BLUITT SAN ANDRES FIELD

Roosevelt County, New Mexico

BEFORE THE

OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

Case No. 8614   Exhibit No. 1

Submitted by Yates

Hearing Date

● Producing Oil Well

■ Producing Gas Well

▲ Non-Producing Well

Yates Exhibits 1 through 14
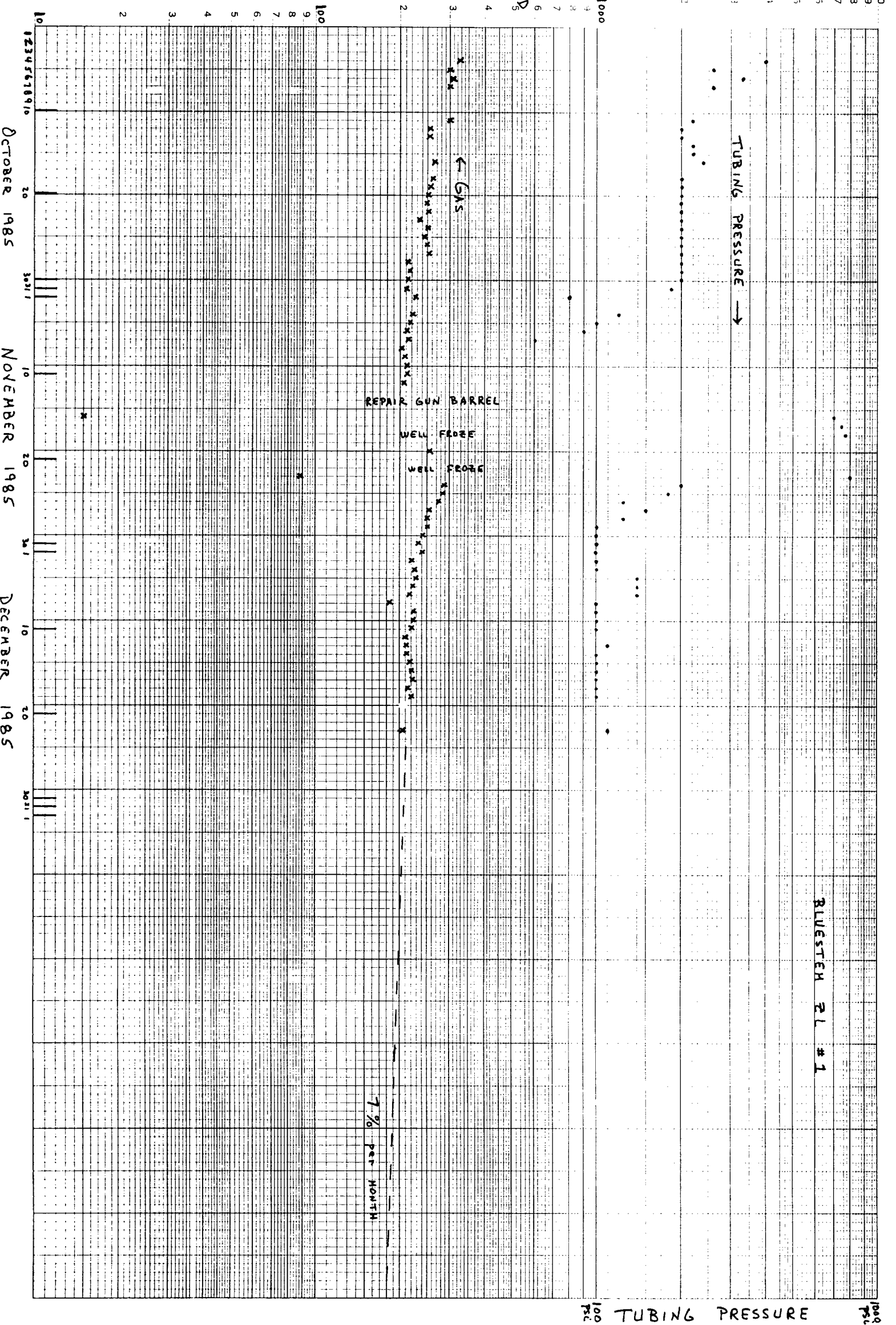Complete Set

T 8 S

R-38-E

R-37-E

BLUESTEM "ZL" FEDERAL NO. 1
1650 FNL + 2310 FEL
Section 20-8S-38E
Roosevelt County, New Mexico

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                         spacing unit.

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                         perforations at 4635-4790.

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                         Bluestem "ZL" Federal #1 rescheduled for examiner hear-
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8614   yales   2

2

K+E SEMI-LOGARITHMIC 3 CYCLES X 150 DIVISIONS
KEUFFEL & ESSER CO.   MADE IN U.S.A.

47 5490

Mcf/D

TUBING PRESSURE →

BLUESTEM PL #1

← GAS

REPAIR GUN BARREL

WELL FROZE

WELL FROZE

7 % per MONTH

OCTOBER 1985

NOVEMBER 1985

DECEMBER 1985

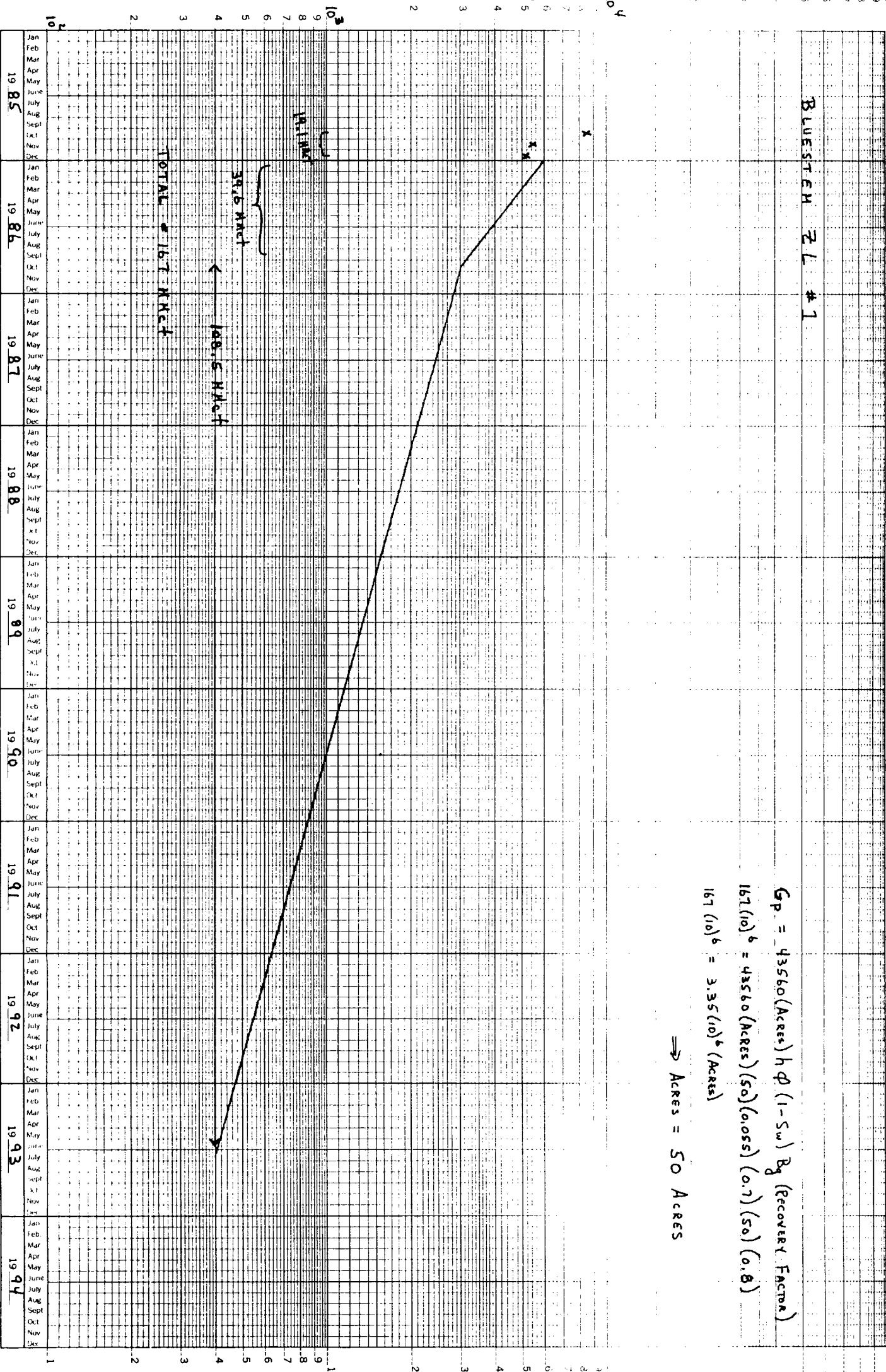TUBING PRESSURE

8614   yates   3

W

Bluestem 7L #1

$$G_p = 43560(\text{Acres})\, h\, \phi\, (1-S_w)\, B_g\, (\text{Recovery Factor})$$

$$167(10)^6 = 43560(\text{Acres})(50)(0.055)(0.7)(50)(0.8)$$

$$167(10)^6 = 3.35(10)^6/(\text{Acres})$$
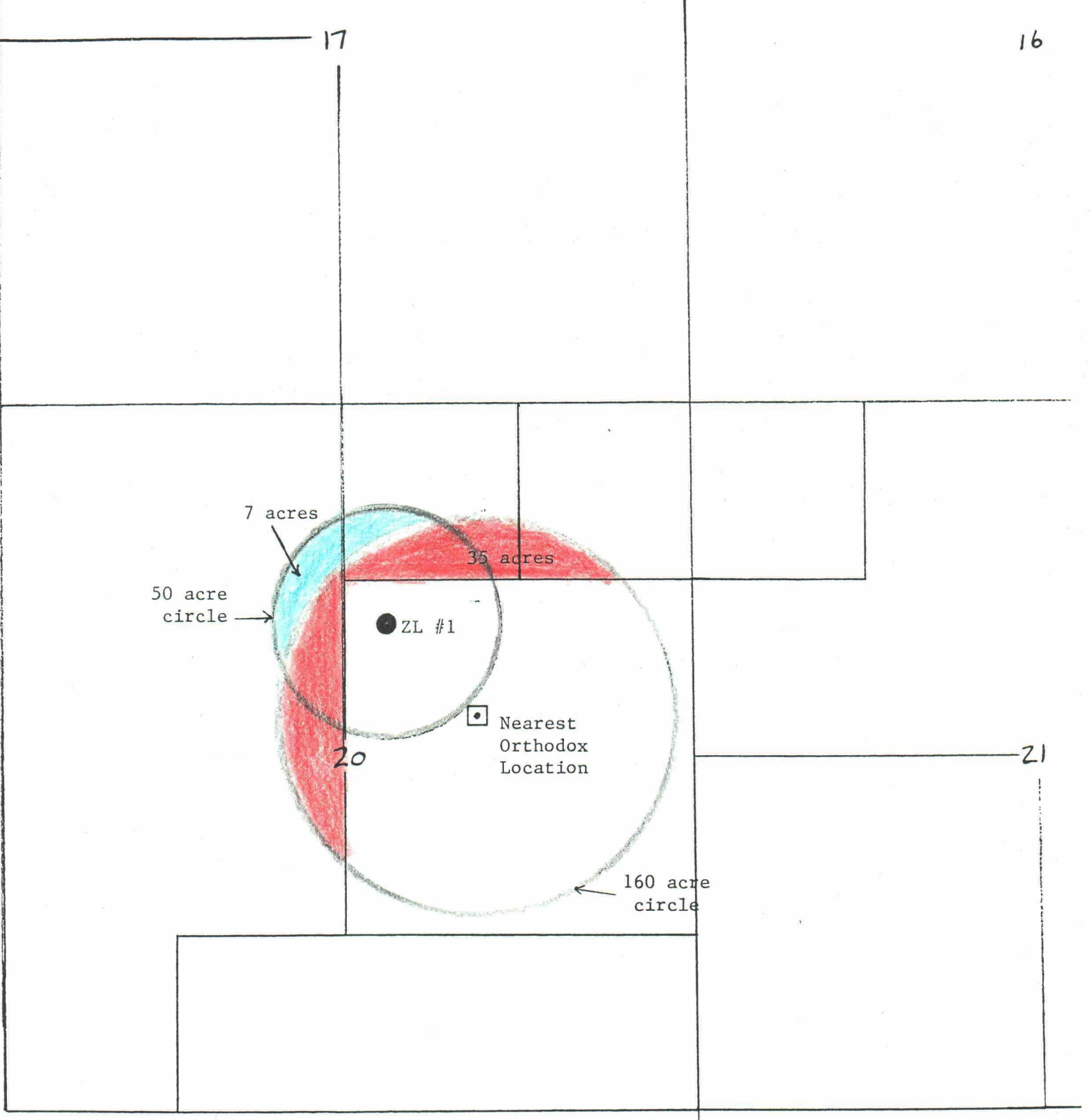
$$\Longrightarrow \text{Acres} = 50 \text{ Acres}$$

Mcf/month

19.1 Mcf

39.6 MMcf

128.5 MMcf

TOTAL = 167 MMcf

1985 1986 1987 1988 1989 1990 1991 1992 1993 1994

8614

4

Yates

4

7 acres

50 acre
circle →

35 acres

● ZL #1

⊡ Nearest
Orthodox
Location

20

160 acre
circle

Illustration of Bluestem drainage area.

Here 85% of drainage area lies inside 160 acre circle.

ALLOWABLE FACTOR FROM DRAINAGE AREA

BLUESTEM "ZL" FEDERAL NO. 1

ACTUAL LOCATION - 330' from N and W sides of lease

ORTHODOX LOCATION - 990' from N and W sides of lease

SPACING UNIT - 160 Acres on Bluestem lease

Drainage Area	=	50 Acres
Fraction of Drainage area on Bluestem Lease	=	0.55

Fraction of Drainage area on
    lease or inside 160 acre
    circle around nearest
    orthodox location
	=	0.85

COMMISSION FORMULA FOR UNORTHODOX LOCATION

ALLOWABLE FRACTION

$$= \frac{1}{3} [D_{ew} + D_{ns} + F_{ex}] \times A_{su}$$

where

(1) $D_{ew} = \dfrac{\text{Actual EW distance to nearest edge of spacing unit}}{\text{Shortest EW distance allowed for orthodox location}}$

is distance east-west factor

(2) $D_{ns} = \dfrac{\text{Actual NS distance to nearest edge of spacing unit}}{\text{Shortest NS distance allowed for orthodox location}}$

is distance north-south factor

(3) $F_{ex} = 1 - \dfrac{A_{ex}}{\text{Acres in standard spacing unit}}$

is excess outside acreage factor

and A_{ex} = acres in crescent formed by circles
centered at actual location and at
nearest orthodox location such that
each circle has same area as a stan-
dard spacing unit.

(4) $A_{su} = \dfrac{\text{Acres in non-standard spacing unit}}{\text{Acres in standard spacing unit}}$
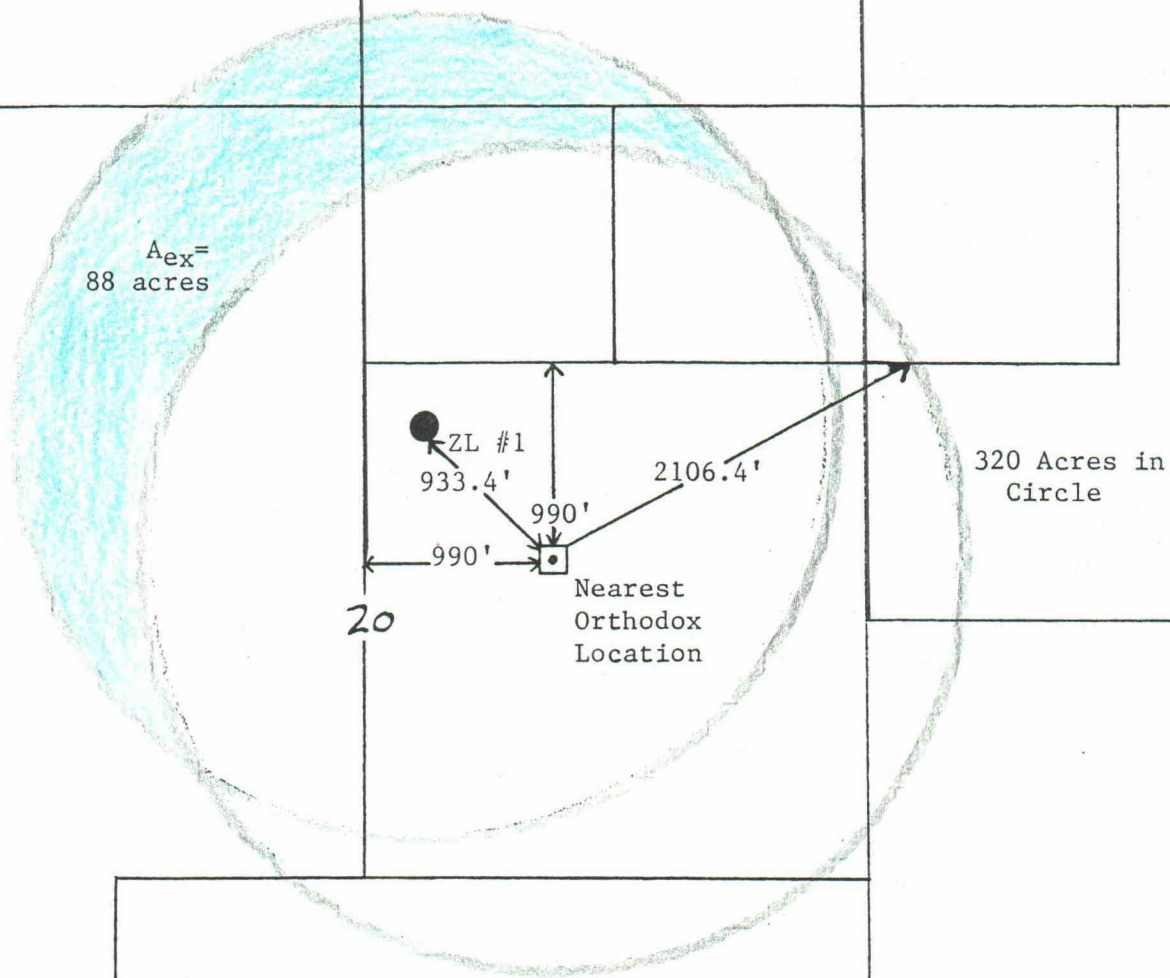
is spacing-unit factor

7

$A_{ex}=$
88 acres

ZL #1

933.4'

990'

2106.4'

320 Acres in
Circle

990'

Nearest
Orthodox
Location

20

21

Illustration of excess outside acreage as used in Commission formula for unorthodox location.

COMPARISON OF COMMISSION FORMULA WITH DRAINAGE AREA

BLUESTEM FACTS

a. Standard Spacing Unit   =   320 Acres

b. Non-Standard Spacing Unit =   160 Acres

c. Actual E-W distance = 330 feet

d. Actual N-S distance = 330 feet

e. E-W distance for orthodox location = 990 feet

f. N-S distance for orthodox location = 990 feet

ASSUMED DRAINAGE AREA(ACRES)	ALLOWABLE FACTOR BY COMMISSION FORMULA	FRACTION OF DRAINAGE AREA ON BLUESTEM LEASE	FRACTION OF DRAINAGE AREA ON LEASE OR WITHIN 160 ACRE CIRCLE AROUND NEAREST ORTHODOX LOCATION
40	0.232	0.58	0.90
80	0.232	0.48	0.71
160	0.232	0.41	0.62
320	0.232	0.36	0.47
640	0.232	0.24	0.29

x
19 Acres
4A   35 Acres
● ZL #1   80
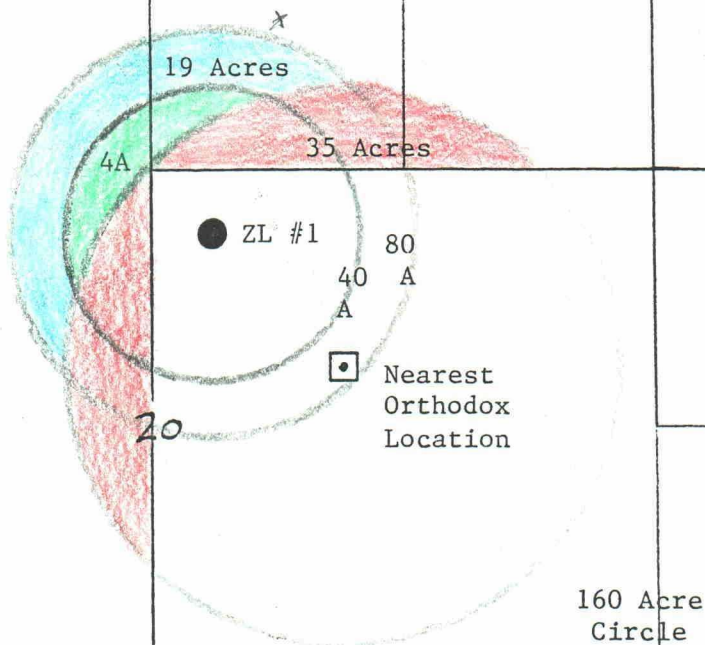40   A
A
□ Nearest
Orthodox
Location
20
160 Acre
Circle

Illustration of allowable factor based on acres drained inside and outside spacing unit.
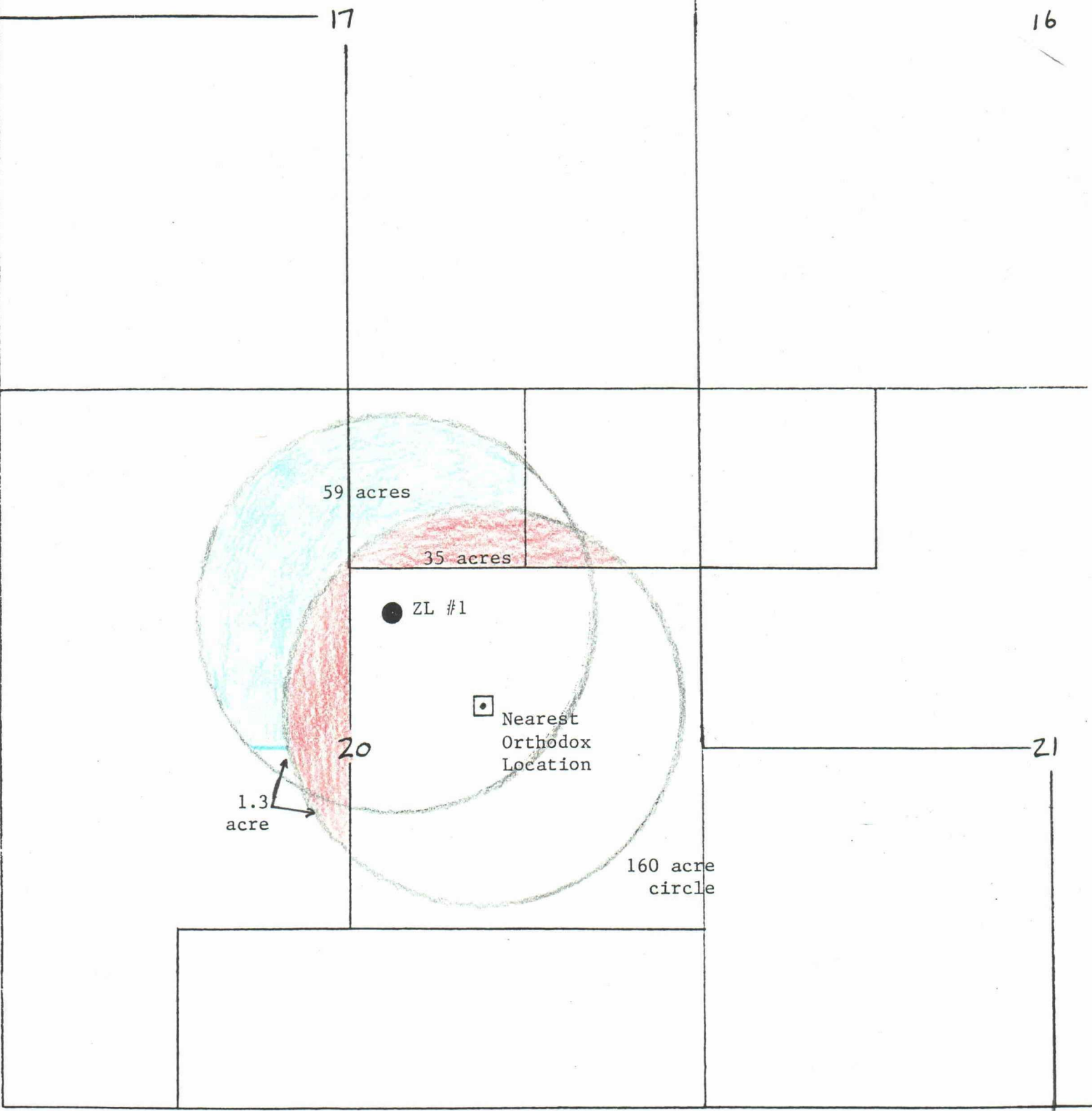
Here drainage areas of 40 and 80 acres are shown.

Illustration of allowable factor based on acres drained inside and outside spacing unit.

Here drainage area is 160 acres.

640 acre
circle

284 acres

170 acres

● ZL #1

☐ Nearest
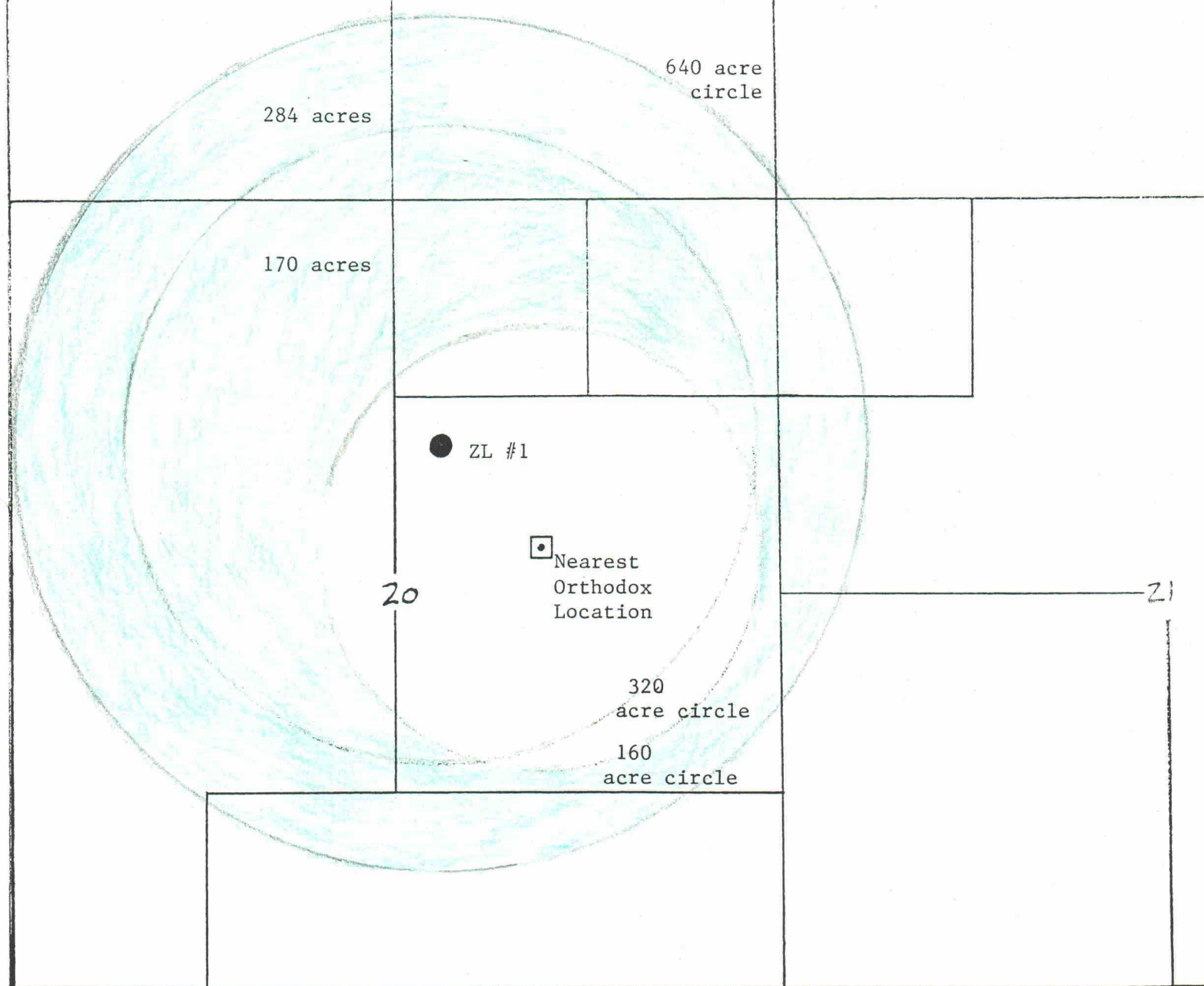Orthodox
Location

20

21

320
acre circle

160
acre circle

Illustration of allowable factor based on acres drained inside and outside spacing unit.

Here drawing areas of 320 and 640 acres are shown.

12

17   16

14 acres

ZL #1

☐
Orthodox
Location

0.6 Acre

40 Acre
Spacing Unit

20   21

40 Acre Circle

Case where Yates owns only 40 acres and well drains 40 acres.

Commission Formula --- Allowable Factor = 0.078

But 0.58 of drainage area lies on lease.

CALCULATION OF COMMISSION FORMULA FOR CASE

WHERE YATES IS ASSUMED TO OWN 40 ACRES

$$\text{ALLOWABLE FRACTION} = \frac{1}{3} \left[D_{ew} + D_{ns} + F_{ex} \right] \times A_{su}$$

Here Yates Bluestem ZL #1 - 330 FNL and 330 FWL of Lease
   "Orthodox Location - 660 FNL and 660 FWL of Lease
   Standard Proration Unit = 320 Acres
   Non-Standard Proration Unit = 40 Acres

Now (1) East-West Factor $\quad D_{ew} = \dfrac{330}{660} = \underline{0.50}$

   (2) North-South Factor $\quad D_{ns} = \dfrac{330}{660} = \underline{0.50}$

   (3) Excess Outside Acreage Factor

   $\quad r = 2106.4$ ft for 320-acre circle

   Area (A_{ex}) of crescent between two circle of radius r
   centered a distance x apart is

$$A_{ex} = 2x\sqrt{r^2 - \left(\frac{x}{2}\right)^2}$$

   where x = 466.7 feet

$$A_{ex} = 2(466.7)\sqrt{(2106.4)^2 - (233.3)^2} = 1954000 \text{ ft}^2$$
$$= 44.8 \text{ Acres}$$

   and

$$F_{ex} = 1 - \frac{44.8}{320} = \underline{0.86}$$

   (4) Spacing Unit Factor

$$A_{su} = \frac{40}{320} = \underline{0.125}$$

8614   14
yates

Then

$$\text{Allowable Factor} = \frac{1}{3} [D_{ew} + D_{ns} + F_{ex}] \times A_{su}$$

$$\text{Allowable Factor} = \frac{1}{3} [0.50 + 0.50 + 0.86] \times 0.125$$
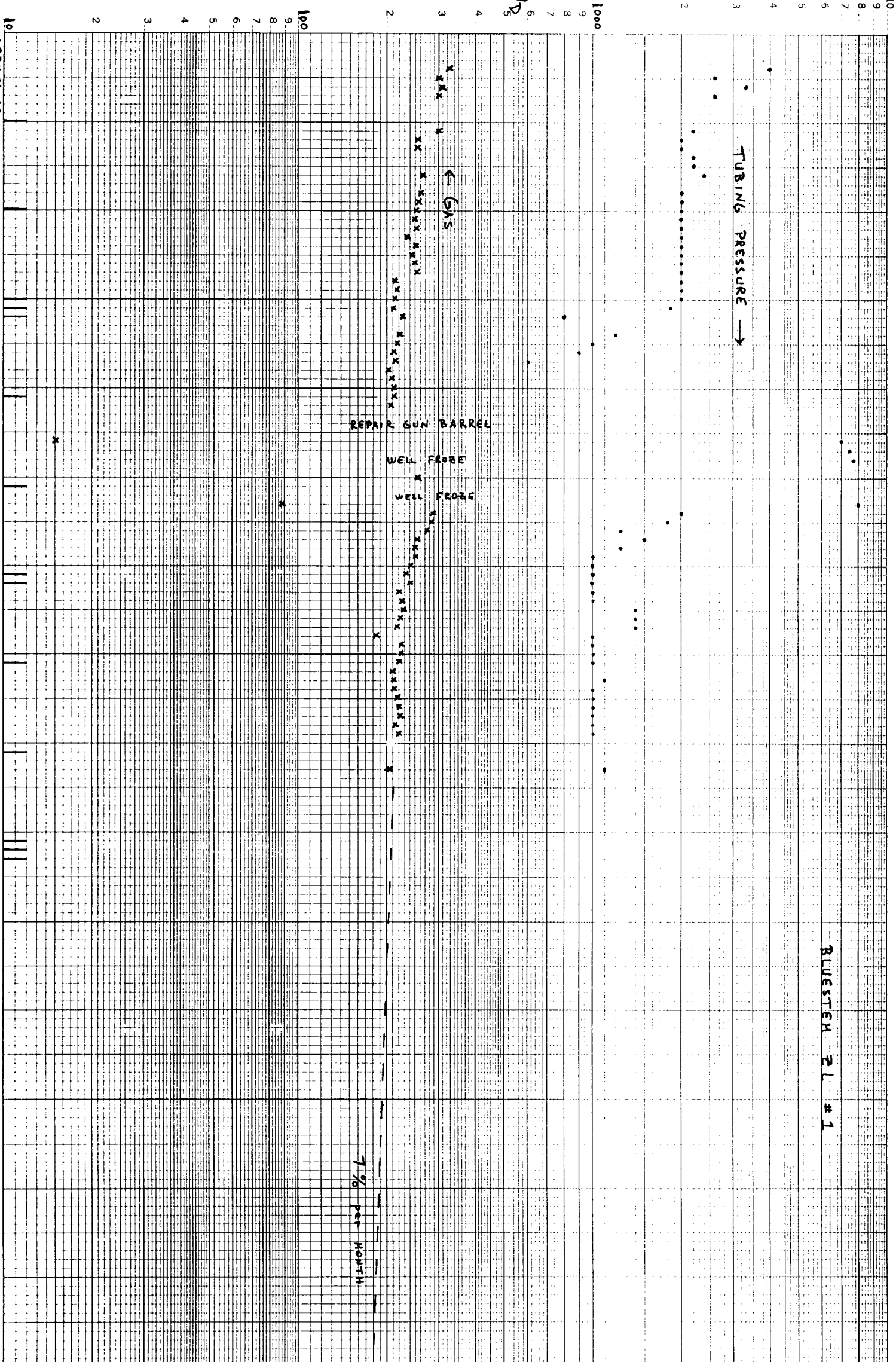
$$\text{Allowable Factor} = \underline{0.078}$$

regardless of actual drainage area of well

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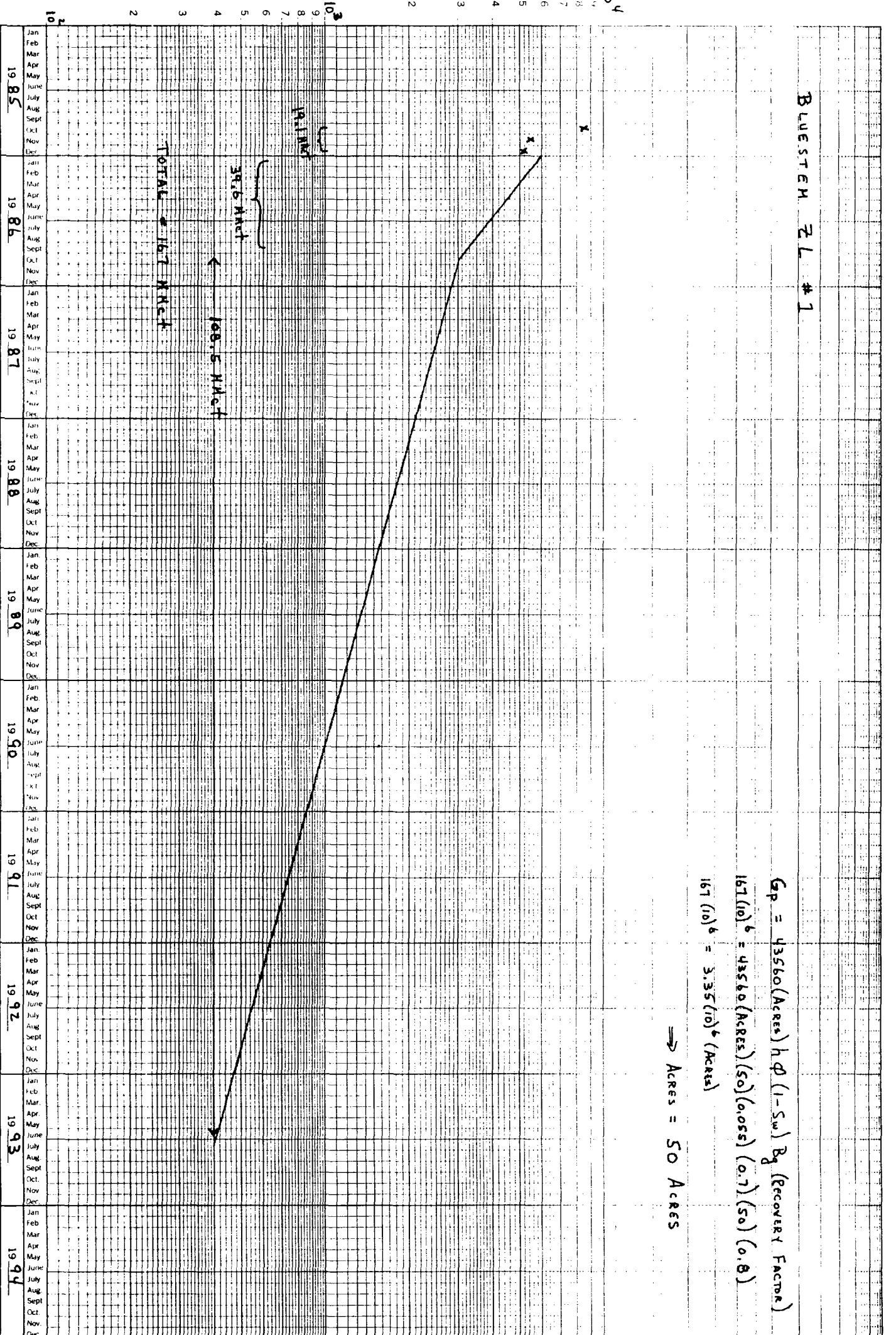
2

Mcf/D

OCTOBER 1985

NOVEMBER 1985

DECEMBER 1985

TUBING PRESSURE →

BLUESTEM - 2L - #1

← GAS

REPAIR GUN BARREL

WELL FROZE

WELL FROZE

7 % PER MONTH

TUBING PRESSURE

BLUESTEM ZL #1

Mct/MONTH

$$G_p = 43560\,(\text{Acres})\,h\phi\,(1-S_w)\,R_g\,(\text{Recovery Factor})$$

$$167\,(10)^9 = 43560\,(\text{Acres})\,(50)\,(0.055)\,(0.7)\,(50)\,(0.8)$$

$$\frac{167\,(10)^9}{\ } = 3.35\,(10)^6\,(\text{Acres})$$

$$\Longrightarrow \text{Acres} = 50\ \text{Acres}$$

121 MMct

39.6 MMct

108.5 MMct

TOTAL = 167 MMct

7 acres

50 acre
circle →

35 acres

● ZL #1

⊡ Nearest
    Orthodox
    Location
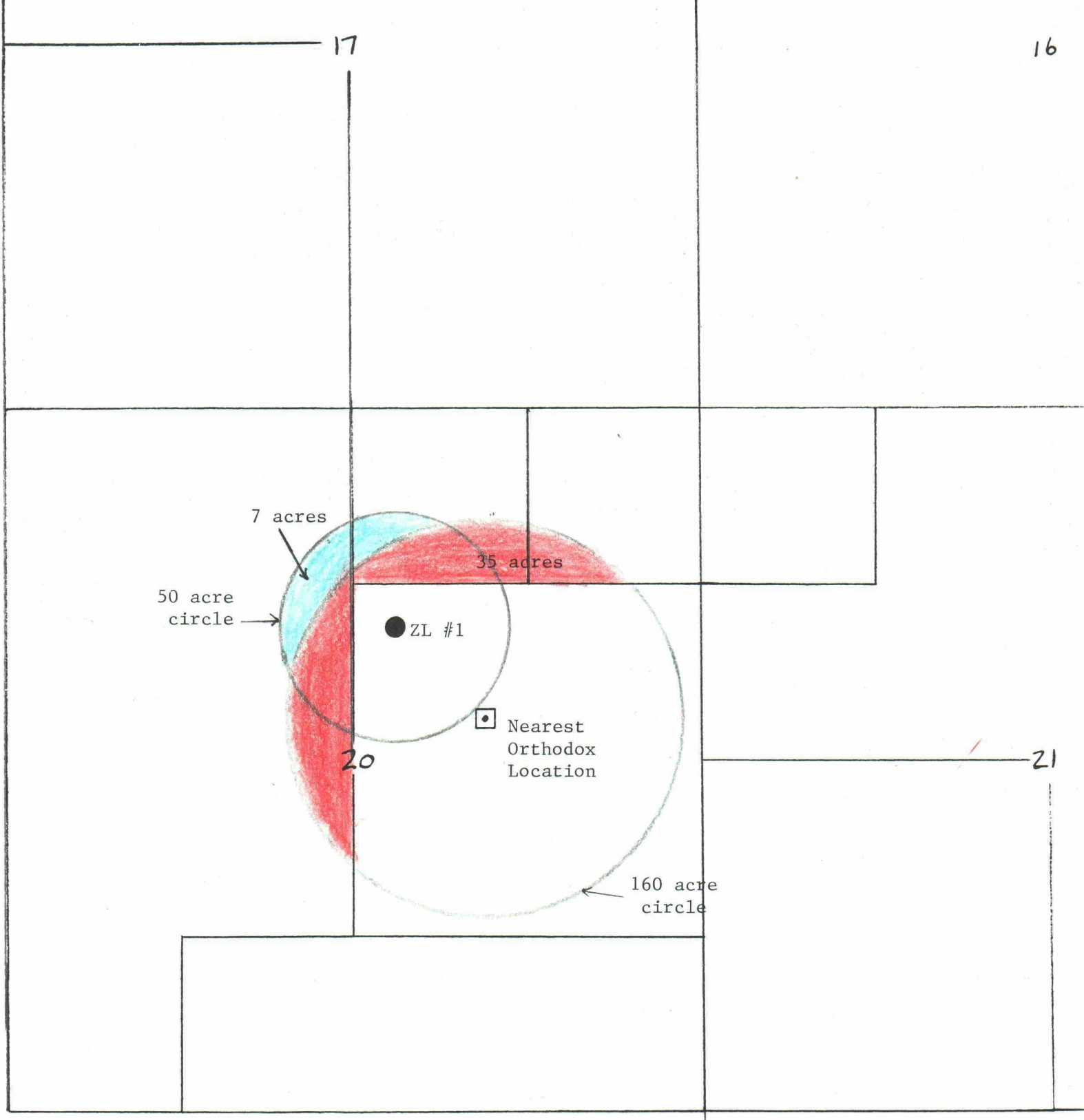
20

160 acre
circle

21

Illustration of Bluestem drainage area.

Here 85% of drainage area lies inside 160 acre circle.

ALLOWABLE FACTOR FROM DRAINAGE AREA

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ACTUAL LOCATION - 330' from N and W sides of lease

ORTHODCX LOCATION - 990' from N and W sides of lease

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Drainage Area	=	50 Acres
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Fraction of Drainage area on
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    circle around nearest
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6

COMMISSION FORMULA FOR UNORTHODOX LOCATION

ALLOWABLE FRACTION

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where

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is distance east-west factor

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and $A_{ex} = $ acres in crescent formed by circles centered at actual location and at nearest orthodox location such that each circle has same area as a standard spacing unit.

(4) $A_{su} = \dfrac{\text{Acres in non-standard spacing unit}}{\text{Acres in standard spacing unit}}$

is spacing-unit factor

7

A_{ex}= 88 acres

ZL #1
933.4'

990'

2106.4'

320 Acres in Circle

990'

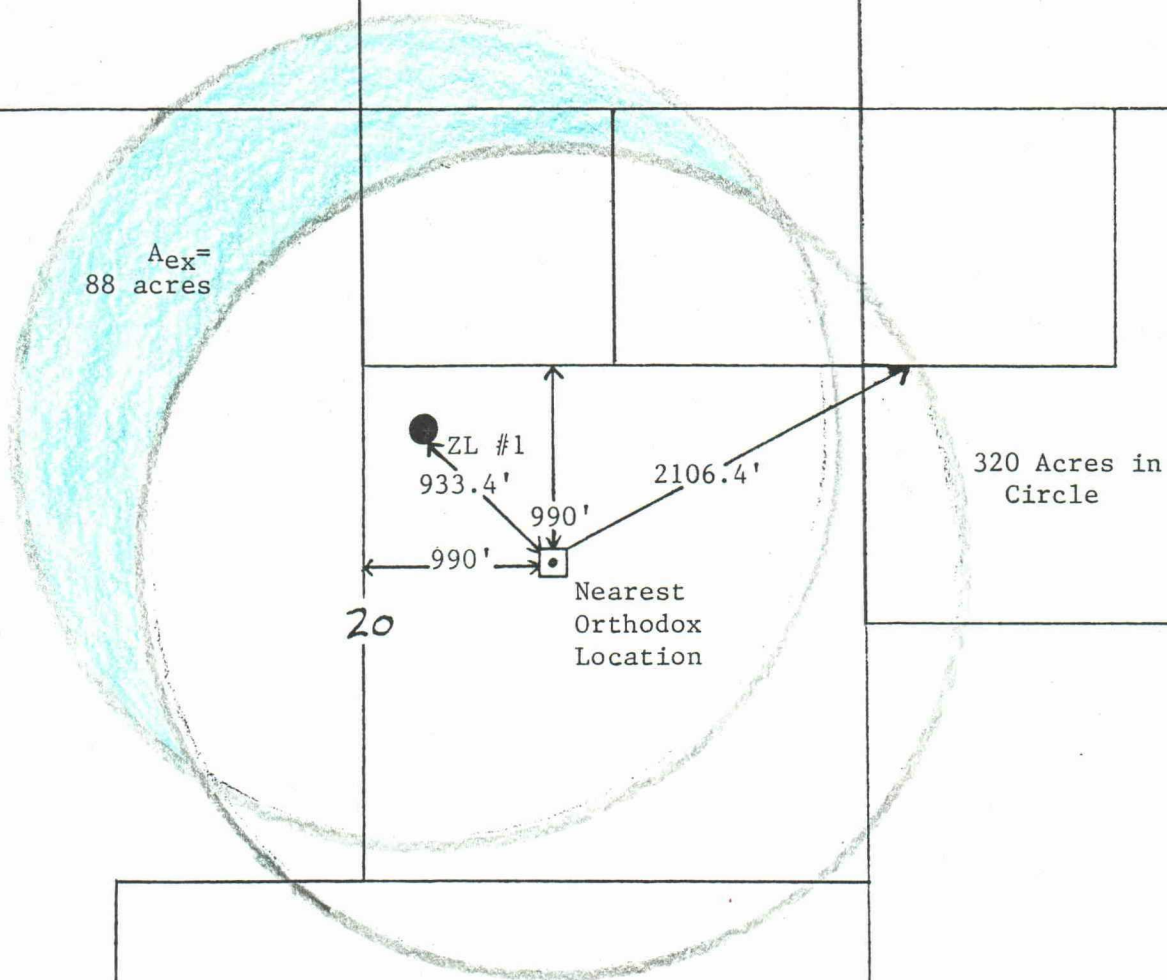20

Nearest
Orthodox
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21

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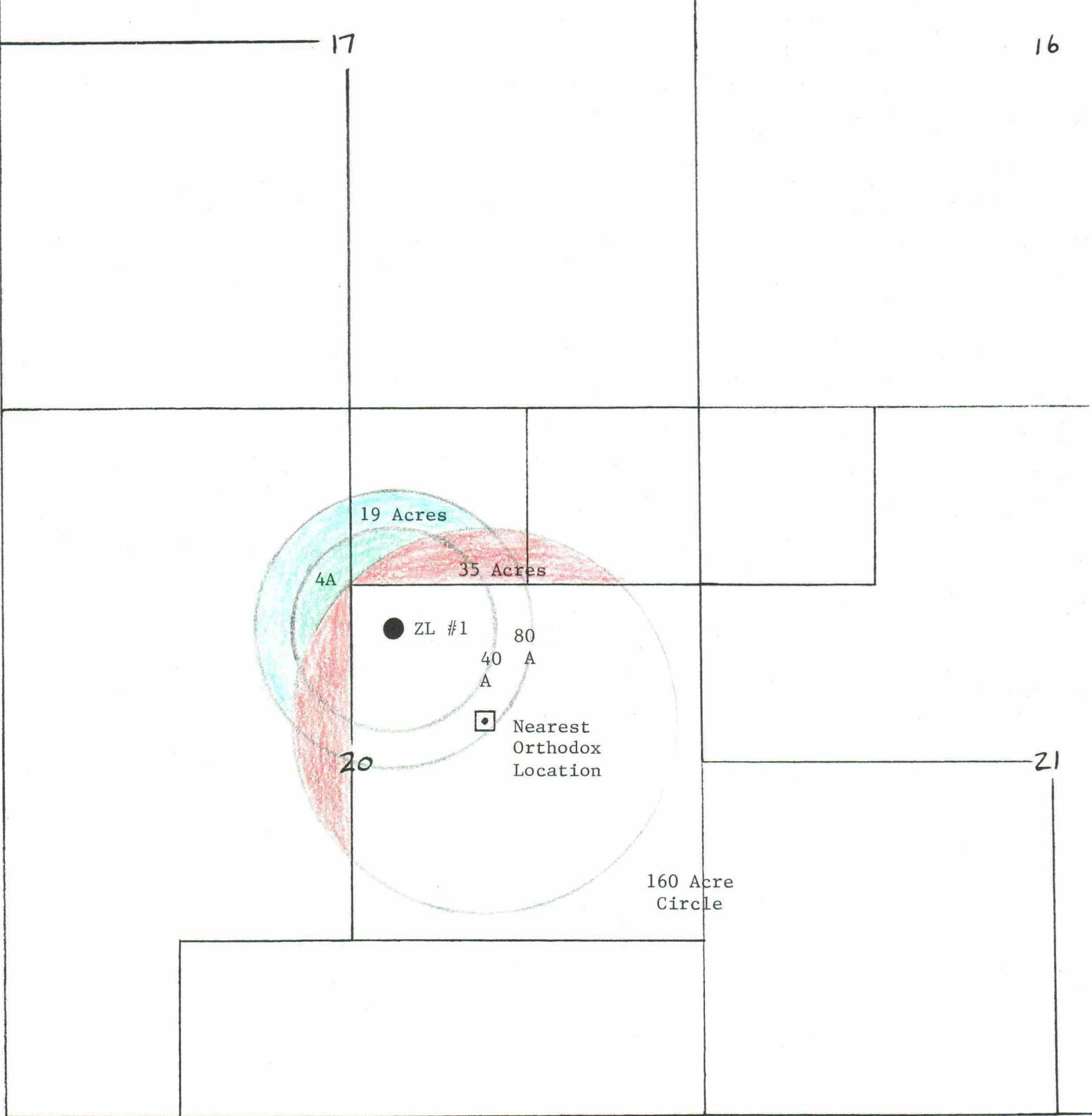| ASSUMED DRAINAGE AREA(ACRES)	ALLOWABLE FACTOR BY COMMISSION FORMULA	FRACTION OF DRAINAGE AREA ON BLUESTEM LEASE	FRACTION OF DRAINAGE AREA ON LEASE OR WITHIN 160 ACRE CIRCLE AROUND NEAREST ORTHODOX LOCATION
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19 Acres

4A

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ZL #1

80
A

40
A

Nearest
Orthodox
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20

21

160 Acre
Circle

Illustration of allowable factor based on acres drained inside and outside spacing unit.

Here drainage areas of 40 and 80 acres are shown.

59 acres

35 acres

● ZL #1

Nearest
Orthodox
Location

20

1.3
acre

160 acre
circle

Illustration of allowable factor based on acres drained inside and outside spacing unit.

Here drainage area is 160 acres.

640 acre
circle

284 acres

170 acres

● ZL #1

◉ Nearest
Orthodox
Location

20

21

320
acre circle

160
acre circle

Illustration of allowable factor based on acres drained inside and outside spacing unit.
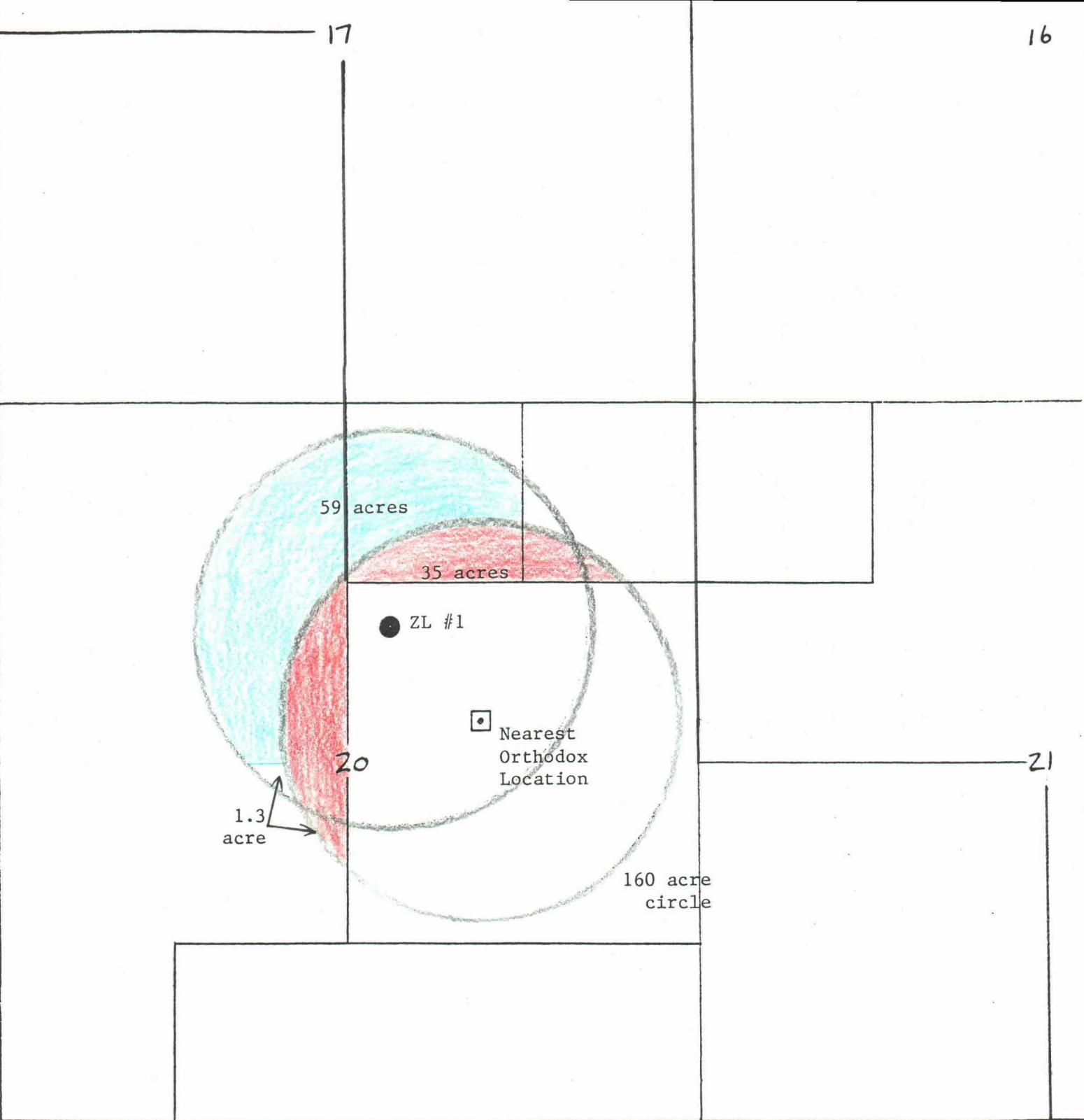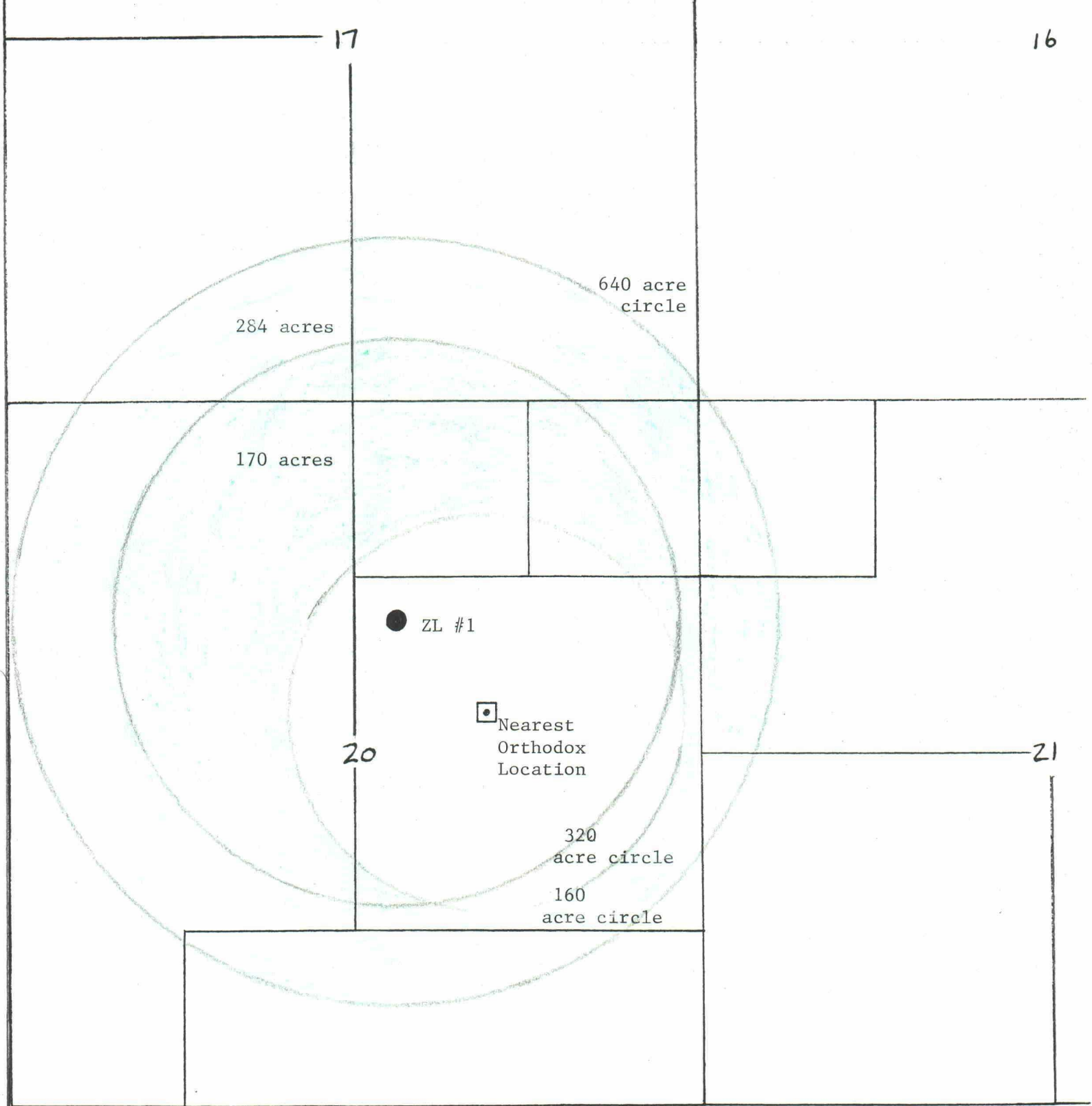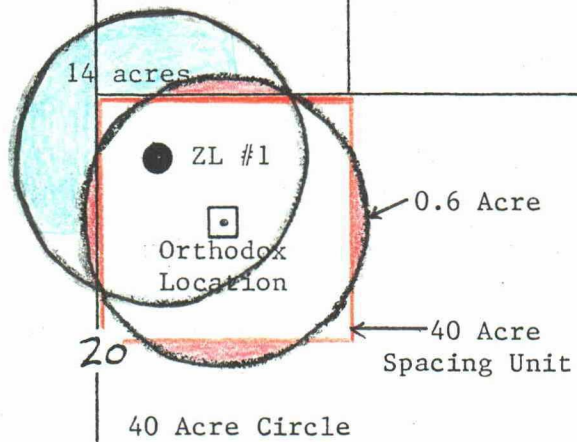
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12

14 acres

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0.6 Acre

Orthodox
Location

40 Acre
Spacing Unit

20

21

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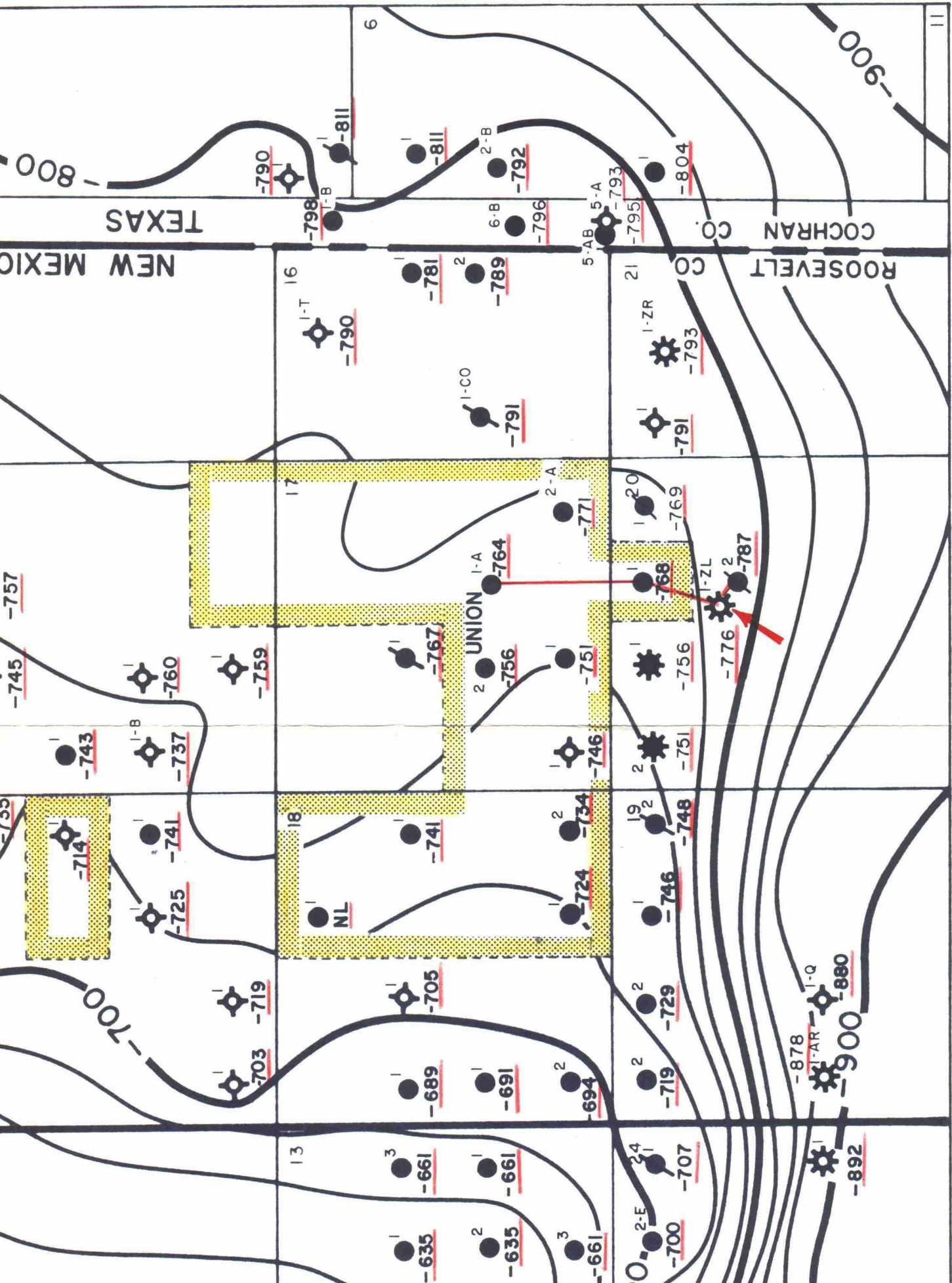$$F_{ex} = 1 - \frac{44.8}{320} = \underline{0.86}$$

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Then

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$$\text{Allowable Factor} = \frac{1}{3} [0.50 + 0.50 + 0.86] \times 0.125$$

$$\text{Allowable Factor} = \underline{0.078}$$

regardless of actual drainage area of well

BLUITT SAN ANDRES ASSOCIATED POOL
ROOSEVELT COUNTY, NEW MEXICO

TEXAS

NEW MEXICO

COCHRAN CO.

ROOSEVELT CO.

UNION

6

16

17

18

13

−900

−800

−700

−900

−811
−811
2-B −792
5-A −793
−804

1-B −798
−790

6-B −796
5-AB 5-A −795
21

−781
2 −789
1-ZR −793

1-T −790

1-CO −791
1-791

2-A
2 −771
1-ZO −769
−787

1-A −764
−768
1-ZL 2 −776

−757
1 −767
2 UNION −756
−751
−756

−745
−760
−759
2 −751
2 −751

1-B −743
1 −737
−746
2 −748

−714
−741
−741
2 −734
19 2
−748

−725
NL −724
1 −746

−719
−705
2 −729
1-Q −880

−703
1-878 1-AR
−900

−689
−691
2 −694
2 −719
24 −707

13 3 −661
−661
2 −661
2-E −700
1 −892

−635
2 −635
3 −661