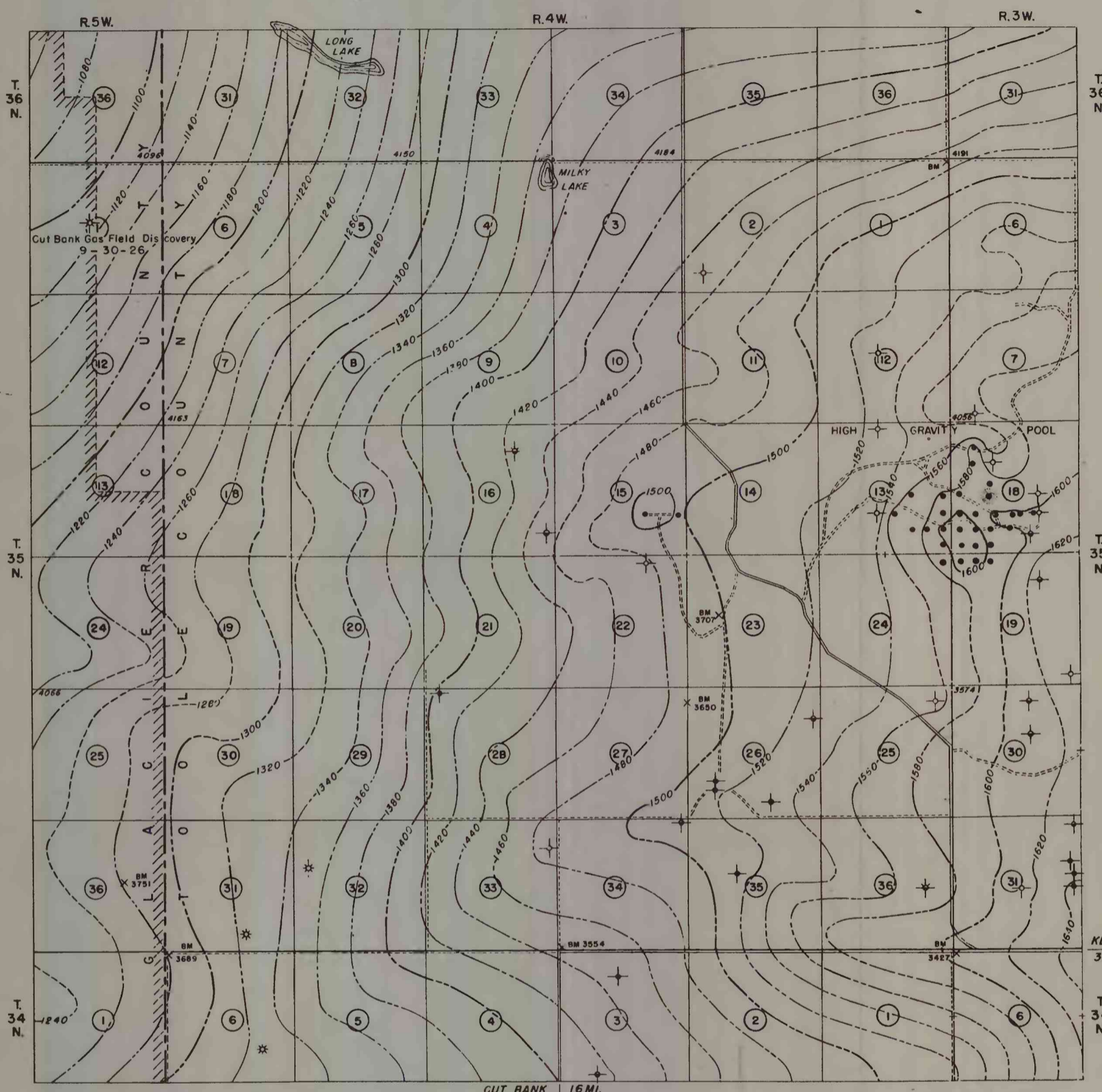


EXPLANATION

- STRUCTURE CONTOUR SYMBOLS**
- CONTROL FROM OIL WELL DATA
 - - - CONTROL BY SURFACE MAPPING AND ADJUSTED INTERVAL BETWEEN TOP OF COLORADO SHALE AND MADISON LIMESTONE
 - - - CONTROL INADEQUATE, POSITION OF CONTOURS INFERRED
- THE INTERVAL FROM CONTOURED HORIZON TO TOP OF COLORADO SHALE VARIES FROM 2,310 TO 2,500 FEET, INCREASING WESTWARD.
- WELL SYMBOLS**
- OIL WELL
 - ⊙ OIL WELL (SUNBURST SAND PRODUCTION)
 - ⊕ OIL WELL, ABANDONED
 - ⊕ SHOW OF GAS AND OIL, ABANDONED
 - ⊕ SHOW OF OIL, ABANDONED
 - ⊕ GAS WELL, ABANDONED
 - ⊕ GAS WELL, SHUT IN
 - ⊕ GAS WELL
 - ⊕ DRY HOLE, ABANDONED
- MISCELLANEOUS SYMBOLS**
- //// EAST BOUNDARY OF DEFINED CUT BANK GAS AREA
 - == GRADED GRAVEL ROAD
 - - - UNSURFACED ROAD
 - ⊕ FOUND CORNER
 - ⊕ SECTION CORNER WITH ELEVATION
 - ⊕ BENCH MARK

NOTE ON PRODUCTION

OIL IS PRODUCED CHIEFLY FROM POROUS ZONES IN THE MADISON LIMESTONE AT AN UNCONFORMITY JUST BELOW THE ELLIS FORMATION. ONE WELL YIELDS SMALL AMOUNTS FROM THE SUNBURST SAND. THICKNESS OF THE MADISON PRODUCTIVE ZONE VARIES FROM 5 TO 15 FEET, WITH AN AVERAGE OF ABOUT 7 FEET. OIL GRAVITY VARIES FROM 35.4° TO 38.6° A.P.I., WITH AN AVERAGE OF ABOUT 37°. AFTER ACID, INITIAL PRODUCTION OF WELLS VARIES FROM 8 TO 1,100 BARRELS PER DAY WITH AN AVERAGE SETTLED DAILY YIELD OF ABOUT 30 BARRELS. DECLINE IS USUALLY RAPID. WELLS SOON MAKE WATER IN VOLUMES EXCEEDING OIL PRODUCED. TOTAL PRODUCTION OF THE HIGH GRAVITY POOL FROM OPENING, FEBRUARY 15, 1941, TO JULY 1, 1946 WAS 361,123 BARRELS. GAS IS NOT PRODUCED FROM THE MADISON LIMESTONE.

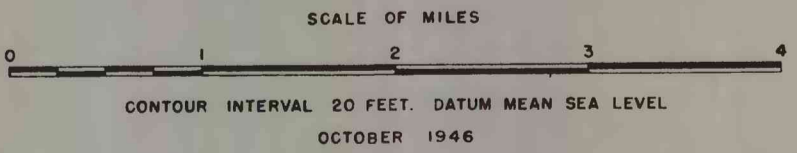


BASE COMPILED FROM G.L.O. TOWNSHIP PLATS AND AUTHORS' FIELD SHEETS.

GEOLOGY BY C.E. ERDMANN, A.B. COZZENS AND J.T. GIST. 1943-1944; J.W. NORDQUIST 1945

UNITED STATES DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY

MAP SHOWING CONTOURS ON ERODED SURFACE OF MADISON LIMESTONE AND WELLS REACHING THE MADISON T. 35N, R. 4W, TOOLE COUNTY, MONTANA



STANDARD WELL LOG FOR CENTRAL AND EAST PART OF T. 35N, R. 4W.

SYSTEM	SERIES	GROUP	FORMATION	THICKNESS (FT)	POTENTIAL	GRAPHIC LOG	RESISTANCE	DESCRIPTION AND REMARKS
SUNBURST SAND PRODUCTION	MONTANA GR.	EAGLE SS.	163-170	115-122	80	[Graphic Log]	[Resistance]	TWO MEDICINE FM.
								VIRGELLE SANDSTONE MEMBER
								TRANSITION ZONE
								See Composite Section of Exposed Rocks on Sheet A
								Lettered beds are markers for structural mapping
								Shale, dark gray, finely micaceous; bentonitic in places, contains numerous limestone concretion beds
								Bed N in T. 35 N., R. 3 W.
								Sandstone, calcareous, laminated with siltstone
								Shale, dark gray, silty
								Sandstone, gray-green, laminated as above
								Shale, dark gray, sandy
								Sandstone, light gray with minor chert
								Shale, dark gray, sandy
								Sandstone, fine-grained, interbedded with dark sandy shale
								Sandstone, fine-grained
Shale, dark gray, sandy								
Sandstone, light gray								
Mudstone, variegated, gray, green and red with thin sandstone beds								
Sandstone, gray-green, medium-grained								
Mudstone, variegated								
Sandstone, gray-green, shaly								
Mudstone and siltstone								
Sunburst sand (oil locally). Cut Bank sand beneath Sunburst sand in west part of map								
DISCONFORMITY								
Sandstone, gray-drab, fine-grained with thin laminae of dark micaceous shale								
DISCONFORMITY								
Shale, non-fissile, gray to dark gray, calcareous toward base								
Sandstone, gray, calcareous								
DISCONFORMITY								
MISSISSIPPIAN	LOWER	MADISON LS.	1100±					Limestone, white to cream colored, dense, crystalline, cherty. Eroded surface is porous and dolomitic locally
JURASSIC	UPPER	ELLIS FM.	240					
LOWER	KOOTENAI FM.	455						
LOWER	NIOBARARA FM.	650						

GRAPHIC LOG IS A COMPOSITE OF NORTHERN ORDNANCE-SEEWALD WELL NO. 1, C SW SW SEC. 2, AND CONSOLIDATED GAS CO.-GILLESPIE WELL NO. 1, SE NW SE SEC. 15. ELECTRIC LOG IS FOR SEEWALD WELL NO. 1, BY COURTESY NORTHERN ORDNANCE INC.

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Montana (Toole County) T. 35N R. 4W. Geol. 1:63,310. 1946

sheet 2 copy 1