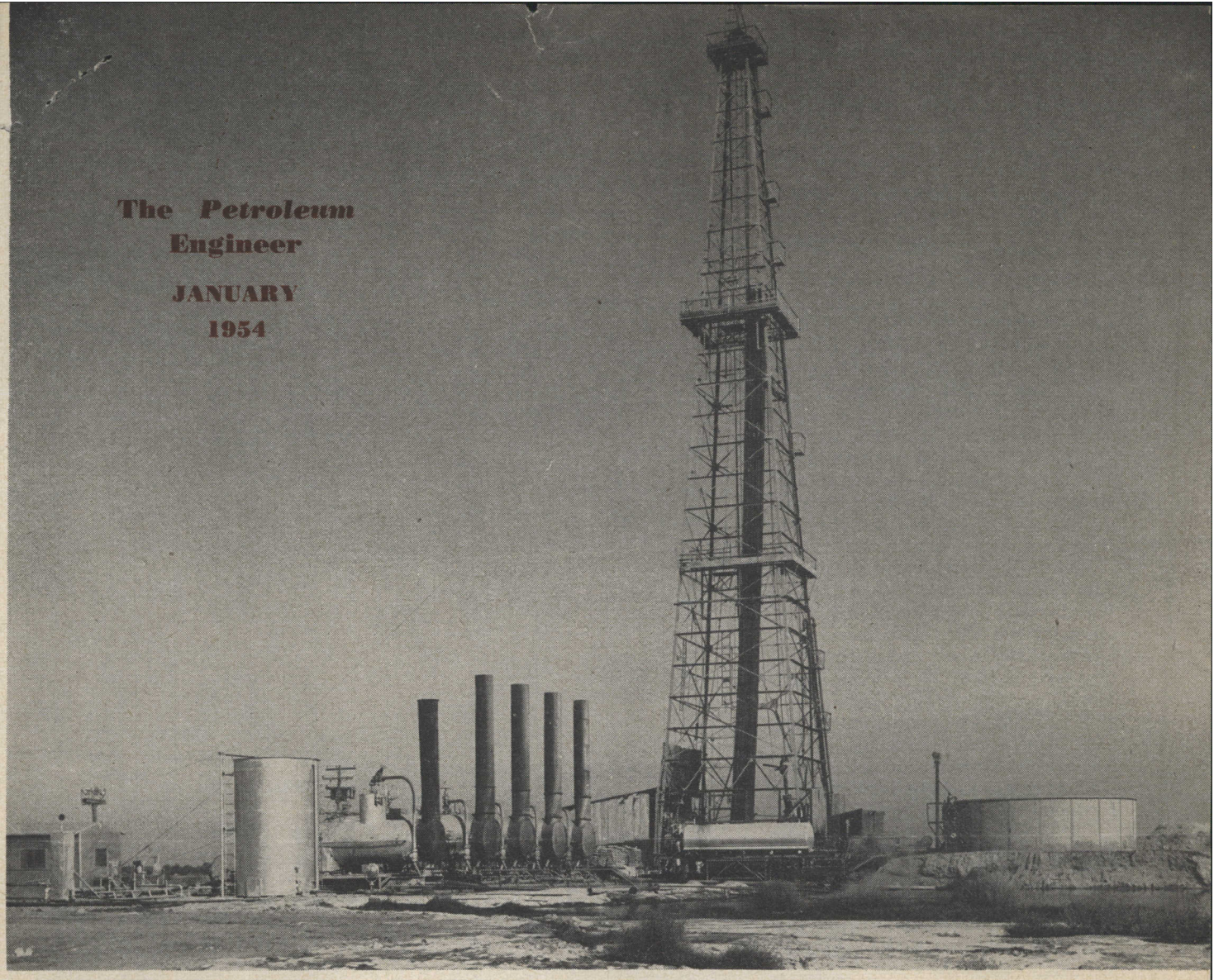
The *Petroleum* Engineer

JANUARY
1954



World's deepest production comes from Richfield Oil's Coles Levee well in Kern County, California. *Courtesy Richfield*

California Takes Depth Records

Ohio Oil is fishing at its 21,482-ft titan of the depths and Richfield has production at 17,895 ft on the West Coast

ERNESTINE ADAMS*

IN 1945 when *The Petroleum Engineer* published the first of this series of deep drilling articles, a graph was made and discarded because the extrapolation showed the drilling depth record in 1955 at 21,000 ft, the producing depth record at 18,000 ft. The figures, even to an optimist, looked pretty big. There are limits, people keep saying.

But in 1953, the Ohio Oil Company passed the 4-mile depth on October 6 and went on to 21,482 ft before it was halted by a fishing job.

Richfield Oil Corporation in 1953 almost reached the prediction that was daring in 1945. Its Coles Levee "A" 67-29 is producing from the Eocene at 17,500-895 ft, only 105 ft short of 18,000-ft forecast.

The producing record was broken more than once in 1953. Shell Oil's Gonsoulin-Minvielle No. 1 in Weeks Island, Louisiana's Gulf Coast was completed in October for production at 17,306 ft.

EXCLUSIVE

Deep Production

Weeks Island in Louisiana is still the most important deep oil field. It is the largest producer in Louisiana. Shell Oil this year has added two producing wells below 15,000 ft to the 6 it already had and Humble Oil and Refining com-

*Managing Editor.

pleted an extension to Weeks Island field, making 9 wells producing from below 15,000 ft. The last three titans of the deep are producing condensate and gas from below 17,000 ft.

This year 22* wells were drilled below 15,000 ft and 16 of these were completed for production at depths from 5592 to 17,895 ft.

Two of the deep wells were wildcats operated by Richardson and Bass in Eddy County, New Mexico. Both found production about 7000 ft.

Six others found new sands. Richfield has production at the new record depth in North Coles Levee, California. It came in so recently that it has not been determined whether it is an economic well but the fact that the well discovered the first production in the Eocene in that particular part of the San Joaquin Valley is significant.

Phillips discovered new pay in the Alta Loma field, Texas, at 14,549-68 ft with initial production of 407 bbl of oil and 2,500,000 cu ft of gas.

Tide Water Associated discovered a new sand at 14,672 ft in Venice field, Louisiana.

The Texas Company brought the Cote Blanche field, Louisiana, into the below 15,000-ft production class when it found pay at 15,243-56 ft with initial production of 522 bbl of oil.

Elk City field in Oklahoma got new deep production from 12,704-734 ft at Shell's Carter-Caughron.

Another new sand in the West Poison Spider field, Wyoming, was dis-

*Also five wells added to 1952 completions.

Operators of wells below 15,000 ft.

Company	Have drilled, number	Drilled in 1953 number	Total
Abercrombie, J. S.	1	0	1
Brazos Oil and Gas Co.	0	1	1
Continental Oil	2	0	2
Denver Product & Ref.	1	0	1
Gulf Oil	4	2	6
Humble Oil and Refinery	4	1	5
LaGloria Corporation	1	0	1
Lion Oil	1	0	1
Little Nick Oil	1	0	1
Magnolia Petroleum	4	1	5
Mountain Fuel Supply	1	0	1
Pacific Western	1	0	1
Phillips Petroleum	7	6	13
Placid Oil	1	0	1
Pure Oil	2	1	3
Quintana	1	0	1
Richardson & Bass	4	2	6
Richfield Oil	0	1	1
Shell Oil	11	4	15
Standard of California	4	0	4
Standard of Texas	0	1	1
Stanolind	2	0	2
Superior Oil	9	0	9
Texas Company	10	1	11
Tide Water Associated	0	1	1
Union Producing	1	0	1
Vasen, George	1	0	1
Western Gulf	1	0	1
Total 28 companies	75	22	*97

Wells below 15,000 drilled in:

Year	No.	Year	No.
1938	1	1949	11
1945	4	1950	5
1946	1	1951	12
1947	8	1952	26
1948	7	1953	22

DESCRIPTION OF WELLS IN THE UNITED STATES DRILLED BELOW 15,000 FT

CALIFORNIA

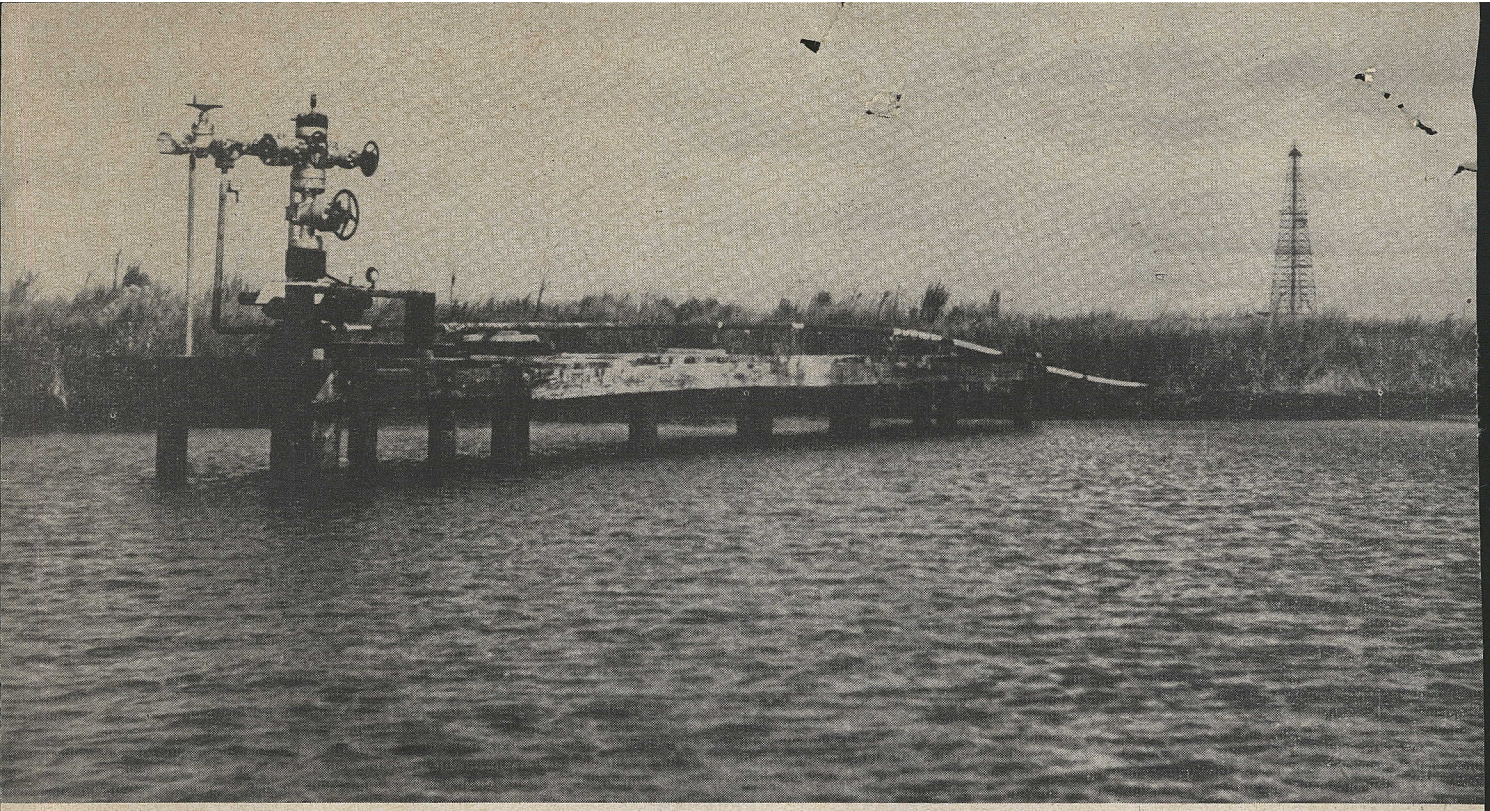
TD, ft / Prod. depth	Company / Well	Drilled by	Field / County or parish	Completed / Spudded	Drill time, days	Casing and cementing schedule	Mud program	Bits, rock, drag and diamond	Cores / Drillstem tests	Deepest form. / Producing form., thickness	Perforations, production, pressures, choke, GOR, gravity, etc.	Remarks
15,436 / 13,205	Shell Oil No. 378 Taylor	Company	Ventura Av. Ventura	10- 3-53 / 9-28-52	239	13⅜″/998′-9⅝″/10,531′, 7″/ 12,180′-4½″ & 5″ lnr/ 12,075′-13,225′ (plug).	Clay base.	290 total	63 C	Upper Mio D-8 L. Plio 700′	Perf. 12,210-13,205′ w 4½″ holes/ft. IP 1548 B/D 1594 MCF, GOR 1030, CP 3000 psi, TP 2500 psi.	Deep test on subsurface information.
17,895 / 17,895	Richfield CLA 67-29		N. Coles Levee Kern Co.	12- 4-53 / 11-12-52	362	7″/29-35# N-80/17,500′.	Oil base.		200-300′	Eocene Eocene	Perf. 17,497-892′, IP 58 B/D oil 43.2°, 1785 MCF, GOR 15,000, CP-Pkr., TP 1550, psi, 1⅛″ choke.	World's deepest producer. Found new sand. Site selected by sub-surface study. 7″ string longest in state.
21,482 / Fishing	Ohio Oil KCLA No. 72-4	Company	Paloma Kern Co.	Fishing / 10-23-51		9⅝″/10,947′ wt 513,732#	Water clay to 10,955′ oil base to TD	Rock bits to 10,947′ Dia&diaC	130 cores (5143′)			World's deepest well since it passed former record of 20,521′ 8/20/53. Site near top of known structure in old field.

LOUISIANA

TD, ft / Prod. depth	Company / Well	Drilled by	Field / County or parish	Completed / Spudded	Drill time, days	Casing and cementing schedule	Mud program	Bits, rock, drag and diamond	Cores / Drillstem tests	Deepest form. / Producing form., thickness	Perforations, production, pressures, choke, GOR, gravity, etc.	Remarks
15,520 / 14,672	TideWaterNo.24A Manhattan	Rowan Drilling Co.	Venice Plaquemines	7-23-53 / 2- 2-53	120	5″/18# N-80/8RT & C liner 13,593-15,029′ w/100x, slo-set	Lime base emulsion Comp. w/low alk. CMC.	110 R 3 drag	1 dia. 8 SW	U. Miocene U. Mio. 42′	Perf. 14,662-72′ w/60 bullets. 97B/D, 142 MCF, 1050 GOR Cas. Pkr., Tub. P. 300 psi, no choke.	Flank test on piercement dome. Disc. new sand. Site chosen by geology.
15,826 / 15,256	The Texas Co. St. Lease 340		Cote Blanche St. Mary's							Miocene	Perf. 15,243-56′, IP 522 B/D 31.3° gravity, GOR 460, TP 2100, 1⅛ ck. Perf. 15,190-810′ fluid. 84 B/D.	
17,183 / 17,122	Shell Oil Weeks Gall Unit 1 No. 1		Weeks Island Iberia	3-11-53	141	20″/123′/150x-13⅜″/2971′/ 275x-9⅝″/13,000/425x-7″lnr/ 16,932′/550x.	Replac'd lime-treated oil emulsion withred mud at TD	109R	5 cores 1 DS	Miocene Miocene	Perf. 17,038-122′, 138 B/D of 39.2°, 3951 MCF, 28,630 GOR, TP 1400 psi, ¾″ choke	FW in famous Weeks Island field. Deepest producer in the world when it came in.
17,260 / D & A	Richardson & Bass No. 1 E. E. Cockrell		Wildcat Plaquemines	12-20-52		20″/287′/300x-13⅜″/2993′/ 1500x.	Lime base.					
17,403 / 17,250	Humble No. 1 Hortense Provost-Gonsoulin	Company	Weeks Island Iberia	4-15-53 / 10- 9-52	135	20″/162′/250x-13⅜″/3026′/600x-9⅝″/13,053′/800x-7″ lnr/ 16,811′/500x-5″ x-line/710′ at 17,330′/55x.	Caustic-quebracho additives. Emul. with 10% diesel oil below 10,200′.	91R 3 dia C 4 drag	12 dia C 43 SW 6 DS	Miocene Mio "Y" sd 55′	Perf. 17,080-113′ w/132 jets & 17,250-330′, 192 B/D cond. 4777 CF, 24,920 GOR, Pkr, Tub. 5400 psi STP 6000 psi.	Longest string of 9⅝″ casing. When completed was second deepest producer. Extended field.
18,568 / 17,306	Shell Gonsoulin-Minvielle No. 2	Shell Marine Rig No. 7	Weeks Island Iberia	10- 1-53	141	20″/120′/300x-13⅜″/3000′/300x-9⅝″/14,008′/425x-7″/17,348′/ 500x.	Oil base mud not used.	97R 7 dia C	20 dia C	Miocene Miocene "Y"	Perf. 17,262-70′ w/64-17,276-86 w/80-17,296-308′ w/ 96 IP, 141 B/D cond., 4300 MCF, 1½″ ck. TP 5800 psi	Blow-out preventers used. Producing zone pressures dangerous. World's deepest producer until 12-4-53.

DESCRIPTION OF WELLS IN THE UNITED STATES DRILLED BELOW 15,000 FT (Continued)

TD, ft Prod. depth	Company Well	Drilled by	Field County or parish	Completed Spudded	Drill time, days	Casing and cementing schedule	Mud program	Bits, rock, drag and diamond	Cores Drillstem tests	Deepest form. Producing form., thickness	Perforations, production, pressures, choke, GOR, gravity, etc.	Remarks
NEW MEXICO												
15,611 6,890	Richardson & Bass No. 1 Fidel-Fed.		Wildcat Eddy	9-18-53 9-29-52		20″/360′/65x-13⅜″/3535′/2725x-9⅝″/12,930′/2525x.			34 cores 16 DST	Lime & shale	Perf. 240 shots 6850-90′, PB to 6890′ & fract. Flowing 175 B/D, ¼″ choke.	
16,549 7,035	Richardson & Bass No. 1 G. H. Cobb Federal		Wildcat Eddy	7-27-53 5-29-52		20″/650′/450x-13⅜″/3040′/2500x-9⅝″/12,651′/2050x-7″ lnr/9419-12,621′/600x.			33 cores 18 DS	Granite Delaware sand	Pumping 215 B/D 40° oil from 7003-16′ & 7022-35′.	Top oil sand 6996′.
OKLAHOMA												
15,624 12,734	Shell No. 1 Carter-Caughron		Elk City Beckham	12-53						Des Moines lime	IP 32 B/D from 12,734′.	New pay.
TEXAS												
15,000 12,196	Phippips No. 2 Cozby	Company	Chocolate Bay Brazoria	11- 3-53 5-28-53	133	20″/205′-13⅜″/7015′-9⅝″/11,560′-5½″/12,250′.	Lime base oil emulsion 17.3#.			Andrau IX Andrau IX 44′	Perf. 12,160-96′ w/120 jets. IP 341 B/D, 5821 MCF, 17,059 GOR. CP 600, TP 7325 psi.	Discovered new sand.
15,000 12,059	Phillips No. 1 Houston "S"	Company	Chocolate Bayou Brazoria	1-10-53 5- 4-52		10¾″/7097′/1500x-7⅝″/11,770′/1300x-5½″/13,950/600x.	9.5% oil emulsion-lime 17.4#.	86R			Perf. 12,043-53 w/40 jets. 354 B/D cond. 7509 MCF, 21,212 GOR, Pkr TP 7700 psi, STP 8250 psi.	Extended field.
15,002 9,487	La Gloria Corp. S. Weslaco Gas Unit No. 10	Company	So. Weslaco Hidalgo	12- 4-52 6- 8-52	127	9⅝″/9486′-7″ lnr/11,345′-4½″ lnr/14,943′.	Lime base oil emulsion.	92R 3 dia	41C 7DS	Frio-Vicksburg Frio 36′	Perf. 9452-87′ w/140 jets. 1500 gal acid, 10 B Cond. 1000 MCF, GOR 100,000, TP 822, 4575 Tub. 1″ choke.	Site selected by seis. Semi-WC. disc. new sand.
15,003 D & A	Phillips No. 1 Houston "U"	Company	Chocolate Bayou, Brazoria	11-16-53 7-16-52		18″BW/190′-10¾″/7273′-7⅝″ X-line 11,899′.	Lime base 7.5% oil 17.4# final.	91R				Semi-wildcat.
15,010 14,581	Phillips No. 1 Hulen	Company	Alta Loma Galveston	11- 3-53 5-21-53	114	20″/200′-13⅜″/7000′-9⅝″/11,078′-5½″/14,718′.	Milcal 8% oil emulsion 17.2#.				Perf. 14,549-81′, 407 B/D cond. 2500 MCF, GOR 6142, CP 1000 psi, TP 4050 psi.	Found new sand.
15,075 15,030	Phillips No. 1 Puckett "E"	Company	Puckett Pecos	5-24-53 8-12-52		5½″ N80/15,065′/2600x.		281 Total	13 DS	Pre-Cam. Gran. Ellenberger 1635′ thick	Perf. 14,550-15,000′ w/1584 jets. 10,000 gal acid. Gas well 37,500 MCF, TP 2852 psi.	Topped Ellenberger at 13,410′–Pre-Cambrian Granite at 15,045′.
15,529 D & A	Magnolia No. 1 Mc Faddin Trust Blk. "B"	Company	Wildcat Jefferson	1-31-53 5- 8-52		13⅜″/9⅝″/7″-5″ lnr		46R 2 drag	1 DS	Frio-Hackberry Dry	Perf. 14,670-82′ w/ 48 bullets.	
15,996 D & A	Gulf Mitchell Bros., State No. 1	Western Service Drilling	Wildcat Presidio	2-19-53 3-12-52	284[2]	13⅜″/184′/100x-9⅝″/4356′/900x-7⅝″/9758/620x.	Water base, chemically treated.	111R 7 core	40 cores 22 DS	Ellenberger Dry		Drilled by Argo Oil Corp. to 9997′, 1-9-47. Gulf deepened from 9997′ to 15,996′.
16,008 5,622	Brazos Oil & Gas S. Savage No. 2	Steen Drilling	Collegeport Matagorda	7-17-53 10- 4-52		13⅜″/715′-9⅝″/6022 .	Natural to 6022′. Oil emul. to TD.		None	Miocene	Perf. 5386-94′, 5592-5622′ with 6 bullets per ft.	
16,456 D & A	Phillips No. 1 Delta-Wilson	Delta-Gulf Drilling Co.	Wildcat Val Verde	8-14-52 6- 9-51		4½″ & 5 5/16″ DP set 15,656′		319 total 25 dia C		Wilberns Dry	Perf. 11,800-15,586′ w/ 3476 jets. 7000 gal acid.	Topped Ellenberger 14,885′-Wilberns 16,450′.
16,525 D & A	Phillips No. 1 Puckett "B"	Company	Puckett Pecos	9-23-53 5-10-53		5½″/16,291′/3400x.			17C 20DS	Granite Dry	Perf. 14 times from 8230-16,210′.	
16,575 D & A	Phillips No. 1 Puckett "G"	Trinity Drilling Company	Puckett Pecos	9- 5-53 8-20-52		13⅜″/950′/984x-9⅝″/5229′/1750x.	Surface with native mud.	279R	15DS	Penna. Dry		
16,696 D & A	Gulf No. 1 P. G. Northrup et'al	Parker Drilling Co.	Wildcat Reeves	5-13-53 1-13-52	469	20″/142′/450x-13⅜″/1626′/1500x-9⅝″/5195′/1700x-7⅝″/11,750′/500x.	Water base chemically treated.	287R 14 dia C		Penna. Dry	Treated 5000 gal acid.	Deepest well in Permian Basin.
17,373 D & A	Standard of Texas No. 1 Serapio Vela	Holmes Drilling Company	Wildcat Zapata	9- 7-53 7-24-52	333	13⅜″/1014′/625x-9⅝″/6500′/350x-7″/15,685′.	Lime base to 6500′, lime oil emul. to TD	160R	13 cores 12 DS	Navarro Shell Dry		Bottom hole temperature in excess of 385° were encountered.
WYOMING												
16,603 16,090	Pure Oil No. 3 West Poison	Brinkerhoff Drilling Co.	Poison Spider Natrona	Deepened 10,000′ hole		7″ N-80, 38-35-32# Reg. & 29-32#, HIU: 1000 x uniflow, 50 x strata crete.				Basal Sundance Morrison	Perf. 15,922-16,090′ w/972 jets treated w/10,614 gal hydrochloric & 2623 gal of Fluophosphoric.	Found new sand. Site chosen by field development and reflection seismograph.



Two record breakers are these Shell wells in Weeks Island field. In the foreground is Weeks-Gall Unit No. 1 Well which came in for the deepest producer in March from 17,122 ft and the derrick at right is Gonsoulin-Minvielle State Unit Well No. 2 which produces from 17,306 ft. The latter was drilled to 14,000 ft in 30 days and at this depth set a string of 9⅝-in. casing, believed to be the longest string of this size ever set in a well. It weighed 673,100 lb. Production depth records were broken three times in 1953.

covered by Pure Oil at 15,922-16,-090 ft.

In December 1952 LaGloria Corporation found a new sand at 9452-87 ft in the South Weslaco field, Texas.

Chocolate Bayou field, Texas, was extended by Phillips. Initial production of 354 bbl of oil and 7,509,000 cu ft of gas came from 12,099 ft in 60-ft thick formation.

Weeks Island field was extended by Humble's well, producing 195 bbl of oil initially from 17,250 ft.

Wells completed in known sands were Shell's No. 378 Taylor in Ventura Avenue field, California, at 12,210-13,205 ft for 1548 bbl a day; Shell's Gall Unit 1 and Gonsoulin-Minvielle-State No. 2, both completed below 17,-000 ft in Weeks Island field with initial production of 138 and 141 bbl of oil a day; Brazos Oil No. 2 Stewart Savage at 5386-94 ft and 5595-622 ft in Collegeport field, Matagorda County, Texas; and Phillips No. 1 Puckett "E" in Puckett Ellenberger, Pecos County, Texas, at 15,030 ft with 37,500,000 cu ft gas initial production.

Costs Virtually Unchanged

Average cost for the nearly 100 wells below 15,000 ft has not been changed by this year's deep drilling costs. Costs still run about $550,000 per well.

It is well to point out, however, that many deep wells are wildcats and there is considerable difference between the cost in wildcats and field wells. The deep exploratory wells cost on the average of $740,000 per well. A number of them run over a million dollars each.

Perhaps the surprising thing in the cost of wildcats is that one has actually been drilled for less than $300,000 in Louisiana. This does not include Continental Oil Company's California well that was drilled in 1938 and also cost under $300,000.

On the other hand, we have no record of a deep field well that went over a million dollars. The cost here runs from less than $300,000 to about $850,000 and the average is $525,000 per well.

Although fewer than a 100 wells may give the roughest estimate of cost, it is interesting to note that the deep wildcats cost about 40 per cent more than deep field wells, which is probably along average difference in cost for all field wells and wildcats.

Deep Foreign Wells

Four wells have been drilled below 15,000 ft in Venezuela and apparently none elsewhere outside the United States. Each of those below held depth records when completed:

Caribbean Petroleum drilled to 15,-106 ft in the Cabimas field, Zulia State in 1945. The contractor was Venezuela Oil Consessions, Ltd.

Colon Development Company drilled to 15,638 ft in the Catatumbo field, Zulia, in 1949.

Creole drilled to 17,039 ft west of Maracaibo, Zulia, in 1953. (See page B-36).

Shell drilled to 17,537 ft in the Maracaibo Basin in 1953 to set the record for foreign well depths.

None of the deep foreign wells has been completed as a producer but all are said to have had some shows of oil and gas.

Costs for these wells are higher even than in the United States. Those who give estimates put costs at between $2 and $3 million a well. * * *

Location and averages of wells below 15,000 ft.

State	Number wells 1953	Total holes	Completed as producers	Drilling time avg. days	Avg. bits per well	Mud costs avg.	Well costs avg.
Alabama	0	1	0	225	186	.....	.....
California	2	12	6	280	215	$76,000	$535,000
Colorado	0	1	1	420	322	.....	.....
Florida	0	1	0	485	144	.....	.....
Louisiana	5	38	21	148	102	51,000	508,000
Mississippi	0	3	0	306	237	.....	.....
New Mexico	2	2	2	375	...	.....	.....
Oklahoma	1	6	2	456	306	35,000	626,000
Texas	10	28	9	251	157	77,000	625,000
Wyoming	1	4	2	379	286	.....	.....
Total	21	96	43	232	160		

PICTORIALLY COVERING THE WORLD'S DEEPEST TEST

A Tribute to Ohio Oil And The Supply Companies

Someone, somewhere, once said he was going to climb a theretofore unscaled mountain just because it was there . . . and they've been writing and talking about it ever since.

Other men, and teams of men, have risen to new heights by conquering the depths of the earth. They did it not only "because it was there," but because they hoped to find something useful when they arrived at their destination.

Daring, unsung men have been penetrating the impenetrable for more than a half century, helping to write—in oil—the progressive industrial history of a people well-equipped with venturesome qualities, and stimulated by a unique environment.

They didn't do it overnight, or singlehandedly, and there was little or no fanfare; only the gradual testimony of free men of all walks of life enjoying a high standard of living. It took them years and years, and involved more than one generation. Not just a few hands and brains contributed to the ultimate success.

It evolved, and is evolving.

Last month, the Ohio Oil Co., toppled the world's record for deep drilling by cutting through nearly four miles of earth's strata.

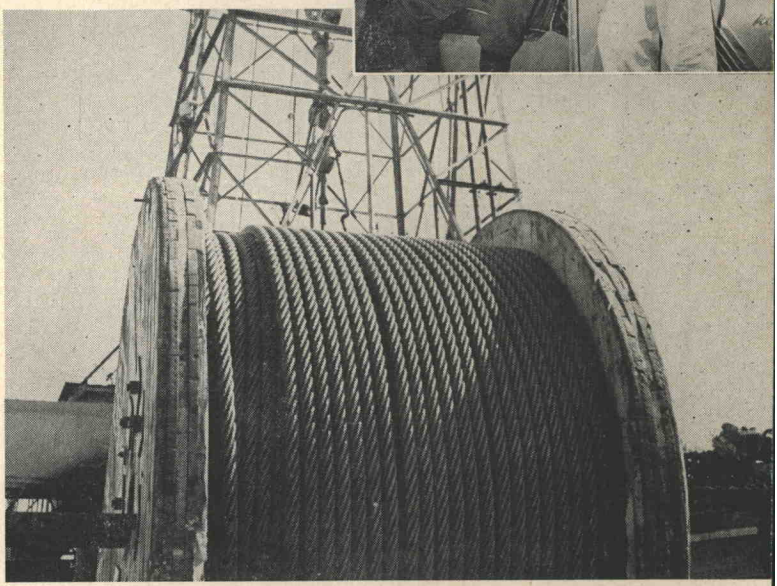
Ohio's geological wildcat in the Paloma field, some 25 miles southwest of Bakersfield, California, worked its way below 20,521 feet, which was the previous world depth established by Superior Oil Co.'s No. 1 Unit in Sublette county, Wyoming, in 1949.

The exploratory venture was begun nearly two years ago in search of Eocene pay. Present producing depth of the Paloma field is approximately 11,000 feet in the Upper Miocene.

At one time, 11,000 feet was considered an incredible depth.—BB

At left, George Sowards, Ohio's Los Angeles Division Manager discusses bit life and penetration with driller, W. A. Harris.

To right, seated, B. H. Doan, Drilling Superintendent, reports by radio to Bakersfield office, that well log, held by Ed Fletcher, shows well nearing depth record.



Wire center drilling line, 5,000 ft. of 1¼ in., used on world record breaker. Company tools were used. Well (background) was started two years ago; passed old depth mark Aug. 20.

Announcing 3 new and improved organic dispersants by Magcobar

1

2

3

Alkatan-1:1

A powerful dispersing agent with a 1:1 alkali-tannin ratio. Field personnel are referring to Alkatan 1:1 as the MIRACLE BREAK-OVER CHEMICAL. Mud converted to a lime-treated system with Alkatan 1:1 does not exhibit the high viscosity hump so common to the normal caustic-quebracho conversions where each chemical is added separately. This results in a more rapid breakover, with a saving of valuable rig time.

Alkatan-1:2

This product contains 1 part alkali to 2 parts tannin. Superior treating may be expected with Alkatan 1:2 in MEDIUM AND LOW pH DRILLING MUDS. Exceptional results are also obtained in treating out cement and in combination with phosphates.

Emulsite

A mud conditioner for the preparation and stabilization of OIL EMULSION MUDS. Low pH emulsite muds are especially suited for work-over jobs, shallow wells, or where minor contamination from salt or anhydrite is expected. Emulsite also acts as a protective colloid and dispersing agent for muds in which no oil is used.

Look to Magcobar's experience and know-how for quality products. Magcobar's research chemists and engineers are constantly at work on ways to simplify and solve many of the oil industry's drilling problems. Wherever your rig is located, a Magcobar engineer is always on call, and Magcobar products are available through more than 350 dealers.

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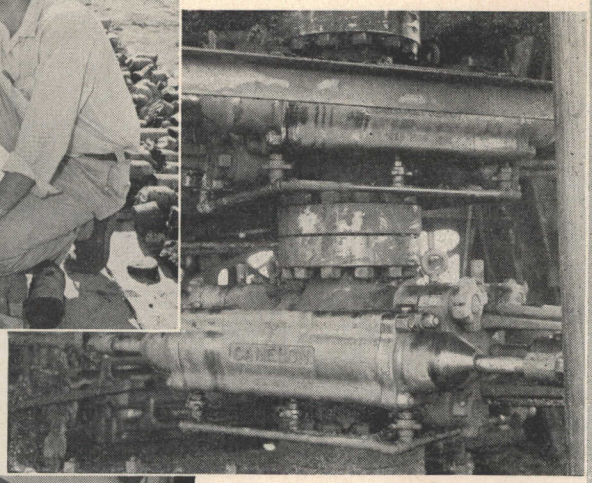
CONCENTRATE • NOHEEV • TANNATHIN • RED OX LIQUID • ALKATAN • QUEBRACHO • KEMBREAK • MAGCOPHOS • CHEMICALS

"Miles of cores" (left) are being examined by District Geologist R. W. Shoemaker and geologist Tom Wilson.



Three blow-out preventers were installed (right) to protect against unknown pressures.

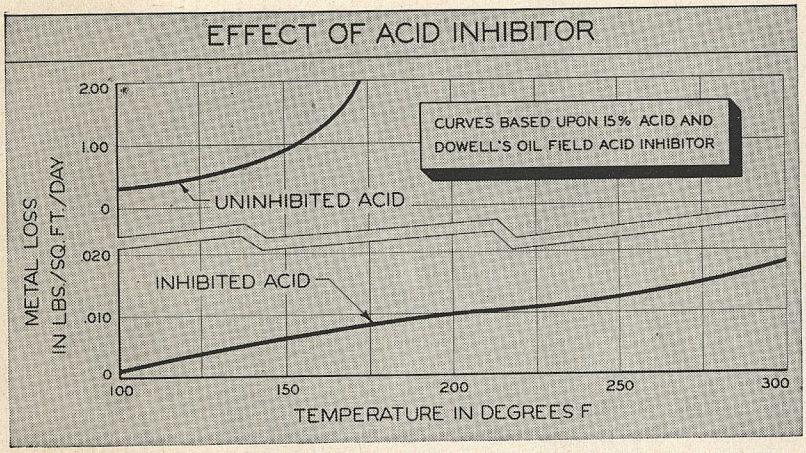
Drlg. Supt. Doan, with Derrickman Craig keep close check on mud which must be kept between 115-125 lb. per cu. ft. Above this weight it entered salt water zone at 13,818 ft. Below 115 lbs., salt water thinned mud.

Driller Hyatt Harris checks diamond studded bit with ring gauge. Insert shows Rotary Helper Bill McLaughlin examining bit pulled from 20,246 ft. Penetration rates: 1 to 3 ft. per hr.

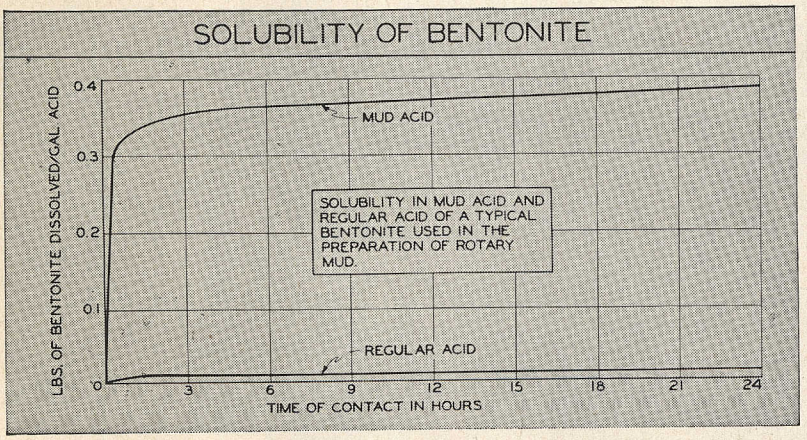
Above its 14-foot substructure, the 164-foot derrick stands over the deepest hole in the world. Drill pipe of 4½ in. is stacked in 164 "fourbles" from 20,250 ft. Total weight — nearly 174 tons. Preparing to run back in hole on way to 21,000 ft., the objective depth.

MORE FOR YOUR MONEY...

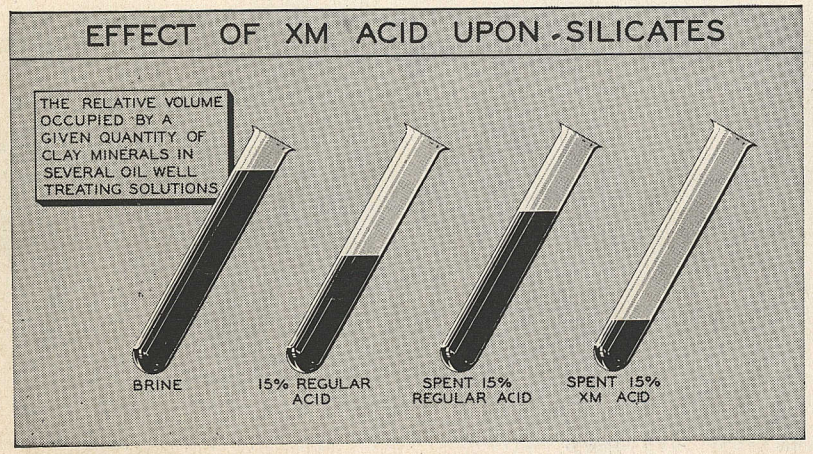
Let Dowell Fit Acidizing to Your Specific Well Problem



Dowell inhibitor permits high-temperature acidizing, and retards the rate of corrosion on well equipment to the point where acid damage is not at all apparent.



Ordinary commercial bentonite, such as is used in the preparation of drilling muds, is many times more soluble in Mud Acid than it is in regular acid.



This drawing illustrates the swelling-control effect of XM Acid on silicates. The same quantity of silicates has been placed in each of four different solutions.

Acid Corrosion? Ask for *Dowell X*—Corrosion of tubing, packers and other well equipment can become especially important in acidizing wells with high bottom hole temperatures. The Dowell inhibitor used in oil well applications reduces metal loss to approximately .01 lb. per sq. ft. per day at temperatures as high as 200°F., with less loss at lower temperatures. Some inhibitors considered highly effective will display corrosion rates at least 10 times greater.

Removal of Mud? Ask for *Dowell Mud Acid*—Dowell Mud Acid is used to remove mud sheaths and to acidize certain dolomite and sand formations. It also provides a superior method of removing mud from critical areas prior to squeeze cementing. Mud Acid is designed to dissolve bentonite and similar silicate materials.

Silicate Swelling? Ask for *Dowell XM Acid*—Certain dolomite and limestone formations contain silicates which can swell during acidizing and actually block formation pores. XM acid is designed to control such swelling. XM acid treatments have shown greater increases in production, less emulsion and easier return of the spent acid.

Faster Acid Action? Ask for *Dowell XX Acid*—This acid contains an intensifier to increase the reaction rate on dolomitic formations. Dowell XX acid is also designed to provide greater solvent action on other formations.

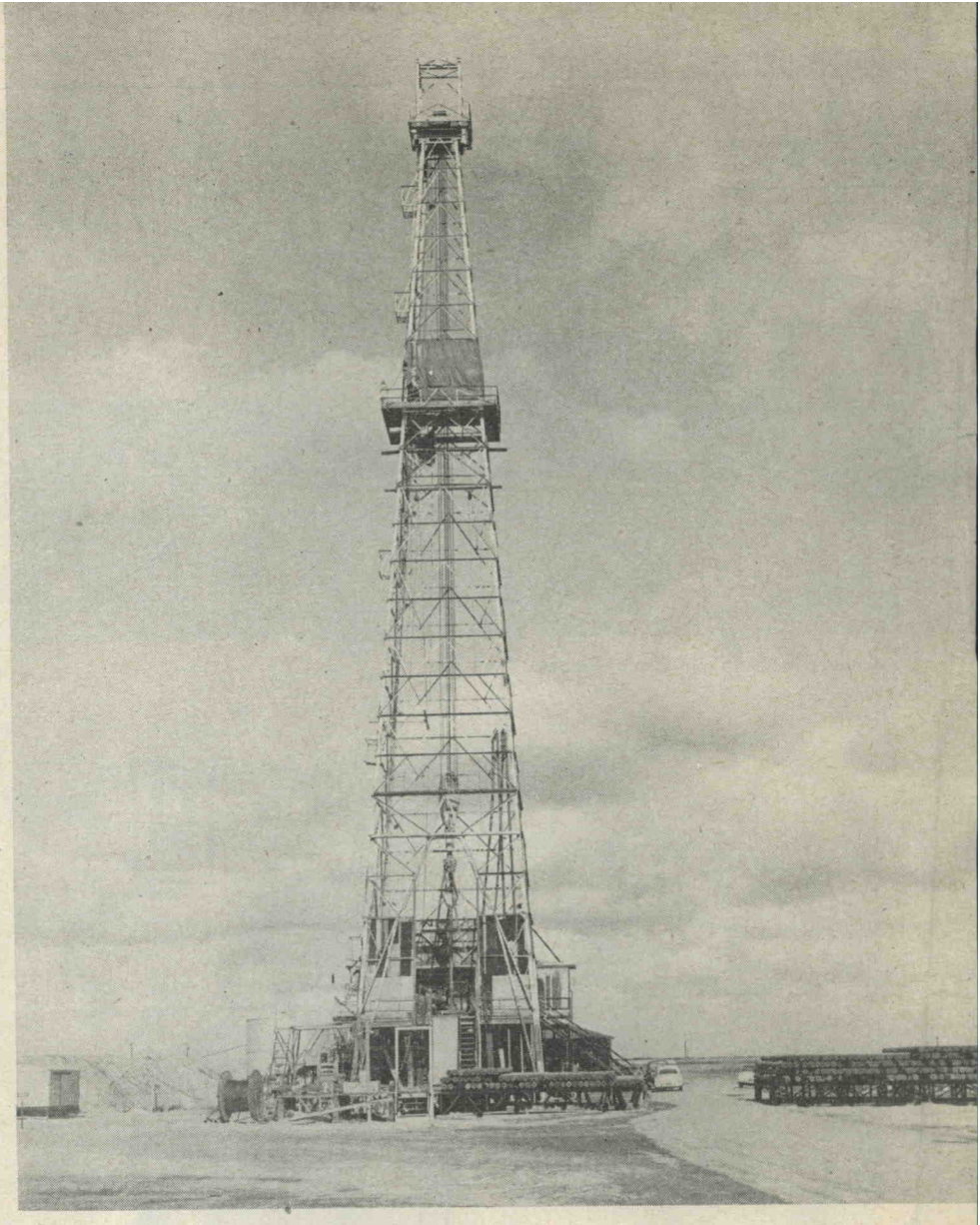
Easier Acid Injection? Ask for *Dowell XF Acid*—This acid contains a chemical to reduce surface tension, thereby increasing the penetrating and wetting abilities of the acid. Addition of the F agent aids in the return of the spent acid and permits treatment of relatively fine pores.

Oil Emulsions? Ask for *Dowell XW Acid*—An agent is added to this acid which helps to prevent the formation of emulsions and aids in the breaking of emulsions that have already been formed.

Remove "Gyp"? Ask for *Dowell XG Acid*—This acid contains a foaming agent which is helpful in removing "gyp" from tubing or the face of pay.

Tracing Agent? Ask for *Dowell XC Acid*—A special agent, used in XC acid, enables engineers to tell spent acid from formation water. Spent XC acid has been found in nearby wells. Migration to other formations higher or lower in the well has also been traced.

Other problems? Dowell uses a wide range of other treating services, chemicals, products and tools, including: Jel X materials, Sandfrac, Heavy Acid, Hot Acid, Securaloy Removal, Blanket, Soap Seal, Jelly Seal, Jelflake®, Temporary Plugging Materials, Temporary Fillers, Paraffin Solvents, Triple Zone Acidizing Tools, Compressors, Bridge Plugs, Jet Guns and Packers.



The Ohio Oil Company's KCL A No. 72-4 in the Paloma field southwest of Bakersfield, California.

P 400.

Deepest Active Test in California Seeks Record

Ohio Oil Company's well at Bakersfield challenges record depths for drilling and for production

WILLIAM RINTOUL

ONE of the most ambitious test wells ever planned for California today is heading into unexplored strata more than three miles below the surface of the Paloma field, 15 miles southwest of Bakersfield in Kern County.

The Ohio Oil Company is backing the test well, which in early December had reached a depth of 16,495 ft. According to the program for the test well, penetration will proceed to a total depth of between 18,000-22,000 ft. Principal objective is the Eocene zone, a highly productive pay horizon in many of the Southern San Joaquin Valley fields in California. In the absence of other deep tests in the Paloma field, it is pretty much of a question as to where the Eocene will be found.

Designated at KCL A No. 72-4, the deep test is located on Section 4—T 32S —R 26E. It is on land leased from Kern County Land Company in the south central portion of the 12-year-old Paloma field, where 97 wells produce an average of 8400 bbl-per-day of 48-60 gravity crude oil from depths of 10,650-11,-440 ft.

One of the first considerations when the deep test was approved was to lease the open land that might be affected by a deep discovery. Several weeks before spudding the test well on October 23, 1951, The Ohio Oil Company increased its already considerable holdings in the Paloma district through lease of an additional 2598 acres from Kern County Land Company.

Equipment assembled for the projected drilling job attested to the serious determination with which The Ohio Oil Company is pursuing its Paloma prospect. If there is anything to that saying about the third time proving the charm, the operator may expect to enjoy success with the Paloma deep test.

A company rig is being used for the drilling job and the current project makes the third start in five years for the powerful rotary. Previously it was used for a deep test in the West Branch field of Ogemaw County, Michigan, and a 13,818-ft duster on the Mitchell lease near Arvin in Kern County.

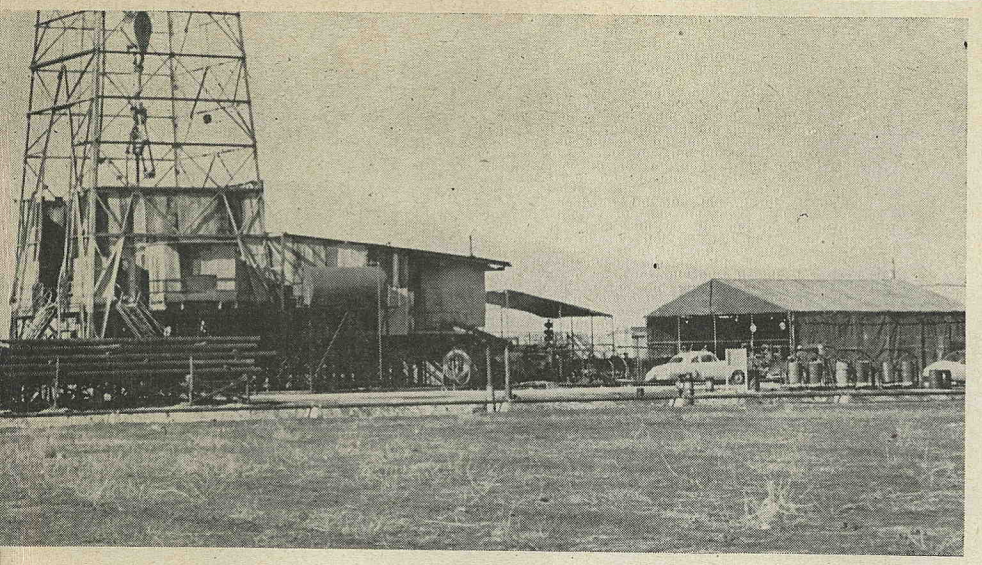
Rigging-up required about two weeks at the Paloma location and proved to be considerably less trying than the original rig-up job in Michigan. Much of the Michigan work was done in temperatures as low as 33 deg below zero. In Michigan's sub-zero weather it was necessary to lay more than one mile of steam coils and cover them with sheet iron to thaw out the ground for excavation.

A 178-ft Lee C. Moore steel derrick with 36-ft base and 15-ft substructure marks the drill site for miles around in the flat, alluvium-covered Paloma district. One portion of the substructure, 9 ft 3 in. high, supports the 21-ton load of four 350 hp Superior gas engines, which power the rotary. Another portion of the substructure, 13 ft 3 in. high, supports the National 125 drawworks that weighs more than 38 tons.

The engine and drawworks substructure is separate from the derrick floor substructure so that vibrations from the heavy machinery will not be transmitted to the derrick and derrick floor. Derrick floor substructure is 15 ft high. Legs of the derrick are extended, so that the substructure independent of the derrick can be moved in or out. A special safety feature of the substructure is the ease of access to the cellar, blowout preventer and to the master gate controls.

Cantilever type supports eliminate the hazardous cross-bracing of a conventional substructure. There is enough clearance to drive a two-ton truck under the supporting beams. The substructure has casing or drill pipe support capacity of 450,000 lb and a rotary table support of 300,000 lb. Over-all length of the pipe

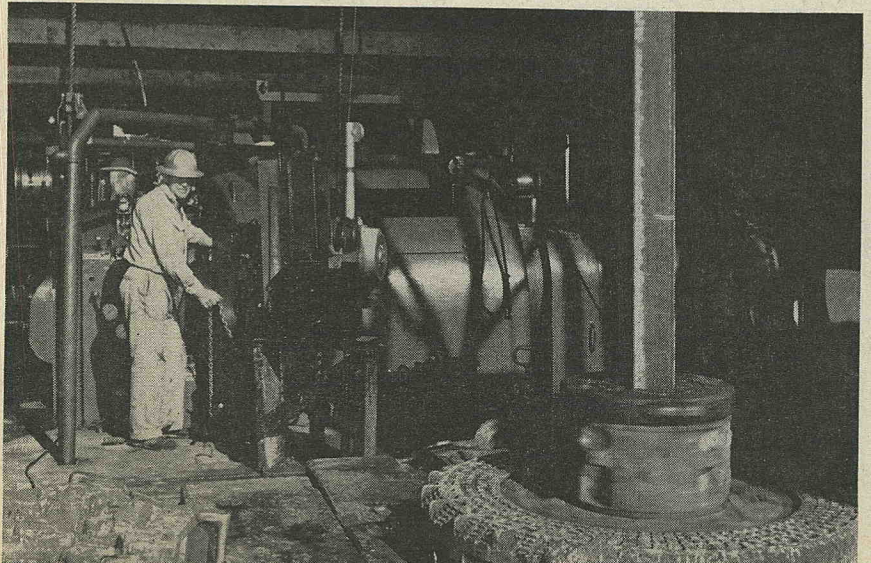
EXCLUSIVE



Ground level layout at the Paloma deep test.

Seated, Robert M. "Bob" Miller, division superintendent; C. W. Stephens, division petroleum engineer; R. W. Shoemaker, district geologist; *standing,* A. F. "Tony" Tokash, district production superintendent; Ben Hollandsworth, drilling superintendent.

Driller V. E. "Bill" Gillette keeps an experienced eye on the spinning rotary table from his vantage point beside the brake.



rack is 40 ft; width is 16 ft. It is made up of four prefabricated steel units, 3 ft 9 in. high, 8 ft wide and 20 ft long. The rack will support a casing load of 400,000 lb.

There are five safety platforms between the floor of the rig and the crown block, and run-a-round provides the safety platform on the outside of the derrick at the level of the 120 ft high "fourble" board.

A gin pole atop the derrick is used principally for placing the 8560-lb crown block during rig-up work. Capacity of the five-ton traveling block is 360 tons. The block has five 88-in. manganese steel sheaves. The hook weighs almost a ton and has a carrying capacity of 300 tons.

Assembled from prefabricated angle steel, the derrick weighs 67,037 lb. Fully rigged, the derrick, engines, drawworks, crown block, traveling block, and hook can readily hoist and control 300 tons.

The engine group and drawworks are set on a separate steel substructure four feet below derrick floor level. Guards over each coupling form a non-skid step. Ample space is provided between engines for easy access and safe working conditions. Two C-350 National mud pumps are used for circulating and another C-250 National mud pump is used for mixing. They are powered by two 350-hp Superior gas engines identical to those in the four-engine group that powers the drawworks. Each of the gas engines has a radiator that is 7 ft 7 in. high and has a cooling system capacity of 70 gal. Lubricating system for each of the engines has a capacity of 30 gal. Ohio's outfit features an independent rotary drive, driven by two G. M. C. twin diesels. Motors are connected to the National rotary table with an Oilwell torque converter.

Blowout equipment includes two Shaffer blowout heads and one Hyrdril head. One of the Shaffers is used on the bottom to afford a complete shut-off. The second, a ram-type head, shuts off around the drill pipe. The Hyrdril is used on top and is capable of a shut-off either on the drill-pipe, collars, kelly, or without anything in the hole.

With the exception of the rotary drive and the size of the drill pipe, equipment being used at Paloma is essentially the same as was used for the Michigan drilling job five years ago. Minor changes have been made in the equipment to conform to California safety regulations. For example, one d-c generator driven by the drawworks had to be replaced by an electrical generator located away from the well.

To date protection pipe cemented in the deep test includes 13⅜-in. casing cemented at 1431 ft with 1000 sacks, and 9⅝-in. casing cemented at 10,947 ft with 1200 sacks. Additional pipe on hand includes enough 5½-in. casing to complete the well at 22,500 ft, if findings should warrant completion from that record-breaking depth. Paloma sand, the field's regular producing horizon in the Stevens zone, was topped at 10,038 ft and shortly thereafter was cased-off.

As pipe was set at 10,947 ft, 5548 ft of 8¼-in. hole has been drilled to a depth

of 16,495 ft. Of this footage, 92 ft were drilled with 11 conventional rock bits for an average drilling rate of 1.2 ft per hour; 2817 ft were drilled with 13 diamond bits for an average drilling rate of 1.2 ft per hour; and 2639 ft were cored with four diamond core-heads for an average coring rate of 1.2 ft per hour. Footage obtained from any one diamond bit has varied from 81 ft in 93 hours for one drilling bit to 1147 ft in 86 hours for one coring bit. While rates of coring and drilling have been about the same, indications are that the coring bits give greater total footages per bit than the drilling bits. The diamond bits have amazing durability, and in the case of the drilling bits have been left on bottom for as long as seven days.

From 13,500 ft the drilling has consisted chiefly of coring. Ninety-five per cent of the total interval has been cored, the practice being to take 54-ft cores. There is also a rate of penetration indicator to add to the information regarding formations being penetrated.

Mud in the hole is an oil-base type mud. The weight is carried at 115 lb per cubic foot. Flow-line temperatures of the mud increased steadily from around 125 F at a depth of 11,000 ft to around 170 F at 15,500 ft and has remained fairly constant since that time.

The 16,000 ft plus of 4½-in., 17.35 lb vanadium steel, integral-joint drill pipe imposes a considerable load on the ten 1¼-in. wire-center drilling lines. As a precaution, therefore, a definite program of moving and cutting the line has been followed. Between 15,00-16,000 ft, this moving and cutting program dictated that the line be moved a few feet, from 3 to 5 ft, after every round trip and that the line be cut 100 ft after every fourth round trip. Between 16.000-20,000 ft, the program features the same moving procedure but dictates that the line be cut 100 ft after every third round trip.

Only one serious fishing job occurred up to early December. It occurred at 16,495 ft when a core barrel was stuck on the bottom of the hole. After efforts to jar the fish loose had failed the hole was sidetracked 75 ft off bottom.

Some of the men who are playing a key role in the Paloma deep test include Robert M. "Bob" Miller, division superintendent and an Ohio oil man for more than 45 years; C. W. Stephens, division petroleum engineer; Don Everitts, petroleum engineer who has "sat on" the well; R. W. Shoemaker, district geologist; and Ben Hollandsworth, drilling superintendent. With the exception of Stephens, whose headquarters are in Los Angeles, all the Ohio men are located in Bakersfield.

One record that has fallen to the deep test is that of the deepest penetration to date in the Paloma field. Previously the deepest test in the field was Superior Oil Company's Anderson No. 56-35, a 14,486-ft hole two miles northeast of the Ohio location. Superior's well was plugged back for completion in the Stevens zone.

Records that the Ohio deep test may challenge in the coming months are the deep drilling and producing records

To obtain more information on products advertised see page E-43

Members of one of the crews assigned to Ohio's deep test include: E. E. McCutcheon, rotary helper; J. J. Helton, derrickman; M. S. Sexton, rotary helper; Howard Weimer, rotary helper; and Bill Gillette, driller. All are from Bakersfield.

for California, and possibly the world's record for deep drilling and producing.

Two of those records are held by Superior Oil Company. Superior's Limoneira No. 1 in the North Montalvo area of Ventura County, California, went to 18,734 ft before abandonment in 1949 as the deepest well ever drilled in California. Superior's Pacific Creek Unit One in Sublette County, Wyoming, set a world's record for deep drilling three years ago at 20,521 ft. Superior drilled this project with a National 160, the only rotary larger than the National 125 being used at Paloma.

Pure Oil Company is believed to hold the world's record for deep production with a well that was completed this year in West Poison Spider field of Natrona county, Wyoming, from 16,102-607 ft. Pure's well which is now pumping, produced from the Morrison formation at 16,102 ft.

If Ohio is unable to complete for a new deep discovery, there is some doubt as to whether or not the well will be completed in the Paloma sand. Completion of the deep test, which is located between two producing wells, would disturb forty-acre spacing of the unitized Paloma field, which is unitized on the Paloma producing horizon in the Stevens zone.

Ohio Oil Company has the principal interest in the Paloma unit, 42 per cent, although Western Gulf Oil Company is the operator. Others in the unit include The Texas Company, Union Oil Company of California, Sunray Oil Corporation, Chanslor-Canfield Midway Oil Company, and General Petroleum Corporation.

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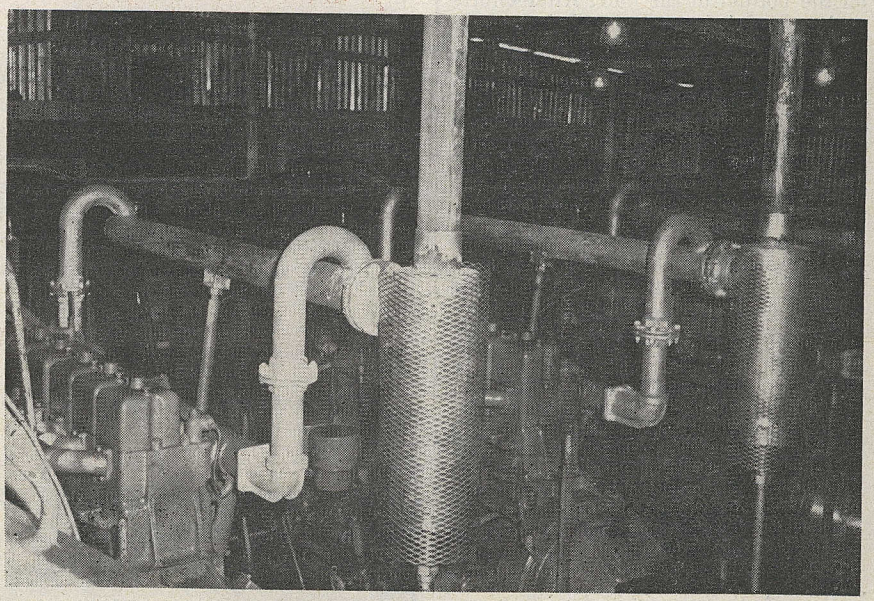

Four 350-hp gas engines power the rotary that may push Ohio's Paloma deep test to new depth records.