Case No
6823

Large Exhibits

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PROPOSED AMENDMENT TO STATEWIDE RULES

104 B & 104 C

NMOCD Copy

CASE NO. 6823 (3/11/80)

EXHIBITS 1, 5-10 A

Amend curr

Rule 104 B

(a) Wildc

In Union, projected be located surface co form of a Land Surve located no such tract nor closer than 330 feet to any quarter ... section or subdivision inner boundary.

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e
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x

(b) Wildcat Wells Other Than CO_2 Gas Wells

In Union, Harding and Quay Counties any Wildcat well, other than a CO_2 gas well shall be located on a tract consisting of approximately 40 surface contiguous acres substantially in the form of a square which is a legal subdivision of the U.S. Public Land Surveys, or on a governmental quarter - quarter section or lot and shall be located not closer than 330 feet to any boundary of such tract.

Re-designate current Rule 104 B III as Rule 104 B IV and add Union, Harding, and Quay Counties to the excepted counties. No other changes to this rule.

RULE 104 C II (c)

Amend current rule to read as follows:

Rule 104 C II (c) Union, Harding, and Quay Counties

Unless otherwise provided in special pool rules, each development well for a defined gas pool in the Tubb formation or older shall be located on a designated drilling tract consisting of 640 surface contiguous acres, more or less, substantially in a form of a square which is a legal subdivision of the U.S. Public Land Surveys being a governmental section, and shall be located not closer than 1650 feet to any outer boundary of such tract nor closer than 330 feet to any quarter - quarter section or subdivision inner boundary.

RULE 104 C II (d)

New Rule to read as follows:

Rule 104 C II (d) Union, Harding, and Quay Counties

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 6823 Exhibit No. 1
Submitted by: Amoco
Hearing Date 3-11-80

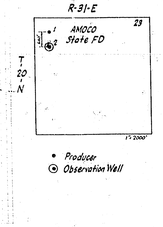
Unless otherwise provided in special pool rules, each development well for a defined gas pool, other than a CO_2 gas pool, shall be located on a designated drilling tract consisting of 160 surface contiguous acres, more or less, substantially in the form of a square which is a quarter section, being a legal subdivision of the U.S. Public Land Surveys, and shall be located not closer than 660 feet to any outer boundary of such tract nor closer than 330 feet to any quarter - quarter section or subdivision inner boundary nor closer than 1320 feet to the nearest well drilling to or capable of producing from the same pool.

Re-designate current Rule 104 C II (c) as Rule 104 C II (e) and add Union, Harding, and Quay Counties to the excepted counties. No other changes to this rule.

U.S.A.F.C. MICROGRAPHICS
BEST AVAILABLE COPY

Change in B ⌐Hole Pressure vs. Time
State FD Observation Well
Bravo Dome Area
1974 Interference Test

⊙ State FD No. 2



Time-Days

State FD 1974 Interference Test Data
Bravo Dome Area

Producing Time-Days	Prod. Rate* M cfd	Pressure Observation No. of Days Since Start of Test	Pressure Observation Change in Bottom Hole Pressure, psi State FD No. 2
0-7	1,380	0	0
7-11	960		
11-14	704		
14-20	1,120		
20-25	1,412		
25-44	1,028		
44-48	823		
48-56	850		
56-63	823		
63-71	645		
71-77	590	72	-1.5
77-84	711	79	-1.6

* Rates are questionable due to scale build-up on well tester orifice plate.

LJS/cw
449/H3

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 6823 Exhibit No. 5
Submitted by: Amoco
Hearing Date: 3-1-80

1974 and 1979 Theoretical
Calculation of Bravo Dome Area Interference Test Results
(Based on a homogeneous and infinite system)

Basic Equation

$$\Delta P_{obs\ well} = \frac{70.6Qu\ B}{Kh} \cdot -E_1\left(-\frac{\phi u c\ r^2}{.0264\ Kh\ t}\right)$$

where Q = flow rate, mcfpd
u = viscosity, cp
B = Reservoir Volume Factor, Rbl/mcf
Kh = permeability, md-ft.
ϕh = porosity feet, fraction
c = Compressibility, psi^{-1}
r = distance to observation well, ft.
t = time, days

State F1 Test

Values used for theoretical curve

u = .0161
B = 6.3
Kh = 3089 - 1974 test
3862 - 1979 test
ϕh = 25
c = 201 x 10^{-5}
r = 660

Theoretical calculation results

Producing Time-Days	Calculated Pressure Change, psi 1974 Test	1979 Test
3	-.26	-.32
7	-1.47	-1.12
14	-2.94	-2.91
21	-3.97	-3.99
45		-6.22

LJS/cw
449/H3

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 6823 Exhibit No. 6
Submitted by: Amoco
Hearing Date: 3-1-80

Hatmann Test

Values used for theoretical curve same as State F1 except

Kh = 2,226 for both 1974 and 1979 test

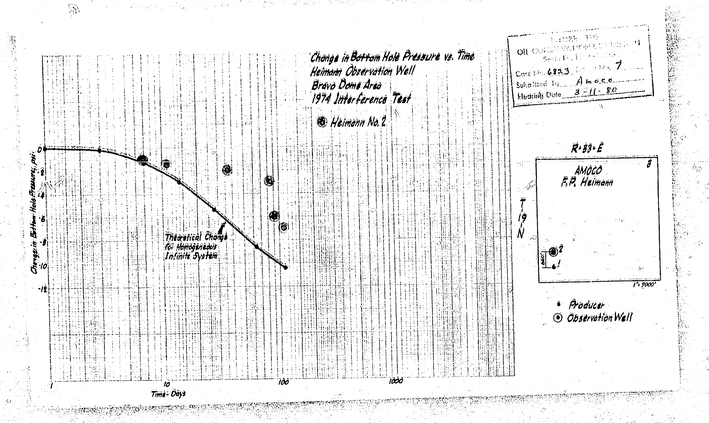
Theoretical calculation results

Producing Time-Days	Calculated Pressure Change, psi 1974 Test	1979 Test
3	-.19	-.11
7	-1.27	-.75
14	-2.85	-1.55
28	-5.33	-3.19
63	-8.68	-5.26
111	-10.47	
158		-6.06

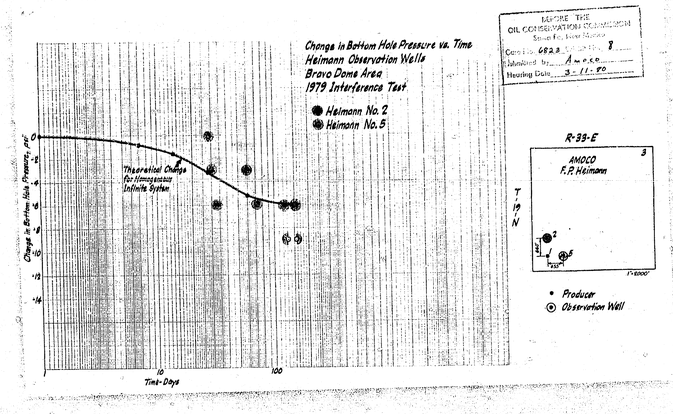
LJS/cw
449/H4

BEFORE THE
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Santa Fe, New Mexico
Case No. 6823 Exhibit No. 4
Submitted by: Amoco
Hearing Date: 3-1-80

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BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 6823 Exhibit No. 7
Submitted by Amoco
Hearing Date 3-11-80



BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 6823 Exhibit No. 8
Submitted by Amoco
Hearing Date 3-11-80

Heimann 1974 Interference Test Data
Bravo Dome Area

Production		Pressure Observation	
			Change in Bottom Hole
	Avg. Rate	No. of Days	Pressure, psi
Days Prod.	mcfpd	Since Start of Test	Heimann No. 2
0-7	1,494	0	0
		7	-1.0
		11	-1.5
7-14	1,519		
14-21	1,517		
21-28	1,508		
28-35	1,472		
35-42	1,436	37	-2.0
42-49	1,460		
49-56	1,519		
56-63	1,448		
63-70	1,451		
70-77	1,395		
77-84	1,395		-3.0
84-91	1,453	85	-4.1
91-98	1,410	94	
98-105	1,333		-7.0
105-111	1,279	111	

LJS/cm
4C7/84

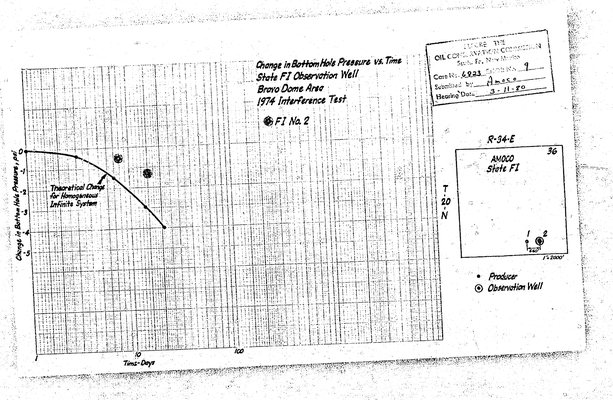
BEFORE THE
OIL CONSERVATION COMMISSION
Case No. 6823 Exhibit No. 7A
Submitted by Amoco
Hearing Date 3-11-80

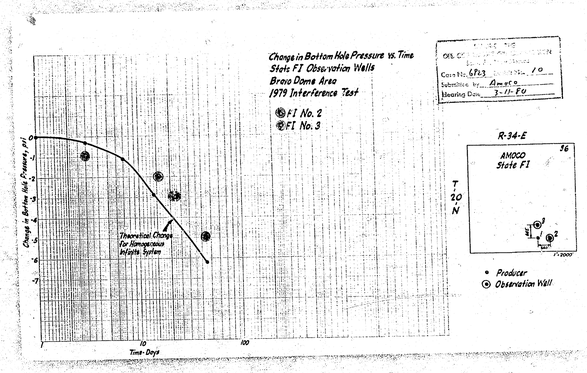
Heimann 1979 Interference Test Data
Bravo Dome Area

Production		Pressure Observation		
			Change in Bottom Hole	
	Avg. Rate	No. of Days	Pressure, psi	
Days Prod.	mcfpd	Since Start of Test	Heimann No. 2	Heimann No. 5
0-7	886	0	0	0
7-14	667			
14-21	977			
21-28	1,028			
28-35	950	29	0	0
		30	0	-3.0
		33	0	-6.0
35-42	938			
42-49	950			
49-56	871			
56-63	862	60	-3.0	-6.0
63-70	856			
70-77	765	72	-6.0	-6.0
77-84	723			
84-91	538			
91-98	702			
98-105	722			
105-112	744			
112-119	759			
119-126	638			
126-133	637	127		-6.0
133-140	679	134	-6.0	-9.0
140-147	722			
147-154	597			
154-158	210	156	-6.0	-9.0

LJS/cm
449/H5

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State F1 1974 Interference Test Data
Bravo Dome Area

Production		Pressure Observation
Days Prod.	Avg. Rate mcfpd	No. of Days Since Start of Test	Change in Bottom Hole Pressure, psi State F1 No. 2
0-7	1,559	0	0
7-14	1,453	8	-.5
14-21	1,488	15	-1.3

LJS/cr
469/H

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Santa Fe, New Mexico
Case No. 6923 9A
Submitted by: Amoco
Hearing Date: 3-11-80

State F1 1979 Interference Test Data
Bravo Dome Area

Production		Pressure Observation
Days Prod.	Avg. Rate mcfpd	No. of Days Since Start of Test	Change in Bottom Hole Pressure, psi State F1 No. 2	State F1 No. 3
0-7	1,449	0	0	0
7-14	1,499	8	-1.0	-1.0
14-45	1,486	16	-2.0	-3.0
		22	-3.0	-3.0
		23	-5.0	-5.0
		40	-5.0	-5.0
		45	-5.0	-5.0

LJS/cr
469/H2

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Case No. 6923 10A
Submitted by: Amoco
Hearing Date: 3-11-80

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COLFAX

MORA

APPROXIMATE EXTENT

APPROXI
(7)
(8)
(9)
QUAY
CUADALUPE

NE

A

GULF #1
JOLLA LAND &
CATTLE CO. 'L'

21 - T30N - R34E

SKELLY #1
VAN PELT

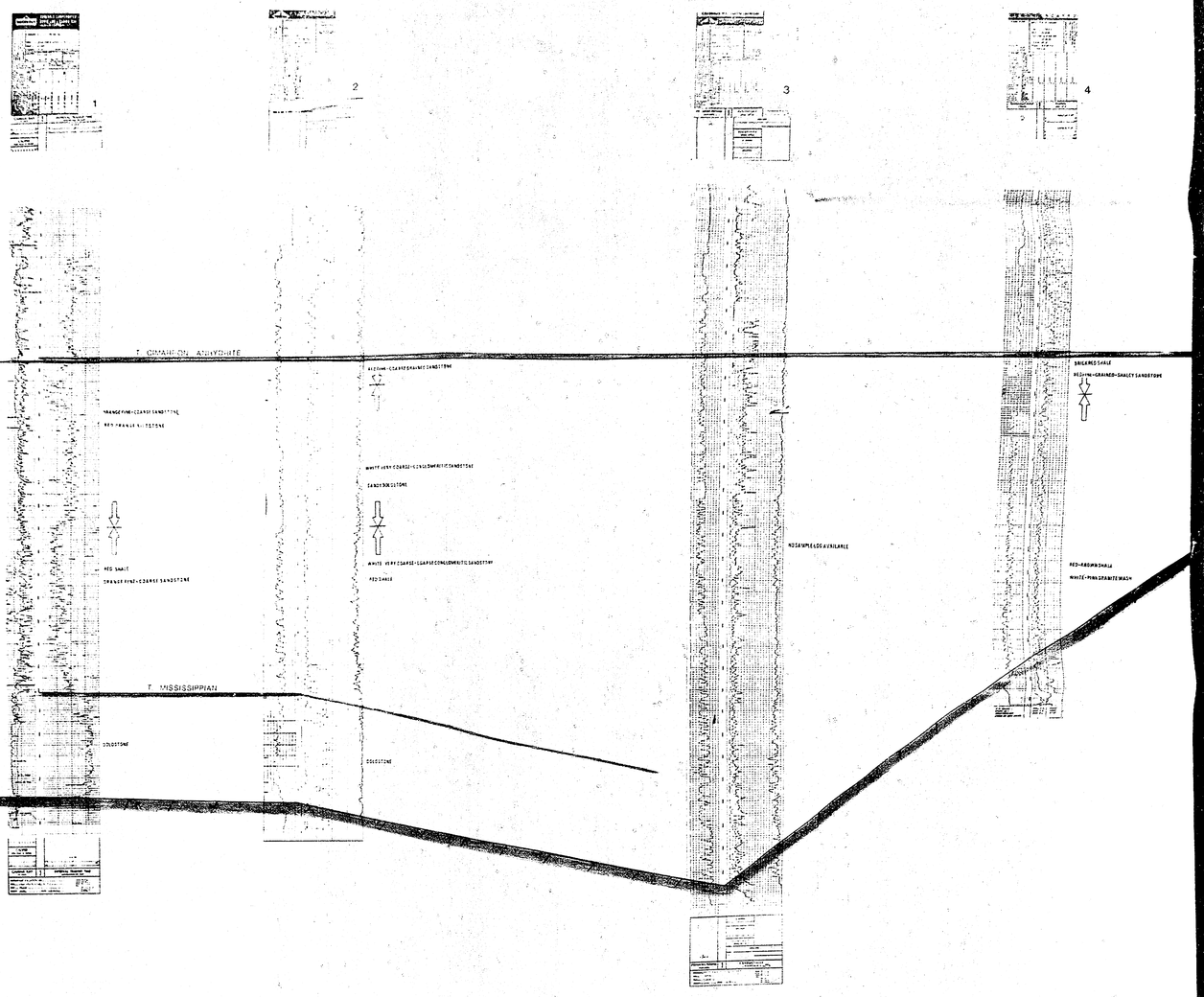
9 - T28N - R35E

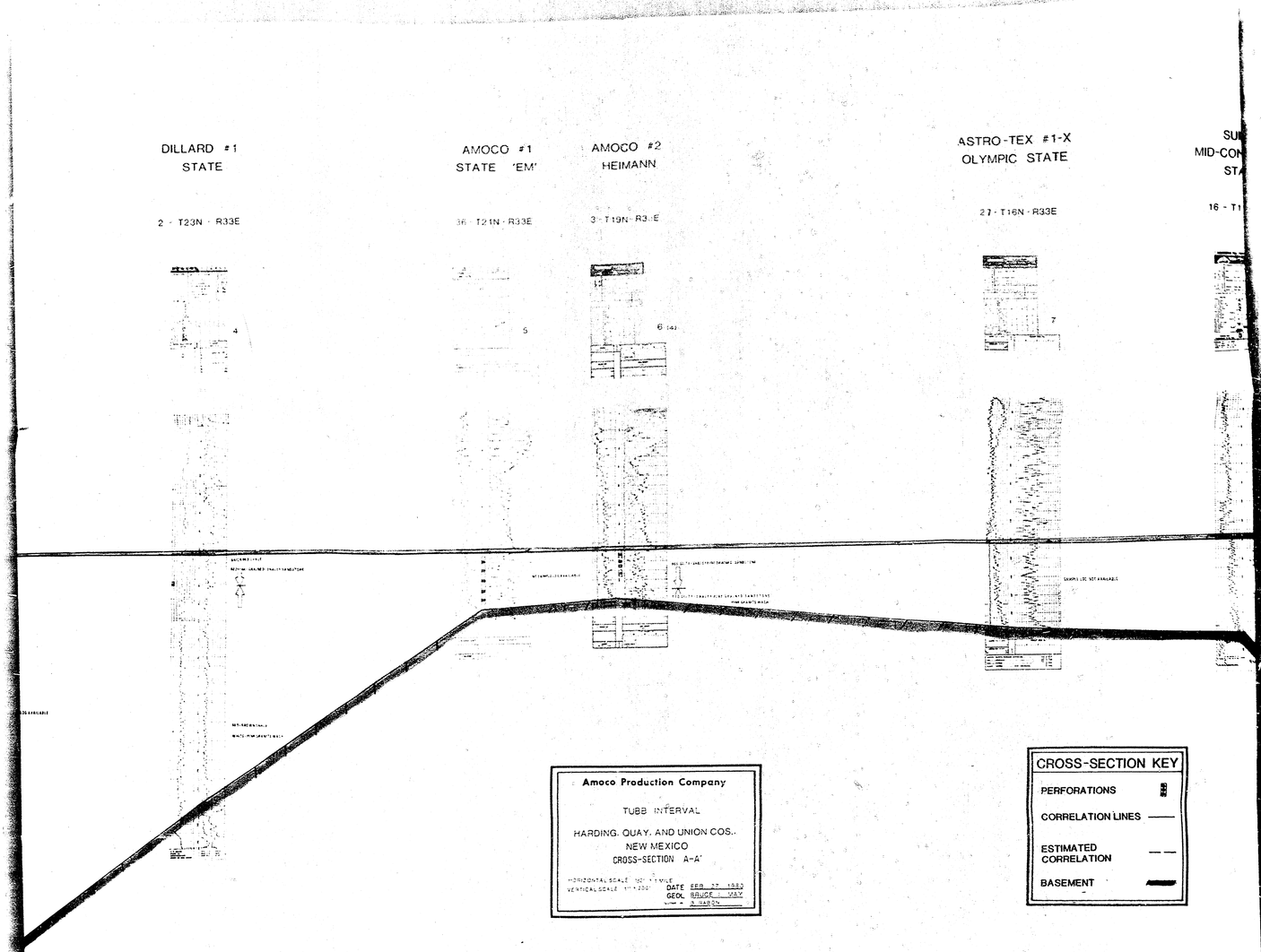
WESTERN &
ANSON #1
FEDERAL

29 - T26N - R33E

DILLARD #1
STATE

2 - T23N - R33E





Amoco Production Company

TUBB INTERVAL

HARDING, QUAY, AND UNION COS., NEW MEXICO

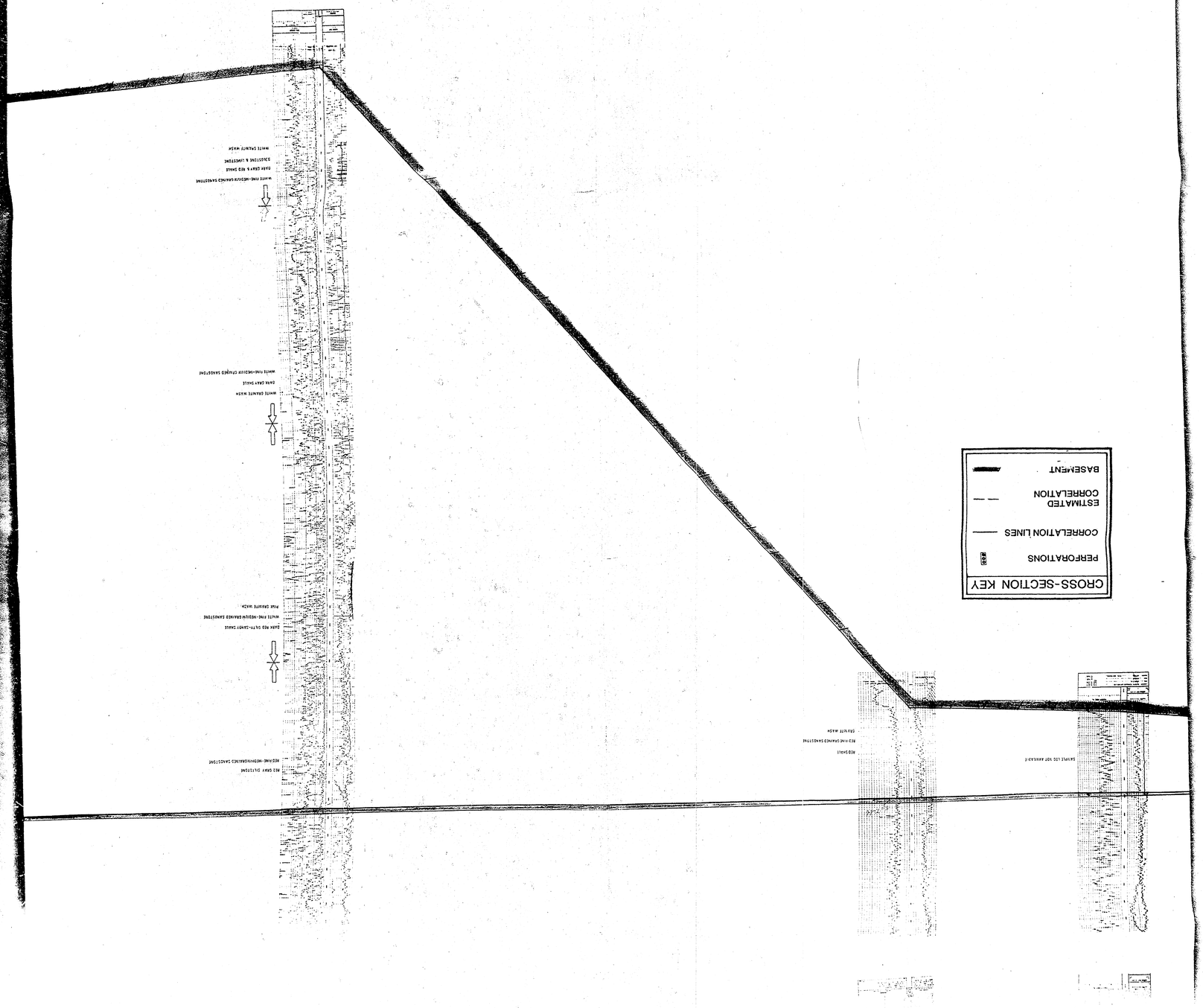
CROSS-SECTION A-A'

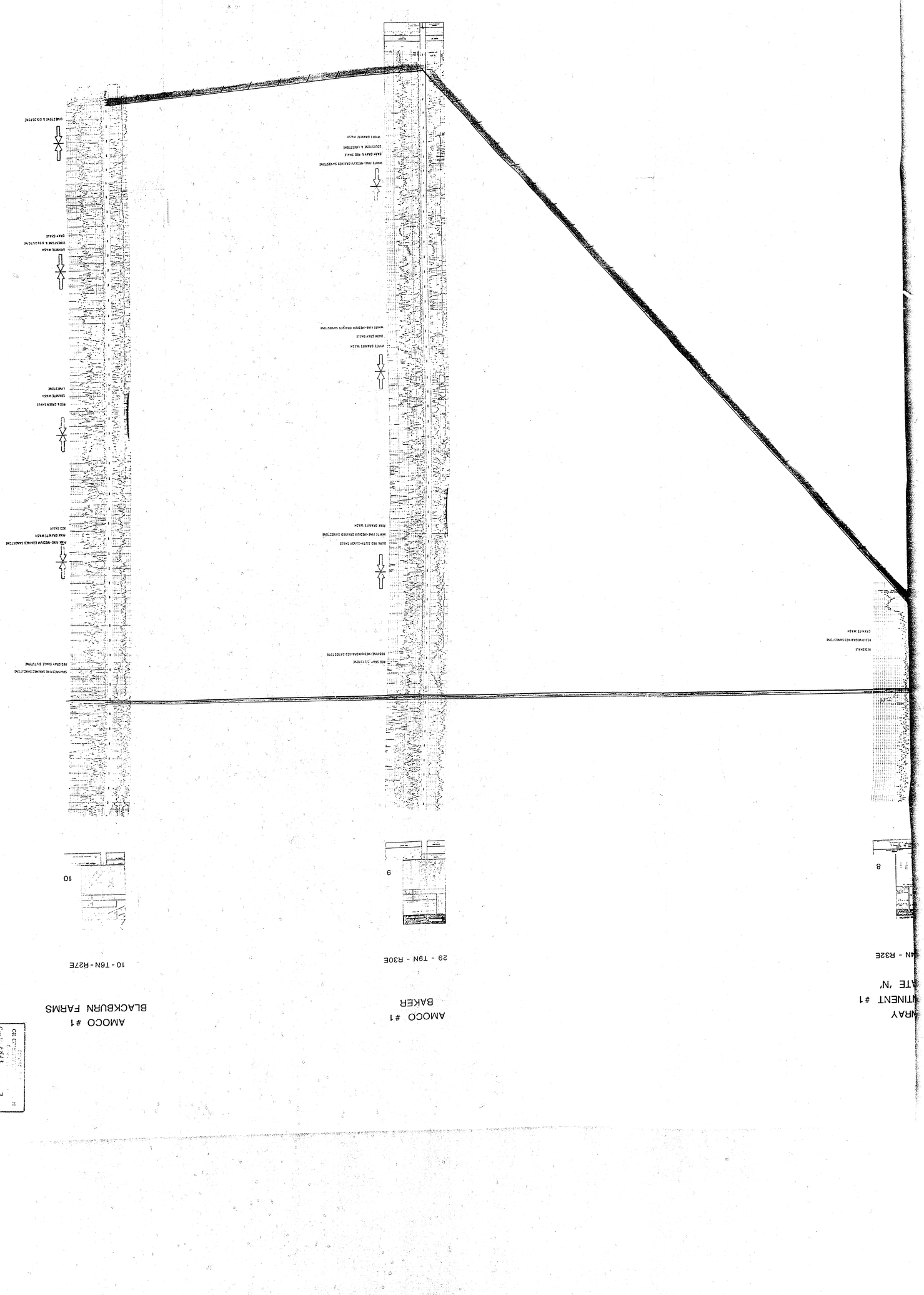
HORIZONTAL SCALE 1 INCH = 1 MILE
VERTICAL SCALE 1" = 200'

DATE FEB 17 1983
GEOL ROUCE VAN A. HARDY

CROSS-SECTION KEY

- PERFORATIONS
- CORRELATION LINES
- ESTIMATED CORRELATION
- BASEMENT


CROSS-SECTION KEY
PERFORATIONS
CORRELATION LINES
ESTIMATED CORRELATION
BASEMENT


WHITE SAMITE WASH
DARK GRAY SHALE
WHITE FINE-MEDIUM GRAINED SANDSTONE
DARK RED SILTY-SANDY SHALE
WHITE FINE-MEDIUM GRAINED SANDSTONE
RED SHALE
RED FINE-MEDIUM GRAINED SANDSTONE
RED SHALE
GRAY-WHITE FINE GRAINED SANDSTONE
RED SHALE
RED SHALE
RED FINE GRAINED SANDSTONE
SILTSTONE
RED SHALE
RED FINE-MEDIUM GRAINED SANDSTONE
MUDSTONE & SILTSTONE
DARK SHALE
SILTSTONE & MUDSTONE
GRAMITE WASH
LIMESTONE
RED & GREEN SHALE
GRAMITE WASH
LIMESTONE
WHITE FINE-MEDIUM GRAINED SANDSTONE
DARK GRAY & RED SHALE
SILTSTONE & LIMESTONE
WHITE GRAMITE WASH
LIMESTONE & MUDSTONE
10
9
8
10 - T6N - R27E
29 - T9N - R30E
N - R32E
AMOCO #1
BLACKBURN FARMS
AMOCO #1
BAKER
NRAY
TINENT #1
TE 'N'
SW
A'

6823 4
Amoco 3/11/80

NEW MEXICO | TEXAS

SE

B'

AMOCO #1
STATE 'FA'

29 - T24N - R27E

1

AMOCO #1
STATE 'FB'

13 - T22N - R28E

2

AMOCO #1
STATE 'FD'

23 - T20N - R31E

3

AMOCO #2
HEIMANN

3 - T19N - R33E

4 (6)

AMOCO #1
NIKKEL

10 - T18N - R35E

5

CO2 IN ACTION
[TEXAS PACIFIC]
#1 - COOTS

62 - BLK. XR

WMD LEE SURVEY

6

T. CIMARRON ANHYDRITE

TOP OF TUBB

RED SHALY FINE GRAINED SANDSTONE

PINK GRANITE WASH

RED VERY FINE SILTY-SHALEY SANDSTONE

DARK RED SILTY SHALE

GRANITE WASH FINY

PINK VERY FINE GRAINED SANDSTONE

RED SHALE

RED SILTY-SHALEY FINE GRAINED SANDSTONE

RED SILTY-SHALEY FINE GRAINED SANDSTONE

PINK GRANITE WASH

LIGHT RED VERY-FINE SANDSTONE

DARK RED SHALE

SAMPLES DO NOT AVAILABLE

Amoco Production Company

TUBB INTERVAL

QUAY, HARDING, AND UNION COS., NEW MEXICO AND HARTLEY CO., TEXAS

CROSS-SECTION B-B'

HORIZONTAL SCALE 1/2" = 1 MILE
VERTICAL SCALE 1" = 250'

DATE FEB. 27, 1980
GEOL BRUCE I. MAY
Drawn by B. PABON

CROSS-SECTION KEY

PERFORATIONS

CORRELATION LINES

ESTIMATED CORRELATION

BASEMENT

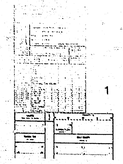
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NW

B

AMOCO #1
STATE 'FA'

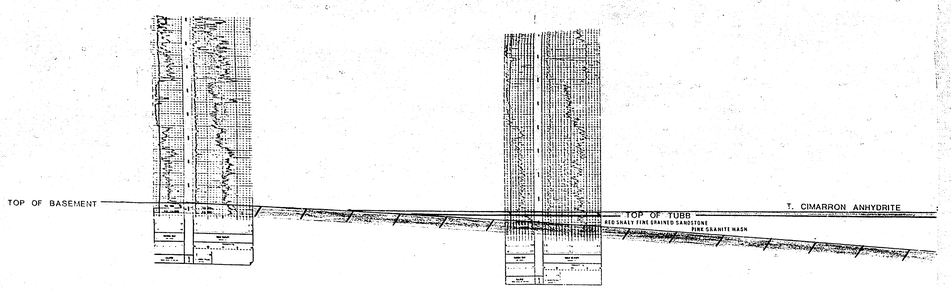
29 - T24N - R27E



AMOCO #1
STATE 'FB'

13 - T22N - R28E





Amoco Production Company

TUBB INTERVAL

QUAY, HARDING, AND UNION COS., NEW MEXICO AND HARTLEY CO., TEXAS

CROSS-SECTION B-B'

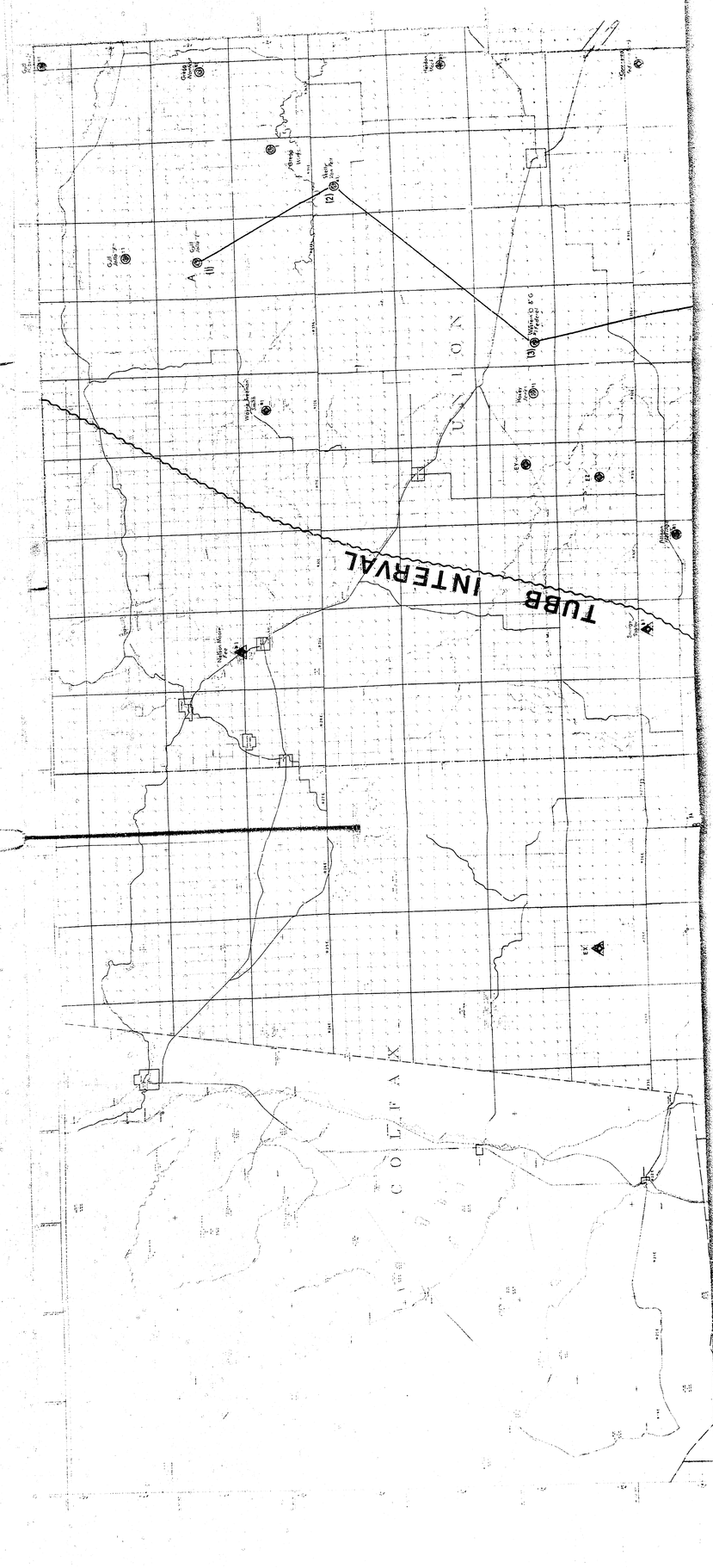
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VERTICAL SCALE: 1" = 200'

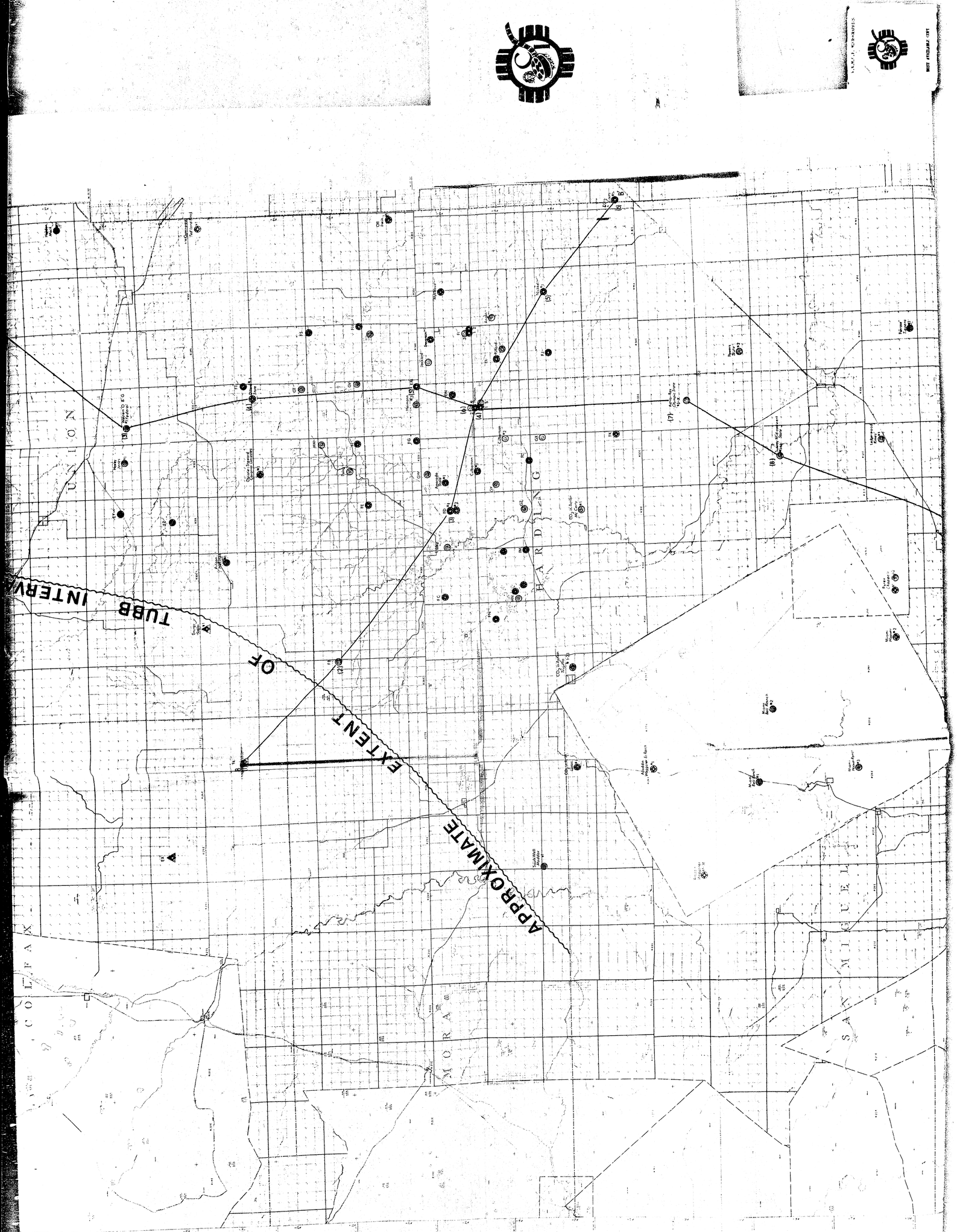
DATE FEB. 27, 1980
GEOL. BRUCE I. MAY
Drafted by B. RABOY

CROSS-SECTION KEY

PERFORATIONS
CORRELATION LINES
ESTIMATED CORRELATION
BASEMENT

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TUBB INTERVAL
COLFAX
UNION
Gulf
Hobbs
Warren
Wells
Mark
Texaco
Phillips
Hobbs Water
Wayne Jackson
Gulf
Warren


UNION
HARDING
COLFAX
MORA
SAN MIGUEL
TUBB INTERVAL
OF
EXTENT
APPROXIMATE

SAN MIGUEL

GUADALUPE

QUAY

CURRY

DE BACA

ROOSEVELT

Miami Pool Ranch #1

Miami Jett Ranch #2

Miami Flynn-Pines #3

Miami Hoover #2

Pures Chaparral #1, #2

Roy Hoosier #1

Underwood Ranch #1

Parsons' Tobacco #1

Sun North Preslo

(9) Arnold Ruler #1

Sandoval Fuller #1

Hamlin #1

(8) Quay Mid continent Store #1

(10) A' Annes Blackburn Farms #1

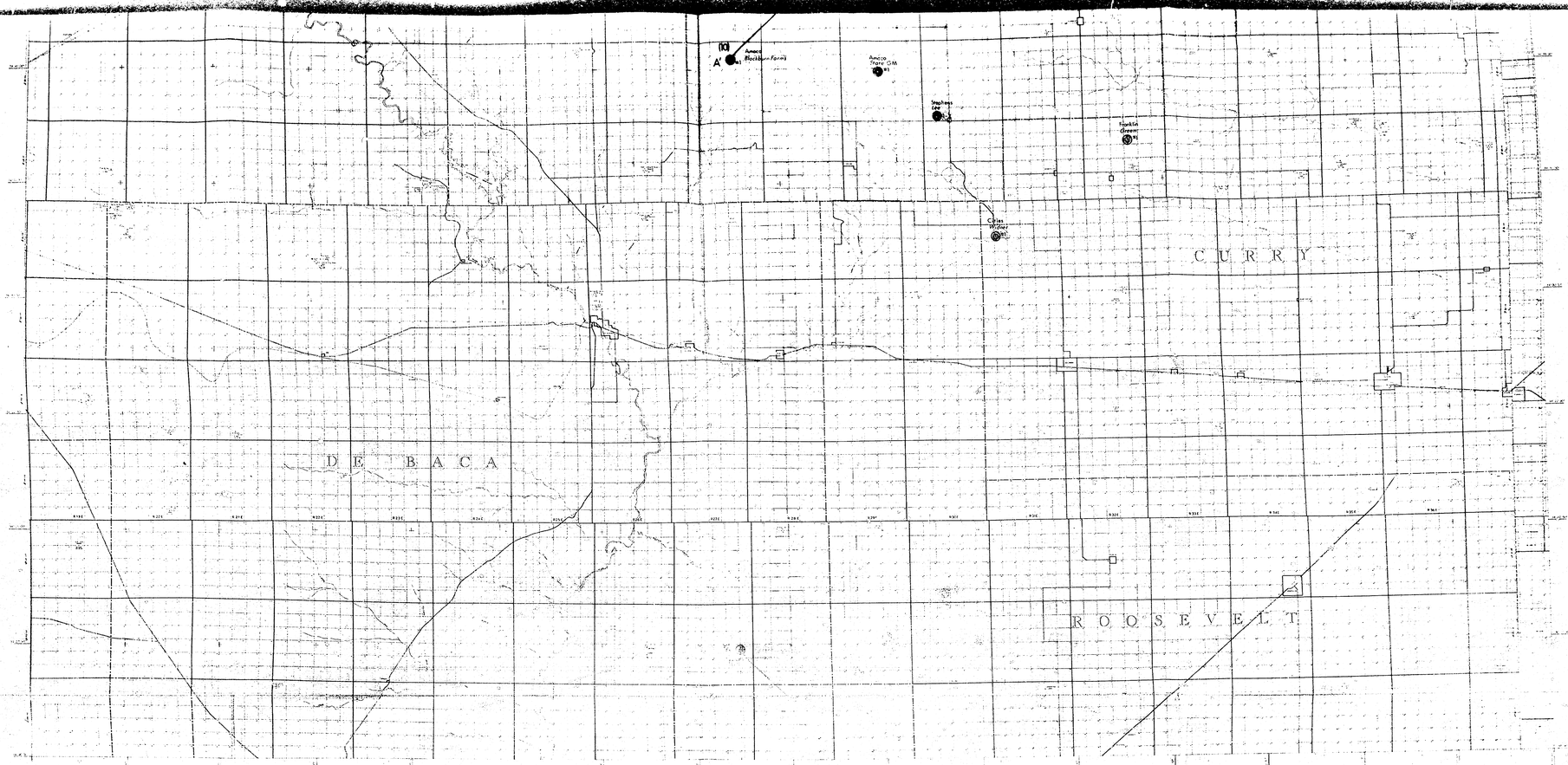
Amoco Taylor (3M) #1

Stephens Lee #1, #2

Franklin Gleaves #1

Coles Wagner #1

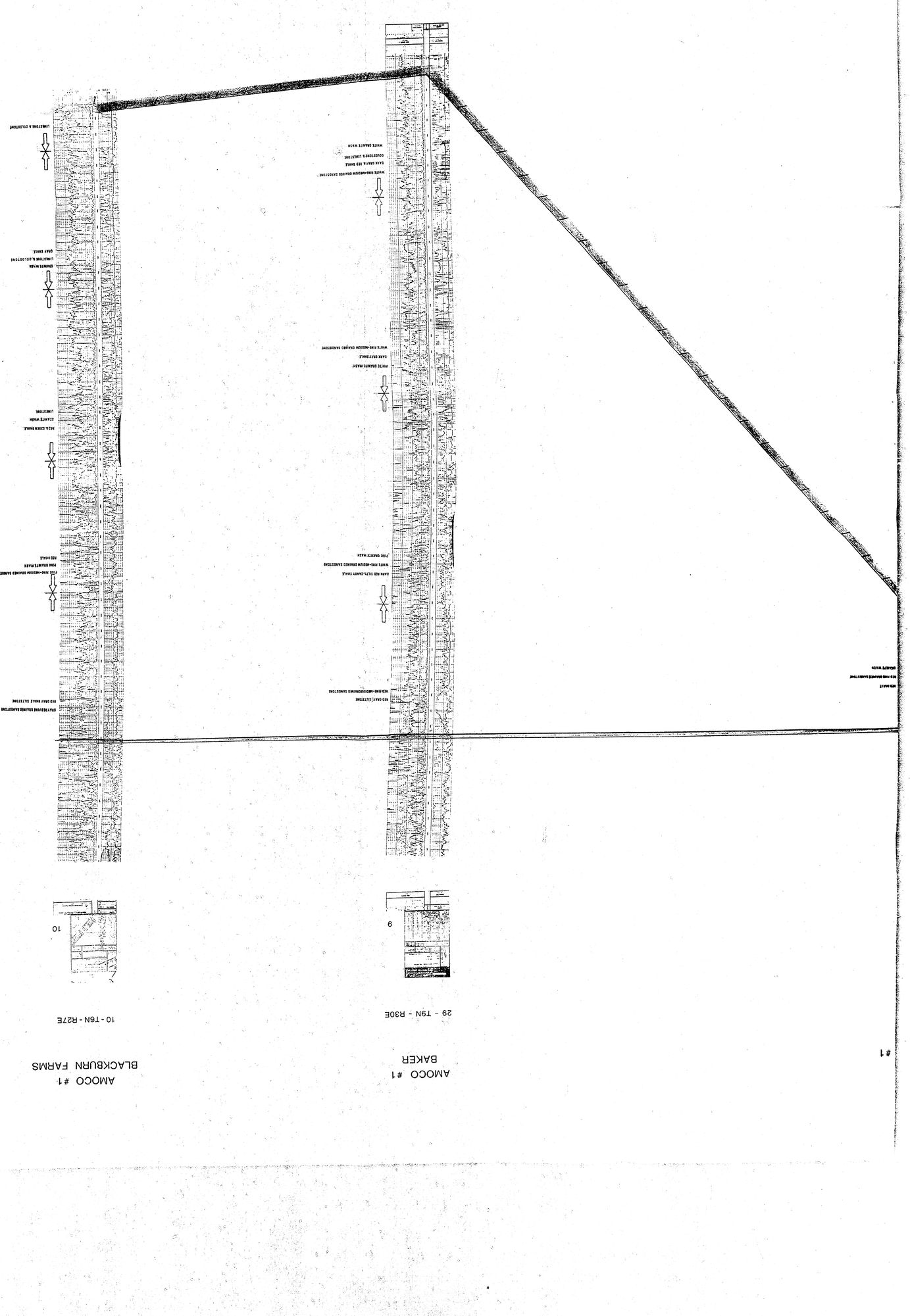
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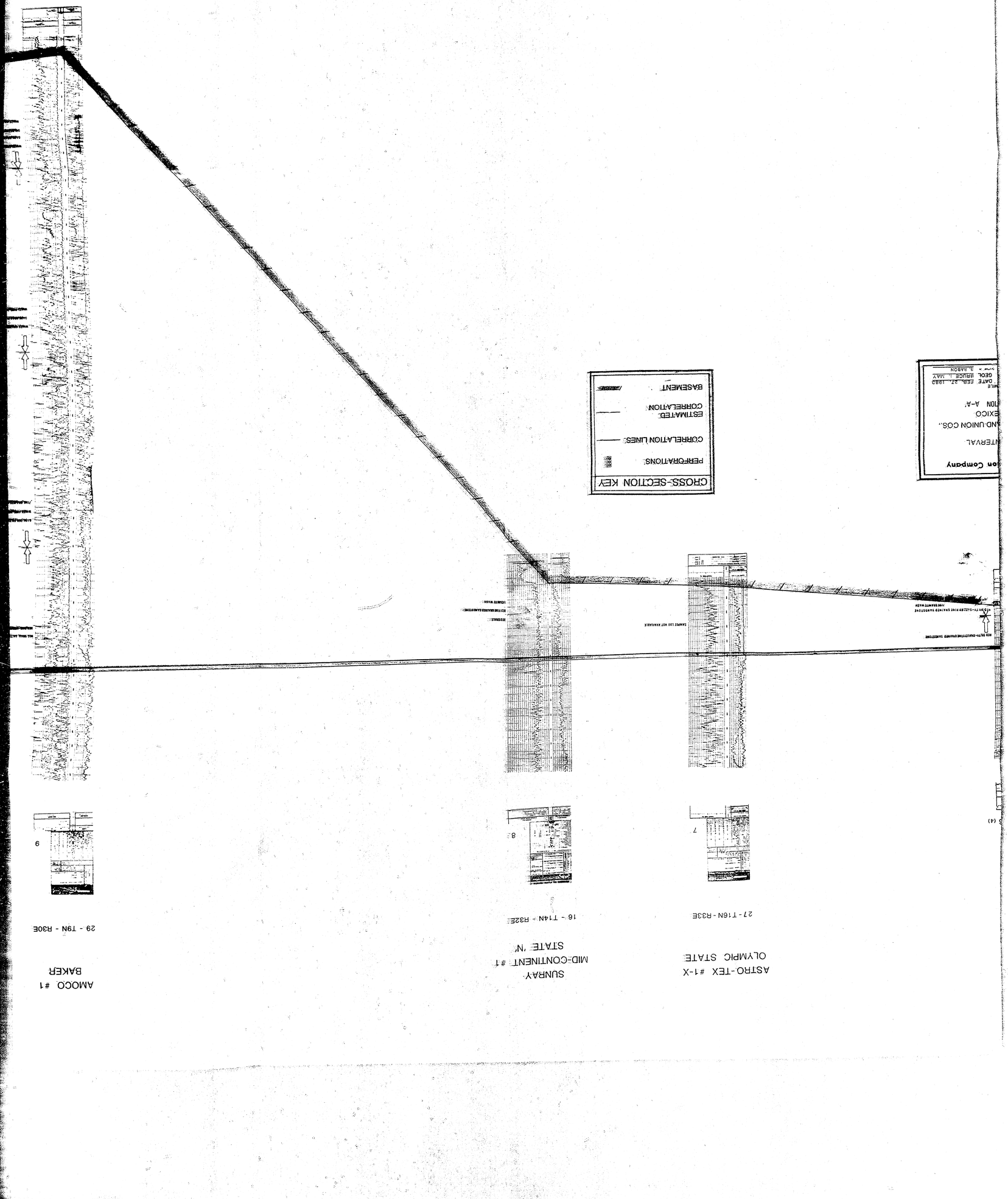


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NEW MEXICO TECH

NEW MEXICO STATE




CROSS-SECTION KEY
PERFORATIONS
CORRELATION LINES
ESTIMATED CORRELATION
BASEMENT
ASTRO-TEX #1-X
OLYMPIC STATE
27-T16N-R33E
SUNRAY
MID-CONTINENT #1
STATE 'N'
16 - T14N - R32E
AMOCO #1
BAKER
29 - T9N - R30E

DILLARD #1
STATE

2 - T23N - R33E

AMOCO #1
STATE 'EM'

36 - T21N - R33E

AMOCO #2
HEIMANN

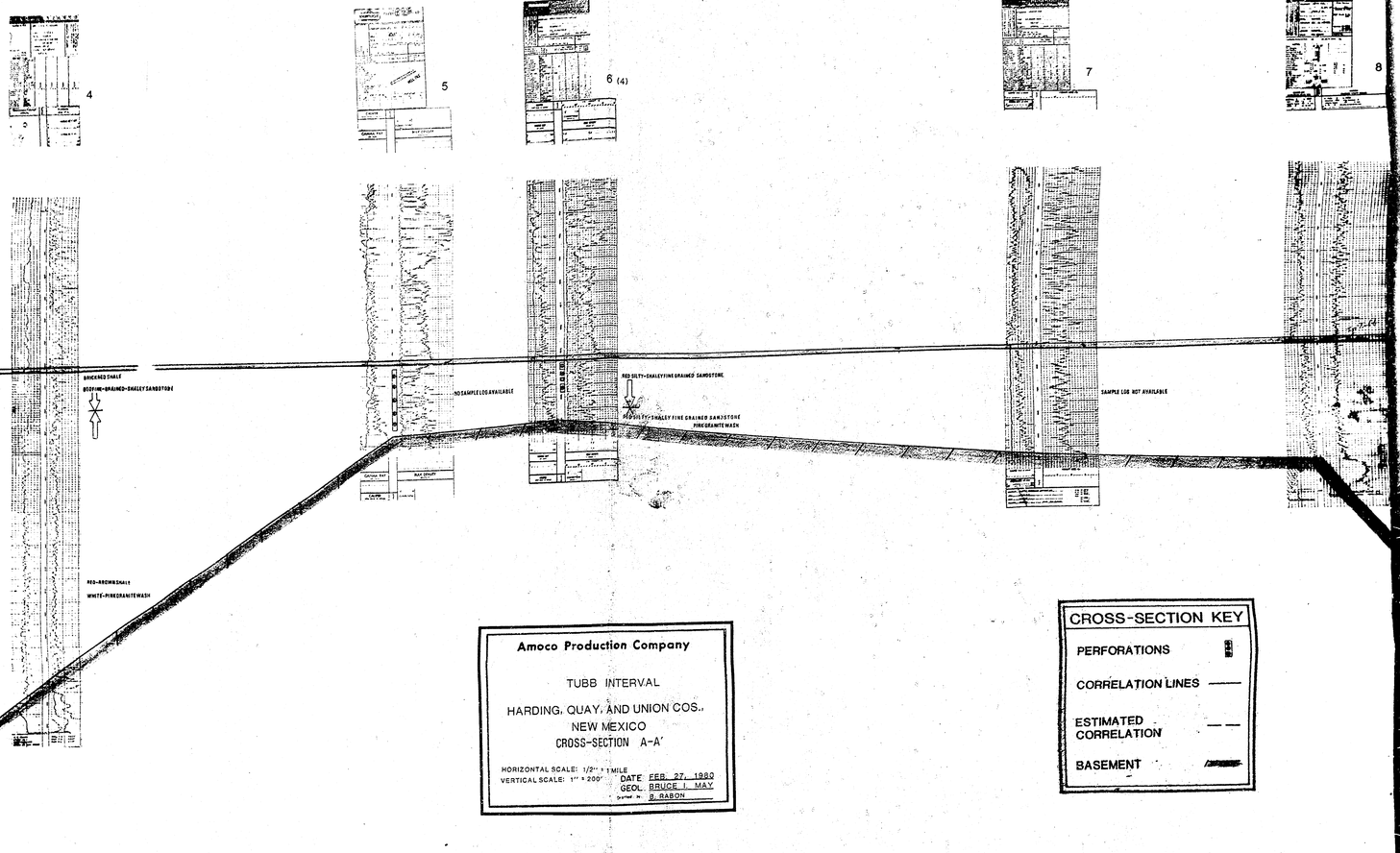
3 - T19N - R33E

ASTRO-TEX #1-X
OLYMPIC STATE

27 - T16N - R33E

SUNRAY
MID-CONTINENT
STATE 'N'

16 - T14N - R32E



Amoco Production Company

TUBB INTERVAL

HARDING, QUAY, AND UNION COS., NEW MEXICO
CROSS-SECTION A-A'

HORIZONTAL SCALE: 1/2" = 1 MILE
VERTICAL SCALE: 1" = 200'

DATE FEB. 27, 1980
GEOL. BRUCE I. MAY
DRAWN B. RABON

CROSS-SECTION KEY

- PERFORATIONS
- CORRELATION LINES
- ESTIMATED CORRELATION
- BASEMENT

#1
ND &
O. 'L'

R34 E

SKELLY #1
VAN PELT

9 - T28N - R35E

WESTERN &
ANSON #1
FEDERAL

29 - T26N - R33E

DILLARD #1
STATE

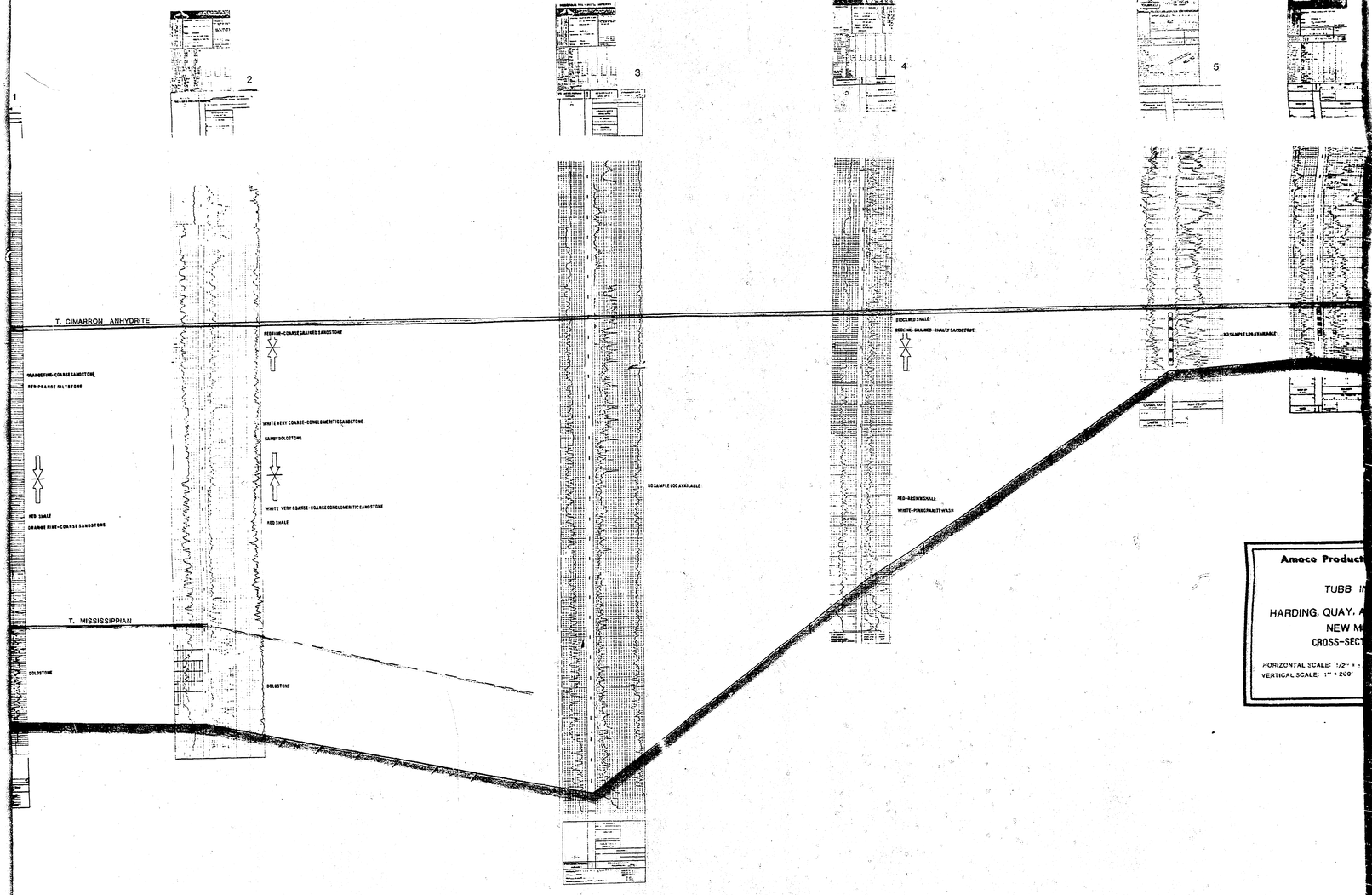
2 - T23N - R33E

AMOCO #1
STATE 'EM'

36 - T21N - R33E

AMOCO #2
HEIMANN

3 - T19N - R3



Amoco Product

TUBB I

HARDING, QUAY, A

NEW M

CROSS-SECT

HORIZONTAL SCALE: 1/2" = 1

VERTICAL SCALE: 1" = 200'

NE

A

GULF #1
JOLLA LAND &
CATTLE CO. 'L'

21 - T30N - R34E

SKELLY #1
VAN PELT

9 - T28N - R35E

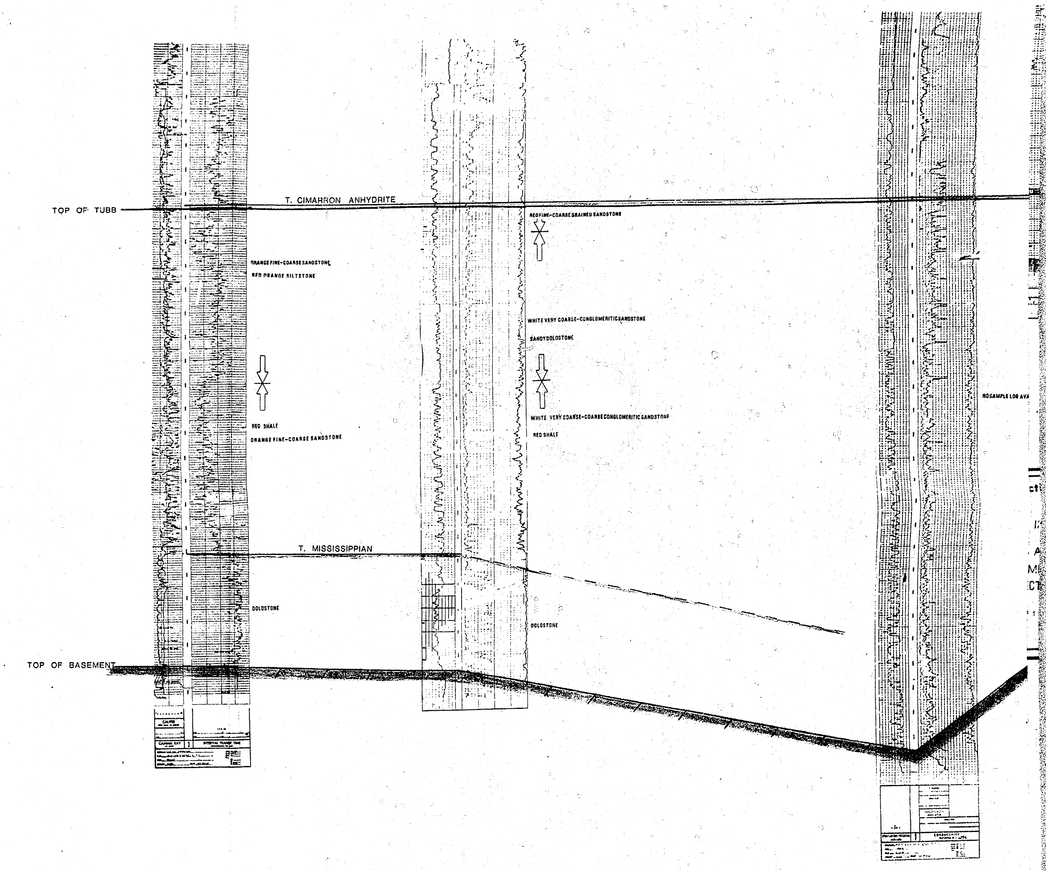
WESTERN &
ANSON #1
FEDERAL

29 - T26N - R33E









NEW MEXICO | TEXAS

SE

B'

8E

2

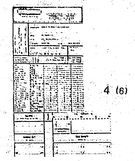
AMOCO #1
STATE 'FD'

23 - T20N - R31E



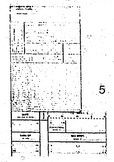
AMOCO #2
HEIMANN

3 - T19N - R33E



AMOCO #1
NIKKEL

10 - T18N - R35E



CO2 IN ACTION
[TEXAS PACIFIC]
#1 - COOTS

62 - BLK. XR

WMD LEE SURVEY



CROSS-SECTION KEY

PERFORATIONS

CORRELATION LINES

ESTIMATED CORRELATION

BASEMENT

6813
Amoco
3/1/80

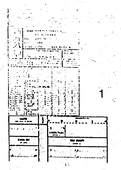
BEST AVAILABLE COPY

NW

B

AMOCO #1
STATE 'FA'

29 - T24N - R27E



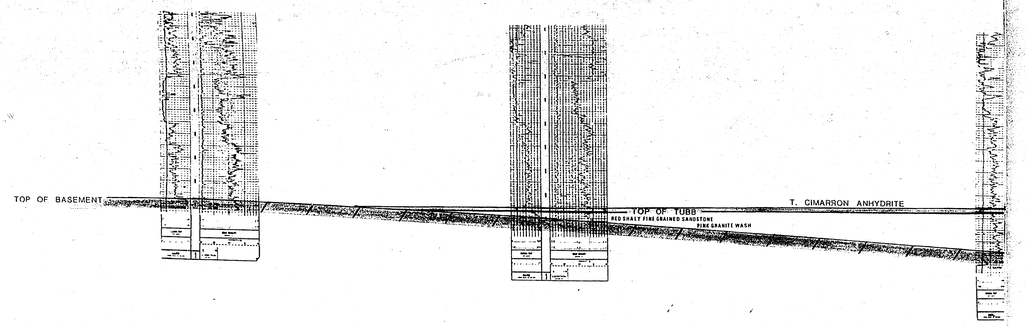
AMOCO #1
STATE 'FB'

13 - T22N - R28E



AMC
STA

23 - T



Amoco Production Company

TUBB INTERVAL

QUAY, HARDING, AND UNION COS., NEW MEXICO AND HARTLEY CO., TEXAS

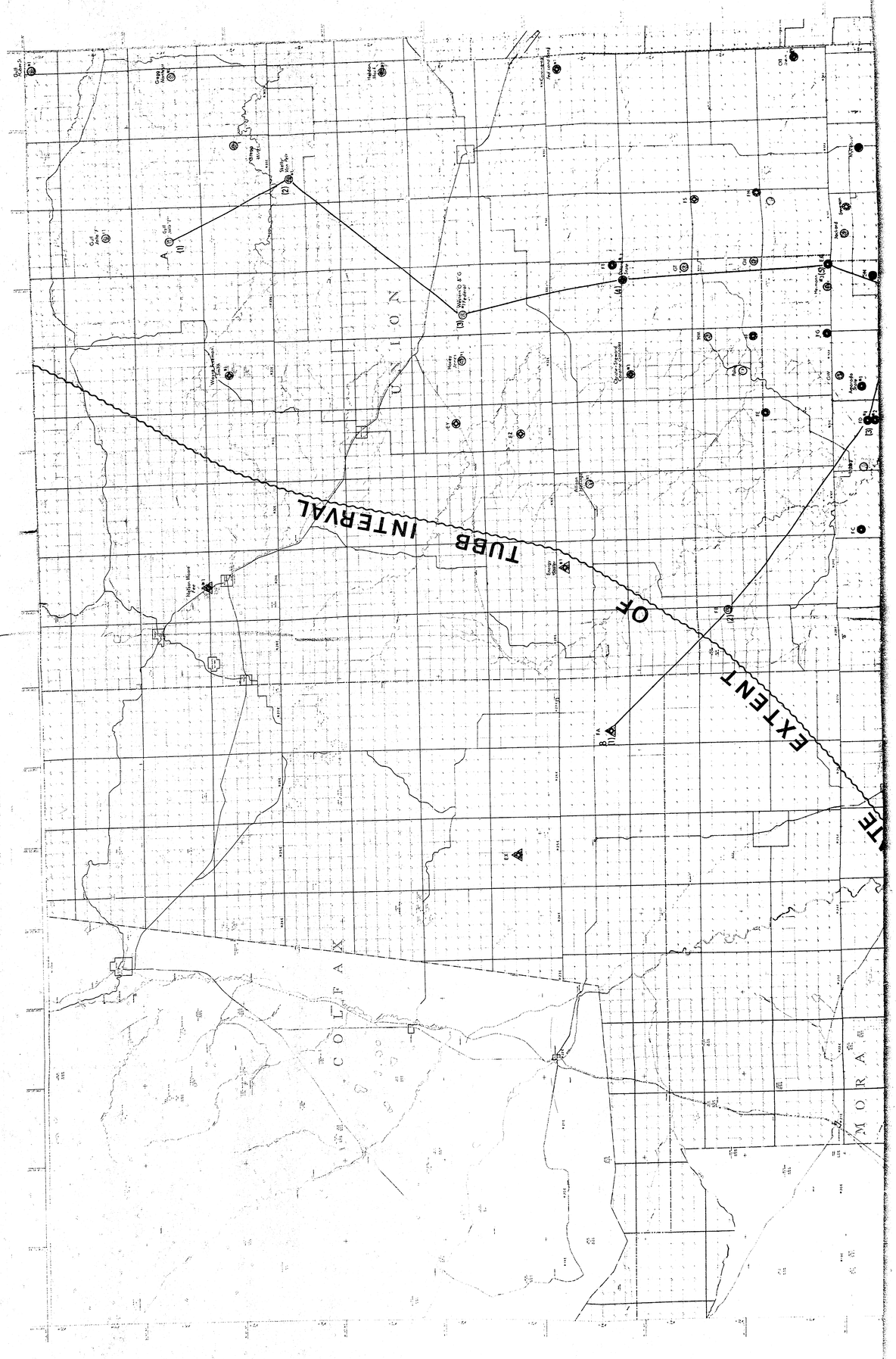
CROSS-SECTION B-B'

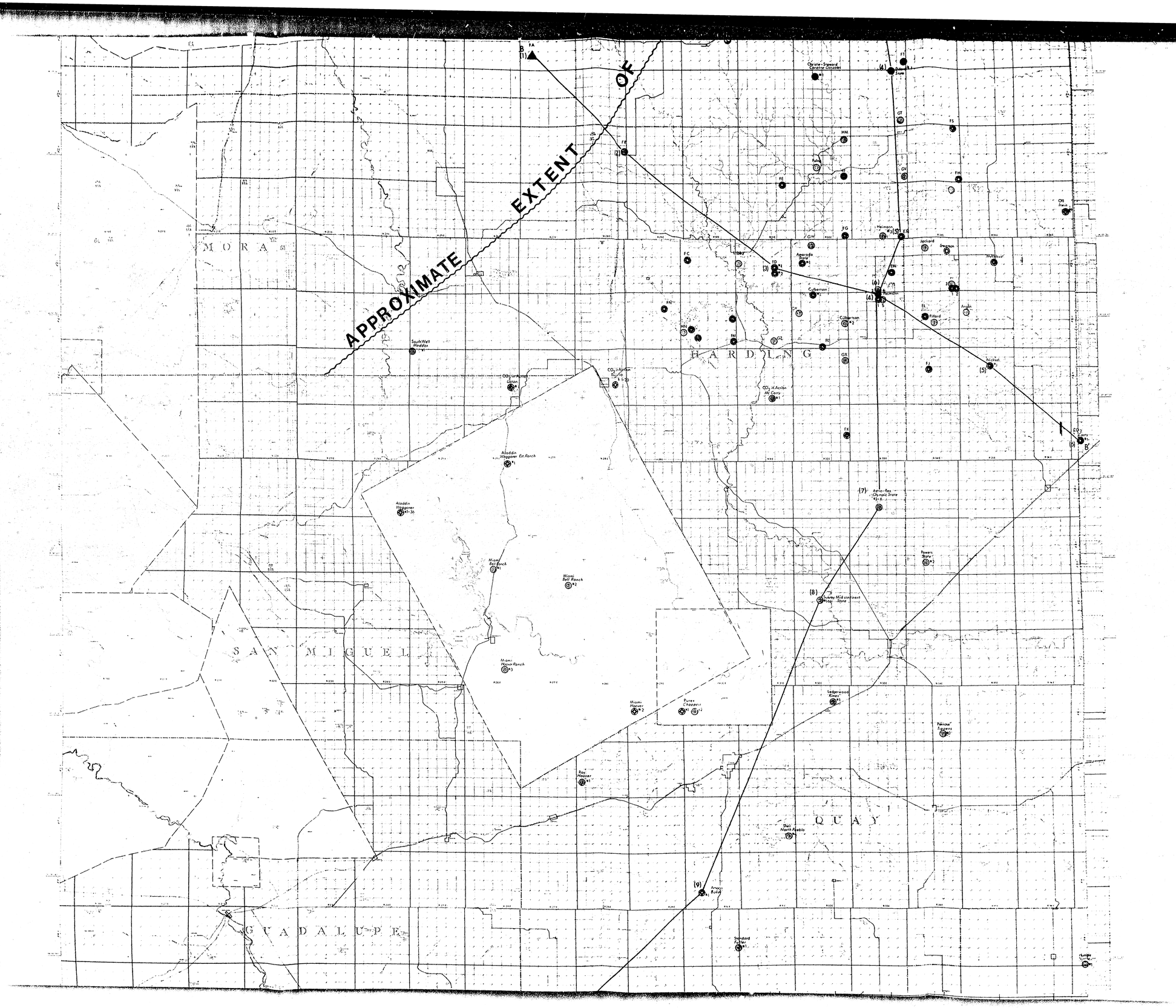
HORIZONTAL SCALE: 1/2" = 1 MILE
VERTICAL SCALE: 1" = 200' DATE FEB. 27, 1980
GEOL. BRUCE I. MAY
Drafted by B. RABON

CROSS-SECTION KEY

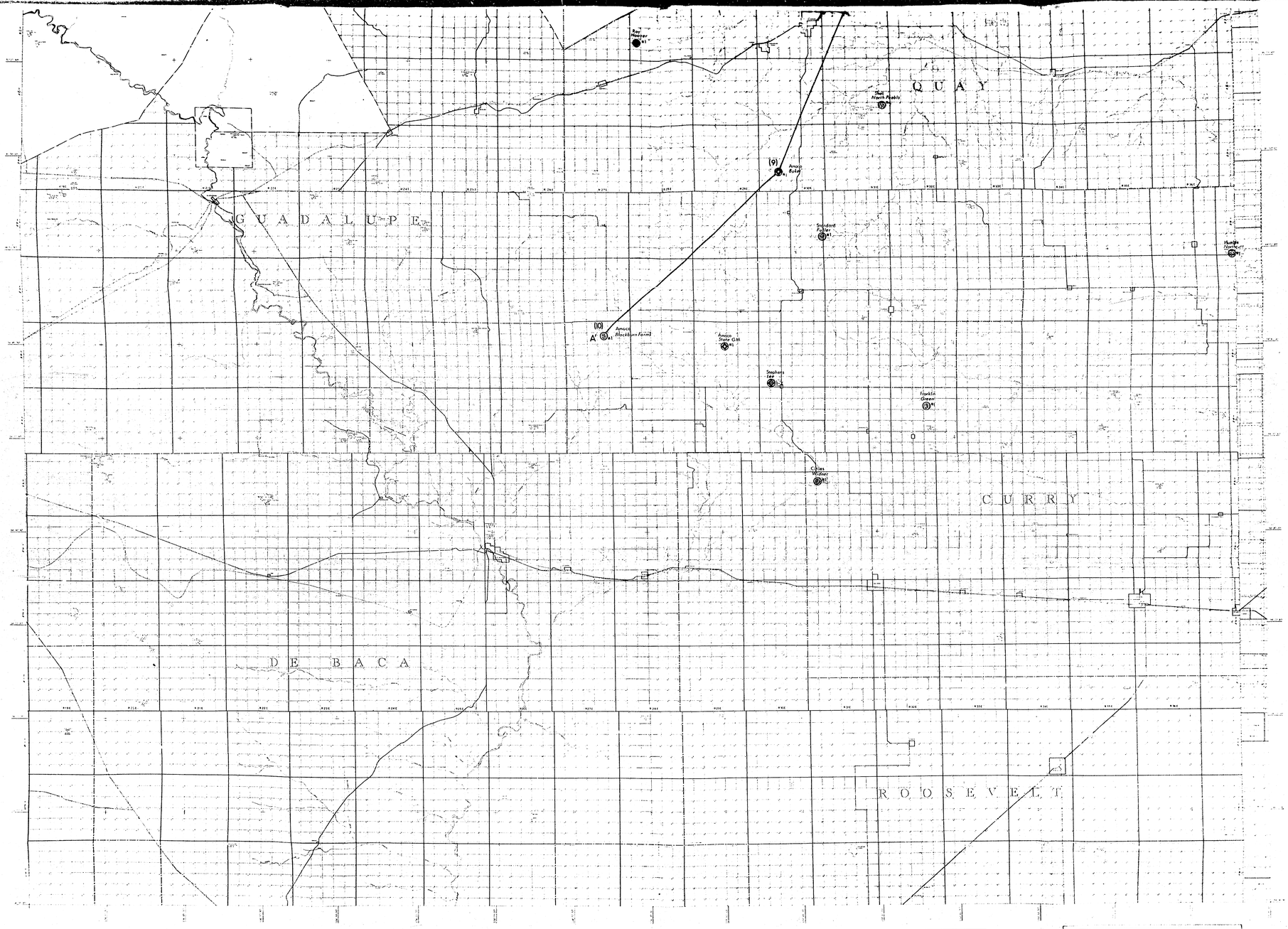
PERFORATIONS
CORRELATION LINES
ESTIMATED CORRELATION
BASEMENT

A.R.M.A.-I.P. MICROGRAPHICS
BEST AVAILABLE COPY


TUBB INTERVAL
OF
EXTENT
UNION
COLFAX
MORA



BEST AVAILABLE COPY



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DALLAS, TEXAS

OUR NO NM-B

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CONTROLLED REGIONAL BASE MAP NO. NM-B

Muldrow Aerial Surveys Corporation

A DIVISION OF GEOMAP COMPANY

DALLAS, TEXAS

SCALE 1"= 16000'

KEY TO TUBB INTERVAL MAP

TUBB INTERVAL PRODUCTIVE	●
TUBB INTERVAL UNTESTED	◎
TUBB INTERVAL UNPRODUCTIVE	⊗
TUBB INTERVAL NOT PRESENT	⚠
APPROXIMATE EXTENT OF TUBB INTERVAL	~~~
BOUNDARIES OF COUNTIES OF INTEREST	—·—·—

ALL WELL LOCATIONS ARE ESTIMATED WITHIN SECTIONS

Amoco Production Company

TUBB INTERVAL

Harding, Quay, and Union Co.,

New Mexico & Hartley Co., Texas

HORIZONTAL SCALE: 1" = 3 Miles

DATE FEB. 27, 1980

GEOL BRUCE I. MAY

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NE

A

GULF #1
JOLLA LAND &
CATTLE CO. 'L'

21 - T30N - R34E

SKELLY #1
VAN PELT

9 - T28N - R35E

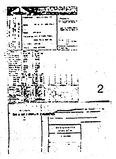
WESTERN &
ANSON #1
FEDERAL

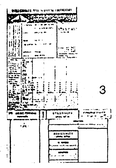
29 - T26N - R33E

DILLARD #1
STATE

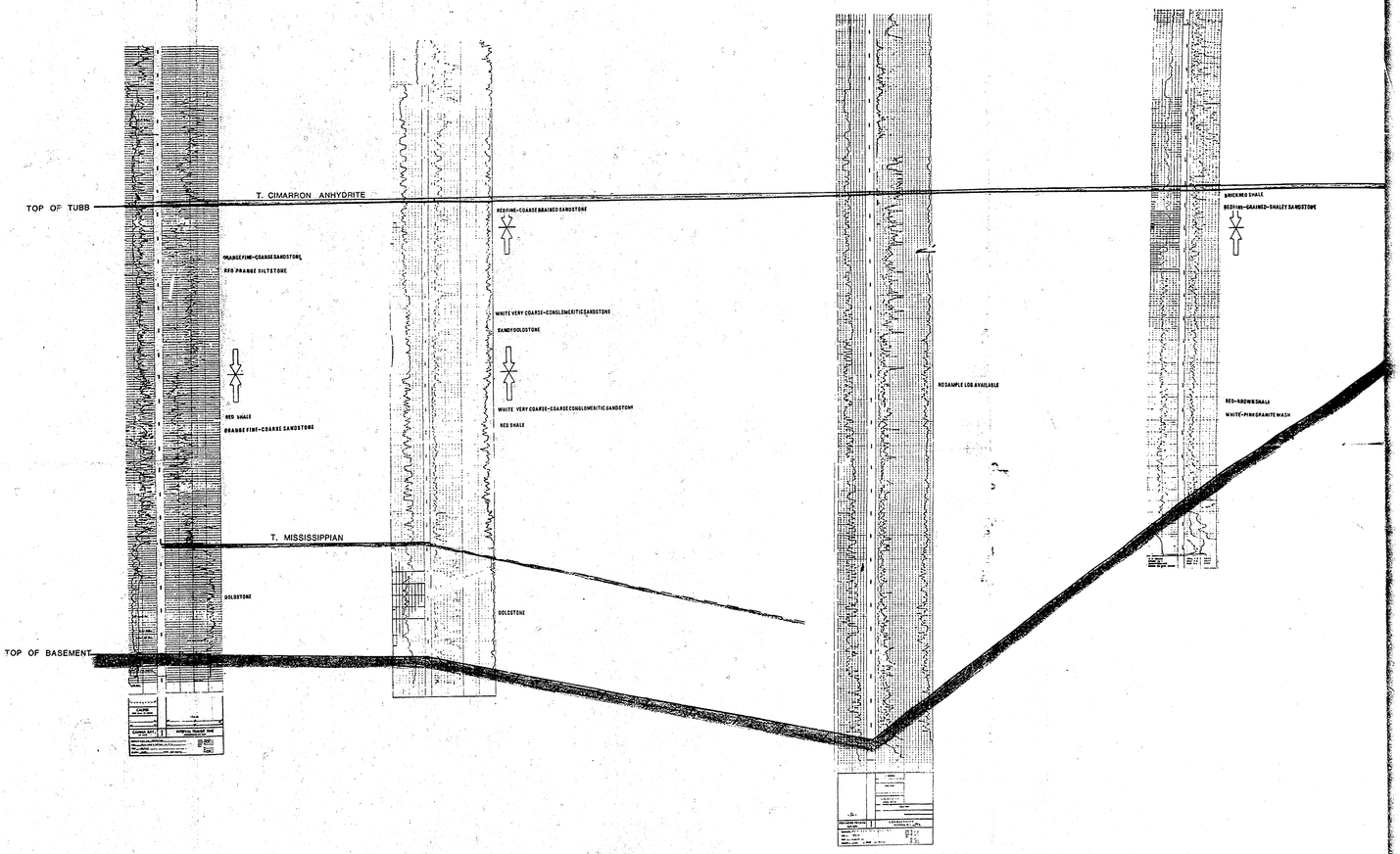
2 - T23N - R33E


1


2


3


4



Amoco Production Company

TUBB INTERVAL

HARDING, QUAY, AND UNION COS.,
NEW MEXICO
CROSS-SECTION A-A'

HORIZONTAL SCALE: 1/2" = 1 MILE
VERTICAL SCALE: 1" = 200'

DATE FEB. 27, 1980
DRWN B. BABON
DESC. BRUCE T. MAY

CROSS-SECTION KEY

PERFORATIONS

CORRELATION LINES

ESTIMATED CORRELATION

BASEMENT

TEX #1-X
C STATE

16N - R33E

SUNRAY
MID-CONTINENT #1
STATE 'N'

16 - T14N - R32E

AMOCO #1
BAKER

29 - T9N - R30E

7

8

9

SAMPLE LOG NOT AVAILABLE

RED SHALE

RED FINE GRAINED SANDSTONE

GRANITE WASH

RED GRAY SILTSTONE

RED FINE-MEDIUM GRAINED SANDSTONE

DARK RED SILTY-SANDY SHALE

WHITE FINE-MEDIUM GRAINED SANDSTONE

PINK GRANITE WASH

WHITE GRANITE WASH

DARK GRAY SHALE

WHITE FINE-MEDIUM GRAINED SANDSTONE

WHITE FINE-MEDIUM GRAINED SANDSTONE

DARK GRAY & RED SHALE

DOLOSTONE & LIMESTONE

WHITE GRANITE WASH

CROSS-SECTION KEY

PERFORATIONS

CORRELATION LINES

ESTIMATED CORRELATION

BASEMENT

SW

A'

AMOCO #1
BAKER

29 - T9N - R30E

9

AMOCO #1
BLACKBURN FARMS

10 - T6N - R27E

10

RED GRAY SILTSTONE
RED FINE-MEDIUM GRAINED SANDSTONE

DARK RED SILTY-SANDY SHALE
WHITE FINE-MEDIUM GRAINED SANDSTONE
PINK GRANITE WASH

WHITE GRANITE WASH
DARK GRAY SHALE
WHITE FINE-MEDIUM GRAINED SANDSTONE

WHITE FINE-MEDIUM GRAINED SANDSTONE
DARK GRAY & RED SHALE
DOLOSTONE & LIMESTONE
WHITE GRANITE WASH

GRAY/RED FINE GRAINED SANDSTONE
RED GRAY SHALE SILTSTONE

PINK FINE-MEDIUM GRAINED SANDSTONE
PINK GRANITE WASH
RED SHALE

RED& GREEN SHALE
GRANITE WASH
LIMESTONE

GRANITE WASH
LIMESTONE & DOLOSTONE
GRAY SHALE

LIMESTONE & DOLOSTONE

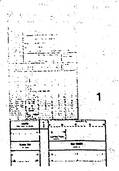
NW

B

NE
ME

AMOCO #1
STATE 'FA'

29 - T24N - R27E



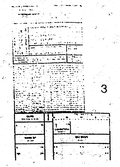
AMOCO #1
STATE 'FB'

13 - T22N - R28E



AMOCO #1
STATE 'FD'

23 - T20N - R31E



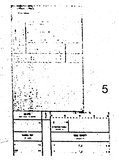
AMOCO #2
HEIMANN

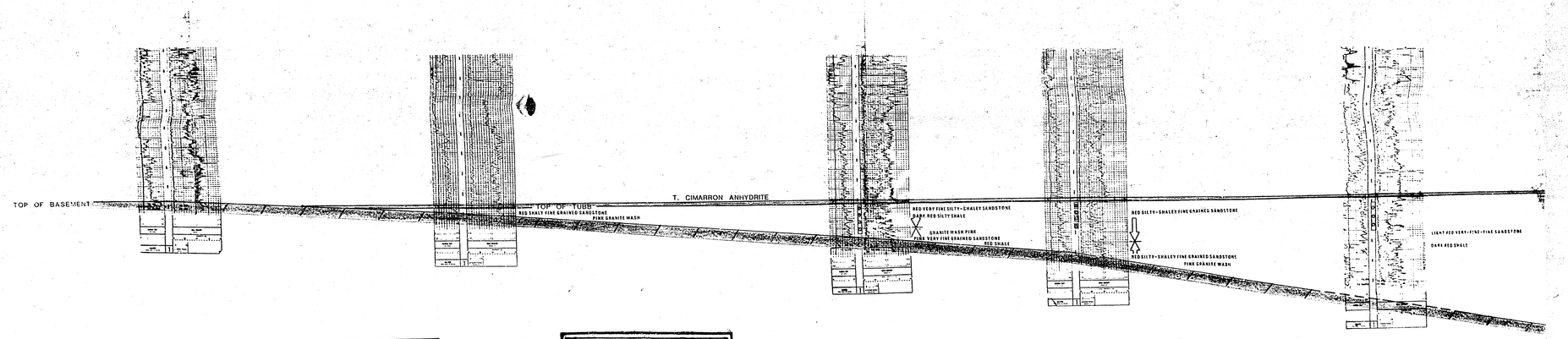
3 - T19N - R33E



AMOCO #1
NIKKEL

10 - T18N - R35E





Amoco Production Company

TUBB INTERVAL

QUAY, HARDING, AND UNION COS., NEW MEXICO AND HARTLEY CO., TEXAS

CROSS-SECTION B-B'

HORIZONTAL SCALE: 1/2" = 1 MILE
VERTICAL SCALE: 1" = 200'
DATE FEB. 27, 1980
GEOL. BRUCE I. MAY
Drafted by B. RABON

CROSS-SECTION KEY

PERFORATIONS
CORRELATION LINES
ESTIMATED CORRELATION
BASEMENT

N.A.R.A. MICROGRAPHICS
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NEW MEXICO | TEXAS

SE

B'

#1
'FD'

- R31E

3

AMOCO #2
HEIMANN

3 - T19N - R33E

4 (6)

AMOCO #1
NIKKEL

10 - T18N - R35E

5

CO2 IN ACTION
[TEXAS PACIFIC]
#1 - COOTS

62 - BLK. XR

WMD LEE SURVEY

6

RED VERY FINE SILTY-SHALEY SANDSTONE
DARK RED SILTY SHALE
GRANITE WASH PINK
RED VERY FINE GRAINED SANDSTONE
RED SHALE

RED SILTY-SHALEY FINE GRAINED SANDSTONE
PINK GRANITE WASH

LIGHT RED VERY-FINE-FINE SANDSTONE
DARK RED SHALE

SAMPLE LOG NOT AVAILABLE

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