FORM 470 2-57

PAN AMERICAN PETROLEUM CORPORATION

Box 487, Farmington, New Mexico
October 7, 1959

File: B-2326-400.1 x 986.510

Subject: Request for Exemption from
Directional Survey Requirements
J. J. Lommori "A" No. 6
Horseshoe Gallup Field

Mr. E. C. Arnold (2)
New Mexico Oil Conservation Commission
1000 Rio Brazos Road
Aztec, New Mexico

Dear Sir:

This will refer to a recent interpretation of the requirements of Rule III regarding substitution of deviation test calculations for a directional survey where hole deviation is more than five degrees over a 500-foot interval. A copy of Mr. A. L. Porter's letter of July 7, 1959, on this subject is attached for your reference.

As discussed in a recent conversation between personnel of our respective offices, it is respectfully requested that similar exemption from directional survey requirements be granted for Pan American's J. J. Lommori "A" No. 6 in the Horseshoe Gallup Field where hole deviations have exceeded the five-degree tolerance. It is necessary to determine that the bottom of the hole is on the assigned lease where the well is drilled (i.e. on the 40-acre tract) when the deviation from the vertical in any 500-foot interval averages more than five degrees from the vertical as required by Rule III, New Mexico Oil Conservation Commission.

Directional surveys have been obtained on some 20 previous Pan American wells located in both Horseshoe Gallup and Verde Gallup Fields where hole inclinations exceeded five degrees over a 500-foot interval. These surveys have shown that hole deviation in the crooked hole drilling area of these two oil fields has consistently followed an up-dip direction at right angles to the steeply dipping subsurface beds. Utilizing available structural control in these two fields and hole deviation readings, it is possible to determine bottom hole locations without running directional surveys.

The attached graph and calculations illustrate the similarity of results obtained from TOTCO readings and a directional survey run on Pan American's O. J. Hoover "C" No. 1, SE/4 SW/4 Section 11, T-30-N, R-16-W, in the Horseshoe Gallup Field, located approximately one mile northwest of the J. J. Lommori "A" No. 6. The directional survey run by Schlumberger Well Surveying Corporation previously submitted to your office shows the

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bottom hole location at a depth of 2230 feet to be 412 feet from the north line and 585 feet from the west line of the drilling tract boundaries of the well. This well was ultimately drilled to a total depth of 2241 feet. The calculated bottom hole location (depth 2230 feet) using TOTCO readings and an estimated bore hole drift direction of N 45° W, as interpreted from structural conditions, is 403 feet from the north line and 603 feet from the west line of this tract. Using the directional survey for control, the TOTCO method results in a total distance discrepancy of 20-1/2 feet at a depth of 2230 feet. Assuming a constant direction of drift toward the nearest boundary from the surface location, a computed bottom hole location for the O. J. Hoover "C" No. 1 would still be 347 feet from the north line of the drilling unit, or within the same tract. This information is shown by Attachment Nos. 1 and 2 and Figure No. 1.

Similarly, calculations illustrate the same correspondence of results between TOTCO readings and a directional survey run on Pan American's J. J. Lommori "A" No. 1, located NE/4 NE/4 Section 14, T-30-N, R-16-W, approximately one-half mile northwest of the J. J. Lommori "A" No. 6. The directional survey run by Schlumberger also submitted to your office indicated the bottom hole location at a depth of 3150 feet to be 390 feet from the north line and 482 feet from the west line of this drilling tract. Using the directional survey for control, the TOTCO method results in a total distance discrepancy of 13-1/2 feet at a depth of 3150 feet, or approximately a three percent error. This information is also shown by Attachment Nos. 3 and 4 and Figure No. 2.

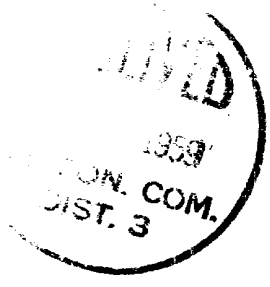
Pan American's J. J. Lommori "A" No. 6, located 1980 feet from the north and the west lines, Section 13, R-30-N, R-16-W, San Juan County, New Mexico, and in the Horseshoe Gallup Field, was drilled to a total depth of 3914 feet on September 13, 1959. According to calculations using TOTCO surveys run during the drilling of the hole and estimating a drift direction of N 38° W or in an up-dip direction, the estimated bottom hole location at total depth is approximately 341 feet from the north line and 411 feet from the west line of the tract, as illustrated by the remaining attachments. Even assuming a constant direction of drift toward the nearest boundary line, the approximate bottom hole location would be 254 feet from the outer boundary, or within the same 40-acre tract as the surface location. A sketch of structural conditions in the immediate area is included for your review. These data conclusively demonstrate that the bottom hole location of the J. J. Lommori "A" No. 6 is well within the 40-acre unit on which the well is drilled.

Yours very truly,

PAN AMERICAN PETROLEUM CORPORATION

L. O. Speer, Jr.
Area Superintendent

WWS:hh
Attach.



C
O
P
Y

Governor
John Burroughs
Chairman

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

P. O. Box 871
Santa Fe

July 7, 1959

Pan American Petroleum Corporation
P. O. Box 68
Hobbs, New Mexico

Attention: Mr. J. W. Brown

Re: Request for Exemption,
Deviation Tests

Gentlemen:

Reference is made to your letter of July 2, 1959, wherein you requested exemption to Rule 111 - Deviation Tests, for your U.S.A. Malco Refineries "G" Well No. 5, Empire-Abo Field, Eddy County, New Mexico.

Your letter of April 16, 1959, and of May 21, 1959, are also noted at this time, as well as our letter of April 20, 1959. All related to the same general subject - the Rule 111 requirement to run a directional survey on a well when the deviation from the vertical in any 500-foot interval averages more than five degrees.

This office is of the opinion that a directional survey is unnecessary on any well which has such a deviation from the vertical, provided that Totco or other deviational surveys are made throughout the course of drilling the well, and the cumulative drift according to such deviational surveys, if assumed to be all in one direction and toward the nearest outer boundary of the proration unit on which the well is located, shows conclusively that the bottom of the hole is on the same tract as the surface location.

In view of the above, you have complied with Rule 111 in this particular case.

The same will be true in future cases where a deviational survey has been so filed which establishes conclusively that the well is bottomed on its tract or proration unit.

Very truly yours,

A. L. Porter, Jr.
Secretary-Director

cc: Mr. M. L. Armstrong - Artesia, N. Mex.
Mr. R. F. Montgomery - Hobbs, New Mexico

Attachment No. 1

DRIFT CALCULATIONS USING
TOTCO SURVEY READINGS
O. J. HOOVER "C" NO. 1
HORSESHOE GALLUP FIELD

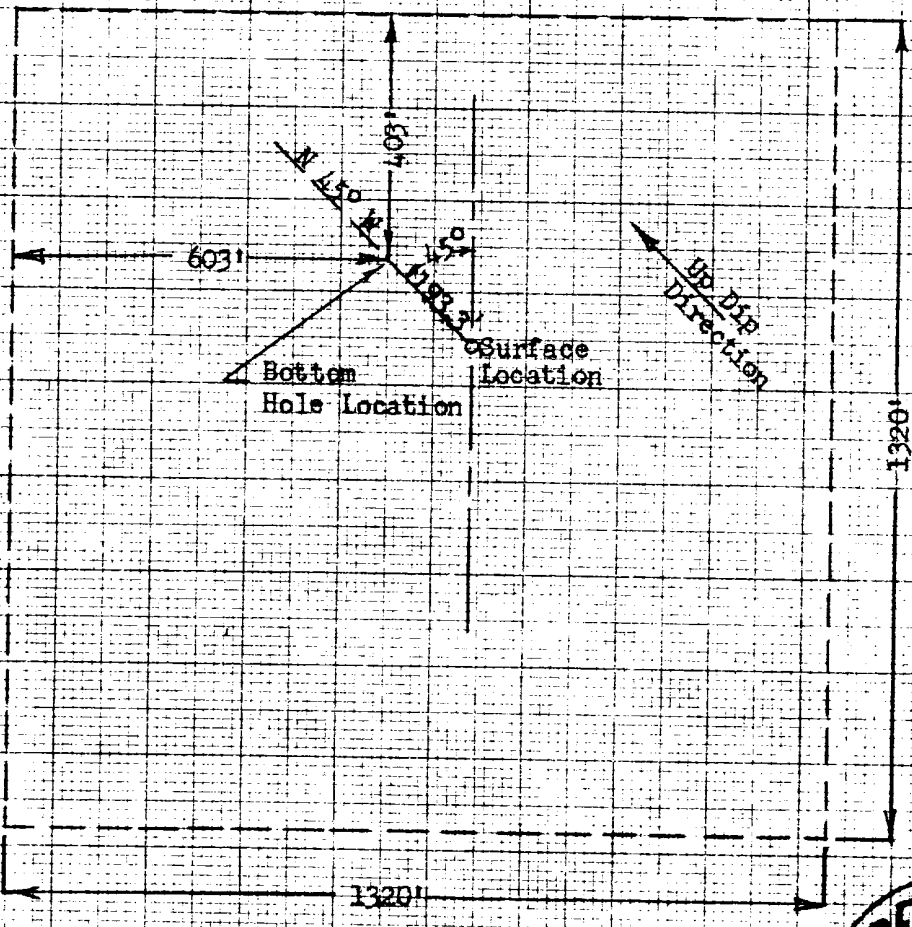
Depth Interval (feet)	Average TOTCO Hole Inclination (Degree)	Horizontal Drift (feet)		Cumulative Horizontal Drift (feet)
0-100	0	0		0
100-200	½	.8		.8
200-300	½	.8		1.6
300-400	1	1.8		3.4
400-500	1½	2.4		5.8
500-600	2	3.5		9.3
600-700	2½	4.3		13.6
700-800	3½	6.1		19.7
800-900	4	7.0		26.7
900-1000	4½	7.8		34.5
1000-1100	5½	9.5		44.0
1100-1200	6	10.5		54.5
1200-1300	7	12.2		66.7
1300-1400	7	12.2		78.9
1400-1500	7½	13.1		92.0
1500-1600	8	13.9		105.9
1600-1700	8½	14.7		120.6
1700-1800	8	13.9		134.5
1800-1900	7½	13.1		147.6
1900-2000	7½	13.1		160.7
2000-2100	8	13.9		174.6
2100-2200	7½	13.1		187.7
2200-2241	8	5.6	Total	193.3

Total horizontal error = 20½' or 10% error

Attachment No. 2

Estimated Bottom Hole Location Using
TOTCO Survey Readings
O. J. Hoover "C" No. 1
Horseshoe Gallup Field

SURFACE LOCATION: 780' FSL & 2060' FWL Section 11, T-30-N, R-16-W, San Juan County, New Mexico



Proration Unit (SE/4 SW/4)

Scale: 1" = 300'

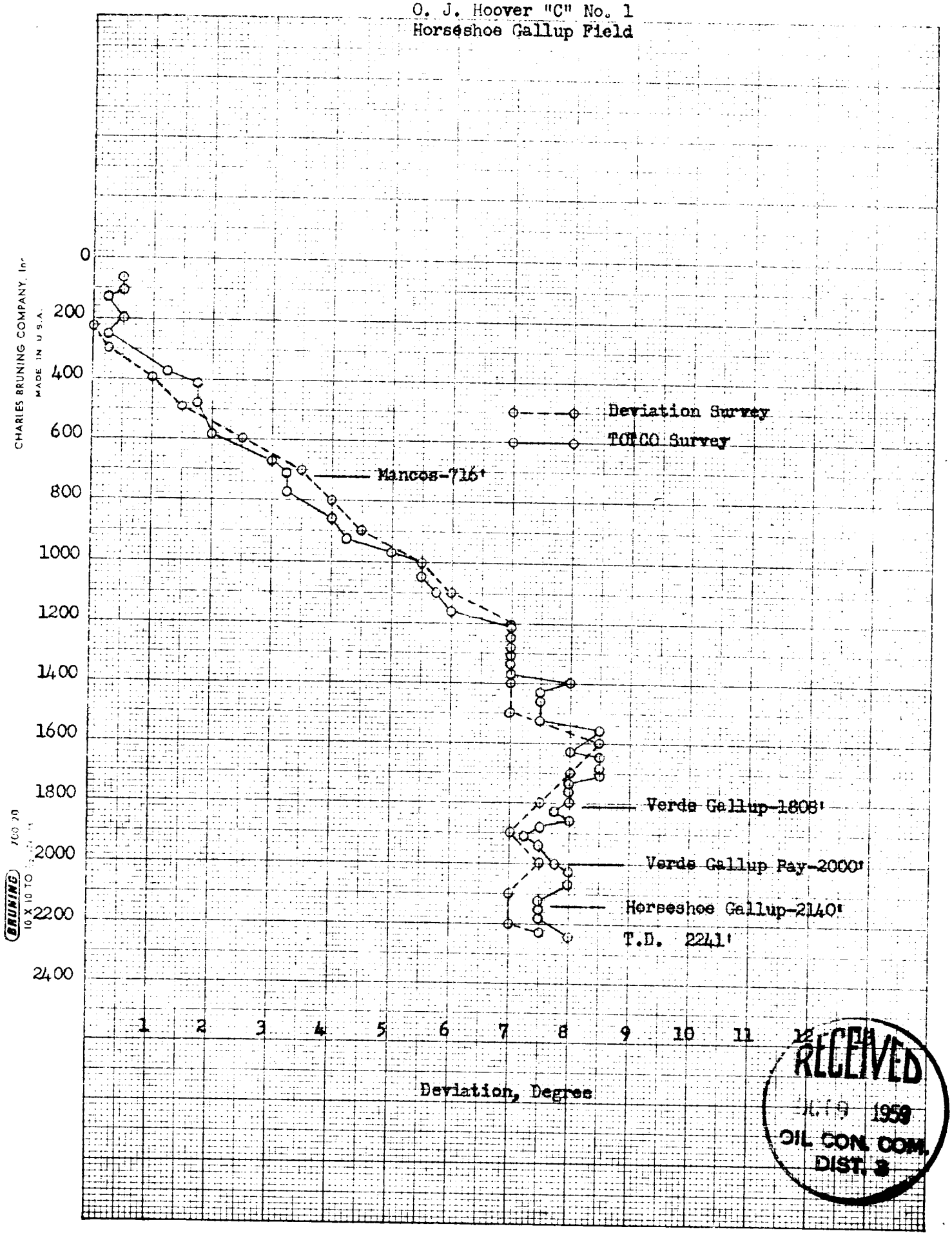
ACTUAL BOTTOM HOLE LOCATION (DIRECTION LOG): 412' FNL 585' FWL of SE/4 SW/4 of Section 11, or 201' N 50° W of top of surface casing.

ESTIMATED BOTTOM HOLE LOCATION (TOTCO): 403' FNL & 603' FWL of this proration unit.

Figure No. 1

O. J. Hoover "C" No. 1

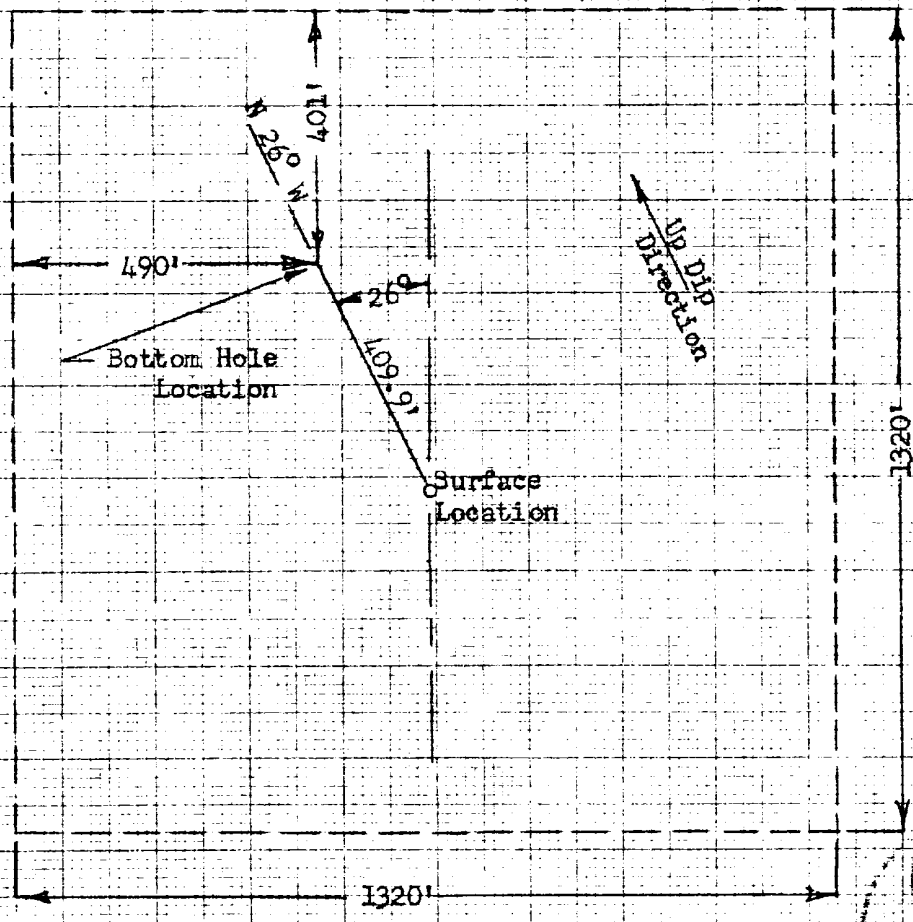
Horseshoe Gallup Field



Attachment No. 4

Estimated Bottom Hole Location Using
TOTCO Survey Readings
J. J. Lommori "A" No. 1
Horseshoe Gallup Field

SURFACE LOCATION: 770' FNL & 650' FEL Section 14, T-30-N, R-16-W, San Juan County, New Mexico



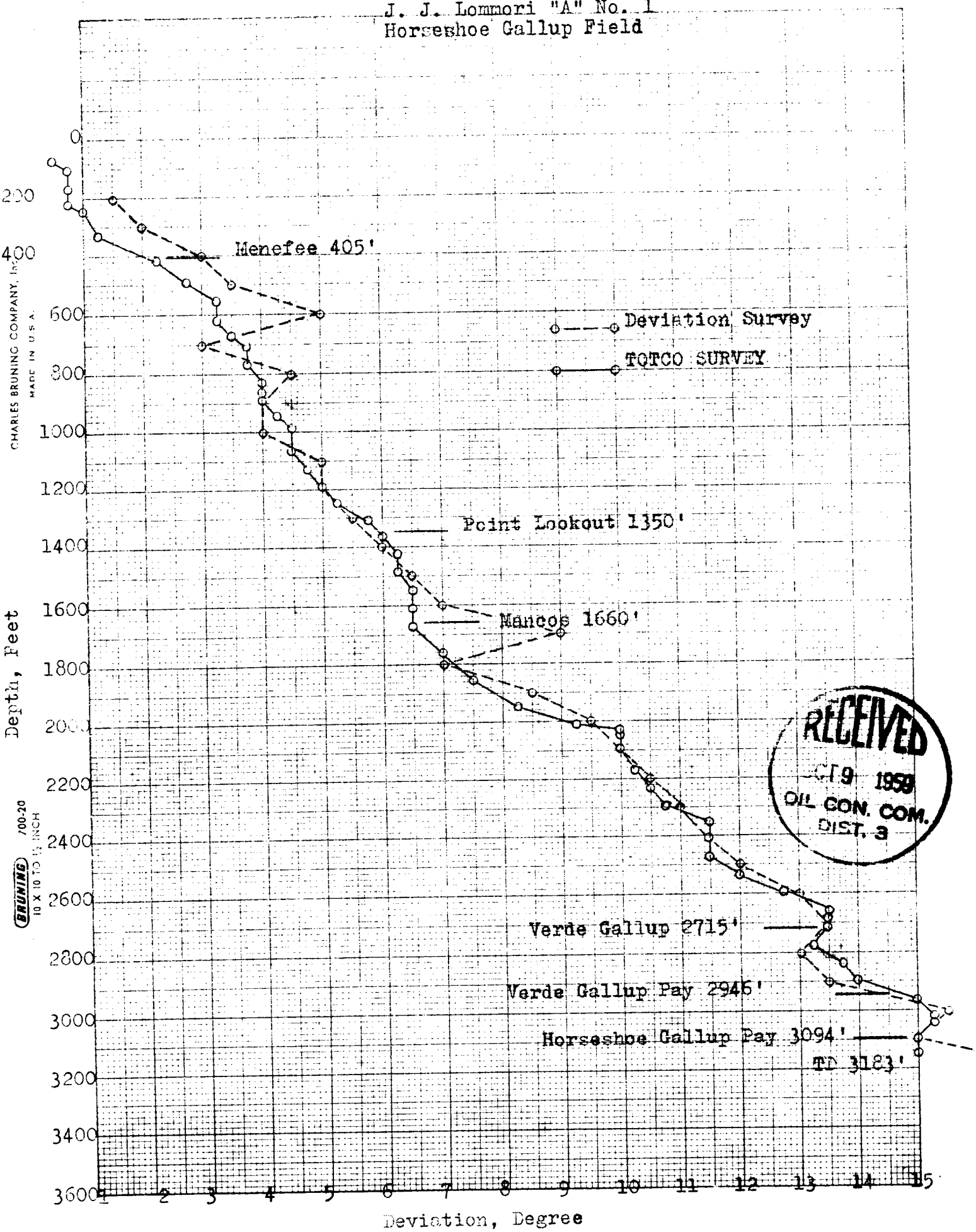
Proration Unit (NE/4 NE/4)

Scale: 1" = 300'

ACTUAL BOTTOM HOLE LOCATION (DIRECTION LOG): 390' FNL & 482' FWL of NE/4 NE/4 of Section 14, or 422' N 26° W of the surface casing point.

ESTIMATED BOTTOM HOLE LOCATION (TOTCO): 401' FNL & 490' FWL of proration unit for the J. J. Lommori "A" No. 1.

Figure No. 2
J. J. Lommori "A" No. 1
Horseshoe Gallup Field



Attachment No. 5

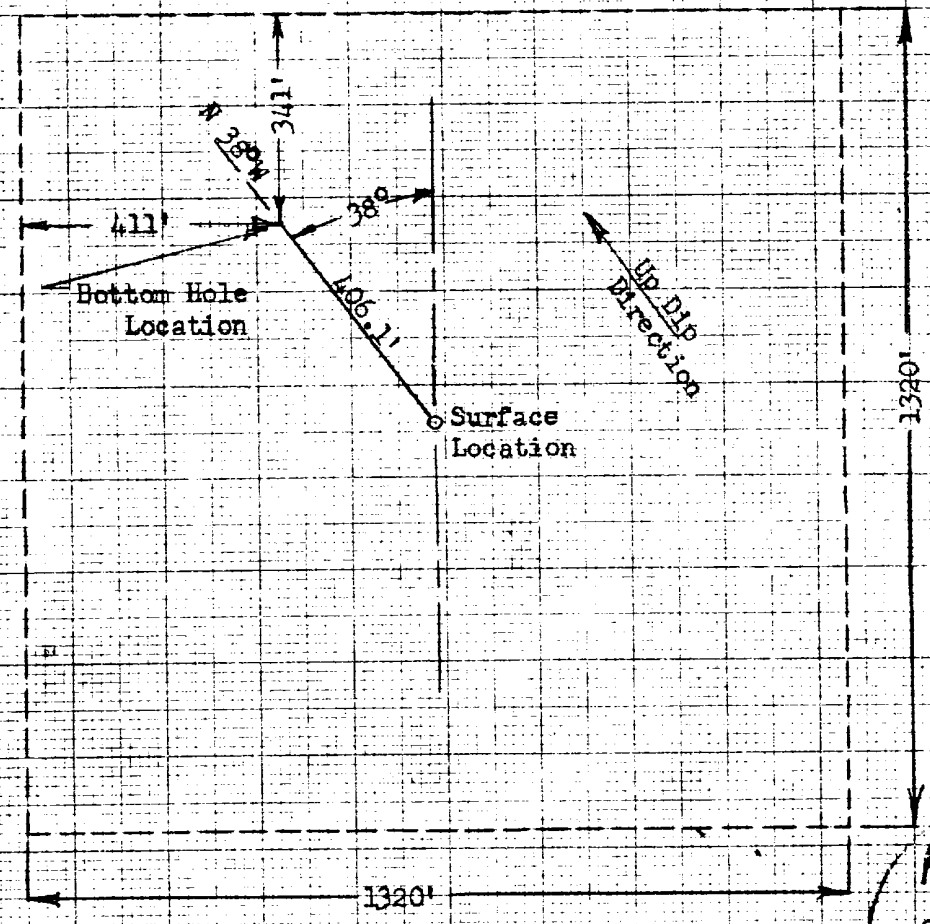
DRIFT CALCULATIONS USING
TOTCO SURVEY READINGS
J. J. LOMMORI "A" NO. 6
HORSESHOE GALLUP FIELD

Depth Interval (feet)	Average TOTCO Hole Inclination (Degree)	Horizontal Drift (feet)		Cumulative Horizontal Drift (feet)
0-100	½	.8		.8
100-200	1	1.8		2.6
200-300	1½	2.4		5.0
300-400	2	3.5		8.5
400-500	2	3.5		12.0
500-600	2	3.5		15.5
600-700	2½	4.3		19.8
700-800	3	5.2		25.0
800-900	3½	6.1		31.1
900-1000	3½	6.1		37.2
1000-1100	4	7.0		44.2
1100-1200	4½	7.8		52.0
1200-1300	4½	7.8		59.8
1300-1400	5	8.7		68.5
1400-1500	5½	9.5		78.0
1500-1600	5½	9.5		87.5
1600-1700	5½	9.5		97.0
1700-1800	6	10.5		107.5
1800-1900	6	10.5		118.0
1900-2000	6	10.5		128.5
2000-2100	6	10.5		139.0
2100-2200	6	10.5		149.5
2200-2300	6½	11.4		160.9
2300-2400	6½	11.4		172.3
2400-2500	6½	11.4		183.7
2500-2600	6½	11.4		195.1
2600-2700	7	12.2		207.3
2700-2800	7½	13.1		220.4
2800-2900	8	13.9		234.3
2900-3000	8½	14.7		249.0
3000-3100	9	15.6		264.6
3100-3200	9½	16.5		281.1
3200-3300	9½	16.5		297.6
3300-3400	10	17.4		315.0
3400-3500	10	17.4		332.4
3500-3600	10	17.4		349.8
3600-3700	10	17.4		367.2
3700-3800	10½	18.2		385.4
3800-3900	10½	18.2		403.6
3900-3914	10½	2.5	Total	406.1

Attachment No. 6

Estimated Bottom Hole Location Using
TOTCO Survey Readings
J. J. Lommori "A" No. 6
Horseshoe Gallup Field

SURFACE LOCATION: 1980' FNL & 1980' FWL Section 13, T-30-N, R-16-W, San Juan County, New Mexico

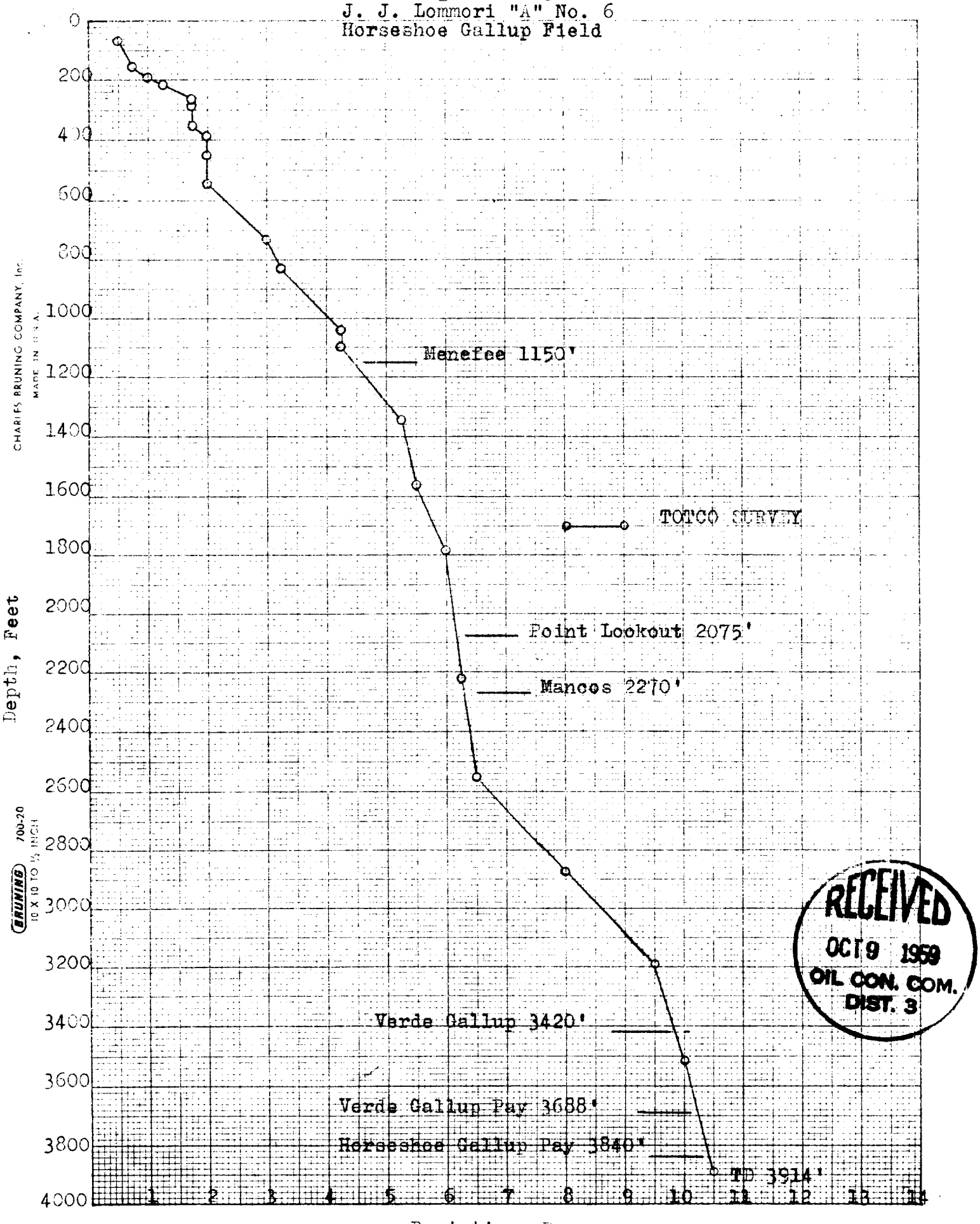


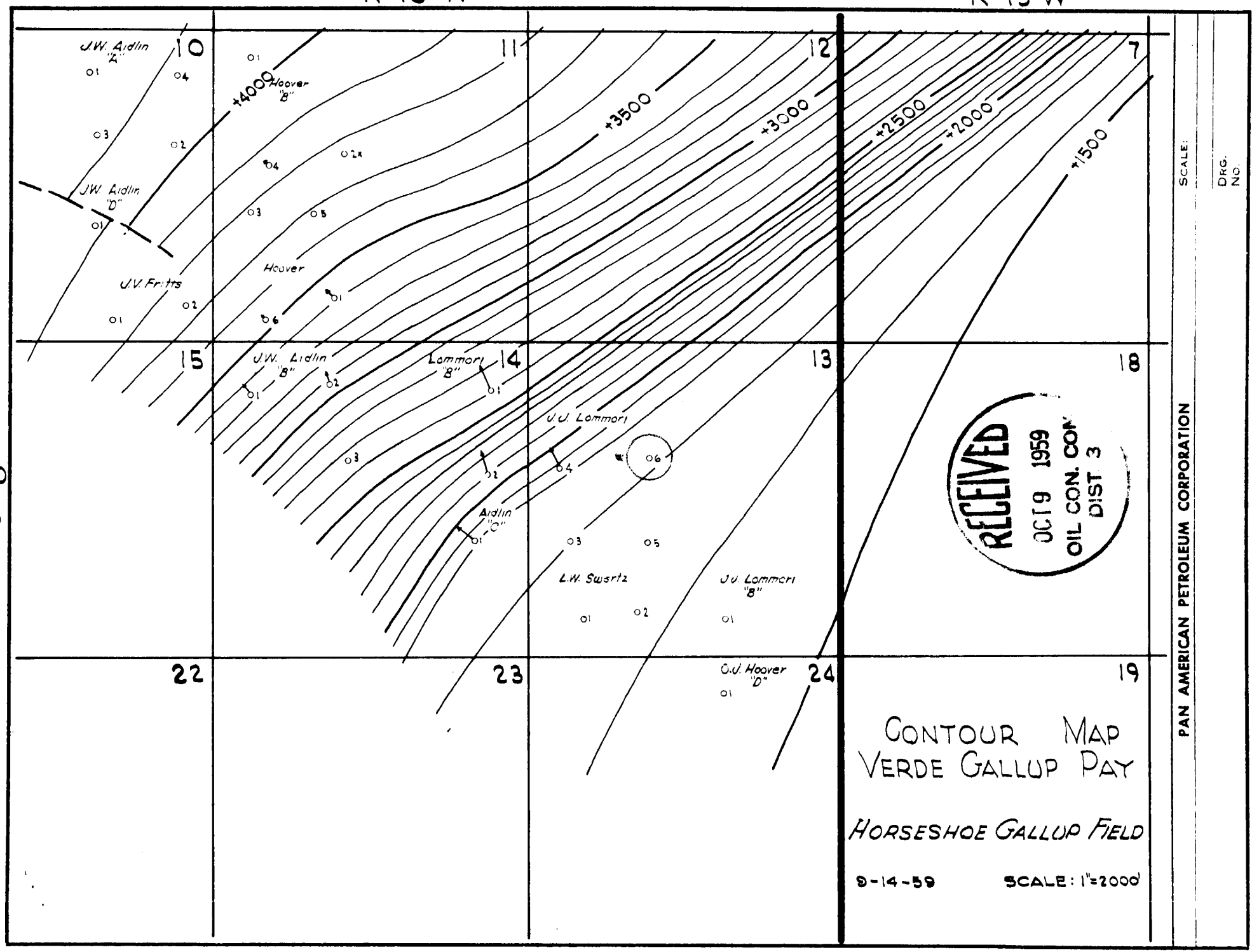
Proration Unit (SE/4 NW/4)

Scale: 1" = 300'

ESTIMATED BOTTOM HOLE LOCATION (TOTCO): 341' FNL & 411' FWL of SE/4 NW/4 of Section 13, or 406' N 38° W of top of surface casing.

Figure No. 3
J. J. Lommori "A" No. 6
Horseshoe Gallup Field




R-16-W
R-15-W
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J.W. Aidlin "A"
J.W. Aidlin "D"
J.V. Fritts
Hoover "B"
Hoover
J.W. Aidlin "B"
Lommori "B"
U.U. Lommori
Aidlin "C"
L.W. Swartz
J.U. Lommori "B"
O.U. Hoover "D"
+4000
+3500
+3000
+2500
+2000
+1500
RECEIVED
OCT 9 1959
OIL CON. COM.
DIST 3
CONTOUR MAP
VERDE GALLUP PAY
HORSESHOE GALLUP FIELD
9-14-59
SCALE: 1"=2000'
PAN AMERICAN PETROLEUM CORPORATION
SCALE:
DRG. NO.