	9Ø.171ØØ
	548643.21ØØØ	11Ø.37ØSØ
	693450.Ø1ØØØ	132.728ØØ
	863852.82ØØØ	157.245ØØ
	1Ø62Ø1Ø.4ØØØØ	183.92ØØØ
	129ØØ81.6ØØØØ	212.754ØØ
		243.747ØØ
MINIMUM AVERAGE COST DEPTH		
4715. feet		
MINIMUM MARGINAL COST DEPTH		
3143. feet		
POINT OF INFLECTION		
	38526.29ØØØ	
MINIMUM AVERAGE COST		
	8.17ØØØ	
MINIMUM MARGINAL COST		
	5.5ØØØØ	

Table 41

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN NORTH CENTRAL TEXAS

$\hat{Y} = 8.60 - 0.24(10^{-2})X_1 + 0.30(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	820.	672400.	5.0500	6.7706	-1.7206
2	1787.	3193369.	4.5600	5.1564	-0.5964
3	3039.	9235521.	5.4500	3.8944	1.5556
4	4300.	18490000.	5.6600	3.5676	2.0924
5	6099.	37197801.	6.0900	4.7417	1.3483
6	8606.	74063236.	7.5700	9.5948	-2.0248
7	11071.	122567041.	15.5500	18.0187	-2.4687
8	13937.	197119984.	34.1800	32.3658	1.8142

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.85760517E 01	0.21384872E 01	0.40103355E 01	0.09999999E 01	0.
-0.24461094E-02	0.75089325E-03	-0.32575994E 01	0.62073750E 04	0.84898027E 00
0.29798786E-06	0.50370100E-07	0.59159672E 01	0.57457417E 08	0.94393449E 00

RSQ = 0.9651
R = 0.9824
F(2, 5)= 69.1225
SUMUSQ = 25.4177
DURBIN-W.= 1.4421

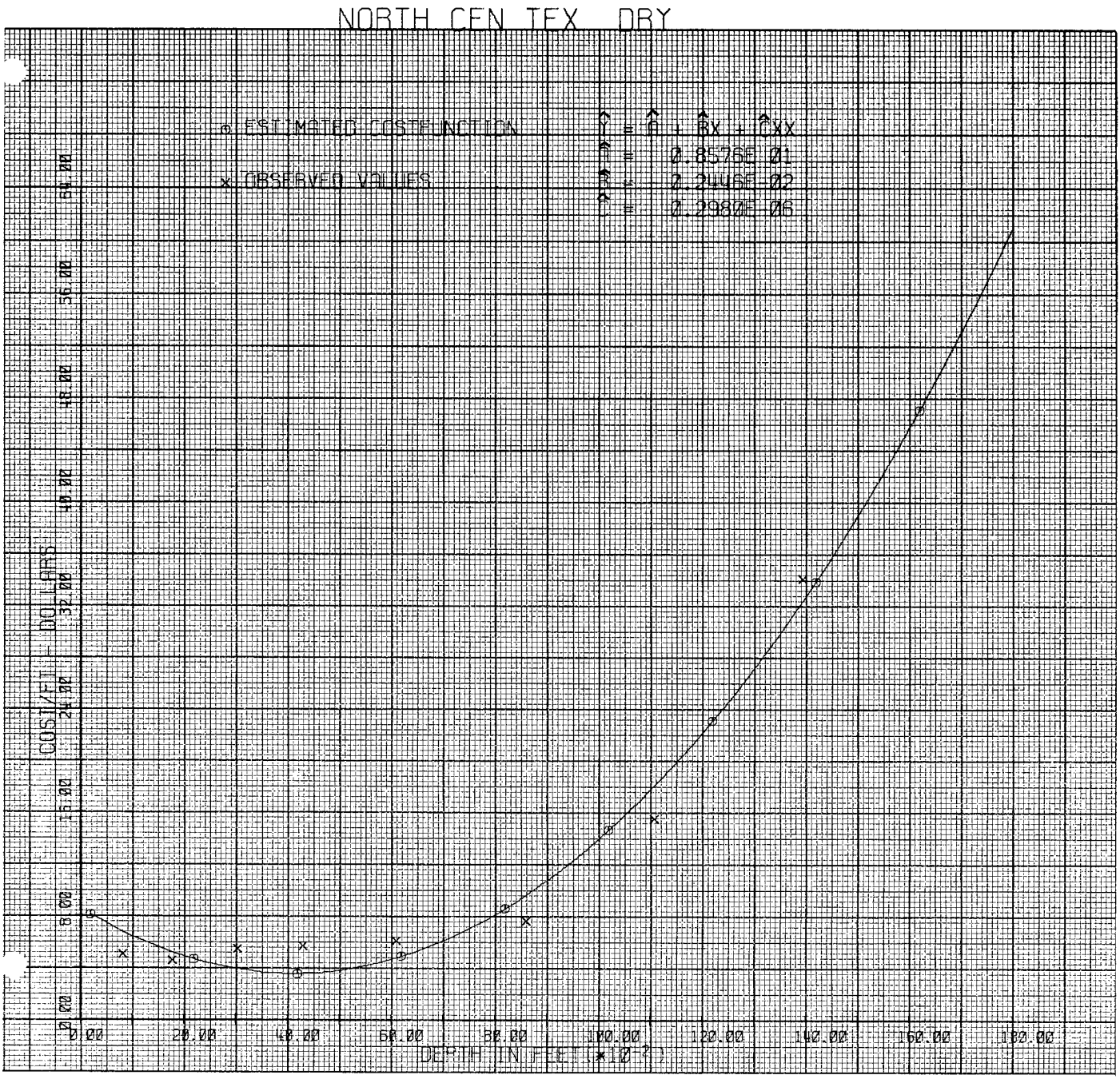

NORTH CEN TEX DRY
ESTIMATED COSTFUNCTION
OBSERVED VALUES
$\hat{Y} = \hat{A} + \hat{B}X + \hat{C}XX$
$\hat{A} = 0.8576E\ 01$
$\hat{B} = 0.2446E-02$
$\hat{C} = 0.2980E-06$
COST/FT - DOLLARS
DEPTH IN FEET $\times 10^{-2}$
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00

Table 41a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN NORTH CENTRAL TEXAS

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	6428.00000
	9751.99990
	11760.00000
	14240.00000
	18980.00000
	27768.00000
	42391.99900
	64640.00000
	96300.00000
	139160.00000
	195008.00000
	265632.00000
	352820.00000
	458359.99000
	584040.00000
	731648.00000
	902972.00000
	1099800.00000
MINIMUM AVERAGE COST DEPTH	
4104. feet	
MINIMUM MARGINAL COST DEPTH	
2736. feet	
MARGINAL COST	
	4.57800
	2.36800
	1.94600
	3.31200
	6.46600
	11.40800
	18.13800
	26.65600
	36.96200
	49.05600
	62.93800
	78.60800
	96.06600
	115.31200
	136.34600
	159.16800
	183.77800
	210.17600
POINT OF INFLECTION	
14597.10100	
MINIMUM AVERAGE COST	
3.55678	
MINIMUM MARGINAL COST	
1.88370	

Table 42

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN PANHANDLE TEXAS

$$\hat{Y} = 8.80 - 0.48(10^{-3})X_1 + 0.13(10^{-6})\,X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	2052.	4210704.	7.9100	8.3985	-0.4885
2	3250.	10562500.	9.4800	8.6794	0.8006
3	4501.	20259001.	9.5800	9.3887	0.1913
4	6622.	43850884.	10.8800	11.5619	-0.6819
5	8891.	79049881.	14.9400	15.2388	-0.2988
6	11502.	132296004.	21.9800	21.1993	0.7807
7	14066.	198926178.	28.5500	28.8534	-0.3034

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.88223914E 01	0.11015289E 01	0.80092234E 01	0.09999999E 01	0.
-0.48510917E-03	0.33340275E-03	-0.14550244E 01	0.72691428E 04	0.96307448E 00
0.13573048E-06	0.20479185E-07	0.66277288E 01	0.69725904E 08	0.99536333E 00

RSQ = 0.9940
R = 0.9970
F(2, 4)= 328.5868
SUMUSQ = 2.1720
DURBIN-W.= 2.4323

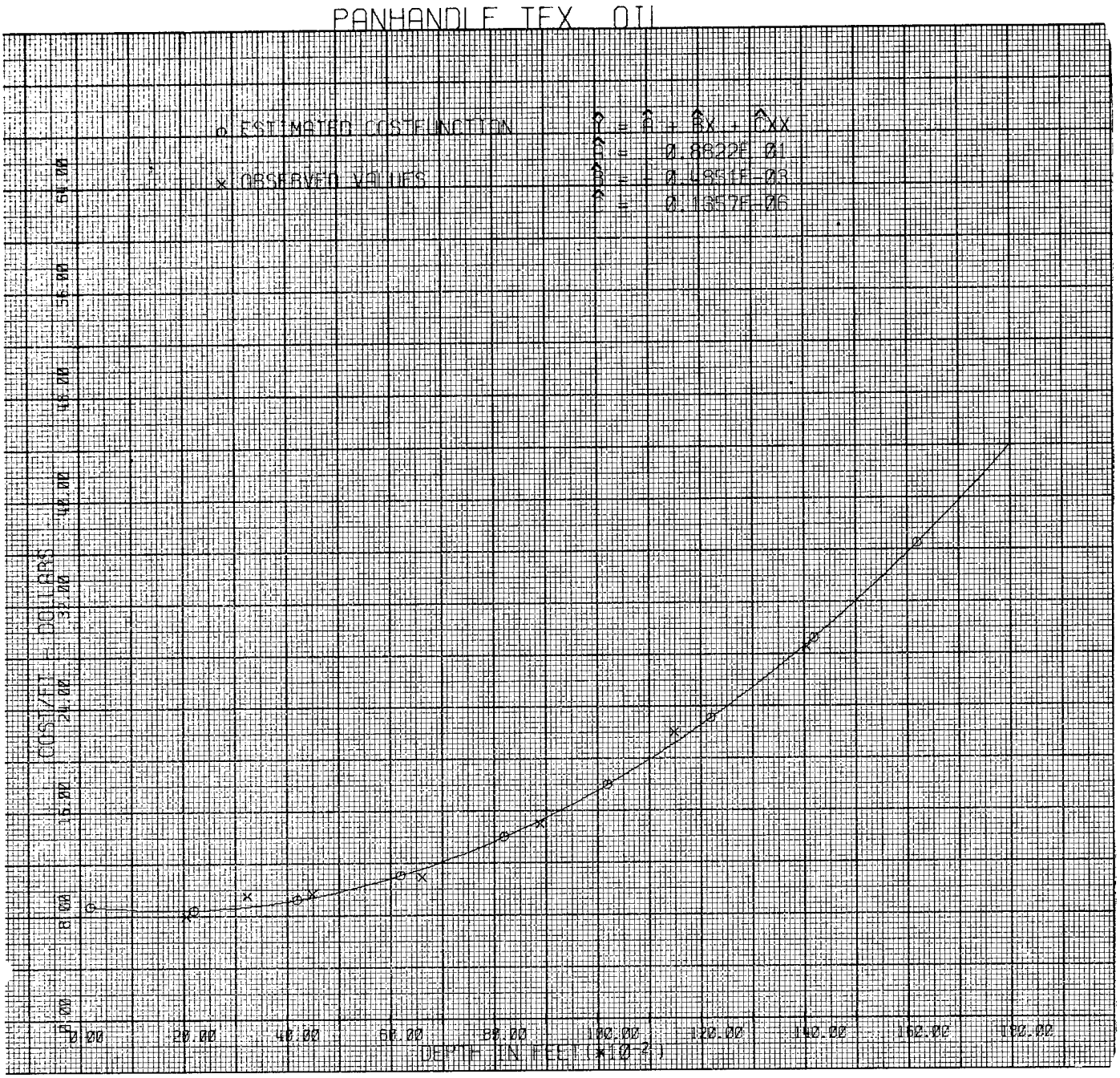

PANHANDLE TEX. OIL
o ESTIMATED COST FUNCTION
x OBSERVED VALUES
$\hat{C} = \hat{A} + \hat{B}X + \hat{C}XX$
$\hat{A}$ = Ø.8822E Ø1
$\hat{B}$ = Ø.4551E-Ø3
$\hat{C}$ = Ø.1357E-Ø6
COST/FT. DOLLARS
DEPTH IN FEET (*10^-2)
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
15.00
24.00
32.00
40.00
48.00
56.00

Table 42a

TOTAL AND MARGINAL DRILLING COSTS FOR OIL WELLS IN PANHANDLE TEXAS

(in dollars)

DEPTH	TOTAL COST	MARGINAL COST
1800Ø. feet		
	8472.60000	
	16789.20000	8.25890
	25764.00000	8.51000
	36211.20100	9.57530
	48945.00100	11.45480
	64779.60000	14.14850
	84529.20100	17.65640
	109008.00000	21.97850
	139030.20000	27.11480
	175410.00000	33.06530
	218961.60000	39.83000
	270499.20000	47.40890
	330837.00000	55.80200
	400789.20000	65.00930
	481170.00000	75.03080
	572793.60000	85.86650
	676474.21000	97.51640
	793026.00000	109.98050
		123.25880

MINIMUM AVERAGE COST DEPTH	
1787. feet	
MINIMUM MARGINAL COST DEPTH	
1192. feet	
POINT OF INFLECTION	
14993.53400	
MINIMUM AVERAGE COST	
8.38847	
MINIMUM MARGINAL COST	
8.24396	

Table 43

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR GAS WELLS IN PANHANDLE TEXAS

$$\hat{Y} = 17 - 0.28(10^{-2})X_1 + 0.40(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	798.	636804.	15.6000	15.0103	0.5897
2	1871.	3500641.	13.5600	13.1789	0.3811
3	3192.	10188864.	10.3600	12.1848	-1.8248
4	4270.	18232900.	11.5800	12.4044	-0.8244
5	6118.	37429924.	17.4800	14.9363	2.5437
6	8552.	73136704.	21.5600	22.4255	-0.8655

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.16967462E 02	0.24796499E 01	0.68426846E 01	0.09999999E 01	0.
-0.27707126E-02	0.12759406E-02	-0.21715058E 01	0.41334999E 04	0.66553251E 00
0.39861197E-06	0.13217060E-06	0.30158897E 01	0.23854306E 08	0.80290894E 00

RSQ =	0.8618
R =	0.9284
F(2, 3)=	9.3565
SUMUSQ =	11.7221
DURBIN-W.=	2.4635

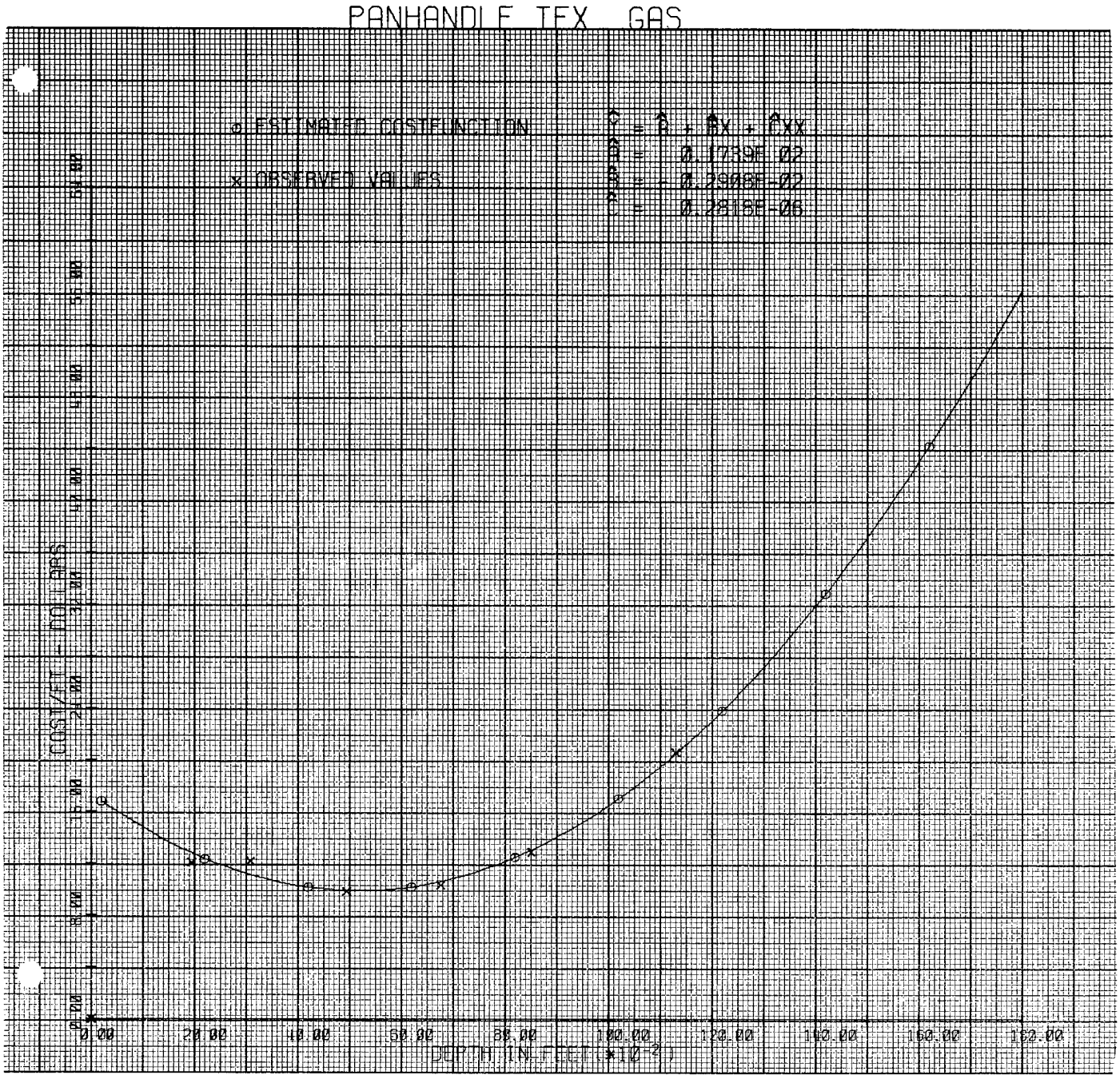

PANHANDLE TEX GAS
o ESTIMATED COSTFUNCTION
x OBSERVED VALUES
$\hat{C} = \hat{A} + \hat{B}X + \hat{C}XX$
$\hat{A} = \emptyset.1739E\ \emptyset2$
$\hat{B} = -\emptyset.2906E-\emptyset2$
$\hat{C} = \emptyset.2816E-\emptyset6$
COST/FT - DOLLARS
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10⁻²)

Table 43a

TOTAL AND MARGINAL DRILLING COSTS FOR GAS WELLS IN PANHANDLE TEXAS

(in dollars)

DEPTH	
18000.	feet
TOTAL COST	
	14763.80000
	25402.40000
	33606.60000
	41067.20000
	49475.00100
	60520.80100
	75895.40000
	97289.60000
	126394.20000
	164900.00000
	214497.80000
	276878.40000
	353732.60000
	446751.20000
	557625.01000
	688044.81000
	839701.41000
	1014285.60000
MINIMUM AVERAGE COST DEPTH	
5160.	feet
MINIMUM MARGINAL COST DEPTH	
3440.	feet
MARGINAL COST	
	12.41940
	9.13960
	7.55060
	7.65240
	9.44500
	12.92840
	18.10260
	24.96760
	33.52340
	43.77000
	55.70740
	69.33560
	84.65460
	101.66440
	120.36500
	140.75640
	162.83860
	186.61160
POINT OF INFLECTION	
51018.03400	
MINIMUM AVERAGE COST	
9.88781	
MINIMUM MARGINAL COST	
7.38709	

Table 44

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN PANHANDLE TEXAS

$\hat{Y} = 2.90 + 0.15(10^{-2})X$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X	Y	$\hat{Y}$	$Y - \hat{Y}$
1	832.	4.8000	4.1287	0.6713
2	1852.	5.4900	5.6344	-0.1444
3	3120.	9.5700	7.5063	2.0637
4	4387.	10.8100	9.3767	1.4333
5	6388.	9.9900	12.3322	-2.3422
6	8533.	12.1400	15.4973	-3.3573
7	11472.	16.2200	19.8360	-3.6160
8	13621.	28.3000	23.0084	5.2916

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.29004278E 01	0.20486338E 01	0.14157862E 01	0.09999999E 01	0.
0.14762492E-02	0.26903588E-03	0.54871833E 01	0.62757500E 04	0.91314696E 00

RSQ = 0.8338
R = 0.9131
F(1, 6)= 30.1092
SUMUSQ = 64.6176
DURBIN-W.= 1.5574

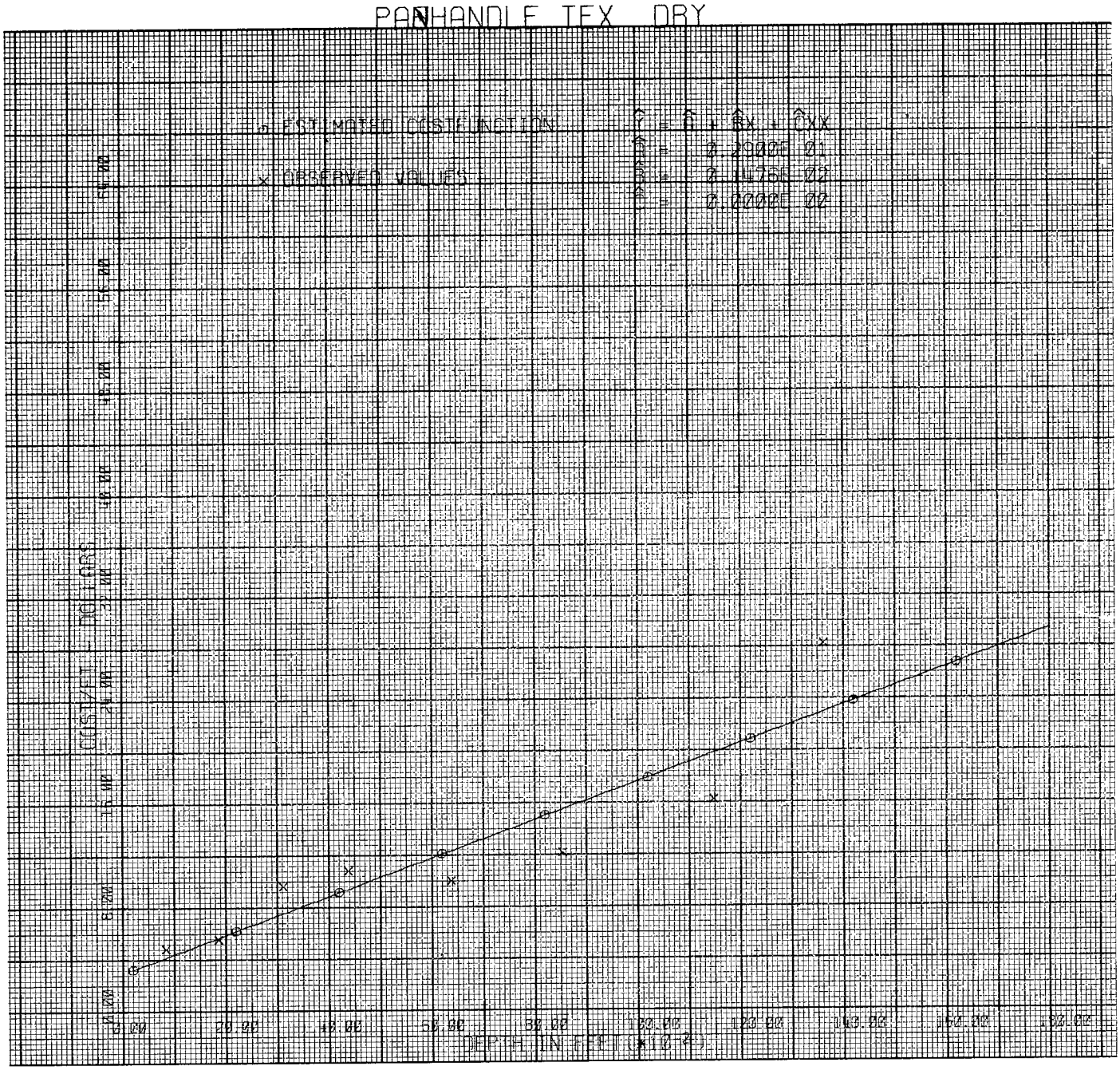

PANHANDLE TEX DRY
ESTIMATED COST FUNCTION
OBSERVED VALUES
COST/FT
DOLLARS
DEPTH IN FEET (*10^2)

Table 45

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN SOUTH WEST TEXAS

$\hat{Y} = 12.90 - 0.28(10^{-2})X_1 + 0.32(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	787.	619369.	10.2100	10.8706	-0.6606
2	1827.	3337929.	8.4700	8.8365	-0.3665
3	3101.	9616201.	7.9000	7.2789	0.6211
4	4349.	18913801.	7.8500	6.7506	1.0994
5	6195.	38378025.	8.1800	7.7790	0.4010
6	8360.	69889600.	11.2500	11.7370	-0.4870
7	11430.	130644900.	19.5700	22.4425	-2.8725
8	12760.	181408800.	31.2000	28.9349	2.2651

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.12865459E 02	0.17818746E 01	0.72201820E 01	0.09999999E 01	0.
-0.27842205E-02	0.66751281E-03	-0.41710366E 01	0.61011250E 04	0.82056715E 00
0.31689490E-06	0.47600417E-07	0.66573974E 01	0.54277178E 08	0.92285074E 00

RSQ =	0.9669
R =	0.9833
F(2, 5)=	72.9906
SUMUSQ =	15.9453
DURBIN-W.=	2.1732

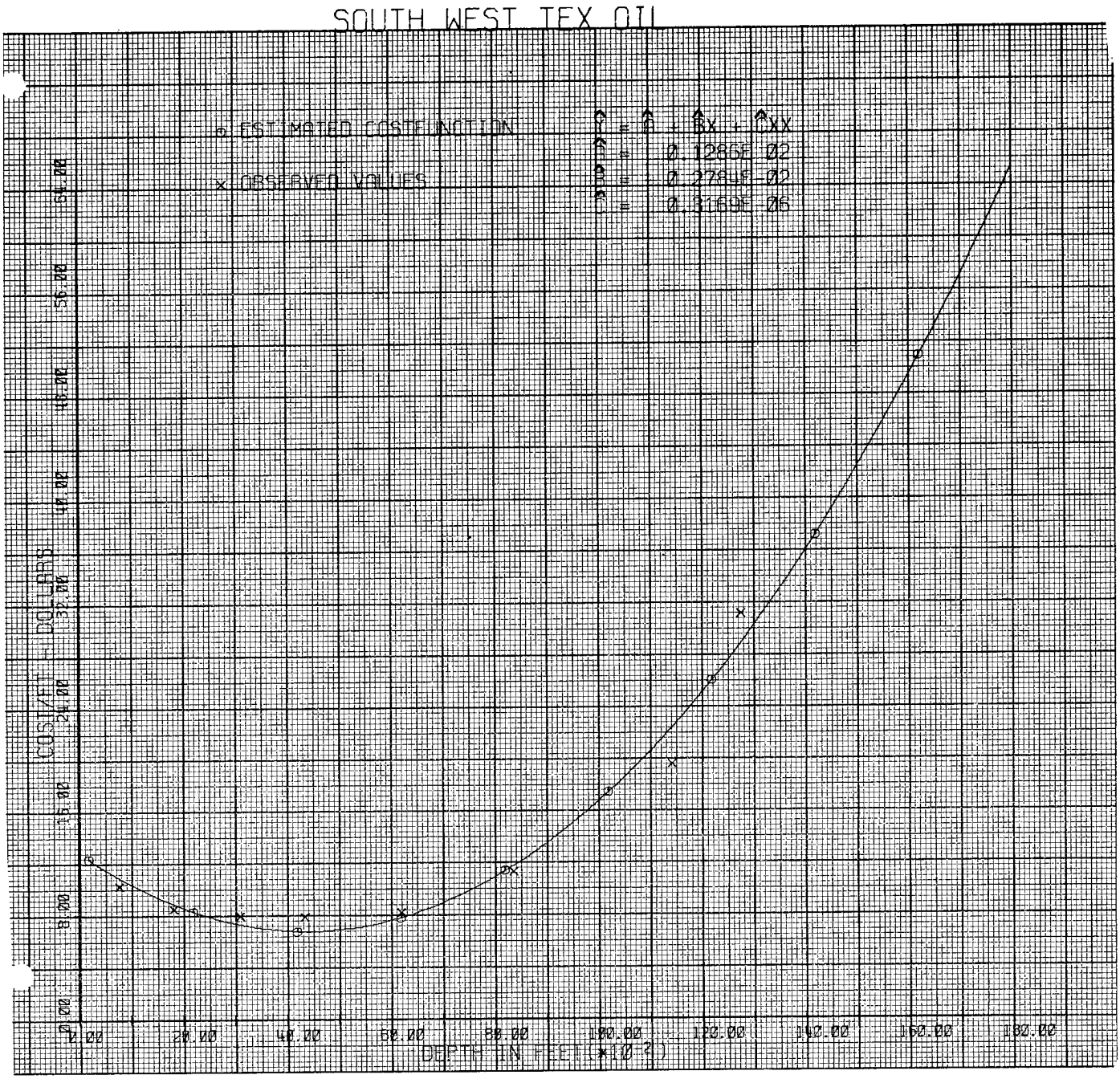

SOUTH WEST TEX OIL
ESTIMATED COST FUNCTION
OBSERVED VALUES
Ŷ = Â + B̂X + ĈXX
Â = 0.12865E 02
B̂ = 0.2784E-02
Ĉ = 0.3169E 06
COST/FT. DOLLARS
DEPTH IN FEET (×10-2)
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00

Table 45a

TOTAL AND MARGINAL DRILLING COSTS FOR OIL WELLS IN SOUTHWEST TEXAS

(in dollars)

DEPTH
18000. feet
TOTAL COST
10392.90000
17119.20000
22080.30000
27177.60000
34312.50000
45386.40100
62300.70000
86956.79900
121256.10000
167100.00000
226389.90000
301027.20000
392913.30000
503949.60000
636037.50000
791078.39000
970973.70000
1177624.80000
MINIMUM AVERAGE COST DEPTH
4393. feet
MINIMUM MARGINAL COST DEPTH
2928. feet
MARGINAL COST
8.24270
5.52680
4.71230
5.79920
8.78750
13.67720
20.46830
29.16080
39.75470
52.25000
66.64670
82.94480
101.14430
121.24520
143.24750
167.15120
192.95630
220.66280
POINT OF INFLECTION
29630.25700
MINIMUM AVERAGE COST
6.74557
MINIMUM MARGINAL COST
4.70742

Table 46

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR GAS WELLS IN SOUTH WEST TEXAS

$$\hat{Y} = 7.50 - 0.7(10^{-3})X_1 + 0.21(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	802.	643204.	7.6000	7.0967	0.5033
2	1779.	3164841.	6.9500	6.9408	0.0092
3	3113.	9690769.	6.8200	7.3737	-0.5537
4	4254.	18096516.	8.1400	8.3355	-0.1955
5	6139.	37687321.	11.2900	11.1190	0.1710
6	8635.	74563225.	16.6300	17.0953	-0.4653
7	11190.	125216100.	26.1700	25.9158	0.2542
8	13563.	191977484.	37.2500	36.5574	0.6926
9	17160.	273616400.	56.7700	57.1858	-0.4158

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.75235213E 01	0.43163382E-00	0.17430333E 02	0.09999999E 01	0.
-0.70015248E-03	0.12602250E-03	-0.55557737E 01	0.74038889E 04	0.95065692E 00
0.20945372E-06	0.70345253E-08	0.29775104E 02	0.83053616E 08	0.99801023E 00

RSQ = 0.9994
R = 0.9997
F(2, 6)= 4633.5646
SUMUSQ = 1.5611
DURBIN-W.= 2.0286

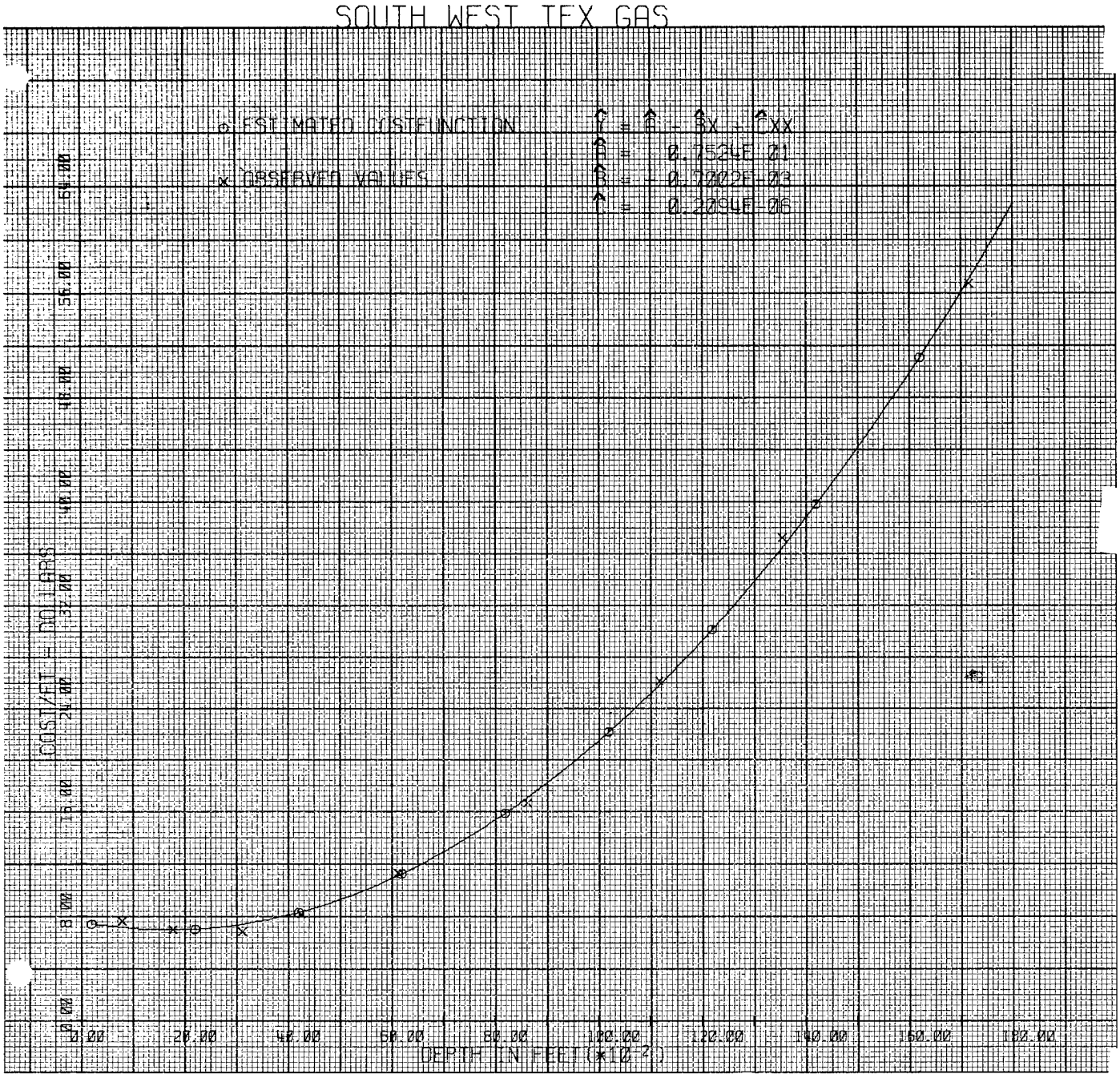

SOUTH WEST TEX GAS
ESTIMATED COSTFUNCTION
OBSERVED VALUES
COST/FT = DOLLARS
DEPTH IN FEET(*10^2)
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00

Table 46a

TOTAL AND MARGINAL DRILLING COSTS FOR GAS WELLS IN SOUTHWEST TEXAS

(in dollars)

DEPTH
18000. feet
TOTAL COST
7033.20000
13922.40000
21924.00000
32294.40100
46290.00000
65167.20100
90182.40100
122592.00000
163652.40000
214620.00000
276751.20000
351302.40000
439530.00000
542690.40000
662040.00000
798835.21000
954332.40000
1129788.00000
MINIMUM AVERAGE COST DEPTH
1672. feet
MINIMUM MARGINAL COST DEPTH
1115. feet
MARGINAL COST
6.75180
7.23600
8.97660
11.97360
16.22700
21.73680
28.50300
36.52560
45.80460
56.34000
68.13180
81.18000
95.48460
111.04560
127.86300
145.93680
165.26700
185.85360
POINT OF INFLECTION
11600.88500
MINIMUM AVERAGE COST
6.93866
MINIMUM MARGINAL COST
6.74355

Table 47

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN SOUTH WEST TEXAS

$\hat{Y} = 3.90 - 0.43(10^{-3})X_1 + 0.16(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	815.	664225.	4.0600	3.6540	0.4060
2	1806.	3261636.	3.4600	3.6350	-0.1750
3	3049.	9296401.	4.0800	4.0481	0.0319
4	4291.	18412681.	6.0300	4.9464	1.0836
5	6122.	37478884.	5.5900	7.1559	-1.5659
6	8635.	74563225.	10.4800	11.9059	-1.4259
7	11215.	125776225.	19.3300	18.8499	0.4801
8	13464.	190639648.	28.5300	26.6115	1.9185
9	18690.	287329025.	50.0400	50.7932	-0.7532

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.39011955E 01	0.10649510E 01	0.36632629E 01	0.09999999E 01	0.
-0.43150876E-03	0.28674909E-03	-0.15048303E 01	0.75652222E 04	0.94708916E 00
0.15732723E-06	0.14798908E-07	0.10631002E 02	0.88894296E 08	0.99641670E 00

RSQ = 0.9948
R = 0.9974
F(2, 6)= 574.6333
SUMUSQ = 10.3346
DURBIN-W.= 2.0674

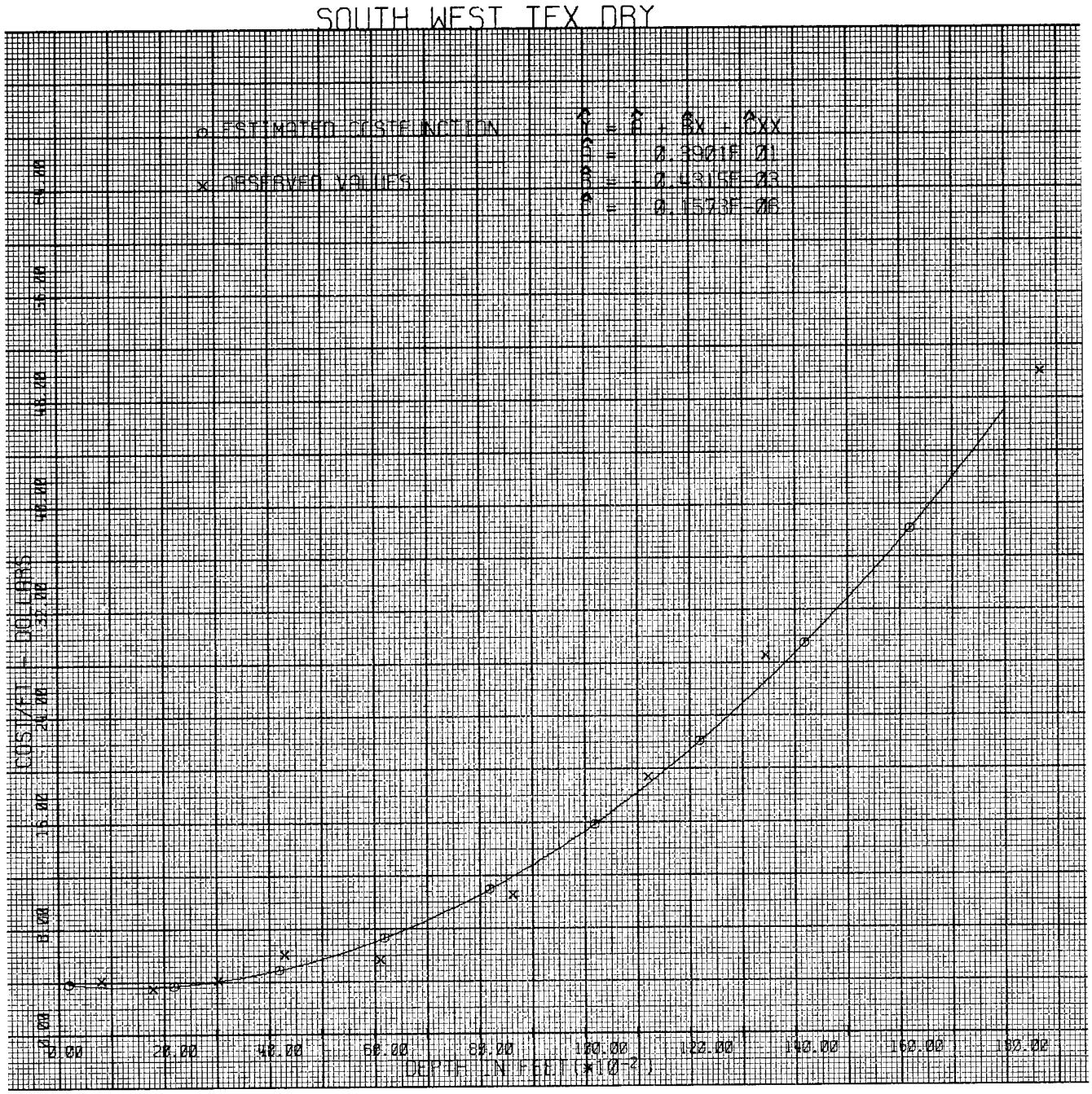

SOUTH WEST TEX DRY
o ESTIMATED COST FUNCTION
x OBSERVED VALUES
$\hat{Y} = \hat{B} + \hat{B}X + \hat{C}XX$
$\hat{B} = 0.1901E\ 01$
$\hat{C} = 0.4315E\ 03$
$\hat{B} = 0.1573E\ 06$
COST/FT. DOLLARS
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10**-2)

Table 47a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN SOUTHWEST TEXAS

(in dollars)

DEPTH	TOTAL COST	MARGINAL COST
18000. feet		
	3626.30000	
	7334.40000	3.50990
	12066.60000	4.06260
	18767.20000	5.55910
	28380.00000	7.99940
	41848.80100	11.38350
	60117.40100	15.71140
	84129.60100	20.98310
	114829.20000	27.19860
	153160.00000	34.35790
	200065.30000	42.46100
	256490.40000	51.50790
	323377.60000	61.49860
	401671.20000	72.43310
	492315.00000	84.31140
	596252.80000	97.13350
	714428.41000	110.89940
	847785.60000	125.60910
		141.26260

MINIMUM AVERAGE COST DEPTH	1372. feet
MINIMUM MARGINAL COST DEPTH	914. feet
POINT OF INFLECTION	4944.66760
MINIMUM AVERAGE COST	3.60508
MINIMUM MARGINAL COST	3.50644

Table 48

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN WEST TEXAS

$$\hat{Y} = 16.70 - 0.21(10^{-2})X_1 + 0.17(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	771.	594441.	16.2000	15.2088	0.9912
2	1821.	3316041.	13.5000	13.5105	-0.0105
3	3091.	9554281.	11.3900	11.9666	-0.5766
4	4347.	18896409.	9.7500	10.9890	-1.2390
5	6068.	36820624.	10.0900	10.5366	-0.4466
6	8519.	72573361.	12.5200	11.6626	0.8574
7	11028.	121616784.	16.7100	14.9699	1.7401
8	13193.	187027624.	18.2600	19.5758	-1.3158

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.16698845E 02	0.12741010E 01	0.13106374E 02	0.09999999E 01	0.
-0.20661344E-02	0.46673521E-03	-0.44267806E 01	0.61047500E 04	0.46001182E-00
0.17313755E-06	0.32772372E-07	0.52830338E 01	0.54678398E 08	0.64092053E 00

RSQ = 0.8802
R = 0.9382
F(2, 5)= 18.3720
SUMUSQ = 8.5441
DURBIN-W.= 1.6630

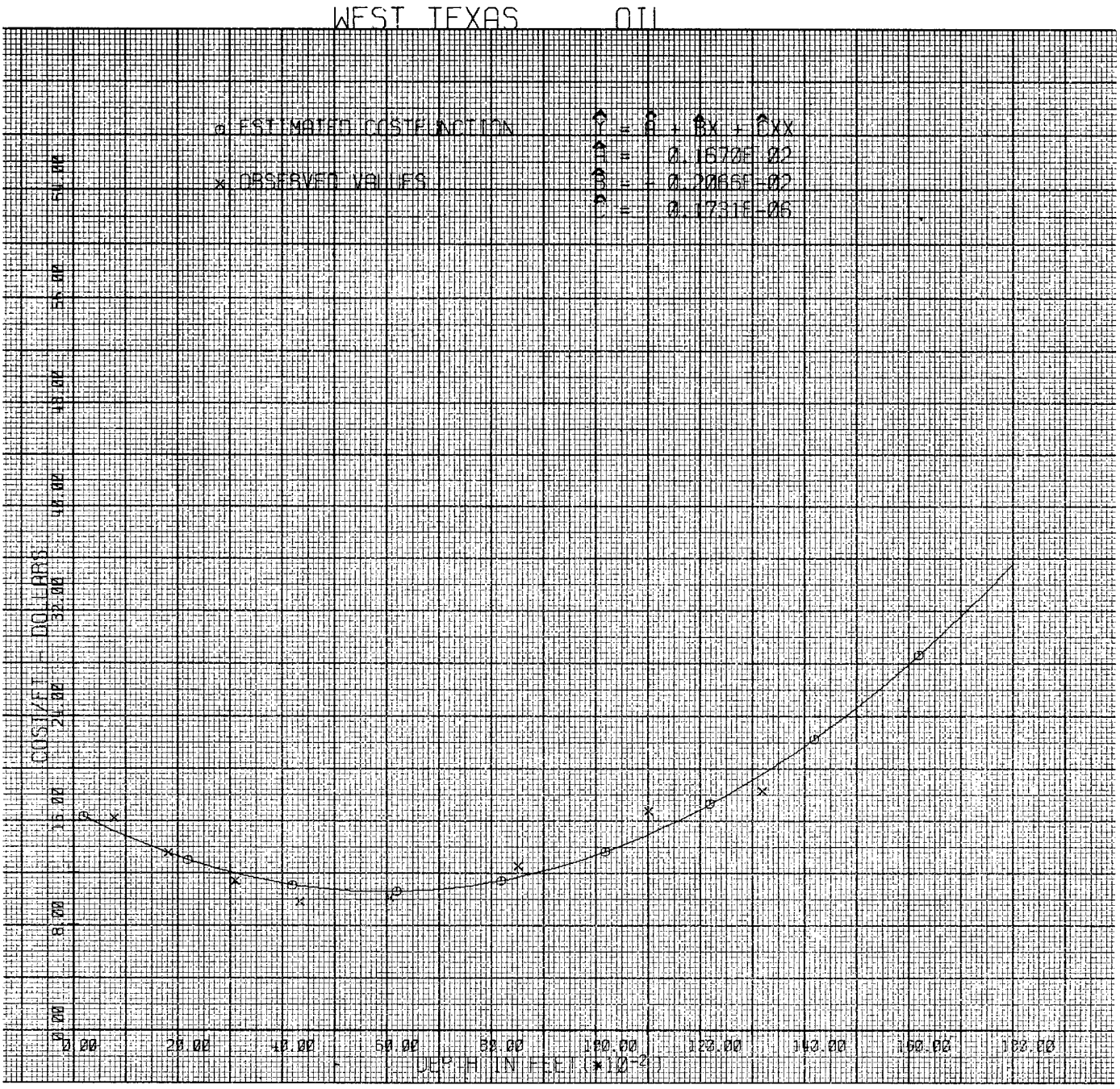

WEST TEXAS OIL
o ESTIMATED COST FUNCTION
x OBSERVED VALUES
Ŷ = Â + B̂x + Ĉxx
Â = 0.1670E 02
B̂ = 0.2066E-02
Ĉ = 0.1731E-06
COST/FT - DOLLARS
DEPTH IN FEET (*10⁻²)
0.00
8.000
16.00
24.00
32.00
40.00
48.00
56.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00

Table 48a

TOTAL AND MARGINAL DRILLING COSTS FOR OIL WELLS IN WEST TEXAS

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	14807.10000
	26520.20000
	36179.70000
	44822.39900
	53487.50000
	63213.59900
	75039.29900
	90003.19900
	109143.90000
	133500.00000
	164110.10000
	202012.80000
	248246.70000
	303850.40000
	369862.49000
	447321.60000
	537266.30000
	640735.19000
MINIMUM AVERAGE COST DEPTH	
5968. feet	
MINIMUM MARGINAL COST DEPTH	
3978. feet	
MARGINAL COST	
	13.08730
	10.51320
	8.97770
	8.48080
	9.02250
	10.60280
	13.22170
	16.87920
	21.57530
	27.31000
	34.08330
	41.89520
	50.74570
	60.63480
	71.56250
	83.52880
	96.53370
	110.57720
POINT OF INFLECTION	
62871.68000	
MINIMUM AVERAGE COST	
	10.53542
MINIMUM MARGINAL COST	
	8.48056

Table 49

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR GAS WELLS IN WEST TEXAS

$\hat{Y} = 15.30 - 0.20(10^{-2})X_1 + 0.22(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	2236.	4999696.	12.0500	11.8298	0.2202
2	3455.	11937025.	10.7500	10.8507	-0.1007
3	4536.	20575296.	9.9800	10.5295	-0.5495
4	6776.	45914176.	12.8600	11.5002	1.3598
5	8917.	79512889.	12.3200	14.4914	-2.1714
6	12022.	72264242.	25.3200	22.4127	2.9073
7	14189.	100663860.	28.3700	30.4541	-2.0841
8	17007.	172309512.	44.4200	44.0016	0.4184

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.15325065E 02	0.26515328E 01	0.57797004E 01	0.09999999E 01	0.
-0.20550638E-02	0.68480874E-03	-0.30009310E 01	0.86422500E 04	0.91437023E 00
0.21998136E-06	0.35529834E-07	0.61914547E 01	0.99754166E 08	0.97314890E 00

RSQ =	0.9811
R =	0.9905
F(2, 5)=	129.6749
SUMUSQ =	19.8958
DURBIN-W.=	3.6887

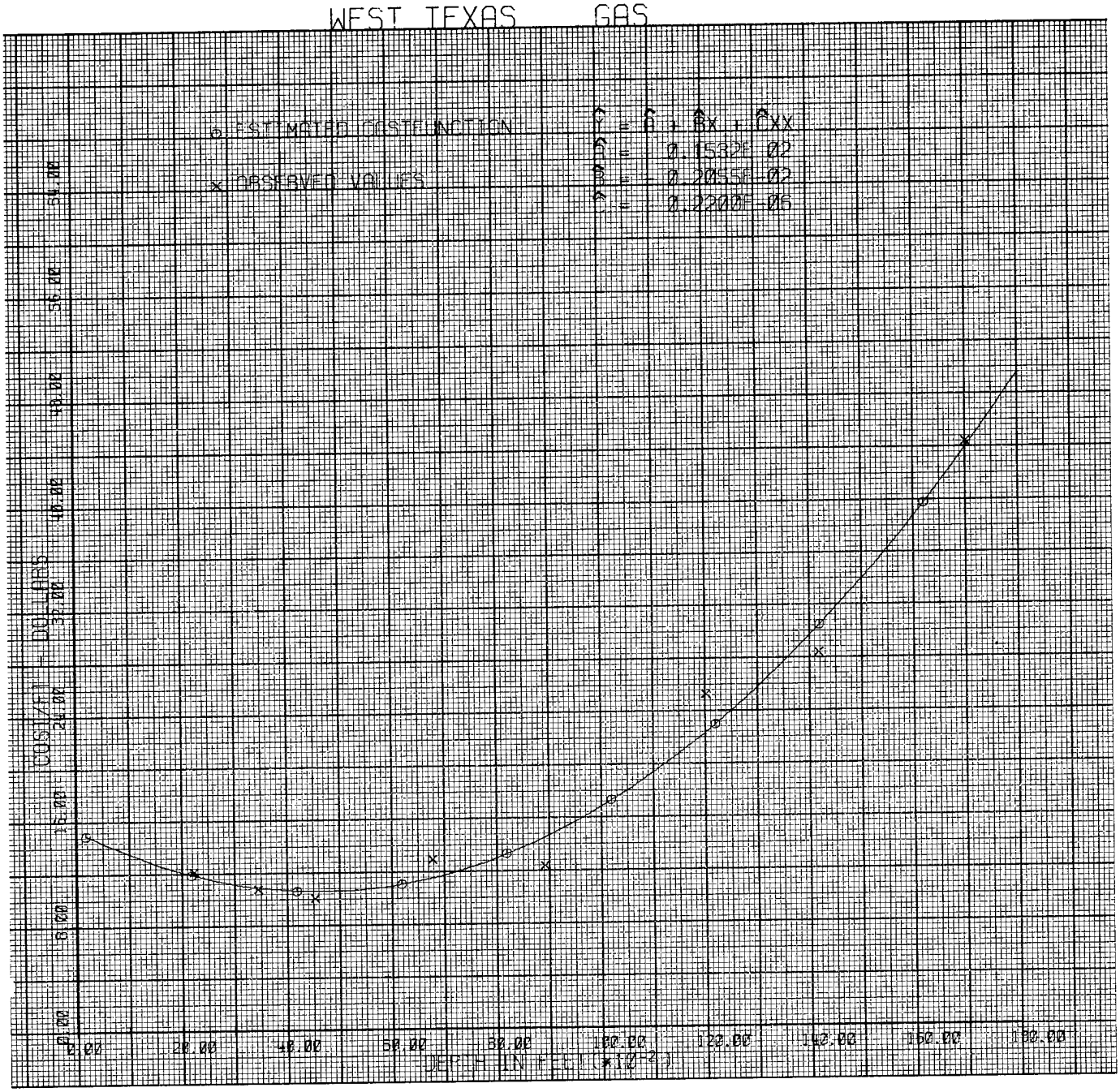

WEST TEXAS GAS
ESTIMATED COST FUNCTION
OBSERVED VALUES
Ĉ = Â + B̂X + ĈXX
Â = Ø.1532E Ø2
B̂ = -Ø.2055E Ø2
Ĉ = Ø.2200E-Ø6
COST/FT = DOLLARS
DEPTH IN FEET (*10^-2)
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
0.00
12.00
24.00
36.00
48.00
60.00

Table 49a

TOTAL AND MARGINAL DRILLING COSTS FOR GAS WELLS IN WEST TEXAS

(in dollars)

DEPTH
18000. feet
TOTAL COST
13485.00000
24180.00000
33405.00000
42479.99900
52725.00000
65460.00000
82004.99900
103680.00000
131805.00000
167700.00000
212685.00000
268080.00000
335205.00000
415379.99000
509925.00000
620160.00000
747405.01000
892980.01000
MINIMUM AVERAGE COST DEPTH
4670. feet
MINIMUM MARGINAL COST DEPTH
3114. feet
MARGINAL COST
11.87000
9.74000
8.93000
9.44000
11.27000
14.42000
18.89000
24.68000
31.79000
40.22000
49.97000
61.04000
73.43000
87.14000
102.17000
118.52000
136.19000
155.18000
POINT OF INFLECTION
49138.35600
MINIMUM AVERAGE COST
10.52111
MINIMUM MARGINAL COST
8.92148

Table 50

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN WEST TEXAS

$\hat{Y} = 18.90 - 0.33(10^{-2})X_1 + 0.29(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	858.	736164.	17.1900	16.2994	0.8906
2	1829.	3345241.	14.8700	13.8347	1.0353
3	3081.	9492561.	11.5700	11.4622	0.1078
4	3081.	9492561.	8.5000	11.4622	-2.9622
5	4337.	18809569.	9.0500	9.9939	-0.9439
6	6163.	37982569.	11.0100	9.4879	1.5221
7	8717.	75986089.	13.2900	12.0180	1.2720
8	11109.	123409881.	16.8900	17.8116	-0.9216

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.18931539E 02	0.19727010E 01	0.95967602E 01	0.09999999E 01	0.
-0.33160336E-02	0.83445264E-03	-0.39739027E 01	0.48968749E 04	0.15852749E-00
0.28942508E-06	0.67793738E-07	0.42692008E 01	0.34906829E 08	0.35679197E-00

RSQ = 0.7901
R = 0.8889
F(2, 5)= 9.4124
SUMUSQ = 16.3264
DURBIN-W.= 1.5518

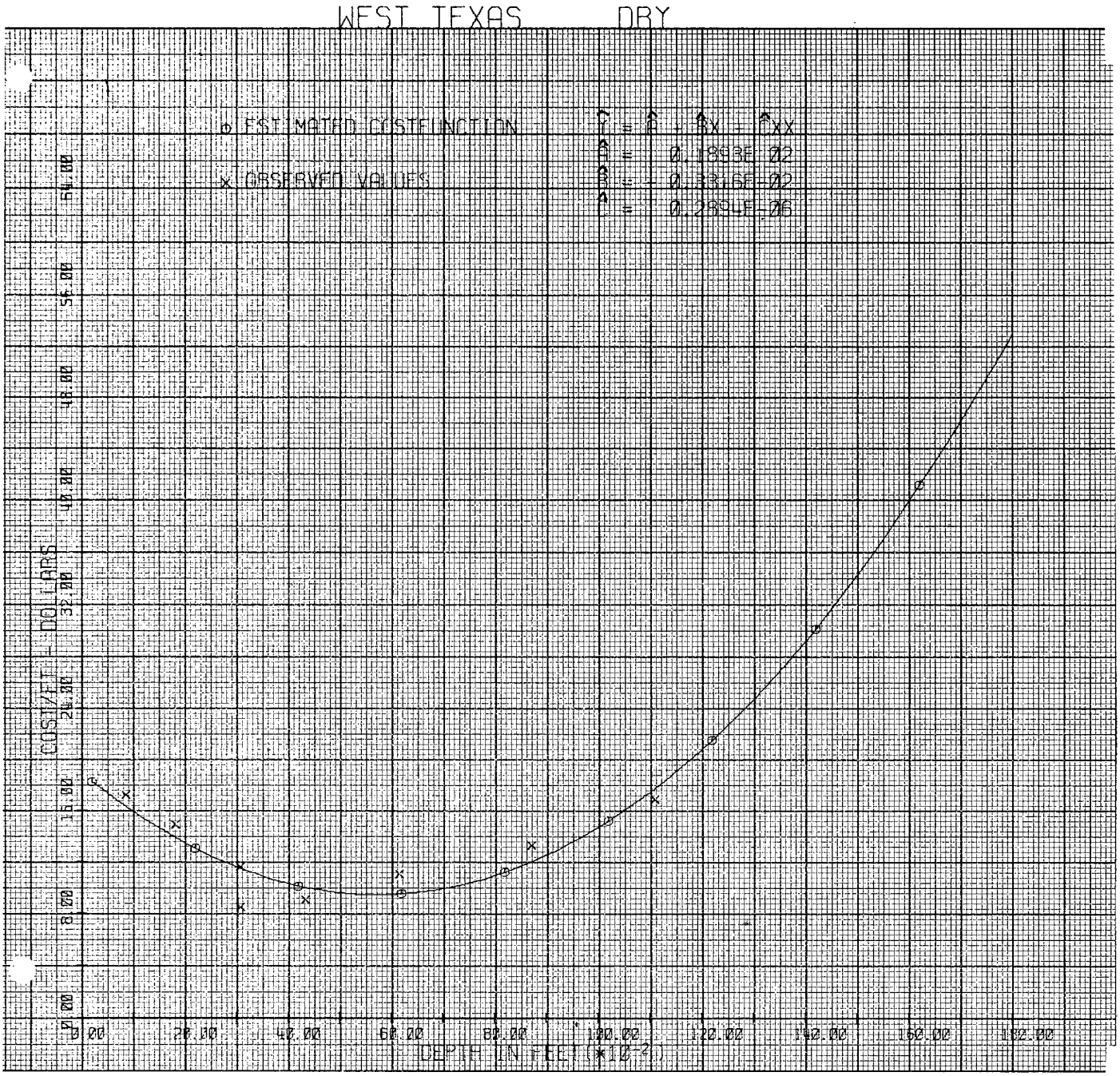

WEST TEXAS DRY
ø ESTIMATED COST FUNCTION
x OBSERVED VALUES
Ŷ = Â + B̂X + ĈXX
B̂ = 0.1893E 02
Ĉ = -0.3316E-02
Â = 0.2894E 06
COST/FT - DOLLARS
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10-2)

Table 50a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN WEST TEXAS

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	15903.40000
	26911.20000
	34759.80000
	41185.60100
	47925.00000
	56714.40000
	69290.20000
	87388.79900
	112746.60000
	147100.00000
	192185.40000
	249739.20000
	321497.80000
	409197.59000
	514574.99000
	639366.39000
	785308.21000
	954136.80000
MINIMUM AVERAGE COST DEPTH	
	5729. feet
MINIMUM MARGINAL COST DEPTH	
	3819. feet
MARGINAL COST	
	13.16620
	9.13880
	6.84780
	6.29320
	7.47500
	10.39320
	15.04780
	21.43880
	29.56620
	39.43000
	51.03020
	64.36680
	79.43980
	96.24920
	114.79500
	135.07720
	157.09580
	180.85080
POINT OF INFLECTION	
	54032.01500
MINIMUM AVERAGE COST	
	9.43116
MINIMUM MARGINAL COST	
	6.26488

Table 51

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN UTAH

$\hat{Y} = 23.30 - 0.38(10^{-2})X_1 + 0.37(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	777.	603729.	21.3500	20.5814	0.7686
2	1774.	3147076.	18.1800	17.7686	0.4114
3	2962.	8773444.	13.0900	15.3790	-2.2890
4	4346.	18887716.	13.8600	13.9146	-0.0546
5	5923.	35081929.	15.3400	13.9767	1.3633
6	11940.	171281800.	30.9500	31.1497	-0.1997

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.23284450E 02	0.17530668E 01	0.13282123E 02	0.09999999E 01	0.
-0.37668142E-02	0.73519441E-03	-0.51235621E 01	0.46203333E 04	0.64832935E 00
0.37064882E-06	0.54537104E-07	0.67962687E 01	0.34842915E 08	0.80950232E 00

RSQ = 0.9646
R = 0.9822
F(2, 3)= 40.9288
SUMUSQ = 7.9011
DURBIN-W.= 2.1347

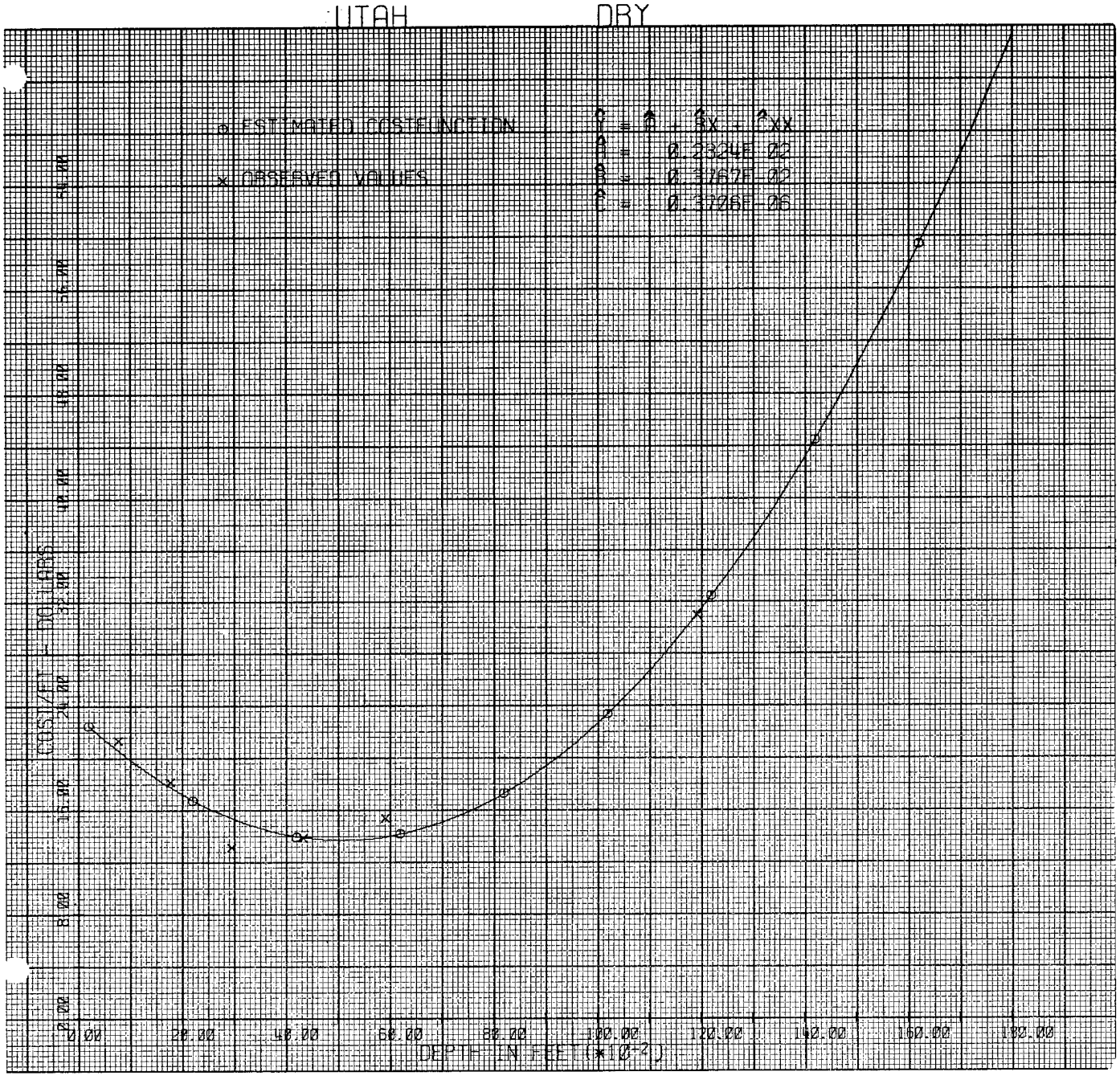

UTAH
DRY
o ESTIMATED COST FUNCTION
× OBSERVED VALUES
$\hat{C} = \hat{\beta} + \hat{\beta}X + \hat{\beta}XX$
$\hat{\beta}$ = Ø.2324E Ø2
$\hat{\beta}$ = -Ø.3762E Ø2
$\hat{\beta}$ = Ø.1706E Ø6
COST/FT - DOLLARS
64.00
56.00
48.00
40.00
32.00
24.00
16.00
8.00
0.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10^-2)

Table 5la

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN UTAH

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	19243.60000
	34376.80000
	45823.20000
	56406.40100
	68350.00100
	83877.60100
	105212.80000
	134579.20000
	174200.40000
	226300.00000
	293101.60000
	376828.81000
	479705.20000
	603954.40000
	751800.00000
	925465.61000
	1127174.80000
	1359151.20000
MINIMUM AVERAGE COST DEPTH	
5082. feet	
MINIMUM MARGINAL COST DEPTH	
3388. feet	
MARGINAL COST	
	16.81780
	12.61920
	10.64420
	10.89280
	13.36500
	18.06080
	24.98020
	34.12320
	45.48980
	59.08000
	74.89380
	92.93120
	113.19220
	135.67680
	160.38500
	187.31680
	216.47220
	247.85120
POINT OF INFLECTION	
69462.27200	
MINIMUM AVERAGE COST	
13.66749	
MINIMUM MARGINAL COST	
10.47665	

Table 52

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN WYOMING

$\hat{Y} = 6.30 + 0.15(10^{-2})\ X$

Where:

$\hat{Y}$ = **Estimated drilling cost per foot**

X = **Depth**

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X	Y	$\hat{Y}$	$Y - \hat{Y}$
3	671.	10.4700	10.9386	-0.4686
4	1891.	14.8800	13.0283	1.8517
5	3083.	17.0600	15.5991	1.4609
6	4477.	14.6000	19.2028	-4.6028
7	6192.	14.4300	21.7122	-7.2822
8	8596.	28.0700	26.0834	1.9866
9		34.0700	29.6811	4.3889

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.63170613E 01	0.23048520E 01	0.27407665E 01	0.09999999E 01	0.
0.14990374E-02	0.26751748E-03	0.56035120E 01	0.71057778E 04	0.90427058E 00

RSQ = 0.8177
R = 0.9043
F(1, 7)= 31.3993
SUMUSQ = 107.0273
DURBIN-W.= 1.3678

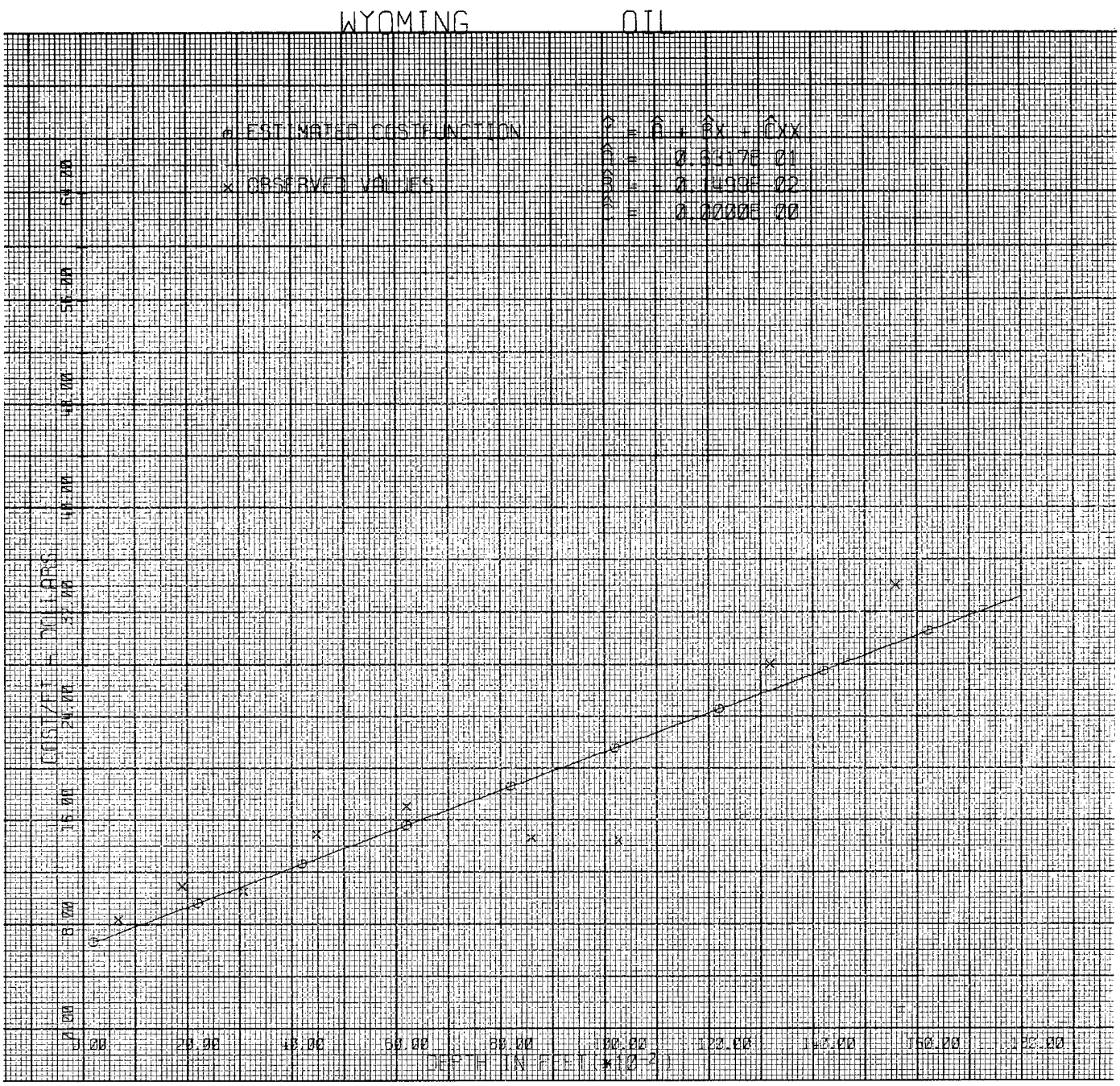

WYOMING OIL
ESTIMATED COST FUNCTION
OBSERVED VALUES
$\hat{C} = \hat{B} + \hat{B}X + \hat{C}XX$
$\hat{B} = \emptyset.6417\text{E}\ 01$
$\hat{B} = \emptyset.1490\text{E}\ 02$
$\hat{C} = \emptyset.2000\text{E}\ 00$
COST/FT. DOLLARS
64.00
56.00
48.00
40.00
32.00
24.00
16.00
8.00
0.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10-2)

Table 53

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR GAS WELLS IN WYOMING

$$\hat{Y} = 25.95 - 0.35(10^{-2})X_1 + 0.36(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	442.	195364.	25.0000	24.4764	0.5236
2	1778.	3161284.	19.4600	20.8602	-1.4002
3	3029.	9174841.	20.0200	18.6270	1.3930
4	4346.	18887716.	16.3800	17.4809	-1.1009
5	6586.	43375396.	19.7200	18.3700	1.3500
6	8708.	75829264.	21.4900	22.5098	-1.0198
7	11062.	122367844.	31.1100	30.8558	0.2542

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.25952718E 02	0.13987689E 01	0.18553971E 02	0.09999999E 01	0.
-0.34976043E-02	0.60722432E-03	-0.57599871E 01	0.51358571E 04	0.46795885E-00
0.35625020E-06	0.51235718E-07	0.69531612E 01	0.38998815E 08	0.66731428E 00

RSQ = 0.9403
R = 0.9697
F(2, 4)= 31.5118
SUMUSQ = 8.3141
DURBIN-W.= 3.7247

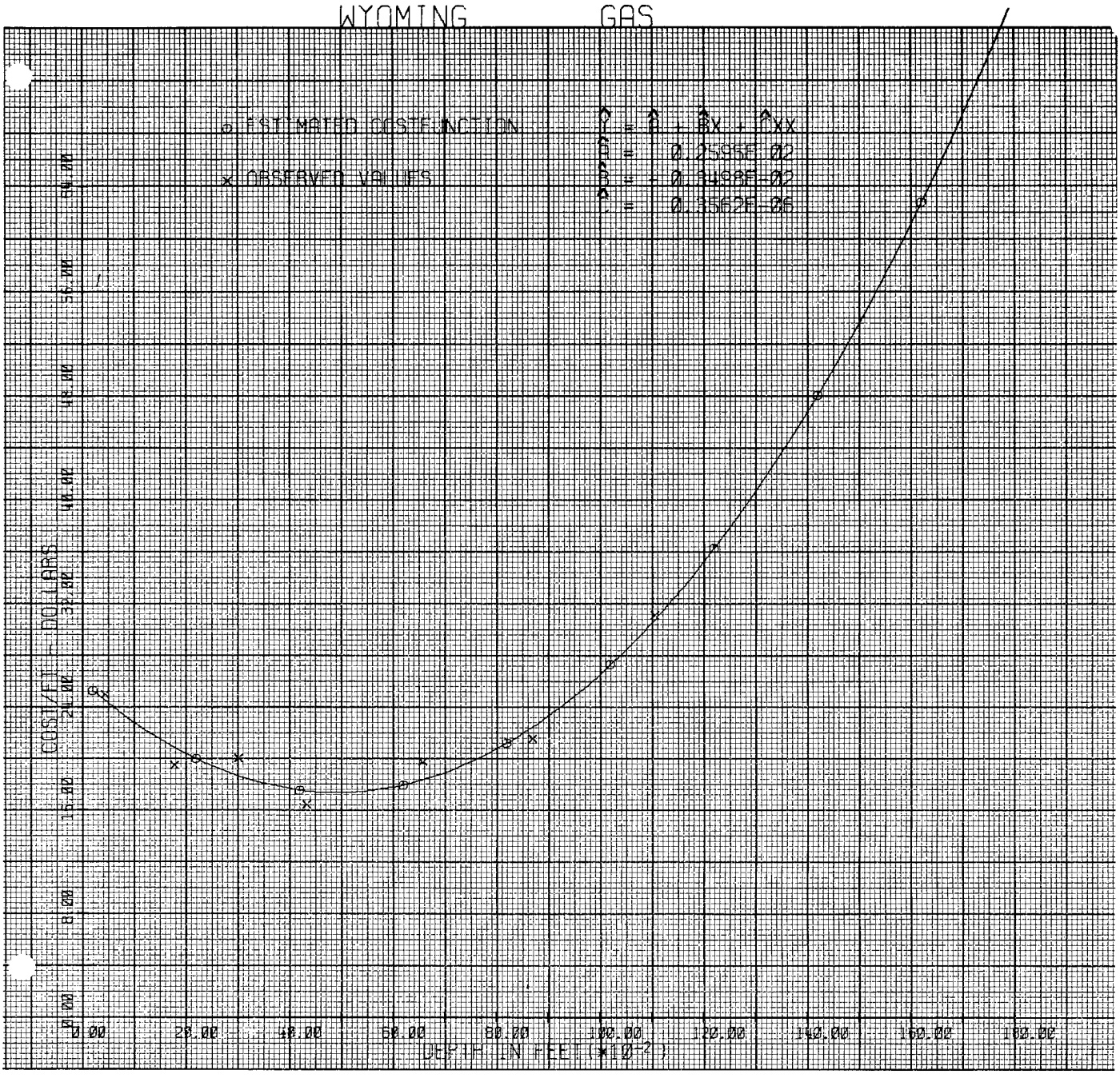

WYOMING GAS
⊙ ESTIMATED COST FUNCTION
× OBSERVED VALUES
Ŷ = B̂ + B̂X + B̂XX
B̂ = 0.2595E 02
B̂ = 0.3498E-02
B̂ = 0.3562E-06
COST/FT - DOLLARS
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (×10⁻²)

Table 53a

TOTAL AND MARGINAL DRILLING COSTS FOR GAS WELLS IN WYOMING

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	22803.20000
	40757.60000
	55985.40100
	70628.80000
	86825.00000
	106711.20000
	132424.60000
	166102.40000
	209881.80000
	265900.00000
	336294.20000
	423201.61000
	528759.40000
	655104.80000
	804375.00000
	978707.21000
	1180238.60000
	1411106.40000
MINIMUM AVERAGE COST DEPTH	
	4910. feet
MINIMUM MARGINAL COST DEPTH	
	3273. feet
MARGINAL COST	
	20.02260
	16.23240
	14.57940
	15.06360
	17.68500
	22.44360
	29.33940
	38.37240
	49.54260
	62.85000
	78.29460
	95.87640
	115.59540
	137.45160
	161.44500
	187.57560
	215.84340
	246.24840
POINT OF INFLECTION	
	85250.86200
MINIMUM AVERAGE COST	
	17.36213
MINIMUM MARGINAL COST	
	14.49950

Table 54

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN WYOMING

$$\hat{Y} = 19.15 - 0.33(10^{-2})X_1 + 0.25(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	655.	429025.	17.1500	17.0730	0.0770
2	1847.	3411409.	14.0100	13.8312	0.1788
3	3148.	9909904.	11.3200	11.1066	0.2134
4	4396.	19324816.	8.7900	9.2908	-0.5008
5	6413.	41126569.	7.8100	8.0079	-0.1979
6	8701.	75707401.	7.8600	9.0231	-1.1631
7	10695.	114383025.	14.4000	12.0494	2.3506
8	13154.	186513858.	17.5700	18.5279	-0.9579

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.19157694E 02	0.12138972E 01	0.15781973E 02	0.09999999E 01	0.
-0.33470983E-02	0.44354088E-03	-0.75463130E 01	0.61261250E 04	0.73119218E-01
0.25081490E-06	0.31591156E-07	0.79394025E 01	0.54664983E 08	0.30715182E-00

RSQ = 0.9269
R = 0.9628
F(2, 5)= 31.6999
SUMUSQ = 8.1690
DURBIN-W.= 3.0404

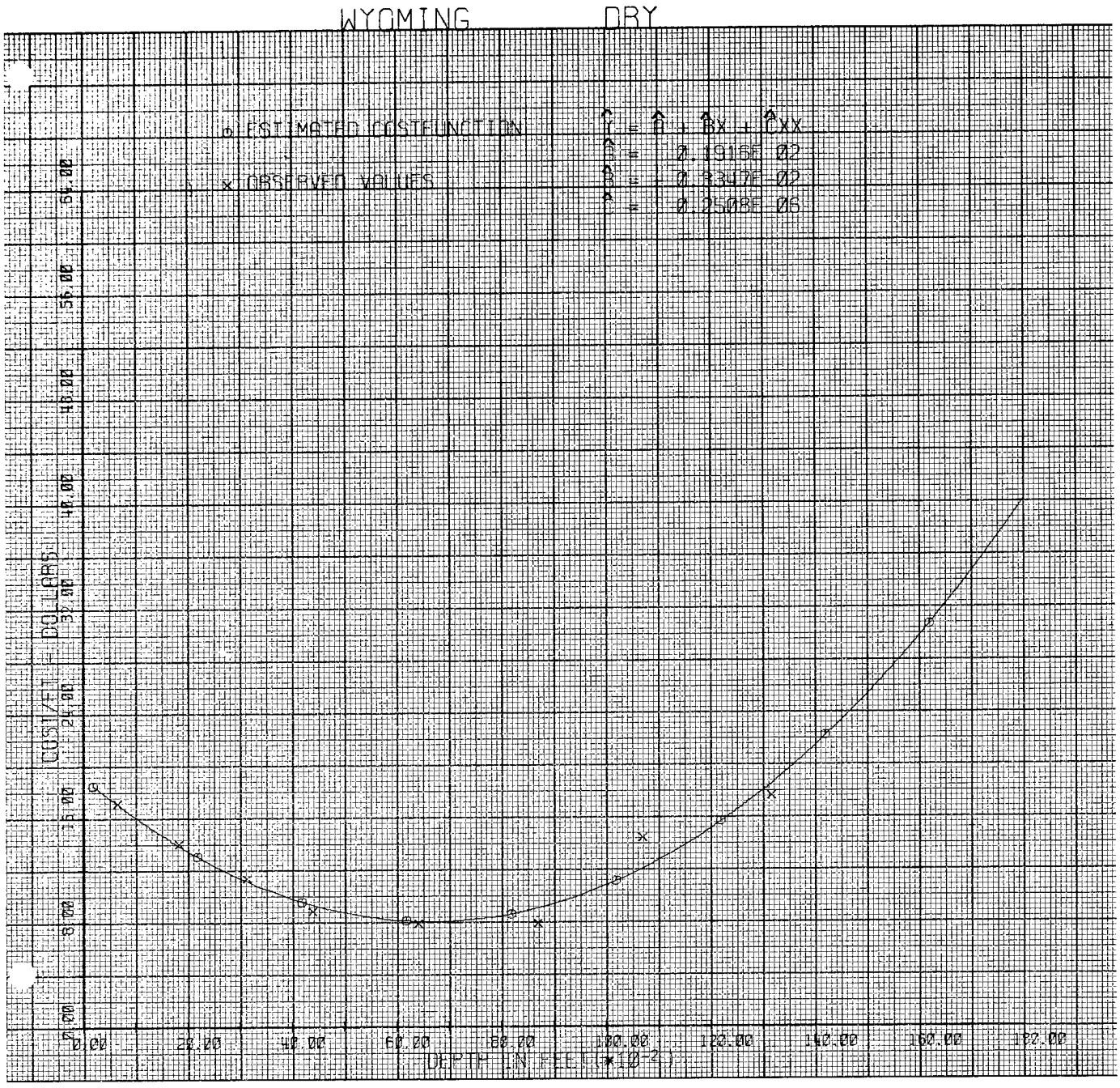

WYOMING DRY
o ESTIMATED COSTFUNCTION
x OBSERVED VOLUES
Ĉ = Â + B̂x + Ĉxx
Â = 2.1916E Ø2
B̂ = Ø.3347E Ø2
Ĉ = Ø.2508E Ø6
COST/FT - DOLLARS
DEPTH IN FEET (×10⁻²)

Table 54a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN WYOMING

(in dollars)

DEPTH	TOTAL COST	MARGINAL COST
18000. feet	16063.80000	13.21840
	26938.40000	8.78160
	34128.60100	5.84960
	39139.20100	4.42240
	43475.00100	4.50000
	48640.80200	6.08240
	56141.40100	9.16960
	67481.60200	13.76160
	84166.20300	19.85840
	107700.00000	27.46000
	139587.80000	36.56640
	181334.41000	47.17760
	234444.60000	59.29360
	300423.20000	72.91440
	380775.01000	88.04000
	477004.81000	104.67040
	590617.42000	122.80560
	723117.63000	142.44560

MINIMUM AVERAGE COST DEPTH
6673. feet

MINIMUM MARGINAL COST DEPTH
4448. feet

POINT OF INFLECTION
53336.63600

MINIMUM AVERAGE COST
7.99332

MINIMUM MARGINAL COST
4.27110

ESTIMATED DRILLING COST FUNCTIONS PER GEOLOGICAL REGION

Includes Average Drilling Estimated Cost Functions (Tables 55 to 63 and their Corresponding Figures) and Total and Marginal Costs (Tables 55. a to 63. a).

Table 55

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN REGION I (Carbon-Permian)

$$\hat{Y} = 8.30 - 0.57(10^{-3})X_1 + 0.14(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	1137.	1292769.	8.2300	7.8313	0.3987
2	2373.	5631129.	5.7000	7.7366	-2.0366
3	3530.	12460900.	5.6600	8.0416	-2.3816
4	4777.	22819729.	6.9900	8.7965	-1.8065
5	6799.	46226401.	9.2600	10.9605	-1.7005
6	785.	616225.	7.1300	7.9377	-0.8077
7	1748.	3055504.	7.5600	7.7302	-0.1702
8	2911.	8473921.	8.7300	7.8311	0.8989
9	881.	776161.	8.6300	7.9052	0.7248
10	1908.	3640464.	8.7400	7.7212	1.0188
11	3115.	9703225.	10.3800	7.8884	2.4916
12	4401.	19368801.	11.3900	8.5223	2.8677
13	6504.	42302016.	11.6800	10.5723	1.1077
14	8718.	76003524.	12.4900	14.0895	-1.5995
15	11119.	123632161.	20.1800	19.4791	0.7009
16	825.	680625.	6.4000	7.9239	-1.5239
17	1792.	3211264.	6.4600	7.7270	-1.2670
18	3038.	9229444.	7.0700	7.8654	-0.7954
19	4320.	18662400.	8.0700	8.4685	-0.3985
20	6095.	37149025.	9.5400	10.0751	-0.5351
21	8546.	73034116.	11.5400	13.7663	-2.2263
22	836.	698896.	7.8200	7.9201	-0.1001
23	1819.	3308761.	5.0600	7.7253	-2.6653
24	3019.	9114361.	13.5000	7.8599	5.6401
25	870.	756900.	8.0100	7.9088	0.1012
26	1881.	3538161.	7.9200	7.7222	0.1978
27	3127.	9778129.	8.0900	7.8922	0.1978
28	4369.	19088161.	9.0100	8.5009	0.5091
29	6012.	36144144.	11.2800	9.9801	1.2999
30	933.	870489.	7.6600	7.8887	-0.2287
31	3085.	9517225.	8.4600	7.8792	0.5808
32	13465.	190653112.	27.1600	26.3286	0.8314
33	1836.	3370896.	8.4000	7.7244	0.6756

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.83020014E 01	0.73831981E 00	0.11244451E 02	0.09999999E 01	0.
-0.57566073E-03	0.32132816E-03	-0.17915041E 01	0.38355757E 04	0.82580031E 00
0.14217852E-06	0.25532837E-07	0.55684574E 01	0.24104913E 08	0.90932264E 00

RSQ = 0.8436
R = 0.9185
F(2, 30)= 80.9078
SUMUSQ = 90.3551
DURBIN-W.= 1.6571

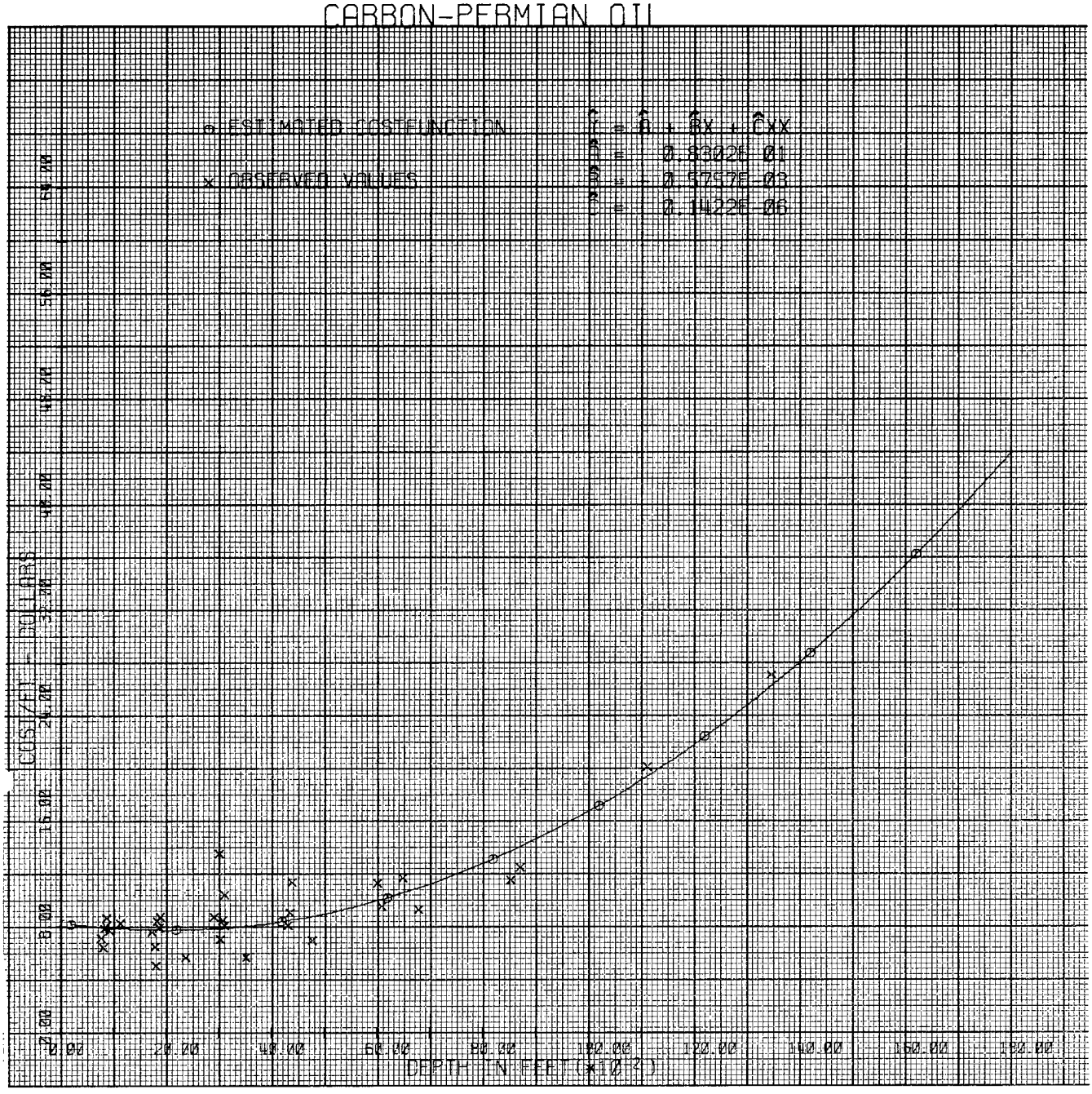

CARBON-PERMIAN OIL
ESTIMATED COSTFUNCTION
OBSERVED VALUES
$\hat{C}_x = \hat{\beta} + \hat{\beta}x + \hat{C}xx$
$\hat{\beta}$ = 0.83026E 01
$\hat{\beta}$ = 0.5757E-03
$\hat{C}$ = 0.1422E-06
COST/FT. DOLLARS
DEPTH IN FEET (x10^2)

Table 55a

TOTAL AND MARGINAL DRILLING COSTS FOR OIL WELLS IN REGION I

(Carbon Permian)

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	7868.49990
	15438.80000
	23564.10100
	33097.60000
	44892.50100
	59802.00100
	78679.30100
	102377.60000
	131750.10000
	167650.00000
	210930.50000
	262444.80000
	323046.10000
	393587.60000
	474922.50000
	567904.00000
	673385.31000
	792219.61000
MINIMUM AVERAGE COST DEPTH	
	2024. feet
MINIMUM MARGINAL COST DEPTH	
	1350. feet
MARGINAL COST	
	7.57720
	7.70560
	8.68720
	10.52200
	13.21000
	16.75120
	21.14560
	26.39320
	32.49400
	39.44800
	47.25520
	55.91560
	65.42920
	75.79600
	87.01600
	99.08920
	112.01560
	125.79520
POINT OF INFLECTION	
	15625.91600
MINIMUM AVERAGE COST	
	7.71932
MINIMUM MARGINAL COST	
	7.52509

Table 56

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR GAS WELLS IN REGION I (Carbon-Permian)

$$\hat{Y} = 13.50 - 0.16(10^{-2})X_1 + 0.19(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	648.	419904.	11.3000	12.5072	-1.2072
2	1504.	2262016.	10.3700	11.4589	-1.0889
3	2878.	8282884.	13.4700	10.3631	3.1069
4	4116.	16941456.	9.5200	9.9949	-0.4749
5	6114.	37380996.	11.6300	10.6387	0.9913
6	8413.	70778569.	14.3500	13.2710	1.0790
7	10857.	117874449.	19.2400	18.2889	0.9511
8	16296.	132779808.	37.1800	37.6657	-0.4857
9	882.	777924.	13.8500	12.1927	1.6573
10	1807.	3265249.	11.0300	11.1552	-0.1252
11	3069.	9418761.	8.4400	10.2680	-1.8280
12	4337.	18809569.	8.3200	9.9909	-1.6709
13	6141.	37711881.	9.6100	10.6579	-1.0479
14	920.	846400.	9.6000	12.1437	-2.5437
15	1735.	3010225.	9.9400	11.2242	-1.2842
16	4470.	19980900.	8.0700	9.9975	-1.9275
17	6156.	37896336.	10.6400	10.6686	-0.0286
18	887.	786769.	14.1000	12.1863	1.9137
19	1909.	3644281.	11.5000	11.0608	0.4392
20	3182.	10125124.	11.0700	10.2183	0.8517
21	4066.	16532356.	10.6200	9.9984	0.6216
22	887.	786769.	14.1200	12.1863	1.9337
23	1897.	3598609.	11.6800	11.0717	0.6083
24	3041.	9247681.	9.8400	10.2811	-0.4411

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.13487265E 02	0.67202146E 00	0.20069694E 02	0.09999999E 01	0.
-0.16365980E-02	0.25654092E-03	-0.63794811E 01	0.40088333E 04	0.74305878E 00
0.19147660E-06	0.16476230E-07	0.11621384E 02	0.28997445E 08	0.90715762E 00

RSQ = 0.9397
R = 0.9694
F(2, 21)= 163.7232
SUMUSQ = 46.9091
DURBIN-W.= 1.3721

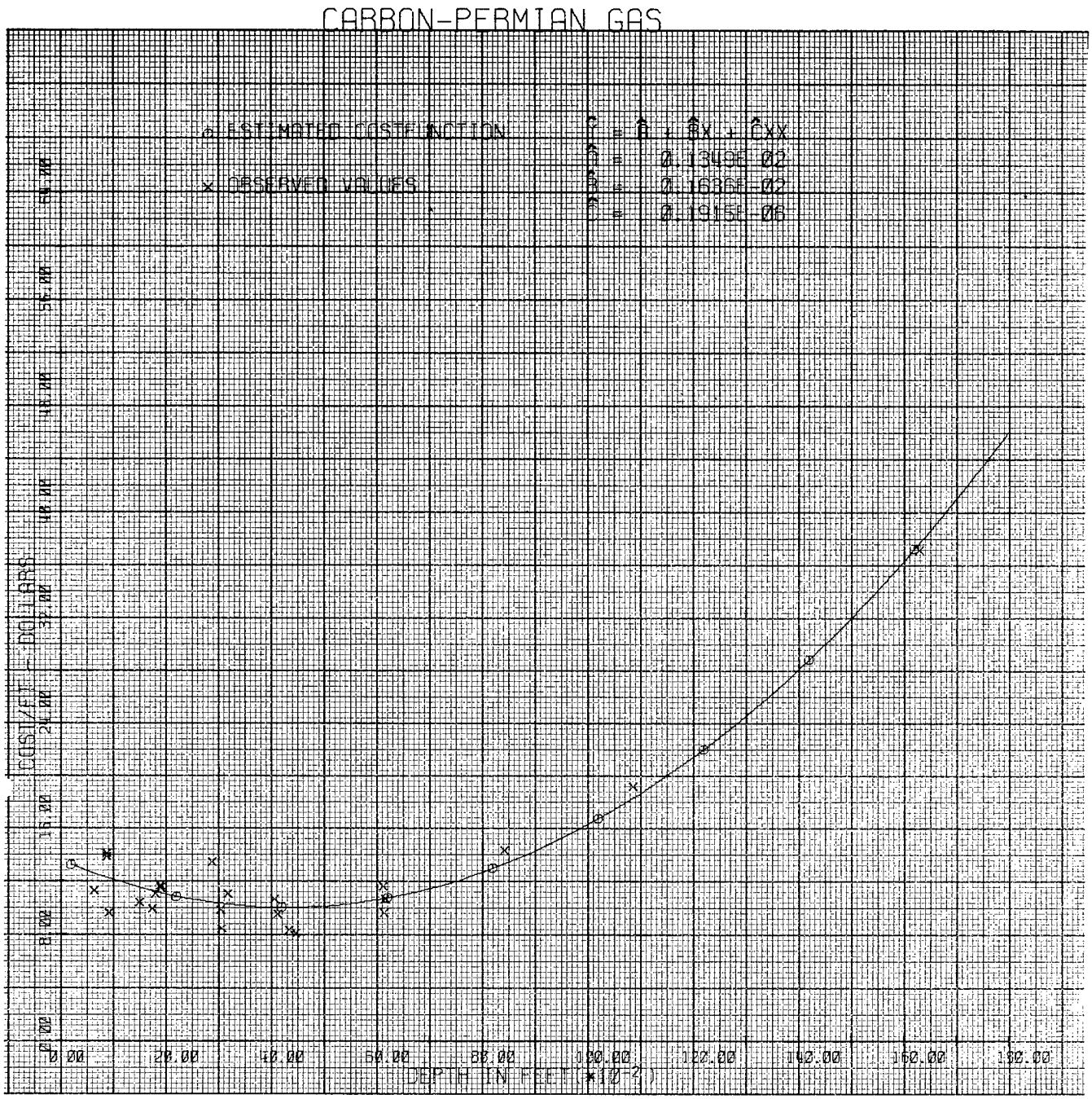

CARBON-PERMIAN GAS
ø ESTIMATED COST FUNCTION
× OBSERVED VALUES
Ĉ = Â + B̂X + ĈXX
Â = Ø.1349E-02
B̂ = Ø.1636E-02
Ĉ = Ø.1915E-06
COST/FT - DOLLARS
DEPTH IN FEET *10^-2
Ø.ØØ
8.ØØ
16.ØØ
24.ØØ
32.ØØ
40.ØØ
48.ØØ
56.ØØ
64.ØØ
Ø.ØØ
20.ØØ
40.ØØ
60.ØØ
80.ØØ
100.ØØ
120.ØØ
140.ØØ
160.ØØ
180.ØØ

Table 56a

TOTAL AND MARGINAL DRILLING COSTS FOR GAS WELLS IN REGION I

(Carbon Permian)

(in dollars)

DEPTH
18000.feet
TOTAL COST
12045.50000
21968.00000
30916.50000
40040.00000
50487.50100
63408.00100
79950.50100
101264.00000
128497.50000
162800.00000
205320.50000
257208.00000
319611.50000
393680.00000
480562.51000
581408.01000
697365.51000
829584.01000
MINIMUM AVERAGE COST DEPTH
4272. feet
MINIMUM MARGINAL COST DEPTH
2848. feet
MARGINAL COST
10.79250
9.24400
8.84450
9.59400
11.49250
14.54000
18.73650
24.08200
30.57650
38.22000
47.01250
56.95400
68.04450
80.28400
93.67250
108.21000
123.89650
140.73200
POINT OF INFLECTION
42697.80600
MINIMUM AVERAGE COST
9.99588
MINIMUM MARGINAL COST
8.83117

Table 57

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN REGION I (Carbon-Permian)

$$\hat{Y} = 6.90 - 0.11(10^{-2})X_1 + 0.18(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	2102.	4418404.	5.8200	5.4808	0.3392
2	3315.	10989225.	4.4900	5.3973	-0.9073
3	4584.	21013056.	4.8300	5.8866	-1.0566
4	6679.	44609041.	6.3500	7.9846	-1.6346
5	8760.	76737600.	9.4500	11.6594	-2.2094
6	11780.	69384200.	17.6400	19.8126	-2.1726
7	830.	688900.	7.0500	6.1470	0.9030
8	1829.	3345241.	6.5500	5.5739	0.9761
9	3069.	9418761.	6.5200	5.3707	1.1493
10	4338.	18818244.	7.1600	5.7457	1.4143
11	6157.	37908649.	11.2000	7.3115	3.8885
12	888.	788544.	7.4200	6.1037	1.3163
13	1873.	3508129.	6.7100	5.5570	1.1530
14	3167.	10029889.	7.0200	5.3787	1.6413
15	4414.	19483396.	7.4500	5.7869	1.6631
16	6351.	40335201.	8.5800	7.5500	1.0300
17	8753.	76615009.	11.4700	11.6444	-0.1744
18	11095.	123099025.	15.6500	17.6705	-2.0205
19	13686.	193653298.	34.0000	26.6771	7.3229
20	16509.	268136770.	37.3900	39.2882	-1.8982
21	820.	672400.	5.0500	6.1546	-1.1046
22	1787.	3193369.	4.5600	5.5906	-1.0306
23	3039.	9235521.	5.4500	5.3690	0.0810
24	4300.	18490000.	5.6600	5.7259	-0.0659
25	6099.	37197801.	6.0900	7.2429	-1.1529
26	8606.	74063236.	7.5700	11.3331	-3.7631
27	816.	665856.	5.9000	6.1576	-0.2576
28	1814.	3290596.	5.4300	5.5798	-0.1498
29	3028.	9168784.	6.4600	5.3684	1.0916
30	4171.	17397241.	7.7500	5.6627	2.0873
31	979.	958441.	4.3100	6.0383	-1.7283
32	1897.	3598609.	5.7400	5.5481	0.1919
33	3152.	9935104.	4.9300	5.3772	-0.4472
34	4385.	19228225.	5.2800	5.7709	-0.4909
35	6000.	36000000.	7.1700	7.1286	0.0414
36	840.	705600.	4.2800	6.1394	-1.8594
37	1780.	3168400.	4.8100	5.5934	-0.7834
38	2996.	8976016.	5.8700	5.3671	0.5029
39	748.	559504.	5.7900	6.2103	-0.4203
40	1671.	2792241.	4.9400	5.6402	-0.7002
41	2923.	8543929.	4.6000	5.3654	-0.7654

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.69010858E 01	0.69677698E 00	0.99042965E 01	0.09999999E 01	0.
-0.10604930E-02	0.25980275E-03	-0.40819161E 01	0.44397561E 04	0.84413901E 00
0.18306846E-06	0.17314141E-07	0.10573349E 02	0.33372419E 08	0.94610474E 00

RSQ = 0.9271
R = 0.9629
F(2, 38)= 241.5781
SUMUSQ = 137.9256
DURBIN-W.= 1.8373

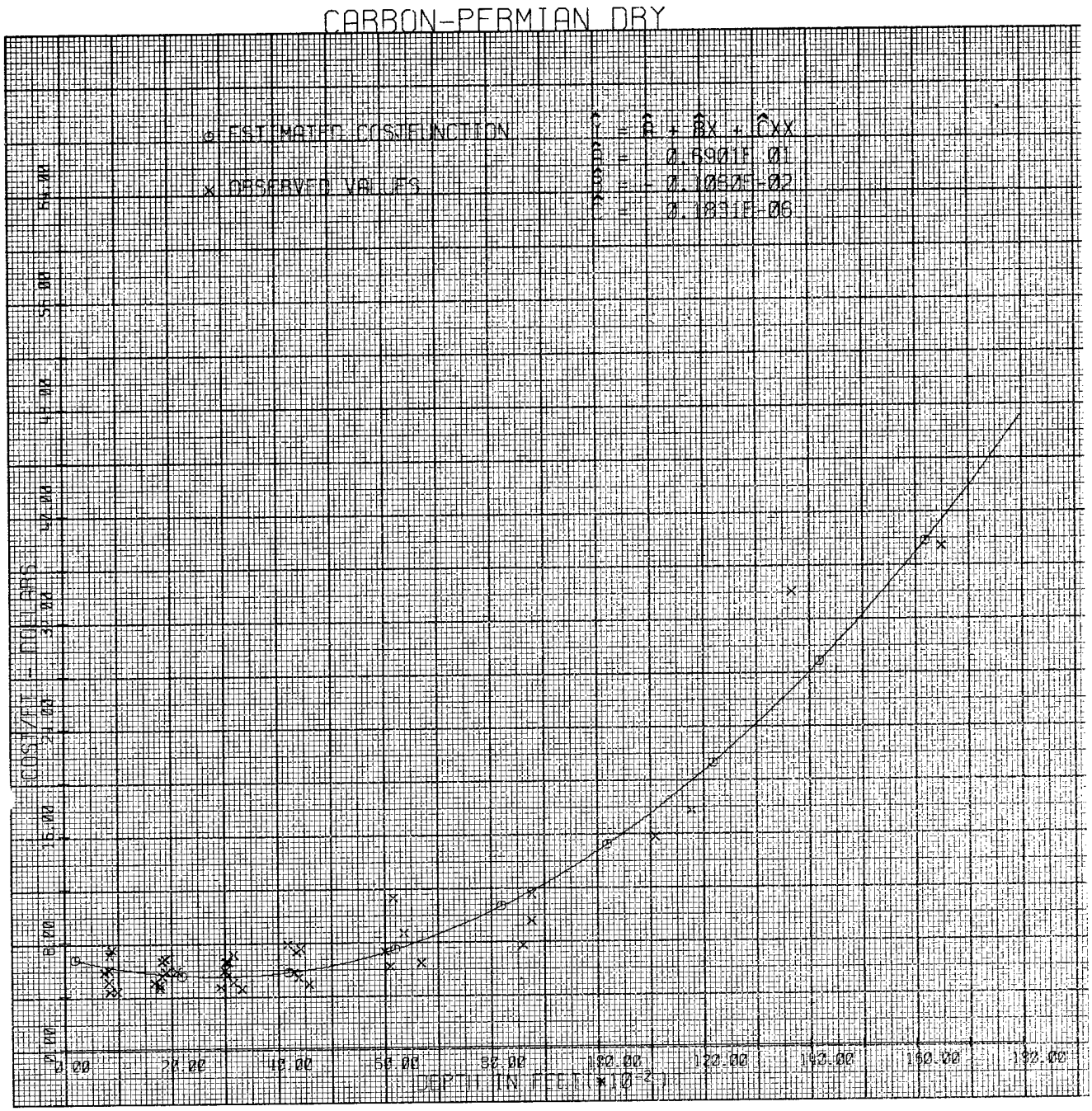

CARBON-PERMIAN DRY
ESTIMATED COST FUNCTION
OBSERVED VALUES
$\hat{Y} = \hat{B} + \hat{B}X + \hat{C}XX$
$\hat{B}$ = 0.6901E 01
$\hat{B}$ = -0.1052E-02
$\hat{C}$ = 0.1031E-06
COST/FT IN DOLLARS
DEPTH IN FEET (*10^-2)
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00

Table 57a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN REGION I

(Carbon Permian)

(in dollars)

DEPTH
12000.feet
TOTAL COST
6024.10000
11026.80000
16106.70000
22362.40000
30892.50000
42795.60000
59170.29900
81115.19900
109728.90000
146110.00000
191357.10000
246568.80000
312843.70000
391280.40000
482977.50000
589033.60000
710547.31000
848617.20000
MINIMUM AVERAGE COST DEPTH
2895.feet
MINIMUM MARGINAL COST DEPTH
1930.feet
MARGINAL COST
5.33030
4.85820
5.48470
7.20980
10.03350
13.95580
18.97670
25.09620
32.31430
40.63100
50.04630
60.56020
72.17270
84.88380
98.69350
113.60180
129.60870
146.71420
POINT OF INFLECTION
15534.89300
MINIMUM AVERAGE COST
5.36687
MINIMUM MARGINAL COST
4.85549

Table 58

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN REGION II (Cenozoic)

$$\hat{Y} = 9.45 - 0.10(10^{-2})X_1 + 0.17(10^{-6})X_2$$

Where:

$\hat{Y}$ = **Estimated drilling cost per foot**

X_1 = **Depth**

X_2 = **Square of depth**

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	945.	893025.	8.3500	8.6350	-0.2850
2	1910.	3648100.	8.8700	8.1055	0.7645
3	3205.	10272025.	10.4600	7.8898	2.5702
4	4396.	19324816.	12.4500	8.1922	4.2578
5	6235.	38875225.	11.8200	9.6014	2.2186
6	8783.	77141089.	12.8800	13.4445	-0.5645
7	11343.	128663649.	18.2100	19.5171	-1.3071
8	13996.	197944008.	25.0600	28.1494	-3.0894
9	671.	450241.	12.4700	8.8428	3.6272
10	1917.	3674889.	7.7500	8.1028	-0.3528
11	3210.	10304100.	6.2600	7.8901	-1.6301
12	4378.	19166884.	6.3900	8.1840	-1.7940
13	6376.	40653376.	9.3100	9.7567	-0.4467
14	8755.	76650025.	14.4200	13.3903	1.0297
15	10972.	120384784.	23.4000	18.4997	4.9003
16	2052.	4210704.	7.9100	8.0541	-0.1441
17	3250.	10562500.	9.4800	7.8925	1.5875
18	4501.	20259001.	9.5800	8.2419	1.3381
19	6622.	43850884.	10.8800	10.0437	0.8363
20	8891.	79049881.	14.9400	13.6559	1.2841
21	11502.	132296004.	21.9800	19.9674	2.0126
22	14066.	198926178.	28.5500	28.4094	0.1406
23	800.	640000.	6.4800	8.7418	-2.2618
24	1770.	3132900.	5.9200	8.1628	-2.2428
25	3064.	9388096.	6.8200	7.8858	-1.0658
26	4378.	19166884.	8.1300	8.1840	-0.0540
27	6151.	37834801.	7.2800	9.5121	-2.2321
28	8515.	72505225.	12.5800	12.9369	-0.3569
29	787.	619369.	10.2100	8.7517	1.4583
30	1827.	3337929.	8.4700	8.1386	0.3314
31	3101.	9616201.	7.9000	7.8862	0.0138
32	4349.	18913801.	7.8500	8.1712	-0.3212
33	6195.	38378025.	8.1800	9.5586	-1.3786
34	8360.	69889600.	11.2500	12.6545	-1.4045
35	3595.	12924025.	4.0500	7.9360	-3.8860
36	4536.	20575296.	7.6500	8.2592	-0.6092
37	6066.	36796356.	6.4800	9.4242	-2.9442

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.94588698E 01	0.95594873E 00	0.98947459E 01	0.09999999E 01	0.
-0.10316027E-02	0.33478972E-03	-0.30813453E 01	0.54451351E 04	0.82903978E 00
0.16912110E-06	0.23627842E-07	0.71577041E 01	0.42913242E 08	0.91675043E 00

RSQ = 0.8753
R = 0.9356
F(2, 34)= 119.2880
SUMUSQ = 143.8210
DURBIN-W.= 1.2662

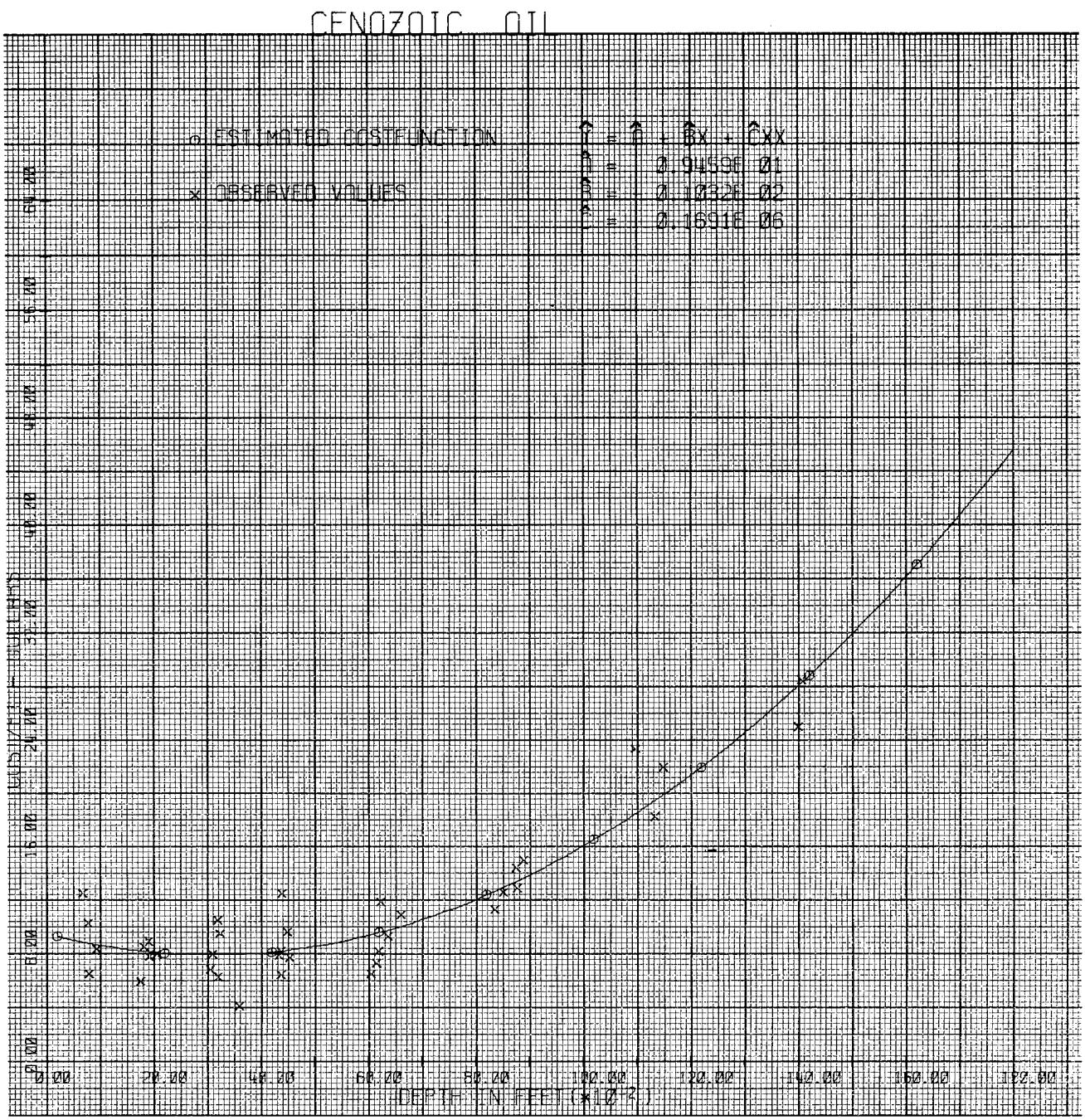

CENOZOIC OIL
ESTIMATED COSTFUNCTION
OBSERVED VALUES
$\hat{C} = \hat{\alpha} + \hat{\beta}X + \hat{\gamma}XX$
$\hat{\alpha}$ = 2.9459E 01
$\hat{\beta}$ = 2.1032E-02
$\hat{\gamma}$ = 2.1691E-06
COSTS IN CENTS/BARREL
DEPTH IN FEET(*10^-2)
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00

Table 58a

TOTAL AND MARGINAL DRILLING COSTS FOR OIL WELLS IN REGION II

(Cenozoic)

(in dollars)

DEPTH	
18000.	feet
TOTAL COST	
8596.09990	
16142.80000	
23654.70000	
32146.40000	
42632.50000	
56127.60000	
73646.30000	
96203.20000	
124812.90000	
160490.00000	
204249.10000	
257104.80000	
320071.70000	
394164.40000	
480397.50000	
579785.60000	
693343.30000	
822085.21000	
MINIMUM AVERAGE COST DEPTH	
3051.	feet
MINIMUM MARGINAL COST DEPTH	
2034.	feet
MARGINAL COST	
7.90230	
7.36020	
7.83270	
9.31930	
11.82150	
15.33780	
19.86870	
25.41420	
31.97430	
39.54900	
48.13830	
57.74220	
68.36070	
79.99380	
92.64150	
106.30380	
120.98070	
136.67220	
POINT OF INFLECTION	
24059.00300	
MINIMUM AVERAGE COST	
7.88445	
MINIMUM MARGINAL COST	
7.35960	

Table 59

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR GAS WELLS IN REGION II (Cenozoic)

$\hat{Y} = 13.55 - 0.16(10^{-2})X_1 + 0.20(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	1090.	1188100.	9.7900	12.0122	-2.2222
2	1751.	3066001.	12.4500	11.3037	1.1463
3	2986.	8916196.	12.3000	10.4397	1.8603
4	4281.	18326961.	11.8200	10.1770	1.6430
5	5995.	35940025.	11.7600	10.8416	0.9184
6	8523.	72641529.	13.5300	13.9272	-0.3972
7	10898.	118766404.	18.6800	19.1120	-0.4320
8	13745.	94462512.	26.7400	28.2458	-1.5058
9	16528.	68293696.	41.0000	40.2502	0.7498
10	761.	579121.	11.0000	12.4288	-1.4288
11	4345.	18879025.	7.0700	10.1811	-3.1111
12	6177.	38155329.	10.1100	10.9800	-0.8700
13	8648.	74787904.	13.5300	14.1449	-0.6149
14	11102.	123254404.	23.2300	19.6606	3.5694
15	13440.	190316800.	27.4200	27.1151	0.3049
16	1934.	3740356.	12.1100	11.1379	0.9721
17	3081.	9492561.	12.1600	10.3981	1.7619
18	4950.	24502500.	9.8400	10.2991	-0.4591
19	6756.	45643536.	10.3300	11.5065	-1.1765
20	8510.	72420100.	12.8900	13.9049	-1.0149
21	11292.	127509264.	20.6200	20.1863	0.4337
22	1997.	3988009.	11.9500	11.0839	0.8661
23	2910.	8468100.	10.5000	10.4756	0.0244
24	9327.	86992929.	15.9900	15.4344	0.5556
25	11409.	130165281.	19.1300	20.5170	-1.3870
26	13952.	197329152.	29.4500	29.0340	0.4160
27	16633.	269164172.	40.1600	40.7626	-0.6026

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.13555149E 02	0.81703498E 00	0.16590659E 02	0.09999999E 01	0.
-0.16295295E-02	0.23521020E-03	-0.69279713E 01	0.75192963E 04	0.87406142E 00
0.19631346E-06	0.13743018E-07	0.14284596E 02	0.79313777E 08	0.96202286E 00

RSQ = 0.9752
R = 0.9875
F(2, 24)= 471.1217
SUMUSQ = 52.4999
DURBIN-W.= 1.5069

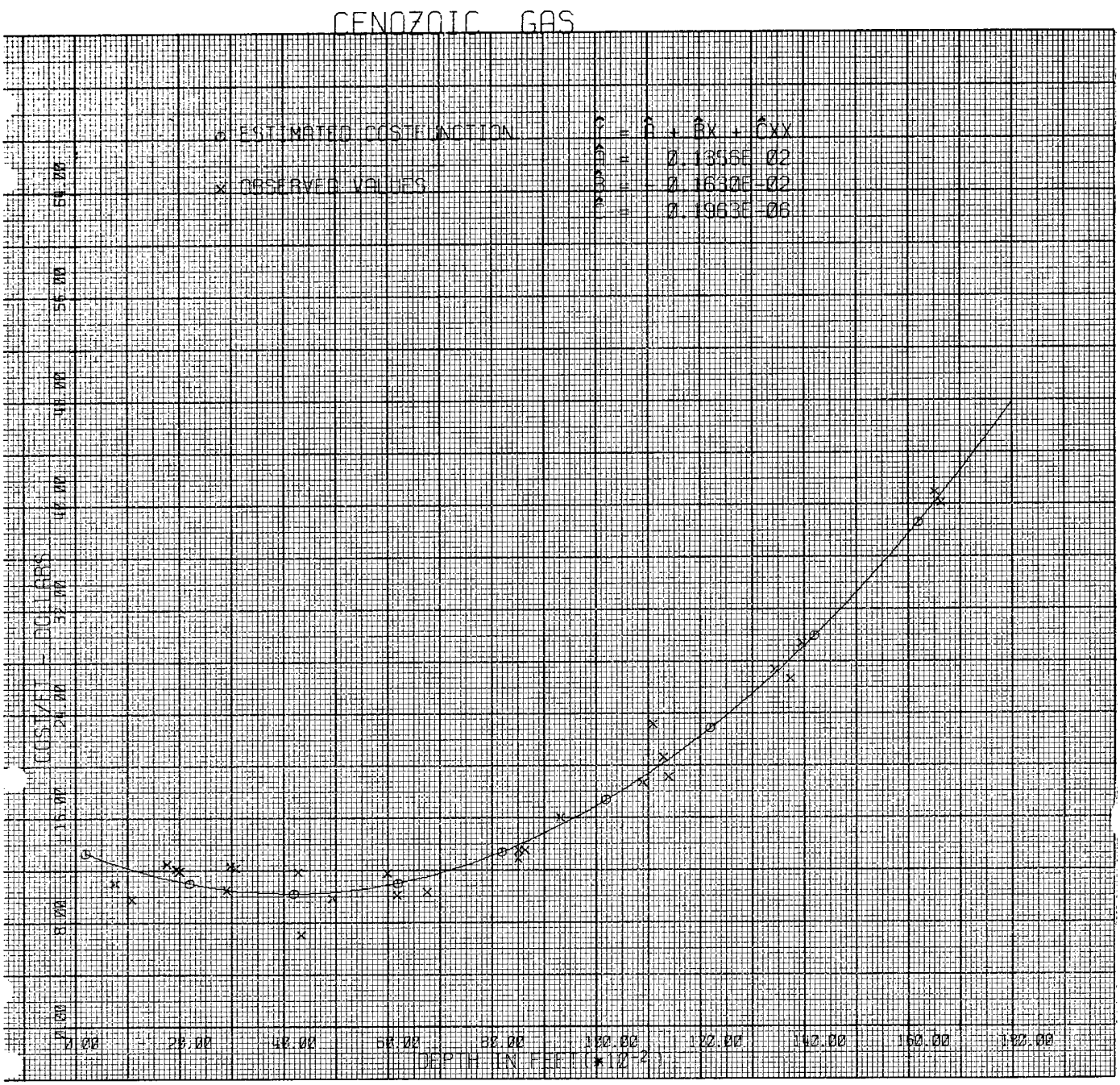

CENOZOIC GAS
⊙ ESTIMATED COST FUNCTION
× OBSERVED VALUES
$\hat{C} = \hat{\alpha} + \hat{\beta}X + \hat{\gamma}XX$
$\hat{\alpha}$ = Ø.1356E Ø2
$\hat{\beta}$ = -Ø.1630E-Ø2
$\hat{\gamma}$ = Ø.1963E-Ø6
COST/FT - DOLLARS
64.00
56.00
48.00
40.00
32.00
24.00
16.00
8.00
0.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10-2)

Table 59a

TOTAL AND MARGINAL DRILLING COSTS FOR GAS WELLS IN REGION II

(Cenozoic)

(in dollars)

DEPTH	
18000. feet	
TOTAL COST	
	12126.30000
	22170.40000
	31310.10000
	40723.20100
	51587.50000
	65080.80000
	82380.89900
	104665.60000
	133112.70000
	168900.00000
	213205.30000
	267206.40000
	332081.10000
	409007.19000
	499162.50000
	603724.81000
	723871.91000
	860781.60000
MINIMUM AVERAGE COST DEPTH	
4152. feet	
MINIMUM MARGINAL COST DEPTH	
2768. feet	
MARGINAL COST	
	10.88890
	9.39560
	9.08010
	9.94240
	11.98250
	15.20040
	19.59610
	25.16960
	31.92090
	39.85000
	48.95690
	59.24160
	70.70410
	83.34440
	97.16250
	112.15840
	128.33210
	145.68360
POINT OF INFLECTION	
42249.94900	
MINIMUM AVERAGE COST	
10.17628	
MINIMUM MARGINAL COST	
9.04837	

Table 60

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN REGION II (Cenozoic)

$\hat{Y} = 7.45 - 0.15\,(10^{-2})X_1 + 0.20(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	847.	717409.	7.1300	6.3232	0.8068
2	1877.	3523129.	5.6400	5.3299	0.3101
3	3153.	9941409.	5.1600	4.6849	0.4751
4	4307.	18550249.	5.8600	4.6596	1.2004
5	6225.	38750625.	7.5000	5.7900	1.7100
6	8787.	77211369.	10.9900	9.5839	1.4061
7	11219.	125865961.	16.0600	15.6021	0.4579
8	13633.	92929344.	17.0000	23.9036	-6.9036
9	2532.	6411024.	5.0000	4.9179	0.0821
10	4434.	19660356.	5.4900	4.6892	0.8008
11	5917.	35010889.	6.5800	5.5098	1.0702
12	8548.	73068304.	9.5200	9.1195	0.4005
13	11472.	131606784.	9.8300	16.3633	-6.5333
14	836.	698896.	7.0000	6.3361	0.6639
15	1825.	3330625.	5.8400	5.3700	0.4700
16	3065.	9394225.	4.6000	4.7086	-0.1086
17	4329.	18740241.	4.0800	4.6643	-0.5843
18	6121.	37466641.	4.1200	5.6911	-1.5711
19	8715.	75951225.	9.0300	9.4416	-0.4116
20	11045.	121992025.	15.3200	15.0933	0.2267
21	815.	664225.	4.0600	6.3609	-2.3009
22	1806.	3261636.	3.4600	5.3849	-1.9249
23	3049.	9296401.	4.0800	4.7132	-0.6332
24	4291.	18412681.	6.6300	4.6563	1.9737
25	6122.	37478884.	5.5900	5.6921	-0.1021
26	8635.	74563225.	10.4800	9.2859	1.1941
27	11215.	125776225.	19.3300	15.5903	3.7397
28	13464.	190639648.	28.5300	23.2470	5.2830
29	18690.	287329025.	50.0400	48.8123	1.2277
30	3427.	11744329.	5.1700	4.6309	0.5391
31	4513.	20367169.	4.1100	4.7108	-0.6008
32	6091.	37100281.	3.3000	5.6634	-2.3634

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.74564342E 01	0.11190859E 01	0.66629682E 01	0.09999999E 01	0.
-0.15064259E-02	0.32130256E-03	-0.46884961E 01	0.62814062E 04	0.83049481E 00
0.19899150E-06	0.18729658E-07	0.10624406E 02	0.58219077E 08	0.94260571E 00

RSQ = 0.9366
R = 0.9678
F(2, 29)= 214.1302
SUMUSQ = 167.9000
DURBIN-W.= 1.5513

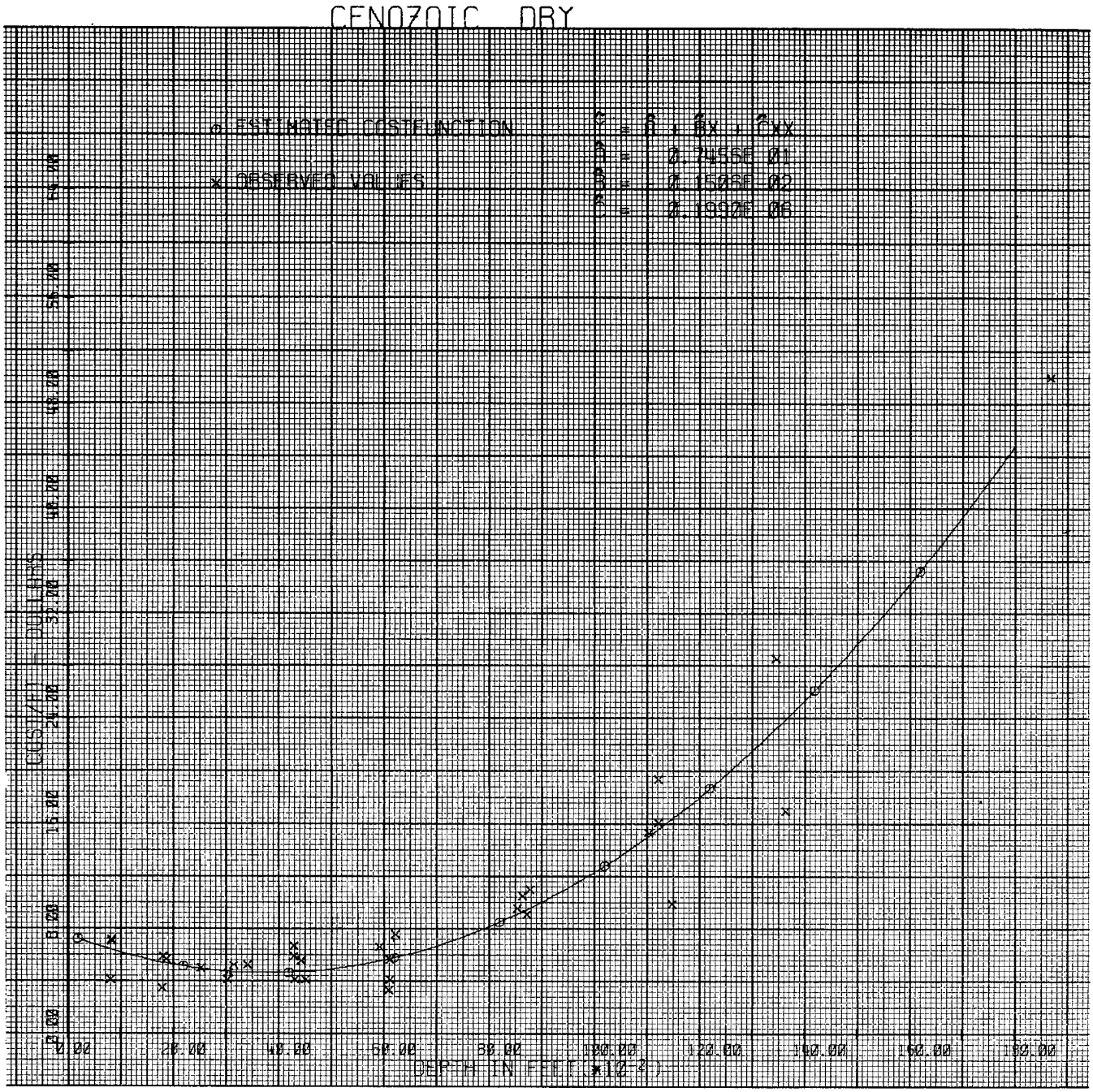

CENOZOIC DRY
o ESTIMATED COST FUNCTION
× OBSERVED VALUES
$\hat{Y} = \hat{\beta} + \hat{\beta}X + \hat{C}XX$
$\hat{\beta}$ = 0.2455E 01
$\hat{\beta}$ = 0.1506E 02
$\hat{C}$ = 0.1992E 06
DOLLARS
COST/FT
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET (*10-2)

Table 60a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN REGION II

(Cenozoic)

(in dollars)

DEPTH	
18000.feet	
TOTAL COST	
	6149.00000
	10480.00000
	14187.00000
	18464.00000
	24505.00000
	33504.00000
	46654.99900
	65151.99900
	90188.99900
	122960.00000
	164659.00000
	216480.00000
	279617.00000
	355264.00000
	444615.00000
	548864.00000
	669205.01000
	806832.00000
MINIMUM AVERAGE COST DEPTH	
	3784.feet
MINIMUM MARGINAL COST DEPTH	
	2523.feet
MARGINAL COST	
	5.04100
	3.82000
	3.79300
	4.96000
	7.32100
	10.87600
	15.62500
	21.56800
	28.70500
	37.03600
	46.56100
	57.28000
	69.19300
	82.30000
	96.60100
	112.09600
	128.78500
	146.66800
POINT OF INFLECTION	
	17431.41500
MINIMUM AVERAGE COST	
	4.60671
MINIMUM MARGINAL COST	
	3.65694

Table 61

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR OIL WELLS IN REGION III (Mesozoic)

$\hat{Y} = 18.40 - 0.24(10^{-2})X_1 + 0.195(10^{-6})X_2$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	727.	528529.	17.1000	16.7513	0.3487
2	1705.	2907025.	15.0500	14.8465	0.2035
3	2955.	8732025.	12.5500	12.9552	-0.4052
4	4283.	18344089.	10.4300	11.6137	-1.1837
5	5867.	34421689.	12.1400	10.9134	1.2266
6	771.	594441.	16.2300	16.6576	-0.4276
7	1821.	3316041.	13.5000	14.6453	-1.1453
8	3091.	9554281.	11.3900	12.7862	-1.3962
9	4347.	18896409.	9.7500	11.5665	-1.8165
10	6068.	36820624.	10.0900	10.8945	-0.8045
11	8519.	72573361.	12.5200	11.9321	0.5879
12	11028.	121616784.	16.7100	15.4216	1.2884
13	13193.	187027624.	18.2600	20.4066	-2.1466
14	839.	703921.	19.2800	16.5142	2.7658
15	1958.	3833764.	15.2800	14.4145	0.8655
16	3267.	10673289.	12.4700	12.5782	-0.1082
17	4446.	19766916.	10.2600	11.4965	-1.2365
18	6509.	42367081.	12.2000	10.9083	1.2917
19	9047.	81848209.	13.8600	12.4624	1.3976
20	11324.	128232976.	16.6900	15.9953	0.6947

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.18408988E 02	0.80086083E 00	0.22986501E 02	0.09999999E 01	0.
-0.24220044E-02	0.31520085E-03	-0.76840034E 01	0.50882500E 04	0.10599291E-00
0.19505961E-06	0.23715746E-07	0.82248984E 01	0.39489334E 08	0.33428725E-00

RSQ = 0.8014
R = 0.8952
F(2, 17)= 34.3054
SUMUSQ = 31.2811
DURBIN-W.= 1.9952

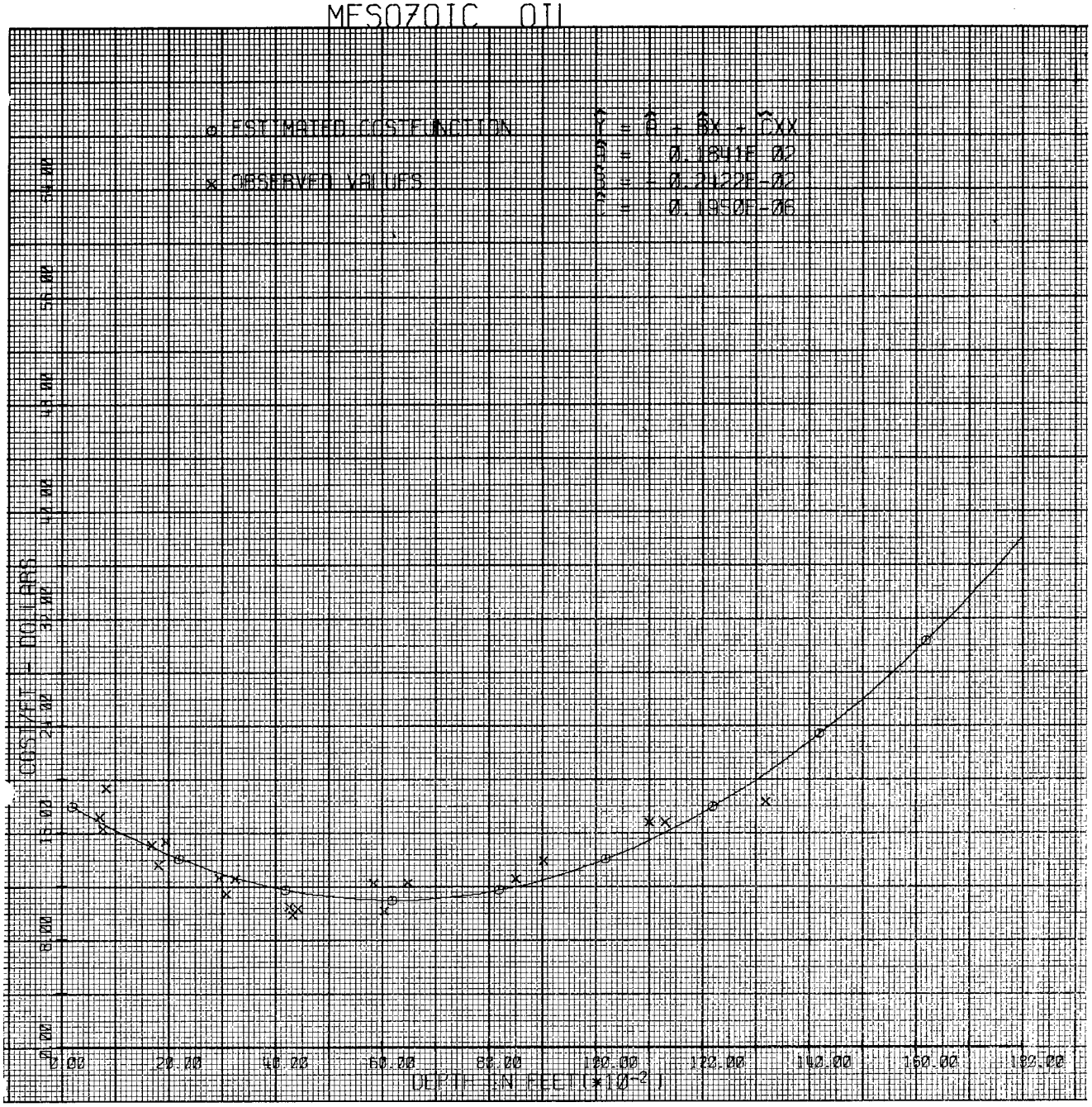

MESOZOIC OIL
o ESTIMATED COST FUNCTION
× OBSERVED VALUES
$\hat{Y} = \hat{\beta} + \hat{\beta}X + \hat{C}XX$
$\hat{\beta}$ = Ø.1841E ØØ
$\hat{\beta}$ = -Ø.2422E-Ø2
$\hat{C}$ = Ø.1950E-Ø6
COST/FT - DOLLARS
DEPTH IN FEET (×10⁻²)

Table 61a

TOTAL AND MARGINAL DRILLING COSTS FOR OIL WELLS IN REGION III

(Mesozoic)

(in dollars)

DEPTH	
18000.feet	
TOTAL COST	
	16183.00000
	28692.00000
	38697.00100
	47368.00000
	55875.00000
	65388.00100
	77077.00100
	92112.00000
	111663.00000
	136900.00000
	168993.00000
	209112.00000
	258427.00000
	318108.00000
	389325.00000
	473248.00000
	571047.01000
	683892.00000
MINIMUM AVERAGE COST DEPTH	
6210.feet	
MINIMUM MARGINAL COST DEPTH	
4140.feet	
MARGINAL COST	
	14.15100
	11.06200
	9.14300
	8.39400
	8.81500
	10.40600
	13.16700
	17.09800
	22.19900
	28.47000
	35.91100
	44.52200
	54.30300
	65.25400
	77.37500
	90.66600
	105.12700
	120.75800
POINT OF INFLECTION	
67625.84000	
MINIMUM AVERAGE COST	
10.88938	
MINIMUM MARGINAL COST	
8.38251	

Table 62

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR GAS WELLS IN REGION III (Mesozoic)

$$\hat{Y} = 12.60 - 0.9(10^{-3})\, X_1 + 0.16(10^{-6})X_2$$

Where:

$\hat{Y}$ = **Estimated drilling cost per foot**

X_1 = **Depth**

X_2 = **Square of depth**

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	5828.	33965584.	14.3400	12.7338	1.6062
2	8182.	66945124.	17.3300	15.8620	1.4680
3	2236.	4999696.	12.0500	11.3673	0.6827
4	3455.	11937025.	10.7500	11.3697	-0.6197
5	4536.	20575296.	9.9800	11.7683	-1.7883
6	6776.	45914176.	12.8600	13.7810	-0.9210
7	8917.	79512889.	12.3200	17.2009	-4.8809
8	12022.	72264242.	25.3200	24.7589	0.5611
9	14189.	100663860.	28.3700	31.8560	-3.4860
10	17007.	72309512.	44.4200	43.3258	1.0942
11	4294.	18438436.	11.4000	11.6467	-0.2467
12	6003.	36036009.	13.5800	12.9056	0.6744
13	8346.	69655716.	19.5200	16.1459	3.3741
14	11427.	130576329.	24.9000	23.0724	1.8276
15	14050.	98701250.	32.0100	31.3558	0.6542

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.12595283E 02	0.27131832E 01	0.46422530E 01	0.09999999E 01	0.
-0.90584718E-03	0.65613861E-03	-0.13805728E 01	0.84845333E 04	0.93294191E 00
0.15950979E-06	0.34077887E-07	0.46807418E 01	0.90070200E 08	0.97305916E 00

RSQ = 0.9541
R = 0.9768
F(2, 12)= 124.8032
SUMUSQ = 62.7873
DURBIN-W.= 1.6055

MESOZOIC GAS

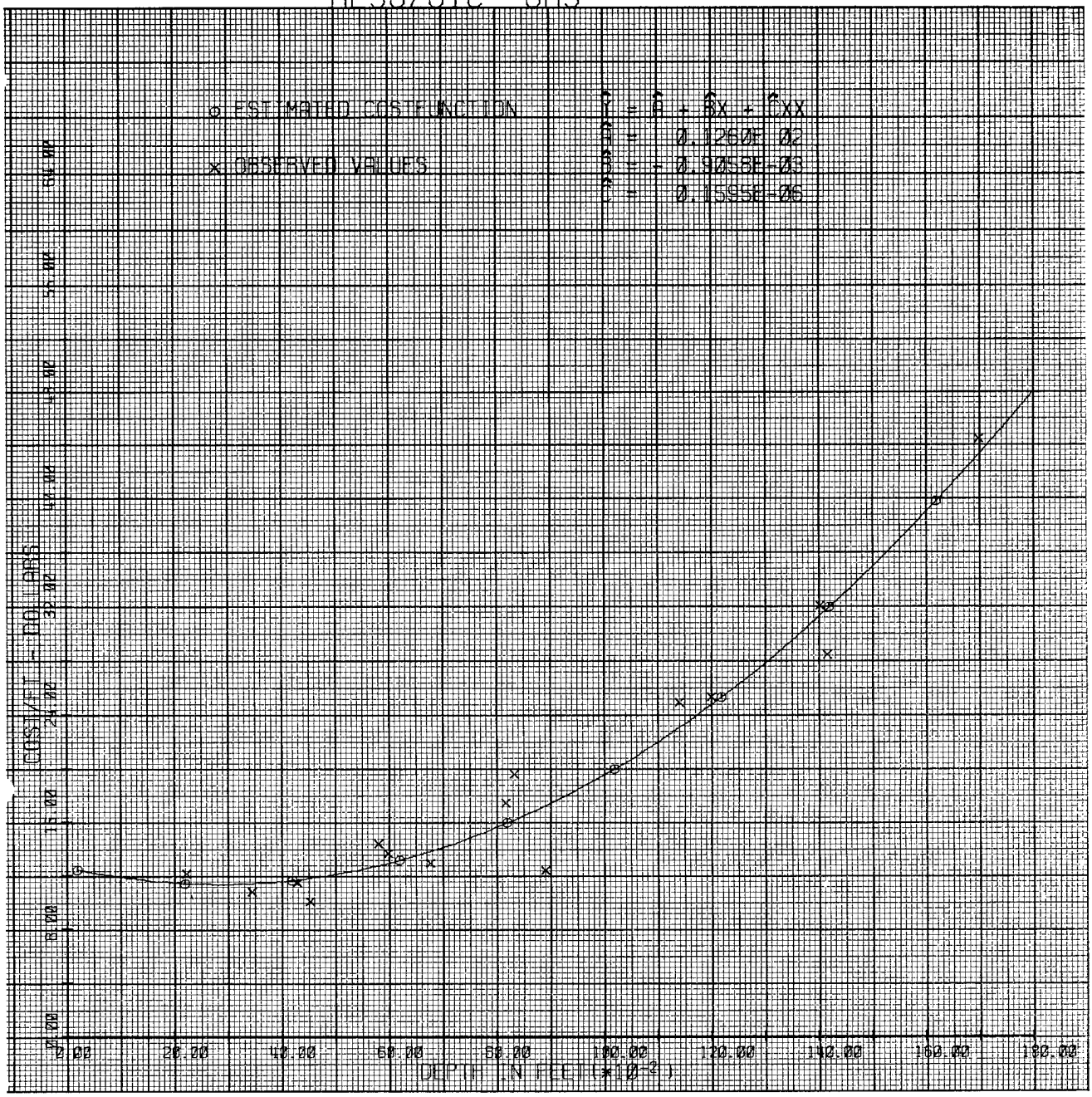


Table 62a

TOTAL AND MARGINAL DRILLING COSTS FOR GAS WELLS IN REGION III

(Mesozoic)

(in dollars)

DEPTH	TOTAL COST	MARGINAL COST
1800Ø.feet		
	11853.70000	
	22852.80000	11.26690
	33954.30000	10.89080
	46115.20000	11.47170
	60292.50100	13.00960
	77443.20100	15.50450
	98524.30000	18.95640
	124492.80000	23.36530
	156305.70000	28.73120
	194920.00000	35.05410
	241292.70000	42.33400
	296380.80000	50.57090
	361141.30000	59.76480
	436531.20000	69.91570
	523507.50000	81.02360
	623027.19000	93.08850
	736047.30000	106.11040
	863524.80000	120.08930
		135.02520

MINIMUM AVERAGE COST DEPTH
2839. feet

MINIMUM MARGINAL COST DEPTH
1893. feet

POINT OF INFLECTION
32126.06100

MINIMUM AVERAGE COST
11.31399

MINIMUM MARGINAL COST
10.88532

Table 63

ESTIMATED AVERAGE DRILLING COST FUNCTION FOR DRY HOLES IN REGION III (Mesozoic)

$$\hat{Y} = 19.33 - 0.39(10^{-2})X_1 + 0.32(10^{-6})X_2$$

Where:

$\hat{Y}$ = Estimated drilling cost per foot

X_1 = Depth

X_2 = Square of depth

SAMPLE NUMBER	OBSERVED VALUES			ESTIMATED VALUES	RESIDUAL
	X_1	X_2	Y	$\hat{Y}$	$Y - \hat{Y}$
1	740.	547600.	15.6900	16.5996	-0.9096
2	1637.	2679769.	12.2500	13.7608	-1.5108
3	2922.	8538084.	9.2900	10.6008	-1.3108
4	4157.	17280649.	6.2900	8.5699	-2.2799
5	5795.	33582025.	6.3200	7.3980	-1.0780
6	8493.	72131049.	14.2700	9.2502	5.0198
7	858.	736164.	17.1900	16.1964	0.9936
8	1829.	3345241.	14.8700	13.2208	1.6492
9	3081.	9492561.	11.5700	10.2840	1.2860
10	4337.	18809569.	8.5000	8.3563	0.1437
11	6163.	37982569.	9.0500	7.3734	1.6766
12	8717.	75986089.	11.0100	9.6156	1.3944
13	11109.	123409881.	13.2900	15.5409	-2.2509
14	13277.	188139364.	16.8900	24.1078	-7.2178
15	18403.	284667602.	61.7100	56.4523	5.2577
16	811.	657721.	14.0200	16.3559	-2.3359
17	1694.	2869636.	11.4100	13.5980	-2.1880
18	3086.	9523396.	11.0600	10.2743	0.7857
19	4309.	18567481.	10.0200	8.3882	1.6318
20	6069.	36832761.	12.6400	7.3714	5.2686
21	8815.	77704225.	11.9100	9.7857	2.1243
22	11075.	122655625.	14.5200	15.4308	-0.9108
23	13603.	192520804.	20.4200	25.6589	-5.2389

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.19333119E 02	0.15670921E 01	0.12336938E 02	0.09999999E 01	0.
-0.39332607E-02	0.47160805E-03	-0.83401049E 01	0.61295652E 04	0.60701833E 00
0.32333207E-06	0.27430759E-07	0.11787207E 02	0.59709687E 08	0.80259019E 00

RSQ = 0.9205
R = 0.9594
F(2, 20)= 115.8361
SUMUSQ = 205.3996
DURBIN-W.= 1.8129

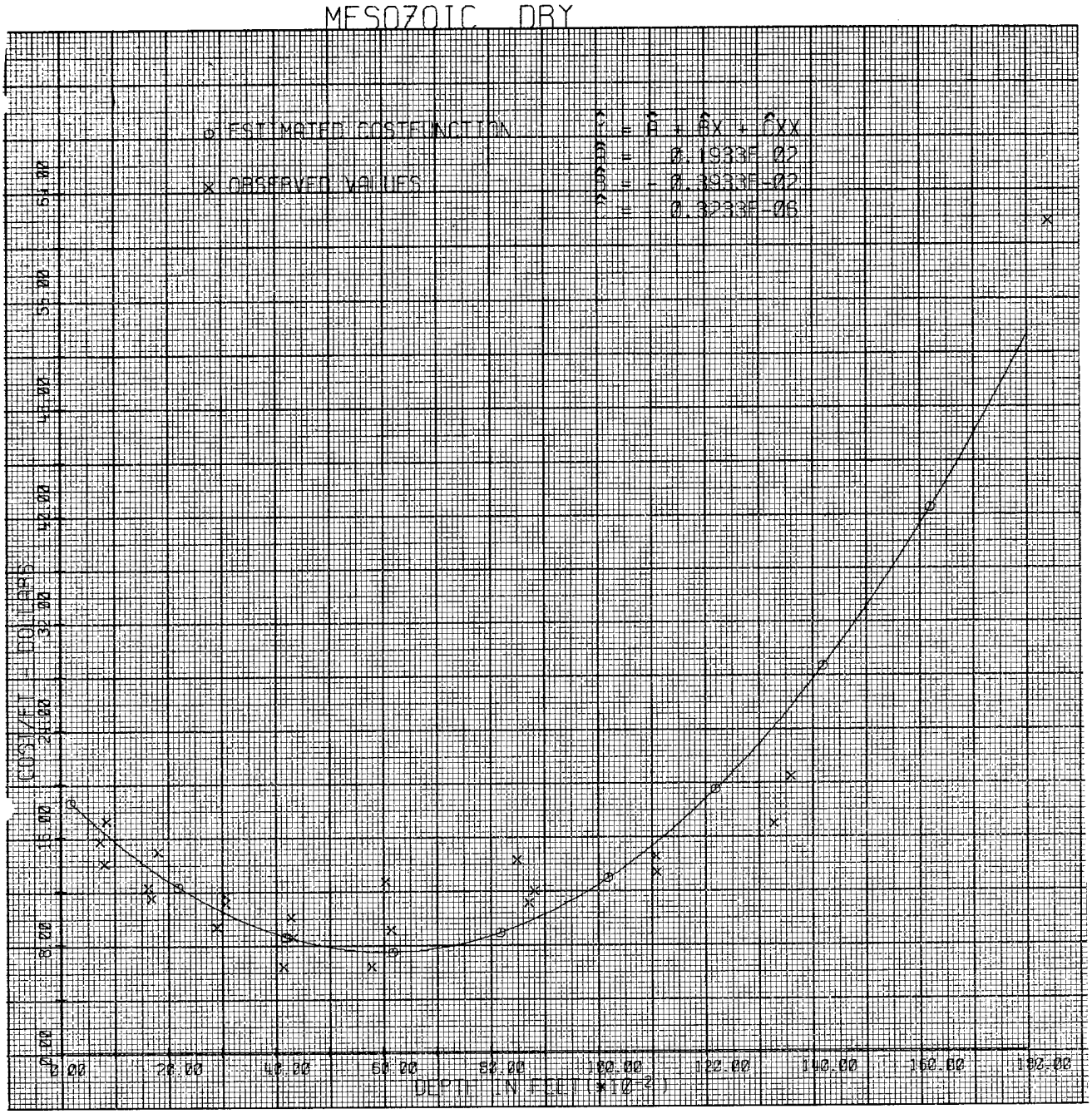

MESOZOIC DRY
ESTIMATED COSTFUNCTION
OBSERVED VALUES
C = Ĉ + ĈX + ĈXX
Ĉ = Ø.1933E Ø2
Ĉ = - Ø.3933E-Ø2
Ĉ = Ø.3233E-Ø6
COST/FT - DOLLARS
DEPTH IN FEET (*10^-2)

Table 63a

TOTAL AND MARGINAL DRILLING COSTS FOR DRY HOLES IN REGION III

(Mesozoic)

(in dollars)

DEPTH	
18000.feet	
TOTAL COST	
	15720.30000
	25514.40000
	31322.10000
	35083.20000
	38737.49900
	44224.79800
	53484.89800
	68457.59800
	91082.69700
	123300.00000
	167049.30000
	224270.39000
	296903.09000
	386887.19000
	496162.49000
	626668.79000
	780345.89000
	959133.60000
MINIMUM AVERAGE COST DEPTH	
	6083.feet
MINIMUM MARGINAL COST DEPTH	
	4055.feet
MARGINAL COST	
	12.43390
	7.47760
	4.46110
	3.38440
	4.24750
	7.05040
	11.79310
	18.47560
	27.09790
	37.66000
	50.16190
	64.60360
	80.98510
	99.30640
	119.56750
	141.76840
	165.90910
	191.98960
POINT OF INFLECTION	
	44820.11000
MINIMUM AVERAGE COST	
	7.36859
MINIMUM MARGINAL COST	
	3.38146

SECTION II: INTERMEDIATE SIZE DIAMETER DRILLING COST FUNCTIONS

Includes Tables 1 to 44 and Figures of Average Costs for Cased and Uncased Wells as a Function of Both Depth and Diameter.

Table 1

MUD COSTS AS A FUNCTION OF
DEPTH AND DIAMETER
(in dollars)

$$Y_{MU} = \frac{1}{5.6148} \left(\pi \cdot \frac{\phi^2}{4} \cdot D \cdot P \cdot 2\right)$$

Where:

Y_{MU} = Mud cost per well;

P = Price of mud per barrel equal to $4.00 in our calculations;

ϕ = Diameter of the hole drilled in feet. In our calculations this variable ranges from 10 to 45 inches and the inside diameter (ID) of the casing ranges from 8 to 30 inches, given that casing $ID \approx \frac{2}{3} \phi$;

D = Depth ranging from 1,000 to 10,000 feet in our calculations.

Y_{MU} (given ϕ = 10 in.)	Y_{MU} (given ϕ = 11 in.)	Y_{MU} (given ϕ = 12 in.)	Y_{MU} (given ϕ = 13 in.)	Y_{MU} (given ϕ = 14 in.)	Y_{MU} (given ϕ = 15 in.)
777.11	940.30	1119.04	1313.32	1523.14	1748.50
1554.22	1880.61	2238.08	2626.63	3046.27	3497.00
2331.33	2820.91	3357.12	3939.95	4569.41	5245.50
3108.44	3761.21	4476.16	5253.27	6092.55	6993.99
3885.55	4701.52	5595.19	6566.58	7615.68	8742.49
4662.66	5641.82	6714.23	7879.90	9138.82	10490.99
5439.77	6582.13	7833.27	9193.22	10661.95	12239.49
6216.88	7522.43	8952.31	10506.53	12185.09	13987.99
6993.99	8462.73	10071.35	11819.85	13708.23	15736.49
7771.10	9403.04	11190.39	13133.17	15231.36	17484.98

Y_{MU} (given ϕ = 16 in.)	Y_{MU} (given ϕ = 17 in.)	Y_{MU} (given ϕ = 18 in.)	Y_{MU} (given ϕ = 19 in.)	Y_{MU} (given ϕ = 20 in.)	Y_{MU} (given ϕ = 21 in.)
1989.40	2245.85	2517.84	2805.37	3108.44	3427.06
3978.81	4491.70	5035.68	5610.74	6216.88	6854.11
5968.21	6737.55	7553.51	8416.11	9325.32	10281.17
7957.61	8983.40	10071.35	11221.47	12433.77	13708.23
9947.01	11229.25	12589.19	14026.84	15542.21	17135.28
11936.42	13475.09	15107.03	16832.21	18650.65	20562.34
13925.82	15720.94	17624.86	19637.58	21759.09	23989.40
15915.22	17966.79	20142.70	22442.95	24867.53	27416.46
17904.62	20212.64	22660.54	25248.32	27975.97	30843.51
19894.03	22458.49	25178.38	28053.68	31084.42	34270.57

Continued

Y_{MU} (given ϕ = 22 in.)	Y_{MU} (given ϕ = 23 in.)	Y_{MU} (given ϕ = 24 in.)	Y_{MU} (given ϕ = 25 in.)	Y_{MU} (given ϕ = 26 in.)	Y_{MU} (given ϕ = 27 in.)
3761.21	4110.91	4476.16	4856.94	5253.27	5665.13
7522.43	8221.83	8952.31	9713.88	10506.53	11330.27
11283.64	12332.74	13428.47	14570.82	15759.80	16995.40
15044.86	16443.66	17904.62	19427.76	21013.06	22660.54
18806.07	20554.57	22380.78	24284.70	26266.33	28325.67
22567.29	24665.48	26856.94	29141.64	31519.60	33990.81
26328.50	28776.40	31333.09	33998.58	36772.86	39655.94
30089.71	32887.31	35809.25	38855.52	42026.13	45321.08
33850.93	36998.23	40285.40	43712.46	47279.40	50986.21
37612.14	41109.14	44761.56	48569.40	52532.66	56651.35

Y_{MU} (given ϕ = 28 in.)	Y_{MU} (given ϕ = 29 in.)	Y_{MU} (given ϕ = 30 in.)	Y_{MU} (given ϕ = 31 in.)	Y_{MU} (given ϕ = 32 in.)	Y_{MU} (given ϕ = 33 in.)
6092.55	6535.50	6993.99	7468.03	7957.61	8462.73
12185.09	13071.00	13987.99	14936.06	15915.22	16925.46
18277.64	19606.50	20981.98	22404.09	23872.83	25388.20
24370.18	26141.99	27975.97	29872.12	31830.44	33850.93
30462.73	32677.49	34969.97	37340.15	39788.05	42313.66
36555.27	39212.99	41963.96	44808.19	47745.66	50776.39
42647.82	45748.49	48957.96	52276.22	55703.27	59239.13
48740.36	52283.99	55951.95	59744.25	63660.88	67701.86
54832.91	58819.49	62945.94	67212.28	71618.49	76164.59
60925.46	65354.98	69939.94	74680.31	79576.11	84627.32

Y_{MU} (given ϕ = 34 in.)	Y_{MU} (given ϕ = 35 in.)	Y_{MU} (given ϕ = 36 in.)	Y_{MU} (given ϕ = 37 in.)	Y_{MU} (given ϕ = 38 in.)	Y_{MU} (given ϕ = 39 in.)
8983.40	9519.60	10071.35	10638.64	11221.47	11819.85
17966.79	19039.20	20142.70	21277.28	22442.95	23639.70
26950.19	28558.81	30214.05	31915.93	33664.42	35459.55
35933.59	38078.41	40285.40	42554.57	44885.90	47279.40
44916.98	47598.01	50356.75	53193.21	56107.37	59099.25
53900.38	57117.61	60428.11	63831.85	67328.84	70919.10
62883.77	66637.22	70499.46	74470.49	78550.32	82738.94
71867.17	76156.82	80570.81	85109.13	89771.79	94558.79
80850.57	85676.42	90642.16	95747.77	100993.27	106378.64
89833.96	95196.02	100713.51	106386.41	112214.74	118198.49

Y_{MU} (given ϕ = 40 in.)	Y_{MU} (given ϕ = 41 in.)	Y_{MU} (given ϕ = 42 in.)	Y_{MU} (given ϕ = 43 in.)	Y_{MU} (given ϕ = 44 in.)	Y_{MU} (given ϕ = 45 in.)
12433.77	13063.23	13708.23	14368.77	15044.86	15736.49
24867.53	26126.45	27416.46	28737.54	30089.71	31472.97
37301.30	39189.68	41124.68	43106.31	45134.57	47209.46
49735.07	52252.90	54832.91	57475.09	60179.43	62945.94
62168.83	65316.13	68541.14	71843.86	75224.29	78682.43
74602.60	78379.36	82249.36	86212.63	90269.14	94418.91
87036.37	91442.58	95957.59	100581.40	105314.00	110155.40
99470.13	104505.81	109665.82	114950.17	120358.86	125891.88
111903.90	117569.03	123374.05	129318.94	135403.72	141628.37
124337.66	130632.26	137082.28	143687.71	150448.57	157364.86

Table 2

CUTTER COSTS FOR SOFT ROCK

AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

$$Y_{CU} = \pi \frac{\phi^2}{4} DC_H$$

Where:

Y_{CU} = Cutter cost per well;

ϕ = Diameter of the hole drilled in feet. In our calculations this variable ranges from 10 to 45 inches and the inside diameter (ID) of the casing ranges from 8 to 30 inches, given that casing $ID \approx \frac{2}{3} \phi$;

D = Depth ranging from 1,000 to 10,000 feet in our calculations;

C_H = Cost per foot of linear cut as a function of the geological medium equal to $0.50 in the below calculations for soft rock.

Y_{CU} (given ϕ = 10 in.)	Y_{CU} (given ϕ = 11 in.)	Y_{CU} (given ϕ = 12 in.)	Y_{CU} (given ϕ = 13 in.)	Y_{CU} (given ϕ = 14 in.)	Y_{CU} (given ϕ = 15 in.)
272.71	329.98	392.70	460.88	534.51	613.59
545.41	659.95	785.40	921.75	1069.01	1227.18
818.12	989.93	1178.10	1382.63	1603.52	1840.78
1090.83	1319.90	1570.79	1843.50	2138.03	2454.37
1363.54	1649.88	1963.49	2304.38	2672.53	3067.96
1636.24	1979.86	2356.19	2765.25	3207.04	3681.55
1908.95	2309.83	2748.89	3226.13	3741.55	4295.14
2181.66	2639.81	3141.59	3687.00	4276.05	4908.73
2454.37	2969.78	3534.29	4147.88	4810.56	5522.33
2727.07	3299.76	3926.99	4608.76	5345.07	6135.92

Y_{CU} (given ϕ = 16 in.)	Y_{CU} (given ϕ = 17 in.)	Y_{CU} (given ϕ = 18 in.)	Y_{CU} (given ϕ = 19 in.)	Y_{CU} (given ϕ = 20 in.)	Y_{CU} (given ϕ = 21 in.)
698.13	788.12	883.57	984.47	1090.83	1202.64
1396.26	1576.25	1767.14	1968.95	2181.66	2405.28
2094.39	2364.37	2650.72	2953.42	3272.49	3607.92
2792.52	3152.50	3534.29	3937.90	4363.32	4810.56
3490.66	3940.62	4417.86	4922.37	5454.15	6013.20
4188.79	4728.75	5301.43	5906.84	6544.98	7215.84
4886.92	5516.87	6185.01	6891.32	7635.81	8418.48
5585.05	6305.00	7068.58	7875.79	8726.64	9621.12
6283.18	7093.12	7952.15	8860.27	9817.47	10823.76
6981.31	7881.25	8835.72	9844.74	10908.30	12026.40

Continued

Y_{CU} (given ϕ = 22 in.)	Y_{CU} (given ϕ = 23 in.)	Y_{CU} (given ϕ = 24 in.)	Y_{CU} (given ϕ = 25 in.)	Y_{CU} (given ϕ = 26 in.)	Y_{CU} (given ϕ = 27 in.)
1319.90	1442.62	1570.79	1704.42	1843.50	1988.04
2639.81	2885.24	3141.59	3408.84	3687.00	3976.07
3959.71	4327.87	4712.38	5113.26	5530.51	5964.11
5279.62	5770.49	6283.18	6817.69	7374.01	7952.15
6599.52	7213.11	7853.97	8522.11	9217.51	9940.19
7919.42	8655.73	9424.77	10226.53	11061.01	11928.22
9239.33	10098.36	10995.57	11930.95	12904.52	13916.26
10559.23	11540.98	12566.36	13635.37	14748.02	15904.30
11879.14	12983.60	14137.16	15339.80	16591.52	17892.34
13199.04	14426.22	15707.95	17044.22	18435.02	19880.37

Y_{CU} (given ϕ = 28 in.)	Y_{CU} (given ϕ = 29 in.)	Y_{CU} (given ϕ = 30 in.)	Y_{CU} (given ϕ = 31 in.)	Y_{CU} (given ϕ = 32 in.)	Y_{CU} (given ϕ = 33 in.)
2138.03	2293.47	2454.37	2620.72	2792.52	2969.78
4276.05	4586.94	4908.73	5241.44	5585.05	5939.57
6414.08	6880.41	7363.10	7862.16	8377.57	8909.35
8552.11	9173.88	9817.47	10482.87	11170.10	11879.14
10690.13	11467.35	12271.84	13103.59	13962.62	14848.92
12828.16	13760.82	14726.20	15724.31	16755.15	17818.71
14966.19	16054.29	17180.57	18345.03	19547.67	20788.49
17104.21	18347.76	19634.94	20965.75	22340.20	23758.27
19242.24	20641.23	22089.30	23586.47	25132.72	26728.06
21380.27	22934.70	24543.67	26207.19	27925.24	29697.84

Y_{CU} (given ϕ = 34 in.)	Y_{CU} (given ϕ = 35 in.)	Y_{CU} (given ϕ = 36 in.)	Y_{CU} (given ϕ = 37 in.)	Y_{CU} (given ϕ = 38 in.)	Y_{CU} (given ϕ = 39 in.)
3152.50	3340.67	3534.29	3733.37	3937.90	4147.88
6305.00	6681.33	7068.58	7466.73	7875.79	8295.76
9457.50	10022.00	10602.87	11200.10	11813.69	12443.64
12609.99	13362.67	14137.16	14933.46	15751.58	16591.52
15762.49	16703.33	17671.44	18666.83	19689.48	20739.40
18914.99	20044.00	21205.73	22400.19	23627.37	24887.28
22067.49	23384.67	24740.02	26133.56	27565.27	29035.16
25219.99	26725.33	28274.31	29866.92	31503.17	33183.04
28372.48	30066.00	31808.60	33600.29	35441.06	37330.92
31524.98	33406.66	35342.89	37333.65	39378.96	41478.81

Y_{CU} (given ϕ = 40 in.)	Y_{CU} (given ϕ = 41 in.)	Y_{CU} (given ϕ = 42 in.)	Y_{CU} (given ϕ = 43 in.)	Y_{CU} (given ϕ = 44 in.)	Y_{CU} (given ϕ = 45 in.)
4363.32	4584.21	4810.56	5042.36	5279.62	5522.33
8726.64	9168.42	9621.12	10084.72	10559.23	11044.65
13089.96	13752.64	14431.68	15127.08	15838.85	16566.98
17453.28	18336.85	19242.24	20169.44	21118.47	22089.30
21816.60	22921.06	24052.80	25211.81	26398.08	27611.63
26179.92	27505.27	28863.36	30254.17	31677.70	33133.96
30543.24	32089.49	33673.92	35296.53	36957.32	38656.28
34906.56	36673.70	38484.48	40338.89	42236.93	44178.61
39269.87	41257.91	43295.04	45381.25	47516.55	49700.94
43633.19	45842.13	48105.60	50423.61	52796.17	55223.26

Table 3

CUTTER COSTS FOR MEDIUM SOFT ROCK

AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

$$Y_{CU} = \pi \frac{\phi^2}{4} DC_H$$

Where:

Y_{CU} = Cutter cost per well;

ϕ = Diameter of the hole drilled in feet. In our calculations this variable ranges from 10 to 45 inches and the inside diameter (ID) of the casing ranges from 8 to 30 inches, given that casing ID $\approx \frac{2}{3} \phi$;

D = Depth ranging from 1,000 to 10,000 feet in our calculations;

C_H = Cost per foot of linear cut as a function of the geological medium equal to $0.75 in the below calculations for medium soft rock.

Y_{CU} (given ϕ = 10 in.)	Y_{CU} (given ϕ = 11 in.)	Y_{CU} (given ϕ = 12 in.)	Y_{CU} (given ϕ = 13 in.)	Y_{CU} (given ϕ = 14 in.)	Y_{CU} (given ϕ = 15 in.)
409.06	494.96	589.05	691.31	801.76	920.39
818.12	989.93	1178.10	1382.63	1603.52	1840.78
1227.18	1484.89	1767.14	2073.94	2405.28	2761.16
1636.24	1979.86	2356.19	2765.25	3207.04	3681.55
2045.31	2474.82	2945.24	3456.57	4008.80	4601.94
2454.37	2969.78	3534.29	4147.88	4810.56	5522.33
2863.43	3464.75	4123.34	4839.19	5612.32	6442.71
3272.49	3959.71	4712.38	5530.51	6414.08	7363.10
3681.55	4454.68	5301.43	6221.82	7215.84	8283.49
4090.61	4949.64	5890.48	6913.13	8017.60	9203.88

Y_{CU} (given ϕ = 16 in.)	Y_{CU} (given ϕ = 17 in.)	Y_{CU} (given ϕ = 18 in.)	Y_{CU} (given ϕ = 19 in.)	Y_{CU} (given ϕ = 20 in.)	Y_{CU} (given ϕ = 21 in.)
1047.20	1182.19	1325.36	1476.71	1636.24	1803.96
2094.39	2364.37	2650.72	2953.42	3272.49	3607.92
3141.59	3546.56	3976.07	4430.13	4908.73	5411.88
4188.79	4728.75	5301.43	5906.84	6544.98	7215.84
5235.98	5910.93	6626.79	7383.55	8181.22	9019.80
6283.18	7093.12	7952.15	8860.27	9817.47	10823.76
7330.38	8275.31	9277.51	10336.98	11453.71	12627.72
8377.57	9457.49	10602.87	11813.69	13089.96	14431.68
9424.77	10639.68	11928.22	13290.40	14726.20	16235.64
10471.97	11821.87	13253.58	14767.11	16362.45	18039.60

Continued

Y_{CU} (given ϕ = 22 in.)	Y_{CU} (given ϕ = 23 in.)	Y_{CU} (given ϕ = 24 in.)	Y_{CU} (given ϕ = 25 in.)	Y_{CU} (given ϕ = 26 in.)	Y_{CU} (given ϕ = 27 in.)
1979.86	2163.93	2356.19	2556.63	2765.25	2982.06
3959.71	4327.87	4712.38	5113.26	5530.51	5964.11
5939.57	6491.80	7068.58	7669.90	8295.76	8946.17
7919.42	8655.73	9424.77	10226.53	11061.01	11928.22
9899.28	10819.67	11780.96	12783.16	13826.27	14910.28
11879.14	12983.60	14137.16	15339.80	16591.52	17892.34
13858.99	15147.54	16493.35	17896.43	19356.78	20874.39
15838.85	17311.47	18849.54	20453.06	22122.03	23856.45
17818.71	19475.40	21205.73	23009.69	24887.28	26838.51
19798.56	21639.34	23561.93	25566.33	27652.54	29820.56

Y_{CU} (given ϕ = 28 in.)	Y_{CU} (given ϕ = 29 in.)	Y_{CU} (given ϕ = 30 in.)	Y_{CU} (given ϕ = 31 in.)	Y_{CU} (given ϕ = 32 in.)	Y_{CU} (given ϕ = 33 in.)
3207.04	3440.20	3681.55	3931.08	4188.79	4454.68
6414.08	6880.41	7363.10	7862.16	8377.57	8909.35
9621.12	10320.61	11044.65	11793.23	12566.36	13364.03
12828.16	13760.82	14726.20	15724.31	16755.15	17818.71
16035.20	17201.02	18407.75	19655.39	20943.93	22273.38
19242.24	20641.23	22089.31	23586.47	25132.72	26728.06
22449.28	24081.43	25770.86	27517.55	29321.51	31182.74
25656.32	27521.64	29452.41	31448.63	33510.29	35637.41
28863.36	30961.84	33133.96	35379.70	37699.08	40092.09
32070.40	34402.05	36815.51	39310.78	41887.87	44546.76

Y_{CU} (given ϕ = 34 in.)	Y_{CU} (given ϕ = 35 in.)	Y_{CU} (given ϕ = 36 in.)	Y_{CU} (given ϕ = 37 in.)	Y_{CU} (given ϕ = 38 in.)	Y_{CU} (given ϕ = 39 in.)
4728.75	5011.00	5301.43	5600.05	5906.84	6221.82
9457.49	10022.00	10602.87	11200.10	11813.69	12443.64
14186.24	15033.00	15904.30	16800.14	17720.53	18665.46
18914.99	20044.00	21205.73	22400.19	23627.37	24887.28
23643.74	25055.00	26507.17	28000.24	29534.22	31109.10
28372.49	30066.00	31808.60	33600.29	35441.06	37330.93
33101.23	35077.00	37110.03	39200.34	41347.91	43552.75
37829.98	40088.00	42411.47	44800.38	47254.75	49774.57
42558.73	45099.00	47712.90	50400.43	53161.59	55996.39
47287.48	50110.00	53014.33	56000.48	59068.44	62218.21

Y_{CU} (given ϕ = 40 in.)	Y_{CU} (given ϕ = 41 in.)	Y_{CU} (given ϕ = 42 in.)	Y_{CU} (given ϕ = 43 in.)	Y_{CU} (given ϕ = 44 in.)	Y_{CU} (given ϕ = 45 in.)
6544.98	6876.32	7215.84	7563.54	7919.42	8283.49
13089.96	13752.64	14431.68	15127.08	15838.85	16566.98
19634.94	20628.96	21647.52	22690.62	23758.27	24850.47
26179.92	27505.27	28863.36	30254.17	31677.70	33133.96
32724.90	34381.59	36079.20	37817.71	39597.12	41417.45
39269.87	41257.91	43295.04	45381.25	47516.55	49700.94
45814.85	48134.23	50510.88	52944.79	55435.97	57984.43
52359.83	55010.55	57726.72	60508.33	63355.40	66267.91
58904.81	61886.87	64942.56	68071.87	71274.82	74551.40
65449.79	68763.19	72158.40	75635.42	79194.25	82834.89

Table 4

CUTTER COSTS FOR MEDIUM HARD ROCK
AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

$$Y_{CU} = \pi \frac{\phi^2}{4} DC_H$$

Where:

Y_{CU} = Cutter cost per well;

ϕ = Diameter of the hole drilled in feet. In our calculations this variable ranges from 10 to 45 inches and the inside diameter (ID) of the casing ranges from 8 to 30 inches, given that casing $ID \approx \frac{2}{3} \phi$;

D = Depth ranging from 1,000 to 10,000 feet in our calculations;

C_H = Cost per foot of linear cut as a function of the geological medium equal to $1.00 in the below calculations for medium hard rock.

Y_{CU} (given ϕ = 10 in.)	Y_{CU} (given ϕ = 11 in.)	Y_{CU} (given ϕ = 12 in.)	Y_{CU} (given ϕ = 13 in.)	Y_{CU} (given ϕ = 14 in.)	Y_{CU} (given ϕ = 15 in.)
545.41	659.95	785.40	921.75	1069.01	1227.18
1090.83	1319.90	1570.79	1843.50	2138.03	2454.37
1636.24	1979.86	2356.19	2765.25	3207.04	3681.55
2181.66	2639.81	3141.59	3687.00	4276.05	4908.73
2727.07	3299.76	3926.99	4608.76	5345.07	6135.92
3272.49	3959.71	4712.38	5530.51	6414.08	7363.10
3817.90	4619.66	5497.78	6452.26	7483.09	8590.29
4363.32	5279.62	6283.18	7374.01	8552.11	9817.47
4908.73	5939.57	7068.58	8295.76	9621.12	11044.65
5454.15	6599.52	7853.97	9217.51	10690.13	12271.84

Y_{CU} (given ϕ = 16 in.)	Y_{CU} (given ϕ = 17 in.)	Y_{CU} (given ϕ = 18 in.)	Y_{CU} (given ϕ = 19 in.)	Y_{CU} (given ϕ = 20 in.)	Y_{CU} (given ϕ = 21 in.)
1396.26	1576.25	1767.14	1968.95	2181.66	2405.28
2792.52	3152.50	3534.29	3937.90	4363.32	4810.56
4188.79	4728.75	5301.43	5906.84	6544.98	7215.84
5585.05	6305.00	7068.58	7875.79	8726.64	9621.12
6981.31	7881.25	8835.72	9844.74	10908.30	12026.40
8377.57	9457.50	10602.87	11813.69	13089.96	14431.68
9773.84	11033.74	12370.01	13782.64	15271.62	16836.96
11170.10	12609.99	14137.16	15751.58	17453.28	19242.24
12566.36	14186.24	15904.30	17720.53	19634.94	21647.52
13962.62	15762.49	17671.44	19689.48	21816.60	24052.80

Continued

Y_{CU} (given ϕ = 22 in.)	Y_{CU} (given ϕ = 23 in.)	Y_{CU} (given ϕ = 24 in.)	Y_{CU} (given ϕ = 25 in.)	Y_{CU} (given ϕ = 26 in.)	Y_{CU} (given ϕ = 27 in.)
2639.81	2885.24	3141.59	3408.84	3687.00	3976.07
5279.62	5770.49	6283.18	6817.69	7374.01	7952.15
7919.42	8655.73	9424.77	10226.53	11061.01	11928.22
10559.23	11540.98	12566.36	13635.37	14748.02	15904.30
13199.04	14426.22	15707.95	17044.22	18435.02	19880.37
15838.85	17311.47	18849.54	20453.06	22122.03	23856.45
18478.66	20196.71	21991.13	23861.90	25809.03	27832.52
21118.47	23081.96	25132.72	27270.75	29496.04	31808.60
23758.27	25967.21	28274.31	30679.59	33183.04	35784.67
26398.08	28852.45	31415.90	34088.43	36870.05	39760.75

Y_{CU} (given ϕ = 28 in.)	Y_{CU} (given ϕ = 29 in.)	Y_{CU} (given ϕ = 30 in.)	Y_{CU} (given ϕ = 31 in.)	Y_{CU} (given ϕ = 32 in.)	Y_{CU} (given ϕ = 33 in.)
4276.05	4586.94	4908.73	5241.44	5585.05	5939.57
8552.11	9173.88	9817.47	10482.87	11170.10	11879.14
12828.16	13760.82	14726.20	15724.31	16755.15	17818.71
17104.21	18347.76	19634.94	20965.75	22340.20	23758.27
21380.27	22934.70	24543.67	26207.19	27925.24	29697.84
25656.32	27521.64	29452.41	31448.63	33510.29	35637.41
29932.37	32108.58	34361.14	36690.06	39095.34	41576.98
34208.43	36695.52	39269.87	41931.50	44680.39	47516.55
38484.48	41282.46	44178.61	47172.94	50265.44	53456.12
42760.53	45869.39	49087.34	52414.38	55850.49	59395.69

Y_{CU} (given ϕ = 34 in.)	Y_{CU} (given ϕ = 35 in.)	Y_{CU} (given ϕ = 36 in.)	Y_{CU} (given ϕ = 37 in.)	Y_{CU} (given ϕ = 38 in.)	Y_{CU} (given ϕ = 39 in.)
6305.00	6681.33	7068.58	7466.73	7875.79	8295.76
12609.99	13362.67	14137.16	14933.46	15751.58	16591.52
18914.99	20044.00	21205.73	22400.19	23627.37	24887.28
25219.99	26725.33	28274.31	29866.92	31503.17	33183.04
31524.98	33406.66	35342.89	37333.65	39378.96	41478.81
37829.98	40088.00	42411.47	44800.38	47254.75	49774.57
44134.98	46769.33	49480.04	52267.11	55130.54	58070.33
50439.97	53450.66	56548.62	59733.84	63006.33	66366.09
56744.97	60132.00	63617.20	67200.57	70882.12	74661.85
63049.97	66813.33	70685.78	74667.31	78757.91	82957.61

Y_{CU} (given ϕ = 40 in.)	Y_{CU} (given ϕ = 41 in.)	Y_{CU} (given ϕ = 42 in.)	Y_{CU} (given ϕ = 43 in.)	Y_{CU} (given ϕ = 44 in.)	Y_{CU} (given ϕ = 45 in.)
8726.64	9168.42	9621.12	10084.72	10559.23	11044.65
17453.28	18336.85	19242.24	20169.44	21118.47	22089.30
26179.92	27505.27	28863.36	30254.17	31677.70	33133.96
34906.56	36673.70	38484.48	40338.89	42236.93	44178.61
43633.19	45842.13	48105.60	50423.61	52796.17	55223.26
52359.83	55010.55	57726.72	60508.33	63355.40	66267.91
61086.47	64178.98	67347.84	70593.05	73914.63	77312.57
69813.11	73347.40	76968.96	80677.78	84473.86	88357.22
78539.75	82515.82	86590.07	90762.50	95033.10	99401.87
87266.39	91684.25	96211.20	100847.22	105592.33	110446.52

Table 5

CUTTER COSTS FOR HARD ROCK

AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

$$Y_{CU} = \pi \frac{\phi^2}{4} DC_H$$

Where:

Y_{CU} = Cutter cost per well;

ϕ = Diameter of the hole drilled in feet. In our calculations this variable ranges from 10 to 45 inches and the inside diameter (ID) of the casing ranges from 8 to 30 inches, given that casing $ID \approx \frac{2}{3} \phi$;

D = Depth ranging from 1,000 to 10,000 feet in our calculations;

C_H = Cost per foot of linear cut as a function of the geological medium equal to $1.50 in the below calculations for hard rock.

Y_{CU} (given ϕ = 10 in.)	Y_{CU} (given ϕ = 11 in.)	Y_{CU} (given ϕ = 12 in.)	Y_{CU} (given ϕ = 13 in.)	Y_{CU} (given ϕ = 14 in.)	Y_{CU} (given ϕ = 15 in.)
818.12	989.93	1178.10	1382.63	1603.52	1840.78
1636.24	1979.86	2356.19	2765.25	3207.04	3681.55
2454.37	2969.78	3534.29	4147.88	4810.56	5522.33
3272.49	3959.71	4712.38	5530.51	6414.08	7363.10
4090.61	4949.64	5890.48	6913.13	8017.60	9203.88
4908.73	5939.57	7068.58	8295.76	9621.12	11044.65
5726.86	6929.50	8246.67	9678.39	11224.64	12885.43
6544.98	7919.42	9424.77	11061.01	12828.16	14726.20
7363.10	8909.35	10602.87	12443.64	14431.68	16566.98
8181.22	9899.28	11780.96	13826.27	16035.20	18407.75

Y_{CU} (given ϕ = 16 in.)	Y_{CU} (given ϕ = 17 in.)	Y_{CU} (given ϕ = 18 in.)	Y_{CU} (given ϕ = 19 in.)	Y_{CU} (given ϕ = 20 in.)	Y_{CU} (given ϕ = 21 in.)
2094.39	2364.37	2650.72	2953.42	3272.49	3607.92
4188.79	4728.75	5301.43	5906.84	6544.98	7215.84
6283.18	7093.12	7952.15	8860.27	9817.47	10823.76
8377.57	9457.49	10602.87	11813.69	13089.96	14431.68
10471.97	11821.87	13253.58	14767.11	16362.45	18039.60
12566.36	14186.24	15904.30	17720.53	19634.94	21647.52
14660.75	16550.62	18555.02	20673.95	22907.43	25255.44
16755.15	18914.99	21205.73	23627.37	26179.92	28863.36
18849.54	21279.36	23856.45	26580.80	29452.41	32471.28
20943.93	23643.74	26507.17	29534.22	32724.90	36079.20

Continued

Y_{CU} (given ϕ = 22 in.)	Y_{CU} (given ϕ = 23 in.)	Y_{CU} (given ϕ = 24 in.)	Y_{CU} (given ϕ = 25 in.)	Y_{CU} (given ϕ = 26 in.)	Y_{CU} (given ϕ = 27 in.)
3959.71	4327.87	4712.38	5113.26	5530.51	5964.11
7919.42	8655.73	9424.77	10226.53	11061.01	11928.22
11879.14	12983.60	14137.16	15339.80	16591.52	17892.34
15838.85	17311.47	18849.54	20453.06	22122.03	23856.45
19798.56	21639.34	23561.93	25566.33	27652.54	29820.56
23758.27	25967.21	28274.31	30679.59	33183.04	35784.67
27717.99	30295.07	32986.70	35792.86	38713.55	41748.79
31677.70	34622.94	37699.08	40906.12	44244.06	47712.90
35637.41	38950.81	42411.47	46019.39	49774.57	53677.01
39597.12	43278.67	47123.85	51132.65	55305.07	59641.12

Y_{CU} (given ϕ = 28 in.)	Y_{CU} (given ϕ = 29 in.)	Y_{CU} (given ϕ = 30 in.)	Y_{CU} (given ϕ = 31 in.)	Y_{CU} (given ϕ = 32 in.)	Y_{CU} (given ϕ = 33 in.)
6414.08	6880.41	7363.10	7862.16	8377.57	8909.35
12828.16	13760.82	14726.20	15724.31	16755.15	17818.71
19242.24	20641.23	22089.31	23586.47	25132.72	26728.06
25656.32	27521.64	29452.41	31448.63	33510.29	35637.41
32070.40	34402.05	36815.51	39310.78	41887.87	44546.76
38484.48	41282.46	44178.61	47172.94	50265.44	53456.12
44898.56	48162.87	51541.71	55035.09	58643.01	62365.47
51312.64	55043.27	58904.81	62897.25	67020.59	71274.82
57726.72	61923.68	66267.91	70759.41	75398.16	80184.18
64140.80	68804.09	73631.02	78621.56	83775.73	89093.53

Y_{CU} (given ϕ = 34 in.)	Y_{CU} (given ϕ = 35 in.)	Y_{CU} (given ϕ = 36 in.)	Y_{CU} (given ϕ = 37 in.)	Y_{CU} (given ϕ = 38 in.)	Y_{CU} (given ϕ = 39 in.)
9457.49	10022.00	10602.87	11200.10	11813.69	12443.64
18914.99	20044.00	21205.73	22400.19	23627.37	24887.28
28372.49	30066.00	31808.60	33600.29	35441.06	37330.93
37829.98	40088.00	42411.47	44800.38	47254.75	49774.57
47287.48	50110.00	53014.33	56000.48	59068.44	62218.21
56744.97	60132.00	63617.20	67200.58	70882.12	74661.85
66202.47	70154.00	74220.06	78400.67	82695.81	87105.49
75659.96	80176.00	84822.93	89600.77	94509.50	99549.13
85117.45	90197.99	95425.80	100800.86	106323.19	111992.77
94574.95	100219.99	106028.66	112000.96	118136.87	124436.42

Y_{CU} (given ϕ = 40 in.)	Y_{CU} (given ϕ = 41 in.)	Y_{CU} (given ϕ = 42 in.)	Y_{CU} (given ϕ = 43 in.)	Y_{CU} (given ϕ = 44 in.)	Y_{CU} (given ϕ = 45 in.)
13089.96	13752.64	14431.68	15127.08	15838.85	16566.98
26179.92	27505.27	28863.36	30254.17	31677.70	33133.96
39269.87	41257.91	43295.04	45381.25	47516.55	49700.94
52359.83	55010.55	57726.72	60508.33	63355.40	66267.91
65449.79	68763.19	72158.40	75635.42	79194.25	82834.89
78539.75	82515.83	86590.07	90762.50	95033.10	99401.87
91629.71	96268.46	101021.75	105889.58	110871.95	115968.85
104719.67	110021.10	115453.43	121016.67	126710.80	132535.83
117809.63	123773.74	129885.11	136143.75	142549.65	149102.81
130899.58	137526.37	144316.79	151270.83	158388.50	165669.79

Table 6

CUTTER COSTS FOR VERY HARD ROCK
AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

$$Y_{CU} = \pi \frac{\phi^2}{4} DC_H$$

Where:

Y_{CU} = Cutter cost per well;

ϕ = Diameter of the hole drilled in feet. In our calculations this variable ranges from 10 to 45 inches and the inside diameter (ID) of the casing ranges from 8 to 30 inches, given that casing $ID \approx \frac{2}{3} \phi$;

D = Depth ranging from 1,000 to 10,000 feet in our calculations;

C_H = Cost per foot of linear cut as a function of the geological medium equal to $2.00 in the below calculations for very hard rock.

Y_{CU} (given ϕ = 10 in.)	Y_{CU} (given ϕ = 11 in.)	Y_{CU} (given ϕ = 12 in.)	Y_{CU} (given ϕ = 13 in.)	Y_{CU} (given ϕ = 14 in.)	Y_{CU} (given ϕ = 15 in.)
1090.83	1319.90	1570.79	1843.50	2138.03	2454.37
2181.66	2639.81	3141.59	3687.00	4276.05	4908.73
3272.49	3959.71	4712.38	5530.51	6414.08	7363.10
4363.32	5279.62	6283.18	7374.01	8552.11	9817.47
5454.15	6599.52	7853.97	9217.51	10690.13	12271.84
6544.98	7919.42	9424.77	11061.01	12828.16	14726.20
7635.81	9239.33	10995.57	12904.52	14966.19	17180.57
8726.64	10559.23	12566.36	14748.02	17104.21	19634.94
9817.47	11879.14	14137.16	16591.52	19242.24	22089.30
10908.30	13199.04	15707.95	18435.02	21380.27	24543.67

Y_{CU} (given ϕ = 16 in.)	Y_{CU} (given ϕ = 17 in.)	Y_{CU} (given ϕ = 18 in.)	Y_{CU} (given ϕ = 19 in.)	Y_{CU} (given ϕ = 20 in.)	Y_{CU} (given ϕ = 21 in.)
2792.52	3152.50	3534.29	3937.90	4363.32	4810.56
5585.05	6305.00	7068.58	7875.79	8726.64	9621.12
8377.57	9457.50	10602.87	11813.69	13089.96	14431.68
11170.10	12609.99	14137.16	15751.58	17453.28	19242.24
13962.62	15762.49	17671.44	19689.48	21816.60	24052.80
16755.15	18914.99	21205.73	23627.37	26179.92	28863.36
19547.67	22067.49	24740.02	27565.27	30543.24	33673.92
22340.20	25219.99	28274.31	31503.17	34906.56	38484.48
25132.72	28372.48	31808.60	35441.06	39269.87	43295.04
27925.24	31524.98	35342.89	39378.96	43633.19	48105.60

Continued

Y_{CU} (given ϕ = 22 in.)	Y_{CU} (given ϕ = 23 in.)	Y_{CU} (given ϕ = 24 in.)	Y_{CU} (given ϕ = 25 in.)	Y_{CU} (given ϕ = 26 in.)	Y_{CU} (given ϕ = 27 in.)
5279.62	5770.49	6283.18	6817.69	7374.01	7952.15
10559.23	11540.98	12566.36	13635.37	14748.02	15904.30
15838.85	17311.47	18849.54	20453.06	22122.03	23856.45
21118.47	23081.96	25132.72	27270.75	29496.04	31808.60
26398.08	28852.45	31415.90	34088.43	36870.05	39760.75
31677.70	34622.94	37699.08	40906.12	44244.06	47712.90
36957.32	40393.43	43982.26	47723.81	51618.07	55665.05
42236.93	46163.92	50265.44	54541.49	58992.08	63617.20
47516.55	51934.41	56548.62	61359.18	66366.09	71569.35
52796.17	57704.90	62831.80	68176.87	73740.10	79521.50

Y_{CU} (given ϕ = 28 in.)	Y_{CU} (given ϕ = 29 in.)	Y_{CU} (given ϕ = 30 in.)	Y_{CU} (given ϕ = 31 in.)	Y_{CU} (given ϕ = 32 in.)	Y_{CU} (given ϕ = 33 in.)
8552.11	9173.88	9817.47	10482.87	11170.10	11879.14
17104.21	18347.76	19634.94	20965.75	22340.20	23758.27
25656.32	27521.64	29452.41	31448.63	33510.29	35637.41
34208.43	36695.52	39269.87	41931.50	44680.39	47516.55
42760.53	45869.39	49087.34	52414.38	55850.49	59395.69
51312.64	55043.27	58904.81	62897.25	67020.59	71274.82
59864.74	64217.15	68722.28	73380.13	78190.68	83153.96
68416.85	73391.03	78539.75	83863.00	89360.78	95033.10
76968.96	82564.91	88357.22	94345.88	100530.88	106912.23
85521.06	91738.79	98174.69	104828.75	111700.98	118791.37

Y_{CU} (given ϕ = 34 in.)	Y_{CU} (given ϕ = 35 in.)	Y_{CU} (given ϕ = 36 in.)	Y_{CU} (given ϕ = 37 in.)	Y_{CU} (given ϕ = 38 in.)	Y_{CU} (given ϕ = 39 in.)
12609.99	13362.67	14137.16	14933.46	15751.58	16591.52
25219.99	26725.33	28274.31	29866.92	31503.17	33183.04
37829.98	40088.00	42411.47	44800.38	47254.75	49774.57
50439.97	53450.66	56548.62	59733.84	63006.33	66366.09
63049.97	66813.33	70685.78	74667.31	78757.91	82957.61
75659.96	80176.00	84822.93	89600.77	94509.50	99549.13
88269.95	93538.66	98960.09	104534.23	110261.08	116140.65
100879.94	106901.33	113097.24	119467.69	126012.66	132732.18
113489.94	120263.99	127234.40	134401.15	141764.25	149323.70
126099.93	133626.66	141371.55	149334.61	157515.83	165915.22

Y_{CU} (given ϕ = 40 in.)	Y_{CU} (given ϕ = 41 in.)	Y_{CU} (given ϕ = 42 in.)	Y_{CU} (given ϕ = 43 in.)	Y_{CU} (given ϕ = 44 in.)	Y_{CU} (given ϕ = 45 in.)
17453.28	18336.85	19242.24	20169.44	21118.47	22089.30
34906.56	36673.70	38484.48	40338.89	42236.93	44178.61
52359.83	55010.55	57726.72	60508.33	63355.40	66267.91
69813.11	73347.40	76968.96	80677.78	84473.86	88357.22
87266.39	91684.25	96211.20	100847.22	105592.33	110446.52
104719.67	110021.10	115453.43	121016.66	126710.80	132535.83
122172.95	128357.95	134695.67	141186.11	147829.26	154625.13
139626.22	146694.80	153937.91	161355.55	168947.73	176714.44
157079.50	165031.65	173180.15	181525.00	190066.19	198803.74
174532.78	183368.50	192422.39	201694.44	211184.66	220893.05

Table 7

CASING COSTS AS A FUNCTION OF DEPTH AND DIAMETER

$$Y_{CAS} = \left[7,500 + 1,625\left(\frac{2}{3}\phi - 10\right)\right] \frac{D}{1,000}$$

Where:

Y_{CAS} = Casing cost per well;

ϕ = Diameter of the well in feet. In our calculations this variable ranges from 10 to 45 inches and the inside diameter (ID) of the casing ranges from 8 to 30 inches, given that casing ID $\approx \frac{2}{3}\phi$;

D = Depth ranging from 1,000 to 10,000 feet in our calculations.

Y_{CAS} (given ϕ = 10 in.)	Y_{CAS} (given ϕ = 11 in.)	Y_{CAS} (given ϕ = 12 in.)	Y_{CAS} (given ϕ = 13 in.)	Y_{CAS} (given ϕ = 14 in.)	Y_{CAS} (given ϕ = 15 in.)
2083.33	3166.67	4250.00	5333.33	6416.67	7500.00
4166.67	6333.33	8500.00	10666.67	12833.33	15000.00
6250.00	9500.00	12750.00	16000.00	19250.00	22500.00
8333.33	12666.67	17000.00	21333.33	25666.67	30000.00
10416.67	15833.33	21250.00	26666.67	32083.33	37500.00
12500.00	19000.00	25500.00	32000.00	38500.00	45000.00
14583.33	22166.67	29750.00	37333.33	44916.67	52500.00
16666.67	25333.33	34000.00	42666.67	51333.33	60000.00
18750.00	28500.00	38250.00	48000.00	57750.00	67500.00
20833.33	31666.67	42500.00	53333.33	64166.67	75000.00

Y_{CAS} (given ϕ = 16, in.)	Y_{CAS} (given ϕ = 17 in.)	Y_{CAS} (given ϕ = 18 in.)	Y_{CAS} (given ϕ = 19 in.)	Y_{CAS} (given ϕ = 20 in.)	Y_{CAS} (given ϕ = 21 in.)
8583.33	9666.67	10750.00	11833.33	12916.67	14000.00
17166.67	19333.33	21500.00	23666.67	25833.33	28000.00
25750.00	29000.00	32250.00	35500.00	38750.00	42000.00
34333.33	38666.67	43000.00	47333.33	51666.67	56000.00
42916.67	48333.33	53750.00	59166.67	64583.33	70000.00
51500.00	58000.00	64500.00	71000.00	77500.00	84000.00
60083.33	67666.67	75250.00	82833.33	90416.67	98000.00
68666.67	77333.33	86000.00	94666.67	103333.33	112000.00
77250.00	87000.00	96750.00	106500.00	116250.00	126000.00
85833.33	96666.67	107500.00	118333.33	129166.67	140000.00

Y_{CAS} (given ϕ = 22 in.)	Y_{CAS} (given ϕ = 23 in.)	Y_{CAS} (given ϕ = 24 in.)	Y_{CAS} (given ϕ = 25 in.)	Y_{CAS} (given ϕ = 26 in.)	Y_{CAS} (given ϕ = 27 in.)
15083.33	16166.67	17250.00	18333.33	19416.67	20500.00
30166.67	32333.33	34500.00	36666.67	38833.33	41000.00
45250.00	48500.00	51750.00	55000.00	58250.00	61500.00
60333.33	64666.67	69000.00	73333.33	77666.67	82000.00
75416.67	80833.33	86250.00	91666.67	97083.33	102500.00
90500.00	97000.00	103500.00	110000.00	116500.00	123000.00
105583.33	113166.67	120750.00	128333.34	135916.67	143500.00
120666.67	129333.33	138000.00	146666.67	155333.33	164000.00
135750.00	145500.00	155250.00	165000.00	174750.00	184500.00
150833.33	161666.67	172500.00	183333.34	194166.67	205000.00

Y_{CAS} (given ϕ = 28 in.)	Y_{CAS} (given ϕ = 29 in.)	Y_{CAS} (given ϕ = 30 in.)	Y_{CAS} (given ϕ = 31 in.)	Y_{CAS} (given ϕ = 32 in.)	Y_{CAS} (given ϕ = 33 in.)
21583.33	22666.67	23750.00	24833.33	25916.67	27000.00
43166.67	45333.33	47500.00	49666.67	51833.33	54000.00
64750.00	68000.00	71250.00	74500.00	77750.00	81000.00
86333.33	90666.67	95000.00	99333.33	103666.67	108000.00
107916.67	113333.33	118750.00	124166.67	129583.33	135000.00
129500.00	136000.00	142500.00	149000.00	155500.00	162000.00
151083.33	158666.67	166250.00	173833.33	181416.67	189000.00
172666.67	181333.33	190000.00	198666.67	207333.33	216000.00
194250.00	204000.00	213750.00	223500.00	233250.00	243000.00
215833.34	226666.67	237500.00	248333.34	259166.67	270000.00

Y_{CAS} (given ϕ = 34 in.)	Y_{CAS} (given ϕ = 35 in.)	Y_{CAS} (given ϕ = 36 in.)	Y_{CAS} (given ϕ = 37 in.)	Y_{CAS} (given ϕ = 38 in.)	Y_{CAS} (given ϕ = 39 in.)
28083.33	29166.67	30250.00	31333.33	32416.67	33500.00
56166.67	58333.33	60500.00	62666.67	64833.33	67000.00
84250.00	87500.00	90750.00	94000.00	97250.00	100500.00
112333.33	116666.67	121000.00	125333.33	129666.67	134000.00
140416.67	145833.33	151250.00	156666.67	162083.33	167500.00
168500.00	175000.00	181500.00	188000.00	194500.00	201000.00
196583.33	204166.67	211750.00	219333.33	226916.66	234500.00
224666.67	233333.33	242000.00	250666.67	259333.33	268000.00
252750.00	262500.00	272250.00	282000.00	291750.00	301500.00
280833.34	291666.66	302500.00	313333.34	324166.66	335000.00

Y_{CAS} (given ϕ = 40 in.)	Y_{CAS} (given ϕ = 41 in.)	Y_{CAS} (given ϕ = 42 in.)	Y_{CAS} (given ϕ = 43 in.)	Y_{CAS} (given ϕ = 44 in.)	Y_{CAS} (given ϕ = 45 in.)
34583.33	35666.67	36750.00	37833.33	38916.67	40000.00
69166.67	71333.33	73500.00	75666.67	77833.33	80000.00
103750.00	107000.00	110250.00	113500.00	116750.00	120000.00
138333.33	142666.67	147000.00	151333.33	155666.67	160000.00
172916.67	178333.33	183750.00	189166.67	194583.33	200000.00
207500.00	214000.00	220500.00	227000.00	233500.00	240000.00
242083.34	249666.67	257250.00	264833.34	272416.67	280000.00
276666.67	285333.33	294000.00	302666.67	311333.33	320000.00
311250.00	321000.00	330750.00	340500.00	350250.00	360000.00
345833.34	356666.66	367500.00	378333.33	389166.66	400000.00

Table 8

CEMENTING COSTS PER WELL

AS A FUNCTION OF DEPTH AND DIAMETER

(in dollars)

$$Y_C = 1.30\left(\frac{5}{9}\pi \; P \frac{\phi^2}{4} D\right)$$

Where:

Y_C = Cementing cost per well;

P = Price of cementing material equal to $2 per cubic foot, in our calculations;

ϕ = Diameter of the hole drilled in feet. In our calculations this variable ranges from 10 to 45 inches and the inside diameter (ID) of the casing ranges from 8 to 30 inches, given that casing ID$\approx\frac{2}{3}\phi$;

D = Depth in feet ranging from 1,000 to 10,000 feet in our calculations.

Y_C (given ϕ = 10 in.)	Y_C (given ϕ = 11 in.)	Y_C (given ϕ = 12 in.)	Y_C (given ϕ = 13 in.)	Y_C (given ϕ = 14 in.)	Y_C (given ϕ = 15 in.)
787.82	953.26	1134.46	1331.42	1544.13	1772.60
1575.64	1906.53	2268.93	2662.84	3088.26	3545.20
2363.46	2859.79	3403.39	3994.26	4632.39	5317.80
3151.29	3813.06	4537.85	5325.67	6176.52	7090.39
3939.11	4766.32	5672.32	6657.09	7720.65	8862.99
4726.93	5719.58	6806.78	7988.51	9264.78	10635.59
5514.75	6672.85	7941.24	9319.93	10808.91	12408.19
6302.57	7626.11	9075.70	10651.35	12353.04	14180.79
7090.39	8579.38	10210.17	11982.77	13897.17	15953.39
7878.22	9532.64	11344.63	13314.18	15441.30	17725.99

Y_C (given ϕ = 16 in.)	Y_C (given ϕ = 17 in.)	Y_C (given ϕ = 18 in.)	Y_C (given ϕ = 19 in.)	Y_C (given ϕ = 20 in.)	Y_C (given ϕ = 21 in.)
2016.82	2276.80	2552.54	2844.04	3151.29	3474.29
4033.65	4553.61	5105.08	5688.07	6302.57	6948.59
6050.47	6830.41	7657.63	8532.11	9453.86	10422.88
8067.29	9107.22	10210.17	11376.14	12605.15	13897.17
10084.12	11384.02	12762.71	14220.18	15756.43	17371.47
12100.94	13660.83	15315.25	17064.21	18907.72	20845.76
14117.76	15937.63	17867.79	19908.25	22059.00	24320.05
16134.59	18214.43	20420.34	22752.29	25210.29	27794.34
18151.41	20491.24	22972.88	25596.32	28361.58	31268.64
20168.23	22768.04	25525.42	28440.36	31512.86	34742.93

Continued

Y_C (given ϕ = 22 in.)	Y_C (given ϕ = 23 in.)	Y_C (given ϕ = 24 in.)	Y_C (given ϕ = 25 in.)	Y_C (given ϕ = 26 in.)	Y_C (given ϕ = 27 in.)
3813.06	4167.58	4537.85	4923.88	5325.67	5743.22
7626.11	8335.15	9075.70	9847.77	10651.35	11486.44
11439.17	12502.73	13613.56	14771.65	15977.02	17229.66
15252.23	16670.30	18151.41	19695.54	21302.69	22972.88
19065.28	20837.88	22689.26	24619.42	26628.37	28716.10
22878.34	25005.46	27227.11	29543.31	31954.04	34459.32
26691.39	29173.03	31764.97	34467.19	37279.72	40202.53
30504.45	33340.61	36302.82	39391.08	42605.39	45945.75
34317.51	37508.19	40840.67	44314.96	47931.06	51688.97
38130.56	41675.76	45378.52	49238.85	53256.74	57432.19

Y_C (given ϕ = 28 in.)	Y_C (given ϕ = 29 in.)	Y_C (given ϕ = 30 in.)	Y_C (given ϕ = 31 in.)	Y_C (given ϕ = 32 in.)	Y_C (given ϕ = 33 in.)
6176.52	6625.58	7090.39	7570.97	8067.29	8579.38
12353.04	13251.16	14180.79	15141.93	16134.59	17158.75
18529.56	19876.74	21271.18	22712.90	24201.88	25738.13
24706.08	26502.32	28361.58	30283.86	32269.17	34317.51
30882.61	33127.90	35451.97	37854.83	40336.46	42896.88
37059.13	39753.48	42542.37	45425.79	48403.76	51476.26
43235.65	46379.06	49632.76	52996.76	56471.05	60055.64
49412.17	53004.63	56723.15	60567.72	64538.34	68635.02
55588.69	59630.21	63813.55	68138.69	72605.63	77214.39
61765.21	66255.79	70903.94	75709.65	80672.93	85793.77

Y_C (given ϕ = 34 in.)	Y_C (given ϕ = 35 in.)	Y_C (given ϕ = 36 in.)	Y_C (given ϕ = 37 in.)	Y_C (given ϕ = 38 in.)	Y_C (given ϕ = 39 in.)
9107.22	9650.81	10210.17	10785.28	11376.14	11982.77
18214.43	19301.63	20420.34	21570.55	22752.29	23965.53
27321.65	28952.44	30630.50	32355.83	34128.43	35948.30
36428.87	38603.26	40840.67	43141.11	45504.57	47931.06
45536.09	48254.07	51050.84	53926.39	56880.72	59913.83
54643.30	57904.88	61261.01	64711.67	68256.86	71896.60
63750.52	67555.70	71471.17	75496.94	79633.00	83879.36
72857.74	77206.51	81681.34	86282.22	91009.15	95862.13
81964.96	86857.33	91891.51	97067.50	102385.29	107844.89
91072.17	96508.14	102101.68	107852.77	113761.43	119827.66

Y_C (given ϕ = 40 in.)	Y_C (given ϕ = 41 in.)	Y_C (given ϕ = 42 in.)	Y_C (given ϕ = 43 in.)	Y_C (given ϕ = 44 in.)	Y_C (given ϕ = 45 in.)
12605.15	13243.28	13897.17	14566.82	15252.23	15953.39
25210.29	26486.56	27794.34	29133.64	30504.45	31906.77
37815.44	39729.84	41691.52	43700.46	45756.68	47860.16
50420.58	52973.12	55588.69	58267.28	61008.90	63813.55
63025.73	66216.40	69485.86	72834.10	76261.13	79766.93
75630.87	79459.68	83383.03	87400.92	91513.35	95720.32
88236.02	92702.96	97280.21	101967.74	106765.58	111673.71
100841.16	105946.24	111177.38	116534.57	122017.80	127627.09
113446.31	119189.52	125074.55	131101.39	137270.03	143580.48
126051.45	132432.81	138971.72	145668.21	152522.25	159533.87

Table 9

TOTAL RIG COSTS FOR SOFT ROCK

AS A FUNCTION OF DEPTH AND DIAMETER*

(in dollars)

$$Y_{RIG} = \left[\frac{DH_i(\phi+8)}{7,200}\right](1,200 + 1,15HPR)$$

Where:

Y_{RIG} = Total rig cost, per well;

ϕ = Diameter of the hole drilled in feet. In our calculations this variable ranges from 10 to 45 inches and the inside diameter (ID) of the casing ranges from 8 to 30 inches, given that casing ID $\approx \frac{2}{3}\phi$;

D = Depth ranging from 1,000 to 10,000 feet in our calculations;

HPR = $26(\phi - 10) + \frac{D}{5} - 800$; $500 < HPR < 2,500$ is the rig horsepower requirement;

H_i = Factor of the hardness of the soil equal to $\frac{3}{4}$ for soft rock.

* In these calculations, this total drilling time is the result of a ratio between total depth and the corresponding penetration rate.

Y_{RIG} (given ϕ = 10 in.)	Y_{RIG} (given ϕ = 11 in.)	Y_{RIG} (given ϕ = 12 in.)	Y_{RIG} (given ϕ = 13 in.)	Y_{RIG} (given ϕ = 14 in.)	Y_{RIG} (given ϕ = 15 in.)
2250.00	2375.00	2500.00	2625.00	2750.00	2875.00
4500.00	4750.00	5000.00	5250.00	5500.00	5750.00
6750.00	7125.00	7500.00	7875.00	8250.00	8625.00
9000.00	9736.71	10498.33	11284.87	12096.33	12932.71
13406.25	14446.93	15518.75	16621.72	17755.83	18921.09
18675.00	20067.56	21497.50	22964.81	24469.50	26011.56
24806.25	26598.62	28434.58	30314.16	32237.33	34204.11
31800.00	34040.08	36330.00	38669.75	41059.33	43498.75
39656.25	42391.97	45183.75	48031.59	50935.50	53895.47
48375.00	51654.27	54995.83	58399.69	61865.83	65394.27

Y_{RIG} (given ϕ = 16 in.)	Y_{RIG} (given ϕ = 17 in.)	Y_{RIG} (given ϕ = 18 in.)	Y_{RIG} (given ϕ = 19 in.)	Y_{RIG} (given ϕ = 20 in.)	Y_{RIG} (given ϕ = 21 in.)
3000.00	3125.00	3250.00	3375.00	3500.00	3625.00
6000.00	6250.00	6500.00	6750.00	7000.00	7250.00
9000.00	9375.00	9824.75	10454.91	11103.75	11771.28
13794.00	14680.21	15591.33	16527.38	17488.33	18474.21
20117.50	21345.05	22603.75	23893.59	25214.58	26566.72
27591.00	29207.81	30862.00	32553.56	34282.50	36048.81
36214.50	38268.49	40366.08	42507.28	44692.08	46920.49
45988.00	48527.08	51116.00	53754.75	56443.33	59181.75
56911.50	59983.59	63111.75	66295.97	69536.25	72832.60
68985.00	72638.02	76353.33	80130.94	83970.83	87873.02

Y_{RIG} (given ϕ = 22 in.)	Y_{RIG} (given ϕ = 23 in.)	Y_{RIG} (given ϕ = 24 in.)	Y_{RIG} (given ϕ = 25 in.)	Y_{RIG} (given ϕ = 26 in.)	Y_{RIG} (given ϕ = 27 in.)
3750.00	3875.00	4000.00	4125.00	4250.00	4375.00
7500.00	7750.00	8000.00	8250.00	8630.33	9102.19
12457.50	13162.41	13886.00	14628.28	15389.25	16168.91
19485.00	20520.71	21581.33	22666.87	23777.33	24912.71
27950.00	29364.43	30810.00	32286.72	33794.58	35333.59
37852.50	39693.56	41572.00	43487.81	45441.00	47431.56
49192.50	51508.11	53867.33	56270.16	58716.58	61206.62
61970.00	64808.08	67696.00	70633.75	73621.33	76658.75
76185.00	79593.47	83058.00	86578.59	90155.25	93787.97
91837.50	95864.27	99953.33	104104.69	108318.33	112594.27

Y_{RIG} (given ϕ = 28 in.)	Y_{RIG} (given ϕ = 29 in.)	Y_{RIG} (given ϕ = 30 in.)	Y_{RIG} (given ϕ = 31 in.)	Y_{RIG} (given ϕ = 32 in.)	Y_{RIG} (given ϕ = 33 in.)
4500.00	4625.00	4750.00	4875.00	5000.00	5125.00
9586.50	10083.27	10592.50	11114.19	11648.33	12194.94
16967.25	17784.28	18620.00	19474.41	20347.50	21239.28
26073.00	27258.21	28468.33	29703.38	30963.33	32248.21
36903.75	38505.05	40137.50	41801.09	43495.83	45221.72
49459.50	51524.81	53627.50	55767.56	57945.00	60159.81
63740.25	66317.49	68938.33	71602.78	74310.83	77062.49
79746.00	82883.08	86070.00	89306.75	92593.33	95929.75
97476.75	101221.59	105022.50	108879.47	112792.50	116761.59
116932.50	121333.02	125795.84	130320.94	134908.33	139558.02

Y_{RIG} (given ϕ = 34 in.)	Y_{RIG} (given ϕ = 35 in.)	Y_{RIG} (given ϕ = 36 in.)	Y_{RIG} (given ϕ = 37 in.)	Y_{RIG} (given ϕ = 38 in.)	Y_{RIG} (given ϕ = 39 in.)
5370.75	5632.55	5900.58	6174.84	6455.33	6742.05
12754.00	13325.52	13909.50	14505.94	15114.83	15736.19
22149.75	23078.91	24026.75	24993.28	25978.50	26982.41
33558.00	34892.71	36252.33	37636.88	39046.33	40480.71
46978.75	48766.93	50586.25	52436.72	54318.33	56231.09
62412.00	64701.56	67028.50	69392.81	71794.50	74233.56
79857.75	82696.61	85579.08	88505.16	91474.83	94488.12
99316.00	102752.08	106238.00	109773.75	113359.33	116994.75
120786.75	124867.97	129005.25	133198.60	137448.00	141753.47
144270.00	149044.27	153880.83	158779.69	163740.83	168764.27

Y_{RIG} (given ϕ = 40 in.)	Y_{RIG} (given ϕ = 41 in.)	Y_{RIG} (given ϕ = 42 in.)	Y_{RIG} (given ϕ = 43 in.)	Y_{RIG} (given ϕ = 44 in.)	Y_{RIG} (given ϕ = 45 in.)
7035.00	7334.18	7639.58	7951.22	8269.08	8593.18
16370.00	17016.27	17675.00	18346.19	19029.83	19725.94
28005.00	29046.28	30106.25	31184.91	32282.25	33398.28
41940.00	43424.21	44933.33	46467.38	48026.33	49610.21
58175.00	60150.05	62156.25	64193.59	66262.08	68361.72
76710.00	79223.81	81775.00	84363.56	86989.50	89652.81
97545.00	100645.49	103789.58	106977.28	110208.58	113483.49
120680.00	124415.09	128200.00	132034.75	135919.33	139853.75
146115.00	150532.60	155006.25	159535.97	164121.75	168763.59
173850.00	178645.83	182291.67	185937.50	189583.33	193229.17

Table 10

TOTAL RIG COSTS FOR MEDIUM SOFT ROCK
AS A FUNCTION OF DEPTH AND DIAMETER*
(in dollars)

$$Y_{RIG} = \left[\frac{DH_i(\phi+8)}{7,200}\right](1,200 + 1.15HPR)$$

Where:

Y_{RIG} = Total rig cost; per well;

ϕ = Diameter of the hole drilled in feet. In our calculations this variable ranges from 10 to 45 inches and the inside diameter (ID) of the casing ranges from 8 to 30 inches, given that casing ID$\approx\frac{2}{3}\ \phi$;

D = Depth ranging from 1,000 to 10,000 feet in our calculations;

HPR = $26(\phi - 10) + \frac{D}{5} - 800$; $500 < HPR < 2,500$ is the rig horsepower requirement;

H_i = Factor of the hardness of the soil equal to 1 for medium soft rock.

* In these calculations, this total drilling time is the result of a ratio between total depth and the corresponding penetration rate.

Y_{RIG} (given ϕ = 10 in.)	Y_{RIG} (given ϕ = 11 in.)	Y_{RIG} (given ϕ = 12 in.)	Y_{RIG} (given ϕ = 13 in.)	Y_{RIG} (given ϕ = 14 in.)	Y_{RIG} (given ϕ = 15 in.)
3000.00	3166.67	3333.33	3500.00	3666.67	3833.33
6000.00	6333.33	6666.67	7000.00	7333.33	7666.67
9000.00	9500.00	10000.00	10500.00	11000.00	11500.00
12000.00	12982.28	13997.78	15046.50	16128.44	17243.61
17875.00	19262.57	20691.67	22162.29	23674.44	25228.12
24900.00	26756.75	28663.33	30619.75	32626.00	34682.08
33075.00	35464.82	37912.78	40418.88	42983.11	45605.49
42400.00	45386.78	48440.00	51559.67	54745.78	57998.33
52875.00	56522.63	60245.00	64042.13	67914.00	71860.63
64500.00	68872.36	73327.78	77866.25	82487.78	87192.36

Y_{RIG} (given ϕ = 16 in.)	Y_{RIG} (given ϕ = 17 in.)	Y_{RIG} (given ϕ = 18 in.)	Y_{RIG} (given ϕ = 19 in.)	Y_{RIG} (given) ϕ = 20 in.)	Y_{RIG} (given ϕ = 21 in.)
4000.00	4166.67	4333.33	4500.00	4666.67	4833.33
8000.00	8333.33	8666.67	9000.00	9333.33	9666.67
12000.00	12500.00	13099.67	13939.88	14805.00	15695.04
18392.00	19573.61	20788.44	22036.50	23317.78	24632.28
26823.33	28460.07	30138.33	31858.13	33619.44	35422.29
36788.00	38943.75	41149.33	43404.75	45710.00	48065.08
48286.00	51024.65	53821.44	56676.38	59589.45	62560.65
61317.33	64702.78	68154.67	71673.00	75257.78	78909.00
75882.00	79978.13	84149.00	88394.62	92715.00	97110.13
91980.00	96850.70	101804.44	106841.25	111961.11	117164.03

Y_{RIG} (given ϕ = 22 in.)	Y_{RIG} (given ϕ = 23 in.)	Y_{RIG} (given ϕ = 24 in.)	Y_{RIG} (given ϕ = 25 in.)	Y_{RIG} (given ϕ = 26 in.)	Y_{RIG} (given ϕ = 27 in.)
5000.00	5166.67	5333.33	5500.00	5666.67	5833.33
10000.00	10333.33	10666.67	11000.00	11507.11	12136.25
16610.00	17549.88	18514.67	19504.38	20519.00	21558.54
25980.00	27360.94	28775.11	30222.50	31703.11	33216.94
37266.67	39152.57	41080.00	43048.96	45059.45	47111.46
50470.00	52924.75	55429.33	57983.75	60588.00	63242.08
65590.00	68677.49	71823.11	75026.87	78288.78	81608.82
82626.67	86410.78	90261.33	94178.33	98161.78	102211.67
101580.00	106124.62	110744.00	115438.13	120207.00	125050.63
122450.00	127819.03	133271.11	138806.25	144424.45	150125.69

Y_{RIG} (given ϕ = 28 in.)	Y_{RIG} (given ϕ = 29 in.)	Y_{RIG} (given ϕ = 30 in.)	Y_{RIG} (given ϕ = 31 in.)	Y_{RIG} (given ϕ = 32 in.)	Y_{RIG} (given ϕ = 33 in.)
6000.00	6166.67	6333.33	6500.00	6666.67	6833.33
12782.00	13444.36	14123.33	14818.92	15531.11	16259.92
22623.00	23712.37	24826.67	25965.88	27130.00	28319.04
34764.00	36344.28	37957.78	39604.50	41284.44	42997.61
49205.00	51340.07	53516.67	55734.79	57994.45	60295.63
65946.00	68699.75	71503.33	74356.75	77260.00	80213.08
84987.00	88423.32	91917.78	95470.38	99081.11	102749.99
106328.00	110510.78	114760.00	119075.67	123457.78	127906.33
129969.00	134962.13	140030.00	145172.63	150390.00	155682.13
155910.00	161777.36	167727.78	173761.25	179877.78	186077.36

Y_{RIG} (given ϕ = 34 in.)	Y_{RIG} (given ϕ = 35 in.)	Y_{RIG} (given ϕ = 36 in.)	Y_{RIG} (given ϕ = 37 in.)	Y_{RIG} (given ϕ = 38 in.)	Y_{RIG} (given ϕ = 39 in.)
7161.00	7510.07	7867.44	8233.12	8607.11	8989.40
17005.33	17767.36	18546.00	19341.25	20153.11	20981.58
29533.00	30771.87	32035.67	33324.38	34638.00	35976.54
44744.00	46523.61	48336.44	50182.50	52061.78	53974.28
62638.33	65022.57	67448.33	69915.63	72424.44	74974.79
83216.00	86268.75	89371.33	92523.75	95726.00	98978.08
106477.00	110262.15	114105.45	118006.88	121966.44	125984.15
132421.33	137002.78	141650.67	146365.00	151145.78	155993.00
161049.00	166490.63	172007.00	177598.13	183264.00	189004.63
192360.00	198725.69	205174.45	211706.25	218321.11	225019.02

Y_{RIG} (given ϕ = 40 in.)	Y_{RIG} (given ϕ = 41 in.)	Y_{RIG} (given ϕ = 42 in.)	Y_{RIG} (given ϕ = 43 in.)	Y_{RIG} (given ϕ = 44 in.)	Y_{RIG} (given ϕ = 45 in.)
9380.00	9778.90	10186.11	10601.63	11025.44	11457.57
21826.67	22688.36	23566.67	24461.58	25373.11	26301.25
37340.00	38728.38	40141.67	41579.88	43043.00	44531.04
55920.00	57898.94	59911.11	61956.50	64035.11	66146.94
77566.67	80200.07	82875.00	85591.46	88349.44	91148.96
102280.00	105631.75	109033.33	112484.75	115986.00	119537.08
130060.00	134193.99	138386.11	142636.38	146944.78	151311.32
160906.67	165886.78	170933.33	176046.33	181225.77	186471.67
194820.00	200710.13	206675.00	212714.63	218829.00	225018.13
231800.00	238194.44	243055.56	247916.67	252777.77	257638.89

Table 11

TOTAL RIG COSTS FOR MEDIUM HARD ROCK
AS A FUNCTION OF DEPTH AND DIAMETER*
(in dollars)

$$Y_{RIG} = \left[\frac{DH_i(\phi+8)}{7,200}\right](1,200 + 1.15HPR)$$

Where:

Y_{RIG} = Total rig cost per well;

ϕ = Diameter of the hole drilled in feet. In our calculations this variable ranges from 10 to 45 inches and the inside diameter (ID) of the casing ranges from 8 to 30 inches, given that casing ID $\approx \frac{2}{3}\ \phi$;

D = Depth ranging from 1,000 to 10,000 feet in our calculations;

HPR = $26(\phi - 10) + \frac{D}{5} - 800$; $500 < HPR < 2,500$ is the rig horsepower requirement;

H_i = Factor of the hardness of the soil equal to $\frac{\pm 3}{2.3}$ for medium hard rock/

* In these calculations, this total drilling time is the result of a ratio between total depth and the corresponding penetration rate.

Y_{RIG} (given ϕ = 10 in.)	Y_{RIG} (given ϕ = 11 in.)	Y_{RIG} (given ϕ = 12 in.)	Y_{RIG} (given ϕ = 13 in.)	Y_{RIG} (given ϕ = 14 in.)	Y_{RIG} (given ϕ = 15 in.)
3913.04	4130.43	4347.83	4565.22	4782.61	5000.00
7826.09	8260.87	8695.65	9130.43	9565.22	10000.00
11739.13	12391.30	13043.48	13695.65	14347.83	15000.00
15652.17	16933.41	18257.97	19625.87	21037.10	22491.67
23315.22	25125.09	26989.13	28907.34	30879.71	32906.25
32478.26	34900.11	37386.96	39938.80	42555.65	45237.50
43141.30	46258.46	49451.45	52720.27	56064.93	59485.42
55304.35	59200.15	63182.61	67251.74	71407.54	75650.00
68967.39	73725.16	78580.44	83533.21	88583.48	93731.25
84130.43	89833.51	95644.93	101564.67	107592.75	113729.17

Y_{RIG} (given ϕ = 16 in.)	Y_{RIG} (given ϕ = 17 in.)	Y_{RIG} (given ϕ = 18 in.)	Y_{RIG} (given ϕ = 19 in.)	Y_{RIG} (given ϕ = 20 in.)	Y_{RIG} (given ϕ = 21 in.)
5217.39	5434.78	5652.17	5869.57	6086.96	6304.35
10434.78	10869.57	11304.35	11739.13	12173.91	12608.70
15652.17	16304.35	17086.52	18182.45	19310.87	20471.79
23989.57	25530.80	27115.36	28743.26	30414.49	32129.06
34986.96	37121.83	39310.87	41554.08	43851.45	46202.99
47984.35	50796.20	53673.04	56614.89	59621.74	62693.59
62981.74	66553.90	70201.88	73925.71	77725.36	81600.85
79979.13	84394.93	88897.39	93486.52	98162.32	102924.78
98976.52	104319.29	109759.56	115297.34	120932.61	126665.38
119973.91	126326.99	132788.40	139358.15	146036.23	152822.64

Y_{RIG} (given ϕ = 22 in.)	Y_{RIG} (given ϕ = 23 in.)	Y_{RIG} (given ϕ = 24 in.)	Y_{RIG} (given ϕ = 25 in.)	Y_{RIG} (given ϕ = 26 in.)	Y_{RIG} (given ϕ = 27 in.)
6521.74	6739.13	6956.52	7173.91	7391.30	7608.70
13043.48	13478.26	13913.04	14347.83	15009.28	15829.89
21665.22	22891.14	24149.57	25440.49	26763.91	28119.84
33886.96	35688.19	37532.75	39420.65	41351.88	43326.45
48608.70	51068.57	53582.61	56150.81	58773.19	61449.73
65830.43	69032.28	72299.13	75630.98	79027.83	82489.67
85552.17	89579.33	93682.32	97861.14	102115.80	106446.29
107773.91	112709.71	117732.17	122841.30	128037.10	133319.56
132495.65	138423.42	144448.70	150571.47	156791.74	163109.51
159717.39	166720.47	173831.89	181051.63	188379.71	195816.12

Y_{RIG} (given ϕ = 28 in.)	Y_{RIG} (given ϕ = 29 in.)	Y_{RIG} (given ϕ = 30 in.)	Y_{RIG} (given ϕ = 31 in.)	Y_{RIG} (given ϕ = 32 in.)	Y_{RIG} (given ϕ = 33 in.)
7826.09	8043.48	8260.87	8478.26	8695.65	8913.04
16672.17	17536.12	18421.74	19329.32	20257.97	21208.59
29508.26	30929.18	32382.61	33868.53	35386.96	36937.38
45344.35	47405.58	49510.15	51658.04	53849.28	56083.84
64180.44	66965.31	69804.35	72697.55	75644.93	78646.47
86016.52	89608.37	93265.22	96987.07	100773.91	104625.76
110852.61	115334.76	119892.75	124526.58	129236.23	134021.72
138688.69	144144.49	149686.96	155316.09	161031.89	166834.35
169524.78	176037.55	182647.83	189355.60	196160.87	203063.64
203360.87	211013.94	218775.36	226645.11	234623.19	242709.61

Y_{RIG} (given ϕ = 34 in.)	Y_{RIG} (given ϕ = 35 in.)	Y_{RIG} (given ϕ = 36 in.)	Y_{RIG} (given ϕ = 37 in.)	Y_{RIG} (given ϕ = 38 in.)	Y_{RIG} (given ϕ = 39 in.)
9340.43	9795.74	10261.88	10738.86	11226.67	11725.31
22180.87	23174.82	24190.43	25227.72	26286.67	27367.28
38521.30	40137.23	41785.65	43466.58	45180.00	46925.92
58361.74	60682.97	63047.54	65455.43	67906.67	70401.23
81702.17	84812.05	87976.09	91194.30	94466.67	97793.21
108542.61	112524.45	116571.31	120683.15	124860.00	129101.85
138883.04	143820.20	148833.19	153922.01	159086.67	164327.16
172723.48	178699.28	184761.74	190910.87	197146.67	203469.13
210063.91	217161.69	224356.96	231649.73	239040.00	246527.77
250904.34	259207.42	267618.84	276138.59	284766.66	293503.07

Y_{RIG} (given ϕ = 40 in.)	Y_{RIG} (given ϕ = 41 in.)	Y_{RIG} (given ϕ = 42 in.)	Y_{RIG} (given ϕ = 43 in.)	Y_{RIG} (given ϕ = 44 in.)	Y_{RIG} (given ϕ = 45 in.)
12234.78	12755.09	13286.23	13828.21	14381.01	14944.66
28469.57	29593.51	30739.13	31906.41	33095.36	34305.98
48704.35	50515.27	52358.70	54234.62	56143.04	58083.97
72939.13	75520.36	78144.93	80812.83	83524.06	86278.62
101173.91	104608.79	108097.83	111641.03	115238.40	118889.95
133408.70	137780.54	142217.39	146719.24	151286.08	155917.94
169643.48	175035.63	180503.62	186047.44	191667.10	197362.59
209878.26	216374.06	222956.52	229625.65	236381.44	243223.91
254113.04	261795.82	269576.09	277453.86	285429.13	293501.90
302347.82	310688.40	317028.98	323369.56	329710.14	336050.72

Table 12

TOTAL RIG COSTS FOR HARD ROCK
AS A FUNCTION OF DEPTH AND DIAMETER*
(in dollars)

$$Y_{RIG} = \left[\frac{DH_i(\phi+8)}{7,200}\right](1,200 + 1.15HPR)$$

Where:

Y_{RIG} = Total rig cost per well;

ϕ = Diameter of the hole drilled in feet. In our calculations this variable ranges from 10 to 45 inches and the inside diameter (ID) of the casing ranges from 8 to 30 inches, given that casing ID $\approx \frac{2}{3}\phi$;

D = Depth ranging from 1,000 to 10,000 feet in our calculations;

HPR = $26(\phi - 10) + \frac{+D}{5} - 800$; $500 > HPR > 2,500$ is the rig horsepower requirement;

H_i = Factor of the hardness of the soil equal to $\frac{+3}{1.3}$ for hard rock.

* In these calculations, this total drilling time is the result of a ratio between total depth and the corresponding penetration rate.

Y_{RIG} (given ϕ = 10 in.)	Y_{RIG} (given ϕ = 11 in.)	Y_{RIG} (given ϕ = 12 in.)	Y_{RIG} (given ϕ = 13 in.)	Y_{RIG} (given ϕ = 14 in.)	Y_{RIG} (given ϕ = 15 in.)
6923.08	7307.69	7692.31	8076.92	8461.54	8846.15
13846.15	14615.39	15384.62	16153.85	16923.08	17692.31
20769.23	21923.08	23076.92	24230.77	25384.62	26538.46
27692.31	29959.10	32302.56	34722.69	37219.49	39792.95
41250.00	44452.08	47750.00	51143.75	54633.33	58218.75
57461.54	61746.35	66146.15	70660.96	75290.77	80035.58
76326.92	81841.89	87491.03	93274.33	99191.80	105243.43
97846.15	104738.72	111784.62	118983.85	126336.41	133842.31
122019.23	130436.83	139026.93	147789.52	156724.62	165832.21
148846.15	158936.22	169217.95	179691.35	190356.41	201213.14

Y_{RIG} (given ϕ = 16 in.)	Y_{RIG} (given ϕ = 17 in.)	Y_{RIG} (given ϕ = 18 in.)	Y_{RIG} (given ϕ = 19 in.)	Y_{RIG} (given ϕ = 20 in.)	Y_{RIG} (given ϕ = 21 in.)
9230.77	9615.38	10000.00	10384.62	10769.23	11153.85
18461.54	19230.77	20000.00	20769.23	21538.46	22307.69
27692.31	28846.15	30230.00	32168.94	34165.38	36219.33
42443.08	45169.87	47973.33	50853.46	53810.26	56843.72
61900.00	65677.08	69550.00	73518.75	77583.33	81743.75
84895.39	89870.19	94960.00	100164.81	105484.62	110919.42
111429.23	117749.20	124203.33	130791.64	137514.10	144370.74
141501.54	149314.10	157280.00	165399.23	173671.80	182097.70
175112.31	184564.91	194190.00	203987.59	213957.69	224100.29
212261.54	223501.60	234933.33	246556.73	258371.79	270378.53

Y_{RIG} (given ϕ = 22 in.)	Y_{RIG} (given ϕ = 23 in.)	Y_{RIG} (given ϕ = 24 in.)	Y_{RIG} (given ϕ = 25 in.)	Y_{RIG} (given ϕ = 26 in.)	Y_{RIG} (given ϕ = 27 in.)
11538.46	11923.08	12307.69	12692.31	13076.92	13461.54
23076.92	23846.15	24615.38	25384.62	26554.87	28006.73
38330.77	40499.71	42726.15	45010.10	47351.54	49750.48
59953.85	63140.64	66404.10	69744.23	73161.03	76654.49
86000.00	90352.09	94800.00	99343.75	103983.33	108718.75
116469.23	122134.04	127913.85	133808.65	139818.46	145943.27
151361.54	158486.51	165745.64	173138.94	180666.41	188328.05
190676.92	199409.49	208295.39	217334.61	226527.18	235873.08
234415.39	244902.98	255563.08	266395.68	277400.77	288578.37
282576.92	294966.99	307548.72	320322.12	333287.18	346443.91

Y_{RIG} (given ϕ = 28 in.)	Y_{RIG} (given ϕ = 29 in.)	Y_{RIG} (given ϕ = 30 in.)	Y_{RIG} (given ϕ = 31 in.)	Y_{RIG} (given ϕ = 32 in.)	Y_{RIG} (given ϕ = 33 in.)
13846.15	14230.77	14615.39	15000.00	15384.62	15769.23
29496.92	31025.45	32592.31	34197.50	35841.03	37522.88
52206.92	54720.87	57292.31	59921.25	62607.69	65351.64
80224.62	83871.41	87594.87	91395.00	95271.80	99225.26
113550.00	118477.08	123500.00	128618.75	133833.33	139143.75
152183.08	158537.88	165007.69	171592.50	178292.31	185107.12
196123.85	204053.82	212117.95	220316.25	228648.72	237115.35
245372.31	255024.87	264830.78	274790.00	284902.57	295168.46
299928.46	311451.06	323146.16	335013.76	347053.85	359266.44
359792.31	373332.37	387064.11	400987.50	415102.57	429409.31

Y_{RIG} (given ϕ = 34 in.)	Y_{RIG} (given ϕ = 35 in.)	Y_{RIG} (given ϕ = 36 in.)	Y_{RIG} (given ϕ = 37 in.)	Y_{RIG} (given ϕ = 38 in.)	Y_{RIG} (given ϕ = 39 in.)
16525.38	17330.93	18155.64	18999.52	19862.56	20744.78
39243.08	41001.60	42798.46	44633.65	46507.18	48419.04
68153.08	71012.02	73928.46	76902.40	79933.85	83022.79
103255.39	107362.18	111545.64	115805.77	120142.57	124556.03
144550.00	150052.08	155650.00	161343.75	167133.33	173018.75
192036.92	199081.73	206241.54	213516.35	220906.15	228410.96
245716.15	254451.12	263320.26	272323.56	281461.02	290732.66
305587.70	316160.26	326886.16	337765.39	348797.95	359983.85
371651.54	384209.14	396939.24	409841.83	422916.93	436164.52
443907.69	458597.75	473479.49	488552.89	503817.94	519274.68

Y_{RIG} (given ϕ = 40 in.)	Y_{RIG} (given ϕ = 41 in.)	Y_{RIG} (given ϕ = 42 in.)	Y_{RIG} (given ϕ = 43 in.)	Y_{RIG} (given ϕ = 44 in.)	Y_{RIG} (given ϕ = 45 in.)
21646.15	22566.70	23506.41	24465.29	25443.33	26440.54
50369.23	52357.76	54384.62	56449.81	58553.33	60695.19
86169.23	89373.17	92634.62	95953.56	99330.00	102763.94
129046.15	133612.95	138256.41	142976.54	147773.33	152646.80
179000.00	185077.09	191250.00	197518.75	203883.33	210343.75
236030.77	243765.58	251615.39	259580.19	267660.00	275854.81
300138.46	309678.43	319352.57	329160.87	339103.33	349179.97
371323.08	382815.65	394461.54	406260.77	418213.33	430319.23
449584.62	463177.22	476942.32	490879.91	504990.00	519272.60
534923.07	549679.49	560897.44	572115.38	583333.33	594551.28

Table 13

TOTAL RIG COSTS FOR VERY HARD ROCK
AS A FUNCTION OF DEPTH AND DIAMETER*
(in dollars)

$$Y_{RIG} = \left[\frac{DH_i(\phi+8)}{7,200}\right](1,200 + 1.15HPR)$$

Where:

Y_{RIG} = Total rig cost, per well;

ϕ = Diameter of the hole drilled in feet. In our calculations this variable ranges from 10 to 45 inches and the inside diameter (ID) of the casing ranges from 8 to 30 inches, given that casing ID $\approx \frac{2}{3}\ \phi$;

D = Depth ranging from 1,000 to 10,000 feet in our calculations;

HPR = $26(\phi - 10) + \frac{D}{5} - 800$; $500 > HPR > 2,500$ is the rig horsepower requirement;

H_i = Factor of the hardness of the soil equal to 3 for very hard rock.

* In these calculations, this total drilling time is the result of a ratio between total depth and the corresponding penetration rate.

Y_{RIG} (given ϕ = 10 in.)	Y_{RIG} (given ϕ = 11 in.)	Y_{RIG} (given ϕ = 12 in.)	Y_{RIG} (given ϕ = 13 in.)	Y_{RIG} (given ϕ = 14 in.)	Y_{RIG} (given ϕ = 15 in.)
9000.00	9500.00	10000.00	10500.00	11000.00	11500.00
18000.00	19000.00	20000.00	21000.00	22000.00	23000.00
27000.00	28500.00	30000.00	31500.00	33000.00	34500.00
36000.00	38946.83	41993.33	45139.50	48385.33	51730.83
53625.00	57787.71	62075.00	66486.88	71023.33	75684.37
74700.00	80270.25	85990.00	91859.25	97878.00	104046.25
99225.00	106394.46	113738.33	121256.63	128949.33	136816.46
127200.00	136160.33	145320.00	154679.00	164237.33	173995.00
158625.00	169567.88	180735.00	192126.38	203742.00	215581.88
193500.00	206617.08	219983.34	233598.75	247463.33	261577.08

Y_{RIG} (given ϕ = 16 in.)	Y_{RIG} (given ϕ = 17 in.)	Y_{RIG} (given ϕ = 18 in.)	Y_{RIG} (given ϕ = 19 in.)	Y_{RIG} (given ϕ = 20 in.)	Y_{RIG} (given ϕ = 21 in.)
12000.00	12500.00	13000.00	13500.00	14000.00	14500.00
24000.00	25000.00	26000.00	27000.00	28000.00	29000.00
36000.00	37500.00	39299.00	41819.63	44415.00	47085.12
55176.00	58720.83	62365.33	66109.50	69953.33	73896.83
80470.00	85380.21	90415.00	95574.37	100858.33	106266.88
110364.00	116831.25	123448.00	130214.25	137130.00	144195.25
144858.00	153073.96	161464.33	170029.13	178768.33	187681.96
183952.00	194108.33	204464.00	215019.00	225773.33	236727.00
227646.00	239934.38	252447.00	265183.87	278145.00	291330.38
275940.00	290552.09	305413.33	320523.75	335883.33	351492.09

Y_{RIG} (given ϕ = 22 in.)	Y_{RIG} (given ϕ = 23 in.)	Y_{RIG} (given ϕ = 24 in.)	Y_{RIG} (given ϕ = 25 in.)	Y_{RIG} (given ϕ = 26 in.)	Y_{RIG} (given ϕ = 27 in.)
15000.00	15500.00	16000.00	16500.00	17000.00	17500.00
30000.00	31000.00	32000.00	33000.00	34521.33	36408.75
49830.00	52649.63	55544.00	58513.13	61557.00	64675.62
77940.00	82082.83	86325.33	90667.50	95109.33	99650.83
111800.00	117457.71	123240.00	129146.87	135178.33	141334.37
151410.00	158774.25	166288.00	173951.25	181764.00	189726.25
196770.00	206032.46	215469.33	225080.62	234866.34	244826.46
247880.00	259232.34	270784.00	282535.00	294485.34	306635.00
304740.00	318373.88	332232.00	346314.38	360621.00	375151.88
367350.00	383457.09	399813.34	416418.75	433273.34	450377.08

Y_{RIG} (given ϕ = 28 in.)	Y_{RIG} (given ϕ = 29 in.)	Y_{RIG} (given ϕ = 30 in.)	Y_{RIG} (given ϕ = 31 in.)	Y_{RIG} (given ϕ = 32 in.)	Y_{RIG} (given ϕ = 33 in.)
18000.00	18500.00	19000.00	19500.00	20000.00	20500.00
38346.00	40333.08	42370.00	44456.75	46593.33	48779.75
67869.00	71137.12	74480.00	77897.63	81390.00	84957.13
104292.00	109032.83	113873.33	118813.50	123853.33	128992.83
147615.00	154020.21	160550.00	167204.37	173983.33	180886.88
197838.00	206099.25	214510.00	223070.25	231780.00	240639.25
254961.00	265269.96	275753.34	286411.13	297243.34	308249.96
318984.00	331532.33	344280.01	357227.00	370373.34	383719.00
389907.00	404886.37	420090.01	435517.88	451170.00	467046.37
467730.00	485332.08	503183.34	521283.75	539633.34	558232.09

Y_{RIG} (given ϕ = 34 in.)	Y_{RIG} (given ϕ = 35 in.)	Y_{RIG} (given ϕ = 36 in.)	Y_{RIG} (given ϕ = 37 in.)	Y_{RIG} (given ϕ = 38 in.)	Y_{RIG} (given ϕ = 39 in.)
21483.00	22530.21	23602.33	24699.37	25821.33	26968.21
51016.00	53302.08	55638.00	58023.75	60459.33	62944.75
88599.00	92315.62	96107.00	99973.13	103914.00	107929.63
134232.00	139570.83	145009.33	150547.50	156185.34	161922.83
187915.00	195067.71	202345.00	209746.88	217273.33	224924.37
249648.00	258806.25	268114.00	277571.25	287178.00	296934.25
319431.00	330786.46	342316.34	354020.63	365899.33	377952.46
397264.00	411008.34	424952.00	439095.00	453437.34	467979.00
483147.00	499471.88	516021.01	532794.38	549792.00	567013.87
577080.00	596177.08	615523.34	635118.76	654963.33	675057.08

Y_{RIG} (given ϕ = 40 in.)	Y_{RIG} (given ϕ = 41 in.)	Y_{RIG} (given ϕ = 42 in.)	Y_{RIG} (given ϕ = 43 in.)	Y_{RIG} (given ϕ = 44 in.)	Y_{RIG} (given ϕ = 45 in.)
28140.00	29336.71	30558.33	31804.88	33076.33	34372.71
65480.00	68065.08	70700.00	73384.75	76119.33	78903.75
112020.00	116185.13	120425.00	124739.63	129129.00	133593.13
167760.00	173696.83	179733.33	185869.50	192105.33	198440.83
232700.00	240600.21	248625.01	256774.38	265048.33	273446.87
306840.00	316895.25	327100.00	337454.25	347958.00	358611.26
390180.00	402581.96	415158.34	427909.13	440834.33	453933.96
482720.00	497660.34	512800.00	528139.00	543677.33	559415.00
584460.01	602130.38	620025.01	638143.87	656487.00	675054.38
695399.99	714583.33	729166.67	743749.99	758333.33	772916.67

Table 14

TOTAL FIXED COSTS
(in dollars)

$Y_{FC} = Y_{MOB} + Y_{SP} + Y_{RT} + Y_{SC}$

Where:

Y_{MOB} = 400 + 4(HPR - 500) is the mobilization and demobilization costs as a function of the rig horsepower requirement HPR = $26(\phi - 10) + \frac{D}{5} - 800$; $500 < HPR < 2,500$;

Y_{SP} = 2,000 + 6.5(HPR - 500) is the site preparation cost as a function of the rig horsepower HPR = $26(\phi - 10) + \frac{D}{5} - 800$; $500 < HPR < 2,500$;

Y_{RT} = 3,800 + 4.1(HPR - 500) is the rig-up and tear-down cost as a function of the rig horsepower HPR = $26(\phi - 10) + \frac{D}{5} - 800$; $500 < HPR < 2,500$;

Y_{SC} = 0.025 (total variable cost) is the surface casing cost as a function of total variable costs which include costs for mud, cementing, casing, cutter and rig.

Y_{FC} (given ϕ = 10 in.)	Y_{FC} (given ϕ = 11 in.)	Y_{FC} (given ϕ = 12 in.)	Y_{FC} (given ϕ = 13 in.)	Y_{FC} (given ϕ = 14 in.)	Y_{FC} (given ϕ = 15 in.)
10002.67	10046.27	10090.92	10136.63	10183.39	10231.21
10205.34	10292.53	10381.84	10473.25	10566.78	10662.41
10408.00	10538.80	10672.75	10809.88	10950.17	11093.62
10610.67	11174.95	11744.54	12319.43	12899.62	13485.12
13827.09	14442.75	15065.04	15693.96	16329.51	16971.69
17081.01	17750.13	18427.21	19112.24	19805.23	20506.18
20372.43	21097.09	21831.04	22574.28	23326.79	24088.58
23701.34	24483.64	25276.55	26080.06	26894.18	27718.91
27067.76	27909.77	28763.71	29629.59	30507.40	31397.14
30471.68	31375.48	32292.55	33222.87	34166.46	35123.30

Y_{FC} (given ϕ = 16 in.)	Y_{FC} (given ϕ = 17 in.)	Y_{FC} (given ϕ = 18 in.)	Y_{FC} (given ϕ = 19 in.)	Y_{FC} (given ϕ = 20 in.)	Y_{FC} (given ϕ = 21 in.)
10280.08	10330.01	10380.99	10433.03	10486.13	10540.27
10760.16	10860.02	10961.98	11066.06	11172.25	11280.55
11240.24	11390.03	11663.03	12209.84	12760.63	13315.39
14075.92	14672.03	15273.44	15880.15	16492.17	17109.49
17620.50	18275.94	18938.01	19606.71	20282.04	20964.00
21215.08	21931.94	22656.76	23389.53	24130.25	24878.93
24859.66	25640.02	26429.66	27228.59	28036.79	28854.28
28554.24	29400.19	30256.74	31123.90	32001.67	32890.05
32298.82	33212.44	34137.98	35075.46	36024.88	36986.23
36093.40	37076.77	38073.39	39083.28	40106.42	41142.82

Continued

Y_{FC} (given ϕ = 22 in.)	Y_{FC} (given ϕ = 23 in.)	Y_{FC} (given ϕ = 24 in.)	Y_{FC} (given ϕ = 25 in.)	Y_{FC} (given ϕ = 26 in.)	Y_{FC} (given ϕ = 27 in.)
10595.48	10651.74	10709.05	10767.42	10826.85	10887.33
11390.96	11503.48	11618.11	11734.85	12092.96	12603.17
13874.14	14436.86	15003.56	15574.24	16148.89	16727.53
17732.12	18360.05	18993.28	19631.82	20275.66	20924.80
21652.59	22347.81	23049.67	23758.15	24473.26	25195.00
25635.57	26400.17	27172.72	27953.23	28741.69	29538.11
29681.05	30517.10	31362.44	32217.05	33080.95	33954.13
33789.03	34698.62	35618.82	36549.63	37491.05	38443.08
37959.51	38944.73	39941.88	40950.96	41971.98	43004.93
42192.49	43255.41	44331.60	45421.04	46523.75	47639.71

Y_{FC} (given ϕ = 28 in.)	Y_{FC} (given ϕ = 29 in.)	Y_{FC} (given ϕ = 30 in.)	Y_{FC} (given ϕ = 31 in.)	Y_{FC} (given ϕ = 32 in.)	Y_{FC} (given ϕ = 33 in.)
10948.86	11011.45	11075.10	11139.80	11205.56	11272.37
13116.03	13631.54	14149.70	14670.51	15193.98	15720.10
17310.14	17896.73	18487.30	19081.85	19680.37	20282.87
21579.25	22239.01	22904.07	23574.43	24250.09	24931.06
25923.37	26658.37	27400.00	28148.26	28903.15	29664.67
30342.48	31154.81	31975.10	32803.34	33639.54	34483.70
34836.59	35728.34	36629.37	37539.67	38459.26	39388.14
39405.71	40378.95	41362.80	42357.26	43362.32	44377.99
44049.82	45106.64	46175.40	47256.09	48348.71	49453.27
48768.94	49911.42	51067.16	52236.17	53418.43	54613.96

Y_{FC} (given ϕ = 34 in.)	Y_{FC} (given ϕ = 35 in.)	Y_{FC} (given ϕ = 36 in.)	Y_{FC} (given ϕ = 37 in.)	Y_{FC} (given ϕ = 38 in.)	Y_{FC} (given ϕ = 39 in.)
11695.88	12150.35	12606.15	13063.27	13521.72	13981.49
16248.87	16780.29	17314.37	17851.09	18390.47	18932.50
20889.35	21499.81	22114.25	22732.66	23355.06	23981.43
25617.34	26308.92	27005.80	27707.98	28415.47	29128.27
30432.82	31207.60	31989.01	32777.06	33571.73	34373.03
35335.81	36195.87	37063.90	37939.88	38823.81	39715.70
40326.29	41273.73	42230.45	43196.45	44171.73	45156.30
45404.28	46441.17	47488.66	48546.77	49615.48	50694.80
50569.76	51698.19	52838.55	53990.84	55155.07	56331.23
55822.74	57044.79	58280.10	59528.66	60790.49	62065.57

Y_{FC} (given ϕ = 40 in.)	Y_{FC} (given ϕ = 41 in.)	Y_{FC} (given ϕ = 42 in.)	Y_{FC} (given ϕ = 43 in.)	Y_{FC} (given ϕ = 44 in.)	Y_{FC} (given ϕ = 45 in.)
14442.59	14905.02	15368.77	15833.85	16300.25	16767.98
19477.18	20024.52	20574.50	21127.14	21682.43	22240.38
24611.78	25246.10	25884.41	26526.69	27172.95	27823.19
29846.37	30569.77	31298.48	32032.49	32771.80	33516.42
35180.96	35995.52	36816.71	37644.53	38478.98	39320.06
40615.55	41523.35	42439.11	43362.83	44294.50	45234.13
46150.14	47153.27	48165.68	49187.38	50218.35	51258.61
51784.73	52885.27	53996.42	55118.17	56250.53	57393.50
57519.33	58719.36	59931.32	61155.22	62391.05	63638.82
63353.92	64552.61	65419.85	66297.65	67186.00	68084.90

Table 15

TOTAL AND AVERAGE DRILLING COSTS FOR
CASED WELLS IN SOFT ROCK
AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

Y_{TC} (given ϕ = 10 in.)	Y_{AVC} (given ϕ = 10 in.)
16125.25	16.13
22450.49	11.23
28775.74	9.59
35100.99	8.78
46556.39	9.31
58895.86	9.82
72119.39	10.30
86226.98	10.78
101218.63	11.25
117094.35	11.71

Y_{TC} (given ϕ = 11 in.)	Y_{AVC} (given ϕ = 11 in.)
17759.34	17.76
25718.68	12.86
33678.02	11.23
42259.59	10.56
55532.53	11.11
69738.65	11.62
84877.94	12.13
100950.41	12.62
117956.06	13.11
135894.88	13.59

Y_{TC} (given ϕ = 12 in.)	Y_{AVC} (given ϕ = 12 in.)
19431.11	19.43
29062.21	14.53
38693.32	12.90
49594.42	12.40
64728.95	12.95
80845.77	13.47
97944.89	13.99
116026.30	14.50
135090.00	15.01
155135.99	15.51

Y_{TC} (given ϕ = 13 in.)	Y_{AVC} (given ϕ = 13 in.)
21140.54	21.14
32481.09	16.24
43821.63	14.61
57105.47	14.28
74145.65	14.83
92217.24	15.37
111320.23	15.90
131454.63	16.43
152620.44	16.96
174817.66	17.48

Y_{TC} (given ϕ = 14 in.)	Y_{AVC} (given ϕ = 14 in.)
22887.65	22.89
35975.30	17.99
49062.95	16.35
64792.75	16.20
83782.63	16.76
103853.04	17.31
125003.98	17.86
147235.43	18.40
170547.40	18.95
194939.89	19.49

Y_{TC} (given ϕ = 15 in.)	Y_{AVC} (given ϕ = 15 in.)
24672.43	24.67
39544.86	19.77
54417.29	18.14
72656.25	18.16
93639.90	18.73
115753.19	19.29
138996.11	19.86
163368.67	20.42
188870.86	20.99
215502.69	21.55

Continued

Y_{TC} (given ϕ = 16 in.)	Y_{AVC} (given ϕ = 16 in.)
26494.88	26.49
43189.77	21.59
59884.65	19.96
80695.98	20.17
103717.45	20.74
127917.67	21.32
153296.64	21.90
179854.36	22.48
207590.83	23.07
236506.05	23.65

Y_{TC} (given ϕ = 17 in.)	Y_{AVC} (given ϕ = 17 in.)
28355.01	28.36
46910.01	23.46
65465.02	21.82
88911.94	22.23
114015.28	22.80
140346.49	23.39
167905.57	23.99
196692.51	24.59
226707.31	25.19
257949.98	25.79

Y_{TC} (given ϕ = 18 in.)	Y_{AVC} (given ϕ = 18 in.)
30252.80	30.25
50705.60	25.35
71351.82	23.78
97304.12	24.33
124533.40	24.91
153039.65	25.51
182822.89	26.12
213883.11	26.74
246220.30	27.36
279834.47	27.98

Y_{TC} (given ϕ = 19 in.)	Y_{AVC} (given ϕ = 19 in.)
32188.27	32.19
54576.53	27.29
77799.35	25.93
105872.53	26.47
135271.79	27.05
165997.15	27.67
198048.61	28.29
231426.15	28.93
266129.80	29.57
302159.53	30.22

Y_{TC} (given ϕ = 20 in.)	Y_{AVC} (given ϕ = 20 in.)
34161.41	34.16
58522.81	29.26
84379.06	28.13
114617.16	28.65
146230.48	29.25
179218.99	29.87
213582.72	30.51
249321.66	31.17
286435.80	31.83
324925.16	32.49

Y_{TC} (given ϕ = 21 in.)	Y_{AVC} (given ϕ = 21 in.)
36172.22	36.17
62544.43	31.27
91090.93	30.36
123538.02	30.88
157409.44	31.48
192705.17	32.12
229425.23	32.78
267569.61	33.45
307138.32	34.13
348131.34	34.81

Continued

Y_{TC} (given ϕ = 22 in.)	Y_{AVC} (given ϕ = 22 in.)
38220.70	38.22
66641.39	33.32
97934.98	32.64
132635.11	33.16
168808.68	33.76
206455.69	34.41
245576.13	35.08
286170.01	35.77
328237.34	36.47
371778.10	37.18

Y_{TC} (given ϕ = 23 in.)	Y_{AVC} (given ϕ = 23 in.)
40306.85	40.31
70813.70	35.41
104911.19	34.97
141908.42	35.48
180428.21	36.09
220470.54	36.75
262035.44	37.43
305122.88	38.14
349732.87	38.86
395865.42	39.59

Y_{TC} (given ϕ = 24 in.)	Y_{AVC} (given ϕ = 24 in.)
42430.67	42.43
75061.35	37.53
112019.57	37.34
151357.96	37.84
192268.01	38.45
234749.74	39.12
278803.13	39.83
324428.19	40.55
371624.91	41.29
420393.30	42.04

Y_{TC} (given ϕ = 25 in.)	Y_{AVC} (given ϕ = 25 in.)
44592.17	44.59
79384.34	39.69
119260.12	39.75
160983.72	40.25
204328.11	40.87
249293.27	41.55
295879.22	42.27
344085.95	43.01
393913.46	43.77
445361.75	44.54

Y_{TC} (given ϕ = 26 in.)	Y_{AVC} (given ϕ = 26 in.)
46791.34	46.79
84149.87	42.07
126632.84	42.21
170785.71	42.70
216608.48	43.32
264101.14	44.02
313263.71	44.75
364096.16	45.51
416598.51	46.29
470770.76	47.08

Y_{TC} (given ϕ = 27 in.)	Y_{AVC} (given ϕ = 27 in.)
49028.18	49.03
89230.55	44.62
134137.73	44.71
180763.93	45.19
229109.14	45.82
279173.36	46.53
330956.59	47.28
384458.83	48.06
439680.08	48.85
496620.34	49.66

Continued

Y_{TC} (given ϕ = 28 in.)	Y_{AVC} (given ϕ = 28 in.)
51302.69	51.30
94399.34	47.20
141774.79	47.26
190918.37	47.73
241830.08	48.37
294509.92	49.08
348957.87	49.85
405173.95	50.65
463158.15	51.46
522910.49	52.29

Y_{TC} (given ϕ = 29 in.)	Y_{AVC} (given ϕ = 29 in.)
53614.87	53.61
99656.24	49.83
149544.02	49.85
201249.04	50.31
254771.30	50.95
310110.80	51.69
367267.53	52.47
426241.51	53.28
487032.73	54.11
549641.19	54.96

Y_{TC} (given ϕ = 30 in.)	Y_{AVC} (given ϕ = 30 in.)
55964.72	55.96
105001.26	52.50
157445.42	52.48
211755.94	52.94
267932.81	53.59
325976.03	54.33
385885.62	55.13
447661.54	55.96
511303.83	56.81
576812.47	57.68

Y_{TC} (given ϕ = 31 in.)	Y_{AVC} (given ϕ = 31 in.)
58352.25	58.35
110434.39	55.22
165478.99	55.16
222439.06	55.61
281314.59	56.26
342105.60	57.02
404812.08	57.83
469434.01	58.68
535971.43	59.55
604424.31	60.44

Y_{TC} (given ϕ = 32 in.)	Y_{AVC} (given ϕ = 32 in.)
60777.45	60.78
115955.63	57.98
173644.73	57.88
233298.40	58.32
294916.66	58.98
358499.50	59.75
424046.93	60.58
491558.94	61.44
561035.53	62.34
632476.71	63.25

Y_{TC} (given ϕ = 33 in.)	Y_{AVC} (given ϕ = 33 in.)
63240.32	63.24
121564.99	60.78
181942.64	60.65
244333.98	61.08
308739.02	61.75
375157.75	62.53
443590.18	63.37
514036.32	64.25
586496.15	65.17
660969.69	66.10

Continued

Y_{TC} (given ϕ = 34 in.)	Y_{AVC} (given ϕ = 34 in.)
66215.03	66.22
127262.46	63.63
190372.71	63.46
255545.78	63.89
322781.66	64.56
392080.34	65.35
463441.84	66.21
536866.16	67.11
612353.27	68.04
689903.23	68.99

Y_{TC} (given ϕ = 35 in.)	Y_{AVC} (given ϕ = 35 in.)
69273.06	69.27
133048.04	66.52
198934.96	66.31
266933.80	66.73
337044.56	67.41
409267.27	68.21
483601.88	69.09
560048.44	70.01
638606.91	70.96
719277.31	71.93

Y_{TC} (given ϕ = 36 in.)	Y_{AVC} (given ϕ = 36 in.)
72375.15	72.38
138921.74	69.46
207629.38	69.21
278498.05	69.62
351527.76	70.31
426718.53	71.12
504070.33	72.01
583583.17	72.95
665257.06	73.92
749091.98	74.91

Y_{TC} (given ϕ = 37 in.)	T_{AVC} (given ϕ = 37 in.)
75521.30	75.52
144883.55	72.44
216455.96	72.15
290238.53	72.56
366231.25	73.25
444434.13	74.07
524847.16	74.98
607470.36	75.93
692303.71	76.92
779347.21	77.93

Y_{TC} (given ϕ = 38 in.)	T_{AVC} (given ϕ = 38 in.)
78711.50	78.71
150933.47	75.47
225414.71	75.14
302155.23	75.54
381155.01	76.23
462414.07	77.07
545932.39	77.99
631709.99	78.96
719746.86	79.97
810043.00	81.00

Y_{TC} (given ϕ = 39 in.)	T_{AVC} (given ϕ = 39 in.)
81945.76	81.95
157071.51	78.54
234505.64	78.17
314248.16	78.56
396299.06	79.26
480658.35	80.11
567326.03	81.05
656302.09	82.04
747586.53	83.07
841179.36	84.12

Continued

Y_{TC} (given ϕ = 40 in.)	Y_{AVC} (given Φ = 40 in.)
85224.08	85.22
163297.66	81.65
243728.74	81.24
326517.31	81.63
411663.39	82.33
499166.98	83.19
589028.06	84.15
681246.62	85.16
775822.71	86.20
872756.28	87.28

Y_{TC} (given ϕ = 41 in.)	Y_{AVC} (given Φ = 41 in.)
88546.45	88.55
169611.92	84.81
253084.00	84.36
338962.69	84.74
427248.00	85.45
517939.93	86.32
611038.47	87.29
706543.62	88.32
804455.40	89.38
904325.17	90.43

Y_{TC} (given ϕ = 42 in.)	Y_{AVC} (given Φ = 42 in.)
91912.88	91.91
176014.29	88.01
262571.43	87.52
351584.30	87.90
443052.90	88.61
536977.23	89.50
633357.29	90.48
732193.08	91.52
833484.59	92.61
934800.05	93.48

Y_{TC} (given ϕ = 43 in.)	Y_{AVC} (given Φ = 43 in.)
95323.37	95.32
182504.78	91.25
272191.03	90.73
364382.14	91.10
459078.08	91.82
556278.87	92.71
655984.50	93.71
758194.98	94.77
862910.29	95.88
965651.63	96.57

Y_{TC} (given ϕ = 44 in.)	Y_{AVC} (given Φ = 44 in.)
98777.91	98.78
189083.38	94.54
281942.81	93.98
377356.19	94.34
475323.54	95.06
575844.84	95.97
678920.10	96.99
784549.32	98.07
892732.50	99.19
996879.93	99.69

Y_{TC} (given ϕ = 45 in.)	Y_{AVC} (given Φ = 45 in.)
102276.51	102.28
195750.09	97.88
291826.75	97.28
390506.47	97.63
491789.28	98.36
595675.16	99.28
702164.10	100.31
811256.12	101.41
922951.22	102.55
1028484.90	102.85

Table 16

TOTAL AND AVERAGE DRILLING COSTS FOR
CASED WELLS IN MEDIUM SOFT ROCK
AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

Y_{TC} (given ϕ = 10 in.)	Y_{AVC} (given ϕ = 10 in.)
17033.76	17.03
24267.52	12.13
31501.28	10.50
38735.04	9.68
51835.67	10.37
66115.06	11.02
81573.19	11.65
98210.08	12.28
116025.71	12.89
135020.10	13.50

Y_{TC} (given ϕ = 11 in.)	Y_{AVC} (given ϕ = 11 in.)
18739.91	18.74
27679.82	13.84
36619.74	12.21
46262.75	11.57
61314.13	12.26
77609.74	12.93
95149.59	13.59
113933.68	14.24
133962.00	14.88
155234.55	15.52

Y_{TC} (given ϕ = 12 in.)	Y_{AVC} (given ϕ = 12 in.)
20486.53	20.49
31173.06	15.59
41859.59	13.95
53986.38	13.50
71037.48	14.21
89398.30	14.90
109068.84	15.58
130049.11	16.26
152339.10	16.93
175938.81	17.59

Y_{TC} (given ϕ = 13 in.)	Y_{AVC} (given ϕ = 13 in.)
22273.62	22.27
34747.23	17.37
47220.85	15.74
61905.93	15.48
81005.73	16.20
101480.74	16.91
123330.96	17.62
146556.39	18.32
171157.03	19.02
197132.87	19.71

Y_{TC} (given ϕ = 14 in.)	Y_{AVC} (given ϕ = 14 in.)
24101.17	24.10
38402.34	19.20
52703.51	17.57
70021.40	17.51
91218.88	18.24
113857.07	18.98
137935.94	19.71
163455.51	20.43
190415.77	21.16
218816.73	21.88

Y_{TC} (given ϕ = 15 in.)	Y_{AVC} (given ϕ = 15 in.)
25969.19	25.97
42138.38	21.07
58307.57	19.44
78332.79	19.58
101676.94	20.34
126527.27	21.09
152883.78	21.84
180746.47	22.59
210115.34	23.35
240990.39	24.10

Continued

Y_{TC} (given ϕ = 16 in.)	Y_{AVC} (given ϕ = 16 in.)
27877.67	27.88
45955.35	22.98
64033.02	21.34
86840.10	21.71
112379.89	22.48
139491.35	23.25
168174.47	24.02
198429.26	24.80
230255.72	25.58
263653.85	26.37

Y_{TC} (given ϕ = 17 in.)	Y_{AVC} (given ϕ = 17 in.)
29826.63	29.83
49853.26	24.93
69879.88	23.29
95543.33	23.89
123327.75	24.67
152749.31	25.46
183808.03	26.26
216503.90	27.06
250836.93	27.87
286807.11	28.68

Y_{TC} (given ϕ = 18 in.)	Y_{AVC} (given ϕ = 18 in.)
31816.05	31.82
53832.10	26.92
76067.10	25.36
104442.48	26.11
134520.50	26.90
166301.15	27.72
199784.45	28.54
234970.38	29.37
271858.96	30.21
310450.17	31.05

Y_{TC} (given ϕ = 19 in.)	Y_{AVC} (given ϕ = 19 in.)
33845.93	33.85
57891.87	28.95
82885.08	27.63
113537.55	28.38
145958.15	29.19
180146.88	30.02
216103.73	30.87
253828.70	31.73
293321.80	32.59
334583.03	33.46

Y_{TC} (given ϕ = 20 in.)	Y_{AVC} (given ϕ = 20 in.)
35916.29	35.92
62032.58	31.02
89849.99	29.95
122828.54	30.71
157640.71	31.53
194286.49	32.38
232765.87	33.25
273078.87	34.13
315225.47	35.03
359205.69	35.92

Y_{TC} (given ϕ = 21 in.)	Y_{AVC} (given ϕ = 21 in.)
38027.11	38.03
66254.22	33.13
96961.85	32.32
132315.46	33.08
169568.16	33.91
208719.97	34.79
249770.87	35.68
292720.87	36.59
337569.96	37.51
384318.16	38.43

Continued

Y_{TC} (given ϕ = 22 in.)	Y_{AVC} (given ϕ = 22 in.)
40178.40	40.18
70556.79	35.28
104220.64	34.74
141998.29	35.50
181740.52	36.35
223447.33	37.24
267118.73	38.16
312754.71	39.09
360355.27	40.04
409920.42	40.99

Y_{TC} (given ϕ = 23 in.)	Y_{AVC} (given ϕ = 23 in.)
42370.15	42.37
74940.30	37.47
111626.38	37.21
151877.04	37.97
194157.77	38.83
238468.58	39.74
284809.45	40.69
333180.39	41.65
383581.40	42.62
436012.49	43.60

Y_{TC} (given ϕ = 24 in.)	Y_{AVC} (given ϕ = 24 in.)
44602.37	44.60
79404.75	39.70
119179.05	39.73
161951.71	40.49
206819.93	41.36
253783.70	42.30
302843.03	43.26
353997.91	44.25
407248.35	45.25
462594.35	46.26

Y_{TC} (given ϕ = 25 in.)	Y_{AVC} (given ϕ = 25 in.)
46875.06	46.88
83950.12	41.98
126878.67	42.29
172222.31	43.06
219726.99	43.95
269392.71	44.90
321219.47	45.89
375207.28	46.90
431356.12	47.93
489666.02	48.97

Y_{TC} (given ϕ = 26 in.)	Y_{AVC} (given ϕ = 26 in.)
49188.22	49.19
88988.15	44.49
134725.22	44.91
182688.81	45.67
232878.94	46.58
285295.59	47.55
339938.77	48.56
396808.47	49.60
455904.71	50.66
517227.47	51.72

Y_{TC} (given ϕ = 27 in.)	Y_{AVC} (given ϕ = 27 in.)
51541.84	51.54
94378.20	47.19
142718.72	47.57
193351.25	48.34
246275.80	49.26
301492.36	50.25
359000.93	51.29
418801.53	52.35
480894.13	53.43
545278.74	54.53

Continued

Y_{TC} (given ϕ = 28 in.)	Y_{AVC} (given ϕ = 28 in.)
53935.93	53.94
99866.20	49.93
150859.15	50.29
204209.60	51.05
259917.56	51.98
317983.01	53.00
378405.96	54.06
441186.41	55.15
506324.36	56.26
573819.82	57.38

Y_{TC} (given ϕ = 29 in.)	Y_{AVC} (given ϕ = 29 in.)
56370.48	56.37
105452.16	52.73
159146.53	53.05
215263.88	53.82
273804.21	54.76
334767.53	55.79
398153.84	56.88
463963.12	58.00
532195.41	59.13
602850.67	60.29

Y_{TC} (given ϕ = 30 in.)	Y_{AVC} (given ϕ = 30 in.)
58845.50	58.85
111136.09	55.57
167580.84	55.86
226514.07	56.63
287935.77	57.59
351845.94	58.64
418244.58	59.75
487131.70	60.89
558507.29	62.06
632371.35	63.24

Y_{TC} (given ϕ = 31 in.)	Y_{AVC} (given ϕ = 31 in.)
61360.99	61.36
116917.98	58.46
176162.10	58.72
237960.18	59.49
302312.23	60.46
369218.23	61.54
438678.19	62.67
510692.10	63.84
585259.98	65.03
662381.81	66.24

Y_{TC} (given ϕ = 32 in.)	Y_{AVC} (given ϕ = 32 in.)
63916.95	63.92
122797.82	61.40
184890.29	61.63
249602.22	62.40
316933.58	63.39
386884.39	64.48
459454.65	65.64
534644.35	66.83
612453.48	68.05
692882.08	69.29

Y_{TC} (given ϕ = 33 in.)	Y_{AVC} (given ϕ = 33 in.)
66513.37	66.51
128775.63	64.39
193765.43	64.59
261440.17	65.36
331799.84	66.36
404844.44	67.47
480573.97	68.65
558988.43	69.87
640087.83	71.12
723872.16	72.39

Continued

Y_{TC} (given ϕ = 34 in.)	Y_{AVC} (given ϕ = 34 in.)
69665.69	69.67
134851.39	67.43
202787.51	67.60
273474.05	68.37
346911.00	69.38
423098.37	70.52
502036.16	71.72
583724.36	72.97
668162.98	74.24
755352.02	75.54

Y_{TC} (given ϕ = 35 in.)	Y_{AVC} (given ϕ = 35 in.)
72909.61	72.91
141025.12	70.51
211956.53	70.65
285703.84	71.43
362267.06	72.45
441646.18	73.61
523841.20	74.83
608852.13	76.11
696678.96	77.41
787321.69	78.73

Y_{TC} (given ϕ = 36 in.)	Y_{AVC} (given ϕ = 36 in.)
76202.51	76.20
147296.80	73.65
221272.48	73.76
298129.56	74.53
377868.02	75.57
460487.87	76.75
545989.11	78.00
634371.74	79.30
725635.74	80.63
819781.16	81.98

Y_{TC} (given ϕ = 37 in.)	T_{AVC} (given ϕ = 37 in.)
79544.39	79.54
153666.45	76.83
230735.38	76.91
310751.19	77.69
393713.88	78.74
479623.44	79.94
568479.87	81.21
660283.19	82.54
755033.38	83.89
852730.43	85.27

Y_{TC} (given ϕ = 38 in.)	T_{AVC} (given ϕ = 38 in.)
82935.24	82.94
160134.05	80.07
240345.22	80.12
323568.75	80.89
409804.63	81.96
499052.89	83.18
591313.49	84.47
686586.47	85.82
784871.80	87.21
886169.49	88.62

Y_{TC} (given ϕ = 39 in.)	T_{AVC} (given ϕ = 39 in.)
86375.09	86.38
166699.62	83.35
250102.00	83.37
336582.22	34.15
426140.30	85.23
518776.22	86.46
614489.99	87.78
713281.60	89.16
815151.07	90.57
920098.38	92.01

Continued

Y_{TC} (given ϕ = 40 in.)	Y_{AVC} (given Φ = 40 in.)
89863.91	89.86
173363.14	86.68
260005.72	86.67
349791.62	87.45
442720.86	88.54
538793.43	89.80
638009.33	91.14
740368.58	92.55
845871.14	93.99
954517.04	95.45

Y_{TC} (given ϕ = 41 in.)	Y_{AVC} (given Φ = 41 in.)
93401.70	93.40
180124.63	90.06
270056.37	90.02
363196.94	90.80
459546.32	91.91
559104.52	93.18
661871.54	94.55
767847.38	95.98
877032.04	97.45
988856.60	98.89

Y_{TC} (given ϕ = 42 in.)	Y_{AVC} (given Φ = 42 in.)
96988.48	96.99
186984.07	93.49
280253.97	93.42
376798.17	94.20
476616.68	95.32
579709.49	96.62
686076.61	98.01
795718.04	99.46
908633.76	100.96
1021737.20	102.17

Y_{TC} (given ϕ = 43 in.)	Y_{AVC} (given Φ = 43 in.)
100624.25	100.62
193941.48	96.97
290598.51	96.87
390595.33	97.65
493931.94	98.79
600608.34	100.10
710624.54	101.52
823980.53	103.00
940676.30	104.52
1055022.40	105.50

Y_{TC} (given ϕ = 44 in.)	Y_{AVC} (given Φ = 44 in.)
104308.98	104.31
200996.85	100.50
301089.99	100.36
404588.40	101.15
511492.11	102.30
621801.07	103.63
735515.33	105.07
852634.85	106.58
973159.66	108.13
1088712.30	108.87

Y_{TC} (given ϕ = 45 in.)	Y_{AVC} (given Φ = 45 in.)
108042.70	108.04
208150.17	104.08
311728.41	103.91
418777.40	104.69
529297.16	105.86
643287.69	107.21
760748.98	108.68
881681.01	110.21
1006083.80	111.79
1122806.80	112.28

Table 17

TOTAL AND AVERAGE DRILLING COSTS FOR
CASED WELLS IN MEDIUM HARD ROCK
AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

Y_{TC} (given ϕ = 10 in.)	Y_{AVC} (given ϕ = 10 in.)
18109.39	18.11
26418.78	13.21
34728.18	11.58
43037.57	10.76
58110.71	11.62
74721.35	12.45
92869.49	13.27
112555.13	14.07
133778.28	14.86
156538.92	15.65

Y_{TC} (given ϕ = 11 in.)	Y_{AVC} (given ϕ = 11 in.)
19896.89	19.90
29993.77	15.00
40090.66	13.36
50989.10	12.75
68168.77	13.63
86971.36	14.50
107396.86	15.34
129445.28	16.18
153116.61	17.01
178410.86	17.84

Y_{TC} (given ϕ = 12 in.)	Y_{AVC} (given ϕ = 12 in.)
21727.64	21.73
33655.29	16.83
45582.93	15.19
59158.11	14.79
78498.67	15.70
99547.56	16.59
122304.79	17.47
146770.35	18.35
172944.24	19.22
200826.47	20.08

Y_{TC} (given ϕ = 13 in.)	Y_{AVC} (given ϕ = 13 in.)
23601.66	23.60
37403.33	18.70
51204.99	17.07
67544.58	16.89
89100.40	17.82
112449.97	18.74
137593.29	19.66
164530.35	20.57
193261.17	21.47
223785.74	22.38

Y_{TC} (given ϕ = 14 in.)	Y_{AVC} (given ϕ = 14 in.)
25518.94	25.52
41237.89	20.62
56956.83	18.99
76148.51	19.04
99973.95	19.99
125678.57	20.95
153262.34	21.89
182725.29	22.84
214067.40	23.79
247288.67	24.73

Y_{TC} (given ϕ = 15 in.)	Y_{AVC} (given ϕ = 15 in.)
27479.49	27.48
45158.98	22.58
62838.46	20.95
84969.91	21.24
111119.34	22.22
139233.36	23.21
169311.96	24.19
201355.15	25.17
235362.92	26.15
271335.27	27.13

Continued

Y_{TC} (given ϕ = 16 in.)	Y_{AVC} (given ϕ = 16 in.)
29483.29	29.48
49166.59	24.58
68849.88	22.95
94008.77	23.50
122536.57	24.51
153114.36	25.52
185742.15	26.53
220419.94	27.55
257147.74	28.57
295925.53	29.59

Y_{TC} (given ϕ = 17 in.)	Y_{AVC} (given ϕ = 17 in.)
31530.36	31.53
53260.72	26.63
74991.08	25.00
103265.10	25.82
134225.62	26.85
167321.55	27.89
202552.90	28.94
239919.67	29.99
279421.86	31.05
321059.45	32.11

Y_{TC} (given ϕ = 18 in.)	Y_{AVC} (given ϕ = 18 in.)
33620.69	33.62
57441.38	28.72
81512.12	27.17
112738.89	28.18
146186.50	29.24
181854.94	30.31
219744.22	31.39
259854.32	32.48
302185.27	33.58
346737.03	34.67

Y_{TC} (given ϕ = 19 in.)	Y_{AVC} (given ϕ = 19 in.)
35754.28	35.75
61708.56	30.85
88747.34	29.58
122430.15	30.61
158419.22	31.68
196714.53	32.79
237316.09	33.90
280223.91	35.03
325437.97	36.16
372958.28	37.30

Y_{TC} (given ϕ = 20 in.)	Y_{AVC} (given ϕ = 20 in.)
37931.14	37.93
66062.27	33.03
96145.66	32.05
132338.88	33.08
170923.76	34.18
211900.32	35.32
255268.54	36.47
301028.42	37.63
349179.98	38.80
399723.19	39.97

Y_{TC} (given ϕ = 21 in.)	Y_{AVC} (given ϕ = 21 in.)
40151.25	40.15
70502.51	35.25
103707.07	34.57
142465.07	35.62
183700.14	36.74
227412.30	37.90
273601.54	39.09
322267.87	40.28
373411.27	41.49
427031.77	42.70

Continued

Y_{TC} (given ϕ = 22 in.)	Y_{AVC} (given ϕ = 22 in.)
42414.63	42.41
75029.26	37.51
111431.59	37.14
152808.72	38.20
196748.35	39.35
243250.48	40.54
292315.11	41.76
343942.24	42.99
398131.88	44.24
454884.00	45.49

Y_{TC} (given ϕ = 23 in.)	Y_{AVC} (given ϕ = 23 in.)
44721.27	44.72
79642.54	39.82
119319.21	39.77
163369.84	40.84
210068.39	42.01
259414.86	43.24
311409.25	44.49
366051.55	45.76
423341.77	47.04
483279.90	48.33

Y_{TC} (given ϕ = 24 in.)	Y_{AVC} (given ϕ = 24 in.)
47071.17	47.07
84342.35	42.17
127369.92	42.46
174148.43	43.54
223660.27	44.73
275905.44	45.98
330883.94	47.27
388595.78	48.57
449040.96	49.89
512219.46	51.22

Y_{TC} (given ϕ = 25 in.)	Y_{AVC} (given ϕ = 25 in.)
49464.34	49.46
89128.67	44.56
135583.73	45.19
185144.48	46.29
237523.97	47.50
292722.22	48.79
350739.21	50.11
411574.95	51.45
475229.44	52.80
541702.69	54.17

Y_{TC} (given ϕ = 26 in.)	Y_{AVC} (given ϕ = 26 in.)
51900.76	51.90
94467.46	47.23
143960.64	47.99
196357.99	49.09
251659.50	50.33
309865.18	51.64
370975.03	53.00
434989.04	54.37
501907.22	55.77
571729.58	57.17

Y_{TC} (given ϕ = 27 in.)	Y_{AVC} (given ϕ = 27 in.)
54380.45	54.38
100201.92	50.10
152500.65	50.83
207788.97	51.95
266066.87	53.21
327334.35	54.56
391591.42	55.94
458838.07	57.35
529074.31	58.79
602300.13	60.23

Continued

Y_{TC} (given ϕ = 28 in.)	Y_{AVC} (given ϕ = 28 in.)
56903.40	56.90
106045.11	53.02
161203.76	53.73
219437.42	54.86
280746.07	56.15
345129.72	57.52
412588.38	58.94
483122.03	60.39
556730.69	61.86
633414.34	63.34

Y_{TC} (given ϕ = 29 in.)	Y_{AVC} (given ϕ = 29 in.)
59469.62	59.47
111997.03	56.00
170069.97	56.69
231303.32	57.83
295697.09	59.14
363251.28	60.54
433965.89	62.00
507840.91	63.48
584876.35	64.99
665072.20	66.51

Y_{TC} (given ϕ = 30 in.)	Y_{AVC} (given ϕ = 30 in.)
62079.09	62.08
118057.68	59.03
179099.28	59.70
243386.70	60.85
310919.96	62.18
381699.05	63.62
455723.97	65.10
532994.74	66.62
613511.33	68.17
697273.75	69.73

Y_{TC} (given ϕ = 31 in.)	Y_{AVC} (given ϕ = 31 in.)
64731.83	64.73
124227.07	62.11
188291.68	62.76
255687.54	63.92
326414.65	65.28
400473.02	66.75
477862.62	68.27
558583.47	69.82
642635.59	71.40
730018.95	73.00

Y_{TC} (given ϕ = 32 in.)	Y_{AVC} (given ϕ = 32 in.)
67427.83	67.43
130505.19	65.25
197647.18	65.88
268205.84	67.05
342181.17	68.44
419573.16	69.93
500381.83	71.48
584607.15	73.08
672249.15	74.69
763307.82	76.33

Y_{TC} (given ϕ = 33 in.)	Y_{AVC} (given ϕ = 33 in.)
70167.09	70.17
136892.04	68.45
207165.79	69.06
280941.62	70.24
358219.53	71.64
438999.52	73.17
523281.60	74.75
611065.76	76.38
702352.01	78.04
797140.35	79.71

Continued

Y_{TC} (given ϕ = 34 in.)	Y_{AVC} (given ϕ = 34 in.)
73515.26	73.52
143387.63	71.69
216847.49	72.28
293894.85	73.47
374529.72	74.91
458752.08	76.46
546561.94	78.08
637959.30	79.74
732944.17	81.44
831516.52	83.15

Y_{TC} (given ϕ = 35 in.)	Y_{AVC} (given ϕ = 35 in.)
76964.51	76.96
149991.94	75.00
226692.29	75.56
307065.55	76.77
391111.73	78.22
478830.83	79.81
570222.84	81.46
665287.77	83.16
764025.62	84.89
866436.37	86.64

Y_{TC} (given ϕ = 36 in.)	Y_{AVC} (given ϕ = 36 in.)
80468.13	80.47
156704.99	78.35
236700.19	78.90
320453.72	80.11
407965.58	81.59
499235.78	83.21
594264.30	84.89
693051.17	86.63
795596.37	88.40
901899.90	90.19

Y_{TC} (given ϕ = 37 in.)	T_{AVC} (given ϕ = 37 in.)
84026.11	84.03
163526.78	81.76
246871.19	82.29
334059.35	83.51
425091.26	85.02
519966.92	86.66
618686.33	88.38
721249.50	90.16
827656.42	91.96
937907.08	93.79

Y_{TC} (given ϕ = 38 in.)	T_{AVC} (given ϕ = 38 in.)
87638.46	87.64
170457.29	85.23
257205.28	85.74
347882.44	86.97
442488.77	88.50
541024.26	90.17
643488.93	91.93
749882.76	93.74
860205.75	95.58
974457.90	97.45

Y_{TC} (given ϕ = 39 in.)	T_{AVC} (given ϕ = 39 in.)
91305.18	91.31
177496.54	88.75
267702.48	89.23
361923.01	90.48
460158.11	92.03
562407.81	93.73
668672.09	95.52
778950.95	97.37
893244.38	99.25
1011552.40	101.16

Continued

Y_{TC} (given ϕ = 40 in.)	Y_{AVC} (given Φ = 40 in.)
95026.26	95.03
184644.51	92.32
278362.77	92.79
376181.03	94.05
478099.29	95.62
584117.55	97.35
694235.80	99.18
808454.07	101.06
926772.33	102.97
1049190.60	104.92

Y_{TC} (given ϕ = 41 in.)	Y_{AVC} (given Φ = 41 in.)
98801.71	98.80
191901.23	95.95
289186.17	96.40
390656.52	97.66
496312.30	99.26
606153.49	101.03
720180.09	102.88
838392.12	104.80
960789.55	106.75
1086657.00	108.67

Y_{TC} (given ϕ = 42 in.)	Y_{AVC} (given Φ = 42 in.)
102631.52	102.63
199266.67	99.63
300172.66	100.06
405349.48	101.34
514797.14	102.96
628515.62	104.75
746504.94	106.64
868765.09	108.60
995296.09	110.59
1122214.00	112.22

Y_{TC} (given ϕ = 43 in.)	Y_{AVC} (given Φ = 43 in.)
106515.70	106.52
206740.85	103.37
311322.25	103.77
420259.90	105.06
533553.81	106.71
651203.95	108.53
773210.36	110.46
899573.00	112.45
1030291.90	114.48
1158203.70	115.82

Y_{TC} (given ϕ = 44 in.)	Y_{AVC} (given Φ = 44 in.)
110454.25	110.45
214323.76	107.16
322634.94	107.54
435387.79	108.85
552582.31	110.52
674218.47	112.37
800296.33	114.33
930815.84	116.35
1065777.00	118.42
1194626.00	119.46

Y_{TC} (given ϕ = 45 in.)	Y_{AVC} (given Φ = 45 in.)
114447.16	114.45
222015.40	111.01
334110.73	111.37
450733.14	112.68
571882.63	114.38
697559.21	116.26
827762.87	118.25
962493.61	120.31
1101751.50	122.42
1231480.90	123.15

Table 18

TOTAL AND AVERAGE DRILLING COSTS FOR
CASED WELLS IN HARD ROCK
AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

Y_{TC} (given ϕ = 10 in.)	Y_{AVC} (given ϕ = 10 in.)
21474.20	21.47
33148.40	16.57
44822.60	14.94
56496.81	14.12
77891.49	15.58
102006.36	17.00
128841.43	18.41
158396.69	19.80
190672.14	21.19
225667.78	22.57

Y_{TC} (given ϕ = 11 in.)	Y_{AVC} (given ϕ = 11 in.)
23491.80	23.49
37183.60	18.59
50875.40	16.96
65693.35	16.42
89670.07	17.93
116518.10	19.42
146237.46	20.89
178828.12	22.35
214290.10	23.81
252623.39	25.26

Y_{TC} (given ϕ = 12 in.)	Y_{AVC} (given ϕ = 12 in.)
25558.25	25.56
41316.51	20.66
57074.76	19.02
75163.88	18.79
101791.14	20.36
131440.84	21.91
164112.97	23.44
199807.54	24.98
238524.54	26.50
280263.98	28.03

Y_{TC} (given ϕ = 13 in.)	Y_{AVC} (given ϕ = 13 in.)
27673.56	27.67
45547.12	22.77
63420.68	21.14
84908.41	21.23
114254.71	22.85
146774.56	24.46
182467.97	26.07
221334.94	27.67
263375.47	29.26
308589.55	30.86

Y_{TC} (given ϕ = 14 in.)	Y_{AVC} (given ϕ = 14 in.)
29837.72	29.84
49875.43	24.94
69913.15	23.30
94926.93	23.73
127060.76	25.41
162519.28	27.09
201302.47	28.76
243410.34	30.43
288842.89	32.09
337600.12	33.76

Y_{TC} (given ϕ = 15 in.)	Y_{AVC} (given ϕ = 15 in.)
32050.73	32.05
54301.45	27.15
76552.18	25.52
105219.45	26.30
140209.31	28.04
178674.98	29.78
220616.45	31.52
266033.72	33.25
314926.79	34.99
367295.67	36.73

Continued

Y_{TC} (given ϕ = 16 in.)	Y_{AVC} (given ϕ = 16 in.)
34312.59	34.31
58825.18	29.41
83337.77	27.78
115785.96	28.95
153700.36	30.74
195241.68	32.54
240409.92	34.34
289205.09	36.15
341627.18	37.96
397676.20	39.77

Y_{TC} (given ϕ = 17 in.)	Y_{AVC} (given ϕ = 17 in.)
36623.31	36.62
63446.61	31.72
90269.92	30.09
126626.46	31.66
167533.89	33.51
212219.36	35.37
260682.88	37.24
312924.45	39.12
368944.06	40.99
428741.71	42.87

Y_{TC} (given ϕ = 18 in.)	Y_{AVC} (given ϕ = 18 in.)
38982.87	38.98
68165.75	34.08
97701.17	32.57
137740.96	34.44
181709.92	36.34
229608.04	38.27
281435.33	40.21
337191.79	42.15
396877.41	44.10
460492.20	46.05

Y_{TC} (given ϕ = 19 in.)	Y_{AVC} (given ϕ = 19 in.)
41391.29	41.39
72982.59	36.49
106110.76	35.37
149129.45	37.28
196228.44	39.25
247407.71	41.23
302667.27	43.24
362007.12	45.25
425427.26	47.27
492927.68	49.29

Y_{TC} (given ϕ = 20 in.)	Y_{AVC} (given ϕ = 20 in.)
43848.57	43.85
77897.14	38.95
114725.84	38.24
160791.94	40.20
211089.45	42.22
265618.37	44.27
324378.70	46.34
387370.44	48.42
454593.59	50.51
526048.16	52.60

Y_{TC} (given ϕ = 21 in.)	Y_{AVC} (given ϕ = 21 in.)
46354.69	46.35
82909.39	41.45
123546.41	41.18
172728.42	43.18
226292.95	45.26
284240.02	47.37
346569.62	49.51
413281.75	51.66
484376.42	53.82
559853.61	55.99

Continued

Y_{TC} (given ϕ = 22 in.)	Y_{AVC} (given ϕ = 22 in.)
48909.67	48.91
88019.34	44.01
132572.49	44.19
184938.89	46.23
241838.95	48.37
303272.66	50.55
369240.02	52.75
439741.04	54.97
514775.72	57.20
594344.04	59.43

Y_{TC} (given ϕ = 23 in.)	Y_{AVC} (given ϕ = 23 in.)
51513.50	51.51
93227.01	46.61
141804.05	47.27
197423.36	49.36
257727.44	51.55
322716.29	53.79
392389.92	56.06
466748.33	58.34
545791.51	60.64
629519.48	62.95

Y_{TC} (given ϕ = 24 in.)	Y_{AVC} (given ϕ = 24 in.)
54166.19	54.17
98532.38	49.27
151241.12	50.41
210181.82	52.55
273958.42	54.79
342570.91	57.10
416019.30	59.43
494303.59	61.79
577423.78	64.16
665379.88	66.54

Y_{TC} (given ϕ = 25 in.)	Y_{AVC} (given ϕ = 25 in.)
56867.72	56.87
103935.45	51.97
160883.61	53.63
223214.27	55.80
290531.89	58.11
362836.52	60.47
440128.18	62.88
522406.86	65.30
609672.56	67.74
701925.26	70.19

Y_{TC} (given ϕ = 26 in.)	Y_{AVC} (given ϕ = 26 in.)
59618.11	59.62
110080.88	55.04
170731.73	56.91
236520.72	59.13
307447.85	61.49
383513.12	63.92
464716.54	66.39
551058.10	68.88
642537.79	71.39
739155.64	73.92

Y_{TC} (given ϕ = 27 in.)	Y_{AVC} (given ϕ = 27 in.)
62417.36	62.42
116758.66	58.38
180785.27	60.26
250101.16	62.53
324706.31	64.94
404600.72	67.43
489784.40	69.97
580257.33	72.53
676019.53	75.11
777071.00	77.71

Continued

Y_{TC} (given ϕ = 28 in.)	Y_{AVC} (given ϕ = 28 in.)
65265.45	65.27
123573.43	61.79
191044.32	63.68
263955.60	65.99
342307.26	68.46
426099.30	71.02
515331.74	73.62
610004.55	76.25
710117.75	78.90
815671.34	81.57

Y_{TC} (given ϕ = 29 in.)	Y_{AVC} (given ϕ = 29 in.)
68162.40	68.16
130525.20	65.26
201508.86	67.17
278084.02	69.52
360250.70	72.05
448008.88	74.67
541358.56	77.34
640299.76	80.04
744832.46	82.76
854956.65	85.50

Y_{TC} (given ϕ = 30 in.)	Y_{AVC} (given ϕ = 30 in.)
71108.20	71.11
137613.97	68.81
212178.90	70.73
292486.45	73.12
378536.64	75.71
470329.45	78.39
567864.88	81.12
671142.96	83.89
780163.65	86.68
894926.98	89.49

Y_{TC} (given ϕ = 31 in.)	Y_{AVC} (given ϕ = 31 in.)
74102.85	74.10
144839.73	72.42
223054.43	74.35
307162.87	76.79
397165.06	79.43
493061.01	82.18
594850.69	84.98
702534.14	87.82
816111.34	90.68
935582.26	93.56

Y_{TC} (given ϕ = 32 in.)	Y_{AVC} (given ϕ = 32 in.)
77146.35	77.15
152202.50	76.10
234135.45	78.05
322113.28	80.53
416135.98	83.23
516203.55	86.03
622315.99	88.90
734473.32	91.81
852675.49	94.74
976922.55	97.69

Y_{TC} (given ϕ = 33 in.)	Y_{AVC} (given ϕ = 33 in.)
80238.71	80.24
159702.25	79.85
245421.97	81.81
337337.68	84.33
435449.39	87.09
539757.09	89.96
650260.78	92.89
766960.47	95.87
889856.14	98.87
1018947.80	101.89

Continued

Y_{TC} (given ϕ = 34 in.)	Y_{AVC} (given ϕ = 34 in.)
84111.15	84.11
167339.01	83.67
256913.99	85.64
352836.09	88.21
455105.29	91.02
563721.62	93.95
678685.05	96.96
799995.62	100.00
927653.28	103.07
1061658.10	106.17

Y_{TC} (given ϕ = 35 in.)	Y_{AVC} (given ϕ = 35 in.)
88112.26	88.11
175112.76	87.56
268611.50	89.54
368608.48	92.15
475103.68	95.02
588097.13	98.02
707588.82	101.08
833578.74	104.20
966066.91	107.34
1105053.30	110.51

Y_{TC} (given ϕ = 36 in.)	Y_{AVC} (given ϕ = 36 in.)
92181.88	92.18
183023.51	91.51
280514.51	93.50
384654.86	96.16
495444.57	99.09
612883.65	102.15
736972.07	105.28
867709.87	108.46
1005097.00	111.68
1149133.50	114.91

Y_{TC} (given ϕ = 37 in.)	T_{AVC} (given ϕ = 37 in.)
96319.99	96.32
191071.26	95.54
292623.01	97.54
400975.24	100.24
516127.96	103.23
638081.15	106.35
766834.83	109.55
902388.97	112.80
1044743.60	116.08
1193898.70	119.39

Y_{TC} (given ϕ = 38 in.)	T_{AVC} (given ϕ = 38 in.)
100526.60	100.53
199256.00	99.63
304937.01	101.65
417569.61	104.39
537153.82	107.43
663689.64	110.61
797177.05	113.88
937616.07	117.20
1085006.70	120.56
1239348.90	123.93

Y_{TC} (given ϕ = 39 in.)	T_{AVC} (given ϕ = 39 in.)
104801.71	104.80
207577.74	103.79
317456.50	105.82
434437.98	108.61
558522.19	111.70
689709.12	114.95
827998.78	118.29
973391.16	121.67
1125886.20	125.10
1285484.10	128.55

Continued

Y_{TC} (given ϕ = 40 in.)	Y_{AVC} (given ϕ = 40 in.)
109145.32	109.15
216036.48	108.02
330181.49	110.06
451580.34	112.90
580233.04	116.05
716139.59	119.36
859299.98	122.76
1009714.20	126.21
1167382.30	129.71
1332304.20	133.23

Y_{TC} (given ϕ = 41 in.)	Y_{AVC} (given ϕ = 41 in.)
113557.42	113.56
224632.21	112.32
343111.97	114.37
468996.69	117.25
602286.39	120.46
742981.06	123.83
891080.69	127.30
1046585.30	130.82
1209494.90	134.39
1378611.00	137.86

Y_{TC} (given ϕ = 42 in.)	Y_{AVC} (given ϕ = 42 in.)
118038.03	118.04
233364.94	116.68
356247.95	118.75
486687.05	121.67
624682.23	124.94
770233.50	128.37
923340.87	131.91
1084004.30	135.50
1252223.90	139.14
1421487.40	142.15

Y_{TC} (given ϕ = 43 in.)	Y_{AVC} (given ϕ = 43 in.)
122587.13	122.59
242234.67	121.12
369589.43	123.20
504651.39	126.16
647420.57	129.48
797896.95	132.98
956080.55	136.58
1121971.40	140.25
1295569.40	143.95
1464852.40	146.49

Y_{TC} (given ϕ = 44 in.)	Y_{AVC} (given ϕ = 44 in.)
127204.73	127.20
251241.39	125.62
383136.39	127.71
522889.72	130.72
670501.40	134.10
825971.38	137.66
989299.72	141.33
1160486.40	145.06
1339531.40	148.84
1508705.80	150.87

Y_{TC} (given ϕ = 45 in.)	Y_{AVC} (given ϕ = 45 in.)
131890.83	131.89
260385.11	130.19
396888.87	132.30
541402.05	135.35
693924.71	138.78
854456.82	142.41
1022998.40	146.14
1199549.40	149.94
1384109.90	153.79
1553047.80	155.30

Table 19

TOTAL AND AVERAGE DRILLING COSTS FOR
CASED WELLS IN VERY HARD ROCK
AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

Y_{TC} (given ϕ = 10 in.)	Y_{AVC} (given ϕ = 10 in.)
23882.57	23.88
37965.15	18.98
52047.72	17.35
66130.29	16.53
91973.49	18.39
121352.94	20.23
154268.63	22.04
190720.58	23.84
230708.78	25.63
274233.23	27.42

Y_{TC} (given ϕ = 11 in.)	Y_{AVC} (given ϕ = 11 in.)
26077.14	26.08
42354.28	21.18
58631.43	19.54
76258.67	19.06
105030.21	21.01
137534.46	22.92
173771.42	24.82
213741.08	26.72
257443.45	28.60
304878.53	30.49

Y_{TC} (given ϕ = 12 in.)	Y_{AVC} (given ϕ = 12 in.)
28326.15	28.33
46852.31	23.43
65378.46	21.79
86706.98	21.68
118486.85	23.70
154195.87	25.70
193834.08	27.69
237401.44	29.68
284897.97	31.66
336323.66	33.63

Y_{TC} (given ϕ = 13 in.)	Y_{AVC} (given ϕ = 13 in.)
30629.61	30.63
51459.22	25.73
72288.83	24.10
97475.23	24.37
132343.40	26.47
171337.19	28.56
214456.61	30.64
261701.66	32.71
313072.33	34.79
368568.62	36.86

Y_{TC} (given ϕ = 14 in.)	Y_{AVC} (given ϕ = 14 in.)
32987.51	32.99
56175.02	28.09
79362.53	26.45
108563.40	27.14
146599.86	29.32
188958.40	31.49
235639.03	33.66
286641.74	35.83
341966.53	38.00
401613.41	40.16

Y_{TC} (given ϕ = 15 in.)	Y_{AVC} (given ϕ = 15 in.)
35399.85	35.40
60999.70	30.50
86599.55	28.87
119971.51	29.99
161256.24	32.25
207059.51	34.51
257381.32	36.77
312221.68	39.03
371580.58	41.29
435458.02	43.55

Continued

Y_{TC} (given ϕ = 16 in.)	Y_{AVC} (given ϕ = 16 in.)
37866.64	37.87
65933.27	32.97
93999.91	31.33
131699.54	32.92
176312.53	35.26
225640.51	37.61
279683.50	39.95
338441.48	42.31
401914.47	44.66
470102.46	47.01

Y_{TC} (given ϕ = 17 in.)	Y_{AVC} (given ϕ = 17 in.)
40387.86	40.39
70975.73	35.49
101563.59	33.85
143747.51	35.94
191768.74	38.35
244701.42	40.78
302545.56	43.22
365301.16	45.66
432968.22	48.11
505546.73	50.55

Y_{TC} (given ϕ = 18 in.)	Y_{AVC} (given ϕ = 18 in.)
42963.54	42.96
76127.07	38.06
109713.88	36.57
156115.41	39.03
207624.85	41.52
264242.21	44.04
325967.49	46.57
392800.68	49.10
464741.79	51.64
541790.82	54.18

Y_{TC} (given ϕ = 19 in.)	Y_{AVC} (given ϕ = 19 in.)
45593.65	45.59
81387.30	40.69
119029.97	39.68
168803.23	42.20
223880.88	44.78
284262.90	47.38
349949.30	49.99
420940.07	52.62
497235.21	55.25
578834.73	57.88

Y_{TC} (given ϕ = 20 in.)	Y_{AVC} (given ϕ = 20 in.)
48278.21	48.28
86756.41	43.38
128586.00	42.86
181811.00	45.45
240536.82	48.11
304763.49	50.79
374491.00	53.50
449719.33	56.21
530448.49	58.94
616678.49	61.67

Y_{TC} (given ϕ = 21 in.)	Y_{AVC} (given ϕ = 21 in.)
51017.21	51.02
92234.42	46.12
138381.97	46.13
195138.69	48.78
257592.69	51.52
325743.98	54.29
399592.56	57.08
479138.44	59.89
564381.61	62.71
655322.07	65.53

Continued

Y_{TC} (given ϕ = 22 in.)	Y_{AVC} (given ϕ = 22 in.)
53810.65	53.81
97821.30	48.91
148417.90	49.47
208786.30	52.20
275048.46	55.01
347204.36	57.87
425254.01	60.75
509197.41	63.65
599034.57	66.56
694765.47	69.48

Y_{TC} (given ϕ = 23 in.)	Y_{AVC} (given ϕ = 23 in.)
56658.54	56.66
103517.08	51.76
158693.78	52.90
222753.86	55.69
292904.15	58.58
369144.64	61.52
451475.34	64.50
539896.25	67.49
634407.38	70.49
735008.71	73.50

Y_{TC} (given ϕ = 24 in.)	Y_{AVC} (given ϕ = 24 in.)
59560.87	59.56
109321.74	54.66
169209.60	56.40
237041.34	59.26
311159.75	62.23
391564.81	65.26
478256.54	68.32
571234.95	71.40
670500.01	74.50
776051.75	77.61

Y_{TC} (given ϕ = 25 in.)	Y_{AVC} (given ϕ = 25 in.)
62517.64	62.52
115235.28	57.62
179965.38	59.99
251648.75	62.91
329815.26	65.96
414464.88	69.08
505597.63	72.23
603213.51	75.40
707312.51	78.59
817894.64	81.79

Y_{TC} (given ϕ = 26 in.)	Y_{AVC} (given ϕ = 26 in.)
65528.86	65.53
122025.68	61.01
190961.10	63.65
266576.09	66.64
348870.68	69.77
437844.84	72.97
533498.59	76.21
635831.92	79.48
744844.85	82.76
860537.34	86.05

Y_{TC} (given ϕ = 27 in.)	Y_{AVC} (given ϕ = 27 in.)
68594.52	68.59
129446.20	64.72
202196.76	67.40
281823.37	70.46
368326.02	73.67
461704.71	76.95
561959.44	80.28
669090.21	83.64
783097.03	87.01
903979.87	90.40

Continued

Y_{TC} (given ϕ = 28 in.)	Y_{AVC} (given ϕ = 28 in.)
71714.62	71.71
137026.69	68.51
213672.38	71.22
297390.58	74.35
388181.28	77.64
486044.46	81.01
590980.16	84.43
702988.36	87.87
822069.06	91.34
948222.25	94.82

Y_{TC} (given ϕ = 29 in.)	Y_{AVC} (given ϕ = 29 in.)
74889.16	74.89
144767.14	72.38
225387.95	75.13
313277.71	78.32
408436.43	81.69
510864.12	85.14
620560.75	88.65
737526.35	92.19
861760.91	95.75
993264.42	99.33

Y_{TC} (given ϕ = 30 in.)	Y_{AVC} (given ϕ = 30 in.)
78118.15	78.12
152667.56	76.33
237343.46	79.11
329484.78	82.37
429091.52	85.82
536163.67	89.36
650701.24	92.96
772704.24	96.59
902172.64	100.24
1039106.50	103.91

Y_{TC} (given ϕ = 31 in.)	Y_{AVC} (given ϕ = 31 in.)
81401.58	81.40
160727.94	80.36
249538.92	83.18
346011.78	86.50
450146.51	90.03
561943.13	93.66
681401.60	97.34
808521.96	101.07
943304.19	104.81
1085748.30	108.57

Y_{TC} (given ϕ = 32 in.)	Y_{AVC} (given ϕ = 32 in.)
84739.46	84.74
168948.29	84.47
261974.33	87.32
362858.70	90.71
471601.42	94.32
588202.46	98.03
712661.83	101.81
844979.55	105.62
985155.59	109.46
1133190.00	113.32

Y_{TC} (given ϕ = 33 in.)	Y_{AVC} (given ϕ = 33 in.)
88131.78	88.13
177328.60	88.66
274649.69	91.55
380025.57	95.01
493456.24	98.69
614941.70	102.49
744481.94	106.35
882077.00	110.26
1027726.80	114.19
1181431.50	118.14

Continued

Y_{TC} (given ϕ = 34 in.)	Y_{AVC} (given ϕ = 34 in.)
92424.01	92.42
185868.88	92.93
287565.00	95.85
397512.36	99.38
515710.97	103.14
642160.84	107.03
776861.95	110.98
919814.32	114.98
1071017.90	119.00
1230472.80	123.05

Y_{TC} (given ϕ = 35 in.)	Y_{AVC} (given ϕ = 35 in.)
96865.71	96.87
194569.12	97.28
300720.24	100.24
415319.08	103.83
538365.61	107.67
669859.86	111.64
809801.82	115.69
958191.49	119.77
1115028.90	123.89
1280313.90	128.03

Y_{TC} (given ϕ = 36 in.)	Y_{AVC} (given ϕ = 36 in.)
101387.38	101.39
203429.33	101.71
314115.45	104.71
433445.73	108.36
561420.18	112.28
698038.80	116.34
843301.58	120.47
997208.52	124.65
1159759.70	128.86
1330954.90	133.10

Y_{TC} (given ϕ = 37 in.)	T_{AVC} (given ϕ = 37 in.)
105989.04	105.99
212449.51	106.22
327750.60	109.25
451892.31	112.97
584874.66	116.97
726697.62	121.12
877361.22	125.34
1036865.40	129.61
1205210.30	133.91
1382395.70	138.24

Y_{TC} (given ϕ = 38 in.)	T_{AVC} (given ϕ = 38 in.)
110670.68	110.67
221629.64	110.81
341625.69	113.88
470658.83	117.66
608729.03	121.75
755836.33	125.97
911980.72	130.28
1077162.20	134.65
1251380.70	139.04
1434636.30	143.46

Y_{TC} (given ϕ = 39 in.)	T_{AVC} (given ϕ = 39 in.)
115432.30	115.43
230969.75	115.48
355740.74	118.58
489745.27	122.44
632983.34	126.60
785454.95	130.91
947160.12	135.31
1118098.80	139.76
1298271.00	144.25
1487676.80	148.77

Continued

Y_{TC} (given ϕ = 40 in.)	Y_{AVC} (given ϕ = 40 in.)
120273.91	120.27
240469.82	120.23
370095.73	123.37
509151.64	127.29
657637.55	131.53
815553.47	135.93
982899.39	140.41
1159675.30	144.96
1345881.20	149.54
1541517.10	154.15

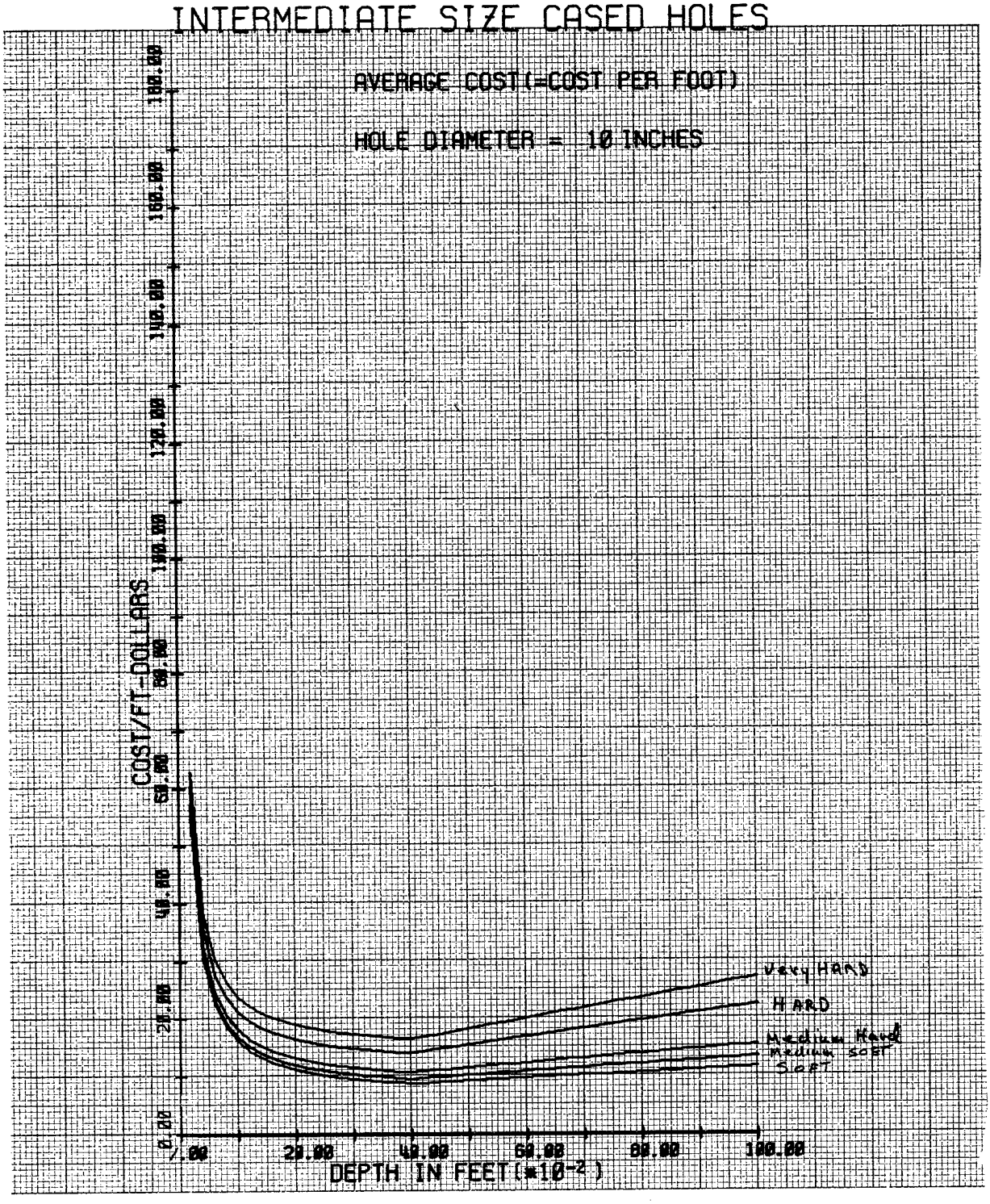
Y_{TC} (given ϕ = 41 in.)	Y_{AVC} (given ϕ = 41 in.)
125195.50	125.20
250129.86	125.06
384690.68	128.23
528877.95	132.22
682691.69	136.54
846131.88	141.02
1019198.50	145.60
1201891.60	150.24
1394211.20	154.91
1594625.70	159.46

Y_{TC} (given ϕ = 42 in.)	Y_{AVC} (given ϕ = 42 in.)
130197.07	130.20
259949.86	129.97
399525.57	133.18
548924.19	137.23
708145.74	141.63
877190.18	146.20
1056057.60	150.87
1244747.80	155.59
1443261.10	160.36
1643271.60	164.33

Y_{TC} (given ϕ = 43 in.)	Y_{AVC} (given ϕ = 43 in.)
135278.63	135.28
269929.83	134.96
414600.40	138.20
569290.36	142.32
733999.68	146.80
908728.39	151.45
1093476.50	156.21
1288243.90	161.03
1493030.70	165.89
1692462.00	169.25

Y_{TC} (given ϕ = 44 in.)	Y_{AVC} (given ϕ = 44 in.)
140440.16	140.44
280069.76	140.03
429915.19	143.31
589976.45	147.49
760253.55	152.05
940746.48	156.79
1131455.20	161.64
1332379.80	166.55
1543520.30	171.50
1742196.90	174.22

Y_{TC} (given ϕ = 45 in.)	Y_{AVC} (given ϕ = 45 in.)
145681.68	145.68
290369.65	145.18
445469.93	148.49
610982.48	152.75
786907.34	157.38
973244.47	162.21
1169993.90	167.14
1377155.60	172.14
1594729.60	177.19
1792476.20	179.25


INTERMEDIATE SIZE CASED HOLES
AVERAGE COST(=COST PER FOOT)
HOLE DIAMETER = 10 INCHES
COST/FT-DOLLARS
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
DEPTH IN FEET(*10^-2)
0.00
20.00
40.00
60.00
80.00
100.00
Very HARD
HARD
Medium Hard
medium soft
Soft

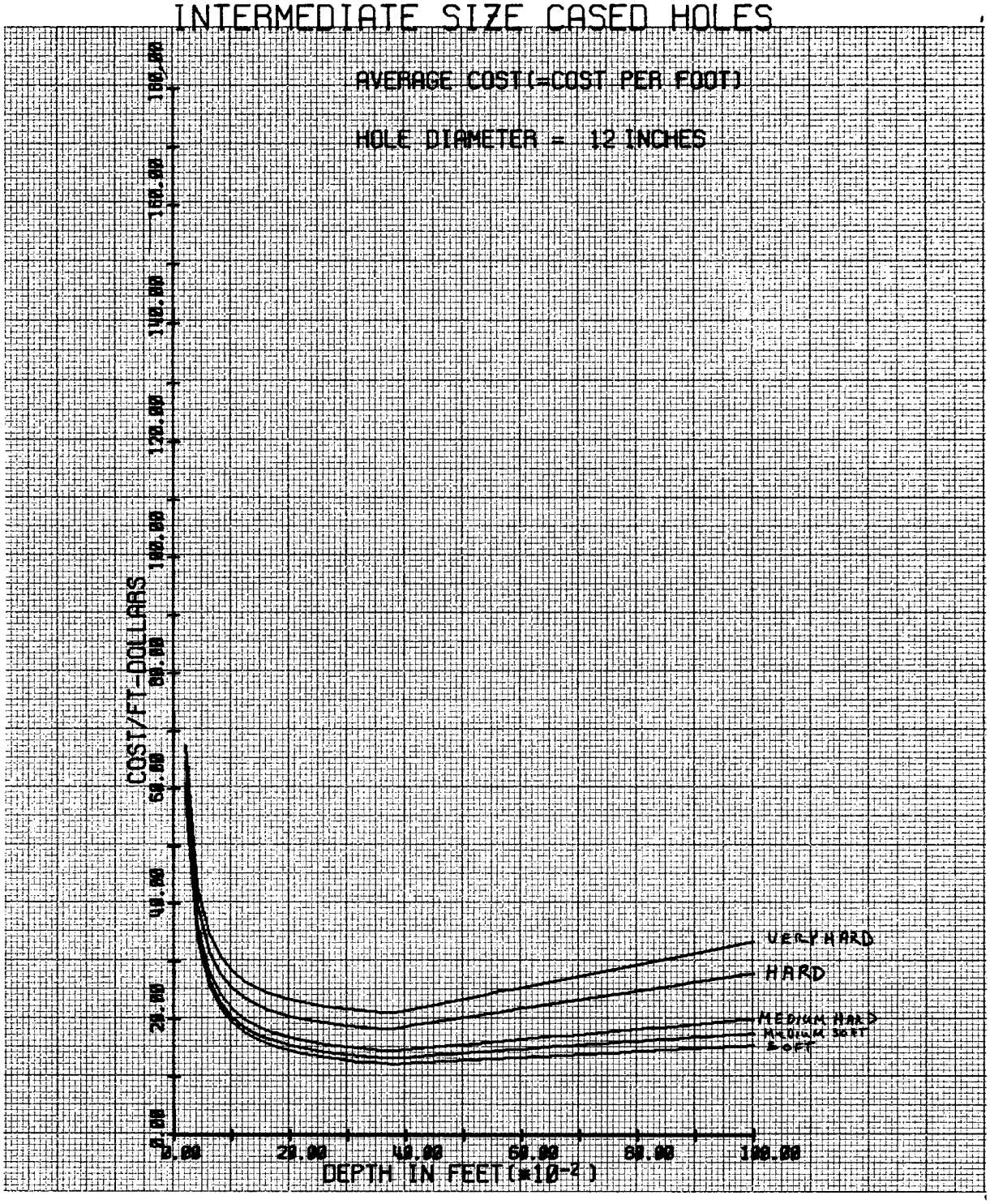
No. 02

INTERMEDIATE SIZE CASED HOLE COST AS A

FUNCTION OF THE OUTSIDE HOLE DIAMETER FOR

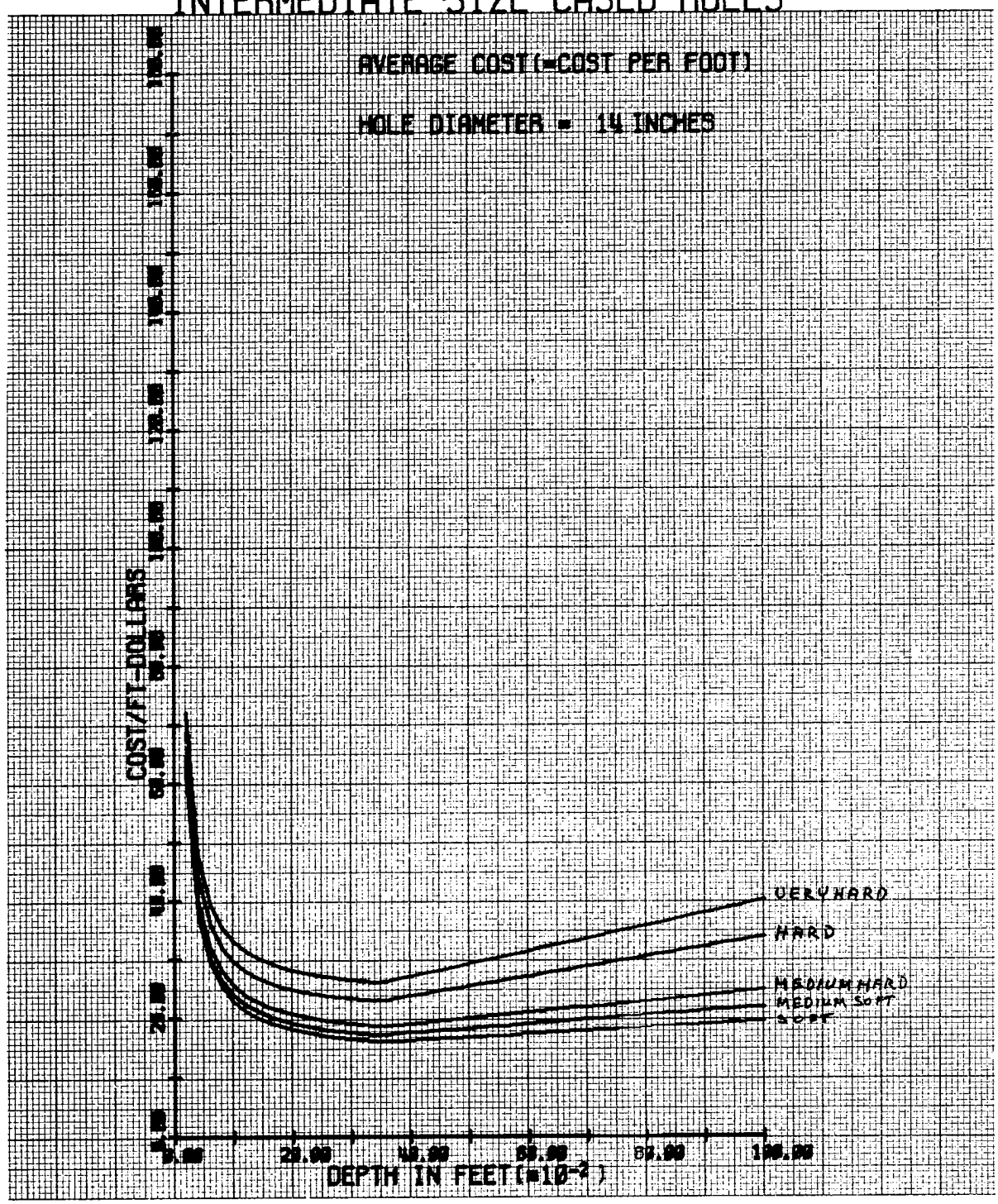
1,000 to 10,000 FEET DEPTH

INTERMEDIATE SIZE CASED HOLES



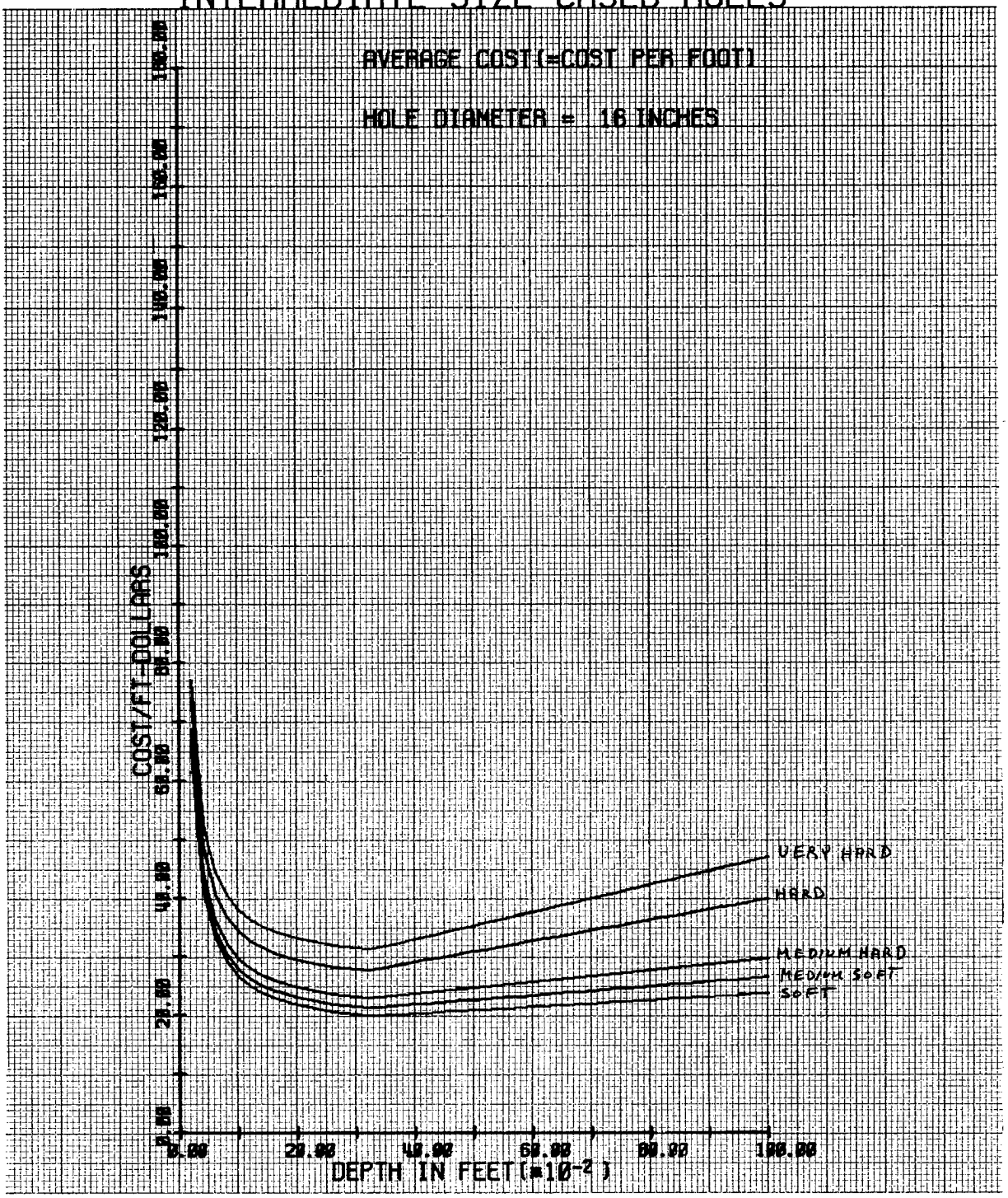
CHARTS GRAPHIC CONTROLS CORPORATION BUFFALO, NEW YORK

INTERMEDIATE SIZE CASED HOLES



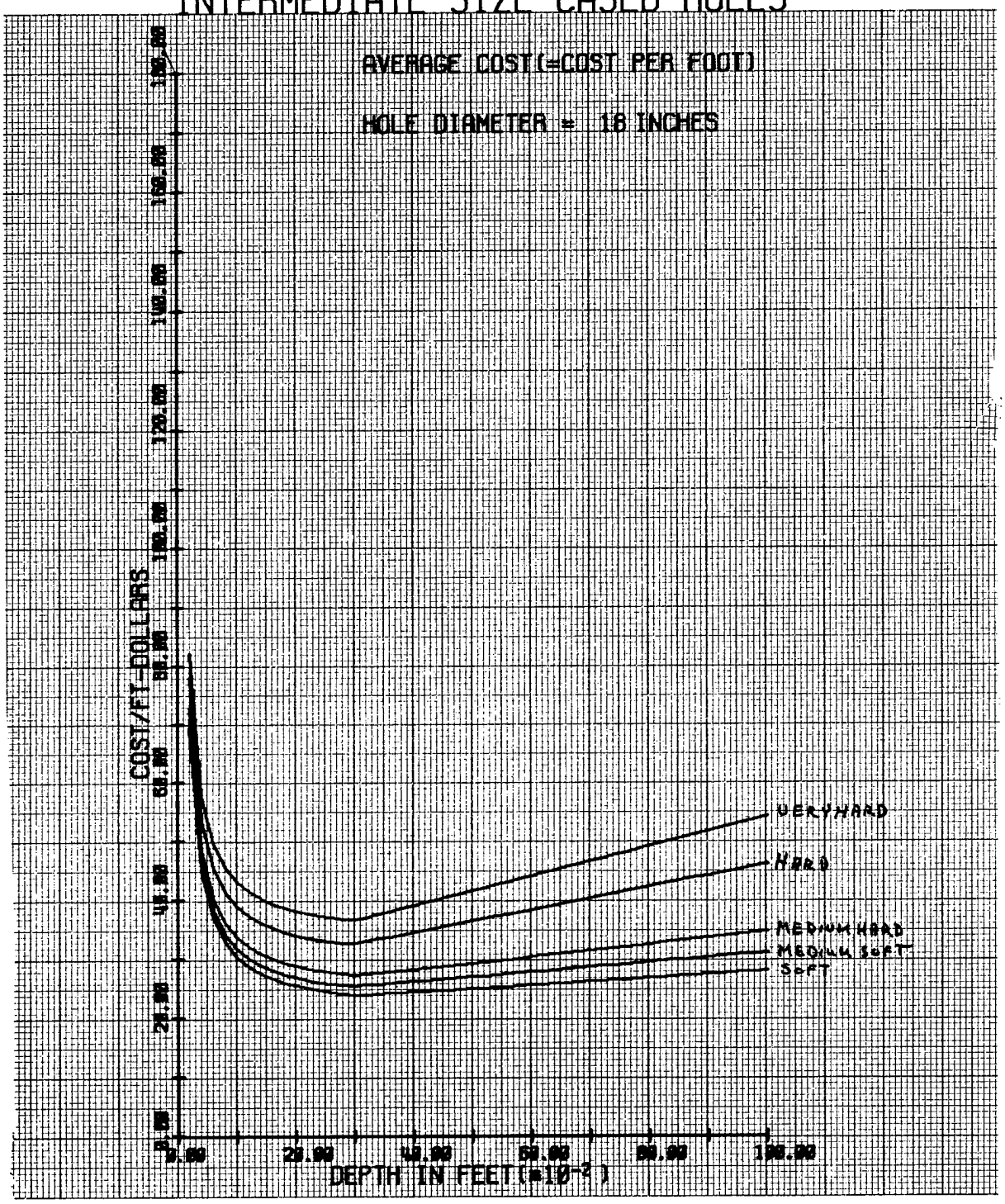
RECORDING CHARTS GRAPHIC CONTROLS CORPO

INTERMEDIATE SIZE CASED HOLES



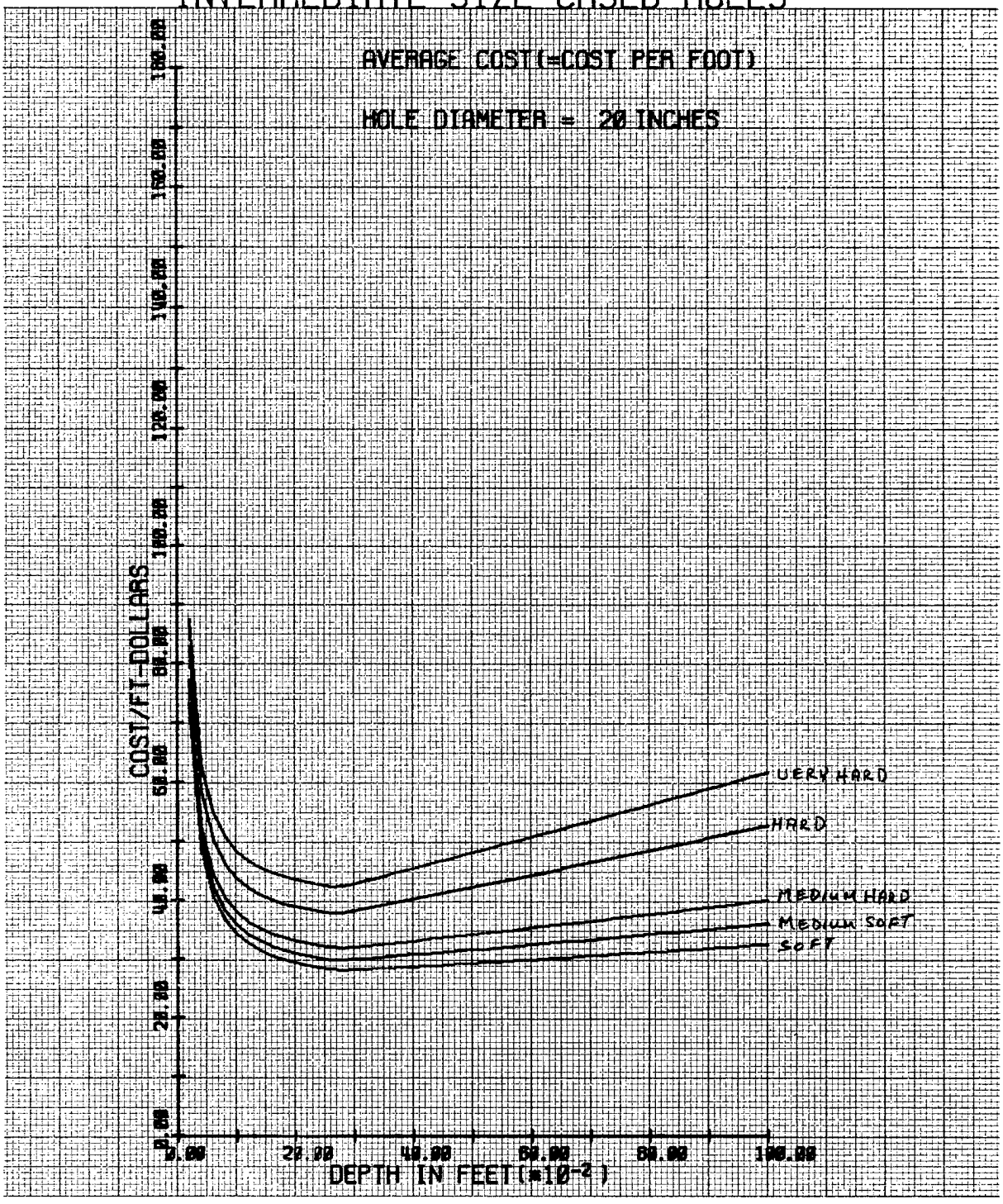
PRINTED IN U.S.A. No. 02

INTERMEDIATE SIZE CASED HOLES



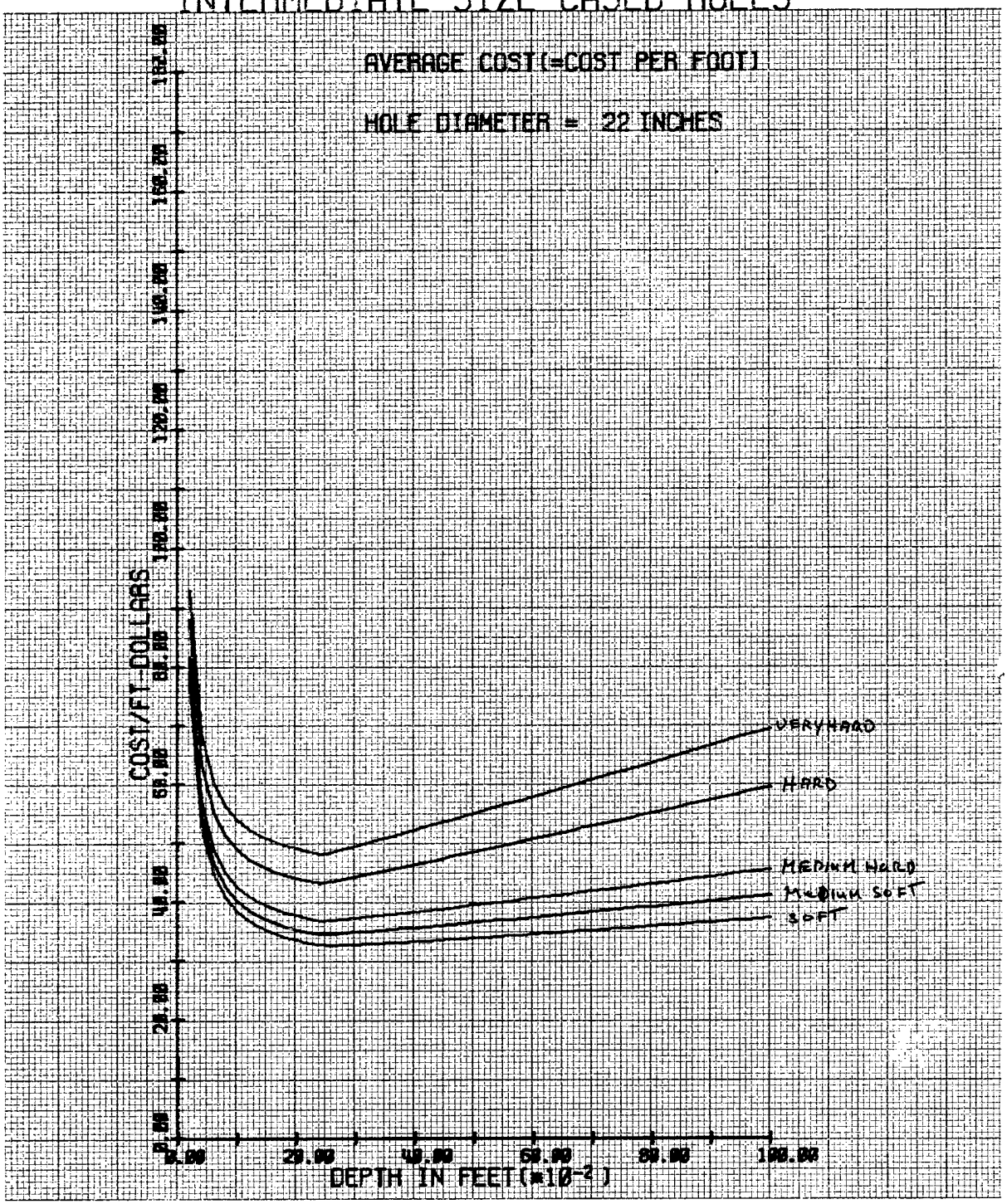
RECORDING CHARTS GRAPHIC CONTROLS CORPORATION BUFFALO, NEW YORK

INTERMEDIATE SIZE CASED HOLES



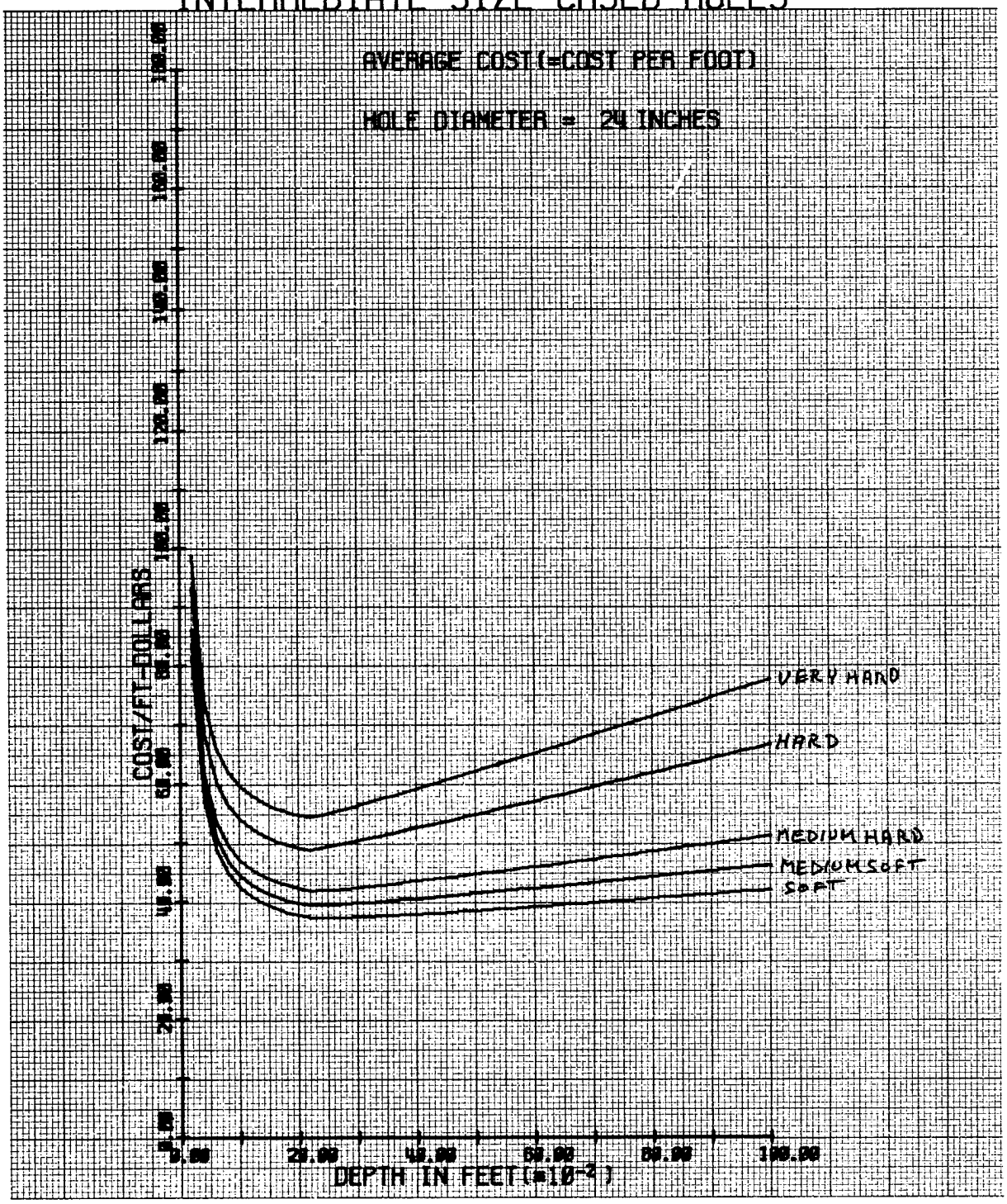
PRINTED IN U.S.A. No. 02

INTERMEDIATE SIZE CASED HOLES



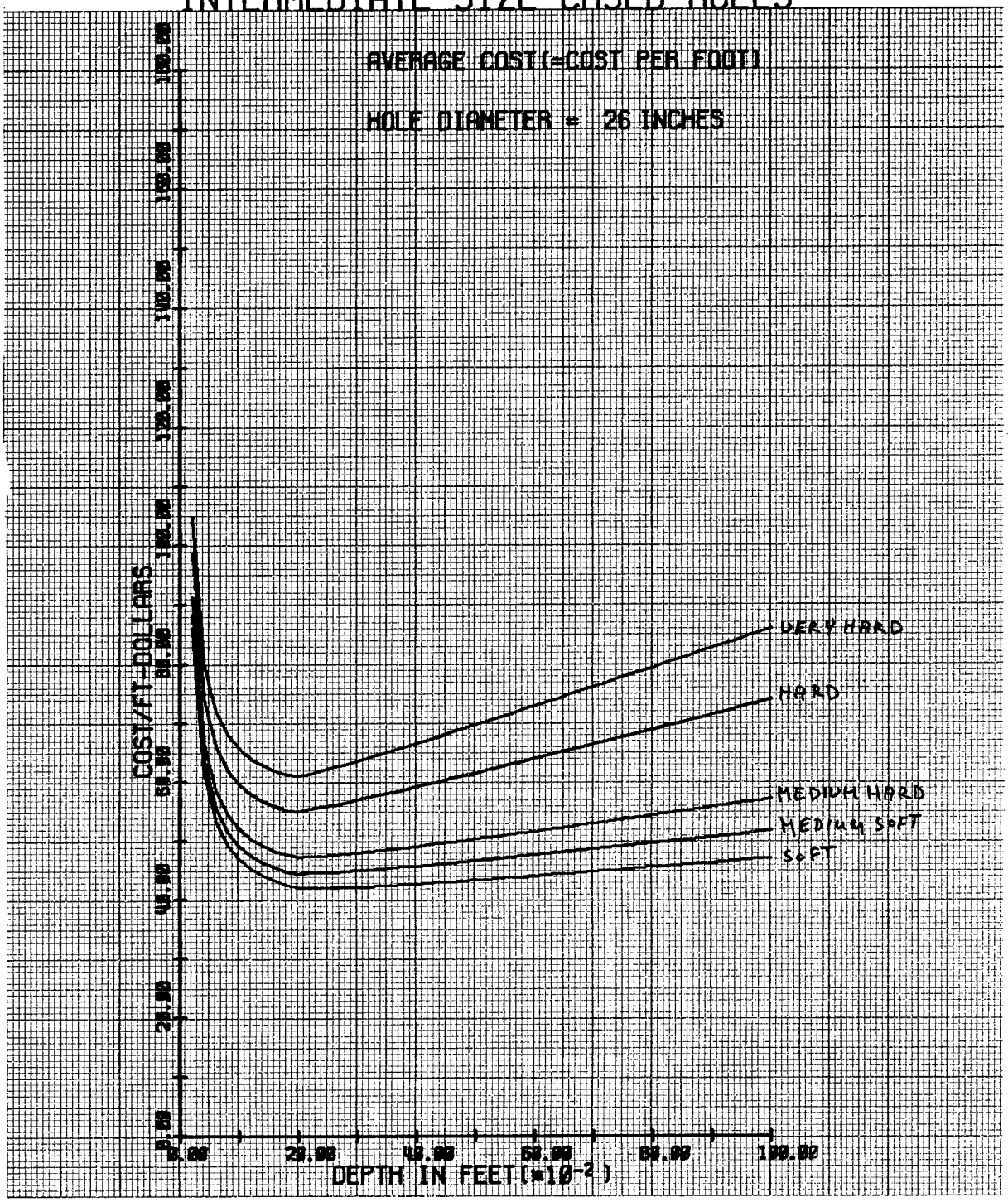
CONTROLS CORPORATION BUFFALO, NEW YORK

INTERMEDIATE SIZE CASED HOLES



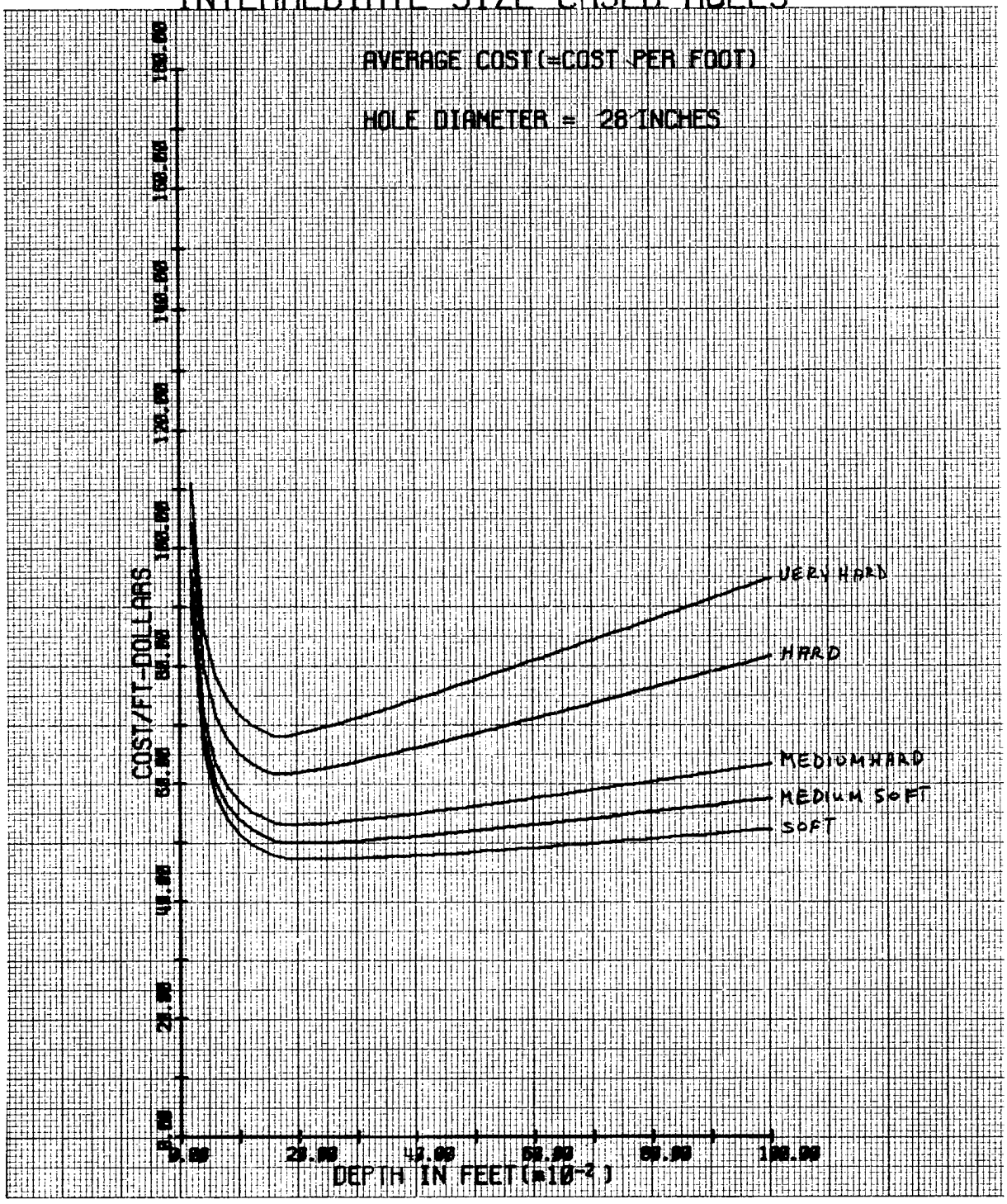
RECORDING CHARTS GRAPHIC CONTROLS CORP

INTERMEDIATE SIZE CASED HOLES



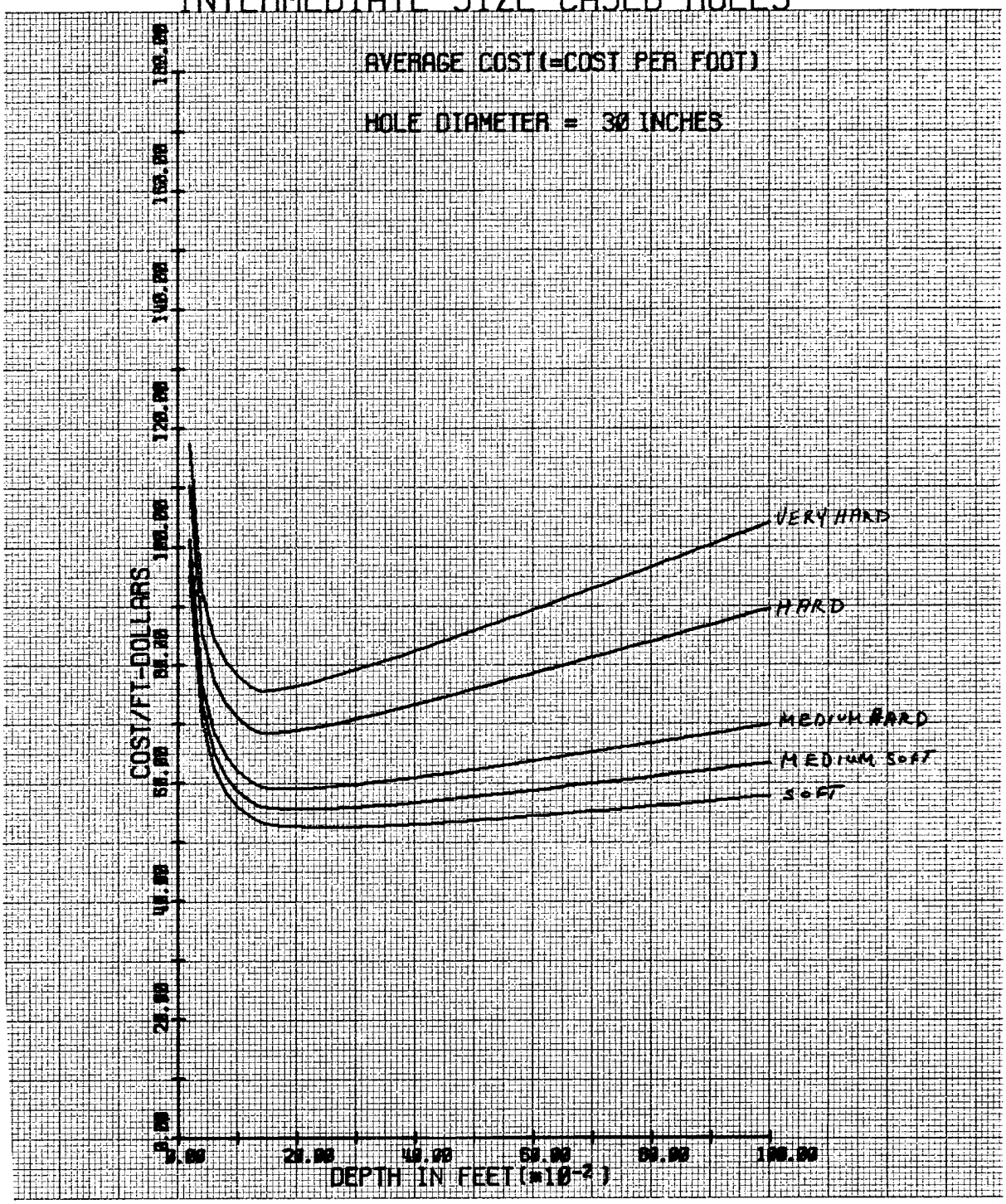
PRINTED IN U.S.A. No. 02

INTERMEDIATE SIZE CASED HOLES



RECORDING CHARTS GRAPHIC CONTROLS CORPORATION BUFFALO, NEW YORK

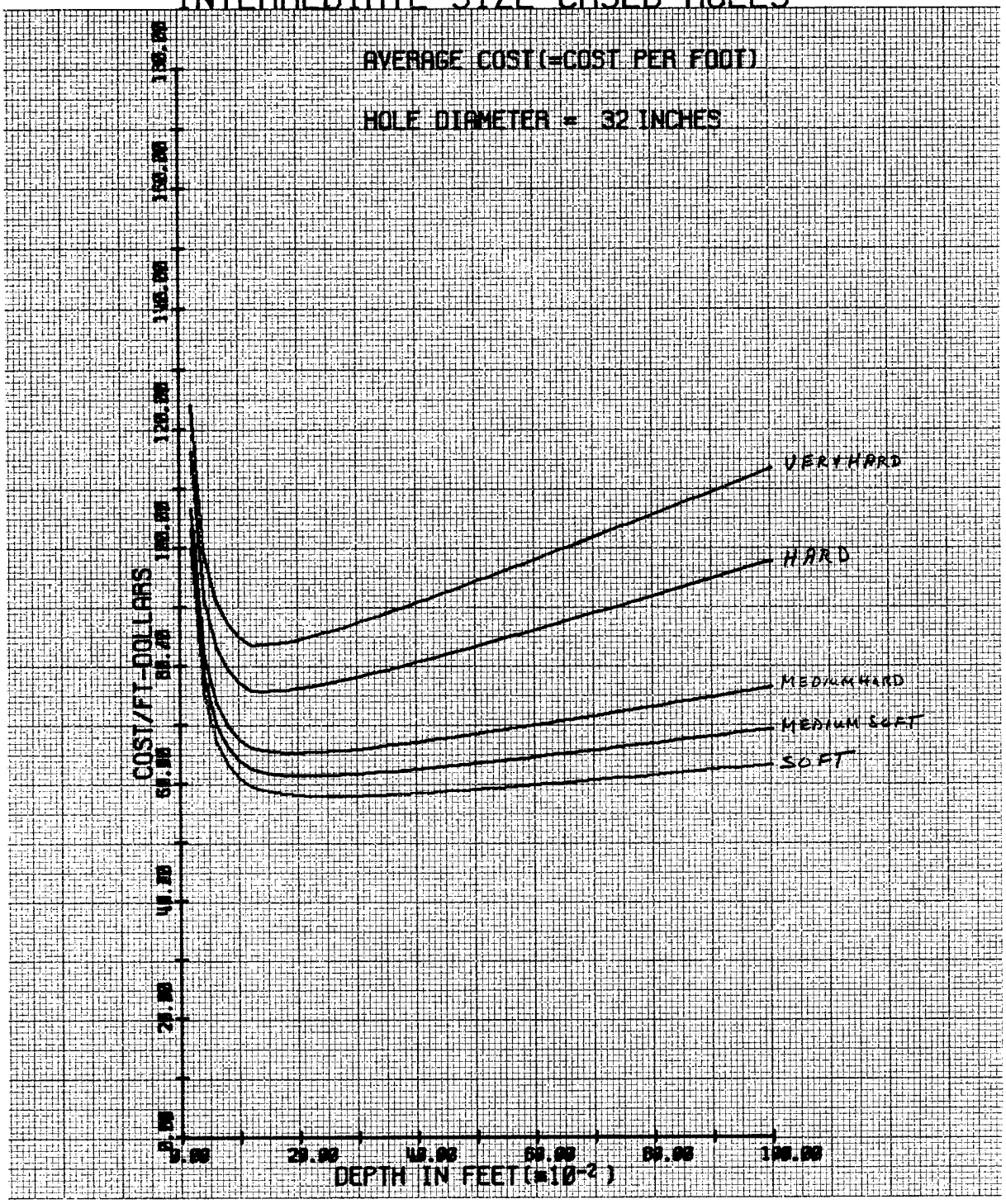
INTERMEDIATE SIZE CASED HOLES



PRINTED IN U.S.A.

NO. 02

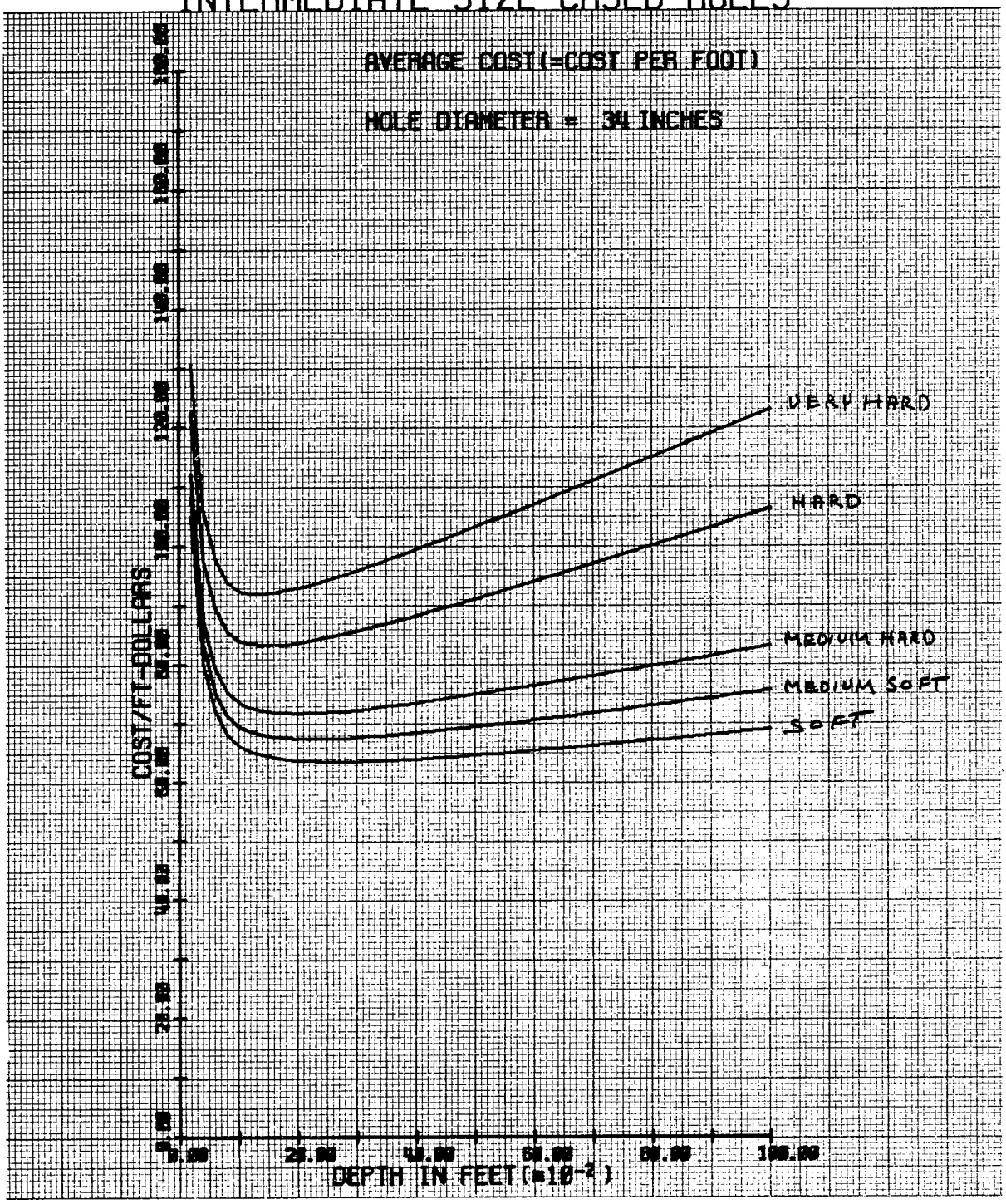
INTERMEDIATE SIZE CASED HOLES



RATION BUFFALO, NEW YORK

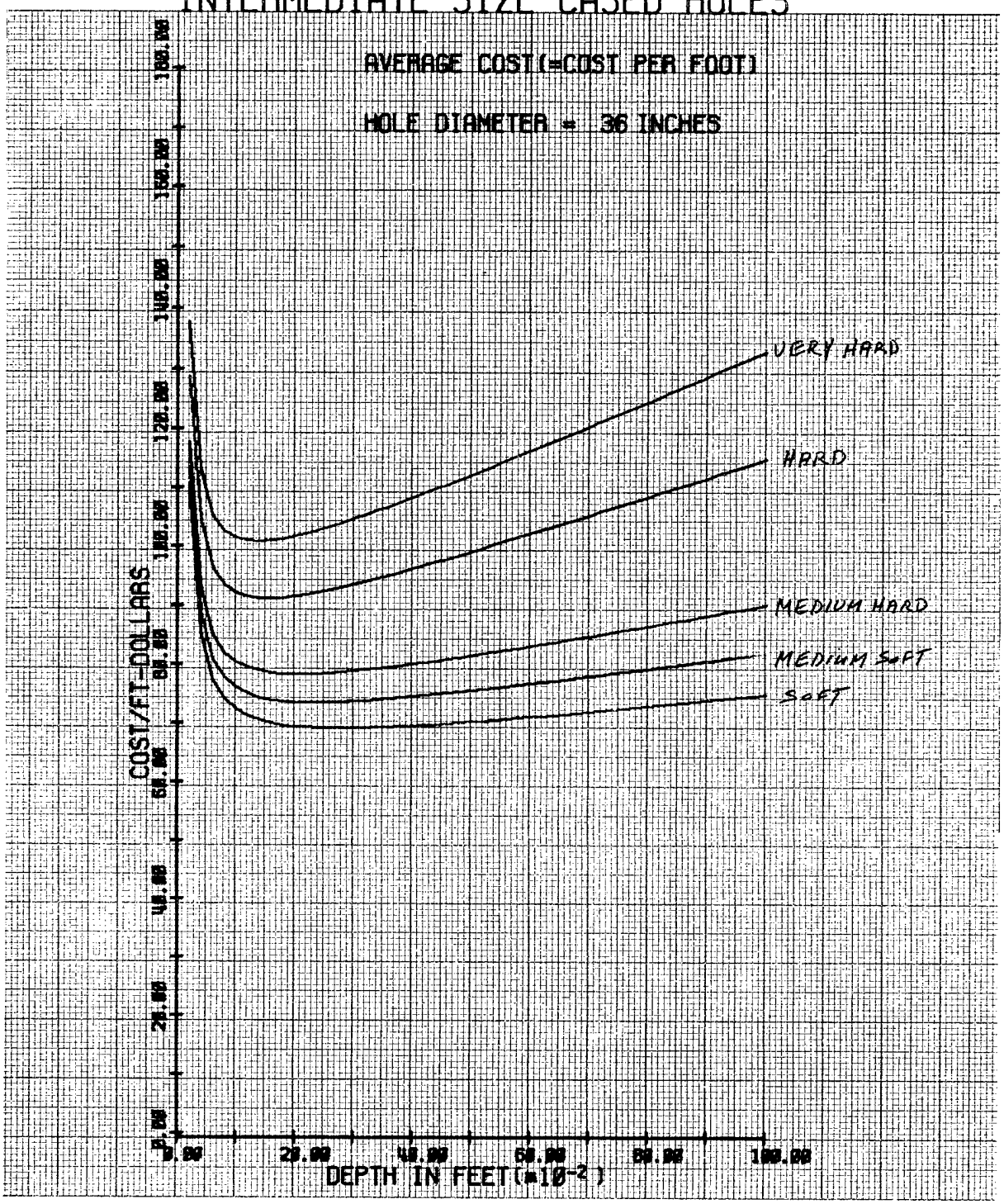
PRINTED IN U.S.A.

INTERMEDIATE SIZE CASED HOLES



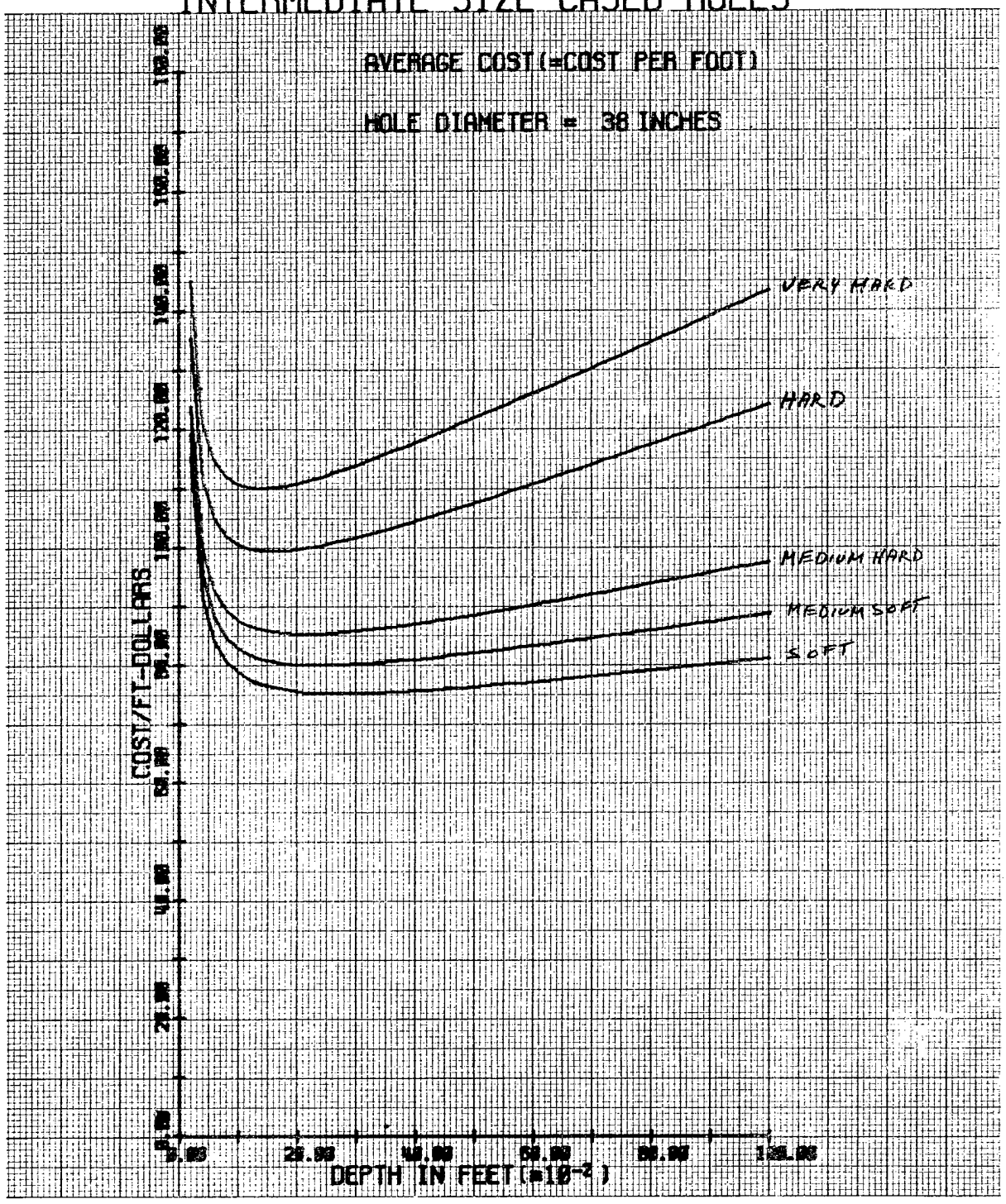
RECORDING CHARTS GRAPHIC CONTROLS CORPORATION BUFFALO

INTERMEDIATE SIZE CASED HOLES



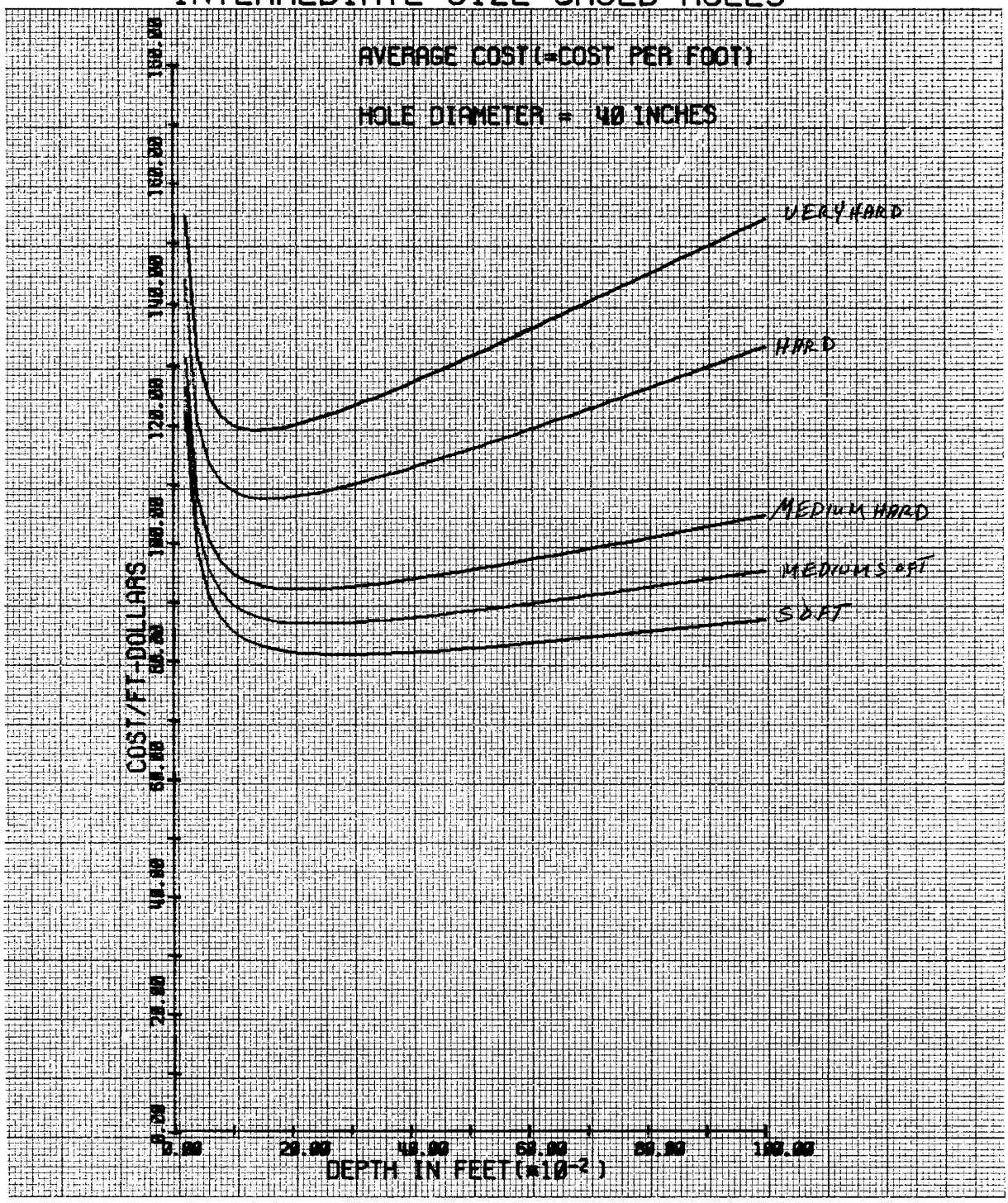
PRINTED IN U.S.A. No. 02

INTERMEDIATE SIZE CASED HOLES



RECORDING CHARTS GRAPHIC CONTROLS CORPORATION BUFFALO, NEW YORK

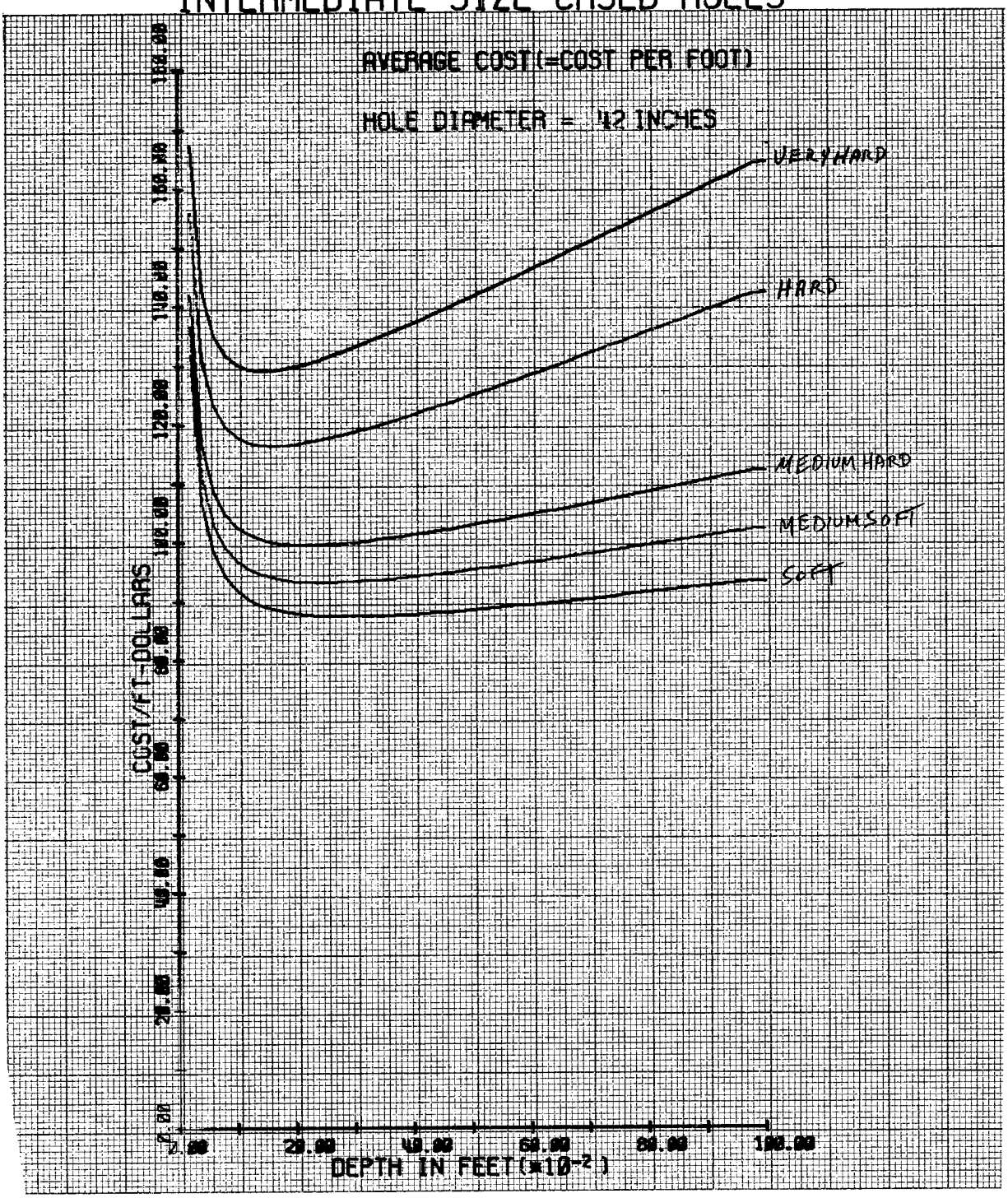
INTERMEDIATE SIZE CASED HOLES



02

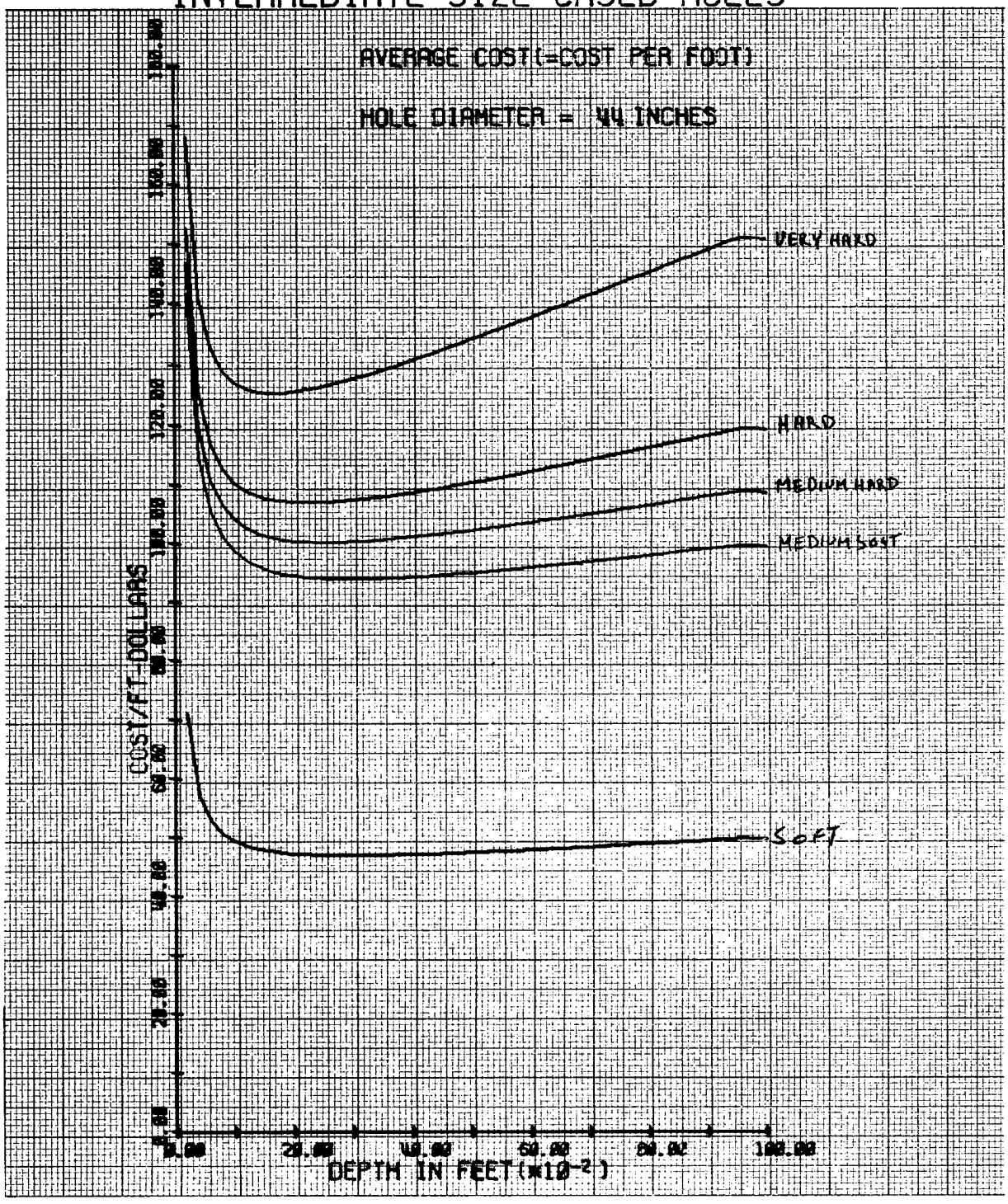
RECORDING CHARTS GRAPHIC

INTERMEDIATE SIZE CASED HOLES



PRINTED IN U.S.A. No. 02

INTERMEDIATE SIZE CASED HOLES



RECORDING CHARTS GRAPHIC CONTROLS CORPORATION BUFFALO, NEW YORK

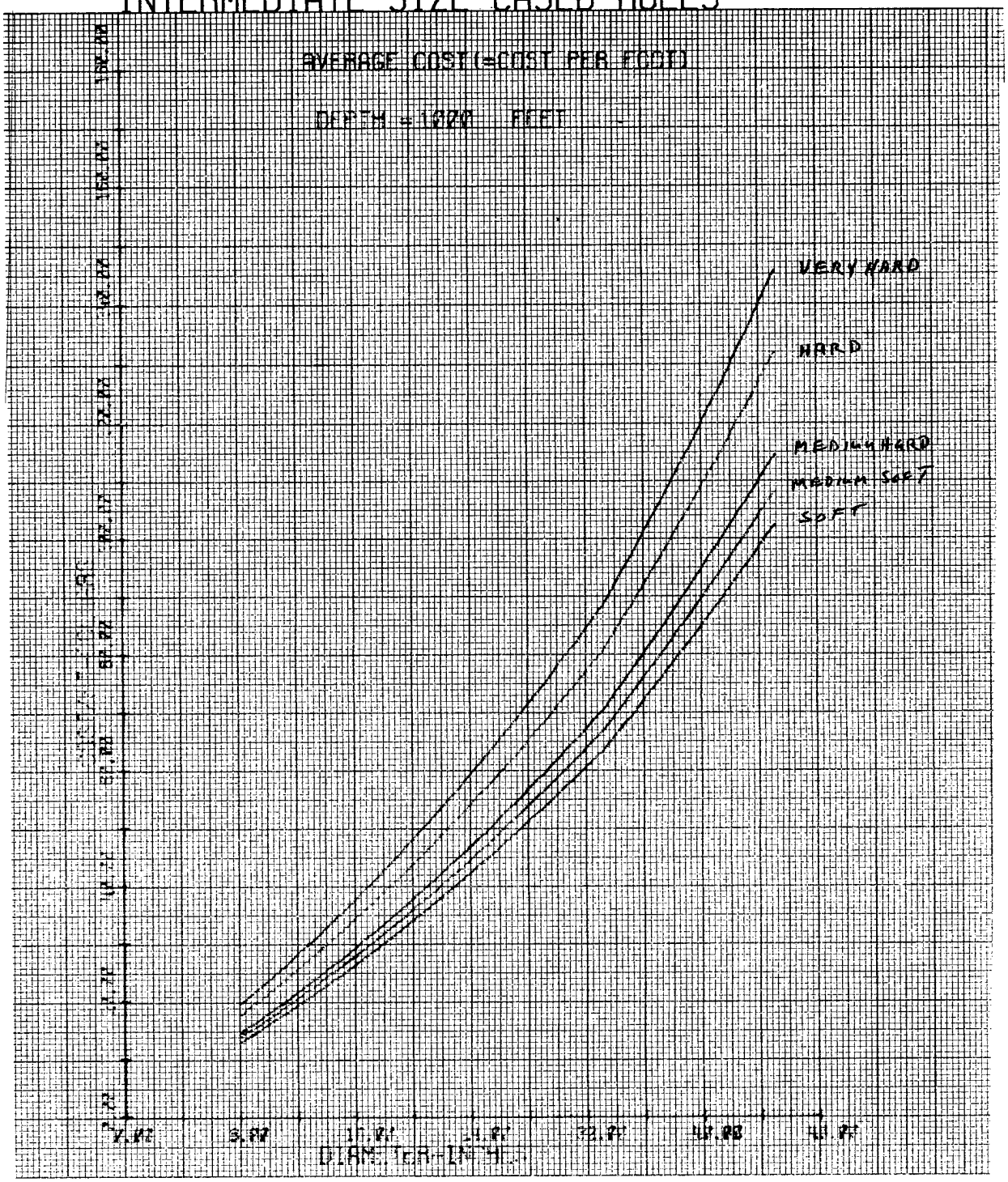
INTERMEDIATE SIZE CASED HOLE COST

AS A FUNCTION OF DEPTH FOR

10 INCHES TO 45 INCHES OUTSIDE DIAMETERS

(=8 INCHES TO 30 INCHES INSIDE DIAMETERS)

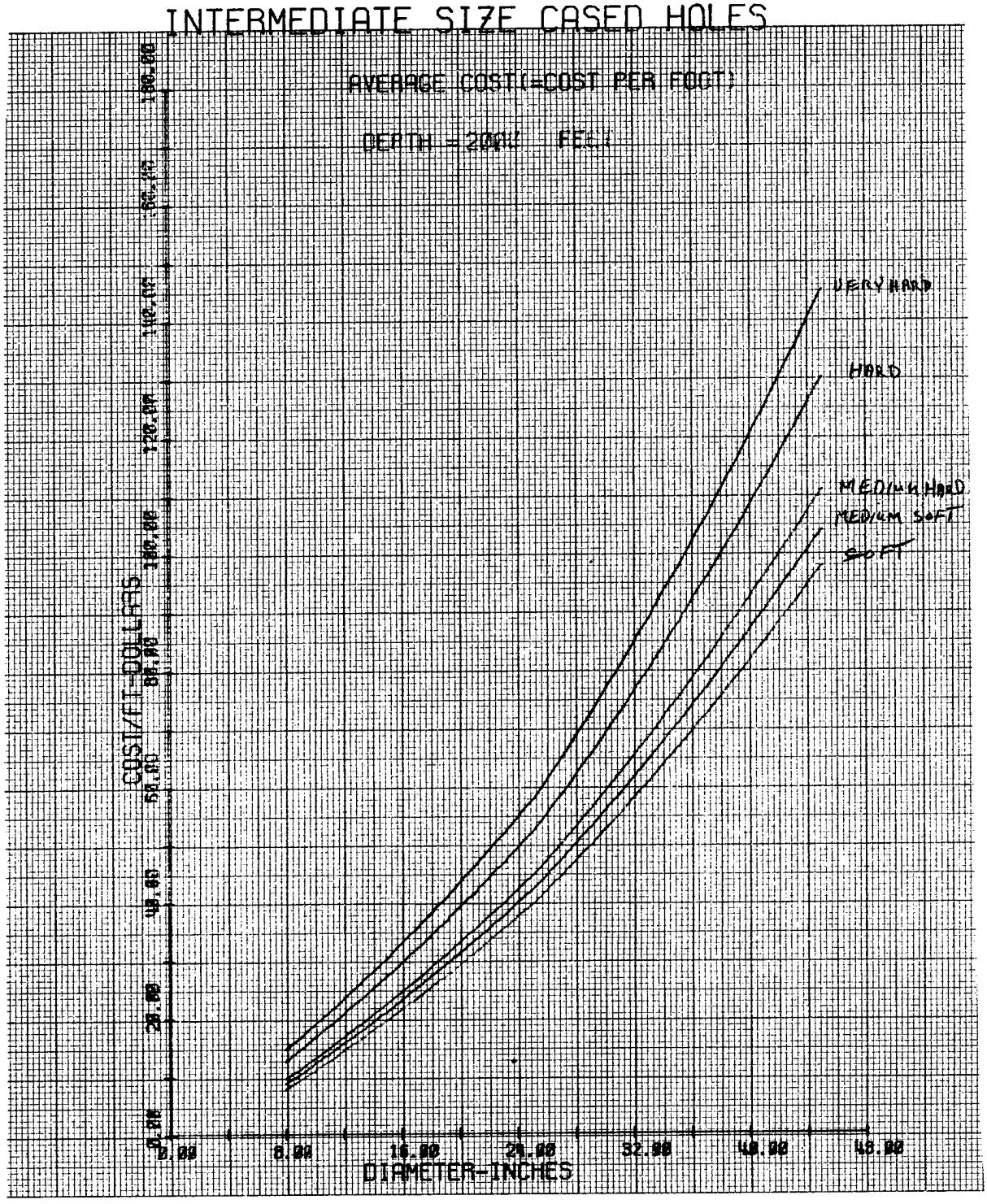
INTERMEDIATE SIZE CASED HOLES



PRINTED IN U.S.A.

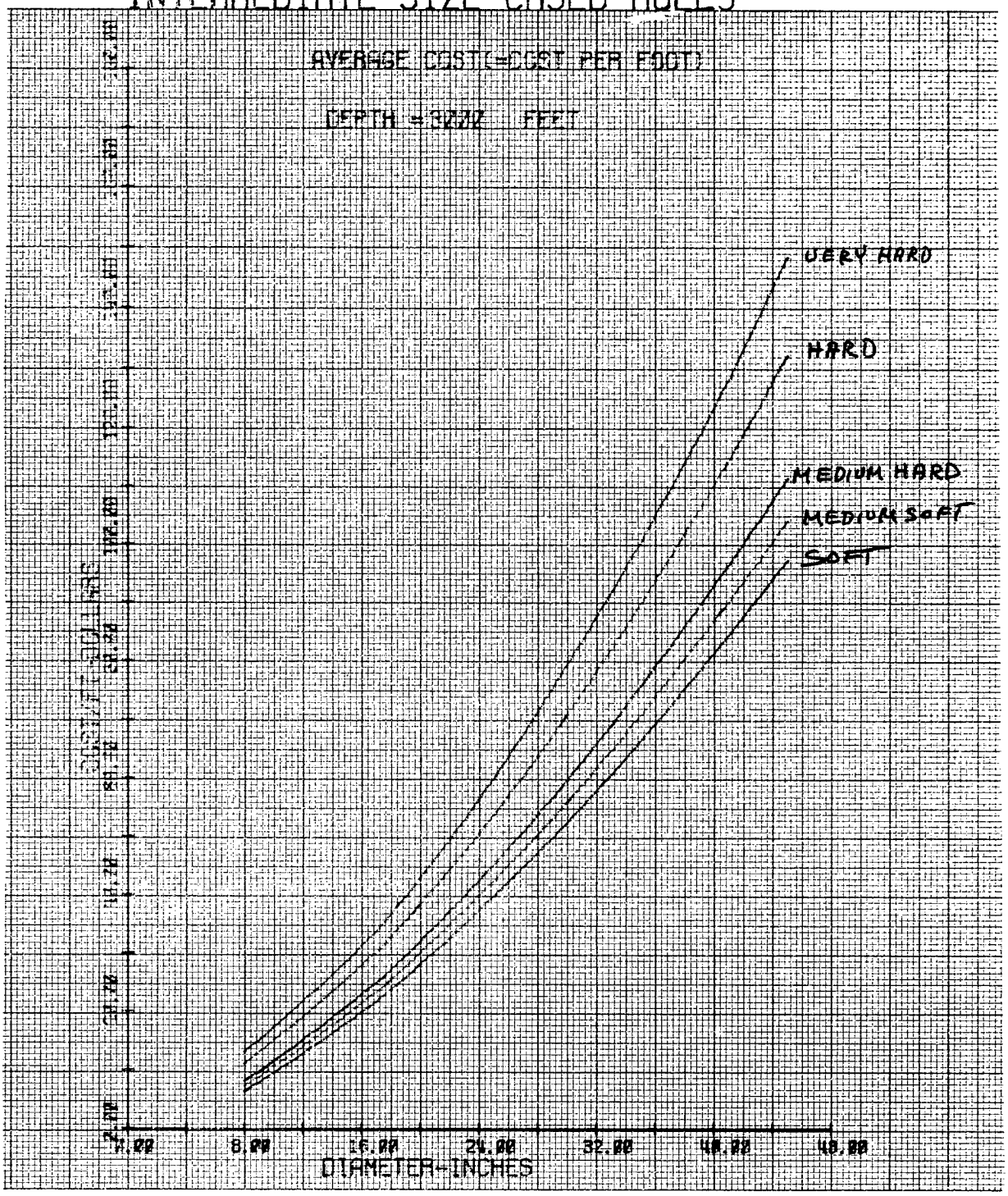
No. 02

INTERMEDIATE SIZE CASED HOLES



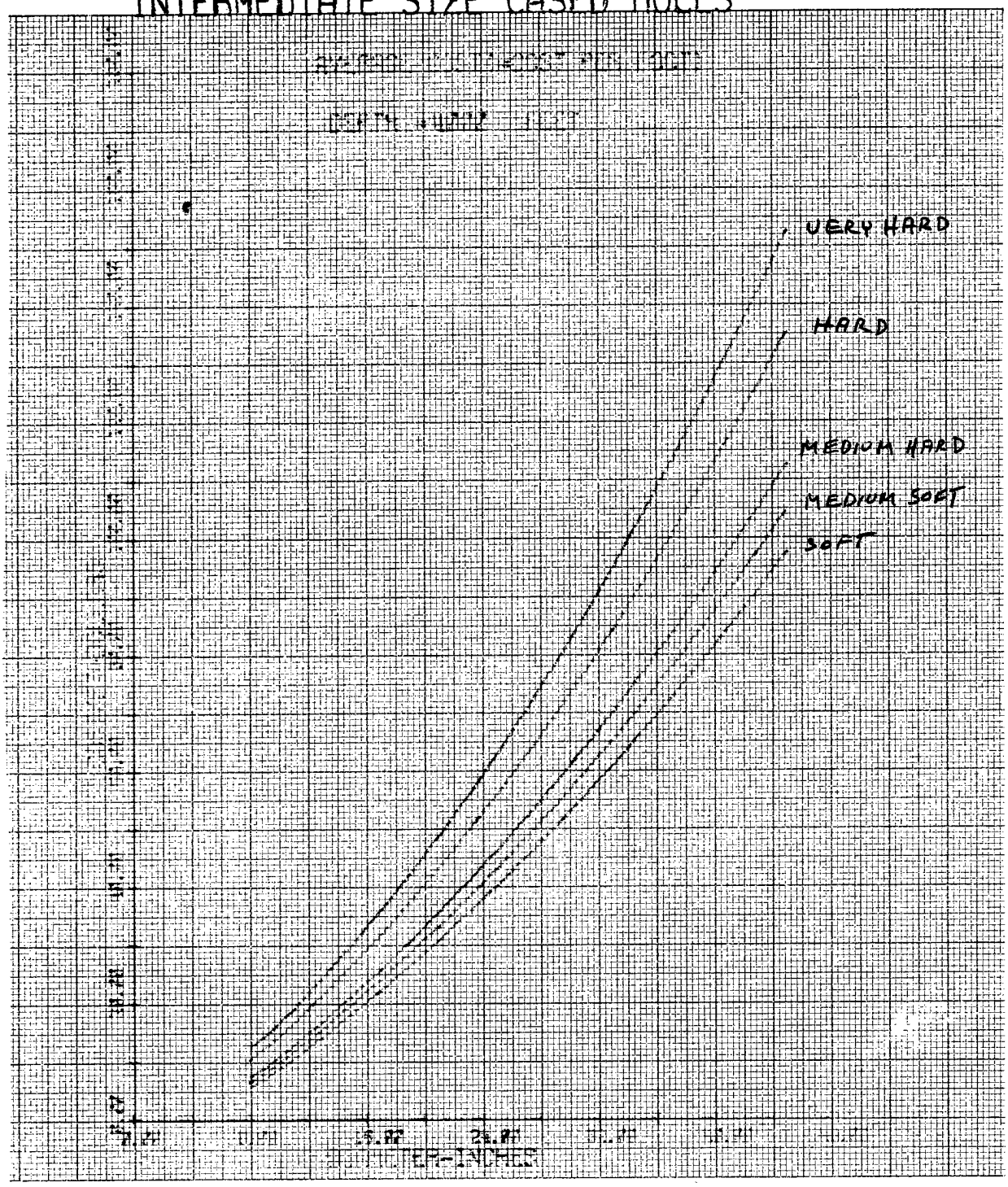
RECORDING CHARTS GRAPHIC CONTROLS CORPORATION

INTERMEDIATE SIZE CASED HOLES



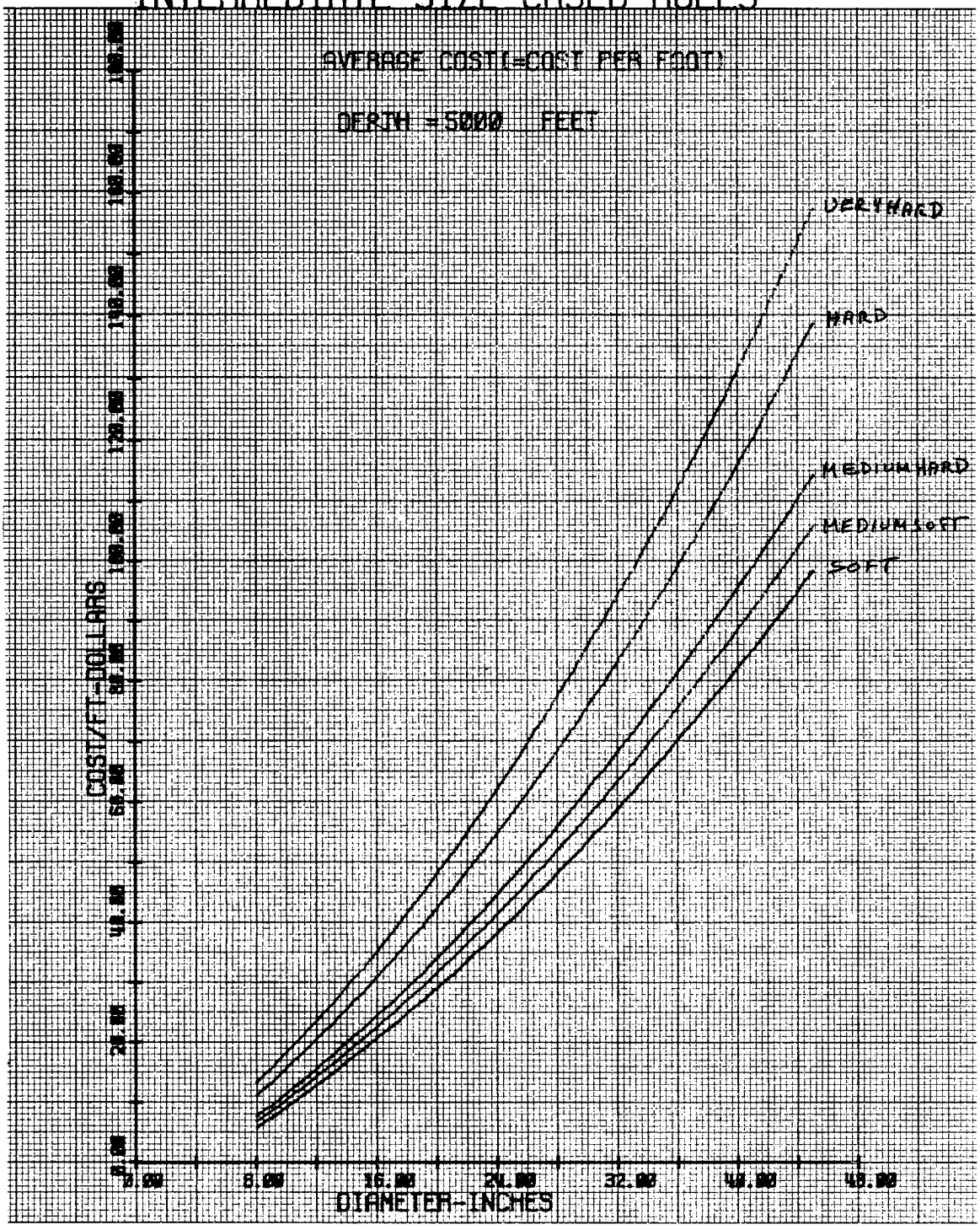
PRINTED IN U.S.A. No. 02

INTERMEDIATE SIZE CASED HOLES



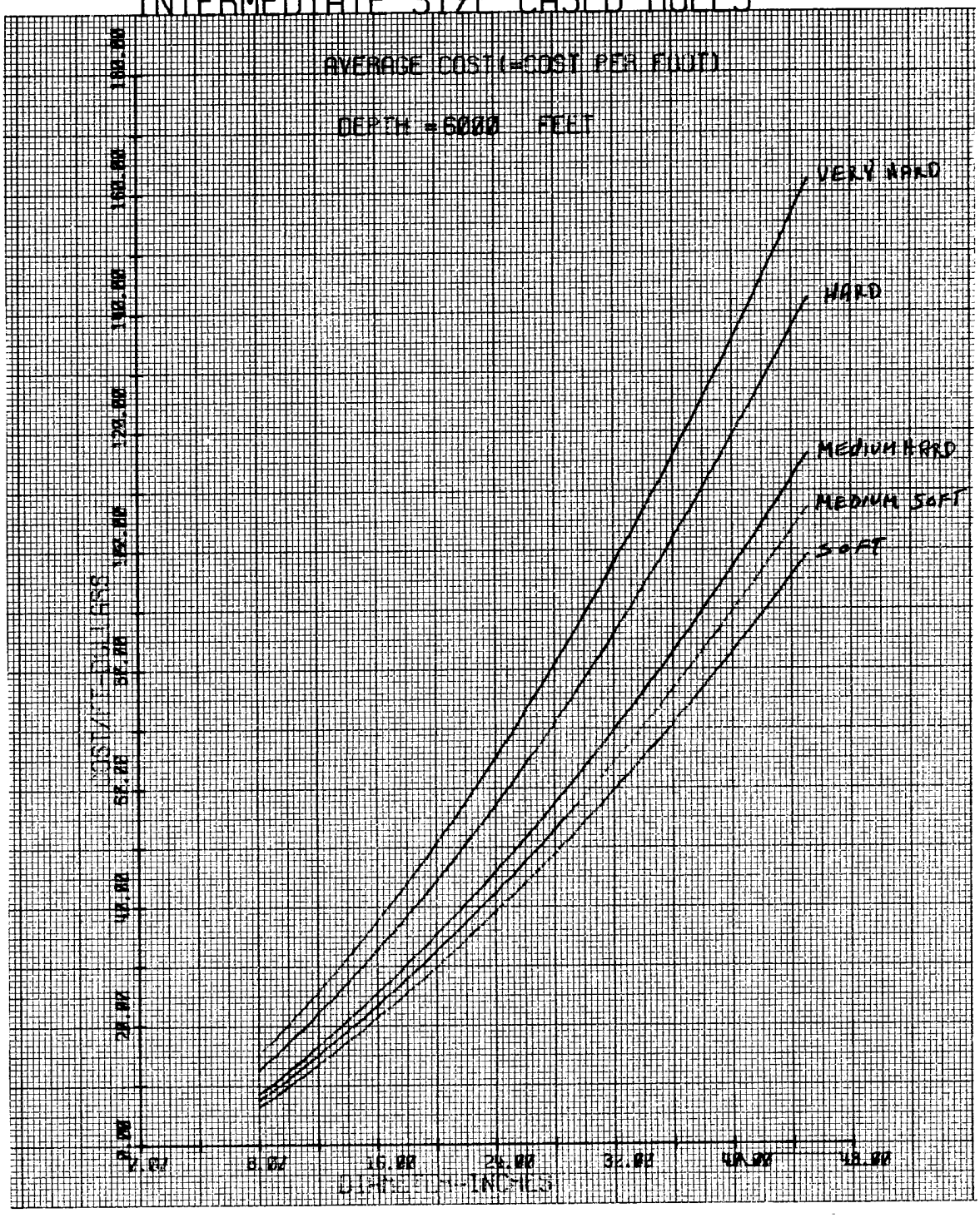
PRINTED IN U.S.A. No. 02

INTERMEDIATE SIZE CASED HOLES



© RECORDING CHARTS GRAPHIC CONTROLS CORPORATION BUFFALO, NEW YORK

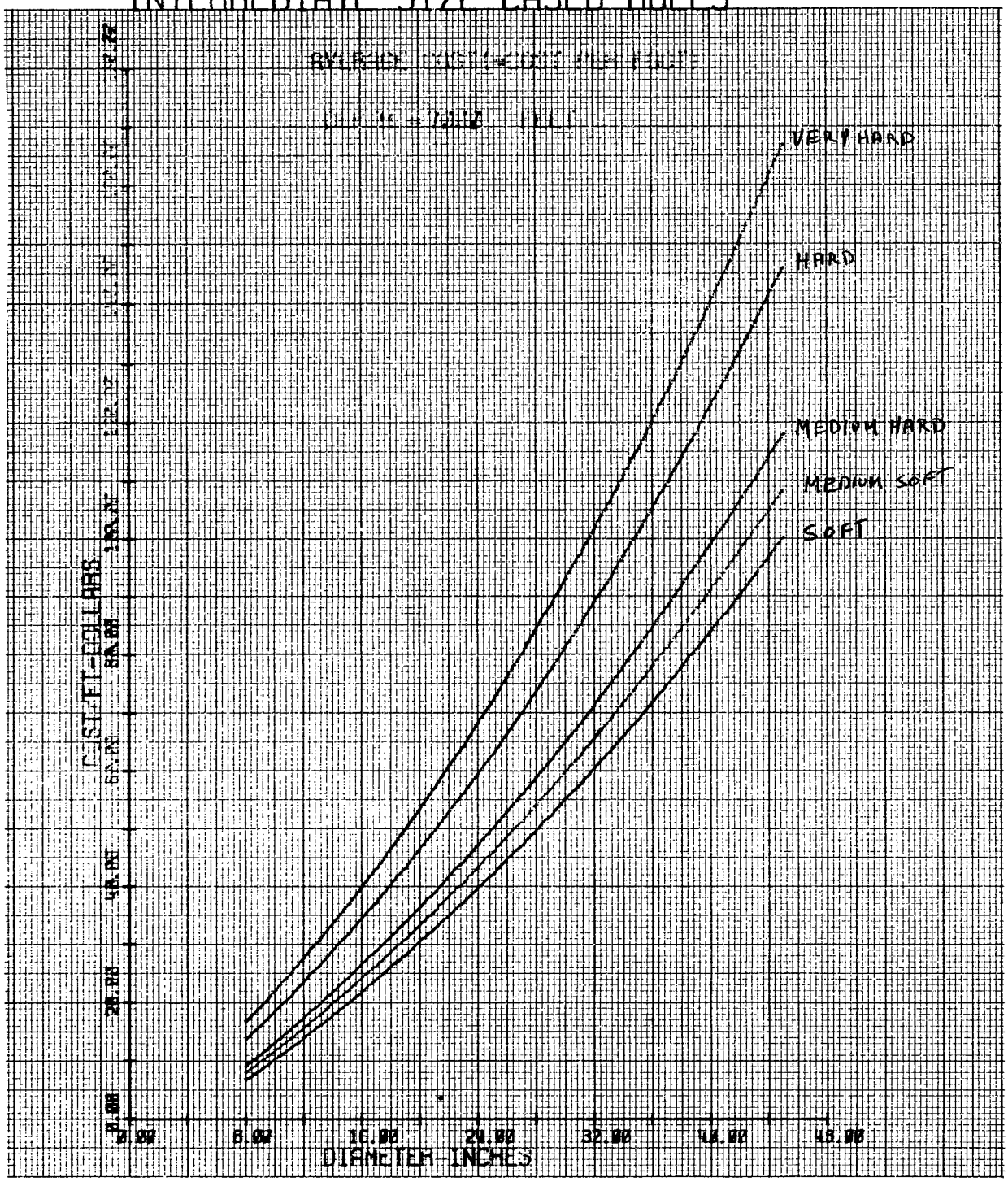
INTERMEDIATE SIZE CASED HOLES



PRINTED IN U.S.A.

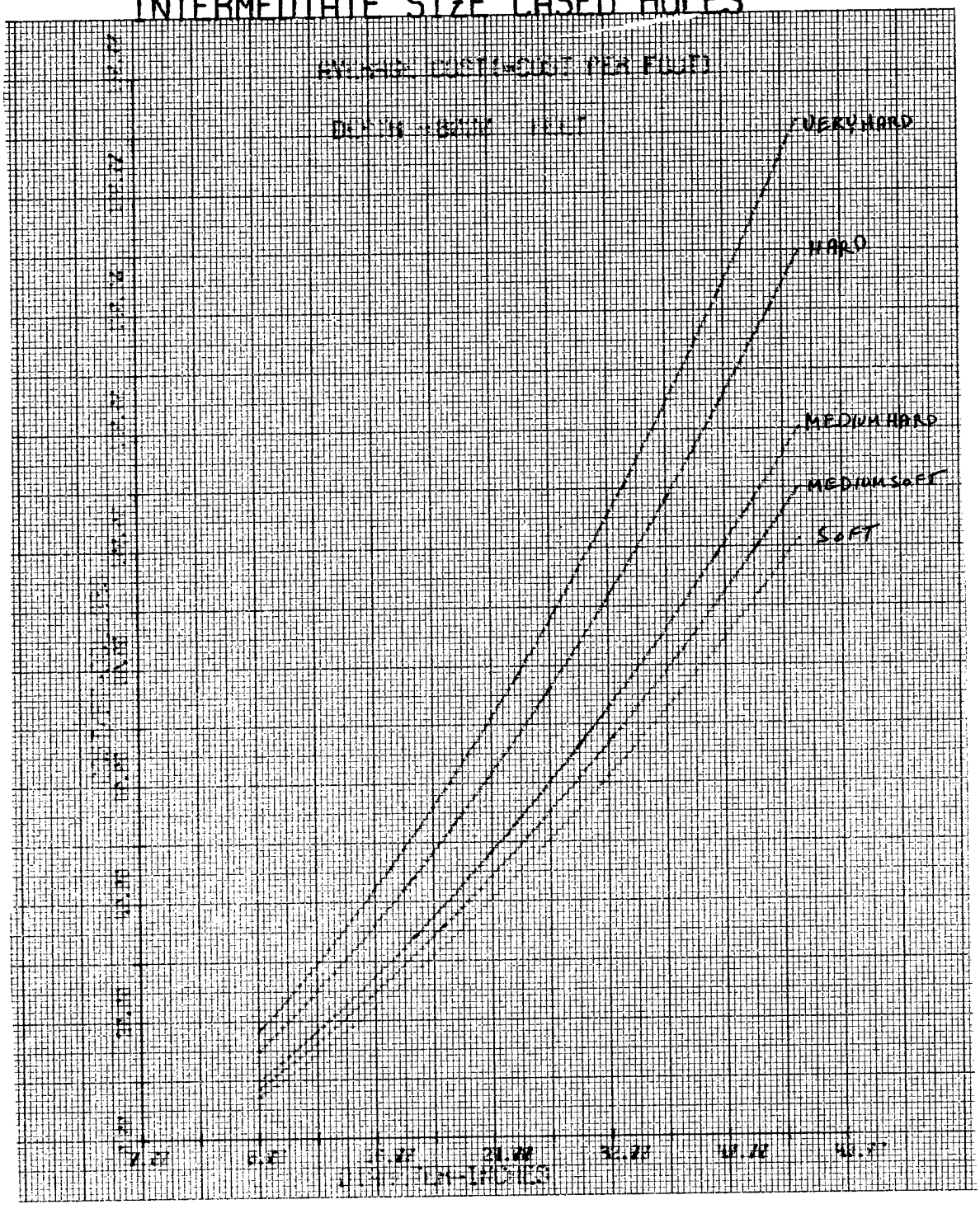
No. 02

INTERMEDIATE SIZE CASED HOLES



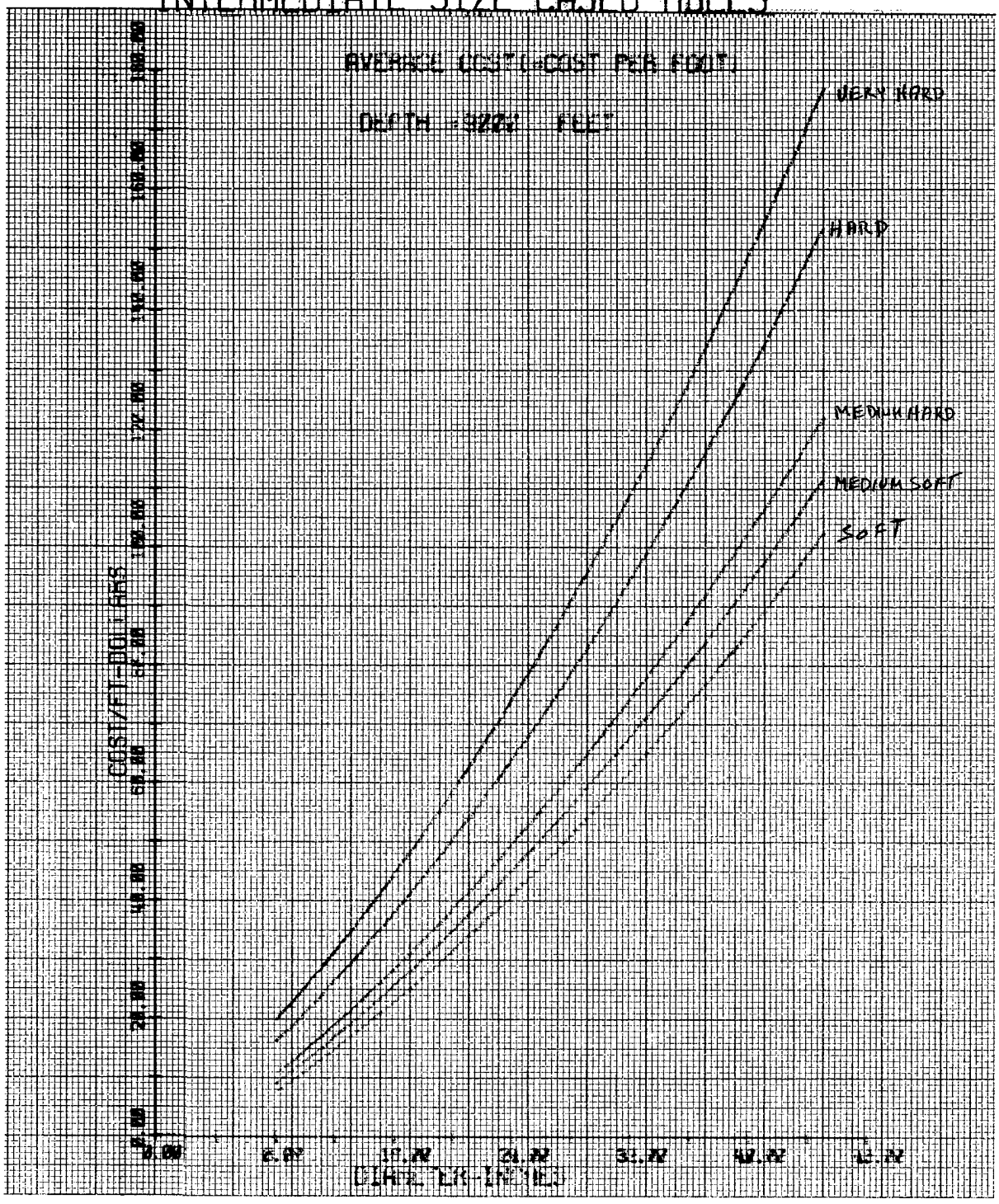
CONTROLS CORPORATION BUFFALO, NEW YORK

INTERMEDIATE SIZE CASED HOLES



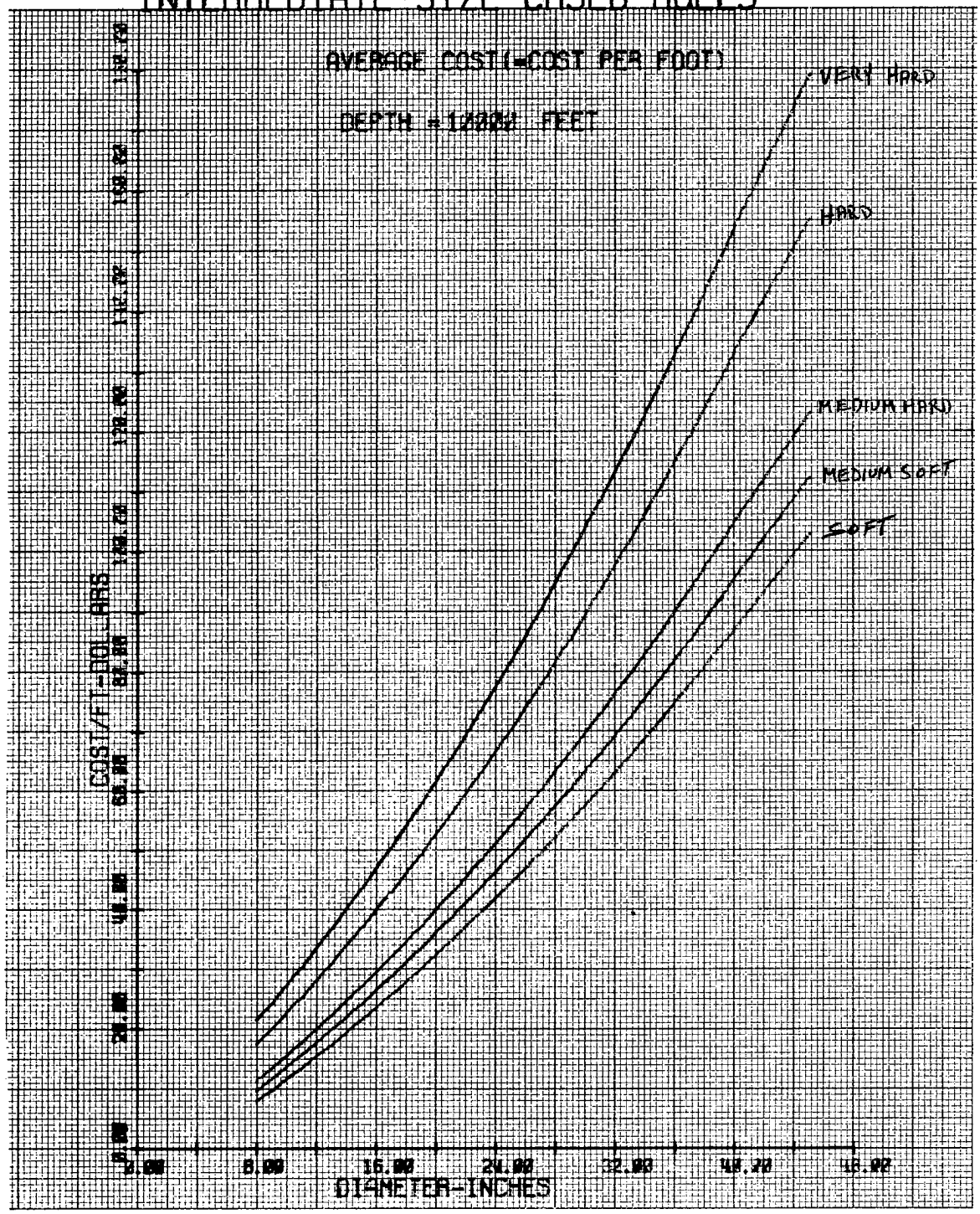
RECORDING CHARTS GRAPHIC CONTROLS

INTERMEDIATE SIZE CASED HOLES



PRINTED IN U.S.A. No. 02

INTERMEDIATE SIZE CASED HOLES



RECORDING CHARTS GRAPHIC CONTROLS CORPORATION BUFFALO, NEW YORK

Table 20

TOTAL AND AVERAGE DRILLING COSTS FOR
UNCASED WELLS IN SOFT ROCK
AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

Y_{TU} (given ϕ = 10 in.)	Y_{AVU} (given ϕ = 10 in.)
13254.09	13.25
16708.18	8.35
20162.28	6.72
23616.37	5.90
32200.62	6.44
41668.93	6.94
52021.30	7.43
63257.74	7.91
75378.24	8.38
88382.80	8.84

Y_{TU} (given ϕ = 11 in.)	Y_{AVU} (given ϕ = 11 in.)
13639.41	13.64
17478.82	8.74
21318.23	7.11
25779.87	6.44
34932.88	6.99
45019.06	7.50
56038.43	8.01
67990.96	8.50
80876.68	8.99
94695.58	9.47

Y_{TU} (given ϕ = 12 in.)	Y_{AVU} (given ϕ = 12 in.)
14046.64	14.05
18293.29	9.15
22539.93	7.51
28056.56	7.01
37806.63	7.56
48538.99	8.09
60253.65	8.61
72950.59	9.12
86629.83	9.63
101291.36	10.13

Y_{TU} (given ϕ = 13 in.)	Y_{AVU} (given ϕ = 13 in.)
14475.79	14.48
19151.58	9.58
23827.37	7.94
30446.46	7.61
40821.89	8.16
52228.73	8.70
64666.97	9.24
78136.62	9.77
92637.68	10.29
108170.14	10.82

Y_{TU} (given ϕ = 14 in.)	Y_{AVU} (given ϕ = 14 in.)
14926.85	14.93
20053.71	10.03
25180.56	8.39
32949.56	8.24
43978.65	8.80
56088.26	9.35
69278.40	9.90
83549.05	10.44
98900.22	10.99
115331.92	11.53

Y_{TU} (given ϕ = 15 in.)	Y_{AVU} (given ϕ = 15 in.)
15399.83	15.40
20999.67	10.50
26599.50	8.87
35565.86	8.89
47276.91	9.46
60117.60	10.02
74087.92	10.58
89187.88	11.15
105417.47	11.71
122776.70	12.28

Continued

Y_{TU} (given ϕ = 16 in.)	Y_{AVU} (given ϕ = 16 in.)
15894.73	15.89
21989.45	10.99
28084.18	9.36
38295.35	9.57
50716.67	10.14
64316.73	10.72
79095.54	11.30
95053.11	11.88
112189.42	12.47
130504.49	13.05

Y_{TU} (given ϕ = 17 in.)	Y_{AVU} (given ϕ = 17 in.)
16411.53	16.41
23023.07	11.51
29634.60	9.88
41138.05	10.28
54297.93	10.86
68685.67	11.45
84301.27	12.04
101144.74	12.64
119216.07	13.25
138515.27	13.85

Y_{TU} (given ϕ = 18 in.)	Y_{AVU} (given ϕ = 18 in.)
16950.26	16.95
24100.52	12.05
31444.20	10.48
44093.95	11.02
58020.69	11.60
73224.40	12.20
89705.10	12.82
107462.77	13.43
126497.42	14.06
146809.05	14.68

Y_{TU} (given ϕ = 19 in.)	Y_{AVU} (given ϕ = 19 in.)
17510.90	17.51
25221.80	12.61
33767.25	11.26
47163.05	11.79
61884.95	12.38
77932.94	12.99
95307.02	13.62
114007.20	14.25
134033.47	14.89
155385.84	15.54

Y_{TU} (given ϕ = 20 in.)	Y_{AVU} (given ϕ = 20 in.)
18093.45	18.09
26386.90	13.19
36175.20	12.06
50345.35	12.59
65890.71	13.18
82811.28	13.80
101107.05	14.44
120778.03	15.10
141824.23	15.76
164245.63	16.42

Y_{TU} (given ϕ = 21 in.)	Y_{AVU} (given ϕ = 21 in.)
18697.92	18.70
27595.84	13.80
38668.05	12.89
53640.85	13.41
70037.97	14.01
87859.41	14.64
107105.18	15.30
127775.27	15.97
149869.68	16.65
173388.41	17.34

Continued

Y_{TU} (given ϕ = 22 in.)	Y_{AVU} (given ϕ = 22 in.)
19324.31	19.32
28848.61	14.42
41245.81	13.75
57049.55	14.26
74326.73	14.87
93077.35	15.51
113301.41	16.19
134998.90	16.87
158169.83	17.57
182814.20	18.28

Y_{TU} (given ϕ = 23 in.)	Y_{AVU} (given ϕ = 23 in.)
19972.61	19.97
30145.21	15.07
43908.46	14.64
60571.45	15.14
78756.99	15.75
98465.09	16.41
119695.73	17.10
142448.93	17.81
166724.69	18.52
192522.99	19.25

Y_{TU} (given ϕ = 24 in.)	Y_{AVU} (given ϕ = 24 in.)
20642.82	20.64
31485.64	15.74
46656.01	15.55
64206.55	16.05
83328.76	16.67
104022.63	17.34
126288.16	18.04
150125.37	18.77
175534.24	19.50
202514.78	20.25

Y_{TU} (given ϕ = 25 in.)	Y_{AVU} (given ϕ = 25 in.)
21334.95	21.33
32869.90	16.43
49488.47	16.50
67954.85	16.99
88042.02	17.61
109749.97	18.29
133078.69	19.01
158028.21	19.75
184598.50	20.51
212789.57	21.28

Y_{TU} (given ϕ = 26 in.)	Y_{AVU} (given ϕ = 26 in.)
22049.00	22.05
34665.18	17.33
52405.82	17.47
71816.35	17.95
92896.78	18.58
115647.10	19.27
140067.32	20.01
166157.44	20.77
193917.45	21.55
223347.36	22.33

Y_{TU} (given ϕ = 27 in.)	Y_{AVU} (given ϕ = 27 in.)
22784.96	22.78
36744.11	18.37
55408.08	18.47
75791.05	18.95
97893.04	19.58
121714.04	20.29
147254.05	21.04
174513.08	21.81
203491.11	22.61
234188.15	23.42

Continued

Y_{TU} (given ϕ = 28 in.)	Y_{AVU} (given ϕ = 28 in.)
23542.83	23.54
38879.63	19.44
58495.23	19.50
79878.96	19.97
103030.81	20.61
127950.78	21.33
154638.89	22.09
183095.11	22.89
213319.46	23.70
245311.94	24.53

Y_{TU} (given ϕ = 29 in.)	Y_{AVU} (given ϕ = 29 in.)
24322.62	24.32
41071.75	20.54
61667.28	20.56
84080.06	21.02
108310.07	21.66
134357.32	22.39
162221.82	23.17
191903.55	23.99
223402.52	24.82
256718.73	25.67

Y_{TU} (given ϕ = 30 in.)	Y_{AVU} (given ϕ = 30 in.)
25124.33	25.12
43320.47	21.66
64924.24	21.64
88394.36	22.10
113730.84	22.75
140933.67	23.49
170002.85	24.29
200938.39	25.12
233740.28	25.97
268408.53	26.84

Y_{TU} (given ϕ = 31 in.)	Y_{AVU} (given ϕ = 31 in.)
25947.95	25.95
45625.79	22.81
68266.10	22.76
92821.86	23.21
119293.10	23.86
147679.81	24.61
177981.98	25.43
210199.63	26.27
244332.74	27.15
280381.32	28.04

Y_{TU} (given ϕ = 32 in.)	Y_{AVU} (given ϕ = 32 in.)
26793.49	26.79
47987.72	23.99
71692.85	23.90
97362.57	24.34
124996.87	25.00
154595.75	25.77
186159.22	26.59
219687.27	27.46
255179.90	28.35
292637.12	29.26

Y_{TU} (given ϕ = 33 in.)	Y_{AVU} (given ϕ = 33 in.)
27660.94	27.66
50406.24	25.20
75204.50	25.07
102016.47	25.50
130842.13	26.17
161681.49	26.95
194534.55	27.79
229401.31	28.68
266281.76	29.59
305175.91	30.52

Continued

Y_{TU} (given ϕ = 34 in.)	Y_{AVU} (given ϕ = 34 in.)
29024.47	29.02
52881.36	26.44
78801.06	26.27
106783.57	26.70
136828.90	27.37
168937.04	28.16
203107.98	29.02
239341.75	29.92
277638.32	30.85
317997.71	31.80

Y_{TU} (given ϕ = 35 in.)	Y_{AVU} (given ϕ = 35 in.)
30455.58	30.46
55413.08	27.71
82482.52	27.49
111663.88	27.92
142957.16	28.59
176362.38	29.39
211879.52	30.27
249508.59	31.19
289249.58	32.14
331102.50	33.11

Y_{TU} (given ϕ = 36 in.)	Y_{AVU} (given ϕ = 36 in.)
31914.98	31.91
58001.41	29.00
86248.87	28.75
116657.38	29.16
149226.93	29.85
183957.52	30.66
220849.16	31.55
259901.83	32.49
301115.55	33.46
344490.30	34.45

Y_{TU} (given ϕ = 37 in.)	T_{AVU} (given ϕ = 37 in.)
33402.69	33.40
60646.33	30.32
90100.13	30.03
121764.09	30.44
155638.20	31.13
191722.47	31.95
230016.89	32.86
270521.47	33.82
313236.21	34.80
358161.11	35.82

Y_{TU} (given ϕ = 38 in.)	T_{AVU} (given ϕ = 38 in.)
34918.69	34.92
63347.85	31.67
94036.29	31.35
126983.99	31.75
162190.96	32.44
199657.21	33.28
239382.72	34.20
281367.51	35.17
325611.57	36.18
372114.89	37.21

Y_{TU} (given ϕ = 39 in.)	T_{AVU} (given ϕ = 39 in.)
36463.00	36.46
66105.98	33.05
98057.34	32.69
132317.09	33.08
168885.23	33.78
207761.75	34.63
248946.66	35.56
292439.96	36.55
338241.63	37.58
386351.71	38.64

Continued

Y_{TU} (given ϕ = 40 in.)	Y_{AVU} (given ϕ = 40 in.)
38035.60	38.04
68920.70	34.46
102163.30	34.05
137763.40	34.44
175721.00	35.14
216036.10	36.01
258708.70	36.96
303738.80	37.97
351126.40	39.01
400871.50	40.09

Y_{TU} (given ϕ = 41 in.)	Y_{AVU} (given ϕ = 41 in.)
39636.51	39.64
71792.02	35.90
106354.16	35.45
143322.91	35.83
182698.27	36.54
224480.25	37.41
268668.84	38.38
315264.04	39.41
364265.87	40.47
415225.71	41.52

Y_{TU} (given ϕ = 42 in.)	Y_{AVU} (given ϕ = 42 in.)
41265.71	41.27
74719.95	37.36
110629.92	36.88
148995.61	37.25
189817.04	37.96
233094.19	38.85
278827.08	39.83
327015.69	40.88
377660.03	41.96
428328.33	42.83

Y_{TU} (given ϕ = 43 in.)	Y_{AVU} (given ϕ = 43 in.)
42923.21	42.92
77704.47	38.85
114990.57	38.33
154781.52	38.70
197077.31	39.42
241877.94	40.31
289183.42	41.31
338993.73	42.37
391308.90	43.48
441650.08	44.17

Y_{TU} (given ϕ = 44 in.)	Y_{AVU} (given ϕ = 44 in.)
44609.02	44.61
80745.60	40.37
119436.13	39.81
160680.62	40.17
204479.08	40.90
250831.49	41.81
299737.86	42.82
351198.18	43.90
405212.47	45.02
455191.00	45.52

Y_{TU} (given ϕ = 45 in.)	Y_{AVU} (given ϕ = 45 in.)
46323.12	46.32
83843.32	41.92
123966.59	41.32
166692.93	41.67
212022.35	42.40
259954.83	43.33
310490.39	44.36
363629.03	45.45
419370.73	46.60
468951.06	46.90

Table 21

TOTAL AND AVERAGE DRILLING COSTS FOR
UNCASED WELLS IN MEDIUM SOFT ROCK
AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

Y_{TU} (given ϕ = 10 in.)	Y_{AVU} (given ϕ = 10 in.)
14162.60	14.16
18525.21	9.26
22887.81	7.63
27250.42	6.81
37479.90	7.50
48888.13	8.15
61475.11	8.78
75240.84	9.41
90185.32	10.02
106308.55	10.63

Y_{TU} (given ϕ = 11 in.)	Y_{AVU} (given ϕ = 11 in.)
14619.98	14.62
19439.96	9.72
24259.94	8.09
29783.03	7.45
40714.47	8.14
52890.16	8.82
66310.07	9.47
80974.23	10.12
96882.62	10.76
114035.25	11.40

Y_{TU} (given ϕ = 12 in.)	Y_{AVU} (given ϕ = 12 in.)
15102.07	15.10
20404.14	10.20
25706.20	8.57
32448.53	8.11
44115.16	8.82
57091.52	9.52
71377.60	10.20
86973.41	10.87
103878.93	11.54
122094.18	12.21

Y_{TU} (given ϕ = 13 in.)	Y_{AVU} (given ϕ = 13 in.)
15608.86	15.61
21417.73	10.71
27226.59	9.08
35246.92	8.81
47681.97	9.54
61492.23	10.25
76677.70	10.95
93238.38	11.65
111174.26	12.35
130485.35	13.05

Y_{TU} (given ϕ = 14 in.)	Y_{AVU} (given ϕ = 14 in.)
16140.37	16.14
22480.74	11.24
28821.12	9.61
38178.21	9.54
51414.90	10.28
66092.28	11.02
82210.36	11.74
99769.13	12.47
118768.60	13.20
139208.76	13.92

Y_{TU} (given ϕ = 15 in.)	Y_{AVU} (given ϕ = 15 in.)
16696.59	16.70
23593.18	11.80
30489.77	10.16
41242.39	10.31
55313.94	11.06
70891.68	11.82
87975.59	12.57
106565.68	13.32
126661.95	14.07
148264.40	14.83

Continued

Y_{TU} (given ϕ = 16 in.)	Y_{AVU} (given ϕ = 16 in.)
17277.52	17.28
24755.04	12.38
32232.55	10.74
44439.47	11.11
59379.11	11.88
75890.41	12.65
93973.38	13.42
113628.01	14.20
134854.31	14.98
157652.28	15.77

Y_{TU} (given ϕ = 17 in.)	Y_{AVU} (given ϕ = 17 in.)
17883.16	17.88
25966.31	12.98
34049.47	11.35
47769.45	11.94
63610.39	12.72
81088.49	13.51
100203.74	14.31
120956.14	15.12
143345.69	15.93
167372.40	16.74

Y_{TU} (given ϕ = 18 in.)	Y_{AVU} (given ϕ = 18 in.)
18513.51	18.51
27227.01	13.61
36159.48	12.05
51232.31	12.81
68007.79	13.60
86485.90	14.41
106666.66	15.24
128550.05	16.07
152136.08	16.90
177424.75	17.74

Y_{TU} (given ϕ = 19 in.)	Y_{AVU} (given ϕ = 19 in.)
19168.57	19.17
28537.13	14.27
38852.97	12.95
54828.08	13.71
72571.31	14.51
92082.66	15.35
113362.14	16.19
136409.75	17.05
161225.48	17.91
187809.34	18.78

Y_{TU} (given ϕ = 20 in.)	Y_{AVU} (given ϕ = 20 in.)
19848.34	19.85
29896.67	14.95
41646.13	13.88
58556.73	14.64
77300.94	15.46
97878.76	16.31
120290.20	17.18
144535.24	18.07
170613.90	18.96
198526.16	19.85

Y_{TU} (given ϕ = 21 in.)	Y_{AVU} (given ϕ = 21 in.)
20552.82	20.55
31305.63	15.65
44538.97	14.85
62418.28	15.60
82196.70	16.44
103874.21	17.31
127450.82	18.21
152926.52	19.12
180301.33	20.03
209575.23	20.96

Continued

Y_{TU} (given ϕ = 22 in.)	Y_{AVU} (given ϕ = 22 in.)
21282.01	21.28
32764.01	16.38
47531.47	15.84
66412.73	16.60
87258.57	17.45
110068.99	18.34
134844.00	19.26
161583.59	20.20
190287.77	21.14
220956.52	22.10

Y_{TU} (given ϕ = 23 in.)	Y_{AVU} (given ϕ = 23 in.)
22035.91	22.04
34271.82	17.14
50623.65	16.87
70540.07	17.64
92486.56	18.50
116463.12	19.41
142469.75	20.35
170506.45	21.31
200573.22	22.29
232670.06	23.27

Y_{TU} (given ϕ = 24 in.)	Y_{AVU} (given ϕ = 24 in.)
22814.52	22.81
35829.04	17.91
53815.49	17.94
74800.30	18.70
97880.67	19.58
123056.59	20.51
150328.06	21.48
179695.10	22.46
211157.68	23.46
244715.83	24.47

Y_{TU} (given ϕ = 25 in.)	Y_{AVU} (given ϕ = 25 in.)
23617.84	23.62
37435.68	18.72
57107.01	19.04
79193.43	19.80
103440.89	20.69
129849.40	21.64
158418.94	22.63
189149.53	23.64
222041.16	24.67
257093.83	25.71

Y_{TU} (given ϕ = 26 in.)	Y_{AVU} (given ϕ = 26 in.)
24445.87	24.45
39503.47	19.75
60498.20	20.17
83719.46	20.93
109167.24	21.83
136841.55	22.81
166742.39	23.82
198869.75	24.86
233223.65	25.91
269804.07	26.98

Y_{TU} (given ϕ = 27 in.)	Y_{AVU} (given ϕ = 27 in.)
25298.62	25.30
41891.76	20.95
63989.06	21.33
88378.37	22.09
115059.70	23.01
144033.04	24.01
175298.40	25.04
208855.77	26.11
244705.16	27.19
282846.55	28.28

Continued

Y_{TU} (given ϕ = 28 in.)	Y_{AVU} (given ϕ = 28 in.)
26176.07	26.18
44346.49	22.17
67579.59	22.53
93170.19	23.29
121118.28	24.22
151423.88	25.24
184086.97	26.30
219107.57	27.39
256485.67	28.50
296221.27	29.62

Y_{TU} (given ϕ = 29 in.)	Y_{AVU} (given ϕ = 29 in.)
27078.24	27.08
46867.67	23.43
71269.79	23.76
98094.89	24.52
127342.98	25.47
159014.05	26.50
193108.12	27.59
229625.16	28.70
268565.20	29.84
309928.21	30.99

Y_{TU} (given ϕ = 30 in.)	Y_{AVU} (given ϕ = 30 in.)
28005.11	28.01
49455.30	24.73
75059.66	25.02
103152.49	25.79
133733.80	26.75
166803.57	27.80
202361.82	28.91
240408.54	30.05
280943.74	31.22
323967.40	32.40

Y_{TU} (given ϕ = 31 in.)	Y_{AVU} (given ϕ = 31 in.)
28956.69	28.96
52109.38	26.05
78949.21	26.32
108342.99	27.09
140290.73	28.06
174792.44	29.13
211848.10	30.26
251457.72	31.43
293621.29	32.62
338338.82	33.83

Y_{TU} (given ϕ = 32 in.)	Y_{AVU} (given ϕ = 32 in.)
29932.99	29.93
54829.90	27.41
82938.42	27.65
113666.38	28.42
147013.79	29.40
182980.64	30.50
221566.93	31.65
262772.67	32.85
306597.86	34.07
353042.48	35.30

Y_{TU} (given ϕ = 33 in.)	Y_{AVU} (given ϕ = 33 in.)
30934.00	30.93
57616.87	28.81
87027.30	29.01
119122.67	29.78
153902.96	30.78
191368.18	31.89
231518.33	33.07
274353.42	34.29
319873.43	35.54
368078.38	36.81

Continued

Y_{TU} (given ϕ = 34 in.)	Y_{AVU} (given ϕ = 34 in.)
32475.14	32.48
60470.29	30.24
91215.86	30.41
124711.84	31.18
160958.25	32.19
199955.07	33.33
241702.30	34.53
286199.96	35.77
333448.02	37.05
383446.51	38.34

Y_{TU} (given ϕ = 35 in.)	Y_{AVU} (given ϕ = 35 in.)
34092.13	34.09
63390.15	31.70
95504.08	31.83
130433.92	32.61
168179.65	33.64
208741.29	34.79
252118.83	36.02
298312.28	37.29
347321.63	38.59
399146.88	39.91

Y_{TU} (given ϕ = 36 in.)	Y_{AVU} (given ϕ = 36 in.)
35742.34	35.74
66376.47	33.19
99891.98	33.30
136288.89	34.07
175567.18	35.11
217726.87	36.29
262767.94	37.54
310690.39	38.84
361494.25	40.17
415179.48	41.52

Y_{TU} (given ϕ = 37 in.)	T_{AVU} (given ϕ = 37 in.)
37425.78	37.43
69429.23	34.71
104379.55	34.79
142276.75	35.57
183120.83	36.62
226911.78	37.82
273649.60	39.09
323334.30	40.42
375965.88	41.77
431544.33	43.15

Y_{TU} (given ϕ = 38 in.)	T_{AVU} (given ϕ = 38 in.)
39142.43	39.14
72548.43	36.27
108966.79	36.32
148397.51	37.10
190840.59	38.17
236296.03	39.38
284763.83	40.68
336243.99	42.03
390736.52	43.42
448241.39	44.82

Y_{TU} (given ϕ = 39 in.)	T_{AVU} (given ϕ = 39 in.)
40892.32	40.89
75734.08	37.87
113653.70	37.88
154651.16	38.66
198726.47	39.75
245879.62	40.98
296110.63	42.30
349419.47	43.68
405806.17	45.09
465270.71	46.53

Continued

Y_{TU} (given ϕ = 40 in.)	Y_{AVU} (given Φ = 40 in.)
42675.43	42.68
78986.19	39.49
118440.28	39.48
161037.70	40.26
206778.47	41.36
255662.56	42.61
307689.99	43.96
362860.75	45.36
421174.84	46.80
482632.26	48.26

Y_{TU} (given ϕ = 41 in.)	Y_{AVU} (given Φ = 41 in.)
44491.76	44.49
82304.73	41.15
123326.53	41.11
167557.15	41.89
214996.58	43.00
265644.84	44.27
319501.91	45.64
376567.80	47.07
436842.51	48.54
499757.12	49.98

Y_{TU} (given ϕ = 42 in.)	Y_{AVU} (given Φ = 42 in.)
46341.31	46.34
85689.73	42.84
128312.45	42.77
174209.48	43.55
223380.82	44.68
275826.46	45.97
331546.40	47.36
390540.65	48.82
452809.21	50.31
515265.43	51.53

Y_{TU} (given ϕ = 43 in.)	Y_{AVU} (given Φ = 43 in.)
48224.09	48.22
89141.17	44.57
133398.05	44.47
180994.71	45.25
231931.17	46.39
286207.42	47.70
343823.46	49.12
404779.29	50.60
469074.91	52.12
531020.83	53.10

Y_{TU} (given ϕ = 44 in.)	Y_{AVU} (given Φ = 44 in.)
50140.09	50.14
92659.06	46.33
138583.31	46.19
187912.83	46.98
240647.64	48.13
296787.72	49.46
356333.08	50.90
419283.72	52.41
485639.63	53.96
547023.33	54.70

Y_{TU} (given ϕ = 45 in.)	Y_{AVU} (given Φ = 45 in.)
52089.32	52.09
96243.40	48.12
143868.25	47.96
194963.85	48.74
249530.23	49.91
307567.37	51.26
369075.26	52.73
434053.93	54.26
502503.36	55.83
563272.95	56.33

Table 22

TOTAL AND AVERAGE DRILLING COSTS FOR
UNCASED WELLS IN MEDIUM HARD ROCK
AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

Y_{TU} (given ϕ = 10 in.)	Y_{AVU} (given ϕ = 10 in.)
15238.24	15.24
20676.47	10.34
26114.71	8.70
31552.95	7.89
43754.93	8.75
57494.42	9.58
72771.41	10.40
89585.89	11.20
107937.88	11.99
127827.37	12.78

Y_{TU} (given ϕ = 11 in.)	Y_{AVU} (given ϕ = 11 in.)
15776.96	15.78
21753.91	10.88
27730.87	9.24
34509.38	8.63
47569.12	9.51
62251.77	10.38
78557.35	11.22
96485.83	12.06
116037.23	12.89
137211.56	13.72

Y_{TU} (given ϕ = 12 in.)	Y_{AVU} (given ϕ = 12 in.)
16343.18	16.34
22886.36	11.44
29429.54	9.81
37620.26	9.41
51576.35	10.32
67240.78	11.21
84613.55	12.09
103694.65	12.96
124484.08	13.83
146981.84	14.70

Y_{TU} (given ϕ = 13 in.)	Y_{AVU} (given ϕ = 13 in.)
16936.91	16.94
24073.82	12.04
31210.73	10.40
40885.57	10.22
55776.64	11.16
72461.46	12.08
90940.02	12.99
111212.34	13.90
133278.41	14.81
157138.22	15.71

Y_{TU} (given ϕ = 14 in.)	Y_{AVU} (given ϕ = 14 in.)
17558.15	17.56
25316.29	12.66
33074.44	11.02
44305.32	11.08
60169.97	12.03
77913.78	12.99
97536.76	13.93
119038.91	14.88
142420.22	15.82
167680.71	16.77

Y_{TU} (given ϕ = 15 in.)	Y_{AVU} (given ϕ = 15 in.)
18206.89	18.21
26613.78	13.31
35020.67	11.67
47879.51	11.97
64756.35	12.95
83597.77	13.93
104403.77	14.91
127174.36	15.90
151909.53	16.88
178609.28	17.86

Continued

Y_{TU} (given ϕ = 16 in.)	Y_{AVU} (given ϕ = 16 in.)
18883.14	18.88
27966.27	13.98
37049.41	12.35
51608.15	12.90
69535.78	13.91
89513.42	14.92
111541.05	15.93
135618.69	16.95
161746.33	17.97
189923.96	18.99

Y_{TU} (given ϕ = 17 in.)	Y_{AVU} (given ϕ = 17 in.)
19586.89	19.59
29373.78	14.69
39160.67	13.05
55491.22	13.87
74508.26	14.90
95660.73	15.94
118948.61	16.99
144371.90	18.05
171930.62	19.10
201624.74	20.16

Y_{TU} (given ϕ = 18 in.)	Y_{AVU} (given ϕ = 18 in.)
20318.15	20.32
30836.30	15.42
41604.50	13.87
59528.73	14.88
79673.79	15.93
102039.69	17.01
126626.42	18.09
153433.99	19.18
182462.39	20.27
213711.62	21.37

Y_{TU} (given ϕ = 19 in.)	Y_{AVU} (given ϕ = 19 in.)
21076.91	21.08
32353.83	16.18
44715.23	14.91
63720.68	15.93
85032.37	17.01
108650.31	18.11
134574.51	19.22
162804.95	20.35
193341.64	21.48
226184.59	22.62

Y_{TU} (given ϕ = 20 in.)	Y_{AVU} (given ϕ = 20 in.)
21863.18	21.86
33926.37	16.96
47941.80	15.98
68067.07	17.02
90584.00	18.12
115492.60	19.25
142792.87	20.40
172484.80	21.56
204568.40	22.73
239043.66	23.90

Y_{TU} (given ϕ = 21 in.)	Y_{AVU} (given ϕ = 21 in.)
22676.96	22.68
35553.92	17.78
51284.20	17.09
72567.90	18.14
96328.68	19.27
122566.54	20.43
151281.49	21.61
182473.52	22.81
216142.64	24.02
252288.84	25.23

Continued

Y_{TU} (given ϕ = 22 in.)	Y_{AVU} (given ϕ = 22 in.)
23518.24	23.52
37236.48	18.62
54742.42	18.25
77223.16	19.31
102266.40	20.45
129872.14	21.65
160040.39	22.86
192771.12	24.10
228064.37	25.34
265920.11	26.59

Y_{TU} (given ϕ = 23 in.)	Y_{AVU} (given ϕ = 23 in.)
24387.03	24.39
38974.06	19.49
58316.48	19.44
82032.87	20.51
108397.18	21.68
137409.40	22.90
169069.54	24.15
203377.61	25.42
240333.58	26.70
279937.48	27.99

Y_{TU} (given ϕ = 24 in.)	Y_{AVU} (given ϕ = 24 in.)
25283.32	25.28
40766.64	20.38
62006.36	20.67
86997.02	21.75
114721.00	22.94
145178.32	24.20
178368.98	25.48
214292.96	26.79
252950.29	28.11
294340.94	29.43

Y_{TU} (given ϕ = 25 in.)	Y_{AVU} (given ϕ = 25 in.)
26207.12	26.21
42614.24	21.31
65812.08	21.94
92115.60	23.03
121237.88	24.25
153178.90	25.53
187938.68	26.85
225517.21	28.19
265914.48	29.55
309130.50	30.91

Y_{TU} (given ϕ = 26 in.)	Y_{AVU} (given ϕ = 26 in.)
27158.42	27.16
44982.78	22.49
69733.62	23.24
97388.63	24.35
127947.80	25.59
161411.14	26.90
197778.65	28.25
237050.32	29.63
279226.16	31.03
324306.17	32.43

Y_{TU} (given ϕ = 27 in.)	Y_{AVU} (given ϕ = 27 in.)
28137.23	28.14
47715.48	23.86
73770.99	24.59
102816.09	25.70
134850.77	26.97
169875.04	28.31
207888.89	29.70
248892.32	31.11
292885.34	32.54
339867.93	33.99

Continued

Y_{TU} (given ϕ = 28 in.)	Y_{AVU} (given ϕ = 28 in.)
29143.55	29.14
50525.40	25.26
77924.20	25.97
108398.00	27.10
141946.80	28.39
178570.59	29.76
218269.40	31.18
261043.19	32.63
306892.00	34.10
355815.79	35.58

Y_{TU} (given ϕ = 29 in.)	Y_{AVU} (given ϕ = 29 in.)
30177.37	30.18
53412.54	26.71
82193.23	27.40
114134.34	28.53
149235.86	29.85
187497.81	31.25
228920.17	32.70
273502.95	34.19
321246.14	35.69
372149.74	37.21

Y_{TU} (given ϕ = 30 in.)	Y_{AVU} (given ϕ = 30 in.)
31238.70	31.24
56376.89	28.19
86578.09	28.86
120025.12	30.01
156717.99	31.34
196656.68	32.78
239841.21	34.26
286271.58	35.78
335947.78	37.33
388869.81	38.89

Y_{TU} (given ϕ = 31 in.)	Y_{AVU} (given ϕ = 31 in.)
32327.53	32.33
59418.47	29.71
91078.78	30.36
126070.34	31.52
164393.16	32.88
206047.22	34.34
251032.53	35.86
299349.09	37.42
350996.91	39.00
405975.96	40.60

Y_{TU} (given ϕ = 32 in.)	Y_{AVU} (given ϕ = 32 in.)
33443.87	33.44
62537.27	31.27
95695.30	31.90
132270.01	33.07
172261.38	34.45
215669.41	35.94
262494.11	37.50
312735.48	39.09
366393.51	40.71
423468.22	42.35

Y_{TU} (given ϕ = 33 in.)	Y_{AVU} (given ϕ = 33 in.)
34587.71	34.59
65733.29	32.87
100427.66	33.48
138624.11	34.66
180322.64	36.06
225523.26	37.59
274225.97	39.18
326430.75	40.80
382137.62	42.46
441346.58	44.13

Continued

Y_{TU} (given ϕ = 34 in.)	Y_{AVU} (given ϕ = 34 in.)
36324.71	36.32
69006.52	34.50
105275.84	35.09
145132.65	36.28
188576.96	37.72
235608.77	39.27
286228.09	40.89
340434.90	42.55
398229.21	44.25
459611.02	45.96

Y_{TU} (given ϕ = 35 in.)	Y_{AVU} (given ϕ = 35 in.)
38147.03	38.15
72356.98	36.18
110239.85	36.75
151795.63	37.95
197024.33	39.40
245925.94	40.99
298500.47	42.64
354747.93	44.34
414668.29	46.07
478261.57	47.83

Y_{TU} (given ϕ = 36 in.)	Y_{AVU} (given ϕ = 36 in.)
40007.96	40.01
75784.66	37.89
115319.69	38.44
158613.05	39.65
205664.74	41.13
256474.77	42.75
311043.13	44.43
369369.83	46.17
431454.86	47.94
497298.22	49.73

Y_{TU} (given ϕ = 37 in.)	T_{AVU} (given ϕ = 37 in.)
41907.50	41.91
79289.55	39.64
120515.36	40.17
165584.91	41.40
214498.21	42.90
267255.26	44.54
323856.07	46.27
384300.62	48.04
448588.92	49.84
516720.97	51.67

Y_{TU} (given ϕ = 38 in.)	T_{AVU} (given ϕ = 38 in.)
43845.65	43.85
82871.67	41.44
125826.85	41.94
172711.20	43.18
223524.72	44.70
278267.40	46.38
336939.26	48.13
399540.28	49.94
466070.45	51.79
536529.81	53.65

Y_{TU} (given ϕ = 39 in.)	T_{AVU} (given ϕ = 39 in.)
45822.41	45.82
86531.00	43.27
131254.18	43.75
179991.94	45.00
232744.29	46.55
289511.21	48.25
350292.73	50.04
415088.82	51.89
483899.49	53.77
556724.75	55.67

Continued

Y_{TU} (given ϕ = 40 in.)	Y_{AVU} (given ϕ = 40 in.)
47837.78	47.84
90267.56	45.13
136797.34	45.60
187427.12	46.86
242156.90	48.43
300986.68	50.16
363916.46	51.99
430946.24	53.87
502076.02	55.79
577305.79	57.73

Y_{TU} (given ϕ = 41 in.)	Y_{AVU} (given ϕ = 41 in.)
49891.76	49.89
94081.33	47.04
142456.33	47.49
195016.73	48.75
251762.56	50.35
312693.81	52.12
377810.46	53.97
447112.54	55.89
520600.03	57.84
597557.52	59.76

Y_{TU} (given ϕ = 42 in.)	Y_{AVU} (given ϕ = 42 in.)
51984.35	51.98
97972.33	48.99
148231.14	49.41
202760.79	50.69
261561.27	52.31
324632.59	54.11
391974.74	56.00
463587.72	57.95
539471.53	59.94
615742.31	61.57

Y_{TU} (given ϕ = 43 in.)	Y_{AVU} (given ϕ = 43 in.)
54115.55	54.12
101940.54	50.97
154121.79	51.37
210659.28	52.66
271553.03	54.31
336803.03	56.13
406409.28	58.06
480371.77	60.05
558690.52	62.08
634202.15	63.42

Y_{TU} (given ϕ = 44 in.)	Y_{AVU} (given ϕ = 44 in.)
56285.35	56.29
105985.98	52.99
160128.26	53.38
218712.22	54.68
281737.84	56.35
349205.13	58.20
421114.09	60.16
497464.70	62.18
578256.99	64.25
652937.05	65.29

Y_{TU} (given ϕ = 45 in.)	Y_{AVU} (given ϕ = 45 in.)
58493.77	58.49
110108.63	55.05
166250.57	55.42
226919.59	56.73
292115.70	58.42
361838.89	60.31
436089.16	62.30
514866.52	64.36
598170.95	66.46
671947.00	67.19

Table 23

TOTAL AND AVERAGE DRILLING COSTS FOR
UNCASED WELLS IN HARD ROCK
AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

Y_{TU} (given ϕ = 10 in.)	Y_{AVU} (given ϕ = 10 in.)
18603.05	18.60
27406.09	13.70
36209.14	12.07
45012.19	11.25
63535.71	12.71
84779.43	14.13
108743.34	15.53
135427.45	16.93
164831.74	18.31
196956.23	19.70

Y_{TU} (given ϕ = 11 in.)	Y_{AVU} (given ϕ = 11 in.)
19371.87	19.37
28943.74	14.47
38515.61	12.84
49213.62	12.30
69070.42	13.81
91798.52	15.30
117397.94	16.77
145868.67	18.23
177210.72	19.69
211424.08	21.14

Y_{TU} (given ϕ = 12 in.)	Y_{AVU} (given ϕ = 12 in.)
20173.79	20.17
30547.58	15.27
40921.37	13.64
53626.03	13.41
74868.83	14.97
99134.06	16.52
126421.73	18.06
156731.83	19.59
190064.37	21.12
226419.35	22.64

Y_{TU} (given ϕ = 13 in.)	Y_{AVU} (given ϕ = 13 in.)
21008.81	21.01
32217.61	16.11
43426.42	14.48
58249.40	14.56
80930.95	16.19
106786.05	17.80
135814.71	19.40
168016.93	21.00
203392.71	22.60
241942.04	24.19

Y_{TU} (given ϕ = 14 in.)	Y_{AVU} (given ϕ = 14 in.)
21876.92	21.88
33953.84	16.98
46030.76	15.34
63083.75	15.77
87256.78	17.45
114754.49	19.13
145576.89	20.80
179723.96	22.47
217195.72	24.13
257992.15	25.80

Y_{TU} (given ϕ = 15 in.)	Y_{AVU} (given ϕ = 15 in.)
2778.13	22.78
35756.26	17.88
48734.39	16.24
68129.06	17.03
93846.32	18.77
123039.39	20.51
155708.26	22.24
191852.93	23.98
231473.41	25.72
274569.68	27.46

Continued

Y_{TU} (given ϕ = 16 in.)	Y_{AVU} (given ϕ = 16 in.)
23712.43	23.71
37624.87	18.81
51537.30	17.18
73385.33	18.35
100699.57	20.14
131640.74	21.94
166208.82	23.74
204403.84	25.55
246225.77	27.36
291674.62	29.17

Y_{TU} (given ϕ = 17 in.)	Y_{AVU} (given ϕ = 17 in.)
24679.83	24.68
39559.67	19.78
54439.50	18.15
78852.58	19.71
107816.54	21.56
140558.54	23.43
177078.59	25.30
217376.68	27.17
261452.82	29.05
309307.00	30.93

Y_{TU} (given ϕ = 18 in.)	Y_{AVU} (given ϕ = 18 in.)
25680.33	25.68
41560.66	20.78
57793.55	19.26
84530.79	21.13
115197.21	23.04
149792.79	24.97
188317.54	26.90
230771.45	28.85
277154.53	30.79
327466.78	32.75

Y_{TU} (given ϕ = 19 in.)	Y_{AVU} (given ϕ = 19 in.)
26713.93	26.71
43627.85	21.81
62078.65	20.69
90419.98	22.60
122841.59	24.57
159343.50	26.56
199925.69	28.56
244588.17	30.57
293330.93	32.59
346153.99	34.62

Y_{TU} (given ϕ = 20 in.)	Y_{AVU} (given ϕ = 20 in.)
27780.61	27.78
45761.23	22.88
66521.98	22.17
96520.13	24.13
130749.68	26.15
169210.65	28.20
211903.03	30.27
258826.82	32.35
309982.02	34.44
365368.62	36.54

Y_{TU} (given ϕ = 21 in.)	Y_{AVU} (given ϕ = 21 in.)
28880.40	28.88
47960.80	23.98
71123.54	23.71
102831.25	25.71
138921.49	27.78
179394.26	29.90
224249.57	32.04
273487.41	34.19
327107.78	36.35
385110.67	38.51

Continued

Y_{TU} (given ϕ = 22 in.)	Y_{AVU} (given ϕ = 22 in.)
30013.28	30.01
50226.57	25.11
75883.32	25.29
109353.33	27.34
147357.00	29.47
189894.32	31.65
236965.30	33.85
288569.92	36.07
344708.21	38.30
405380.14	40.54

Y_{TU} (given ϕ = 23 in.)	Y_{AVU} (given ϕ = 23 in.)
31179.26	31.18
52558.52	26.28
80801.33	26.93
116086.39	29.02
156056.22	31.21
200710.83	33.45
250050.22	35.72
304074.39	38.01
362783.32	40.31
426177.04	42.62

Y_{TU} (given ϕ = 24 in.)	Y_{AVU} (given ϕ = 24 in.)
32378.34	32.38
54956.67	27.48
85877.56	28.63
123030.41	30.76
165019.16	33.00
211843.80	35.31
263504.34	37.64
320000.77	40.00
381333.11	42.37
447501.35	44.75

Y_{TU} (given ϕ = 25 in.)	Y_{AVU} (given ϕ = 25 in.)
33610.51	33.61
57421.01	28.71
91112.02	30.37
130185.40	32.55
174245.80	34.85
223293.22	37.22
277327.65	39.62
336349.11	42.04
400357.59	44.48
469353.08	46.94

Y_{TU} (given ϕ = 26 in.)	Y_{AVU} (given ϕ = 26 in.)
34875.77	34.88
60596.20	30.30
96504.71	32.17
137551.36	34.39
183736.15	36.75
235059.08	39.18
291520.16	41.65
353119.37	44.14
419856.73	46.65
491732.23	49.17

Y_{TU} (given ϕ = 27 in.)	Y_{AVU} (given ϕ = 27 in.)
36174.14	36.17
64272.22	32.14
102055.62	34.02
145128.29	36.28
193490.21	38.70
247141.41	41.19
306081.86	43.73
370311.58	46.29
439830.56	48.87
514638.80	51.46

Continued

Y_{TU} (given ϕ = 28 in.)	Y_{AVU} (given ϕ = 28 in.)
37505.60	37.51
68053.72	34.03
107764.76	35.92
152916.18	38.23
203507.99	40.70
259540.18	43.26
321012.75	45.86
387925.71	48.49
460279.06	51.14
538072.79	53.81

Y_{TU} (given ϕ = 29 in.)	Y_{AVU} (given ϕ = 29 in.)
38870.15	38.87
71940.71	35.97
113632.12	37.88
160915.04	40.23
213789.47	42.76
272255.40	45.38
336312.84	48.04
405961.79	50.75
481202.24	53.47
562034.20	56.20

Y_{TU} (given ϕ = 30 in.)	Y_{AVU} (given ϕ = 30 in.)
40267.80	40.27
75933.18	37.97
119657.71	39.89
169124.87	42.28
224334.66	44.87
285287.08	47.55
351982.13	50.28
424419.81	53.05
502600.11	55.84
586523.04	58.65

Y_{TU} (given ϕ = 31 in.)	Y_{AVU} (given ϕ = 31 in.)
41698.55	41.70
80031.14	40.02
125841.53	41.95
177545.67	44.39
235143.57	47.03
298635.22	49.77
368020.61	52.57
443299.75	55.41
524472.65	58.27
611539.28	61.15

Y_{TU} (given ϕ = 32 in.)	Y_{AVU} (given ϕ = 32 in.)
43162.39	43.16
84234.58	42.12
132183.57	44.06
186177.44	46.54
246216.18	49.24
312299.79	52.05
384428.28	54.92
462601.63	57.83
546819.85	60.76
637082.95	63.71

Y_{TU} (given ϕ = 33 in.)	Y_{AVU} (given ϕ = 33 in.)
44659.33	44.66
88543.50	44.27
138683.84	46.23
195020.18	48.76
257552.50	51.51
326280.83	54.38
401205.14	57.32
482325.45	60.29
569641.75	63.29
663154.05	66.32

Continued

Y_{TU} (given ϕ = 34 in.)	Y_{AVU} (given ϕ = 34 in.)
46920.60	46.92
92957.91	46.48
145342.34	48.45
204073.88	51.02
269152.54	53.83
340578.31	56.76
418351.19	59.76
502471.21	62.81
592938.33	65.88
689752.55	68.98

Y_{TU} (given ϕ = 35 in.)	Y_{AVU} (given ϕ = 35 in.)
49294.78	49.29
97477.80	48.74
152159.06	50.72
213338.55	53.33
281016.28	56.20
355192.25	59.20
435866.45	62.27
523038.90	65.38
616709.58	68.52
716878.48	71.69

Y_{TU} (given ϕ = 36 in.)	Y_{AVU} (given ϕ = 36 in.)
51721.71	51.72
102103.18	51.05
159134.00	53.04
222814.19	55.70
293143.73	58.63
370122.64	61.69
453750.90	64.82
544028.52	68.00
640955.51	71.22
744531.85	74.45

Y_{TU} (given ϕ = 37 in.)	T_{AVU} (given ϕ = 37 in.)
54201.38	54.20
106834.04	53.42
166267.18	55.42
232500.80	58.13
305534.90	61.11
385369.48	64.23
472004.55	67.43
565440.09	70.68
665676.12	73.96
772712.62	77.27

Y_{TU} (given ϕ = 38 in.)	T_{AVU} (given ϕ = 38 in.)
56733.79	56.73
111670.38	55.84
173558.58	57.85
242398.37	60.60
318189.77	63.64
400932.78	66.82
490627.37	70.09
587273.59	73.41
690871.39	76.76
801420.80	80.14

Y_{TU} (given ϕ = 39 in.)	T_{AVU} (given ϕ = 39 in.)
59318.94	59.32
116612.21	58.31
181008.20	60.34
252506.91	63.13
331108.35	66.22
416812.52	69.47
509619.41	72.80
609529.02	76.19
716541.36	79.62
830656.41	83.07

Continued

Y_{TU} (given ϕ = 40 in.)	Y_{AVU} (given Φ = 40 in.)
61956.84	61.96
121659.52	60.83
188616.05	62.87
262826.42	65.71
344290.65	68.86
433008.72	72.17
528980.63	75.57
632206.40	79.03
742686.00	82.52
860419.44	86.04

Y_{TU} (given ϕ = 41 in.)	Y_{AVU} (given Φ = 41 in.)
64647.48	64.65
126812.32	63.41
196382.13	65.46
273356.91	68.34
357736.65	71.55
449521.37	74.92
548711.05	78.39
655305.71	81.91
769305.32	85.48
889511.55	88.95

Y_{TU} (given ϕ = 42 in.)	Y_{AVU} (given Φ = 42 in.)
67390.85	67.39
132070.60	66.04
204306.43	68.10
284098.36	71.02
371446.38	74.29
466350.47	77.73
568810.66	81.26
678826.95	84.85
796399.33	88.49
915015.71	91.50

Y_{TU} (given ϕ = 43 in.)	Y_{AVU} (given Φ = 43 in.)
70186.98	70.19
137434.36	68.72
212388.96	70.80
295050.77	73.76
385419.79	77.08
483496.03	80.58
589279.48	84.18
702770.13	87.85
823968.00	91.55
940850.82	94.09

Y_{TU} (given ϕ = 44 in.)	Y_{AVU} (given Φ = 44 in.)
73035.84	73.04
142903.61	71.45
220629.72	73.54
306214.15	76.55
399656.92	79.93
500958.03	83.49
610117.47	87.16
727135.25	90.89
852011.36	94.67
967016.88	96.70

Y_{TU} (given ϕ = 45 in.)	Y_{AVU} (given Φ = 45 in.)
75937.44	75.94
148478.34	74.24
229028.70	76.34
317588.51	79.40
414157.77	82.83
518736.50	86.46
631324.66	90.19
751922.30	93.99
880529.38	97.84
993513.92	99.35

Table 24

TOTAL AND AVERAGE DRILLING COSTS FOR
UNCASED WELLS IN VERY HARD ROCK
AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

Y_{TU} (given ϕ = 10 in.)	Y_{AVU} (given ϕ = 10 in.)
21011.42	21.01
32222.84	16.11
43434.25	14.48
54645.67	13.66
77617.71	15.52
104126.01	17.35
134170.55	19.17
167751.34	20.97
204868.39	22.76
245521.68	24.55

Y_{TU} (given ϕ = 11 in.)	Y_{AVU} (given ϕ = 11 in.)
21957.21	21.96
34114.42	17.06
46271.63	15.42
59778.95	14.94
84430.56	16.89
112814.87	18.80
144931.90	20.70
180781.63	22.60
220364.07	24.48
263679.22	26.37

Y_{TU} (given ϕ = 12 in.)	Y_{AVU} (given ϕ = 12 in.)
22941.69	22.94
36083.38	18.04
49225.07	16.41
65169.13	16.29
91564.53	18.31
121889.10	20.31
156142.83	22.31
194325.73	24.29
236437.80	26.27
282479.04	28.25

Y_{TU} (given ϕ = 13 in.)	Y_{AVU} (given ϕ = 13 in.)
23964.86	23.96
38129.72	19.06
52294.57	17.43
70816.22	17.70
99019.64	19.80
131348.68	21.89
167803.35	23.97
208383.64	26.05
253089.56	28.12
301921.10	30.19

Y_{TU} (given ϕ = 14 in.)	Y_{AVU} (given ϕ = 14 in.)
25026.71	25.03
40253.42	20.13
55480.14	18.49
76720.21	19.18
106795.88	21.36
141193.62	23.53
179913.45	25.70
222955.36	27.87
270319.36	30.04
322005.44	32.20

Y_{TU} (given ϕ = 15 in.)	Y_{AVU} (given ϕ = 15 in.)
26127.25	26.13
42454.50	21.23
58781.76	19.59
82881.11	20.72
114893.24	22.98
151423.92	25.24
192473.13	27.50
238040.90	29.76
288127.19	32.01
342732.03	34.27

Continued

Y_{TU} (given ϕ = 16 in.)	Y_{AVU} (given ϕ = 16 in.)
27266.48	27.27
44732.96	22.37
62199.44	20.73
89298.92	22.32
123311.75	24.66
162039.58	27.01
205482.40	29.35
253640.23	31.71
306513.07	34.06
364100.89	36.41

Y_{TU} (given ϕ = 17 in.)	Y_{AVU} (given ϕ = 17 in.)
28444.39	28.44
47088.79	23.54
65733.18	21.91
95973.63	23.99
132051.38	26.41
173040.59	28.84
218941.26	31.28
269753.39	33.72
325476.97	36.16
386112.01	38.61

Y_{TU} (given ϕ = 18 in.)	Y_{AVU} (given ϕ = 18 in.)
29660.99	29.66
49521.99	24.76
69806.25	23.27
102905.24	25.73
141112.14	28.22
184426.96	30.74
232849.70	33.26
286380.34	35.80
345018.91	38.34
408765.40	40.88

Y_{TU} (given ϕ = 19 in.)	Y_{AVU} (given ϕ = 19 in.)
30916.28	30.92
52032.56	26.02
74997.86	25.00
110093.76	27.52
150494.03	30.10
196198.69	32.70
247207.71	35.32
303521.12	37.94
365138.89	40.57
432061.04	43.21

Y_{TU} (given ϕ = 20 in.)	Y_{AVU} (given ϕ = 20 in.)
32210.25	32.21
54620.51	27.31
80382.14	26.79
117539.18	29.38
160197.06	32.04
208355.77	34.73
262015.32	37.43
321175.70	40.15
385836.92	42.87
455998.95	45.60

Y_{TU} (given ϕ = 21 in.)	Y_{AVU} (given ϕ = 21 in.)
33542.91	33.54
57285.83	28.64
85959.10	28.65
125241.51	31.31
170221.22	34.04
220898.22	36.82
277272.51	39.61
339344.09	42.42
407112.97	45.23
480579.13	48.06

Continued

Y_{TU} (given ϕ = 22 in.)	Y_{AVU} (given ϕ = 22 in.)
34914.26	34.91
60028.52	30.01
91728.74	30.58
133200.74	33.30
180566.51	36.11
233826.02	38.97
292979.28	41.85
358026.29	44.75
428967.06	47.66
505801.56	50.58

Y_{TU} (given ϕ = 23 in.)	Y_{AVU} (given ϕ = 23 in.)
36324.30	36.32
62848.59	31.42
97691.05	32.56
141416.89	35.35
191232.93	38.25
247139.18	41.19
309135.64	44.16
377222.31	47.15
451399.18	50.16
531666.27	53.17

Y_{TU} (given ϕ = 24 in.)	Y_{AVU} (given ϕ = 24 in.)
37773.02	37.77
65746.03	32.87
103846.05	34.62
149889.93	37.47
202220.48	40.44
260837.69	43.47
325741.58	46.53
396932.13	49.62
474409.34	52.71
558173.23	55.82

Y_{TU} (given ϕ = 25 in.)	Y_{AVU} (given ϕ = 25 in.)
39260.42	39.26
68720.85	34.36
110193.72	36.73
158619.88	39.65
213529.16	42.71
274921.57	45.82
342797.10	48.97
417155.76	52.14
497997.54	55.33
585322.44	58.53

Y_{TU} (given ϕ = 26 in.)	Y_{AVU} (given ϕ = 26 in.)
40786.52	40.79
72541.00	36.27
116734.07	38.91
167606.73	41.90
225158.97	45.03
289390.80	48.23
360302.21	51.47
437893.20	54.74
522163.78	58.02
613113.93	61.31

Y_{TU} (given ϕ = 27 in.)	Y_{AVU} (given ϕ = 27 in.)
42351.30	42.35
76959.76	38.48
123467.11	41.16
176850.49	44.21
237109.92	47.42
304245.39	50.71
378256.90	54.04
459144.45	57.39
546908.06	60.77
641547.68	64.15

Continued

Y_{TU} (given ϕ = 28 in.)	Y_{AVU} (given ϕ = 28 in.)
43954.76	43.95
81506.98	40.75
130392.82	43.46
186351.16	46.59
249382.00	49.88
319485.34	53.25
396661.17	56.67
480909.51	60.11
572230.36	63.58
670623.69	67.06

Y_{TU} (given ϕ = 29 in.)	Y_{AVU} (given ϕ = 29 in.)
45596.92	45.60
86182.65	43.09
137511.21	45.84
196108.72	49.03
261975.20	52.40
335110.64	55.85
415515.03	59.36
503188.39	62.90
598130.70	66.46
700341.96	70.03

Y_{TU} (given ϕ = 30 in.)	Y_{AVU} (given ϕ = 30 in.)
47277.76	47.28
90986.77	45.49
144822.28	48.27
206123.20	51.53
274889.55	54.98
351121.30	58.52
434818.48	62.12
525981.08	65.75
624609.09	69.40
730702.51	73.07

Y_{TU} (given ϕ = 31 in.)	Y_{AVU} (given ϕ = 31 in.)
48997.29	49.00
95919.34	47.96
152326.03	50.78
216394.58	54.10
288125.02	57.63
367517.33	61.25
454571.51	64.94
549287.57	68.66
651665.51	72.41
761705.31	76.17

Y_{TU} (given ϕ = 32 in.)	Y_{AVU} (given ϕ = 32 in.)
50755.50	50.76
100980.37	50.49
160022.45	53.34
226922.87	56.73
301681.62	60.34
384298.70	64.05
474774.12	67.82
573107.87	71.64
679299.95	75.48
793350.37	79.34

Y_{TU} (given ϕ = 33 in.)	Y_{AVU} (given ϕ = 33 in.)
52552.40	52.55
106169.85	53.08
167911.56	55.97
237708.06	59.43
315559.35	63.11
401465.44	66.91
495426.31	70.78
597441.98	74.68
707512.44	78.61
825637.70	82.56

Continued

Y_{TU} (given ϕ = 34 in.)	Y_{AVU} (given ϕ = 34 in.)
55233.46	55.23
111487.78	55.74
175993.34	58.66
248750.15	62.19
329758.22	65.95
419017.53	69.84
516528.08	73.79
622289.91	77.79
736302.97	81.81
858567.28	85.86

Y_{TU} (given ϕ = 35 in.)	Y_{AVU} (given ϕ = 35 in.)
58048.23	58.05
116934.16	58.47
184267.80	61.42
260049.15	65.01
344278.21	68.86
436954.98	72.83
538079.45	76.87
647651.64	80.96
765671.54	85.07
892139.13	89.21

Y_{TU} (given ϕ = 36 in.)	Y_{AVU} (given ϕ = 36 in.)
60927.21	60.93
122508.99	61.25
192734.94	64.24
271605.06	67.90
359119.34	71.82
455277.79	75.88
560080.41	80.01
673527.18	84.19
795618.15	88.40
926353.25	92.64

Y_{TU} (given ϕ = 37 in.)	T_{AVU} (given ϕ = 37 in.)
63870.43	63.87
128212.28	64.11
201394.77	67.13
283417.87	70.85
374281.60	74.86
473985.96	79.00
582530.94	83.22
699916.54	87.49
826142.77	91.79
961209.62	96.12

Y_{TU} (given ϕ = 38 in.)	T_{AVU} (given ϕ = 38 in.)
66877.87	66.88
134044.02	67.02
210247.26	70.08
295487.59	73.87
389764.99	77.95
493079.47	82.18
605431.05	86.49
726819.71	90.85
857245.44	95.25
996708.25	99.67

Y_{TU} (given ϕ = 39 in.)	T_{AVU} (given ϕ = 39 in.)
69949.54	69.95
140004.22	70.00
219292.44	73.10
307814.20	76.95
405569.51	81.11
512558.36	85.43
628780.75	89.83
754236.67	94.28
888926.15	98.77
1032849.20	103.28

Continued

Y_{TU} (given ϕ = 40 in.)	Y_{AVU} (given ϕ = 40 in.)
73085.43	73.09
146092.86	73.05
228530.30	76.18
320397.73	80.10
421695.16	84.34
532422.59	88.74
652580.03	93.23
782167.46	97.77
921184.90	102.35
1069632.30	106.96

Y_{TU} (given ϕ = 41 in.)	Y_{AVU} (given ϕ = 41 in.)
76285.55	76.29
152309.96	76.15
237960.83	79.32
333238.16	83.31
438141.95	87.63
552672.19	92.11
676828.90	96.69
810612.06	101.33
954021.68	106.00
1105526.20	110.55

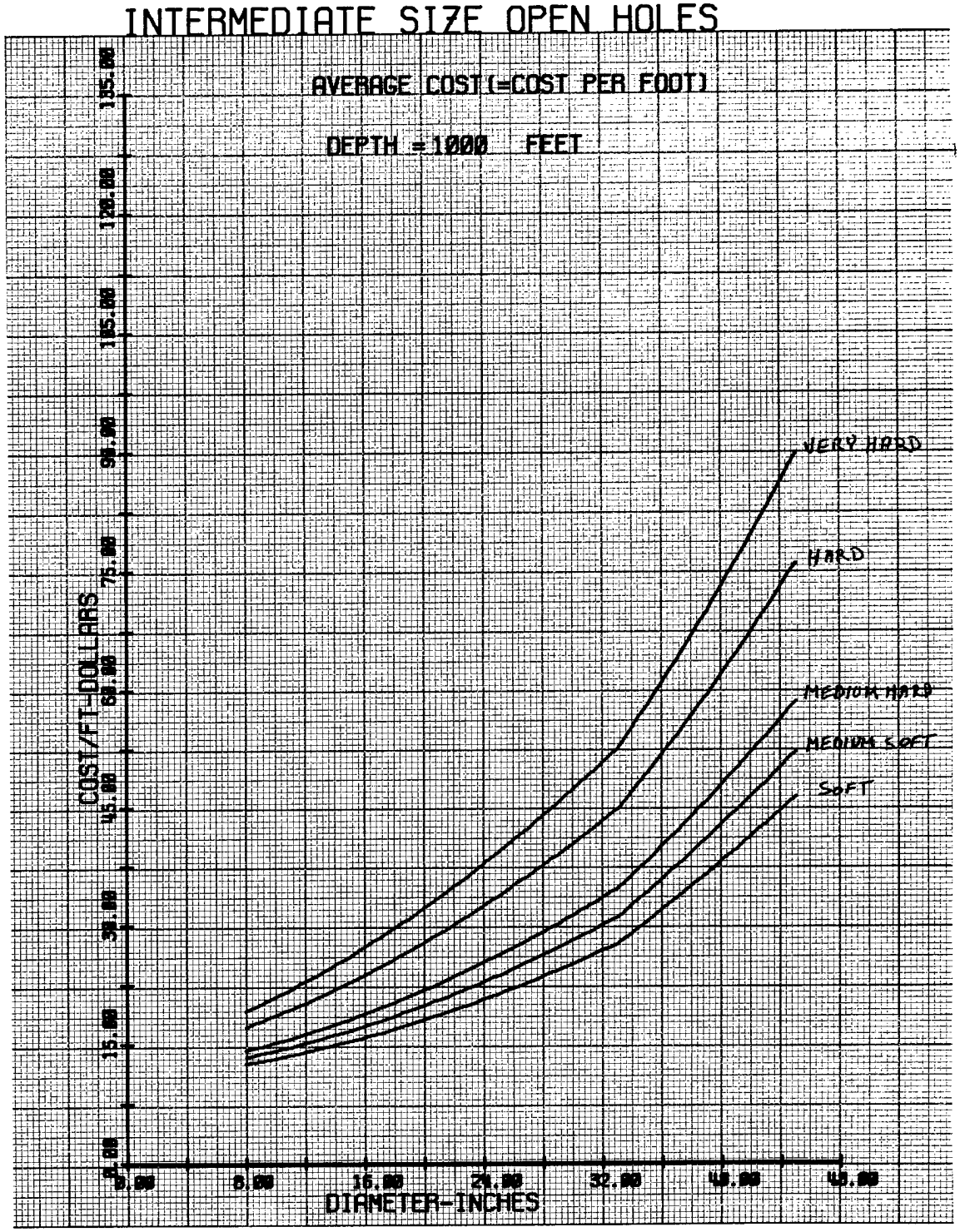
Y_{TU} (given ϕ = 42 in.)	Y_{AVU} (given ϕ = 42 in.)
79549.90	79.55
158655.52	79.33
247584.05	82.53
346335.50	86.58
454909.87	90.98
573307.15	95.55
701527.34	100.22
839570.46	104.95
987436.50	109.72
1136799.90	113.68

Y_{TU} (given ϕ = 43 in.)	Y_{AVU} (given ϕ = 43 in.)
82878.47	82.88
165129.52	82.56
257399.94	85.80
359689.74	89.92
471998.91	94.40
594327.46	99.05
726675.37	103.81
869042.68	108.63
1021429.40	113.49
1168460.50	116.85

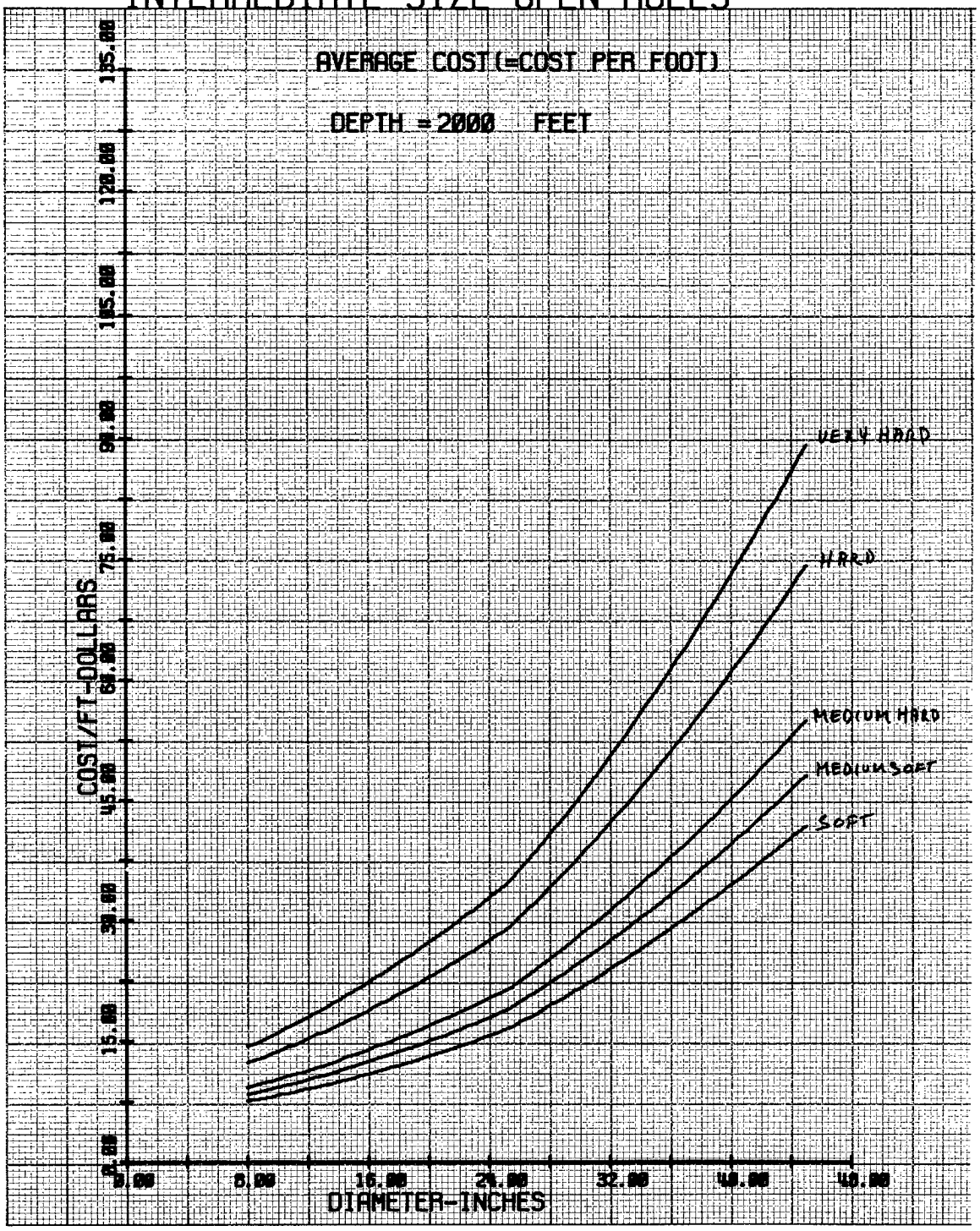
Y_{TU} (given ϕ = 44 in.)	Y_{AVU} (given ϕ = 44 in.)
86271.27	86.27
171731.97	85.87
267408.51	89.14
373300.88	93.33
489409.09	97.88
615733.12	102.62
752273.00	107.47
899028.69	112.38
1056000.20	117.33
1200508.00	120.05

Y_{TU} (given ϕ = 45 in.)	Y_{AVU} (given ϕ = 45 in.)
89728.30	89.73
178462.88	89.23
277609.77	92.54
387168.94	96.79
507140.40	101.43
637524.16	106.25
778320.20	111.19
929528.54	116.19
1091149.20	121.24
1232942.30	123.29

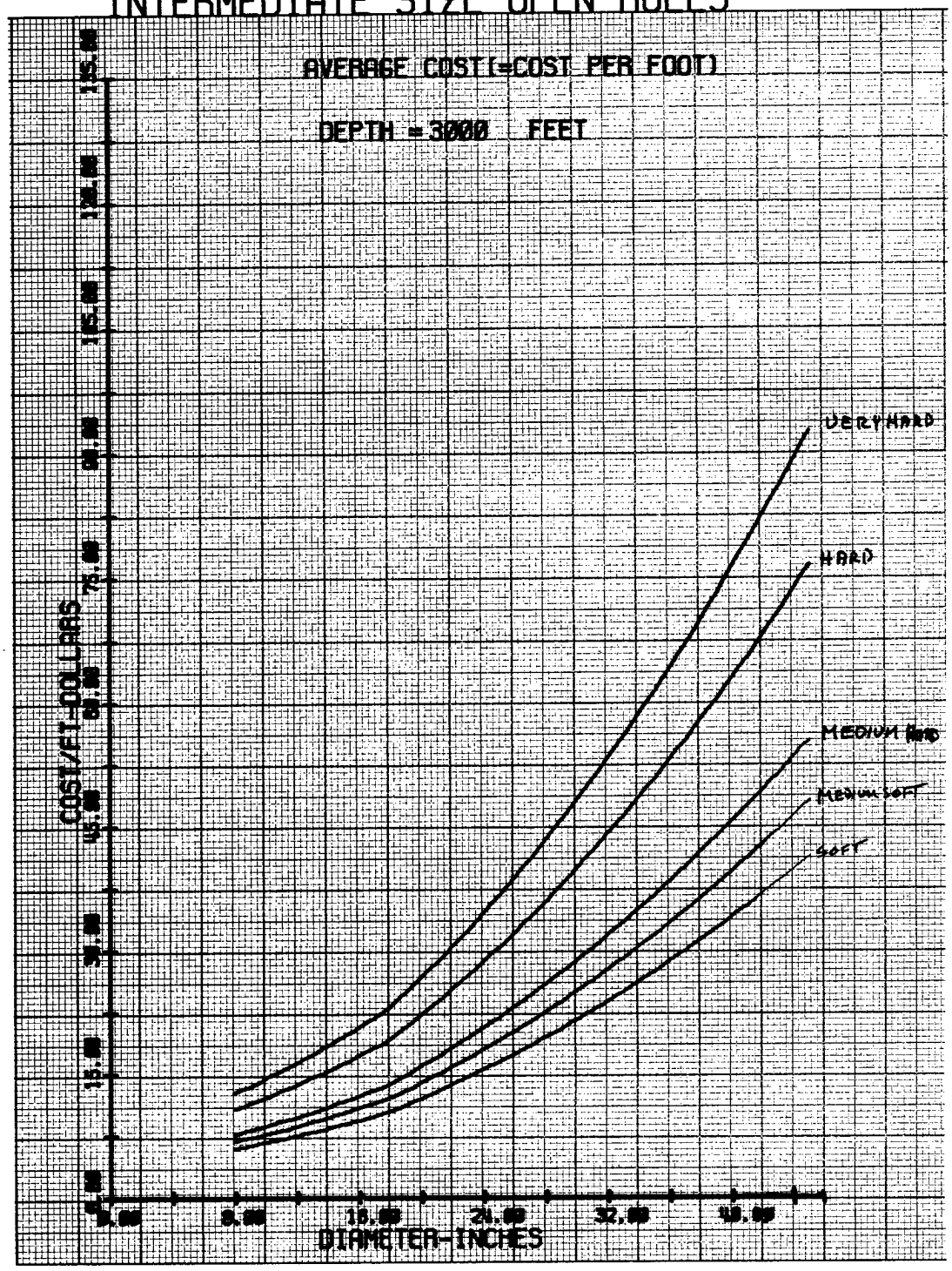
INTERMEDIATE SIZE OPEN HOLE COST AS A FUNCTION OF THE HOLE DIAMETER FOR 1,000 to 10,000 FEET DEPTH


INTERMEDIATE SIZE OPEN HOLES
AVERAGE COST (=COST PER FOOT)
DEPTH = 1000 FEET
COST/FT-DOLLARS
DIAMETER-INCHES
VERY HARD
HARD
MEDIUM HARD
MEDIUM SOFT
SOFT

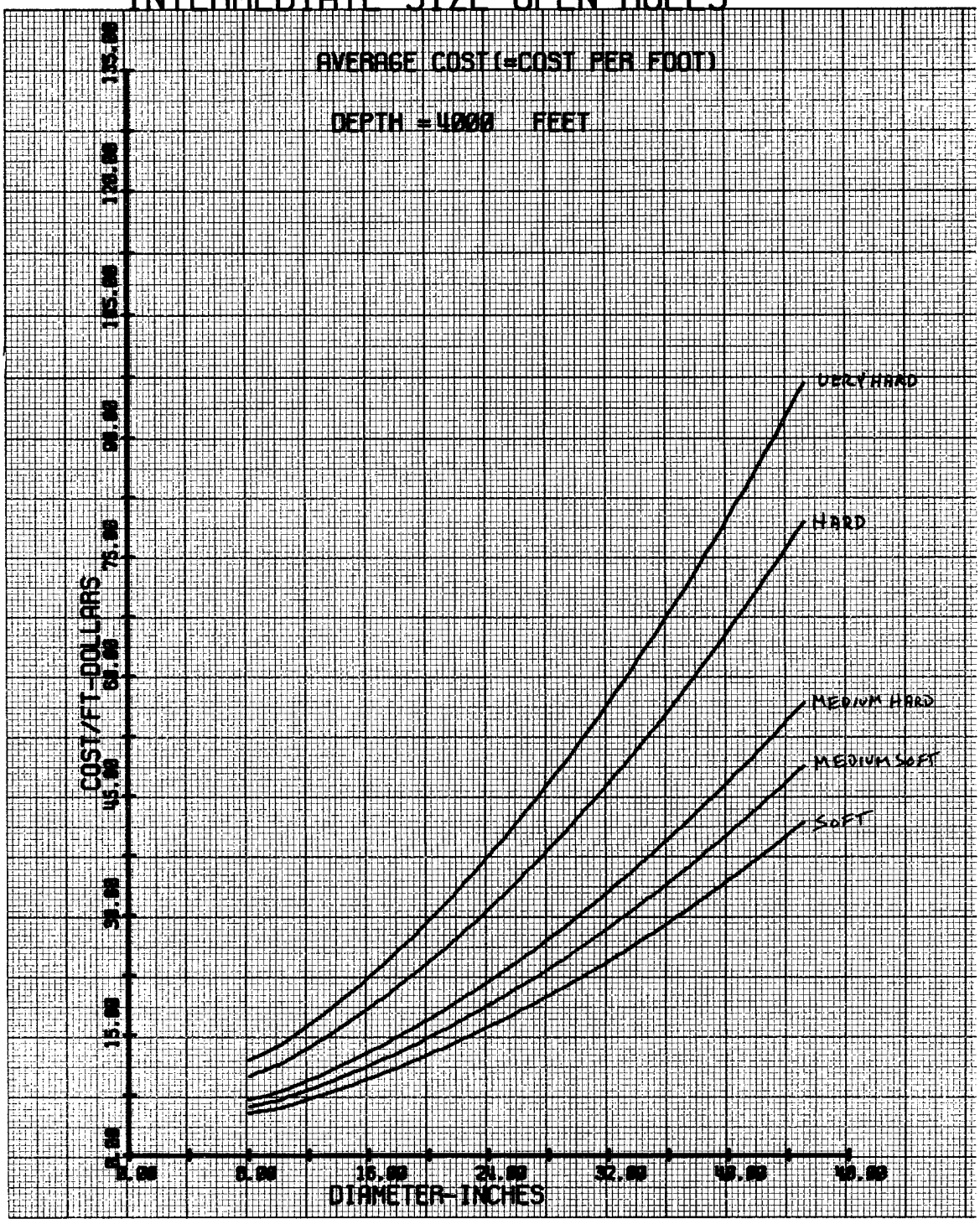
INTERMEDIATE SIZE OPEN HOLES



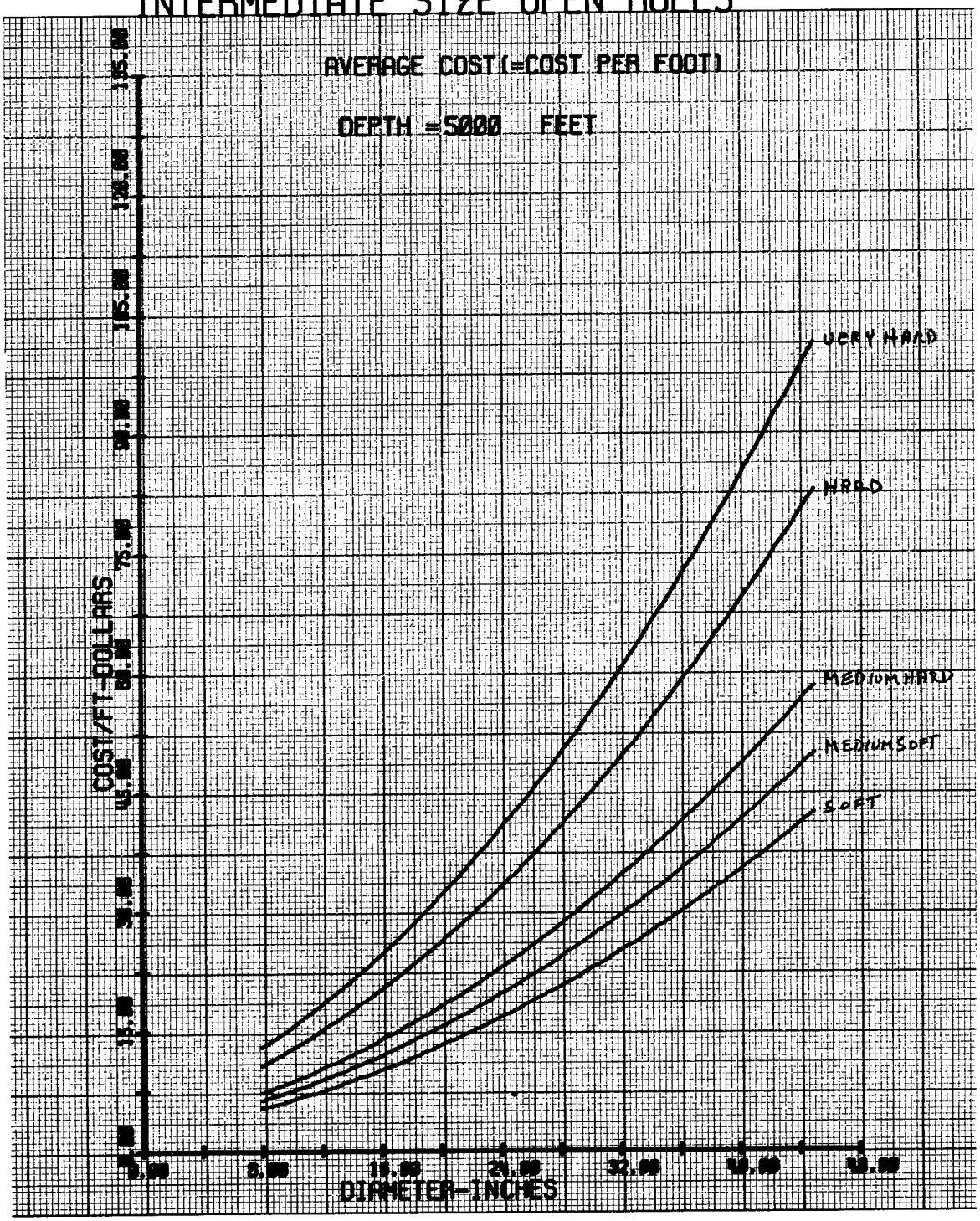
INTERMEDIATE SIZE OPEN HOLES



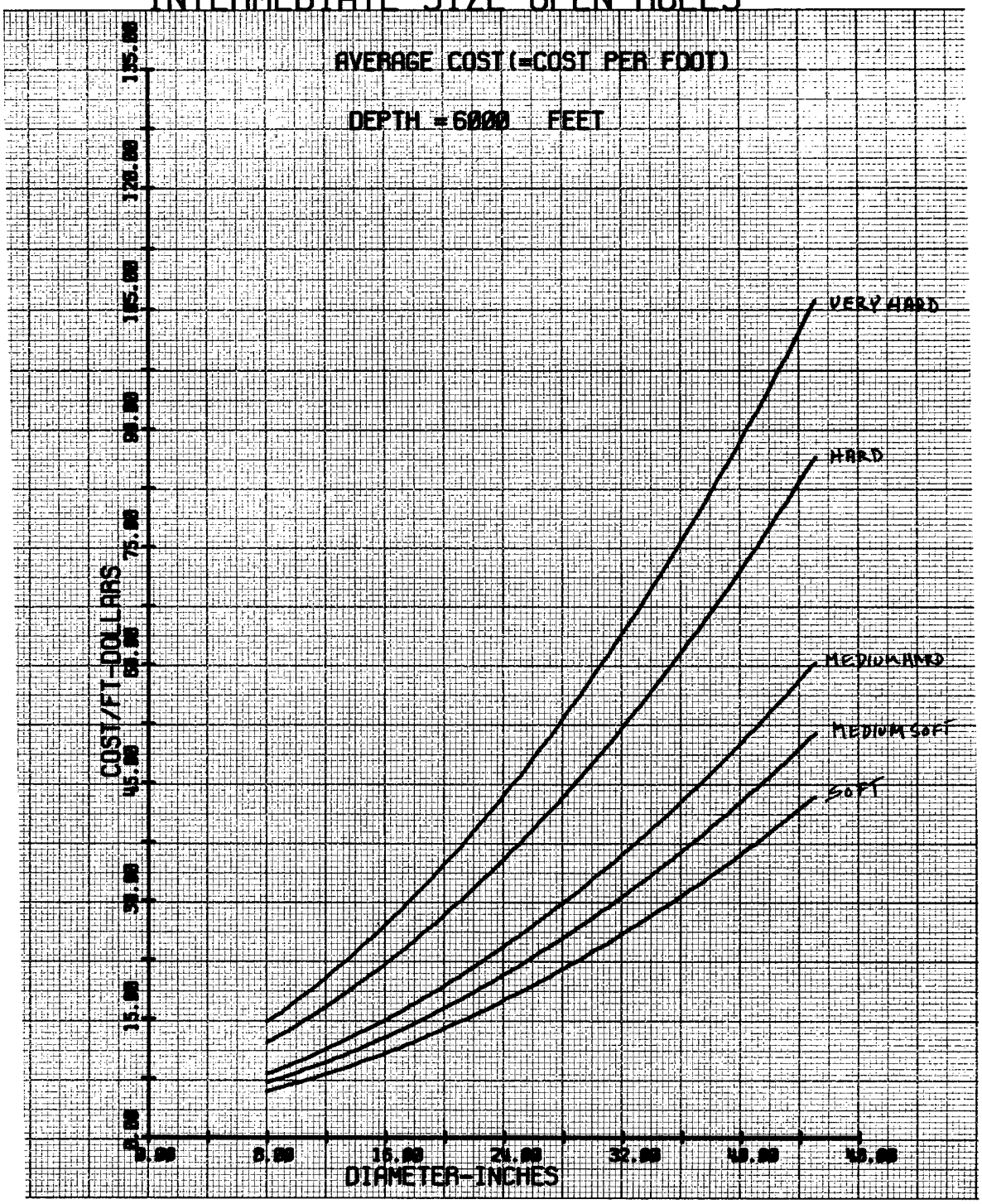
INTERMEDIATE SIZE OPEN HOLES

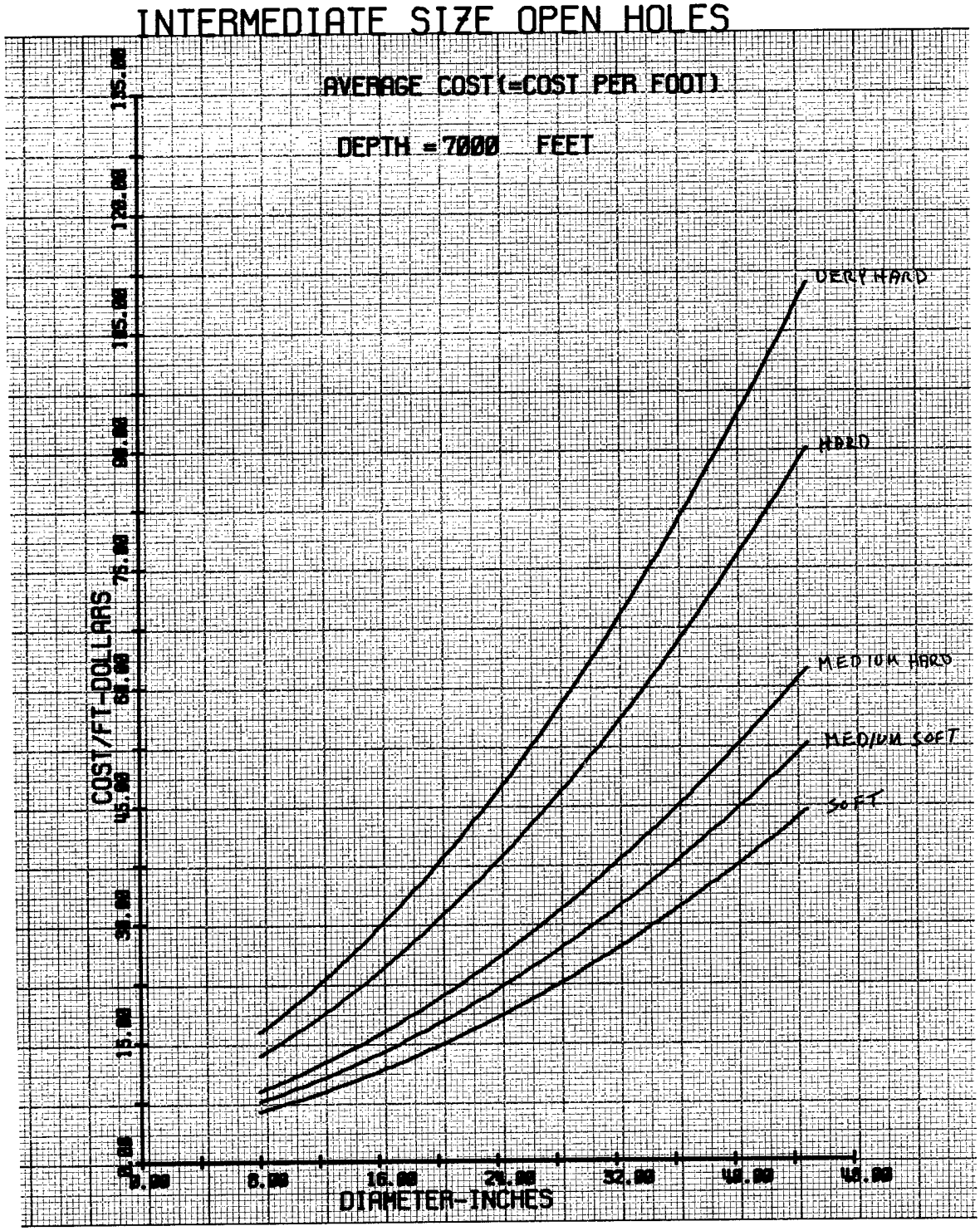


INTERMEDIATE SIZE OPEN HOLES

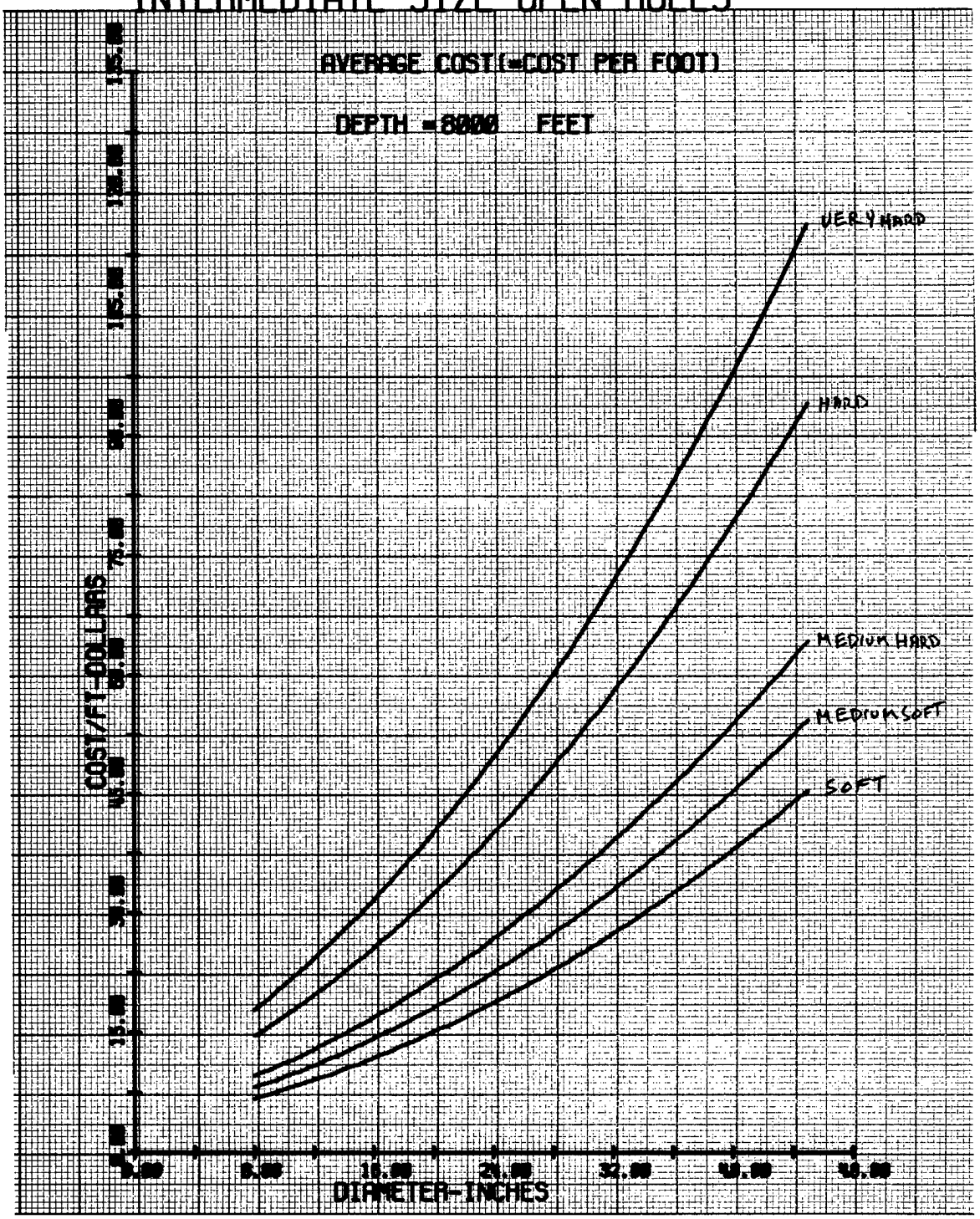


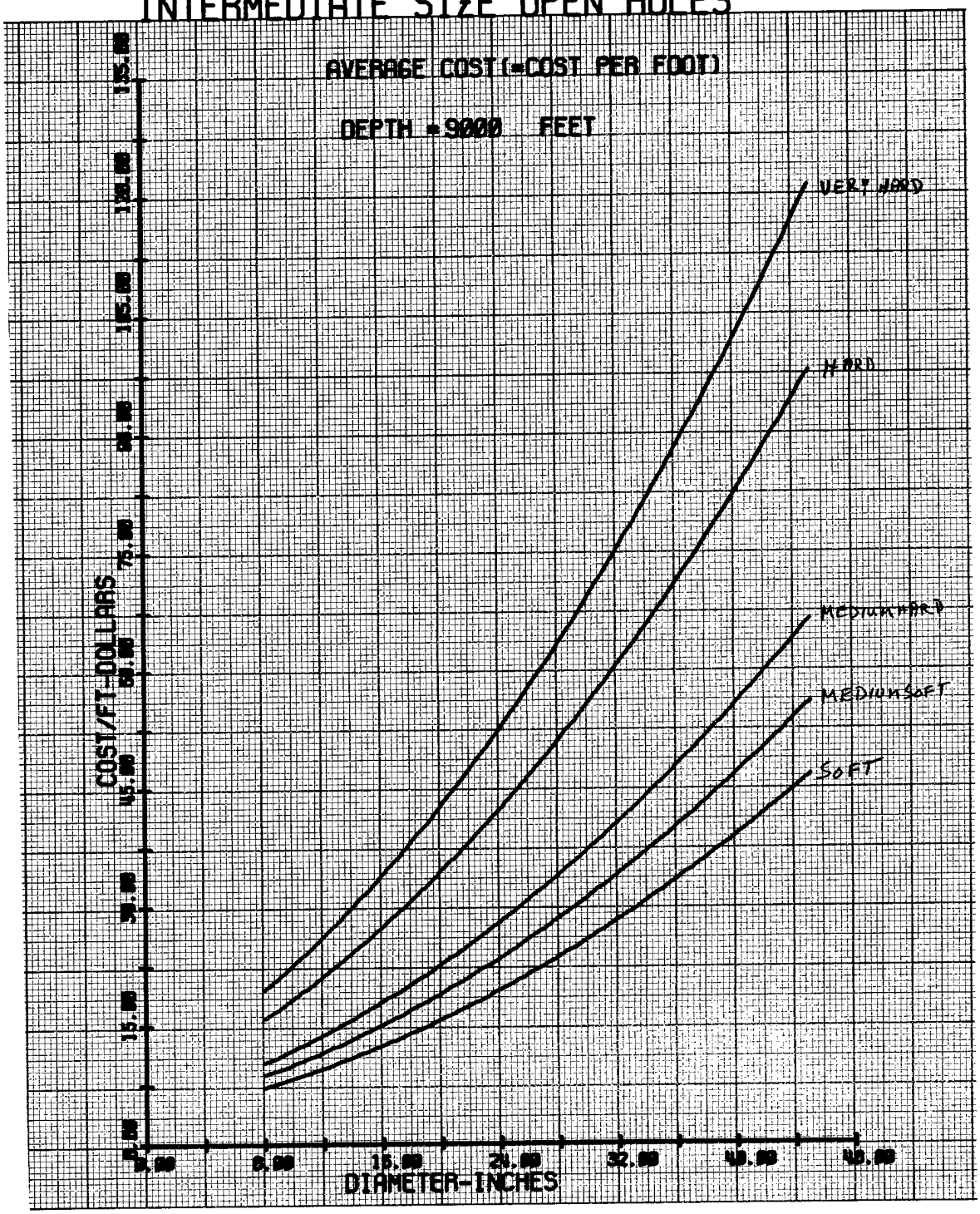
INTERMEDIATE SIZE OPEN HOLES



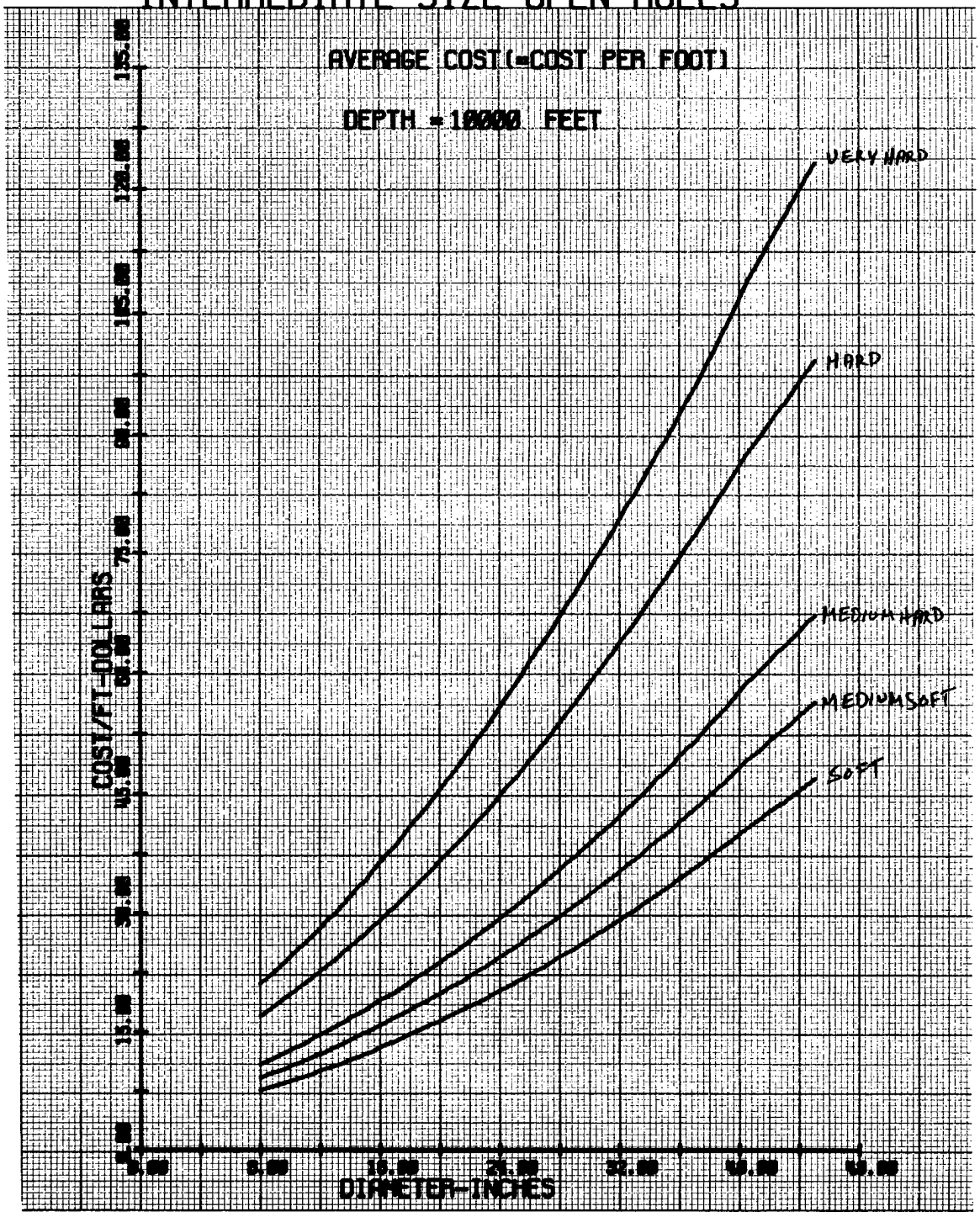

INTERMEDIATE SIZE OPEN HOLES
AVERAGE COST(=COST PER FOOT)
DEPTH = 7000 FEET
VERY HARD
HARD
MEDIUM HARD
MEDIUM SOFT
SOFT
COST/FT-DOLLARS
DIAMETER-INCHES

INTERMEDIATE SIZE OPEN HOLES




INTERMEDIATE SIZE OPEN HOLES
AVERAGE COST (=COST PER FOOT)
DEPTH = 9000 FEET
VERY HARD
HARD
MEDIUM HARD
MEDIUM SOFT
SOFT
COST/FT-DOLLARS
DIAMETER-INCHES

INTERMEDIATE SIZE OPEN HOLES

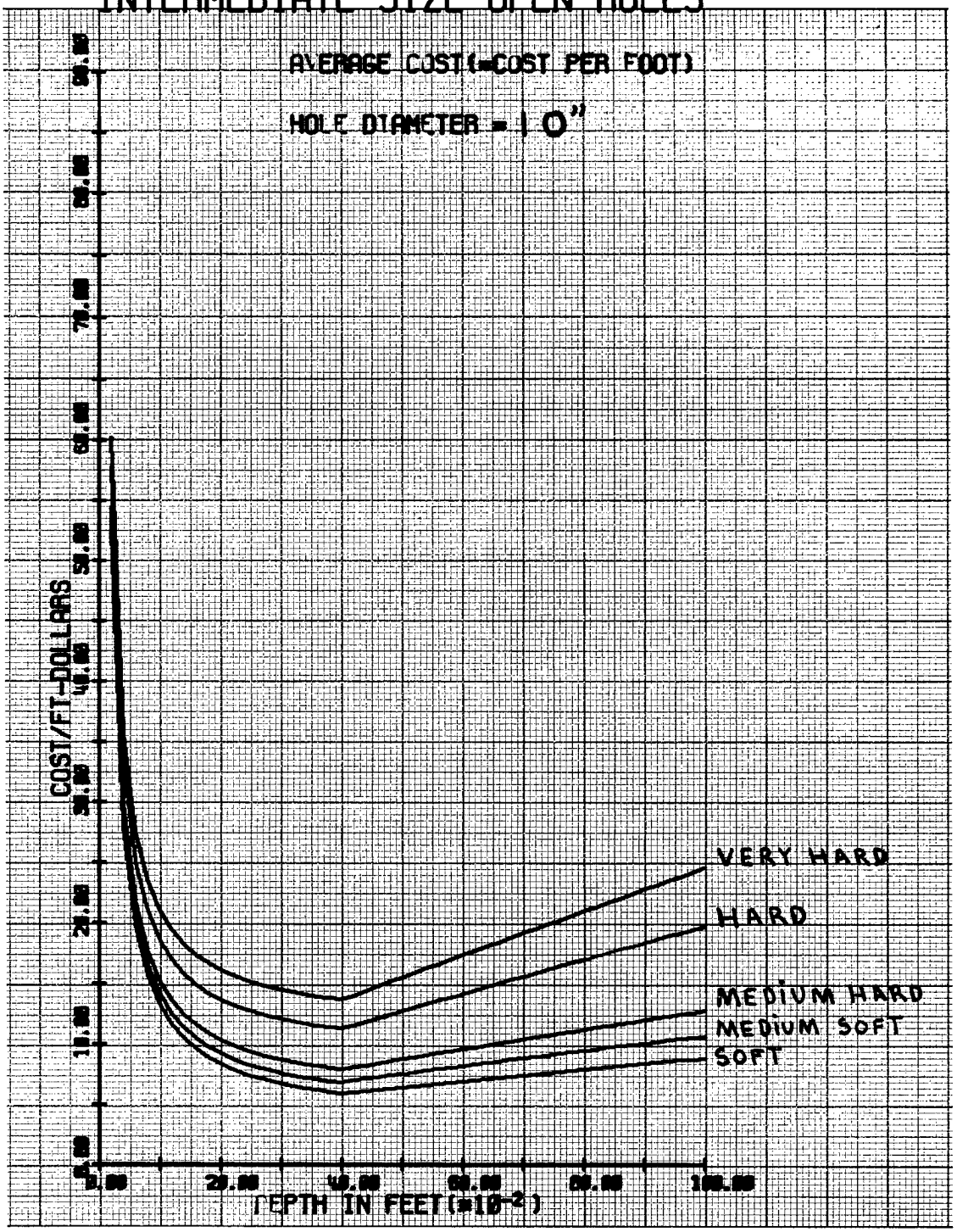


INTERMEDIATE SIZE OPEN HOLE COST

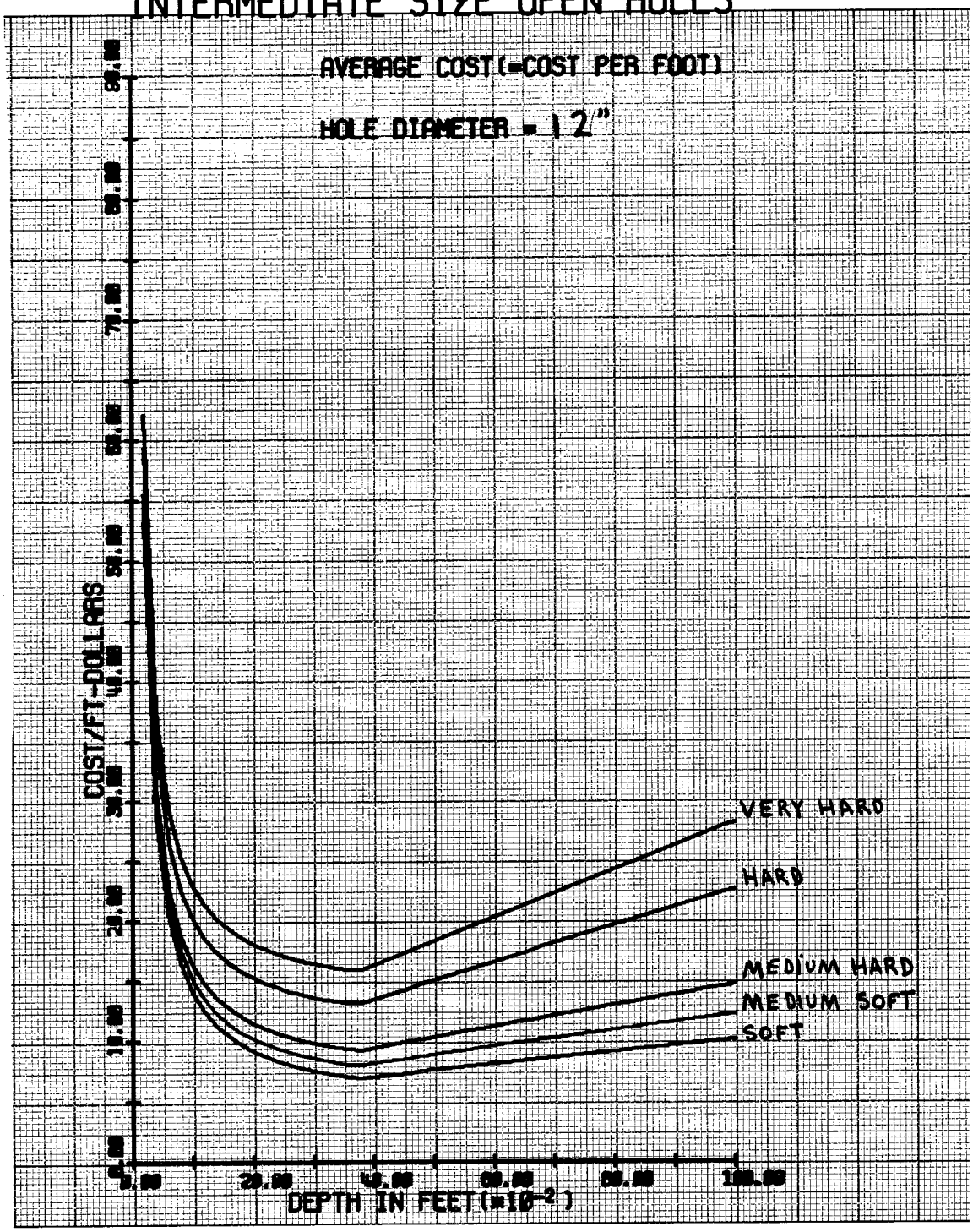
AS A FUNCTION OF DEPTH FOR

10 INCHES TO 30 INCHES DIAMETERS

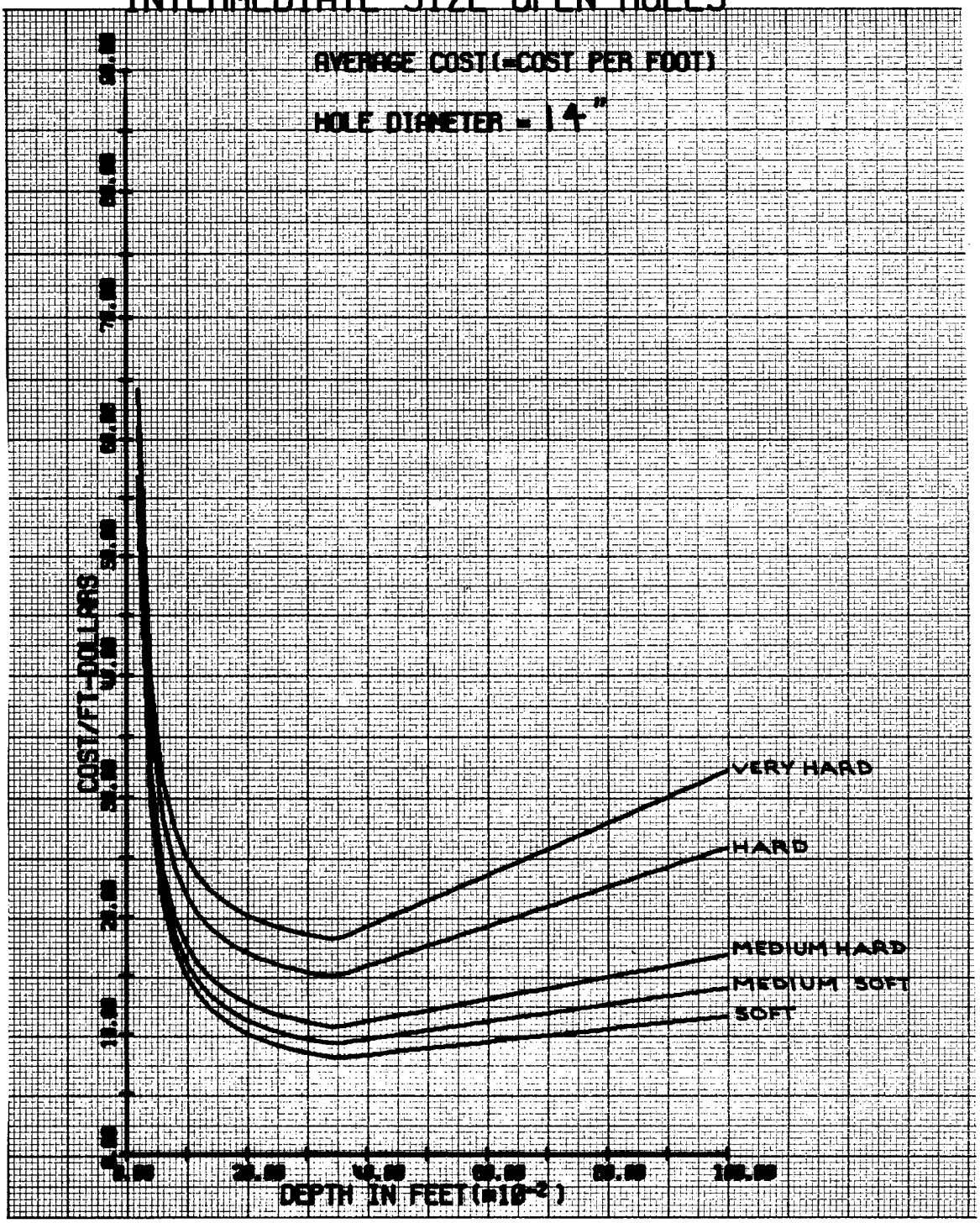
INTERMEDIATE SIZE OPEN HOLES



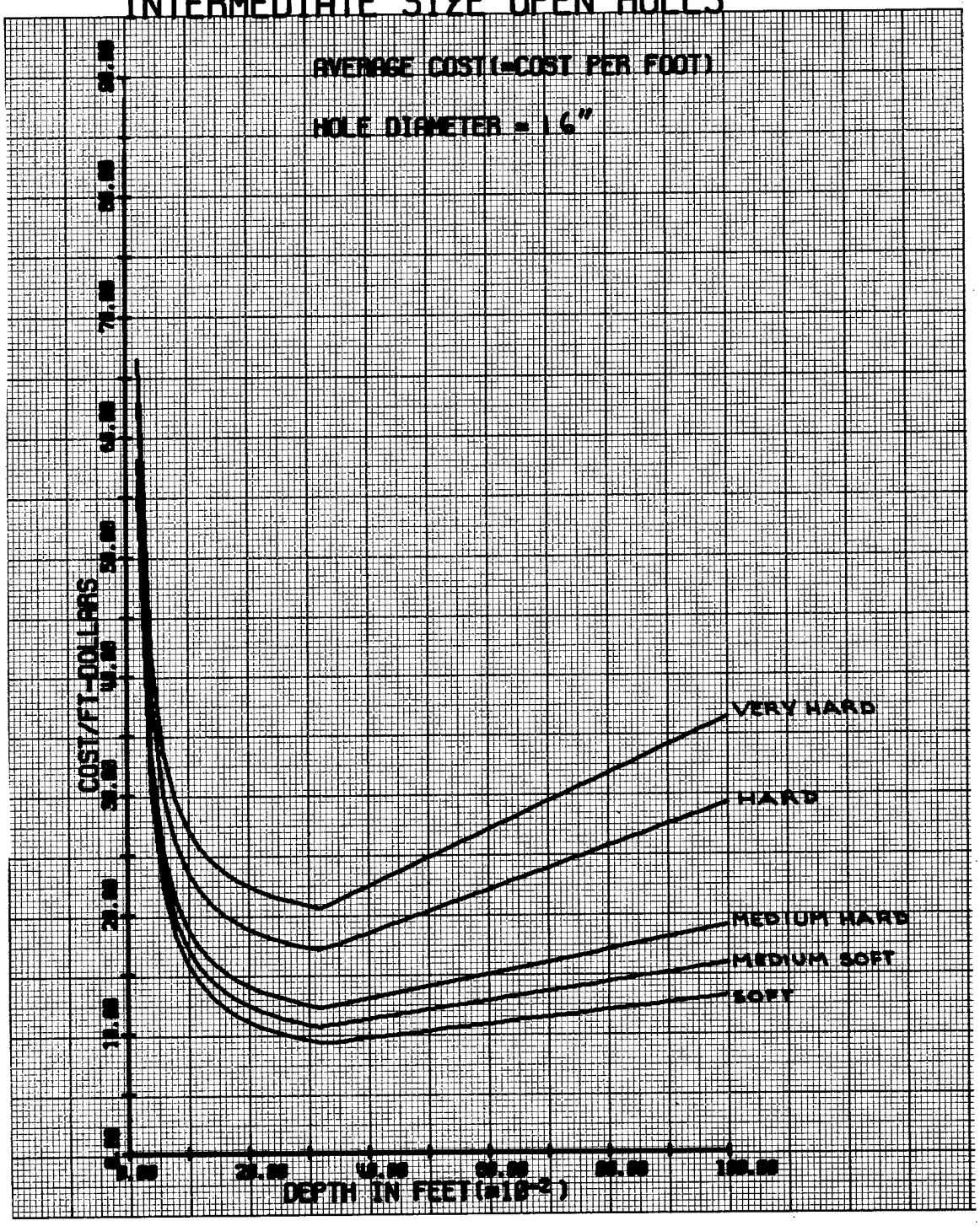
INTERMEDIATE SIZE OPEN HOLES



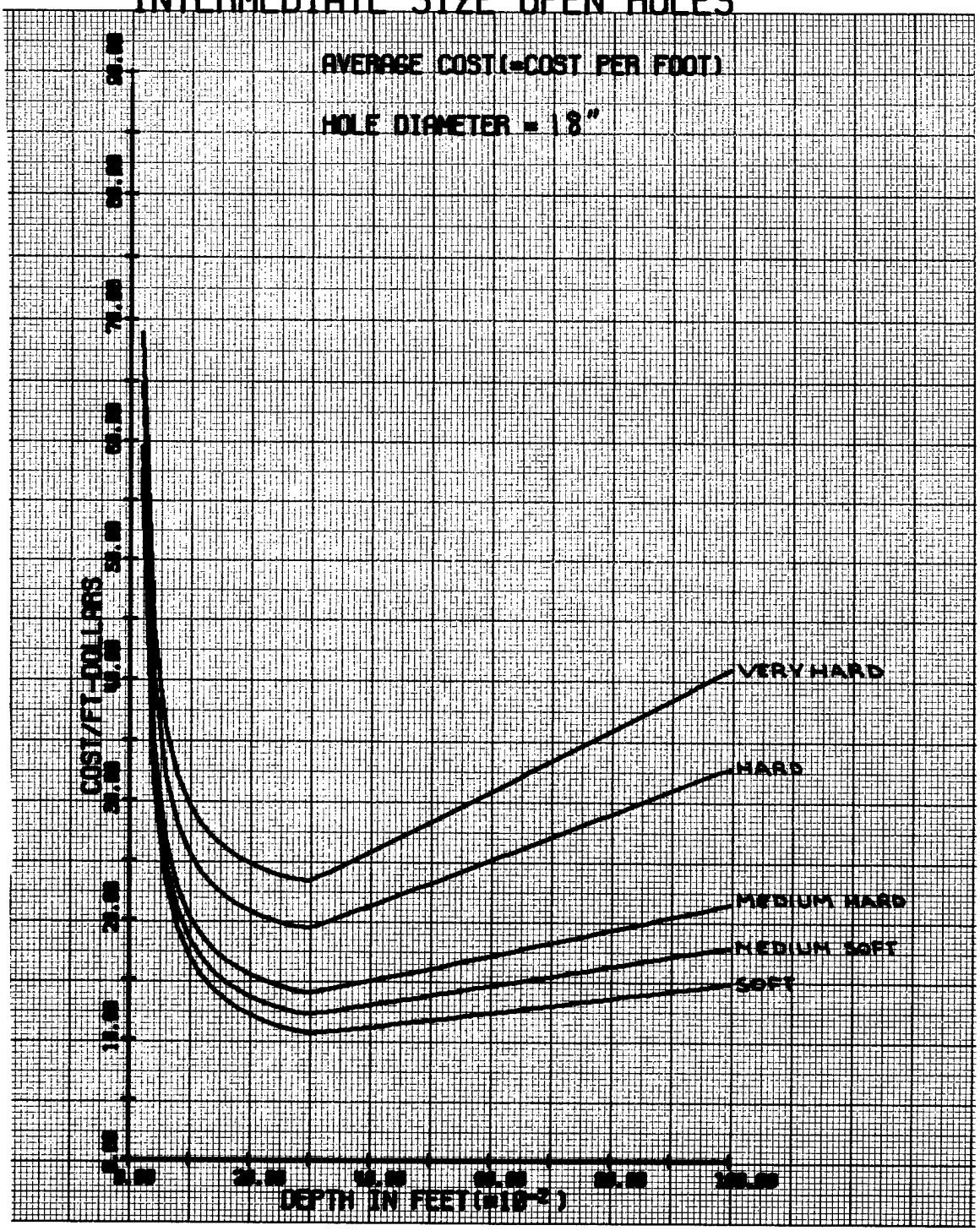
INTERMEDIATE SIZE OPEN HOLES



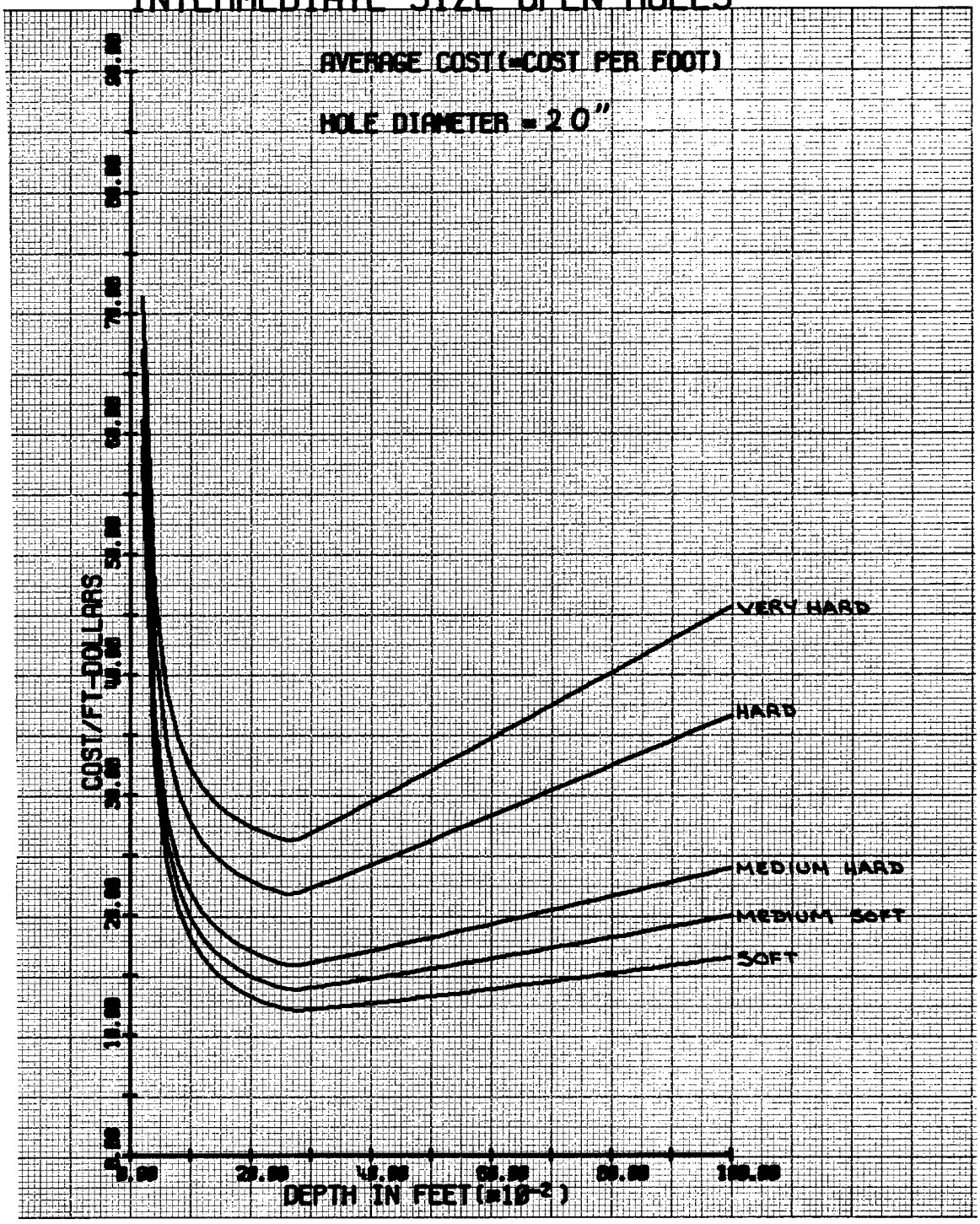
INTERMEDIATE SIZE OPEN HOLES



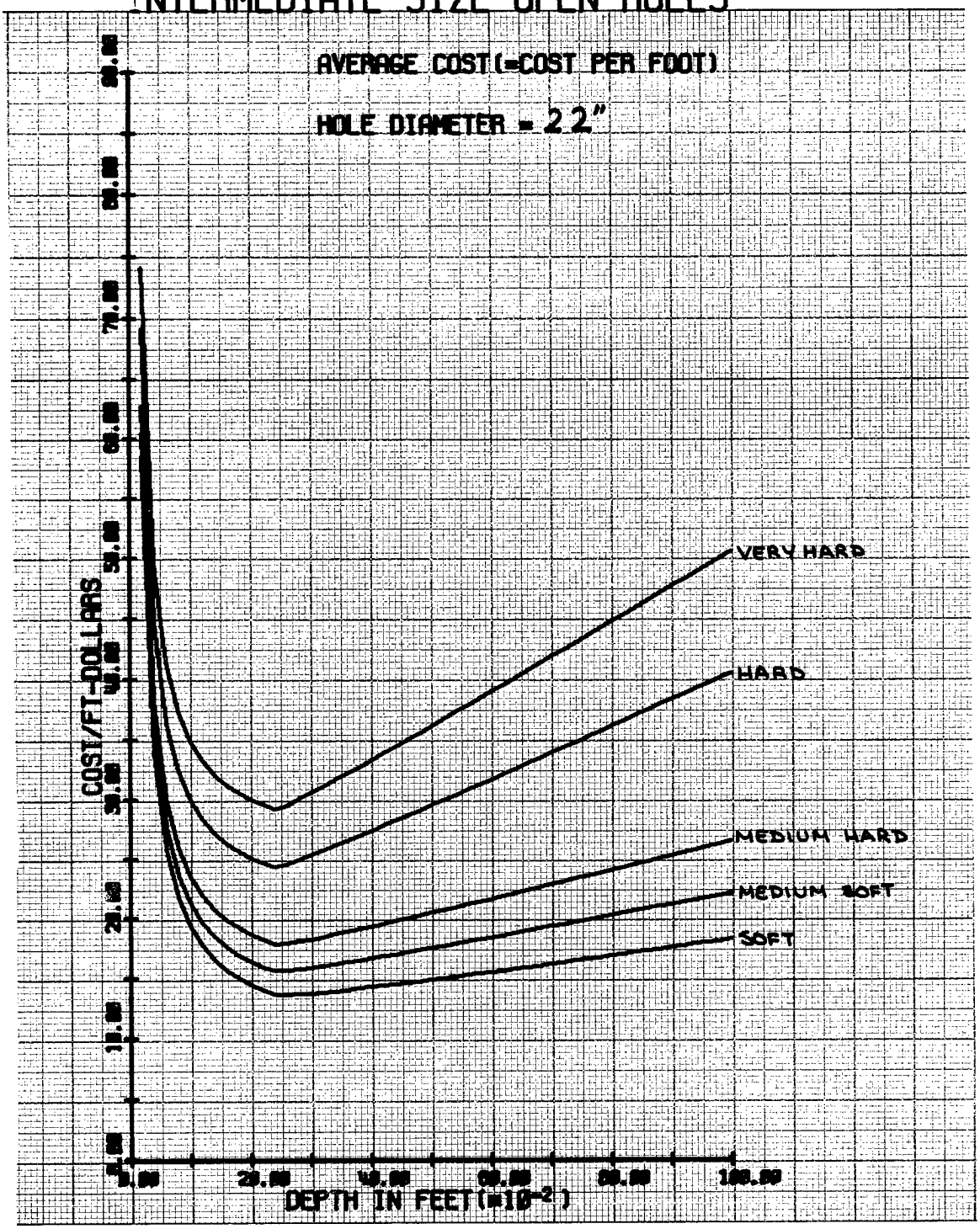
INTERMEDIATE SIZE OPEN HOLES



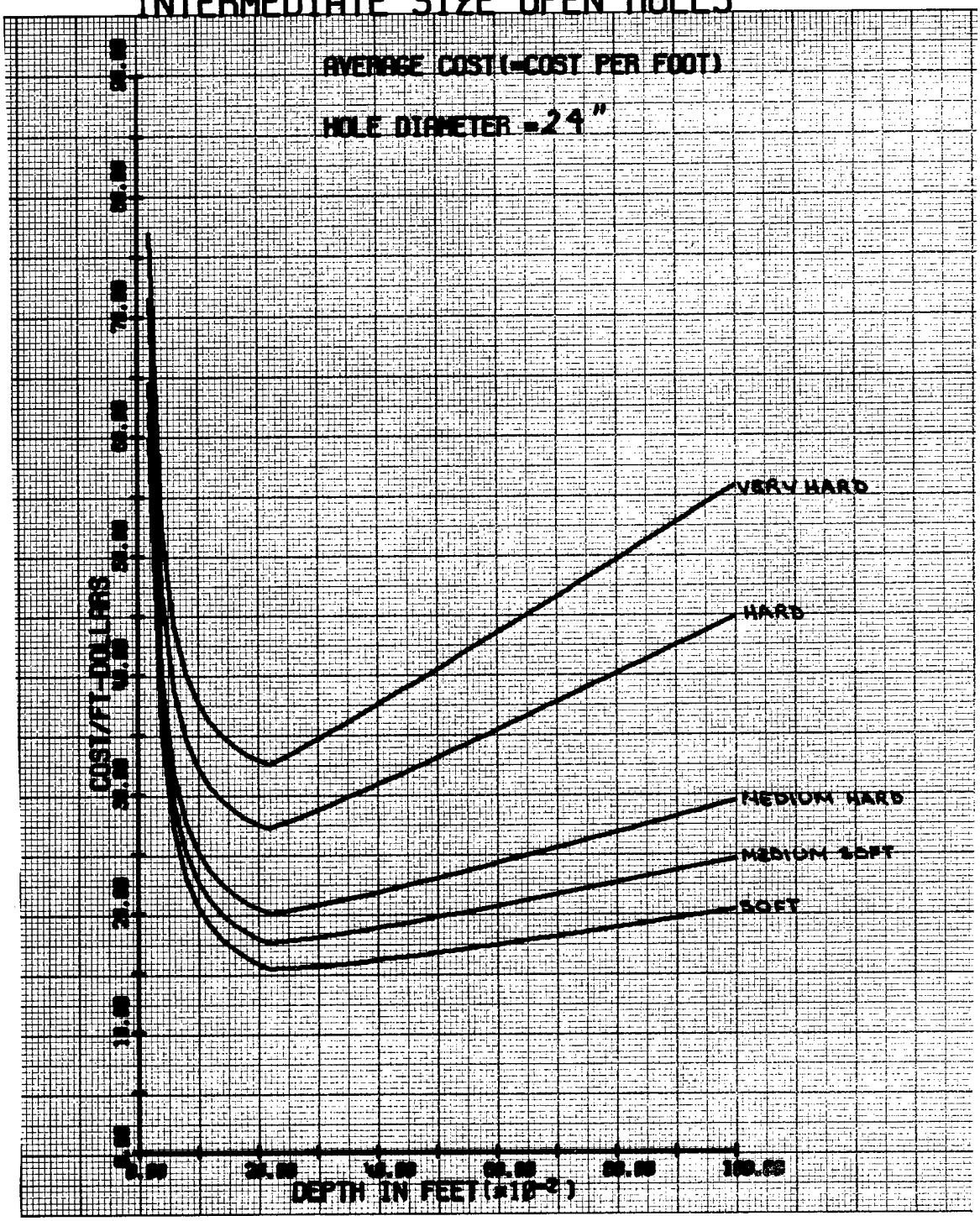
INTERMEDIATE SIZE OPEN HOLES



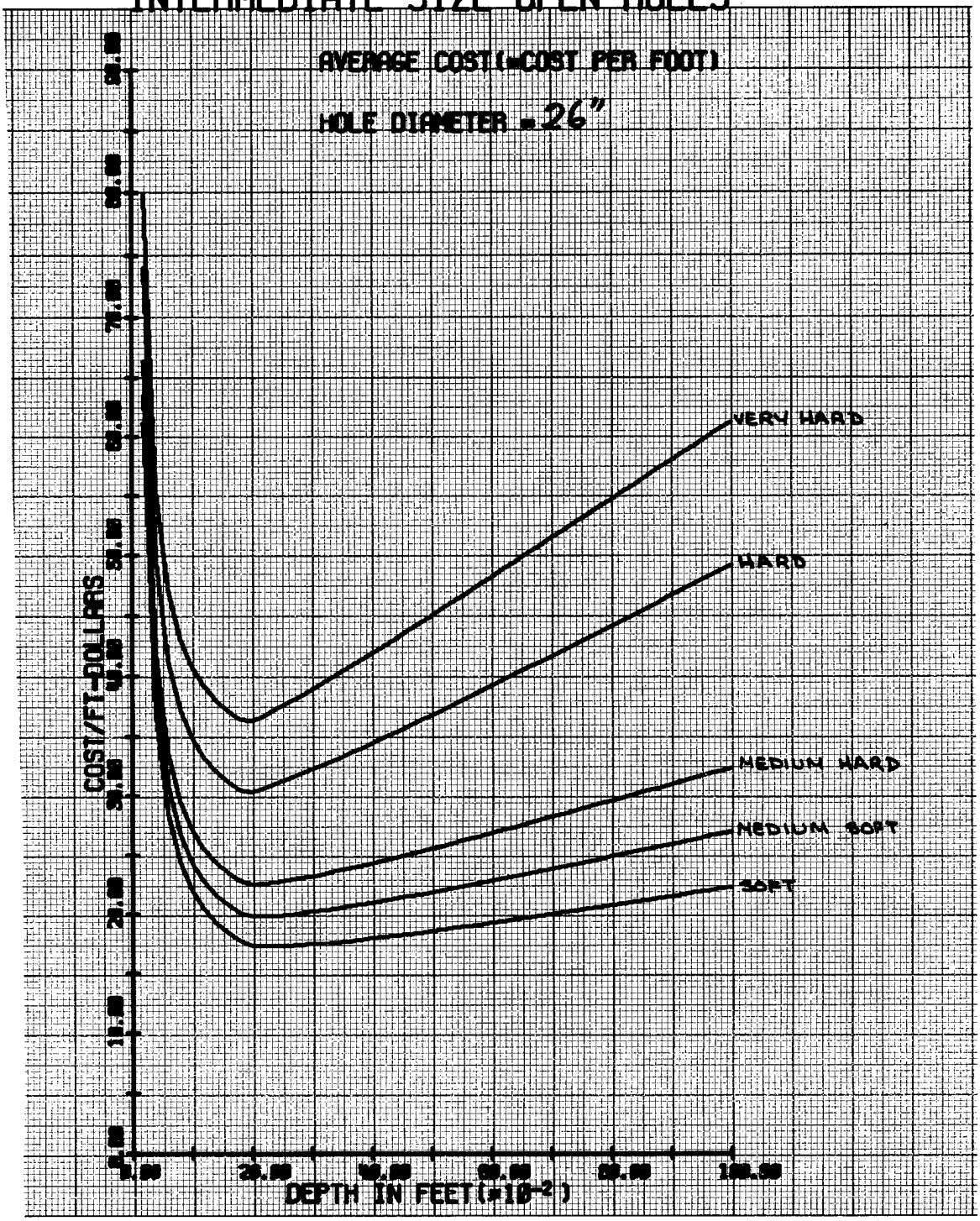
INTERMEDIATE SIZE OPEN HOLES



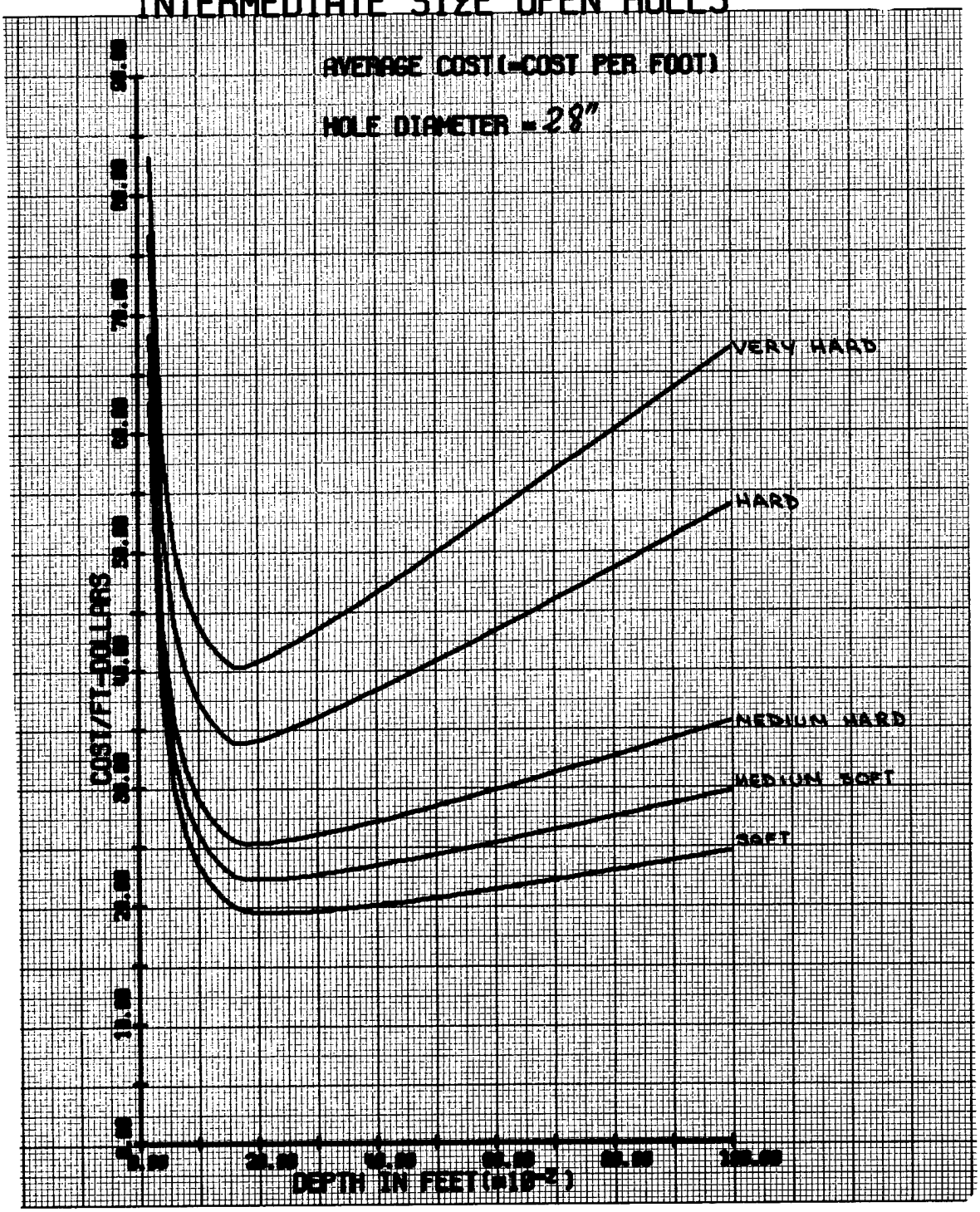
INTERMEDIATE SIZE OPEN HOLES



INTERMEDIATE SIZE OPEN HOLES



INTERMEDIATE SIZE OPEN HOLES



INTERMEDIATE SIZE OPEN HOLES

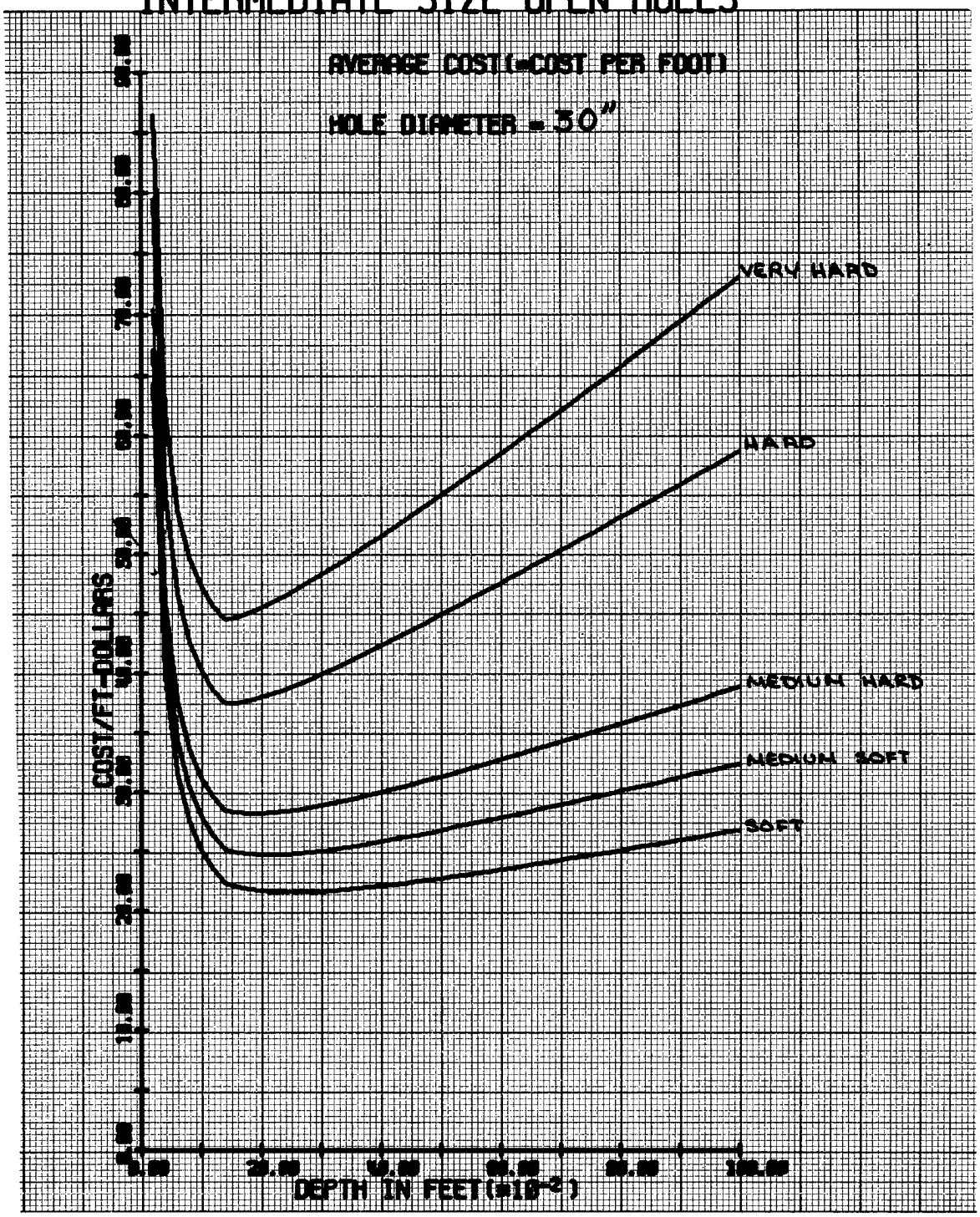


Table 25

DIFFERENCE OF TOTAL DRILLING COSTS BETWEEN CASED AND UNCASED WELLS IN SOFT ROCK AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

Y_{TC} = Total drilling costs for cased wells;

Y_{TU} = Total drilling costs for uncased wells;

ϕ = Diameter of the hole drilled defined for uncased wells. For comparison, the diameter of the open hole of the cased well must be $\frac{3}{2}$ ϕ times as large.

$Y_{TC} - Y_{TU}$ (given ϕ = 10 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 11 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 12 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 13 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 14 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 15 in.)
11418.34	12855.47	16206.16	17712.48	21245.37	22820.87
22836.68	25710.95	32412.31	35424.95	42490.72	45641.72
34255.01	38566.42	48811.89	53971.98	65910.37	71335.48
49039.88	54916.11	69247.56	75426.07	90588.46	97069.25
61439.28	68784.57	86726.77	94449.90	113430.79	121531.77
74084.26	82898.61	104500.66	113768.42	136616.91	146338.09
86974.81	97258.21	122569.24	133381.64	160146.83	171488.21
100110.93	111863.40	140932.52	153289.53	184020.56	196982.13
113492.62	126714.15	159590.47	173492.12	208238.10	222819.87
127119.39	141810.47	178543.11	193989.39	232799.42	249001.40

$Y_{TC} - Y_{TU}$ (given ϕ = 16 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 17 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 18 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 19 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 20 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 21 in.)
26535.94	28180.64	32077.92	33791.79	37871.27	39654.33
53071.90	56361.27	65130.03	69177.54	78614.36	82838.55
83935.39	89625.52	102693.53	108007.54	121270.22	126810.94
113062.61	119845.67	136669.98	143755.32	161410.59	168798.21
141551.34	150030.18	171088.45	179945.13	202042.10	211276.62
170433.01	180607.60	205948.96	216576.98	243164.75	254246.19
199707.59	211577.95	241251.49	253650.85	284778.57	297706.90
229375.08	242941.21	276996.06	291166.75	326883.51	341658.74
259435.49	274697.39	313182.66	329124.68	369479.60	386101.75
289888.81	306846.48	349811.29	367524.65	412566.84	431035.90

Continued

$Y_{TC} - Y_{TU}$ (given ϕ = 22 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 23 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 24 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 25 in.)	$Y_{TC} - Y_{TU}$ (given = ϕ 26 in.)	$Y_{TC} - Y_{TU}$ (given = ϕ 27 in.)
43916.01	46242.42	51732.33	54186.35	59896.76	62439.12
92716.38	97117.25	107436.10	112013.65	122406.33	126553.55
140696.83	146464.25	160973.37	166967.49	182099.82	188320.66
187284.43	194974.33	214291.50	222283.68	242431.81	250726.26
234412.29	244024.67	268199.00	278189.23	303402.28	313770.35
282080.40	293615.25	322695.90	334684.16	365011.25	377452.94
330288.77	343746.11	377782.17	391768.48	427258.71	441774.01
379037.42	394417.24	433457.80	449442.15	490144.66	506733.54
428326.32	445628.58	489722.82	507705.21	553669.09	572331.60
478155.49	497380.24	546577.21	566557.64	617832.00	638568.14

$Y_{TC} - Y_{TU}$ (given ϕ = 28 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 29 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 30 in.)
68370.05	71000.75	77152.18
137134.66	141433.03	152429.62
204076.20	210523.75	226902.51
271705.34	280302.08	302112.11
340022.09	350768.01	378058.44
409026.45	421921.55	454741.50
478718.40	493762.68	532161.25
549097.97	566291.44	610317.73
620165.13	639507.77	689210.94
689488.12	708932.91	760076.37

Table 26

DIFFERENCE OF TOTAL DRILLING COSTS BETWEEN CASED AND UNCASED WELLS IN MEDIUM SOFT ROCK AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

Y_{TC} = Total drilling costs for cased wells;

Y_{TU} = Total drilling costs for uncased wells;

ϕ = Diameter of the hole drilled defined for uncased wells. For comparison, the diameter of the open hole of the cased well must be $\frac{3}{2}$ ϕ times as large.

$Y_{TC} - Y_{TU}$ (given ϕ = 10 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 11 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 12 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 13 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 14 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 15 in.)
11806.59	13257.69	16713.98	18237.07	21886.74	23481.81
23613.17	26515.39	33427.96	36474.14	43773.48	46963.61
35419.76	39773.08	50360.90	55658.49	68140.73	73730.87
51082.37	57057.07	71993.95	78290.63	94137.25	100755.90
64197.04	71665.42	90405.34	98276.18	118153.26	126426.58
77639.14	86601.19	109209.63	118654.65	142627.69	152555.65
91408.67	101864.40	128406.85	139426.03	167560.51	179143.14
105505.63	117455.03	147996.97	160590.32	192951.74	206189.03
119930.02	133373.10	167980.03	182147.54	218801.36	233693.32
134681.84	149618.60	188355.99	204097.68	245109.40	261656.02

$Y_{TC} - Y_{TU}$ (given ϕ = 16 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 17 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 18 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 19 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 20 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 21 in.)
27324.85	28991.90	33028.33	34767.36	38997.16	40808.17
54649.71	57983.81	67151.19	71329.07	81239.42	85612.35
86946.50	92829.20	106559.24	112006.18	125934.71	131623.13
117512.24	124452.86	142118.94	149381.52	167957.34	175541.90
147440.82	156116.60	178268.01	187346.25	210634.83	220115.53
177893.29	188304.22	215006.46	225900.35	253967.18	265344.02
208869.65	221015.73	252334.27	265043.82	297954.38	311227.37
240369.90	254251.14	290251.48	304776.66	342596.46	357765.58
272394.04	288010.43	328758.05	345098.88	387893.39	404958.66
304942.07	322293.62	367853.99	386010.48	433845.19	452806.58

Continued

$Y_{TC} - Y_{TU}$ (given ϕ = 22 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 23 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 24 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 25 in.)	$Y_{TC} - Y_{TU}$ (given = ϕ 26 in.)	$Y_{TC} - Y_{TU}$ (given = ϕ 27 in.)
45231.36	47629.78	53387.99	55926.55	61929.22	64565.29
96011.62	100579.57	111467.76	116230.77	127196.15	131471.38
146233.96	152163.86	167456.99	173628.37	189603.80	196016.66
195027.44	202933.98	223329.26	231557.76	252862.76	261413.25
244541.27	254424.44	279987.35	290272.99	316973.06	327661.16
294775.45	306635.25	337431.28	349774.04	381934.67	394760.39
345729.97	359566.41	395661.05	410060.93	447747.60	462710.93
397404.84	413217.91	454676.65	471133.66	514411.85	531512.81
449800.06	467589.77	514478.06	532992.23	581927.42	601165.98
502915.65	522681.97	575065.34	595636.60	650294.31	671670.49

$Y_{TC} - Y_{TU}$ (given ϕ = 28 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 29 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 30 in.)
70812.41	73546.01	80037.59
142637.58	147073.81	158694.87
212674.38	219328.72	236668.75
283627.98	292500.44	315624.91
355498.40	366588.96	395563.36
428285.61	441594.29	476484.12
501989.64	517516.42	558387.16
576610.47	594355.38	641272.47
652148.09	672111.11	725140.06
725515.94	745094.19	798839.40

Table 27

DIFFERENCE OF TOTAL DRILLING COSTS BETWEEN CASED AND UNCASED WELLS IN MEDIUM HARD ROCK AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

Y_{TC} = Total drilling costs for cased wells;

Y_{TU} = Total drilling costs for uncased wells;

ϕ = Diameter of the hole drilled defined for uncased wells. For comparison, the diameter of the open hole of the cased well must be $\frac{3}{2}$ ϕ times as large.

$Y_{TC} - Y_{TU}$ (given ϕ = 10 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 11 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 12 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 13 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 14 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 15 in.)
12241.25	13706.33	17277.51	18817.37	22593.10	24207.74
24482.51	27412.68	34555.02	37634.74	45186.22	48415.48
36723.75	41119.01	52082.58	57536.61	70632.63	76410.92
53416.96	59499.39	75118.63	81544.58	98159.75	104929.21
67364.41	74967.45	94610.15	102642.58	123530.17	131992.00
81738.94	90862.59	114614.16	124253.07	149498.52	159652.71
96540.55	107184.80	135130.67	146376.07	176064.78	187911.34
111769.26	123934.11	156159.67	169011.57	203228.96	216767.88
127425.04	141110.51	177701.19	192159.56	230991.05	246222.35
143507.90	158713.97	199755.19	215820.06	259351.06	276274.72

$Y_{TC} - Y_{TU}$ (given ϕ = 16 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 17 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 18 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 19 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 20 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 21 in.)
28188.03	29877.45	34062.30	35826.49	40215.91	42054.87
56376.08	59754.89	69365.62	73691.28	84131.31	88673.15
90320.51	96423.06	110896.15	116488.53	131157.48	137007.48
122540.28	129653.26	148260.24	155716.74	175319.63	183119.64
154124.49	163015.71	186393.08	195713.70	220335.96	230085.07
186392.02	197061.49	225294.66	236479.41	266206.45	277905.48
219342.89	231790.60	264965.00	278013.87	312931.10	326581.13
252977.09	267203.05	305404.08	320317.08	360509.94	376109.95
287294.63	303298.82	346611.92	363389.05	408942.93	426492.95
322295.50	340077.95	388588.51	407229.76	458230.09	477730.11

Continued

$Y_{TC} - Y_{TU}$ (given ϕ = 22 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 23 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 24 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 25 in.)	$Y_{TC} - Y_{TU}$ (given = ϕ 26 in.)	$Y_{TC} - Y_{TU}$ (given = ϕ 27 in.)
46648.85	49128.23	55184.81	57818.99	64146.76	66889.03
99655.56	104413.57	115938.35	120912.54	132513.76	136929.03
152423.37	158531.01	174693.83	181059.11	197968.86	204591.78
203718.46	211861.98	233456.70	241943.75	264534.38	273364.94
255953.13	266132.54	293244.58	303853.38	332210.31	343248.52
309127.38	321342.68	354057.46	366788.02	400996.67	414242.51
363241.21	377492.40	415895.31	430747.65	470893.44	486346.91
418294.64	434581.69	478758.21	495732.29	541900.64	559561.75
474287.64	492610.59	542646.08	561741.95	614018.23	633886.99
531220.24	551579.05	607558.96	628776.58	687246.23	709322.66

$Y_{TC} - Y_{TU}$ (given ϕ = 28 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 29 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 30 in.)
73487.97	76338.33	83208.46
148741.27	153328.31	165638.51
222248.46	229129.02	247532.64
296951.48	306125.56	330708.02
372850.34	384317.95	415164.64
449945.03	463706.14	500902.53
528235.54	544290.19	587921.66
607721.91	626070.05	676222.03
688404.10	709045.76	765803.72
766398.21	786053.96	842611.10

Table 28

DIFFERENCE OF TOTAL DRILLING COSTS BETWEEN
CASED AND UNCASED WELLS IN HARD ROCK
AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

Y_{TC} = Total drilling costs for cased wells;

Y_{TU} = Total drilling costs for uncased wells;

ϕ = Diameter of the hole drilled defined for uncased wells. For comparison, the diameter of the open hole of the cased well must be $\frac{3}{2}$ ϕ times as large.

$Y_{TC} - Y_{TU}$ (given ϕ = 10 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 11 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 12 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 13 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 14 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 15 in.)
13447.68	14940.72	18809.08	20382.48	24477.77	26131.54
26895.36	29881.44	37618.17	40764.98	48955.55	52263.08
40343.04	44822.16	56779.80	62684.34	77515.65	83838.10
60207.26	66572.34	84114.93	90880.05	109644.67	116809.83
76673.60	84629.94	106841.09	115297.49	139036.17	147992.63
93895.55	103443.16	130473.98	140621.66	169485.53	180233.27
111873.11	123011.98	155013.60	166852.56	200992.73	213531.76
130606.27	143336.42	180459.96	193990.19	233557.79	247888.11
150095.05	164416.46	206813.04	222034.55	267180.70	283302.31
170339.44	186252.12	234072.85	250985.64	301861.46	319774.36

$Y_{TC} - Y_{TU}$ (given ϕ = 16 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 17 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 18 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 19 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 20 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 21 in.)
30453.76	32187.89	36737.03	38551.52	43327.59	45222.45
60907.51	64375.78	75198.00	79945.58	91852.74	96878.93
99703.82	106444.17	122991.72	128965.67	145656.92	151930.89
136796.49	144361.69	165570.37	173535.62	195966.32	204331.62
173258.85	182715.35	209509.10	219465.67	247786.96	258243.57
210930.17	222277.98	254807.93	266755.80	301118.80	313666.76
249810.48	263049.59	301466.86	315406.06	355961.86	370601.12
289899.75	305030.18	349485.88	365416.38	412316.14	429046.73
331198.01	348219.74	398865.00	416786.82	470181.63	489003.56
373705.26	392618.26	449604.22	469517.35	529558.37	550471.59

Continued

$Y_{TC} - Y_{TU}$ (given ϕ = 22 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 23 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 24 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 25 in.)	$Y_{TC} - Y_{TU}$ (given = ϕ 26 in.)	$Y_{TC} - Y_{TU}$ (given = ϕ 27 in.)
50225.43	52931.89	59803.54	62709.48	69925.94	72971.18
109475.68	114780.49	128066.84	133650.25	146981.54	151764.26
169538.65	176112.66	194636.95	201510.99	220951.79	228125.87
227984.35	236749.70	261624.45	270789.84	296886.62	306452.05
288092.39	299049.07	330425.41	341882.16	374786.04	386742.83
349862.77	363010.79	401039.85	414787.93	454650.04	468998.18
413295.48	428634.83	473467.73	489507.18	536478.63	553218.13
478390.55	495921.23	547709.10	566039.86	620271.79	639402.63
545147.93	564869.96	623763.89	644386.02	706029.48	727551.74
613567.66	635481.05	701632.15	724545.63	793751.86	817665.40

$Y_{TC} - Y_{TU}$ (given ϕ = 28 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 29 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 30 in.)
80532.43	83716.98	91623.03
165311.22	170293.96	184451.93
248483.19	255957.31	277231.16
333770.87	343736.35	372277.18
421174.25	433631.10	469590.05
510693.32	525641.55	569169.74
602328.12	619767.72	671016.28
696078.59	716009.62	775129.61
791944.85	814367.16	881509.79
883414.62	902818.20	966524.76

Table 29

DIFFERENCE OF TOTAL DRILLING COSTS BETWEEN CASED AND UNCASED WELLS IN VERY HARD ROCK AS A FUNCTION OF DEPTH AND DIAMETER
(in dollars)

Y_{TC} = Total drilling costs for cased wells;

Y_{TU} = Total drilling costs for uncased wells;

ϕ = Diameter of the hole drilled defined for uncased wells. For comparison, the diameter of the open hole of the cased well must be $\frac{3}{2}$ ϕ times as large.

$Y_{TC} - Y_{TU}$ (given ϕ = 10 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 11 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 12 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 13 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 14 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 15 in.)
14388.43	15909.43	20021.85	21628.79	25990.50	27683.40
28776.86	31818.85	40043.69	43257.58	51981.00	55366.80
43165.30	47728.28	60488.81	66735.40	82901.83	89636.14
65325.84	71920.59	90946.28	97987.01	118418.48	125905.19
83638.53	91881.97	116060.32	124861.24	150796.81	160155.22
102933.50	112825.64	142353.11	152914.22	184550.36	195780.44
123210.77	134751.60	169824.66	182145.95	219679.11	232780.88
144470.34	157659.85	198474.95	212556.43	256183.08	271156.51
166712.19	181550.40	228303.99	244145.65	294062.25	310907.38
189936.34	206423.24	259311.78	276913.63	333316.63	352033.44

$Y_{TC} - Y_{TU}$ (given ϕ = 16 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 17 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 18 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 19 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 20 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 21 in.)
32294.39	34073.25	38933.53	40798.34	45907.90	47858.67
64588.78	68146.49	79924.21	84994.13	98047.05	103442.11
107010.16	114232.20	132390.51	138674.52	156961.32	163579.82
147742.42	155675.12	178918.13	187296.82	211945.60	220770.27
187848.00	197763.88	227213.88	237687.25	268894.46	279925.29
229525.23	241424.29	277277.75	289845.77	327807.90	341044.91
272774.14	286656.37	329109.74	343772.45	388685.92	404129.09
317594.72	333460.12	382709.87	399467.24	451528.54	469177.87
363986.94	381835.54	438078.12	456930.17	516335.72	536191.22
411950.86	431782.63	495214.47	516161.21	583107.56	605169.17

Continued

$Y_{TC} - Y_{TU}$ (given ϕ = 22 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 23 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 24 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 25 in.)	$Y_{TC} - Y_{TU}$ (given = ϕ 26 in.)	$Y_{TC} - Y_{TU}$ (given = ϕ 27 in.)
53217.52	56099.71	63614.36	66728.62	74645.78	77922.61
117300.08	123020.29	137683.30	143728.66	158428.75	163510.06
182920.95	189873.95	210269.40	217556.88	239006.67	246628.62
246824.83	256095.47	283555.80	293272.43	322138.54	332301.15
312889.73	324478.04	359199.70	371345.50	407824.37	420527.63
381115.68	395021.67	437201.11	451776.05	496064.15	511308.08
451502.65	467726.31	517560.00	534564.12	586857.90	604642.49
524050.71	542592.02	600276.40	619709.64	680205.60	700530.85
598759.75	619618.73	685350.37	707212.76	776107.22	798973.14
675629.95	698806.52	772781.68	797073.27	874562.87	899969.41

$Y_{TC} - Y_{TU}$ (given ϕ = 28 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 29 in.)	$Y_{TC} - Y_{TU}$ (given ϕ = 30 in.)
86242.31	89681.71	98403.92
178442.88	183747.18	199382.88
269132.75	277089.19	300647.65
362573.03	373181.64	404859.28
458763.74	472024.48	512017.79
557704.84	573617.75	622123.17
659396.42	677961.47	735175.43
763838.29	785055.51	851174.51
871030.74	894900.00	970120.50
972647.90	992120.04	1061773.70

Table 30

MARGINAL DRILLING COSTS FOR

CASED WELLS IN SOFT ROCK

AS A FUNCTION OF DIAMETER AT A GIVEN DEPTH

(in dollars)

$$Y_{MC} = Y_{TC}(\phi+1) - Y_{TC}(\phi)$$

Where:

Y_{MC} = Marginal drilling costs;

$Y_{TC}(\phi+1)$ = Total drilling costs for cased wells in soft rock at a diameter of $\phi+1$;

$Y_{TC}(\phi)$ = Total drilling cost for cased wells in soft rock at a diameter ϕ;

ϕ = Diameter of hole drilled ranging from 10 to 44 inches.

Y_{MC} (given ϕ = 10 in.)	Y_{MC} (given ϕ = 11 in.)	Y_{MC} (given ϕ = 12 in.)	Y_{MC} (given ϕ = 13 in.)	Y_{MC} (given ϕ = 14 in.)	Y_{MC} (given ϕ = 15 in.)
1634.09	1671.77	1709.43	1747.11	1784.78	1822.45
3268.19	3343.53	3418.88	3494.21	3569.56	3644.91
4902.28	5015.30	5128.31	5241.32	5354.34	5467.36
7158.60	7334.83	7511.05	7687.28	7863.50	8039.73
8976.14	9196.42	9416.70	9636.98	9857.27	10077.55
10842.79	11107.12	11371.47	11635.80	11900.15	12164.48
12758.55	13066.95	13375.34	13683.75	13992.13	14300.53
14723.43	15075.89	15428.33	15780.80	16133.24	16485.69
16737.43	17133.94	17530.44	17926.96	18323.46	18719.97
18800.53	19241.11	19681.67	20122.23	20562.80	21003.36

Y_{MC} (given ϕ = 16 in.)	Y_{MC} (given ϕ = 17 in.)	Y_{MC} (given ϕ = 18 in.)	Y_{MC} (given ϕ = 19 in.)	Y_{MC} (given ϕ = 20 in.)	Y_{MC} (given ϕ = 21 in.)
1860.13	1897.79	1935.47	1973.14	2010.81	2048.48
3720.24	3795.59	3870.93	3946.28	4021.62	4096.96
5580.37	5886.80	6447.53	6579.71	6711.87	6844.05
8215.96	8392.18	8568.41	8744.63	8920.86	9097.09
10297.83	10518.12	10738.39	10958.69	11178.96	11399.24
12428.82	12693.16	12957.50	13221.84	13486.18	13750.52
14608.93	14917.32	15225.72	15534.11	15842.51	16150.90
16838.15	17190.60	17543.04	17895.51	18247.95	18600.40
19116.48	19512.99	19909.50	20306.00	20702.52	21099.02
21443.93	21884.49	22325.06	22765.63	23206.18	23646.76

Continued

Y_{MC} (given ϕ = 22 in.)	Y_{MC} (given ϕ = 23 in.)	Y_{MC} (given ϕ = 24 in.)	Y_{MC} (given ϕ = 25 in.)	Y_{MC} (given ϕ = 26 in.)	Y_{MC} (given ϕ = 27 in.)
2086.15	2123.82	2161.50	2199.17	2236.84	2274.51
4172.31	4247.65	4322.99	4765.53	5080.68	5168.79
6976.21	7108.38	7240.55	7372.72	7504.89	7637.06
9273.31	9449.54	9625.76	9801.99	9978.22	10154.44
11619.53	11839.80	12060.10	12280.37	12500.66	12720.94
14014.85	14279.20	14543.53	14807.87	15072.22	15336.56
16459.31	16767.69	17076.09	17384.49	17692.88	18001.28
18952.87	19305.31	19657.76	20010.21	20362.67	20715.12
21495.53	21892.04	22288.55	22685.05	23081.57	23478.07
24087.32	24527.88	24968.45	25409.01	25849.58	26290.15

Y_{MC} (given ϕ = 28 in.)	Y_{MC} (given ϕ = 29 in.)	Y_{MC} (given ϕ = 30 in.)	Y_{MC} (given ϕ = 31 in.)	Y_{MC} (given ϕ = 32 in.)	Y_{MC} (given ϕ = 33 in.)
2312.18	2349.85	2387.53	2425.20	2462.87	2974.71
5256.90	5345.02	5433.13	5521.24	5609.36	5697.47
7769.23	7901.40	8033.57	8165.74	8297.91	8430.07
10330.67	10506.90	10683.12	10859.34	11035.58	11211.80
12941.22	13161.51	13381.78	13602.07	13822.36	14042.64
15600.88	15865.23	16129.57	16393.90	16658.25	16922.59
18309.66	18618.09	18926.46	19234.85	19543.25	19851.66
21067.56	21420.03	21772.47	22124.93	22477.38	22829.84
23874.58	24271.10	24667.60	25064.10	25460.62	25857.13
26730.70	27171.28	27611.84	28052.40	28492.98	28933.55

Y_{MC} (given ϕ = 34 in.)	Y_{MC} (given ϕ = 35 in.)	Y_{MC} (given ϕ = 36 in.)	Y_{MC} (given ϕ = 37 in.)	Y_{MC} (given ϕ = 38 in.)	Y_{MC} (given ϕ = 39 in.)
3058.03	3102.09	3146.15	3190.20	3234.26	3278.32
5785.58	5873.70	5961.81	6049.92	6138.04	6226.15
8562.25	8694.42	8826.58	8958.75	9090.93	9223.10
11388.02	11564.25	11740.48	11916.70	12092.93	12269.15
14262.90	14483.20	14703.49	14923.76	15144.05	15364.33
17186.93	17451.26	17715.60	17979.94	18244.28	18508.63
20160.04	20468.45	20776.83	21085.23	21393.64	21702.03
23182.27	23534.73	23887.19	24239.63	24592.10	24944.52
26253.64	26650.15	27046.65	27443.15	27839.67	28236.18
29374.08	29814.67	30255.23	30695.79	31136.36	31576.92

Y_{MC} (given ϕ = 40 in.)	Y_{MC} (given ϕ = 41 in.)	Y_{MC} (given ϕ = 42 in.)	Y_{MC} (given ϕ = 43 in.)	Y_{MC} (given ϕ = 44 in.)
3322.37	3366.43	3410.49	3454.54	3498.60
6314.26	6402.37	6490.49	6578.60	6666.71
9355.26	9487.43	9619.60	9751.78	9883.94
12445.38	12621.61	12797.84	12974.05	13150.28
15584.61	15804.90	16025.18	16245.46	16465.74
18772.95	19037.30	19301.63	19565.98	19830.32
22010.41	22318.82	22627.21	22935.60	23244.00
25297.00	25649.46	26001.91	26354.34	26706.80
28632.69	29029.20	29425.70	29822.21	30218.72
31568.89	30474.88	30851.58	31228.30	31604.97

Table 31

MARGINAL DRILLING COSTS FOR

CASED WELLS IN MEDIUM SOFT ROCK

AS A FUNCTION OF DIAMETER AT A GIVEN DEPTH

(in dollars)

$Y_{MC} = Y_{TC}(\phi+1) - Y_{TC}(\phi)$

Where:

Y_{MC} = Marginal drilling costs;

$Y_{TC}(\phi+1)$ = Total drilling costs for cased wells in medium soft rock at a diameter of $\phi+1$;

$Y_{TC}(\phi)$ = Total drilling cost for cased wells in medium soft rock at a diameter ϕ;

ϕ = Diameter of hole drilled ranging from 10 to 44 inches.

Y_{MC} (given ϕ = 10 in.)	Y_{MC} (given ϕ = 11 in.)	Y_{MC} (given ϕ = 12 in.)	Y_{MC} (given ϕ = 13 in.)	Y_{MC} (given ϕ = 14 in.)	Y_{MC} (given ϕ = 15 in.)
1706.15	1746.62	1787.09	1827.55	1868.02	1908.48
3412.30	3493.24	3574.17	3655.11	3736.04	3816.97
5118.46	5239.85	5361.26	5482.66	5604.06	5725.45
7527.71	7723.63	7919.55	8115.47	8311.39	8507.31
9478.46	9723.35	9968.25	10213.15	10458.06	10702.95
11494.68	11788.56	12082 44	12376.33	12670.20	12964.08
13576.40	13919.25	14262.12	14604.98	14947.84	15290.69
15723.60	16115.43	16507.28	16899.12	17290.96	17682.79
17936.29	18377.10	18817.93	19258.74	19699.57	20140.38
20214.45	20704.26	21194 06	21683.86	22173.66	22663.46

Y_{MC} (given ϕ = 16 in.)	Y_{MC} (given ϕ = 17 in.)	Y_{MC} (given ϕ = 18 in.)	Y_{MC} (given ϕ = 19 in.)	Y_{MC} (given ϕ = 20 in.)	Y_{MC} (given ϕ = 21 in.)
1948.96	1989.42	2029.88	2070.36	2110.82	2151.29
3897.91	3978.84	4059.77	4140.71	4221.64	4302.57
5846.86	6187.22	6817.98	6964.91	7111.86	7258.79
8703.23	8899.15	9095.07	9290.99	9486.92	9682.83
10947.86	11192.75	11437.65	11682.56	11927.45	12172.36
13257.96	13551.84	13845.73	14139.61	14433.48	14727.36
15633.56	15976.42	16319.28	16662.14	17005.00	17347.86
18074.64	18466.48	18858.32	19250.17	19642.00	20033.84
20581.21	21022.03	21462.34	21903.67	22344.49	22785.31
23153.26	23643 06	24132.86	24622.66	25112.47	25602.26

Continued

Y_{MC} (given ϕ = 22 in.)	Y_{MC} (given ϕ = 23 in.)	Y_{MC} (given ϕ = 24 in.)	Y_{MC} (given ϕ = 25 in.)	Y_{MC} (given ϕ = 26 in.)	Y_{MC} (given ϕ = 27 in.)
2191.75	2232.22	2272.69	2313.16	2353.62	2394.09
4383.51	4464.45	4545.37	5038.03	5390.05	5488.00
7405.74	7552.67	7699.62	7846.55	7993.50	8140.43
9878.75	10074.67	10270.60	10466.50	10662.44	10858.35
12417.25	12662.16	12907.06	13151.95	13396.86	13641.76
15021.25	15315.12	15609.01	15902.88	16196.77	16490.65
17690.72	18033.58	18376.44	18719.30	19062.16	19405.03
20425.68	20817.52	21209.37	21601.19	21993.06	22384.88
23226.13	23666.95	24107.77	24548.59	24989.42	25430.23
26092.07	26581.86	27071.67	27561.45	28051.27	28541.08

Y_{MC} (given ϕ = 28 in.)	Y_{MC} (given ϕ = 29 in.)	Y_{MC} (given ϕ = 30 in.)	Y_{MC} (given ϕ = 31 in.)	Y_{MC} (given ϕ = 32 in.)	Y_{MC} (given ϕ = 33 in.)
2434.55	2475.02	2515.49	2555.96	2596.42	3152.32
5585.96	5683.93	5781.89	5879.84	5977.81	6075.76
8287.38	8434.31	8581.26	8728.19	8875.14	9022.08
11054.28	11250.19	11446.11	11642.04	11837.95	12033.88
13886.65	14131.56	14376.46	14621 35	14866.26	15111.16
16784.52	17078.41	17372.29	17666.16	17960.05	18253.93
19747.88	20090.74	20433.61	20776.46	21119.32	21462.19
22776.71	23168.58	23560.40	23952.25	24344.08	24735.93
25871.05	26311.88	26752.70	27193.50	27634.34	28075.16
29030.85	29520.68	30010.46	30500.27	30990.09	31479.86

Y_{MC} (given ϕ = 34 in.)	Y_{MC} (given ϕ = 35 in.)	Y_{MC} (given ϕ = 36 in.)	Y_{MC} (given ϕ = 37 in.)	Y_{MC} (given ϕ = 38 in.)	Y_{MC} (given ϕ = 39 in.)
3243.92	3292.90	3341.88	3390.85	3439.85	3488.82
6173.73	6271.68	6369.65	6467.60	6565.57	6663.52
9169.02	9315.95	9462.90	9609.84	9756.78	9903.72
12229.79	12425.72	12621.63	12817.56	13013.47	13209.40
15356.06	15600.96	15845.86	16090.75	16335.67	16580.56
18547.81	18841.69	19135.57	19429.45	19723.33	20017.21
21805.04	22147.91	22490.76	22833.63	23176.50	23519.34
25127.77	25519.61	25911.45	26303.28	26695.13	27086.98
28515.98	28956.78	29397.64	29838.41	30279.27	30720.07
31969.66	32459.48	32949.27	33439.06	33928.89	34418.66

Y_{MC} (given ϕ = 40 in.)	Y_{MC} (given ϕ = 41 in.)	Y_{MC} (given ϕ = 42 in.)	Y_{MC} (given ϕ = 43 in.)	Y_{MC} (given ϕ = 44 in.)
3537.79	3586.78	3635.77	3684.73	3733.72
6761.49	6859.44	6957.41	7055.37	7153.32
10050.65	10197.60	10344.54	10491.48	10638.42
13405.32	13601.23	13797.16	13993.07	14189.00
16825.46	17070.36	17315.26	17560.17	17805.05
20311.09	20604.97	20898.85	21192.73	21486.62
23862.21	24205.07	24547.93	24890.79	25233.66
27478.80	27870.66	28262.49	28654.32	29046.16
31160.90	31601.72	32042.55	32483.36	32924.14
34339.56	32880.60	33285.20	33689.89	34094.50

Table 32

MARGINAL DRILLING COSTS FOR

CASED WELLS IN MEDIUM HARD ROCK

AS A FUNCTION OF DIAMETER AT A GIVEN DEPTH

(in dollars)

$Y_{MC} = Y_{TC}(\phi+1) - Y_{TC}(\phi)$

Where:

Y_{MC} = Marginal drilling costs;

$Y_{TC}(\phi+1)$ = Total drilling costs for cased wells in medium hard rock at a diameter of $\phi+1$;

$Y_{TC}(\phi)$ = Total drilling cost for cased wells in medium hard rock at a diameter ϕ;

ϕ = Diameter of hole drilled ranging from 10 to 44 inches.

Y_{MC} (given ϕ = 10 in.)	Y_{MC} (given ϕ = 11 in.)	Y_{MC} (given ϕ = 12 in.)	Y_{MC} (given ϕ = 13 in.)	Y_{MC} (given ϕ = 14 in.)	Y_{MC} (given ϕ = 15 in.)
1787.50	1830.75	1874.02	1917.28	1960.55	2003.80
3574.99	3661.52	3748.04	3834.56	3921.09	4007.61
5362.48	5492.27	5622.06	5751.84	5881.63	6011.42
7951.53	8169.01	8386.47	8603.93	8821.40	9038.86
10058.06	10329.90	10601.73	10873.55	11145.39	11417.23
12250.01	12576.20	12902.41	13228.60	13554.79	13881.00
14527.37	14907.93	15288.50	15669.05	16049.62	16430.19
16890.15	17325.07	17760.00	18194.94	18629.86	19064.79
19338.33	19827.63	20316.93	20806.23	21295.52	21784.82
21871.94	22415.61	22959.27	23502.93	24046.60	24590.26

Y_{MC} (given ϕ = 16 in.)	Y_{MC} (given ϕ = 17 in.)	Y_{MC} (given ϕ = 18 in.)	Y_{MC} (given ϕ = 19 in.)	Y_{MC} (given ϕ = 20 in.)	Y_{MC} (given ϕ = 21 in.)
2047.07	2090.33	2133.59	2176.86	2220.11	2263.38
4094.13	4180.66	4267.18	4353.71	4440.24	4526.75
6141.20	6521.04	7235.22	7398.32	7561.41	7724.52
9256.33	9473.79	9691.26	9908.73	10126.19	10343.65
11689.05	11960.88	12232.72	12504.54	12776.38	13048.21
14207.19	14533.39	14859.59	15185.79	15511.98	15838.18
16810.75	17191.32	17571.87	17952.45	18333.00	18713.57
19499.73	19934.65	20369.59	20804.51	21239.45	21674.37
22274.12	22763.41	23252.70	23742.01	24231.29	24720.61
25133.92	25677.58	26221.25	26764.91	27308.58	27852.23

Continued

Y_{MC} (given ϕ = 22 in.)	Y_{MC} (given ϕ = 23 in.)	Y_{MC} (given ϕ = 24 in.)	Y_{MC} (given ϕ = 25 in.)	Y_{MC} (given ϕ = 26 in.)	Y_{MC} (given ϕ = 27 in.)
2306.64	2349.90	2393.17	2436.42	2479.69	2522.95
4613.28	4699.81	4786.32	5338.79	5734.46	5843.19
7887.62	8050.71	8213.81	8376.91	8540.01	8703.11
10561.12	10778.59	10996.05	11213.51	11430.98	11648.45
13320.04	13591.88	13863.70	14135.53	14407.37	14679.20
16164.38	16490.58	16816.78	17142.96	17469.17	17795.37
19094.14	19474.69	19855.27	20235.82	20616.39	20996.96
22109.31	22544.23	22979.17	23414.09	23849.03	24283.96
25209.89	25699.19	26188.48	26677.78	27167.09	27656.38
28395.90	28939.56	29483.23	30026.89	30570.55	31114.21

Y_{MC} (given ϕ = 28 in.)	Y_{MC} (given ϕ = 29 in.)	Y_{MC} (given ϕ = 30 in.)	Y_{MC} (given ϕ = 31 in.)	Y_{MC} (given ϕ = 32 in.)	Y_{MC} (given ϕ = 33 in.)
2566.22	2609.47	2652.74	2696.00	2739.26	3348.17
5951.92	6060.65	6169.39	6278.12	6386.85	6495.59
8866.21	9029.31	9192.40	9355.50	9518.61	9681.70
11865.90	12083.38	12300.84	12518.30	12735.78	12953.23
14951.02	15222.87	15494.69	15766.52	16038.36	16310.19
18121.56	18447.77	18773.97	19100.14	19426.36	19752.56
21377.51	21758.08	22138.65	22519.21	22899.77	23280.34
24718.88	25153.83	25588.73	26023.68	26458.61	26893.54
28145.66	28634.98	29124.27	29613.55	30102.86	30592.16
31657.86	32201.55	32745.20	33288.87	33832.53	34376.17

Y_{MC} (given ϕ = 34 in.)	Y_{MC} (given ϕ = 35 in.)	Y_{MC} (given ϕ = 36 in.)	Y_{MC} (given ϕ = 37 in.)	Y_{MC} (given ϕ = 38 in.)	Y_{MC} (given ϕ = 39 in.)
3449.25	3503.62	3557.98	3612.35	3666.72	3721.08
6604.31	6713.05	6821.79	6930.51	7039.25	7147.97
9844.80	10007.90	10171.00	10334.09	10497.20	10660.29
13170.70	13388.17	13605.63	13823.09	14040.57	14258.02
16582.01	16853.85	17125.68	17397.51	17669.34	17941.18
20078.75	20404.95	20731.14	21057.34	21383.55	21709.73
23660.91	24041.45	24422.03	24802.60	25183.16	25563.70
27328.48	27763.40	28198.33	28633.26	29068.20	29503.12
31081.45	31570.75	32060.05	32549.33	33038.63	33527.95
34919.84	35463.53	36007.18	36550.82	37094.50	37638.20

Y_{MC} (given ϕ = 40 in.)	Y_{MC} (given ϕ = 41 in.)	Y_{MC} (given ϕ = 42 in.)	Y_{MC} (given ϕ = 43 in.)	Y_{MC} (given ϕ = 44 in.)
3775.45	3829.81	3884.18	3938.55	3992.91
7256.72	7365.44	7474.18	7582.91	7691.64
10823.40	10986.49	11149.59	11312.69	11475.79
14475.49	14692.96	14910.42	15127.89	15345.35
18213.01	18484.84	18756.67	19028.50	19300.32
22035.95	22362.13	22688.34	23014.52	23340.74
25944.30	26324.84	26705.42	27085.97	27466.54
29938.05	30372.98	30807.91	31242.84	31677.77
34017.23	34506.54	34995.80	35485.10	35974.50
37466.41	35557.00	35989.70	36422.30	36854.91

Table 33

MARGINAL DRILLING COSTS FOR

CASED WELLS IN HARD ROCK

AS A FUNCTION OF DIAMETER AT A GIVEN DEPTH

(in dollars)

$$Y_{MC} = Y_{TC}(\phi+1) - Y_{TC}(\phi)$$

Where:

Y_{MC} = Marginal drilling costs;

$Y_{TC}(\phi+1)$ = Total drilling costs for cased wells in hard rock at a diameter of $\phi+1$;

$Y_{TC}(\phi)$ = Total drilling cost for cased wells in in hard rock at a diameter ϕ;

ϕ = Diameter of hole drilled ranging from 10 to 44 inches.

Y_{MC} (given ϕ = 10 in.)	Y_{MC} (given ϕ = 11 in.)	Y_{MC} (given ϕ = 12 in.)	Y_{MC} (given ϕ = 13 in.)	Y_{MC} (given ϕ = 14 in.)	Y_{MC} (given ϕ = 15 in.)
2017.60	2066.45	2115.31	2164.16	2213.01	2261.86
4035.20	4132.91	4230.61	4328.31	4426.02	4523.73
6052.80	6199.36	6345.92	6492.47	6639.03	6785.59
9196.54	9470.53	9744.53	10018.52	10292.52	10566.51
11778.58	12121.07	12463.57	12806.05	13148.55	13491.05
14511.74	14922.74	15333.72	15744.72	16155.70	16566.70
17396.03	17875.51	18355.00	18834.50	19313.98	19793.47
20431.43	20979.42	21527.40	22075.40	22623.38	23171.37
23617.96	24234.44	24850.93	25467.42	26083.90	26700.39
26955.61	27640.59	28325.57	29010.57	29695.55	30380.53

Y_{MC} (given ϕ = 16 in.)	Y_{MC} (given ϕ = 17 in.)	Y_{MC} (given ϕ = 18 in.)	Y_{MC} (given ϕ = 19 in.)	Y_{MC} (given ϕ = 20 in.)	Y_{MC} (given ϕ = 21 in.)
2310.72	2359.56	2408.42	2457.28	2506.12	2554.98
4621.43	4719.14	4816.84	4914.55	5012.25	5109.95
6932.15	7431.25	8409.59	8615.08	8820.57	9026.08
10840.50	11114.50	11388.49	11662.49	11936.48	12210.47
13833.53	14176.03	14518.52	14861.01	15203.50	15546.00
16977.68	17388.68	17799.67	18210.66	18621.65	19032.64
20272.96	20752.45	21231.94	21711.43	22190.92	22670.40
23719.36	24267.34	24815.33	25363.32	25911.31	26459.29
27316.88	27933.35	28549.85	29166.33	29782.83	30399.30
31065.51	31750.49	32435.48	33120.48	33805.45	34490.43

Continued

Y_{MC} (given ϕ = 22 in.)	Y_{MC} (given ϕ = 23 in.)	Y_{MC} (given ϕ = 24 in.)	Y_{MC} (given ϕ = 25 in.)	Y_{MC} (given ϕ = 26 in.)	Y_{MC} (given ϕ = 27 in.)
2603.83	2652.69	2701.53	2750.39	2799.25	2848.09
5207.67	5305.37	5403.07	6145.43	6677.78	6814.77
9231.56	9437.07	9642.55	9848.06	10053.54	10259.05
12484.47	12758.46	13032.45	13306.45	13580.44	13854.44
15888.49	16230.98	16573.47	16915.96	17258.46	17600.95
19443.63	19854.62	20265.61	20676.60	21087.60	21498.58
23149.90	23629.38	24108.88	24588.36	25067.86	25547.34
27007.29	27555.26	28103.27	28651.24	29199.23	29747.22
31015.79	31632.27	32248.78	32865.23	33481.74	34098.22
35175.45	35860.40	36545.38	37230.38	37915.36	38600.34

Y_{MC} (given ϕ = 28 in.)	Y_{MC} (given ϕ = 29 in.)	Y_{MC} (given ϕ = 30 in.)	Y_{MC} (given ϕ = 31 in.)	Y_{MC} (given ϕ = 32 in.)	Y_{MC} (given ϕ = 33 in.)
2896.95	2945.80	2994.65	3043.50	3092.36	3872.44
6951.77	7088.77	7225.76	7362.77	7499.75	7636.76
10464.54	10670.04	10875.53	11081.02	11286.52	11492.02
14128.42	14402.43	14676.42	14950.41	15224.40	15498.41
17943.44	18285.94	18628.42	18970.92	19313.41	19655.90
21909.58	22320.57	22731.56	23142.54	23553.54	23964.52
26026.82	26506.32	26985.80	27465.30	27944.79	28424.27
30295.21	30843.20	31391.18	31939.18	32487.15	33035.15
34714.71	35331.19	35947.70	36564.15	37180.65	37797.14
39285.31	39970.34	40655.27	41340.30	42025.25	42710.29

Y_{MC} (given ϕ = 34 in.)	Y_{MC} (given ϕ = 35 in.)	Y_{MC} (given ϕ = 36 in.)	Y_{MC} (given ϕ = 37 in.)	Y_{MC} (given ϕ = 38 in.)	Y_{MC} (given ϕ = 39 in.)
4001.11	4069.62	4138.11	4206.61	4275.11	4343.61
7773.75	7910.75	8047.75	8184.74	8321.74	8458.74
11697.51	11903.01	12108.50	12314.00	12519.49	12724.99
15772.39	16046.38	16320.38	16594.37	16868.37	17142.36
19998.39	20340.89	20683.39	21025.86	21368.37	21710.85
24375.52	24786.52	25197.50	25608.49	26019.48	26430.48
28903.77	29383.25	29862.76	30342.22	30821.73	31301.20
33583.13	34131.13	34679.10	35227.10	35775.09	36323.04
38413.63	39030.09	39646.60	40263.10	40879.50	41496.09
43395.20	44080.20	44765.20	45450.20	46135.19	46820.11

Y_{MC} (given ϕ = 40 in.)	Y_{MC} (given ϕ = 41 in.)	Y_{MC} (given ϕ = 42 in.)	Y_{MC} (given ϕ = 43 in.)	Y_{MC} (given ϕ = 44 in.)
4412.10	4480.61	4549.10	4617.60	4686.10
8595.73	8732.73	8869.73	9006.72	9143.72
12930.48	13135.98	13341.48	13546.96	13752.48
17416.35	17690.36	17964.34	18238.33	18512.33
22053.35	22395.84	22738.34	23080.83	23423.31
26841.47	27252.44	27663.45	28074.43	28485.44
31780.70	32260.18	32739.69	33219.16	33698.68
36871.10	37418.99	37967.11	38515.00	39063.00
42112.61	42729.00	43345.50	43962.00	44578.50
46306.80	42876.41	43365.00	43853.39	44342.00

Table 34

MARGINAL DRILLING COSTS FOR
CASED WELLS IN VERY HARD ROCK
AS A FUNCTION OF DIAMETER AT A GIVEN DEPTH
(in dollars)

$$Y_{MC} = Y_{TC}(\phi+1) - Y_{TC}(\phi)$$

Where:

Y_{MC} = Marginal drilling costs;

$Y_{TC}(\phi+1)$ = Total drilling costs for cased wells in very hard rock at a diameter of $\phi+1$;

$Y_{TC}(\phi)$ = Total drilling cost for cased wells in very hard rock at a diameter ϕ;

ϕ = Diameter of hole drilled ranging from 10 to 44 inches.

Y_{MC} (given ϕ = 10 in.)	Y_{MC} (given ϕ = 11 in.)	Y_{MC} (given ϕ = 12 in.)	Y_{MC} (given ϕ = 13 in.)	Y_{MC} (given ϕ = 14 in.)	Y_{MC} (given ϕ = 15 in.)
2194.57	2249.01	2303.46	2357.90	2412.34	2466.79
4389.13	4498.03	4606.91	4715.80	4824.68	4933.57
6583.71	6747.03	6910.37	7073.70	7237.02	7400.36
10128.38	10448.31	10768.25	11088.17	11408.11	11728.03
13056.72	13456.64	13856.55	14256.46	14656.38	15056.29
16181.52	16661.41	17141.32	17621.21	18101.11	18581.00
19502.79	20062.66	20622.53	21182.42	21742.29	22302.18
23020.50	23660.36	24300.22	24940.08	25579.94	26219.80
26734.67	27454.52	28174.36	28894.20	29614.05	30333.89
30645.30	31445.13	32244.96	33044.79	33844.61	34644.44

Y_{MC} (given ϕ = 16 in.)	Y_{MC} (given ϕ = 17 in.)	Y_{MC} (given ϕ = 18 in.)	Y_{MC} (given ϕ = 19 in.)	Y_{MC} (given ϕ = 20 in.)	Y_{MC} (given ϕ = 21 in.)
2521.22	2575.68	2630.11	2684.56	2739.00	2793.44
5042.46	5151.34	5260.23	5369.11	5478.01	5586.38
7563.68	8150.29	9316.09	9556.03	9795.97	10035.93
12047.97	12367.90	12687.82	13007.77	13327.69	13647.61
15456.21	15856.11	16256.03	16655.94	17055.87	17455.77
19060.91	19540.79	20020.69	20500.59	20980.49	21460.38
22862.06	23421.93	23981.81	24541.70	25101.56	25661.45
26859.68	27499.52	28139.39	28779.26	29419.11	30058.97
31053.75	31773.57	32493.42	33213.28	33933.12	34652.96
35444.27	36244.09	37043.91	37843.76	38643.58	39443.40

Continued

Y_{MC} (given ϕ = 22 in.)	Y_{MC} (given ϕ = 23 in.)	Y_{MC} (given ϕ = 24 in.)	Y_{MC} (given ϕ = 25 in.)	Y_{MC} (given ϕ = 26 in.)	Y_{MC} (given ϕ = 27 in.)
2847.89	2902.33	2956.77	3011.22	3065.66	3120.10
5695.78	5804.66	5913.54	6790.40	7420.52	7580.49
10275.88	10515.82	10755.78	10995.72	11235.66	11475.62
13967.56	14287.48	14607.41	14927.34	15247.28	15567.21
17855.69	18255.60	18655.51	19055.42	19455.34	19855.26
21940.28	22420.17	22900.07	23379.96	23859.87	24339.75
26221.33	26781.20	27341.09	27900.96	28460.84	29020.73
30698.84	31338.70	31978.55	32618.41	33258.29	33898.15
35372.81	36092.63	36812.50	37532.34	38252.18	38972.03
40243.24	41043.04	41842.89	42642.70	43442.52	44242.38

Y_{MC} (given ϕ = 28 in.)	Y_{MC} (given ϕ = 29 in.)	Y_{MC} (given ϕ = 30 in.)	Y_{MC} (given ϕ = 31 in.)	Y_{MC} (given ϕ = 32 in.)	Y_{MC} (given ϕ = 33 in.)
3174.54	3228.99	3283.43	3337.88	3392.32	4292.23
7740.45	7900.42	8060.38	8220.35	8380.31	8540.28
11715.57	11955.51	12195.46	12435.41	12675.36	12915.31
15887.13	16207.07	16527.00	16846.92	17166.87	17486.79
20255.15	20655.09	21054.99	21454.91	21854.82	22254.73
24819.66	25299.55	25779.46	26259.33	26739.24	27219.14
29580.59	30140.49	30700.36	31260.23	31820.11	32380.02
34537.99	35177.89	35817.72	36457.59	37097.45	37737.32
39691.85	40411.73	41131.55	41851.41	42571.21	43291.10
45042.17	45842.08	46641.80	47441.70	48241.50	49041.30

Y_{MC} (given ϕ = 34 in.)	Y_{MC} (given ϕ = 35 in.)	Y_{MC} (given ϕ = 36 in.)	Y_{MC} (given ϕ = 37 in.)	Y_{MC} (given ϕ = 38 in.)	Y_{MC} (given ϕ = 39 in.)
4441.70	4521.67	4601.66	4681.64	4761.62	4841.61
8700.24	8860.21	9020.18	9180.13	9340.11	9500.07
13155.24	13395.21	13635.15	13875.09	14115.05	14354.99
17806.72	18126.65	18446.58	18766.52	19086.44	19406.37
22654.64	23054.57	23454.48	23854.37	24254.31	24654.20
27699.02	28178.94	28658.82	29138.71	29618.63	30098.52
32939.87	33499.76	34059.64	34619.50	35179.40	35739.27
38377.17	39017.03	39656.88	40296.80	40936.59	41576.50
44011.00	44730.80	45450.59	46170.41	46890.30	47610.20
49841.11	50641.00	51440.80	52240.59	53040.50	53840.30

Y_{MC} (given ϕ = 40 in.)	Y_{MC} (given ϕ = 41 in.)	Y_{MC} (given ϕ = 42 in.)	Y_{MC} (given ϕ = 43 in.)	Y_{MC} (given ϕ = 44 in.)
4921.59	5001.57	5081.56	5161.53	5241.52
9660.04	9820.00	9979.97	10139.93	10299.89
14594.95	14834.89	15074.83	15314.79	15554.74
19726.31	20046.23	20366.17	20686.09	21006.03
25054.14	25454.05	25853.94	26253.87	26653.80
30578.41	31058.30	31538.21	32018.09	32497.98
36299.11	36859.09	37418.91	37978.70	38538.70
42216.30	42856.20	43496.11	44135.89	44775.80
48330.00	49049.89	49769.61	50489.59	51209.30
53108.61	48645.89	49190.41	49734.91	50279.30

Table 35

MARGINAL DRILLING COSTS FOR
UNCASED WELLS IN SOFT ROCK
AS A FUNCTION OF DIAMETER AT A GIVEN DEPTH
(in dollars)

$Y_{MUC} = Y_{TU}(\phi+1) - Y_{TU}(\phi)$

Where:

Y_{MUC} = Marginal drilling cost;

$Y_{TU}(\phi+1)$ = Total drilling cost for uncased wells in soft rock at a diameter $\phi+1$;

$Y_{TU}(\phi)$ = Total drilling costs for uncased wells in soft rock at a diameter ϕ;

ϕ = Diameter of the hole drilled ranging from 10 to 44 inches.

Y_{MUC} (given ϕ = 10 in.)	Y_{MUC} (given ϕ = 11 in.)	Y_{MUC} (given ϕ = 12 in.)	Y_{MUC} (given ϕ = 13 in.)	Y_{MUC} (given ϕ = 14 in.)	Y_{MUC} (given ϕ = 15 in.)
385.32	407.23	429.15	451.06	472.98	494.90
770.64	814.47	858.29	902.13	945.96	989.78
1155.95	1221.70	1287.44	1353.19	1418.94	1484.68
2163.50	2276.69	2389.90	2503.10	2616.30	2729.49
2732.26	2873.75	3015.26	3156.76	3298.26	3439.76
3350.13	3519.93	3689.74	3859.53	4029.34	4199.13
4017.13	4215.22	4413.32	4611.43	4809.52	5007.62
4733.22	4959.63	5186.03	5412.43	5638.83	5865.23
5498.44	5753.15	6007.85	6262.54	6517.25	6771.95
6312.78	6595.78	6878.78	7161.78	7444.78	7727.79

Y_{MUC} (given ϕ = 16 in.)	Y_{MUC} (given ϕ = 17 in.)	Y_{MUC} (given ϕ = 18 in.)	Y_{MUC} (given ϕ = 19 in.)	Y_{MUC} (given ϕ = 20 in.)	Y_{MUC} (given ϕ = 21 in.)
516.80	538.73	560.64	582.55	604.47	626.39
1033.62	1077.45	1121.28	1165.10	1208.94	1252.77
1550.42	1809.60	2323.05	2407.95	2492.85	2577.76
2842.70	2955.90	3069.10	3182.30	3295.50	3408.70
3581.26	3722.76	3864.26	4005.76	4147.26	4288.76
4368.94	4538.73	4708.54	4878.34	5048.13	5217.94
5205.73	5403.83	5601.92	5800.03	5998.13	6196.23
6091.63	6318.03	6544.43	6770.83	6997.24	7223.63
7026.65	7281.35	7536.05	7790.76	8045.45	8300.15
8010.78	8293.78	8576.79	8859.79	9142.78	9425.79

Continued

Y_{MUC} (given ϕ = 22 in.)	Y_{MUC} (given ϕ = 23 in.)	Y_{MUC} (given ϕ = 24 in.)	Y_{MUC} (given ϕ = 25 in.)	Y_{MUC} (given ϕ = 26 in.)	Y_{MUC} (given ϕ = 27 in.)
648.30	670.21	692.13	714.05	735.96	757.87
1296.60	1340.43	1384.26	1795.28	2078.93	2135.52
2662.65	2747.55	2832.46	2917.35	3002.26	3087.15
3521.90	3635.10	3748.30	3861.50	3974.70	4087.91
4430.26	4571.77	4713.26	4854.76	4996.26	5137.77
5387.74	5557.54	5727.34	5897.13	6066.94	6236.74
6394.32	6592.43	6790.53	6988.63	7186.73	7384.84
7450.03	7676.44	7902.84	8129.23	8355.64	8582.03
8554.86	8809.55	9064.26	9318.95	9573.66	9828.35
9708.79	9991.79	10274.79	10557.79	10840.79	11123.79

Y_{MUC} (given ϕ = 28 in.)	Y_{MUC} (given ϕ = 29 in.)	Y_{MUC} (given ϕ = 30 in.)	Y_{MUC} (given ϕ = 31 in.)	Y_{MUC} (given ϕ = 32 in.)	Y_{MUC} (given ϕ = 33 in.)
779.79	801.71	823.62	845.54	867.45	1363.53
2192.12	2248.72	2305.32	2361.93	2418.52	2475.12
3172.05	3256.96	3341.86	3426.75	3511.65	3596.56
4201.10	4314.30	4427.50	4540.71	4653.90	4767.10
5279.26	5420.77	5562.26	5703.77	5845.26	5986.77
6406.54	6576.35	6746.14	6915.94	7085.74	7255.55
7582.93	7781.03	7979.13	8177.24	8375.33	8573.43
8808.44	9034.84	9261.24	9487.64	9714.04	9940.44
10083.06	10337.76	10592.46	10847.16	11101.86	11356.56
11406.79	11689.80	11972.79	12255.80	12538.79	12821.80

Y_{MUC} (given ϕ = 34 in.)	Y_{MUC} (given ϕ = 35 in.)	Y_{MUC} (given ϕ = 36 in.)	Y_{MUC} (given ϕ = 37 in.)	Y_{MUC} (given ϕ = 38 in.)	Y_{MUC} (given ϕ = 39 in.)
1431.11	1459.40	1487.71	1516.00	1544.31	1572.60
2531.72	2588.33	2644.92	2701.52	2758.13	2814.72
3681.46	3766.35	3851.26	3936.16	4021.05	4105.96
4880.31	4993.50	5106.71	5219.90	5333.10	5446.31
6128.26	6269.77	6411.27	6552.76	6694.27	6835.77
7425.34	7595.14	7764.95	7934.74	8104.54	8274.35
8771.54	8969.64	9167.73	9365.83	9563.94	9762.04
10166.84	10393.24	10619.64	10846.04	11072.45	11298.84
11611.26	11865.97	12120.66	12375.36	12630.06	12884.77
13104.79	13387.80	13670.81	13953.78	14236.82	14519.79

Y_{MUC} (given ϕ = 40 in.)	Y_{MUC} (given ϕ = 41 in.)	Y_{MUC} (given ϕ = 42 in.)	Y_{MUC} (given ϕ = 43 in.)	Y_{MUC} (given ϕ = 44 in.)
1600.91	1629.20	1657.50	1685.81	1714.10
2871.32	2927.93	2984.52	3041.13	3097.72
4190.86	4275.76	4360.65	4445.56	4530.46
5559.51	5672.70	5785.91	5899.10	6012.31
6977.27	7118.77	7260.27	7401.77	7543.27
8444.15	8613.94	8783.75	8953.55	9123.34
9960.14	10158.24	10356.34	10554.44	10752.53
11525.24	11751.65	11978.04	12204.45	12430.35
13139.47	13394.16	13648.87	13903.57	14158.26
14354.21	13102.62	13321.75	13540.92	13760.06

Table 36

MARGINAL DRILLING COSTS FOR
UNCASED WELLS IN MEDIUM SOFT ROCK
AS A FUNCTION OF DIAMETER AT A GIVEN DEPTH
(in dollars)

$$Y_{MUC} = Y_{TU}(\phi+1) - Y_{TU}(\phi)$$

Where:

Y_{MUC} = Marginal drilling cost;

$Y_{TU}(\phi+1)$ = Total drilling cost for uncased wells in medium soft rock at a diameter $\phi+1$;

$Y_{TU}(\phi)$ = Total drilling costs for uncased wells in medium soft rock at a diameter ϕ;

ϕ = Diameter of the hole drilled ranging from 10 to 44 inches.

Y_{MUC} (given ϕ = 10 in.)	Y_{MUC} (given ϕ = 11 in.)	Y_{MUC} (given ϕ = 12 in.)	Y_{MUC} (given ϕ = 13 in.)	Y_{MUC} (given ϕ = 14 in.)	Y_{MUC} (given ϕ = 15 in.)
457.38	482.09	506.79	531.51	556.22	580.93
914.75	964.18	1013.59	1063.01	1112.44	1161.86
1372.13	1446.26	1520.39	1594.53	1668.65	1742.78
2532.61	2665.50	2798.39	2931.29	3064.18	3197.08
3234.57	3400.69	3566.81	3732.93	3899.04	4065.17
4002.03	4201.36	4400.71	4600.05	4799.40	4998.73
4834.96	5067.53	5300.10	5532.66	5765.23	5997.79
5733.39	5999.18	6264.97	6530.75	6796.55	7062.33
6697.30	6996.31	7295.33	7594.34	7893.35	8192.36
7726.70	8058.93	8391.17	8723.41	9055.64	9387.88

Y_{MUC} (given ϕ = 16 in.)	Y_{MUC} (given ϕ = 17 in.)	Y_{MUC} (given ϕ = 18 in.)	Y_{MUC} (given ϕ = 19 in.)	Y_{MUC} (given ϕ = 20 in.)	Y_{MUC} (given ϕ = 21 in.)
605.64	630.35	655.06	679.77	704.48	729.19
1211.27	1260.70	1310.12	1359.54	1408.96	1458.38
1816.92	2110.01	2693.49	2793.16	2892.84	2992.50
3329.98	3462.86	3595.77	3728.65	3861.55	3994.45
4231.28	4397.40	4563.52	4729.63	4895.76	5061.87
5198.08	5397.41	5596.76	5796.10	5995.45	6194.78
6230.36	6462.92	6695.48	6928.06	7160.62	7393.18
7328.13	7593.91	7859.70	8125.49	8391.28	8657.07
8491.38	8790.39	9089.40	9388.42	9687.43	9986.44
9720.12	10052.35	10384.59	10716.82	11049.07	11381.29

Continued

Y_{MUC} (given ϕ = 22 in.)	Y_{MUC} (given ϕ = 23 in.)	Y_{MUC} (given ϕ = 24 in.)	Y_{MUC} (given ϕ = 25 in.)	Y_{MUC} (given ϕ = 26 in.)	Y_{MUC} (given ϕ = 27 in.)
753.90	778.61	803.32	828.03	852.75	877.45
1507.81	1557.22	1606.64	2067.79	2388.29	2454.73
3092.18	3191.84	3291.52	3391.19	3490.86	3590.53
4127.34	4260.23	4393.13	4526.03	4658.91	4791.82
5227.99	5394.11	5560.22	5726.35	5892.46	6058.58
6394.13	6593.47	6792.81	6992.15	7191.49	7390.84
7625.75	7858.31	8090.88	8323.45	8556.01	8788.57
8922.86	9188.65	9454.43	9720.22	9986.02	10251.80
0285.45	10584.46	10883.48	11182.49	11481.51	11780.51
713.5^	12045.77	12378.00	12710.24	13042.48	13374.72

Y_{MUC} (given ϕ = 28 in.)	Y_{MUC} (given ϕ = 29 in.)	Y_{MUC} (given ϕ = 30 in.)	Y_{MUC} (given ϕ = 31 in.)	Y_{MUC} (given ϕ = 32 in.)	Y_{MUC} (given ϕ = 33 in.)
902.17	926.87	951.58	976.30	1541.14	1001.01
2521.18	2587.63	2654.08	2720.52	2853.42	2786.97
3690.20	3789.87	3889.55	3989.21	4188.56	4088.88
4924.70	5057.60	5190.50	5323.39	5589.17	5456.29
6224.70	6390.82	6556.93	6723.06	7055.29	6889.17
7590.17	7789.52	7988.87	8188.20	8586.89	8387.54
9021.15	9253.70	9486.28	9718.83	10183.97	9951.40
10517.59	10783.38	11049.18	11314.95	11846.54	11580.75
12079.53	12378.54	12677.55	12976.57	13574.59	13275.57
13706.94	14039.19	14371.42	14703.66	15368.13	15035.90

Y_{MUC} (given ϕ = 34 in.)	Y_{MUC} (given ϕ = 35 in.)	Y_{MUC} (given ϕ = 36 in.)	Y_{MUC} (given ϕ = 37 in.)	Y_{MUC} (given ϕ = 38 in.)	Y_{MUC} (given ϕ = 39 in.)
1616.99	1650.21	1683.44	1716.65	1749.89	1783.11
2919.86	2986.32	3052.76	3119.20	3185.65	3252.11
4288.22	4387.90	4487.57	4587.24	4686.91	4786.58
5722.08	5854.97	5987.86	6120.76	6253.65	6386.54
7221.40	7387.53	7553.65	7719.76	7885.88	8052.00
8786.22	8985.58	9184.91	9384.25	9583.59	9782.94
10416.53	10649.11	10881.66	11114.23	11346.80	11579.36
12112.32	12378.11	12643.91	12909.69	13175.48	13441.28
13873.61	14172.62	14471.63	14770.64	15069.65	15368.67
15700.37	16032.60	16364.85	16697.06	17029.32	17361.55

Y_{MUC} (given ϕ = 40 in.)	Y_{MUC} (given ϕ = 41 in.)	Y_{MUC} (given ϕ = 42 in.)	Y_{MUC} (given ϕ = 43 in.)	Y_{MUC} (given ϕ = 44 in.)
1816.33	1849.55	1882.78	1916.00	1949.23
3318.54	3385.00	3451.44	3517.89	3584.34
4886.25	4985.92	5085.60	5185.26	5284.94
6519.45	6652.33	6785.23	6918.12	7051.02
8218.11	8384.24	8550.35	8716.47	8882.59
9982.28	10181.62	10380.96	10580.30	10779.65
11811.92	12044.49	12277.06	12509.62	12742.18
13707.05	13972.85	14238.64	14504.43	14770.21
15667.67	15966.70	16265.70	16564.72	16863.73
17124.86	15508.31	15755.40	16002.50	16249.63

Table 37

MARGINAL DRILLING COSTS FOR
UNCASED WELLS IN MEDIUM HARD ROCK
AS A FUNCTION OF DIAMETER AT A GIVEN DEPTH
(in dollars)

$$Y_{MUC} = Y_{TU}(\phi+1) - Y_{TU}(\phi)$$

Where:

Y_{MUC} = Marginal drilling cost;

$Y_{TU}(\phi+1)$ = Total drilling cost for uncased wells in medium hard rock at a diameter $\phi+1$;

$Y_{TU}(\phi)$ = Total drilling costs for uncased wells in medium hard rock at a diameter ϕ;

ϕ = Diameter of the hole drilled ranging from 10 to 44 inches.

Y_{MUC} (given ϕ = 10 in.)	Y_{MUC} (given ϕ = 11 in.)	Y_{MUC} (given ϕ = 12 in.)	Y_{MUC} (given ϕ = 13 in.)	Y_{MUC} (given ϕ = 14 in.)	Y_{MUC} (given ϕ = 15 in.)
538.72	566.22	593.73	621.24	648.74	676.25
1077.44	1132.45	1187.46	1242.47	1297.49	1352.49
1616.16	1698.67	1781.19	1863.71	1946.23	2028.74
12956.43	3110.88	3265.31	3419.75	3574.19	3728.64
3814.19	4007.23	4200.29	4393.33	4586.38	4779.43
4757.35	4989.01	5220.68	5452.32	5683.99	5915.65
5785.94	6056.20	6326.47	6596.74	6867.01	7137.28
6899.94	7208.82	7517.69	7826.57	8135.45	8444.33
8099.35	8446.85	8794.33	9141.81	9489.31	9836.80
9384.19	9770.28	10156.38	10542.49	10928.57	11314.68

Y_{MUC} (given ϕ = 16 in.)	Y_{MUC} (given ϕ = 17 in.)	Y_{MUC} (given ϕ = 18 in.)	Y_{MUC} (given ϕ = 19 in.)	Y_{MUC} (given ϕ = 20 in.)	Y_{MUC} (given ϕ = 21 in.)
703.75	731.26	758.76	786.27	813.78	841.28
1407.51	1462.52	1517.53	1572.54	1627.55	1682.56
2111.26	2443.83	3110.73	3226.57	3342.40	3458.22
3883.07	4037.51	4191.95	4346.39	4500.83	4655.26
4972.48	5165.53	5358.58	5551.63	5744.68	5937.72
6147.31	6378.96	6610.62	6842.29	7073.94	7305.60
7407.56	7677.81	7948.09	8218.36	8488.62	8758.90
8753.21	9062.09	9370.96	9679.85	9988.72	10297.60
10184.29	10531.77	10879.25	11226.76	11574.24	11921.73
11700.78	12086.88	12472.97	12859.07	13245.18	13631.27

Continued

Y_{MUC} (given ϕ = 22 in.)	Y_{MUC} (given ϕ = 23 in.)	Y_{MUC} (given ϕ = 24 in.)	Y_{MUC} (given ϕ = 25 in.)	Y_{MUC} (given ϕ = 26 in.)	Y_{MUC} (given ϕ = 27 in.)
868.79	896.29	923.80	951.30	978.81	1006.32
1737.58	1792.58	1847.60	2368.54	2732.70	2809.92
3574.06	3689.88	3805.72	3921.54	4037.37	4153.21
4809.71	4964.15	5118.58	5273.03	5427.46	5581.91
6130.78	6323.82	6516.88	6709.92	6902.97	7096.03
7537.26	7768.92	8000.58	8232.24	8463.90	8695.55
9029.15	9299.44	9569.70	9839.97	10110.24	10380.51
10606.49	10915.35	11224.25	11533.11	11842.00	12150.87
12269.21	12616.71	12964.19	13311.68	13659.18	14006.66
14017.37	14403.46	14789.56	15175.67	15561.76	15947.86

Y_{MUC} (given ϕ = 28 in.)	Y_{MUC} (given ϕ = 29 in.)	Y_{MUC} (given ϕ = 30 in.)	Y_{MUC} (given ϕ = 31 in.)	Y_{MUC} (given ϕ = 32 in.)	Y_{MUC} (given ϕ = 33 in.)
1033.82	1061.33	1088.83	1116.34	1143.84	1737.00
2887.14	2964.35	3041.58	3118.80	3196.02	3273.23
4269.03	4384.86	4500.69	4616.52	4732.36	4848.18
5736.34	5890.78	6045.22	6199.67	6354.10	6508.54
7289.06	7482.13	7675.17	7868.22	8061.26	8254.32
8927.22	9158.87	9390.54	9622.19	9853.85	10085.51
10650.77	10921.04	11191.32	11461.58	11731.86	12002.12
12459.76	12768.63	13077.51	13386.39	13695.27	14004.15
14354.14	14701.64	15049.13	15396.60	15744.11	16091.59
16333.95	16720.07	17106.15	17492.26	17878.36	18264.44

Y_{MUC} (given ϕ = 34 in.)	Y_{MUC} (given ϕ = 35 in.)	Y_{MUC} (given ϕ = 36 in.)	Y_{MUC} (given ϕ = 37 in.)	Y_{MUC} (given ϕ = 38 in.)	Y_{MUC} (given ϕ = 39 in.)
1822.32	1860.93	1899.54	1938.15	1976.76	2015.37
3350.46	3427.68	3504.89	3582.12	3659.33	3736.56
4964.01	5079.84	5195.67	5311.49	5427.33	5543.16
6662.98	6817.42	6971.86	7126.29	7280.74	7435.18
8447.37	8640.41	8833.47	9026.51	9219.57	9412.61
10317.17	10548.83	10780.49	11012.14	11243.81	11475.47
12272.38	12542.66	12812.94	13083.19	13353.47	13623.73
14313.03	14621.90	14930.79	15239.66	15548.54	15857.42
16439.08	16786.57	17134.06	17481.53	17829.04	18176.53
18650.55	19036.65	19422.75	19808.84	20194.94	20581.04

Y_{MUC} (given ϕ = 40 in.)	Y_{MUC} (given ϕ = 41 in.)	Y_{MUC} (given ϕ = 42 in.)	Y_{MUC} (given ϕ = 43 in.)	Y_{MUC} (given ϕ = 44 in.)
2053.98	2092.59	2131.20	2169.80	2208.42
3813.77	3891.00	3968.21	4045.44	4122.65
5658.99	5774.81	5890.65	6006.47	6122.31
7589.61	7744.06	7898.49	8052.94	8207.37
9605.66	9798.71	9991.76	10184.81	10377.86
11707.13	11938.78	12170.44	12402.10	12633.76
13894.00	14164.28	14434.54	14704.81	14975.07
16166.30	16475.18	16784.05	17092.93	17401.82
18524.01	18871.50	19218.99	19566.47	19913.96
20251.73	18184.79	18459.84	18734.90	19009.95

Table 38

MARGINAL DRILLING COSTS FOR
UNCASED WELLS IN HARD ROCK
AS A FUNCTION OF DIAMETER AT A GIVEN DEPTH
(in dollars)

$$Y_{MUC} = Y_{TU}(\phi+1) - Y_{TU}(\phi)$$

Where:

Y_{MUC} = Marginal drilling cost;

$Y_{TU}(\phi+1)$ = Total drilling cost for uncased wells in hard rock at a diameter $\phi+1$;

$Y_{TU}(\phi)$ = Total drilling costs for uncased wells in hard rock at a diameter ϕ;

ϕ = Diameter of the hole drilled ranging from 10 to 44 inches.

Y_{MUC} (given ϕ = 10 in.)	Y_{MUC} (given ϕ = 11 in.)	Y_{MUC} (given ϕ = 12 in.)	Y_{MUC} (given ϕ = 13 in.)	Y_{MUC} (given ϕ = 14 in.)	Y_{MUC} (given ϕ = 15 in.)
768.82	801.92	835.02	868.11	901.21	934.30
1537.65	1603.84	1670.03	1736.23	1802.42	1868.61
2306.47	2405.76	2505.05	2604.34	2703.63	2802.91
4201.43	4412.41	4623.37	4834.35	5045.31	5256.27
5534.71	5798.41	6062.12	6325.83	6589.54	6853.25
7019.09	7335.54	7651.99	7968.44	8284.90	8601.35
8654.60	9023.79	9392.98	9762.18	10131.37	10500.56
10441.22	10863.16	11285.10	11707.03	12128.97	12550.91
12378.98	12853.65	13328.34	13803.01	14277.69	14752.36
14467.85	14995.27	15522.69	16050.11	16577.53	17104.94

Y_{MUC} (given ϕ = 16 in.)	Y_{MUC} (given ϕ = 17 in.)	Y_{MUC} (given ϕ = 18 in.)	Y_{MUC} (given ϕ = 19 in.)	Y_{MUC} (given ϕ = 20 in.)	Y_{MUC} (given ϕ = 21 in.)
967.40	1000.50	1033.60	1066.68	1099.79	1132.88
1934.80	2000.99	2067.19	2133.38	2199.57	2265.77
2902.20	3354.05	4285.10	4443.33	4601.56	4759.78
5467.25	5678.21	5889.19	6100.15	6311.12	6522.08
7116.97	7380.67	7644.38	7908.09	8171.81	8435.51
8917.80	9234.25	9550.71	9867.15	10183.61	10500.06
10869.77	11238.95	11608.15	11977.34	12346.54	12715.73
12972.84	13394.77	13816.72	14238.65	14660.59	15082.51
15227.05	15701.71	16176.40	16651.09	17125.76	17600.43
17632.38	18159.78	18687.21	19214.63	19742.05	20269.47

Continued

Y_{MUC} (given ϕ = 22 in.)	Y_{MUC} (given ϕ = 23 in.)	Y_{MUC} (given ϕ = 24 in.)	Y_{MUC} (given ϕ = 25 in.)	Y_{MUC} (given ϕ = 26 in.)	Y_{MUC} (given ϕ = 27 in.)
1165.98	1199.08	1232.17	1265.26	1298.37	1331.46
2331.95	2398.15	2464.34	3175.19	3676.02	3781.50
4918.01	5076.23	5234.46	5392.69	5550.91	5709.14
6733.06	6944.02	7154.99	7365.96	7576.93	7787.89
8699.22	8962.94	9226.64	9490.35	9754.06	10017.78
10816.51	11132.97	11449.42	11765.86	12082.33	12398.77
13084.92	13454.12	13823.31	14192.51	14561.70	14930.89
15504.47	15926.38	16348.34	16770.26	17192.21	17614.13
18075.11	18549.79	19024.48	19499.14	19973.83	20448.50
20796.90	21324.31	21851.73	22379.15	22906.57	23433.99

Y_{MUC} (given ϕ = 28 in.)	Y_{MUC} (given ϕ = 29 in.)	Y_{MUC} (given ϕ = 30 in.)	Y_{MUC} (given ϕ = 31 in.)	Y_{MUC} (given ϕ = 32 in.)	Y_{MUC} (given ϕ = 33 in.)
1364.55	1397.65	1430.75	1463.84	1496.94	2261.27
3886.99	3992.47	4097.96	4203.44	4308.92	4414.41
5867.36	6025.59	6183.82	6342.04	6500.27	6658.50
7998.86	8209.83	8420.80	8631.77	8842.74	9053.70
10281.48	10545.19	10808.91	11072.61	11336.32	11600.04
12715.22	13031.68	13348.14	13664.57	13981.04	14297.48
15300.09	15669.29	16038.48	16407.67	16776.86	17146.05
18036.08	18458.02	18879.94	19301.88	19723.82	20145.76
20923.18	21397.87	21872.54	22347.20	22821.90	23296.58
23961.41	24488.84	25016.24	25543.67	26071.09	26598.50

Y_{MUC} (given ϕ = 34 in.)	Y_{MUC} (given ϕ = 35 in.)	Y_{MUC} (given ϕ = 36 in.)	Y_{MUC} (given ϕ = 37 in.)	Y_{MUC} (given ϕ = 38 in.)	Y_{MUC} (given ϕ = 39 in.)
2374.18	2426.93	2479.67	2532.41	2585.15	2637.90
4519.89	4625.38	4730.86	4836.34	4941.83	5047.31
6816.72	6974.94	7133.18	7291.40	7449.62	7607.85
9264.67	9475.64	9686.61	9897.57	10108.54	10319.51
11863.74	12127.45	12391.17	12654.87	12918.58	13182.30
14613.94	14930.39	15246.84	15563.30	15879.74	16196.20
17515.26	17884.45	18253.65	18622.82	18992.04	19361.22
20567.69	20989.62	21411.57	21833.50	22255.43	22677.37
23771.25	24245.93	24720.61	25195.27	25669.97	26144.64
27125.94	27653.37	28180.77	28708.18	29235.62	29763.02

Y_{MUC} (given ϕ = 40 in.)	Y_{MUC} (given ϕ = 41 in.)	Y_{MUC} (given ϕ = 42 in.)	Y_{MUC} (given ϕ = 43 in.)	Y_{MUC} (given ϕ = 44 in.)
2690.64	2743.37	2796.13	2848.86	2901.60
5152.80	5258.28	5363.76	5469.25	5574.73
7766.08	7924.30	8082.53	8240.76	8398.98
10530.49	10741.45	10952.41	11163.38	11374.36
13446.00	13709.73	13973.41	14237.13	14500.85
16512.65	16829.10	17145.56	17462.00	17778.47
19730.41	20099.62	20468.82	20837.98	21207.20
23099.31	23521.24	23943.18	24365.12	24787.05
26619.32	27094.01	27568.67	28043.36	28518.02
29092.12	25504.16	25835.11	26166.06	26497.04

Table 39

MARGINAL DRILLING COSTS FOR
UNCASED WELLS IN VERY HARD ROCK
AS A FUNCTION OF DIAMETER AT A GIVEN DEPTH
(in dollars)

$$Y_{MUC} = Y_{TU}(\phi+1) - Y_{TU}(\phi)$$

Where:

Y_{MUC} = Marginal drilling cost;

$Y_{TU}(\phi+1)$ = Total drilling cost for uncased wells in very hard rock at a diameter $\phi+1$;

$Y_{TU}(\phi)$ = Total drilling costs for uncased wells in very hard rock at a diameter ϕ;

ϕ = Diameter of the hole drilled ranging from 10 to 44 inches.

Y_{MUC} (given ϕ = 10 in.)	Y_{MUC} (given ϕ = 11 in.)	Y_{MUC} (given ϕ = 12 in.)	Y_{MUC} (given ϕ = 13 in.)	Y_{MUC} (given ϕ = 14 in.)	Y_{MUC} (given ϕ = 15 in.)
945.79	984.48	1023.17	1061.85	1100.54	1139.23
1891.58	1968.96	2046.34	2123.70	2201.08	2278.46
2837.38	2953.44	3069.50	3185.57	3301.62	3417.68
5133.28	5390.18	5647.09	5903.99	6160.90	6417.81
6812.85	7133.97	7455.11	7776.24	8097.36	8418.51
8688.86	9074.23	9459.58	9844.94	10230.30	10615.66
10761.35	11210.93	11660.52	12110.10	12559.68	13009.27
13030.29	13544.10	14057.91	14571.72	15085.54	15599.33
15495.68	16073.73	16651.76	17229.80	17807.83	18385.88
18157.54	18799.82	19442.06	20084.34	20726.59	21368.86

Y_{MUC} (given ϕ = 16 in.)	Y_{MUC} (given ϕ = 17 in.)	Y_{MUC} (given ϕ = 18 in.)	Y_{MUC} (given ϕ = 19 in.)	Y_{MUC} (given ϕ = 20 in.)	Y_{MUC} (given ϕ = 21 in.)
1177.91	1216.60	1255.29	1293.97	1332.66	1371.35
2355.83	2433.20	2510.57	2587.95	2665.32	2742.69
3533.74	4073.07	5191.61	5384.28	5576.96	5769.64
6674.71	6931.61	7188.52	7445.42	7702.33	7959.23
8739.63	9060.76	9381.89	9703.03	10024.16	10345.29
11001.01	11386.37	11771.73	12157.08	12542.45	12927.80
13458.86	13908.44	14358.01	14807.61	15257.19	15706.77
16113.16	16626.95	17140.78	17654.58	18168.39	18682.20
18963.90	19541.94	20119.98	20698.03	21276.05	21854.09
22011.12	22653.39	23295.64	23937.91	24580.18	25222.43

Continued

Y_{MUC} (given ϕ = 22 in.)	Y_{MUC} (given ϕ = 23 in.)	Y_{MUC} (given ϕ = 24 in.)	Y_{MUC} (given ϕ = 25 in.)	Y_{MUC} (given ϕ = 26 in.)	Y_{MUC} (given ϕ = 27 in.)
1410.04	1448.72	1487.40	1526.10	1564.78	1603.46
2820.07	2897.44	2974.82	3820.15	4418.76	4547.22
5962.31	6155.00	6347.67	6540.35	6733.04	6925.71
8216.15	8473.04	8729.95	8986.85	9243.76	9500.67
10666.42	10987.55	11308.68	11629.81	11950.95	12272.08
13313.16	13698.51	14083.88	14469.23	14854.59	15239.95
16156.36	16605.94	17055.52	17505.11	17954.69	18404.27
19196.02	19709.82	20223.63	20737.44	21251.25	21765.06
22432.12	23010.16	23588.20	24166.24	24744.28	25322.30
25864.72	26506.96	27149.20	27791.49	28433.75	29076.01

Y_{MUC} (given ϕ = 28 in.)	Y_{MUC} (given ϕ = 29 in.)	Y_{MUC} (given ϕ = 30 in.)	Y_{MUC} (given ϕ = 31 in.)	Y_{MUC} (given ϕ = 32 in.)	Y_{MUC} (given ϕ = 33 in.)
1642.16	1680.84	1719.53	1758.21	1796.90	2681.06
4675.67	4804.12	4932.57	5061.03	5189.48	5317.93
7118.39	7311.07	7503.75	7696.42	7889.11	8081.78
9757.56	10014.48	10271.38	10528.29	10785.19	11042.09
12593.20	12914.35	13235.47	13556.60	13877.73	14198.87
15625.30	16010.66	16396.03	16781.37	17166.74	17552.09
18853.86	19303.45	19753.03	20202.61	20652.19	21101.77
22278.88	22792.69	23306.49	23820.30	24334.12	24847.93
25900.34	26478.39	27056.41	27634.45	28212.48	28790.53
29718.27	30360.55	31002.80	31645.05	32287.34	32929.58

Y_{MUC} (given ϕ = 34 in.)	Y_{MUC} (given ϕ = 35 in.)	Y_{MUC} (given ϕ = 36 in.)	Y_{MUC} (given ϕ = 37 in.)	Y_{MUC} (given ϕ = 38 in.)	Y_{MUC} (given ϕ = 39 in.)
2814.77	2878.98	2943.22	3007.44	3071.67	3135.89
5446.38	5574.83	5703.29	5831.74	5960.20	6088.64
8274.46	8467.14	8659.83	8852.49	9045.18	9237.86
11299.00	11555.91	11812.81	12069.72	12326.61	12583.53
14519.99	14841.13	15162.26	15483.39	15804.52	16125.65
17937.45	18322.81	18708.17	19093.51	19478.89	19864.23
21551.37	22000.96	22450.52	22900.11	23349.70	23799.28
25361.73	25875.54	26389.36	26903.17	27416.96	27930.79
29368.57	29946.61	30524.63	31102.66	31680.71	32258.75
33571.85	34214.12	34856.37	35498.63	36140.95	36783.09

Y_{MUC} (given ϕ = 40 in.)	Y_{MUC} (given ϕ = 41 in.)	Y_{MUC} (given ϕ = 42 in.)	Y_{MUC} (given ϕ = 43 in.)	Y_{MUC} (given ϕ = 44 in.)
3200.12	3264.35	3328.57	3392.80	3457.03
6217.10	6345.56	6474.00	6602.45	6730.91
9430.53	9623.22	9815.89	10008.57	10201.26
12840.43	13097.34	13354.24	13611.14	13868.06
16446.79	16767.92	17089.04	17410.18	17731.31
20249.59	20634.96	21020.31	21405.66	21791.05
24248.87	24698.45	25148.02	25597.63	26047.20
28444.60	28958.40	29472.22	29986.01	30499.85
32836.78	33414.82	33992.90	34570.80	35149.00
35893.91	31273.70	31660.59	32047.50	32434.30

Table 40

ESTIMATED DRILLING TIME FUNCTION FOR GOMEZ FIELD (TEXAS)

FOR 12-1/4-INCH DIAMETER WELLS

$Y_{DT} = 0.126(10^{-5})X^2 + 0.06X - 31$

where: Y_{DT} = Drilling time in hours

X = Depth in feet

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
-0.31091213E-01	0.20843568E-01	-0.14916454E 01	0.09999999E 01	0.
0.59937941E-04	0.78546197E-05	0.76309157E 01	0.60667446E 04	0.95545216E 00
0.12643326E-08	0.65738512E-09	0.19232754E 01	0.43287724E 08	0.94466193E 00

RSQ = 0.9143
R = 0.9562
F(2,228)= 1215.8740
SUMUSQ = 0.7859
DURBIN-W.= 0.1169

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
1	821.00	0.0182	0.0190	-0.0007
2	1107.00	0.0462	0.0368	0.0094
3	1579.00	0.0657	0.0667	-0.0010
4	1960.00	0.0927	0.0912	0.0015
5	2340.00	0.1147	0.1161	-0.0013
6	2690.00	0.1360	0.1393	-0.0033

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
7	3068.00	0.1582	0.1647	-0.0064
8	3437.00	0.1787	0.1899	-0.0111
9	3742.00	0.1977	0.2109	-0.0132
10	4234.00	0.2182	0.2454	-0.0271
11	4509.00	0.2327	0.2649	-0.0321
12	4708.00	0.2477	0.2791	-0.0314
13	4912.00	0.2595	0.2938	-0.0343
14	5146.00	0.2745	0.3108	-0.0363
15	5312.00	0.2910	0.3230	-0.0320
16	5507.00	0.3072	0.3373	-0.0301
17	5690.00	0.3202	0.3509	-0.0306
18	5872.00	0.3317	0.3645	-0.0327
19	5953.00	0.3400	0.3705	-0.0305
20	6473.00	0.3772	0.4099	-0.0326
21	6745.00	0.3982	0.4307	-0.0325
22	6950.00	0.4150	0.4465	-0.0315
23	7818.00	0.4792	0.5148	-0.0355
24	7998.00	0.4952	0.5292	-0.0339
25	8182.00	0.5107	0.5440	-0.0332
26	8496.00	0.5422	0.5694	-0.0272
27	8758.00	0.5682	0.5908	-0.0226
28	8934.00	0.5890	0.6053	-0.0163
29	9059.00	0.6002	0.6156	-0.0154
30	9104.00	0.6065	0.6194	-0.0129
31	9214.00	0.6205	0.6285	-0.0080
32	9371.00	0.6452	0.6416	0.0036
33	9511.00	0.6680	0.6533	0.0147
34	9540.00	0.6735	0.6558	0.0177
35	1500.00	0.0673	0.0617	0.0056
36	2500.00	0.1344	0.1267	0.0077

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
37	2967.00	0.1595	0.1579	0.0016
38	3060.00	0.1780	0.1642	0.0138
39	3166.00	0.1935	0.1713	0.0221
40	3386.00	0.2225	0.1864	0.0361
41	3589.00	0.2475	0.2003	0.0472
42	3735.00	0.2597	0.2104	0.0493
43	3943.00	0.2775	0.2249	0.0526
44	4321.00	0.2990	0.2515	0.0475
45	4690.00	0.3165	0.2778	0.0387
46	4948.00	0.3345	0.2964	0.0380
47	5206.00	0.3530	0.3152	0.0378
48	5449.00	0.3785	0.3331	0.0454
49	5612.00	0.3952	0.3451	0.0501
50	5860.00	0.4202	0.3636	0.0567
51	5981.00	0.4290	0.3726	0.0564
52	6933.00	0.5345	0.4452	0.0892
53	7222.00	0.5605	0.4677	0.0928
54	7489.00	0.5822	0.4887	0.0935
55	7756.00	0.6077	0.5098	0.0979
56	8021.00	0.6262	0.5310	0.0952
57	8315.00	0.6455	0.5547	0.0908
58	8651.00	0.6735	0.5821	0.0914
59	8872.00	0.6977	0.6002	0.0975
60	9092.00	0.7182	0.6184	0.0999
61	9295.00	0.7402	0.6353	0.1050
62	9512.00	0.7645	0.6534	0.1110
63	9790.00	0.7912	0.6769	0.1143
64	10010.00	0.8130	0.6956	0.1174
65	10109.00	0.8285	0.7040	0.1245
66	558.00	0.0250	0.0027	0.0223

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
67	1320.00	0.0555	0.0502	0.0053
68	1540.00	0.0645	0.0642	0.0003
69	1761.00	0.0800	0.0784	0.0016
70	2072.00	0.1015	0.0985	0.0030
71	2345.00	0.1205	0.1164	0.0041
72	2546.00	0.1345	0.1297	0.0048
73	2795.00	0.1475	0.1463	0.0012
74	3345.00	0.1613	0.1835	-0.0223
75	3500.00	0.1753	0.1942	-0.0189
76	3707.00	0.1898	0.2085	-0.0187
77	4150.00	0.2048	0.2394	-0.0347
78	4350.00	0.2170	0.2536	-0.0365
79	4471.00	0.2285	0.2622	-0.0336
80	4662.00	0.2448	0.2758	-0.0310
81	4872.00	0.2620	0.2909	-0.0289
82	5030.00	0.2753	0.3024	-0.0271
83	5106.00	0.2825	0.3079	-0.0254
84	5267.00	0.2990	0.3197	-0.0207
85	5390.00	0.3090	0.3287	-0.0197
86	5561.00	0.3255	0.3413	-0.0158
87	6369.00	0.4075	0.4019	0.0056
88	6467.00	0.4243	0.4094	0.0149
89	6469.00	0.4243	0.4096	0.0147
90	6623.00	0.4388	0.4213	0.0174
91	6759.00	0.4568	0.4318	0.0250
92	7555.00	0.5440	0.4939	0.0501
93	7727.00	0.5618	0.5075	0.0542
94	7962.00	0.5763	0.5263	0.0500
95	8175.00	0.5943	0.5434	0.0509
96	8380.00	0.6120	0.5600	0.0521

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
97	8545.00	0.6278	0.5734	0.0544
98	8727.00	0.6415	0.5883	0.0533
99	9018.00	0.6608	0.6123	0.0485
100	9322.00	0.6823	0.6375	0.0448
101	9597.00	0.7060	0.6606	0.0454
102	1500.00	0.0673	0.0617	0.0056
103	2500.00	0.1344	0.1267	0.0077
104	3203.00	0.1722	0.1739	-0.0017
105	3480.00	0.1879	0.1928	-0.0049
106	3808.00	0.2039	0.2155	-0.0116
107	3976.00	0.2129	0.2272	-0.0143
108	4583.00	0.2329	0.2702	-0.0372
109	4856.00	0.2477	0.2898	-0.0421
110	4945.00	0.2534	0.2962	-0.0428
111	5061.00	0.2614	0.3046	-0.0432
112	5190.00	0.2687	0.3140	-0.0454
113	6610.00	0.3822	0.4203	-0.0382
114	7950.00	0.4942	0.5253	-0.0312
115	8098.00	0.5212	0.5372	-0.0160
116	8333.00	0.5422	0.5562	-0.0140
117	8357.00	0.5479	0.5581	-0.0102
118	8575.00	0.5697	0.5758	-0.0062
119	8765.00	0.5867	0.5914	-0.0047
120	8810.00	0.5907	0.5951	-0.0044
121	8995.00	0.6114	0.6103	0.0011
122	9110.00	0.6219	0.6199	0.0020
123	9265.00	0.6432	0.6328	0.0104
124	9376.00	0.6544	0.6420	0.0124
125	9595.00	0.6754	0.6604	0.0150
126	1500.00	0.0673	0.0617	0.0056

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
127	2500.00	0.1344	0.1267	0.0077
128	3225.00	0.1733	0.1754	-0.0021
129	3510.00	0.2083	0.1949	0.0134
130	3890.00	0.2458	0.2212	0.0246
131	3993.00	0.2563	0.2284	0.0279
132	4201.00	0.2688	0.2430	0.0257
133	4747.00	0.2925	0.2819	0.0106
134	4952.00	0.3070	0.2967	0.0103
135	5132.00	0.3235	0.3098	0.0137
136	5407.00	0.3423	0.3300	0.0123
137	5589.00	0.3560	0.3434	0.0126
138	5764.00	0.3708	0.3564	0.0144
139	5926.00	0.3860	0.3685	0.0175
140	6050.00	0.3980	0.3778	0.0202
141	6149.00	0.4108	0.3853	0.0255
142	6286.00	0.4273	0.3956	0.0316
143	6678.00	0.4680	0.4256	0.0425
144	7135.00	0.5198	0.4609	0.0588
145	7251.00	0.5348	0.4700	0.0648
146	7381.00	0.5528	0.4802	0.0726
147	7696.00	0.5935	0.5051	0.0884
148	7878.00	0.6138	0.5196	0.0942
149	8040.00	0.6323	0.5325	0.0997
150	8253.00	0.6540	0.5497	0.1043
151	8345.00	0.6683	0.5571	0.1111
152	8517.00	0.6873	0.5711	0.1162
153	8751.00	0.7120	0.5902	0.1218
154	8988.00	0.7383	0.6098	0.1285
155	9178.00	0.7630	0.6255	0.1375
156	9349.00	0.7880	0.6398	0.1482

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
157	9412.00	0.7945	0.6450	0.1495
158	1500.00	0.0673	0.0617	0.0056
159	2500.00	0.1344	0.1267	0.0077
160	3466.00	0.1863	0.1918	-0.0055
161	3552.00	0.1941	0.1978	-0.0037
162	3807.00	0.2151	0.2154	-0.0004
163	3955.00	0.2286	0.2257	0.0028
164	4201.00	0.2451	0.2430	0.0020
165	4731.00	0.2658	0.2808	-0.0150
166	4902.00	0.2773	0.2931	-0.0158
167	5862.00	0.3458	0.3637	-0.0179
168	6287.00	0.3731	0.3957	-0.0227
169	6585.00	0.3908	0.4184	-0.0276
170	7946.00	0.4621	0.5250	-0.0629
171	9264.00	0.5418	0.6327	-0.0909
172	9481.00	0.5588	0.6508	-0.0920
173	9665.00	0.5733	0.6663	-0.0930
174	1500.00	0.0673	0.0617	0.0056
175	2500.00	0.1344	0.1267	0.0077
176	3223.00	0.1732	0.1752	-0.0020
177	3820.00	0.1955	0.2163	-0.0208
178	4172.00	0.2137	0.2410	-0.0272
179	4674.00	0.2307	0.2767	-0.0459
180	5067.00	0.2515	0.3051	-0.0536
181	5460.00	0.2690	0.3339	-0.0649
182	5735.00	0.2812	0.3542	-0.0730
183	6735.00	0.3265	0.4299	-0.1035
184	7687.00	0.3752	0.5044	-0.1291
185	8405.00	0.4095	0.5620	-0.1525
186	8774.00	0.4322	0.5921	-0.1599

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
187	9047.00	0.4487	0.6147	-0.1659
188	9251.00	0.4622	0.6316	-0.1694
189	9473.00	0.4740	0.6502	-0.1762
190	9709.00	0.4915	0.6700	-0.1785
191	9919.00	0.5060	0.6878	-0.1818
192	10077.00	0.5190	0.7013	-0.1823
193	10098.00	0.5322	0.7031	-0.1708
194	1500.00	0.0673	0.0617	0.0056
195	2500.00	0.1344	0.1267	0.0077
196	3240.00	0.1744	0.1764	-0.0020
197	3557.00	0.1989	0.1981	0.0008
198	3897.00	0.2254	0.2217	0.0037
199	4490.00	0.2531	0.2635	-0.0104
200	4790.00	0.2744	0.2850	-0.0107
201	5048.00	0.2929	0.3037	-0.0108
202	5395.00	0.3159	0.3291	-0.0132
203	6710.00	0.3969	0.4280	-0.0311
204	7814.00	0.4694	0.5145	-0.0451
205	7991.00	0.4859	0.5286	-0.0427
206	8162.00	0.4999	0.5423	-0.0425
207	8392.00	0.5126	0.5609	-0.0483
208	8692.00	0.5394	0.5854	-0.0460
209	8877.00	0.5599	0.6006	-0.0407
210	9028.00	0.5801	0.6131	-0.0330
211	9166.00	0.5944	0.6245	-0.0302
212	9366.00	0.6181	0.6412	-0.0231
213	9491.00	0.6376	0.6517	-0.0140
214	1500.00	0.0673	0.0617	0.0056
215	2500.00	0.1344	0.1267	0.0077
216	3245.00	0.1744	0.1767	-0.0023

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
217	3850.00	0.2217	0.2184	0.0033
218	4068.00	0.2409	0.2337	0.0073
219	4600.00	0.2614	0.2714	-0.0100
220	4916.00	0.2794	0.2941	-0.0147
221	5212.00	0.3024	0.3157	-0.0132
222	5566.00	0.3272	0.3417	-0.0145
223	6264.00	0.3797	0.3940	-0.0143
224	7411.00	0.4477	0.4825	-0.0349
225	7929.00	0.4857	0.5236	-0.0380
226	8484.00	0.5229	0.5684	-0.0455
227	8766.00	0.5377	0.5915	-0.0538
228	9040.00	0.5729	0.6141	-0.0412
229	9312.00	0.6094	0.6367	-0.0273
230	9550.00	0.6439	0.6566	-0.0127
231	9692.00	0.6619	0.6686	-0.0067

Table 41

ESTIMATED DRILLING TIME FUNCTION FOR GOMEZ FIELD (TEXAS)

FOR 13-3/4-INCH DIAMETER WELLS

$$Y_{DT} = 10.45 + 0.88(10^{-2})X + 0.60(10^{-5})X^2$$

where: Y_{DT} = Drilling time in hours

X = Depth in feet

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.10457873E-01	0.17136010E-01	0.61028636E 00	0.09999999E 01	0.
0.88156084E-05	0.64099879E-05	0.13752925E 01	0.60037261E 04	0.95782527E 00
0.60525167E-08	0.54718440E-09	0.11061201E 02	0.41971324E 08	0.97572728E 00

RSQ = 0.9526
R = 0.9760
F(2,165)= 1657.5032
SUMUSQ = 0.3135
DURBIN-W.= 0.1843

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y_i}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
1	1573.00	0.0328	0.0393	-0.0065
2	1964.00	0.0476	0.0511	-0.0036
3	2512.00	0.0651	0.0708	-0.0057
4	2691.00	0.0768	0.0780	-0.0012
5	2967.00	0.0991	0.0899	0.0092
6	3250.00	0.1166	0.1030	0.0135

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
7	3458.00	0.1316	0.1133	0.0182
8	3622.00	0.1448	0.1218	0.0230
9	3695.00	0.1496	0.1257	0.0239
10	3877.00	0.1638	0.1356	0.0282
11	4136.00	0.1826	0.1505	0.0321
12	4492.00	0.2026	0.1722	0.0304
13	4723.00	0.2196	0.1871	0.0325
14	4932.00	0.2343	0.2012	0.0331
15	5411.00	0.2548	0.2354	0.0194
16	5566.00	0.2643	0.2470	0.0173
17	5660.00	0.2753	0.2543	0.0211
18	5855.00	0.2868	0.2696	0.0173
19	5957.00	0.2933	0.2778	0.0156
20	6115.00	0.3061	0.2907	0.0154
21	6214.00	0.3166	0.2989	0.0176
22	6592.00	0.3766	0.3316	0.0450
23	7125.00	0.4313	0.3805	0.0508
24	7620.00	0.4833	0.4291	0.0542
25	7926.00	0.5213	0.4606	0.0608
26	8033.00	0.5321	0.4718	0.0602
27	8119.00	0.5456	0.4810	0.0646
28	8566.00	0.6056	0.5301	0.0755
29	8814.00	0.6253	0.5584	0.0670
30	9032.00	0.6433	0.5838	0.0595
31	9410.00	0.6678	0.6294	0.0385
32	9618.00	0.6826	0.6551	0.0274
33	9734.00	0.6931	0.6697	0.0233
34	9911.00	0.7171	0.6924	0.0247
35	10090.00	0.7381	0.7156	0.0225
36	10284.00	0.7581	0.7412	0.0168

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
37	10406.00	0.7723	0.7576	0.0147
38	10516.00	0.7866	0.7725	0.0141
39	657.00	0.0150	0.0189	-0.0039
40	1893.00	0.0460	0.0488	-0.0028
41	2393.00	0.0665	0.0662	0.0003
42	2697.00	0.0847	0.0783	0.0065
43	3030.00	0.1002	0.0927	0.0075
44	3330.00	0.1175	0.1069	0.0106
45	3571.00	0.1367	0.1191	0.0176
46	3946.00	0.1575	0.1395	0.0180
47	4412.00	0.1782	0.1672	0.0111
48	4719.00	0.1935	0.1868	0.0067
49	5301.00	0.2165	0.2273	-0.0108
50	5557.00	0.2317	0.2463	-0.0146
51	5670.00	0.2410	0.2550	-0.0140
52	5901.00	0.2575	0.2732	-0.0157
53	5983.00	0.2685	0.2799	-0.0114
54	6090.00	0.2810	0.2886	-0.0076
55	6182.00	0.2922	0.2963	-0.0040
56	6263.00	0.3067	0.3031	0.0037
57	6307.00	0.3160	0.3068	0.0092
58	6781.00	0.3607	0.3485	0.0122
59	7283.00	0.4045	0.3957	0.0088
60	7535.00	0.4282	0.4205	0.0077
61	7728.00	0.4445	0.4401	0.0044
62	7870.00	0.4605	0.4547	0.0058
63	8111.00	0.4785	0.4801	-0.0016
64	8290.00	0.4925	0.4995	-0.0070
65	8530.00	0.5112	0.5260	-0.0148
66	8719.00	0.5242	0.5474	-0.0232

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
67	9002.00	0.5427	0.5803	-0.0375
68	9502.00	0.5697	0.6407	-0.0709
69	624.00	0.0140	0.0183	-0.0043
70	2025.00	0.0367	0.0531	-0.0164
71	2646.00	0.0550	0.0762	-0.0212
72	2775.00	0.0652	0.0815	-0.0163
73	3048.00	0.0812	0.0936	-0.0123
74	3315.00	0.0992	0.1062	-0.0069
75	3586.00	0.1190	0.1199	-0.0009
76	3817.00	0.1382	0.1323	0.0060
77	4181.00	0.1610	0.1531	0.0079
78	4391.00	0.1762	0.1659	0.0104
79	4663.00	0.1947	0.1832	0.0116
80	4889.00	0.2132	0.1982	0.0150
81	5350.00	0.2367	0.2309	0.0059
82	5522.00	0.2507	0.2437	0.0071
83	5679.00	0.2587	0.2557	0.0030
84	5760.00	0.2632	0.2620	0.0012
85	6088.00	0.2822	0.2885	-0.0062
86	6256.00	0.2932	0.3025	-0.0092
87	6354.00	0.2997	0.3108	-0.0111
88	6619.00	0.3222	0.3340	-0.0117
89	6688.00	0.3262	0.3401	-0.0139
90	6762.00	0.3302	0.3468	-0.0166
91	6773.00	0.3422	0.3478	-0.0056
92	6785.00	0.3432	0.3489	-0.0057
93	7128.00	0.3865	0.3808	0.0057
94	7448.00	0.4460	0.4119	0.0341
95	7539.00	0.4587	0.4209	0.0378
96	7615.00	0.4682	0.4286	0.0397

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
97	7675.00	0.4805	0.4346	0.0459
98	7809.00	0.4962	0.4484	0.0479
99	7910.00	0.5112	0.4589	0.0524
100	7986.00	0.5220	0.4669	0.0552
101	8115.00	0.5388	0.4806	0.0583
102	8241.00	0.5528	0.4942	0.0587
103	8390.00	0.5726	0.5105	0.0622
104	8542.00	0.5906	0.5274	0.0633
105	8678.00	0.6066	0.5428	0.0639
106	8811.00	0.6216	0.5580	0.0636
107	8956.00	0.6374	0.5749	0.0625
108	9083.00	0.6519	0.5899	0.0620
109	9192.00	0.6686	0.6029	0.0658
110	9282.00	0.6846	0.6137	0.0709
111	9420.00	0.7068	0.6306	0.0763
112	9500.00	0.7173	0.6404	0.0769
113	550.00	0.0132	0.0171	-0.0039
114	1521.00	0.0327	0.0379	-0.0051
115	2108.00	0.0497	0.0559	-0.0062
116	2586.00	0.0697	0.0737	-0.0040
117	2874.00	0.0870	0.0858	0.0012
118	3092.00	0.0980	0.0956	0.0024
119	3412.00	0.1162	0.1110	0.0053
120	3852.00	0.1342	0.1342	0.0000
121	4493.00	0.1535	0.1722	-0.0187
122	4753.00	0.1677	0.1891	-0.0213
123	5278.00	0.1912	0.2256	-0.0343
124	5520.00	0.2080	0.2435	-0.0355
125	5683.00	0.2220	0.2560	-0.0340
126	5881.00	0.2320	0.2716	-0.0396

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
127	6133.00	0.2452	0.2922	-0.0469
128	6356.00	0.2577	0.3110	-0.0533
129	6594.00	0.2710	0.3318	-0.0608
130	6891.00	0.2870	0.3586	-0.0716
131	7414.00	0.3242	0.4085	-0.0843
132	7550.00	0.3332	0.4220	-0.0888
133	7702.00	0.3480	0.4374	-0.0894
134	7829.00	0.3580	0.4505	-0.0925
135	8080.00	0.3747	0.4768	-0.1021
136	8366.00	0.3917	0.5078	-0.1161
137	8712.00	0.4097	0.5466	-0.1369
138	9123.00	0.4297	0.5946	-0.1649
139	9442.00	0.4415	0.6333	-0.1918
140	720.00	0.0155	0.0199	-0.0044
141	1923.00	0.0370	0.0498	-0.0128
142	2360.00	0.0548	0.0650	-0.0102
143	2593.00	0.0656	0.0740	-0.0084
144	2742.00	0.0783	0.0801	-0.0018
145	2900.00	0.0873	0.0869	0.0004
146	3210.00	0.1053	0.1011	0.0042
147	3552.00	0.1273	0.1181	0.0092
148	3895.00	0.1501	0.1366	0.0135
149	4238.00	0.1691	0.1565	0.0126
150	4455.00	0.1781	0.1699	0.0082
151	4761.00	0.1973	0.1896	0.0077
152	5306.00	0.2208	0.2276	-0.0068
153	5551.00	0.2360	0.2459	-0.0098
154	5783.00	0.2520	0.2639	-0.0118
155	6087.00	0.2710	0.2884	-0.0173
156	6268.00	0.3005	0.3035	-0.0030

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
157	6466.00	0.3178	0.3205	-0.0027
158	6620.00	0.3290	0.3341	-0.0051
159	6688.00	0.3352	0.3401	-0.0049
160	6820.00	0.3437	0.3521	-0.0084
161	6876.00	0.3492	0.3572	-0.0080
162	7620.00	0.4062	0.4291	-0.0229
163	8469.00	0.4774	0.5192	-0.0418
164	8657.00	0.4887	0.5404	-0.0517
165	8736.00	0.4932	0.5494	-0.0562
166	9034.00	0.5157	0.5841	-0.0684
167	9366.00	0.5379	0.6240	-0.0860
168	9500.00	0.5469	0.6404	-0.0935

Table 42

ESTIMATED DRILLING TIME FUNCTION FOR GOMEZ FIELD (TEXAS)

FOR 17-1/2-INCH DIAMETER WELLS

$$Y_{DT} = 0.107(10^{-2})X^2 + 0.056X - 13$$

where: Y_{DT} = Drilling time in hours

X = Depth in feet

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
-0.12881994E-01	0.36052929E-01	-0.35730784E-00	0.09999999E 01	0.
0.56300545E-04	0.30874474E-04	0.18235304E 01	0.28082075E 04	0.84177455E 00
0.10735277E-07	0.61143507E-08	0.17557510E 01	0.89652321E 07	0.84137858E 00

RSQ = 0.7171
R = 0.8468
F(2,103)= 130.5121
SUMUSQ = 0.5445
DURBIN-W.= 0.1609

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
1	664.00	0.0310	0.0292	0.0018
2	838.00	0.0390	0.0418	-0.0028
3	1284.00	0.0630	0.0771	-0.0141
4	1784.00	0.0880	0.1217	-0.0337
5	2101.00	0.1190	0.1528	-0.0338
6	2464.00	0.1587	0.1910	-0.0323

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
7	2678.00	0.1930	0.2149	-0.0219
8	2795.00	0.2102	0.2283	-0.0181
9	3010.00	0.2337	0.2538	-0.0201
10	3137.00	0.2497	0.2694	-0.0196
11	3325.00	0.2702	0.2930	-0.0228
12	3409.00	0.2882	0.3038	-0.0156
13	3488.00	0.3085	0.3141	-0.0056
14	3607.00	0.3315	0.3299	0.0016
15	3697.00	0.3485	0.3420	0.0065
16	103.00	0.0050	-0.0070	0.0120
17	702.00	0.0230	0.0319	-0.0089
18	1678.00	0.0537	0.1118	-0.0581
19	2192.00	0.0730	0.1621	-0.0891
20	2488.00	0.0910	0.1936	-0.1026
21	2703.00	0.1040	0.2177	-0.1137
22	2925.00	0.1075	0.2436	-0.1361
23	3073.00	0.1262	0.2615	-0.1353
24	3243.00	0.1432	0.2826	-0.1394
25	3365.00	0.1582	0.2981	-0.1399
26	3574.00	0.1797	0.3255	-0.1457
27	3768.00	0.1967	0.3517	-0.1549
28	3956.00	0.2125	0.3778	-0.1653
29	4171.00	0.2277	0.4087	-0.1810
30	4420.00	0.2390	0.4457	-0.2067
31	643.00	0.0420	0.0278	0.0142
32	1288.00	0.0755	0.0774	-0.0019
33	1752.00	0.1050	0.1187	-0.0137
34	2075.00	0.1352	0.1502	-0.0149
35	2525.00	0.1690	0.1977	-0.0287
36	2699.00	0.2137	0.2173	-0.0035

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
37	2860.00	0.2447	0.2359	0.0088
38	3045.00	0.2740	0.2581	0.0159
39	3229.00	0.2942	0.2808	0.0134
40	3368.00	0.3150	0.2985	0.0165
41	3521.00	0.3530	0.3184	0.0346
42	3657.00	0.3962	0.3366	0.0597
43	4011.00	0.4372	0.3856	0.0516
44	4240.00	0.4530	0.4188	0.0342
45	650.00	0.0344	0.0282	0.0062
46	1618.00	0.0719	0.1063	-0.0344
47	2390.00	0.1174	0.1830	-0.0656
48	3014.00	0.1716	0.2543	-0.0827
49	3178.00	0.1954	0.2745	-0.0791
50	3341.00	0.2154	0.2950	-0.0796
51	3622.00	0.2576	0.3319	-0.0742
52	3887.00	0.2784	0.3682	-0.0898
53	4239.00	0.3171	0.4187	-0.1015
54	843.00	0.0395	0.0422	-0.0027
55	1193.00	0.0615	0.0696	-0.0081
56	1312.00	0.0870	0.0795	0.0075
57	1556.00	0.1210	0.1007	0.0203
58	1936.00	0.1460	0.1364	0.0096
59	2248.00	0.1770	0.1679	0.0091
60	2444.00	0.2092	0.1888	0.0204
61	2573.00	0.2670	0.2031	0.0639
62	2890.00	0.3357	0.2395	0.0963
63	2974.00	0.3482	0.2495	0.0987
64	3071.00	0.3597	0.2613	0.0985
65	3126.00	0.3677	0.2680	0.0997
66	3226.00	0.3807	0.2805	0.1003

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
67	3311.00	0.3932	0.2912	0.1020
68	3383.00	0.4055	0.3004	0.1051
69	3706.00	0.4352	0.3432	0.0920
70	3858.00	0.4457	0.3641	0.0816
71	4075.00	0.4662	0.3948	0.0714
72	4203.00	0.4787	0.4134	0.0654
73	825.00	0.0730	0.0409	0.0321
74	1188.00	0.1055	0.0692	0.0363
75	1702.00	0.1527	0.1140	0.0387
76	2100.00	0.1837	0.1527	0.0311
77	2500.00	0.2200	0.1950	0.0250
78	2781.00	0.2807	0.2267	0.0540
79	2993.00	0.3135	0.2518	0.0617
80	3083.00	0.3335	0.2627	0.0708
81	3223.00	0.3527	0.2801	0.0727
82	3251.00	0.3567	0.2836	0.0731
83	3281.00	0.3645	0.2874	0.0771
84	3346.00	0.3767	0.2957	0.0811
85	3354.00	0.3812	0.2967	0.0845
86	3491.00	0.4060	0.3145	0.0915
87	3848.00	0.4632	0.3627	0.1005
88	3929.00	0.4712	0.3740	0.0972
89	3960.00	0.4762	0.3784	0.0978
90	4051.00	0.4897	0.3914	0.0984
91	4161.00	0.5052	0.4073	0.0980
92	4228.00	0.5195	0.4171	0.1024
93	640.00	0.0430	0.0275	0.0155
94	1143.00	0.0785	0.0655	0.0130
95	1597.00	0.1115	0.1044	0.0071
96	2160.00	0.1440	0.1588	-0.0148

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
97	2396.00	0.1720	0.1836	-0.0116
98	2530.00	0.1985	0.1983	0.0002
99	2918.00	0.2360	0.2428	-0.0068
100	3056.00	0.2495	0.2594	-0.0099
101	3186.00	0.2682	0.2755	-0.0072
102	3410.00	0.2885	0.3039	-0.0154
103	3581.00	0.3115	0.3264	-0.0149
104	3788.00	0.3350	0.3544	-0.0194
105	4102.00	0.3690	0.3987	-0.0297
106	4446.00	0.3982	0.4496	-0.0514

Table 43

ESTIMATED DRILLING TIME FUNCTION FOR AGGREGATED LOCKRIDGE AND S. PYOTE (TEXAS) FOR 12-1/4-INCH DIAMETER WELLS

$$Y_{DT} = 42 + 0.02X + 0.40(10^{-3})X^2$$

where: Y_{DT} = Drilling time in hours

X = Depth in feet

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.41661263E-01	0.34418273E-01	0.12104402E 01	0.09999999E 01	0.
0.22388936E-04	0.12385736E-04	0.18076387E 01	0.65690298E 04	0.95736743E 00
0.40312144E-08	0.98353661E-09	0.40986928E 01	0.50860722E 08	0.96463867E 00

RSQ =	0.9339
R =	0.9664
F(2, 64)=	452.1280
SUMUSQ =	0.1940
DURBIN-W.=	0.2216

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
1	1444.00	0.0647	0.0824	-0.0176
2	2202.00	0.1192	0.1105	0.0087
3	2593.00	0.1462	0.1268	0.0194
4	3548.00	0.1969	0.1718	0.0251
5	4328.00	0.2379	0.2141	0.0239
6	4733.00	0.2572	0.2379	0.0193

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
7	5082.00	0.2782	0.2596	0.0187
8	5453.00	0.2975	0.2836	0.0139
9	5771.00	0.3178	0.3051	0.0127
10	5822.00	0.3228	0.3087	0.0142
11	6655.00	0.4278	0.3692	0.0587
12	7555.00	0.5211	0.4409	0.0802
13	8290.00	0.6154	0.5043	0.1111
14	9531.00	0.7384	0.6212	0.1172
15	9543.00	0.7479	0.6224	0.1255
16	9675.00	0.7632	0.6356	0.1276
17	10002.00	0.7962	0.6689	0.1274
18	10130.00	0.8197	0.6821	0.1376
19	10198.00	0.8294	0.6892	0.1402
20	1500.00	0.0673	0.0843	-0.0171
21	2500.00	0.1344	0.1228	0.0115
22	3900.00	0.2096	0.1903	0.0193
23	4449.00	0.2353	0.2211	0.0143
24	4934.00	0.2513	0.2503	0.0011
25	5481.00	0.2708	0.2855	-0.0146
26	6123.00	0.2971	0.3299	-0.0327
27	7074.00	0.3726	0.4018	-0.0291
28	7739.00	0.4166	0.4564	-0.0397
29	8348.00	0.4509	0.5095	-0.0586
30	9180.00	0.5049	0.5869	-0.0820
31	9434.00	0.5236	0.6117	-0.0880
32	9745.00	0.5559	0.6427	-0.0867
33	9934.00	0.5716	0.6619	-0.0903
34	10120.00	0.5856	0.6811	-0.0955
35	1500.00	0.0673	0.0843	-0.0171
36	2500.00	0.1344	0.1228	0.0115

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
37	3900.00	0.2096	0.1903	0.0193
38	4640.00	0.2389	0.2323	0.0066
39	5249.00	0.2642	0.2702	-0.0060
40	5652.00	0.2819	0.2970	-0.0150
41	6304.00	0.3346	0.3430	-0.0084
42	6968.00	0.3979	0.3934	0.0045
43	7471.00	0.4294	0.4339	-0.0045
44	8091.00	0.4649	0.4867	-0.0218
45	8524.00	0.4952	0.5254	-0.0302
46	9332.00	0.5589	0.6017	-0.0427
47	9729.00	0.5924	0.6411	-0.0486
48	9963.00	0.6087	0.6649	-0.0561
49	10129.00	0.6202	0.6820	-0.0618
50	1371.00	0.0615	0.0799	-0.0185
51	1719.00	0.0818	0.0921	-0.0103
52	2669.00	0.1285	0.1301	-0.0017
53	3711.00	0.1810	0.1803	0.0007
54	4420.00	0.2200	0.2194	0.0006
55	4882.00	0.2365	0.2470	-0.0106
56	5440.00	0.2620	0.2828	-0.0208
57	5860.00	0.2813	0.3113	-0.0300
58	6085.00	0.2996	0.3272	-0.0276
59	6932.00	0.3746	0.3906	-0.0160
60	7459.00	0.4141	0.4329	-0.0189
61	8290.00	0.4801	0.5043	-0.0242
62	8916.00	0.5328	0.5617	-0.0290
63	9566.00	0.5968	0.6247	-0.0279
64	9717.00	0.6178	0.6398	-0.0221
65	9870.00	0.6395	0.6553	-0.0158
66	10040.00	0.6568	0.6728	-0.0160
67	10210.00	0.6725	0.6905	-0.0180

Table 44

ESTIMATED DRILLING TIME FUNCTION FOR AGGREGATED LOCKRIDGE AND S. PYOTE (TEXAS) FOR 13-3/4-INCH DIAMETER WELLS

$$Y_{DT} = 62 + 0.24(10^{-2})X + 0.81(10^{-5})X^2$$

where: Y_{DT} = Drilling time in hours

X = Depth in feet

COEFFICIENT	STANDARD ERROR	T-VALUE	VARIABLE MEAN	SIMPLE R(Y,X)
0.61847210E-01	0.37793708E-01	0.16364419E 01	0.09999999E 01	0.
0.23826724E-05	0.12467415E-04	0.19111197E-00	0.72590074E 04	0.94038161E 00
0.81051183E-08	0.94436096E-09	0.85826486E 01	0.60261369E 08	0.96225456E 00

RSQ = 0.9260
R = 0.9623
F(2,131)= 819.0731
SUMUSQ = 0.9694
DURBIN-W.= 0.0952

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
1	140.00	0.0046	0.0623	-0.0578
2	1233.00	0.0436	0.0771	-0.0335
3	1909.00	0.0788	0.0959	-0.0172
4	2358.00	0.1178	0.1125	0.0052
5	2913.00	0.1560	0.1376	0.0184
6	3381.00	0.1990	0.1626	0.0364

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
7	3842.00	0.2325	0.1906	0.0418
8	4494.00	0.2983	0.2362	0.0620
9	4835.00	0.3398	0.2628	0.0769
10	5145.00	0.3806	0.2887	0.0919
11	5420.00	0.4076	0.3129	0.0947
12	5586.00	0.4176	0.3281	0.0895
13	5818.00	0.4404	0.3501	0.0903
14	6039.00	0.4634	0.3718	0.0915
15	6205.00	0.4824	0.3887	0.0937
16	6465.00	0.5006	0.4160	0.0846
17	6533.00	0.5121	0.4233	0.0887
18	6683.00	0.5266	0.4398	0.0868
19	6843.00	0.5458	0.4577	0.0881
20	7069.00	0.5690	0.4837	0.0853
21	7192.00	0.5838	0.4982	0.0856
22	7225.00	0.5890	0.5022	0.0868
23	7365.00	0.6075	0.5190	0.0884
24	7508.00	0.6313	0.5366	0.0946
25	7644.00	0.6515	0.5536	0.0978
26	7779.00	0.6690	0.5708	0.0981
27	7894.00	0.6828	0.5857	0.0970
28	7985.00	0.6913	0.5977	0.0936
29	8518.00	0.7523	0.6702	0.0820
30	8818.00	0.7858	0.7131	0.0727
31	9132.00	0.8286	0.7595	0.0691
32	9210.00	0.8384	0.7713	0.0671
33	9333.00	0.8616	0.7901	0.0715
34	9478.00	0.8881	0.8125	0.0755
35	9575.00	0.9093	0.8277	0.0815
36	9703.00	0.9333	0.8480	0.0852

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
37	9792.00	0.9541	0.8623	0.0917
38	9836.00	0.9648	0.8694	0.0954
39	1300.00	0.0425	0.0786	-0.0362
40	2390.00	0.1093	0.1138	-0.0045
41	2769.00	0.1490	0.1306	0.0184
42	3496.00	0.2007	0.1692	0.0315
43	4126.00	0.2442	0.2097	0.0346
44	4726.00	0.2779	0.2541	0.0238
45	5140.00	0.3086	0.2882	0.0204
46	5481.00	0.3233	0.3184	0.0049
47	5841.00	0.3386	0.3523	-0.0137
48	6241.00	0.3553	0.3924	-0.0371
49	6551.00	0.3690	0.4253	-0.0563
50	6771.00	0.3813	0.4496	-0.0682
51	6940.00	0.3938	0.4688	-0.0749
52	7096.00	0.4055	0.4869	-0.0813
53	7167.00	0.4112	0.4953	-0.0840
54	7518.00	0.4607	0.5379	-0.0771
55	7602.00	0.4742	0.5484	-0.0741
56	7693.00	0.4869	0.5599	-0.0729
57	7900.00	0.5274	0.5865	-0.0591
58	7971.00	0.5387	0.5958	-0.0571
59	8234.00	0.5757	0.6310	-0.0553
60	8435.00	0.6052	0.6586	-0.0534
61	8690.00	0.6472	0.6946	-0.0474
62	8831.00	0.6735	0.7150	-0.0414
63	8912.00	0.6748	0.7268	-0.0520
64	9162.00	0.7248	0.7640	-0.0393
65	9202.00	0.7341	0.7701	-0.0360
66	9380.00	0.7766	0.7973	-0.0207

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
67	9433.00	0.7856	0.8055	-0.0199
68	9481.00	0.7929	0.8130	-0.0201
69	9665.00	0.8252	0.8420	-0.0168
70	9924.00	0.8782	0.8837	-0.0056
71	10209.00	0.9435	0.9309	0.0126
72	10412.00	0.9858	0.9653	0.0205
73	10667.00	1.0548	1.0095	0.0453
74	10735.00	1.0968	1.0215	0.0753
75	10801.00	1.1161	1.0331	0.0829
76	10850.00	1.1374	1.0419	0.0955
77	10894.00	1.1597	1.0497	0.1100
78	10998.00	1.1780	1.0684	0.1096
79	11040.00	1.1847	1.0760	0.1087
80	11100.00	1.1962	1.0869	0.1093
81	1327.00	0.0382	0.0793	-0.0410
82	2300.00	0.0950	0.1102	-0.0152
83	2977.00	0.1355	0.1408	-0.0053
84	3530.00	0.1832	0.1713	0.0119
85	4066.00	0.2282	0.2055	0.0227
86	4804.00	0.2852	0.2603	0.0249
87	5331.00	0.3149	0.3049	0.0100
88	5650.00	0.3302	0.3340	-0.0038
89	5963.00	0.3525	0.3643	-0.0118
90	6472.00	0.3758	0.4168	-0.0410
91	6801.00	0.3955	0.4529	-0.0574
92	7014.00	0.4132	0.4773	-0.0641
93	7374.00	0.4522	0.5201	-0.0679
94	7791.00	0.5089	0.5724	-0.0635
95	8116.00	0.5449	0.6151	-0.0702
96	8443.00	0.5979	0.6597	-0.0618

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
97	8790.00	0.6561	0.7090	-0.0529
98	9146.00	0.7106	0.7616	-0.0510
99	9395.00	0.7651	0.7996	-0.0345
100	9520.00	0.7906	0.8191	-0.0285
101	9602.00	0.8121	0.8320	-0.0199
102	9682.00	0.8308	0.8447	-0.0139
103	9799.00	0.8765	0.8635	0.0130
104	9911.00	0.9010	0.8816	0.0194
105	10024.00	0.9307	0.9001	0.0306
106	10150.00	0.9562	0.9210	0.0352
107	10166.00	0.9602	0.9237	0.0365
108	10411.00	1.0512	0.9652	0.0860
109	10638.00	1.1149	1.0044	0.1105
110	10732.00	1.1379	1.0209	0.1170
111	10836.00	1.1632	1.0394	0.1238
112	10952.00	1.1912	1.0601	0.1311
113	1320.00	0.0453	0.0791	-0.0338
114	2139.00	0.0876	0.1040	-0.0164
115	2415.00	0.1069	0.1149	-0.0080
116	2447.00	0.1089	0.1162	-0.0073
117	2963.00	0.1522	0.1401	0.0121
118	3872.00	0.2089	0.1926	0.0163
119	4715.00	0.2566	0.2533	0.0033
120	5337.00	0.2916	0.3054	-0.0138
121	5928.00	0.3166	0.3608	-0.0442
122	6280.00	0.3293	0.3965	-0.0672
123	6652.00	0.3436	0.4363	-0.0927
124	6916.00	0.3631	0.4660	-0.1029
125	7438.00	0.4118	0.5280	-0.1162
126	8132.00	0.4748	0.6172	-0.1424

SAMPLE NUMBER	OBSERVED VALUES		ESTIMATED VALUES	RESIDUAL
	X_1	$\frac{Y}{1000}$	$\frac{\hat{Y}}{1000}$	$\frac{Y - \hat{Y}}{1000}$
127	8542.00	0.5065	0.6736	-0.1671
128	8982.00	0.5435	0.7371	-0.1936
129	9495.00	0.5885	0.8152	-0.2267
130	9783.00	0.6395	0.8609	-0.2214
131	10299.00	0.7200	0.9461	-0.2261
132	10732.00	0.7760	1.0209	-0.2449
133	10930.00	0.7960	1.0562	-0.2602
134	11005.00	0.8043	1.0697	-0.2654