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SECURITY INFORMATION

CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

25X1

COUNTRY Chile

REPORT NO.

SUBJECT Petroleum Industry

RESPONSIVE TO	
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ORR NO.	
DAS NO.	
OCI NO.	

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SUPP. TO REPORT NO.

25X1

THIS IS **UNEVALUATED** INFORMATION

SOURCE

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1. Information and statistics on petroleum production, refineries and related activities released by Latin American countries are not always accurate, notably Brazil 25X1 25X1 however, the information released by the Chilean government's Corporacion de Fomento, and by Chile's oil administrative agency (Empresa Nacional de Petroleo (ENAP) are factual. 25X1

2. The article on Chile's drilling activity and petroleum production which appeared on pages 144 and 148 of the 15 Jul 52 (International) issue of World Oil magazine /a copy of which is available on loan in the CIA Library/ is accurate as of 1 Jan 52. The maps accompanying that issue of the magazine appear also to be accurate insofar as Chile is concerned, except it is indicated that there is an oil field on the mainland at Punta Delgada (the table lists one oil well and two gas wells completed at Punta Delgada in 1951). 25X1 only gas has been discovered and produced on Chile's mainland side of the Straits of Magellan. This may be explained by the fact that some gas wells are so wet that it is a matter of opinion whether one would call it an oil or gas well.

3. Under refineries (on page 148 of the 15 July issue of World Oil) there are some confusing data. A 20,000 barrel a day refinery is twice listed under Empresa Nacional del Petroleo; and again a 20,000 barrel daily thermal cracking topping plant is listed elsewhere. This all refers to one and the same refinery now under construction, and expected to be completed in late 1953 or early 1954. Again under refineries there are listed two 6,000 barrels per day refineries on Tierra del Fuego - there is only one refinery on Tierra del Fuego - 25X1 25X1

4. The following additional information brings Chile's petroleum picture up to date, to mid-1952: Chile is selling 2,500 to 3,000 barrels of oil a day to Uruguay. The 20,000 barrel a day additional refinery capacity, under construction and referred to above, is expected to come close to handling Chile's petroleum consumption. However, by 1954 Chile's consumption of petroleum products will probably be a little higher than her total refining capacity. The Chilean government officials estimate that by the end of

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1953 they will be producing 10,000 barrels of oil per day - which will make Chile close to 50% self sufficient.

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5.

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- end -

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Established 1916 as The Oil WEEKLY

International Operations Issue

WORLD OIL

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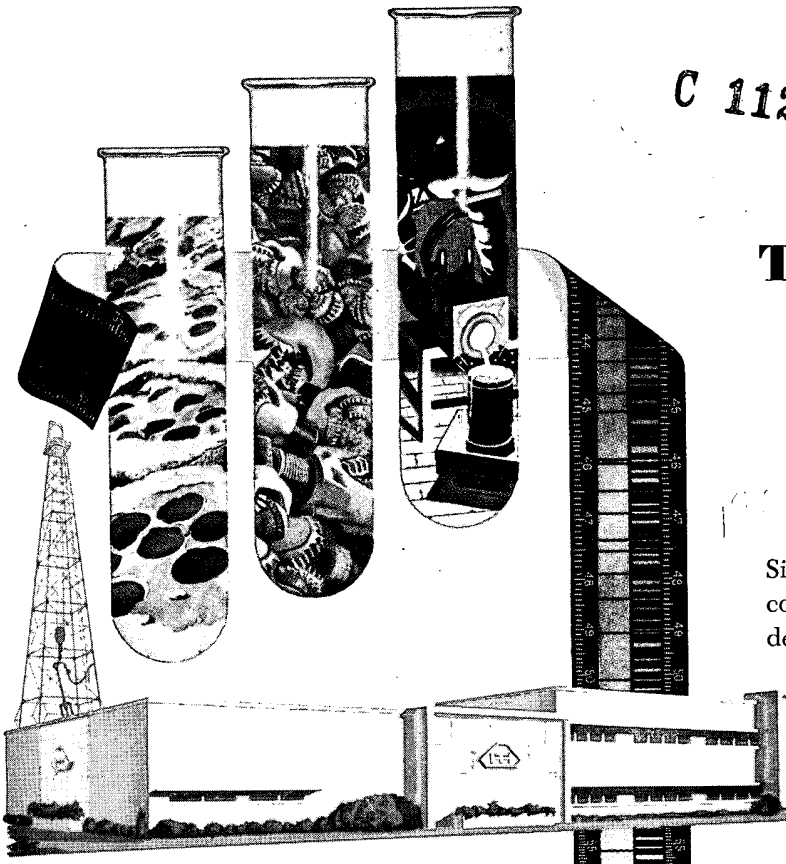

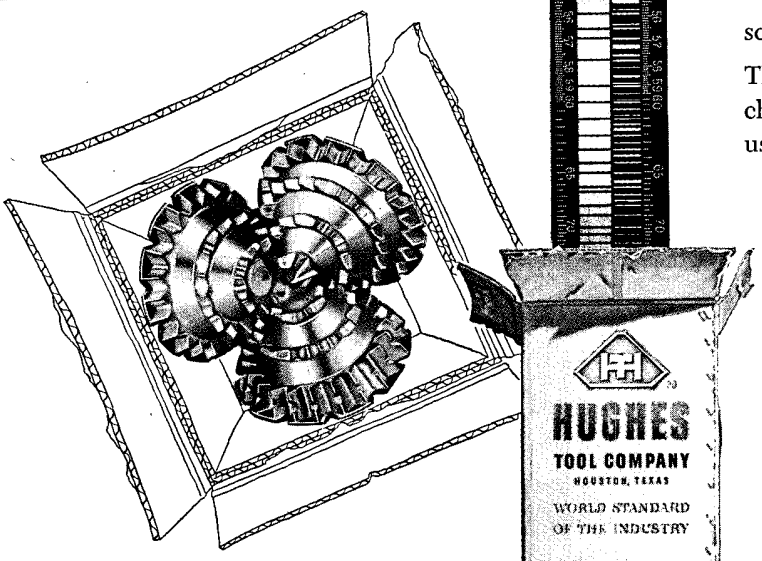

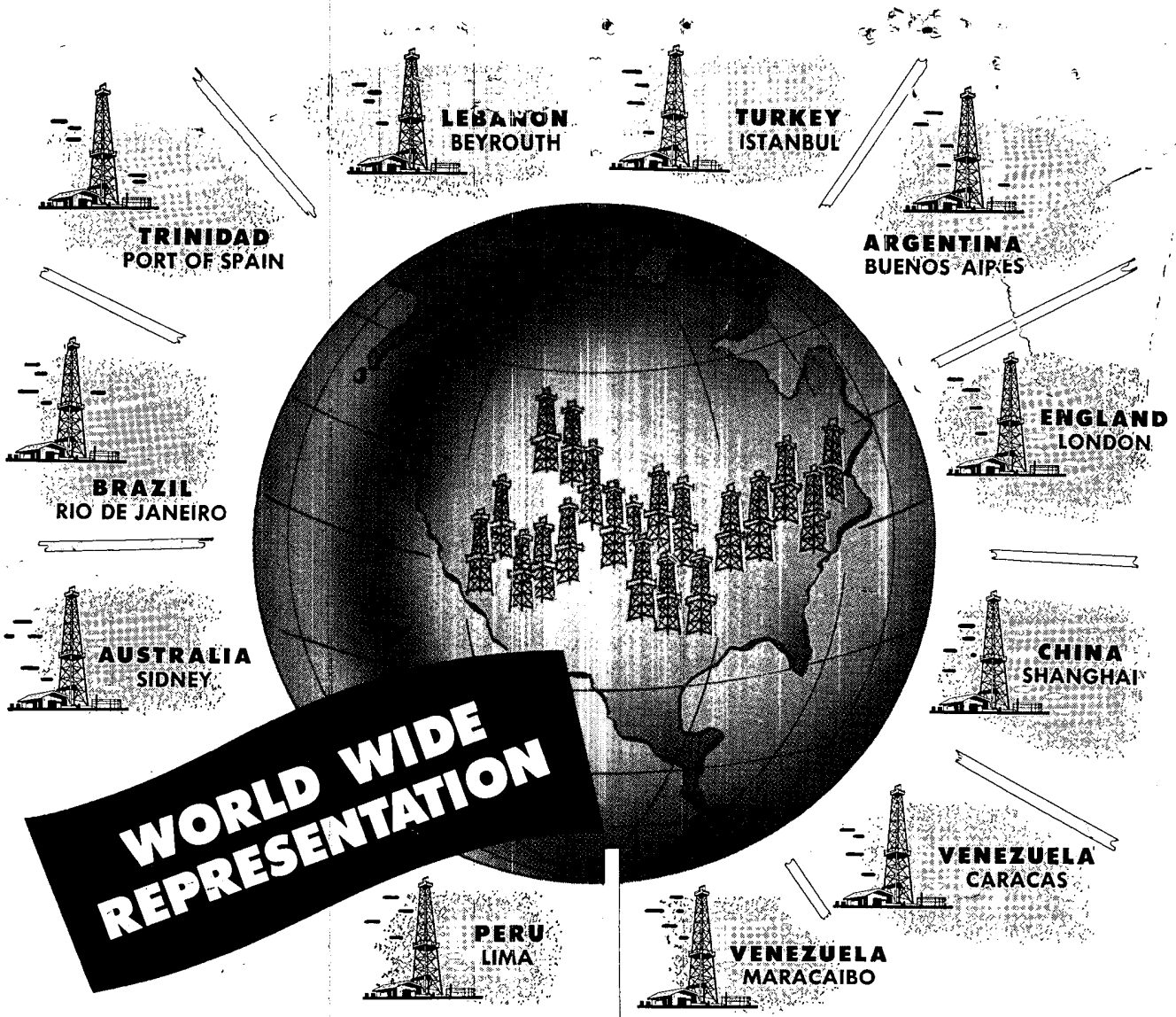

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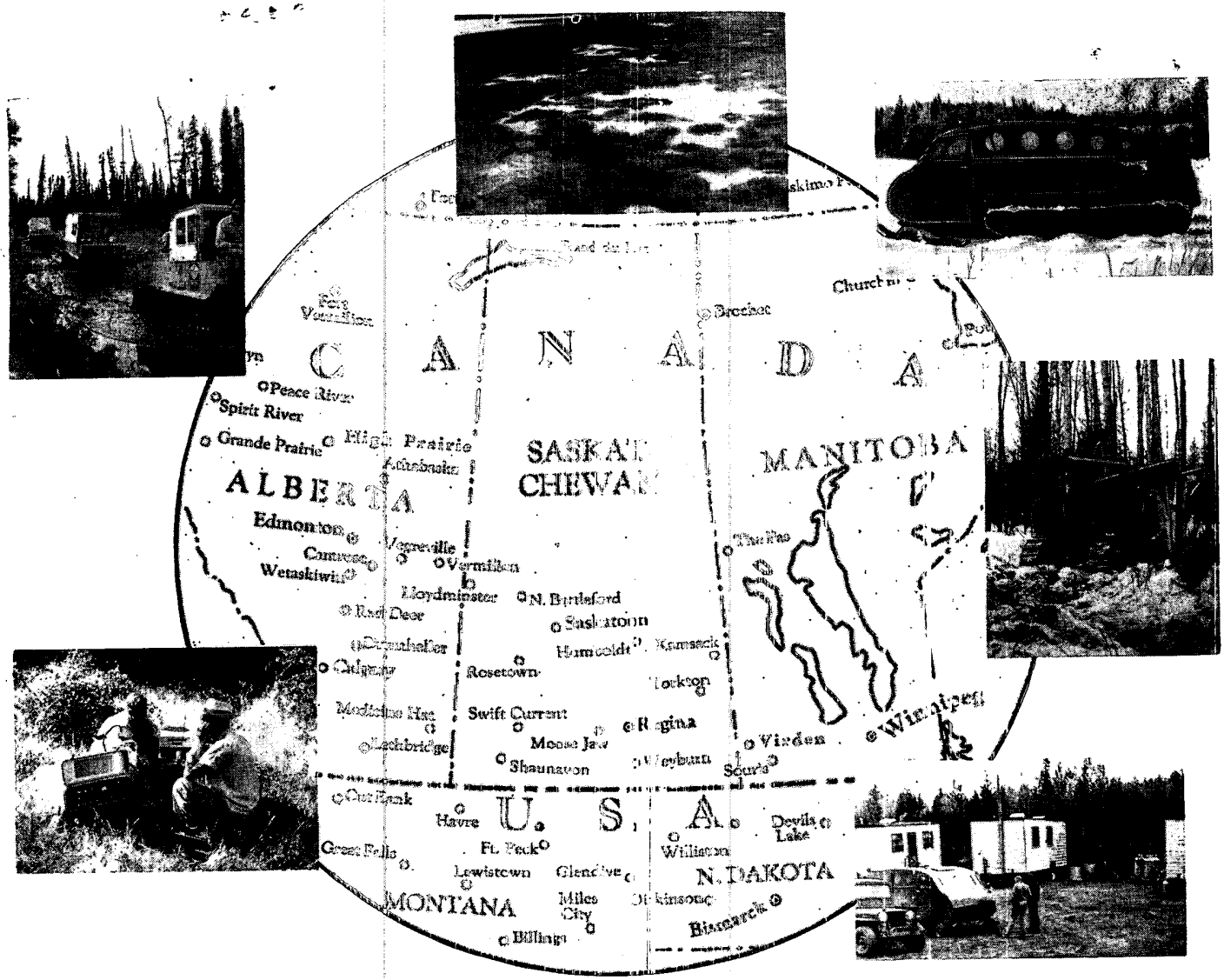
WORLD OIL, published every month except semi-monthly in February and July. Entered as *The Oil Weekly* as second class mail matter December 23, 1916, at the post office at Houston, Texas, under the act of March 3, 1879.



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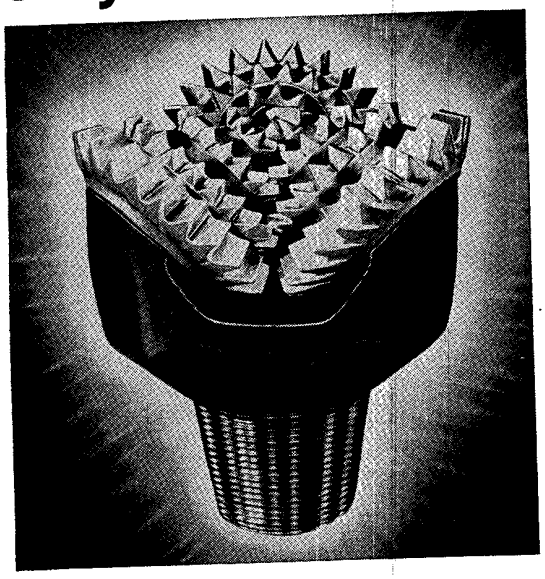

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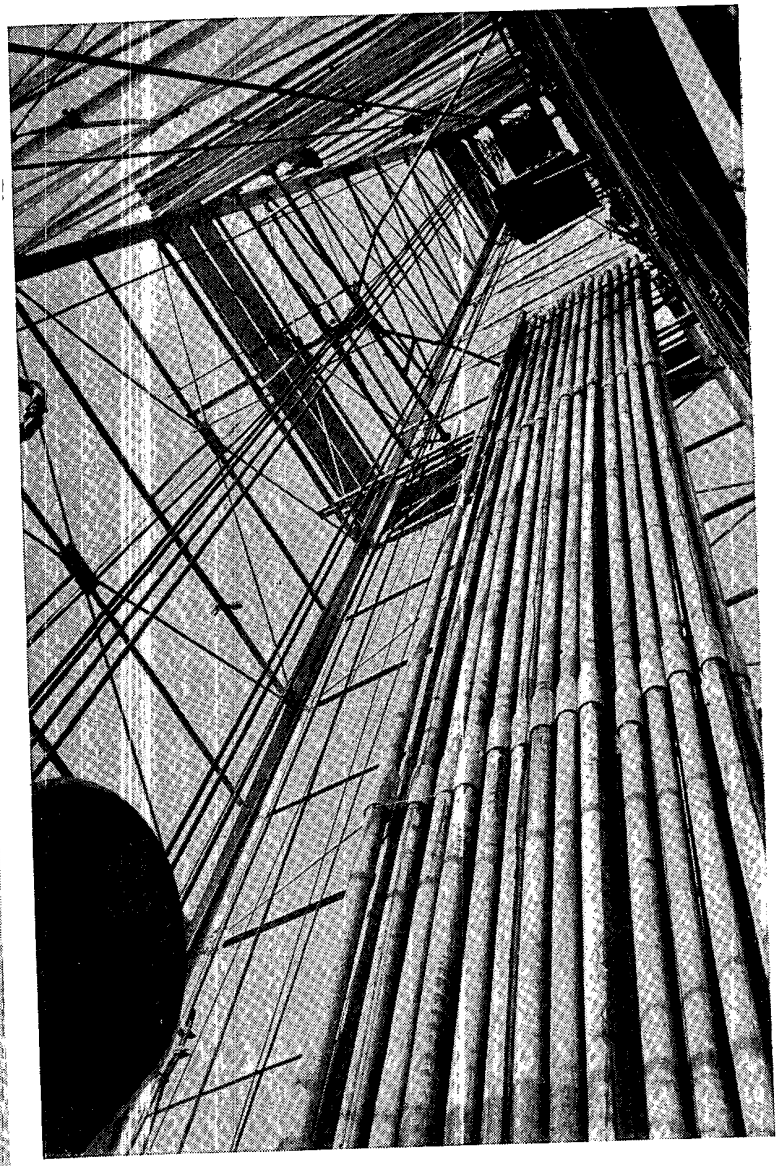

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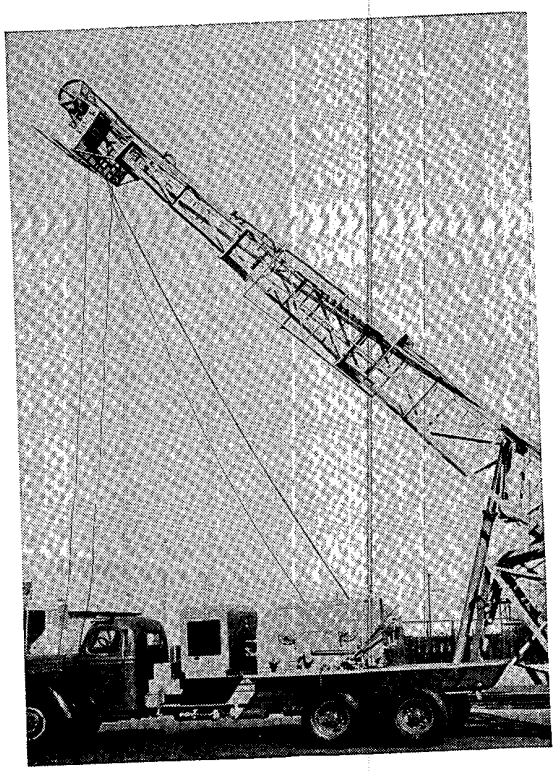

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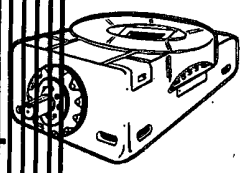

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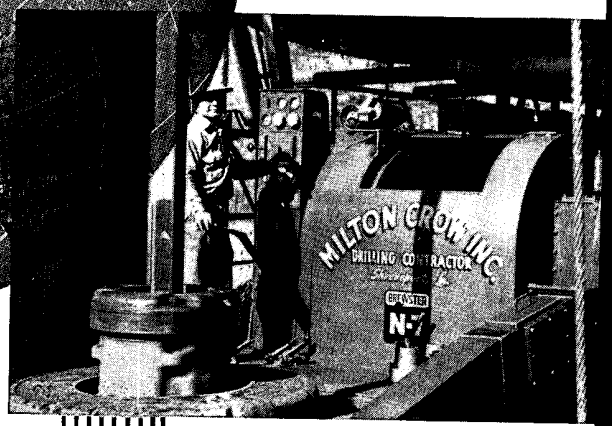

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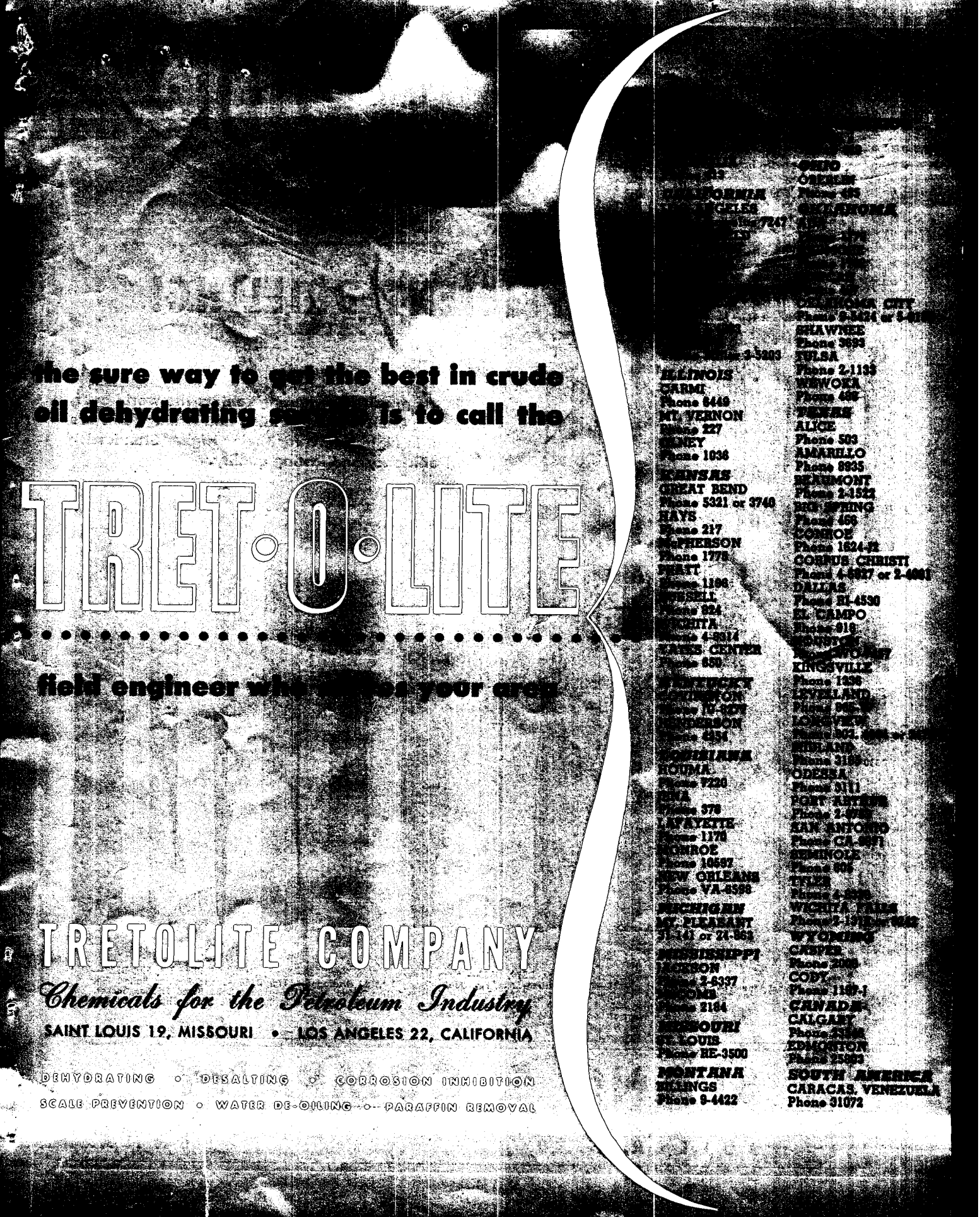

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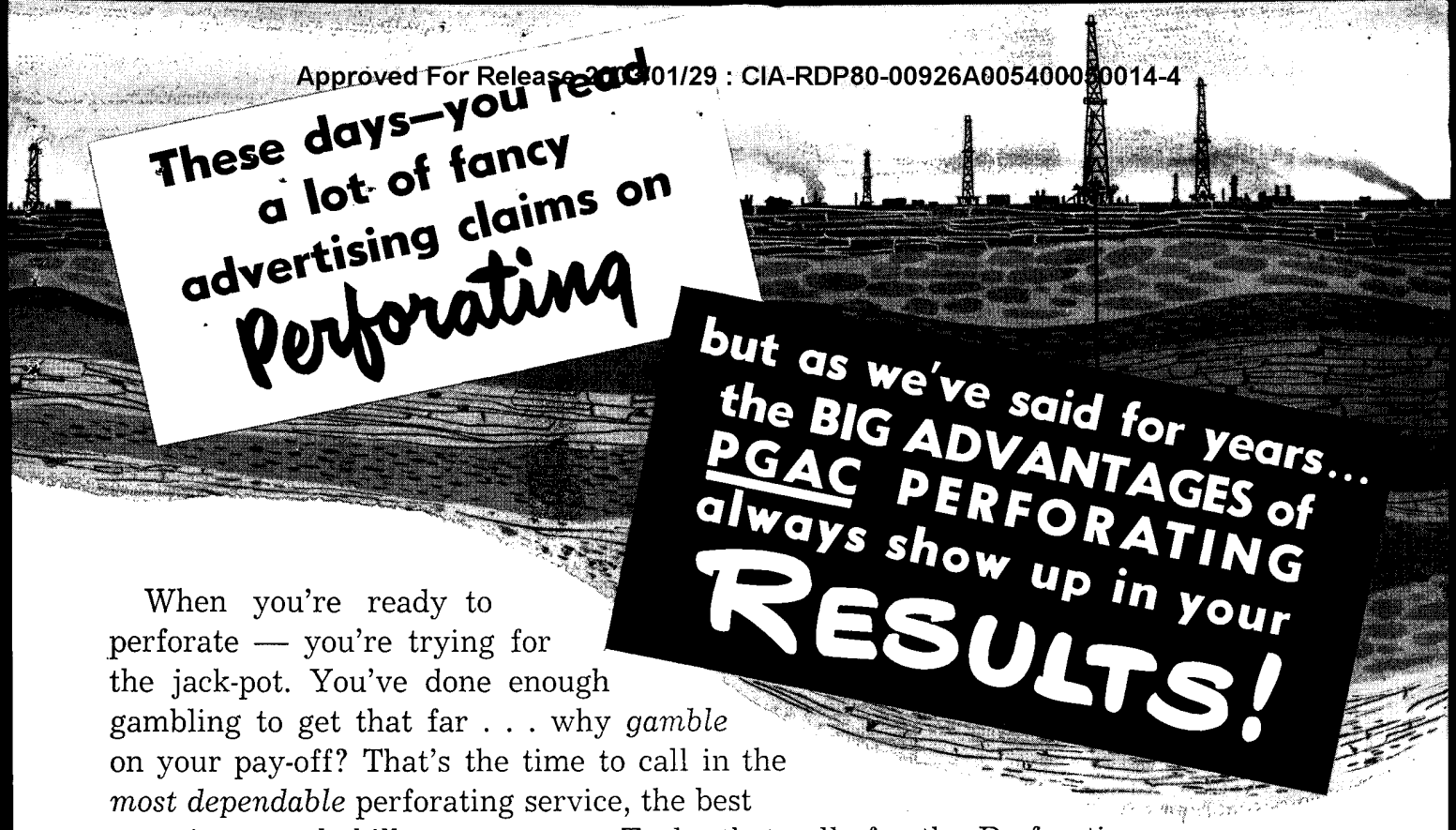

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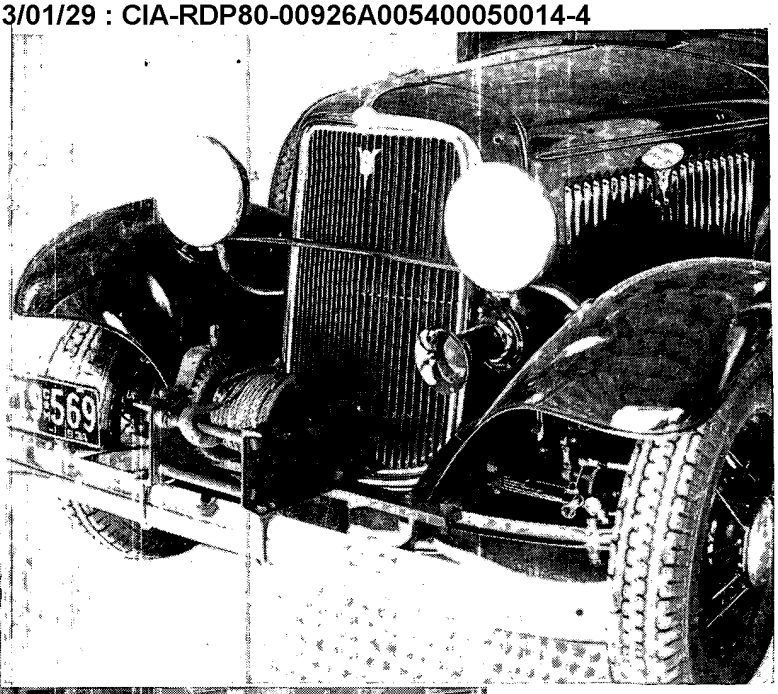

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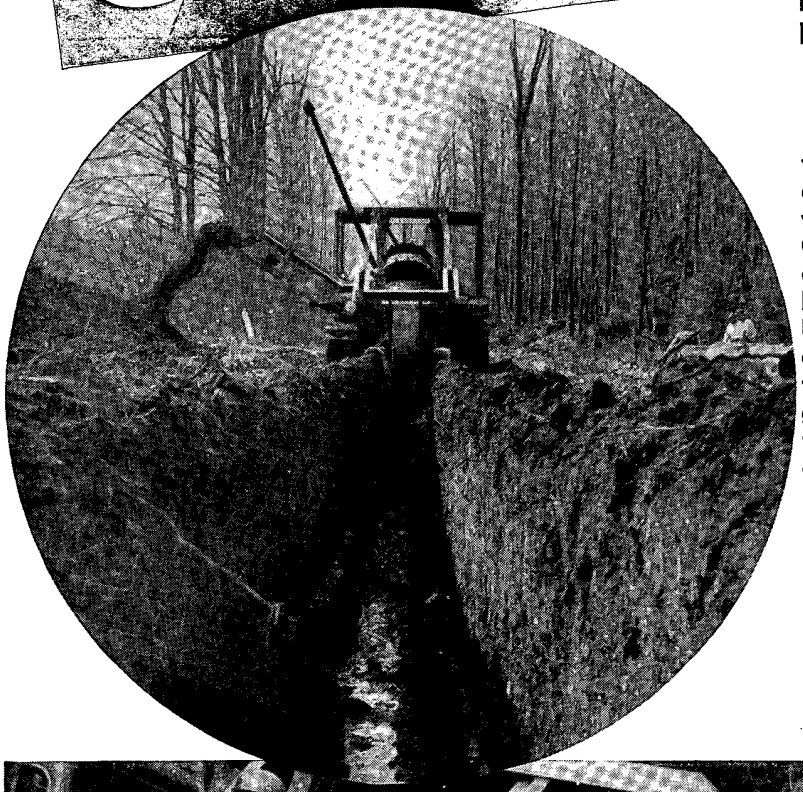

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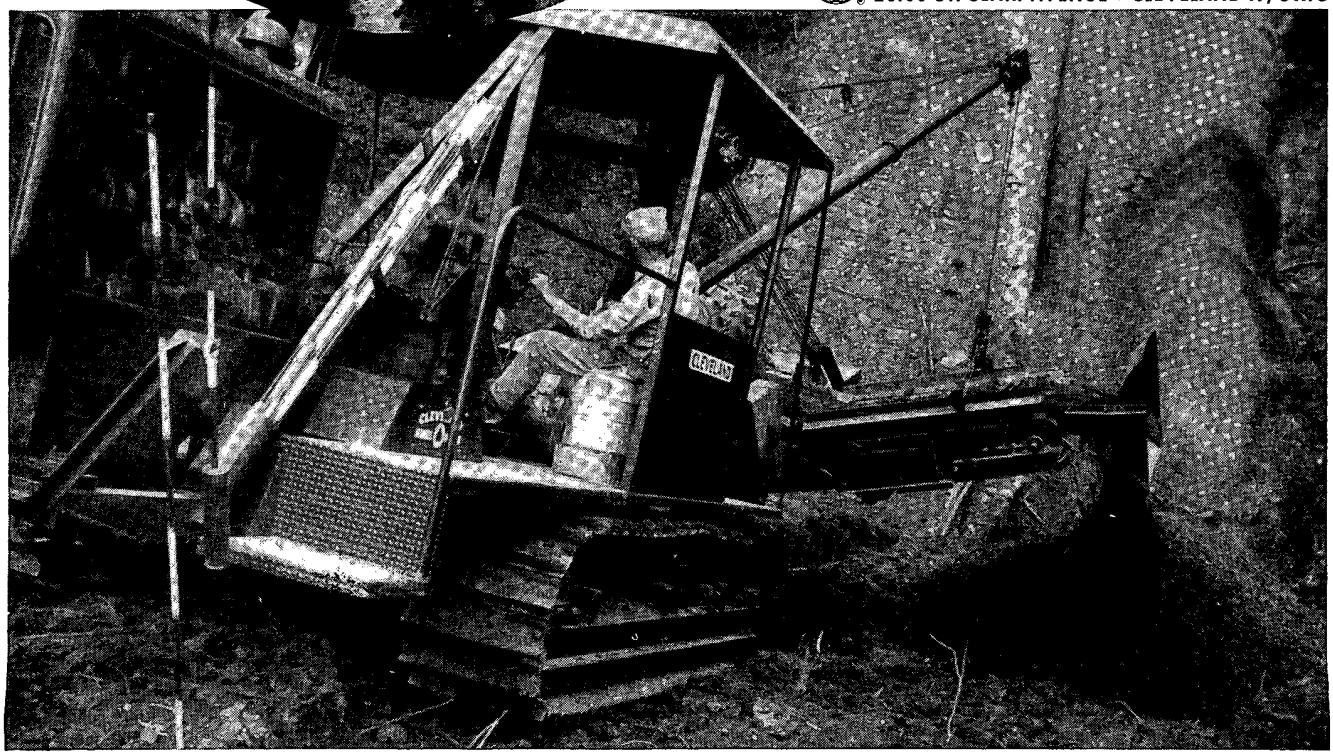

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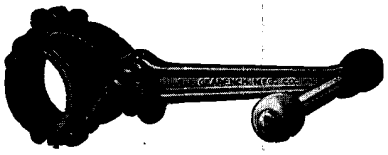

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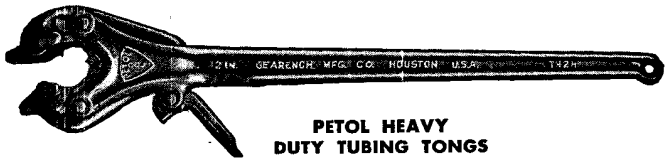

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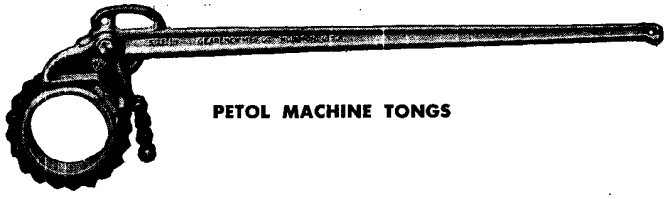

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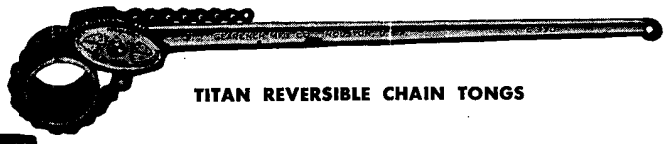

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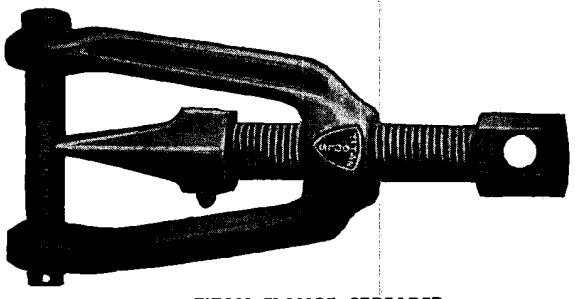

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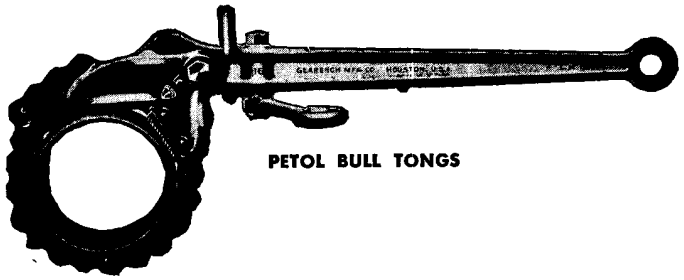

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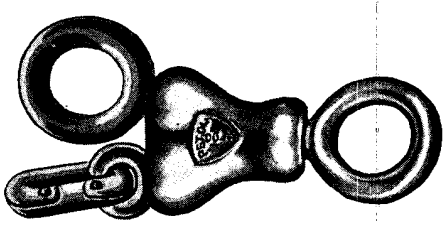

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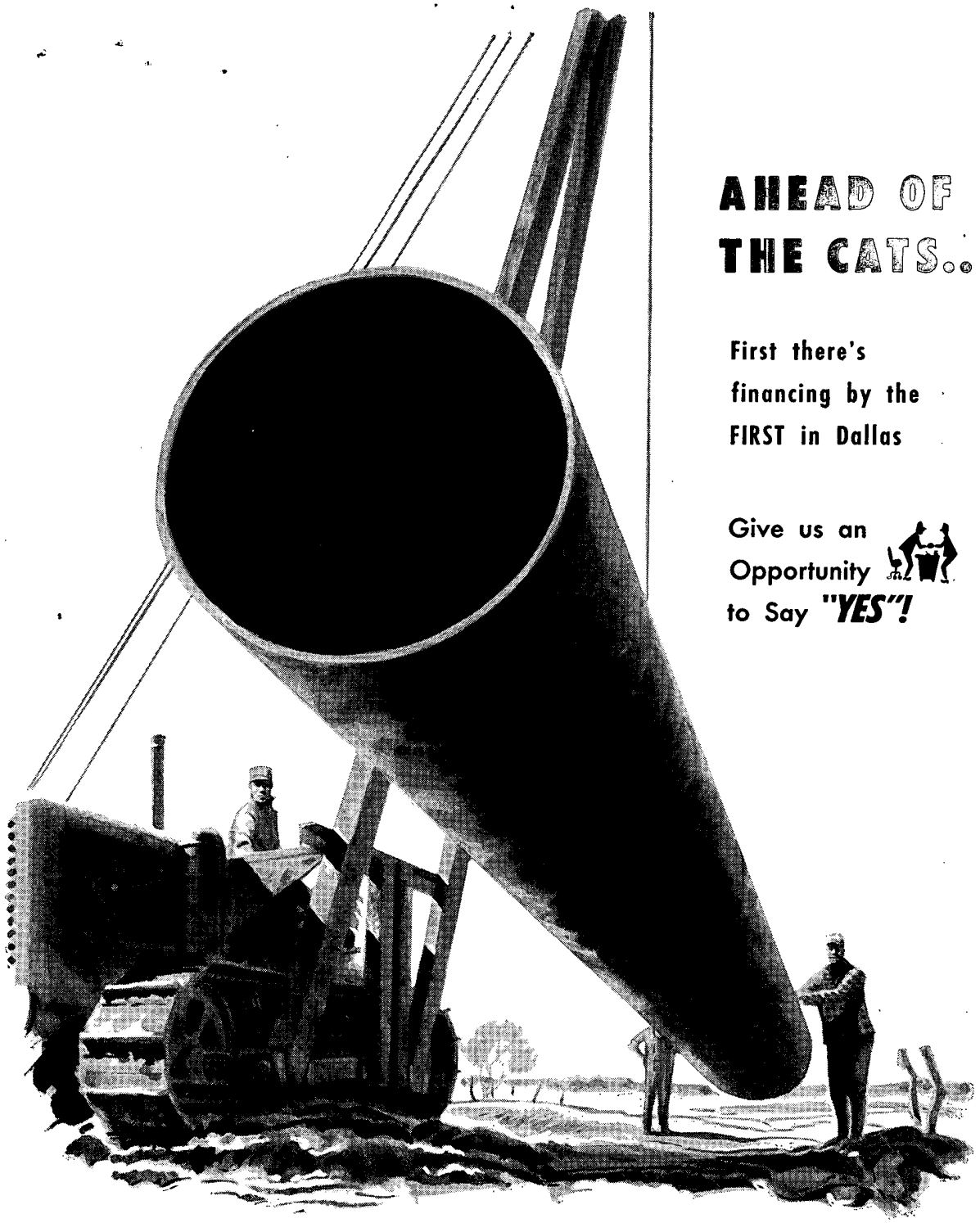

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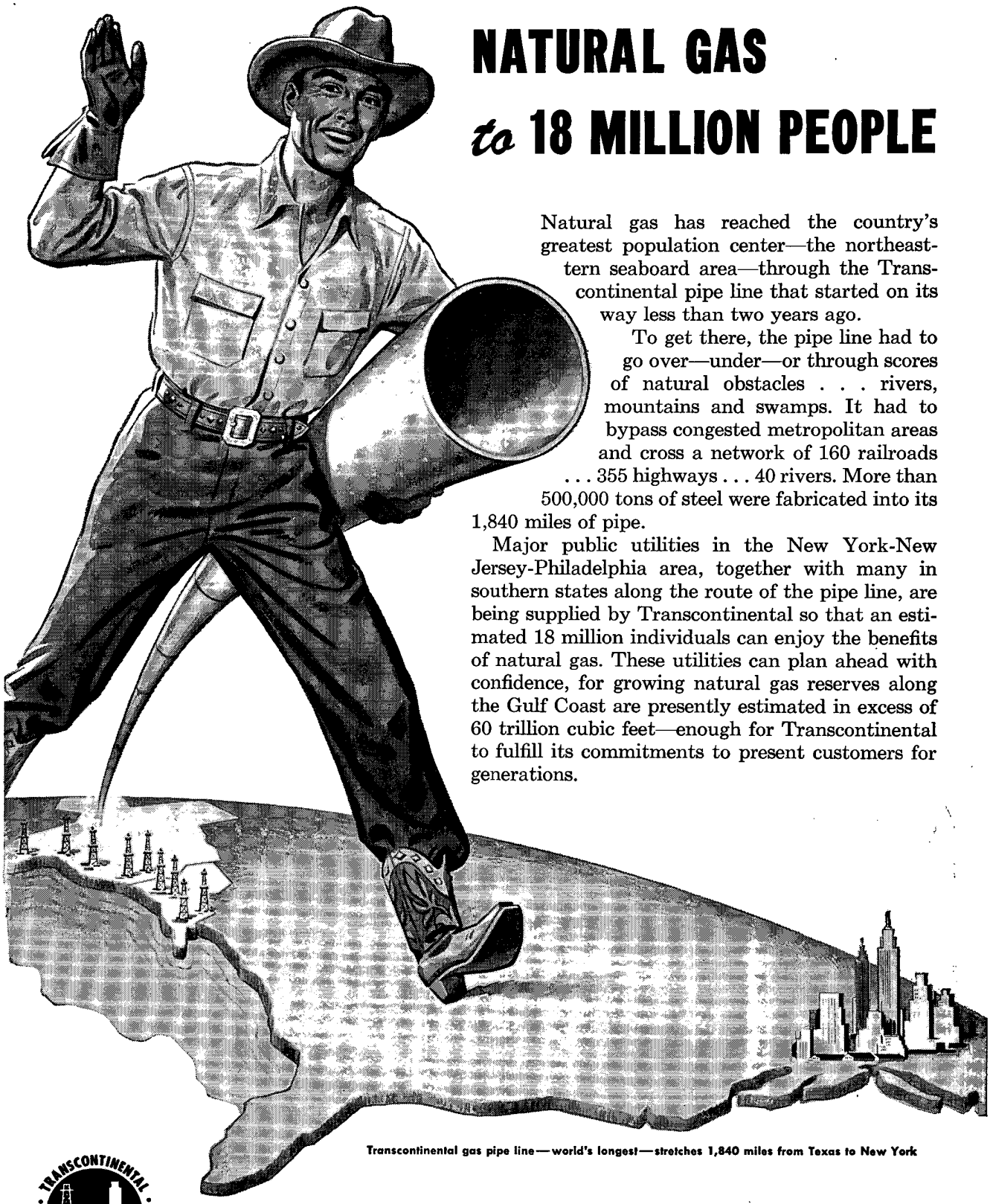
FARMINGTON, N. M.
FULLERTON, TEXAS
GAINESVILLE, TEXAS
GREAT BEND, KANSAS
HOBBS, NEW MEXICO
HOUMA, LOUISIANA
HOUSTON, TEXAS
KERMIT, TEXAS
KILGORE, TEXAS
LAKE CHARLES, LA.
LAUREL, MISS.
MAGNOLIA, ARKANSAS
NATCHEZ, MISS.
NEW IBERIA, LA.
ODESSA, TEXAS
OKLAHOMA CITY, OKLA.
PAULS VALLEY, OKLA.
PLAINVILLE, KANSAS
REFUGIO, TEXAS
SHREVEPORT, LA.
SNYDER, TEXAS
SUNDOWN, TEXAS
WICHITA FALLS, TEXAS

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION MEMBER

THE WORLD'S LARGEST INDEPENDENT OIL FIELD SUPPLY COMPANY

Carrying NATURAL GAS *to* 18 MILLION PEOPLE



Natural gas has reached the country's greatest population center—the northeastern seaboard area—through the Transcontinental pipe line that started on its way less than two years ago.

To get there, the pipe line had to go over—under—or through scores of natural obstacles . . . rivers, mountains and swamps. It had to bypass congested metropolitan areas and cross a network of 160 railroads . . . 355 highways . . . 40 rivers. More than 500,000 tons of steel were fabricated into its 1,840 miles of pipe.

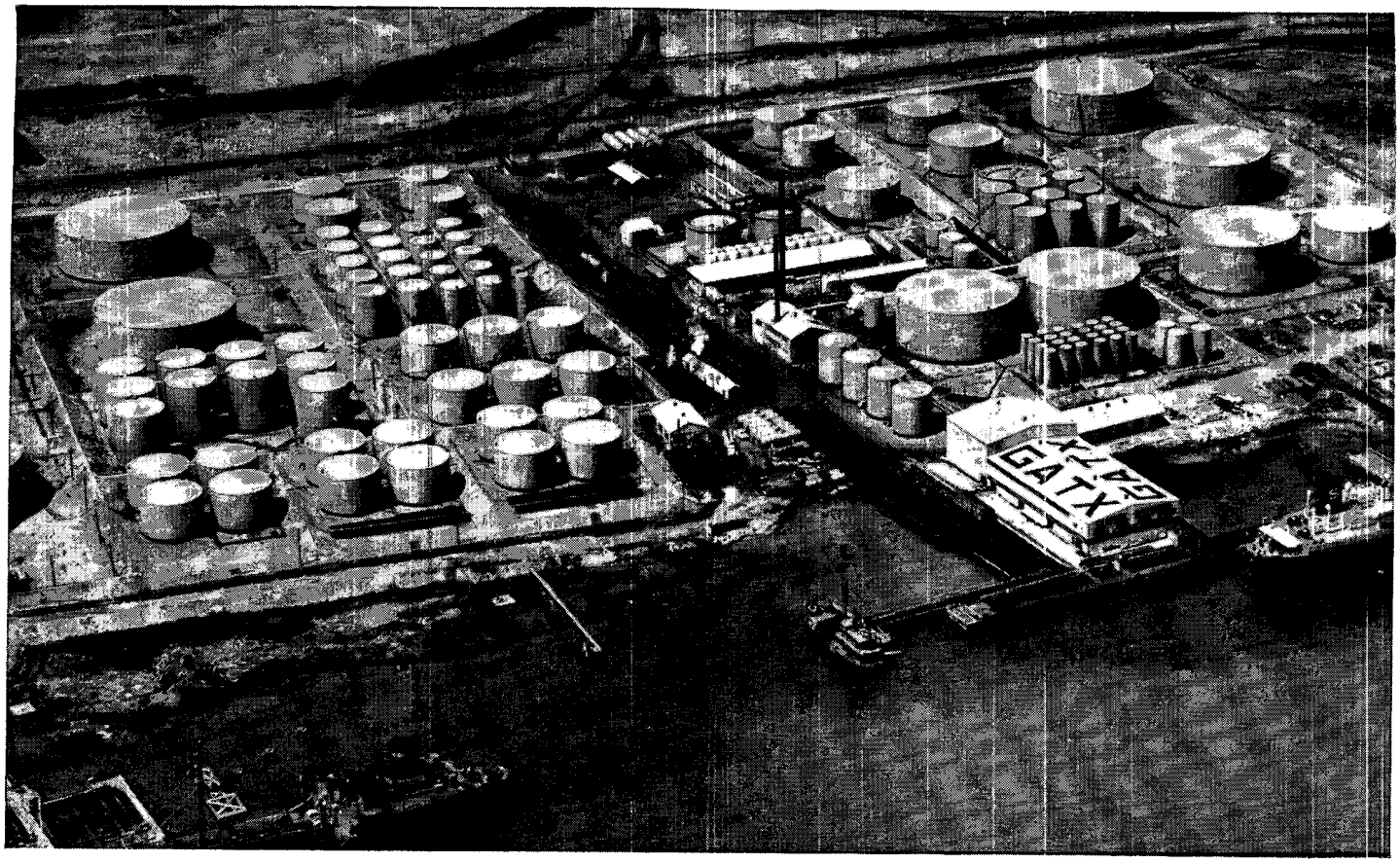
Major public utilities in the New York-New Jersey-Philadelphia area, together with many in southern states along the route of the pipe line, are being supplied by Transcontinental so that an estimated 18 million individuals can enjoy the benefits of natural gas. These utilities can plan ahead with confidence, for growing natural gas reserves along the Gulf Coast are presently estimated in excess of 60 trillion cubic feet—enough for Transcontinental to fulfill its commitments to present customers for generations.

Transcontinental gas pipe line—world's longest—stretches 1,840 miles from Texas to New York

TRANSCONTINENTAL GAS PIPE LINE CORPORATION

HOUSTON • TEXAS

Now!...develop the rich midwest

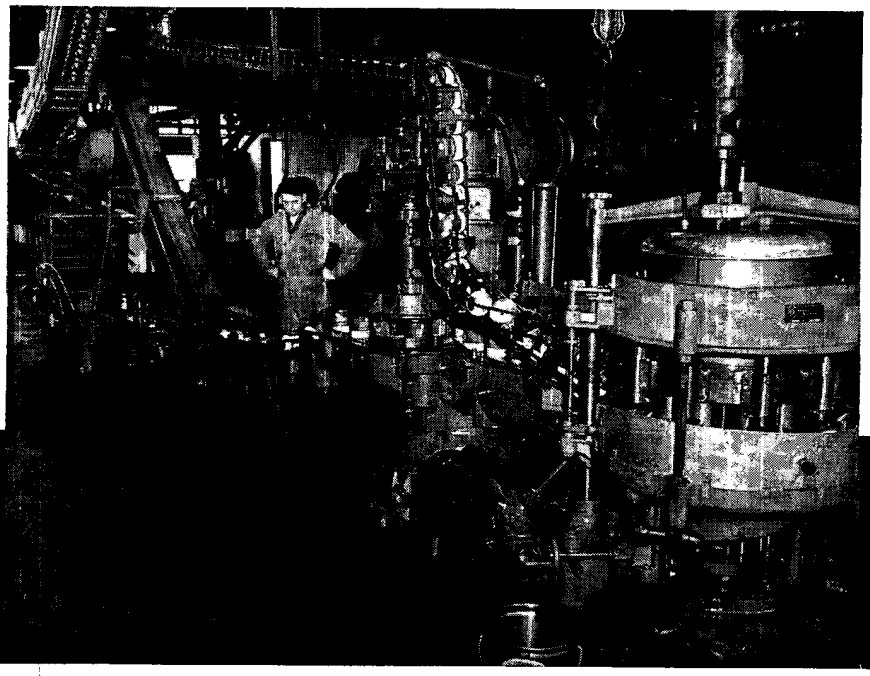


Aerial view of Carteret, N. J. terminal

Your petroleum products *packed in drums or barrels* . . .

With no investment in equipment, General American customers at Carteret, N. J., and Goodhope, La. enjoy all the convenience of private barreling and drumming.

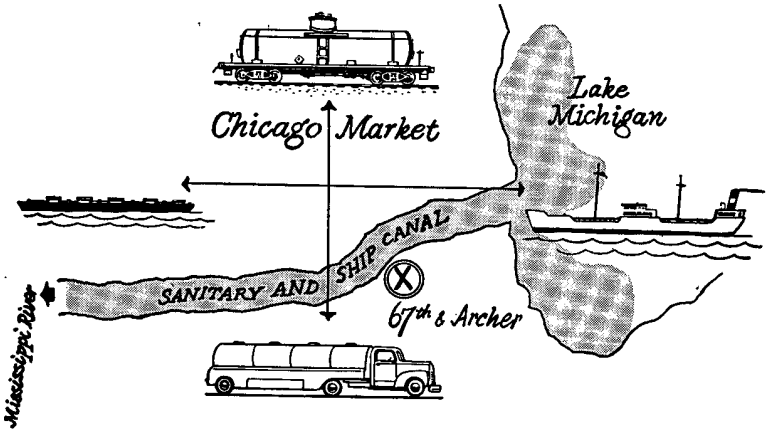
Your own product . . . blended to your specifications, can be handled in this manner . . . packed and ready for quick distribution. These two terminals also offer complete facilities for rapid canning of petroleum products in all size containers including one-quart.

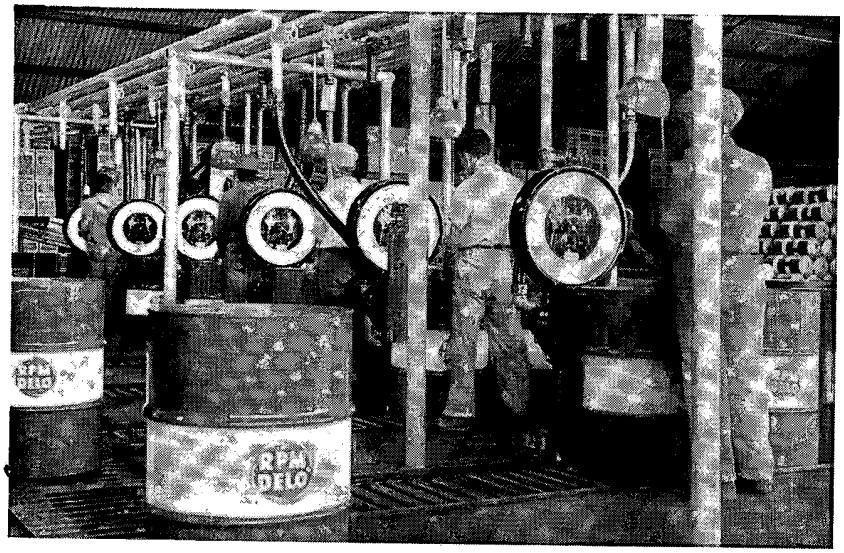


NOW IT'S *FIVE* STRATEGICALLY LOCATED TERMINALS EQUIPPED TO HANDLE ANYTHING THAT FLOWS THROUGH A PIPELINE— Alcohol, benzol, creosote, petroleum or vegetable oil, etc.

market at lowest possible cost—

GENERAL AMERICAN opens new Chicago Tank Storage Terminal!





Make the Midwest your market! Develop the potential of this great inland industrial center. Enjoy all the advantages of your own private terminal . . . without risking capital . . . *without making any investment.*

The new terminal is ideally situated near Chicago's Clearing Industrial District at 67th and Archer on the Sanitary and Ship Canal. It's fully equipped with most modern facilities—special equipment guards against contamination of different types of liquids—protection against excessive evaporation, fire and explosion. Everything for safe, profitable storage and complete distribution at lowest cost.

As a further aid, General American Tank Storage Terminal warehouse receipts represent the highest form of collateral. For financing, storage or distribution suggestions, contact your nearest General American representative.

TANK STORAGE TERMINALS GENERAL AMERICAN TRADE MARK

GENERAL AMERICAN TANK STORAGE TERMINALS

A Division of General American Transportation Corporation

135 SOUTH LA SALLE STREET • CHICAGO 90, ILLINOIS

WORLD'S LARGEST PUBLIC TANK STORAGE SYSTEM

Terminals Chicago, Ill. • Carteret, N. J. • Goodhope, La. • Houston and Corpus Christi, Texas

More than America spent to win its Independence

THE Revolutionary War lasted 8 years and its direct cost was $74,555,642.

This sum is considerably less than the amount Youngstown is spending on expansion--its share of the steel industry's program to help preserve America's 175-year-old freedom from Communistic attack.

Work on a $90,000,000 construction project at the Indiana Harbor Works, East Chicago, Indiana, is under way. It includes a 1500-ton blast furnace, 75 new coke ovens and 8 - 250 ton open hearth furnaces, heating furnaces, a high-lift blooming mill, with 6 - 3 hole recuperative soaking pits, ore dock extension, unloaders and ore bridge, and a vast array of other facilities needed to produce the additional 1,000,000 ingot tons of steel involved. By the end of 1952, the steel industry expansion program will raise the total steel producing capacity of the United States to over 117-million ingot tons. This is more steel than is made in all the rest of the world combined.

This tremendous investment by the shareholders of private industry is possible only with adequate profit--profit earned in the past and to be earned in the future. This is a symbol of public confidence--confidence that the American system of free enterprise is right *and worth saving.* Confidence that it will continue to be our way of life through the years ahead.

Scrap Metal is Critical Again

The Youngstown Sheet and Tube Company

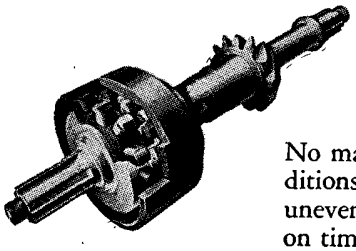
General Offices--Youngstown 1, Ohio
Export Offices--500 Fifth Avenue, New York

MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment.

Macks ARE Masters

OF THE TOUGHEST TERRAIN

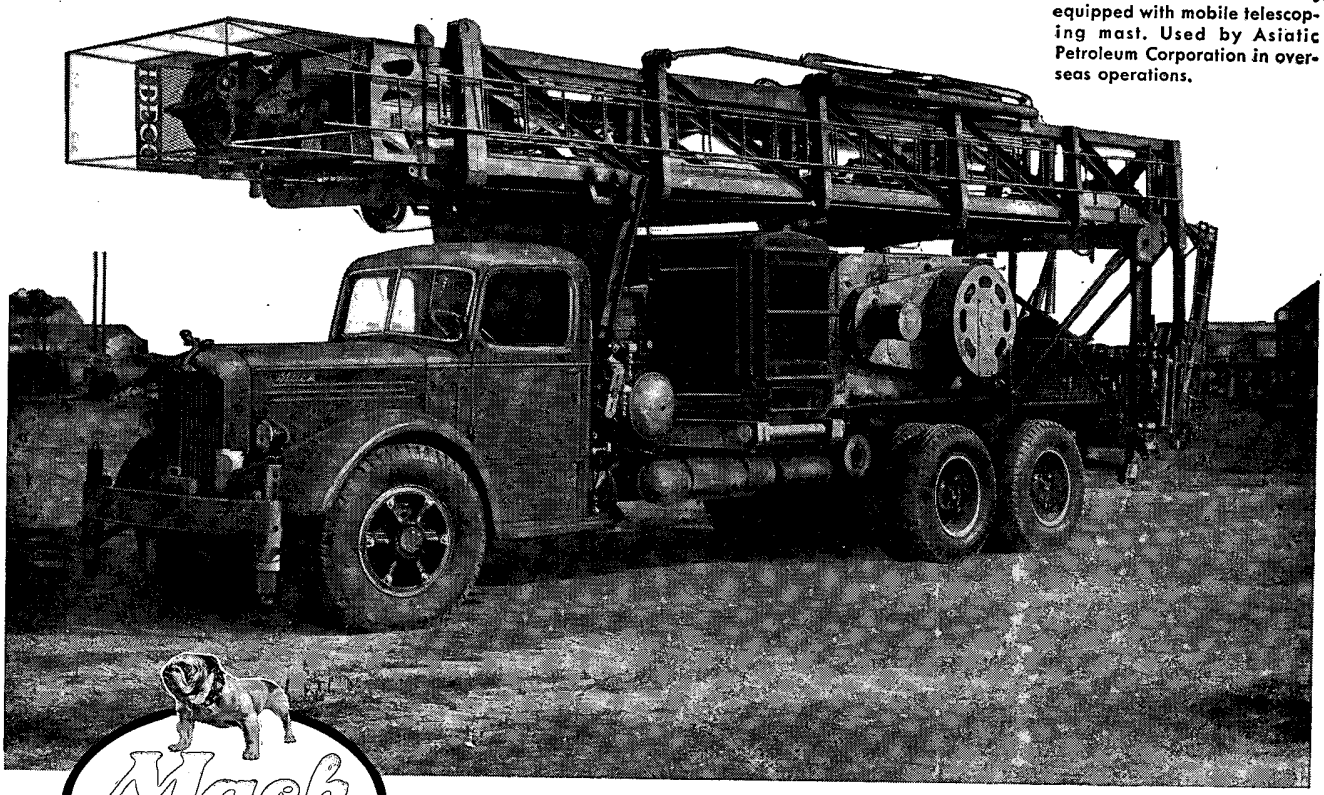


No matter how tough the going... under the worst of weather conditions... through slippery mire or shifting sand... or over rutted, uneven ground – big SUPER MACK trucks keep the payloads moving on time... at less cost and with less absenteeism.

One big reason why Mack trucks lick the toughest terrain is the exclusive Mack inter-axle Power Divider*. Where unequal tractive requirements are encountered, the Power Divider, acting as a third differential, distributes torque to favor the axle and wheels having the most traction, thus eliminating power dissipation in useless wheel slippage.

Mack's exclusive Power Divider combines with numerous other outstanding Mack features to give you the power, strength, traction and easy maintenance so necessary for dependable, uninterrupted service on the job. Your nearest Mack branch or distributor will give you complete details. You'll find it's a story worth listening to.

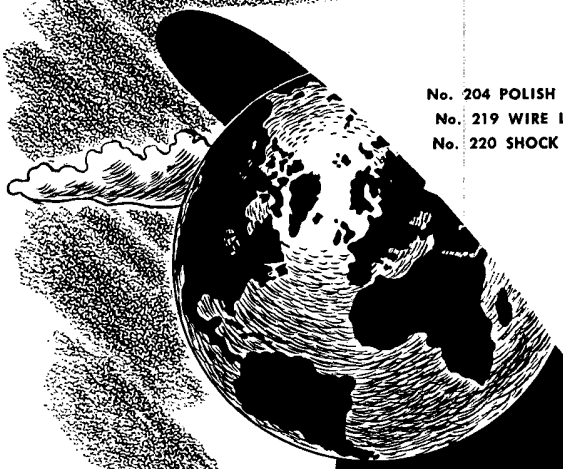
*On Mack six-wheelers



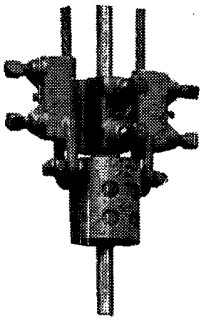
Mack Model LJ six-wheeler, equipped with mobile telescoping mast. Used by Asiatic Petroleum Corporation in overseas operations.

Mack TRUCKS ... outlast them all

Mack Trucks, Empire State Bldg., New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

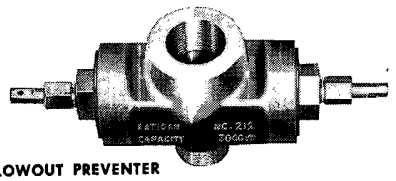


No. 204 POLISH ROD GRIP
No. 219 WIRE LINE CLAMP
No. 220 SHOCK ABSORBER



No. 176 STUFFING BOX

Standard of the world

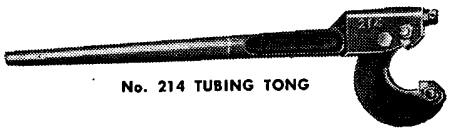


No. 212 BLOWOUT PREVENTER

RATIGAN

"Sure Grip"

OIL WELL PUMPING EQUIPMENT



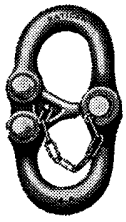
No. 214 TUBING TONG

Ratigan "Sure-Grip" Tools keep pace with world oil well pumping operations and are recognized as *standard* in their class. They incorporate the finest in design, engineering, and materials and efficiently withstand all strains and stresses of the most rugged service, assuring absolute safety under all operating conditions...each Ratigan Product is the result of more than thirty years of oil field engineering experience.

No. 60-H ROD WRENCH

All Ratigan Products are illustrated and described in the Composite Catalog...for individual catalogs, write us direct.

No. 91 SUCKER ROD HOOK



No. 14B MEDIUM "C" LINK

J. P. RATIGAN, Inc.,

1213 Santa Fe Ave., Los Angeles 21, California

Manufacturers of: OIL-LESS BEAM HANGERS and ROD HANGERS • POLISH ROD GRIPS and CLAMPS SPRING SUCKER ROD HOOKS • SUCKER ROD ELEVATORS • BLOWOUT PREVENTER • SPRING SWIVEL LINKS and "C" LINKS • OIL-LESS BEAM ROCKERS and STIRRUP ROCKERS • STUFFING BOXES HORSE HEADS • TUBING TONGS • ROD WRENCHES and COUPLING WRENCHES • TUBING BLOCK CLAMPS BELL NIPPLES • SHOCK ABSORBERS • STRINGING-UP LINKS • ADJUSTABLE SUCKER ROD LINE WEIGHTS • COMBINATION ROD WIPER

Export: National Supply Export Corporation
30 Rockefeller Plaza, New York, N.Y.

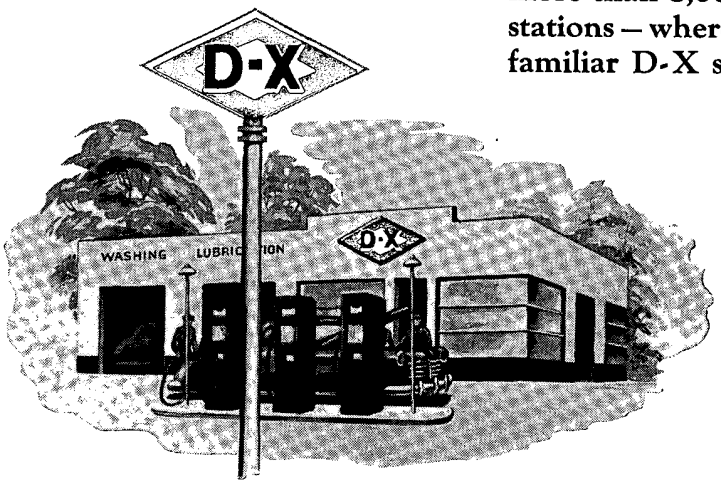
D-X

SYMBOL OF PETROLEUM

Progress

In motor oils, the symbol D-X stands for a motor oil that meets the challenge of modern engine design...D-X Motor Oil with Extrinol. The "extra" of Extrinol makes D-X tougher, safer, more economical.

The same D-X trade-mark also stands for top quality in the products listed below. They are sold in practically every major market in the world. In the central United States, they can be purchased in more than 8,000 D-X bulk and service stations – wherever you see the familiar D-X semaphore.



Buy D-X for Quality

Motor Fuels	Aviation Oils	Solvent Bright Stocks and Neutrals	Waxes
Diesel Fuels	Blended Oils	Conventional Bright Stocks and Neutrals	Petrolatums
Tractor Fuels	Paraffin Oils	Automotive Lubricants	Insecticides
Motor Oils	Transmission Oils	Heating Oils	Stock Sprays
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MID-CONTINENT PETROLEUM CORPORATION

TULSA, OKLA.

Waterloo, Ia. Terre Haute, Ind. Omaha, Nebr. Chicago, Ill. Minneapolis, Minn.

Rely on these MARTIN-DECKER INSTRUMENTS

TYPE F

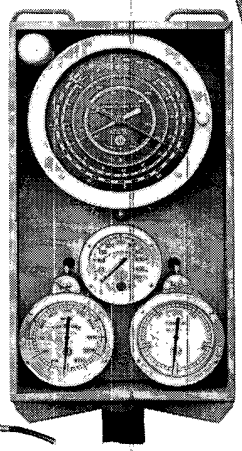
MARTIN-DECKER WEIGHT INDICATOR

with the IDEAL

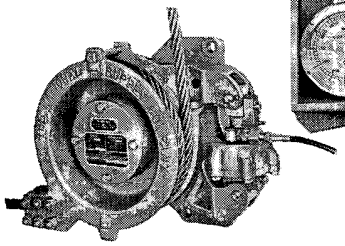
WIRE LINE ANCHOR

Materially lower in cost than the famous Type "D", the Anchor is...

- ...Half the size
- ...Half the weight
- ...Two-thirds the capacity



The Type "F" possesses all the revolutionary advancements found in the famous Type "D".



CHECK THESE OUTSTANDING FEATURES

- Provides convenient side mounting for derrick or mast leg installations.
- Accommodates any line size up to and including 1¼".
- Rated for 40,000-lb. dead line load (400,000 lbs. with ten lines).
- 12" gauge dials graduated for 4, 6, 8, 10 lines.
- Dials show net-weight-on-the-bit directly in pounds or kilos.
- Has a Vernier weight indicator.
- Unaffected by temperature and fluid volume changes.
- No adjustment is necessary for cable size or number of lines strung.

Write for descriptive literature!

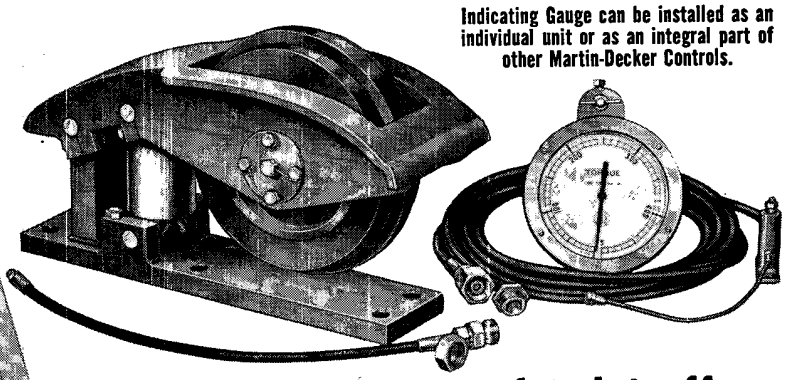
HOME OF THE WEIGHT INDICATOR

THE HYDRO-MECH

The More Positive

TORQUE GAUGE

Indicating Gauge can be installed as an individual unit or as an integral part of other Martin-Decker Controls.



MINIMIZES danger of twist-offs

ON DIESEL ENGINES

Torque build-up isn't indicated by sound or the way the engine runs; consequently, torque can build up gradually without warning of impending danger, and before the driller realizes it, a twist-off has occurred. With the Martin-Decker Hydro-Mech, the driller can see excessive torque and then stop to correct it. With the combination of the Martin-Decker Weight Indicator and the Martin-Decker Hydro-Mech Torque Gauge, you can get more work out of drilling operations, because if the torque is not too high, more weight can be added to speed hole making.

ON STEAM RIGS

The Martin-Decker Hydro-Mech Torque Gauge, which is mounted on the rotary chain, immediately indicates torque, as there is no lag from the drawworks, transmission and motors.

Indispensable for

MILLING and CUTTING JOBS and DIAMOND CORING

The Martin-Decker Hydro-Mech gives phenomenal savings in time and equipment when milling, washing over, running diamond core heads, and directional and deep hole drilling, because the gauge differentiates between the work required to overcome hole friction and that which is being done by the cutting tool so that the driller positively knows what his cutting tool is doing regardless of hole friction, rotational speed, etc.

Substantial increases in rotary chain life are being experienced by Hydro-Mech users, because of the cushioning provided by the synthetic rubber idler wheel and the reduction of chain vibration and whip.

MARTIN DECKER CORP.

LONG BEACH, CALIFORNIA

SAN JOAQUIN VALLEY: T. J. CULLEN, BAKERSFIELD, CALIFORNIA
MID-CONTINENT DISTRIBUTOR: REED ROLLER BIT COMPANY, HOUSTON, TEXAS
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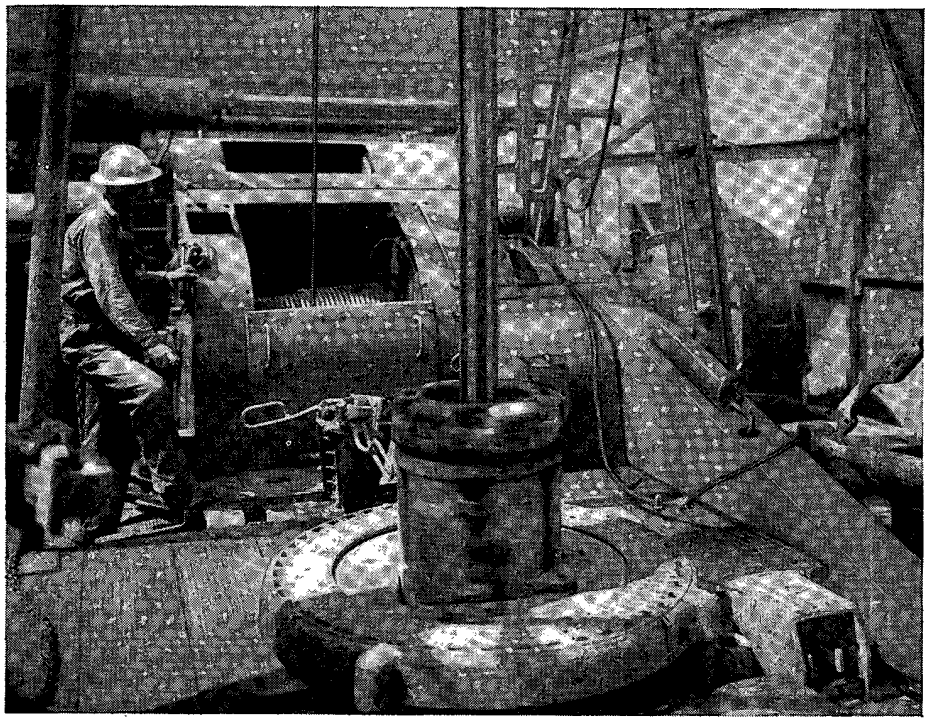
MARTIN-DECKER WEIGHT INDICATORS AND IDEAL WIRE LINE ANCHORS ARE ALSO SOLD THROUGH THE NATIONAL SUPPLY EXPORT CORP., THE NATIONAL SUPPLY CO. AND OTHER RECOGNIZED SUPPLY HOUSES.

WIRE ROPE



ROEBLING ALL-PURPOSE SLINGS with the Tapered Sleeve Splice come to you ready for the job. They cost less than tucked splices . . . have the full strength of the rope. Send for the full story.

In the oil fields Roebling "Blue Center" Preformed is tops for service and savings

"BLUE CENTER" STEEL wire rope is an exclusive Roebling development. It has to pass the most stringent tests for strength, fatigue and abrasion resistance . . . gives rope the extra long life that spells important economies. Besides, Roebling Preforming assures you top performance on the job. "Blue Center" Preformed is easy to handle . . . has better spooling qualities . . . reduces vibration and whipping.

Roebling makes a complete line of wire rope . . . makes the right grade, and construction for every installation. Have your Roebling Field Man help choose the *right* rope for your equipment. Get his advice on the correct use and maintenance of wire rope. It is based on performance records on thousands of installations. John A. Roebling's Sons Company, Trenton 2, New Jersey.

ROEBLING

DISTRIBUTED BY THE NATIONAL SUPPLY COMPANY
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PARKERSBURG MACHINE Co
PARMACO
PARKERSBURG, W. VA., U.S.A.

"The House of Courteous Service"

50 YEARS OF SERVICE

And on Our 50th Anniversary
We Again Invite You to Standardize on

PARMACO PRODUCTS

PACKERS	DRIVE SHOES
CASING SHOES	PLUGS
CASING HEADS	SWABS
CASING WAGONS	BOILER BURNERS

AND OTHER SPECIALTIES

Refer to COMPOSITE CATALOG . . . Pages 4053 to 4072

For Anything Special Contact

PARKERSBURG MACHINE COMPANY

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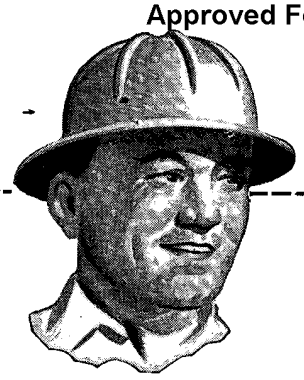


HARD HAT FACTS

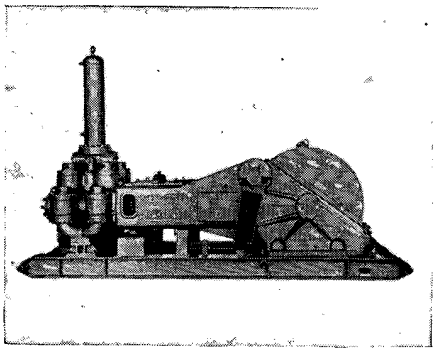
to help you choose field-proved oil field equipment

Gardner-Denver field engineers have their own hard hats—wear them often as they visit oil fields throughout the world. They know from first-hand field experience just what your most troublesome problems are — just what you expect oil field equipment to do.

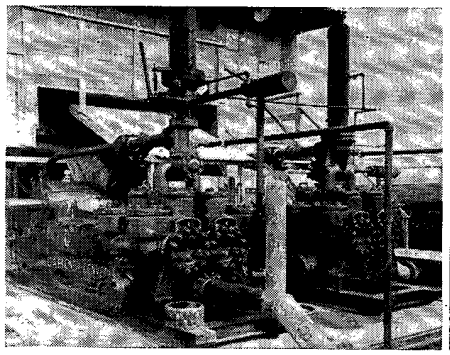
That's one reason Gardner-Denver equipment meets your needs so well. There's no guessing about its performance in the field or on your rig.

There's GarDurloy, for example. That's the tougher alloy iron specially developed by Gardner-Denver metallurgists for oil field service. It's used extensively in all the Gardner-Denver pumps shown here —gives them extra strength—extra resistance to shock loads and continuous heavy duty service.

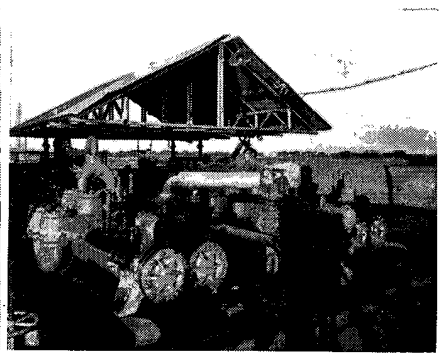
Write for complete information.



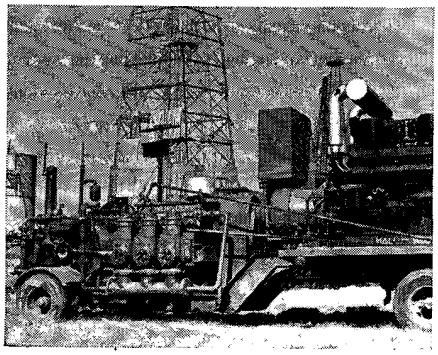
Gardner-Denver 7½ x 18 GXR Power Slush Pump



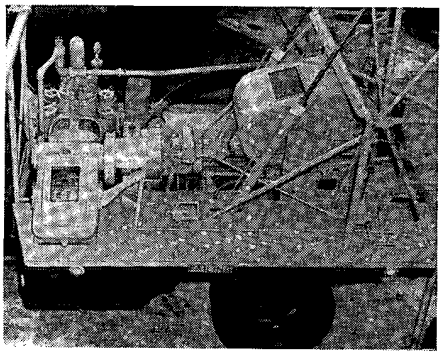
Gardner-Denver 7¾ x 16 FX Power Slush Pump



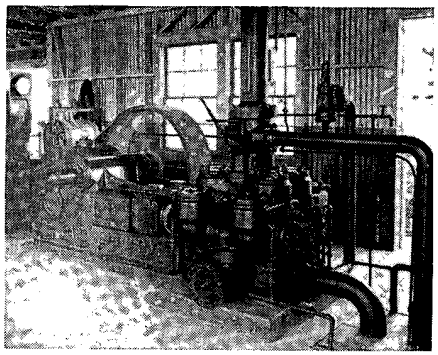
Gardner-Denver 16¼ x 8 x 20 Steam Slush Pump



Gardner-Denver PL7 Cementing Pump



Gardner-Denver 4½ x 6 FX Power Pump on Seismograph Rig



Gardner-Denver 7¼ x 10 FX Oil Line Pump

SINCE 1859

GARDNER-DENVER

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THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS

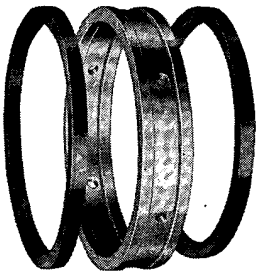
FEWER Shut-Downs

for slush pumps equipped with...

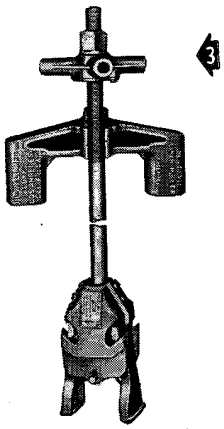
RED DEVIL PRODUCTS

For many years, Red Devil replaceable parts for slush pumps and special parts for circulating systems have been in use throughout the world for shallow and deep, high-pressure drilling. Drilling men admit that you can't buy anything finer *at any price* than Red Devil products.

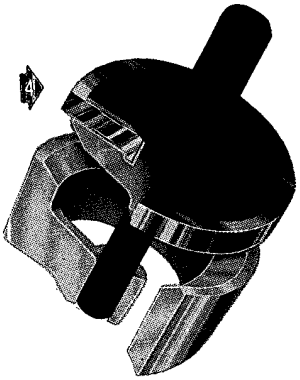
1. **"DIA-HARD" LINERS** are forged in one piece from top quality alloy steel and hardened with a deep high-carbon case to resist wear under the most severe abrasive conditions. Bore is precision honed, and accurate outside dimensions insure a perfect working fit with positive sealing.



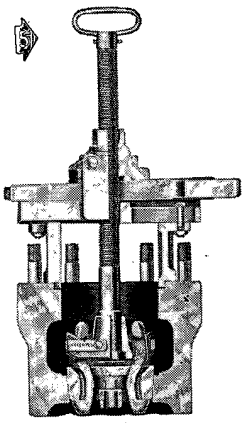
2. **LINER PACKING ASSEMBLIES** for pumps drilled with "tell-tale" holes consist of two "Dia-Tex" *oil and heat resisting* sealing rings separated by a *corrosion proof* steel lantern ring. Liner packing assemblies or "Dia-Tex" sealing rings are available for all slush pumps.



3. **LINER PULLERS** are powerful, heavy duty tools capable of pulling the most obstinate liners. The "Universal Type" Puller (as illustrated) is designed for slush pumps. The "Expanding Grip Type" is for pulling thin wall driven tube-type liners, in small pumps.



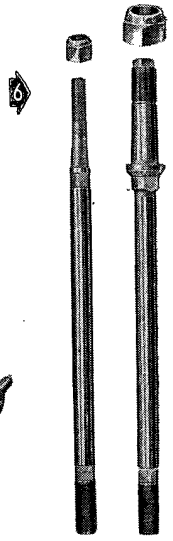
4. **SLUSH PUMP VALVES,** economically designed for high pressure abrasive service, consist of only 5 parts. Valve and seat are drop forged and processed for a deep high carbon case. "Dia-Tex" Inserts are oil and heat resistant and can be reversed when worn to double their long life.

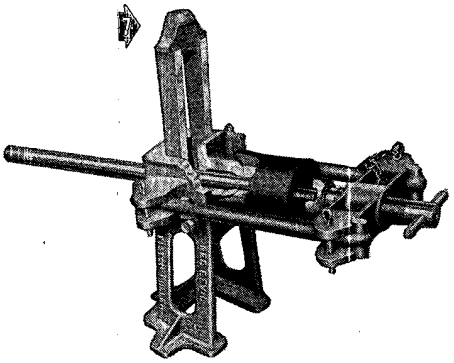


5. **VALVE SEAT PULLERS** provide a fast and positive means for pulling badly stuck valve seats by gripping the bottom rim of the seat. Eliminates the expense and hazards of removing seats with a cutting torch. All parts are made of highest grade alloy steel.

6. **"DIA-HARD" PISTON RODS** are tops where drilling is toughest because of the extreme hardness of the deep high-carbon wear resistant case. A tough core of high tensile strength insures against breakage. Available with API or "GT" Piston End Tapers.

7. **PISTON PULLERS** easily and quickly remove badly stuck pistons without injury to piston or rod. All parts are made from finest alloy steel, heat-treated for superior strength and endurance.



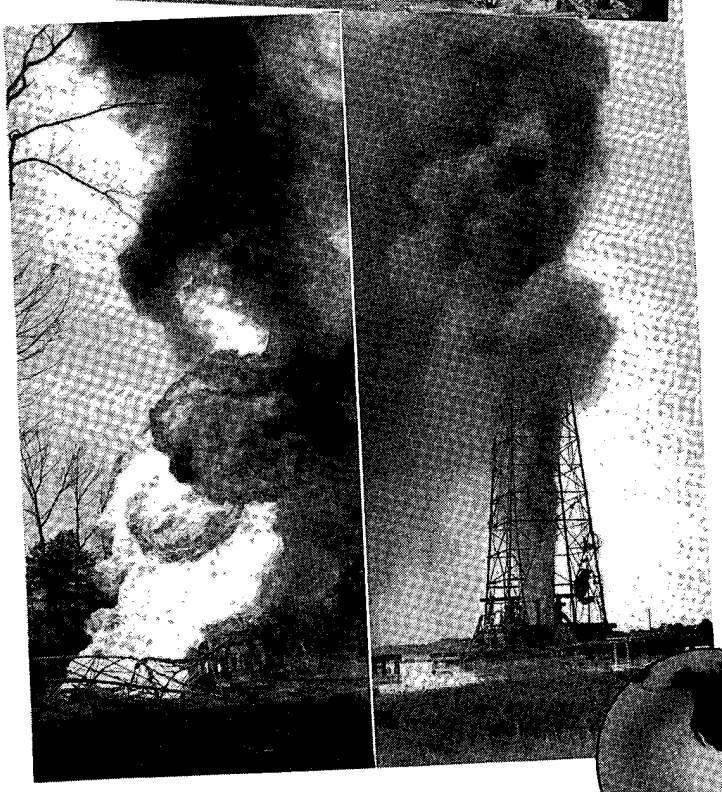


Red Devil Price Catalogs furnished on request

"Dia-Hard" Piston Rods	P-101	"Dia-Hard" Liners	P-120
Piston Rod Lock Nut	P-102	Liner Packing	P-121
Piston Pullers	P-106	Liner Pullers	P-122
Slush Pump Valves	P-110	Stand Pipe Outlets	P-130
Valve Seat Pullers	P-111	"Dia-Hard" Wash Pipes	P-140

Complete information in Composite Catalog. Red Devil Products are available through your own supply store

OIL WELL MANUFACTURING CORP.
6008 South Alameda Street, Los Angeles 1, Calif.
Cable Address "OWMCO"



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M. M. KINLEY CO. CAPS 20 WILD WELLS IN 1950

Every oil well fire, every blowout, is different. And this difference requires fast on-the-spot thinking and decisive on-the-spot action. This ability to size up a well and then to bring it under control in the best and quickest way can come only from broad experience. You don't learn how to cap wild wells by reading a book, and no one can tell you how to put out a fire. Kinley's twenty-five years experience, more than 250 fires and blowouts in fields all over the world, means that you are drawing full measure on the chief asset required for successfully fighting oil well fires and blowouts—experience. Quick action and world-wide coverage assure that wherever your well is, you can depend on the experience of M. M. Kinley Co. to finish the job.

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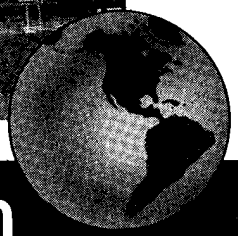
Golden Eagle Field



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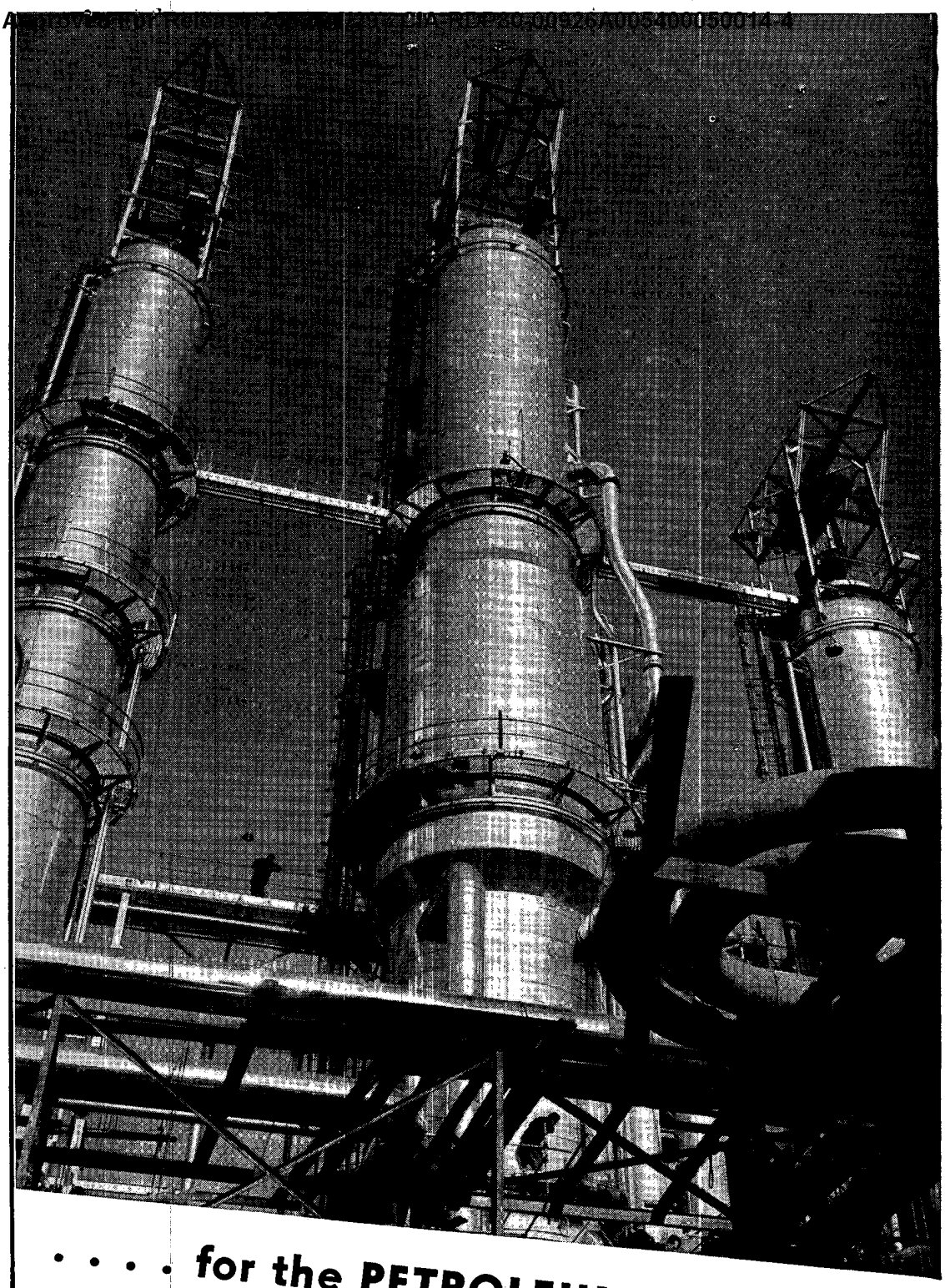

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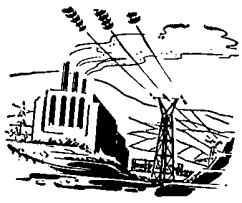

electrification

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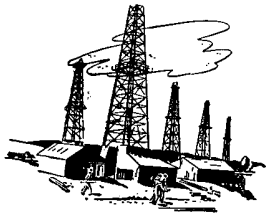
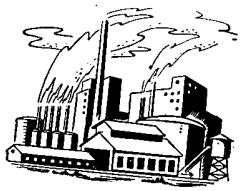


DRILLING

Drill more wells faster with electrified rigs which offer you advantages not found in any other type of oil-field power. Remember that electric motors are simple, electric controls precise—a bit on the end of a 3-mile string of pipe can be delicately controlled at 1 rpm or at top speed. Send for GEA-4456, GEA-3858 and GET-1360.



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Pump more oil automatically with units modernized with efficient electric power. Let our application engineers help you in selecting the motors and control to fit your specific requirements. Whether the well is being pumped slowly for long periods, fast for short periods or round-the-clock service, G.E. dripproof motors ask no quarter due to severe operating conditions. The G.E. Oil Well Pumping Control will save you many man-hours in labor and supervision.

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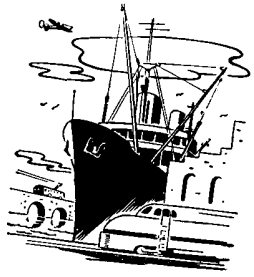
We will continue to engineer the best system for you to move oil efficiently through gathering, branch and trunk pipe lines. Write for our new publication, entitled "G-E Equipment for Electrified Oil Pipelines."



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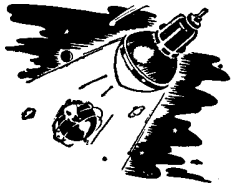
Because it best combines simplicity, security, and savings, today's trend is toward greater use of explosion-proof, corrosion-resisting motors and group installation of control centers. To protect continuity of service at minimum cost, use secondary selective distribution systems with unit substations. For full information on motors and control for hazardous areas, send for GEA-4131.



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"USE THE BETTER TOOL FIRST"

Fig. 1

Fig. 1. Monroe "Talon" Center Spear. Alloy steel, no welds. A well balanced Spear capable of hard usage. Furnished with manila or wire rope type wickers.

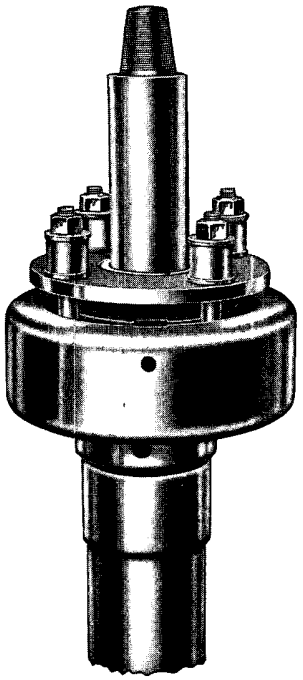

Fig. 2

Fig. 2. Cameron Safety Casing Drive Clamps. Safe, easily handled and applied. No projections to damage cables.

Fig. 3. Monroe "Torpedo" Bit. Heat treated steel. Will drill a straight hole or straighten a crooked one. Machined full length for straightness.

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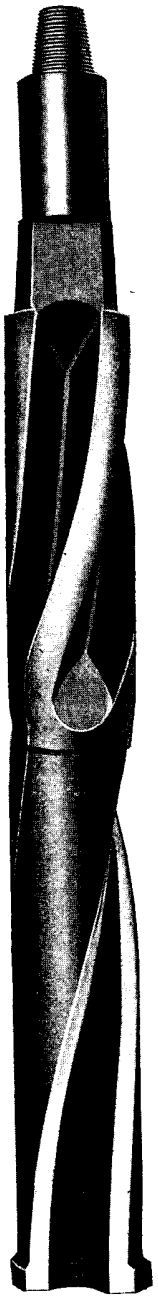

Fig. 3

Manufactured by
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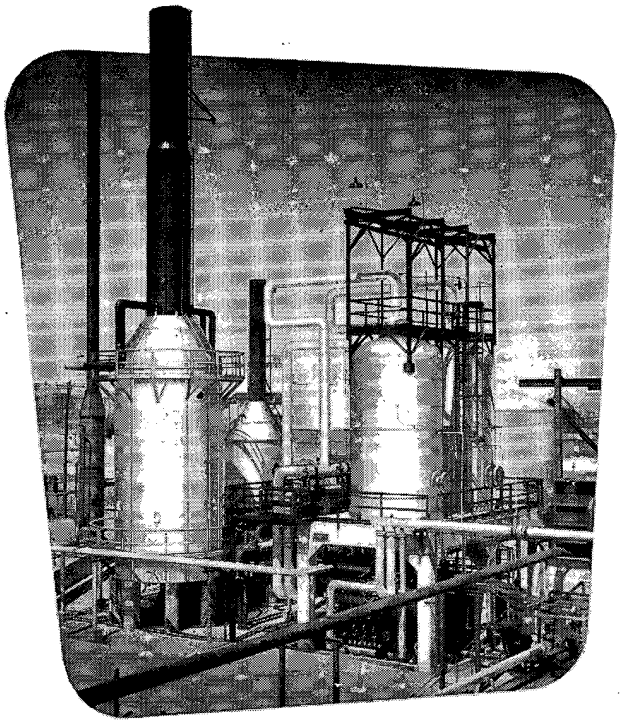

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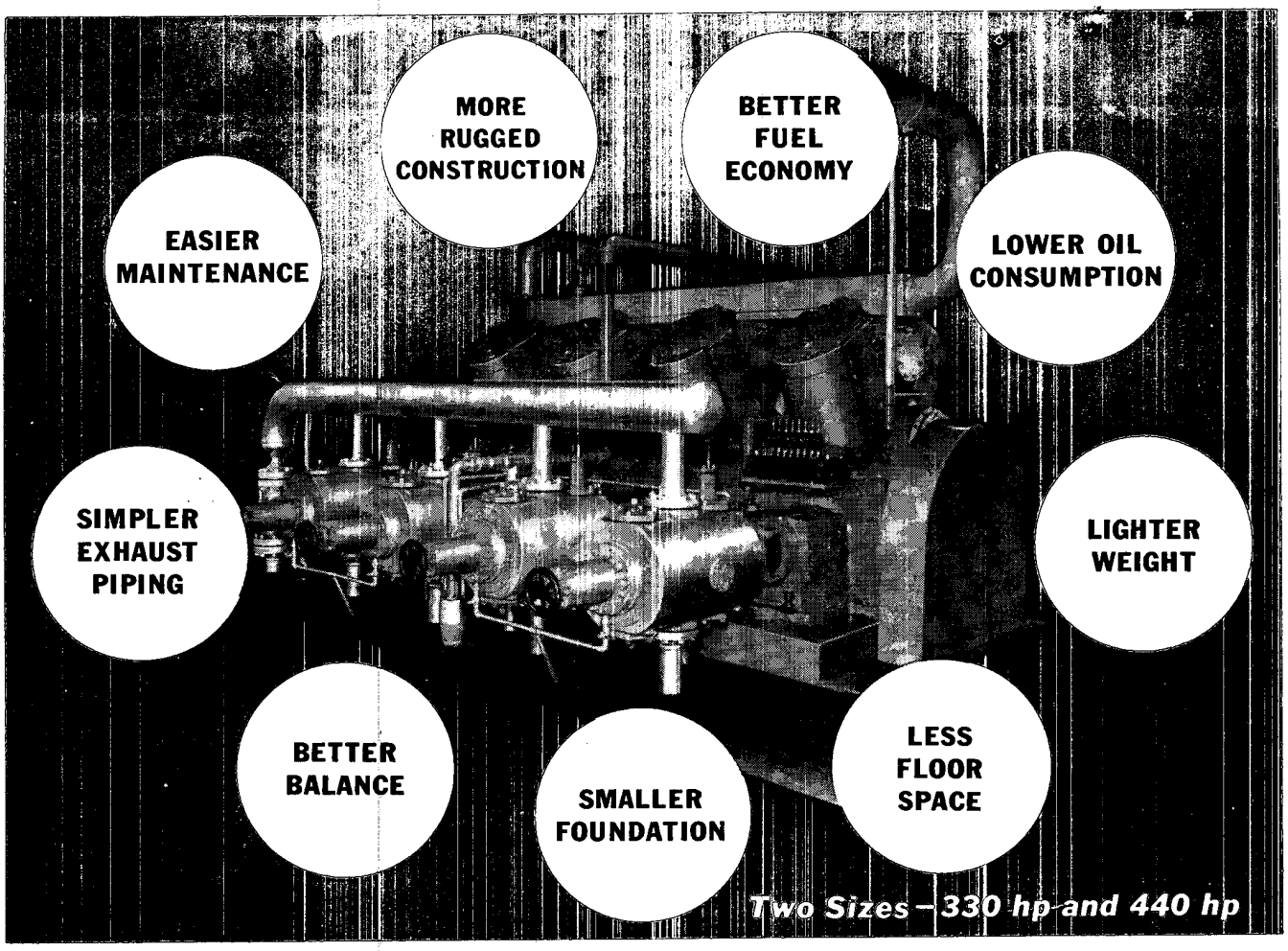

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The *new SVG* gas-engine-driven compressor is essentially the well-known XVG 4-cycle V-angle compressor . . . improved and modernized by a complete redesign from the ground up and from the inside out.

For twenty years the famous XVG compressor has maintained its position as a standard of comparison. Time after time new developments were incorporated into the XVG construction, but there are limits to improving an existing model. There comes a time when a departure from even such a successful model is necessary.

The *new SVG* retains all of those features that have been so successful in the XVG, and takes advantage of new materials, modern rotative speeds, up-to-date manufacturing methods, and "know-how" based upon many years of experience in building both compressors and engines. The *new SVG* is the modern-design gas-engine-driven compressor with an outstanding background . . . a better compressor, all around.

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TYPE SVG —————— 330, 440 hp
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Also companion Gas Engines

IR 4-CYCLE

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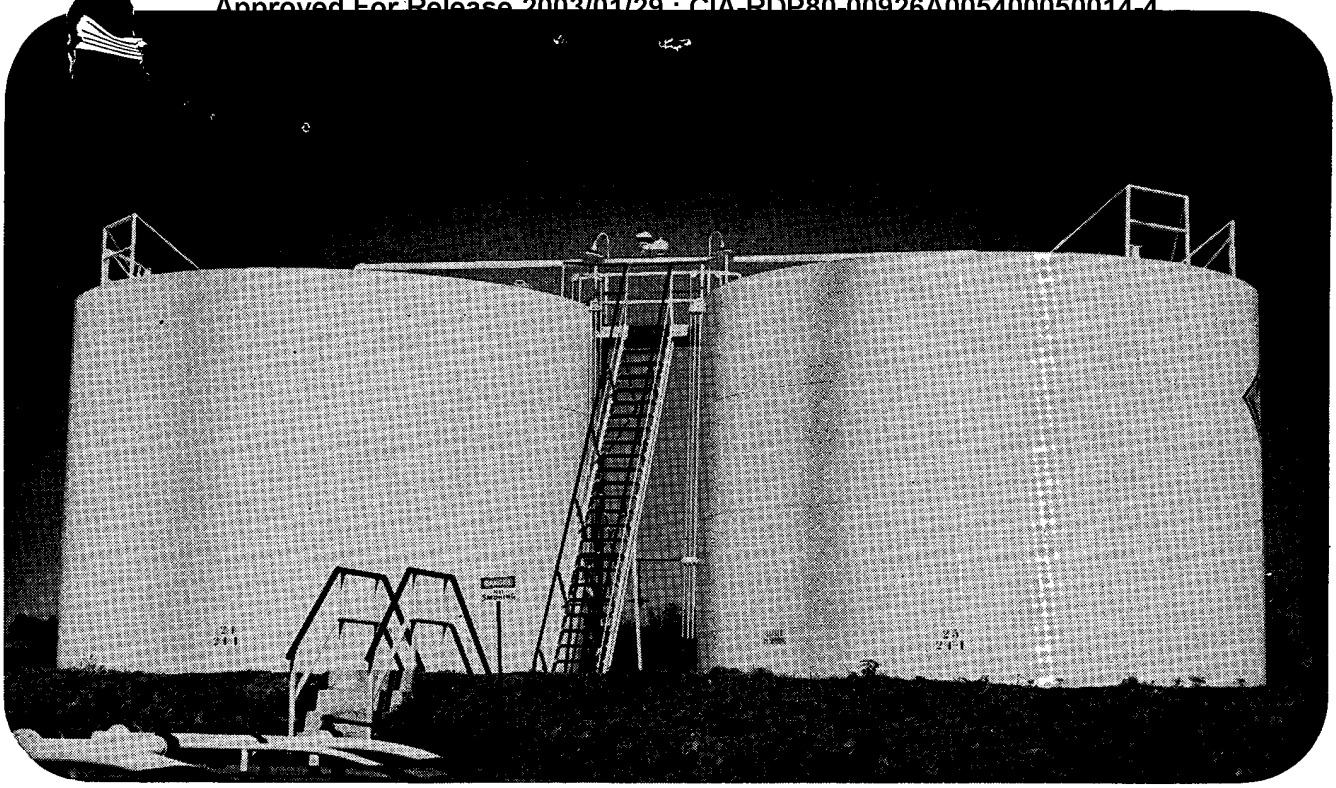

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Our trained field-fabricating crews are ready at all times to meet your storage requirements. They are in the field—on the job—available for expert service in field-fabrication, dismantling, and re-erection. These crews can construct welded steel tanks from riveted tanks without taking the steel plate into a shop for fabrication.

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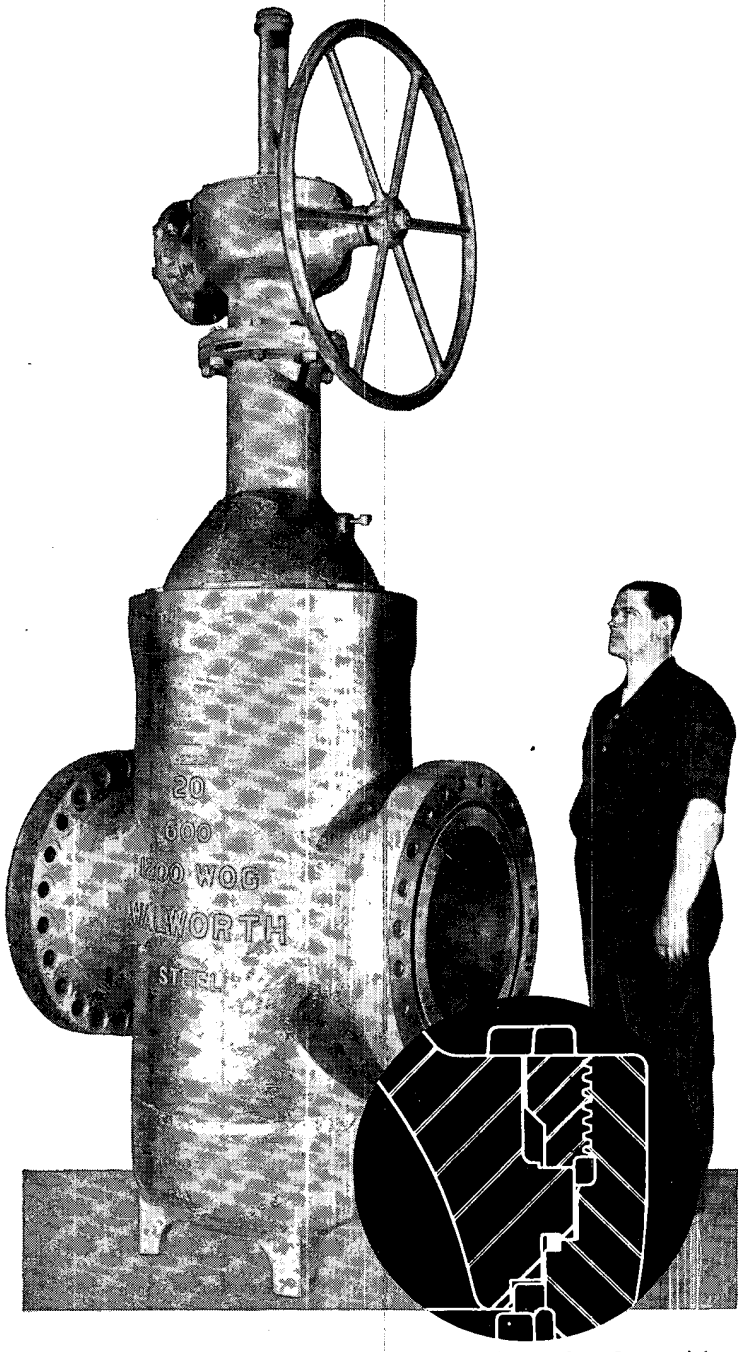
Announcing the New WALWORTH

TYPE 49 Steel Pipe Line Gate Valve

(PATENT APPLIED FOR)



Detail of Boltless Body-to-Bonnet Joint

These new Walworth valves have been designed on the through-port principle, with body and disc ports accurately indexed, and body ports bored to match connecting piping. These valves have no recesses to accumulate dirt and no obstructions to interfere with the free flow of liquid or passage of pigs or scrapers. Furthermore, these valves do not require any internal lubrication and may be installed without regard to flow direction. Walworth Type 49 Steel Pipe Line Gate Valves are made in sizes up to and including 30" in Series 400 and 600. Valves have stellite seat rings, and the body-to-bonnet joint incorporates a Walworth boltless design. A detailed illustration of this joint is shown here.

For further information about these new Type 49 Steel Pipe Line Gate Valves, contact your nearest Walworth distributor.

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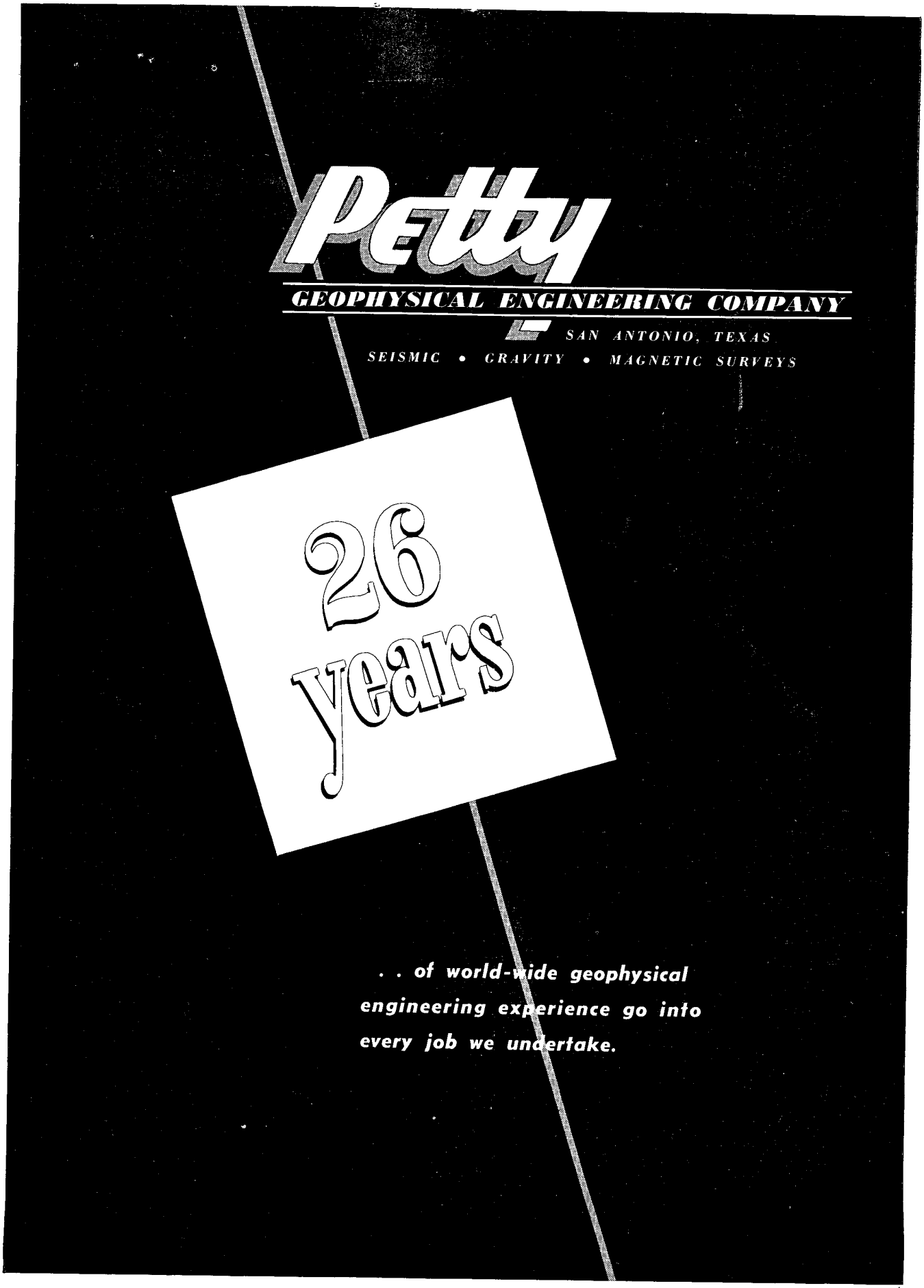

SINCE 1927

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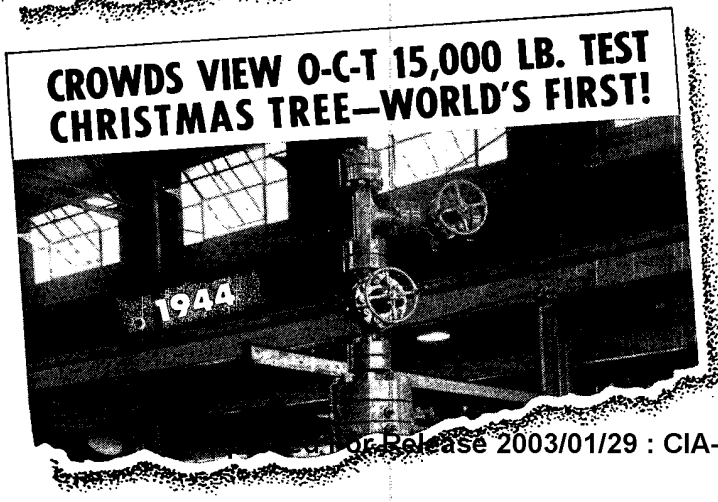
O-C-T pioneered



Twice this year, Oil Center Tool Company equipment has been used on world record wells ... on the world's deepest well in Wyoming and now on the world's highest pressure well in Louisiana.

On Continental Oil Company's Estes No. 1, located near Welsh, La., the pressure gauge stood at 8,920 pounds tubing pressure. Bottom hole pressure is ± 11,000 psi. The well is 11,476' deep. The production sand is from 11,263' - 11,269'.

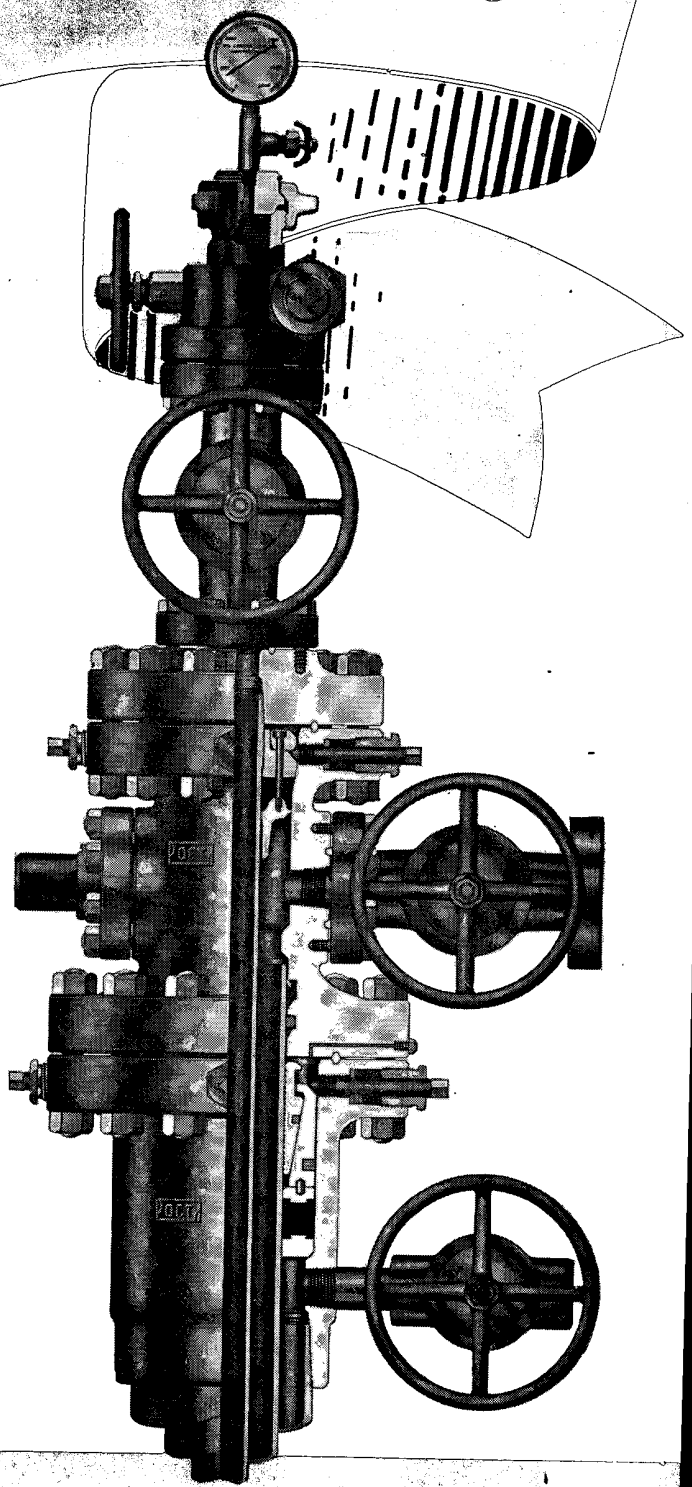
With the O-C-T "C-19" casing head as the foundation, the wellhead assembly on this world's highest pressure well consists of the C-19 casing head and the O-C-T T-16 OU tubing head, "topped off" by the new O-C-T PC production choke.

On your next well ... on wells of any depth or pressure ... take advantage of the added strength, safety, convenience and flexibility provided by dependable Oil Center Tool Company equipment. As a result of progressive engineering and precision manufacturing practices, O-C-T now produces a line of "precision-ered" products which have materially increased the margin of safety in drilling, completing and producing deep, high pressure gas and oil wells.

O-C-T CONGRATULATES THE MEN WHOSE SKILL AND COURAGE WERE RESPONSIBLE FOR SAFELY DRILLING AND COMPLETING THIS WORLD'S HIGHEST PRESSURE WELL.

Oil Center Tool Co.

high pressure controls



During the years O-C-T has served the oil industry, we have felt a responsibility to be ready with equipment to meet ***future needs*** as well as dependable equipment to meet the every-day needs at hand.

As a result of this program of continuous research and development, Oil Center Tool Company gave the industry its first 10,000 lb. tree . . . ***and*** its first 15,000 lb. test tree.

With the expanded search for new and deeper oil reservoirs, pressures and depths will be encountered which will place other new demands on equipment. In anticipation of these future needs, O-C-T has again stepped up its program of research and development. So, when stronger, higher pressure controls are needed, O-C-T will have the equipment required for your operations.

On your next well . . . on wells of any depth or pressure . . . take advantage of the added strength, safety, convenience and flexibility provided by dependable O-C-T products. They have been engineered and manufactured to help you drill for and produce oil with economy and greater safety. Ask your O-C-T Representative or write for details.

O-C-T PRODUCTS HAVE PROVED DEPENDABLE ON THE WORLD'S DEEPEST WELL - ON THE WORLD'S HIGHEST PRESSURE WELL

Oil Center Tool Co.

P. O. Box 3091, Houston, Texas

Canada — Canadian-Vickers, Montreal, Canada

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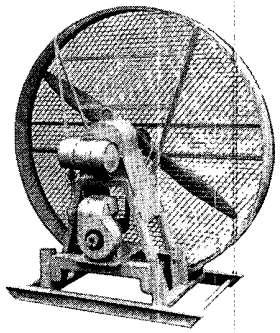
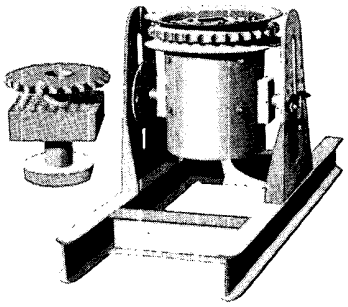


BEMCO BUG BLOWER

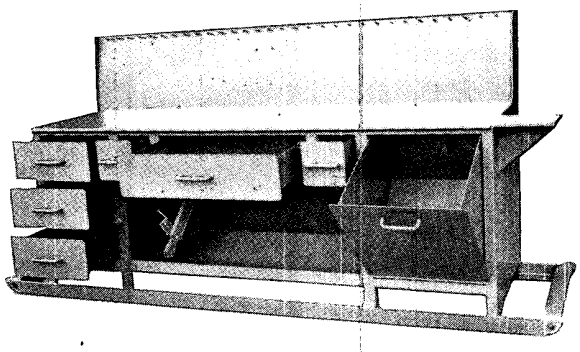
The *original* bug blower . . . with a big 66" blade that sweeps the entire floor area of even the largest rigs. With a BEMCO Blower, *one unit* does the job, taking up less floor space, providing longer, trouble-free service and giving all of the breeze needed for a cool, bug-free floor.

BEMCO Bug Blowers are available with gasoline engine, electric motor or steam turbine drive.



BEMCO RATHOLE DIGGERS

A BEMCO Rathole Digger actually gets your rathole dug before you can move and block up the regular rotary table. Driven by a chain from the regular rotary drive sprocket, BEMCO Rathole Diggers are fully portable and may be easily moved from one rig to another. Three sizes are available, for digging any size rathole up to 13", with any size of square or fluted kelly.



OWEN WORK BENCHES

Long accepted as the standard of the oil industry, Owen All-Steel Work Benches are now manufactured and distributed by BEMCO. Two sizes cover every requirement and provide unequalled protection for hand tools and instruments.

FOR the greatest value in drilling rig tools and accessories, buy BEMCO *field proved* products. Included are BEMCO drill collars and substitutes, circulating and releasing overshots, all-steel mud pits, tool and change houses, casing wagons, suction hoists, renewable brake rims, high pressure mud line fittings and many other quality products.

For complete information, write to either of the offices listed below for the latest BEMCO Catalog.

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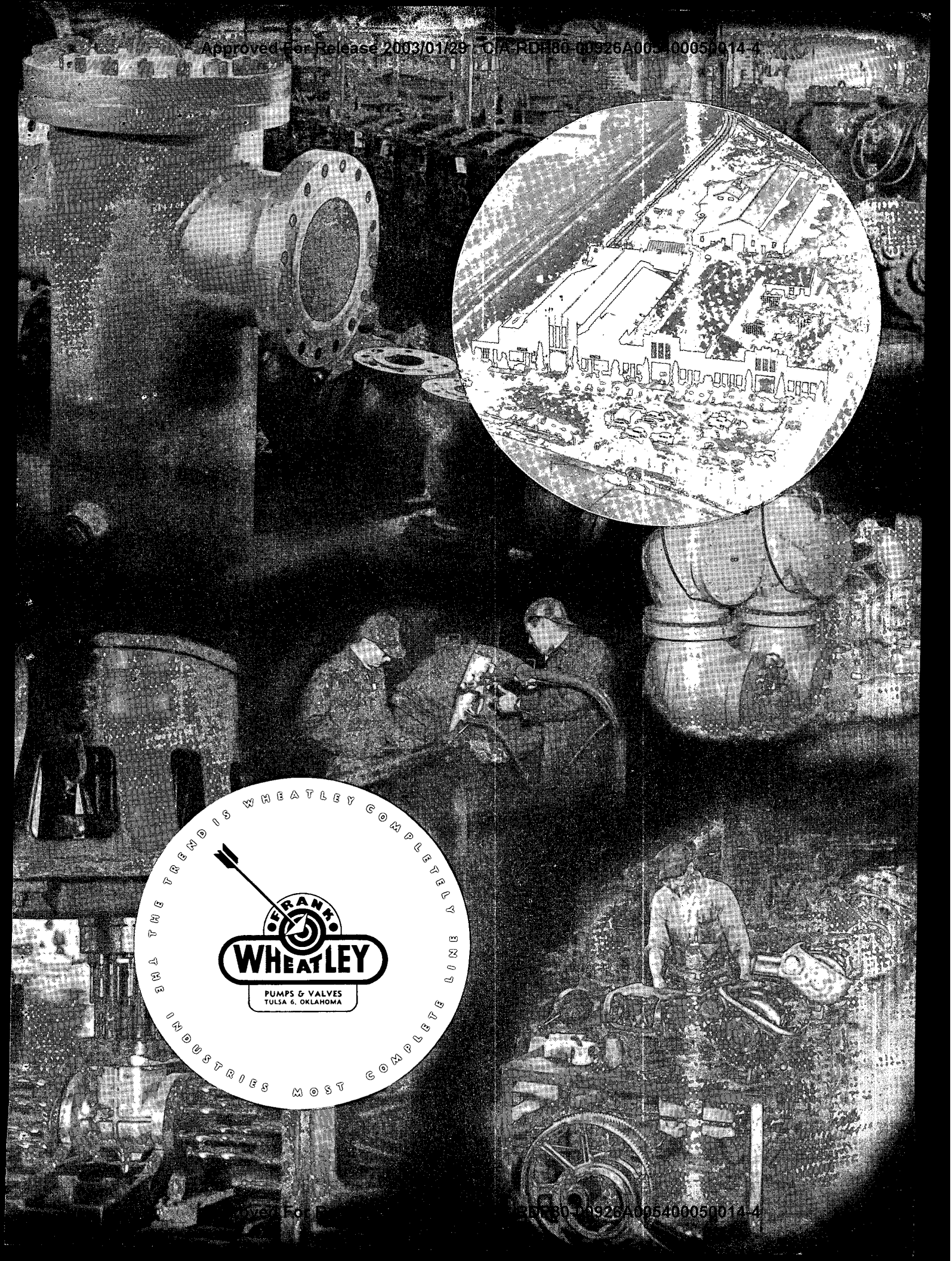

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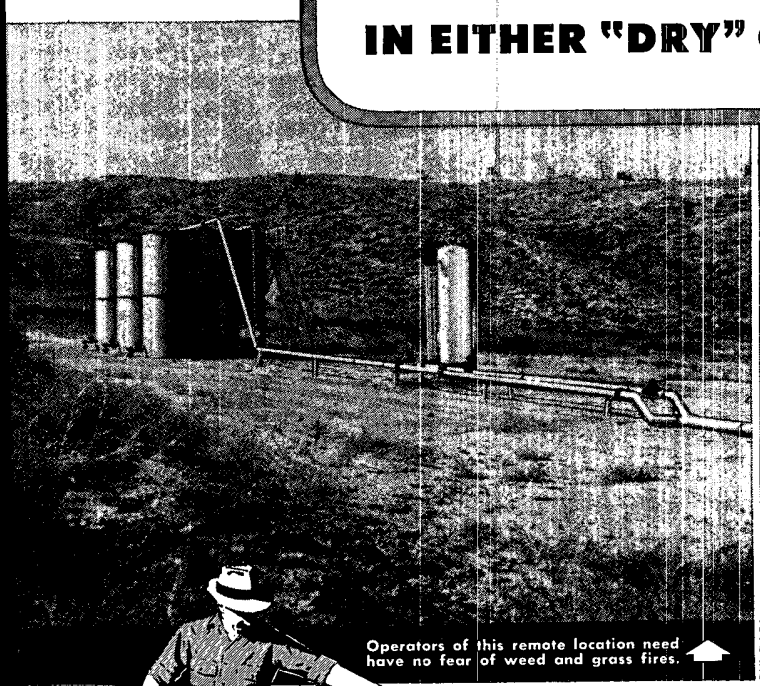
WEED KILLER

GIVES FREEDOM FROM FIRE HAZARD CAUSED BY WEEDS AND GRASSES IN EITHER "DRY" OR "WET" AREAS



Operators of this remote location need have no fear of weed and grass fires.

Rod Lines, kept free of weeds and grasses by Borascu, are easily accessible for inspection and maintenance.

BORASCU is great for reducing labor costs in the battle against fire-hazardous weeds and grasses about all manner of petroleum installations. In oil fields from California to Pennsylvania—from Alberta to Venezuela—economy-minded production men are turning to safe, easy-to-apply Borascu; the most practical solution to their weed and grass maintenance problems. Once tried, Borascu continues to be used consistently by major and independent operators for economy and effectiveness. Users have found that non-corrosive, non-poisonous Borascu reduces the cost of weed problems up to 80% less than the cost of former methods. Application is so easy... just a man, a pail, and Borascu... no special equipment is required. And the results are long-lasting... one correct application can destroy vegetation and prevent future growth for 12 to 24 months, or longer! Borascu Field Men and Distributors are located throughout the oil fields of U.S. and Canada; ask them for details or write to us at once for your copy of our new Borascu Service Bulletin!

LITERATURE AVAILABLE ON REQUEST

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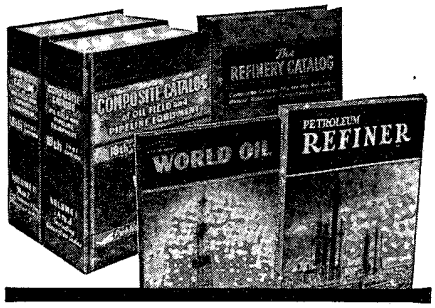

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Indexed by Industrial Arts Index and Engineering Index

FOREWORD . . . .

THE COMPLETE STORY of global oil activity in 1950 epitomizes the triumphs and tribulations of this Twentieth Century. It is a story of freedom and slavery, of private industrial success and limited achievements of enforced statism. While the statesman's hope for a "one world" is yet a dream and avenues of free interchange of information are to a large degree blocked, there still exist on the side streets of those parts of the world in the slave bloc some individuals whose hopes for the future are not dimmed by the realities of the present. They are willing to risk physical danger in order to play their role in the great drama of world enlightenment.

It is to those individuals, as well as to government agencies, oil companies, and other interested persons in the free nations, that WORLD OIL extends its appreciation for technical and valuable oil industry information. For it is they who are responsible to a large degree for WORLD OIL's ability to present these data which permit a proper evaluation of the global oil industry.

Difficult, indeed, is the task of obtaining a true picture of petroleum activities from Russia and its satellites. WORLD OIL has used several sources to obtain creditable estimates wherever possible to permit intelligent analyses of the situation in those countries. However, in some instances, due to a particularly harsh drawing of the Iron Curtain, no reliable estimates were available.

In this issue, WORLD OIL has accumulated information from each oil producing area in the world, presented and catalogued in the most convenient manner possible.

Included are the most complete facts available anywhere on international production, with charts on current production levels, cumulative recovery, number of producing wells, producing depths, producing formations, and other pertinent information by individual fields; on drilling, with compilations of the number of wells completed in individual fields, footage drilled, and bottom-hole results. Other tables offer information on pipe lines and refineries, their locations and capacities.

Also included is the finest and largest collection of current oil field maps on areas outside the U.S. These maps show size, shape and location of oil and gas fields, pipe line outlets, and the location of refineries in practically every international oil producing area.

For assistance in the publication of this comprehensive resume of the global oil story, WORLD OIL again thanks its sources in the four corners of the earth.

The Editors

Fred Rumbaugh
Tool Pusher

William Nelson
Day Driller

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Earl Saunders

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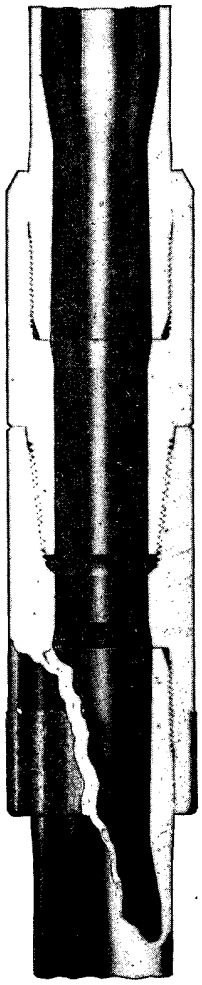

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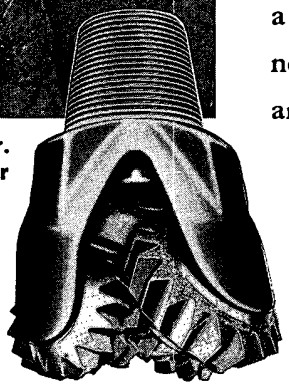

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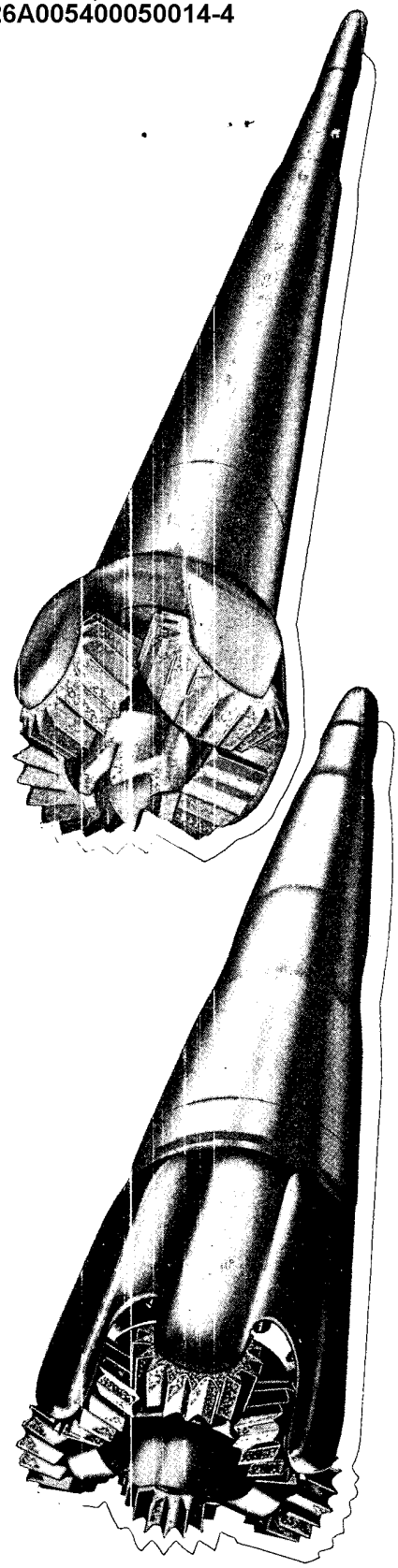

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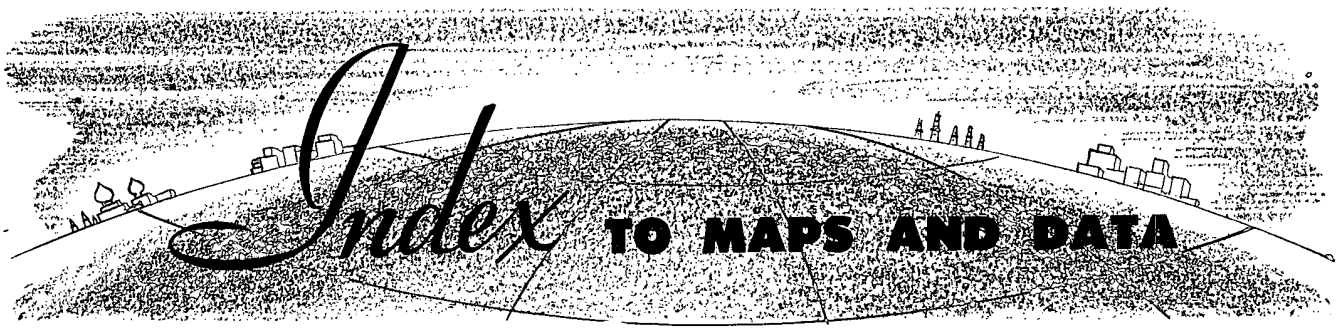

In this issue:

A complete review of world oil laws.

SURVEY SHOWS OIL DEVELOPMENT SLOWED BY GOVERNMENT OPERATION

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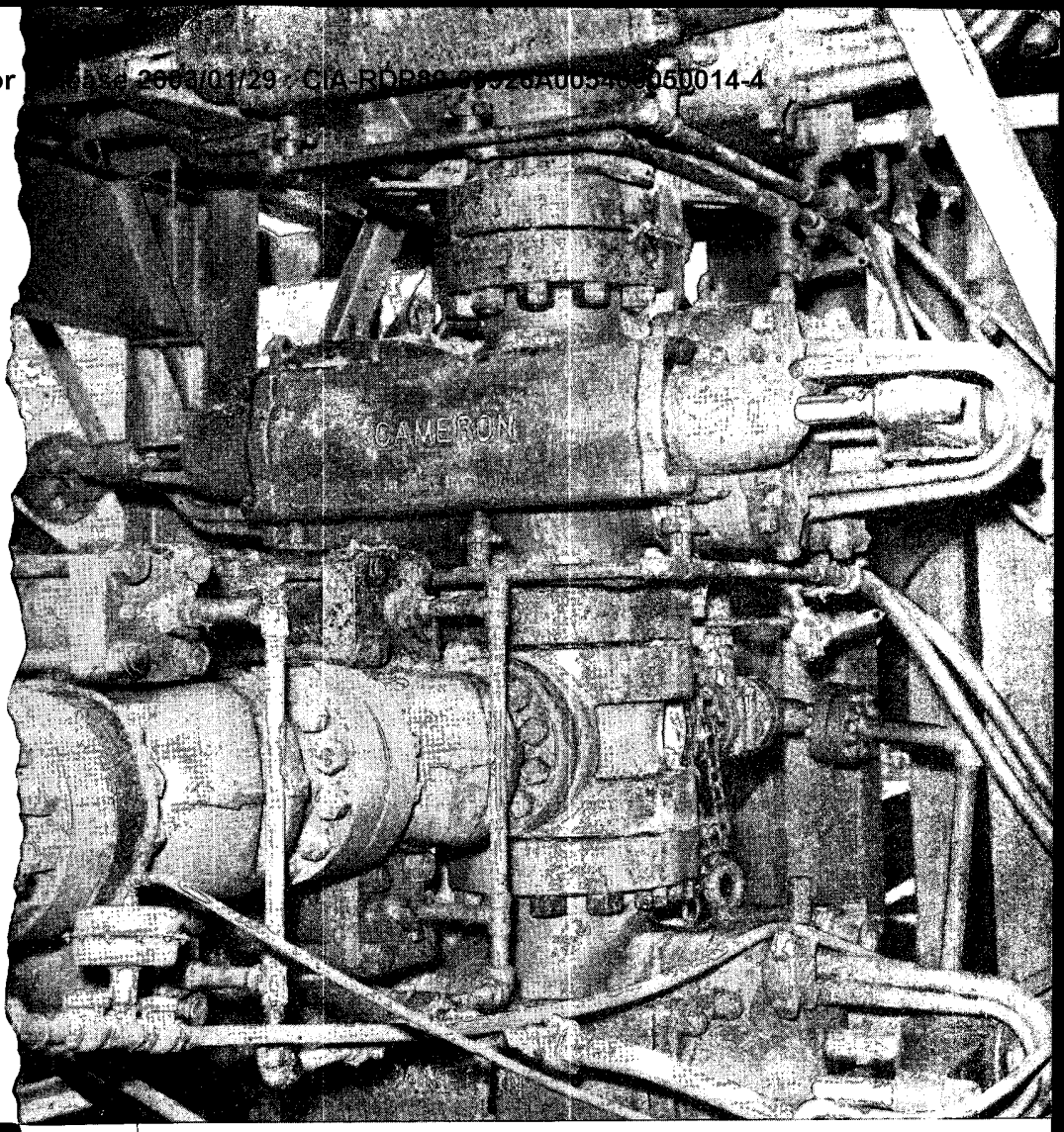
LOG OF A BLOWOUT THAT DIDN'T HAPPEN!



Jan. 6--
Unloaded
16 lb. mud

•

Jan. 17--
Kicked 17 lb.
mud. Rotated
through closed
rams 6 hours

•

Jan. 21--
Drilling ahead.
All's quiet.

The blowouts that **don't** happen never make the headlines. But every day, on perhaps a score or more of wells, Cameron QRC Pressure-Operated Blowout Preventer rams are closed against unruly pressures. The sticking of countless strings of drill pipe is prevented because the patented self-feeding QRC ram packing permits the operator to raise, lower and rotate his pipe through the closed rams.

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OIL IN 1950

Major Activity in Western Hemisphere Contrasts With General Unrest in Iraq, Iran and Indonesia

By DON KLIEWER, WORLD OIL Staff

BOOM CONDITIONS of 1948, after a general letdown in the following year, returned in 1950 to produce even greater achievements. Although crude production records throughout the world were commonplace as 1950 accounting ledgers were closed, increased refinery facilities and pipe line installations starred in the united purpose of achieving greater oil production.

This drive for more and more oil can be attributed to two major factors:

- The many facets of global political unrest of which the Korean war is one catastrophic example and the nationalization effort in Iran, Iraq and Indonesia is another.
- The improved dollar position of several countries whose economies are directly linked with the petroleum industry.

Standout achievements of the Western Hemisphere were underscored by rising activity in the U. S.; increased output in Canada resulting from the completion of the Interprovincial Pipe Line; and the boom in Venezuela, the world's leading crude exporter.

In meeting its greatest demand for petroleum products, the U. S. oil industry established new records in practically every operating branch. One exception was in domestic crude production, which totaled 1,972,812,000 barrels, for a daily average of 5,405,000 barrels, 104,000 short of the 1949 daily record but 7.2 percent more than 1949.

Records set in other divisions included: Drilling, 43,204 new wells, a 9.4 percent increase over the previous record of 39,477 wells drilled in 1948; footage, 159,384,000 feet, a gain of 15 percent over the record of 138,617,000 feet drilled in 1949; refining operations, daily runs of 5,735,000 barrels, 186,000 more than the previous record set in 1948. Natural gasoline production rose to 180,922,000 barrels, a 15.8 percent gain above the 1949 peak; and underground reserves stood at their highest point at the close of the year, 26,217,724,000 barrels. Last year 7780 strict wildcats were drilled as compared to the 1949 record of 6781.

Venezuela's "Sow the Oil" policy and increasing industrial diversification combined with record oil production to give the No. 1 crude exporting nation a future replete with full employment. Reflecting a gain over 1949 of 62,401,870 barrels, Venezuela produced 544,646,947 barrels during 1950.

Increased demand during the year for crude gave Venezuela a record trade balance, nearly $600 million as compared with a low of $232 million the year before when the appetite for oil waned.

Canadian petroleum developments during 1950 were highlighted by the completion of the Interprovincial Pipe Line Company line, which extends 1150 miles from Edmonton, Alberta, to Superior, Wis. The $90 million pipe line was directly responsible for an increased crude production of 7,425,427 barrels in the Western Canadian producing fields, resulting in an annual output of 28,914,256 barrels.

An increase of 18 operating refineries, from 82 in 1949 to 100 in 1950, accounted for the 366,744-barrel increase in Europe's total daily crude runs to stills, from 681,613 barrels in 1949 to 1,048,357 barrels in 1950. Western Europe's share of this rise was 930,357 barrels, an increase of 355,841 barrels from 1949. The 18-refinery increase was achieved both from the construction of new installations and the rebuilding of war-damaged plants.

In Saudi Arabia two developments took place which were big strides toward helping that country retain its No. 2 position in Middle East oil. Highly important in view of expropriation and nationalization trends, was the signing in December of an agreement which provided that Arabian American Oil Company and the government of Saudi Arabia will share 50-50 the profit derived from Aramco's oil activities there. The pact was made retroactive to January 1, 1950.

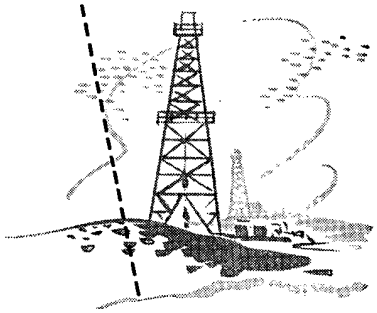
The second significant development also occurred in December, when oil deliveries were started through the 1068-mile, $230 million Tapline from the Persian Gulf to Sidon, Lebanon, on the eastern Mediterranean. This pipe line cuts 3500 miles off the long haul from Saudi Arabia crude sources to European markets.

The final chapter of a phenomenal year's growth in Middle Eastern crude production was written in December, 1950, when the area's output for the year was placed at 635,926,951 barrels.

There were indications that expansion of Middle East petroleum activities may affect the export balance of Venezuela. This suggestion is founded on the new Tapline from the Persian Gulf to Lebanon. The full impact of this pipe line on Venezuelan trade with European countries remains to be seen, but in international oil circles it is felt that Venezuela may be forced to add other commodities to its export list to fill a gap caused by any loss of its European crude markets.

That Venezuela is preparing itself for such an eventuality was evidenced in 1951 by the beginning of an important new export business—iron ore.

On the other hand, the turn of world events—the discord in Iran and the possible loss of production there and the fear of another world war—may cause Venezuelan markets to keep their South American oil supply lines intact and stockpile oil by taking advantage of the new Mediterranean outlet.



In choosing a geophysical company the oil producer must look to these three items for practical analysis. Republic assures ACCURACY by utilizing the most modern equipment available. Much of this equipment—such as the Photogravity Camera . . . new reflection and refraction units—has been designed, manufactured, and perfected by Republic's own personnel. This advance, in methods as well as equipment has led to the uncovering of vast areas thought unworkable. Much of this increase in usable results has been directly attributable to Republic's pioneering and six crew years of experience in the Surface Shooting field.

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WORLD SUPPLY AND DEMAND

Petroleum Need Increases 1,230,900 Barrels Daily; Total Consumption Reaches Average of 10,978,000

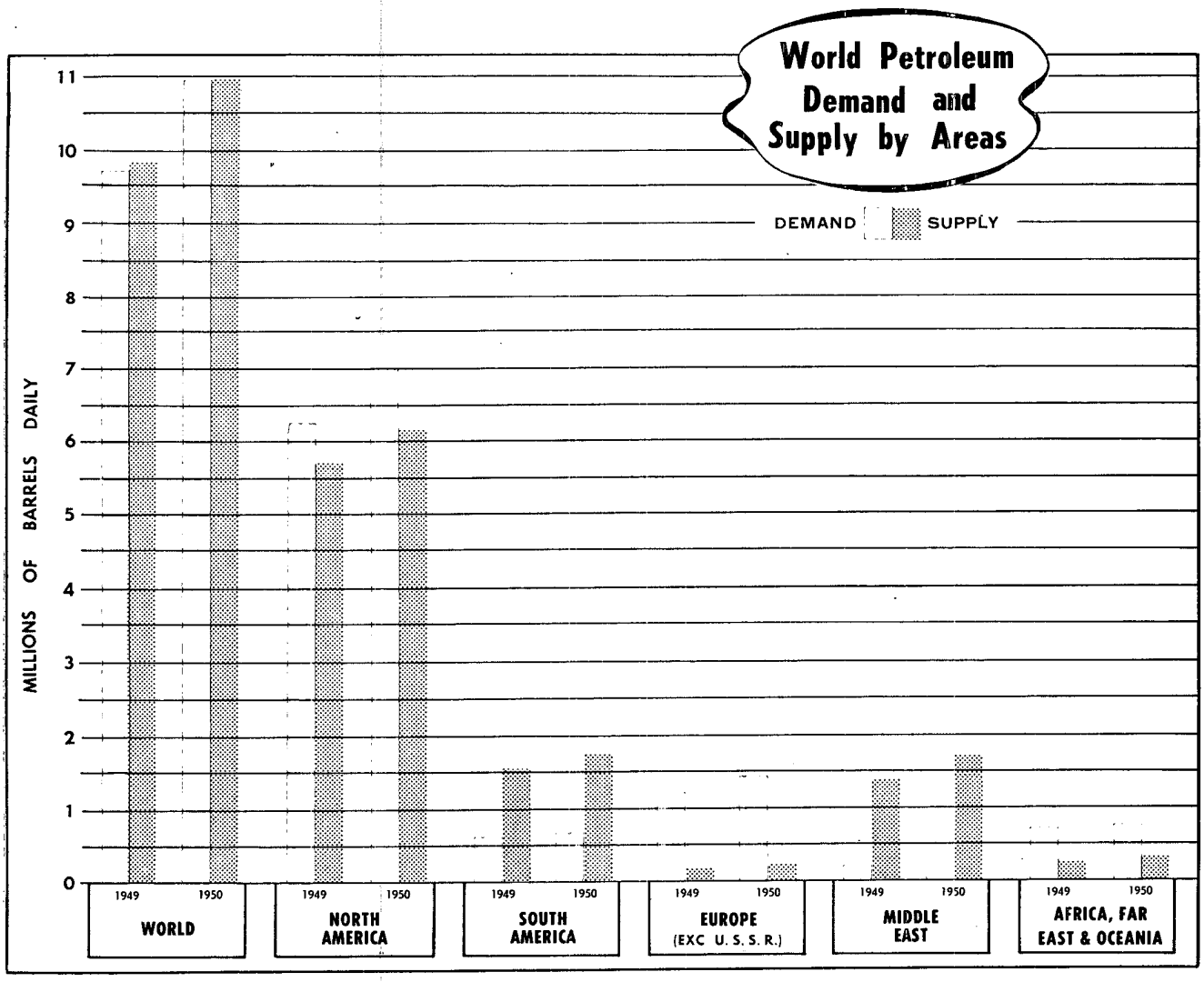
WORLD demand for petroleum in 1950 increased by an average of 1,230,900 barrels daily over 1949, or nearly three times the rate of the increase in 1949 over the previous year. Europe recorded the greatest increase in demand, with a rise of 18 percent over 1949 with the continued expansion of industrial activity in the post-war recovery program of the various nations.

Aside from expanded European industrial activity, an important factor in the near balance of supply and demand in 1950 was the rise of defense production, particularly in the U. S., after the outbreak of the Korean war in late June.

Combined world production again reached a new high with a daily average for 1950 of 10,965,800 barrels of petroleum (crude, natural gasoline and synthetic products). This was an increase of 1,154,700 barrels daily over the previous year's average of 9,811,100 barrels a day—the sharpest year-to-year rise in production in the postwar period.

Total consumption in 1950 averaged 10,978,200 barrels daily and the 12.6 percent gain over 1949 was only slightly more than the gain of supply in 1950 over the previous year, which amounted to nearly 11.8 percent. Consumption in 1949 showed an increase of 4.4 percent over 1948. The balance of supply and demand was distorted to some extent in 1949 with the voluntary cutbacks in production in the U. S. and Venezuela due to the sharp rise in Middle East output.

World supply in 1950 was composed of 10,365,200 barrels daily of crude and 600,600 barrels a day of



natural gasoline and synthetic products. Total crude production was 1,052,100 barrels daily, or about 11 percent higher than 1949, while output of natural gasoline and synthetic products increased by 102,600 barrels a day, or 20 percent. Nearly two-thirds of the total production of the latter was in the U. S., and the 1950 output from this area, averaging 498,000 barrels daily, was equal to the world's total output in 1949. European production of natural gasoline and synthetic products rose significantly in 1950 to 53,200 barrels a day from 26,000 barrels daily in 1949.

Indicative of the greater dependence on imported petroleum, the U. S. for the second successive year was in the column of nations with excess demand over supply, with last year's ratio of consumption over production jumping to 590,700 barrels daily from 317,500 barrels in the previous year. Net imports by the U. S. in 1950 were 550,700 barrels daily, well above the balance of imports over exports amounting to 122,000 barrels a day in the preceding year. Due in large measure to the sharply increased production in Canada, the excess of demand over supply in North American areas other than the U. S., was reduced to 239,600 barrels daily in 1950 from 245,100 barrels a day in 1949. Europe, the largest net importing area, consumed 1,236,300 barrels daily more than it produced in 1950, up from an import balance of 1,040,200 barrels a day in 1949.

Three major geographical areas had production in excess of demand, with the Middle East moving into first position among the leading supply areas to petroleum-short nations.

Petroleum Demand and Supply by Areas, 1947-1948-1949-1950

Barrels Per Day

	Domestic Demand	DOMESTIC SUPPLY: Crude Oil	DOMESTIC SUPPLY: Natural Gasoline, Etc.	DOMESTIC SUPPLY: Total	Excess Supply Over Demand	Excess Demand Over Supply	PERCENT OF WORLD TOTAL: Domestic Demand	PERCENT OF WORLD TOTAL: Domestic Supply
1950:								
United States	6,491,000	5,402,300	498,000	5,900,300	.....	590,700	59.13	52.12
Other North America	525,900	277,000	9,300	286,300	.....	239,600	4.79	2.67
Total North America	7,016,900	5,679,300	507,300	6,186,600	.....	830,300	63.92	54.79
Caribbean Area	225,800	1,640,900	6,700	1,647,600	1,421,800	.....	2.06	15.83
Other South America	469,300	114,800	4,900	119,700	.....	349,600	4.27	1.11
Total South America	695,100	1,755,700	11,600	1,767,300	1,072,200	.....	6.33	16.94
Europe (Excluding U. S. S. R.)	1,451,400	161,900	53,200	215,100	.....	1,236,300	13.22	1.56
U. S. S. R.	770,000	721,000	24,000	745,000	.....	25,000	7.01	6.96
Africa	276,100	45,400	1,500	46,900	.....	229,200	2.52	0.44
Middle East	256,300	1,742,800	.....	1,742,800	1,486,500	.....	2.33	16.81
Far East and Oceania	512,400	259,100	3,000	262,100	.....	250,300	4.67	2.50
TOTAL WORLD	10,978,200	10,365,200	600,600	10,965,800	.....	12,400	100.00	100.00
1949:								
United States	5,792,400	5,046,400	428,500	5,474,900	.....	317,500	59.42	54.19
Other North America	478,200	224,900	8,200	233,100	.....	245,100	4.91	2.41
Total North America	6,270,600	5,271,300	436,700	5,708,000	.....	562,600	64.33	56.60
Caribbean Area	212,900	1,459,300	4,900	1,464,200	1,251,300	.....	2.18	15.67
Other South America	397,500	113,100	5,200	118,300	.....	279,200	4.08	1.21
Total South America	610,400	1,572,400	10,100	1,582,500	972,100	.....	6.26	16.88
Europe (Excluding U. S. S. R.)	1,226,700	160,500	26,000	186,500	.....	1,040,200	12.59	1.72
U. S. S. R.	707,000	638,800	22,000	660,800	.....	46,200	7.25	6.86
Africa	236,800	43,800	1,000	44,800	.....	192,000	2.43	0.47
Middle East	211,800	1,401,300	.....	1,401,300	1,189,500	.....	2.17	15.05
Far East and Oceania	484,000	225,000	2,200	227,200	.....	256,800	4.97	2.42
TOTAL WORLD	9,747,300	9,313,100	498,000	9,811,100	63,800	.....	100.00	100.00
1948:								
United States	5,775,100	5,519,600	401,900	5,921,500	146,400	.....	61.83	58.84
Other North America	444,400	193,800	8,300	202,100	.....	242,300	4.76	2.07
Total North America	6,219,500	5,713,400	410,200	6,123,600	.....	95,900	66.59	60.91
Caribbean Area	210,600	1,458,800	3,700	1,462,500	1,251,900	.....	2.25	15.55
Other South America	390,000	112,000	4,800	116,800	.....	273,200	4.18	1.20
Total South America	600,600	1,570,800	8,500	1,579,300	978,700	.....	6.43	16.75
Europe (Excluding U. S. S. R.)	1,069,600	151,100	21,100	172,200	.....	897,400	11.45	1.61
U. S. S. R.	618,000	595,600	12,000	607,600	.....	10,400	6.62	6.35
Africa	212,500	36,900	800	37,700	.....	174,800	2.27	0.39
Middle East	182,200	1,138,700	.....	1,138,700	956,500	.....	1.95	12.14
Far East and Oceania	438,000	173,300	1,100	174,400	.....	263,600	4.69	1.85
TOTAL WORLD	9,340,400	9,379,800	453,700	9,833,500	493,100	.....	100.00	100.00
1947:								
United States	5,449,200	5,087,600	364,000	5,451,600	2,400	.....	62.36	61.45
Other North America	487,300	176,100	2,300	178,400	.....	308,900	5.58	2.12
Total North America	5,936,500	5,263,700	366,300	5,630,000	.....	306,500	67.94	63.57
Caribbean Area	181,600	1,315,700	3,800	1,319,500	1,137,900	.....	2.08	15.89
Other South America	262,300	102,400	3,300	105,700	.....	156,600	3.00	1.24
Total South America	443,900	1,418,100	7,100	1,425,200	981,300	.....	5.08	17.13
Europe (Excluding U. S. S. R.)	1,010,600	133,800	33,600	167,400	.....	843,200	11.57	1.62
U. S. S. R.	578,000	513,600	10,000	523,600	.....	54,400	6.62	6.20
Africa	180,300	23,700	1,000	24,700	.....	155,600	2.06	0.29
Middle East	168,800	839,200	.....	839,200	670,400	.....	1.93	10.13
Far East and Oceania	419,500	87,500	3,100	90,600	.....	328,900	4.80	1.06
TOTAL WORLD	8,737,600	8,279,600	421,100	8,700,700	.....	36,900	100.00	100.00

Source: Demand and natural gasoline production figures from C. J. Bauer, Petroleum Economist, Standard Oil Company (New Jersey). Crude production figures by WORLD OIL.

WORLD CRUDE PRODUCTION

Output Jumps Nearly 384 Million Barrels for All-Time High; U. S. Yield, Up 7.1 Percent, Is 52.12 Percent of Total

WORLD crude production in 1950 jumped 383,994,000 barrels over 1949 for an all-time peak of 3,783,284,000 barrels to boost the cumulative output to 65,539,369,000. This record was the result of a daily average production of 10,365,162 barrels, an 11.3 percent increase over the previous year.

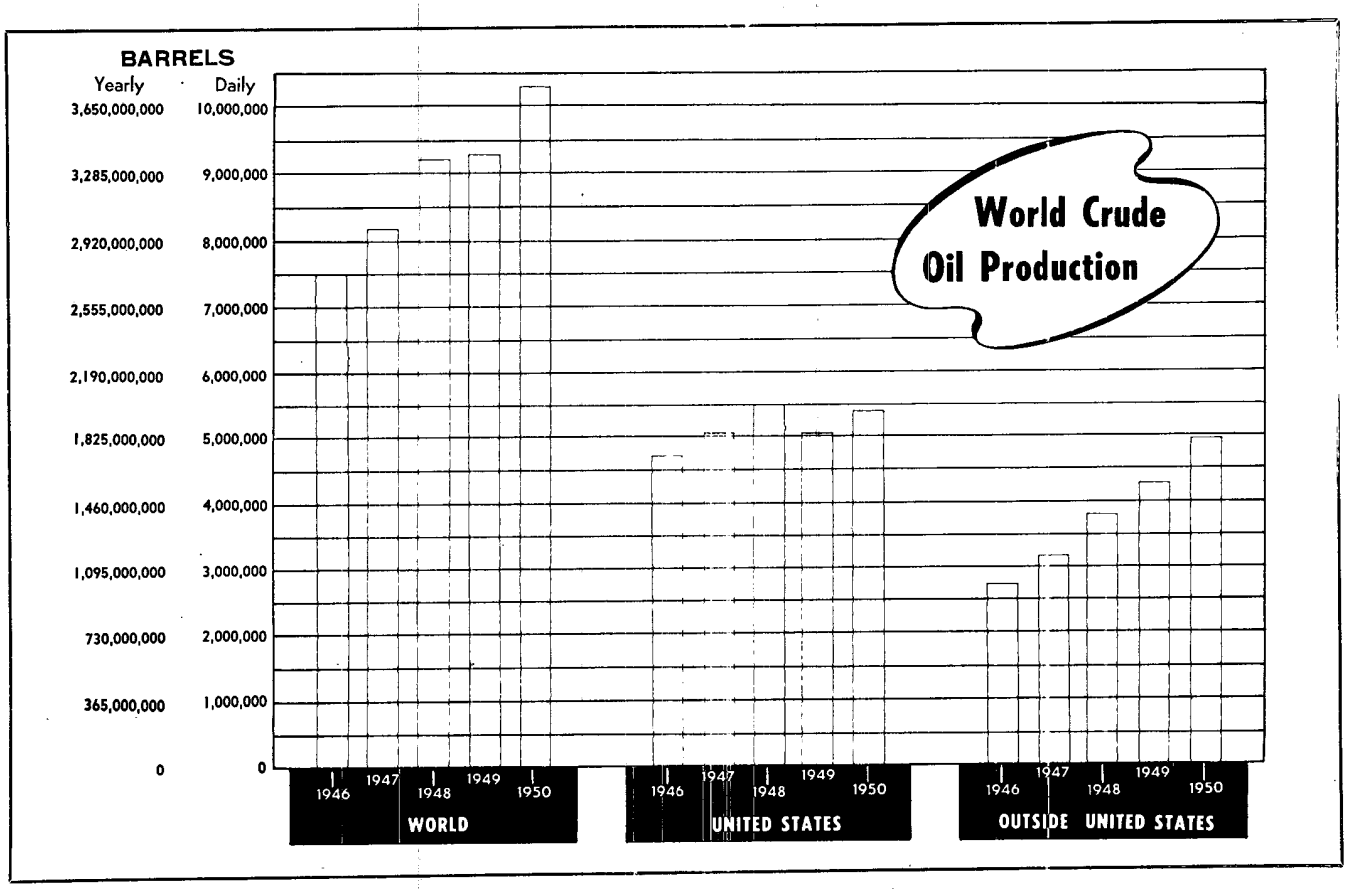
U. S. production of 1,971,845 barrels, 7.1 percent above the previous year, accounted for 52.12 percent of the world total, a drop of 2.07 percent from 1949.

North America, despite a decline of 1.82 percent in its proportionate share of world crude output, remained the world's leading producing area, with a percentage of 54.79. Further development work in Canada and Mexico helped offset the U. S. percentage drop. Canada, with an increase in production of 7,894,000 barrels over its 1949 total of 21,000,000 barrels, upped its percent of world production by .14 to .76 percent.

With 1950 output of 72,118,000 barrels—an increase over 1949 of 11,208 barrels—Mexico produced 1.91 percent of the world's output. This amounted to an increase of .11 percent.

Oil production trends shifted slightly as Asia's percentage of world production rose 1.85 to 19.31; South America's percentage increased .06 to 16.94; and Africa, Europe, and North America all experienced percentage declines in total production.

Emphasis was drawn to Asia and the mounting progress of its petroleum industry as reflected in the production figures: Iran led the rising tide with 241,425,000



(All Figures in Barrels)

YEAR	WORLD		UNITED STATES		OUTSIDE U.S.A.	
	Annual Total	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average
1938....	1,988,041,000	5,466,000	1,214,355,000	3,327,000	773,686,000	2,119,000
1939....	2,086,160,000	5,715,500	1,264,962,000	3,465,000	821,198,000	2,249,900
1940....	2,149,821,000	5,873,800	1,353,214,000	3,367,300	796,607,000	2,176,500
1941....	2,220,657,000	6,084,000	1,402,228,000	3,841,700	818,429,000	2,242,300
1942....	2,093,100,000	5,734,500	1,386,645,000	3,799,000	706,455,000	1,935,500
1943....	2,256,637,000	6,182,600	1,505,613,000	4,125,000	751,034,000	2,057,600
1944....	2,592,371,000	7,102,400	1,677,904,000	4,584,400	914,467,000	2,518,000
1945....	2,594,798,000	7,109,000	1,713,655,000	4,694,900	881,143,000	2,414,100
1946....	2,745,474,000	7,521,800	1,733,939,000	4,750,500	1,011,525,000	2,771,300
1947....	3,022,075,000	8,279,700	1,856,987,000	5,087,600	1,165,088,000	3,192,100
1948....	3,433,021,000	9,405,500	2,020,185,000	5,519,600	1,412,836,000	3,885,900
1949....	3,399,290,000	9,313,100	1,841,940,000	5,046,400	1,557,350,000	4,266,700
1950....	3,783,284,000	10,365,200	1,971,845,000	5,402,300	1,811,439,000	4,962,900

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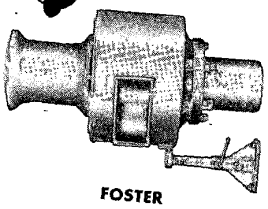
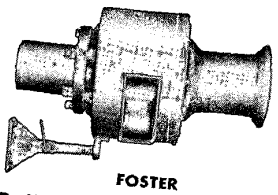


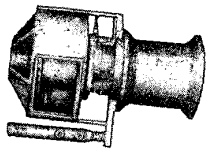
FOSTER
AIR SPINNING CATHEAD

. . . Fully enclosed . . . operator can apply any desired amount of power to the pull line . . . Instant engagement without reducing lineshaft speed . . . 19½" single plate crawl-free friction clutch; recommended for pull up to 12,000 lbs. . . . Smoothness of power makes spinning rope and spinning chain last much longer . . . no adjustments during life of Cathead.



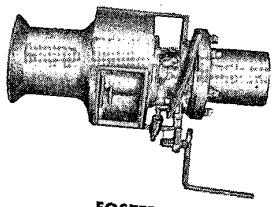
FOSTER
AIR MASTER BREAKOUT CATHEAD

. . . Fully enclosed . . . operator in complete control of pull on jerkline at all times . . . Instant engagement without reducing lineshaft speed . . . 16" triple plate crawl-free friction clutch; amply powered and field proved . . . No brakes required and no metal-to-metal impacts . . . no adjustments during life of Cathead.



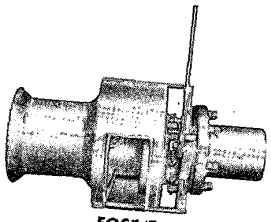
FOSTER
MIDGET MASTER BREAKOUT CATHEAD

Friction clutch and small drum permit instant engagement without reducing lineshaft speed . . . no metal-to-metal impact . . . no brakes required . . . equipped with air or manual controls.



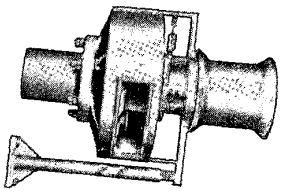
FOSTER
MIDGET SPINNING CATHEAD

Relieves operator of handling spinning line . . . pipe is spun up smoothly under low clutch pressures . . . plenty of power for tonging. Drum does not crawl when clutch is disengaged.



FOSTER
SPINNING CATHEAD

. . . Instant engagement without reducing lineshaft speed . . . Will spin and tong with forked line . . . Heavy bearings, well lubricated . . . record of years of operation without repairs . . . Eliminates hand-wrapping of spinning line.



FOSTER
MASTER, TYPE B, BREAKOUT CATHEAD

. . . Instant engagement without reducing lineshaft speed . . . No metal-to-metal impacts . . . no complicated brake necessary . . . Powerful friction clutch . . . roller bearings . . . Either air or manual controls.

● When you know and understand the problem, then you can get down to finding ways to lick it. We've been doing just that during 25 years of specialization in cathead manufacture. This specialization has meant the best in safety, speed, dependability and economy, whether it is on catheads for the shallowest or the deepest wells. As a result we have a line of catheads that are first choice of the drilling industry.

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barrels, a gain of 36,713,000 barrels over 1949, resulting in a .36 percent gain in its share of the world production. Iran now produces 6.38 percent of the world's crude. Kuwait production rose sharply from 89,930,000 barrels to 125,722,000 barrels, a gain of .67 percent to 3.32 percent of the world output. Iraq's percentage rose .33 to 1.24 percent as a result of its 15,760,000-barrel increase to 46,760,000 barrels. Qatar production, up 10,707,000 barrels from 1949 to 11,457,000 in 1950, represented .30 percent of world production. This is an increase of .28 percent over the previous year.

During the year, Saudi Arabia's share of world production rose .15 percent to 5.27 percent after increased output of 25,539,000 barrels over 1949 production of 174,008,000 barrels. Turkey produced .01 percent of the world's total, and Bahrein's slight increase of 31,000 barrels over the previous year failed to prevent a decline of .03 percent in its share of world production, which amounted to .29 percent.

In the Far East, British Borneo (Sarawak and Brunei) accounted for a .05 percent increase up to .79 percent over-all with its 1950 production of 29,700,000 barrels. India gained slightly to .08 percent of the world output, while Sakhalin (part of Union of Socialist Soviet Republics) decreased slightly to .19 percent. Pakistan, Japan, and Indonesia each posted a .01 percent hike in their portions of world production over the combined 1949 total of 1.38 percent. With an output of 803,000 barrels, China's 1950 proportionate share of world production of .02 percent was unchanged from 1949.

The ebb and flow of various political influences during the year are also reflected in the record 1950 crude

Trends in World Crude Oil Production, by Countries, and Cumulative Production Through 1950

(Sources: U. S. Bureau of Mines except 1950 from private sources or estimated by WORLD OIL)

CONTINENT and COUNTRY	ANNUAL PRODUCTION (Thousands of Barrels) 1949	ANNUAL PRODUCTION (Thousands of Barrels) 1950	DAILY AVERAGE PRODUCTION (Actual Barrels) 1949	DAILY AVERAGE PRODUCTION (Actual Barrels) 1950	% Diff. '49-'50	YEAR'S PRODUCTION As Percent of World 1949	YEAR'S PRODUCTION As Percent of World 1950	CUMULATIVE PRODUCTION TO January 1, 1951 (Thousands of Barrels) Total	As % of World
North America	**1,924,034**	**2,072,935**	**5,271,326**	**5,679,274**	+ 7.7	**56.61**	**54.79**	**43,592,593**	**66.51**
Canada	21,010	28,904	57,561	79,189	+ 37.6	0.62	0.76	191,044	0.29
Cuba	174	68	477	186	— 1.0	.....	.....	2,161	.....
Mexico	60,910	72,118	166,877	197,584	+ 18.4	1.80	1.91	2,482,029	3.79
United States	1,841,940	1,971,845	5,046,411	5,402,315	+ 7.1	54.19	52.12	40,917,359	62.43
South America	**573,920**	**640,840**	**1,572,383**	**1,755,726**	+ 11.7	**16.88**	**16.94**	**7,382,016**	**11.27**
Argentina	22,961	22,590	62,907	61,890	— 1.6	0.68	0.60	457,779	0.70
Barbadoes	.....	.....	.....	.....	.....	.....	.....	8	.....
Bolivia	678	616	1,857	1,688	— 9.1	0.02	0.02	5,587	0.01
Brazil	109	339	299	929	+ 210.7	.....	0.01	979	.....
Chile	110	631	301	1,729	+ 474.4	.....	0.02	741	.....
Colombia	29,722	34,059	81,430	93,312	+ 14.6	0.87	0.90	505,014	0.77
Ecuador	2,617	2,691	7,170	7,373	+ 2.8	0.07	0.07	49,089	0.08
Peru	14,790	15,028	40,520	41,173	+ 1.6	0.44	0.40	401,505	0.61
Trinidad	20,617	20,239	56,485	55,449	— 1.8	0.61	0.53	412,704	0.63
Venezuela	482,316	544,647	1,321,414	1,492,183	+ 12.9	14.19	14.39	5,548,610	8.47
Europe	**291,727**	**322,241**	**799,252**	**882,852**	+ 10.5	**8.58**	**8.52**	**8,374,525**	**12.78**
Albania	2,188	2,106	5,995	5,770	— 3.8	0.06	0.06	17,468	0.03
Austria	6,100	6,205	16,712	17,000	+ 1.7	0.18	0.16	64,126	0.10
Czechoslovakia	292	280	800	767	— 4.1	0.01	0.01	4,713	0.01
France	411	893	1,126	2,447	+ 117.3	0.01	0.02	15,297	0.02
Germany	5,947	7,830	16,293	21,452	+ 31.7	0.18	0.21	106,577	0.16
Great Britain	338	340	926	932	+ 0.6	0.01	0.01	4,810	0.01
Hungary	3,791	3,460	10,386	9,479	— 8.7	0.11	0.09	49,524	0.07
Italy	71	72	195	197	+ 0.02	.....	.....	3,563	0.01
Netherlands	4,314	4,864	11,819	13,326	+ 12.8	0.13	0.13	14,084	0.02
Poland	965	928	2,644	2,542	— 3.9	0.03	0.02	279,381	0.43
Roumania	33,700	31,609	92,329	86,600	— 6.2	0.99	0.84	1,257,195	1.92
U. S. S. R. (Excl. Sakhalin)	233,170	263,165	638,822	721,000	+ 12.9	6.86	6.96	6,555,183	10.00
Yugoslovia	440	489	1,205	1,340	+ 11.2	0.01	0.01	2,604	.....
Africa	**15,998**	**16,573**	**43,830**	**45,406**	+ 3.6	**0.47**	**0.44**	**153 656**	**0.23**
Algeria	.....	7	.....	19	.....	.....	.....	150	.....
Egypt	15,862	16,275	43,457	44,589	+ 2.6	0.47	0.43	152,642	0.23
Morocco	136	291	373	798	+ 113.7	.....	0.01	864	.....
Asia, Total	**593,603**	**730,687**	**1,626,310**	**2,001,882**	+ 23.1	**17.46**	**19.31**	**6,035,476**	**9.21**
Asia, Middle East	**511,480**	**636,111**	**1,401,315**	**1,742,770**	+ 24.4	**15.04**	**16.81**	**4,010,115**	**6.12**
Bahrein	10,985	11,016	30,096	30,181	+ 0.3	0.32	0.29	120,916	0.18
Iran	204,712	241,425	560,855	661,438	+ 17.9	6.02	6.38	2,384,803	3.64
Iraq	31,000	46,760	84,931	128,110	+ 50.8	0.91	1.24	488,996	0.75
Kuwait	89,930	125,722	246,384	344,444	+ 39.8	2.65	3.32	284,308	0.43
Qatar	750	11,457	2,055	31,389	+1427.4	0.02	0.30	12,207	0.02
Saudi Arabia	174,008	199,547	476,734	546,704	+ 14.7	5.12	5.27	718,606	1.10
Turkey	95	184	260	504	+ 93.8	.....	0.01	279	.....
Asia, Far East	**82,123**	**94,576**	**224,995**	**259,112**	+ 15.2	**2.42**	**2.50**	**2,025,361**	**3.09**
Borneo, British (Sarawak and Brunei)	25,108	29,700	68,789	81,370	+ 18.3	0.74	0.79	213,580	0.33
Burma	316	400	866	1,096	+ 26.6	0.01	0.01		
India	1,894	3,051	5,189	8,359	+ 61.1	0.06	0.08	344,138	0.52
Pakistan	746	1,250	2,044	3,424	+ 67.5	0.02	0.03		
China	752	803	2,060	2,200	+ 6.8	0.02	0.02	4,852	0.01
Formosa (Taiwan)	22	24	60	66	+ 10.0	.....	.....	309	.....
Japan	1,353	2,048	3,707	5,611	+ 51.4	0.04	0.05	98,445	0.15
Indonesia	44,932	50,300	123,102	137,808	+ 11.9	1.32	1.33	1,269,797	1.94
Sakhalin (Part of U. S. S. R.)	7,000	7,000	19,178	19,178	.....	0.21	0.19	94,240	0.14
Australia-New Zealand	**8**	**8**	**22**	**22**	.....	.....	.....	**59**	.....
World, Undistributed	.....	.....	.....	.....	.....	.....	.....	1,044	.....
TOTAL WORLD	**3,399,290**	**3,783,284**	**9,313,123**	**10,365,162**	+ 11.3	**100.00**	**100.00**	**65,539,369**	**100.00**

* Figures from Bureau of Mines, except 1950; will not always check with those in other tables which are from private sources.

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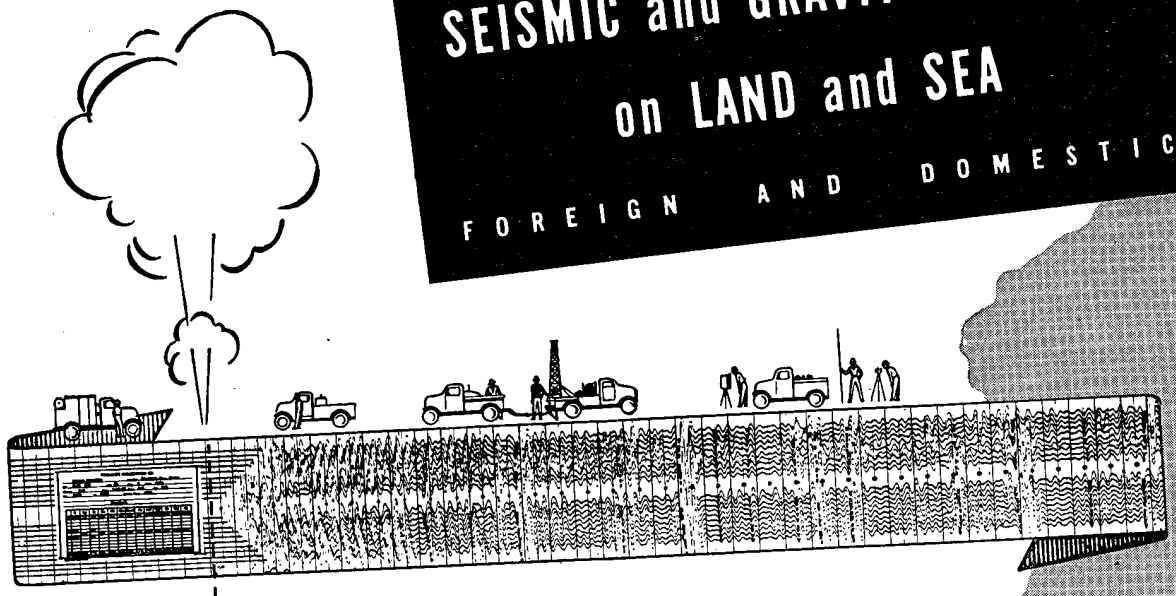

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production tables. Increased consumption, the Korean "police action," currency restrictions, and other factors played major roles in the political facet of world conditions which led to increased attention for Asian oil.

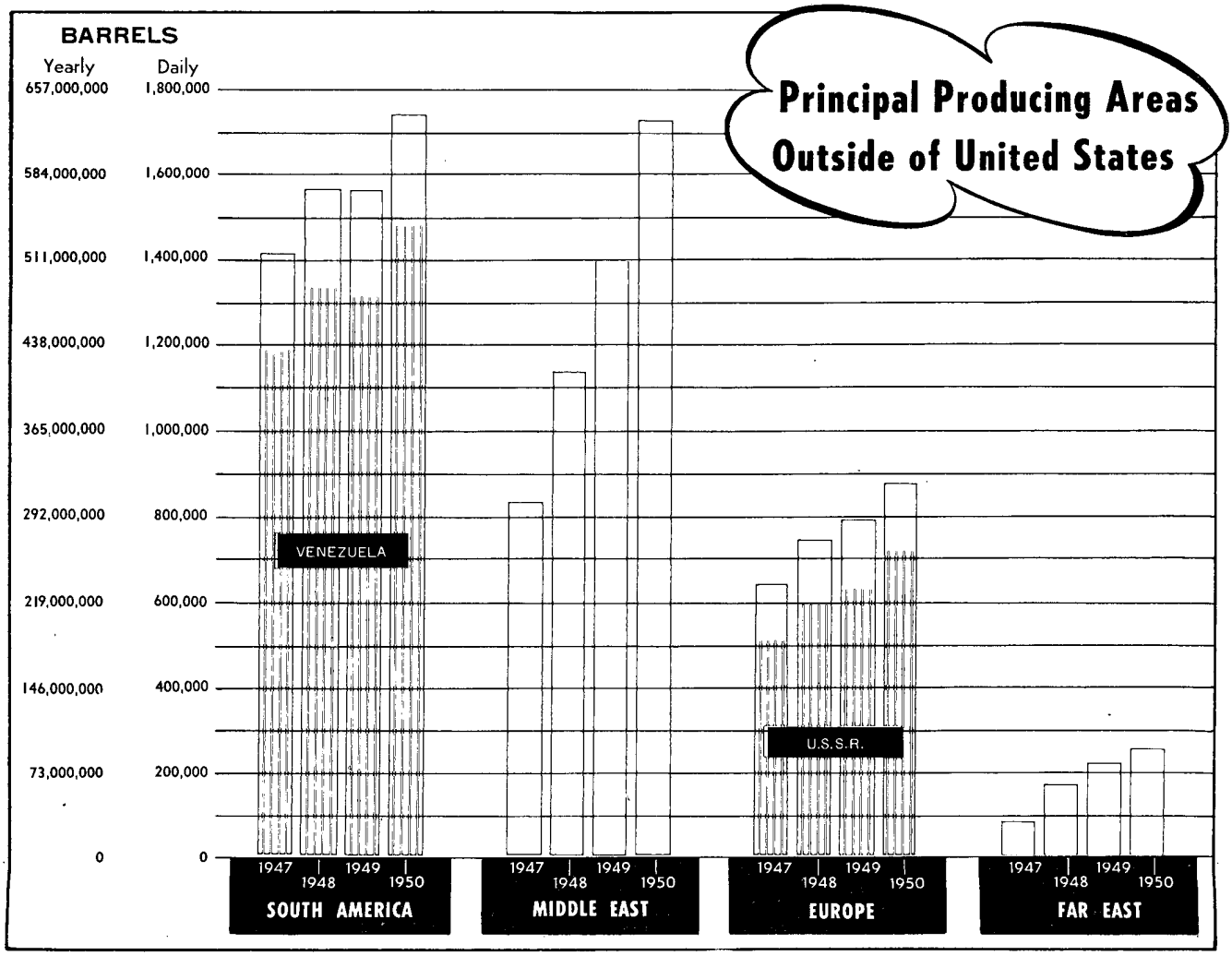
South America's share of world production rose in 1950 to 16.94 percent, .06 percent above the previous year. This increase was accounted for by continued Venezuelan oil industry progress. The nation, the world's largest crude oil exporter, in 1950 produced 544,647,000 barrels, a 62,331,000-barrel increase over 1949, amounting to a .20 percent increase in its share of world production which now amounts to 14.39 percent. Venezuela's boom helped declining South American world production percentages which resulted in Trinidad, Peru, and Argentina. Chile produced 631,000 barrels, 521,000 more than in 1949, which was equivalent to .02 percent of the world total.

The percentage yielded by European fields fell .06. Germany's increase of .03, up to .21 percent, resulting from a production rise of 1,883,000 barrels over the 1949 figure of 5,947,000 barrels, together with increases of .01 percent in France, up to .02 percent, and .10 percent in Union of Soviet Socialist Republics (except Sakhalin), up to 6.96 percent of the world total, failed to offset slumps in Hugary of 331,000 barrels, down to .09 percent of the world total; in Poland of 37,000 barrels, down to .02 percent; and in Roumania of 2,091,000 barrels, down to .84 percent. No percentage changes were marked up by Czechoslovakia, Great Britain, The Netherlands, and Yugoslavia, which together produced .16 percent of the world's crude output in 1949 or 5,973,000 barrels.

Egyptian production rose 413,000 barrels over the previous year to 16,275,000 barrels; however, the country's percentage of world production declined .04 percent to .43 percent. Moroccan oil output of 291,000 barrels, an increase of 155,000 barrels over 1949, and Algerian production totaling 7000 barrels combined with Egyptian production to leave Africa with a .03 percent decline in its share of world production.

Production estimates from oil fields behind the Iron Curtain, including the satellite countries in Europe and Communist China, are vague. The 1950 Chinese production figure of 803,000 barrels is significant only as an indication of possible oil resources within the Russian orbit.

Roumania, Hungary, Poland, Austria, and Czechoslovakia in 1950 produced 42,482,000 barrels of oil, a decline of 2,366,000 barrels from the previous year's output of 44,848,000 barrels. Each of these countries experienced a marked production decline, except Austria where output was increased 105,000 barrels over the 1949 figure of 6,100,000 barrels.

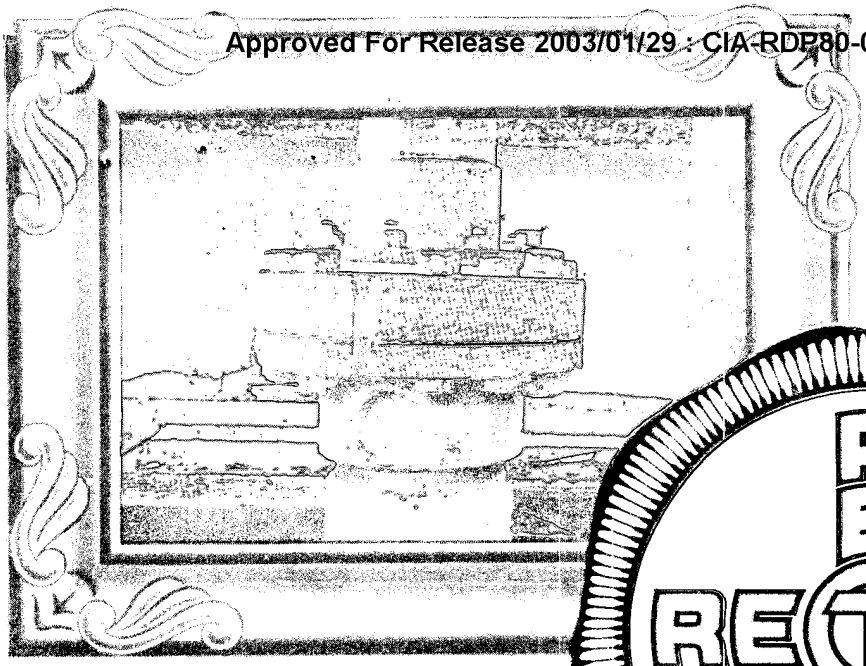


World Crude Oil Production, By Countries, By Years (Part 1)

(Complete production history of world, in thousands of barrels of 42 U. S. Gallons. Sources: *Mineral Resources and Minerals Yearbook*, except as otherwise indicated)

YEAR	WORLD TOTAL	Percent Produced by U.S.	NORTH AMERICA					SOUTH AMERICA									
			Canada	Mexico	United States	Cuba	Total North America	Argentina	Barbados	Bolivia	Brazil	Chile	Colombia	Ecuador	Peru	Trinidad	Venezuela	Total South America
1857	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1858	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1859	6	31	.....	.....	2	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1860	509	98	.....	.....	500	.....	500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1861	2,131	99	.....	.....	2,114	.....	2,114	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1862	3,092	99	12	.....	3,057	.....	3,069	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1863	2,763	94	83	.....	2,611	.....	2,694	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1864	2,304	92	90	.....	2,116	.....	2,206	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1865	2,716	92	110	.....	2,498	.....	2,608	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1866	3,899	92	175	.....	3,598	.....	3,773	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1867	3,709	90	190	.....	3,347	.....	3,537	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1868	3,990	91	200	.....	3,646	.....	3,846	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1869	4,696	90	220	.....	4,215	.....	4,435	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1870	5,799	91	250	.....	5,261	.....	5,511	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1871	5,730	91	270	.....	5,205	.....	5,475	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1872	6,877	92	308	.....	6,293	.....	6,601	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1873	10,838	91	365	.....	9,894	.....	10,259	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1874	11,933	92	169	.....	10,927	.....	11,096	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1875	9,977	88	220	.....	8,788	.....	9,008	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1876	11,051	83	312	.....	9,133	.....	9,445	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1877	15,754	85	312	.....	13,350	.....	13,662	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1878	18,417	84	312	.....	15,397	.....	15,709	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1879	23,601	84	575	.....	19,914	.....	20,489	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1880	30,018	88	350	.....	26,286	.....	26,636	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1881	31,993	86	275	.....	27,661	.....	27,936	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1882	35,704	85	275	.....	30,350	.....	30,625	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1883	30,255	78	250	.....	23,450	.....	23,700	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1884	35,969	67	250	.....	24,218	.....	24,468	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1885	26,765	59	250	.....	21,859	.....	22,109	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1886	47,243	59	584	.....	28,065	.....	28,649	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1887	47,807	59	526	.....	28,283	.....	28,809	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1888	52,165	53	695	.....	27,612	.....	28,307	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1889	61,507	57	705	.....	35,164	.....	35,869	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1890	76,633	60	795	.....	45,824	.....	46,619	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1891	91,100	60	755	.....	54,293	.....	55,048	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1892	88,739	57	780	.....	50,515	.....	51,295	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1893	92,038	53	798	.....	48,431	.....	49,229	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1894	89,337	55	829	.....	49,344	.....	50,173	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1895	103,692	51	726	.....	52,892	.....	53,618	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1896	114,199	53	727	.....	60,960	.....	61,687	.....	.....	.....	.....	.....	.....	.....	47	.....	.....	47
1897	121,992	50	710	.....	60,476	.....	61,186	.....	.....	.....	.....	.....	.....	.....	71	.....	.....	71
1898	124,979	44	758	.....	55,364	.....	56,122	.....	.....	.....	.....	.....	.....	.....	71	.....	.....	71
1899	131,147	44	808	.....	57,071	.....	57,879	.....	.....	.....	.....	.....	.....	.....	89	.....	.....	89
1900	149,137	43	913	.....	63,621	.....	64,534	.....	.....	.....	.....	.....	.....	.....	274	.....	.....	274
1901	167,440	41	757	10	69,389	.....	70,156	.....	.....	.....	.....	.....	.....	.....	275	.....	.....	275
1902	181,809	49	531	40	88,767	.....	89,338	.....	.....	.....	.....	.....	.....	.....	287	.....	.....	287
1903	194,879	52	487	75	100,461	.....	101,023	.....	.....	.....	.....	.....	.....	.....	278	.....	.....	278
1904	217,948	54	553	126	117,081	.....	117,760	.....	.....	.....	.....	.....	.....	.....	290	.....	.....	290
1905	215,091	63	634	251	134,717	.....	135,602	.....	.....	.....	.....	.....	.....	.....	373	.....	.....	373
1906	213,263	59	569	502	126,494	.....	127,565	.....	.....	.....	.....	.....	.....	.....	531	.....	.....	531
1907	263,957	63	789	1,005	166,095	.....	167,889	B	.....	.....	.....	.....	.....	.....	751	.....	.....	751
1908	285,287	63	528	3,933	178,527	.....	182,988	12	.....	.....	.....	.....	.....	.....	945	B	.....	957
1909	298,709	61	421	2,714	183,171	.....	186,306	18	.....	.....	.....	.....	.....	.....	1,411	57	.....	1,486
1910	327,763	64	316	3,634	209,557	.....	213,507	20	.....	.....	.....	.....	.....	.....	1,258	143	.....	1,421
1911	344,361	64	291	12,553	220,449	.....	233,293	13	.....	.....	.....	.....	.....	.....	1,465	285	.....	1,763
1912	352,443	63	242	16,558	222,935	.....	239,736	47	.....	.....	.....	.....	.....	.....	1,752	437	.....	2,236
1913	385,345	64	228	25,696	248,446	.....	274,370	131	.....	.....	.....	.....	.....	.....	2,071	504	.....	2,706
1914	407,544	65	215	26,235	265,763	.....	292,213	276	.....	.....	.....	.....	.....	.....	1,837	644	.....	2,757
1915	432,033	65	215	32,911	281,104	.....	314,230	513	.....	.....	.....	.....	.....	.....	2,579	750	.....	3,842
1916	457,500	66	198	40,546	300,767	.....	341,511	867	.....	.....	.....	.....	.....	.....	2,593	929	.....	4,389
1917	502,891	67	214	55,293	335,316	.....	390,823	1,218	.....	.....	.....	.....	.....	57	2,577	1,602	120	5,574
1918	503,515	71	305	63,828	355,928	.....	420,061	1,353	.....	.....	.....	.....	.....	C60	2,527	2,082	333	6,355
1919	555,875	68	241	87,073	378,367	.....	465,681	1,331	.....	.....	.....	.....	.....	C60	2,628	1,841	425	6,285
1920	688,884	64	196	157,069	442,929	.....	600,194	1,651	.....	.....	.....	.....	.....	C60	2,817	2,083	457	7,068
1921	766,002	62	188	193,398	472,183	.....	665,769	2,036	.....	.....	.....	.....	67	C60	3,699	2,354	1,433	9,649
1922	858,898	65	179	182,278	557,531	.....	739,988	2,866	.....	.....	.....	.....	323	C60	5,314	2,445	2,201	13,209
1923	1,015,736	72	170	149,585	732,407	.....	882,162	3,400	.....	.....	.....	.....	425	87	5,699	3,051	4,201	16,863
1924	1,014,318	70	161	139,678	713,940	.....	853,779	4,639	.....	.....	.....	.....	445	C100	8,379	4,057	9,042	26,662
1925	1,068,933	71	332	115,515	763,743	.....	879,590	6,336	.....	.....	.....	.....	1,007	160	9,232	4,387	19,687	40,809
1926	1,096,823	70	364	90,421	770,874	.....	861,659	7,351	.....	.....	.....	.....	6,444	214	10,762	4,971	36,911	67,153
1927	1,262,582	71	477	64,121	901,129	.....	965,727	8,630	.....	.....	.....	.....	15,014	537	10,127	5,380	63,134	102,822
1928	1,324,774	68	624	50,151	901,474	.....	952,249	9,070	.....	.....	.....	.....	19,897	1,084	12,006	7,684	105,749	155,490
1929	1,485,867	68	1,117	44,688	1,007,323	.....	1,053,128	9,391	.....	B	.....	.....	20,385	1,381	13,422	8,716	137,472	190,767
1930	1,410,037	64	1,522	39,530	898,011	.....	939,063	9,002	.....	56	.....	.....	20,346	1,553	12,449	9,419	136,669	189,494
1931	1,372,532	62	1,543	33,039	851,081	.....	885,663	11,709	.....	25	.....	.....	18,237	1,762	10,089	9,744	116,613	168,179
1932	1,309,677	60	1,044	32,805	785,159	.....	819,008	13,139	.....	44	.....	.....	16,414	1,597	9,899	10,126	116,154	167,760
1933	1,442,146	63	1,145	34,001	905,656	23	940,825	13,691	.....	112	.....	.....	13,158	1,620	13,257	9,561	117,720	169,119
1934	1,522,288	60	1,417	38,172	908,065	28	947,682	14,024	.....	159	.....	.....	17,341	1,637	16,314	10,894	136,103	196,472
1935	1,654,495	60	1,447	40,241	996,596	47	1,038,331	14,297	.....	164	.....	.....	17,598	1,732	17,067	11,671	148,254	210,783
1936	1,791,546	61	1,500	41,028	1,099,687	62	1,142,277	15,458	.....	105	.....	.....	18,756	1,942	17,593	13,237	154,794	221,885
1937	2,039,231	63	2,944	46,907	1,279,160	33	1,329,044	16,355	.....	122	.....	.....	20,599	2,161	17,457	15,503	186,230	258,427
1938	1,988,041	61	6,966	38,506	1,214,355	78	1,259,905	17,076	.....	226	.....	.....	21,582	2,246	15,839	17,737	188,174	262,880
1939	2,086,160	60.6	7,838	42,898	1,264,962	112	1,315,810	18,613	.....	215	.....	.....	23,857	2,313	13,508	19,270	206,470	284,246
1940	2,149,821	62.9	8,591	44,036	1,353,214	142	1,405,983	20,609	.....	288	2	.....	25,593	2,349	12,126	22,227	185,570	268,764
1941	2,220,657	63.1	10,134	42,196	1,402,228	150	1,454,708	21,873	.....	235	3	.....	24,553	1,557	11,935	20,506	228,430	309,092
1942	2,093,100	66.2	10,365	34,815	1,386,645	151	1,431,976	23,704	2	308	33	.....	10,487	2,278	13,629	22,069	147,675	220,185
1943	2,256,637	66.7	10,052	35,163	1,505,613	107	1,550,935	27,714	2	334	48	.....	13,261	2,315	14,654	21,385	177,631	257,344
1944	2,592,371	64.7	10,099	38,203	1,677,904	109	1,726,315	24,230	1	314	58	.....	22,291	2,967	14,389	22,139	257,046	343,435
1945	2,594,798	66.0	8,483	43,547	1,713,655	149	1,765,834	22,881	2	382	79	.....	22,449	2,664	13,744	21,093	323,156	406,450
1946	2,745,474	63.2	7,586	49,235	1,733,939	269	1,791,029	20,604	1	363	67	.....	22,118	2,323	12,468	20,233	388,486	466,663
1947	3,022,075	61.5	7,692	56,284	1,856,987	300	1,921,263	21,846	B	377	97	.....	24,794	2,282	12,764	20,521	434,905	517,586
1948	3,433,021	58.8	12,287	58,508	2,020,185	159	2,091,139	23,734	B	464	144	.....	23,792	2,563	14,069	20,111	490,015	574,892
1949	3,399,290	54.2	21,010	60,910	1,841,940	174	1,924,034	22,961	B	678	109	110	29,722	2,617	14,790	20,617	482,316	573,920
1950	3,783,284	52.1	28,904	72,118	1,971,845	68	2,072,935	22,590	B	616	339	631	34,059	2,691	15,028	20,239	544,647	640,840
Total	65,539,369	62.4	191,044	2,482,029	40,917,359	2,161	43,592,593	457,779	8	5,587	979	741	505,014	49,089	401,505	412,704	5,548,610	7,382,016

* **WORLD OIL** from private sources. B Less than 1,000 barrels. C Estimated production.



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20TH ANNIVERSARY

THIS first Rectorhead ushered in a new era of safety for the Oil Industry. It gave operators their first repackable head, which enables them to replace worn out, deteriorated, resilient packing. It assured a dependable, leak-proof seal that eliminated pressure build-up between strings, minimized fire hazard and assured better control of drilling, completion and producing operations.

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"The Positive Leak Preventer"

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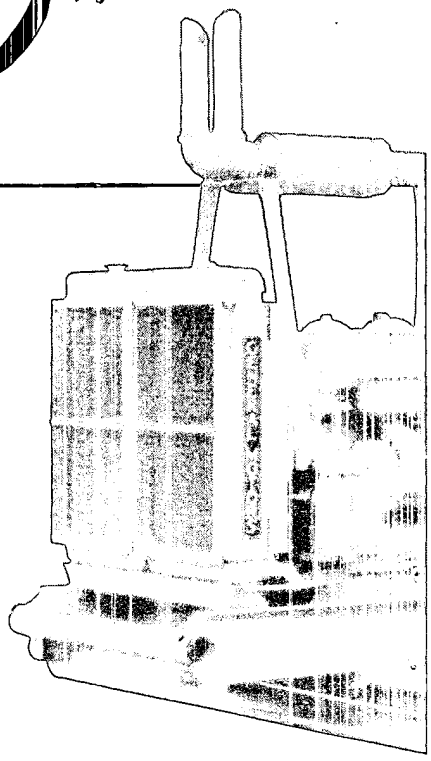


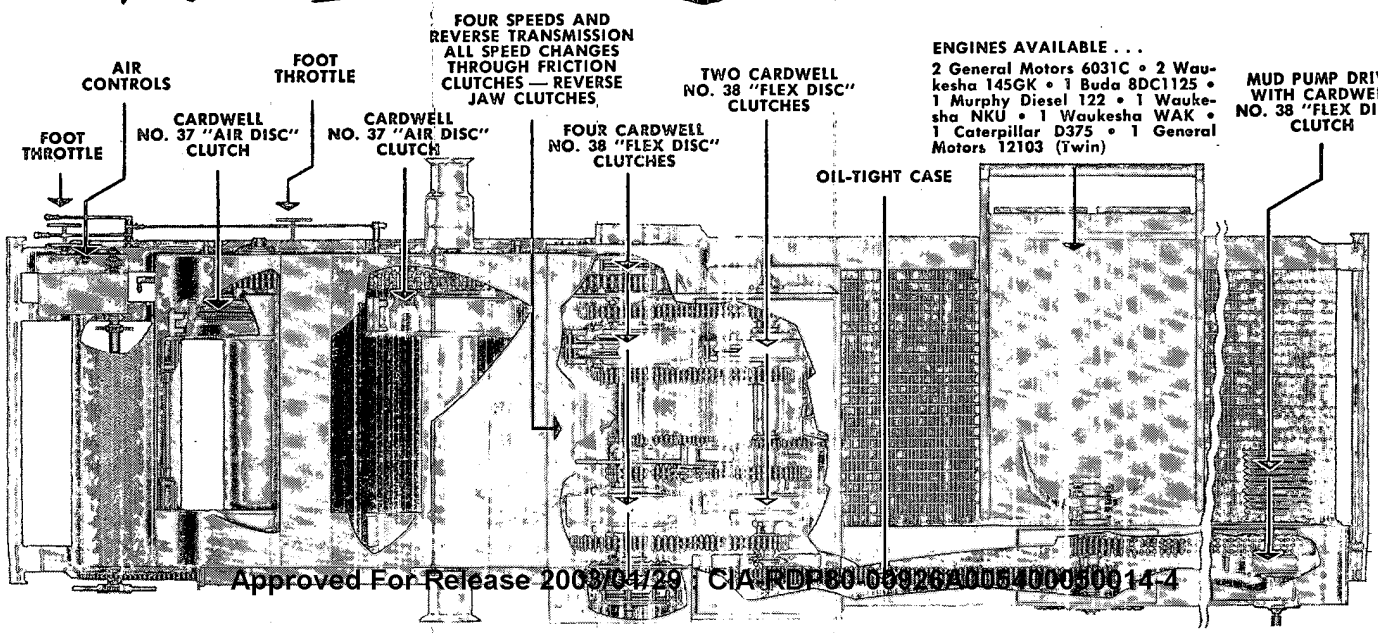
TWENTY-FIVE YEARS of rig research and field study has resulted in this most modern of all 5,000-foot draw works. Ground bearing fits, balanced parts, and air-operated friction clutches built with watchmaker precision, have made this super-smooth draw works a reality.

There are no better rigs than CARDWELL. Based on reports from contractors, operators and oil companies, CARDWELL rigs are known all over the world as "*tough iron*" because we build them to stand hard use without repairs.

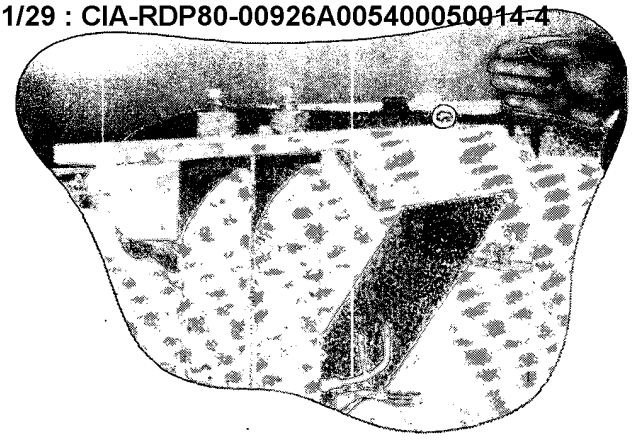
H. W. Cardwell

A New Draw Works

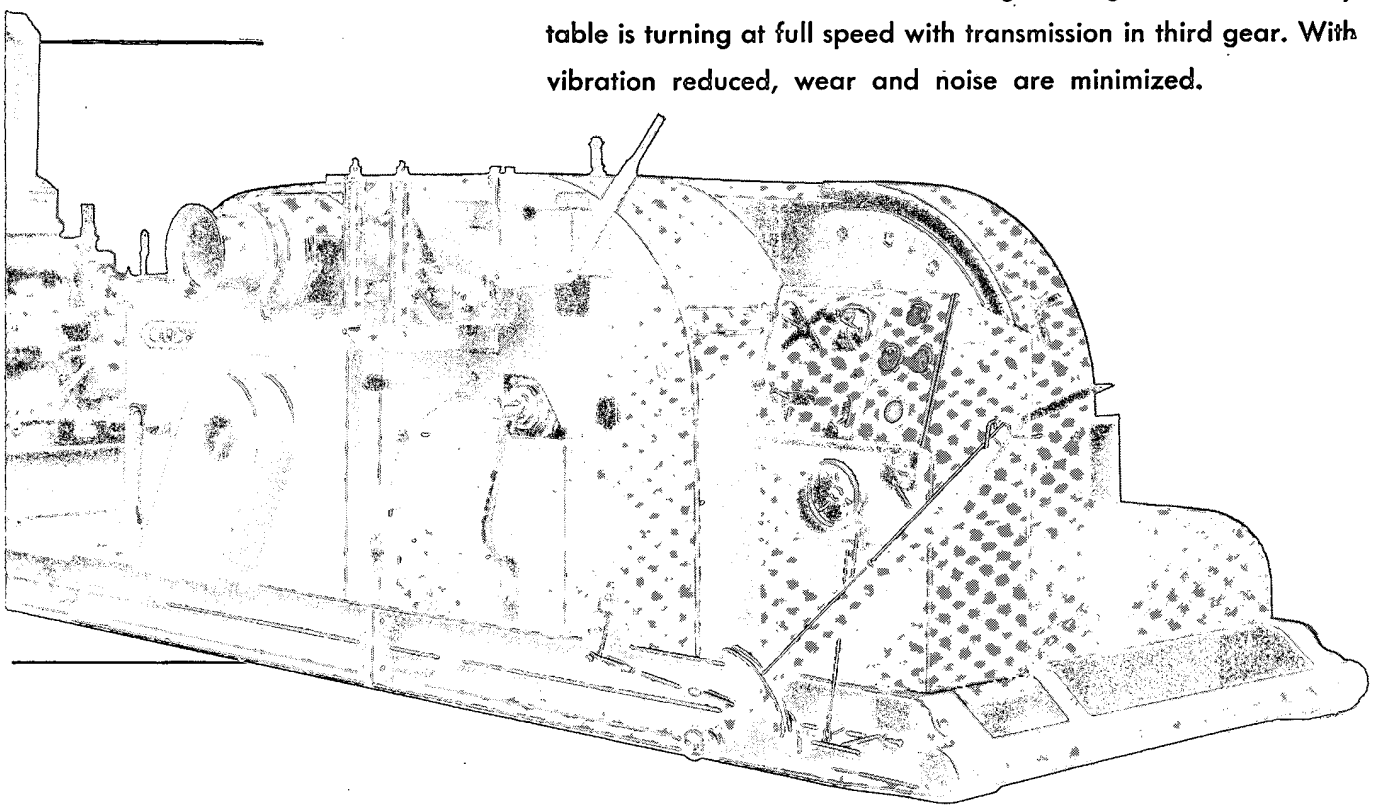
THIS power flow shows the compact design of the "Model D." Note the friction clutch drives running in oil in the transmission.



"New Super Smooth"



NOTE the 5-cent coin standing on edge while the rotary table is turning at full speed with transmission in third gear. With vibration reduced, wear and noise are minimized.



THE CARDWELL chain transmission in the "Model D" is operated through CARDWELL air-controlled friction clutches running in oil—making it possible to change to any transmission speed without stopping the block—no shock, no time lost. Rotary table speeds are also changed without stopping the table. Slush pump drive is operated from driller's position by air-controlled friction clutch. The "Model D" is available with one or two drums and can be equipped with single engine up to 320 HP, or with two engines up to 160 HP each. *Write for new catalog and prices.*

World Crude Oil Production, By Countries, By Years (Part 2)

(Complete production history of world, in thousands of barrels of 42 U. S. Gallons. Sources: *Mineral Resources and Minerals Yearbook*, except as otherwise indicated)

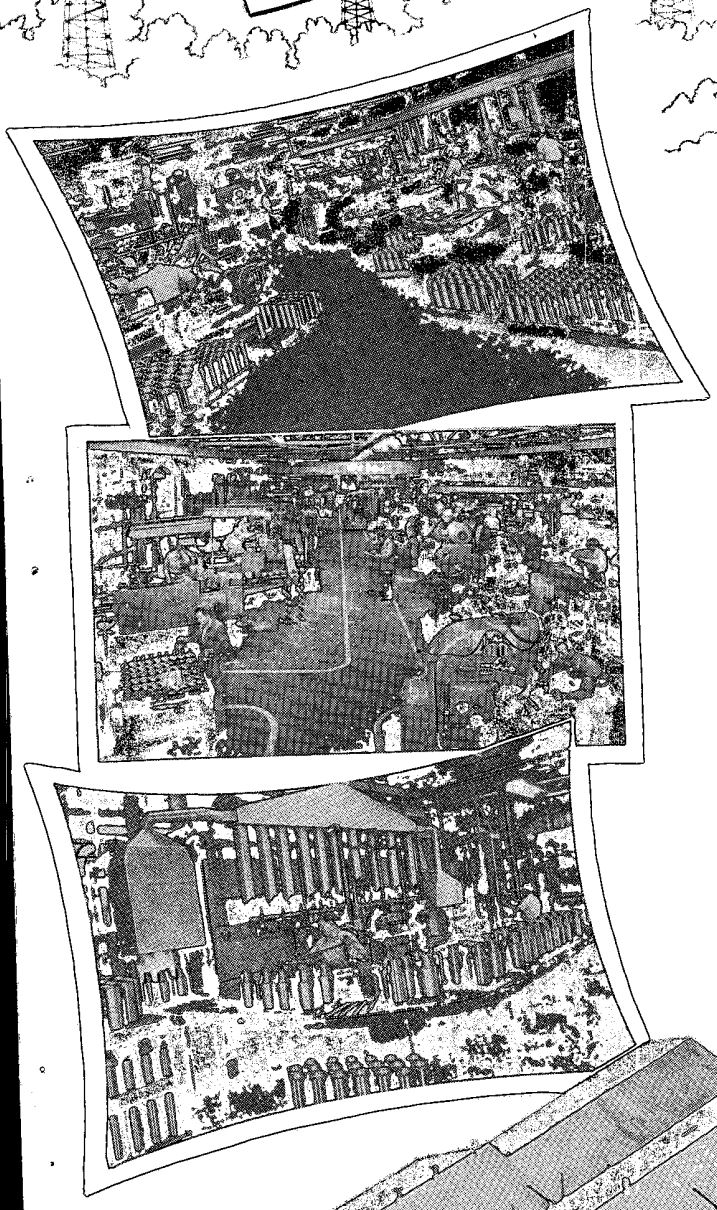
	EUROPE													AFRICA			
Year	Albania	Austria	Czecho-slovakia	Great Britain	France	Ger-many	Hun-gary	Italy	Nether-lands	Poland	Rou-mania	[F]U.S.S.R. (Russia)	Yugo-slavia	[F]Total Europe	Egypt	Algeria	Morocco	Total Africa
1857	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	2	.....	.....	.....	.....
1858	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	4	.....	.....	.....	.....
1859	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	4	.....	.....	.....	.....
1860	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9	.....	.....	9	.....	.....	.....	.....
1861	.....	.....	.....	.....	.....	.....	.....	[B]	.....	.....	17	.....	.....	17	.....	.....	.....	.....
1862	.....	.....	.....	.....	.....	.....	.....	[B]	.....	.....	23	.....	.....	23	.....	.....	.....	.....
1863	.....	.....	.....	.....	.....	.....	.....	[B]	.....	.....	28	41	.....	69	.....	.....	.....	.....
1864	.....	.....	.....	.....	.....	.....	.....	[B]	.....	.....	33	65	.....	98	.....	.....	.....	.....
1865	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	39	67	.....	108	.....	.....	.....	.....
1866	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	42	83	.....	125	.....	.....	.....	.....
1867	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	51	120	.....	172	.....	.....	.....	.....
1868	.....	.....	.....	.....	.....	.....	.....	[B]	.....	.....	56	88	.....	144	.....	.....	.....	.....
1869	.....	.....	.....	.....	.....	.....	.....	[B]	.....	.....	59	202	.....	261	.....	.....	.....	.....
1870	.....	.....	.....	.....	.....	.....	.....	[B]	.....	.....	84	204	.....	288	.....	.....	.....	.....
1871	.....	.....	.....	.....	.....	.....	.....	[B]	.....	.....	90	165	.....	255	.....	.....	.....	.....
1872	.....	.....	.....	.....	.....	.....	.....	[B]	.....	.....	91	185	.....	276	.....	.....	.....	.....
1873	.....	.....	.....	.....	.....	.....	.....	[B]	.....	.....	104	475	.....	579	.....	.....	.....	.....
1874	.....	.....	.....	.....	.....	.....	.....	1	.....	150	103	583	.....	837	.....	.....	.....	.....
1875	.....	.....	.....	.....	.....	.....	.....	1	.....	158	108	697	.....	964	.....	.....	.....	.....
1876	.....	.....	.....	.....	.....	.....	.....	3	.....	164	111	1,321	.....	1,599	.....	.....	.....	.....
1877	.....	.....	.....	.....	.....	.....	.....	3	.....	170	108	1,801	.....	2,082	.....	.....	.....	.....
1878	.....	.....	.....	.....	.....	.....	.....	4	.....	176	109	2,401	.....	2,690	.....	.....	.....	.....
1879	.....	.....	.....	.....	.....	.....	.....	3	.....	215	110	2,761	.....	3,089	.....	.....	.....	.....
1880	.....	.....	.....	.....	.....	9	.....	2	.....	229	115	3,001	.....	3,356	.....	.....	.....	.....
1881	.....	.....	.....	.....	.....	29	.....	1	.....	287	122	3,601	.....	4,040	.....	.....	.....	.....
1882	.....	.....	.....	.....	.....	58	.....	2	.....	330	136	4,538	.....	5,064	.....	.....	.....	.....
1883	.....	.....	.....	.....	.....	27	.....	2	.....	365	139	6,002	.....	6,535	.....	.....	.....	.....
1884	.....	.....	.....	.....	.....	46	.....	3	.....	408	211	10,805	.....	11,473	.....	.....	.....	.....
1885	.....	.....	.....	.....	.....	41	.....	2	.....	465	193	13,925	.....	14,626	.....	.....	.....	.....
1886	.....	.....	.....	.....	.....	74	.....	2	.....	306	168	18,006	.....	18,556	.....	.....	.....	.....
1887	.....	.....	.....	.....	.....	74	.....	1	.....	344	182	18,368	.....	18,969	.....	.....	.....	.....
1888	.....	.....	.....	.....	.....	85	.....	1	.....	467	219	23,049	.....	23,821	.....	.....	.....	.....
1889	.....	.....	.....	.....	.....	68	.....	1	.....	515	298	24,609	.....	25,491	.....	.....	.....	.....
1890	.....	.....	.....	.....	.....	108	.....	3	.....	659	383	28,691	.....	29,844	.....	.....	.....	.....
1891	.....	.....	.....	.....	.....	109	.....	8	.....	631	488	34,573	.....	35,809	.....	.....	.....	.....
1892	.....	.....	.....	.....	.....	101	.....	18	.....	646	593	35,775	.....	37,133	.....	.....	.....	.....
1893	.....	.....	.....	.....	.....	100	.....	19	.....	693	535	40,457	.....	41,804	.....	.....	.....	.....
1894	.....	.....	.....	.....	.....	123	.....	21	.....	949	508	36,375	.....	37,976	.....	.....	.....	.....
1895	.....	.....	.....	.....	.....	121	.....	26	.....	1,453	576	46,140	.....	48,316	.....	.....	.....	.....
1896	.....	.....	.....	.....	.....	145	.....	18	.....	2,444	543	47,221	.....	50,371	.....	.....	.....	.....
1897	.....	.....	.....	.....	.....	166	.....	14	.....	2,226	571	54,399	.....	57,376	.....	.....	.....	.....
1898	.....	.....	.....	.....	.....	184	.....	15	.....	2,376	776	61,610	.....	64,961	.....	.....	.....	.....
1899	.....	.....	.....	.....	.....	192	.....	16	.....	2,314	1,426	65,955	.....	69,903	.....	.....	.....	.....
1900	.....	.....	.....	.....	.....	358	.....	12	.....	2,347	1,629	75,780	.....	80,126	.....	.....	.....	.....
1901	.....	.....	.....	.....	.....	314	.....	16	.....	3,251	1,678	85,168	.....	90,427	.....	.....	.....	.....
1902	.....	.....	.....	.....	.....	354	.....	19	.....	4,142	2,060	80,540	.....	87,115	.....	.....	.....	.....
1903	.....	.....	.....	.....	.....	446	.....	18	.....	5,235	2,763	75,591	.....	84,053	.....	.....	.....	.....
1904	.....	.....	.....	.....	.....	637	.....	26	.....	5,947	3,599	78,537	.....	88,746	.....	.....	.....	.....
1905	.....	.....	.....	.....	.....	561	.....	44	.....	5,766	4,421	54,960	.....	65,752	.....	.....	.....	.....
1906	.....	.....	.....	.....	.....	579	.....	54	.....	5,468	6,378	58,897	.....	71,376	.....	.....	.....	.....
1907	.....	.....	.....	.....	.....	757	.....	60	.....	8,456	8,118	61,851	.....	79,242	.....	.....	.....	.....
1908	.....	.....	.....	.....	.....	1,009	.....	51	.....	12,612	8,252	62,187	.....	84,111	.....	.....	.....	.....
1909	.....	.....	.....	.....	.....	1,019	.....	42	.....	14,933	9,327	65,970	.....	91,291	.....	.....	.....	.....
1910	.....	.....	.....	.....	.....	1,032	.....	51	.....	12,673	9,724	70,337	.....	93,817	.....	.....	.....	.....
1911	.....	.....	.....	.....	.....	1,017	.....	75	.....	10,519	11,108	66,184	.....	88,903	21	.....	.....	21
1912	.....	.....	.....	.....	.....	1,031	.....	54	.....	8,535	12,976	68,019	.....	90,615	214	.....	.....	214
1913	.....	.....	.....	.....	.....	857	.....	47	.....	7,818	13,555	62,834	.....	85,111	98	.....	.....	98
1914	.....	.....	.....	.....	.....	781	.....	40	.....	6,436	12,827	67,020	.....	87,104	753	1	.....	754
1915	.....	.....	.....	.....	.....	703	.....	44	.....	5,352	12,030	68,548	.....	86,677	212	4	.....	216
1916	.....	.....	.....	.....	.....	656	.....	51	.....	6,587	8,945	65,817	.....	82,056	404	8	.....	412
1917	.....	.....	.....	.....	[G]	642	.....	41	.....	6,228	3,721	63,072	.....	73,704	943	9	.....	952
1918	.....	.....	.....	.....	363	270	.....	35	.....	6,032	8,730	27,168	.....	42,598	1,935	7	.....	1,942
1919	.....	.....	48	2	334	265	.....	35	.....	6,096	6,618	31,752	.....	45,150	1,517	5	.....	1,522
1920	.....	.....	69	3	356	246	.....	35	.....	5,607	7,435	25,430	.....	39,181	1,042	4	.....	1,046
1921	.....	.....	94	3	389	274	.....	32	.....	5,167	8,368	28,968	.....	43,295	1,255	3	.....	1,258
1922	.....	.....	120	1	496	319	.....	31	.....	5,227	9,843	35,692	.....	51,729	1,188	9	.....	1,197
1923	.....	.....	74	1	494	346	.....	34	.....	5,402	10,867	39,147	.....	56,365	1,054	9	.....	1,063
1924	.....	.....	76	2	497	406	.....	39	.....	5,657	13,369	45,355	.....	65,401	1,122	11	.....	1,133
1925	.....	.....	158	3	459	541	.....	61	.....	5,960	16,650	52,448	.....	76,280	1,226	12	.....	1,238
1926	.....	.....	150	2	478	653	.....	41	.....	5,844	23,314	64,311	.....	94,793	1,188	9	.....	1,197
1927	.....	.....	112	2	504	663	.....	47	.....	5,342	26,368	77,018	.....	110,056	1,267	8	.....	1,275
1928	.....	.....	94	1	512	630	.....	46	.....	5,492	30,773	[D]84,745	.....	122,293	1,842	8	.....	1,850
1929	.....	.....	93	.....	535	704	.....	45	.....	4,988	34,758	[D]99,507	.....	140,630	1,868	20	.....	1,888
1930	.....	.....	157	[B]	523	1,182	.....	59	.....	4,904	41,624	[D]125,555	.....	174,004	1,996	16	.....	2,012
1931	.....	.....	134	[E]	520	1,606	.....	124	.....	4,662	49,127	162,842	.....	219,015	2,038	[E]	.....	2,038
1932	.....	.....	126	[E]	530	1,608	.....	208	.....	4,116	53,815	154,367	.....	214,770	1,895	[E]	7	1,902
1933	11	.....	122	[E]	562	1,665	.....	204	.....	4,072	54,020	154,840	.....	215,496	1,663	[E]	7	1,670
1934	10	.....	178	[E]	557	2,187	.....	151	.....	3,913	62,063	174,318	.....	243,377	1,546	[E]	6	1,552
1935	41	44	133	[E]	541	2,996	.....	119	.....	3,812	61,310	182,386	2	251,384	1,301	[E]	4	1,305
1936	273	50	127	[E]	503	3,115	.....	123	.....	3,789	63,659	186,206	1	257,846	1,278	[E]	4	1,282
1937	619	221	123	[E]	502	3,176	16	110	.....	3,716	52,452	193,241	4	254,180	1,196	[E]	22	1,218
1938	752	383	130	[E]	513	3,861	288	101	.....	3,763	48,487	204,956	9	263,243	1,581	[E]	27	1,608
1939	934	1,240	120	.....	500	4,487	1,103	91	.....	3,898	45,648	216,866	10	274,897	4,666	[E]	27	4,693
1940	1,497	2,808	163	124	496	7,371	1,881	85	.....	3,891	43,168	218,600	10	280,094	6,505	[E]	27	6,532
1941	1,334	4,238	182	223	414	6,303	3,183	95	.....	1,793	40,517	238,150	10	296,443	8,546	[E]	27	8,573
1942	1,601	5,899	271	605	463	5,191	5,037	101	.....	2,794	42,094	227,470	10	291,536	8,275	[E]	41	8,316
1943	1,001	7,478	200	839	356	4,973	6,347	86	1	3,500	39,182	200,750	10	264,723	8,953	.....	39	8,992
1944	334	8,218	185	703	300	6,154	6,277	55	11	3,000	26,191	275,000	307	326,735	9,416	.....	32	9,448
1945	267	3,074	91	532	202	3,935	5,018	53	37	750	34,772	148,953	307	197,991	9,406	.....	26	9,432
1946	1,000	5,734	196	412	368	4,539	5,146	83	395	866	31,434	157,673	245	208,091	9,070	.....	20	9,090
1947	2,000	6,285	210	351	356	4,032	4,330	81	1,340	951	28,552	187,463	365	236,316	8,627	.....	21	8,648
1948	1,500	6,149	204	323	370	4,489	3,647	71	3,122	1,039	34,000	218,000	385	273,299	13,398	.....	100	13,498
1949	2,188	6,100	292	338	411	5,947	3,791	71	4,314	965	33,700	233,170	440	291,727	15,862	.....	136	15,998
1950	2,106	6,205	280	340	893	7,830	3,460	72	4,864	928	31,609	263,165	489	322,241	16,275	7	291	16,573
Total	17,468	64,126	4,713	4,810	15,297	106,577	49,524	3,563	14,084	279,381	1,257,195	6,555,183	2,604	8,374,525	152,642	150	864	153,656

[*] WORLD OIL from private sources. [B] Less than 1,000 barrels. [C] Estimated production. [D] Year ended September 30. [E] No more data available. [F] Includes fields in Russian Asia other than Sakhalin. [G] France's earlier production credited to Germany.

KEEPING PACE WITH A GIANT

AMERICAN IRON & MACHINE WORKS CO. · MANUFACTURERS OF OIL FIELD EQUIPMENT · REG. U.S. PAT. OFF. · OKLAHOMA CITY U.S.A.

MORE THAN 27 YEARS

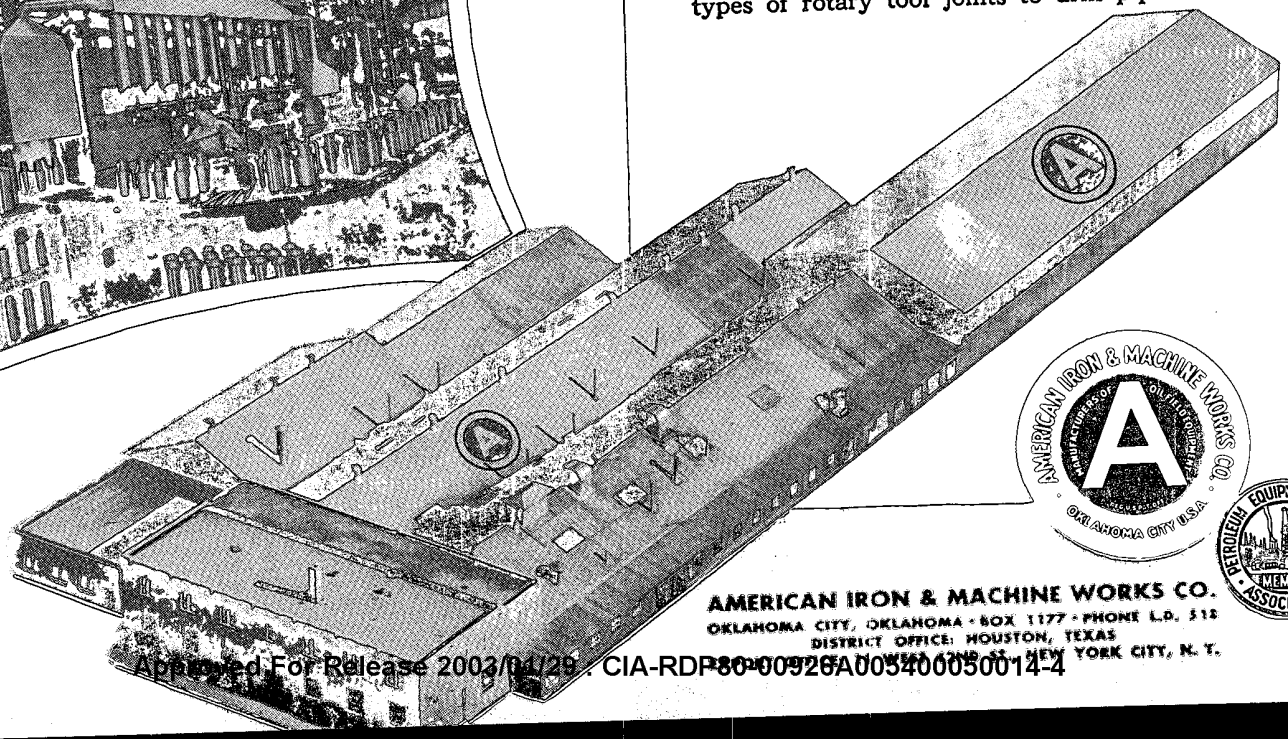


Like the giant it now is—the vastness of the world-wide oil industry makes us humble when we realize the relatively small part our company occupies in it.

Yet, we feel justifiably proud of the fact that during our more than 27 years of manufacturing activity, we have constantly developed both products and plant facilities to keep pace with its needs!

American Iron Plant No. 1 is both technical and manufacturing headquarters for our outstanding line of oil field equipment. Housed in this plant is American Iron's modern tool joint production line—plus complete machining and heat treating facilities for all American Iron Products.

American Iron Plant No. 2, covering 7½ acres, provides sufficient storage racks for the handling of 1,000,000 feet of pipe. Complete facilities are available for the installation of all types of rotary tool joints to drill pipe.



AMERICAN IRON & MACHINE WORKS CO. · MANUFACTURERS OF OIL FIELD EQUIPMENT · OKLAHOMA CITY U.S.A.

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION · MEMBER

AMERICAN IRON & MACHINE WORKS CO.

OKLAHOMA CITY, OKLAHOMA · BOX 1177 · PHONE L.D. 515

DISTRICT OFFICE: HOUSTON, TEXAS

[illegible] NEW YORK CITY, N. Y.

World Crude Oil Production, By Countries, By Years (Part 3)

(Complete production history of world, in thousands of barrels of 42 U. S. Gallons. Sources: *Mineral Resources and Minerals Yearbook*, except as otherwise indicated)

	ASIA — Middle East								ASIA — Far East												
										[E]Burma-India Pakistan				[H]							
Year	Bahrein	Iran	Iraq	Kuwait	Qatar	Saudi Arabia	Turkey	Total Middle East	British Borneo	Burma	Pakistan	India	China	For-mosa	Japan	Indo-nesia	Sak-halin	Total Far East	[F]Total Asia	Aus-tralia-N.Z.	Rest of World
1857	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1858	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1859	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1860	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1861	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1862	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1863	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1864	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1865	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1866	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1867	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1868	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1869	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1870	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1871	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1872	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1873	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1874	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1875	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	.....	.....	5	5	.....	.....
1876	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7	.....	.....	7	7	.....	.....
1877	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	.....	.....	10	10	.....	.....
1878	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18	.....	.....	18	18	.....	.....
1879	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23	.....	.....	23	23	.....	.....
1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	26	.....	.....	26	26	.....	.....
1881	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	17	.....	.....	17	17	.....	.....
1882	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15	.....	.....	15	15	.....	.....
1883	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20	.....	.....	20	20	.....	.....
1884	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28	.....	.....	28	28	.....	.....
1885	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	30	.....	.....	30	30	.....	.....
1886	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	38	.....	.....	38	38	.....	.....
1887	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	29	.....	.....	29	29	.....	.....
1888	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	37	.....	.....	37	37	.....	.....
1889	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	94	.....	.....	.....	53	.....	.....	147	147	.....	.....
1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	118	.....	.....	.....	52	.....	.....	170	170	.....	.....
1891	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	190	.....	.....	.....	53	.....	.....	243	243	.....	.....
1892	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	242	.....	.....	.....	69	.....	.....	311	311	.....	.....
1893	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	299	.....	.....	.....	106	600	.....	1,005	1,005	.....	.....
1894	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	327	.....	.....	.....	173	688	.....	1,188	1,188	.....	.....
1895	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	372	.....	.....	.....	170	1,216	.....	1,758	1,758	.....	.....
1896	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	430	.....	.....	.....	237	1,427	.....	2,094	2,094	.....	.....
1897	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	546	.....	.....	.....	262	2,552	.....	3,360	3,360	.....	.....
1898	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	542	.....	.....	.....	319	2,964	.....	3,825	3,825	.....	.....
1899	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	941	.....	.....	.....	539	1,796	.....	3,276	3,276	.....	.....
1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,079	.....	.....	.....	871	2,253	.....	4,203	4,203	.....	.....
1901	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,431	.....	.....	.....	1,117	4,014	.....	6,562	6,562	.....	20
1902	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,617	.....	.....	.....	996	2,430	.....	5,043	5,043	.....	26
1903	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,510	.....	.....	.....	1,209	5,770	.....	9,489	9,489	.....	36
1904	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,385	.....	.....	.....	1,219	6,508	.....	11,112	11,112	.....	40
1905	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,137	.....	.....	.....	1,347	7,850	.....	13,334	13,334	.....	30
1906	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,016	.....	.....	.....	1,564	8,181	.....	13,761	13,761	.....	30
1907	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,344	.....	.....	.....	1,718	9,983	.....	16,045	16,045	.....	30
1908	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,047	.....	.....	.....	1,871	10,283	.....	17,201	17,201	.....	30
1909	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,677	.....	.....	.....	1,887	11,042	.....	19,606	19,606	.....	20
1910	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,138	.....	.....	.....	1,829	11,031	.....	18,998	18,998	.....	20
1911	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,451	.....	.....	.....	1,737	12,173	.....	20,361	20,361	.....	20
1912	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,117	.....	.....	.....	1,659	10,846	.....	19,622	19,622	.....	20
1913	.....	1,857	.....	.....	.....	.....	.....	1,857	141	.....	7,930	.....	.....	.....	1,940	11,172	.....	21,183	23,040	.....	20
1914	.....	2,910	.....	.....	.....	.....	.....	2,910	318	.....	7,410	.....	.....	.....	2,636	11,422	.....	21,786	24,696	.....	20
1915	.....	3,616	.....	.....	.....	.....	.....	3,616	392	.....	8,202	.....	.....	.....	2,928	11,920	.....	23,442	27,058	.....	10
1916	.....	4,477	.....	.....	.....	.....	.....	4,477	629	.....	8,491	.....	.....	.....	2,963	12,547	.....	24,630	29,107	.....	25
1917	.....	7,147	.....	.....	.....	.....	.....	7,147	542	.....	8,079	.....	.....	.....	2,861	13,180	.....	24,662	31,809	.....	29
1918	.....	8,623	.....	.....	.....	.....	.....	8,623	504	.....	8,188	.....	.....	.....	2,441	12,778	.....	23,911	32,534	.....	25
1919	.....	10,139	.....	.....	.....	.....	.....	10,139	596	.....	8,736	.....	.....	.....	2,238	15,508	.....	27,078	37,217	.....	20
1920	.....	12,230	.....	.....	.....	.....	.....	12,230	1,020	.....	8,375	.....	.....	.....	2,221	17,529	.....	29,145	41,375	.....	20
1921	.....	16,673	.....	.....	.....	.....	.....	16,673	1,411	.....	8,734	.....	.....	.....	2,233	16,958	2	29,338	46,011	.....	20
1922	.....	22,247	.....	.....	.....	.....	.....	22,247	2,849	.....	8,529	.....	.....	.....	2,055	17,066	7	30,506	52,753	.....	22
1923	.....	25,230	.....	.....	.....	.....	.....	25,230	3,940	.....	8,406	.....	.....	.....	1,804	19,870	9	34,029	59,259	.....	24
1924	.....	32,373	.....	.....	.....	.....	.....	32,373	4,163	.....	8,416	.....	.....	.....	1,814	20,473	80	34,946	67,319	.....	24
1925	.....	35,038	.....	.....	.....	.....	.....	35,038	4,257	.....	8,274	.....	.....	.....	1,915	21,422	87	35,955	70,993	.....	23
1926	.....	35,842	.....	.....	.....	.....	.....	35,842	4,942	.....	8,011	.....	.....	.....	1,785	21,243	181	36,162	72,004	.....	17
1927	.....	39,688	338	.....	.....	.....	.....	40,026	4,943	.....	8,032	.....	.....	.....	1,789	27,459	440	42,663	82,689	.....	13
1928	.....	43,461	713	.....	.....	.....	.....	44,174	[G]5,223	.....	8,741	.....	.....	.....	1,944	32,118	677	48,703	92,877	.....	15
1929	.....	42,145	798	.....	.....	.....	.....	42,943	5,290	.....	8,747	.....	.....	.....	2,023	39,279	[D]1,134	56,473	99,416	.....	38
1930	.....	45,828	913	.....	.....	.....	.....	46,741	4,907	.....	8,292	.....	.....	.....	1,950	41,729	[D]1,805	58,683	105,424	.....	40
1931	.....	44,376	830	.....	.....	.....	.....	45,206	3,854	.....	8,200	.....	.....	.....	2,050	35,539	2,734	52,377	97,583	.....	54
1932	.....	49,471	836	.....	.....	.....	.....	50,307	3,796	.....	8,817	.....	.....	.....	1,630	39,001	2,631	55,875	106,182	.....	62
1933	31	54,392	917	.....	.....	.....	.....	55,340	4,490	.....	8,743	.....	.....	.....	1,455	42,606	2,338	59,632	114,972	.....	71
1934	285	57,851	7,689	.....	.....	.....	.....	65,825	5,140	.....	10,503	.....	.....	.....	1,834	46,925	2,881	67,283	133,108	.....	96
1935	1,265	57,273	27,408	.....	.....	.....	.....	85,946	5,546	7,181	[E]	2,038	.....	.....	2,249	47,171	2,545	66,730	152,676	5	4
1936	4,645	62,718	30,406	.....	.....	20	.....	97,789	5,209	7,588	[E]	1,978	.....	.....	2,440	50,025	3,212	70,452	168,241	5	4
1937	7,762	77,804	31,836	.....	.....	65	.....	117,467	6,009	7,848	[E]	2,162	.....	.....	2,488	56,724	3,656	78,887	196,354	4	4
1938	8,298	78,372	32,643	.....	.....	495	.....	119,808	6,913	7,538	[E]	2,488	.....	.....	2,511	57,318	[C]3,821	80,589	200,397	4	4
1939	7,589	78,151	30,791	.....	.....	3,934	.....	120,465	7,097	7,873	[E]	2,327	4	.....	2,054	62,087	4,000	86,042	206,507	3	4
1940	7,074	66,317	24,225	.....	.....	5,075	.....	102,691	7,047	7,731	[E]	2,302	10	.....	2,639	62,011	4,000	85,740	188,431	3	14
1941	6,794	50,777	12,650	.....	.....	4,310	.....	74,531	6,864	7,762	[E]	2,899	87	62	1,929	53,704	4,000	77,307	151,838	3	.....
1942	6,241	72,256	19,726	.....	.....	4,530	.....	102,753	3,000	2,500	[E]	2,792	340	48	1,652	24,000	4,000	38,332	141,085	2	.....
1943	6,572	74,612	24,848	.....	.....	4,868	.....	110,900	4,500	1,000	[E]	2,735	447	38	1,727	48,294	5,000	63,741	174,641	2	.....
1944	6,714	102,045	30,943	.....	.....	7,794	.....	147,496	6,000	750	[E]	2,784	505	40	1,601	22,260	5,000	38,940	186,436	2	.....
1945	7,309	130,526	35,112	.....	.....	21,311	.....	194,258	2,100	725	[E]	2,363	484	14	1,544	7,600	6,000	20,830	215,088	3	.....
1946	8,010	146,819	35,665	5,931	.....	59,944	.....	256,369	2,050	15	[E]	2,193	513	16	1,343	2,100	6,000	14,230	270,599	2	.....
1947	9,411	154,998	35,834	16,225	.....	89,852	.....	306,320	12,970	59	356	1,863	374	22	1,276	8,020	[C]7,000	31,940	338,260	2	.....
1948	10,915	190,384	26,115	46,500	.....	142,853	.....	416,767	20,120	360	490	1,875	533	23	1,122	31,900	[C]7,000	63,423	480,190	3	.....
1949	10,985	204,712	31,000	89,930	750	174,008	95	511,480	25,108	316	746	1,894	752	22	1,353	44,932	7,000	82,123	593,603	8	.....
1950*	11,016	241,425	46,760	125,722	11,457	199,547	184	636,111	29,700	400	1,250	3,051	803	24	2,048	50,300	7,000	94,576	730,687	8	.....
Total	120,916	2,384,883	488,996	284,308	12,207	718,606	279	4,010,115	213,580		344,138		4,852	309	98,445	1,269,797	94,240	2,025,361	6,035,476	59	1,044

[*] **WORLD OIL** from private sources. [B] Less than 1,000 barrels. [C] Estimated production. [D] Year ended September 30 [E] Separation of British India and Burma prior to 1935 not available from U.S. Bureau of Mines data used here. Data by Dudley Stamp in "Petroleum Development and Technology, 1933," and in A.I.M.E. "Transactions" indicate cumulative through 1934 as follows: Burma 184,528, India 20,756. Pakistan included with India prior to 1947. [F] Exclusive of U.S.S.R. fields in Asia, other than Sakhalin, which are included with U.S.S.R. in Europe. [G] Beginning of production in Brunei. [H] Formosa included with Japan prior to 1941.

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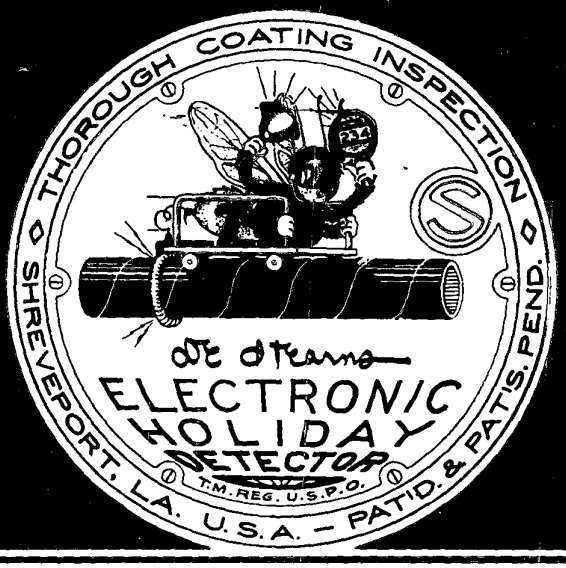

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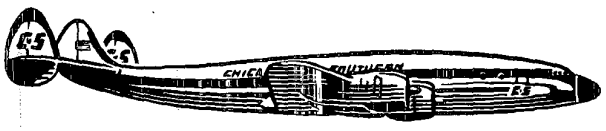

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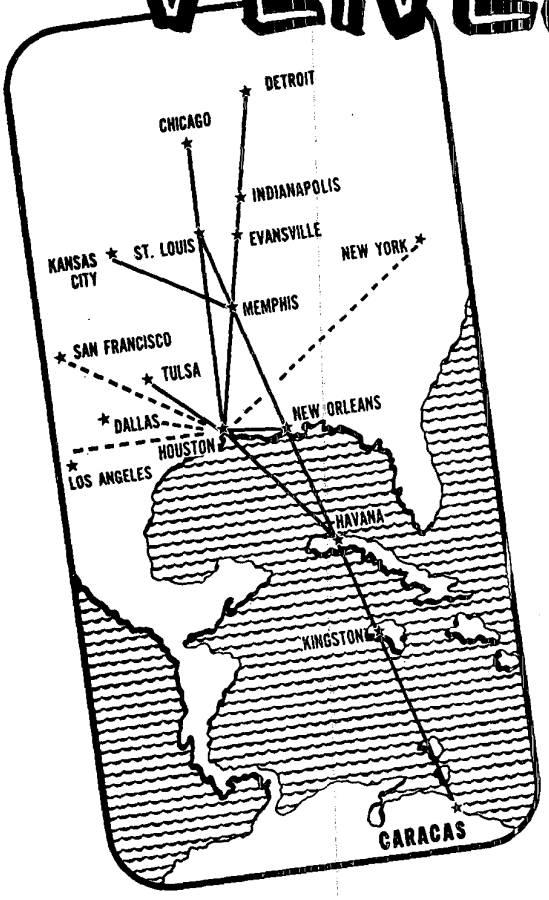

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WORLD CRUDE RESERVES

Estimated Reserves Exceed 95 Billion Barrels for Increase Exceeding 18 Billion in Last Five Years

THE U. S. position as world's leading petroleum producer is threatened with a danger that only another major oil discovery can erase. The danger is diminishing reserves. With an annual production in 1950 of 1,971,845,000 barrels, 52.12 percent of the world output, the U. S. had a ratio of reserves to production of only 13.3 years. In other words, estimated reserves as of January 1, 1951, will fulfill requirements for less than 14 years without further field discoveries. The reserves were estimated at 26,217,724,000 barrels, or 27.54 percent of world reserves. On January 1, 1946, estimated reserves of 20,826,813,000 barrels formed 30.90 percent of the world's supply.

Total world estimated reserves as of January 1, 1951, were 95,208,124,000 barrels, 18,796,311,000 above the reserves estimated five years earlier. In 1946, reserves were placed at 76,411,813,000 barrels. That world reserve increase accounts for the U. S. figure for 1951 accounting for only 27.54 percent of the world total when reserves

Five-Year Comparison of Estimated World Crude Reserves, by Countries

(THOUSANDS OF BARRELS)

CONTINENT and COUNTRY	ESTIMATED RESERVES				ANNUAL PRODUCTION		Ratio of Reserves to 1950 Prod. (Years' Supply)
	Thousand Barrels Jan. 1, 1946	Percent of World	Thousand Barrels Jan. 1, 1951	Percent of World	Thousand Barrels in 1950	Percent of World	
North America	21,849,813	32.41	28,722,224	30.17	2,072,935	54.79	13.9
Alaska	.....	.....	500	.....	.....	.....	.....
Canada	15,000	0.22	1,200,000	1.26	28,904	0.76	41.5
Cuba	3,000	.....	4,000	.....	68	.....	58.8
Mexico	870,000	1.29	1,300,000	1.37	72,118	1.91	18.0
United States	20,826,813	30.90	26,217,724	27.54	1,971,845	52.12	13.3
South America	8,336,000	12.37	10,650,000	11.19	640,840	16.94	16.6
Argentina	300,000	0.45	270,000	0.28	22,590	0.60	12.0
Bolivia	50,000	0.07	23,000	0.02	616	0.02	37.3
Brazil	1,000	.....	26,000	0.03	339	0.01	76.7
Chile	.....	.....	30,000	0.04	631	0.02	47.5
Colombia	500,000	0.74	375,000	0.39	34,059	0.90	11.0
Ecuador	25,000	0.04	26,000	0.03	2,691	0.07	0.7
Peru	160,000	0.24	150,000	0.16	15,028	0.40	10.0
Trinidad	300,000	0.45	250,000	0.26	20,239	0.53	12.4
Venezuela	7,000,000	10.38	9,500,000	9.98	544,647	14.39	17.4
Europe	8,840,150	13.11	6,206,700	6.52	322,241	8.52	19.3
Albania	25,000	0.04	20,000	0.02	2,106	0.06	9.5
Austria	75,000	0.11	60,000	0.06	6,205	0.16	9.7
Czechoslovakia	3,500	0.01	2,500	.....	280	0.01	8.9
France	10,000	0.01	14,400	0.02	893	0.02	16.1
Germany	85,000	0.13	160,000	0.17	7,830	0.21	20.4
Great Britain	15,000	0.02	3,400	.....	340	0.01	10.0
Hungary	75,000	0.11	35,000	0.04	3,460	0.09	10.1
Italy	1,500	.....	2,200	.....	72	.....	30.6
Netherlands	.....	.....	53,000	0.06	4,864	0.13	10.9
Poland	50,000	0.07	12,000	0.01	928	0.02	12.9
Roumania	500,000	0.74	340,000	0.36	31,609	0.84	10.8
U.S.S.R. (Russia)	8,000,000	11.87	5,500,000	5.78	263,165	6.96	20.9
Yugoslavia	150	.....	4,200	.....	489	0.01	8.6
Africa	75,500	0.11	183,200	0.19	16,573	0.44	11.1
Algeria	500	.....	1,000	.....	7	.....	142.9
Egypt	75,000	0.11	180,000	0.19	16,275	0.43	11.1
Morocco	.....	.....	2,200	.....	291	0.01	7.6
Asia, Total	28,310,000	42.00	49,445,500	51.93	730,687	19.31	67.7
Asia, Middle East	27,000,000	40.05	48,010,000	50.42	636,111	16.81	75.5
Bahrein	250,000	0.37	300,000	0.32	11,016	0.29	27.2
Iran (Persia)	7,000,000	10.38	13,000,000	13.65	241,425	6.38	53.8
Iraq	5,000,000	7.42	8,700,000	9.14	46,760	1.24	186.1
Kuwait	9,000,000	13.35	15,000,000	15.75	125,722	3.32	119.3
Qatar	1,000,000	1.48	1,000,000	1.05	11,457	0.30	87.3
Saudi Arabia	4,750,000	7.05	10,000,000	10.50	199,547	5.27	50.1
Turkey	.....	.....	10,000	0.01	184	0.01	54.3
Asia, Far East	1,310,000	1.95	1,435,500	1.51	94,576	2.50	15.2
Borneo, British (Sarawak and Brunei)	75,000	0.11	250,000	0.26	29,700	0.79	8.4
Burma	100,000	0.15	48,000	0.05	400	0.01	120.0
China	15,000	0.02	10,000	0.01	803	0.02	12.5
Formosa	.....	.....	500	.....	24	.....	20.8
India	35,000	0.05	15,000	0.02	3,051	0.08	4.9
Indonesia	1,000,000	1.49	1,000,000	1.05	50,300	1.33	19.9
Japan	35,000	0.05	22,000	0.03	2,048	0.05	10.7
Pakistan	.....	.....	20,000	0.02	1,250	0.03	16.0
Sakhalin	50,000	0.08	70,000	0.07	7,000	0.19	10.0
Australia-New Zealand	100	.....	500	.....	8	.....	62.5
World, Undistributed	250	.....	.....	.....	.....	.....	.....
TOTAL WORLD	76,411,813	100.00	95,208,124	100.00	3,783,284	100.00	25.2

These 69 ...

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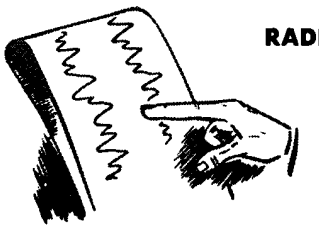
TECHNICAL OIL FIELD SERVICES

..provides services and products for BETTER WELL COMPLETIONS and CONTROL

PERFORATING — Lane-Wells leads the field with 3 types of service, with each of which you get the advantages of extremely accurate depth measurements, full penetration and trained crews who know your conditions. BULLET — Selective firing, with full range of modern equipment to meet every job . . . including the new A-2 gun with greatly increased penetration. KONESHOT — Lane-Wells "PLUS-SERVICE" shaped-charge perforating . . . for either cased or open holes, and semi-selective firing when needed. COMBINATION BULLET-KONESHOT — This service has proved immensely valuable to operators in certain types of difficult jobs.



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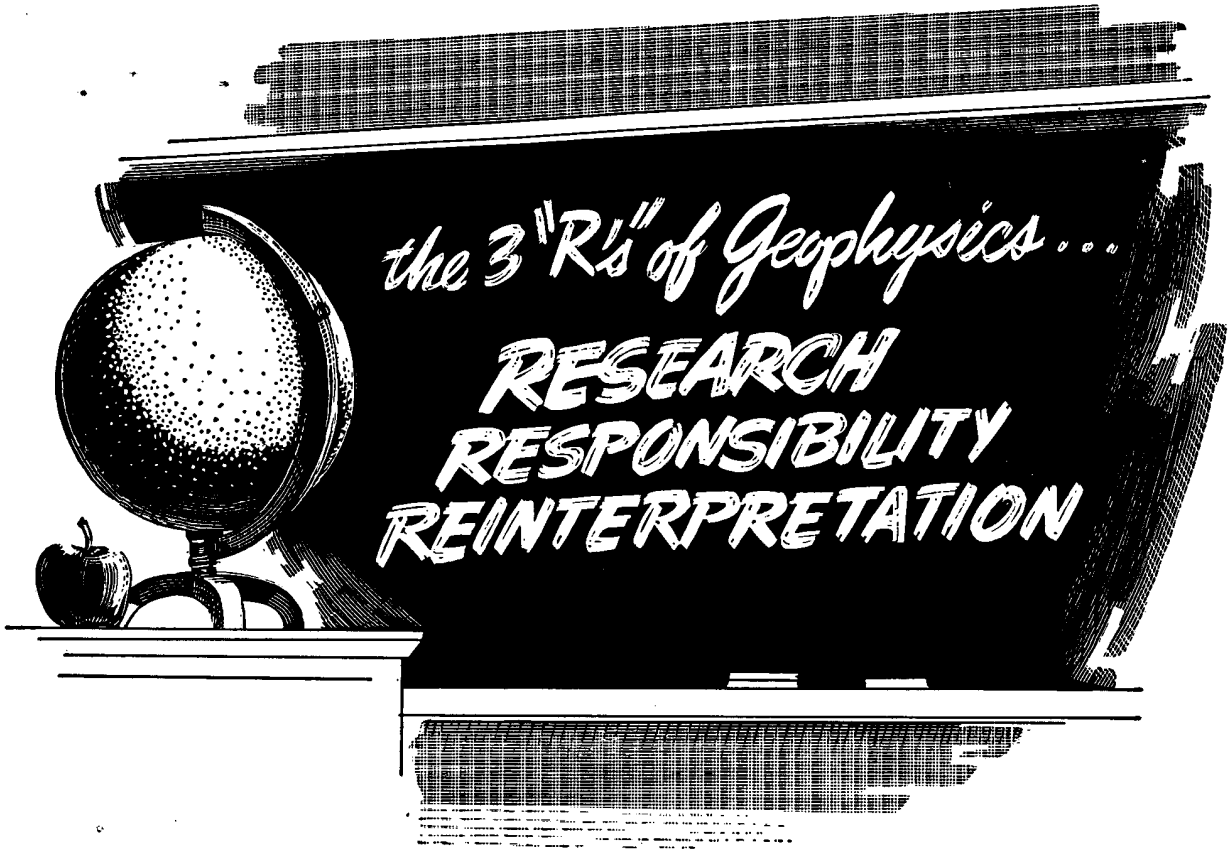

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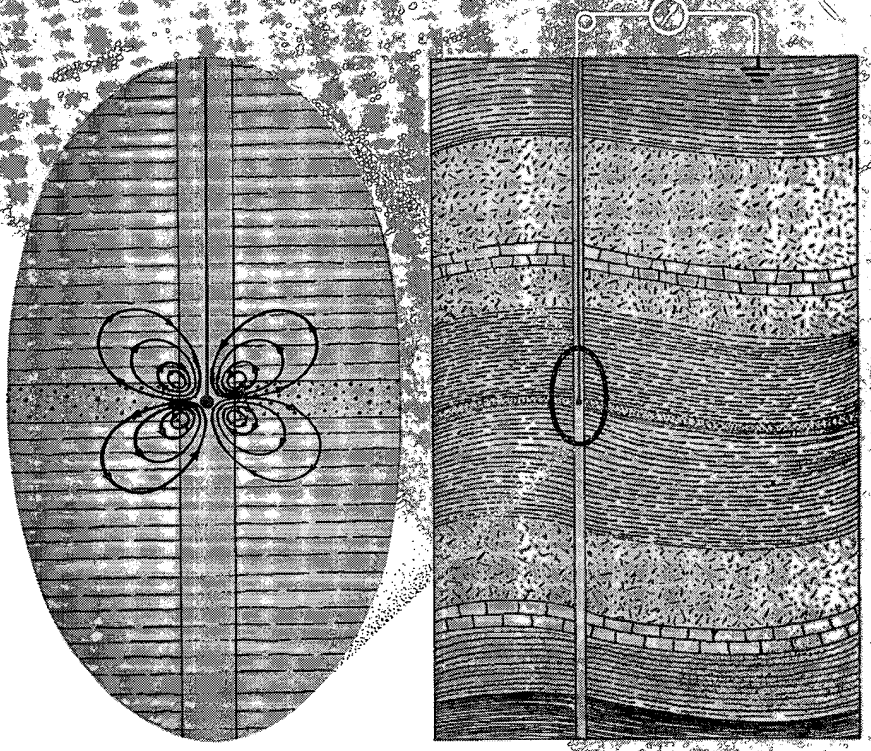
THE SCHLUMBERGER ELECTRICAL LOG



Benjamin Franklin performed a famous experiment 200 years ago, which had a counterpart in the investigations of ground potentials carried on much later by the Schlumbergers. Franklin proved the existence of positive and negative electrical charges by flying a kite in a rainstorm.

This early experiment in the field of natural electrical potentials encouraged other investigators to start and continue work of increasing practical value. The measurement of ground potentials in bore holes by the Schlumbergers was one such important development. The resulting spontaneous potential curve was added to the already existing resistivity curve to complete the fundamental Electrical Log. The development, now only twenty years old, has had an increasing influence on oil exploration and production.

The spontaneous drill hole potential in and around a permeable bed results in the current distribution shown in the above schematic drawing.

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Schlumberger pioneered the electrical log and has been the unquestioned leader in the field of electrical oil well servicing ever since.

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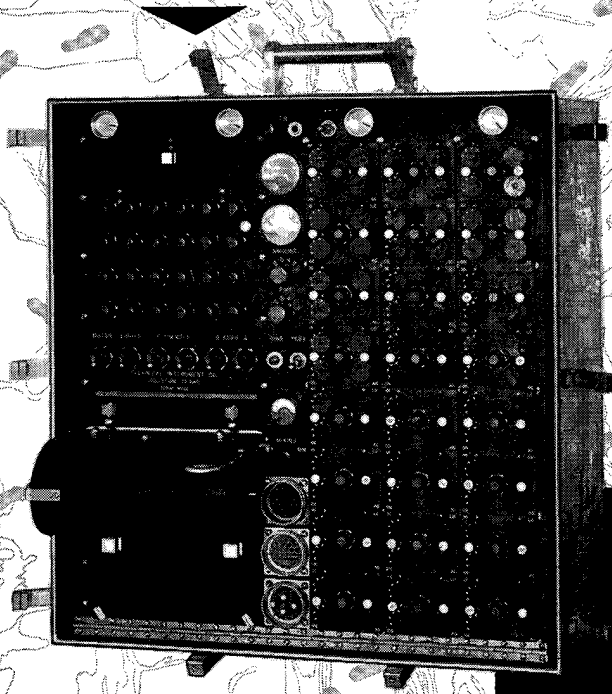

Approximately 40 sets of TIC portable instruments are in operation throughout the world, many of which are working in strictly portable operations such as this terrain.

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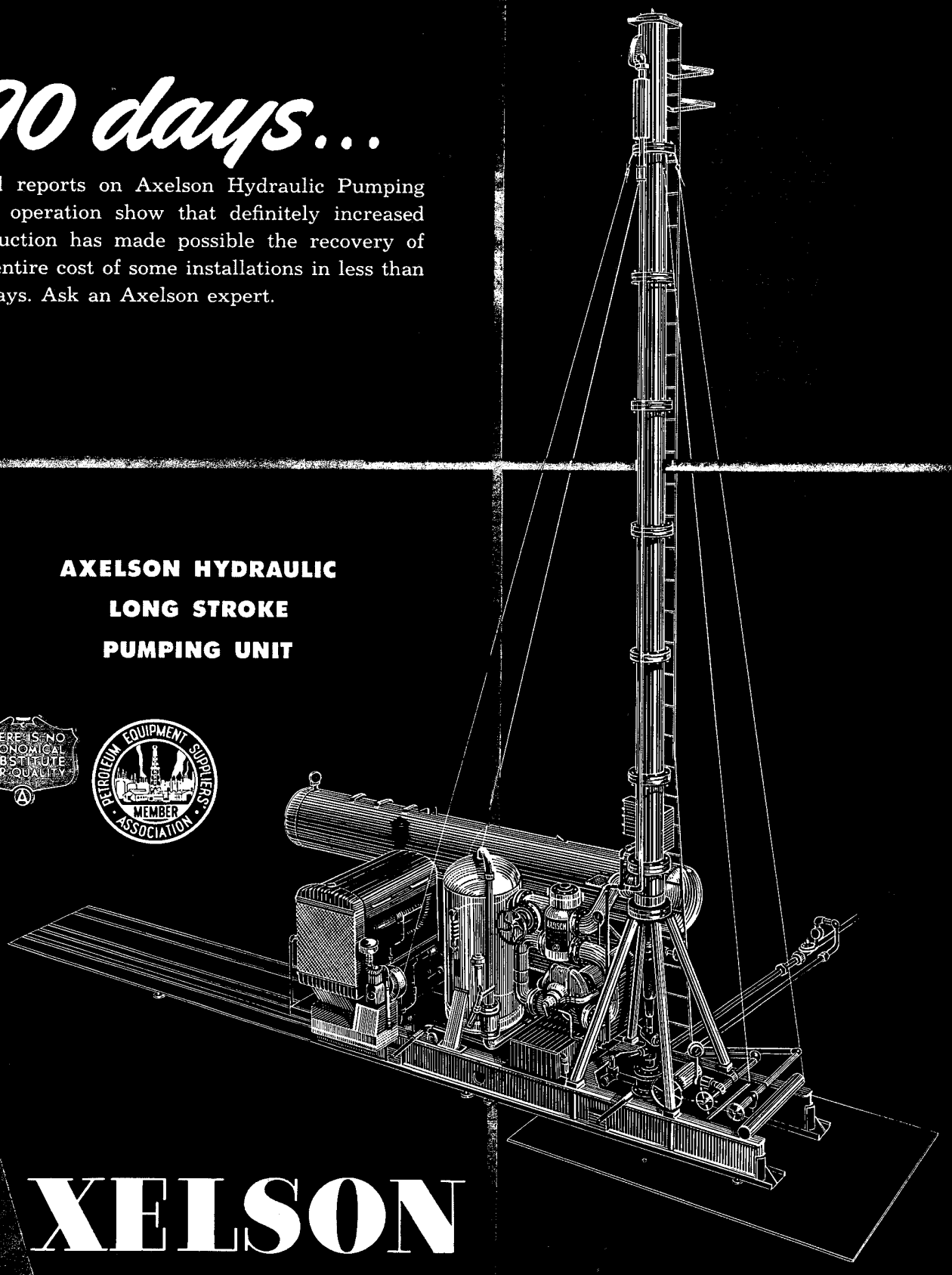

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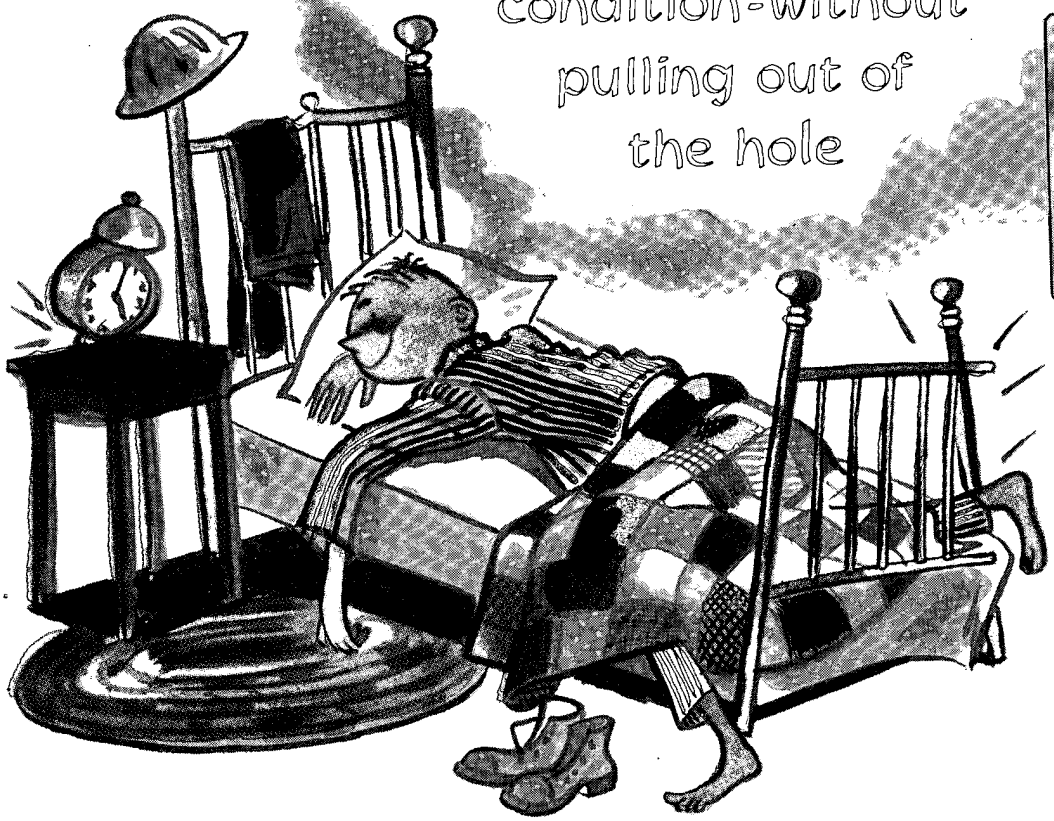
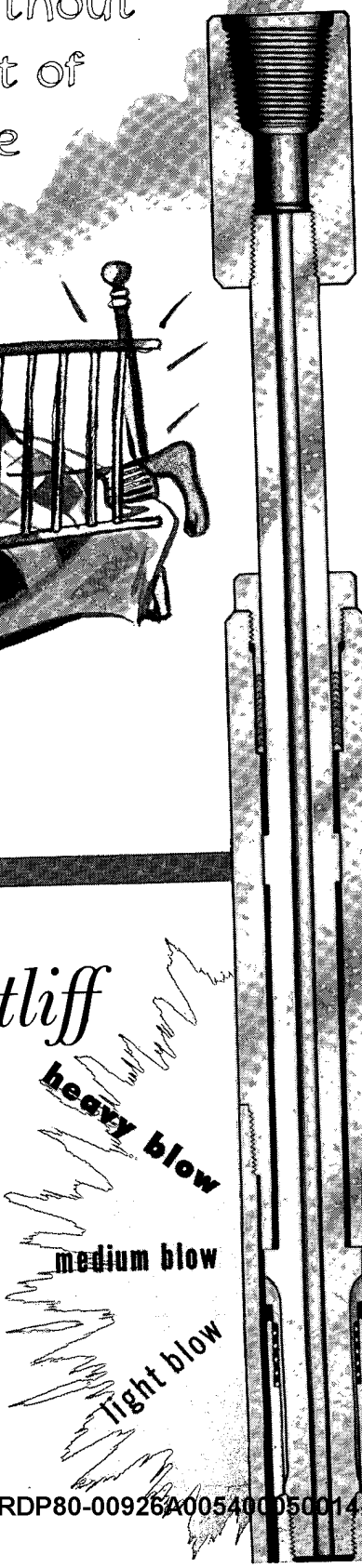


**Jarring Jerry*



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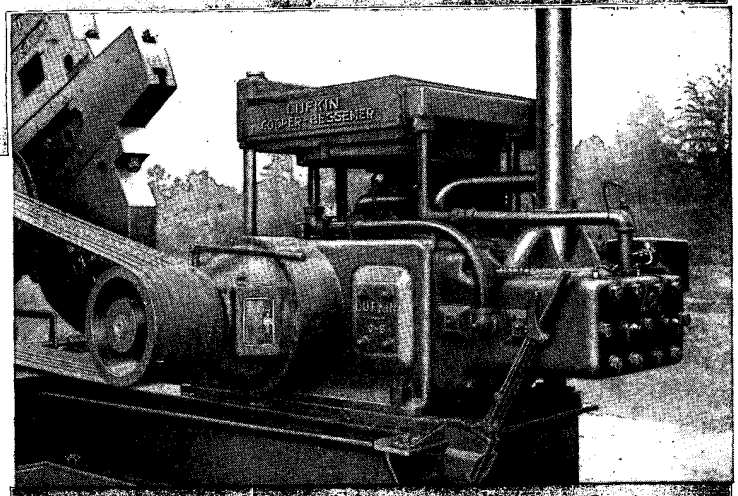

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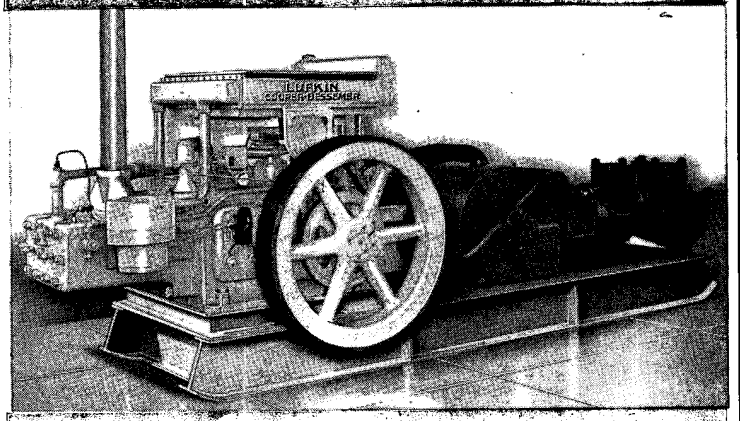
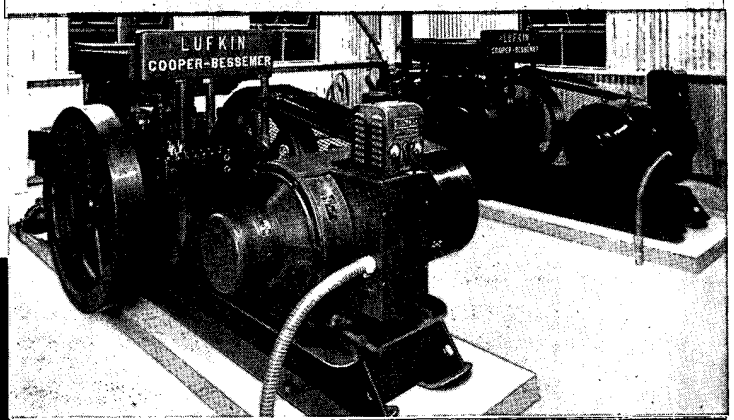
Lufkin equipment for the oil fields of the world is manufactured in Lufkin, Texas. Branches in principal oil fields.



Lufkin Cooper-Bessemer Engine and Pump assembly



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It is known as Tuffy Rotary and is made for two operations—one for Jackknife drilling and one for Standard Rotary drilling. This simplifies ordering and delivering to you the proper specification and grade of steel to get the ultimate low-cost in Rotary Drilling.

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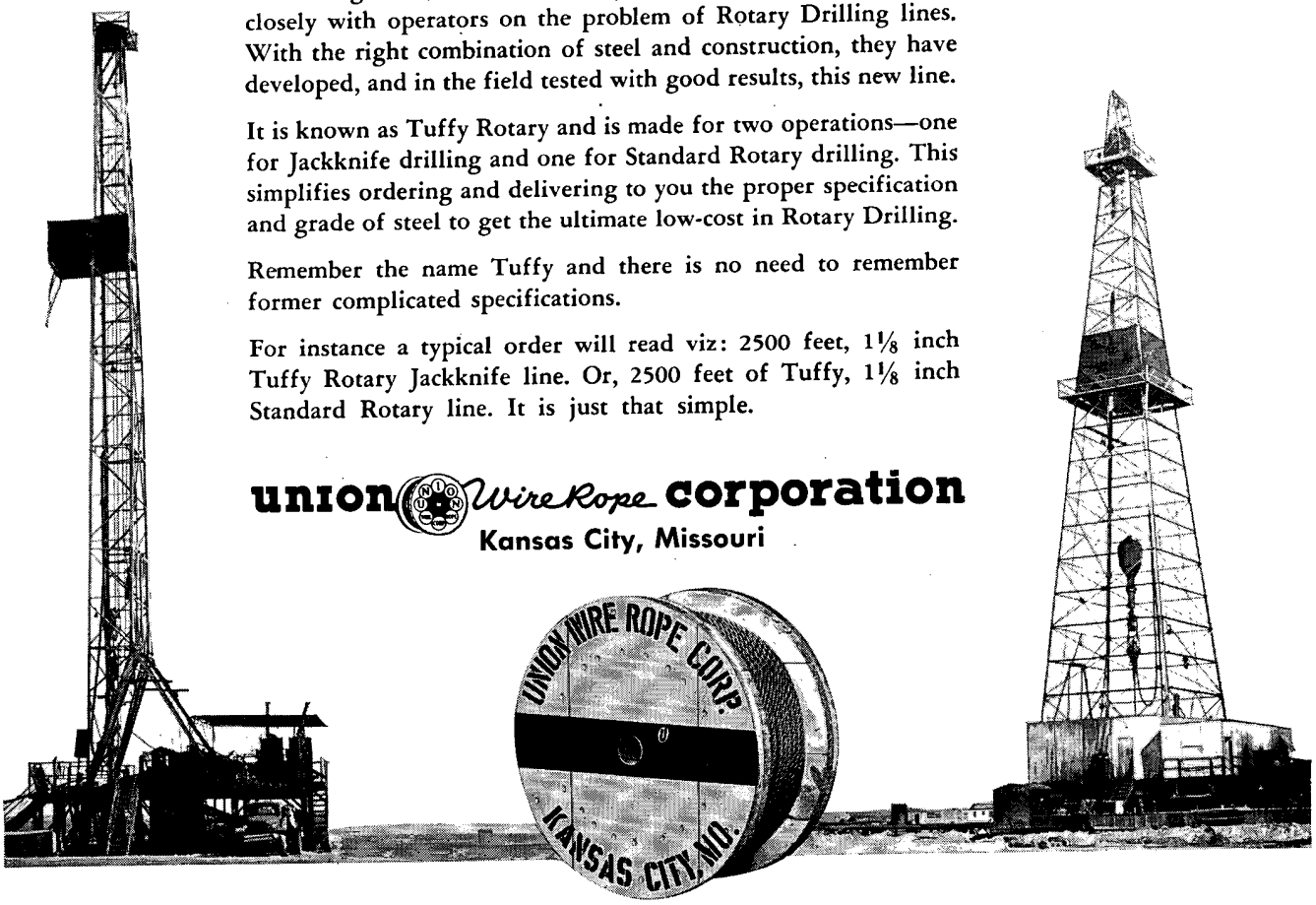

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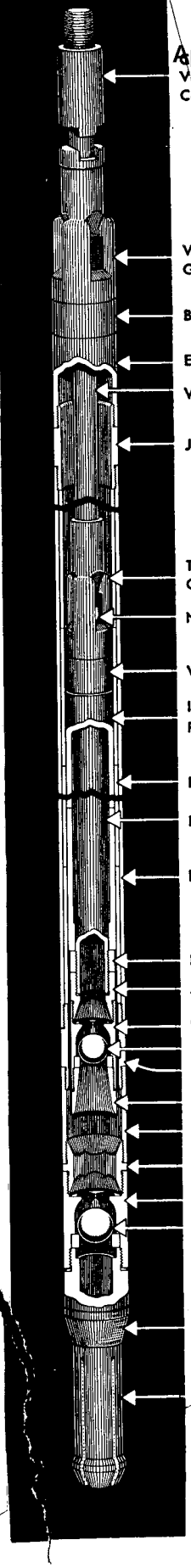


I-R Metal "Stationary" sectional liner barrel rod pump

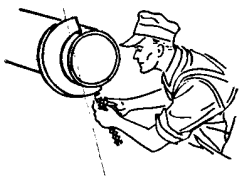
The TOP-QUALITY Line

I-R METAL . . . which is an exclusive Neilsen feature, has a combination of qualities that make it the finest metal for subsurface pumps on the market today. It is a ferrous alloy, consisting principally of iron and nickel in combination with carbon and boron.

LOW COEFFICIENT OF FRICTION . . . permits an I-R Metal to I-R Metal contact at much closer tolerances than specified by A.P.I. You get increased pumping efficiency that is maintained over much longer periods. Note the streamlined fittings.

HIGH ABRASION RESISTANCE — I-R Metal is inherently hard and resistant to abrasion. Where sand conditions are extremely severe, I-R Metal pumps are highly recommended and will quickly pay for themselves in longer service life.

HIGH CORROSION RESISTANCE —I-R Metal being a nickel-boron alloy has been found to be outstanding in corrosion resistance in well fluids containing salt, hydrogen sulphide and carbon dioxide.



PRECISION WORKMANSHIP—Molten I-R Metal is centrifugally cast in seamless steel tubing. Liner sections receive their rifle honing *after assembly* in the barrel and plungers are superfinished and *factory fitted* with microscopic accuracy. Result is a smooth running pump with exceptional operating efficiency under all conditions.

Neilsen I-R Metal Rod Pumps are built in six sizes to run in 1½" to 3" tubing including 1" to 2¼" bores and pump lengths from 7' to 36' and longer if necessary. The Tubing Pumps are built to run on 2", 2½" and 3" tubing with bores of 1¾", 2¼" and 2¾" and with barrel lengths from 5' to 36' and longer.

ASK . . . for your copy of the "Oilwell"-Neilsen Subsurface Pump Catalog and get the facts on "Oilwell's" PUMP-EXCHANGE AGREEMENT. Whenever you want help with a production problem . . . CALL "OILWELL."

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FISHIN'S much FASTER WITH LEBUS KNUCKLE JOINT OVERSHOT SYSTEM

LESS EXPENSIVE MORE EFFECTIVE

The LeBus Knuckle Joint — Overshot System is so efficient that by running the Knuckle Joint above the Overshot on every fishing job, you are able to contact the fish quickly and at a minimum of expense. The FO-47 Knuckle Joint will help the Overshot Guide contact the fish quickly on the first run which is insurance against expensive cutting jobs. The cost of cutting a string of stuck pipe is often more expensive than the entire cost of one LeBus FO-47 Knuckle Joint. Have The LeBus Knuckle Joint always available on your derrick floor, and your regular driller becomes an expert fishing tool operator.

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A REPORT TO THE OIL INDUSTRY ON THE DRILLING MUD PICTURE BEFORE AND AFTER Magcobar's FIRST DECADE OF SERVICE . . . . AT FAIR AND REASONABLE PRICES

SINCE 1941

- . . . the average total cost of drilling a well has increased more than 60%
- . . . the wholesale price index for all commodities (food, clothing, shelter) is up 96.4%
- . . . the average cost of a "low priced car" is up from about $850.00 to more than $2000.00
- . . . the average price of crude oil at the well is up from $1.14 a barrel to more than $2.58 a barrel
- . . . labor costs for drilling a well are up more than 70%
- . . . the cost of drilling equipment is up 45%

YET THE COST OF DRILLING MUD IS STILL 20% BELOW THE 1941 LEVEL

Magcobar
Complete
DRILLING MUD SERVICE
DEALER

Why, contrary to the upward trend in the price of nearly everything else since 1941, is the price of drilling mud still 20% *below* the 1941 average? Magcobar is the answer! When Magcobar entered the field ten years ago, the going price of mud weighting material was way up there above the $40.00 per ton figure. But, Magcobar posted the low but fair price of approximately $22.00 per ton in Gulf Coast fields . . . and the oil industry immediately received the first benefit from Magcobar's entry into the drilling mud picture. The history of Magcobar's climb in a span of only ten years to its position of prominence today in the highly specialized drilling mud business reflects the oil industry's wide acceptance of Magcobar's high quality products, good service and fair and reasonable prices. These *three things* are the foundation upon which Magcobar has been built. And with faith in its record of having established fair prices, better products and real service, Magcobar has again expanded its mines and plants in order to insure adequate supplies of mud material for future needs of the oil industry.

The full story of Magcobar's first ten years is available to you in a fully illustrated brochure. Write for your copy today.

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MAGCOBAR • MAGCOGEL • HIGH YIELD • MAGCO-FIBER • XACT CLAY • FIBER SEAL • SALT GEL • MAGCO-PHOS • RED OX • MAGCO-MICA • TANNATHIN
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DIGEST OF WORLD OIL LAWS

Columns 6, 9 and 10 in the following table involve editorial opinion and the rest are factual.

In the case of Column 6, the nature of the laws permitting or not permitting the operation of private capital have been contrasted with the laws existing in other countries and the editors have made conclusions as to whether they are favorable or not.

Column 9 also represents an editorial opinion, but it, too, is based on a comparison of the facts revealed in the previous columns plus some knowledge as to the prospects for oil in those areas. If operations are indicated as not successful, it means that relative to geological possibilities these nations have not produced enough oil to take care of domestic needs and participation in export movement of petroleum, if the latter is desired. Having a bearing on "yes" or "no" under Column 9 would be the past history of the country under private operation as contrasted under the conditions existing after private operation was eliminated or substantially discouraged.

Opinions expressed in Column 10, "Oil Producing Possibilities," are composites of those given by a group of experts on international oil operations, including E. De Golyer and Wallace Pratt, prominent geologists.

1	2	3	4	5	6	7	8	9	10
COUNTRY	Ownership of Subsurface Oil	Operations by Government Monopoly	Present Operations By Outside Private Companies or Nationals	Operations Permitted to Outside Private Capital	Laws of Type to Encourage Private Oil Operations	Crude Production[1] 1940	Crude Production[1] 1950	Operations Successful	Oil Producing Possibilities
Algeria	Government	No	No	Possible by Concession	Possible by Concession[2]	None	7	No	Fair
Argentina	Government	Yes	Yes, Limited[3]	Present Operators Only	No	20,609	22,590	Yes	Good
Australia	Government, Very Limited Individuals	No	Yes	Yes	Yes	None	8	No	Fair
Austria	Government	No	Yes	Yes	Yes	2,808	6,205	Yes	Fair
Bahrein Island	Government	No	Yes	Total Area Under Concession	Yes	7,074	11,016	Yes	Excellent
Bolivia[4]	Government	Yes	No	No	No[5]	288	616	No	Good
Brazil	Government	Yes	No	Brazilians Only	No	2	339	No	Good
British Borneo	Government	No	Yes	British Nationals Only	No	7,047	29,700	Yes	Good
Burma	Government	No	Yes	No	No[6]	7,731	400	No	Good
Canada	Provincial Governments Mostly[7]	No	Yes	Yes	Yes	8,591	28,904	Yes	Excellent
Chile	Government	Yes[8]	No	No	No	None	631	No[9]	Fair
Colombia	Government with Very Individuals	No	Yes	Yes	Yes, with some Restrictions	25,593	34,059	Yes	Excellent
Denmark	Government	No	Yes	Possible by Concession	Possible by Concession	None	None	No	Fair
Ecuador	Government	No	Yes	Yes	Yes	2,349	2,691	Yes	Good
Egypt	Government	Govt. Company Operations Limited[10]	Yes	Present Operators	No[11]	6,505	16,275	Yes[12]	Good
France	Government	No	Yes	Possible by Concession	Yes	496	893	Yes	Fair
Western Germany	Govt., Limited Individuals	No	Yes	Yes	Yes	7,371	7,830	Yes	Poor
Guatemala	Government	No	No	Restricted Concessions and Contract Terms	No	None	None	No	Poor
Holland (Netherlands)	Government	No	Yes	Yes	Yes	None	4,864	No[13]	Good
India	Government	No	Yes	Yes	Yes	2,302	3,051	Yes	Fair
Indonesia	Government	No	Yes	Possible by Concessions	Possible by Concessions	62,011	50,300	Yes	Excellent
Iran	Government	Commencing Under 1951 Nationalization Law	Prior to New Law—Yes	No Longer	Not since 1951 Nationalization	66,317	241,425	Yes[14]	Excellent
Iraq	Government	No	Yes	Total Area Under Concessions	Yes at Present	24,225	46,760	Yes	Excellent
Italy	Government	No	Yes	Yes	Possible by Contract Terms	85	72	No	Fair
Kuwait	Government	No	Yes	Total Area Under Concession	Yes	None	125,722	Yes	Excellent
Mexico	Government	Yes	Contractors to Govt.	Contractual Only	No	44,036	72,118	Yes[15]	Excellent
Pakistan	Government	No	Yes	Yes	Yes, with Restrictions	n.a.	1,250	Yes	Fair
Peru	Government	No	Yes	Yes	No[16]	12,126	15,028	Yes	Good
Philippines	Government	Govt. Company Operations Authorized	Yes	Yes	Yes, with Restrictions	None	None	No	Fair
Qatar	Government	No	Yes	Total Area Under Concession	Yes	None	11,457	Yes	Excellent
Saudi Arabia	Government	No	Yes	Total Area Under Concession	Yes	5,075	199,547	Yes	Excellent
Sicily	Government	No	Yes	Possible by Concession	Possible by Concession	None	None	No	Fair
Spain	Government	No	No	Limited	No	None	None	No	Fair
Trinidad	Government	No	Yes	Yes[17]	Yes	22,227	20,239	Yes	Good
Tunisia	Government	No	Yes	Possible by Concession	Possible by Concession	None	None	No	Fair
Turkey	Government	Yes	No	Limited	No	None	184	No	Fair
United States	Private Landowners	No	Yes	Yes	Yes	1,353,214	1,971,845	Yes	Excellent
Venezuela	Government	No	Yes	Yes	Yes	185,570	544,647	Yes	Excellent

[1] Thousands of barrels yearly.

[2] Concession can be had under conditions which would tend to encourage development of the properties.

[3] No new concessions are being given outside companies.

[4] Several structures were discovered by American interests operating in Bolivia in 1937 when properties were expropriated by the government.

[5] A 1950 law permits exploration and exploitation by "mixed" companies (i.e private capital companies in which the government has a substantial interest, possibly 50 percent) in the comparatively unpromising northwestern part of the country.

[6] The 1948 Constitution limits operation to government or to companies composed of a majority of Burmese capital. For the present this provision is not being adhered to, and Burmah Oil Company is permitted to continue operations.

[7] The extent of government ownership of subsoil varies in each province, but in Western Canada provincial governments own approximately 90 percent of the subsoil.

[8] While the oil industry is operated under government monopoly, all exploration and drilling have been under contract with private American companies.

[9] Oil development is progressing, but it is too early to term operations entirely successful.

[10] Companies beginning operations in Egypt after 1948 must be owned 51 percent by Egyptian nationals.

[11] Companies operating prior to 1948 under encouraging laws.

[12] All oil in Egypt being produced by companies operating there before 1948.

[13] In relation to domestic supply compared with domestic demand. Based on discovery of oil, etc., it would be "yes."

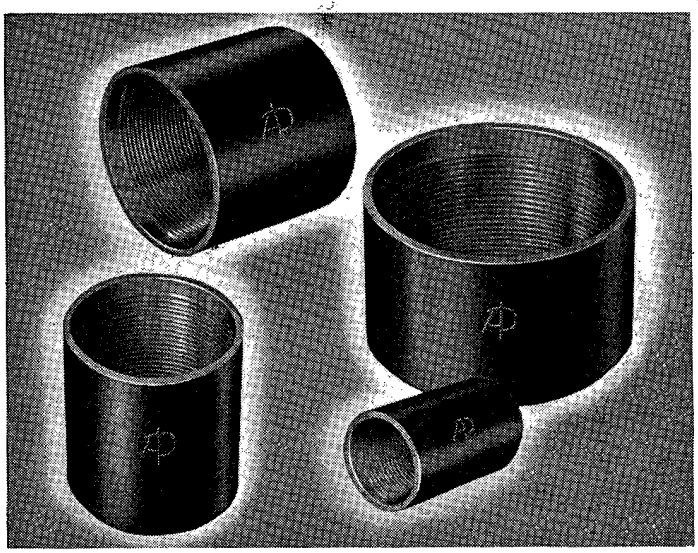
[14] Nationalization could possibly result in curtailed crude oil and refinery production.

[15] Success still dependent upon fields found by private companies prior to expropriation in 1938.

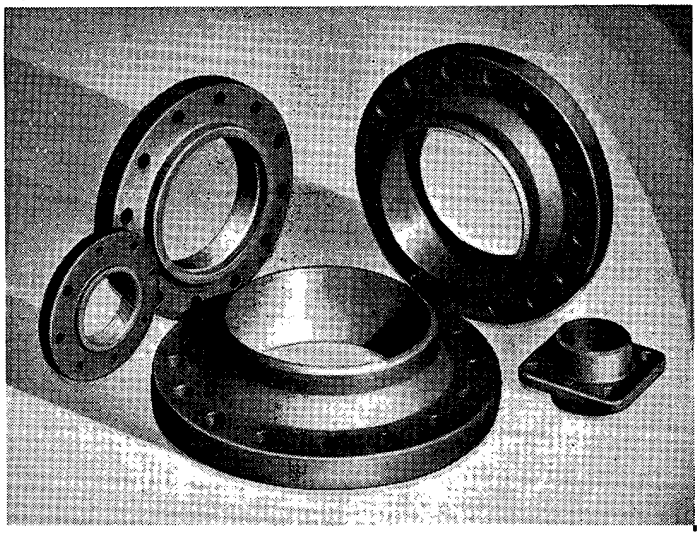
[16] Development of business in this area is being held up by failure to pass workable law. Law covering previously developed areas unsatisfactory.

[17] Majority of persons (presumably majority of stockholders) engaged in operation of oil rights must be British subjects, except persons having acquired oil rights prior to promulgation of 1942 ordinance.

WHEREVER COUPLINGS AND FLANGES ARE USED YOU'LL FIND THE HARRISBURG TRADEMARK



HARRISBURG seamless steel pipe couplings. Threads accurate in form, height, angle, and lead. Made to A.P.I. and A.I.S.I. specifications.



HARRISBURG drop-forged steel pipe flanges. Threads accurate in height, angle, taper, and gauging. Manufactured to A.S.A. standards.

WHO MAKES IT makes the difference

Oil Company Executives and Oil Field Engineers know *Harrisburg* Couplings and Flanges stand the gaff

AMAZING THREAD ACCURACY is the distinguishing feature of these superior products. They are bored and threaded on special machines, according to methods perfected by **Harrisburg** years ago. *Results:* better fit, easier installation, tighter joints, longer trouble-free life.

STANDARDIZE ON HARRISBURG and you'll get greater satisfaction out of all the Couplings and Flanges you buy. Behind them is 98 years of manufacturing experience, and the guarantee of one of the pioneer and largest producers of equipment for the petroleum industry.

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Send me catalogs and full information on: ( ) **Harrisburg** Pipe Couplings; ( ) **Harrisburg** Pipe Flanges. (If prices wanted, attach specifications of types and sizes desired.)

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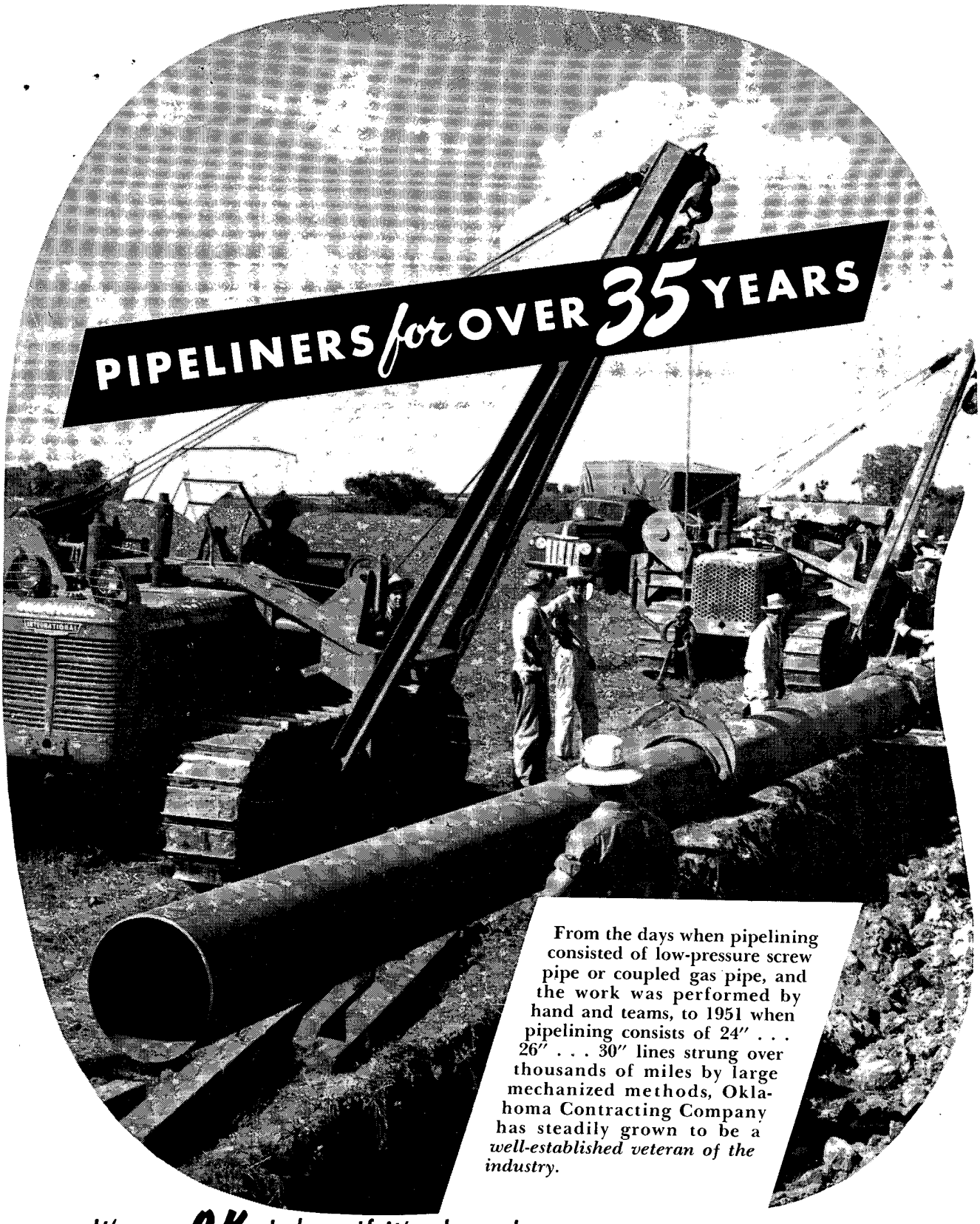
Custom-Built Quality Products in Quantity
98 YEARS IN PENNSYLVANIA'S CAPITAL



From the days when pipelining consisted of low-pressure screw pipe or coupled gas pipe, and the work was performed by hand and teams, to 1951 when pipelining consists of 24" . . . 26" . . . 30" lines strung over thousands of miles by large mechanized methods, Oklahoma Contracting Company has steadily grown to be a *well-established veteran of the industry.*

It's an ***OK*** *Job... If it's done by...*

Oklahoma Contracting Company

DALLAS, TEXAS • HOUSTON, TEXAS

Baash-Ross

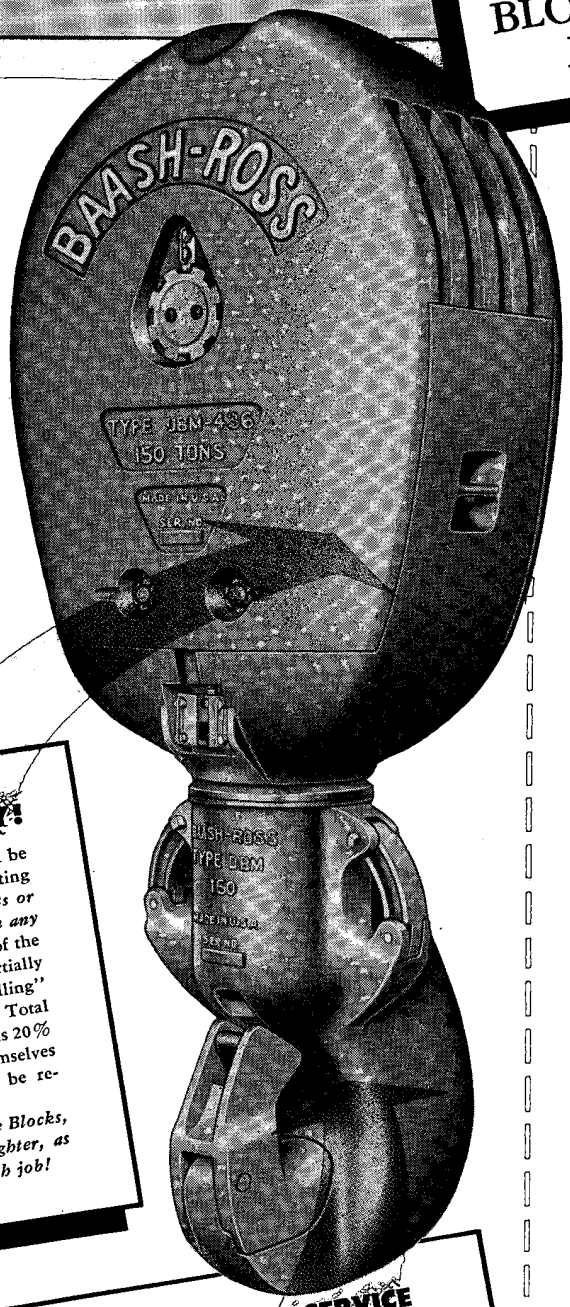
BAASH-ROSS TOOL COMPANY • LOS ANGELES • HOUSTON • OKLAHO[illegible]

The Newest, Most Compact, Most Advanced BLOCK ASSEMBLY In The Field!

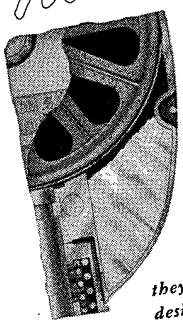
The BAASH-ROSS "DBM" MULTIPLEX BLOCK ASSEMBLY

Loaded with New Features and New Conveniences!

Baash-Ross not only pioneered modern Unitized Block design, but has consistently led in bringing new Block advancements to the oil industry. And the new MULTIPLEX Block is by far the most compact . . . the most convenient . . . the most efficient traveling-block-and-hook assembly yet developed.



New WEIGHT ADJUSTABILITY!



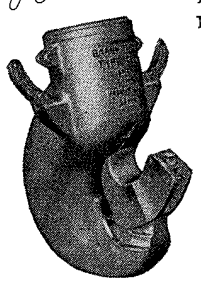
The weight of the MULTIPLEX can be easily adjusted to meet varying operating conditions *without using loose parts or altering the streamlined contour in any way.* Built-in pockets on each side of the MULTIPLEX can be totally or partially filled with lead to increase "falling" speed and boost rig efficiency. Total weight can be increased as much as 20% over the weight of the Blocks themselves —and added weight can easily be removed later, if desired.

Thus, throughout the life of the Blocks, they can be easily made heavier or lighter, as desired, to meet the requirements of each job!

New COMPACTNESS!

The MULTIPLEX is the *shortest* Block and Hook Assembly made. It combines Block, spring-loaded Link Ears and Hook all in *one* compact unit that is not only short—*but also unusually narrow.* We invite you to compare dimensions of the MULTIPLEX with those of *any other* Block and Hook of comparable capacity!

New MULTI-SERVICE HOOK DESIGN!



The spring-loaded MULTIPLEX assembly incorporates *both* a Hook for supporting the swivel, and separate Link Ears equipped with locking arms for supporting the elevator links independent of the Hook. The Hook is equipped with an automatic lock which, when open, helps guide the Hook into the swivel bail. When closed, it cannot open under load —an added safety feature.

The MULTIPLEX is available in a complete range of sizes and capacities to meet any production or drilling requirement. Write today for complete details . . . or see your nearest Baash-Ross representative!

OTHER OUTSTANDING MULTIPLEX FEATURES

RUGGED BODY CONSTRUCTION carries the entire load on an internal framework of heavy rolled steel plates through which pass the heat-treated center and coupling pins. Cast steel outer shell is completely free of load stresses, assuring maximum strength for heavy-duty service.

B-R

COMPLETELY STREAMLINED design will not catch in rig or equipment. Even bolts, pins and grease fittings are fully recessed.

B-R

DOUBLE-ROW TAPERED BEARINGS on *each* sheave carry full radial loads, as well as any thrust loads caused by fleet angle or spread of lines. Individual grease ducts to each bearing assure positive and uniform lubrication!

B-R

CLOSE-COUPLED SHEAVE DESIGN (no spacer plates—narrow-width bearings) reduces Block width to a minimum. Sheave spacing is same as Baash-Ross "DCO" Crown Block to eliminate fleet angle and drift.

B-R

ONE PIECE GUARD fits close to sheaves to prevent line from jumping the grooves and also to permit threading Block without removing guard. Or where lines are left looped in rig, guard can be quickly removed for reeving.

B-R

SPRING-LOADED HOOK (full 6" spring travel) eliminates shock when picking up loads, reduces wear on bearings and other parts.

B-R

FULL-SWIVELLING HOOK ASSEMBLY rotates freely through complete 360° circle—or can be quickly locked in any of *eight* equi-spaced positions.

B-R

INDIVIDUAL GREASE DUCTS to each bearing are machined into the heat-treated center pin, with recessed grease fittings conveniently located on outside.

New LOW CENTER OF GRAVITY!

In the MULTIPLEX the weight is concentrated unusually low to assure proper balance both while running and at rest. This means steadier Block travel, faster operations, greater working efficiency.

BAKER

The "FIRST" Name in Floating Equipment

"First" in the Field

To have been the pioneer in developing and marketing floating equipment means little unless the wealth of knowledge acquired through years has been utilized to attain the position of "leadership" today.—By studying the performance of Baker Floating Equipment in cementing thousands of wells; by continuous "pioneering" as new materials could be incorporated into proven, as well as experimental designs, Baker always has maintained the lead, and is today unquestionably "First" in the Field.

"First" in Successful Results

Success in cementing means only one thing—to secure a leak-proof water shut-off with the initial cement job—and Baker Floating Equipment offers you the best possible opportunity to secure such success. Let us consider the features of Baker Equipment which contribute to Successful Results... Seamless steel collar stock, threaded to *exactly* fit your casing, is a long-time Baker "Standard." The rounded nose of all Baker Shoes is made of "Baker Formula" Cement, and will safely guide the casing past all side wall irregularities. The famous Baker Buoyant Ball permits free passage of the cement slurry; then, at the slightest reversal of pressure, floats to a leak-proof seal against the recessed, abrasion-resistant rubber ring.—All internal construction consists of easily drillable materials, with *no metal* to drill out or to interfere with diamond coring immediately below the shoe. The bit meets the very minimum cross-sectional area of plastic (and no metal) when drilling out, and quickly reduces the cement and plastic to harmless fragments which circulate out of the hole.

"First" and ONLY "Whirling" Action

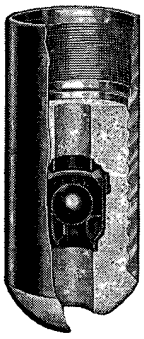
This exclusive Baker development is widely used by operators who are willing to pay slightly more for this added assurance of success, especially when bridges are present in the hole. The baffled side ports in Baker WHIRLER Equipment direct the fluid at an angle against the walls of the hole, and this action combines with the hydraulicking effect of the fluid through the bottom of the shoe to remove bridges and permit safe landing of the casing. In addition, the well is conditioned to permit bonding of the slurry with the formation.

"First" in Popularity

Here is a "First" possible only because you (and thousands of other operators) have been quick to recognize tools and methods which *provide dependable performance.* It is both a challenge and an inspiration to work with men who *insist upon results*—a challenge to supply their present needs, and an inspiration to meet their demands of tomorrow. Baker will always be ready!

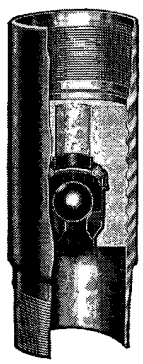
BAKER OIL TOOLS, INC., • Houston • Los Angeles • New York

NO METAL • NO TRICKS • NO TROUBLE DRILLING OUT



This is Product No. 100—Baker Cement Float Shoe—outstandingly "First" for the safe guiding, floating and cementing of casing. No other shoe approaches its world wide popularity. Available also in the "Whirler" Type at a nominal increase in price.

This is Product No. 102—Baker Cement Guide Shoe. Used in combination with a Baker Cement Float Collar when one float valve is considered sufficient, and a stop for the cementing plug is desired above the shoe.

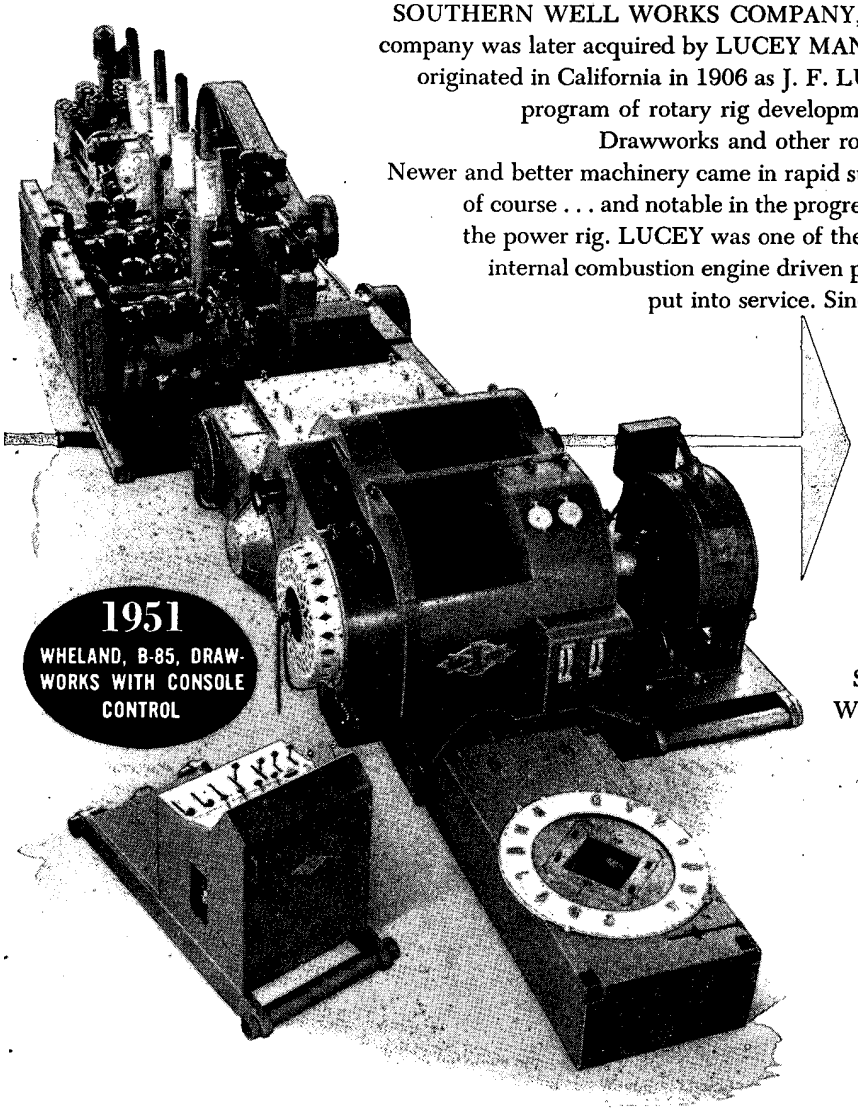


This is Product No. 101 M&F—Baker Cement Float Collar—usually positioned just above the shoe joint to provide a "stop" for the cementing plug. Used in combination with any type of Baker Cement Shoe selected to meet customer's specifications.

Brings "LASTING" Results

WAY BACK, *when Gran'pa was a boy!*

Several years prior to the completion of the celebrated Lucas well in 1901, water wells and oil wells were being drilled with rotary equipment designed and built by PARKER WELL WORKS COMPANY. The LUCEY story began with the PARKER WELL WORKS which was succeeded by the SOUTHERN WELL WORKS COMPANY, Chattanooga, Tennessee, and Beaumont, Texas. This company was later acquired by LUCEY MANUFACTURING CORPORATION, which corporation originated in California in 1906 as J. F. LUCEY COMPANY. The LUCEY engineers organized a program of rotary rig development that soon made LUCEY Boilers, Pumps, Rotaries, Drawworks and other rotary drilling equipment famous throughout the world. Newer and better machinery came in rapid succession – faster and deeper drilling became a matter of course . . . and notable in the progress of rotary rig development were the unitized rig and the power rig. LUCEY was one of the first to recognize this trend. In 1925 the first LUCEY internal combustion engine driven power rigs and electric driven power rigs were built and put into service. Since that time Diesel Engine Driven rigs have become a dominant factor in oil well drilling.



1951
WHELAND, B-85, DRAW-WORKS WITH CONSOLE CONTROL

It was in 1926 that LUCEY MANUFACTURING CORPORATION was merged with the WHELAND COMPANY (established in 1865) one of the best known builders of Saw Mill Machinery. From that day even greater strides were made in the development of rotary drilling equipment, and today WHELAND Rotaries, Drawworks, Swivels, Pumps and Blocks compare more than favorably with like equipment of other manufacture . . . they're the best

The story of rotary rig development by PARKER, SOUTHERN WELL, LUCEY MANUFACTURING, WHELAND COMPANY and others is the story of the oil industry's growth; for certainly the "PARKER", "MOGUL", "REX", "LUCEY" and "WHELAND" Rigs have been a considerable factor in the wonderful progress made by the drilling machinery industry.

The improvement in the rotary rig has made possible deeper and deeper drilling programs and enabled the discovery of many major fields.

Today and tomorrow, as in the yesterdays, you can depend upon WHELAND and LUCEY for the best in rotary drilling equipment, either steam or power . . . in fields outside the U.S.A., they are sold exclusively by LUCEY EXPORT CORPORATION.

LUCEY

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LUCEY EXPORT CORPORATION

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the tong that made Web Wilson famous

"Web Wilson" and "Wilson Type" Tongs have been famous for efficiency and economy since the early days of rotary drilling. Most major improvements in tong design and dependability may be credited to Web Wilson Oil Tools, Inc.

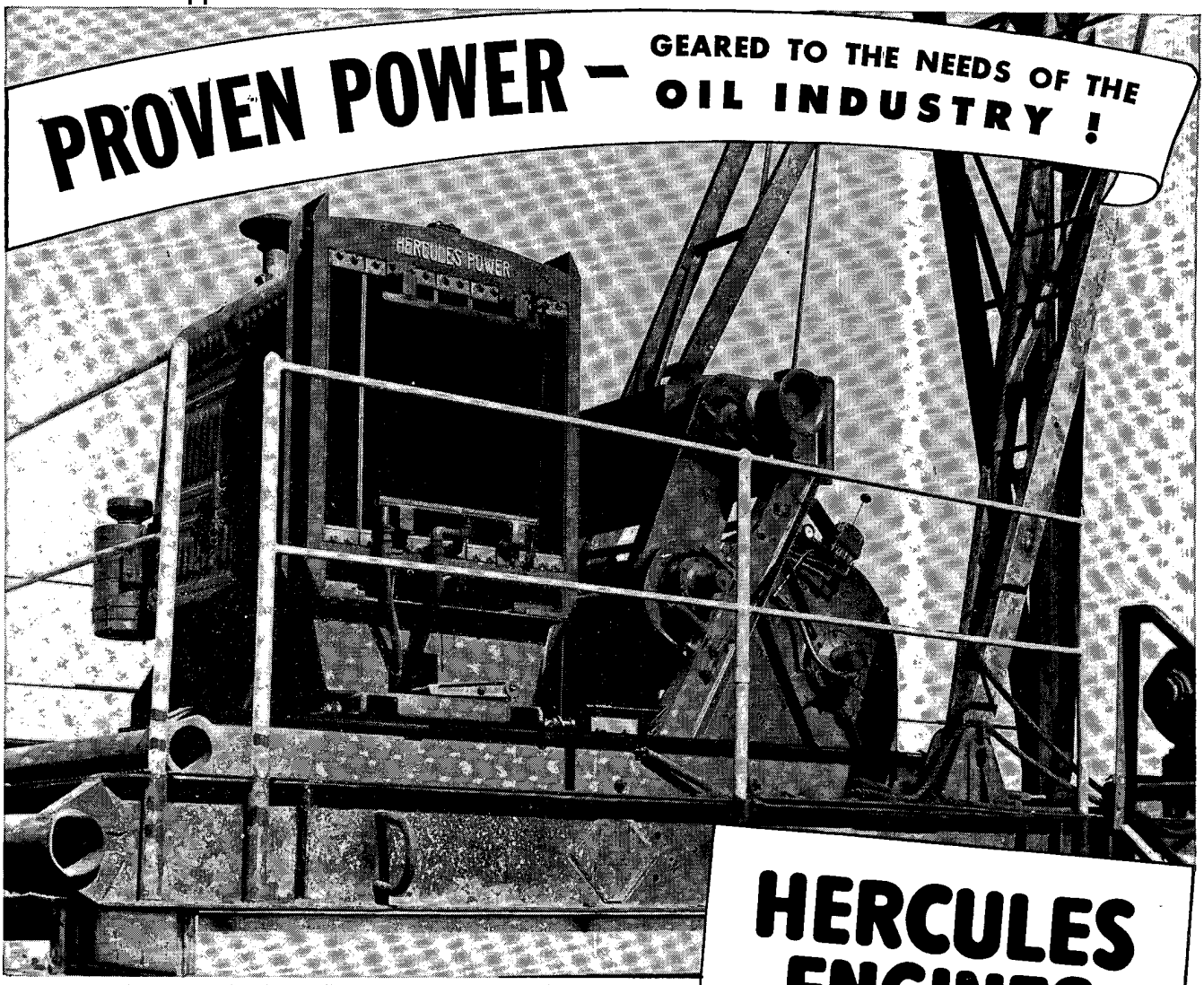
CHECK THESE ADVANTAGES ✳ Spiral hinge pin arrangement ✳ Longer tong life ✳ Greater gripping power ✳ Fewer parts ✳ Self locking latch with finger guard ✳ Size range changed by replacing one jaw only ✳ Fully adjustable, simple one-piece hanger ✳ Safety rope attachment ✳ Maximum strength, minimum weight.

WEB WILSON Oil Tools INC.

LOS ANGELES, CALIFORNIA • HOUSTON, TEXAS • NEW YORK, N. Y.

FIELD PROVEN

PROVEN POWER — GEARED TO THE NEEDS OF THE OIL INDUSTRY !



Another typical Hercules Oil Field Installation is the Hercules Model HXE six-cylinder gasoline engine used here to power a Muskogee Iron Works Work-Over Rig, owned and operated by Beckman, Inc. The auxiliary radiator located in front of the HXE radiator cools the oil used in the torque converter, which transmits power to the Rig.

HERCULES ENGINES

3 to 500 H.P.

Drilling . . . pumping . . . production . . . transportation . . . wherever dependable power is an asset to oil field operation . . . one name stands out as a symbol of outstanding performance and economy. It is Hercules Power . . . high speed, heavy duty, gasoline, gas or diesel power that has "grown up" in the oil fields where it enjoys a wide reputation for reliable day-in, day-out rugged service. Hercules Engines and Power Units are built in a wide variety of horsepower ratings and piston displacements (see chart) to meet the broad, versatile and expanding needs of a still rapidly growing industry. Look over this list. There is a Hercules here to do justice to your power requirements — to reduce operating costs. Write for complete specifications covering the sizes and types of Hercules Engines of particular interest to you.

GAS AND GASOLINE ENGINES

Model	Bore and Stroke	Cu. In. Displ.
Two Cylinder		
BXB	2⅞" x 3"	39
NXA	3" x 4"	56.5
NXB	3¼" x 4"	66.3
Four Cylinder		
ZXA	2½" x 3"	59
ZXB	2⅝" x 3"	65
IXA	3" x 4"	113
IXB	3¼" x 4"	133
IXLB	3¼" x 4¼"	141
JX4E	3⅜" x 4¼"	164
JX4C	3⅜" x 4¼"	188
JX4D	4" x 4¼"	214
Six Cylinder		
QXA	3⅛" x 4⅛"	190
QXB	3¼" x 4⅛"	205
QXC	3⅜" x 4⅛"	221
QXLD	3-7/16" x 4¼"	236.7
JXE	3½" x 4¼"	245
JXB	3⅝" x 4¼"	263
JXC	3⅝" x 4½"	282
JXD	4" x 4½"	320
JXLD	4" x 4½"	339
WXC-3	4⅛" x 4½"	383
WXLC	4" x 4¾"	358
WXLC-3	4¼" x 4¾"	404
TDXB	4⅜" x 5⅛"	474
RXB	4½" x 5⅛"	501
RXC	4⅝" x 5⅛"	529
RXLC	4⅝" x 5¼"	529
RXLD	4¾" x 5¼"	558
RXLDH	4¾" x 5¼"	558
HXB	5" x 6"	707
HXC	5¼" x 6"	779
HXD	5⅜" x 6"	855
HXE	5¾" x 6"	935

DIESEL ENGINES

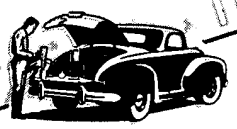
Model	Bore and Stroke Inches	Piston Displ. Cu. In.
Two Cylinder		
DIXC	4" x 4½"	113.1
DIXD	4¼" x 4½"	127.5
Four Cylinder		
DIX4B	3½" x 4"	133
DIX4D	3⅝" x 4"	166
DOOB	3¾" x 4½"	198.8
DOOC	4" x 4½"	226.2
DOOD	4¼" x 4½"	255
Six Cylinder		
DIX6D	3⅝" x 4"	249
DJXB	3½" x 4½"	260
DJXC	3¾" x 4½"	298
DJXH	3¾" x 4½"	298
DJXHF	3¾" x 4½"	298
DWXC	4" x 4¾"	358
DWXD	4¼" x 4¾"	404
DWXLD	4½" x 5"	426
DWXLDF	4½" x 5"	426
DRXB	4⅜" x 5¼"	474
DRXC	4⅝" x 5¼"	529
DFXB	5" x 6"	707
DFXC	5¼" x 6"	779
DFXD	5½" x 6"	855
DFXE	5⅝" x 6"	895
DFXH	5¾" x 6"	935
DFXHF	5¾" x 6"	935
Eight Cylinder		
DNX V-8C	6" x 6"	1348
DNX V-8D	6¼" x 6"	1468
DNX V-8DS	6¼" x 6"	1468

Hercules POWER UNITS are available, equipped with any of the above engines

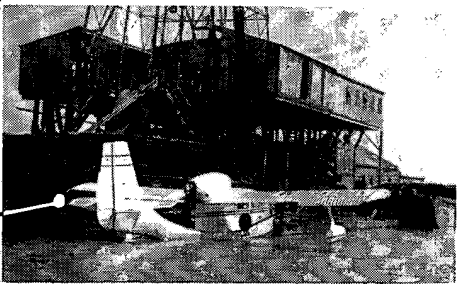
HERCULES MOTORS CORPORATION, Canton, Ohio, U.S.A.

COMPLETE DRILLING .MUD SERVICE..

TRAINED FIELD ENGINEERS...



More than 100 thoroughly experienced mud engineers are ready to aid operators on any drilling mud problem, or to help lay out a complete mud control program.

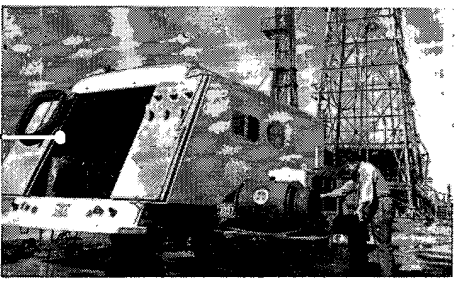


FLYING FIELD SERVICE...

Fast planes, including two amphibians, bring Baroid field service engineers quickly to off-shore rigs or drilling operations in remote and inaccessible places.

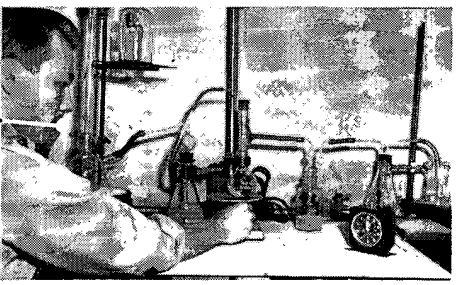
WELL LOGGING...

Baroid Well Logging Service logs the well during drilling, through analyses of the mud and cuttings in the return circulation, plus core analysis on location.

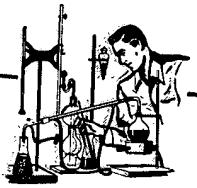


MOBILE LABORATORIES...

When need arises, specially-designed and built trucks, equipped with precision apparatus, bring laboratory facilities and accuracy to the well itself.



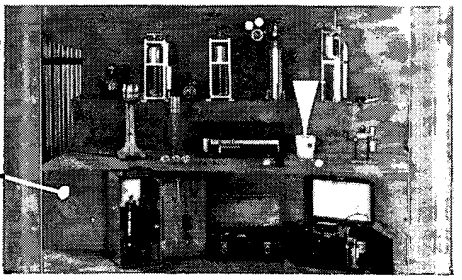
RESEARCH LABORATORIES...



At strategically located points, Baroid maintains completely equipped, modern mud laboratories where specially trained chemists and engineers work steadily to improve and develop drilling mud materials and techniques.

TESTING EQUIPMENT...

Baroid provides operators with up-to-date equipment for making every necessary test on drilling fluids. Many of these items were developed in Baroid laboratories.



500 DISTRIBUTORS
bring Baroid Products to every active drilling area

BAROID SALES DIVISION NATIONAL LEAD COMPANY
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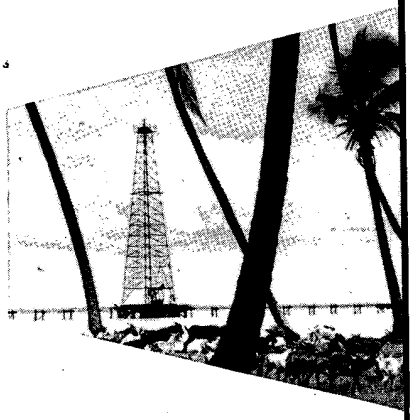
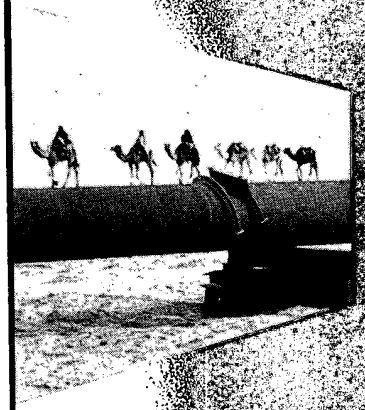
WORLD OIL

MAPS

of oil-producing countries





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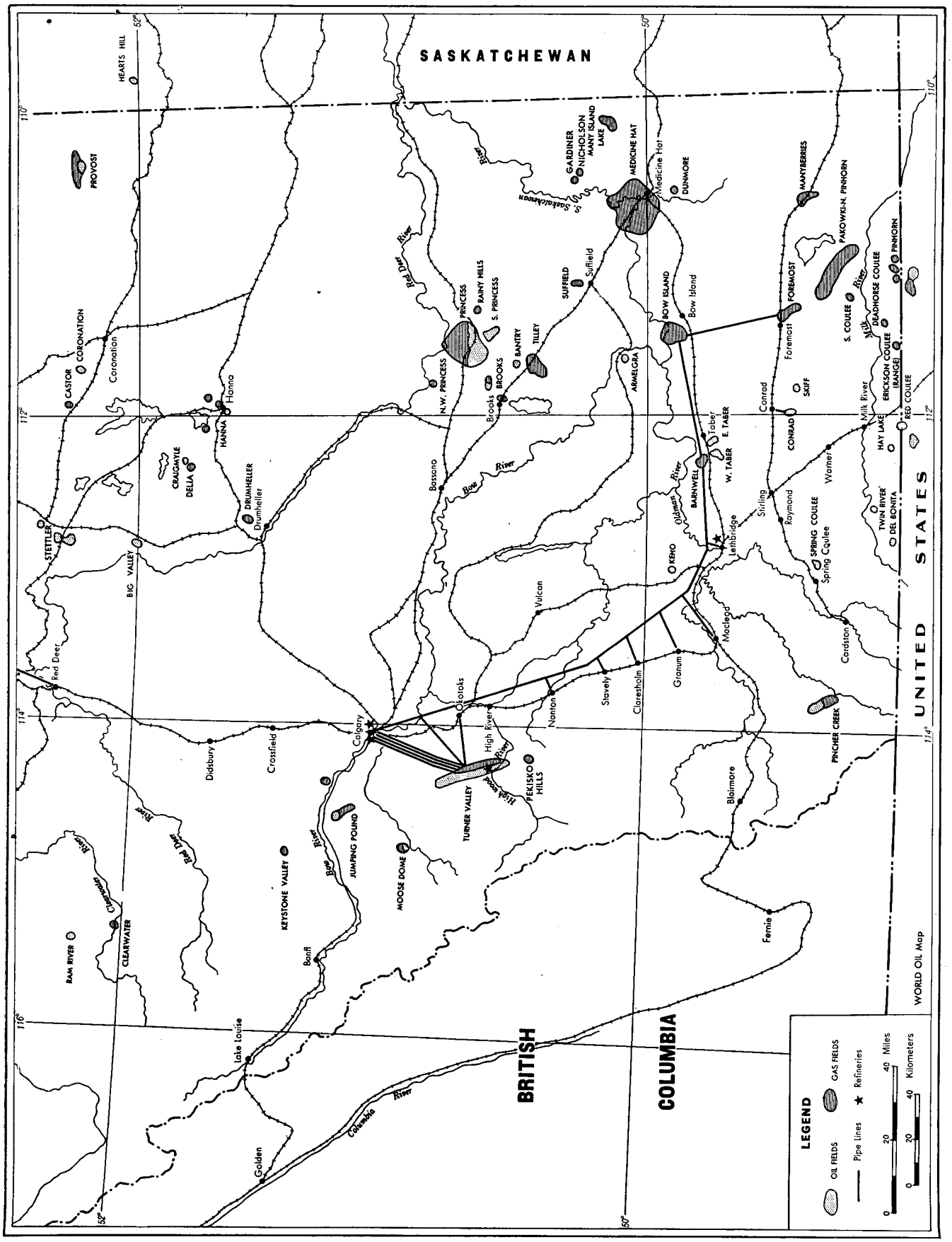

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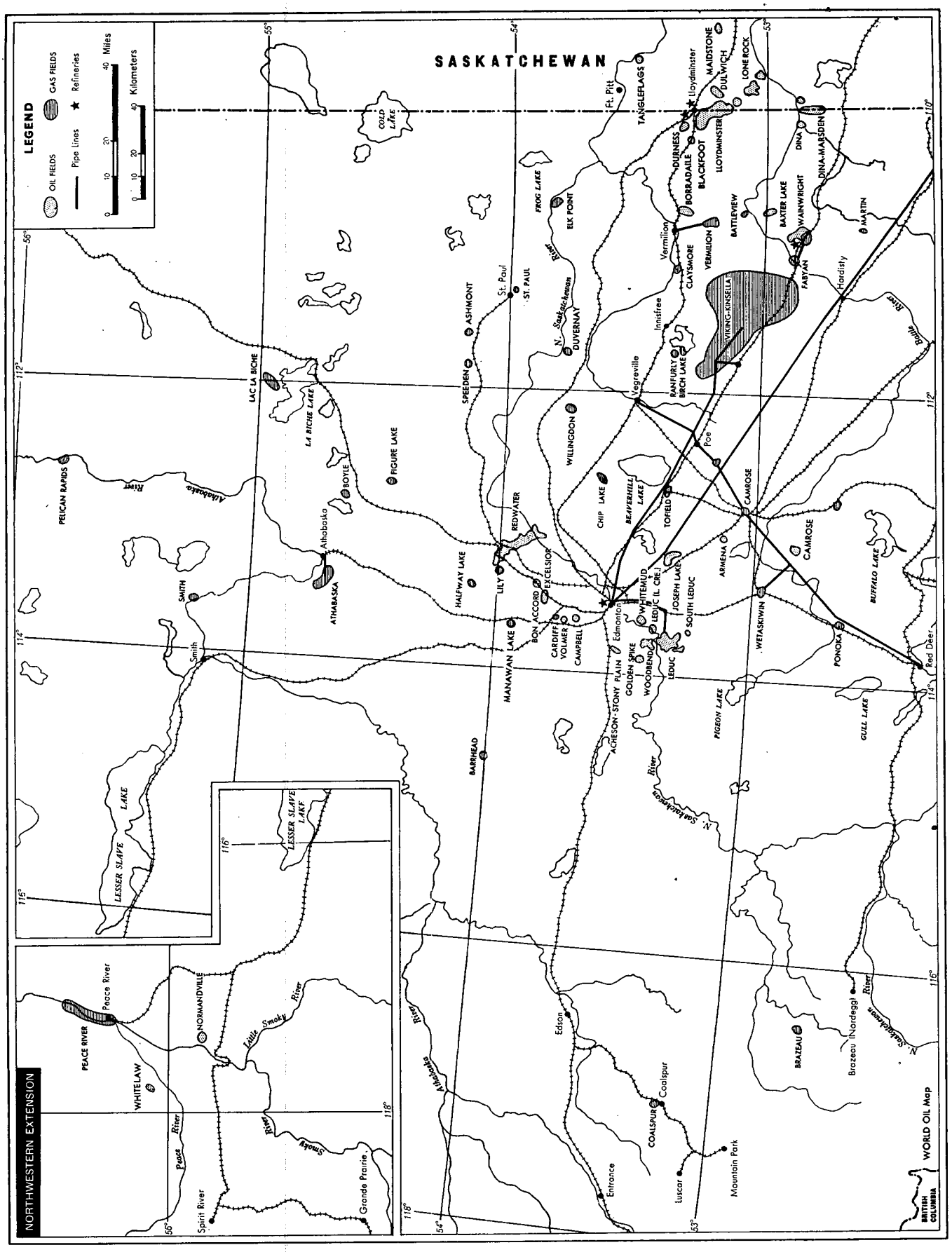

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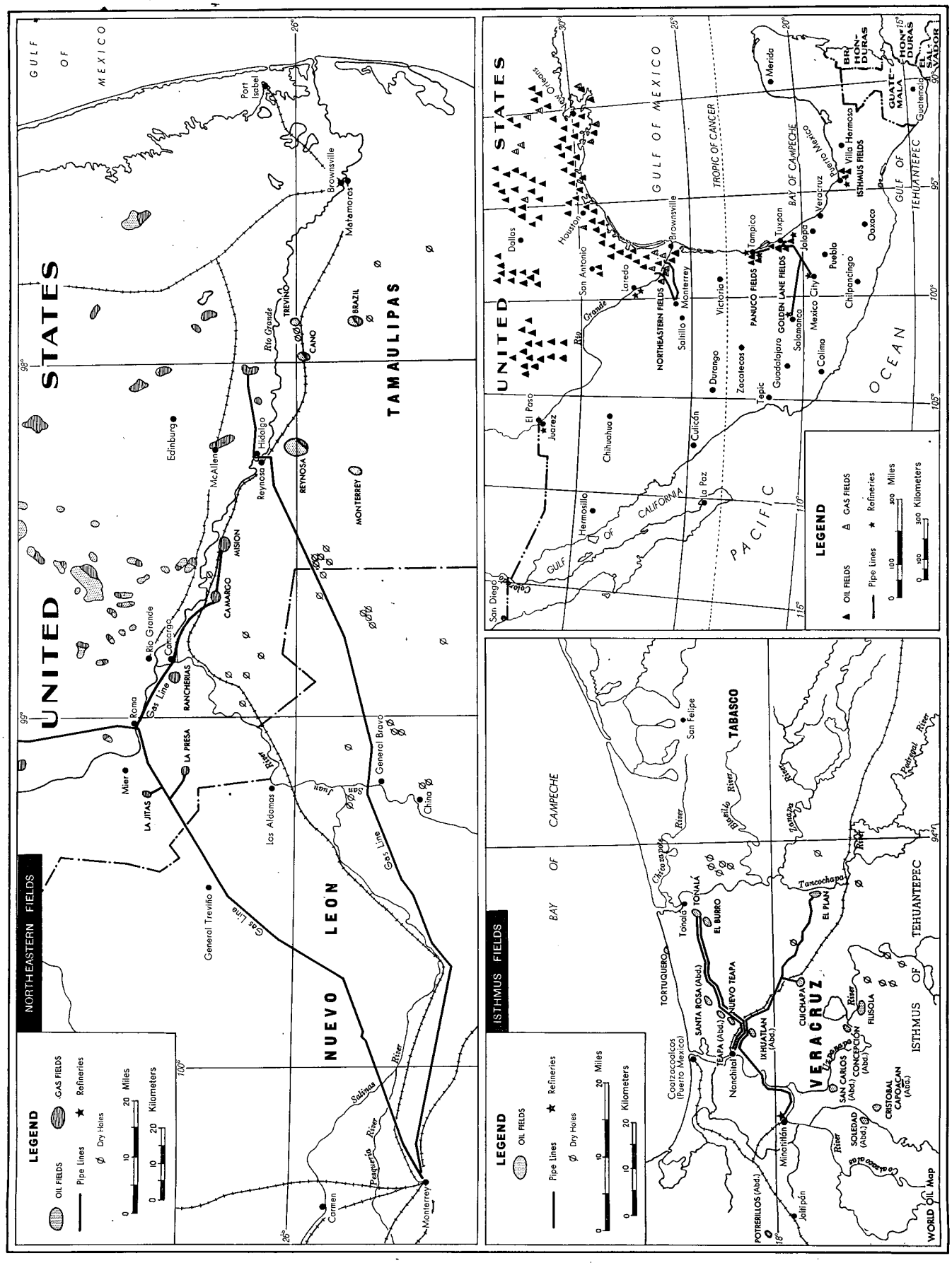

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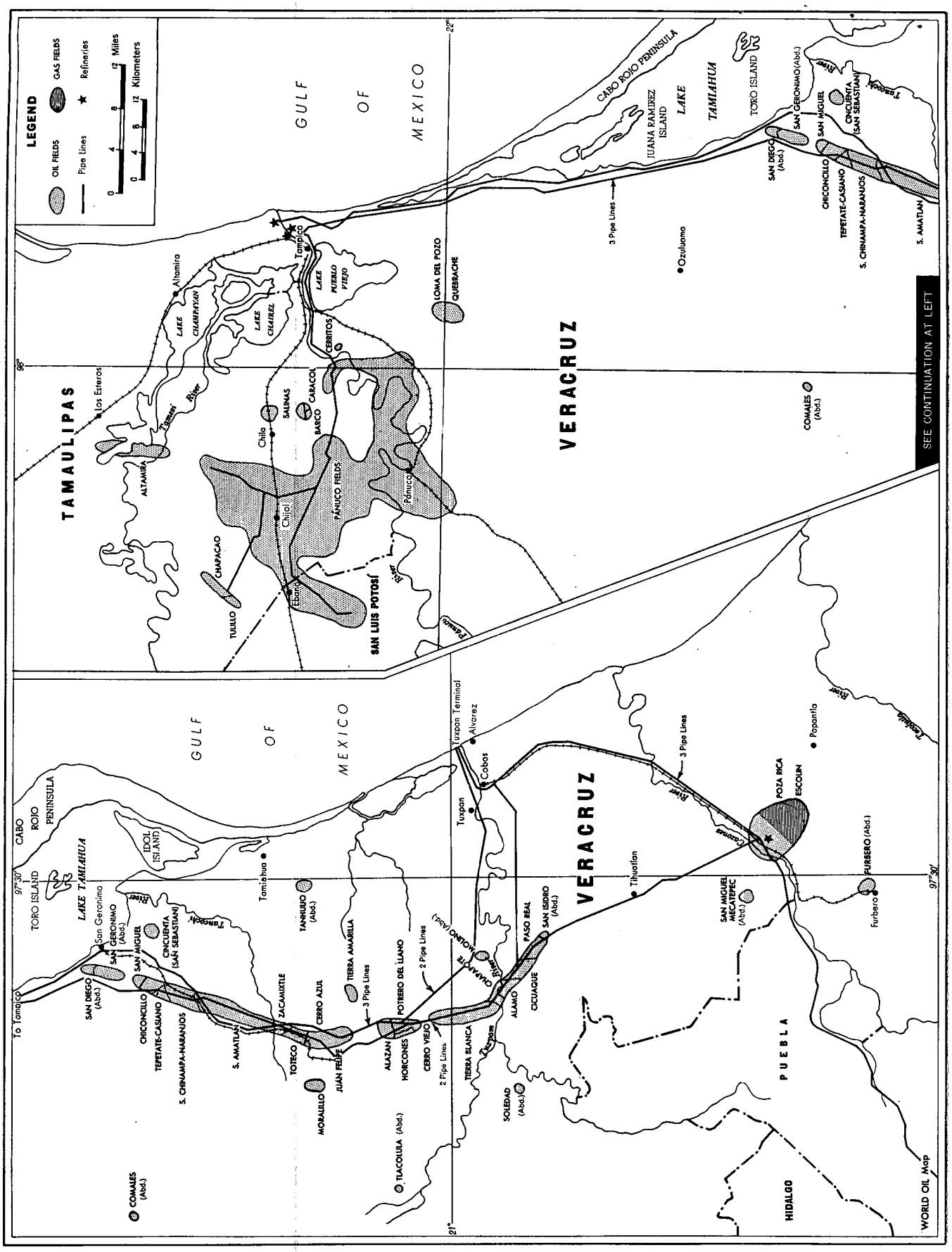

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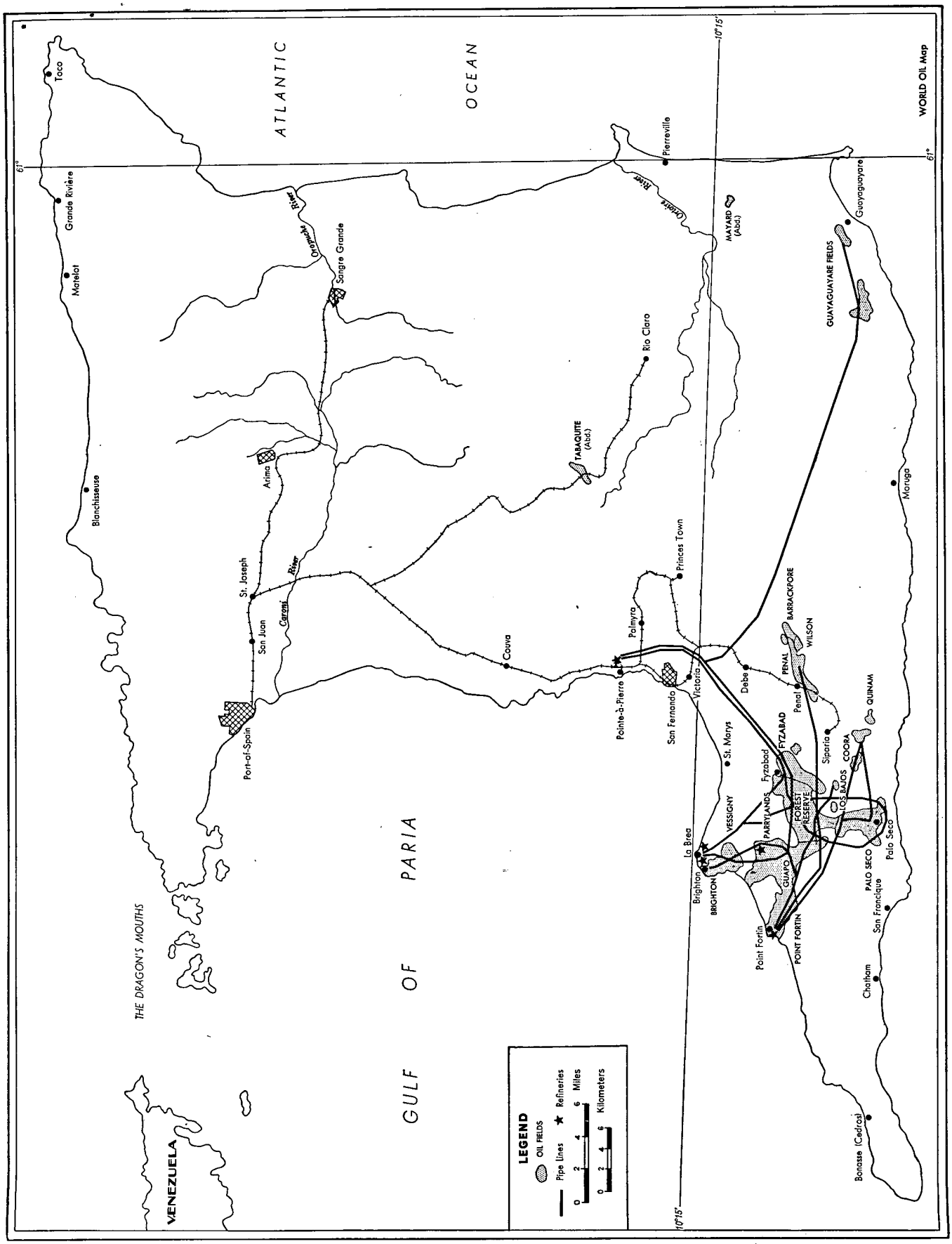

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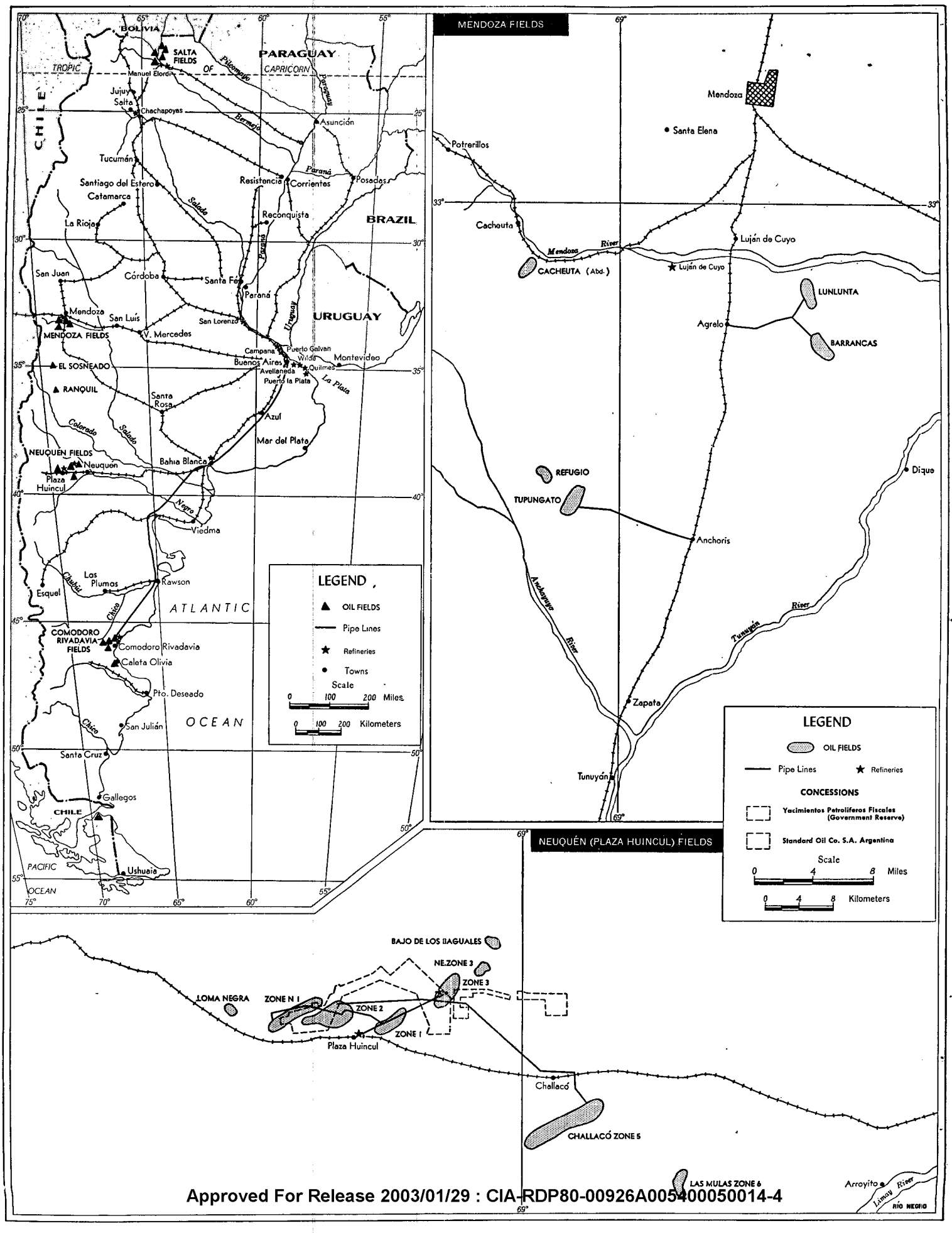

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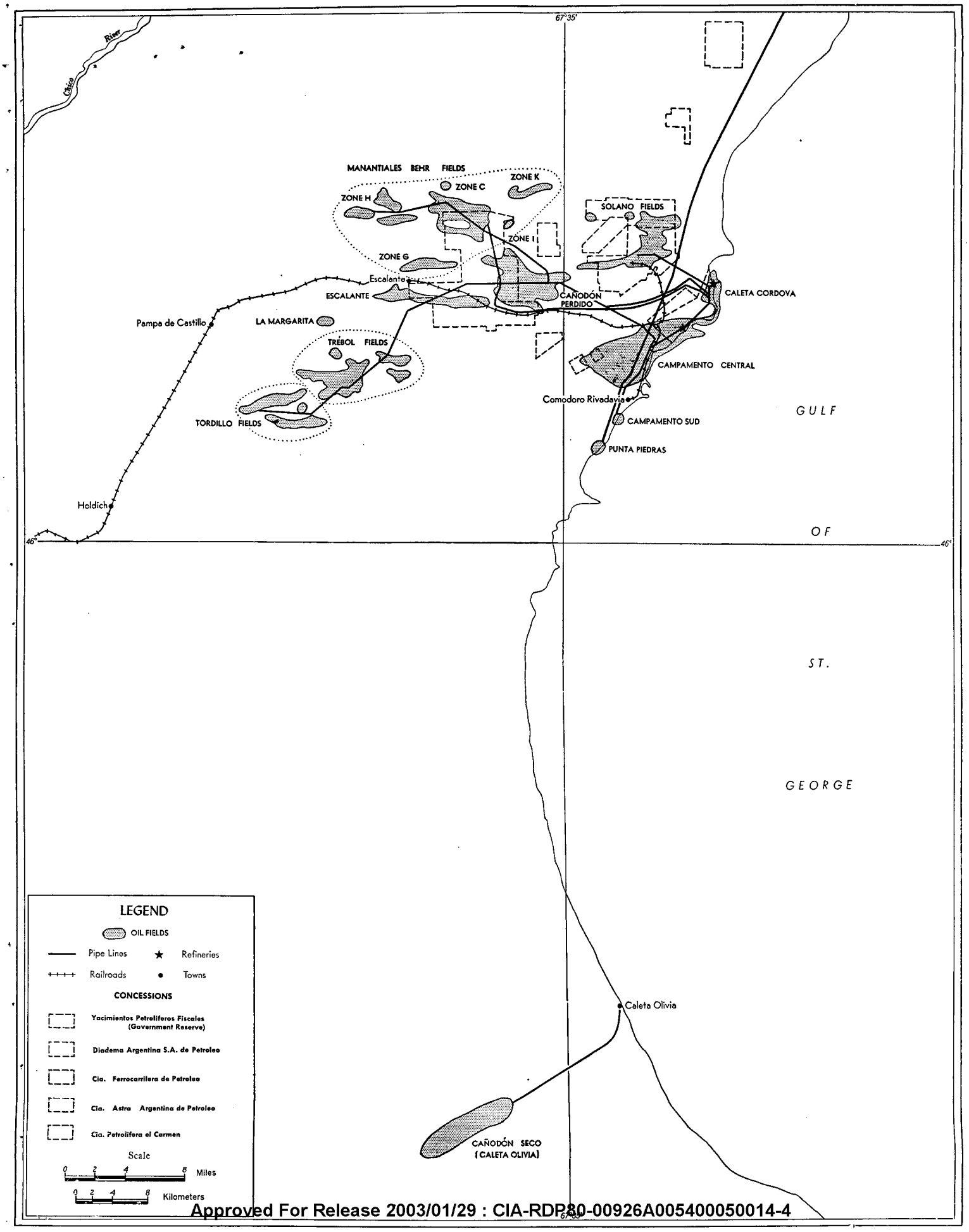

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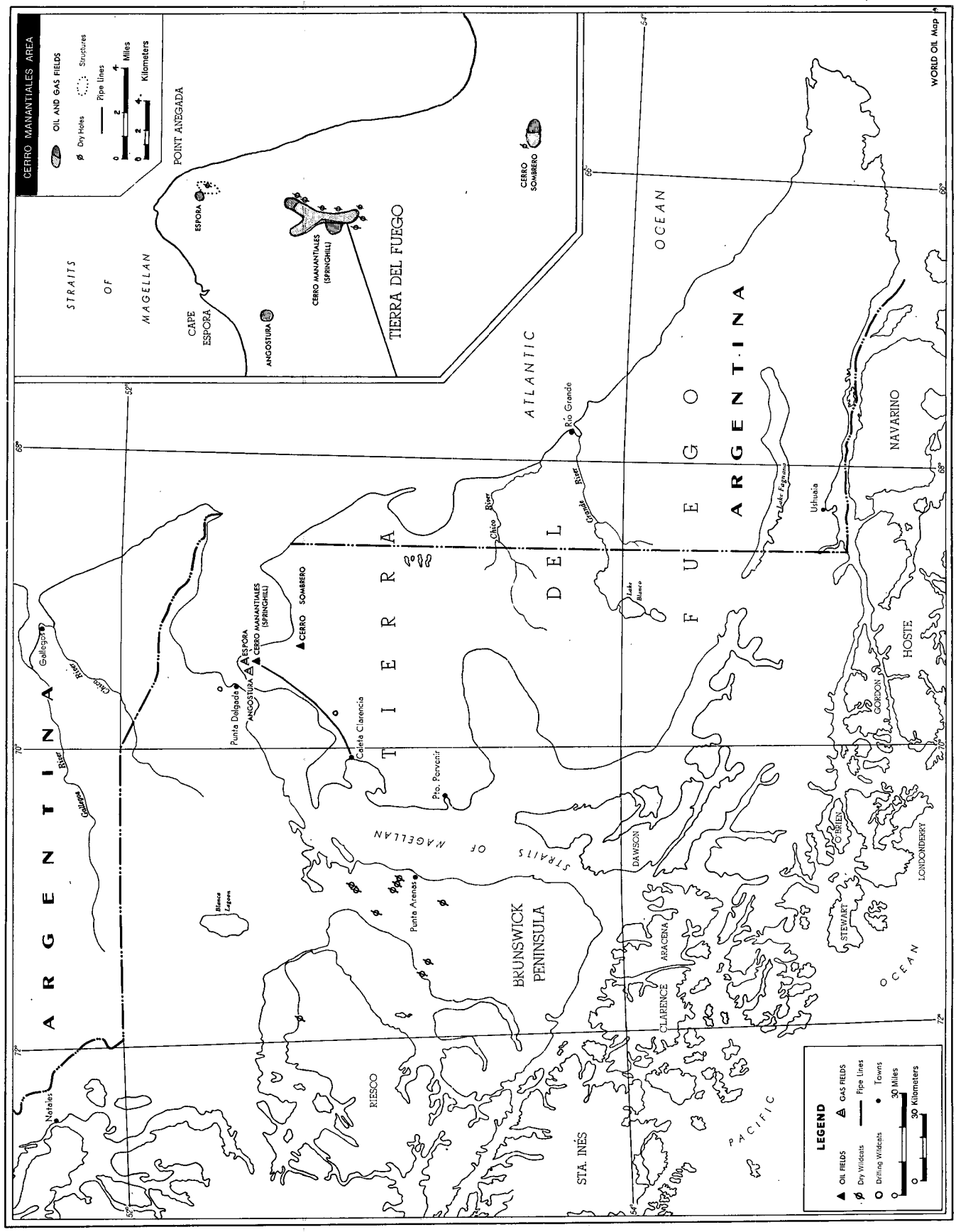

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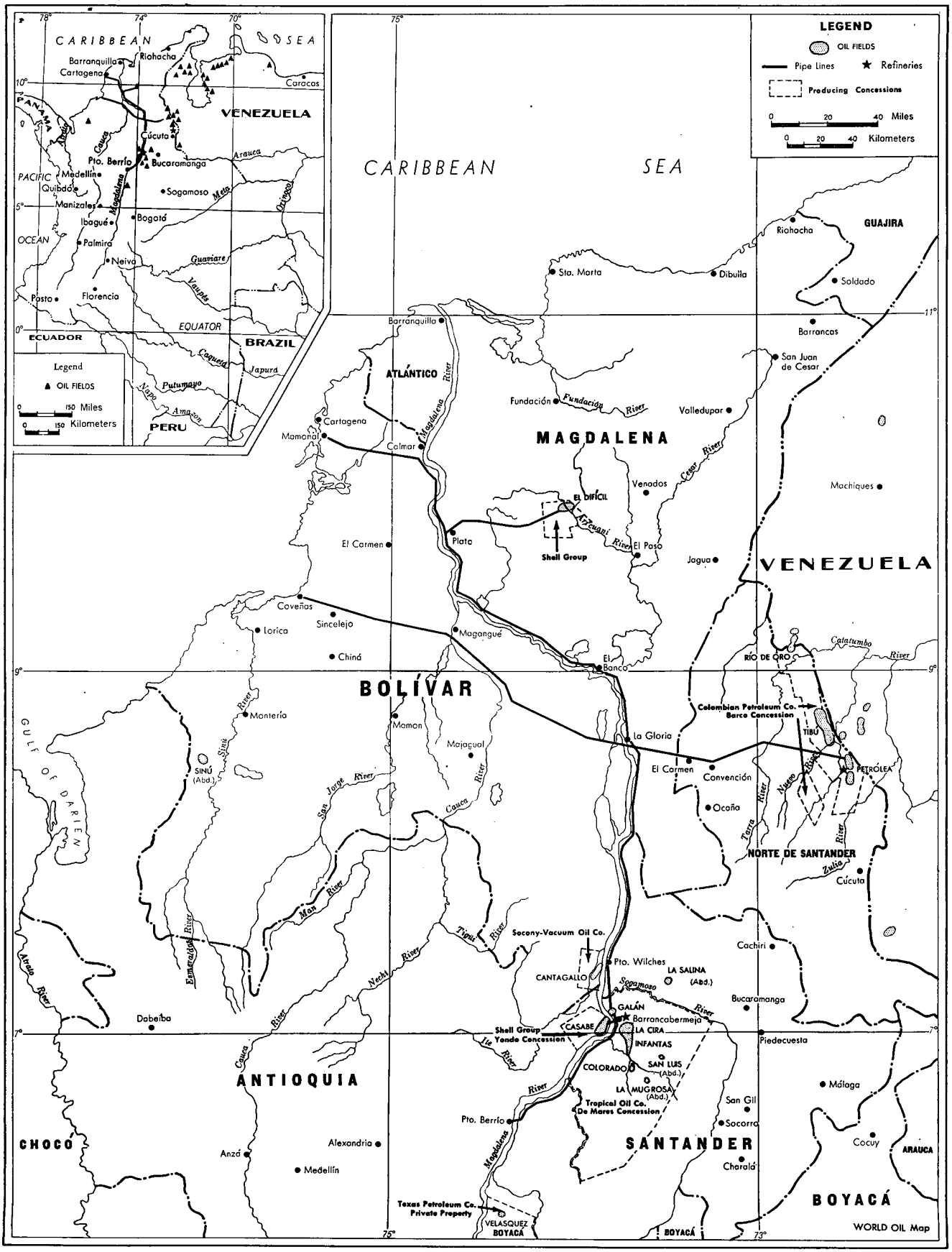

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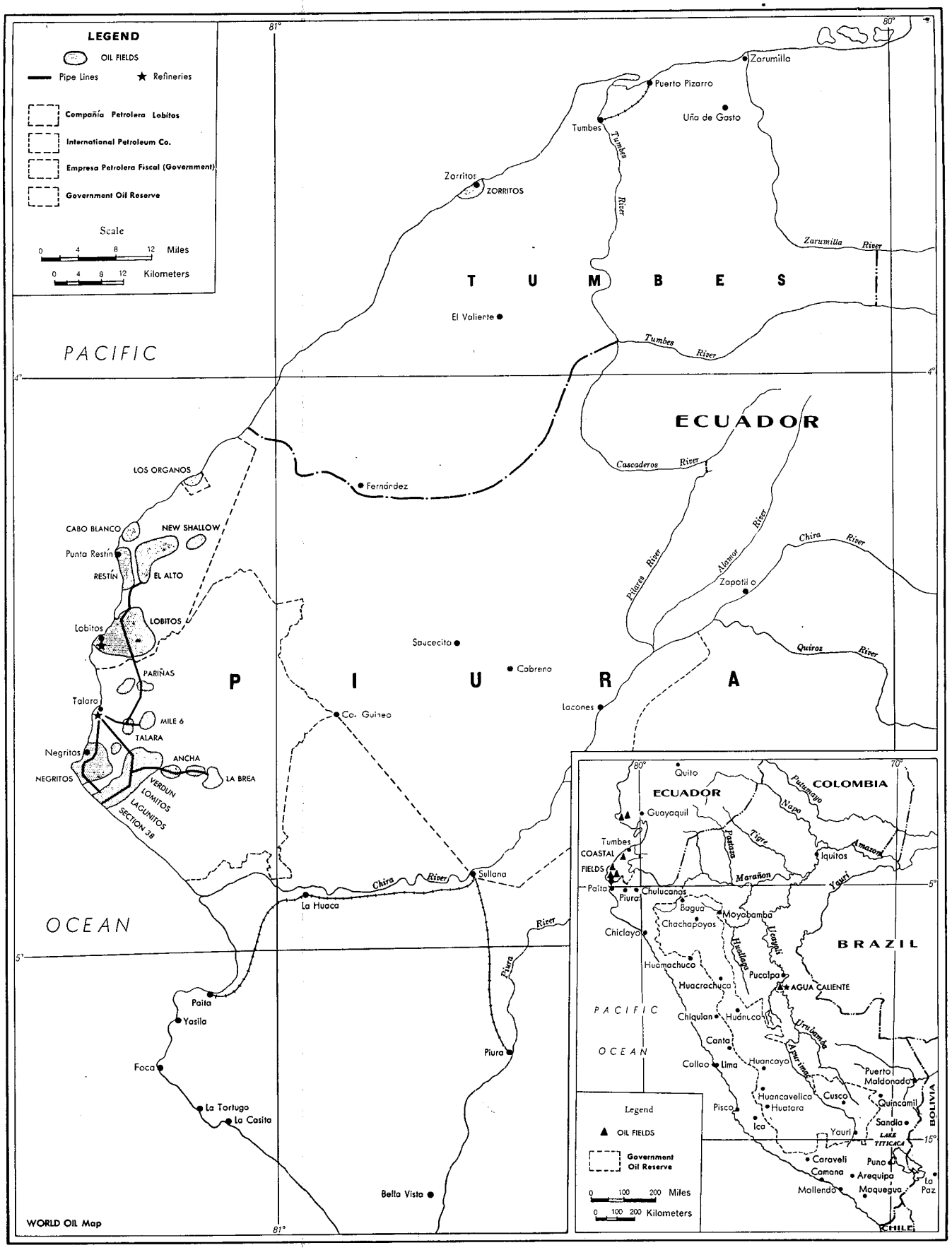

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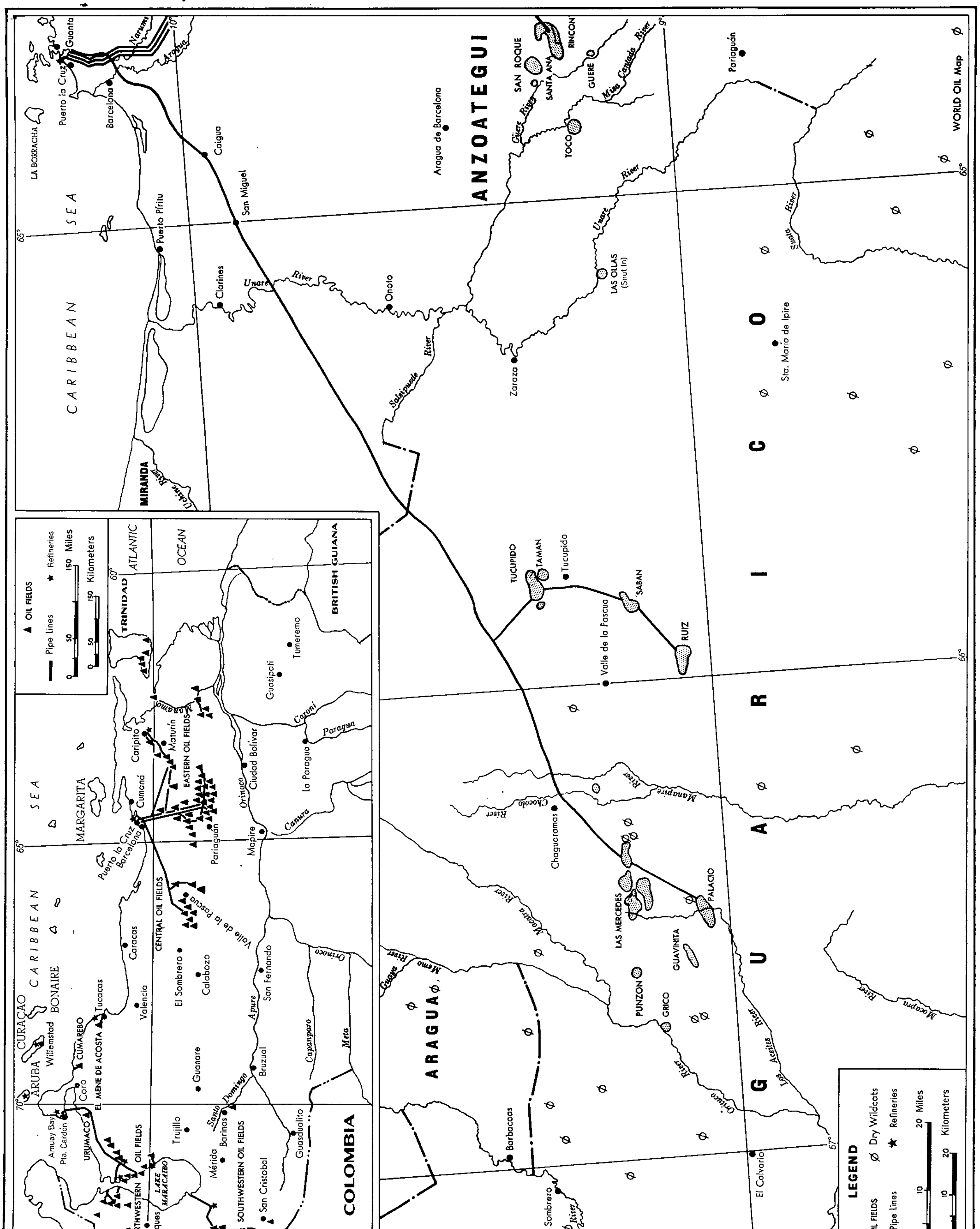

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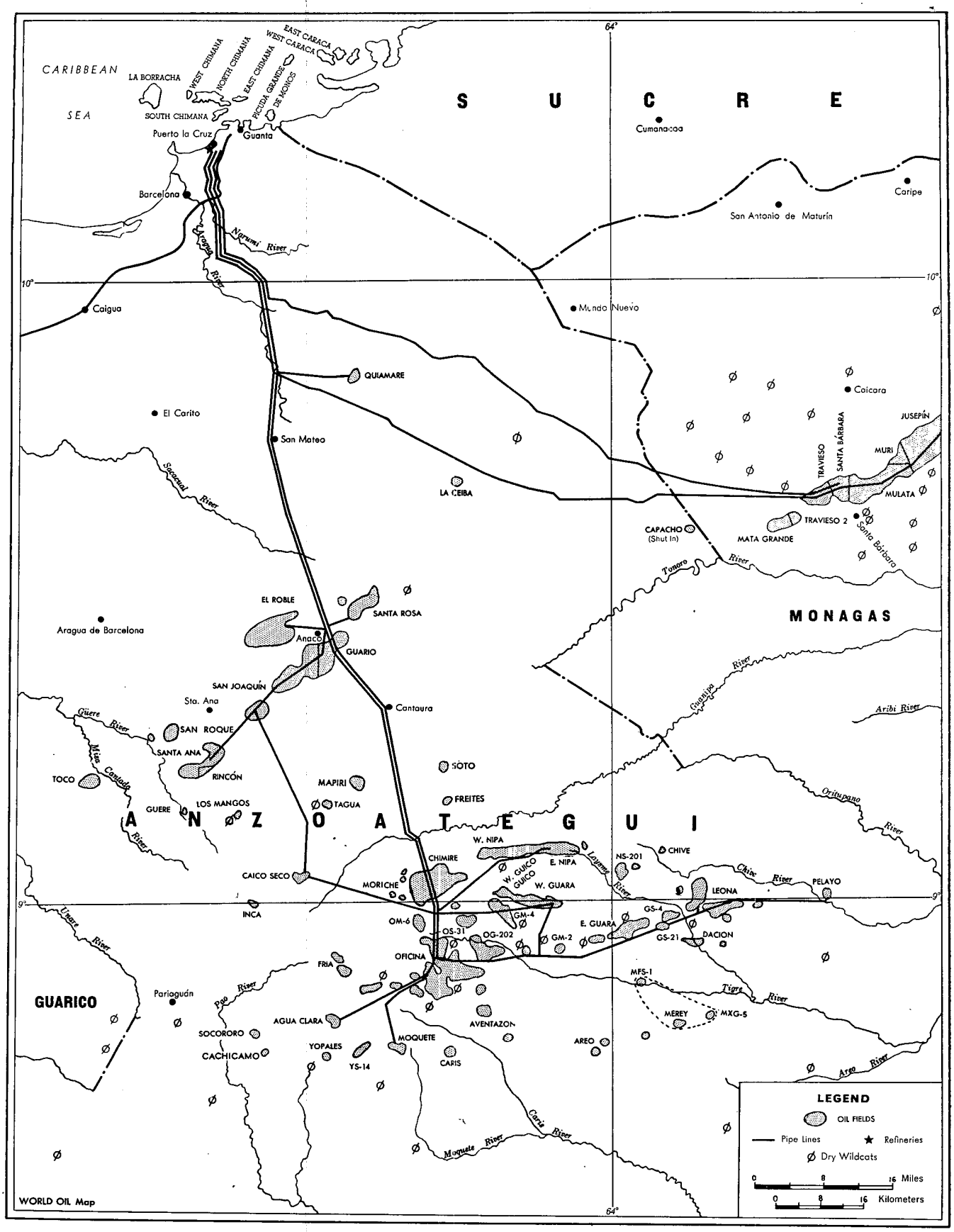

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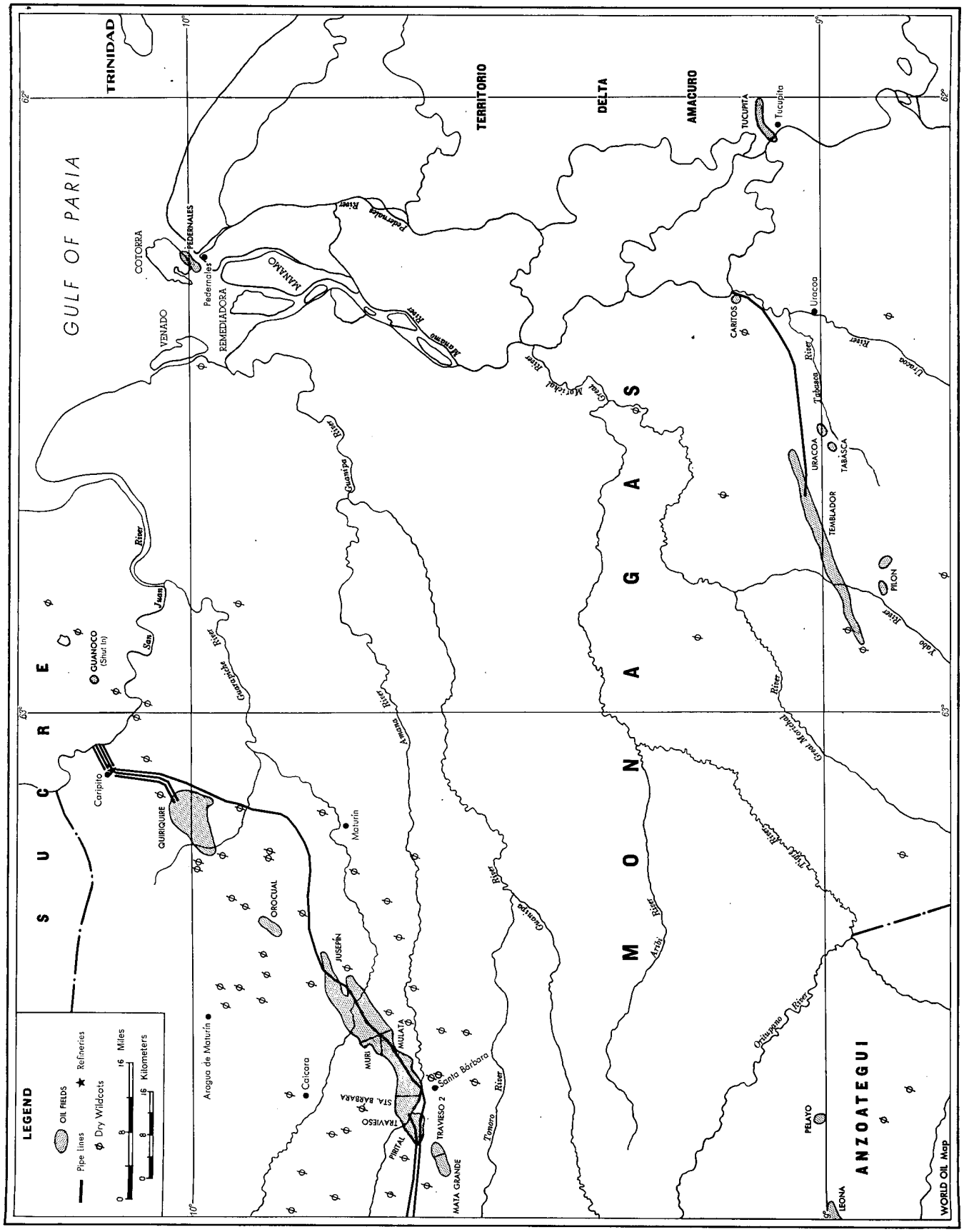

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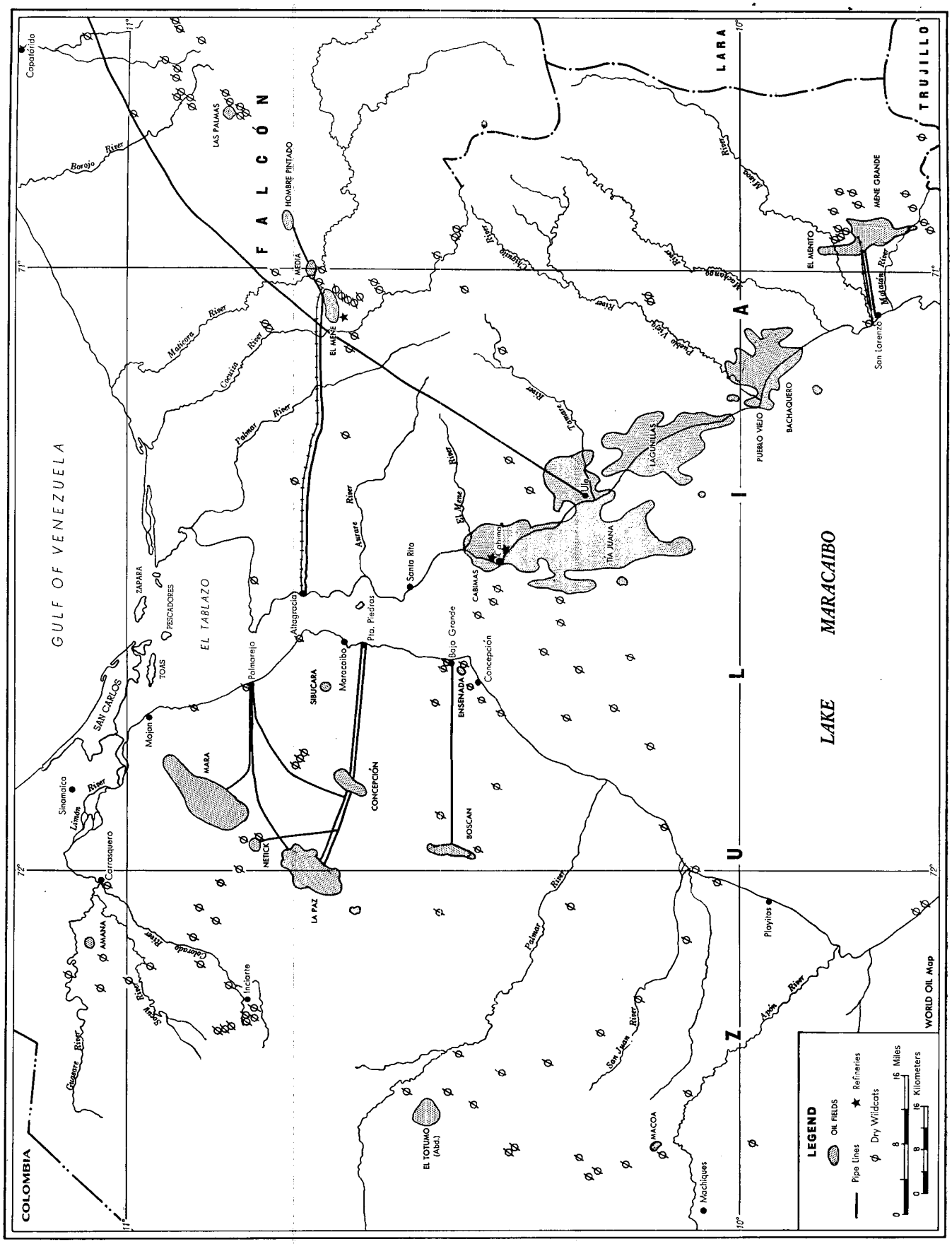

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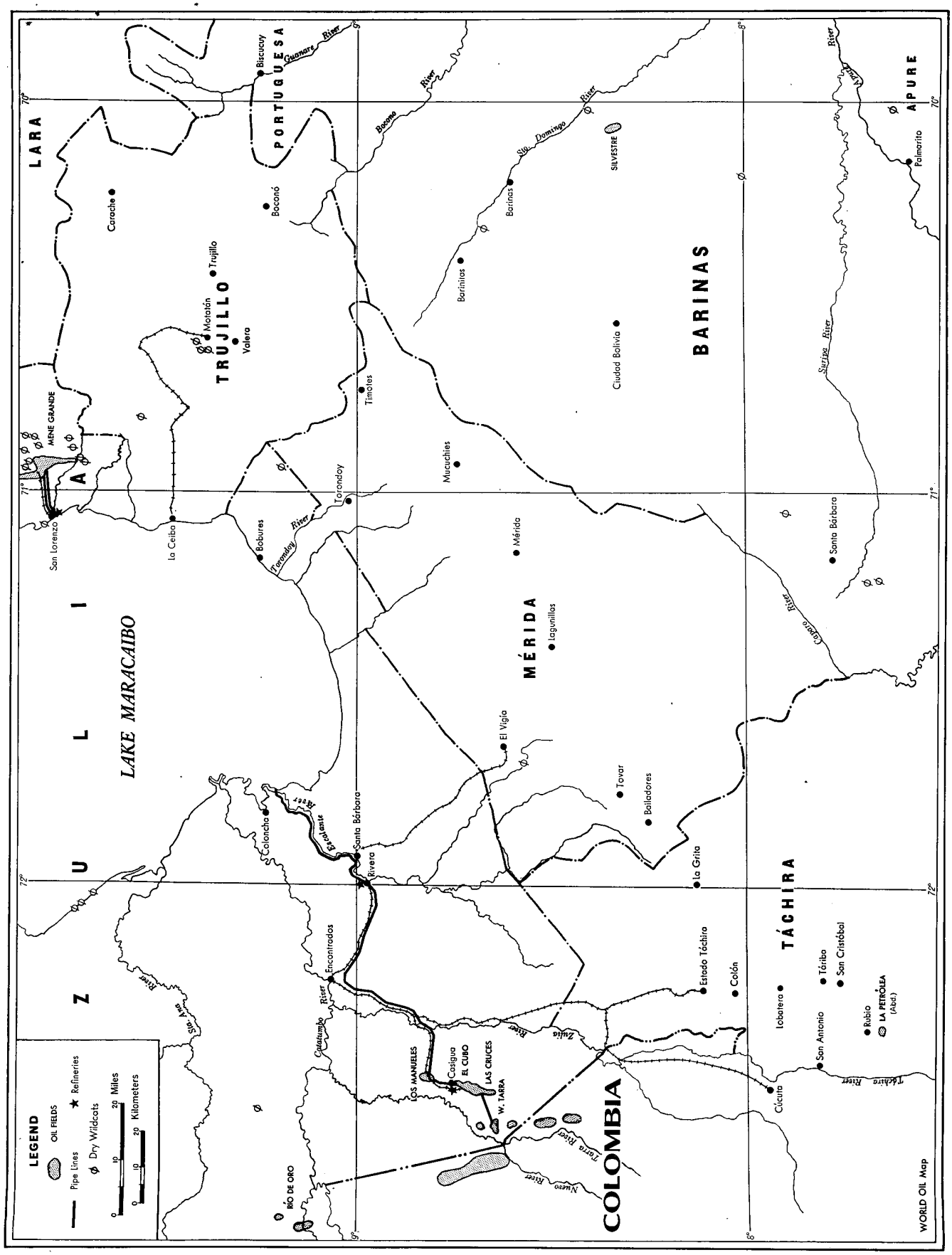

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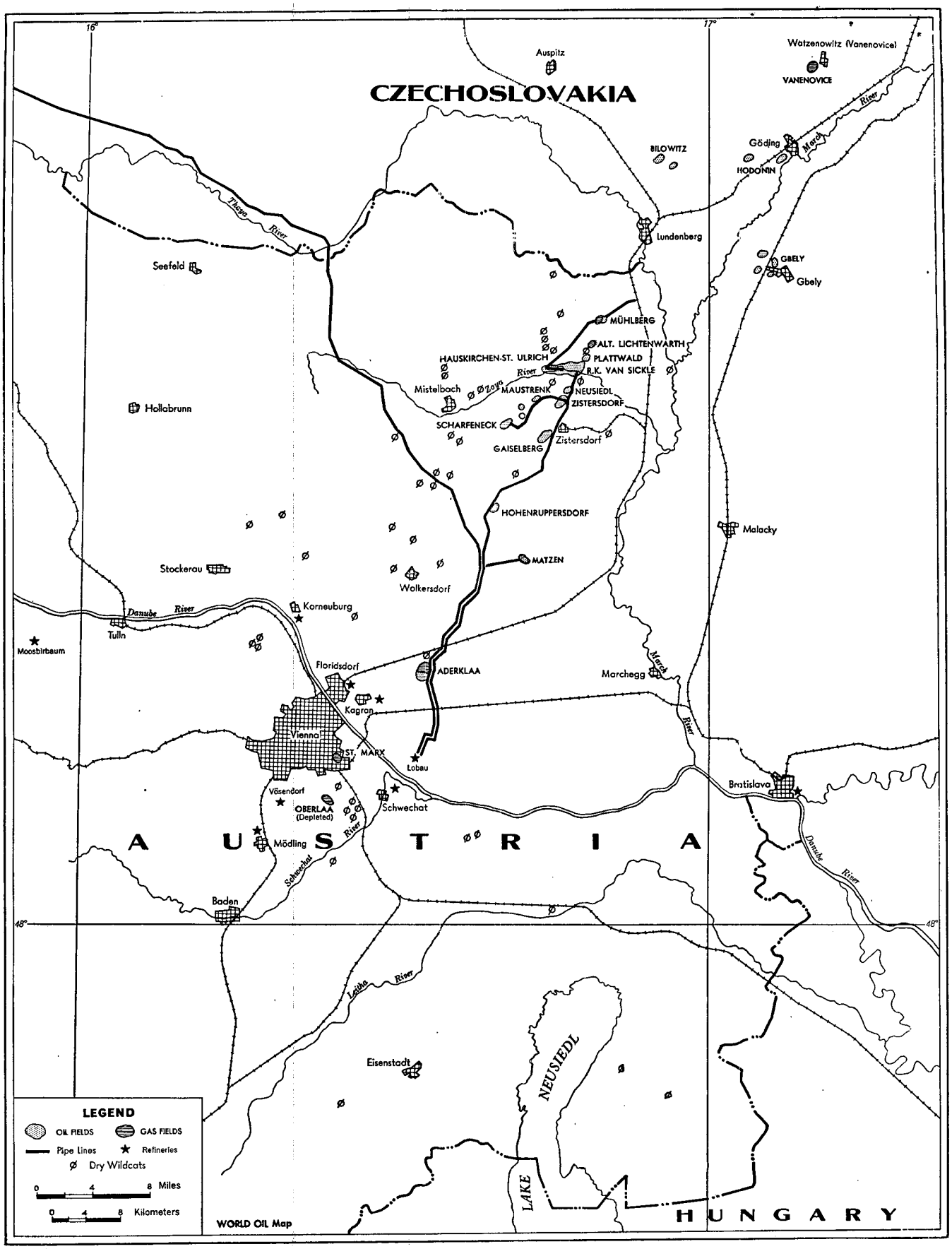

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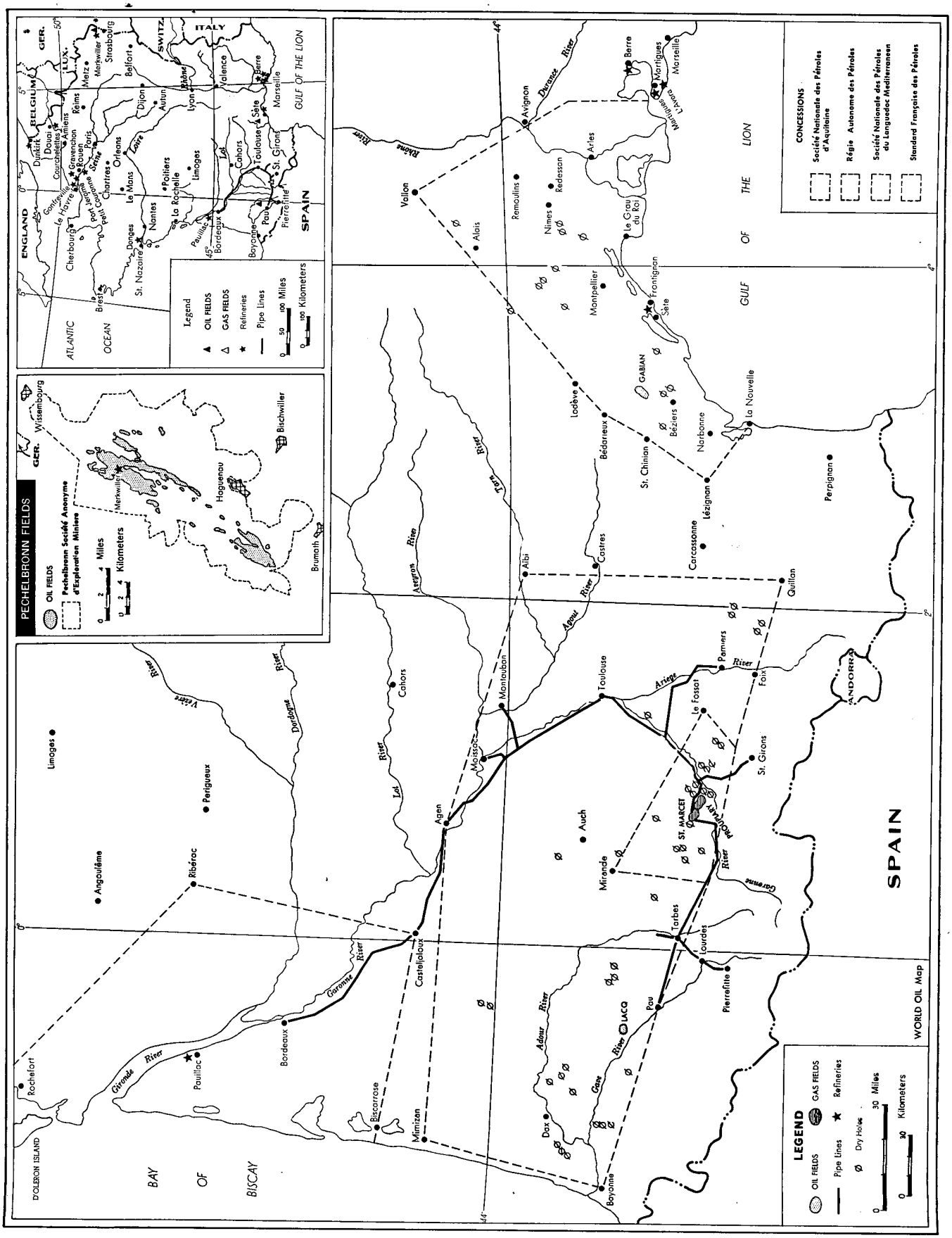

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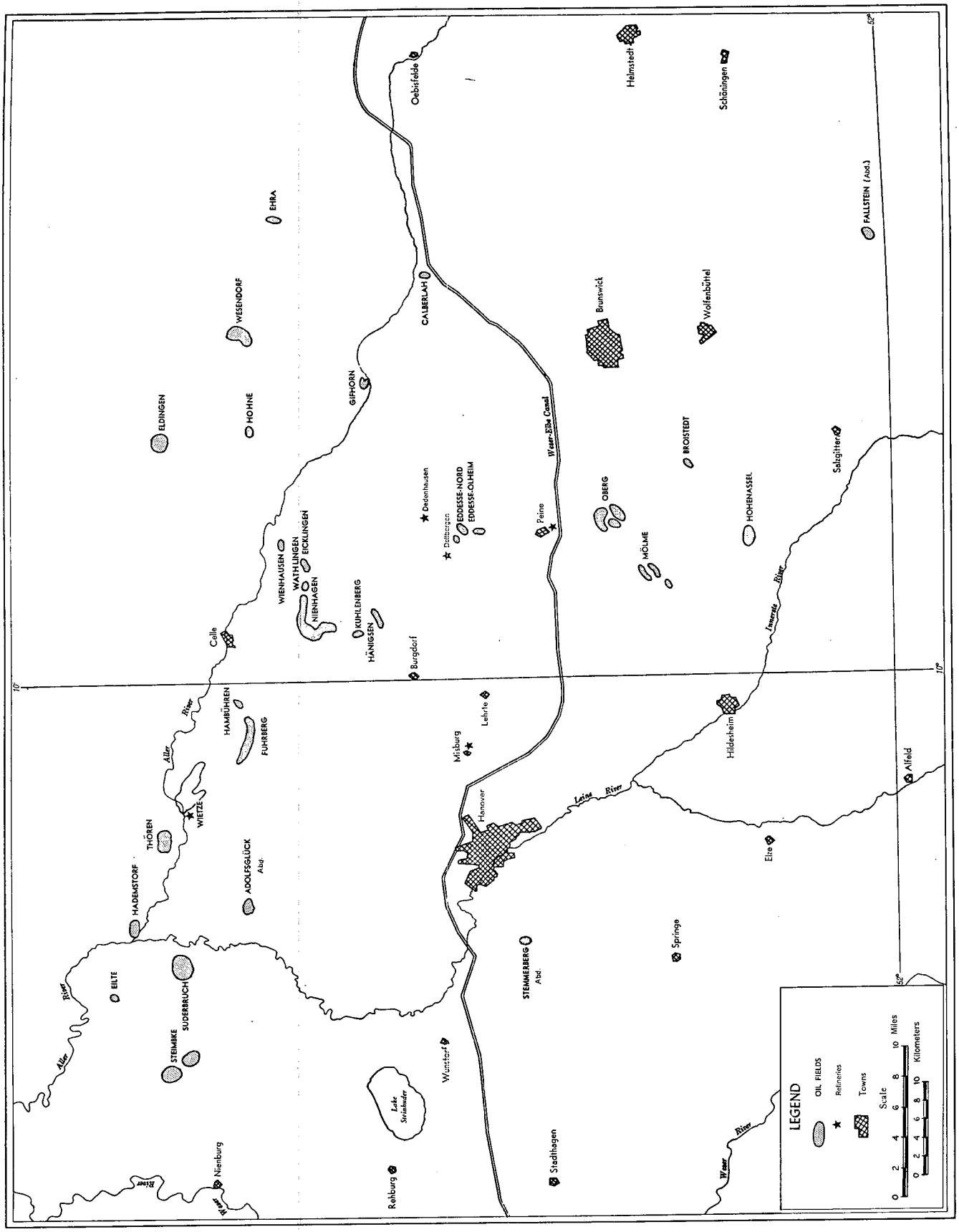

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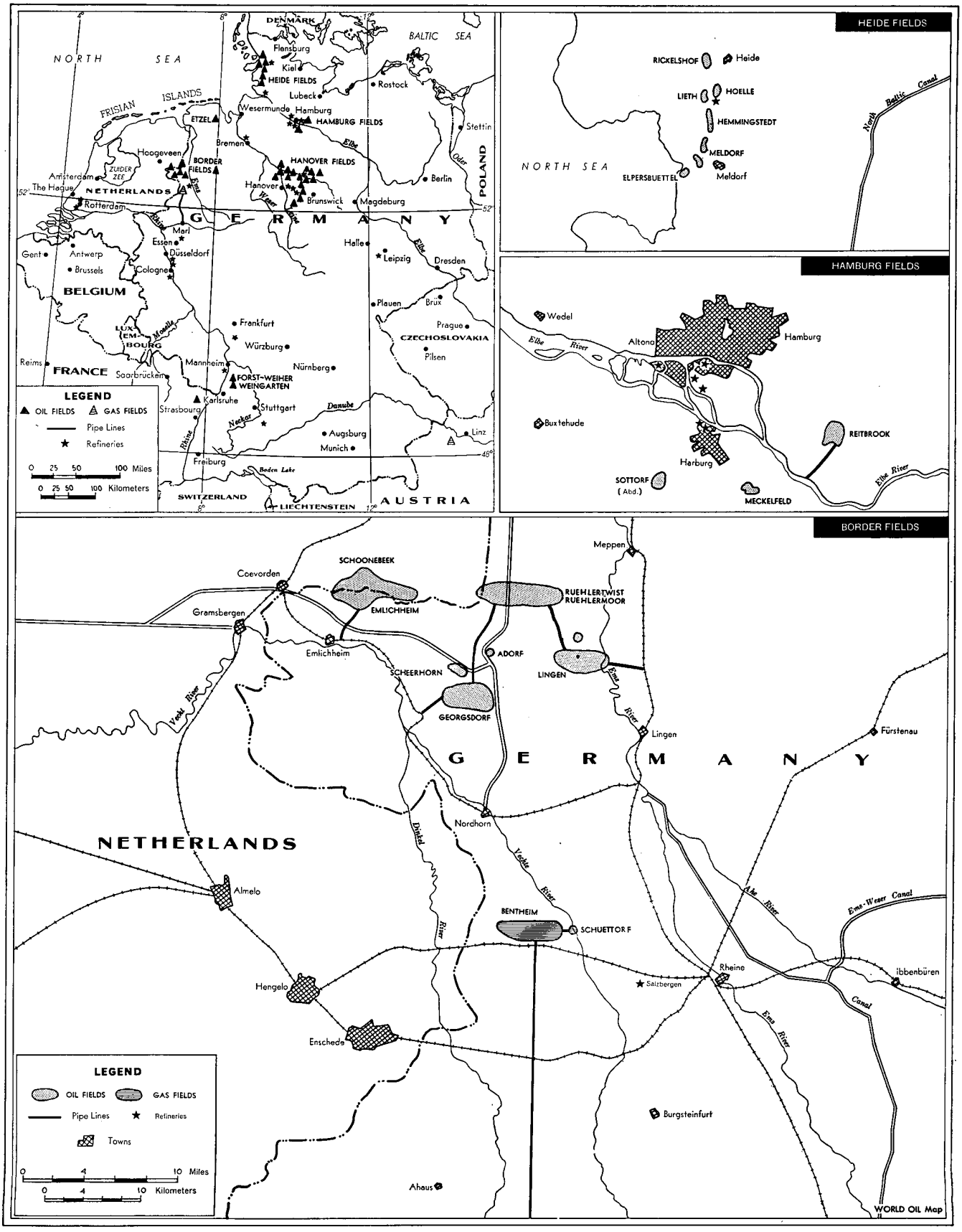

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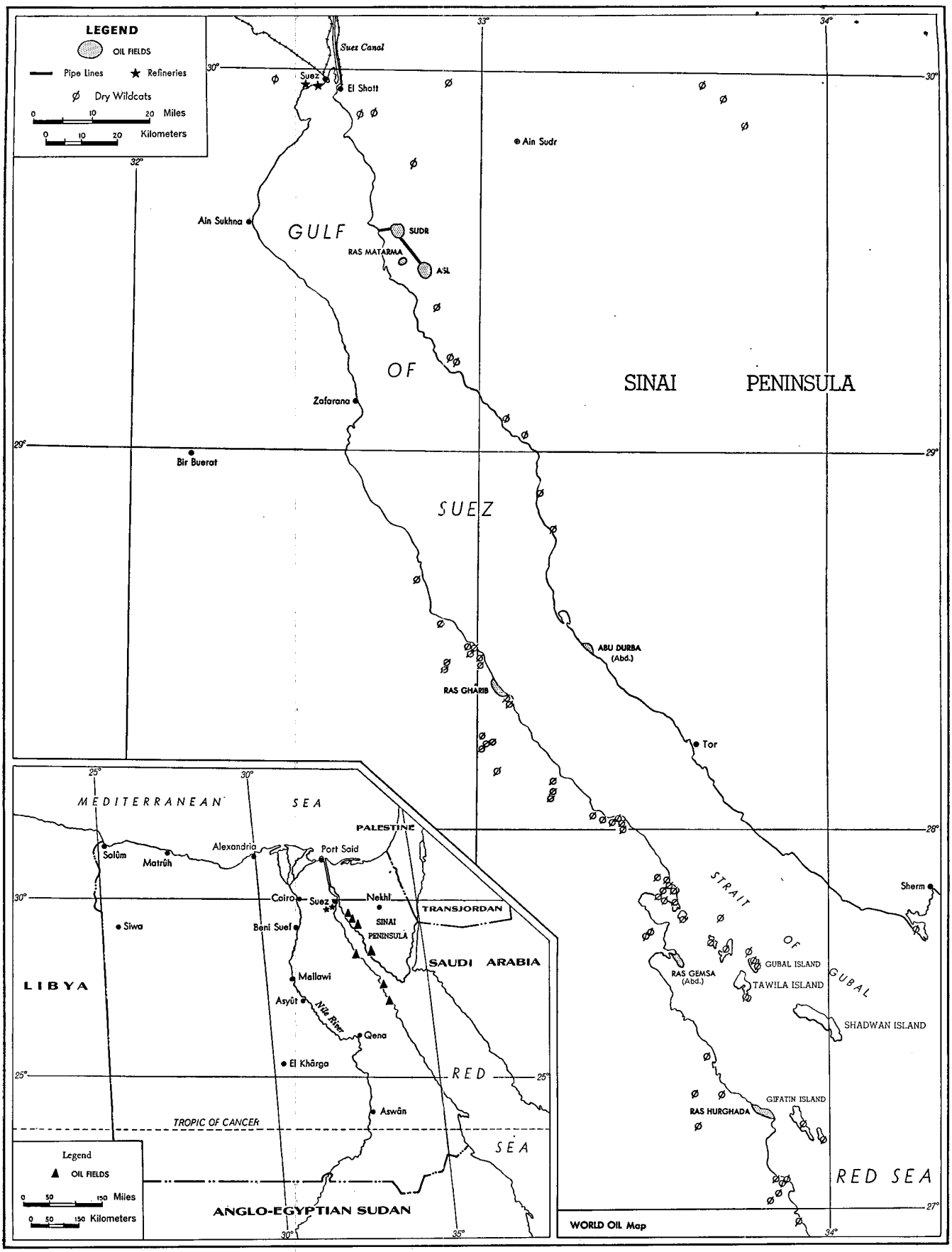

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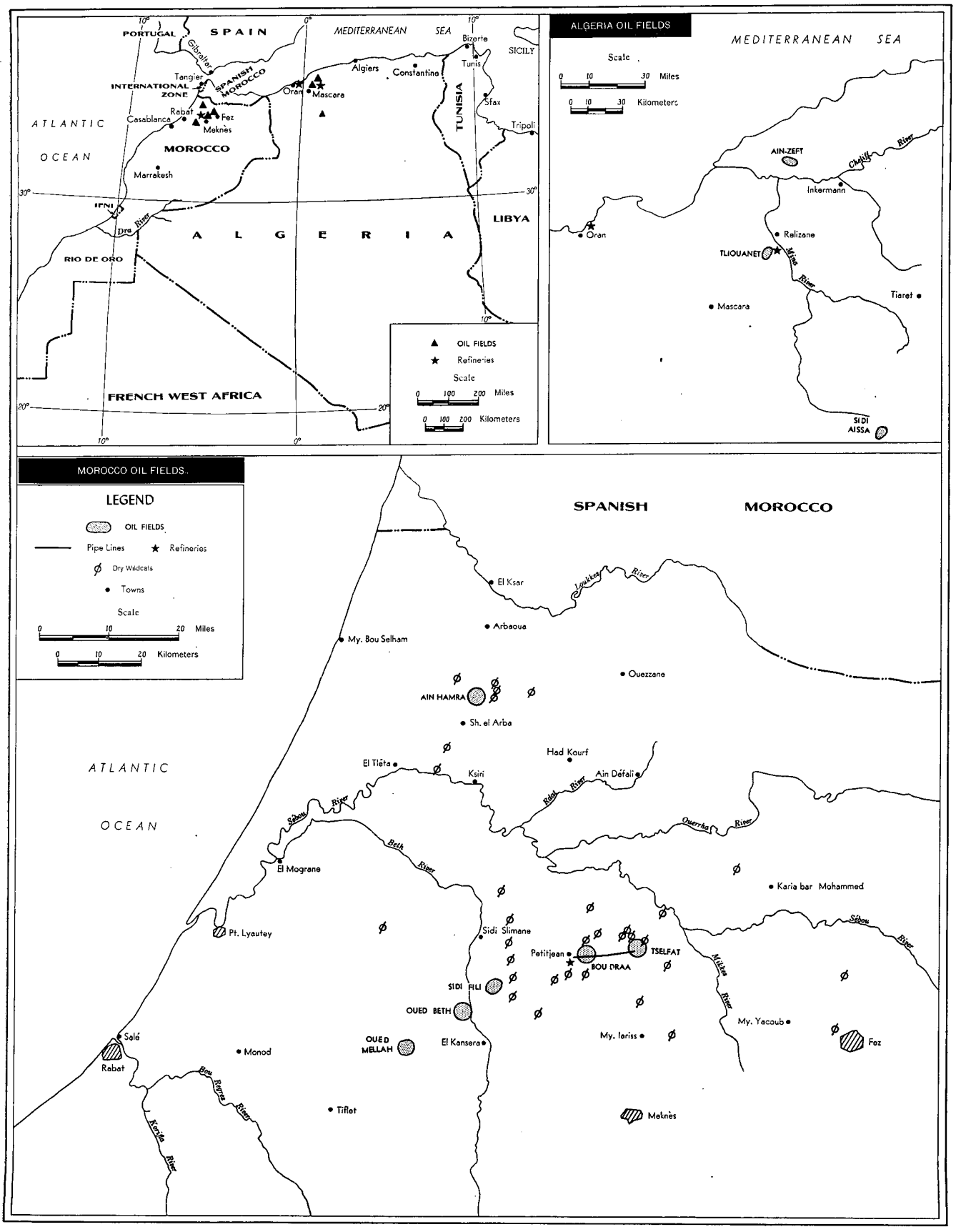

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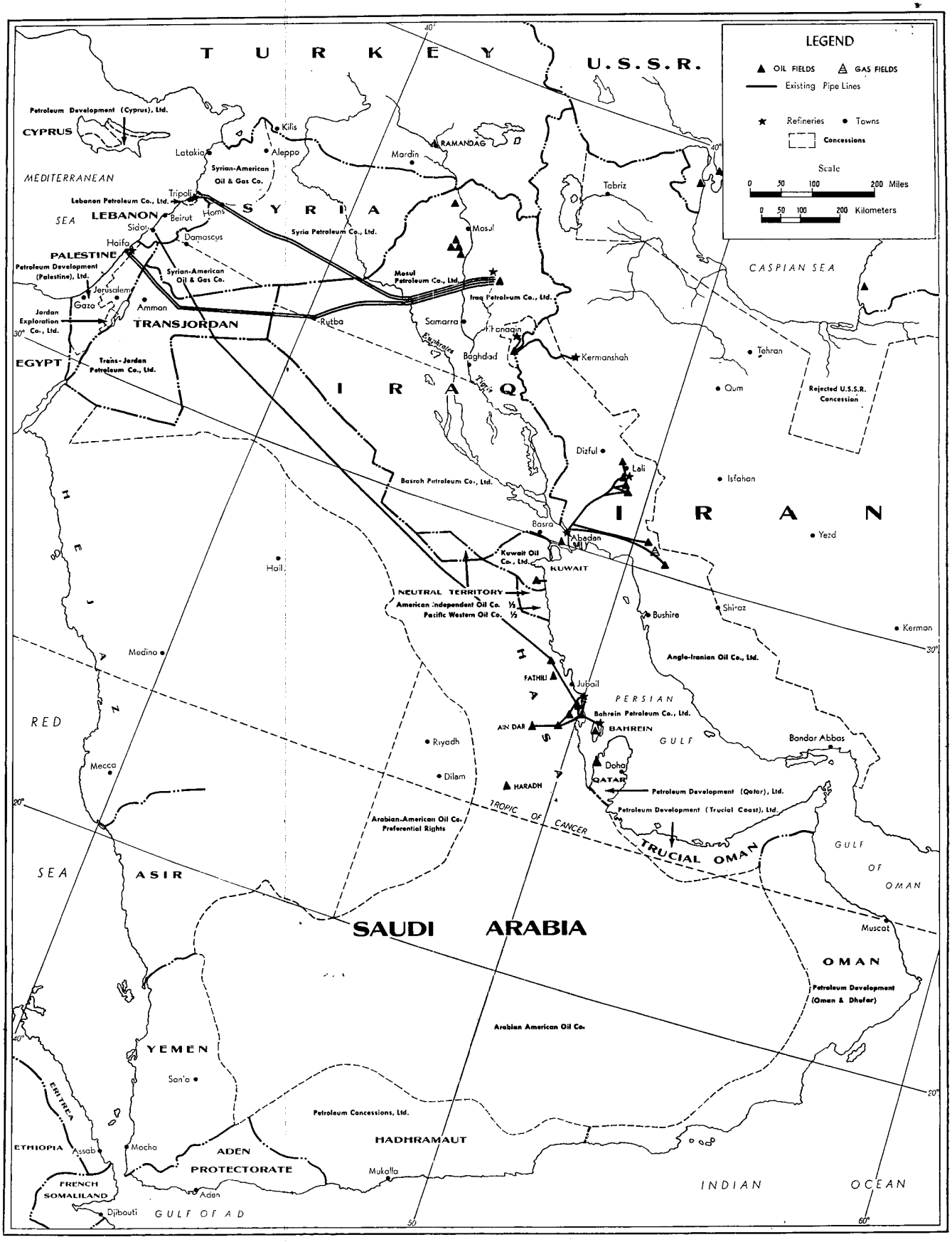

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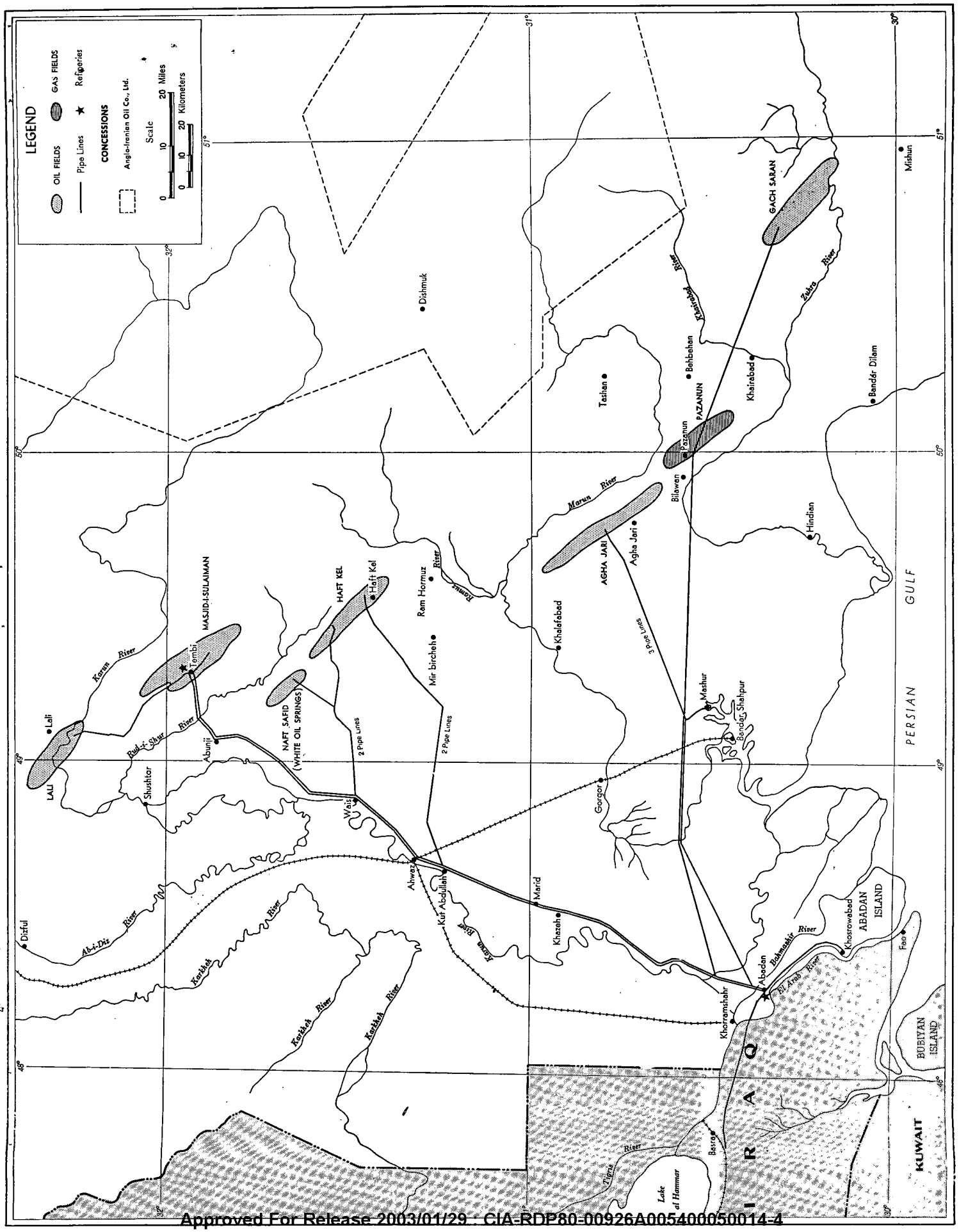

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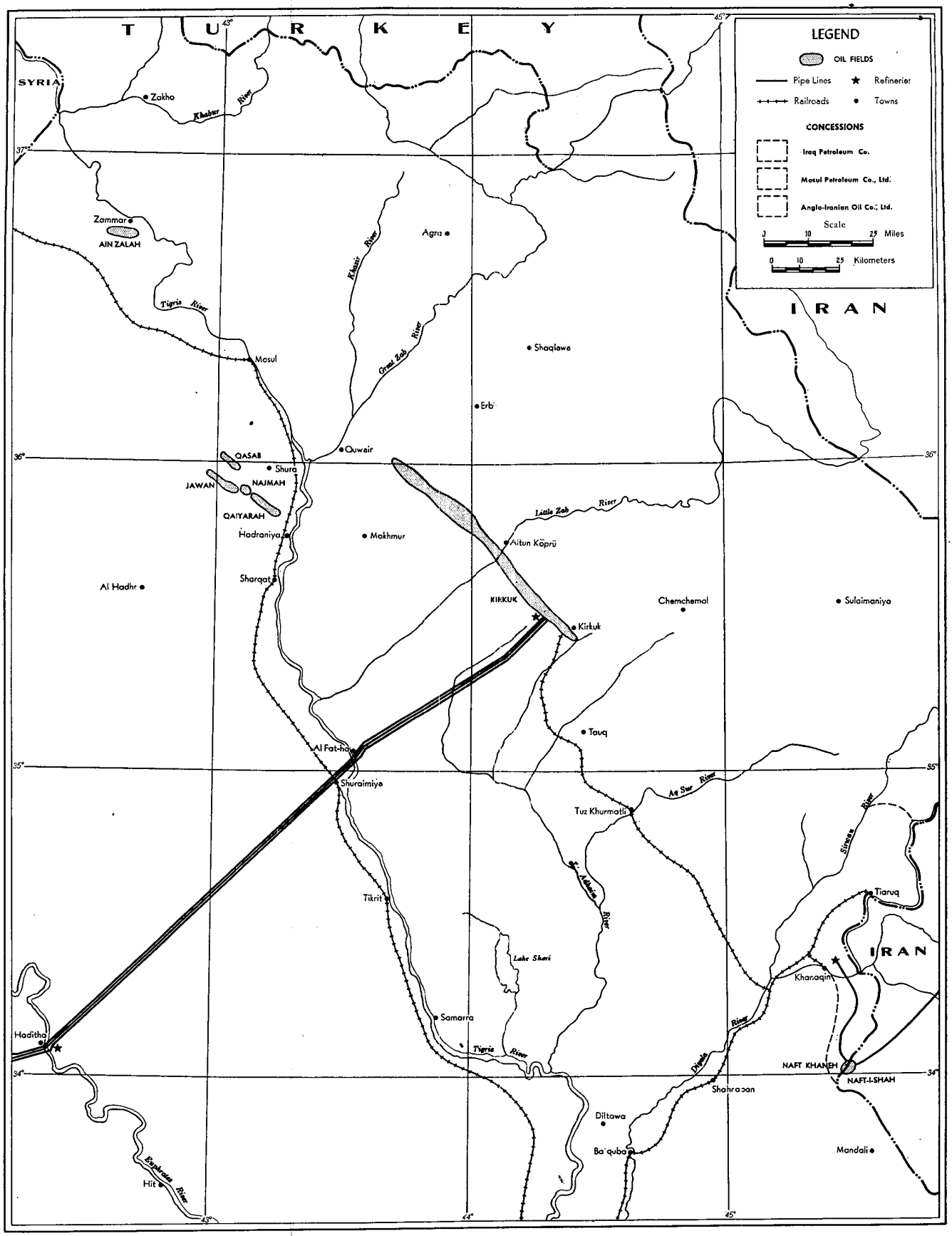

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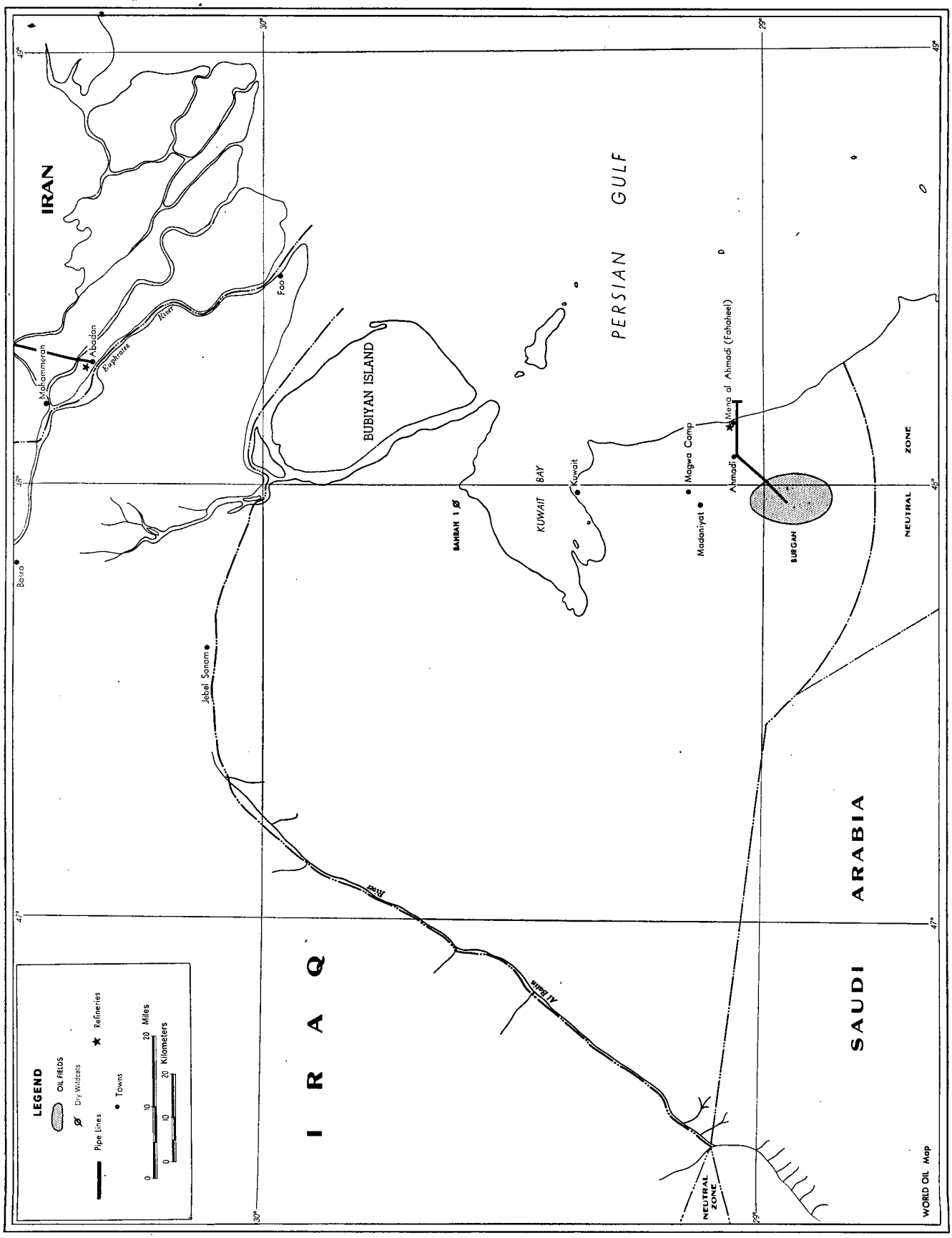
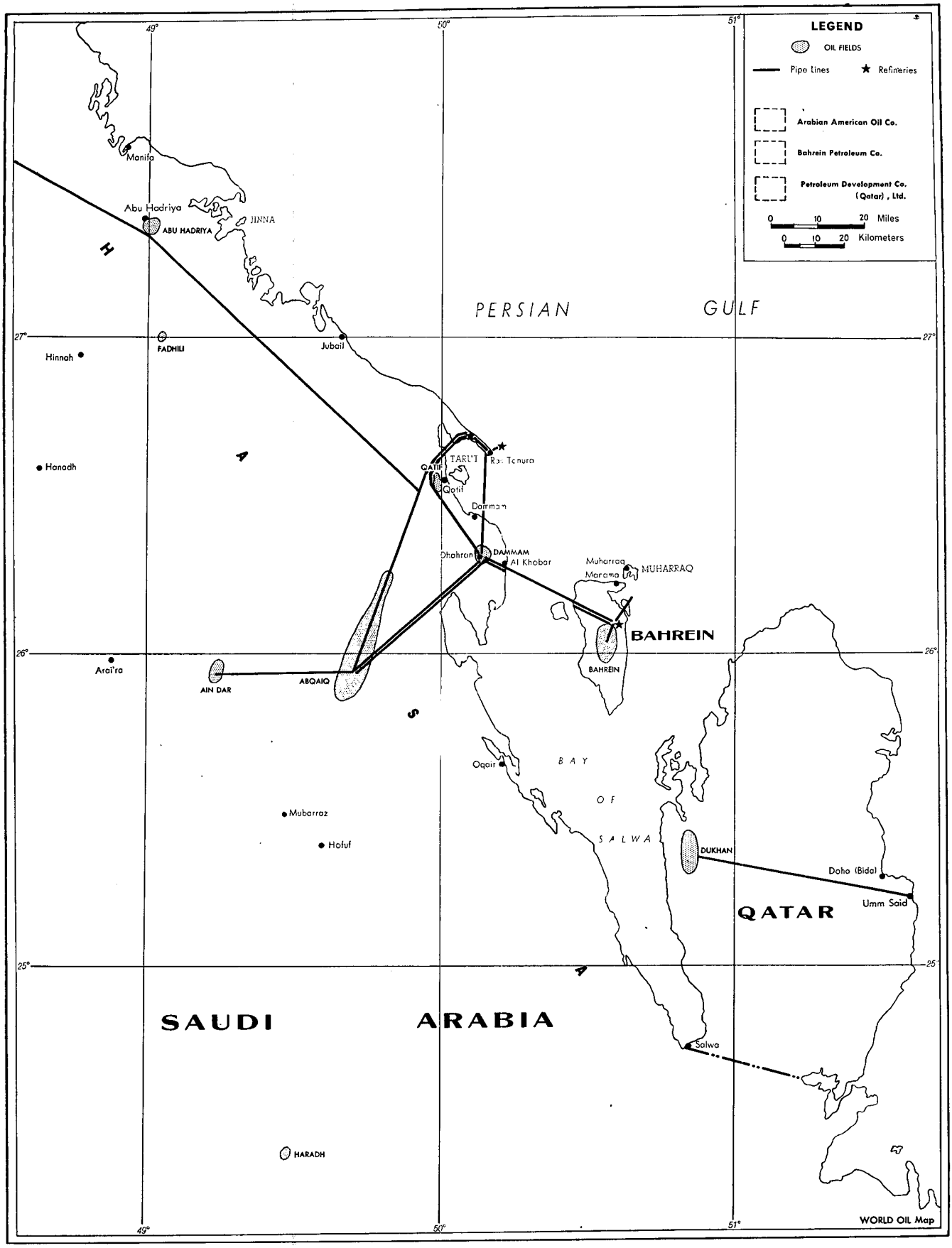


SAUDI ARABIA-BAHREIN-QATAR



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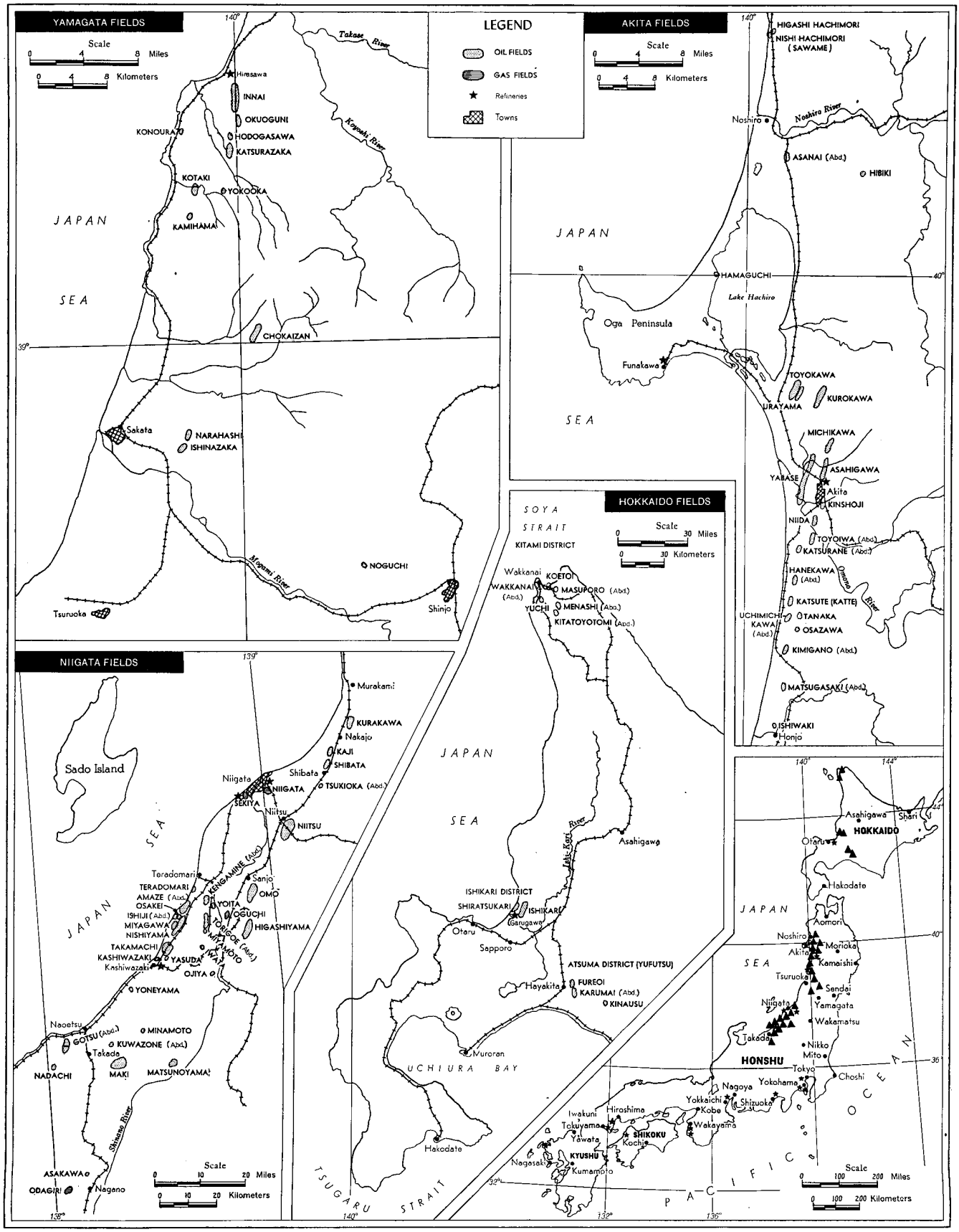

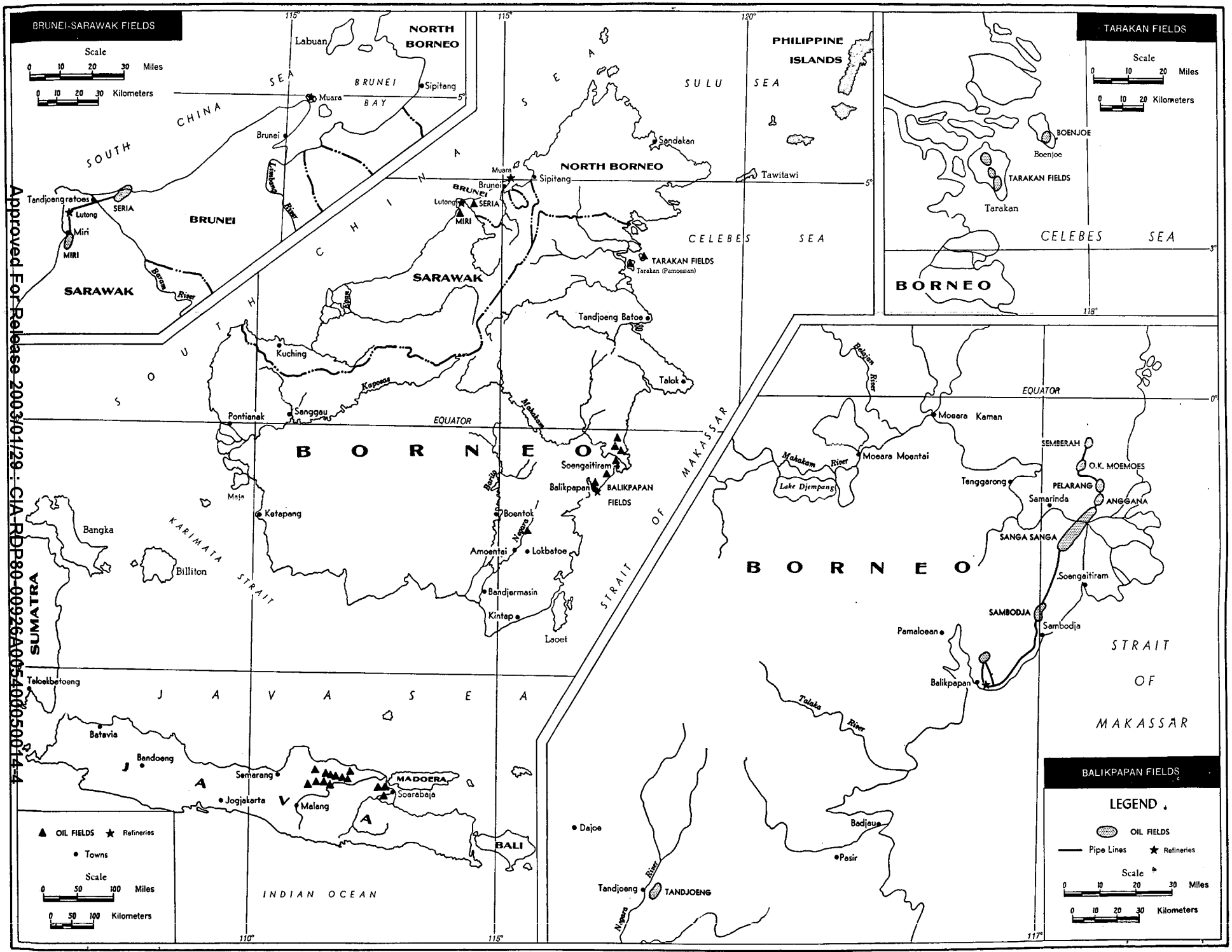

BORNEO - BRUNEI - SARAWAK

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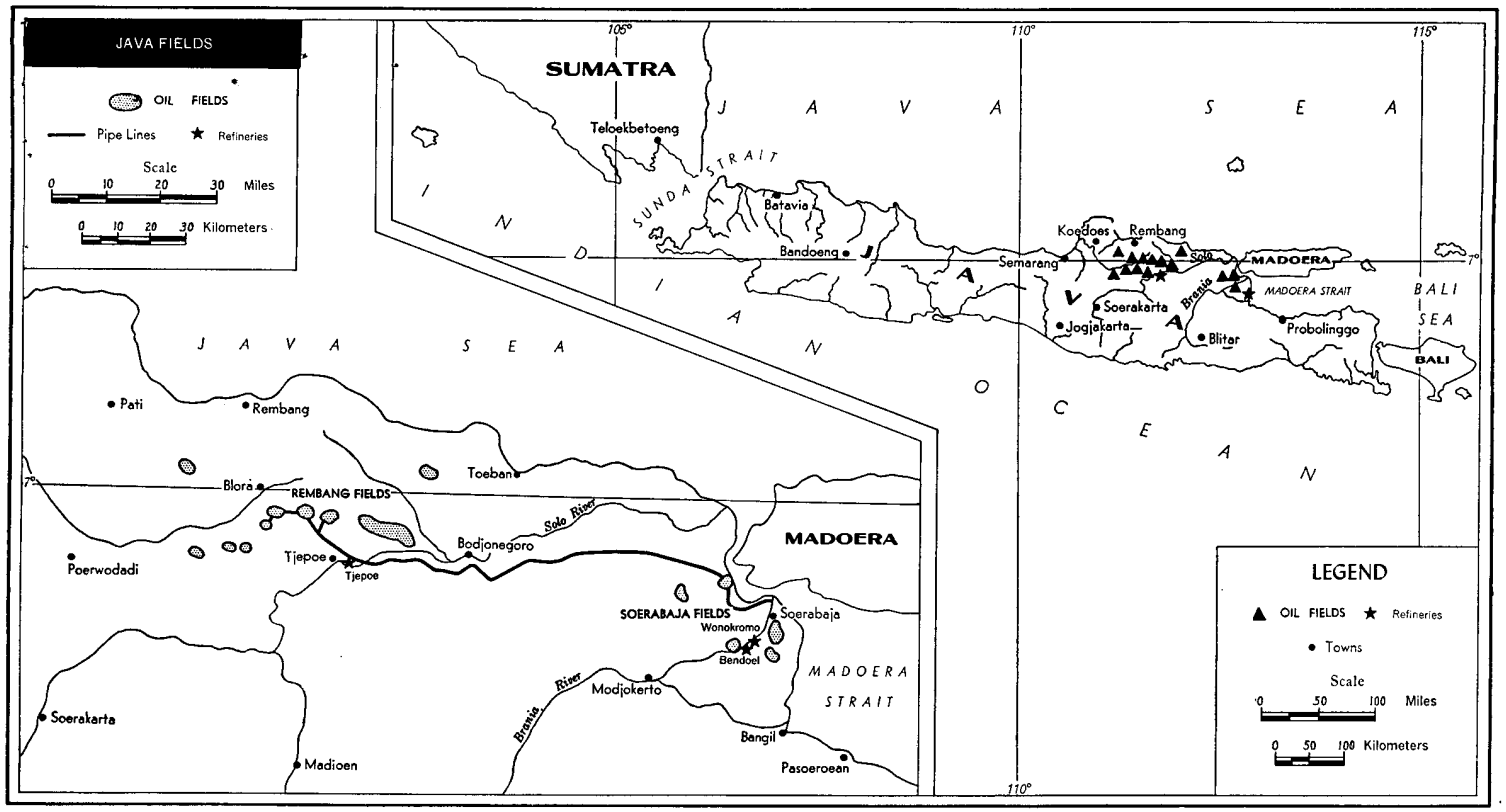
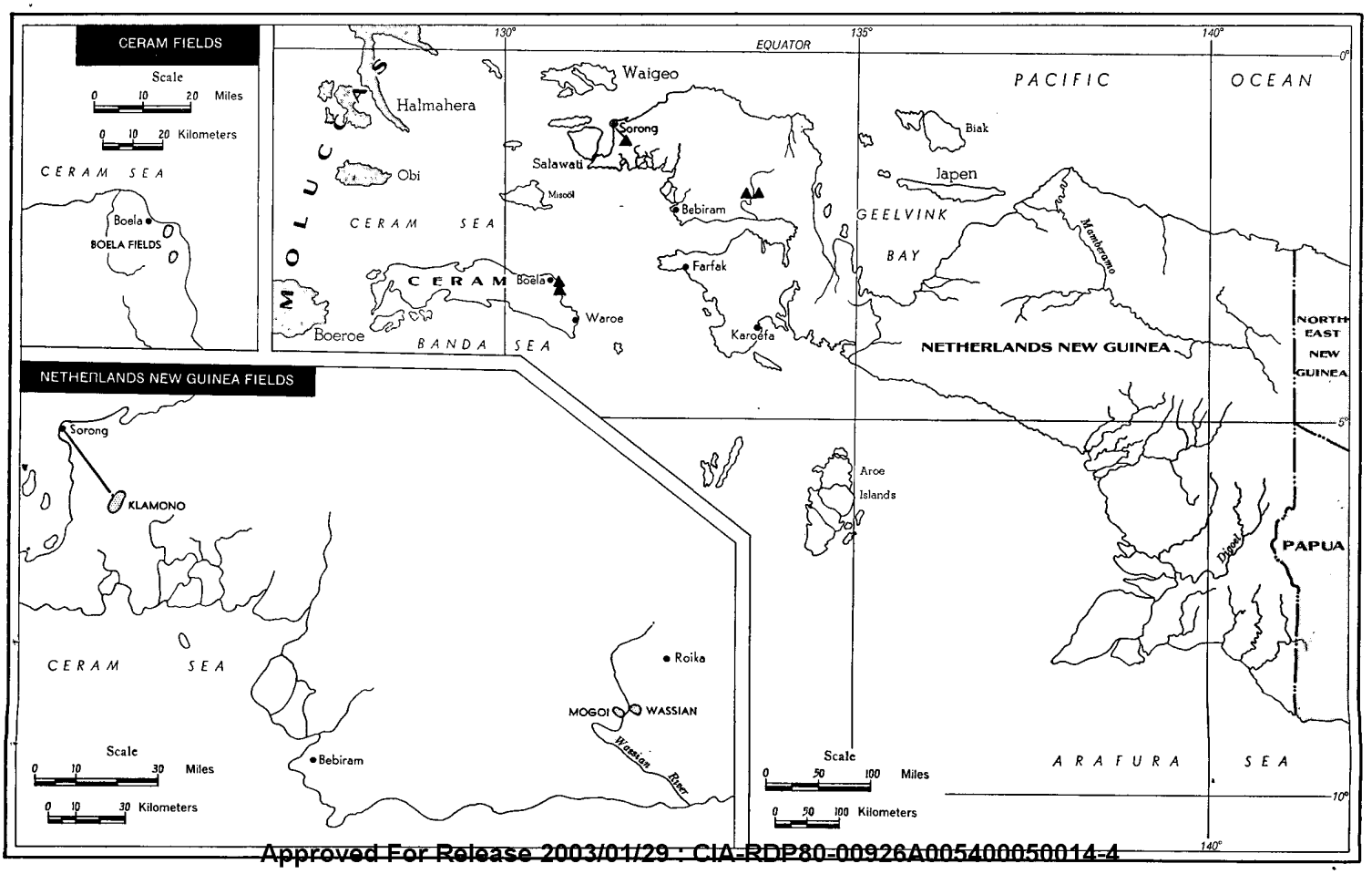
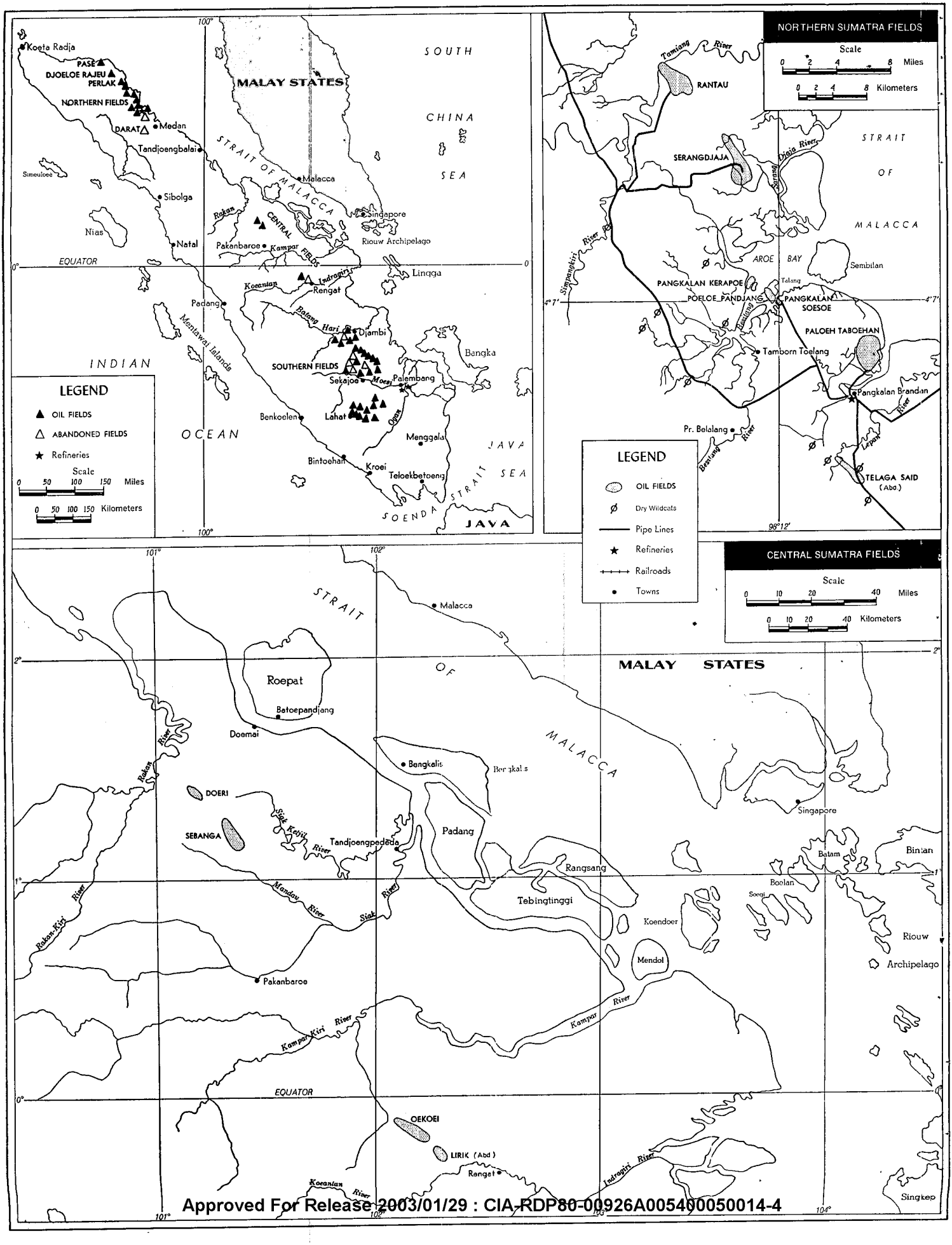




SUMATRA—Northern and Central Oil Areas



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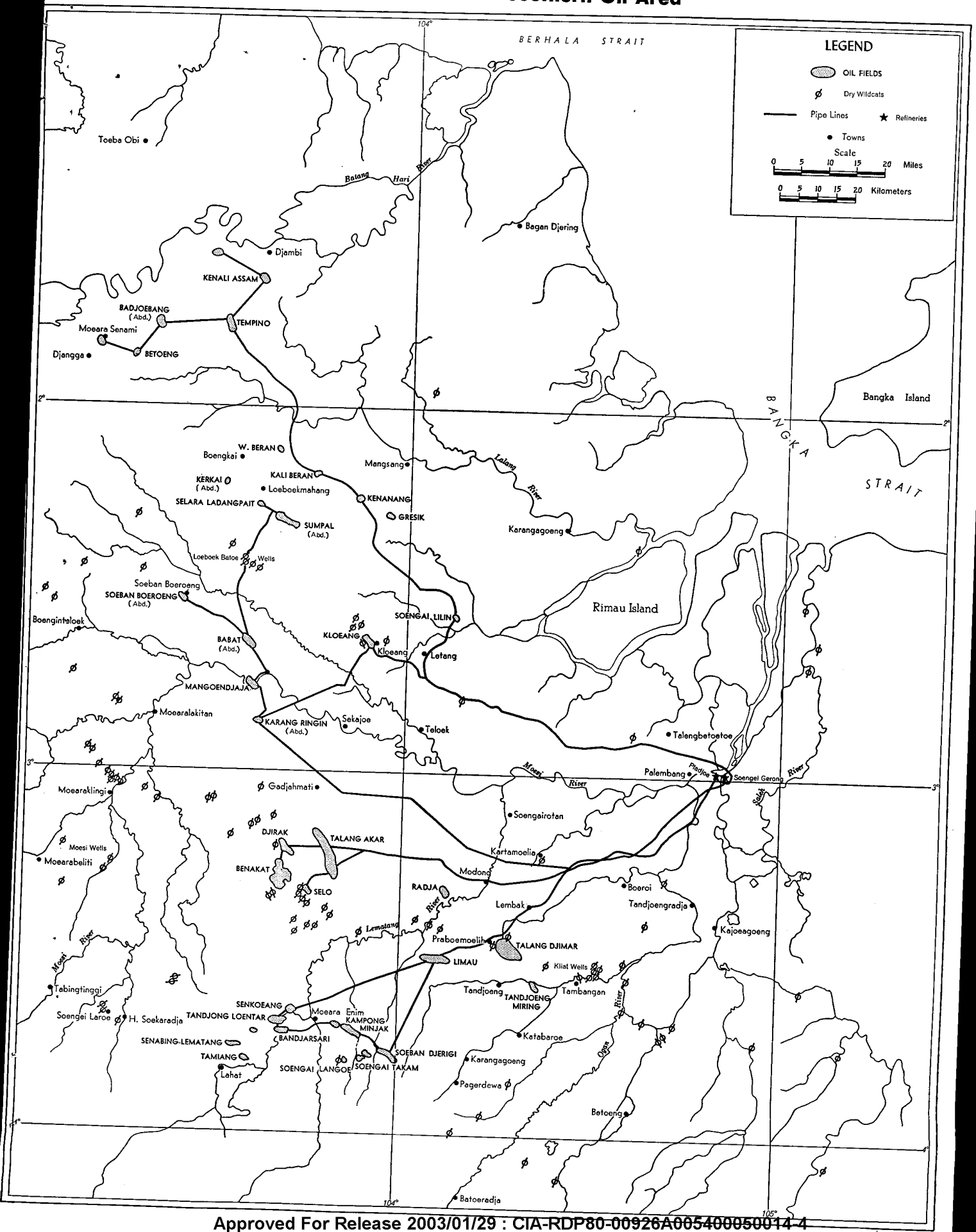

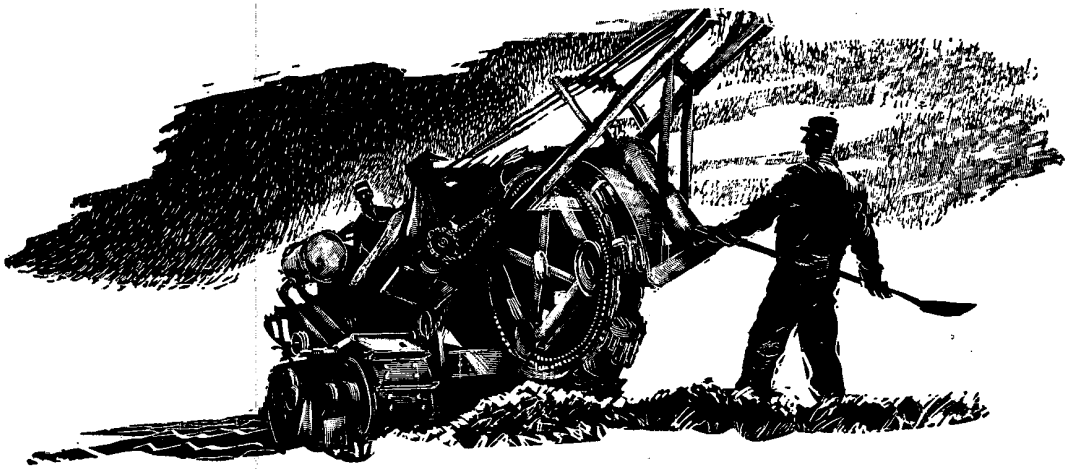

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In Alberta, Canada's oil-rich province, Royal Bank branches number 57, including Calgary, Edmonton, Leduc, Devon, Turner Valley and Redwater. In Saskatchewan, Manitoba and British Columbia, branches total 195.

United States banks are invited to use the unequalled facilities of The Royal Bank of Canada in servicing the accounts of United States clients interested in Canadian oil development.

Address your enquiries to J. C. Mayne, Supervisor, Calgary, Alberta, or to Head Office, Montreal.

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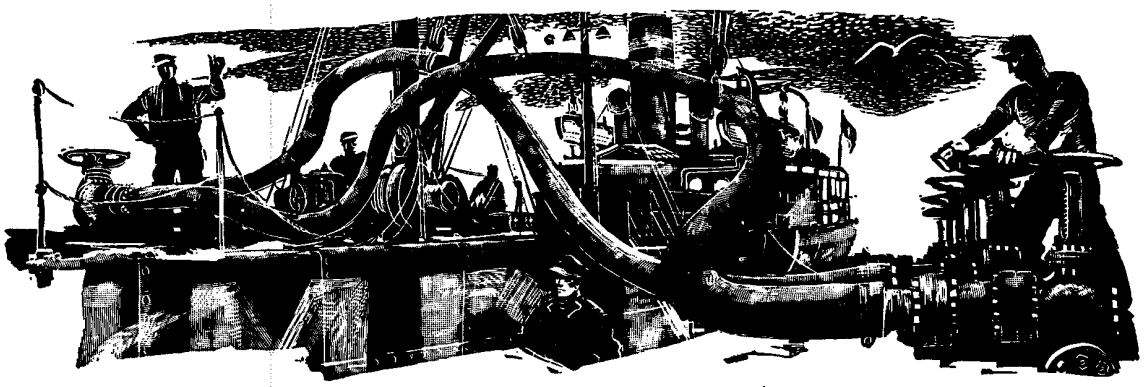
Assets exceed $2,497,000,000 • Over 750 branches in Canada and abroad



1 in July. At the same time Imperial started Stony Plain 1, 3½ miles southwest. Both wells were completed in September. Stony Plain 1 found about 100 barrels a day in a thin section of the D-3 limestone reef and the Acheson-Province 1 found about 1600 barrels a day in 120 feet of the D-3 reef. Activity was moved north as a result of the latter well.

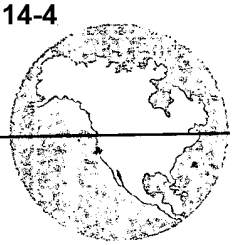
Central Leduc Oil Company, Ltd., a Calgary inde-

Western Canada Oil Production and Geological Data

PROVINCE and FIELD	Year of Discovery	Productive Wells End of 1950: Producing	Shut In	Total	CRUDE OIL PRODUCTION (Barrels): Daily End of 1950	Year 1949	Year 1950	Cumulative Through 1950	Proved Area (Acres)	Gravity of Oil (API)	Formation Name and Kind	Geologic Age	DEPTH (Feet): Min. to Top of Pay	Max. to Bottom of Pay	Type of Structure
Alberta:															
Acheson-Stony Plain	1950	6	....	6	300	.....	51,393	51,393	n.a.	36	Dev. Lime,	Dev.	4969	5123	Reef
										36–37	L. Cret., Sand	Cret.	n.a.	n.a.	
Armelgra	1943	....	....	....	.....	.....	.....								
Armena	1948	....	1	1	.....	.....	.....	462	n.a.	19	Ellis, Sand	Jur.	3100	n.a.	n.a.
Athabaska (Gas)	n.a.	....	....	....	.....	.....	.....	1,184	n.a.	38	Dev. Lime	Dev.	4152	4174	n.a.
Barons	1950	1	....	1	45	.....	1,406	1,406	25,000	....	Labiche, Sand	Cret.	600	1300	Strat. trap
Barnwell (Gas)	n.a.	....	....	....	.....	.....	.....		n.a.	32	Bow Island, Sand	Cret.	n.a.	n.a.	n.a.
Barrhead	1949	1	1	2	8	4,223	599	4,822	5,000	..	Bow Island, Sand	Cret.	2150	n.a.	Monocline
Baxter Lake	1946	....	....	....	.....	.....	.....	1,709	n.a.	24	Madison, Lime	Penn.	4008	4016	n.a.
Big Valley	1950	4	....	4	291	.....	10,215	10,215	n.a.	17	Wainwright, Sand	Cret.	n.a.	n.a.	n.a.
Bolloque Lake	n.a.	....	....	....	.....	.....	753	753	n.a.	33	Dev., Lime	Dev.	5240	n.a.	Reef
Bon Accord	1949	1	....	1	24	9,670	9,629	19,305	n.a.	23	L. Cret., Sand	Cret.	n.a.	n.a.	n.a.
Bow Island (Gas)	n.a.	....	....	....	.....	.....	.....		10,000	35	Dev., Lime	Dev.	3585	3608	n.a.
Brooks (Bantry)	1947	1	....	1	38	13,979	13,149	43,677	n.a.	..	Bow Island, Sand	Cret.	1900	2255	Dome
										24	Bantry, Sand	Cret.	3253	3270	n.a.
Bulwark	1950	1	....	1	18	.....	2,758	2,758	n.a.	Gas	Milk River, Sand	Cret.	1190	1250	Strat. trap
Campbell	1949	8	1	9	197	4,685	60,012	64,697	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Conrad	1944	14	3	17	436	139,728	110,062	1,013,420	1,000	35	n.a., Sand	Cret.	3704	3720	n.a.
Craigmyle	n.a.	....	....	....	.....	.....	.....	n.a.	n.a.	26	Ellis, Sand	Jur.	2960	3125	Trap
Del Bonita	1939	6	....	6	115	7,365	12,668	65,703	200	34	Madison, Lime	Miss.	4024	4044	n.a.
Dina	1929	1	2	3	78	14,062	17,887	77,660	400	36–38	Madison, Lime	Miss.	5054	n.a.	Anticline
Ellerslie	1950	1	....	1	18	.....	570	570	n.a.	14–15	Meridian, Sand	Cret.	1680	1900	Trap
Excelsior	1949	21	1	22	950	1,616	272,186	273,802	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Fabyan (Gas)	n.a.	....	....	....	.....	.....	.....		n.a.	35	n.a., Lime	Dev.	3854	3870	n.a.
Foremost (Gas)	n.a.	....	....	....	.....	.....	.....		200	..	Viking, Sand	Cret.	1585	1900	Strat. trap
Golden Spike	1949	6	....	6	564	85,081	292,873	377,954	5,000	..	Bow Island, Sand	Cret.	2050	2250	Anticline
Hanna	1948	....	....	....	.....	.....	.....	629	n.a.	36	Dev., Lime	Dev.	5362	5900	Coral Reef
Hay Lake	1946	....	....	....	.....	.....	.....	1,140	n.a.	33	Sunburst, Sand	Cret.	3700	3731	Strat. trap
Joseph Lake	1949	25	1	26	1,015	35,858	168,855	204,713	100	30	Madison, Lime	Miss.	3094	n.a.	Dome
Jumping Pound	1944	1	....	1	12	.....	362	9,621	3,000	36–38	Viking, Sand	Cret.	3264	n.a.	n.a.
Keho Lake	n.a.	....	....	....	.....	.....	.....	955	n.a.	46	Madison, Lime	Miss.	9900	n.a.	Anticline
Keystone Valley (Gas)	n.a.	....	....	....	.....	.....	.....		n.a.	32	Bow Island, Sand	Cret.	3680	n.a.	Anticline
Lac La Biche (Gas)	n.a.	....	....	....	.....	.....	.....		.....	..	Blairmore, Sand	Cret.	8500	n.a.	n.a.
									.....	..	Viking, Sand	Cret.	780	810	n.a.
Leduc-Woodbend	1947	503	16	519	24,497	9,688,784	10,604,456	25,323,048	15,000	39	Dev., Lime	Dev.	1544	1585	n.a.
Lisburn	1950	....	1	1	.....	.....	754	754	n.a.	39	Dev., Lime	Dev.	4900	5425	Coral Ree
Lloydminster	1940	116	51	167	2,172	716,941	809,801	2,595,366	n.a.	n.a.	L. Cret., Sand	Cret.	3590	4231	
Medicine Hat (Gas)	n.a.	....	....	....	.....	.....	.....		20,000	10–19	Viking, Sand	Cret.	n.a.	n.a.	n.a.
Moose Dome	1937	....	....	....	.....	.....	.....		40,000	..	Sparky, Sand	Cret.	1750	2000	Strat. trap
Normandville	1949	1	....	1	87	5,891	28,200	8,977	200	47	Medicine Hat, Sd.	Cret.	900	1250	Strat. trap
Pakowki (Gas)	n.a.	....	....	....	.....	.....	.....	34,091	n.a.	39	Fairholme, Lime	Dev.	1534	....	Dome
Pincher Creek	1948	....	1	1	.....	2,319	.....	4,560	25,000	..	Dev., Lime	Dev.	n.a.	n.a.	n.a.
									n.a.	57	Bow Island, Sand	Cret.	2000	2200	Strat. trap
Princess	1940	13	4	17	287	121,227	122,909	710,514	200	wet gas	Madison, Lime	Miss.	11700	12500	Anticline
									200	34	Dev., Lime	Dev.	3980	4000	Dome
									200	26–28	Sunburst, Sand	Cret.	3177	n.a.	Strat. trap
Provost	1946	....	....	....	.....	.....	.....	1,673	200	26	Madison, Lime	Miss.	3300	3320	Strat. trap
									n.a.	21	n.a., Sand	Cret.	2525	n.a.	n.a.
Ram River	1944	....	....	....	.....	.....	.....	207	n.a.	Gas	Viking, Sand	Cret.	2300	n.a.	n.a.
Red Coulee	n.a.	....	....	....	.....	.....	.....	329,851	150	n.a.	n.a.	Dev.	3000	n.a.	n.a.
Redwater	1948	676	57	733	36,572	4,793,491	10,746,472	15,576,838	35,000	31	Vanalta, Sand	Cret.	2417	2475	Terrace
Saint Paul (Gas)	n.a.	....	....	....	.....	.....	.....		n.a.	35	Dev., Lime	Dev.	3105	3303	Coral Reef
Simmons	n.a.	....	....	....	.....	.....	.....		n.a.	..	L. Cret., Sand	Cret.	1547	1570	n.a.
Skiff	n.a.	....	....	....	.....	.....	.....	9,298	n.a.	35	Dev., Lime	Dev.	3087	3272	Coral Reef
Spring Coulee	1950	3	....	3	50	.....	4,604	4,604	n.a.	n.a.	Ellis, Sand	Jur.	3054	3080	n.a.
Stettler	1949	27	2	29	1,320	15,725	246,312	262,037	n.a.	37–38	Madison, Lime	Miss.	5876	6050	n.a.
									n.a.	27–31	Dev., Lime	Dev.	5097	5240	n.a.
Suffield	n.a.	....	....	....	.....	.....	.....	.....	n.a.	31	L. Cret., Sand	Cret.	4200	4348	n.a.
Taber	1937	19	2	21	548	150,746	114,916	1,306,560	2,000	n.a.	Med. Hat., Sand	Cret.	980	1130	Strat. trap
Tilley	1942	....	....	....	.....	.....	.....	14,503	760	17–23	Taber, Sand	Cret.	3028	3260	Strat. trap
Turner Valley (Oil)	1914	300	29	329	8,909	3,826,543	3,344,007	98,263,837	n.a.	27	Sunburst, Sand	Cret.	3170	n.a.	Strat. trap
Natural Gasoline	....	....	....	....	1,102	477,520	431,362	7,667,502	25,000	37–64	Madison, Lime	Miss.	3400	9600	Anticline
Total Turner Valley	....	....	....	....	10,011	4,304,063	3,775,369	105,931,339							
Vermilion	1939	17	31	48	107	86,933	49,041	1,226,760	1,000	14	Vermilion, Sand	Cret.	1870	1980	Strat. trap
Viking-Kinsella (Gas)	n.a.	....	....	....	.....	.....	.....	.....	250,000	..	Viking, Sand	Cret.	2100	2200	Strat. trap
Volmer	1948	....	....	....	.....	1,027	.....	1,518	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Wainright	1922	4	4	8	50	16,086	15,360	303,332	12,000	22	Wainright, Sand	Cret.	2200	2300	Anticline
Whitelaw	1950	....	1	1	.....	.....	6,206	6,206	n.a.	17–26	n.a., Sand	Tri.	3835	3905	n.a.
Whitemud	1949	2	3	5	60	26,506	45,437	71,943	n.a.	38	n.a., Sand	Cret.	4061	4092	n.a.
Total Alberta	....	1,779	213	1,992	79,870	20,246,006	27,595,214	155,952,527							
Saskatchewan:															
Compeer Macklin	1948	....	1	1	.....	n.a.	178	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Dina	1929	12	....	12	104		27,315		n.a.	14–15	Meridian, Sand	Cret.	1680	1900	Strat. trap
Lloydminster	1942	79	23	102	1,394		510,936								
Lone Rock	n.a.	61	4	65	1,627	782,095	496,750	3,355,520	n.a.	10–19	Sparky, Sand	Cret.	1750	2000	Strat. trap
Maidstone	n.a.	....	4	4	.....		5,918		n.a.	n.a.	Sparky, Sand	Cret.	n.a.	n.a.	n.a.
Unity	n.a.	....	....	....	.....	.....	.....	.....	n.a.	..	Sparky, Sand	Cret.	2100	n.a.	n.a.
Total Saskatchewan	....	152	32	184	3,125	782,095	1,041,097	3,355,520							
Northwest Territories:															
Norman Wells	1920	n.a.	n.a.	n.a.	n.a.	182,783	n.a.	2,970,627*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total Western Canada	....	1,931	245	2,176	82,995	21,210,884	28,636,311	162,278,674							

* Cumulative to end of 1949 only. n.a.—Not available.

ALASKA



Completion of Exploration and Drilling of 15 Wells and Core Holes Scheduled During 1951 for Petroleum Reserve

ACTIVE exploration for oil in Alaska is still confined to Naval Petroleum Reserve No. 4, but no commercial production has yet been found in the area. The work is still carried on by Arctic Contractors, Inc., under the direction of a Naval Operating Committee headed by Captain R. H. Meade with the approval of the Secretary of the Navy. Meanwhile, possible civilian participation in the oil search in Alaska is indicated along the southeast coast of the Territory where two individuals have leased more than 1000 square miles. The area had indicated commercial oil production in a well drilled there about 20 years ago and the exploration of this region will be followed with interest by oil men in the states. Oil exploration in Alaska has never been undertaken seriously, except in the Naval Reserve, because of the 15,000-acre limitation placed on leases held by companies or individuals. To assemble the 1000-square-mile block mentioned above, all the individual leaseholders were brought together in a unitized group to form a workable concession.

In the Naval Reserve two noncommercial oil productive areas were found during 1950. One was at Cape Simpson, on the Arctic Coast, where five wells were drilled with a total of 7119 feet; the other was at Umiat, inland on the Colville River, where three wells were drilled for a total of 2283 feet. Four rotary holes were completed in 1950 at depths ranging from 2500 to 11,873 feet. One was a gas well on the Barrow high, and shows of oil or gas were present in two of the other wells. Three cable tool holes were completed at Umiat at depths ranging from 600 to 800 feet penetrating the known sands containing production. These sands are in the permafrost, and while production in excess of 100 barrels daily was indicated in one well, operational techniques have not been developed which permit continuous production under existing conditions. In addition to the above wells, five core holes varying in depths from 700 to 2500 feet were drilled at Cape Simpson, four of which penetrated the sand. On production test, one of these wells flowed oil and gas.

Plans for 1951 call for completion of the exploration work and for the drilling of 15 wells and core holes in addition to the four now drilling. One seismic and four geological parties will round out their geophysical and geological field work this year. Eight cable tool holes, 4 rotary holes, and 3 core holes are scheduled.

CANADA

Completion of 1150-Mile Edmonton-Superior Pipe Line Helps Boost Crude Production to 28,904,256 Barrels

AN INCREASE of 7,425,427 barrels for 1950 in the western producing areas offset a decline of 12,269 barrels in the eastern provinces to give Canada a combined 1950 crude production of 28,904,256 barrels, an increase of 7,413,158 barrels over 1949.

This rise was attributed to the completion in the latter part of the year of the $90 million, 1150-mile pipe line from Edmonton, Alberta, to Superior, Wis. Constructed by Interprovincial Pipe Line Company, Ltd., the line connects with the Great Lakes tanker transportation system which carries oil to Ontario refineries, obviating the necessity of transporting Alberta crude to eastern markets by rail. Prohibitive rail costs heretofore practically limited Alberta crude to the prairie provinces of Alberta, Saskatchewan and Manitoba.

Thus, the benefits of important oil discoveries in Alberta were extended to wider areas of Canada. It was estimated that more than 130,000 barrels a day could be handled at the Edmonton receiving point when conditions warrant an input of that quantity.

Another development in a successful year was the discovery in a new Saskatchewan oil area. Heart's Hill 1, drilled by Albercan Oil Corporation, is midway between the towns of Major and Heart's Hill in west-central Saskatchewan and is 90 miles southeast of Lloydminster. Nearest oil production is the Dina-Marsden field on the Alberta-Saskatchewan border 60 miles northwest. Albercan is a subsidiary of Pancoastal Oil Company C. A. of Venezuela.

Heart's Hill 1 was put on steady production about September 1. Initial tests were carried on for about a month with a bailer, but the method was too inaccurate to permit an estimate of the well's potential.

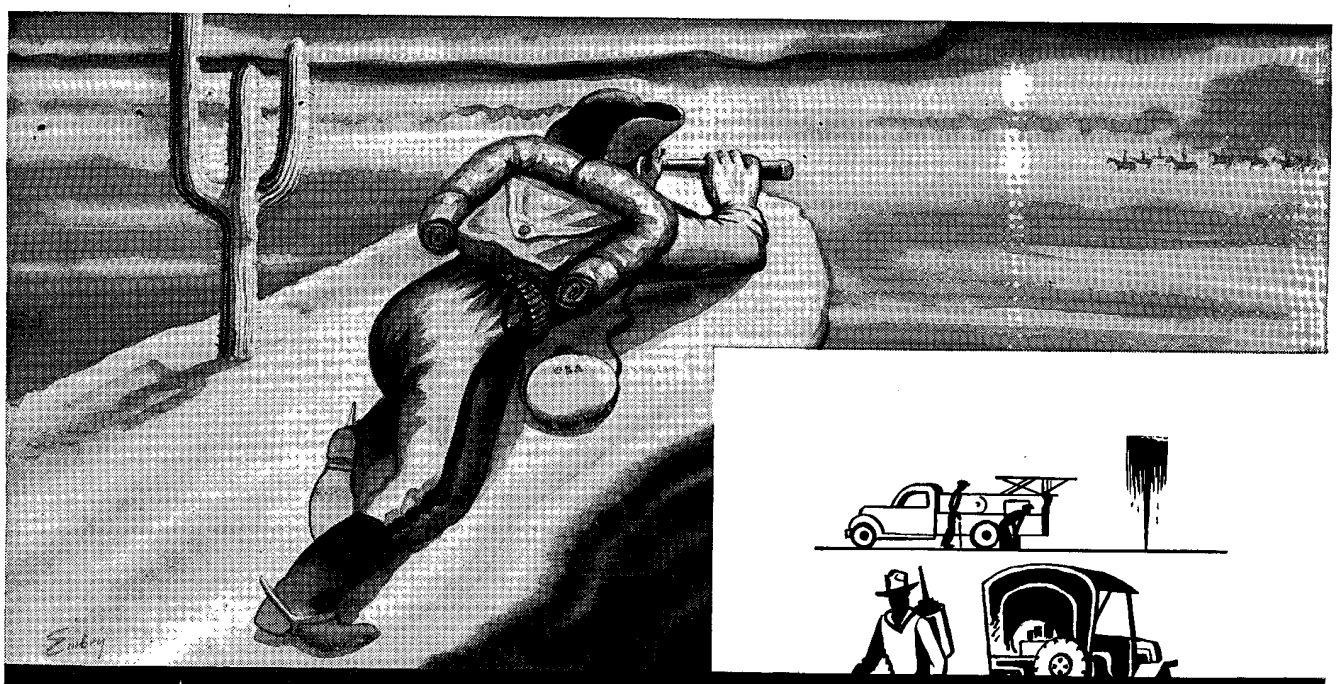
At a bailing rate of 35 barrels daily, the 1400-foot oil column was not lowered, and it was expected the well would pump at a greater rate.

Albercan spudded in its fifth well in Saskatchewan during the latter part of the year. Plans called for 12 wells to be drilled in the province during 1950. The fifth well was situated in the Mayfair area and was planned as a deep test, probably to the top of the PreCambrian.

Acheson-Stony Plains field was still another important 1950 discovery. The field is eight miles west of Edmonton. With the discovery of two wells in September, there were five wells in a six-mile north-south trend which produces either from the Lower Cretaceous sand, D-2 or D-3 reefs. Six more wells were rigging up or drilling as the year ended.

Standard Oil Company of California, Ltd., and Imperial Oil Company, Ltd., were credited with the discovery. Both organizations were carrying on geophysical tests in the area on their jointly held and separate reservations.

California Standard began drilling Acheson-Province



THE FIRST STEP IS RECONNAISSANCE

Before a general trains his big guns on the target, he determines by proper reconnaissance where it is. In the old days this was done by foot patrol and horse cavalry. Now it's done mostly by cameras and observers in high-speed aircraft.

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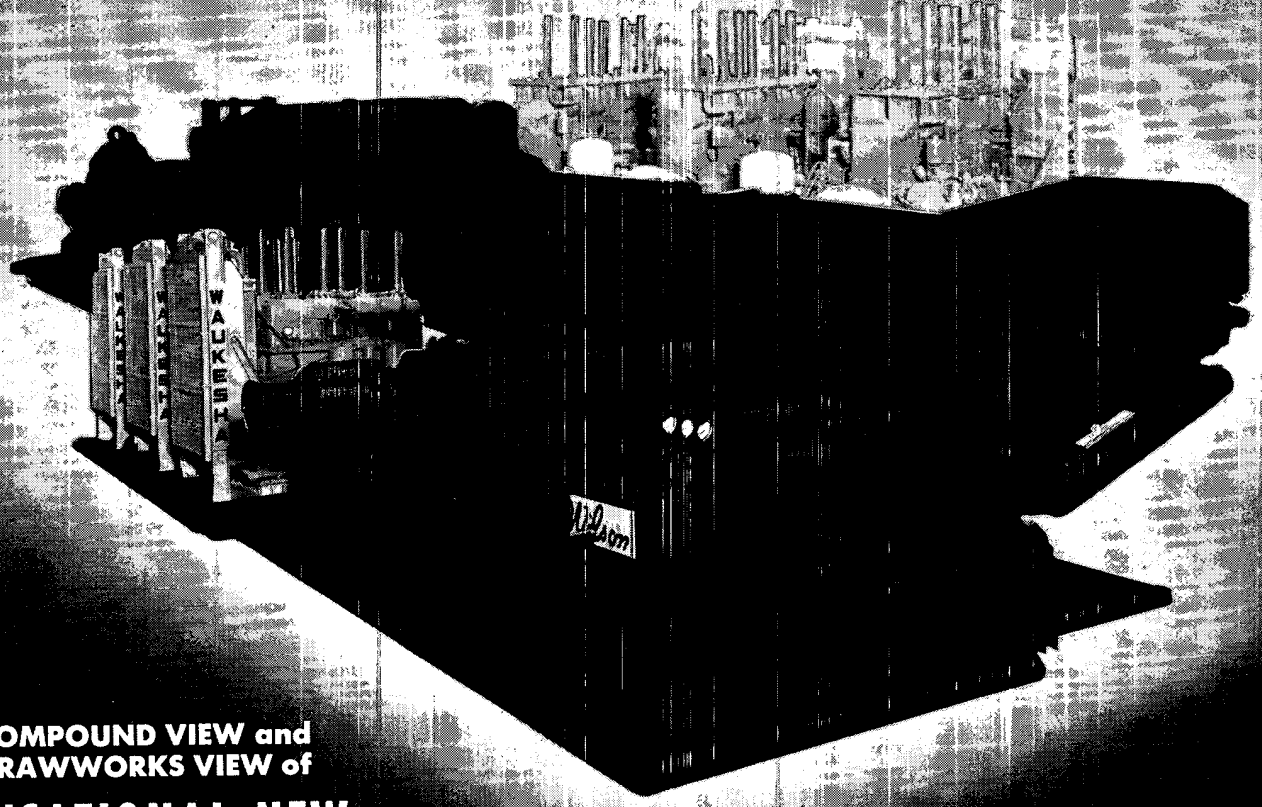

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WICHITA FALLS, TEXAS

pendent, drilled Wild 1, 1½ miles north of Stony Plain 1 and two miles southwest of Acheson Province 1, finding top of the D-3 at 5117 feet and got nine feet of pay section.

Wild 1 raised this question: Was it and Imperial's Stony Plain 1 on the east or the west flank of the D-3 reef? The question remained unanswered since there were no distant stepouts in either direction.

Alberta drilling activity rose slightly in 1950. With 870 wells completed, 618 were oil producers, 40 were gas wells, and 212 were dry holes.

Three hundred and forty-seven wells were completed in Redwater field, Canada's largest producer in terms of wells completed, daily production, and proven resources. The outer limits of this field, located 25 miles northeast of Edmonton, were not established in 1950. Extensions of the 15-mile long and four-mile wide productive area were being found by 23 drilling rigs. Redwater's proven reserves were estimated at about 500 million barrels, with productive acreage exceeding 26,000. In October, 1950, conservative calculations indicated that the field has been 50 percent drilled up. At the close of the year, 41 wells were drilling.

In the Leduc-Woodbend field, 172 wells were completed during the year, of which 157 were oil producers. Fifty wells were drilling at the end of the year.

Excelsior field activity rose sharply during the year. Twenty-seven wells were completed, with 21 resulting oil producers. In 1949 only one well was completed in the field. With a combined total footage of 68,453, 20 wells were completed in Joseph Lake field, all producing. Eight more were being drilled as the year ended. The Campbell field, another important Canadian discovery, yielded eight producers in 11 attempts.

Saskatchewan province, immediately east of Alberta, gained stature in 1950 with a production of 1,052,532 barrels as compared with 784,639 barrels in 1949. Production slipped 72,182 barrels in 1949 because of a voluntary proration due to the lack of adequate markets. However, the 1950 increase was largely credited to the new Interprovincial pipe line, which opened markets far to the east.

Alberta's 1950 production of 843,649 barrels gave Alberta-Saskatchewan a combined output of 1,896,180 barrels, an increase of 385,729 barrels over 1949, as the effects of the new pipe line began to be felt.

Testing activity in Quebec during 1950 failed to locate commercial oil or gas production. Continental Petroleum, Ltd., conducted swabbing tests on its Gaspe 1 in eastern Gaspe peninsula, which was drilled to 1380 feet in 1949, but found only a few gallons of oil per day. The Quebec Oil Development, Ltd.'s, Quebec Oil 1 well was down to 2000 feet in December. Peninsular Oil Corporation's test in Holland township, about 60 miles west of Gaspe village, was suspended in August at a depth of 4817 feet. Another test was begun in December near the coast in Douglas township, Gaspe.

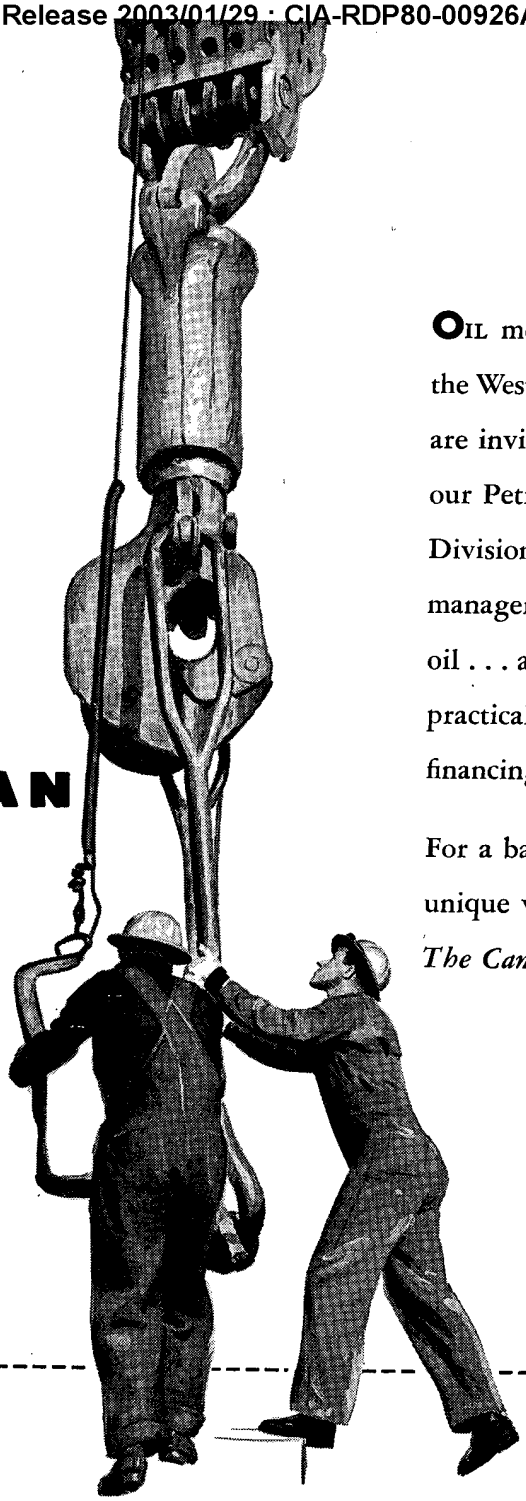
The initial secondary recovery project in Canadian oil fields, begun by Royalite Oil Company, Ltd., in Turner Valley in 1948, was turned into a joint water-flooding and gas-lift method in 1950. The project provided no conclusive results during the year, but it gave promise of increasing the flow rate on the single well on which it was operated.

In October the Imperial president suggested an emphasis change-over from proven area development to explorations for new fields. If the recommendation is accepted generally, some small producers may be forced to limit their expansions, since many will not be able to meet the high cost of wildcatting.

Drilling in Western Canada

PROVINCE and FIELD	WELLS COMPLETED IN 1949					WELLS COMPLETED IN 1950					Wells Drilling at End of 1950
				TOTAL					TOTAL		
	Oil	Gas	Dry	Wells	Footage	Oil	Gas	Dry	Wells	Footage	
ALBERTA:											
Acheson-Stony Plain	....	..	....	....	.....	3	..	4	7	35,431	5
Armena	....	..	1	1	5,432	....	..	....	....	.....	..
Athabaska	....	..	4	4	9,262	....	..	....	....	.....	..
Bantry	....	..	1	1	3,259	....	..	....	....	.....	..
Barrhead	....	..	1	1	6,414	....	..	....	....	.....	1
Big Valley	....	..	....	....	.....	4	..	....	4	21,417	2
Bolloque Lake	....	..	....	....	.....	1	..	....	1	3,883	..
Bon Accord	1	..	2	3	12,162	....	..	1	1	3,595	..
Bonnyville	....	..	....	....	.....	....	1	....	1	1,094	..
Bow Island	....	..	....	....	.....	....	1	....	1	1,968	..
Bruderheim	....	..	....	....	.....	....	..	1	1	4,100	2
Bulwark	....	..	....	....	.....	....	..	2	2	6,452	..
Campbell	1	..	1	2	8,785	8	..	3	11	42,029	2
Camrose	....	..	....	....	.....	....	..	....	....	.....	3
Cessford	....	..	....	....	.....	....	1	....	1	3,286	..
Craigmyle	....	..	3	3	15,028	....	..	....	....	.....	1
Del Bonita	....	..	....	....	.....	1	..	....	1	5,293	..
Elk Point	....	1	....	1	4,449	....	..	....	....	.....	..
Excelsior	1	..	....	1	4,125	21	..	6	27	107,755	1
Gilbert	....	..	....	....	.....	2	..	1	3	12,731	..
Golden Spike	2	..	2	4	25,120	3	..	1	4	24,995	1
Hanna	1	1	2	4	18,347	....	..	....	....	.....	..
Joseph Lake	3	..	1	4	15,078	20	..	....	20	68,453	8
Jumping Pound	....	..	....	....	.....	....	..	....	....	.....	1
Lac La Biche	....	1	2	3	8,428	....	..	....	....	.....	..
Leduc-Woodbend	183	..	17	200	1,058,562	157	..	15	172	1,070,205	50
Lloydminster	18	..	2	20	39,147	25	1	5	31	61,712	8
Manyberries	....	..	....	....	.....	....	1	....	1	2,685	1
Medicine Hat	....	..	....	....	.....	....	4	....	4	4,999	1
Milk River	....	..	....	....	.....	1	..	....	1	5,190	..
Pincher Creek	....	..	....	....	.....	....	..	....	....	.....	1
Pouce Coupe	....	..	....	....	.....	....	..	....	....	.....	1
Princess	....	..	1	1	3,303	....	..	....	....	.....	..
Redwater	287	3	10	300	979,323	334	..	13	347	1,448,688	41
Spring Coulee	....	..	....	....	.....	2	..	....	2	12,242	1
Stettler	2	..	6	8	44,101	21	..	1	22	118,934	1
Taber	....	..	....	....	.....	....	..	1	1	3,265	..
Tilley	....	..	1	1	4,262	....	..	....	....	.....	..
Turner Valley	6	..	....	6	51,493	2	1	1	4	33,960	..
Viking-Kinsella	1	5	....	6	12,798	....	8	....	8	17,169	..
Volmer	1	..	....	1	3,681	....	..	....	....	.....	..
Whitemud	4	..	5	9	38,501	....	..	2	2	8,270	..
Wildcats	29	25	181	235	901,940	13	22	155	190	925,608	22
Total Alberta	540	36	243	819	3,273,000	618	40	212	870	4,055,409	154
BRITISH COLUMBIA:											
Wildcats	....	..	....	....	.....	....	..	5	5	19,437	3
MANITOBA:											
Wildcats	....	..	2	2	11,190	....	..	1	1	5,125	1
SASKATCHEWAN:											
Lloydminster Area	36	..	1	37	77,840	47	3	10	60	115,584	1
Wildcats	3	..	18	21	22,190	....	..	65	65	72,640	4
Total Saskatchewan	39	..	19	58	100,030	47	3	75	125	188,224	5
Total Western Canada	579	36	264	879	3,384,220	665	43	293	1,001	4,268,195	163

KNOW CANADIAN OIL!



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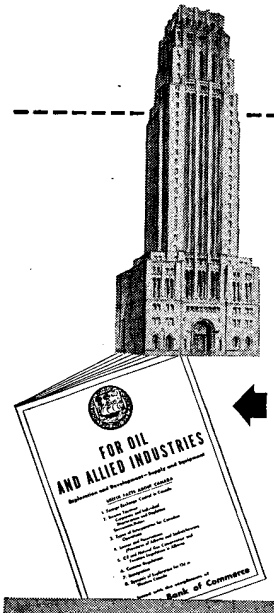

Write for This Booklet!

"For Oil and Allied Industries" contains factual information on Canadian exchange control regulations; taxes; leases and reservations; customs regulations; a map of the oil and gas fields, and other important data.

Direct inquiries to:
Petroleum and Natural Gas Division
The Canadian Bank of Commerce
Calgary, Alberta, Canada

The Canadian Bank of Commerce

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600 Branches across Canada

Drilling in Eastern Canada

Province, County, and Township	Wells Completed in 1949					Wells Completed in 1950				
	Oil	Gas	Dry	Total Wells	Total Footage	Oil	Gas	Dry	Total Wells	Total Footage
NEW BRUNSWICK										
Stony Creek	....	2	2	4	8,678	....	3	....	3	2,806
Wildcats	....	....	....	....	....	....	....	2	2	9,259
ONTARIO										
Elgin County:										
Aldborough	3	4	....	7	7,058	....	4	2	6	9,521
Bayham	....	1	....	1	1,415	....	....	....	....	....
Dunwich	....	3	4	7	10,141	....	3	6	9	11,942
Malahide	....	....	2	2	1,981	....	....	....	....	....
Southwold	....	....	2	2	2,688	....	....	....	....	....
Yarmouth	....	....	1	1	1,226	....	....	....	....	....
Essex County:										
Mersea	....	....	....	....	....	....	1	....	1	994
Haldimand County:										
Haldimand	....	66	40	106	85,852	....	71	37	108	88,312
Kent County:										
Camden, Camden Gore	....	....	....	....	....	....	1	4	5	5,325
Chatham, Chatham Gore	1	....	....	1	1,945	....	2	2	4	7,525
Orford	....	....	....	....	....	....	....	1	1	2,033
Raleigh	....	....	1	1	1,575	2	....	2	4	2,488
Romney	....	1	1	2	4,817	....	1	....	1	1,245
Zone	1	4	3	8	10,888	....	1	1	2	1,315
Lambton County:										
Bosanquet	....	....	....	....	....	....	....	1	1	390
Brooke	....	....	....	....	....	2	....	1	3	1,098
Dawn	....	1	....	1	1,795	....	1	2	3	5,875
Enniskillen	1	....	....	1	481	3	....	1	4	1,908
Euphemia	1	....	2	3	2,353	2	....	1	3	1,058
Moore	....	6	10	16	35,712	2	3	14	19	44,668
Plympton	....	....	2	2	1,202	3	....	4	7	3,898
Sarnia	....	....	3	3	1,597	....	....	....	....	....
Sombra	11	1	12	24	49,426	7	2	8	17	34,474
Warwick	....	....	4	4	1,822	....	....	....	....	....
Lincoln County:										
Caistor	....	4	2	6	2,986	....	7	2	9	4,156
Gainsboro	....	1	1	2	985	....	....	....	....	....
Middlesex County:										
Metcalfe	....	....	6	6	4,525	....	....	1	1	1,824
Mosa	....	4	2	6	9,645	....	5	....	5	7,484
Norfolk County:										
Norfolk	....	16	21	37	42,417	....	19	16	35	41,972
Welland County:										
Welland	....	55	19	74	54,414	....	61	19	80	59,715
Manitoulin Island	....	....	....	....	....	1	....	2	3	1,667
Other Areas	....	6	5	11	8,885	....	3	3	6	5,957
Total	18	175	145	338	356,509	22	188	132	342	360,409

Refineries of Western Canada

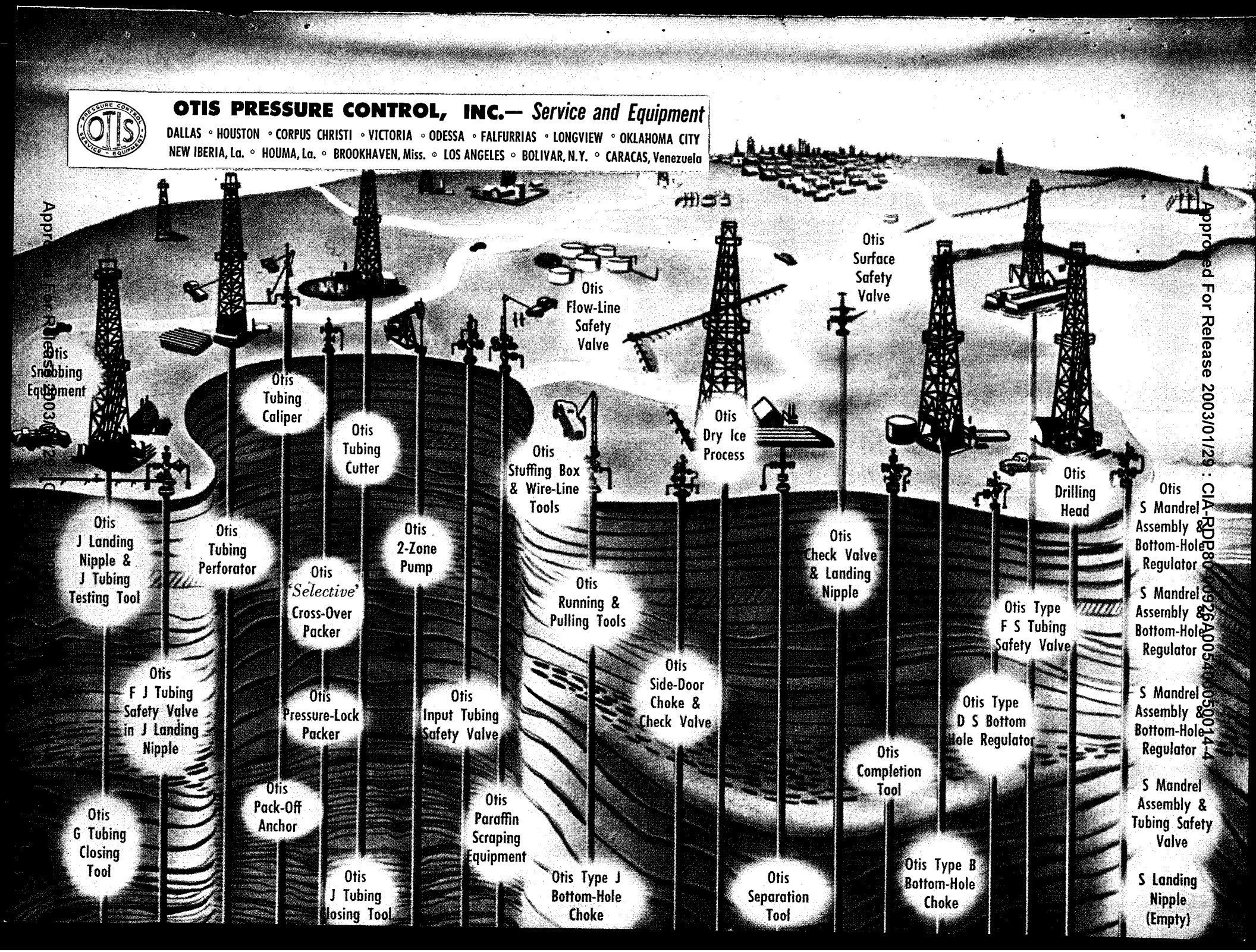
PROVINCE and COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery
ALBERTA:				
British-American Oil Co., Ltd.	Calgary	7,200	2,500	Skim-Crk-Asphalt
	Edmonton*	5,500	4,400	Skim-Crk-Asphalt
Excelsior Refineries	Lloydminster	1,200	1,000	Skim-Crk-Asphalt
Gas and Oil Refineries	Hartell (Turner Valley)	2,500	1,500	Skim-Crk
Husky Oil and Refining, Ltd.	Borradaile	1,200	.....	Dehydration, Desalting
	Lloydminster	7,500	.....	Skim-Asphalt, Dehydration
Imperial Oil, Ltd.	Calgary	9,200	4,600	Skim-Crk-Asphalt
	Edmonton	20,700	18,500	Skim-Crk
Lion Refining	Calgary	750	.....	Skimming
McColl-Frontenac Oil Co., Ltd.	Edmonton*	5,500	4,800	Skim-Crk
Supreme Refineries, Ltd.	Ogden*	500	250	Skim-Crk
Wainright Refineries, Ltd.	Wainright	300	.....	Skimming
BRITISH COLUMBIA:				
Imperial Oil, Ltd.	Ioco	12,000	2,750	Skim-Crk-Asphalt
Shell Oil Company	Shellburn	8,500	3,000	Skim-Crk-Asphalt
Standard Oil Co. of B.C.	Burnaby	8,350	.....	Skim-Asphalt
MANITOBA:				
Anglo-Canadian Oil Co., Ltd.	Brandon	2,100	1,600	Skim-Crk
Imperial Oil, Ltd.	East St. Paul*	10,000	3,100	Skim-Crk
North Star Oil, Ltd.	St. Boniface	4,400	1,000	Skim-Crk
Radio Oil Refining, Ltd.	Winnipeg	1,200	.....	Skimming
Trump Oil Co., Ltd.	Morris	300	.....	Skimming
NORTHWEST TERRITORIES:				
Imperial Oil, Ltd.	Norman Wells	1,250	.....	Skimming
SASKATCHEWAN:				
British-American Oil Co., Ltd.	Moose Jaw	6,000	5,000	Skim-Crk-Asphalt
Franco Oils, Ltd.	Lone Rock	2,000	.....	Dehydration, Desalting
HiWay Refineries, Ltd.	Moose Jaw	1,200	.....	Skimming
	Rosetown	350	.....	Skimming
	Saskatoon	3,150	800	Skim-Crk-Asphalt
Imperial Oil, Ltd.	Regina	20,000	9,700	Skim-Crk-Asphalt
Moose Jaw Refineries	Moose Jaw	1,400	.....	Skimming
Northern Petroleum Corp.	Kamsack	800	.....	Skimming
Prince Albert Refineries	Prince Albert	1,000	.....	Skimming
Saskatchewan Federated Co-operatives, Ltd.	Regina	2,400	1,100	Skim-Crk

* Under Construction.

Eastern Canada Oil Production and Geological Data

PROVINCE, TOWNSHIP or FIELD	Year of Discovery	Producing Wells End of 1950			CRUDE OIL PRODUCTION (Barrels)				Proved Area (Acres)	Gravity of Oil (API)	Formation Name and Kind	Geologic Age	DEPTH (Feet)		Structure
		Flowing	Art. Lift	Total	Daily Average for 1950	Year 1949	Year 1950	Cumulative Through 1950					Min. to Top of Pay	Max. to Bottom of Pay	
NEW BRUNSWICK:															
Stony Creek	1909	....	17	17	46	19,544	16,883	471,080	260	37.3	Albert, Sand	Miss.	1500	3000	Homocline
ONTARIO:															
Bothwell and Thamesville	1895	....	140	140	47	17,940	17,065	2,832,267	400	36	Onondaga, Lime	Dev.	395	410	Anticline
Brant (Gas)	n.a.	....	....	....	....	.....	.....	.....	n.a.	..	Medina-Cataract, Lime, Sand	Sil.	360	532	Monocline
Brooke	n.a.	....	2	2	3	.....	1,000	4,212	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Chatham	n.a.	....	....	....	....	.....	.....	200	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Dawn and Euphemia	1897	....	4	4	5	999	1,920	79,620	600	40	Onondaga, Lime	Dev.	320	370	Dome
									600	36	Guelph-Salina, Li.	Sil.	1600	1800	Dome
Dover and Raleigh	1917	....	10	10	10	3,762	3,714	219,652	900	36	Trenton, Lime	Ord.	2950	3300	Fault
Dunwich*	1898	....	23	23	5	1,929	1,766	201,226	500	n.a.	Onondaga, Lime	Dev.	3300	400	Dome
Elgin (Gas)	n.a.	....	....	....	....	.....	.....	.....	n.a.	..	Clinton, Lime	Sil.	1250	1400	Monocline
Essex	n.a.	....	....	....	....	.....	.....	n.a.	2,000	40	Guelph-Salina, Li.	Sil.	900	1100	Anticline
Haldimand-Norfolk (Gas)	n.a.	....	....	....	....	.....	.....	.....	145,000	..	Medina-Cataract, Lime, Sand	Sil.	350	900	Monocline
									189,000	..	Clinton, Lime	Sil.	870	1200	Lens
Kent (Gas)	n.a.	....	....	....	....	.....	.....	.....	15,000	..	Guelph-Salina, Li.	Sil.	1200	1400	Dome
Lincoln (Gas)	n.a.	....	....	....	....	.....	.....	.....	5,400	..	Medina-Cataract, Lime, Sand	Sil.	315	500	Monocline
Middlesex (Gas)	n.a.	....	....	....	....	.....	.....	.....	200	..	Grimsby, Lime	Sil.	1450	1500	Monocline
Moore*	1904	....	4	4	....	301	103	435,380	500	n.a.	Salina, Lime	Sil.	2150	2200	n.a.
Mosa*	1904	....	170	170	42	18,580	15,495	564,560	4,000	n.a.	Widder, Lime	Dev.	275	425	Dome
Oil Springs	1859	....	660	660	69	25,692	25,310	8,157,350	750	38	Onondaga, Lime	Dev.	370	400	Dome
Onondaga	1910	....	6	6	....	67	70	34,686	1,920	39	Medina-Cataract Sand	Sil.	480	650	Monocline
Petrolia and Enniskillen	1865	....	450	450	112	42,632	40,950	16,398,213	8,000	36	Onondaga, Lime	Dev.	470	510	Anticline
Plympton	n.a.	....	3	3	....	.....	130	170,138	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Sarnia	1875	....	5	5	....	141	114	315,459	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Sombra	1946	35	....	35	387	146,617	141,400	370,475	1,000	n.a.	Salina, Lime	Sil.	1825	1900	n.a.
Tilbury*	1947	....	....	....	....	.....	.....	609	3,000	n.a.	Guelph-Salina, Li.	Sil.	1050	1400	Anticline
Warwick, Metcalfe, and Adelaide	1938	....	9	9	6	2,010	2,025	122,905	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Welland (Gas)	n.a.	....	....	....	....	.....	.....	.....	38,000	..	Medina, Lime	Sil.	400	910	Monocline
Wentworth	n.a.	....	....	....	....	.....	.....	n.a.	6,000	n.a.	Clinton, Lime	Sil.	300	440	Monocline
Total	....	35	1,503	1,538	732	280,214	267,945	30,378,032	.....	..	.....	.....	....	....	.....

* Predominantly a gas field. n.a.—Not Available.



CANADA—Continued

Pipe Lines of Western Canada

COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Year Completed
CRUDE OIL LINES:					
B-A Saskatchewan Pipe Line Co., Ltd.	Interprovincial's Line near Moose Jaw	Moose Jaw	21	6	1950
Imperial Pipe Line Co., Ltd.	Leduc Field	Nisku	8	8	1947
	Nisku	Edmonton	20	8	1948
	Simmons Area	Redwater Field	6	4, 6	1950
	Woodbend Field	Ellerslie	10	8	1950
Interprovincial Pipe Line Co., Ltd.	Edmonton	Superior, Wis.	1150	16, 18, 20	1950
	Redwater Field	Edmonton	30	16	1950
Standard Development Company	Conrad Field	Conrad	5	4	1945
	Princess Field	Princess	4	3	1945
Valley Pipe Line Co.	Turner Valley	Calgary	30	4	1925
	Turner Valley	Calgary	30	4	1937
	Turner Valley	Calgary	31	6	1938
	Turner Valley	(Gathering Lines)	105	2, 3, 4	1945
Winnipeg Pipe Line Co., Ltd.	Interprovincial's Line at Gretna	Winnipeg	75	10	1950
NATURAL GAS LINES:					
Canadian Montana Gas Company	Pakowki Field	Cut Bank, Mont.	66	n.a.	Planned
Canadian Western Natural Gas, Light, Heat, & Power Co.	Bow Island	Calgary	170	16	1912
	Branches to various towns on Bow Island-Calgary system served from Turner Valley	.....	41	3 to 8	Between 1912 and 1920
	Foremost	Bow Island	30	10	1912
	Turner Valley	Calgary	28	10	1922
	Turner Valley	De Winton	16	14	1922
	Turner Valley	Okotoks	15	6	1922
Franco Utilities, Ltd.	Vermilion Field	Vermilion	5	4	1943
Northwestern Utilities, Ltd.	Kinsella	Viking	10	10, 12	1940
	Viking	Edmonton	77	Two 12	1923
	Branches on Viking-Edmonton Line	Vegreville	20	4	1930
		Ponoka	70	8	1946
	Ponoka	Red Deer	30	6	1946
Wainright Gas Co.	Fabyan	Wainright	8	4	1927

Refineries of Eastern Canada

COMPANY	Location of Plant	Crude Charging Capacity, (Bbls. Daily)	Cracking Capacity, (Bbls. Daily)	Type of Refinery
NEW BRUNSWICK:				
New Brunswick Oilfields, Ltd.	Weldon	300	.....	Skimming
NOVA SCOTIA:				
Imperial Oil, Ltd.	Imperial (2 miles of Dartmouth)	34,000	11,600	Skim-Crk-Asphalt
ONTARIO:				
British American Oil Co., Ltd.	Clarkson (Toronto)	8,250	4,500	Complete
Canadian Oil Companies, Ltd.	Petrolia	3,500	1,500	Skim-Crk-Lube-Wax
Imperial Oil, Ltd.	Sarnia	41,500	20,000	Complete
McColl-Frontenac Oil Co., Ltd.	Toronto	13,000	3,300	Skim-Crk
Trinidad Leaseholds, Ltd.	Port Credit (Toronto)	4,000	1,300	Skim-Crk
QUEBEC:				
British American Oil Co., Ltd.	Montreal	17,000	7,500	Skim-Crk-Asphalt
General Petroleum Refineries.	Pointe-aux-Trembles (Montreal)	300	.....	Skimming
Imperial Oil, Ltd.	Montreal	25,000	9,800	Skim-Crk-Asphalt-Lube
McColl-Frontenac Oil Co., Ltd.	Montreal	20,000	12,500	Skim-Crk
Shell Oil Co. of Canada, Ltd.	Montreal	10,000	7,500	Skim-Crk

Natural Gas Pipe Lines of Eastern Canada

COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Year Completed
ONTARIO:					
Dominion Natural Gas Co.	Tilbury	Hamilton	175	12, 10, 8	1912
	Tilbury	Kingsville	30	8	1912
	Haldimand	Hamilton	50	(2) 10	1910
Union Natural Gas Co., (Canada)	Haldimand	Hamilton	50	8	1936
	Dawn	London	60	10	1935
	Tilbury	Windsor	50	(2) 10	1906, 1908
	Tilbury	Sarnia	55	10	1910
	Windsor	Detroit	7	16	1949
QUEBEC:					
Montreal Pipe Line Co.	North Troy, Vt.	Montreal	70	18	1950

MEXICO

Crude Production Gains 11,381,229 Barrels Over 1949; Pemex Hits Drilling High With 217 New Wells for Year

MEXICO'S 1950 crude production from its Isthmus, Northeastern, Northern, Poza Rica and Southern Districts was 72,117,598 barrels, an increase of 11,381,229 barrels over 1949.

Significantly, 46,716,165 barrels, or more than 50 percent of the entire 1950 production, was produced by the fabulous Poza Rica field. These figures point out the continuing need for additional oil reserves if the possibility of overworking Poza Rica is to be avoided.

Despite Petroleos Mexicanos' (Pemex) larger scale exploration campaign, which was initiated in 1948, stepped up in 1949, 1950 and 1951, its record of new discoveries is disappointing. In 13 years, through 1950, Pemex made only 18 new discoveries of oil and gas, none of which was important.

In 1950 Pemex reached its drilling peak with the completion of 217 wells of which 17—or 8 percent—were exploratory tests. New fields were discovered in Tancoco and Tortuquero, Vera Cruz; in the Tampico Zone, and in Xicalango, Campeche.

Mexico had a larger export balance in 1950 than at any time during or since World War II, but its exports exceeded imports by less than 16 million barrels in contrast with an excess exportation of more than 22 million barrels in 1937, the last year in which private oil companies operated in Mexico.

Mexico has doubled its production during the past seven years and today is producing nearly twice as much as at the time of nationalization; however, pyramiding domestic demands, coupled with the ever-present danger

FACTS ON THE *Barrelhead* ABOUT *Canadian Oil*

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FOR THE PROMPTEST RESPONSE to your inquiry, write, phone or see Gordon V. Adams, Special Representative, Bank of Montreal, Calgary Main Office, 140 Eighth Ave. West, Calgary, Alberta. (Telephone 2-8333)

While the Bank is prepared to provide all available information on the oil industry, it does not make recommendations in regard to the purchase of individual oil stocks.

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of depleting its underground stocks in Poza Rica, emphasize the need for discovering new oil reserves.

In general, the rising crude production is being drawn from the same sources as in 1937, from properties expropriated from private interests. The enlarged producing rate—a 1951 program designed to produce 80,000 barrels more than the daily 1950 average of 197,170 barrels—appears to be predicated on siphoning even more production from Poza Rica.

Currently, little is being done to discover additional oil resources. Pemex' poor wildcatting record is due largely to the unwillingness to risk capital except where the investment means assured additional oil production.

Lack of funds has been Pemex' answer to critics of its small testing operation, but that limitation is one of the

Oil Production in Mexico

DISTRICT	COMPANY	Year of Discovery	OIL WELLS AT END OF 1950			CRUDE OIL PRODUCTION (Barrels)			
			Shut In	Producing	Total	Daily End of 1950	Year 1949	Year 1950	Cumulative Through 1950
Isthmus	Petróleos Mexicanos (Pemex)	1921	40	305	345	20,709	6,432,814	7,019,834	169,313,610
Northeastern	Petróleos Mexicanos	1948	2	23	25	1,625	622,843	624,034	1,358,440
Northern	Pemex, Mexican Gulf Oil, Others	1901	143	560	703	23,495	9,153,947	8,795,444	820,750,312
Poza Rica	Petróleos Mexicanos	1930	24	95	119	141,213	36,839,219	46,716,165	412,066,550
Southern	Pemex, Mexican Gulf Oil, Others	1908	72	232	304	24,095	7,687,546	8,962,121	1,102,598,113
	Total	....	281	1,215	1,496	211,137	60,736,369	72,117,598	2,506,087,025

Drilling in Mexico

STATE and FIELD	WELLS COMPLETED IN 1949					WELLS COMPLETED IN 1950					Wells Drilling End of 1950
	Oil	Gas	Dry	TOTAL Wells	TOTAL Footage	Oil	Gas	Dry	TOTAL Wells	TOTAL Footage	
ISTHMUS DISTRICT:											
Tabasco:						3	1	..	4	21,585	1
Belem	..	..	..	..	.....	..	..	3	3	16,402	..
Huimanguillo	..	..	..	..	.....	..	2	..	2	13,540	1
Lago del Carmen	..	..	..	..	.....	..	..	1	1	8,235	..
Sarlat	..	..	..	..	.....	..	..	..	..	.....	..
Wildcats	1	..	2	3	26,229	..	..	..	..	.....	..
Vera Cruz:											
Acalapa	1	..	3	4	9,930	..	..	2	2	5,096	..
Cuichapa	1	..	..	1	2,307	1	..	..	1	2,287	..
El Plan	15	..	3	18	69,967	15	..	4	19	86,125	4
Moloacan	13	..	2	15	25,918	1	..	1	2	5,027	1
Tortuguera	..	..	..	..	.....	3	..	..	3	15,582	1
Wildcats	..	..	3	3	13,174	..	..	2	2	11,859	1
NORTHEASTERN DISTRICT:											
Chihuahua:											
Wildcats	..	..	1	1	10,496	..	..	..	..	.....	..
Coahuila:											1
Wildcats	..	..	..	..	.....	..	..	..	..	.....	
Tamaulipas:											
Brasil	..	4	1	5	38,019	..	4	1	5	37,106	2
Cano	1	..	1	2	12,943	5	..	1	6	39,332	1
Monterrey	..	..	..	..	.....	3	1	..	4	29,060	1
Reynosa	6	9	6	21	118,675	..	4	..	4	25,864	1
Santo Domingo	..	..	..	..	.....	..	..	..	..	.....	1
Treviño	..	..	..	..	.....	..	..	..	..	.....	1
Wildcats	..	..	2	2	19,650	..	..	1	1	2,636	1
NORTHERN DISTRICT:											
San Louis Potosi:											
Limon	4	..	..	4	8,338	7	..	9	16	38,145	5
Tamaulipas:											
Wildcats	..	..	3	3	17,577	..	..	2	2	14,420	1
Vera Cruz:											
Cacalilao	7	..	8	15	27,285	6	..	6	12	20,501	4
Chapacao	1	1	2	4	7,442	2	..	9	11	22,716	7
Corcovado	..	..	2	2	4,776	..	..	..	..	.....	..
Pánuco	..	..	1	1	3,232	..	..	..	..	.....	..
SOUTHERN DISTRICT:											
Puebla:											
Wildcats	..	..	1	1	4,322	..	..	..	..	.....	..
Vera Cruz:											
Agua Nacida	..	..	2	2	14,490	..	..	..	..	.....	..
Alazan	12	..	7	19	46,263	17	..	18	35	81,637	2
Cerro Azul	..	..	..	..	.....	12	4	13	29	56,323	7
Cerro Viejo	..	..	..	..	.....	..	..	1	1	1,991	2
Chinampa	1	..	2	3	7,613	..	..	..	..	.....	..
Horcones	..	..	..	..	.....	..	..	..	..	.....	1
Juan Felipe	..	..	..	..	.....	..	..	..	..	.....	4
Miguel Aleman	..	..	1	1	11,060	..	..	..	..	.....	..
Moralillo	12	..	5	17	87,658	7	..	5	12	57,985	2
Potrero	..	..	..	..	.....	..	..	1	1	2,161	1
Poza Rica-Escolin	7	..	..	7	57,234	25	1	..	26	219,809	7
San Diego	..	..	3	3	5,911	..	..	..	..	.....	..
San Miguel Chico	..	..	..	..	.....	..	..	1	1	2,518	1
San Miguel Mecatepec	..	..	..	..	.....	2	..	1	3	23,763	..
Tenexco	..	..	1	1	7,456	..	..	1	1	6,996	1
Toncoco	..	..	..	..	.....	1	..	1	2	10,380	..
Toteco	..	..	..	..	.....	..	..	4	4	8,612	..
Wildcats	..	..	..	..	.....	..	..	2	2	16,330	3
Total	82	14	62	158	657,965	110	17	90	217	904,023	66

DO THE RIGHT THING AT THE RIGHT TIME

If you wait until you have sand trouble in your well before installing STANCLIFF SCREEN the natural formations may be disturbed and many unnecessary difficulties created.

WHY NOT TAKE PROPER STEPS AT THE START TO AVOID EXPENSIVE WORKOVERS AND CLEAN-OUT JOBS

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EXPORT REPRESENTATIVE: ACME WELL SUPPLY CO., 19 RECTOR ST., NEW YORK 6, N. Y.

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inherent weaknesses of the single company system of operation.

The 22-year-old Poza Rica field contained 95 producing wells at the close of 1950, with 24 having been shut in. The field's cumulative production through 1950 totaled 412,066,550 barrels.

Refineries of Mexico

DISTRICT and COMPANY	Location of Plant	Crude Charging Capacity (Barrels Daily)	Cracking Capacity (Barrels Daily)	Type of Refinery
Central Mexico:				
Petróleos Mexicanos...	Atzcapotzalco (Mexico City)	50,000	12,800	Complete
	Salamanca	30,000	5,000	Distillation
Isthmus:				
Petróleos Mexicanos...	Minatitlan	24,000	.....	Distillation
Northern Mexico:				
Petróleos Mexicanos...	Reynosa	4,000	.....	Distillation
Poza Rica:				
Petróleos Mexicanos...	Poza Rica	4,000	.....	Skimming
Tampico:				
Petróleos Mexicanos...	Arbol Grande	22,000	.....	Skimming, Cracking
	Ciudad Madero	75,000	4,600	Skimming, Cracking
	Mata Redonda	15,000	5,800	Skimming, Cracking

Gas Production in Northeastern Mexico

STATE and FIELD	Operating Company	Producing Wells End of 1950	GAS PRODUCTION (Millions of Cubic Feet) Daily at End of 1950	Year 1949	Year 1950*	Cumulative Through 1950
Tamaulipas:						
Brasil.....	Petróleos Mexicanos	1	.2	42.9	83.9	126.8
Camargo.....	Petróleos Mexicanos	3	1.4	725.6	491.5	1,316.4
Cano.....	Petróleos Mexicanos	4	.1	9.8	36.7	46.5
La Presa.....	Ohio Mex. Oil Corp.	2	.4	183.7	145.1	2,190.7
Mier and Lajitas	Muñoz y Martinez	6	2.0	844.6	719.8	20,053.6
Misión.....	Petróleos Mexicanos	3	5.7	3,196.6	2,039.2	9,984.0
Monterrey.....	Petróleos Mexicanos	2	.1	.....	43.0	43.0
Rancherias.....	Ohio Mex. Oil Corp.	5	.2	251.2	55.9	15,690.8
Reynosa.....	Petróleos Mexicanos	13	3.6	906.7	1,309.4	2,240.7
Total.....	.....	39	13.7	6,161.1	4,924.5	51,692.5

* November and December production estimated.

Pipe Lines of Mexico

COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Daily Capacity	Status
CRUDE LINES						
Petróleos Mexicanos.....	Ebano-Pánuco Fields	Tampico	35	Combination 8 and 10	30,000 bbls.	In use
	Ebano-Pánuco Fields	Gathering Lines	144	4, 6 and 10		
	Poza Rica Field	Mexico City	147	10	50,000 bbls.	In use
	Poza Rica Field	Salamanca	287	12	30,000 bbls.	In use
	Poza Rica Field	Tuxpan	39	One 6, one 8 and one 12	125,000 bbls.	In use
	Tuxpan	Potrero	33	Two 8	50,000 bbls.	In use
	Cobos (Tuxpan)	Alamo Field	20	8	25,000 bbls.	In use
	Alamo Field	Tampico	103	Combination 8 and 10	24,000 bbls.	In use
	Poza Rica Field	Alamo Field	35	12	63,000 bbls.	In use
	Alamo Field	Potrero	14	One 8 and one 10	75,000 bbls.	In use
	Potrero	Chijol (Tampico)	87	Three 8	72,000 bbls.	In use
	Tonalá Field	Minatitlan Refy.	35	Combination 8, 10 and 12		
	El Plan Field	El Chapo Station	21	Combination 8, 10 and 12		
	El Chapo Station	Nachital	6	10	30,000 bbls.	In use
	Cuichapa	El Plan-El Chapo	3	8		
PRODUCTS LINES						
Petróleos Mexicanos.....	Minatitlan	Salina Cruz	155	8	.....	Building
	Tonalá Field	Nanchital	23	3	.....	In use
NATURAL GAS LINES						
Compañía Mexicana de Gas de Monterrey.....	Roma	Monterrey	96	12	50 mil. cu. ft.	In use
	Misión Field	Roma	37	12	30 mil. cu. ft.	In use
Gas Industrial de Monterrey, S. A.....	Reynosa Field	Monterrey	135	14	50 mil. cu. ft.	In use
Petroleos Mexicanos.....	Poza Rica Field	Mexico City	150	20	30 mil. cu. ft.	In use

Engineering and Geological Data on Mexico

STATE and FIELD	Est. Proved Area (Acres)	Gravity of Oil (API)	PRODUCING FORMATION Name	Kind	Age	Depth of Wells (Ft.) Minimum Top Pay	Maximum Total Depth	Average Thickness Pay (Ft.)	Type Structure
ISTHMUS OF TEHUANTEPEC:									
Veracruz:									
Cuichapa.....	300	30	Concepción Inferior	Sand	Miocene	2100	2133	33	Faulted dome
El Burro.....	370	26	Concep. Inf.: Encanto	Sands	Miocene	2460	2620	62	Salt dome
El Plan, Lignitic Zone.....	830	24	Cedral, Lignitic	Sands	Miocene	1970	2440	216	Faulted Ant.
El Plan, Concepción.....	250	30	Concep. Inf.: Sup.	Sands	Miocene	5734	5865	131	Dome
El Plan, East Extension.....	80	35	Concep. Inf.: Encanto	Sands	Miocene	3883	4110	32	Faulted nose
Filisola.....	460	22	Encanto	Sand	Miocene	1585	1980	92	Fltd. terrace
Nuevo Teapa.....	40	36	Encanto	Sand	Miocene	429	711	29	Salt dome
Tonalá.....	470	28	Concep. Inf.: Encanto	Sands	Miocene	1640	2130	167	Salt dome
			Deposito	Sand	Oligocene				
NORTHEASTERN MEXICO:									
Tamaulipas:									
La Presa.....	.....	Gas	Mt. Selman	Sand	Eocene	1925	3160	38	Anticline
Mier.....	.....	Gas	Mt. Selman	Sand	Eocene	2120	2345	....	Nose
Misión.....	.....	Dist.	Vicksburg	Sand	Lwr. Olig.	....	6040	....	Anticline
Rancherias.....	1,230	Gas	Fayette, Yegua, Cook Mt.	Sand	Eocene	264	2440	310	Anticline
Reynosa.....	.....	Dist.	Vicksburg	Sand	Lwr. Olig.	4625	8114	....	Anticline
TAMPICO AREA:									
Veracruz:									
Poza Rica.....	15,850	30	Tamabra	Lime	Lwr. Cre.	7250	7546	296	Nose
Soledad.....	.....	40	Tamabra	Lime	Lwr. Cre.	6435	6480	10	Nose
Northern District, (Ebano, Pánuco, etc.).....	100,000	12	Tamaulipas	Lime fractures	Lwr. Cre.	1148	1968	*	Faulted Ant.
Southern District, (Golden Lane).....	33,000	20	El Abra	Lime reef	Lwr. Cre.	2200	2202	†	Faulted Ant.

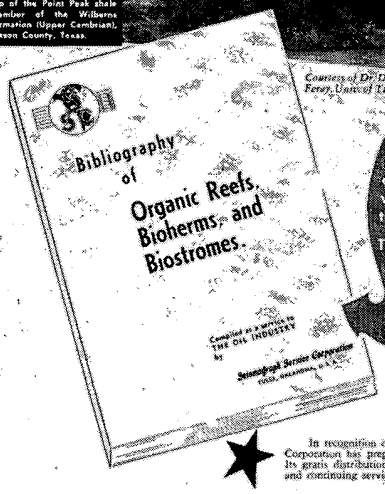
* Production from fractures in first 800 feet of Tamaulipas and San Felipe lines.

† Wells go into reef-phase limestone only about 2 feet.

ARE YOU LOOKING FOR *Reefs*...

Stromatolitic bioherm at the top of the Point Peak shale member of the Wilburns formation (Upper Cambrian), Mason County, Texas.

Courtesy of Dr. D. E. Feray, Univ. of Tulsa



THE GEOLOGIST TAKES A NEW LOOK

The recent realization of the importance of organic reefs in the accumulation of petroleum has opened up broad, new vistas in the application of geology to the discovery of future oil reserves.

THE SEISMOLOGIST TAKES A NEW LOOK

The successful resolution of seismic data in possible reef areas involves, first, a thorough knowledge of the fundamentals of reef origin, occurrence, and characteristics.

In recognition of the above facts, Seismograph Service Corporation has prepared this comprehensive bibliography. Its gratis distribution is another example of SSC's interest and continuing service to the Oil Industry.

SSC continues to confirm its primary goal — UNEXCELLED SERVICE TO THE OIL INDUSTRY — by these four important contributions in 1950 to successful oil exploration

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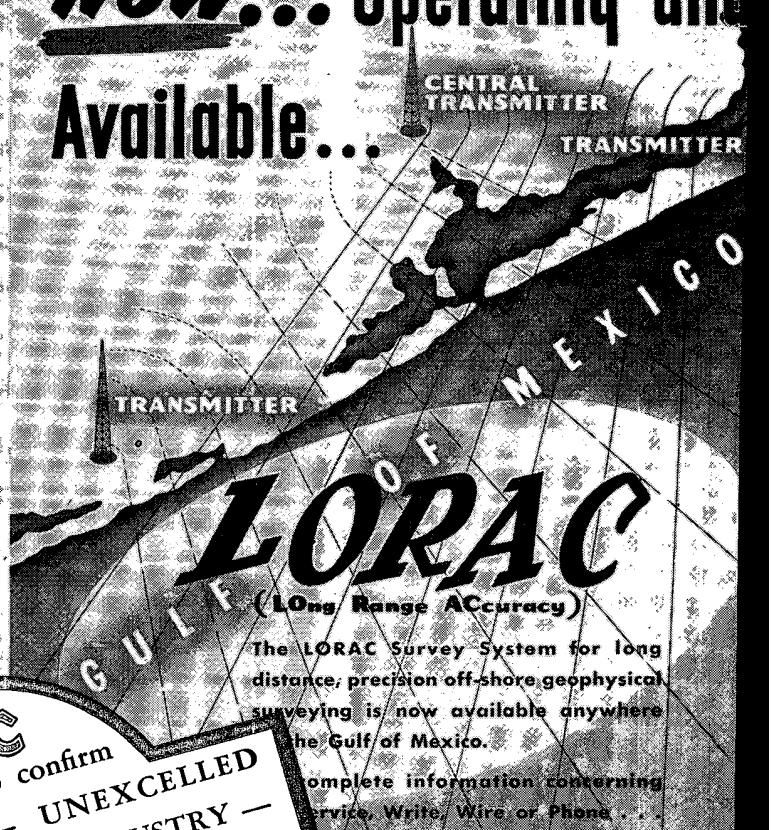


LORAC

(LOng Range ACcuracy)

The LORAC Survey System for long distance, precision off-shore geophysical surveying is now available anywhere in the Gulf of Mexico.

For complete information concerning this service, Write, Wire or Phone . . .

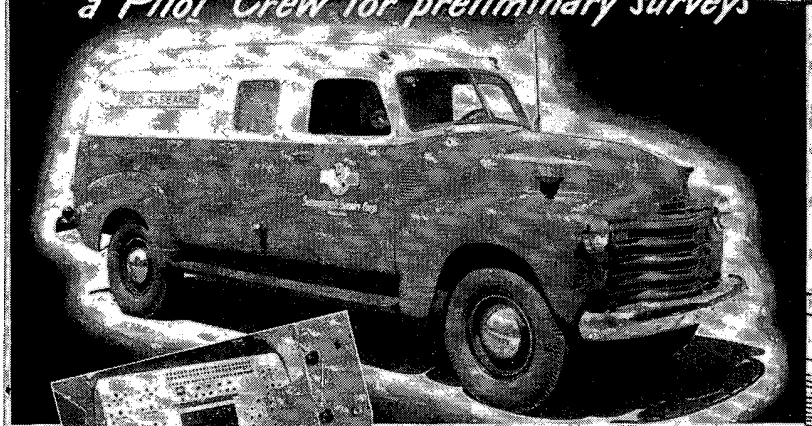
Seismograph Service Corporation

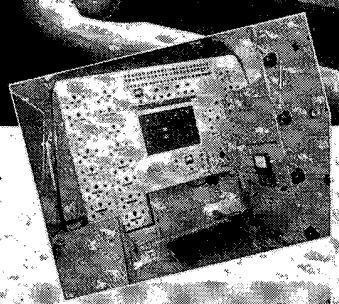
TULSA, OKLAHOMA, U. S. A.

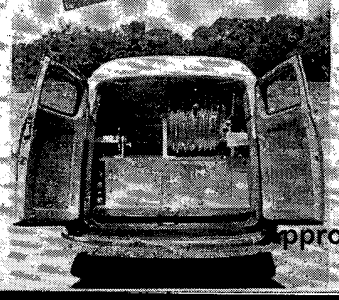
Seismograph Service

SSC *Now ot*

a Pilot Crew for preliminary surveys







The research division of SSC provides another "tool" for more accurate seismic exploration.

The new *laboratory on wheels* contains the equipment for a PILOT CREW to operate in new or extremely difficult shooting areas and in addition to conduct normal field tests. Its use will determine the proper instrumentation and field procedure to be used in an area by the regular seismic crew.

This unit should contribute to more accurate surveys as well as to effect economies in time and materials.

THE EQUIPMENT consists of —

1. Standard 24 trace recording unit.
2. 40 trace camera — permitting multiple recording.
3. Bank of 4 flat response amplifiers.
4. 4 trace variable area recording camera (recording the output of the flat response amplifiers).

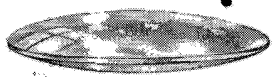
In general, the test shooting will be carried out on a 12-trace geophone spread, with the additional amplifiers paralleled to allow the recording of two filter settings and mixing on each shot.

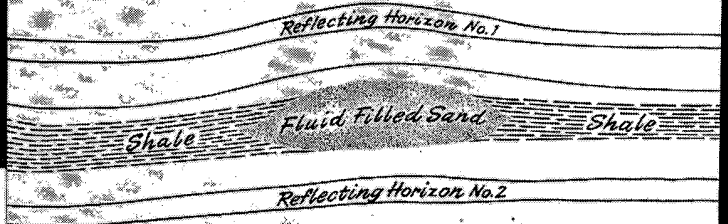
For laboratory study of the test shooting the records made with the variable area camera may be analyzed, when desired, with variable area reproducing equipment.

Seismograph Service Corporation

TULSA, OKLAHOMA, U. S. A.

This is IT !





a new method for the location of . . .

Sand Lens Type Oil Fields

Continuing research and development by SSC, to further utilize the possibilities inherent in the reflection seismic method to locate non-structural type oil fields, has resulted in a new approach to the location of stratigraphic traps.

This new seismic method, another *first* for SSC, for the location and delineation of *sand lens* type oil fields has been proved by 17 oil wells drilled to date by SSC clients.

Seismograph Service Corporation

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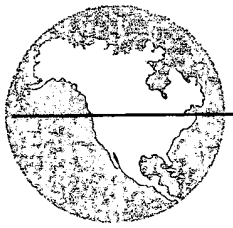


UNITED STATES

Industry Hangs Up New Marks in Meeting Record Demand; Completions Total Exceeds 40,000 Wells for the First Time

IN 1950 the U. S. petroleum industry was called upon to supply the greatest demand for its products that the nation had ever made. In successfully meeting those record-high needs, the industry set new marks in practically every operating division.

Drilling of all types of wells was carried on at unprecedented levels, and the wells were drilled to greater average depths than ever before. More pipe line mileage knowledge was put into operation during the year than in any other comparable period. Production of natural gasoline and natural gas reached the highest levels in history, and reserves of those resources hit new peaks, as did crude reserves.

The refining branch built additional processing capacity and operated its facilities at record-breaking rates. Output of the various refined products, with only a few exceptions, reached new highs. Despite record output, the products were all consumed, so that at the end of December, not only had all the year's production been used, but stocks were at lower levels than they had been a year earlier.

Domestic crude production was one of the few industry operations that did not reach record proportions. Although the country's output was exceptionally large, it failed to match the record production of 1948 by a little more than 2 percent. However, with all-time high importations of both crude and products, the total supply of oils was the greatest in history.

A total of 43,204 new wells were drilled during 1950, and that was the first time that as many as 40,000 new wells had been completed in a single year. The 1950 record was a gain of 4242 wells or 10.9 percent over the previous year's efforts, and an increase of 3727 wells or 9.4 percent over the previous all-time record of 39,477 new wells drilled in 1948.

Total footage represented in the year's wells amounted to 159,384,000 feet. That was a gain of 15 percent over the previous record of 138,617,000 feet drilled in 1949.

Refining operations included the running of 2,093,167,000 barrels of crude—5,735,000 daily—into plant stills, and that was good for a new record. The previous peak had been 2,031,041,000 barrels—5,549,000 daily—in 1948. The rated capacity of all U. S. refineries totaled 6,724,000 barrels daily at the end of 1950, and at that time the plants were being operated at 90.6 percent of their rated capacity. A comparison with a year earlier showed that refining capacity had been increased 152,000 barrels a day to a new all-time peak during 1950.

The nation's crude producers had to be content with a second place during 1950, as their output was quite high, but not enough to top the record of 1948. During the year, crude production totaled 1,972,812,000 barrels for a daily average of 5,405,000 barrels. That was an increase of 7.2 percent over output in 1949, but short of the 5,509,000 barrels averaged daily in 1948.

Production of natural gasoline was stepped up to 180,922,000 barrels during the year, for a new high mark that topped the previous peak reached in 1949 by 15.8 percent. Natural gas' marketed production also hit a new peak of 5975 billion cubic feet, which was 10.2 percent more than the previous high mark reached in 1949.

Underground reserves of crude were increased satisfactorily during 1950 and at the end of the year stood at their highest point. The same was true for other natural gas liquids. Crude reserves total 26,217,724,000 barrels at the close of 1950, representing a net gain of 1,568,235,000 barrels during the period.

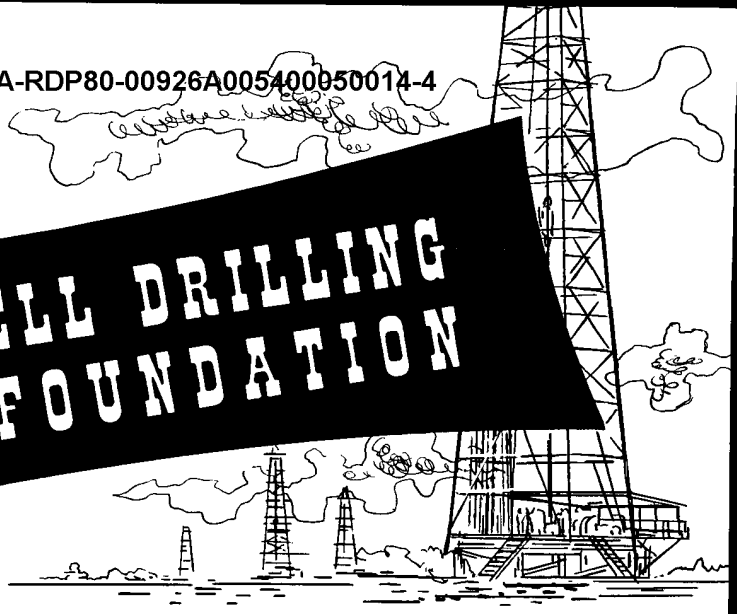
Those reserve additions were due principally to the most active wildcatting year in history. A total of 7780 strict wildcats were completed to far outstrip the pervious record of 6781 drilled in 1949. Partial results of this vigorous campaign were 861 new oil fields and 301 new pay horizons in older fields, for a total of 1117 new oil pools. A year before the score had been 964 oil pools discovered.

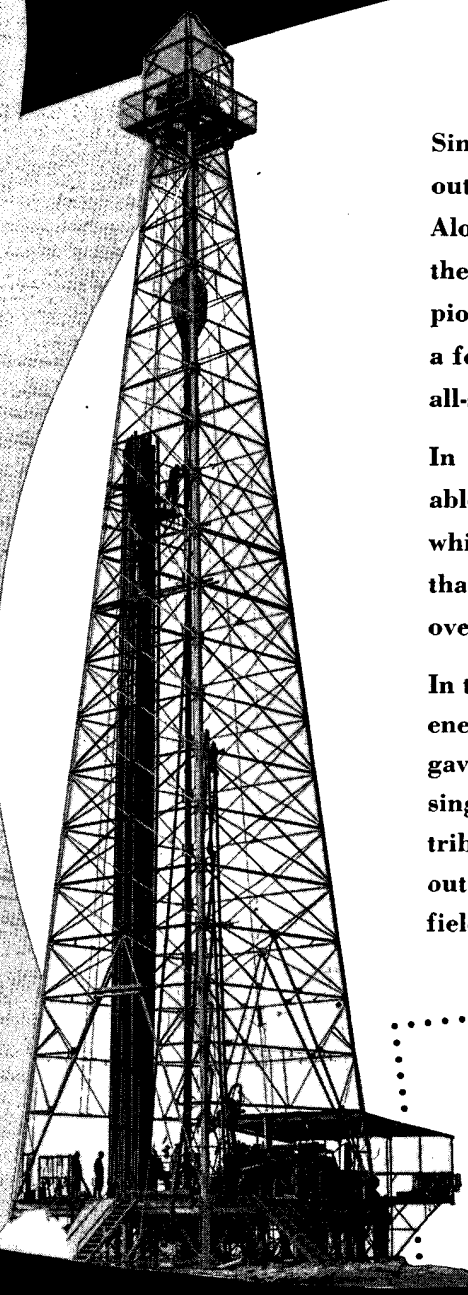
Detailed data on U. S. operations are not presented in this number, as they were covered in the Review-Forecast Issue of February 15, 1951. A partial list of the data contained in the Review-Forecast Issue is presented in the table below:

Index to U. S. Operating Data Published in World Oil's Review-Forecast Issue, February 15, 1951

1897

WE PUT OIL WELL DRILLING ON A SOLID FOUNDATION





Since its founding 54 years ago, Parkersburg has made many outstanding contributions to the progress of rotary drilling. Along about the middle of the century, almost coincidental with the invention of the rotary drilling method, Parkersburg pioneered and developed the portable drilling derrick . . . and a few years later became the leader in the development of today's all-steel heavy duty drilling derrick.

In the early 20's Parkersburg developed the first all-steel portable substructures, engine support and pipe rack . . . all of which are an indispendable part of every modern rotary outfit, that have saved operators thousands of dollars in drilling time over the years.

In the early 30's, when lack of adequate drawworks brakes threatened to halt all attempts to drill below 8000 feet, Parkersburg gave the industry the Hydromatic Brake. Probably no other single new equipment development of the past 20 years has contributed so much to the progress of deep well drilling. For without the Hydromatic it is almost certain that none of today's deeper fields could have been discovered.

With over 54 years service to the industry behind us, Parkersburg looks to the future . . . full of confidence that Parkersburg developments still to come will continue to help with the history of rotary drilling and provide substantial aid to its progress.

1951

PARKERSBURG
RIG & REEL COMPANY • Parkersburg, West Virginia

5110

CENTRAL AMERICA

No New Exploratory Ventures Centered on Guatemala; Panama and Costa Rica Quiescent During Past Year

ALTHOUGH certain sections along the eastern coast of Guatemala were considered potential areas, no new companies conducted any explorations in the area.

The Atlantic Refining Company, The Ohio Oil Company and Standard Oil Company of Ohio abandoned their exploratory licenses in Guatemala as the result of an exploration and exploitation concession law passed in 1949.

A constitutional provision limits exploitation of mineral resources to the government, Guatemalans, and companies of which the capital is at least 60 percent owned by Guatemalans. Such companies are required to invest at least 60 percent of profits in Guatemala.

The decree also establishes the petroleum industry as a public utility, which under the Constitution means retroactive legislation can be enacted at any time. The government under law must acquire ownership of all the contractor's equipment and machinery at cost to be paid out of the production received by the government.

No noteworthy petroleum activity was experienced during the year in Panama and Costa Rica. Geological exploration developed nothing of interest in Panama, although the eastern coast areas were considered potentially productive.

CUBA

OFFSHORE possibilities occupied major interest in Cuban oil activity at the end of 1950. Cuban Gulf Oil Company (Gulf Oil Corporation subsidiary) was considering an offshore test at Blanquizal off the northern coast of Los Villas province. Geophysical operations were extended in 1950 in an effort to increase Cuba's daily crude production of about 500 barrels.

A previous offshore test of Cuban Gulf on the Hicacos concession, about two miles out in the shallow waters of Cardenas Bay in Mantanza State, was abandoned at the end of 1949 at 5045 feet.

TRINIDAD

Crude Production Up 224,183 Barrels Over Previous Year; Continuing Dollar Shortage Limits Drilling Operations

WITH 2053 producing wells at the end of 1950, Trinidad's crude production for the year was 20,238,936 barrels, an increase of 224,183 over 1949. Trinidad equaled its new well pace of 1949 with 144 completions, and had 23 wells drilling as the year ended. The total footage of 604,019, showed an increase of 16,219 over the preceding year.

Judging on a comparison of new well completions for

Engineering and Geological Data on Trinidad

FIELD	Proved Area (Acres)	Gravity of Oil (API)	PRODUCING FORMATION						
			Name	Kind	Age	DEPTH (Ft.) Min. to Top of Pay	DEPTH (Ft.) Max. to Bottom of Pay	Average Thickness of Pay	Type of Structure
Barrackpore	500	17-31	Wilson	Sand	Miocene	500	3500	100	Faulted Anticline
			Herrera	Sand	Oligocene	3000	6000	250	Faulted Anticline
Brighton-Vessigny	1300	30	Morne L'Enfer, Forest	Sand	Miocene	700	2200	50-70	Faulted Anticline
			Nariva	Sand	Oligocene	1800	4600	200	Faulted Anticline
Coora	850	19-30	Morne L'Enfer, Forest	Sand	Miocene	500	6500	20-1200	Faulted Monocline
Cruse	250	13-30	Cruse	Sand	Miocene	1800	4000	200	Stratographic Trap
Erin	10	29	Cruse	Sand	Miocene	3100	3200	50	Faulted Monocline
Forest Reserve	3000	15-33	Forest	Sand	Miocene	0	3500	150	Anticline
			Cruse	Sand	Miocene	1500	8000	200	Anticline
Fyzabad	1600	16-34	Forest, Cruse	Sand	Miocene	127	7200	50-460	Anticline
Guapo	960	14-24	Cruse	Sand	Miocene	250	2500	1800	Anticline
Guayaguayare & Maloney	110	15-50	Forest, Cruse	Sand	Miocene	0	5000	150	Faulted Trap
Los Bajos	200	27-37	Morne L'Enfer, Forest	Sand	Miocene	3000	6000	20-1000	Faulted Monocline
Mackenzie	60	29	Morne L'Enfer	Sand	Miocene	6200	6650	100	Syncline
Mandingo	10	44	Herrera	Sand	Oligocene	3100	3600	130	Anticlinal Crest
Morne Diablo	50	20-33	Cruse	Sand	Miocene	1000	4700	100	Faulted Trap
Palo Seco	700	18-33	Forest, Cruse	Sand	Miocene	1000	6400	20-400	Syncline
Penal	800	21	Forest, Cruse, Wilson	Sand	Oligocene	1300	2500	.....	Faulted Anticline
Point Fortin	1300	17-26	Forest, Cruse	Sand	Miocene	1600	8900	.....	Faulted Anticline
Quarry	500	15-49	Forest, Cruse	Sand	Miocene	280	6800	20-1200	Faulted Trap
Quinam	40	26-34	Cruse	Sand	Miocene	1000	4300	100	Faulted Trap
San Francique	100	21	Forest, Cruse	Sand	Miocene	....	....	.....	.....
Siparia Syncline	410	19-45	Cruse	Sand	Miocene	7200	7950	40	Faulted Trap
Wilson	200	12-26	Wilson	Sand	Miocene	1200	3300	150	Faulted Anticline

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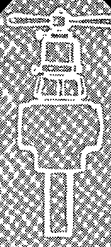

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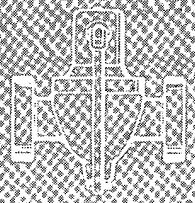

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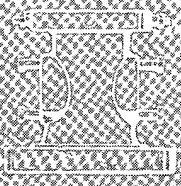

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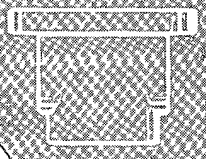

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1950 and 1949, it appeared that a continuing dollar shortage was limiting drilling operations to some extent. This conclusion was given further weight by a comparison of exploratory tests. In 1950 four wildcats were completed with a total footage of 29,994, and two were oil producers. An additional wildcat was undergoing tests as the year ended. Five wildcats were drilled the previous year, one of which was successful.

Antilles Petroleum Company (Trinidad), Ltd., reported no significant developments during 1950, and said its drilling operations would be restricted to field wells in an effort to maintain production.

Trinidad Leaseholds, Ltd's., exploratory tests continued at about the same rate as in 1949, but the wells were drilled to greater depths in an attempt to test Cretaceous formations. No Cretaceous production has yet been found.

Trinidad Leaseholds was developing the deep Herrera sand pool below 10,000 feet. Diamond coring equipment was being used to penetrate the hard sand section.

Trinidad Petroleum Development Company, Ltd., completed Erin 3, XF-360 wildcat, 3½ miles west-southwest of the center of the old Palo Seco field. Initial flow was 240 barrels a day through 7/32-inch choke from the Lower Cruse.

Pipe Lines of Trinidad

COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Year Completed
CRUDE OIL LINES:					
Trinidad Leaseholds, Ltd.	Forest Reserve	Pointe-à-Pierre	16.3	10	1928
	Forest Reserve	Pointe-à-Pierre	16.3	8	1938
	Guayaguayare	Phillippine	27.5	6	1922
	Palo Seco	Forest Reserve	4.4	4	1934
	Morne Diablo	San Francique	5.7	4	1936
	Cruse	Forest Reserve	5.5	6	1944
Trinidad Pet. Dev. Co., Ltd.	Los Bajos	Point Fortin	8.8	(1)-6; (1)-4	1933
	Palo Seco	Sobo La Brea	11	5	1930
	Palo Seco	Erin	5	4	1948
	Palo Seco	Los Bajos	3	6	1938
	Barrackpore	Penal	3	4	1949
	Coora	Los Bajos	6	(2)-4	1938
United British Oilfields of Trinidad, Ltd.	Penal	Point Fortin	18	8	....
	Quarry	Point Fortin	7.5	6	....
	Los Bajos	Point Fortin	8	(1)-6; (1)-4	....
	Morne Diablo	Los Bajos	5	(2)-4	....
	Brighton and Guapo	Quarry	23	6	....
NATURAL GAS LINES:					
Trinidad Leaseholds, Ltd.	Forest Reserve	Pointe-à-Pierre	16	12	1948
Trinidad Pet. Dev. Co., Ltd.	Coora	Los Bajos	6	(1)-8; (1)-6	1938
REFINED PRODUCTS LINES:					
Apex (Trinidad) Oilfields, Ltd.	Fyzabad	Point Fortin	12	2	1930

Refineries of Trinidad

COMPANY	Loaction of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery
General Asphalt Co.	La Brea	1,000	None	Asphalt
Trinidad Leaseholds, Ltd.	Pointe-à-Pierre	70,000	35,000	Crude distillation, Cracking
Trinidad Pet. Dev., Ltd.	Brighton	1,300	None	Skimming
United British Oilfields of Trinidad, Ltd.	Point Fortin	30,000	None	Skimming, Asphalt

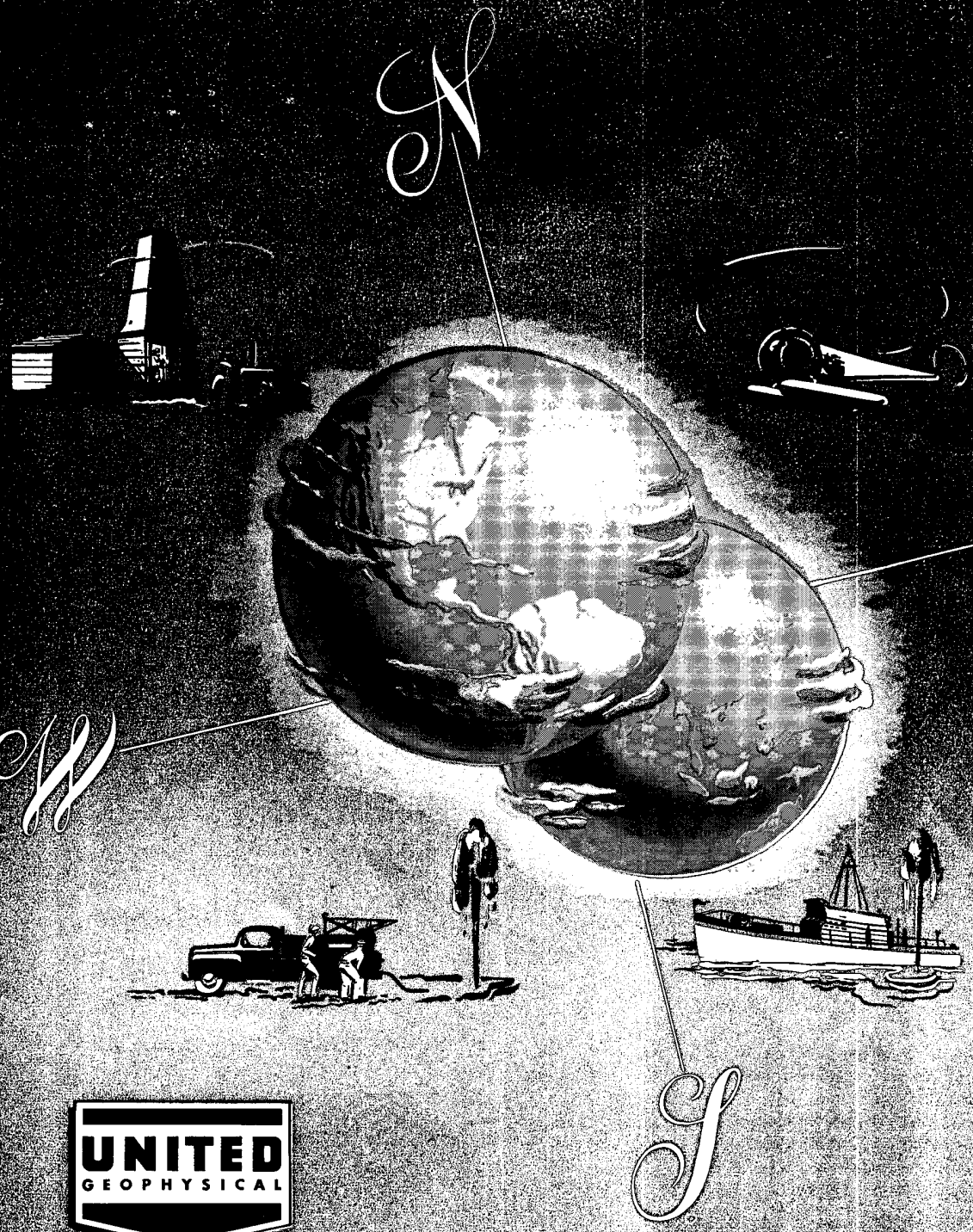
Drilling in Trinidad

FIELD	WELLS COMPLETED IN 1949					WELLS COMPLETED IN 1950					Wells Drilling End of 1950
	Oil	Gas	Dry	Total Wells	Total Footage	Oil	Gas	Dry	Total Wells	Total Footage	
Barrackpore	1	....	....	1	3,905	2	....	1	3	13,335	2
Brighton-Vessigny	10	....	1	11	57,574	14	2	....	16	60,571	2
Coora	8	....	....	8	33,946	3	....	....	3	13,813	..
Cruse	....	....	....	....	....	1	....	....	1	2,416	..
Erin	1	....	....	1	5,014	....	....	....	....	....	..
Forest Reserve	24	1	....	25	91,273	28	....	2	30	117,183	4
Fyzabad	12	....	1	13	39,105	8	....	1	9	47,299	1
Guapo	6	....	....	6	23,440	10	....	1	11	45,402	1
Guayaguayare & Maloney	....	....	1	1	3,217	....	....	....	....	....	..
Mackenzie	....	....	....	....	....	1	....	....	1	7,117	..
Morne Diablo	1	....	....	1	10,850	....	....	....	....	....	1
Palo Seco	9	....	....	9	40,154	11	....	....	11	63,428	3
Penal	14	....	1	15	57,887	12	....	1	13	49,305	1
Point Fortin	17	....	3	20	79,511	14	....	3	17	65,428	2
Quarry	19	....	2	21	81,148	16	1	3	20	68,671	3
Quinam	....	....	....	....	....	2	....	....	2	3,102	..
San Francique	....	....	1	1	1,200	....	....	....	....	....	..
Siparia Syncline	2	....	....	2	16,437	1	....	2	3	16,955	2
Wilson	4	....	....	4	10,796	....	....	....	....	....	..
Wildcats	1	....	4	5	32,343	2	....	2	4	29,994	1
Total	129	1	14	144	587,800	125	3	16	144	604,019	23

Oil Production in Trinidad

FIELD	Operating Company	Year of Discovery	PRODUCING WELLS END OF 1950 Flowing	Art. Lift	Total	CRUDE OIL PRODUCTION (Barrels) Daily End of 1950	Year 1949	Year 1950	Cumulative Through 1950
Brrackpore	Trinidad Leaseholds, Ltd.	1918	13	33	46	1,331	539,144	486,086	7,988,240
Brighton-Vessigny	Antilles Petroleum Co. (Trinidad), Ltd.	1909	36	59	95	2,228	635,019	578,936	8,083,839
Coora	Trinidad Pet. Development Co., Ltd.	1936	40	68	108	2,693	1,088,421	932,338	17,270,449
Cruse	Trinidad Leaseholds, Ltd.	1913	20	85	105	2,107	793,762	769,325	16,504,309
Erin	Trinidad Pet. Development Co., Ltd.	1948	1	....	1	30	3,320	20,235	29,551
Forest Reserve	Trinidad Leaseholds, Ltd.	1914	124	276	400	14,269	5,189,025	5,208,539	101,232,341
Fyzabad	Apex (Trinidad) Oilfields, Ltd.	1920	30	226	256	5,100	1,935,500	1,925,100	78,932,700
Guapo	Kern Trinidad Oilfields, Ltd.	1912	34	96	130	1,700	447,034	549,351	14,804,342
Guayaguayare & Maloney	Trinidad Leaseholds, Ltd.	1902	11	60	71	986	338,778	359,915	9,281,216
Los Bajos	Trinidad Pet. Development Co., Ltd.	1937	....	13	13	126	101,420	80,461	3,136,120
Mackenzie	Trinidad Pet. Development Co., Ltd.	1949	1	1	2	89	15,215	42,330	57,624
Mandingo	Trinidad Pet. Developemnt Co., Ltd.	1948	1	....	1	11	6,011	3,234	13,048
Morne Diablo	Trinidad Leaseholds, Ltd.	1936	3	19	22	314	121,360	114,810	2,459,040
New Dome	United British Oilfields of Trinidad, Ltd.	n.a.	....	9	9	85	32,831	31,501	2,342,061
Palo Seco	Trinidad Leaseholds, Ltd.; Trinidad Pet. Development Co., Ltd.	1926	40	122	162	3,206	744,141	1,010,042	23,347,608
Penal	United British Oilfields of Trinidad, Ltd.	1935	36	71	107	6,245	2,356,739	2,288,220	17,839,993
Point Fortin*	United British Oilfields of Trinidad, Ltd.	1908	171	142	313	8,458	3,043,211	3,076,369	62,935,910
Quarry	Apex (Trinidad) Oilfilelds, Ltd.; Trinidad Pet. Dev. Co., Ltd.	1938	57	75	132	4,370	1,518,299	1,630,073	17,732,162
Quinam	Trinidad Leaseholds, Ltd.	1936	4	10	14	280	111,703	102,374	1,405,383
San Francique	United British Oilfields of Trinidad, Ltd.	1922	....	18	18	233	95,456	88,237	4,816,656
Siparia Syncline	Apex (Trinidad) Oilfields, Ltd.	1945	8	....	8	1,800	431,600	534,000	1,497,300
Wilson	Trinidad Leaseholds, Ltd.	1918	5	35	40	1,116	466,264	407,460	4,002,150
Abandoned Fields		....	....	....	....	....	.....	.....	4,853,537
Total		....	635	1,418	2,053	56,777	20,014,753	20,238,936	400,565,579

* Point Fortin includes Los Bajos production for 1950 (8,149 bbls.), Los Bajos cumulative to 1950 (388,686 bbls.), Cedros cumulative to 1950 (56,121 bbls.)



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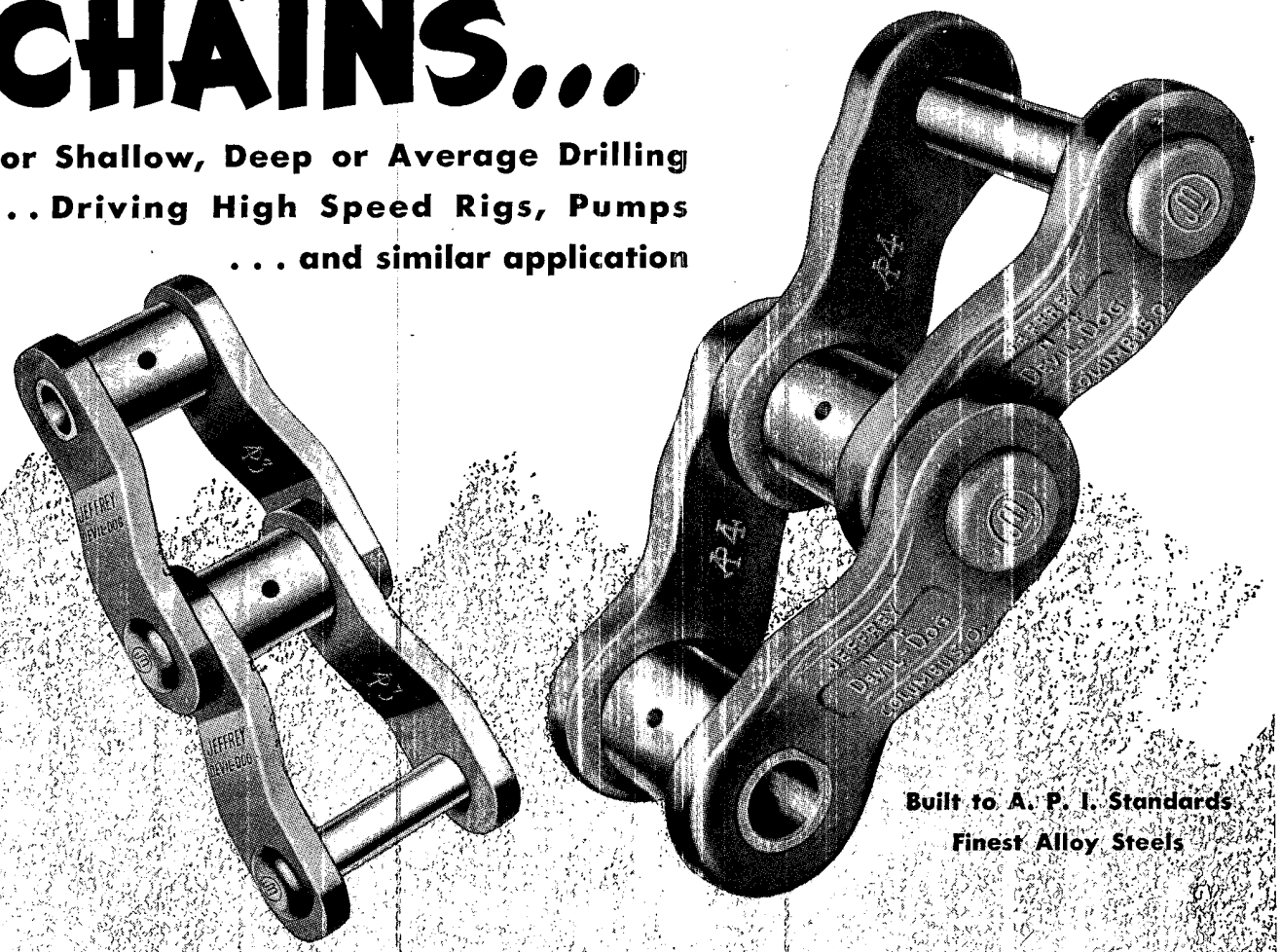

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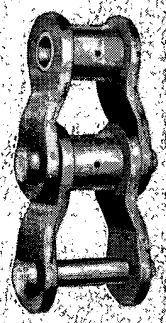

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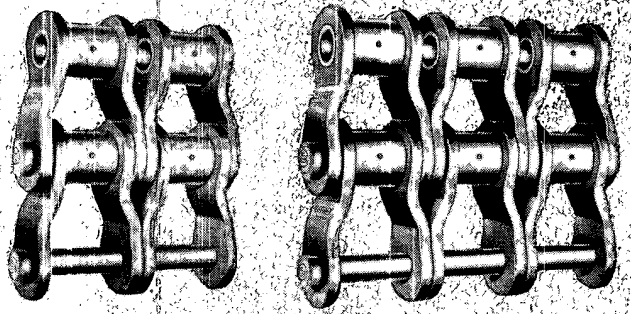

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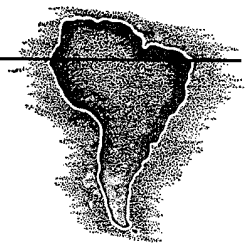


Well Finaled on Argentina Side of Tierra del Fuego; New Gasser to Be Connected into Buenos Aires Line

YACIMIENTOS Petroliferos Fiscales, the Argentine Government oil agency, climaxed in 1950 the discovery of the first oil production on the Argentina side of Tierra del Fuego at the tip of the South American Continent.

YPF said it brought in a well at 6690 feet which produced about 62 barrels daily. An official Buenos Aires statement released in 1950 attributed considerable importance to the discovery and described it as a further step towards attainment of self-sufficiency in petroleum while augmenting Argentina's reserves. No further details on the discovery were issued.

Additional information was made available during the year on other YPF exploration.

A well producing about 21,200,000 cubic feet daily of natural gas was completed in the Canodon Seco area of Comodoro Rivadavia, the major producing area of Argentina. The well was to be connected into the 1100-mile gas pipe line to Buenos Aires.

YPF completed a well at Plaza Huincul field good for 25 barrels a day, and a gas well with a production of about 350,000 cubic feet daily. The Ministry of Commerce and Industry announced in Buenos Aires that YPF had completed five wells with a total production averaging 102 barrels daily and, in addition, five gas wells for a total output of 31,590,000 cubic feet daily.

Diadema Argentina S. A. de Petroleo up to June 30, 1950, had completed 14 wells for the year, one of which was a dry hole. Two wells were operating at the end of June. Diadema Argentina produced 1,774,800 barrels of crude in the first six months.

Ministry of Commerce additionally reported that YPF discovered a new oil pool at 7500 feet in the Punta Piedras

Argentina Crude Oil Production by Regions, YPF and Private Companies, for Recent Years

YEAR	GOBERNACIÓN MILITAR COMODORO RIVADAVIA		NEUQUÉN		SALTA		MENDOZA		TOTAL		Grand Total
	YPF	Private[1]	YPF	Private[2]	YPF	Private[2]	YPF	Prviate[3]	YPF	Private	
Prior to 1944	137,499,041	100,289,709	10,724,155	10,975,559	6,514,912	16,636,947	12,604,982	319,236	167,343,090	128,221,451	295,564,541
1944	10,226,615	6,875,895	1,923,249	445,005	961,366	682,081	3,094,396	21,292	16,205,626	8,024,273	24,229,899
1945	9,722,422	6,411,096	1,964,141	382,061	665,281	618,949	3,102,020	14,999	15,453,864	7,427,105	22,880,969
1946	8,747,176	5,680,285	1,936,628	343,962	466,586	556,074	3,063,475	8,214	14,213,865	6,588,535	20,802,400
1947	9,913,889	5,789,870	2,024,889	295,039	471,436	494,388	2,847,540	8,800	15,257,754	6,588,097	21,845,851
1948	10,532,228	5,781,416	2,429,902	304,801	503,464	513,835	3,178,318	8,762	16,643,912	6,608,814	23,252,726
1949	10,075,102	5,618,867	2,442,155	250,512	434,111	482,858	3,277,442	8,553	16,234,301	6,360,918	22,595,219

[1] Astra, Diadema, and Ferrocarrilera. [2] Standard. [3] El Sosneado.

Oil Production and Producing Wells in Argentina

(1950 data not available)

PROVINCE and FIELD	COMPANY	Year of Discovery	PRODUCING OIL WELLS END OF 1949			CRUDE OIL PRODUCTION—(Barrels)			
			Flowing	Art. Lift	Total	Daily End of 1949	Year 1948	Year 1949	Cumulative Through 1949
GOBERNACIÓN MILITAR COMODORO RIVADAVIA:									
Astra	Astra Cía Argentina de Petróleo	1914	....	253	253	3,472	1,264,743	1,263,743	26,343,583
Comodoro Rivadavia	Yacimientos Petroliferos Fiscales (Y.P.F.)	1904	n.a.	n.a.	n.a.	25,235	9,604,151	9,183,450	194,895,861[1]
Cañodón Seco	Y. P. F.	1945	n.a.	n.a.	n.a.	2,706	928,077	892,000	1,820,077[2]
Jose Segundo	Cía. Ferrocarrilera de Petróleo	1922	....	16	16	57	34,562	29,318	703,354
Manantiales Rosales	Cía. Ferrocarrilera de Petróleo	1922	....	116	116	554	230,057	209,199	7,972,323
Kilómetro 8	Cía. Ferrocarrilera de Petróleo	1915	....	242	242	825	334,102	266,344	25,898,974
Kilómetro 27	Diadema Argentina S. A. de Petróleo	1925	....	433	433	9,830	3,682,407	3,630,000	70,949,600
Reserva	Cía. Ferrocarrilera de Petróleo	1928	....	2	2	6	4,429	3,176	139,638
Sindicato	Cía. Ferrocarrilera de Petróleo	1928	....	34	34	175	76,665	63,724	1,161,562
Solano	Cía. Ferrocarrilera de Petróleo	1924	....	87	87	430	154,451	153,363	3,256,113
MENDOZA:									
El Sosneado	Cía. Río Autel "El Sosneado	1926	....	19	19	.....	8,762	8,567	390,943
Mendoza (Barrancas and Lunlunta)	Y. P. F.	1938							
Tupungata	Y. P. F.	1933	n.a.	n.a.	n.a.	9,505	3,178,318	3,277,442	31,164,261
GOBERNACIÓN DE NEUQUÉN:									
Dadin	Standard Oil Co. S. A. Argentina	1925	....	25	25	301	109,207	109,080	8,166,932
Plaza Huincul	Standard Oil Co. S. A. Argentina	1924	6	43	49	357	195,594	141,434	4,831,019
Plaza Huincul	Y. P. F.	1924							
Challacó	Y. P. F.	1940	n.a.	n.a.	n.a.	7,133	2,429,902	2,442,155	23,815,138
SALTA:									
Agua Blanca	Standard Oil Co. S. A. Argentina	1926	....	3	3	60	26,677	22,889	1,328,185
Cerro Tartagal	Standard Oil Co. S. A. Argentina	1927	....	2	2	10	10,977	9,628	114,689
Lomitas	Standard Oil Co. S. A. Argentina	1927	....	25	25	168	73,205	62,946	3,491,415
Ramos	Standard Oil Co. S. A. Argentina	1937	....	2	2	17	7,031	6,253	77,851
San Pedro	Standard Oil Co. S. A. Argentina	1928	1	23	24	1,038	395,945	381,145	14,972,972
Río Pescado	Y. P. F.	1933							
Tranquitas	Y. P. F.	1928	n.a.	n.a.	n.a.	1,291	503,464	434,111	10,017,008
Vespucio	Y. P. F.	1928							
Total	.....	....	7	1,325	1,332	63,170	23,252,726	22,589,967	431,511,498

n.a.—Not available. [1] Includes production Cañodón Seco, 1945-1947. [2] 1948 and 1949.

oil field in the Minitary Zone of Comodora Rivadavia.

In 1950 an American-owned refinery with a 6000-barrel daily capacity was shut down as a result of the foreign-exchange difficulties. The plant, jointly owned by Socony-Vacuum Oil Company, Inc., and The Texas Company, has been operated by Uutramar, S. A., Petrolera Argen-

Drilling in Argentina

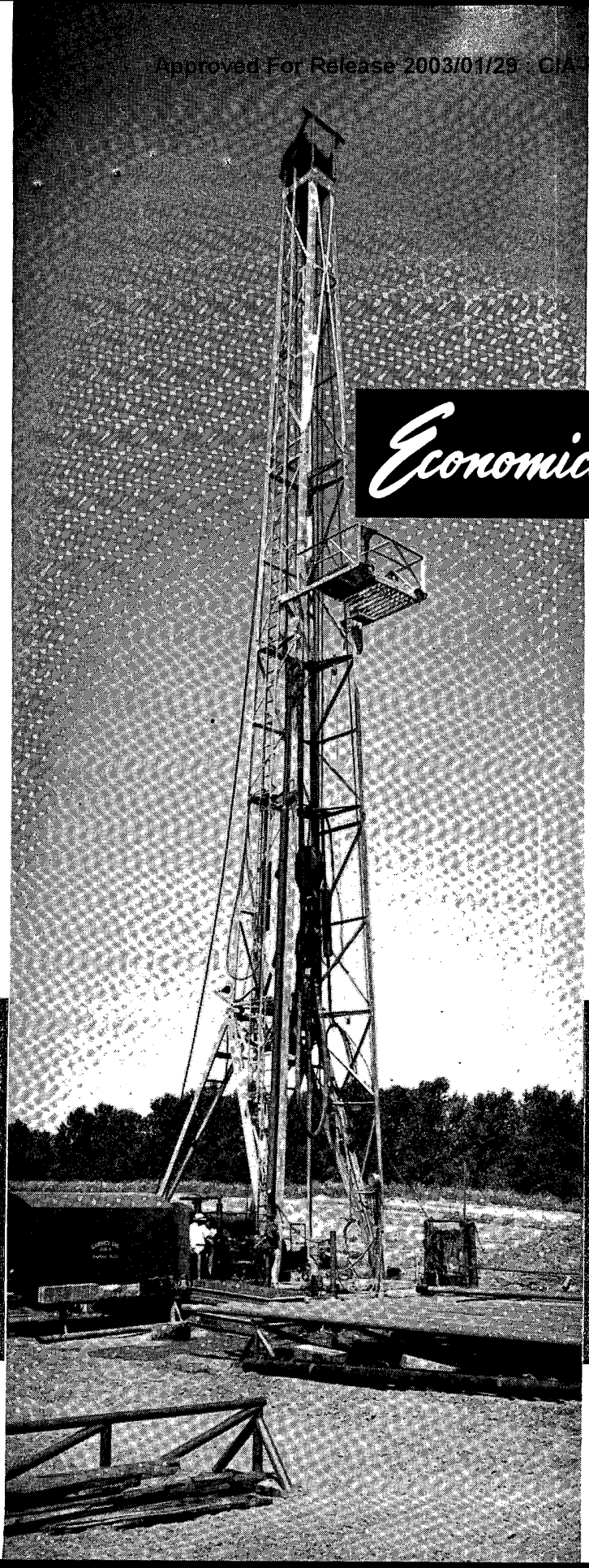
(1950 data not available)

PROVINCE and FIELD	COMPANY	WELLS COMPLETED IN 1948					WELLS COMPLETED IN 1949					Wells Drilling End of 1949
					TOTAL					TOTAL		
		Oil	Gas	Dry	Wells	Footage	Oil	Gas	Dry	Wells	Footage	
GOBERNACIÓN MILITAR COMODORO RIVADAVIA:												
Astra	Astra Cía. Argentina de Petróleo	12	..	3	15	71,759	13	..	..	13	54,866	2
Kilómetro 8	Cía. Ferrocarrilera de Petróleo	2	1	..	3	4,904	..	2	..	2	3,980	..
Kilómetro 27	Diadema Argentina S. A. de Petróleo	26	..	2	28	107,352	23	..	1	24	89,664	2
Manantiales Rosales	Cía Ferrocarrilera de Petróleo	6	..	..	6	10,729	3	..	..	3	12,760	..
Salamanca	Cía. Ferrocarrilera de Petróleo	..	1	..	1	1,264	..	1	..	1	1,522	..
Solano	Cía. Ferrocarrilera de Petróleo	11	1	2	14	29,180	10	..	3	13	24,476	..
Wildcats	Astra Cía. Argentina de Petróleo	..	..	..	..	.....	1	..	..	1	5,970	..
	Yacimientos Petrolíferos Fiscales (Y.P.F.)	..	..	..	..	.....	9	1	n.a.	n.a.	n.a.	n.a.
MENDOZA:												
El Sosneado	Cía. Río Autel "El Sosneado"	..	..	4	4	2,287	..	..	..	..	.....	..
Wildcats	Y. P. F.	..	..	..	..	.....	n.a.	n.a.	n.a.	3	n.a.	n.a.
NEUQUÉN:												
Plaza Huincul	Standard Oil Co. S. A. Argentina	..	1	..	1	3,018	..	..	..	..	.....	1
Plaza Huincul	Y. P. F.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Challacó	Y. P. F.	..	..	..	..	.....	1	..	..	1	3,630	n.a.
Wildcats												
ALTA:												
San Pedro	Standard Oil Co. S. A. Argentina	1	..	..	1	2,943	2	1	..	3	4,011	1
Río Pescado	Y. P. F.	..	..	1	1	4,614	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tranquitas	Y. P. F.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Vespucio												
SANTA CRUZ:												
La Esperanza	Y. P. F.	..	..	..	..	.....	n.a.	n.a.	n.a.	1	n.a.	n.a.
TIERRA DEL FUEGO:												
Rio Grande	Y. P. F.	..	..	..	..	.....	..	1	..	1	6,435	..
Total		58	4	12	74	238,050	62	6	4	76	207,314	6

n.a.—Not available.

Engineering and Geological Data on Argentina

PROVINCE and FIELD	Est. Proved Area (Acres)	Gravity Oil (API)	PRODUCING FORMATION			Minimum to Top of Pay	Maximum to Bottom of Pay	Average Thickness of Pay (Feet)	Type Structure
			Local Name	Kind	Geologic Age				
GOBERNACIÓN MILITAR COMODORO RIVADAVIA:									
Astra	2,965	22	Glauconitico	Sand	Upper Cretaceous	1740	3280	50	Faulted Anticline
Campamento Sud	300	20	Glauconitico	Sand	Upper Cretaceous	1917	2300	26	Anticline
Cañodón Seco	4,000	30	.....	Sand	Jurassic	4085	5612	10	Faulted Anticline
Col. Sarmiento	20	23	Glauconitico	Sand	Upper Cretaceous	2310	2640	26	Faulted Anticline
Costa	13,840	20	Glauconitico	Sand	Upper Cretaceous	1815	2805	30	Faulted Anticline
El Trébol	14,500	23	Glauconitico	Sand	Upper Cretaceous	3878	5960	33	Fualted Anticline
Escalante	18,640	23	Glauconitico	Sand	Upper Cretaceous	2260	4290	33	Faulted Anticline
José Segundo	90	16	Lignitifero	Sand	Lower Cretaceous	2300	3970	30	Faulted Anticline
Kilometro 8	3,900	19	Glauconitico	Sand	Lower Cretaceous	1675	1965	50	Anticline
Kilometro 27	9,975	24	Chubutiano	Sand	Upper Cretaceous	3088	3372	..	Anticline
Manantiales Rosales	2,400	19	Glauconitico	Sand	Lower Cretaceous	1975	3900	26	Faulted Anticline
Reserva	75	18	Continental	Sand	Lower Cretaceous	1750	1985	15	Anticline
Sindicato	415	18	Glauconitico	Sand	Upper Cretaceous	2965	3030	15	Anticline
Solano	5,000	20	Glauconitico	Sand	Lower Cretaceous	1540	2920	35	Faulted Anticline
MENDOZA:									
Cacheuta	700	31	Victor "C" & Potrerillos	Sand	Triassic	1940	3080	13	Monocline
Lunlunta (Barrancas)	1,446	28	Potrerillos Tillita	Sand	Triassic	7720	7890	45	Anticline
Sosneado	150	13	Victor	Sand	Triassic	544	551	..	Monocline
Tupungato	645	30	Victor	Sand	Triassic	5870	6310	69	Anticline
NEUQUÉN:									
Bajo de los Baguales	300	38	Dogger	Sand	Jurassic	3383	3386	20	Monocline
Centro Octógono	150	32	Dogger	Sand	Jurassic	1880	1950	40	Monocline
Challacó	1,688	22	Dogger	Sand	Jurassic	3300	3425	66	Faulted Anticline
Dadín	325	33	Dogger	Sand	Jurassic	1990	2320	40	Lenses
Laguna Colorado	750	33	Dogger	Sand	Jurassic	2450	2610	56	Monocline
Oeste Octógono	1,800	31	Dogger	Sand	Jurassic	2300	2365	33	Monocline
Plaza Huincul	2,157	30	Dogger	Sand	Jurassic	2200	2500	26	Anticline
SALTA:									
Agua Blanca	49	21	Tarija	Sand	Permian	2300	3600	33	Lenses
Lomitas	576	44	Tarija	Lime	Permian	.....	2185	..	Anticline
Ramos	30	51	Devonico	Sand	Devonian	2900	3930	30	Faulted Anticline
Rio Pescado	62	49	Terciario	Sand	Tertiary	4175	4376	103	Anticline
San Pedro	504	45	Tarija Tupambi	Sand	Permian	1800	3300	60	Anticline
Tartagal	40	42	Escarpment Tarija Devonico	Limestone, Sand	Permian	.....	2350	..	Anticline
Tranquitas	3,053	..	Gondwana	Lime	Permian	1950	2350	200	Faulted Anticline



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tina at Dock Sud in Buenos Aires. At the time of the shutdown, the refinery was the only instance of a complete closing directly attributable to the foreign exchange problem, an example of the damaging effects of the world currency restrictions of the U. S. foreign oil interests. The shutdown resulted from the failure of the Argentine officials to grant additional dollar allocations for purchase of suitable crude. The refinery was equipped to run on sweet crudes only.

Available Argentina figures show that 76 wells were completed in 1950, with 62 oil producers, six gas wells and four dry holes. Seventy-four wells were drilled in 1949, of which 58 produced crude, four produced gas and 12 were failures.

Refineries of Argentina

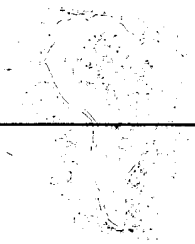
COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery
Cía. Nativa de Petróleos	Campana	17,600	8,000	Complete
	Galvan	5,000	1,850	Skim-Crack
Diadema Argentina S.A. de Petroleo (B.P.M. Shell)	Dock Sud (Avellaneda)	13,800	8,000	Skim-Crack
Condor S.A. Petroleum Argentina	Lomas de Zamora (Buenos Aires) (Building)	1,000	None	Skim-Lube
Lottero Papini	Avellaneda (Buenos Aires)	950	None	Skim-Lube
Cía. "La Isaura" S.A.	Loma Paraguaya (Bahia Blanca)	1,900	None	Skimming
Standard Oil Co. S.A., Argentina	Manuel Elordi	1,100	None	Skimming
	Plaza Huincul	330	None	Skimming
Ultramar S.A. Petrolera, Argentina	Dock Sud (Buenos Aires)	5,000	2,850	Complete
Cía. General de Asfaltos	Wilde (Buenos Aires)	800	None	Skim-Lube
Cía. Ferrocarrilera de Petróleo	Comodoro Rivadavia	6,300	2,000	Skim-Crack
S.A. Com é Ind "Ragor"	Quilmes (Buenos Aires)	500	None	Skim-Lube
Yacimientos Petroliferos Fiscales	La Plata	71,000	24,200	Complete
	San Lorenzo	18,000	None	Comb. Unit
	Lujan de Cuyo	3,800	1,000	Comb. Unit
	Chachapoyas	2,100	None	Comb. Unit
	Plaza Huincul	1,130	504	Skim-Crack
	Buenos Aires	28,000	.....	Comb. Unit Asphalt

Pipe Lines of Argentina

AREA and COMPANY	Origin	Terminus	Length (Miles)	Diameter (Ins.)	Capacity of Line (Bbls. Daily)
CRUDE LINES:					
Gobernación Militar					
Comodoro Rivadavia:					
YPF	El Tordillo	El Trebol	3.7	8	15,725
	El Trébol	Escalante	6.8	8	18,870
	Escalante	Cañadón Perdido	8.9	8–10	22,000
	Cañadón Perdido	Kilómetro 9	5.8	7–8 9–10	28,300
	Cañadón Seco	Caleta Olivia	11	6	6,000
	Kilómetro 9	Caleta Córdova	6	8	25,160
	Kilómetro 9	Kilómetro 5	3.5	9–10	25,160
	Kilómetro 5	Kilómetro 3	2.3	8–10	25,160
	Campamento Sur	Kilómetro 3	2.7	5	6,290
	Manantiales Behr	C. Perdido	8.9	6–8	12,580
Astra	Field	C. Córdova	4.8	8	22,680
	Kilómetro 23	Field	9.3	6	12,580
Diadema	Kilómetro 27	Caleta Olivares	13.6	6	15,750
Ferrocarrilera	Manantiales Rosales	Kilómetro 8	7.5	6	12,580
	Kilómetro 8	C. Córdova	4.7	8	12,580
	Kilómetro 8	Kilómetro 3	3.7	6	12,580
	Mina Solano	Kilómetro 8	18.6	6	12,580
Neuquén:					
YPF	Field	Est. Challacó	3.9	4–6	9,400
Standard Oil Co.	Huincul	Dadin	7	3–6	2,000
	Dadin	Challacó	9	3–4	4,800
Mendoza:					
YPF	Tupungato	Est. Anchoris	10.4	8	18,870
	Barrancas	Agrelo	9.3	3–4	3,100
Salta:					
YPF	Río Pescado	Oran	16.8	4	3,775
	Tranquitas	Vespucio	3.7	3	1,885
Standard Oil Co.	Agua Blanca	Elordi	41.5	3	1,195
	San Pedro	Lomitas	16.3	4	3,900
	Lomitas	Vespucio	3.8	4	5,150
	Vespucio	Hickman	46	4–5–6	5,000
	Hickman	Elordi	37	4	2,500
	Ramos	Aguay	19	1½	240
NATURAL GAS LINES:					
Gobernación Militar					
Comodoro Rivadavia:					
Dirección General del Gas del Estado	Comodoro Rivadavia	Buenos Aires	1000	10	35 Mmcf
	Tupungato	Mendoza	37.2	3–4	.....
	La Plata	Buenos Aires	37.2	6	.....
	Kilómetro 27 (Building)	Kilómetro 12	16	10	5 Mmcf
	Cañadón Seco (Building)	Kilómetro 12	65	10	n.a.

n.a.—Not available.

BOLIVIA



Legislation Provides for Mixed-Company Operations; Oil Area Discovered on Structure Near Sanandita Field

DROPPING 66,000 barrels below its 1949 production, Bolivia in 1950 produced 616,000 barrels of crude. Production declined 40,000 barrels in the Department of Santa Cruz and 26,000 barrels in the Department of Tariji. Five new wells were brought in during the year, one of which was a wildcat. Four wells were being drilled as the year ended.

A new oil field was discovered, called Los Monos, in a structure north of the Sanandita field in the Department of Tariji. Although no production tests were made in 1950, estimates placed the production of the new well at approximately 300 barrels daily.

Initial arrangements were made during the year for more extensive exploitation of proven fields in an effort to raise the 1951 output to a million barrels.

Legislation was approved providing for the first mixed-company operations which have been allowed since Standard Oil Company (N. J.) properties were taken over in 1937 by Yacimientos Petroliferos Fiscales Bolivianos, the state oil agency.

In a move to attract private foreign capital into Bolivia, the new law provided that the policy of reserving

Drilling in Bolivia

Department and Field	WELLS COMPLETED IN 1949				WELLS COMPLETED IN 1950				Wells Drilling End of 1950
	Oil	Dry	Total Wells	Total Footage	Oil	Dry	Total Wells	Total Footage	
SANTA CRUZ:									
Busch	..	1	1	3,996	..	..	..	.....	..
Camiri	2	..	2	5,466	4	..	4	13,600	4
Guayruy	..	1	1	2,443					
TARIJA:									
Sanandita	1	..	1	2,351	..	..	..	.....	..
Wildcats	..	..	..	.....	1	..	1	2,900	..
Total	3	2	5	14,256	5	..	5	16,500	4

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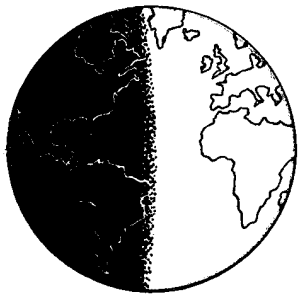

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oil fields no longer extended to such zones as Caupolican and Iturralde and others in the Departments of La Paz, Cochabamba, Beni and Pando.

Pipe Lines of Bolivia

COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Capacity (Barrels Daily)	Year Completed
Yacimientos Petroliferos Fiscales Bolivianos (Y.P.F.B.)..	Camiri	Cochabamba	327	6	6,000	1949
	Lamboyo (Tapirani)	Sucre	44	4 & 6	6,000	1948

Refineries of Bolivia

COMPANY	Location	Charging Capacity (Barrels Daily)	Daily Crude Runs End Of 1950 (Barrels)	Type of Refinery
Yacimientos Petroliferos Fiscales Bolivianos (Y.P.F.B.).....	Camiri	1,447	1,200	Topping
	Mesa Verde (Sucre)	3,000	1,000	Topping
	Sanandita	944	208	Topping
	Valle Hermoso (Cochabamba)	5,000	....	Reforming

Bolivia Oil Production and Geological Data

DEPARTMENT and FIELD	Year of Discovery	PRODUCING WELLS END OF 1950			CRUDE OIL PRODUCION (Barrels)				Proved Area (Acres)	Gravity of Oil (API)	Formation, Name and Kind	Geologic Age	DEPTH (Feet)		Type o Structure
		Flowing	Art. Lift	Total	Daily End of 1950	Year 1949	Year 1950	Cumulative Through 1950					Min. to Top of Pay	Max. to Bottom of Pay	
CHUQUISACA:															
Buena Vista.....	n.a.	..	..	..	.....	.....	Inactive	n.a	1475	43.5	Sand	Devonian	n.a.	3165	Elongated Dome
Caigua.....	n.a.	..	..	..	.....	.....	Inactive	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	Anticline
Camatindi.....	1928	..	..	..	.....	.....	Inactive	11,876	1120	41.5	Sand	Devonian	2350	4300	Faulted Anticline
SANTA CRUZ:															
Camiri-Guayruy	1927	13	3	16	1,330	520,000	480,000	2,820,000	102	54	Devonian, Sandstone	Devonian	1800	2500	Anticline
Saipuru.....	n.a.	..	..	..	.....	.....	Inactive	n.a.	740	40	Sand	Devonian	500	n.a.	Anticline
TARIJA:															
Bermejo.....	1924	1	5	6	378	162,000	136,000	2,700,000	62	26	Tupambi, Lenses	Permo-Triassic	n.a.	n.a.	Anticline
Sanandita.....	1926	..	10	10					89	43	Tupambi, Lenses	Permo-Triassic	n.a.	n.a.	Anticline
Total.....	.....	14	18	32	1,708	682,000	616,000	5,531,876	....	....	.....	.....	....	....	.....

Note: All fields operated by Yacimientos Petroliferos Fiscales Bolivianos.
n.a.—Not available.

BRAZIL

Production, Development Continue at Quickened Pace; Private Foreign Capital Investments May Be Invited

CRUDE production and development activity in Brazil continued at a quickening pace during 1950. Production rose from 112,527 barrels in 1949 to 338,675 barrels, a marked gain of 226,148. Thirty new wells were completed in 1950, as compared to 17 in 1949. Of the 30 new wells, 24 were crude producers, 2 were gas wells, and 4 were dry holes. Two exploratory tests were failures. At the close of the year, four wells were being drilled.

Two new oil fields were discovered in Bahia State—the Almas field situated midway between the Candeias and Aratu fields, where the first well drilled had an estimated potential of 1,000 barrels daily; and the Catu field in the northern part of the state, where the initial well was expected to flow approximately 300 barrels daily.

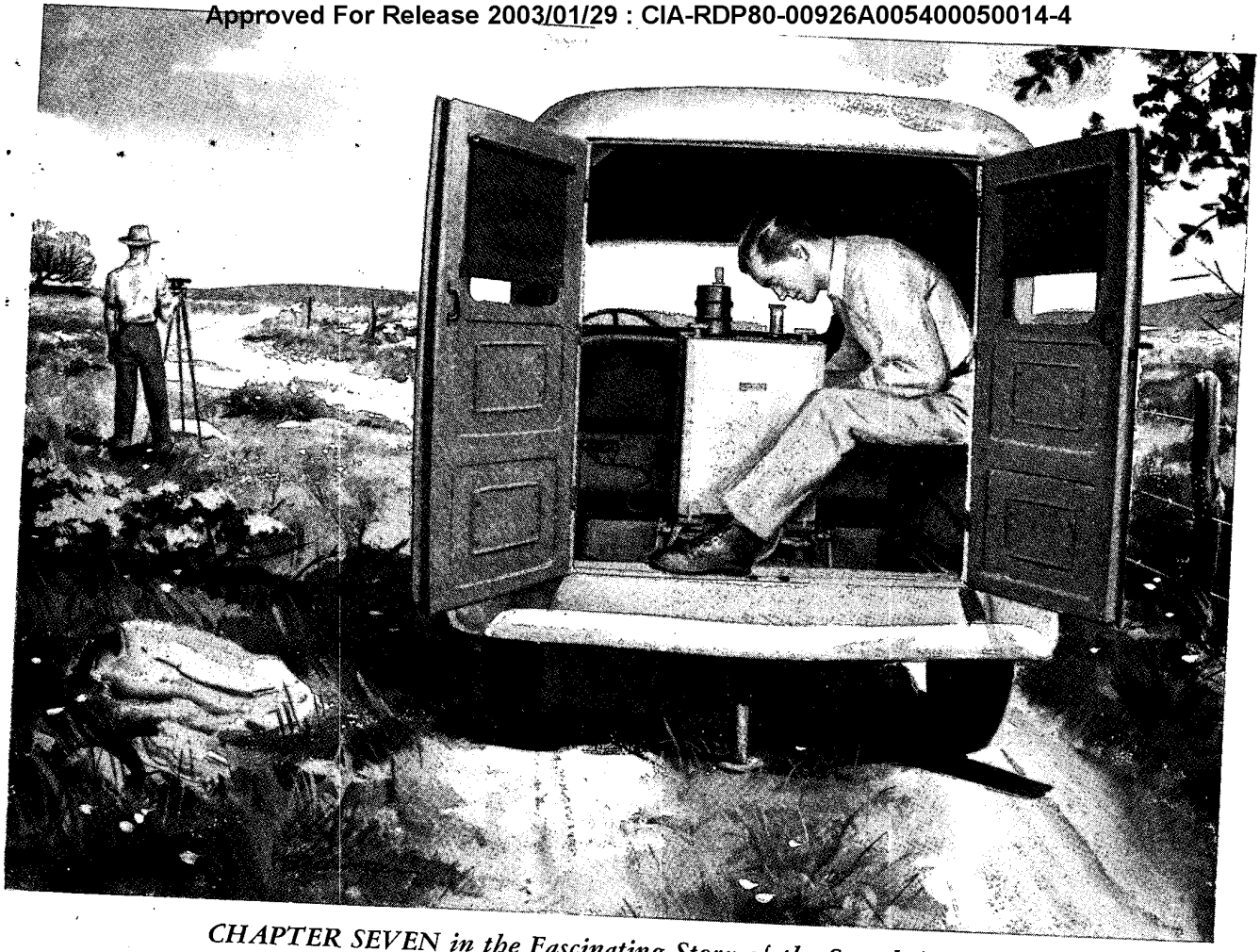
Near the town of Belem, at the mouth of the Amazon River, a wildcat was drilling below 9000 feet. A projected depth of 15,000 feet was scheduled, if necessary. This drilling site is on the eastern border of the principal area of oil interest in Brazil—a vast basin which extends from the mouth of the Amazon River inland 1000 miles, almost to the border of Colombia.

During the year, plans were in the making for two

Brazil Oil Production and Geological Data

STATE and FIELD	Year of Discovery	PRODUCING WELLS END OF 1950			CRUDE OIL PRODUCTION (Barrels)				Proved Area (Acres)	Gravity of Oil (API)	Formation Name and Kind	Geologic Age	DEPTH (Feet)		Avg. Thickness (Feet)	Type of Structure
		Flowing	Art. Lift	Total	Daily End of 1950	Year 1949	Year 1950	Cumulative Through 1950					Min. to Top of Pay	Max. to Bottom of Pay		
BAHIA:																
Aratú.....	1942	..	2	2	25	1,567	1,048	57,195	74	42	Santo Amaro, Sand	Cret.	1312	1968	66	Anticline
Candeias.....	1941	15	47	62	2,500	97,589	321,283	762,956	1200	26	Santo Amaro, Sand	Cret.	2461	3937	33	Anticline
Dom Joao.....	1947	..	32	32	n.a.	6,467	6,114	22,996	750	39	Santo Amaro, Sand	Cret.	886	1313	131	Anticline
Itaparica.....	1942	6	10	16	400	3,452	9,563	13,015	148	30	Santo Amaro, Sand	Cret.	1968	2461	33	Anticline
Lobato-Joanes.....	1939	..	2	2	40	3,452	667	72,133	30	35	Santo Amaro, Sand	Cret.	1312	1706	82	Faults
Pitanga.....	1945	..	..	..	....	.....	Inactive	401	n.a.	26	Santo Amaro, Sand	Cret.	4865	n.a.	8	Anticline
Total.....	....	21	93	114	2,965	112,527	338,675	928,696	.....	...	.....	....	....	....	....	.....

Note: All fields operated by Conselho Nacional de Petroleo. n.a.—Not available.



CHAPTER SEVEN in the Fascinating Story of the Search for Oil

In 1937 The gravimeter, which was placed in regular service in the United States in 1931, was widely used and generally recognized by 1935 as a superior exploration instrument. Its use increased rapidly and by 1937 the gravimeter had rendered the torsion balance practically obsolete. Many different types of gravimeters were developed and built during this period, and one that gained wide-spread usage was the Mott-Smith Gravimeter. This instrument consisted essentially of a horizontal quartz fiber carrying a horizontal weight arm which was connected to "labilizing" fiber which passed through the line of the horizontal fiber and attached to a spring. A small change in gravitational attraction on the weight arm produced a relatively large movement of it and of the index arm. This instrument, considered "quite small," weighed approximately 150 pounds. It was observed from a tripod which was let down through the floor of the truck. Thus, in general field operations, gravimeter stations were laid out along roads which could be reached by truck and the survey then consisted of lines of stations at intervals of ½ to 2 miles on roads that were approximately one to several miles apart.

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new widely-separated wildcats for 1951. The drilling sites were in the northern part of the country, in Maranhao State, and in the southern sector in Sao Paulo State, near the town of Guarehy.

The Mataripe refinery in the Candeias field in Bahai State was being doubled in capacity, from 2500 to 5000 barrels a day. At the port of Santos in Sao Paulo a refinery was under construction with a capacity of 45,000 barrels daily.

The development of these two refineries is a partial step toward the ultimate objective of transforming Brazil into a crude importer instead of a refined products importer, a change long desired by the government.

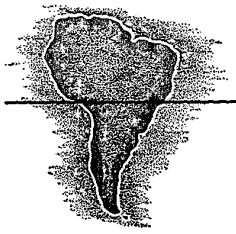
At the close of the year, Brazil's oil activities were being carried on by Conselho Nacional do Petrolea, a government entity, with some American companies engaged as consultants or contractual drillers. However, it was expected that the government might take steps to further facilitate private foreign capital investments on a joint venture basis with government funds.

Refineries of Brazil

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Type of Refinery	Operating Status
Conselho Nacional do Petroleo	Bahia	2,500	Crackling	Operating
Distilaria Rio Grandense	Rio Grande do Sul	500	.....	.....
Industria Matarazzo de Energia	São Paulo	1,000	Skimming	Operating
Ipiranga S. A. Ind. Brasileira de Petroleo	Rio Grande do Sul	1,000	Skimming	Operating
Refinaria e Exploracão de Petroleo Uniao S. A.	São Paulo	20,000	Cracking	Planned
Refinaria de Petroleo Distrito Federal S. A.	Distrito Federal	10,000	Cracking	Planned
Refinaria Nacional de Petroleo	Santos (São Paulo)	45,000	Cracking	Building

Drilling in Brazil

STATE and FIELD	WELLS COMPLETED IN 1949					WELLS COMPLETED IN 1950					Wells Drilling End of 1950
	Oil	Gas	Dry	Total Wells	Total Footage	Oil	Gas	Dry	Total Wells	Total Footage	
BAHIA:											
Aratú	..	..	..	..	.....	..	1	..	1	600	..
Candeias	8	..	1	9	33,700	9	1	1	11	44,300	1
Dom João	5	..	..	5	7,900	15	..	1	16	19,320	2
Wildcats	..	1	2	3	6,410	..	..	1	1	4,950	..
PARA:											
Wildcats	..	..	..	..	.....	..	..	..	..	.....	1
SERGIPE:											
Wildcats	..	..	..	..	.....	..	..	1	1	1,764	..
Total	13	1	3	17	48,010	24	2	4	30	70,934	4



CHILE

New Oil and New Outlet Bring Production Increase; Governmental Petroleum Authority Is Reorganized

CHILE's production increased more than ten-fold in 1950 under the stimulus of new oil and full use of a new outlet.

These developments were part of a stepped-up development campaign which, on the administrative side, included the organization of a new governmental authority, Empresa Nacional del Petroleo, S. A. (SNAP). The government's Corporacion de Fomento had been in charge of development of Chile's oil industry, which came into being late in 1945 but was stifled pending construction of an outlet. This was completed in 1949 in the form of a 42.5-mile, eight-inch pipe line from Cerro Manantiales field to a storage terminal at Calete Clarencia on Gente Grande Bay, Straights of Magellan. Output then moved up to nearly 2000 barrels per day, giving the country a total production of 55,280 barrels in 1949.

This total leaped to 630,950 barrels per day in 1950, with 586,680 barrels coming from Carro Manantiales and the remaining 44,270 from the new Cerro Sombrero field, 15 miles south of the Manantiales area.

Cerro Sombrero had seven operations during its first year and yielded three oil wells, an equal number of gas wells, and one dry hole. Late in the year it had a daily average crude production of 600 barrels from an average depth of 7200 feet.

Drilling in Chile

PROVINCE and FIELD	WELLS COMPLETED IN 1949					WELLS COMPLETED IN 1950					Wells Drilling End of 1950
	Oil	Gas	Dry	Total Wells	Total Footage	Oil	Gas	Dry	Total Wells	Total Footage	
MAGALLANES:											
Cerro Manantiales	5	1	5	11	82,965	4	1	2	7	52,460	..
Cerro Sombrero	..	..	..	..	.....	3	2	1	6	46,293	2
Wildcats	..	1	..	1	7,312	..	2	..	2	15,347	2
Total	5	2	5	12	90,277	7	5	3	15	14 100	4

Chile Oil Production and Geological Data

PROVINCE and FIELD	Year of Discovery	PRODUCING WELLS END OF 1950			CRUDE OIL PRODUCTION (Barrels)				Proved Area (Acres)	Gravity of Oil (API)	Formation Name and Kind	Geologic Age	DEPTH (Feet)		Avg. Thickness of Pay (Feet)	Type of Structure
		Flowing	Art. Lift	Total	Daily End of 1950	Year 1949	Year 1950	Cumulative Through 1950					Min. to Top of Pay	Max. to Bottom of Pay		
MAGALLANES:																
Cerro Manantiales	1945	13	5	18	1,300	55,280	586,680	641,960	750	42-45	Springhill, Sand	Cretaceous	7,350	7,550	65	Anticline
Cerro Sombrero	1950	2	...	2	585	.....	44,270	44,270	...	40-42	Springhill, Sand	Cretaceous	7,200	7,500	60	Anticline
Total	..	15	5	20	1,885	55,280	630,950	686,230								

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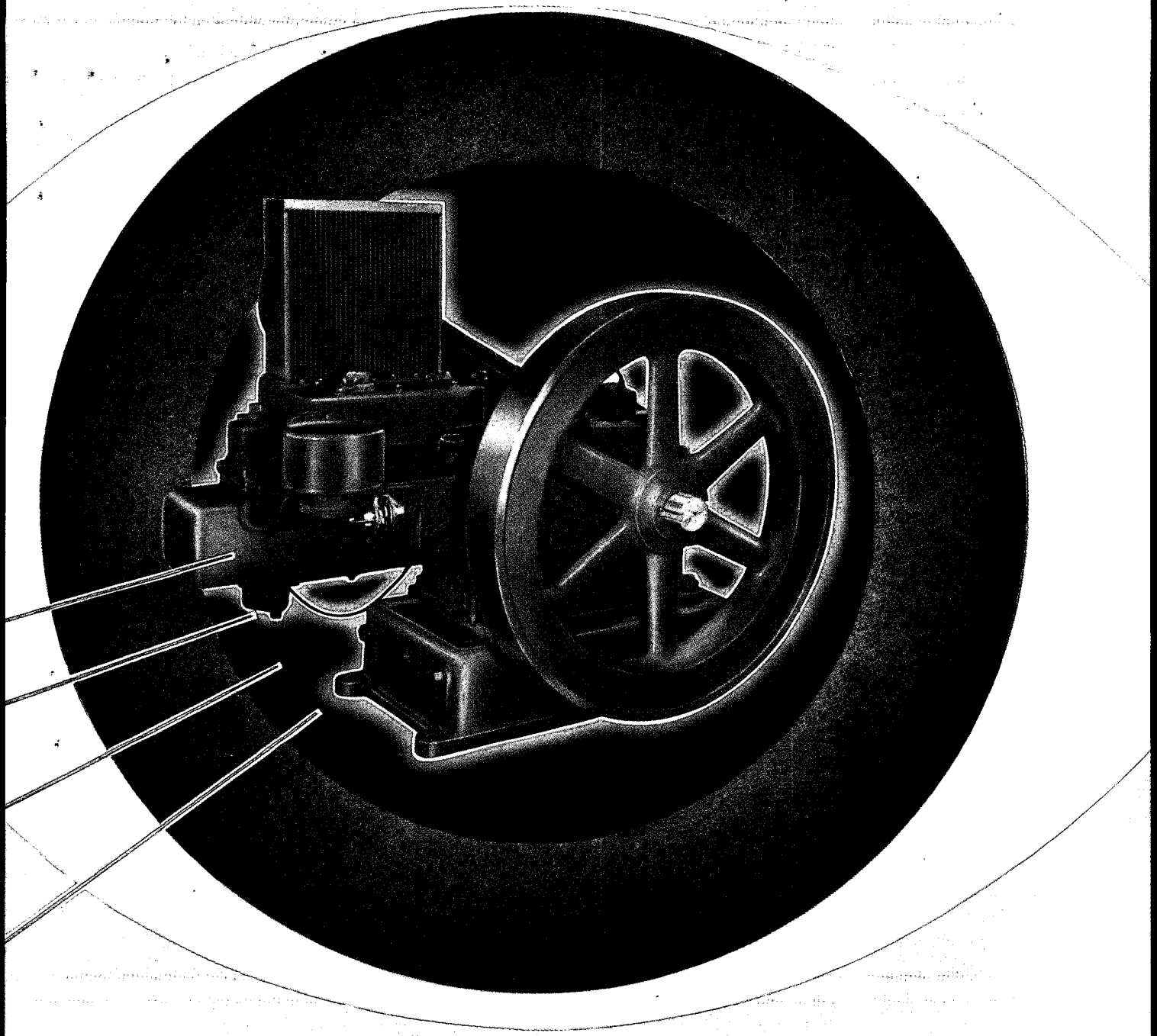

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COLOMBIA

Nation Gets Maximum Output with Minimum Exploration; De Mares to Be Taken Over by State-Owned Enterprise

COLOMBIA'S production mounted to a new high in 1950, writing a bright finish to an era terminated by the state's decision to enter the oil business.

It was a year of maximum production and minimum exploration, and hence not likely to be excelled or long repeated. Total production for the year was 34,059,343 barrels, compared with 29,722,366 in 1949. This gain of 4,336,977 barrels was made despite a slump in both footage and field wells and was accompanied by a sharp decline in wildcatting. The industry drilled 557,972 feet of hole in 1949 and 504,935 feet in 1950; it completed 106 wells in 1949 and 105 in 1950; and it drilled 13 wildcats in 1949 and only six in 1950.

Credit for most of the production gain goes to the Shell Group's Yondó Concession, which boosted its output 3,443,881 barrels during the year, and to Tropical Oil Company's De Mares Concession, where production gained 1,136,178 barrels. It is the De Mares Concession that will be taken over in August by a new state-owned enterprise, Empresa Colombiana de Petróleos, marking the first time that important oil holdings have passed into the ownership of a state by reversion and at no cost to the state.

Under terms of an agreement with Empresa in respect to the oil fields, Tropical, a local subsidiary of International Petroleum Company (Standard Oil Company [N.J.]), will act in a consulting capacity, lending technical aid but without responsibility for results. All production expenses will be met by Empresa. International will engage foreign personnel and Empresa will be responsible for hiring a Colombian staff which will eventually replace all foreigners. Manager of the oil fields, who may be a foreigner, will be appointed by mutual agreement.

For its services International will receive, either in crude or in Colombian pesos at its own choice, a fee of 4 percent of gross production in the first year, 3 percent in the second year, and 2½ percent in the third. The contract is for five years, though subject at the end of the third year to revision or termination by Empreso only.

De Mares' present output is approximately 39 percent

Colombia Oil Production and Geological Data

DEPARTMENT, CONCESSION, and FIELD	Year of Discovery	PRODUCING OIL WELLS END OF 1950			CRUDE OIL PRODUCTION (Barrels)				Proved Area (Acres)	Gravity of Oil (API)	Formation, Name and Kind	Geologic Age	DEPTH (Feet)		Avg. Thickness of Pay (Feet)	Type of Structure
		Flowing	Art. Lift	Total	Daily End of 1950	Year 1949	Year 1950	Cumulative Through 1950					Min. to Top of Pay	Max. to Bottom of Pay		
ANTIOQUIA:																
Yondó Concession:																
Casabe[1]	1941	30	118	148	31,506	6,226,727	9,670,608	31,356,494	5,000	20.8	La Cira, Colorado, Sand	Oligocene-L. Miocene	2100	3900	300	Faulted Anticline
BOLIVAR:																
Cantagallo Concession:																
Cantagallo[2]	1943	3	1	4	963	337,052	437,258	1,330,516	550	20	Esmeraldas, La Paz, Sand	Eocene-Oligocene	6006	6400	160	Faulted Anticline
Floresanto Concession:																
Sinú	n.a.	....	....	....	.....	.....	.....	n.a.	250	50	Pajuil, Sand	Miocene	650	2300	37.5	Faulted Anticline
BOYACA:																
Teran-Guaguaquí:																
Velasquez[3]	1946	5	....	5	1,421	239,352	393,835	700,752	400	25	Sand	Tertiary	6700	8455	85	Anticline
MAGDALENA:																
El Difícil Concession:																
El Difícil[1]	1943	12	....	12	2,683	1,523,519	1,092,307	3,375,657	2,500	40.1	El Difícil, Limestone	Oligocene	5200	5900	28	Faulted Anticline
NORTE DE SANTANDER:																
Barco Concession:																
Carbonera[4]	1939															
									500	21	Cuervos Barco, Sand	Eocene	n.a.	3359	10	Faulted Anticline
Petrolea	1933								4,200	45	La Luna, Ostrea, Limestone	Cretaceous	99	1953	33	Anticline
Río de Oro	1920	86	39	125	27,672	9,460,866	9,394,307	63,368,407	420	39	Catatumbo, Río de Oro, Uribante, Sand, Shale, Limestone	Cretaceous	n.a.	1865	21	Faulted Anticline
Tibú	1940								8,000	31	Barco, Catatumbo, Uribante, Sand, Shale, Limestone	Tertiary, Cretaceous	4300	10876	100	Anticline
SANTANDER:																
De Mares Concession:																
Colorado[5]	1945								270	37.6	Colorado, Sand	Eocene	3400	4200	200	Faulted Anticline
Galán	1945	9	1009	1018	38,981	11,934,850	13,071,028	406,677,740	426	19.5	Zone A, Sand	Oligocene	3900	4050	125	Faulted Anticline
Infantas	1916								5,750	26.3	Zones A, B, C, Sand	Eocene-Oligocene	300	2600	390	Faulted Anticline
La Cira	1926								12,265	24.5	Zones A, B, C, Sand	Eocene-Oligocene	200	4300	382	Faulted Anticline
Las Monas Concession:																
La Salina[2]	1926	....	....	....	.....	.....	.....	75,000	400	21	Lisama, Sand	Eocene	1770	4378	20	Faulted Anticline
Total	....	145	1167	1312	103,226	29,722,366	34,059,343	506,884,566	....	....	.....	.....	....	....	....	.....

[1] Shell Group. [2] Socony-Vacuum Oil Company. [3] Texas Petroleum Company fee. [4] Colombian Petroleum Company. [5] Tropical Oil Company.

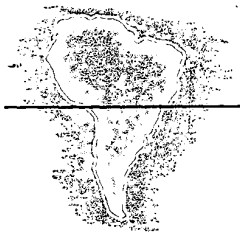
of Colombia's production. Reserves are about 125 million barrels. De Mares' undeveloped area also reverts to the state but is expressly omitted from the scope of the present contract.

The agreement also provides for the operation of the 25,000 barrels per day refinery at Barrancabermeja by International on behalf of Empresa. International will make a loan to Empreso of 20 million pesos (1.95 to the U.S. dollar) to enlarge the plant and erect a cracking unit. The refinery will be leased to International for ten years, but this period will be prolonged should any part of the loan to Empresa remain outstanding.

The De Mares Concession covers about 1,280,000 acres stretching 70 miles along the Magdalena River for an average depth of 30 miles. First granted in 1906, it was purchased by the Benedum-Trees interests in 1916. The discovery was made in 1918, and two years later the operating company, Tropical, was sold to International.

Drilling in Colombia

DEPARTMENT and FIELD	WELLS COMPLETED IN 1949				Wells Completed in 1950	Footage Completed in 1950
	Producing	Dry	Total Wells	Total Footage		
ANTIOQUIA:						
Casabe	44	1	45	221,457	69	294,827
BOLIVAR:						
Cantagallo	..	1	1	7,290	..	.....
BOYACA:						
Velasquez	1	..	1	8,306	3	16,979
MAGDALENA:						
El Dificil	2	2	4	23,390	1	9,516
NORTE DE SANTANDER:						
Barco Fields	33	9	42	208,851	26	138,502
WILDCATS	..	13	13	88,678	6	45,111
Total	80	26	106	557,972	105	504,935



ECUADOR

Crude Production Registers Slight Increase Over 1949; 77 Wells Finaled During Year with 63 Rated Successful

ECUADOR's 1950 crude production of 2,690,983 barrels was a slight increase over the 1949 figure of 2,615,051. Of 77 wells completed during the year, 63 were producers and 14 were failures. Five of the 14 dry holes were exploratory tests.

After spending almost $40 million without significant results in its eastern Ecuador explorations, Shell Oil Company of Ecuador was considering shelving its testing program. This announcement was made early in 1950. Since 1948, Standard Oil Company (N. J.) has been a joint partner in the enterprise.

This extensive exploration has been done under extreme difficulties. Airlift operations have been required to supply field groups with food and all equipment. Many of the groups operated in hostile territory, particularly the geological and geophysical parties whose studies in

Oil Production in Ecuador

PROVINCE and FIELD	Operating Company	Year of Discovery	Total Producing Wells End of 1950	CRUDE OIL PRODUCTION (Barrels)			
				Daily Average for 1950	Year 1949	Year 1950	Cumulative Through 1950
GUAYAS:							
Ancon	Anglo-Ecuadorian Oilfields, Ltd.	1921	931	5416	1,853,883	1,976,685	42,070,294
Carolina-Santa Paula	Carolina Oil Company	n.a.	47	127	60,997	46,279	1,236,573
Concepcion	Concepcion Ecuadorian Oilfields, Ltd.	1931	30	229	79,520	83,534	996,943
Petropolis	Petropolis Oil Company	1937	19	241	105,614	87,924	941,281
Tigre-Cautivo	Ecuador Oilfields, Ltd.	1920	33	1360	515,037	496,561	5,476,909
Total	.....	....	1060	7373	2,615,051	2,690,983	50,722,000

Engineering and Geological Data on Ecuador Oil Fields

PROVINCE and FIELD	Proved Area (Acres)	Gravity of Oil (API)	PRODUCING FORMATION						
			Name	Kind	Age	DEPTH (Feet) Minimum to Top of Pay	DEPTH (Feet) Maximum Total Depth of Wells	Average Thickness of Pay (Feet)	Type Structure
GUAYAS:									
Ancón-Sta. Elena	18,000	37–41	Socorro	Sandstone	Eocene	1200	4000	600	Faulted anticline
			Atlanta			3000	6000	2500	
Carolina-Sta. Paula	n.a.	28–31	Socorro	Sand	Eocene	632	836	200	Steeply dipping erratic blocks
Concepción	n.a.	38	Atlanta	Sand	Eocene	1100	3570	n.a.	Structural strat. trap
El Cautivo	n.a.	39–44	Socorro	Sand	Eocene	750	1000	250	Steeply dipping erratic blocks
El Oro	n.a.	n.a.	n.a.	Lime	Pleistocene	n.a.	n.a.	n.a.	n.a.
El Tambo	....	..	Socorro	Sand	Eocene	....	4000	....	Structural strat. trap
El Tigre	200	39	Atlanta	Sand	Eocene	2900	4300	400	Structural strat. trap
Petrópolis	100	35	.....	Shattered Chert	Eocene	....	2000	....	Steeply dipping erratic blocks

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ECUADOR

eastern Ecuador were completed in 1950, after 13 years' work.

Throughout 1950, drilling tests on the concessions held by the Ecuador Oilfields, Ltd., did not meet with satisfactory results. The board entered into an agreement with an American company under which the latter was granted an option to buy the concessions and physical assets for $1,050,000.

Drilling in Ecuador

PROVINCE and FIELD	WELLS COMPLETED IN 1949				WELLS COMPLETED IN 1950				Wells Drilling End of 1950
	Oil	Dry	Total Wells	Total Footage	Oil	Dry	Total Wells	Total Footage	
GUAYAS:									
Ancón	47	...	47	76,360	49	...	49	113,689	7
Carolina-Santa Paula	4	...	4	5,965	4	1	5	5,588	..
Concepción	4	...	4	2,078	2	...	2	2,200	..
El Oro	..	...	..	.....	..	4	4	5,169	5
Petropolis	3	...	3	10,934	2	...	2	7,103	1
Tigre-Cautivo	9	...	9	39,650	6	4	10	27,111	..
Wildcats	..	...	..	.....	..	5	5	156,488	..
Total	67	...	67	134,987	63	14	77	317,348	13

Crude Oil Pipe Lines of Ecuador

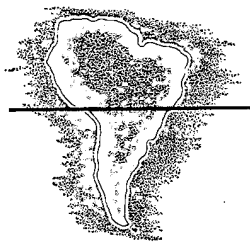
COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Capacity of Line (Bbls. Daily)	Year Completed
Anglo-Ecuadorian Oilfields, Ltd.	Ancon	La Libertad	8	6	12,960	1925
Carolina Oil Co.	Santa Paula	Carolina	3	4	2,400	n.a.
Ecuador Oilfields, Ltd.	Tigre	Cautivo	11	4	2,500	1940
Petropolis Oil Co.	Salinas	La Libertad	8	4	3,600	1940

Refineries of Ecuador

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery
Anglo-Ecuadorian Oilfields, Ltd.	La Libertad (100 mi w. Guayaquil)	6,450	None	Skimming (One lb. oil cut)
Ecuador Oilfields, Ltd.	Cautivo (Guayas, 90 mi from Guayaquil)	600	None	Topping

PARAGUAY

IN MID-1950 Union Oil Company abandoned as a dry hole its fifth exploratory well in the Paraguayan Chaco sector, announcing the discontinuance of operations there. For the previous five years, Union Oil actively explored this region, a little more than half the size of the state of California. On the basis of information gathered, the company decided that it was not economical to seek further for commercial production.



PERU

Operating Contracts Signed with Foreign Oil Companies; Production Jumps 231,748 Barrels Over Previous Year

WITH 290 flowing wells out of its 3698 units, Peru by the end of 1950 had produced 231,748 more barrels of oil than during the preceding year. Peru's record 1950 output of 15,027,839 barrels was largely assisted by the completion of 198 wells during the year, of which 147 were oil producers.

Although action was delayed on a proposed oil law designed to offer foreign capital a satisfactory basis for exploration contracts were signed with foreign oil concerns permitting further operations.

Richmond Petroleum Company, Ltd., and International Petroleum Company were granted permits to operate in Northern Peru. Conorado Petroleum Corporation, the joint foreign arm of Amerada Petroleum Corporation, The Ohio Oil Company and Continental Oil Company, received permits and conducted surface geological and gravity-meter studies. Also among new permit holders was Dunlap and Graham of Long Beach, Calif., with a permit to drill ten wells in the government petroleum zone of Zorritos, also in Northern Peru.

Passage of the new law was expected in petroleum circles sometime in 1951.

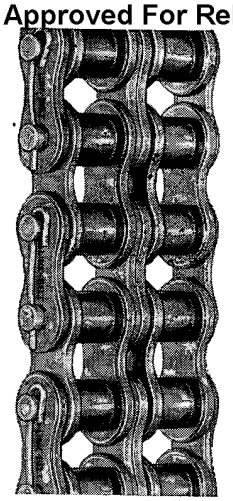
Exploratory tests were conducted in two of Peru's

Gas Production in Peru

Department and Field	Procuding Gas Wells End of 1950	GAS PRODUCTION (Thousand Cubic Feet) Daily End of 1950	Year 1949	Year 1950
PIURA:				
La Brea y Parinas	37	62,365	22,329,782	22,763,473
Lobitos, Restín-El Alto	650	8,587	2,718,405	3,134,384
Total	687	70,952	25,048,187	25,897,857

Refineries of Peru

COMPANY	Location	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Daily Crude Runs End of 1950 (Bbls.)	Type of Refinery
Compañía de Petroleo Ganso Azul Limitada	Agua Caliente	500	....	410	Skimming
Compañía Petrolera Lobitos	Lobitos	100	....	119	Skimming
Empresa Petrolera Fiscal	Villar (Zorritos)	1,200	....	312	Skimming
International Petroleum Company, Ltd.	Talara	30,000	2,000	32,505	Complete



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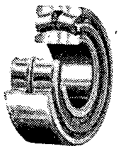

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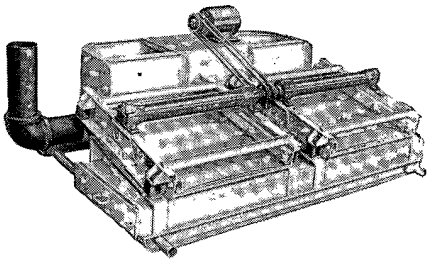

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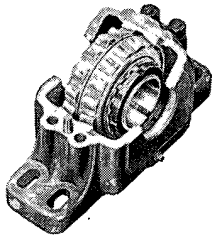

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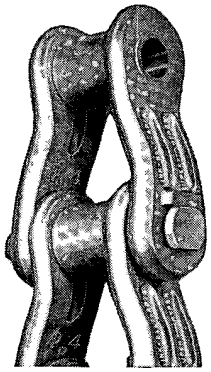
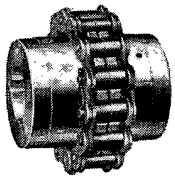
Press-fit or adapter type mounting, split housing, open or closed end, fixed and floating bearing types, grease or oil lubricated, wide range of bearing bores.



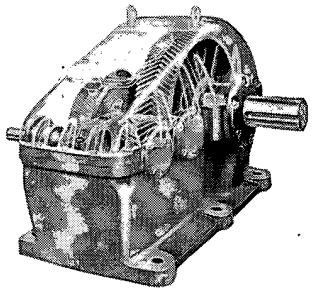
A. P. I. ROTARY CHAINS

Link-Belt manufactures a complete line of A.P.I. oil drilling chains for every drilling service. A complete line of these chains is available which includes A.P.I. 3 and A.P.I 4 Red-Hed, SS-3125 Hyper Single and SS-3125 Hyper Double, SS-40 Hyper, SS-124 Three-Bar Hyper and A.P.I. 4 Super Hyper. Well balanced design, proper selection of materials and accuracy in manufacture make these chains the strongest, most dependable for the severe service encountered in oil well drilling. These chains can be operated on cut tooth sprockets and we suggest their use for smooth, uninterrupted operation.



FLEXIBLE COUPLINGS

Link-Belt "RC" Flexible Coupling. Note how each wheel engages individual rollers. Plastic housings are also available.

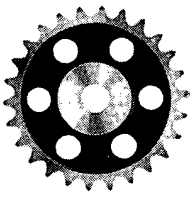


ENCLOSED DRIVES

The Link-Belt line includes: Herringbone and Worm Gear Drives, Gearmotors, Fluid Drives and P.I.V. Variable Speed Drives. They are available in a variety of sizes. Regardless of your specific needs for ratio, power or speed, we have the correct answer, and our engineers will be pleased to assist you with your Speed Reduction problems.

SPROCKETS

Single and multiple cut tooth sprockets are made for all chain sizes in standard arm, rim and plate centers, in solid or split types.



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SHALE SHAKERS

oil-producing sectors, at Loreto and Tumbes, during 1950. None was attempted by Compania de Petroleo Ganso Azul Limitada, the operating company at Huanuco. Compania de Petroleo "El Oriente" found only traces of oil and gas at its Coninca 2, situated in Loreto, with a total depth of 8085 feet.

Compania de Petroleo Ganso Azul found no oil indications in its RT 48 at Tumbes, which was still being tested as the year ended. Another wildcat in Tumbes, which was being drilled by the same company, was begun on November 8. Thirty-two wells were being drilled in the country as the year ended.

The year's drilling activity centered in La Brea and Parinas field, where 105 attempts resulted in 61 new producers, and in the Restin-El Alto field, where 58 producing wells resulted from 60 attempts.

Drilling in Peru

DEPARTMENT and FIELD [1]	Wells Completed in 1949					Wells Completed in 1950				Wells Drilling End of 1950
	Oil	Gas	Dry	Total Wells	Total Footage	Oil	Dry	Total Wells	Total Footage	
LORETO:										
Wildcats	....	....	1	1	4,650	....	....	.....	.....	1
PIURA:										
La Brea y Parinas	80	2	43	125	427,746	61	44	105	397,956	10
Lobitos	8	1	....	9	28,047	20	4	24	125,865	6
Los Organos	3	....	3	6	6,967	8	....	8	18,226	2
Restín-El Alto	51	....	2	53	84,165	58	2	60	111,536	12
Wildcats	....	....	....	.....	.....	....	1	1	6,895	1
Total	142	3	49	194	551,575	147	51	198	660,478	32

Peru Oil Production and Geological Data

Department and Field	Year of Discovery	Producing Wells End of 1950			CRUDE OIL PRODUCTION (Barrels)				Proved Area (Acres)	Gravity of Oil (API)	Formation Name and Kind	Geologic Age	DEPTH (Feet)		Type of Structure
		Flowing	Art. Lift	Total	Daily End of 1950	Year 1949	Year 1950	Cumulative Through 1950					Min. to Top of Pay	Max. to Bottom of Pay	
HUANUCO:															
Agua Calienta[1]	1939	6	....	6	410	140,196	149,462	813,871	1,000	44	Agua Caliente, Ash-bed, Sand	L. Cret.	1000	1300	Dome
PIURA:															
La Brea y Parinas[2]	1875	213	2,375*	2,588	31,564	11,912,964	11,520,912	323,536,310	20,000	35-38	Verdun Talara, Parinas, Salinas, Sand	Eoc.	60	6000	Faulted and Folded
Lobitos[3]	1901	44	220	264	3,667	808,467	1,338,592	73,408,440	5,000	35-36	Terebrátula, Sd	U. Eoc.	142	6500	Faulted blocks
Restín-El Alto[3]	1904	27	748	775	5,150	1,813,312	1,879,759		10,000	35-36	L. Caverno, Sd.	U. Eoc.	1800	2400	Faulted blocks
Los Organos[4]	1943	....	23	23	337	103,861	123,123	710,155	250	44	Talara, Conglomerate, Lomitos, Sand	U. Eoc.	100	6600	Monocline and Faulted blocks
TUMBES:															
Zorritos-Copé[4]	1865	...	42	42	44	17,291	15,991	3,691,751	1,000	38	Zorritos, Sand	Mio.	1200	1800	Monocline and Faulted blocks
Total	....	290	3,408	3,698	41,172	14,796,091	15,027,839	402,160,527	.....	...	.....	.....	....	....	.....

[1] Compania de Petroleo Ganso Azul Limitada. [2] International Petroleum Company. [3] Compania Petrolera Lobitos. [4] Empresa Petrolera Fiscal.
* Includes 2 gas injection wells and 385 wells that produce intermittently.

VENEZUELA

Producers Total 326 Out of 393 Completions for Year; Mene Grande Well Proves Most Important Recent Find

EASTERN and Western Venezuela combined in 1950 to give the country crude production totaling 544,646,947 barrels, a gain of 62,401,870 barrels over the previous year. During the year, 393 wells were completed, of which 326 were oil producers and 63 were dry holes. At the close of the year, 65 wells were being drilled.

Mene Grande Oil Company's Los Mangos 1 was proving the most important recent discovery in Venezuela. The well, situated in Anzoategui, was bottomed at 8828 feet, and was reported producting 600 barrels a day.

Mene Grande drilled ten exploratory wells during July which resulted in the discovery of one new field, the Tagua 1, and eight new pool discoveries within established fields. New pool discoveries were in the Leona, Oficina, Nipa, Guara, and Mapiri fields in eastern Venezuela, and one in Lake Maracaibo. The latter, Rod 517, found Eocene production of about 400 barrels a day.

Creole Petroleum Corporation's new refinery of 60,000 barrels a day rated capacity was nearing completion at Amuay Bay, on the western shore of the Paraguana Peninsula in Western Venezuela. After about three years of construction, the first unit went on stream early in the year. Final completion of all equipment was scheduled for the fall of 1951.

Creole's Amuay unit was scheduled to be the second to be put into operation, Shell Oil Company having begun operations at its Punta Cardon refinery earlier in the year. Creole's refinery is the deep water terminus of the Amuay-Ule pipe line which handles daily 300,000 barrels of Creole's Lake Maracaibo crudes.

In May, the Venezuelan government closed Communist Party branches throughout the country after a week-long strike by petroleum workers earlier in the month, which resulted in the loss of an estimated 7 million to 7½ million barrels of production, some of which was later recovered. Communist leaders apparently disappeared or went underground immediately after the government order, and refinery and tanker

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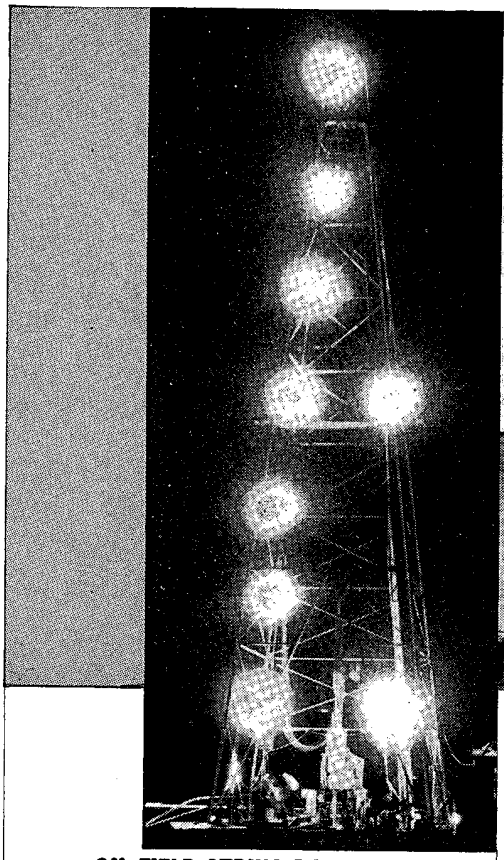

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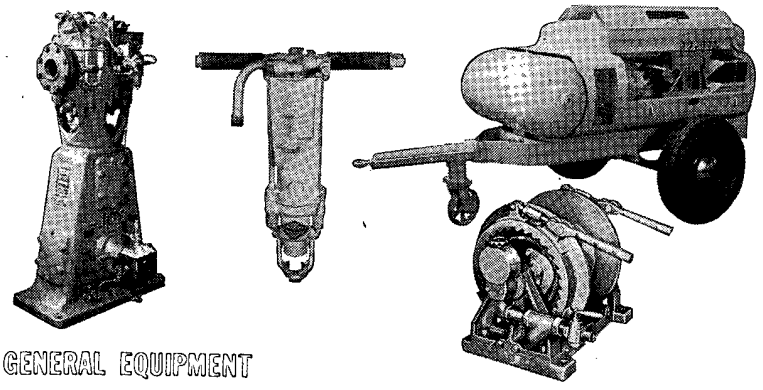

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workers were reported to have gone back to work soon after the strike was broken.

Subsequently, a new labor contract boosting Venezuela's high labor costs by an estimated 10 percent was signed in Caracas. Labor leaders discarded the expired contract which had governed relations since 1948, and presented the industry with nearly 150 new and separate demands.

Industry estimated the cost of new labor demands at an additional $1 billion a year, and refused to negotiate. Labor stood firm even though it was pointed out that the average annual value of all exports from Venezuela, including petroleum, is only slightly more than $1 billion.

The deadlock was broken when the government forced the acceptance of an industry compromise which will cost the companies an estimated $300 million a year over what was previously paid. Even before the pay increase,

Pipe Lines of Venezuela

COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Capacity (Bbls. Daily)
CRUDE OIL					
Eastern Venezuela:					
Creole Pet. Corp.	Cumarebo	Tucupido	2.5	6	15,100
	Jusepín	Travieso	16	16	75,000
	Jusepín	Caripito	46	10	37,190
	Mulata	Travieso	7.4	10	40,100
	Quiriquire	Caripito	21	10, 16	79,400
	Temblador	Boca de Uracoa	34	10	40,100
Mene Grande Oil Co.	Anaco	Puerto La Cruz	60	16	212,000
	Chimire	Anaco	3	8	25,200
	Oficina	Anaco	36	16	173,300
	Soto	Anaco	4	8	12,600
	Travieso	Puerto La Cruz	94.5	16	96,000
Phillips Oil Co.	Mata Grande	Santa Bárbara	6.6	6	12,000
	San Roque	Santa Bárbara	5.6	6	24,000
S. A. Petrolera Las Mercedes	Guasimito	Pamatacual	157	16	193,500
Sinclair Oil & Refining Co.	Muri	Santa Bárbara	9.3	4, 8	554
	Santa Bárbara	El Chaure	95	12	69,750
Socony-Vacuum Oil Co.	Guico	Puerto La Cruz	3.4	8	16,000
	Nipa	Puerto La Cruz	4.3	6	10,000
Venezuelan Atlantic Refining Co.	Avipa	Santa Bárbara	3.7	....	6,000
	Pelayo	Leona	12	6	6,000
	Ruiz	Sabán	10.7	8	18,000
	Sabán	Tucupido	16	8	6,000
	Tamán	Tucupido	3.2	6	18,000
	Tucupido	Las Palmas	11.3	8	32,050
Western Venezuela:					
British Controlled Oilfields, Ltd.	El Mene	La Estacion	31.4	6	25,000
	Hombre Pintado	Media	8	4	n.a.
	Media	El Mene	4.7	3, 4, 6	25,000
Colon Development Co.	Calvario	La Rivera	27.3	8	26,400
	Casigua	Los Manueles	6	8	24,200
	La Rivera	La Solita	26.6	8	27,700
	Los Manueles	Calvario	27.3	8	n.a.
Creole Petroleum Corp.	Punta Gorda	La Salina	28.6	10, 12, 16	44,800
	Rio Ulé	Puerto Gorda	21	10, 12, 16	39,950
	Ulé	Amuay	142	24, 26	300,000
Mene Grande Oil Co.	Bachaquero	Lagunillas	16.7	8	25,000
	Mara	Texas-Creole Sta.	4.2	8	16,000
	Mara	Tres Bocas	2.8	6	4,000
	Netick	La Paz	8.7	3, 4	n.a.
	Pueblo Viejo	Lagunillas	11	8	20,000
	Punta Benitez	Cabimas	6	12	10,000
	Taparito	Punta Benitez	5	12	n.a.
	Taparito	Cabimas	11	12	30,050
	Tasajeras	Lagunillas	2.8	10	19,900
	Texas-Creole Sta.	Tres Bocas	4	10	77,500
	Tres Bocas	Palmarejo	10	12	n.a.
Richmond Exploration Co.	Bajo Grande	Loading Platform	1.6	18	157,400
	Carretera	Bajo Grande	10.6	18	n.a.
	Enseñada	Bajo Grande	4.7	4	50,750
	La Villa	Carretera	12	18	n.a.
Shell Group	Concepción	Sibucara	12	4, 6	6,920
	La Paz	Palmarejo (via Cuatro Bocas)	45	10, 12	103,900
	La Paz	Palmarejo (via La Concepción)	43.7	6, 10, 12	66,600
	Mara	Palmarejo	5	12	77,000
	Mene Grande	San Lorenzo	9.6	8	103,100
	Sibucara	Palmarejo	10	12	119,800
REFINED PRODUCTS					
Eastern Venezuela:					
Creole Petroleum Co.	Los Cocos	Puerto La Cruz	8	6, 12	2,580
Western Venezuela:					
Shell Group	San Lorenzo	Mene Grande	9	2, 3	1,260

Drilling in Venezuela

STATE and FIELD	Wells Completed in 1949				Wells Completed in 1950				Wells Drilling End of 1950
			Total				Total		
	Oil	Dry	Wells	Footage	Oil	Dry	Wells	Footage	
EASTERN VENEZUELA:									
Anzoátegui:									
Aragua	...	...	...	.....	2	...	2	17,866	1
Cachicamo	1	...	1	5,006	...	...	...	.....	..
Caico Seco	1	1	2	15,225	...	1	1	8,193	..
Chimire	44	...	44	320,704	51	...	51	376,226	6
El Roble	4	...	4	41,388	3	...	3	1,670	..
Fría	1	...	1	6,162	...	...	...	.....	..
Guara	19	2	21	139,302	14	3	17	100,614	2
Guario	1	...	1	4,494	2	...	2	10,027	1
Guico	2	...	2	11,139	...	...	...	.....	..
Inca	3	...	3	21,378	2	1	3	7,118	..
Leona	3	1	4	31,914	7	...	7	47,386	1
Merey-Areo	1	...	1	5,795	...	...	...	.....	..
Moriche	...	...	...	.....	...	1	1	6,324	..
Nipa	50	...	50	421,883	27	3	30	182,240	3
Oficina	10	1	11	67,353	15	2	*18	99,010	2
Pelayo	...	1	1	7,523	...	...	...	.....	..
San Joaquín	5	...	5	37,790	...	...	...	.....	..
San Roque	11	...	11	92,631	11	1	12	93,201	1
Santa Ana	2	...	2	16,432	4	1	5	41,292	1
Santa Rosa	3	1	4	43,328	2	...	2	9,778	..
Socororo	...	1	1	4,334	...	...	...	.....	..
Soto	...	...	...	.....	3	...	3	64,934	3
Tocó	1	1	*3	24,362	...	...	...	.....	..
Yopales	7	1	8	37,660	...	...	*1	4,694	..
Guarico:									
Barbacoas	...	...	...	.....	1	...	1	6,399	..
Belén	...	...	...	.....	...	1	1	12,854	..
Guavinita	2	...	2	8,332	2	3	5	11,037	1
Las Mercedes	21	2	23	101,935	31	9	40	238,479	3
Palacio	8	1	9	32,588	6	1	7	28,333	1
Piragua	...	...	...	.....	...	2	2	7,173	1
Ruíz	12	...	12	55,304	39	2	41	221,813	4
Sabán	3	2	*6	18,673	2	1	3	8,869	1
Tamán	12	2	14	60,484	11	3	14	64,885	..
Tucupido	17	5	22	106,524	6	8	*15	54,094	1
Monagas:									
Jusepín	...	...	...	.....	...	1	1	10,827	..
Mulata	10	...	10	56,080	...	...	...	.....	..
Quiriquire	46	3	49	203,934	31	3	34	145,173	2
Santa Bárbara	2	1	3	10,383	...	1	1	2,198	..
Temblador	4	...	4	15,796	...	...	...	.....	..
Territorio Delta Amacuro:									
Pedernales	3	...	3	21,982	4	1	5	42,027	1
Tucupita	5	...	5	29,496	...	...	...	.....	..
Total Wildcats, Eastern	6	17	*24	170,151	5	8	*14	102,007	n.a.
Eastern Total	320	43	366	2,247,470	281	57	342	2,026,741	36
WESTERN VENEZUELA:									
Falcón:									
Hombre Pintado	1	...	1	1,700	...	...	...	.....	1
Mene Mauroca	...	...	...	.....	...	...	...	.....	1
Zulia:									
Amana	...	1	1	6,202	...	...	...	.....	1
Bachaquero	81	3	84	339,935	23	...	23	65,075	4
Boscán-Albaricos	22	1	23	174,402	1	...	1	7,311	..
Cabimas	13	...	13	44,543	...	...	...	.....	..
Conquistado	...	...	...	.....	...	...	...	.....	1
El Cubo-Las Cruces	2	1	3	9,375	...	...	...	.....	2
Ensenada	...	1	1	9,328	...	...	...	.....	..
La Concepción	...	...	...	.....	...	...	...	.....	1
Lagunillas	47	1	48	232,982	4	...	4	11,539	2
La Paz	9	...	9	86,623	1	...	1	13,146	5
Macoa	...	1	1	11,940	...	...	...	.....	..
Mara	16	2	18	165,538	...	...	...	.....	6
Mene Grande	27	...	27	130,013	3	...	3	11,588	2
Sibucara	1	...	1	13,451	...	...	...	.....	1
Tía Juana	52	3	55	142,857	13	...	13	24,331	2
West Tara	3	...	3	28,555	...	...	...	.....	..
Total Wildcats, Western	4	12	16	154,295	...	6	6	69,367	n.a.
Western Total	278	26	304	1,551,739	45	6	51	202,357	29
Total Venezuela	598	69	670	3,799,209	326	63	393	2,229,098	65

n.a.—Not Available. * Includes 1 gas well.

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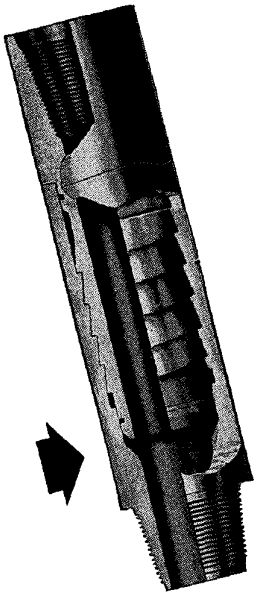

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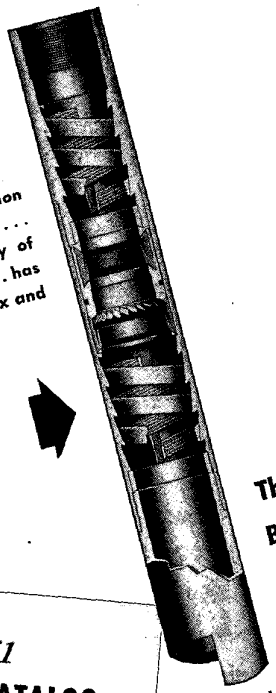
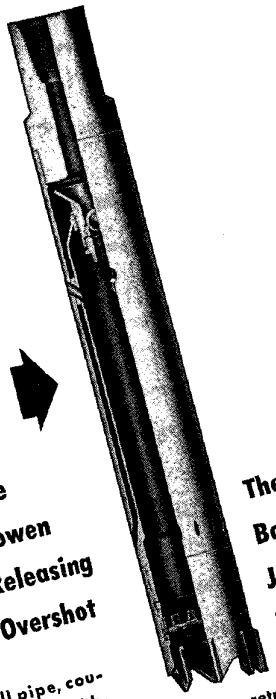


The Bowen Releasing Overshot

Catches drill pipe, couplings or tool joint without making any adjustments . . . utilizes exclusive grapples that cinch tighter as pull increases . . . is easily released at any time.



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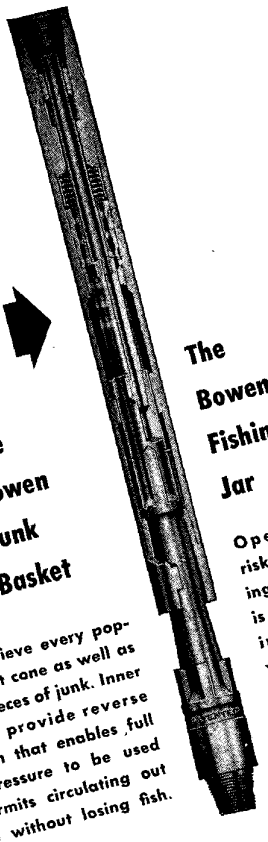

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Oil Production and Producing Wells in Venezuela

STATE and FIELD	OPERATING COMPANY	Year of Discovery	PRODUCING OIL WELLS END OF 1950			CRUDE OIL PRODUCTION (Barrels)			
			Flowing	Art. Lift	Total	Daily at End 1950	Year 1949	Year 1950	Cumulative Through 1950
EASTERN VENEZUELA:									
Anzoategui:									
Anaco	Mene Grande Oil Company	n.a.	....	....	....	.....	5,799	1,082	14,385
Caico Seco	Mene Grande Oil Company	1946	3	....	3	646	324,234	284,002	946,763
Capacho	Creole Petroleum Corporation	1945	....	....	....	.....	shut in	shut in	7,032
Chimire	Mene Grande Oil Co., Creole Pet. Corp., Socony-Vacuum Oil Company	1948	93	....	93	62,606	6,393,084	15,150,420	21,763,802
El Roble	Pantepec Oil Company, Creole Petroleum Corporation	1939	24	....	24	4,996	1,883,205	1,952,109	19,131,850
El Toco	Mene Grande Oil Company	1948	4	....	4	1,638	756,204	631,676	1,761,730
Freites	Creole Petroleum Corporation	1949	....	....	....	.....	13,762	1,025	14,787
Fría	Mene Grande Oil Company	1948	3	....	3	818	345,128	284,669	978,388
Guara	Mene Grande Oil Company, Socony-Vacuum Oil Company	1942	178	43	221	61,709	24,661,819	21,085,217	155,142,795
Guario	Socony-Vacuum Oil Company	1940	24	....	24	6,007	2,279,991	1,803,701	13,347,567
Guico	Socony-Vacuum Oil Company	1944	29	12	41	11,715	4,484,808	3,939,969	29,013,384
Inca	Mene Grande Oil Company	1949	2	....	2	572	34,543	148,709	183,252
La Ceiba	Mene Grande Oil Company	1946	n.a.	n.a.	n.a.	n.a.	54,268	24,574	254,837
La Vieja	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	805	805
Leona	Mene Grande Oil Company	1940	19	11	30	7,363	2,044,593	1,818,583	12,511,932
Merey-Areo	Creole Petroleum Corporation	1934	2	....	2	441	115,177	96,460	337,239
Nipa	Mene Grande Oil Co., Creole Pet. Corp., Socony-Vacuum Oil Company	1945	124	1	125	41,395	12,652,732	14,029,788	39,716,004
Oficina	Mene Grande Oil Company, Creole Petroleum Corp.	1933	120	109	229	51,707	14,826,257	15,503,440	168,864,082
Pelayo	Venezuelan Atlantic Refining Company	1947	1	....	1	63	114,982	45,865	238,773
Quiamare	Mene Grande Oil Company	1943	n.a.	n.a.	n.a.	n.a.	49,368	6,661	702,581
Rincón Largo	Texas Petroleum Company	1941	4	....	4	1,714	657,280	585,585	4,384,826
San Joaquín	Mene Grande Oil Company	1939	40	....	40	8,196	3,803,608	3,176,597	32,449,629
San Roque	Phillips Oil Company	1949	19	....	19	3,134	1,109,088	2,199,146	3,308,234
Santa Ana	Mene Grande Oil Company	1936	12	....	12	4,010	918,579	1,286,348	3,820,714
Santa Rosa	Mene Grande Oil Company	1941	12	....	12	3,983	1,108,163	1,476,457	7,334,500
Soto	Mene Grande Oil Company	1949	n.a.	n.a.	n.a.	3,960	.....	848,057	848,057
Yopales	Creole Petroleum Corporation	1937	10	4	14	2,992	1,255,657	847,787	3,634,600
Guarico:									
Las Mercedes, Guavinta, Palacio	S. A. Petrolera Las Mercedes	1943	144	14	158	22,243	5,686,826	6,827,512	15,216,387
Punzon	Texas Petroleum Company	1949	....	....	....	.....	182	.....	182
Ruíz	Venezuelan Atlantic Refining Company	1949	46	1	47	8,359	181,772	2,129,770	2,311,542
Sabán	Venezuelan Atlantic Refining Company	1948	1	7	8	271	100,333	73,138	199,323
Tamán	Venezuelan Atlantic Refining Company	1949	15	7	22	6,123	782,533	2,989,904	3,772,437
Tucupido	Venezuelan Atlantic Refining Company	1945	23	4	27	4,740	3,079,487	2,404,765	6,515,350
Monagas:									
Jusepin	Creole Petroleum Corporation	1938	192	51	243	24,163	11,526,259	8,849,846	127,954,907
Los Caritos	Texas Petroleum Company	1939	....	....	....	.....	.....	.....	255,906
Mata Grande	Phillips Oil Company	1946	17	....	17	1,573	661,972	535,493	2,005,257
Mulata	Creole Petroleum Corporation, Pantepec Oil Company	1941	124	56	180	19,430	6,760,648	6,723,385	58,644,538
Muri	Sinclair Oil & Refining Company	1942	13	38	51	1,850	932,322	822,622	12,300,740
Orocual	Creole Petroleum Coroporation	1933	....	....	....	.....	Abandoned	Abandoned	29,530
Pirital	Venezuelan Atlantic Refining Company	1944	....	....	....	.....	8,240	1,032	88,560
Quiriquire	Creole Petroleum Corporation	1928	34	381	415	78,623	23,267,286	23,468,628	349,885,033
Santa Barbara	Mene Grande Oil Company, Sinclair Oil & Refining Co.	1941	140	61	201	15,253	7,005,235	70,055,850	67,369,412
Temblador	Mene Grande Oil Company, Creole Petroleum Corp.	1936	83	....	83	9,156	3,708,659	3,430,521	35,371,276
Travieso	Mene Grande Oil Company	1944	....	....	....	.....	.....	.....	37,782,943
Travieso 2	Sinclair Oil & Refining Company	1944	....	9	9	289	124,284	101,874	952,367
Sucre:									
Guanoco	Texas Petroleum Company	1914	....	....	....	.....	shut in	shut in	1,718,940
Territorio Delta Amacuro:									
Pedernales	Creole Petroleum Company	1935	13	....	13	10,860	2,110,930	3,555,204	16,099,900
Tucupita	Creole Petroleum Company, Texas Petroleum Company	1945	38	....	38	7,942	2,150,505	2,715,216	8,970,698
Eastern Totals		....	1,606	809	2,415	490,540	147,979,802	158,913,592	1,268,157,776
WESTERN VENEZUELA:									
Falcon:									
Cumarebo	Creole Petroleum Company	1931	16	20	36	2,949	1,426,095	1,260,000	42,365,279
El Mene	British Controlled Oilfields, Ltd.	1921	....	25	25	382	133,939	148,810	24,981,427
Hombre Pintado	British Controlled Oilfields, Ltd.	1929	1	23	24	576	254,186	214,324	4,694,484
Las Palmas	Creole Petroleum Company	1929	....	....	....	.....	shut in	shut in	433,963
Media	British Controlled Oilfields, Ltd.	1928	....	....	....	.....	shut in	shut in	10,689,546
Mene de Acosta	Tocuyo Oilfields, Ltd.	1927	....	....	....	.....	shut in	shut in	778,077
Urumaco	Richmond Exploration Company	1937	....	....	....	.....	shut in	shut in	1,289,841
Zulia:									
Amana	Guasare Oil Company	1943	....	....	....	.....	36,141	23,637	98,328
Bachaquero	Creole Petroleum Co., Venezuelan Oil Concessions, Ltd., Mene Grande Oil Company	1938	485	216	701	141,217	30,613,410	41,487,615	200,065,398
Boscán-Albaricos	Richmond Exploration Company	1947	....	22	22	14,083	1,282,979	4,534,044	6,088,859
Cabimas	Creole Petroleum Co., Venezuelan Oil Concessions, Ltd., Mene Grande Oil Company	1917	149	764	913	84,040	23,782,400	28,738,457	639,115,276
El Cubo-Las Cruces, Los Manueles, W. Tarra	Colon Development Company	1916	10	110	129	15,506	4,462,743	4,584,394	117,933,696
El Menito	California Company, Mene Grande Oil Company	1924	....	....	....	.....	.....	.....	6,705
Enseñada	Richmond Exploration Company	1948	....	....	....	.....	28,002	29,034	57,797
La Concepción	Shell Caribbean Petroleum Company	1925	1	65	66	3,547	1,389,439	1,399,143	35,225,095
La Paz	Shell Caribbean Petroleum Company	1922	25	31	56	165,969	49,336,677	57,056,444	212,045,800
Lacustre	Venezuelan Oil Concessions, Ltd.	1949	3	....	3	451	.....	2,227	2,227
Lagunillas	Creole Petroleum Company, Venezuelan Oil Concessions, Ltd., Mene Grande Oil Company	1926	284	1,083	1,367	404,306	125,437,695	141,107,403	1,910,069,729
Macoa	Richmond Exploration Company	1949	....	....	....	.....	13,554	.....	13,554
Mara	Creole Pet. Co., Shell Caribbean Pet. Co., Texas Pet. Co., Mene Grande Oil Company	1945	30	....	30	75,882	27,088,296	28,783,404	85,461,436
Mene Grande	Shell Caribbean Petroleum Company	1913	5	328	333	53,283	17,220,507	16,774,403	355,171,983
Netick	Mene Grande Oil Company	1943	....	....	....	.....	78,546	12,183	714,481
Pueblo Viejo	Venezuelan Oil Concessions, Ltd., Mene Grande Oil Co.	1940	10	11	21	14,599	1,018,799	1,937,932	11,209,124
Río de Oro	Colon Development Company	1916	....	....	....	.....	shut in	shut in	24,360
Río Palamar (Totumo)	Creole Petroleum Company	1915	....	....	....	.....	Abandoned	Abandoned	24,259
San José	Richmond Exploration Company	1948	....	....	....	.....	.....	.....	7,435
Sibucara	Shell Carribbean Petroleum Company	1948	2	....	2	9,075	2,358,606	3,236,142	5,689,326
Tia Juana	Creole Petroleum Company, Venezuelan Oil Concessions, Ltd., Mene Grande Oil Company	1928	174	598	772	173,241	48,303,261	54,403,759	659,347,077
Western Totals		....	1,204	3,296	4,500	1,159,106	334,265,275	385,733,355	4,323,604,562
TOTAL VENEZUELA		....	2,810	4,105	6,915	1,649,646	482,245,077	544,646,947	5,591,762,338

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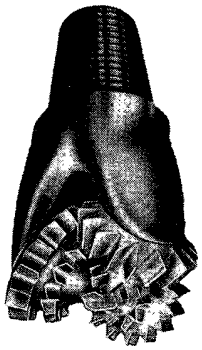

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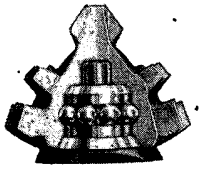
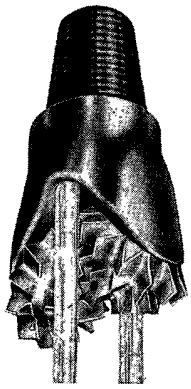


BEARING ASSEMBLY



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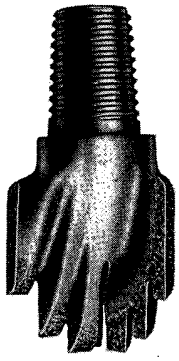

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the Venezuelan worker was one of the highest paid in the world, drawing about $10 a day in take-home pay and $5 in other benefits. Consequently, considerable concern is being felt in Venezuela that persistent labor demands for higher payrolls may eventually price Venezuela oil out of the market.

Drilling activities in the spotlight during the middle of the year included completion of Shell Oil Company's

Engineering and Geological Data on Venezuela Fields

STATE and FIELD	Proven Area (Acres)	Gravity of Oil (API)	Name	Kind	Age	DEPTH, (Feet) Minimum Top of Pay	DEPTH, (Feet) Maximum to Bottom of Pay	DEPTH, (Feet) Average Thickness of Pay (Feet)	Type Structure
EASTERN VENEZUELA:									
Anzoategui:									
B-1	n.a.	40	Oficina	Sand	Miocene	7740	8500	760	Faulted Monocline
Caico Seco	200	n.a.	Oficina	Sand	Miocene	7140	8500	360	Faulted Monocline
Caires	n.a.	n.a.	Oficina	Sand	Miocene	n.a.	8301	n.a.	Faulted Monocline
Chimire	n.a.	n.a.	Oficina	Sand	Miocene	n.a.	6900	n.a.	Faulted Monocline
El Roble	9100	44	Oficina, Merecure	Sand	Miocene, Eocene	7800	10,500	2700	Anticline
Guara	3350	15–37	Oficina	Fine sand	Miocene	5200	6560	1360	Faulted Monocline
Guario	4000	38–45	Oficina	Sand	Miocene	4200	8000	4200	Faulted Monocline
Guico	2650	38	Oficina	Fine sand	Miocene	5200	7000	1800	Faulted Monocline
Inca	n.a.	37.8	Oficina	Sand	Miocene	6824	6831	7	Faulted Monocline
La Ceiba	150	37.3	n.a.	Sand	Miocene	5400	7000	1600	Faulted Monocline
Leona	1100	26	Oficina	Lutitas	Miocene	6000	7000	1000	Faulted Monocline
Nipa	1050	33–38	Oficina	Fine sand	Miocene	7100	7600	500	Faulted Monocline
Oficina	13500	25	Oficina	Fine sand	Miocene	4590	5900	1310	Faulted Monocline
Pelayo	250	30.2	Oficina	Sand	Miocene	7480	8005	525	Faulted Monocline
Quiamare	50	39	n.a.	Sand	Miocene	n.a.	6400	n.a.	Faulted Monocline
Rincón	300	42	Oficina	Sand	Miocene	7730	9000	1270	Faulted Monocline
San Joaquín	7692	43	Oficina, Merecure	Clay, sand	Miocene, Eocene	6230	6560	330	Anticline
San Roque	n.a.	45	Oficina	Sand	Miocene	7640	7870	230	n.a.
Santa Ana	250	34.6	Oficina, Merecure	Sand	Miocene, Eocene	4500	8840	4340	Anticline
Santa Rosa	1670	42	Oficina, Merecure	Fine sand	Miocene, Eocene	7546	10,400	2854	Anticline
Tocó	n.a.	n.a.	Oficina, Merecure	Sand	Miocene, Eocene	n.a.	7950	n.a.	Anticline
Yopales	900	16–42	Oficina	Sand	Miocene	4340	5900	1560	Faulted Monocline
Guarico:									
Guavinita	n.a.	n.a.	La Pascua	Sand	Mio.-Olig.	n.a.	4001	n.a.	Monocline
Las Mercedes	7000	32	La Pascua	Sand	Mio.-Olig.-Cret.	4200	6400	2200	Faulted Monocline
Palacio	1000	34	La Pascua	Sand	Miocene	3500	4500	1000	Faulted Monocline
Punzon	n.a.	n.a.	La Pascua	Sand	Mio.-Olig.	3480	n.a.	n.a.	n.a.
Ruiz	n.a.	29	n.a.	Sand	n.a.	4410	4450	40	n a.
Sabán	n.a.	36	n.a.	Sand	Mio.-Olig.	n.a.	5718	n.a.	n.a.
Taman	n.a.	39	n.a.	Sand	Miocene	2970	5640	2670	n.a.
Tucupido	500	36	Tucupido	Sand	Miocene	n.a.	6858	n.a.	Anticline
Monagas:									
Caritos	200	30.5	Oficina	Sand	Miocene	5650	n.a.	n.a.	n.a.
Jusepín	17000	33	Jusepín	Fine Sand	Miocene	4590	4670	80	Anticline
JX6	n.a.	12.6	n.a.	Lime	Cretaceous	n.a.	2546	n.a.	Monocline
Mata Grande	300	25	n.a.	Fine Sand	Miocene	5700	6100	400	Monocline
Mulata	7240	33	Mulata	Fine sand	Miocene	5240	5900	660	Strat.-trap
Muri	800	32	Muri	Loose sand	Miocene	3280	3600	320	Monocline
Piritál	50	28	n.a.	Sand	Miocene	5870	5925	55	Strat.-trap
Quiriquire	12250	19	Quiriquire	Clay, sand	Pliocene	2624	4900	2276	Faulted Monocline
Santa Bárbara	2315	27–30	Santa Bárbara	Fine sand	Miocene	5900	6560	660	Monocline
Temblador	4600	21	Oficina	Fine sand	Miocene	3600	3930	330	Fault
Travieso	2500	33	La Pica	Sand	Miocene	5500	6450	950	Anticline
Travieso 2	500	31	n.a.	Fine sand	Miocene	5600	6200	600	Monocline
Terr Delta Amacuro:									
Pedernales	972	21	Pedernales	Loose sand	Miocene	1550	2500	950	Anticline
Tucupita	600	16.5	n.a.	Loose sand	Miocene	5550	6000	450	Anticline
WESTERN VENEZUELA:									
Barinas:									
Silvestre	n.a.	26	n.a.	Sand	Eocene	8600	9763	1163	Anticline
Falcón									
Cumarebo	540	48	Socorro	Lent, sand	Miocene	1950	3000	1050	Anticline
El Mene	1008	33	Agua Clara	Sandstone	Miocene	1120	1600	480	Anticline
Hombre Pintado	92	24	Agua Clara	Sandstone	Miocene	2460	2630	170	Anticline
Las Palmas	50	34	Monte Claro	Sand	Oligocene	2750	n.a.	n.a.	Anticline
Media	62	34	Agua Clara	Sandstone	Miocene	3280	3900	620	Fault
Mene de Acosta	n.a.	n.a.	El Salto	Sand	Oligocene	970	2046	1076	Anticline
Zulia:									
Amana	500	31.5	n.a.	Sand	Eocene	3188	4500	1312	Anticline
Bachaquero	19000	13–17	Lagunillas Icotea	Clay, sand	Mio.-Olig.	2800	6000	3200	Monocline
Boscán	n.a.	10–12	n.a.	Sandstone	Olig.-Eoc.	n.a.	9982	n.a.	Anticline
Cabimas	4500	15–27	Lagunillas Icotea	Clay, sand	Mio.-Olig.	1600	3600	2000	Monocline
Concepción	2470	37	Concepción	Sandstone	Eocene	1700	n.a.	n.a.	Anticline
El Cubo, Las Cruces, Tarra	2470	19–33	Mirador	Sandstone	Eocene	2300	6350	4050	Monocline
La Paz	1359	24–34	La Paz, La Luna, Cogollo	Sandstone, Limestone	Eoc.-Cret.	1900	2950	1050	Anticline
Lagunillas	60000	16–30	Lagunillas Icotea	Clay, sand	Mio.-Olig.	2500	5500	3000	Monocline
Los Manueles	420	30–39	Mirador	Sandstone	Eocene	3900	n.a.	n.a.	Dome
Mara	1500	29.5	Cogollo	Limestone	Cretaceous	6400	7000	600	Anticline
Mene Grande	8645	22	Pauji	Clay, sand	Eocene	3050	4550	1500	Anticline
Netick	250	29.2	Mostrencos	Sand	Eocene	5860	6097	237	Faulted Anticline
Pueblo Viejo	3750	21	n.a.	Sand	Eocene	1850	3000	1150	Anticline
Río de Oro	100	38.8	Río de Oro	Sand, lime	Cretaceous	n.a.	1850	n.a.	Fault
Sibucara	n.a.	36.6	Cogollo	Limestone	Cretaceous	12,200	13,451	1251	Anticline
Tía Juana	43000	13	Lagunillas, El Mene	Clay, sand	Miocene, Eocene	2850	5000	2250	Monocline
West Tarra	500	41	n.a.	Limestone	Cretaceous	6900	8400	1500	Anticline

n.a.—Not Available.

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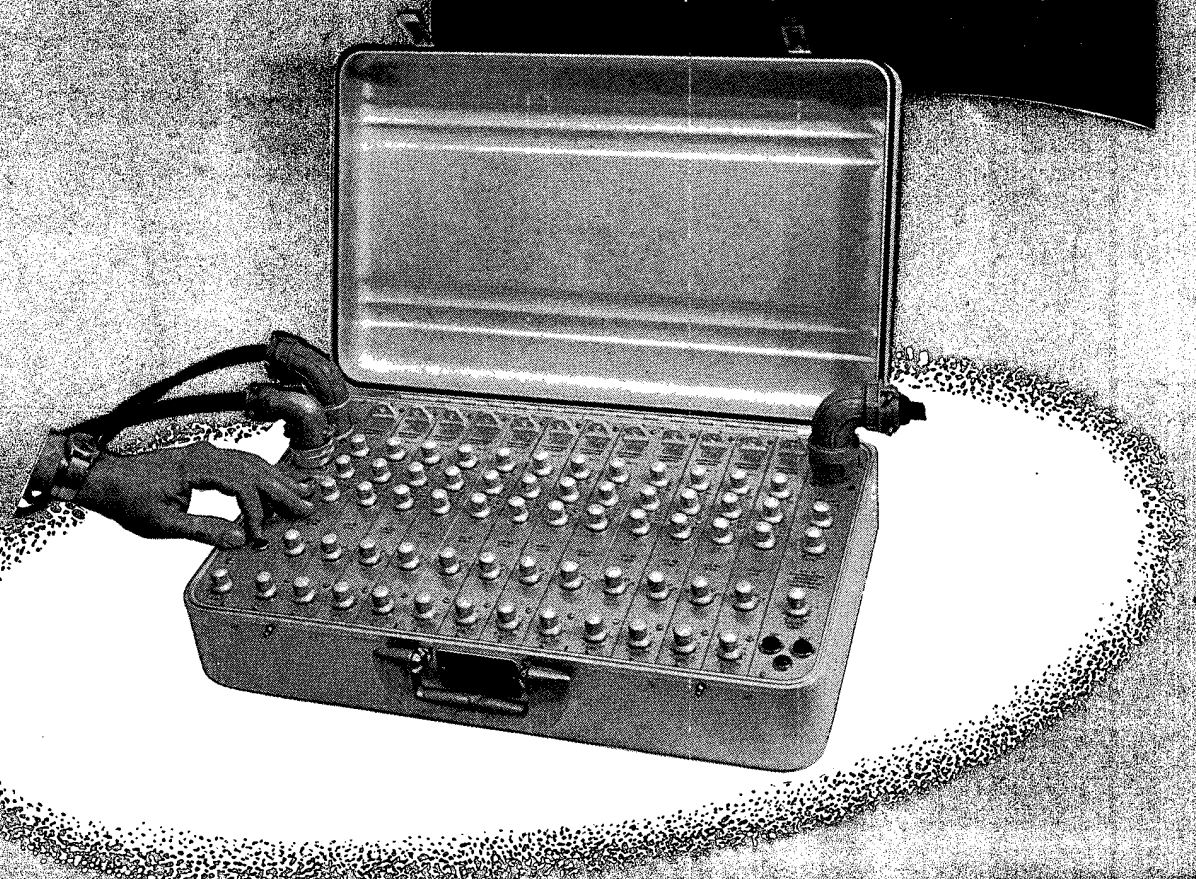

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P-108 well, north of the La Paz field, for 6500 barrels per day. Shell's VL-2 well, an Eocene test 12 miles out in Lake Maracaibo, was abandoned at 7125 feet. Richmond Petroleum Company abandoned its Cretaceous test, Zulia 34 D-1, 39 miles southwest of Maracaibo, at 13,400 feet. Another Cretaceous test by Richmond nine miles south of Mara was plugged back from a total depth of 13,600 feet to test shallower sands.

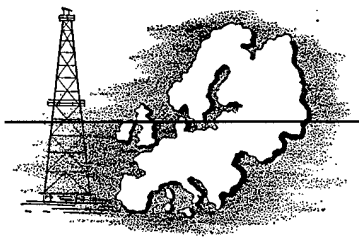
The Atlantic Refining Company was trying for deep production in its Ruiz 3-33, scheduled to 9000 feet in the Ruiz field, where production normally is found between 4000 and 5000 feet. Sinclair was rigging up Guere 1, about four miles west of Mene Grande's Los Mangos 1.

Venezuela had 16 refineries in operation at the close of the year and one building. The latter, owned by Phillips Oil Company, is situated at San Roque. Daily crude runs at the end of 1950 totaled 345,350 barrels.

Refineries of Venezuela

COMPANY	Location of Plant	Crude Charging Capacity (Barrels Daily)	Cracking Capacity (Barrels Daily)	Type of Refinery
British Controlled Oilfields, Ltd.	Mene de Mauroa	200	.....	Skimming
Creole Petroleum Corporation	Amuay	69,000	7,000	Complete
	Caripito	75,000	35,000	Complete
	La Salina	12,000	.....	Skimming
Mene Grande Oil Company	Cabimas	1,800	.....	Skimming
	Oficina	400	.....	Skimming
Phillips Oil Company	San Roque	2,000	.....	Skimming
Shell Group	Calvario	300	n.a.	n.a.
	Cardon	67,000	40,000	Complete
	Casigua	1,000	n.a.	n.a.
	Rivera	300	n.a.	n.a.
	San Lorenzo	44,000	.....	Skimming
Sinclair Oil Company	Puerto La Cruz	35,000	.....	Complete
Socony Vacuum Oil Company	Anaco	250	n.a.	n.a.
	Silvestre	100	n.a.	n.a.
Texas Petroleum Company	Tucupita	10,000	n.a.	n.a.
Venezuela Gulf Refining Company	Puerto La Cruz	32,000	.....	Complete

n.a.—Not Available.



AUSTRIA

Discovery Reported Ten Miles from Zisterdorf Field; Russian Mismanagement May Deplete Reserves in Decade

A DISCOVERY was reported early in 1950 at Gaenserndorf, within 15 miles of the city of Vienna and about ten miles from the older oilfield of Zisterdorf. The well reportedly came in for about 500 barrels daily, although Russian claims throughout its controlled fields are viewed with considerably doubt in free countries.

The Austrian government also early in 1950 accused Russia of so mismanaging lower Austrian oil fields that reserves estimated to last for about 30 years will be depleted in less than ten years.

In a review of its closely-guarded activity, Austria charged the USSR with ordering new drilling in the Zisterdorf fields and with increasing the number of drilling rigs in the area from seven to 35. This action was the result, Austria said, of a 1949 decline in Zisterdorf production.

At this point the discrepancies of figures and information coming out of Russian-dominated fields is apparent, for the estimated 1949 production of Zisterdorf fields was 854,949, an increase of 3609 barrels over 1949.

Upper Austria Provincial government announced the steady rise of Upper Austrian oil production. New methods were reportedly on trial in an effort to further increase output.

Austrian capital was subscribed for the construction of a petrochemical plant in the Linz port area to be operated by Oesterreichische Mineraloelchemie, A.G.

Austria was unable to submit a detailed program for

Refineries of Austria

COMPANY	Location of Plant	Total Charging Capacity Barrels Daily	Type of Refinery
SOVIET ZONE:			
*Aktiengesellschaft der Kohlen wertstoffverbaende	Vösendorf (Vienna)	2,500	Skim, lube, asphalt
Gruppe *Bezin-Benzol Verband (BV)* Aktiengesellschaft de Shell-Floridsdorfer Mineralölfabrik (Shell)	Floridsorf (Vienna)	2,800	Skim, lube, asphalt
*Donau Oel Gesellschaft m.b.H.	Moosbierbaum (near Tulln)	3,500	Skim, lube, asphalt
*Korneuburger Mineralölraffinerie Aktiengesellschaft	Korneuburg (Vienna)	5,600	Skim, lube, asphalt
*"NOVA," Mineralölraffinerie Aktiengesellschaft	Schwechat (Vienna)	3,500	Skim, crack, lube, asphalt
*Oesterreichische Mineralölwerke Gesellschaft m.b.H. (Shell-Socony-Vacuum)	Lobau (Vienna)	5,600	Skimming
Vacuum Oil Co., Aktiegesellschaft (Socony-Vacuum)	Karan (Vienna)	2,500	Skim, lube, asphalt
U. S. ZONE:			
Deutsche Erdölwerke	Ebensee (near Linz)	2,200	Skimming

* Soviet claimed and operated.

Oil Production and Producing Wells in Austria
(1950 data not available)

REGION and FIELD	Operating Company	Year of Discovery	Producing Wells	CRUDE OIL PRODUCTION (Barrels) Year 1948	Year 1949 (Est.)	Cumulative Through 1949
LOWER DANUBE						
Aderklaa	S.M.O.A.*	1942	4	.....	.....	22,000
Gaiselberg	Rohoelgew, A.G.	1938	60	1,047,160	977,472	12,081,632
Hohenruppersdorf	S.M.O.A.	1941	5	14,480	.....	78,480
Maustrenk	S.M.O.A.	1941	44	76,390	322,091	1,464,481
Muhlberg	S.M.O.A.	1942	24	1,819,510	3,666,878	8,416,388
Neusiedl	S.M.O.A.	1936	4	.....	.....	153,000
Scharfeneck	S.M.O.A.	1944	2	260	.....	21,260
St. Ulrich-Hauskirchen	S.M.O.A. & R.V. Van Sickle	1938	351	1,531,250	1,466,208	20,601,458
Van Sickle	S.M.O.A.	1939	52	369,920	364,855	5,663,775
Zisterdorf (Rag and Gosting)	Rohelgew, A.G. & Erdolproduktions G.m.b.H.	1930	91	851,340	854,949	12,089,953
UPPER DANUBE						
Leoprechting	"Pram" Erdolexplorations G.m.b.H.	1906	10	600	.....	2,600
Total	.....	....	647	5,710,910	7,652,453	60,595,027

* Soviet Mineral Oil Administration.

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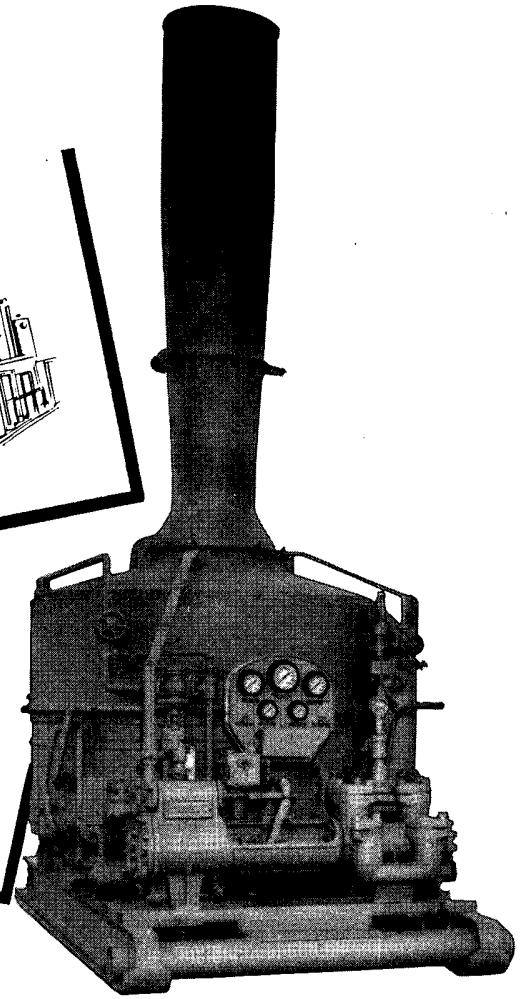
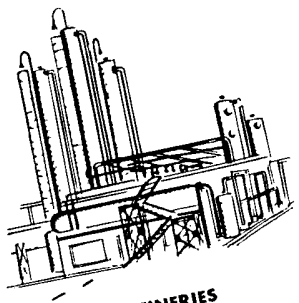
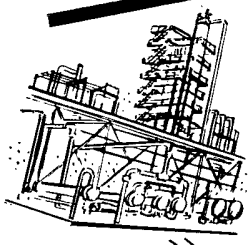




REFINERIES



GASOLINE PLANTS

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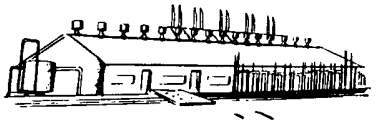

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the period to 1952-1953. However, this much was held as likely by Austrian officials: Consumption would rise to 3,547,960 barrels and Austria would be able to meet the nation's full consumption requirements from home refineries processing in excess of 4 million barrels of petroleum, supplied entirely from indigenous production.

Whether this level of industrial application would be reached by the 1952-1953 period remained doubtful.

Engineering and Geological Data on Austria Fields

REGION and FIELD	Proved Area (Acres)	Range of Gravity (API)	Name	Kind	Age	DEPTH (Feet) Minimum to Top of Pay	DEPTH (Feet) Maximum to Bottom of Pay	Average Thickness of Pay (Feet)	Type of Structure
LOWER DANUBE:									
Aderklaa	....	48.8-gas	Helvet-Schlier	Sand	Miocene	7977	8535	85	Buried Hill
Alt.-Lichtenwarth	....	Gas	Sarmat-Torton	Sand	Miocene	2886	3644	115	Fault structure
Gaiselberg	200	21.5-27.5	Sarmat-Torton	Sand	Miocene	2066	7724	387	Fault structure
Hohenruppersdorf	....	35.0	Sarmat-Torton (Flysch)	Sand, Sandstone	Miocene (Cret.)	3323	5366	98	Fault structure
Matzen	....	23.8	Sarmat	Sand	Miocene	n.a.	n.a.	n.a.	Anticline
Maustrenk	200	26.5	Helvet-Schlier (Flysch)	Sand, Sandstone	Miocene (Eoc.)	2756	3297	164	Stratigr. trap
Mühlberg	....	30.5	Pannon, Sarmat-Torton	Sand	Miocene	1490	5315	476	Fault structure
Neusiedl	....	31.5	Flysch	Sandstone	Eocene	4003	4101	20	Anticline
Oberlaa	....	Gas	Torton	Sand-conglomerate	Miocene	820	873	13	Buried Hill
Plattwald	....	21.5	Torton	Sand	Miocene	3255	5190	56	Fault structure
Scharfeneck	....	24.0	Helvet-Schlier	Sand	Miocene	3251	3317	66	Stratigr. trap
St. Marx	....	Gas	Torton	Sand	Miocene	2343	2395	52	Fault Anticline
St. Ulrich-Hauskirchen	2000	31.5	Helvet-Schlier (Flysch)	Sand, Sandstone	Miocene, (Eoc.)	2723	3773	394	Buried Hill and Anticline
Van Sickle	....	21.5-27.5	Sarmat-Torton	Sand	Miocene	1312	4593	459	Fault structure
Zistersdorf	100	20.7-27.5	Sarmat, Torton, Flysch	Sand, Sandstone	Miocene	2165	7720	518	Fault structure
UPPER DANUBE:									
Leoprechting	....	12.9	Burdigal-Schlier	Sand	Miocene	394	472	33	Stratigr. trap
Wels	....	Gas	Burdigal, Helvet-Schlier	Sand	Miocene	476	1499	33	Stratigr. trap

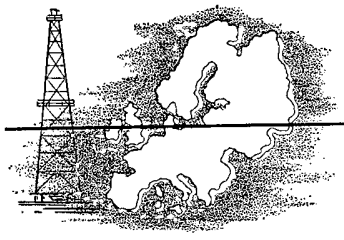
DENMARK

THE search for oil in Denmark was again unsuccessful in 1950. At the end of the year one well was reported drilling. Danish American Prospecting Company (Gulf Oil Corporation) resumed drilling on Gassum 1 in December after a break in the casing had been repaired. The well was deepened from 9955 feet to 11,359 feet without encountering shows of oil or gas.

Danish American during 1950 completed two semideep tests near Frederikshavn City, on the northeast coast, and the other near Aalborg. The former was completed at 4317 feet and the latter at 4997 feet without encountering any shows of oil or gas. In addition to the deep and semideep drilling operations, Danish American maintains a rig on structure drill work and has one seismograph party in the field. A subsurface and micropaleontological laboratory is likewise maintained on a continuous basis with headquarters at Vilborg in North Central Jutland.

Danish American has had an exclusive concession in Denmark since 1938. The concession agreement, which covers 17,000 square miles and adjacent water areas, was redrawn in 1950 for a 50-year period granting the Danish government a five percent stock interest in DAPCO.

Imports, which supply Denmark's petroleum requirements, averaged about 34,000 barrels daily in 1950, compared with about 25,000 barrels a day in 1949. The U. S. supplied about 50 percent of Denmark's petroleum with Britain furnishing nearly all the remainder.



FRANCE

New Lacq Field in Aquitaine Basin Boosts Production; Government Approves Exploration by Foreign Capital

PRODUCTION from the newly-discovered Lacq field in the Aquitaine Basin at the foothills of the Pyrenees proved a boon to France's hitherto almost static oil industry. The field, which was discovered late in 1949 and now has seven producing wells, was responsible for 447,000 barrels of crude in 1950. Thus, crude production in France was almost double in 1950 what it was in 1949, with a total of 893,100 barrels as compared with 463,800.

While the Lacq field is so far the only major discovery in France's postwar petroleum development program, there is sufficient cause for optimism. Early in 1951 the French government approved a plan whereby private foreign capital will, for the first time, be permitted to explore for oil in Southwest France. The permit granted to Standard Francaise des Petroles covers an area of 6809 square miles in the departments of Gironde (Bordeaux), Carente-Maritime (La Rochelle), Darelogne (Perigueux), Lat-a-Garonne (Agen) and Landes (Mont-de-

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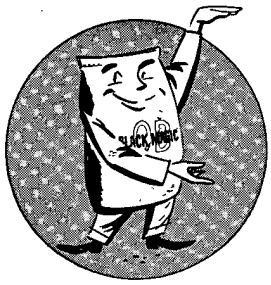


drilled wells deeper

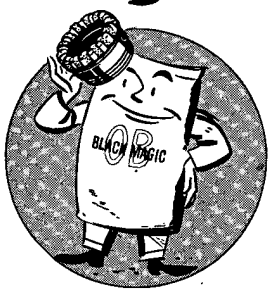
In a famous Gulf Coast wildcat, already the deepest ever drilled in this area and on its way to a new world's record, Black Magic has been used continuously for 16 months. Total cost of maintaining the oil base mud averages less than $25 a day, including all transportation charges from the Pre-mix Plant in Houston. The mud used previously required 12 to 16 hours to recondition after each round trip before it was in shape to resume drilling. Black Magic saved thousands of hours and dollars on this job, and made possible the record for depth, now below 20,000 feet.

drilled hotter wells

The stability of Black Magic under high temperatures is unequalled. Black Magic has not broken down when used in wells with bottom hole temperatures as high as 387°F. In simple laboratory tests, all other commercial drilling fluids (oil base and water-base alike) showed a definite deterioration at 250°F. Under actual high-temperature drilling conditions it would be costly to depend upon any other mud than Black Magic.

drilled thru more heaving shale

The recent use of Black Magic in a deep Gulf Coast well to combat a serious heaving shale condition was highly successful. Other jobs in similar areas have been equally startling. Black Magic's zero filtrate loss enables drilling through hydrous disintegrating shale where other methods have failed. The excellent plastering properties permits a "to gauge" hole, reduces drilling hazards and on many occasions has actually loosened stuck drill pipe. Salt, anhydrite, cement, etc. have no effect on Black Magic.



diamond-cored more footage

Because of the reduced circulating rates when coring with diamonds, Black Magic is the ideal drilling fluid for this type of work. For example, in a deep Oklahoma field where extensive diamond coring was used, not one single hour of mud conditioning time was shown on any well using Black Magic, whereas water base muds required constant care and maintenance costs were prohibitive. Black Magic does not flush or alter connate water in the core and recovery of 100% can be expected.

than any other oil base drilling fluid

For detailed information on any of the above cases, see your nearest Oil Base, Inc. representative. Send for a copy of "Oil Base Drilling Fluids," a paper presented at the Third World Petroleum Congress, held at The Hague, June 1951. This paper describes in detail all phases of the subject and exhibits proof you can't afford to overlook. Ask for Bulletin 102.

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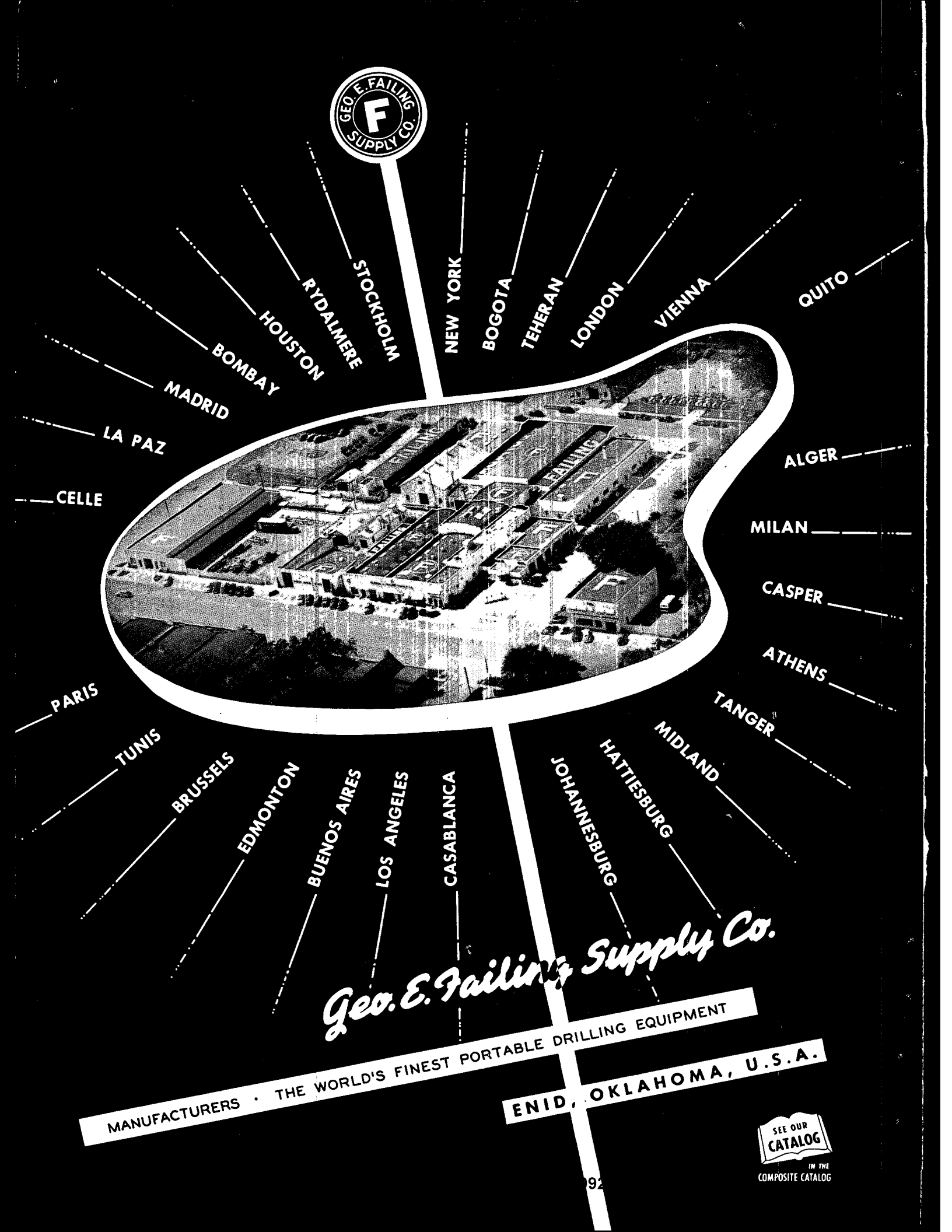
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Marsan). This area is immediately north of and contiguous to the territory conceded to Societe Nationale des Petroles d'Aquitaine and Regie Autonome des Petroles, both being companies in which the French government has controlling interest. Standard Francaise is controlled by United Petroleum Securities Corporation, in which Standard Oil Company (N.J.) has the largest interest, with participation by Gulf Oil Corporation and The Atlantic Refining Company. The agreement between SFP and the French government calls for a total expenditure over a five-year period of about $33,700,000.

In mid-1950, the Economic Cooperation Administration pledged $2,654,000 to finance drilling operations in France and French North Africa. The funds are primarily for the purchase of drilling equipment by government-controlled operating companies, and include a grant of $1,300,000 for the North African enterprise. Societe Nationale de Recherches et d'Exploitation des Petroles en Algerie (SN.REPAL) was given $220,000 for maintenance and replacement of drilling equipment, as well as $500,000 for additional drilling equipment for its operations in Algeria. Societe Cherifienne des Petroles, operating in Morocco, received $580,000 for maintenance and replacement parts for its drilling equipment. Successful drilling programs in these areas would go far toward furnishing France with needed crude from French sources.

Production from the ancient Pechelbronn field fell off from 461,000 barrels in 1949 to 445,000 barrels in 1950, despite the 28 producing oil wells brought in last year. The new wells made a total of 692 producing in Pechelbronn. Pechelbronn Societe Anonyme d'Exploitations Minieres, the operating company, with the aid of $400,000 in ECA funds was continuing its drilling program in the Middle Alsace area, and at the end of 1950 had 12 rigs running. In Alsace there were new shows in lower horizons than those previously drilled, with wildcats drilled to the Lettenkohle and Muschelkalk limestones resulting in five producing wells. Drilling in this area was a continuation of the success of the discovery near Soultz at the end of 1949.

Stepped-up drilling activity was also apparent in the

Refineries of France

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Daily Crude Runs End of 1950 (Bbls.)	Type of Refinery
Cie de Raffinage Shell-Berre	Berre (Marseille)	26,000	7,500	23,000	Topping, Lube, Asphalt, Wax
	Pauillac (Bordeaux)	6,500	.....	6,200	Asphalt
	Petit-Couronne (Rouen)	47,000	3,500	45,000	Topping, Lube, Asphalt
Cie Française de Raffinage	Gonfreville (Le Havre)	64,000	8,000	57,000	Topping, Wax
	La Mède (Marseille)	54,000	12,000	48,000	Topping, Asphalt
Pechelbronn S. A. d'Exploitations Minières	Merkwiller (Strasbourg)	1,500	.....	1,250	Topping, Lube, Asphalt
Raffineries de Pétrole de la Gironde	Ambes (Bordeaux)	18,000	3,000	15,000	Topping
Raffineries Francaises de Petrole de l'Atlantique	Donges (St. Nazaire)	20,000	3,000	17,000	Topping, Lube
Société Générale des Huiles de Petrole	Courchelettes (Douai)	750	.....	750	Lube
	Dunkerque	10,000	.....	8,500	Topping
	L'Avera	33,000	5,000	32,000	Topping
Socony-Vacuum Française	Frontignan (Sète)	23,000	3,500	15,000	Topping
	Notre Dame de Gravenchon (Rouen)	19,000	3,000	11,000	Topping, Lube
Standard Française des Pétroles	Port-Jérôme (Le Havre)	45,000	6,000	44,000	Topping, Lube, Asphalt

Pipe Lines of France

COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Capacity of Lines (Bbls. Daily)	Year Completed
CRUDE OIL LINES:						
Standard Française des Pétroles	Le Havre	Notre-Dame-de Gravenchon	22.5	10	55,000	.....
Cie. Française de Raffinage	L'Avéra	La Mède	7	16	90,000	.....
Cie de Raffinage Shell-Berre	L'Avéra	Berre	20	14	70,000	.....
REFINED PRODUCT LINES:						
Société de Transport de Pétrole par Canalisation	Le Havre	Paris	160	10	20,000	.....
Cie. Francaise de Raffinage	La Mède	Caronte	5.5	12	45,000	.....
			5.5	8	45,000	.....
GAS PIPE LINES:*						
Régie Autonome des Pétrolas	St. Marcet field	Peyrouzet	3	8	24,700	1942
	St. Marcet field	Boussens	10	9½	70,000	1947
	Peyrouzet	Pau via Tarbes	75	5	8,500	1946
	Tarbes	Pierrefitte	22	4	2,000	1946
	Boussens	Toulouse	37	12½	42,500	1947
	Peyrouzet	Toulouse	46	6	14,000	1942
	Capens	Pamiers	34	5	3,500	1947
	Boussens	St. Girons	22	4	6,350	1946
	Toulouse	Bordeaux	155	8	12,000	1948–1949

* Capacity in thousands of cubic feet.

France Oil Production and Geological Data

REGION and FIELD	Operating Company	Year of Discovery	Producing Wells End of 1950			OIL AND GAS PRODUCTION				Gravity of Oil (API)	Formation	Geologic Age	DEPTH (Feet)		Type of Structure
			Flowing	Art. Lift	Total	Daily End of 1950	Year 1949	Year 1950	Cumulative Through 1950				Min. to Top of Pay	Max. to Bottom of Pay	
ALSACE BASIN: Pechelbronn	Pechelbronn Société Anonyme d'Exploitations Minières	1813	12	680	692	1,200	461,000	445,000	20,255,000	32	Sand	Oligocene	600	1200	Faults
											Dolomite	Oligocene	800	1600	Faults
											Sand	Jurassic	1300	2300	Faults
											Sand	Triassic	2900	4000	Faults
AQUITAINE BASIN: Lacq	Société Nationale des Pétroles d'Aquitaine	1949	6	1	7	2,800	.....	447,000	447,000	n.a.	Lime	Cretaceous	2100	n.a.	Anticline
St. Marcet:															
Oil Area.....	Régie Autonome des Pétroles	1939	..	...	...	....	2,800[1]	1,100[2]	49,900	45	Conglomerate	Cretaceous	4000	6000	n.a.
Gas Area.....			n.a.	n.a.	10	25[3]	8,450[3]	8,900[3]	41,650[3]	Gas	Lime	Jurassic, Liassic	5000	7000	Anticline
LANGUEDOC BASIN: Gabian	Société Nationale des Pétroles du Languedoc Mediteranéen	1924	..	...	...	....	.....	.....	187,330	..	Dolomite	Lower Triassic	205	1200	Faulted Anticline
Total (Oil only)	.....	....	18	681	699	4,000	463,800	893,100	20,939,230	..	.....	.....	....	....	.....

[1] Produced only first three months of 1949. [2] Produced only first four months of 1950. [3] Gas—millions of cubic feet.

Languedoc Basin, where Societe Nationale des Petroles du Languedoc Mediteraneen drilled 13 wells, including six observation wells, but with no success. There were also 13 wildcats drilled in the Aquitaine Basin area, but all were dry holes.

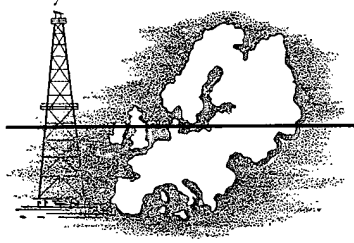
In all areas, drilling in France was increased considerably in 1950, with a total of 113 wells of all categories, including 40 producing oil wells and 73 dry holes completed. Drilling during each postwar year has shown a marked step-up, and 1950's 113 wells represented a 32.9 percent increase over the 85 wells drilled in 1949. Total footage drilled was up 36.1 percent over 1949, with 348,600 feet in 1950.

Success of the accelerated drilling program is illustrated by a comparison of the daily production rates in 1950 and in 1949. At the end of 1950 the daily average was 4000 barrels per day, contrasting with 1340 barrels daily at the end of 1949.

Drilling in France

REGION and FIELD	WELLS COMPLETED IN 1949 Oil	Gas	Dry	Total Wells	Total Footage	WELLS COMPLETED IN 1950 Oil	Gas	Dry	Total Wells	Total Footage	Wells Drilling End of 1950
ALSACE BASIN:											
Pechelbronn	24	..	28	52	120,500	28	..	32	60	125,000	12
Wildcats	2	..	3	5	11,100	5	..	10[1]	15	35,000	n.a.
AQUITAINE BASIN:											
Lacq	..	..	..	..	.....	7	..	4	11	26,500	2
St. Marcet	..	3	..	3	25,200	..	..	1	1	6,500	..
Wildcats	1	..	14	15	61,300	..	..	13	13	84,400	n.a.
LANGUEDOC BASIN:											
Wildcats	3	..	7	10	38,100	..	..	13[2]	13	71,200	n.a.
	30	3	52	85	256,200	40	..	73	113	348,600	14

[1] Includes four observation wells. [2] Includes six observation wells.



GERMANY

More Wildcats, Increased Footage Drilled During Year; Production Pushed Up to New High of 7,830,000 Barrels

GERMAN oil fields in 1950 yielded an estimated 7,830,000 barrels of oil, 1,883,000 more than in 1949, for a record output. The cumulative production was raised to 106,577,000 barrels. Six fewer wells, 343, were completed during the year than in 1949; however, 243 producers were completed while 221 were brought in during 1949.

Another well was brought in for the new Scheerhorn field north of Georgsdorf in Western Germany's Emsland region. The well, Scheerhorn 8, is about 650 feet south of

Oil Production and Producing Wells in Germany

REGION and FIELD	OPERATING COMPANY	Year of Discovery	PRODUCING OIL WELLS END OF 1950 Flowing	Art. Lift	Total	CRUDE OIL PRODUCTION Daily End of 1950	Year 1949	Year 1950	Cumulative Through 1950
BADEN:									
Forst-Weiher	Itag	1934	....	50	50	55	22,267	19,901	563,168
Weingarten	C. Deilmann	1936	....	89	89	60	19,033	21,658	291,091
EMSLAND:									
Adorf	C. Deilmann (Gewerkschaft Elwerath, Preussag, Wintershall A.G., 25 percent each)	1946	1	1	2	25	14,301	9,282	38,724
Emlichheim	Wintershall (90 percent) Deutsche Vacuum Oel A.G. (10 percent)	1944	....	58	58	2,920	902,559	1,075,949	3,036,508
Georgsdorf	Preussag (C. Deilmann, Gw. Elwerath, Wintershall, 25 percent each)	1944	94	9	103	3,930	924,756	1,568,196	3,229,552
Lingen	Deutsche Schachtbau & Tiefbohr-G.m.b.H. (Gw. Elwerath 50 percent)	1942	1	78	79	1,475	420,280	521,199	2,121,479
Ruehlermoor	Deutsche Schachtbau & Tiefbohr-G.m.b.H. (Gw. Elwerath 50 percent)	1949	9	3	12	1,150	5,803	215,208	221,011
Ruehlertwist	Wintershall (C. Deilmann, Gw. Elwerath, Preussag, 25 percent each)	1949	....	8	8	790	2,688	74,795	77,483
Scheerhorn	C. Deilmann (Gw. Elwerath, Preussag, Wintershall, 25 percent each)	1949	6	....	6	265	4,193	67,158	71,351
HAMBURG:									
Reitbrook	Preussag and Deutsche Vacuum, 50 percent each	1937	61	72	133	865	293,818	308,063	8,721,881
HANOVER:									
Adolfsglueck	Deutsche Erdoel-A.G.	1936	....	1	1	.....	175	28	2,163
Broistedt	Preussag & Gw. Elwerath, 50 percent each	1937	....	9	9	115	36,407	41,678	268,085
Calberlah	Gw. Elwerath	1945	....	8	8	18	10,990	7,735	30,725
Eddesse-Oelheim	Preussag & Deutsche Erdoel	1876	1	15	16	43	15,456	14,826	1,656,782
Ehra	Deutsche Erdoel	1939	....	14	14	15	4,221	3,878	72,399
Eicklingen-Wienhausen	Wintershall, Gw. Elwerath, & ITAG	1937	....	16	16	206	75,439	74,599	1,811,038
Eilte	Deutsche Vacuum & Wintershall (50 percent each)	1947	....	1	1	3	3,178	2,261	7,747
Eldingen	Gw. Elwerath	1949	4	1	5	340	266	47,159	47,425
Etzel	Preussag	1942	....	2	2	140	19,383	39,312	206,695
Fuhrberg-Hambuehren	Wintershall, Gewerkschaft Brigitta, ITAG	1939	....	278	278	1,025	354,487	373,695	3,382,132
Gifhorn	Deutsche Erdoel	1935	....	41	41	37	11,942	12,215	303,257
Hademstorf	Deutsche Vacuum	1941	....	13	13	190	98,714	85,736	474,450
Hohenassel	Gw. Elwerath, Preussag & Braunschweigische Bohrgesellschaft m.b.H. (33.3 percent each)	1943	....	28	28	365	130,998	133,189	1,235,187
Meckelfeld	Wintershall & Gw. Elwerath (50 percent each)	1938	....	22	22	50	20,244	19,628	358,872
Moelme	Gw. Elwerath	1935	....	36	36	80	36,757	30,436	1,016,193
Nienhagen-Haenigsen	Gw. Elwerath, Deutsche Vacuum, Wintershall, Deutsche Erdoel, ITAG, Erz-und Erdoel-handelsgesellschaft, Ferd. Koller & Sohn	1889 1940	....	239	239	2,075	876,134	816,662	32,883,796
Oberg	Deutsche Vacuum, ITAG, G. Greiser	1919	....	63	63	200	52,612	72,016	2,324,628
Quakenbrueck	Gw. Brigitta (66.7 percent) & Deutsche Vacuum (33.3 percent)	1950	....	6	6	385	.....	91,098	91,098
Steimbke-Rodewald	Gw. Brigitta & Deutsche Vacuum	1936	4	212	216	1,610	354,100	540,876	3,681,076
Stemmerberg	Gw. Elwerath	1948	....	....	....	.....	175	.....	889
Suderbruch	Gw. Brigitta & Deutsche Vacuum (50 percent each)	1949	5	....	5	995	22,862	237,146	260,008
Thoeren	Deutsche Erdoel, Gw. Brigitta, Deutsche Vacuum	1941	....	60	60	280	119,294	102,200	1,131,994
Wathlingen	Wintershall	1950	....	1	1	55	.....	4,830	4,830
Wesendorf	Deutsche Erdoel, Gw. Elwerath, Preussag	1943	3	16	19	1,565	403,473	526,169	2,559,642
Wietze	Deutsche Erdoel	1874	....	295	295	545	177,198	198,394	16,806,592
SCHLESWIG-HOLSTEIN:									
Heide	Deutsche Erdoel	1935	....	57	57	1,400	392,140	472,584	9,418,724
Hohenhorn	Gw. Elwerath & Preussag (50 percent each)	1949	....	....	....	.....	210	532	742
	Total	....	189	1,802	1,991	23,272	5,826,553	7,830,291	98,409,467

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the field discovery, and was drilled by C. Deilmann Bergbau GmbH. In 1950, three heavy rigs were being used to develop the Scheerhorn structure.

Continued wildcat interest was reflected in the government's Geological Research Office report that about 95,000 feet were drilled during May alone. This figure did not include 11,600 feet drilled in shallow core wells. More than 30 percent of the core drilling operations was in newly-acquired concessions in Upper Bavaria and South Baden, primarily in the districts of Augsburg, Freising,

Engineering and Geological Data on Germany

REGION and FIELD	Est. Proved Area (Acres)	Gravity Oil (API)	PRODUCING FORMATION Name	Kind	Age	DEPTH (Feet) Minimum to Top of Pay	Maximum to Bottom of Pay	Average Thickness of Pay (Feet)	Type of Structure
BADEN:									
Forst-Weiher	230	32–34	Keuper	Sandstone	Triassic	1250	1380	60	Tilted Fault Blocks
			Upper Eocene	Sandstone	Tertiary	1800	2600	10	
			Dogger	Sandstone	Jurassic	2230	2460	100	
Weingarten	300	32–36	Meletta beds	Sand	Middle Oligocene	800	1600	230–500	Tilted Fault Blocks
			Pechelbronn beds	Sand	Lower Oligocene				
EMSLAND:									
Adorf	120	30	Wealden	Shell beds	Lower Cretaceous	4050	4400	350	Anticline
Bentheim	2970	49	Platten-dolomite	Dolomite	Zechstein (Permian)	5250	5580	115	Anticline
Emlichheim	1235	25	Bentheim sandstone (Valendis)	Sand	Cretaceous	2430	2890	80	Anticline
Georgsdorf	1630	24	Bentheim sandstone (Valendis)	Sand	Cretaceous	1600	3300	130	Anticline
Lingen	1190	30–32	Valendis, Wealden	Sand	Cretaceous	2570	3800	20–50	Fault Blocks
			Apt	Marl	Cretaceous			50–140	
			Serpulite	Lime	Jurassic			1–2	
Ruehlermoor	4125	25	Bentheim sandstone (Valendis)	Sand	Cretaceous	1970	2790	75–100	Anticline
Ruehlertwist	1850	25	Bentheim sandstone (Valendis)	Sand	Cretaceous	2430	n.a.	65	Anticline
Scheerhorn	3	30	Bentheim sandstone (Valendis)	Sand	Cretaceous	3600	3684	80	Monocline Unconformity
HAMBURG:									
Reitbrook	1165	21–22	Lower Eocene	Sand	Tertiary	1460	1635	115	Salt Dome
			Reitbrook beds	Lime	Upper Cretaceous	2100	2600		
HANOVER:									
Adolfsglueck	....	40	Rhaetic	Sandstone	Triassic	2600	3300	15	Salt Dome
Broistedt	160	35	Valendis	Sandstone	Lower Cretaceous	2400	3200	16–65	Salt Dome
Calberlah	n.a.	22	Dogger	Sandstone	Jurassic	160	400	16–20	Salt Dome
Eddesse-Oelheim	50	32	Rhaetic	Sandstone	Triassic	2900	3300	20–40	Salt Dome
	10	29	Angulaten Sandstone (Liassic)	Sandstone	Jurassic	820	n.a.	33	Salt Dome
				Sandstone	Jurassic	490	820	33	Salt Dome
Ehra	22	16	Lower Dogger	Sandstone	Lower Cretaceous	1640	3050	65	Salt Dome
Eicklingen-Wienhausen	50	32–33	Valendis, Wealden	Sand	Lower Cretaceous	3560	3700	55	Salt Dome
Eilte	n.a.	23	Wealden	Sandstone	Jurassic	3760	n.a.	110	Anticline
Eldingen	385	35	Lias	Lime Breccia	Jurassic	4560	4700	33	Salt Dome
Etzel	15	13	Cap Rock	Sanestone	Jurassic	260	1935	50–120	Salt Dome
Fuhrberg-Hambuehren	2940	23	Cornbrash (Dogger)	Sandstone	Cretaceous	660	820	100	Salt Dome
Gifhorn	42	17	Wealden	Sand	Cretaceous	4100	4500	80	Salt Dome
Hademstorf	120	25	Wealden	Limestone	Jurassic	5390	n.a.	n.a.	Salt Dome
	....	25–29	Kimmeridge	Limestone	Jurassic	1445	2070	130	Salt Anticline
Hohenassel	60	31	Coral Oolite	Lime	Middle Cretaceous	985	1380	65–100	Salt Dome
Meckelfeld	100	24	Reitbrook beds	Sandstone	Lower Cretaceous	1480	1670	40–65	Salt Dome
Moelme	100	32	Wealden	Sandstone	Cretaceous	160	1800	30–100	Salt Dome
			Coral Oolite	Limestone	Jurassic				
			Rhaetic	Sandstone	Traassic			65	Salt Dome
Neinbagen	4600	22–32	Valendis	Sand	Lower Creatceous	600	5350	30	Salt Dome
			Wealden	Sandstone	Lower Cretaceous				
			Cornbrash	Lime and Sandstone				65	Salt Dome
					Jurassic				
Nienhagen-Haenigsen	120	24–28	Valendis	Sand	Lower Cretaceous	2245	2770	82	Salt Dome
			Wealden	Sandstone					
Oberg	560	36–40	Wealden	Sand	Lower Cretaceous	520	1910	20	Salt Dome
			Lower Dogger	Sand	Jurassic				
Quakenbrueck	250	35	Wealden	Limestone	Lower Cretaceous	1270	n.a.	5	Anticline
			Serpulite	Shale	Jurassic				
Steimbke-Rodewald	405	18	Valendis	Sand	Lower Creta?eous	790	1030	13	Salt Dome and Half Anticline
			Wealden	Sand	Lower Cretaceous	790	990	13	
			Serpulite	Limestone	Jurassic	820	2300	16	
			Cornbrash	Sandstone	Jurassic	820	3675	50	Overthrust Fold
Stemmerberg	....	25	Cornbrash	Sandstone	Middle Jurassic	....	2600	....	Anticline
Suderbruch	1090	25	Valendis	Sand	Lower Cretaceous	3840	n.a.	18	Anticline
	....	35	Cornbrash	Sandstone	Jurassic	6725	n.a.	35	
Thoeren	115	19–34	Wealden	Sandstone	Cretaceous	1575	1720	165	Salt Dome
			Cornbrash		Jurassic	2830	2990	140	
			Rhaetic		Triassic	n.a.	4000	65	
Wathlingen	10	27	Senonian	Sandstone	Cretaceous	2000	n.a.	40	Salt Dome
Wesendorf	310	17	Neocomian	Sand	Cretaceous	1250	1410	33–65	Salt Dome
	....	38	Lower Dogger	Sandstone	Jurassic	2800	3600	23–33	
	....	41	Liassic	Sandstone	Jurassic	5900	5970	100–165	
Wietze	1050	18–27	Senonian		Cretaceous	300	1000	30–65	Salt Dome
			Wealden		Cretaceous	300	1000	200	
			Cornbrash	Sandstone	Jurassic	300	1000	200	
			Rhaetic		Triassic	590	1080	80–100	
SCHLESWIG-HOLSTEIN:									
Heide	1000	18–32	Basal breccia of the lower Cretaceous	Sandstone	Cretaceous	2950	4500	30–130	Salt Dome
			Zechstein	Limestone	Paleozoic	2660	3600	16-50	
Hohenhorn	....	13	Dogger	Sandstone	Jurassic	2635	2740	25	Salt Dome

n.a.—Not available.

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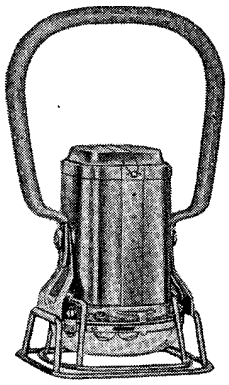


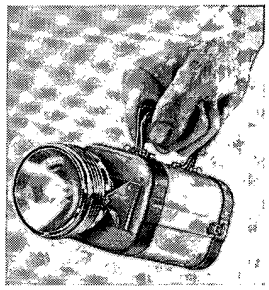
No. 2144-S

Approved by UNDERWRITERS' LABORATORIES (Class 1, Group D) and BUREAU OF MARINE INSPECTION AND NAVIGATION.

ALL-PURPOSE SAFETY HAND LANTERN

Uses standard 6-volt battery. Two bulbs—either gives both "spot" and direct light. Tilts on base to any angle. Wide movable handle. 3½ inch chrome reflector and glass globe. Wt. 2½ lbs.

No. 2144-S (Model 44S) Lantern, less battery. List Pr., Each....$7.25



No. 2188-S

NEW! EXTRA POWER 12-VOLT SAFETY FLASHLIGHT

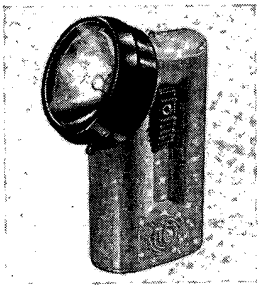
Most powerful safety flashlight made. More than twice the power of ordinary safety lanterns yet more compact. Only 8" long. Fits in tool box. Has folding handles. Uses 8 standard flashlight batteries. Powerful "spot" beam. 2½" silvered reflector. Focusing. Made of rustproof metal, yellow enamel finish. Durable construction.

No. 2188-S Flashlight, less batteries. List Pr. Ea.....$5.95

3-CELL SAFETY FLASHLIGHT

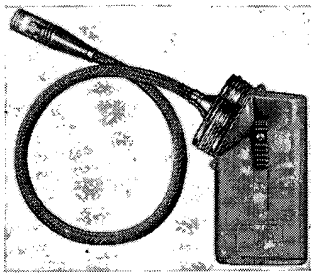
Most convenient design. Stands on base. Fits pocket. Handles easily. Has carrying ring on bottom. Uses 3 standard flashlight batteries but measures only 5¾ x 3 x 2½. New improved construction guaranteed against breakage. Made of ethyl cellulose reenforced with metal. Neoprene rubber lens cap. "High Visibility" yellow color.

No. 1717-S Safety Flashlight, less batteries. List Pr. Ea...$4.00



No. 1717-S

NEW! SAFETY EXTENSION LIGHT



No. 1727-S

The first approved safety flashlight for use in inspecting barrels, pipes, machinery, etc. Uses 3 standard flashlight batteries in compact, ethyl cellulose case. Bronze, flexible extension takes and holds any desired curvature. Bulb is protected by unbreakable, transparent cap. Exclusive convertible feature permits unit to also be used as a standard flashlight. Available in two extension lengths.

No. 1727-S-15 Flashlight with 15" Extension, less batteries. List Pr. Ea. $6.95.

No. 1727-S-30 Flashlight with 30" Extension, less batteries. List Pr. Ea. $7.95.

U. S. BUREAU OF MINES APPROVAL

Safety Lantern No. 2144-S and No. 1717-S Safety Flashlight are approved by the U. S. Bureau of Mines in addition to other approvals.

JUSTRITE APPROVED SAFETY HEADLIGHTS

For work requiring both hands free. Headlamp fits around head. Heavy rubber cord, 4 ft. long, connects to battery case. 6-volt. Powerful "spot" beam. For close work, use with spread-beam "Honeycomb" Lens, No. 1716.

Headlight uses 4 standard flashlight batteries in compact battery case that can be clipped to belt or slipped in pocket. Model 1904-S (at right) has an adjustable elastic headband that holds headlamp around head or cap. Model 1914-S is equipped with a wide flat hook to fit "hard" hats. 2½" reflector is silver plated. Focusing.

No. 1904-S Safety Headlight with elastic headband, less batteries. List Pr. Ea. $5.45.

No. 1914-S—Same as above, but with flat hook for attaching to "hard hat" bracket. List Pr. Ea. $5.45.

No. 1904-S

HONEYCOMB LENS—FOR SPREAD BEAM LIGHT

No. 1716 for Safety Headlights and Safety Flashlights Nos. 2188-S and 1717-S. Interchangeable with standard lens. Spreads beam over wide area. For "close" work. List Pr. Ea. $ .30.

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and Weildorf-Ueberlinger (Lake Constance). Southern Germany, where no quantity commercial production has been discovered, was the object of a major share of core drilling activity.

Sixty-two wildcats were drilled during the year, indicating that interest in extending Germany's proven resources had been maintained since 1949, when 60 wildcats were drilled. Only two of the exploratory tests produced oil. Areas of primary interest were Emsland, in which 8 wildcats were completed without production; Hamburg, dry; Hanover, 2 producers out of 41 wells; North Rhine-Westphalia, Suedwuerttemberg, and Oldenburg, each with 2 failures; and Schleswig-Holstein, with 6 dry holes out of 6 attempts.

Deep well drilling footage was increased considerably with 1,240,323 feet being drilled as compared with 981,272 feet in 1949. Early in the year, after extensive exploration, the Quakenbrueck 5 came in with an initial daily production of 140 barrels from the Wealden and Serpulite. Eight additional wells were completed by the Oldenburgische Erdol-GmbH, joint company of Socony-Vacuum Oil Company, Standard Oil Company (N.J.), and Shell, five of which were oil producers. The field yielded 91,000 barrels during the year.

The Quakenbrueck deposit forms a link between the oil provinces of Hanover and Emsland. Further drilling in the surrounding areas was stimulated and oil traces were found in wells at St. Huelfe, Rheden and Hemmelte. But the pour point of the crude proved to be even higher than that in the Quakenbrueck, where tubing has to be heated to make the oil flow, and there was not sufficient crude production to guarantee commercial possibilities.

In August, Wathlinger 11 of Wintershall AG, between the producing fields of Nienhagen and Eicklinger, came in with initial flow of 42 barrels from the Senonian.

The second successful wildcat of the year was Eddesse-Nord 7 of Preussag, which opened a new field as a part of the old Eddesse-Oelheim producing area. Production was from a Liassic sandstone.

Result of extension drilling in Suderbruch indicated a new producing horizon in the Valendis might be developed. Two successful wells in the Eldingen field confirmed this pool's prospects. In the Steimbke-Rodewald fields, considerable extensions of the producing area and a consequent increase of production was a possibility. Stepouts also were reported from the Wesendorf and Heide fields. In Reitbrook and Oberg secondary recovery methods achieved remarkable results.

Exploratory drilling in 1950 began in Bavaria and South Wuerttemberg, and several geophysical parties and core drilling groups were active in this area and in the Upper Rhine Valley. Of the total footage for the year, 310,218 feet were drilled on wildcat wells, 215,506 feet were semiwildcat (extension) footage and 738,602 feet were in known field drilling.

Two pipe lines were completed in 1950—a six-mile line from Ruehlermoor to Lingen, and a 10½-mile line from

Pipe Lines of Germany

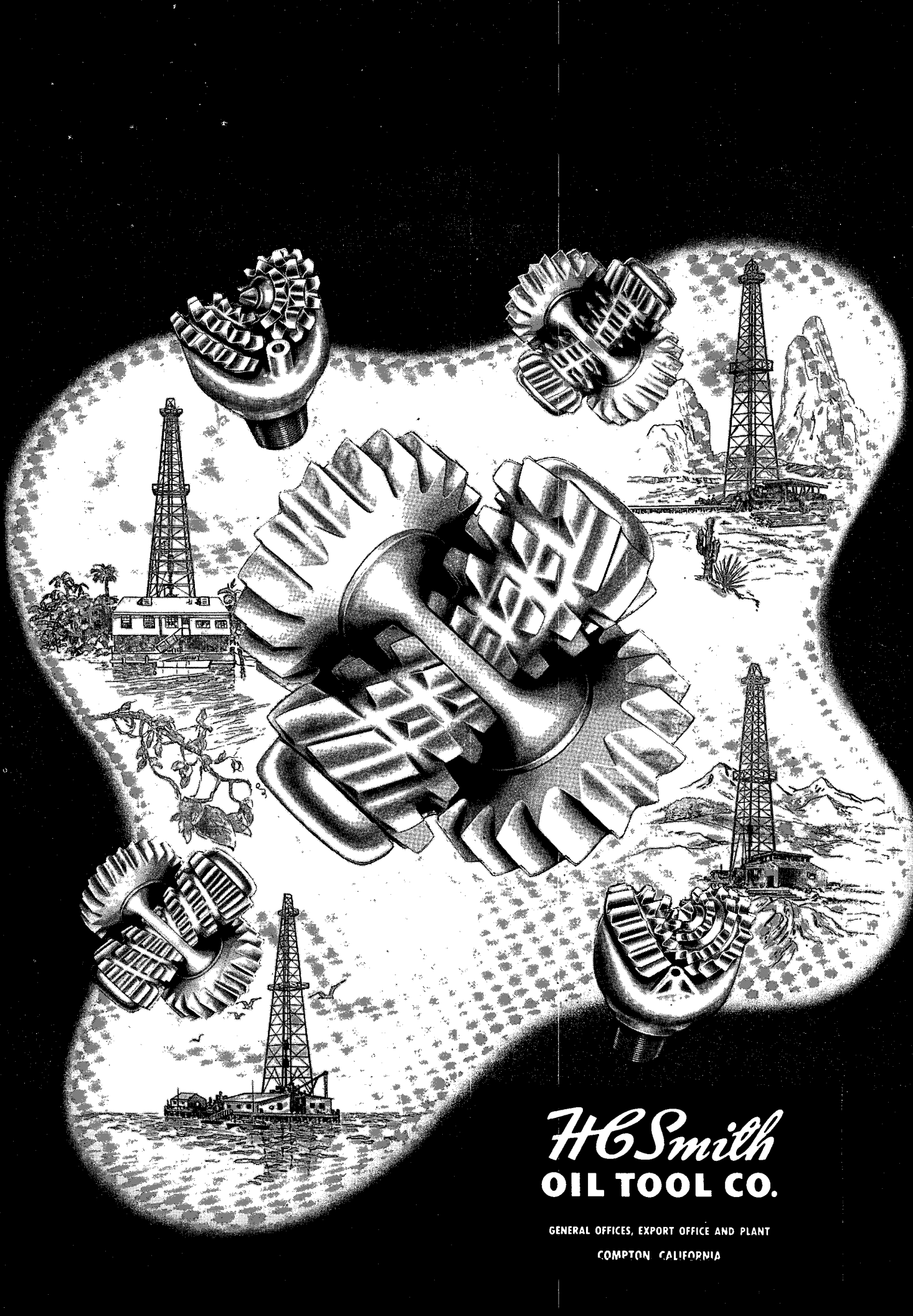
COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Capacity of Line (Bbls. Daily)	Year Completed
CRUDE OIL LINES:						
Deutsche Schachtbau & Tiefbohr GmbH	Lingen	Osterbrook on Dortmund-Ems Canal	6	6	13,500	1945
Deutsche Schachtbau & Tiefbohr GmbH and Gewerkschaft Elwerath	Ruehlermoor	Lingen	6	6	n.a.	1950
Emsland-Erdoelleitung GmbH (C. Deilmann Bergbau GmbH, Gewerkschaft Elwerath, Preussag, Wintershall, A.G.)	Ruehlertwist	Railway at Osterwald (Georgsdorf)	10.5	5	1,950	1950
Erdoelbetrieb Reitbrook (Socony-Vacuum and Preussag)	Reitbrook	Warwisch on Elbe River	5	6 & 8	n.a.	1939
Preussag	Georgsdorf	Railway at Veldhausen	3.5	Two 4	n.a.	1948
Wintershall A.G.	Emlichheim	Railway at Emlichheim	3.5	4	4,700	1948
NATURAL GAS LINES:						
C. Deilmann Bergbau GmbH	Bentheim	Huels (Marl)	48	8	18Mmcf.	1943

n.a.—Not Available.

Drilling in Germany

Region and Field	Wells Completed in 1949 Oil	Dry	Total Wells	Total Footage	Wells Completed in 1950 Oil	Dry	Total Wells	Total Footage	Wells Drilling End of 1950
BADEN:									
Forst-Weiher	1	1	2	4,916	3	3	6	15,833	..
Weingarten	2	2	4	6,773	8	2	10	15,833	2
Wildcats	...	1	1	2,180	...	...	...	.....	n.a.
BAVARIA:									
Wildcats	...	1	1	7,236	...	...	...	.....	n.a.
EAST FRIESLAND:									
Wildcats	...	2	2	11,344	...	...	...	.....	n.a.
EMSLAND:									
Adorf	...	3	3	9,436	...	...	...	.....	..
Emlichheim	27	1	28	74,279	28	...	28	72,528	1
Georgsdorf	42	2	44	112,083	43	2	45	134,516	..
Lingen	22	...	22	70,552	25	...	25	77,797	2
Ruehlermoor	...	...	...	.....	8	...	8	22,214	1
Ruehlertwist	1	...	1	2,938	12	...	12	34,603	1
Scheerhorn	...	...	...	.....	4	1	5	18,477	..
Wildcats	6	7	13	43,286	...	8	8	32,546	n.a.
HAMBURG:									
Reitbrook	5	2	7	11,945	4	2	6	12,503	1
Wildcats	...	1	1	4,645	...	1	1	5,385	n.a.
HANOVER:									
Broistedt	3	...	3	5,663	1	...	1	4,270	..
Calberlah	4	4	8	3,004	...	...	...	.....	..
Eldingen	...	...	...	.....	2	1	3	16,931	3
Etzel	...	...	...	.....	...	...	...	.....	1
Fuhrberg-Hambuehren	22	14	36	36,963	41	6	47	41,297	4
Hademstorf	4	1	5	22,619	...	...	...	.....	..
Hohenassel	4	3	7	10,296	2	1	3	5,300	..
Nienhagen-Haenigsen	1	3	4	4,685	...	...	...	.....	2
Oberg	7	4	11	8,079	1	3	4	4,330	1
Quakenbrueck	...	...	...	.....	5	3	8	16,084	1
Steimbke-Rodewald	42	21	63	120,939	25	8	33	68,687	..
Suderbruch	2	...	2	7,907	3	...	3	14,492	2
Thoeren	2	3	5	13,290	1	...	1	1,045	1
Wathlingen	...	...	...	.....	...	...	...	.....	2
Wesendorf	10	6	16	37,861	14	4	18	42,025	6
Wildcats	4	36	40	160,846	2	39	41	170,848	n.a.
NORTH RHINE-WESTPHALIA:									
Wildcats	...	...	...	.....	...	2	2	9,127	n.a.
OLDENBURG:									
Wildcats	...	1	1	4,052	1	1	2	6,439	n.a.
SCHLESWIG-HOLSTEIN:									
Heide	9	5	14	47,054	10	5	15	50,327	3
Wildcats	1	4	5	19,480	...	6	6	26,494	n.a.
SUEDWUERTTEMBERG:									
Wildcats	...	...	...	.....	...	2	2	2,790	n.a.
Total	221	128	349	864,351	243	100	343	922,721	34

n.a.—Not available.



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GENERAL OFFICES, EXPORT OFFICE AND PLANT

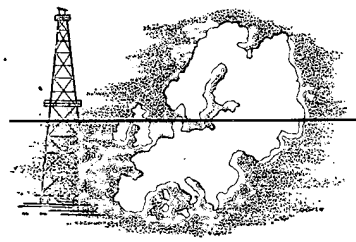
COMPTON CALIFORNIA

Reuhlertwist to the Osterwald railway station. A considerable increase of German refinery capacity was reported. In September a new thermal Winkler-Koch cracking plant of the BP (Anglo Iranian) refinery at Hamburg-Finkenwerder with a capacity of 6000 barrels daily was ready to be put on stream. Two hydrogenation works at Wesseling and Gelsenberg received permits for a higher utilization of their capacity.

Refineries of Germany

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Daily Crude Runs End of 1950 (Bbls.)	Type of Refinery
AMERICAN OCCUPATION ZONE:					
Chemische Fabrik Elektron	Griesheim (Darmstadt)	*700	....	280	Gasoline Rerunning
Zeller & Gmelin	Eislingen (Wuerttemberg)	60	....	....	Skimming, Lubes
BRITISH OCCUPATION ZONE:					
Benzin und Petroleum-GmbH (Anglo-Iranian)	Hamburg-Finkenwerder	12,000	6,000	6,700	Skimming, Cracking
Coelner Benzin-Raffinerie GmbH	Cologne	*300	....	150	Gasoline Rerunning
Deutsche Erdoel A.G.	Heide (Holstein)	1,500	....	1,150	Skimming, Lubes, Asphalt
	Wietze (Hanover)	1,400	....	1,250	Skimming, Lubes, Asphalt
Deutsche Gasolin A.G.	Dollbergen (Hanover)	2,000	....	1,200	Skimming, Lubes, Asphalt
Deutsche Shell A.G.	Dusseldorf-Reisholz	*800	....	1,100	Gasoline Rerunning
	Hamburg-Grasbrook	*1,000	....	1,400	Lubes
	Hamburg-Harburg	9,800	....	8,750	Skimming, Lubes, Wax, Asphalt
	Hamburg-Wilhelmsburg	*450	....	700	Gasoline Rerunning
	Monheim-on-Rhine	4,000	....	2,500	Skimming, Lubes
Deutsche Vacuum Oel A.G.	Bremen-Oslebshausen	12,000	....	6,600	Skimming, Lubes, Wax
	Wedel-on-Elbe	*700	....	700	Lubes
Esso A.G. (Standard of New Jersey)	Hamburg-Harburg	13,200	....	9,900	Skimming, Asphalt
Gelsenberg Benzin A.G.	Gelsenkirchen	14,400	6,500†	7,350	Skimming, Hydrogenation
Gewerkschaft Deurag-Nerag	Misburg (Hanover)	10,500	4,000	7,650	Complete
Georg Greiser	Dollbergen (Hanover)	110	....	50	Skimming, Lubes
Johann Haltermann	Hamburg-Wilhelmsburg	*2,000	....	1,000	Gasoline Rerunning
Mineraloel- & Asphaltwerke AG (MAWAG)	Ostermoor (Holstein)	1,150	....	....	Skimming, Asphalt
Mineraloelwerk Grasbrook GmbH (DEA)	Hamburg-Grasbrook	*1,500	....	800	Lubes, Wax
Mineraloelwerke Albrecht & Co.	Hamburg-Grasbrook	*250	....	100	Lubes
Mineraloelwerke Peine (Schindler)	Peine (Hanover)	350	....	200	Skimming, Lubes
Mineraloelwerke Albert Sengewald	Dedenhausen (Hanover)	470	....	....	Skimming, Lubes
Oelwerke Julius Schindler GmbH	Hamburg-Neuhof	2,400	....	1,100	Skimming, Lubes
Union Rheinische Braunkohlen-Kraftstoff A.G.	Wesseling (Cologne)	16,000	5,200†	6,750	Skimming, Hydrogenation
Wintershall A.G.	Salzbergen (Emsland)	1,400	500	1,050	Complete
FRENCH OCCUPATION ZONE:					
Badische Anilin- & Soda-Fabrik	Ludwigshafen-Oppau	950	....	600	Skimming, Lubes, Wax
RUSSIAN OCCUPATION ZONE:					
Mineraloelwerke	Luetzkendorf	2,200	....	....	Complete

* Half-finished products charging capacity.
† Intake capacity for hydrogenation.



GREAT BRITAIN

Output Shows 1867-Barrel Increase Over 1949 Figure; Refinery Policy Change Results in Stepped-Up Activity

GREAT Britain's 1950 crude production reached 340,067 barrels, which was 1867 more than the 1949 output of 338,200 barrels. Eakring field, in Nottinghamshire, second largest from the standpoint of production, declined 12,000 barrels during 1950, although a systematic program of water injection was conducted.

Duke's Wood, also in Nottinghamshire, kept pace as Britain's largest oil field from the standpoint of producing wells (114 at the end of 1950) and production (172,000 barrels in 1950) with an increase in output of 20,000 barrels over 1949.

During 1950 there was very little drilling and production activity. Two wildcats were drilled in Lancashire and Nottinghamshire. Both were failures.

Mansfield 1 in Nottinghamshire, which was completed in February at 4490 feet, and Formby 4, completed in March at 3880 feet, both wound up in carboniferous rocks.

Remarkable activity was shown in the refinery field as a result of a policy change by which the refineries serving the British market were shifted from the oil field areas to Great Britain itself.

Construction of the Finnart Depot and the 60-mile pipe line, aimed at expanding the Grangemouth refinery, was begun during the year. Anglo-Iranian Oil Company

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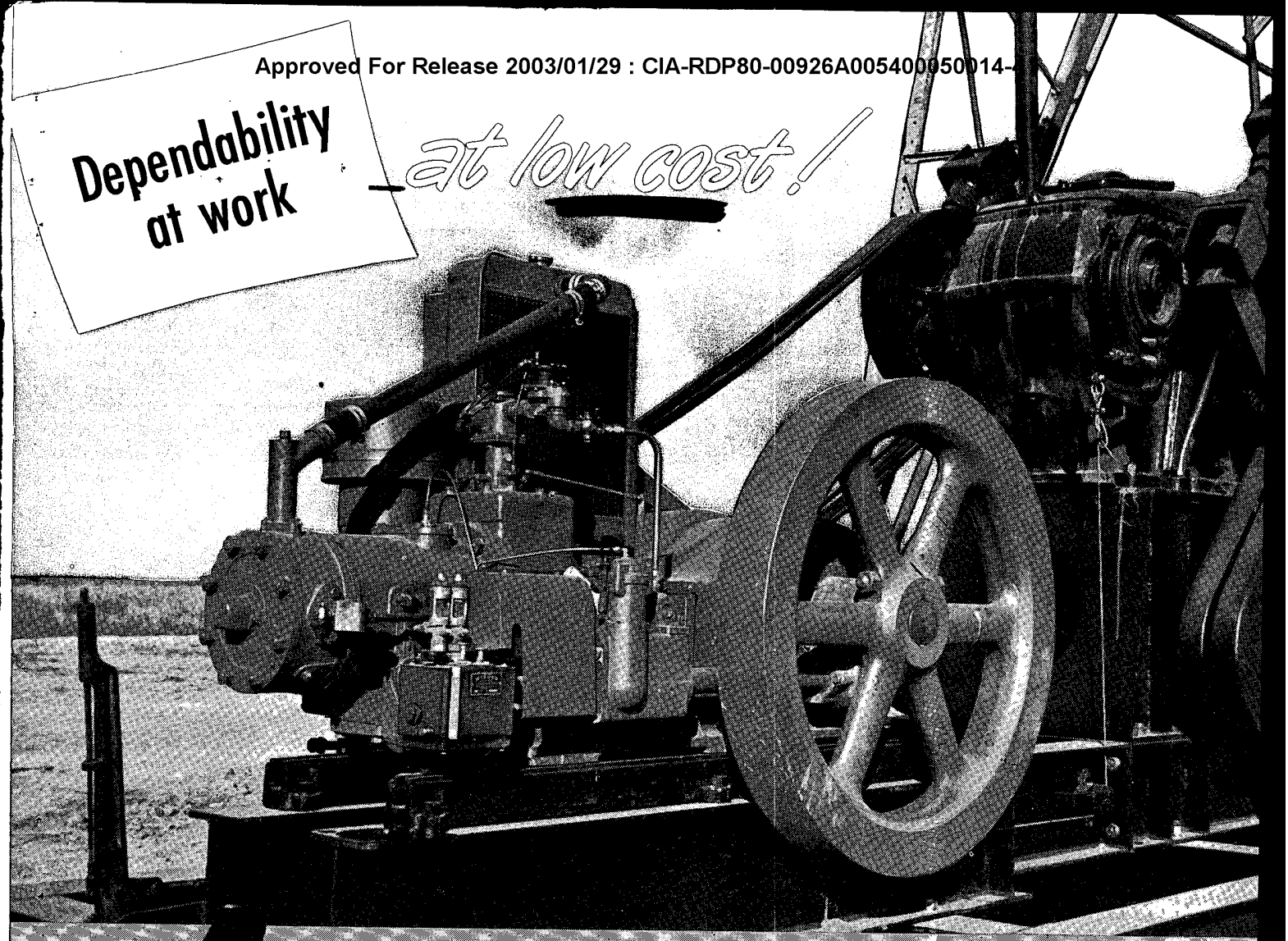

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began work on the Kent refinery on the Isle of Grain in the Thames Estuary. An annual input capacity of 2 million tons of crude was indicated. Vacuum Oil Company, Ltd., subsidiary of Socony-Vacuum Oil Company, Inc., announced plans for an oil refinery at Coryton, England. The $30 million plant will specialize in making high-grade lubricating oils, and will have a 20,000-barrel daily input capacity.

Additional refinery expansion was reported at Anglo-American's Fawley refinery in Southampton; the Berry Wiggins and Company, Ltd., refinery at Kingsworth in Kent; the Lobitos Oilfields, Ltd., plant at Pt. Ellesmere in Cheshire; Petrochemicals, Ltd., plant at Partington in Manchester; the Shell Refining and Marketing Company plants at Shellhaven in London and Stanlow in Cheshire; and the National Oil Refineries, Ltd., (Anglo-Iranian Oil Company, Ltd.,) plant at Llandarcy in Wales.

At Anglo-American's Fawley installation, several of the main refinery units were structurally completed by the end of 1950, and it was expected that the plant will be finished by the end of 1951.

Upon completion the annual throughput capacity will be 40,188,500 barrels, approximately five times greater than that of the existing Esso refinery nearby.

D'Arcy Exploration Company, Ltd., which controls all producing wells in Great Britain except one, was operating 231 producers at the close of the year—48 at Eakring, 114 at Duke's Wood, 50 at Kelham Hills, 10 at Caunton, and 9 at Formby. Anglo-American was operating one well in the Midlothian field at Dalkeith at the close of the year.

The first break in British sterling restrictions, instituted in January against American oil companies, came about the middle of the year after months-long talks. Britain agreed with two U. S. oil companies to allow the latter to sell American oil produced in the Middle East for sterling both inside and outside the sterling area. The agreement was reached with Standard Oil Company (N. J.) and Socony-Vacuum Oil Company. If the restrictions had not been eased, the effect would have been to squeeze dollar oil out of the principal world markets.

As the year drew to a close, the controversy was softened somewhat with agreements, but the U. S. State Department said the system still curbed trade despite British assurances, by treaty and otherwise, that such was not the purpose.

Refineries of Great Britain

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Daily Crude Runs End of 1950 (Bbls.)	Type of Refinery
ENGLAND:					
Esso Petroleum Co., Ltd.	Fawley* (Southampton)	110,000	33,000	18,900	Cracking, Distillation, Gas Absorption and Treating
	Port Ellesmere (Cheshire)	500	None	500	Distillation for Solvents
Anglo-Iranian Oil Co., Ltd.	Isle of Grain* (Kent)	39,000	10,000	.....	Distillation Lubes, Catalytic Cracking
Berry Wiggins & Co., Ltd.	Kingsnorth (Kent)	2,100	None	2,100	Distillation
	Weaste (Manchester)	1,500	None	1,500	Distillation
Caltex and Trinidad Leaseholds, Ltd.	Southampton*	45,000	.....	None	Cracking
Imperial Chemical Industries, Ltd.	Wilton (Middlesborough)	.....	2,000	2,000	Cracking
Lobitos Oilfields, Ltd.	Port Ellesmere (Cheshire)	2,500	1,000	2,500	Distillation, Solvent Refining, Therma Cracking
Manchester Oil Refinery, Ltd.	Trafford Park (Manchester)	2,800	None	2,800	Distillation, Solvent Refining
Petrochemicals, Ltd.	Partington (Manchester)	.....	2,000	2,000	Distillation, Catalytic Cracking, Treating, Gas Fractionation
Shell Refining & Marketing Company, Ltd.	Heysham (Lancashire)	34,000	None	34,000	Distillation
	Shellhaven (London)	28,000	None	16,600	Topping, Lubes and Asphalt
	Stanlow (Cheshire)	37,700	None	37,700	Lubes, Asphalt, Distillation and Topping
Vacuum Oil Company, Ltd.	Coryton* (Kent)	18,000	None	.....	Lubes
SCOTLAND:					
Wm. Briggs & Sons, Ltd.	Dundee (Firth of Tay)	700	None	700	Distillation
Scottish Oils, Ltd.	Grangemouth (Stirling)	14,000	3,000†	13,500	Topping, Cracking
	Pumpherston (Midlothian)	3,700	1,300	3,450	Topping, Wax
Shell Refining & Marketing Company, Ltd.	Ardrossan (Ayrshire)	4,300	None	4,300	Topping, Asphalt
WALES:					
National Oil Refineries, Ltd.	Llandarcy* (Glamorgan)	60,000	4,000†	59,000	Topping, Cracking, Lubes, Wax, Asphalt

* Planned, Building or Expanding.
† Cracking plants at present being used as topping units and are included in Total Crude Charging Capacity

Great Britain Oil Production and Geological Data

COUNTRY, COUNTY, and FIELD	Year of Discovery	Producing Wells End of 1950*	CRUDE OIL PRODUCTION (Barrels) Daily End of 1950	Year 1949	Year 1950	Cumulative Through 1950	Gravity of Oil (API)	Formation, Name and Kind	Geologic Age	DEPTH (Feet) Min. to Top of Pay	Max. to Bottom of Pay	Average Thickness of Pay (Feet)	Type of Structure
ENGLAND:													
Lancashire:													
Formby.....	1939	9	5	2,000	2,000	63,000	37	Keuper, Sand	Triassic	80	250	20	Faulted Monocline
Nottinghamshire:													
Caunton.....	1943	10	25	10,000	9,000	173,000	23.9-31.1	Grit, Sandstone	Upper Carboniferous	2170	2300	12	Dome with faulting
Duke's Wood.....	1941	114	435	152,000	172,000	2,210,000	32.5-33.6	Longshaw, Sandstone	Upper and Lower Carboniferous	1800	2270	70	
								Chatsworth, Limestone		2500	2640	60	Dome with faulting
Eakring.....	1939	48	285	117,000	105,000	1,379,000	34.4-37.6	Longshaw, Sandstone	Upper Carboniferous	1780	2260	100	Dome with faulting
Kelham Hills.....	1941	50	135	56,000	51,000	966,000	27.1-29.3	Grit, Sandstone	Upper Carboniferous	2050	2280	35	Dome with faulting
SCOTLAND:													
Midlothian:													
Dalkeith.....	1937	1	3	1,200	1,067	20,006	39.6	Sandstone	Lower Carboniferous	1728	1760	30	Anticline
	....	232	888	338,200	340,067	4,811,006	.....	.....	.....	....	....	.....	.....

NOTE: All producing fields except Dalkeith operated by D'Arcy Exploration Company, Ltd.

* All wells on artificial lift.

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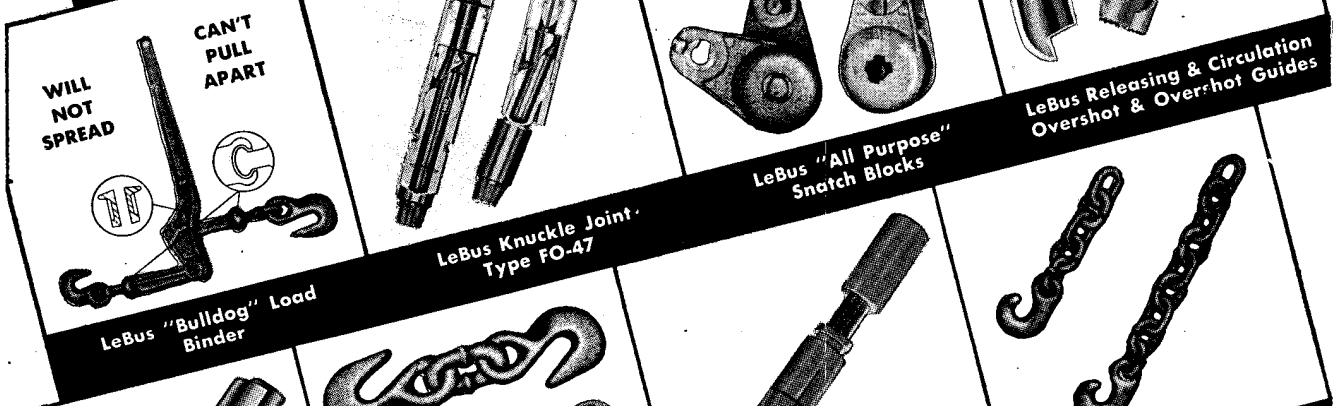

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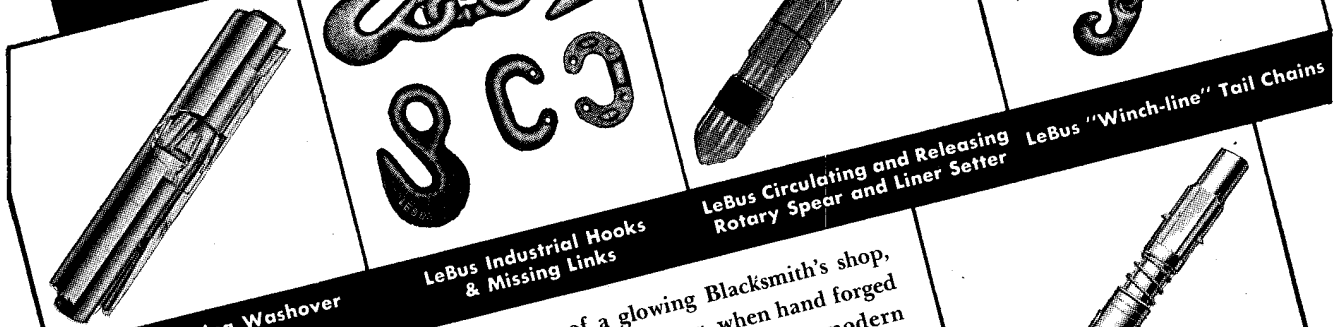

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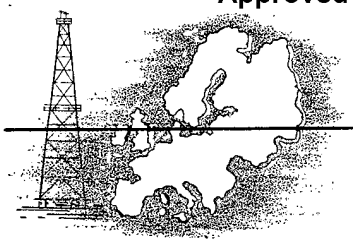

ITALY

Production of Natural Gas Doubles Previous Year's; Increase of 9532 Barrels Registered in Crude Yield

ITALY's 1950 crude production of 71,779 barrels, an increase of 9532 barrels over 1949's output of 62,247, boosted the nation's cumulative figure to 1,744,719. At the end of the year, 312 wells were oil producers, and 31 of them were flowing.

Abetting the minor increase in petroleum production, continued strides were made in the development of natural gas as an important industrial asset. Gas production in 1950 reached a total of 18,302,889,924 cubic feet, more than double the 1949 output.

The major gas producing field in 1950, as in the preceding year, was at Caviaga, where 6,895,010,700 cubic feet were produced. Fifteen gas wells were producing at Caviaga at the end of the year, and 97 were producing in all of Italy's eight gas fields.

An increase in proven field expansion drilling was recorded in Emilia and Lombardia States. Thirty-seven oil wells were completed in 1950 with a total footage of 134,249, as compared with 20 wells and a footage of 104,980 in 1949. Of two wildcats drilled during the year, the Emilia exploration resulted in a dry hole at 5890 feet, while the Lombardia test came in a gasser at 4625 feet. At the close of the year, seven wells were drilling. Both explorations were drilled by Azienda Generale Italiana Petroli, the Italian state petroleum organization.

In the latter part of 1950, oil and gas exploration extended from the Po Valley into Central and Southern Italy. A geological survey was conducted by the Montecatini General Mining Company of Milan in the Porto Recanati region south of Ancona. A wildcat was begun on the basis of preliminary data obtained from the geological party but no conclusive reports were available from the test at 5720 feet.

Geological reconnaissance by AGIP was reported in the Chienti Valley of Marches Province. Ente Nazionale Metano organization was carrying on geological activity in the same sector, and was concentrating on the region from the mouth of the Potenza River on the Adriatic to the Treja Pass. Recently, this group found substantial gas deposits near Aquila in Abruzzi Province.

AGIP completed a small oil producer north of Modena, in Emilia Province. Bottomed at 4950 feet, the well initially tested 15 barrels a day. Indications were that

Drilling in Italy

State and Field	Wells Completed in 1949 Gas	Dry	Total Wells	Total Footage	Wells Completed in 1950 Gas	Dry	Total Wells	Total Footage	Wells Drilling End of 1950
EMILIA:									
Consandolo	n.a.	n.a.	n.a.	n.a.	3	3	6	6,194	n.a.
Cortemagiore	2	1	4*	20,996	14	3	17	65,318	3
Vizzola	n.a.	n.a.	n.a.	n.a.	1	1	2	4,580	n.a.
Wildcats	n.a.	n.a.	n.a.	n.a.	..	1	1	5,890	n.a.
LOMBARDIA:									
Caviaga	16	..	16	83,984	6	..	6	27,478	1
Ripalta	..	..	..	.....	4	..	4	20,164	3
Wildcats	n.a.	n.a.	n.a.	n.a.	1	..	1	4,625	n.a.
Total	18	1	20*	104,980	29	8	37	134,249	7

* Includes one condensate well. n.a.—Not available.

Pipe Lines of Italy

COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Daily Capacity
CRUDE OIL LINES:					
Condor S.p.A.	Genoa*	Rho	93	n.a.	2,750 bbls.
Societa per Azioni Raffineria Padana Olii Minerali	Vado Ligure*	Trecate	99	6 & 8	n.a.
Societa Petrolifera Italiana	Vallezza	Fornovo Taro	6	3	2,700 bbls.
NATURAL GAS LINES:					
Azienda Generale Italiana Petroli	Boltiere	Crespi d'Adda	2	3	n.a.
	Busto Arsizio	Gallarate	4	7	n.a.
	Casalbuttano*	Brescia	25	7	8,800 mcf.
	Castellanza*	Varese	24	7	n.a.
	Caviaga	Cesano Maderno	39	7, 8, 10	68,800 mcf.
	Caviaga	Fiorenzuola	33	3	4,250 mcf.
	Caviaga	Lecco	63	5, 6, 7	15,500 mcf.
	Caviaga	Milano	37	3	3,900 mcf.
	Caviaga	Ripalta	1	7	n.a.
	Cornegliano†	Tavazzano	4	12	35,000 mcf.
	Cortemaggiore*	Caviaga	45	13	880 mcf.
	Cortemaggiore	Piacenza	12	7	35,300 mcf.
	Cortemaggiore	Reggio Emilia	45	3, 4	4,600 mcf.
	Cortemaggiore†	Torino	130	16	120,000 mcf.
	Credera	Novara	76	7, 10, 12	63,500 mcf.
	Fombio	Pizzighettone	7	2	n.a.
	Milano†	Castano Primo	25	7	n.a.
	Mortara†	Novara	16	10	n.a.
	Novara†	Gozzano	25	8	n.a.
	Podenzano	Piacenza	7	5	700 mcf.
	Rivolta d'Adda*	Boltiere	10	10	n.a.
	Seregno	Como	19	12	n.a.
Societa Idrocarburi Nazionali	Passo Segni	Florence	79	3 to 6	80,000 mcf.
Societa Petrolifera Italiana	Gallo	Montalbano	2	2	n.a.
	Vallezza	Fornovo	4	6	n.a.
	Vizzola	Fornovo	1	3	n.a.

* Building. † Planned.

Refineries of Italy

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Average Crude Runs in 1950 (Bbls. Daily)	Type of Refinery
AGIP	Vado Ligure	4,200	n.a.	Lube
Anonima Italiana Petroli	Ancona	10,000	n.a.	Skimming
"Aquila" S. A. Tecnico Industriale	Trieste	11,000	8,200	Complete
Aziende Petrolifere Italiane	Falconara	8,000	n.a.	Skimming
Condor S. p. A. per l'Industrial Petrolifera e Chimica	Rho*	20,000	.....	Complete
D. I. C. A.	Apuania	1,000	400	Skimming
Esso Standard Italiana	Rivarolo	1,700	n.a.	Lube
	Trieste	6,000	2,000	Skimming
Ditta Garrone	San Quirico	1,000	875	Skimming
Industrie Chimiche Italiane del Petrolio	Mantua*	6,000	.....	Skimming
Industria Italiana del Petrolio	La Spezia	15,000	13,900	Complete
Industrie Petrolifere Venete	San Giorgio de Nogaro*	1,900	.....	Skimming
Industria Raffinazione Olii Minerali, S. p. A.	Porto Marghera*	21,000	11,000	Complete
I. R. C. D.	Trieste	150	60	Skimming
Lombarda Petroli	Monza	2,000	1,950	Skimming
N. I. L. O.	Milan	200	90	Skimming
Raffineria Olii Minerali	Firenze	900	550	Skimming
Raffineria Siciliana Industria Olii Minerali	Augusta (Sicily)	12,000	4,900	Complete
R. O. L.	Viguzzolo	1,000	450	Skimming
S. A. Permolio Reffinerie Italiane Olii Minerali	Rome	1,600	1,400	Skimming
	Milan	1,600	1,450	Skimming
	Genoa	1,600	1,350	Skimming
S. A. Raffineria Padana Olii Minerali	Trecate*	13,000	.....	Complete
Sirom Bianchi Petroli	Monza	1,000	550	Skimming
Societa Petroli d'Italia	Fiorenzuola d'Arda*	1,700	900	Skimming
Societa Petrolifera Italiana	Fornovo Taro	700	200	Skimming
STANIC	Bari	15,000	13,250	Skimming
	Leghorn	21,000	8,900	Complete
S. T. O. I.	Firenze/Castello	250	150	Skimming

* Under construction or enlargement. n.a.—Not available.

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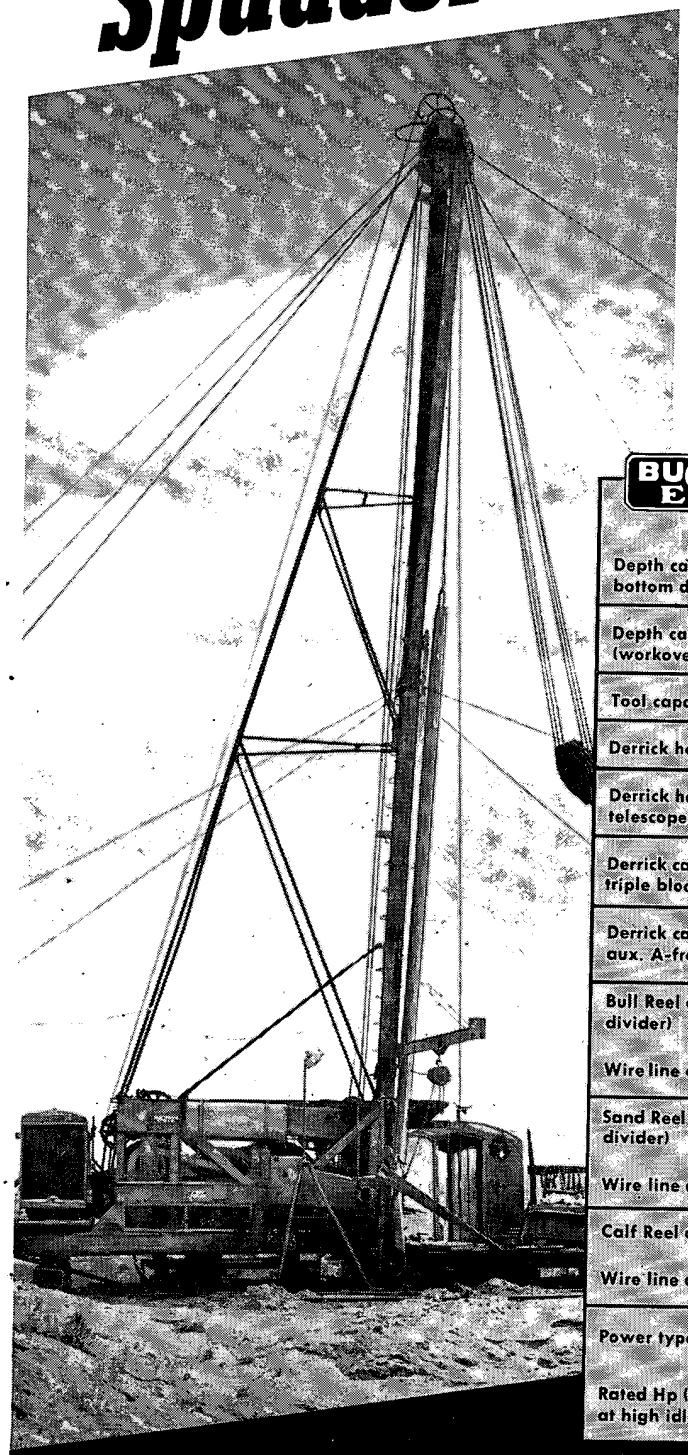

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Depth capacity (top to bottom drilling)	1500 ft.	2500 ft.	3500 ft.	6000 ft.
Depth capacity (workover)	2500 ft.	3500 ft.	5000 ft.	7000 ft.
Tool capacity	2400 lb.	3000 lb.	4200 lb.	6000 lb.
Derrick height, extended	48 ft.	54 ft.	54 ft.	60 ft.
Derrick height, telescoped	30' 7½"	32' 9"	33' 10"	38' 3"
Derrick capacity (6 lines, triple block, casing strut)	36,000 lb.	45,000 lb.	85,000 lb.	100,000 lb.
Derrick capacity (with aux. A-frame leg)	.....	75,000 lb.	120,000 lb.	160,000 lb.
Bull Reel capacity (with divider)	3350 ft.	5630 ft.	7140 ft.	11,120 ft.
Wire line cable diameter	¾ in.	¾ in.	⅞ in.	⅞ in.
Sand Reel capacity (with divider)	3600 ft.	4080 ft.	6000 ft.	11,760 ft.
Wire line cable diameter	⅜ in.	½ in.	9/16 in.	9/16 in.
Calf Reel capacity	385 ft.	890 ft.	680 ft.	900 ft.
Wire line cable diameter	⅝ in.	¾ in.	1 in.	1 in.
Power type	gas-gasoline, diesel	gas-gasoline, diesel	gas-gasoline, diesel	gas-gasoline, diesel
Rated Hp (gasoline) at high idle speed	53 at 1600 rpm	78 at 1775 rpm	175 at 1700 rpm	219 at 1450 rpm

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more wells probably would be drilled in this wildcat territory.

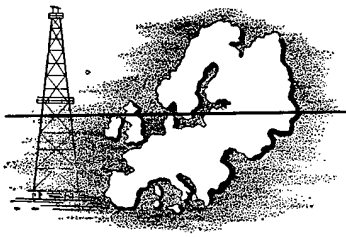
Italy may have sustained a serious setback in oil operations in the Po Valley after a July announcement said that a state monopoly was to be set up over the entire region. Such a move had long been predicted.

Currently, petroleum development and exploration by private enterprise is widely hampered by government acreage restrictions weighted in favor of AGIP.

In a 1950 AGIP activity report, it was pointed out that geophysical gas prospections were conducted by 11 parties in the Po Valley, in the Marche Region and one called "Fossa Bradanica" along the frontiers between the Campania-Basilicata-Puglie-Calabria regions. Thirty-eight new wells were drilled, and the output of methane in the AGIP-controlled fields increased nearly 200 percent. AGIP secured control of 65 percent of the total Italian natural gas output during the year.

Oil Production in Italy

STATE and FIELD	Operating Company	Year of Discovery	PRODUCING WELLS END OF 1950			CRUDE OIL PRODUCTION (Barrels)			
			Flowing	Art. Lift	Total	Daily End of 1950	Year 1949	Year 1950	Cumulative Through 1950
ABRUZZI MOLISE:									
Tocco Casauria	Azienda Generale Italiana Petroli (A.G.I.P.)	1935	....	11	11	8	3,685	3,086	42,832
EMILIA:									
Centopozzi	Societa Petrolifera Italiana	1923	....	60	60	n.a.	4,986	3,880	475,519
Cortemaggiore	A.G.I.P.	n.a.	n.a.	n.a.	n.a.	77	8,577	15,474	24,050
Podenzano-S. Giorgio	A.G.I.P.	1935	19	3	22	17	2,519	8,141	52,712
Salsominore	Societa Petrolifera Italiana	1933	....	3	3	n.a.	535	484	35,451
Settore Parmense	A.G.I.P.	1929	3	6	9	2	1,775	1,047	8,153
Vallezza-Monterotondo	Societa Petrolifera Italiana	1909	7	151	158	n.a.	25,163	22,963	990,736
Vizzola	Societa Petrolifera Italiana	1942	2	1	3	n.a.	1,273	2,231	21,597
LAZIO:									
Ripi	A.G.I.P.	1940	....	13	13	12	3,843	4,105	45,638
LOMBARDIA:									
Caviaga	A.G.I.P.	n.a.	n.a.	n.a.	n.a.	12	1,736	3,383	6,953
Ripalta	A.G.I.P.	n.a.	n.a.	n.a.	n.a.	....	.....	60	60
LUCANIA:									
Tramutola	A.G.I.P.	1937	....	23	23	10	4,256	3,939	39,882
TOSCANA:									
Pietramala	Societa Idrocarburi Nazionali	1939	....	10	10	n.a.	3,899	2,986	n.a.
Abandoned Fields	.....	....	....	....	....	....	.....	.....	1,136
Total	.....	....	31	281	312	138	62,247	71,779	1,744,719



THE NETHERLANDS

Production Record Set as Schoonebeek Output Rises; 20,000-Barrel Refinery Near Rotterdam in Operation

THE Netherlands set a new crude production record in 1950 with an output estimated at 5,193,000 barrels, an increase of 1,281,000 barrels over the 1949 total of 3,912,000. For the year, production in the Schoonebeek field, the largest oil field in Western Europe and the Netherlands' only producing area, rose to an average exceeding 13,000 barrels a day. More than 2700 acres are now considered to be proven in Schoonebeek. The average pay thickness in the anticlinal structure is 80 feet, and production is obtained from approximately 2600 feet.

The most important oil development in the Netherlands in early 1950 was the record production rate in Schoonebeek established during March, when 478,895 barrels (15,448 barrels per day) were produced. The production decrease noted in previous months not only was halted but also was increased. In March, April, and May, the output averaged 14,250 barrels a day, as compared with approximately 12,600 a day in the previous year and 10,000 during 1948. Schoonebeek was filling about 30 percent of the domestic demand during the year.

By December, N. V. Nederlandse Aardolie Mij—a joint company composed equally of the interests of Standard Oil Company (N. J.) and Royal Dutch Shell Group, had almost completed a survey of the entire country and had six drilling rigs operating in exploratory testing.

The new 20,000-barrel a day refinery of Caltex Petroleum Mij (Nederland N. V.) at Pernis near Rotterdam began operating in the spring. Situated on 104 acres eight miles from Rotterdam on the Niewe Maas River, the installation cost approximately $18 million.

Data on Schoonebeek Field

Operating Company	N. V. Nederlandse Aardolie Maatschappij*
Year of Discovery	1943
Production in 1950	4,863,600 Barrels†
Cumulative Production to End of 1950	14,590,900 Barrels
Estimated Proved Area of Field	2,700 Acres
Gravity of Oil (API)	24.8
Producing Formation—Local Name	Valanginian
Kind	Sand
Age	Lower Cretaceous
Minimum depth to top of pay	2,500 Feet
Maximum depth to bottom of pay	2,650 Feet
Average thickness of pay	80 Feet
Type of Structure	Anticline

* Owned 50 percent by Standard Oil (New Jersey) and 50 percent by Shell Oil Company. Properties managed by Shell.
† Estimated.

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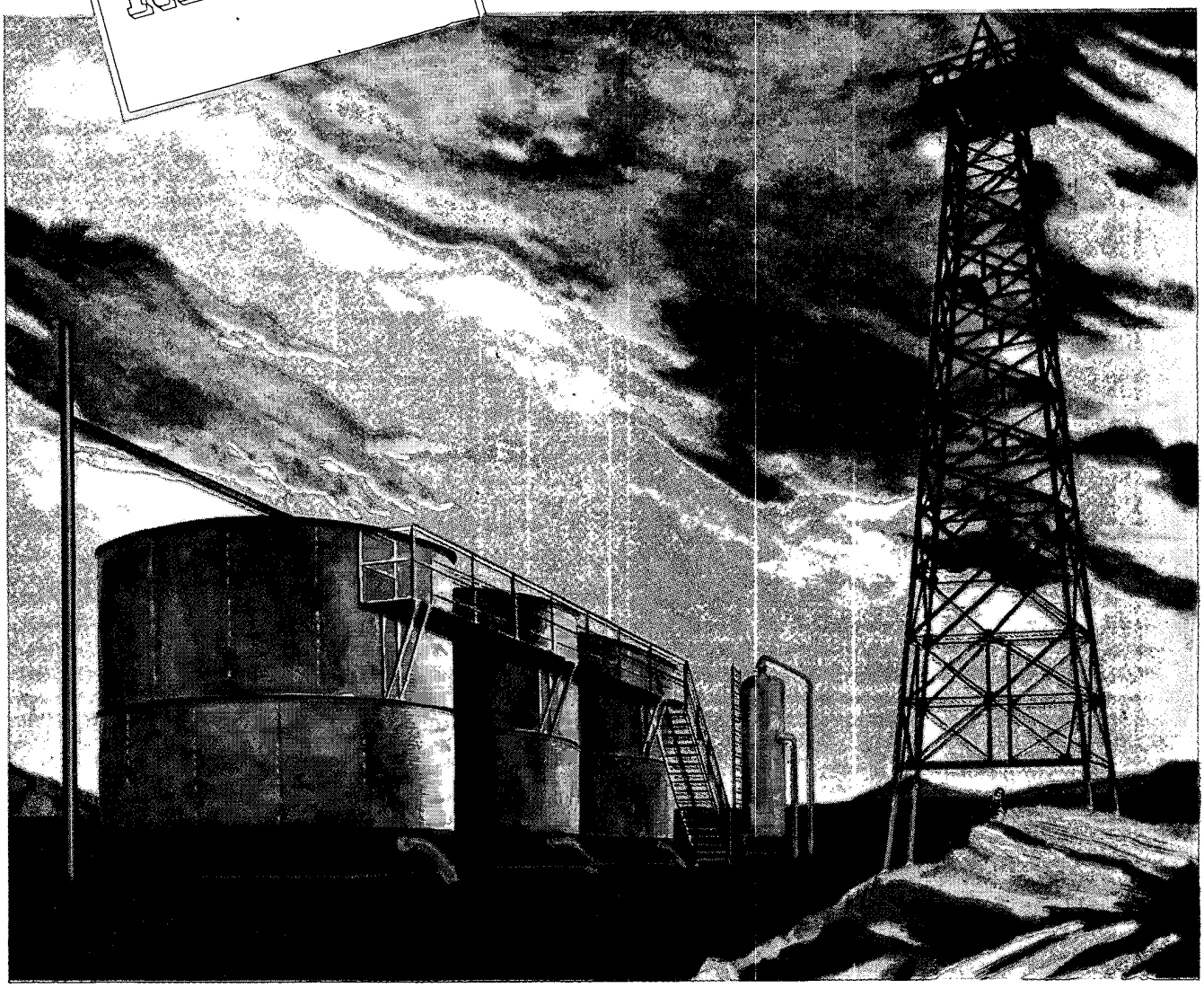

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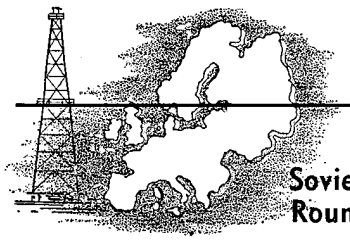

RUSSIA and SATELLITES

Soviet Production Increases for Sixth Consecutive Year; Roumanian Output Drops; Hungary Pushes Nationalization

RUSSIAN oil remained a big question mark in the capitals of the free world during 1950. The strategic aspects of Russian crude production are many and vital to the nonCommunist countries which have joined hands in a mutual effort to block Communist "real estate mania" and stem the Red tide of aggression and subjugation.

Throughout the year, the U. S. military indicated at various times its regard for the important role Russian crude plays in continuing world tension.

Against a shadowy backdrop, oil production figures emanating from Russia and the satellite countries were viewed with doubt. Such releases were largely given in percentage terms but with no known basis.

However, available reports show, in terms of U. S. barrels, that Russia's 1950 crude production was 263,165,000, a rise of 30,165,000 from its 1949 output of 233,000,000. The year marked the sixth straight year of rising production in the USSR.

The Russian press reported that a new field in the Baku district was becoming a prominent source of crude. The area, called the Busovny field, is northeast of the town of Baku on the Apsheron Peninsula. It was brought into production during World War II. The report included little mention of any progress in the historical producing areas of the peninsula. It has been estimated that the area now is producing about 7 million barrels annually, although no concrete production figures were published in 1950.

As the year ended, the Soviet embassy reported that Russian oil output was then more than 20 percent above the prewar production rate. According to figures given

Engineering and Geological Data on U.S.S.R. Asiatic Fields

AREA and FIELD	PRODUCING FORMATION		
	Age	Depth (Ft.)	Type Structure
Eastern Siberia Region:			
Ust Maya	.....	.....	.....
Sakhalin Island:			
Ekhabi	Upper Pliocene	310– 630	Anticline
Katangli	Upper Pliocene	2460	Anticline
Nutovo	Upper Pliocene	260–2885	Anticline
Okha	Upper Pliocene	300– 775	Anticline
Poromay	Middle & Lower Pliocene	8858	Anticline
Wigrek	Upper Pliocene	120– 220	Anticline
Turkmen Area:			
Cheklishlyar	Middle Pliocene	.....	.....
Cheleken	Pliocene	.....	Faulted Dome
Mangshlak	.....	.....	.....
Nepit-Dag	Middle Pliocene	820	Anticline
Neftedag	Upper & Middle Pliocene	.....	Anticline
Uzbek-Tadzhik-Kirgiz (Fergana) Area:			
Ak-Mecket	Eocene	.....	Anticline
Andizhan	.....	.....	Anticline
Barzik	.....	.....	Anticline
Changirtash	.....	.....	Anticline
Chimmon	Eocene	1000	Anticline
Chu	.....	.....	Anticline
Dzhar-Kurgan	.....	.....	Anticline
Encumimsai	.....	.....	Anticline
Eno-Sing	.....	.....	Anticline
Kamishbashi	.....	.....	Anticline
Kanabad-Sai	.....	.....	Anticline
Kaudag	Oligocene	528	Anticline
Kim (Sel Rokho)	Eocene	.....	Anticline
Kirovabad	.....	.....	Anticlinal Fold
Komosol	.....	.....	Anticline
Kulmen	.....	.....	Anticline
Mailisai	.....	.....	Anticline
Melnikovo	.....	.....	Anticline
Mamangan	.....	.....	Anticline
Nefteabad	.....	.....	Anticline
Pavlan-Tash	.....	.....	Anticline
Pitausai	.....	.....	Anticline
Ristansanto	.....	.....	Anticline
Shor-Su (Kagnovich)	Eocene	650	Anticline
Tekebel	.....	.....	Anticline
Uch Kyzyl (Termez)	.....	.....	.....

Refineries of U.S.S.R.

LOCATION	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery
European Refineries:			
Baku (5 Refineries)	375,000	50,000	Skim-Crk.
Batumi	2,000	.....	Skim.
Berdyansk	.....	5,000	Crk.
Boulova	.....	.....	.....
Burguruslan	.....	.....	.....
Chelyabinsk	.....	.....	.....
C. Gorodki	28,000	5,000	Skim-Crk.
Drohodycz[1] (4 Refineries)	3,000	1,000	Complete
Gleboka (Sambor)[1]	100	.....	Skim.
Gorki	.....	10,000	Cracking
Grozny (3 Refineries)	150,000	50,000	Skim-Crk.
Gurev	1,000	.....	Skim.
Ishimbaevo	9,000	.....	Topping
Iskine	.....	.....	Topping
Kazan	.....	.....	.....
Kherson	.....	5,000	Cracking
Krasnodar (Maikop)	25,000	.....	Skimming
Kuibyshev	.....	.....	.....
Leningrad	.....	5,000	Cracking
Makhach Kala	2,000	.....	Skimming
Molotov (Perm) (2 Refineries)	12,000	4,000	Skim-Crk.
Moscow	.....	12,800	Cracking
Munkacs[2]	420	.....	Skimming
Nadworna[1]	200	.....	Skimming
Nebit Dag	.....	.....	.....
Nikolaev	.....	.....	.....
Novobogatinsk	500	.....	Skimming
Odessa	.....	5,000	Cracking
Orsk	28,000	5,000	Skim-Crk.
Saratov	.....	35,000	Cracking
Sernovo	.....	.....	.....
Stalingrad	.....	.....	.....
Sterlitmak	15,000	.....	Skimming
Stryj[1]	250	.....	Skimming
Syzran	.....	.....	.....
Tbilisi (Tiflis)	.....	.....	.....
Taupse	35,000	10,000	Skim-Crk.
Tuimaza	.....	.....	.....
Ufa	28,000	5,000	Skim-Crk
Ukhta	.....	.....	Topping
Ustrzyl i Dolna[1]	1,000	.....	Skimming
Yaroslavl	9,000	4,000	Skim-Crk.
Zniesienie (Lwów)[1]	1,000	.....	Skim-Lube
Asiatic Refineries:			
Fergana (4 Refineries)	40,000	10,000	Skim-Crk.
Irkutsk	.....	.....	.....
Khabarovsk	4,500	3,500	Skim-Crk.
Komosomolsk	4,500	3,500	Skim-Crk.
Krasnovodsk	4,000	3,000	Skim-Crk.
Krasnoyarsk	.....	.....	.....
Moskalvo	.....	.....	Topping
Nikolaevsk	4,500	3,500	Skim-Crk.
Vladivostok	.....	.....	.....

[1] Refineries located in former Polish territory.
[2] Refinery located in former Czechoslovakian territory.

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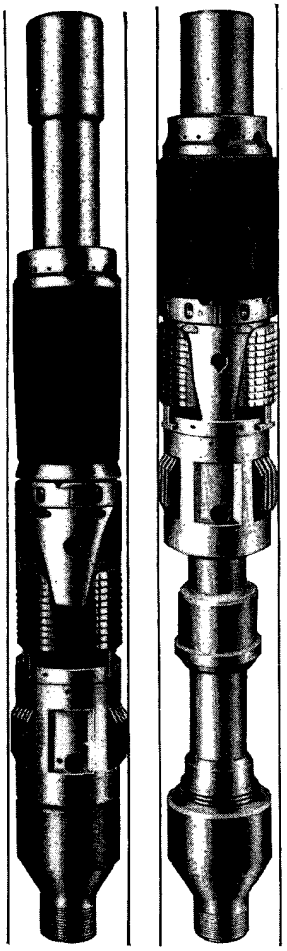

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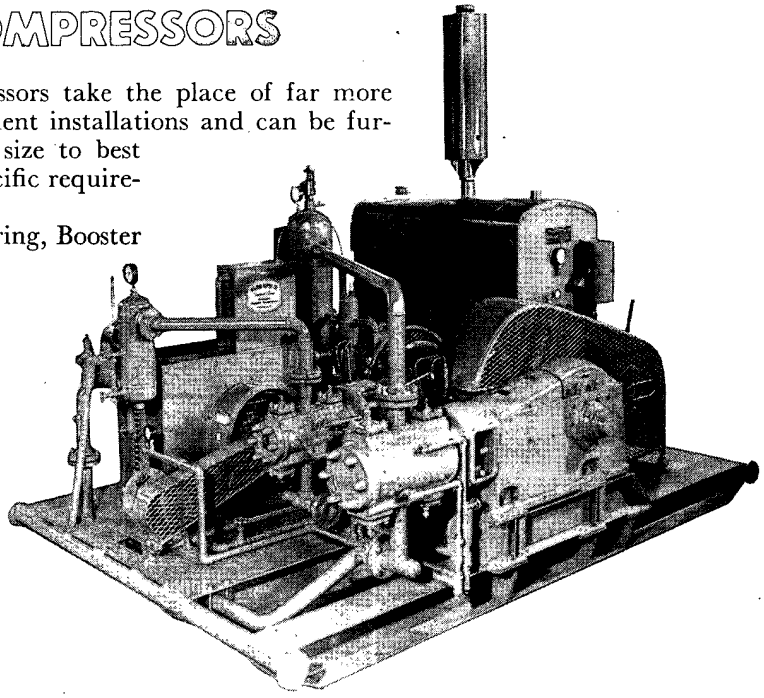

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in November by Marshal N. A. Bulganin, the 1950 production expansion was 21 percent above prewar in the first ten months of the year. The latest five-year plan called for expansion of production during the year of 14 percent above prewar.

Maikop, Grozny and Western Ukraine oil installations, destroyed during the war, were fully restored. Reports also told of extensive development work under way on Sakhalin Island, and cited activities in the Turkmen, Uzbek and Kazakh republics.

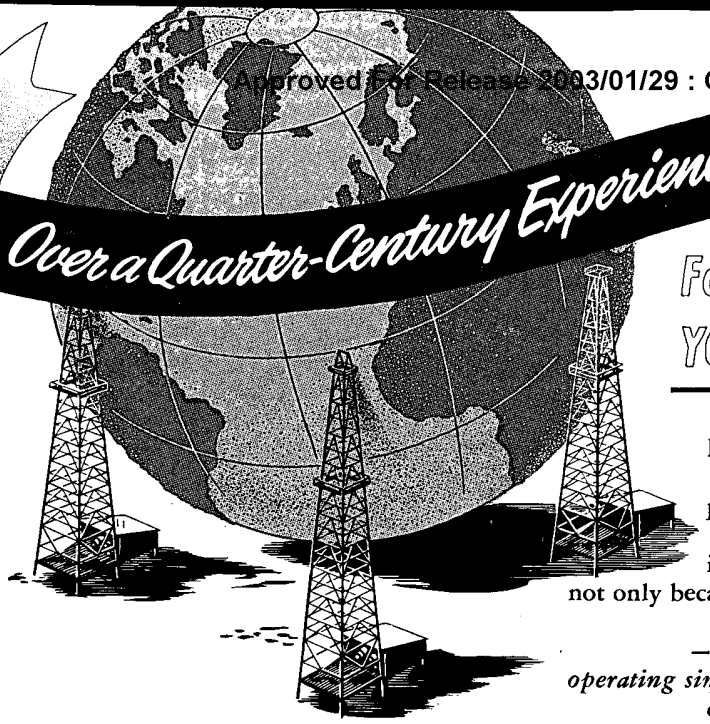
Oil refining industry has been re-equipped and oil industry equipment will be more than three times the prewar production, Bulganin told the Soviet in November. He did not say when the rate would be reached.

Despite 1950 Soviet claims to the contrary, available information indicated that oil development must be increased rapidly to meet a daily production goal of about 1,200,000 barrels in the next four years of the current five-year plan.

Engineering and Geological Data on U.S.S.R. European Fields

AREA and FIELD	PRODUCING FORMATION Age	Depth, (Ft.)	Type Structure
Baku (Azerbaijan) Area:			
Artem (Holy Island)	Middle and Lower Pliocene	3500–9000	Anticlinal Fold
Baladzhary	Lower Pliocene	4729	Anticline
Pibi Eibat	Middle Pliocene	3500–5000	Anticline
Binagady	Lower Pliocene	1500–3116	Anticlinal Fold
Fatmay	Upper Pliocene	1788	Anticline
Kala	Upper to Lower Pliocene	2800–4200	Dome on Fold
Kara-Chkhur	Middle to Lower Pliocene	3440–9000	Anticline
Kara Dag	Middle Pliocene	5340	Anticlinal Fold
Kergez-Kyzyl Tepe	Middle Pliocene	.....	Anticline
Lenin (Balakhany, Sabunchy, Ramany)	Upper to Lower Pliocene	3800–5184	Anticline
Lok-Batan (Mikoyan)	Middle Miocene to Upper Pliocene	.....	Anticlinal Fold
Mahomedly	Upper Pliocene	.....	Anticline
Miadjik	Middle Pliocene	Shallow	Anticline
Nephte Chala	Pliocene	.....	Folded Fault
Peschanny	Middle to Lower Pliocene	.....	Anticline
Pirsagat	Middle Pliocene	4120	Anticlinal Fold
Puta (Molotov)	Middle Pliocene	.....	Anticlinal Fold
Saryncha-Guilbakht	Middle Pliocene	.....	Anticlinal Fold
Shongar	Middle Pliocene	.....	Anticlinal Fold
Shuraabad	Oligocene	Shallow	Overthrust Fold
Shubany (Atashka)	Lower Pliocene	.....	Diapir Fold
Sion Shor	Lower Pliocene	5180	Anticlinal Fold
Siazan	Cretaceous and Oligocene	.....	Overthrust Fold
Surakhany	Upper to Lower Pliocene	3800–5200	Anticline
Sulu Tepe	Lower Pliocene	5200	Anticlinal Fold
Zykh (Beriya)	Middle and Lower Pliocene	.....	Anticlinal & Dome
Carpathian Area:			
Bitkow	Oligocene	3610	Anticline
Boryslaw	Oligocene (Eocene, Cretaceous)	4270–5700	Folds
Czarna	Oligocene	1310	Anticlinal Fold
Daszawa	Miocene	2300	Anticline
Kosmacz	Cretaceous	1920	Anticline
Lipic	Oligocene	1310	Anticline
Lodyna	Oligocene	1150–1900	Diapir Fold
Majdan	Eocene	590–1659	Anticline
Nahujowice	Oligocene and Eocene	535– 656	Anticline
Opaka	Eocene	1970	Anticline
Crow	Cretaceous	300–1835	Fold
Perebinsko	Oligocene	2625	Anticline
Polana	Oligocene	325– 685	Anticline
Rajskie	Oligocene	980–1300	Asymmetrical Fold
Rypne	Oligocene	400–3700	Fold
Schodnica-Urycez	Cretaceous	1480	Anticline
Slobada-Rungurska	Cretaceous	400–1000	Anticline
Strzelbice	Cretaceous	660	Anticline
Crimea Area:			
Chongelek	Middle Miocene	.....	Diapir Fold
Feodosiya	Middle Miocene	.....	Anticlinal Fold
Daghestan Area:			
Achi Su	Middle Miocene	985–2300	Anticlinal Fold
Berekei	Oligocene & Eocene Contact	.....	Domal Uplift
Dag Ogni	Oligocene	60–1000	Domal Fold
Duzlak	.....	.....	Dome
Isber Bash	Middle & Lower Miocene	3025–4685	Domal Anticline
Kaia Kent	Middle Miocene	655–1640	Anticline
Emba Area:			
Baichunas	Jurassic	.....	Salt Dome
Chernaya-Retchka	Jurassic	Shallow	Salt Dome
Dossor	Jurassic	246– 690	Faulted Dome
Dshaksymai	.....	.....	Faulted Dome
Iskine	Jurassic-Salt Core Contact	2195	Salt Dome
Koschaghyl	Jurassic	350–1200	Salt Dome
Kulsary	Jurassic	.....	Salt Dome
Makat	Jurassic	.....	Salt Dome
Novobogatinsk	Jurassic	.....	Salt Dome
Sagis	Lower Cretaceous & Middle Jurassic	328–2132	Faulted Dome
Shobarkuduk	.....	.....	Salt Dome

AREA and FIELD	PRODUCING FORMATION Age	Depth, (Ft.)	Type Structure
South Georgian Area:			
Malye Shiraki	Lower Pliocene & Upper Miocene	980–7850	Anticlinal Fold
Mirzaani	Lower Pliocene & Upper Miocene	980–7850	Anticlinal Fold
Grozny Area:			
Akhazovski	Middle Miocene	.....	Folded Overthrust
Ali Yurt	Middle Miocene	9185	Overthrust Fold
Bakovichi	Middle Miocene	.....	Anticline
Groskaya Mountain	Middle Miocene	3530	Fold Anticline
Grozny, New (October)	Middle Miocene	7220–10200	Anticline
Grozny, Old	Middle Miocene	7220–10200	Folded Anticline
Gudermes	Middle Miocene	3840–4595	Anticline
Gunuski	Middle Miocene	4315	Anticline
Makhkety	Middle Miocene	3280–3940	Anticline
Malgobek	Middle Miocene	990–2300	Anticlinal Fold
Pravoberezhnoye	.....	.....	.....
Voznessenka	Middle Miocene	990–2300	Anticlinal Fold
Kama River Area:			
Krasnokamsk	Permian & Upper Carboniferous	2950–3100	Anticline
Overiata	Permian & Upper Carboniferous	.....	Anticline
Polazna	Permian & Upper Carboniferous	3400	Anticline
Severokamsk	Permian, Upper Carboniferous & Devonian	3200–5840	Anticline
Shilovo	Permian	3152	Anticline
Verkhne-Chusovskiye Gorodki	Permian	3200	Buried Reef
Kuban-Maikop Area:			
Abuzy	Oligocene	2500–4920	Monocline
Adaghum	Upper Miocene	985	Diapir Fold
Asphalt Mountain	Lower Miocene & Oligocene	2240–2950	Monocline
Olsk	Oligocene	.....	Monocline
Kalujsky	Middle Miocene	.....	Monocline
Keslerovo-Varenikovo	Upper Miocene & Oligocene	1148-1640 2625–3280	Diapir Fold
Khadyzhensky	Oligocene	2240–3480	Monocline
Krymsky-Kudako	Middle Miocene	650–1640	Anticline
Kura-Tsite	Lower Miocene & Oligocene	2250–2950	Monocline
Kutaiss	Lower Miocene & Oligocene	2240–2950	Monocline
Maikop (Apsheron)	Lower Oligocene	1640–3480	Monocline
Sepsil	Oligocene	.....	.....
Shiraky	Lower Miocene & Oligocene	2240–2950	Monocline
Suvorov-Cherkess	Pliocene & Miocene	330–1475	Domal Uplift
Wax Mountain	.....	.....	.....
Pechora Area:			
Ukhta (Chibien, Ust Kulom, Yareg, Izhma, Cherdin)	Devonian	.....	Anticline
Saratov Area:			
Dergachi	Upper Pliocene	383–3300	.....
Kurdium	Upper Pliocene	1716	.....
Teplovka	Upper Pliocene	1320	.....
Yelshanka	.....	.....	.....
Ukraine Area:			
Melitopol	Mesozoic	.....	Salt Dome
Poltava	.....	.....	Salt Dome
Romny	Mesozoic	.....	Salt Dome
Ural-Volga Area:			
Allaguvatovo	Lower Permian	1650–2085	Buried Reef
Buguruslan	Permian	985	Anticlinal
Buranchino	Lower Permian	1640–2085	Buried Reef
Ishimbaevo	Lower Permian	1640–2085	Buried Reef
Kusiankul	Lower Permian	1380–2490	Buried Reef
Kuzminovka	Lower Permian	.....	Buried Reef
Shugarov	.....	.....	.....
Smakaevo	Lower Permian	.....	Diapir Fold
Syzran	Upper & Lower Carboniferous	2130–3280	Domal Uplift
Termen-Yelga	Lower Permian & Devonian	2750	Reef
Tuimaza	Carboniferous	3440–3775	Buried Reef
Yablonovo (Stavropol)	Upper & Lower Carboniferous	2130–3280	Domal Uplift



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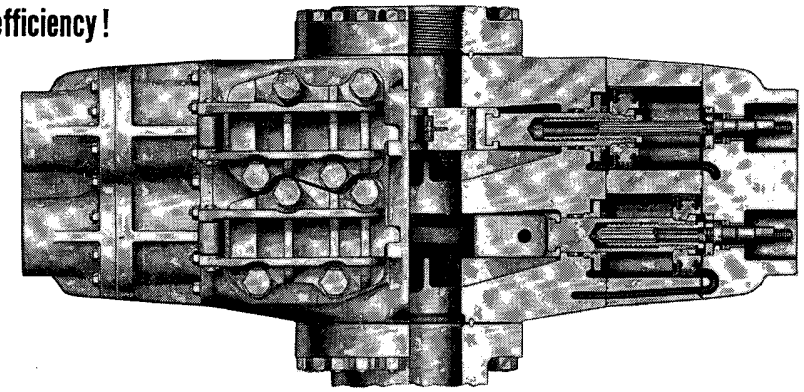
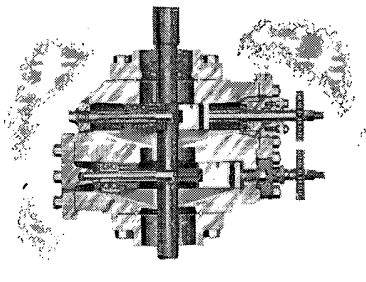
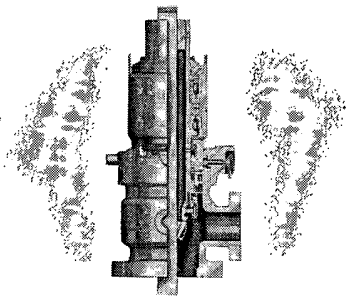




SHAFFER MECHANICAL CELLAR CONTROL GATES

- Available in both Double (illustrated above) and Single types for operation by air, electric or steam drive *—plus complete manual stand-by operation!*
- Require minimum space—less than 29" for Double, 19" for Single, even in sizes as large as 13⅜" (12" Series 900).
- Self-Draining Ram Compartments, with no place for detrimental mud to accumulate and interfere with free ram travel . . . Quick, Easy Ram Changes by simply removing *one* end cover . . . and many other unique features make these gates outstanding in their field.

Domestic or overseas, wherever your operations call for mechanically-operated cellar control gates, Shaffer has the most advanced design available!

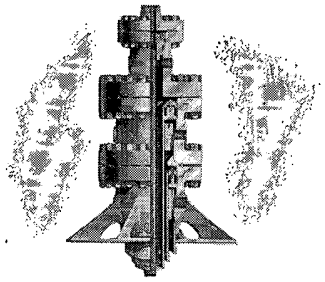


SHAFFER COMBINATION ROTATING BLOWOUT PREVENTERS AND STRIPPERS

—Combine in One Unit Every Necessary Feature for Complete Pressure Control While Drilling.

- Can be used with *any* standard kelly —square, hexagonal or octagonal; any type drill pipe—coupled, upset or flush. No special strings or equipment needed!
- Maintains continuous seal around pipe, couplings, tool joints, upsets, subs, drill collars, etc. *automatically* —whether string is rotating, being raised, lowered, or is stationary.
- Quick Releasing Bonnet permits lifting bits, reamers, other large-diameter tools through the unit quickly, easily. . . . and many other unique features!

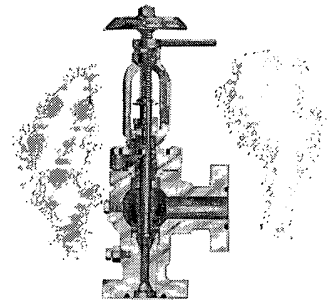
Nothing equals this unit for maintaining complete pressure control while the drill string is in the well. Available in a complete range of sizes.



SHAFFER LANDING HEADS AND TUBING HEADS

—Meet Every Requirement for Modern Compact Casing and Tubing Suspensions The World Over.

- Available in various types and packing arrangements. Base Heads and Combination Base, Casing and Tubing Heads are available for combining several units into one where space is at a premium.
- Shaffer provides a full line of modern Tubing Heads, Multiple Zone Hook-Ups and other equipment to complete your pressure control installation—for conditions anywhere in the world!



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—The Pioneer Adjustable Flow Bean that Provides Operating Features Unequalled By Any Other Equipment.

- Available with Conical, Micro and electrically-heated Thermo Tips in both regular and hard metal designs to meet various drilling, production and refinery applications. All popular sizes—in both flanged or screwed connections—to meet your particular requirements.

ALSO, SHAFFER FISHING TOOLS!

In addition to pressure control equipment, Shaffer also provides one of the most complete lines of dependable fishing tools in the industry. Not only all conventional types—but many tools that are unique in operation and purpose. Write for complete information!

Send for [illegible] Shaffer Catalog. See pages 4525 to 4600 of your 1951 Composite Catalog for additional Shaffer data.

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28 years OF OIL TOOL LEADERSHIP

ALBANIA

Albania's 1950 crude output reflected a decline. In 1950, 2,106,000 barrels were produced as compared to 2,188,000 the preceding year. During the third quarter of 1950, the daily production rate was 5700 barrels.

After several months of stagnation in the Devoli and Berat fields, Russia took over active control of the Albanian oil industry and moved four more drilling rigs into the fields. The added equipment reportedly permitted an increase in crude production, but Russia took all of is for its own use.

CZECHOSLOVAKIA

Czechoslovakia was still another Russian-dominated Balkan country to suffer declining crude production during the year. In 1950, 280,000 barrels were produced, a drop of 12,000 barrels from the 1949 output. Production rate in the third quarter was 1000 barrels daily.

A new discovery was reported during the year near Malacky, Slovakia. The production was taken over by Russian authorities, who said they considered the producer an extension of the important Austrian oil fields near Zisterdorf.

HUNGARY

As 1950 began, the Hungarian government was in the process of following up its decree nationalizing virtually all of its industry. In New York, officials of the Standard Oil Company (N. J.) described the action as merely an official step in taking over properties that were confiscated in 1948. The Hungarian minister of state claimed that foreign imperialists had used foreign business to build up a spy ring and for sabotage activities.

Shrouded by the cloak of Communism, Hungarian crude activity information, as well as that concerning most other enterprises, was withheld. However, Hungary's 1950 crude production was estimated at 3,460,000 barrels, a decrease of 331,000 barrels from its record year in 1949 when 3,791,000 barrels were produced. During the third quarter of 1950, the daily average production rate was 12,000 barrels.

Estimated proven acreage in the Budafapuszta, Hahot, Hohot-Ederics and Lovasi fields was 7950.

POLAND

With an estimated crude production of 928,000 barrels, Poland, like other satellite countries, was faced in 1950 with a diminishing output which extended into the second straight year. In 1949, 965,000 barrels of crude were produced, as compared with 1,039,000 in 1948.

Available information indicates that no extensive new oil resources were found and that development drilling in established fields failed to keep pace with the natural field decline in production. This information is borne out by the 1950 production drop.

Beginning in 1950 and scheduled to continue for the following five years, refinery operations were expected only to include reconstruction and development of existing producing installations. One report indicated that the construction of plants to produce more lubricants, rather than more gasoline, was stressed during the year.

This trend apparently ties in with the report in a Polish government publication that Polish efforts are to be directed toward achieving results which may better serve the drilling program of USSR.

ROUMANIA

Roumania's crude production declined for the second year in a row in 1950. Production of 31,609,000 barrels fell 2,091,000 barrels short of 1949 production.

Roumania is still regarded as highly strategic to the communists since it supplies petroleum to both the Soviet Union and the eastern European satellite nations from its Ploesti, Targul Mures and Moldova fields.

Rigid censorship practices were continued throughout the year. Consequently, oil production figures, except for the above estimate, were expressed only in percentages of an unknown base.

The 1950 one-year state plan called for production, expressed in terms of 1949, of 132.5 percent on crude oil. According to the State Planning Commission, the crude production rate at the end of the third quarter was 132.5 percent.

The Roumanian claim for its 1950 production would indicate an output of from 100,000 to 125,000 barrels daily on the basis of pre-nationalization figures. Washington officials doubted the figures, and believed the production rate was closer to 85,000 barrels a day.

An indication of the progress claimed was evidenced by the rationing of gasoline in Roumania, the most important oil producer in Europe.

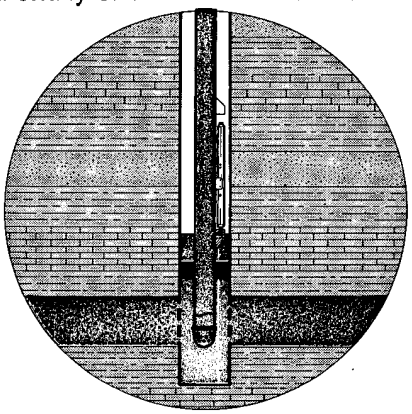
Reports from Russian-controlled areas of eastern Europe indicated that a new oil discovery was made in the Transylvania border region between Hungary and Roumania. The vague reports placed the location northwest of Oradea-Mare, which is in Roumania near the frontier; however, it was not clear whether the discovery was in Hungary or Roumania. Heretofore, the Transylvania region has produced only gas from several sizable fields.

In the third quarter of 1950, crude production from Roumania averaged 75,000 barrels daily. Most of this production went to Russia or was used by Russian military forces in the Balkans themselves.

It was also believed that Russia curtailed local refining of Roumanian crude and designated it for shipment to Batumi, on the Black Sea coast.

The History of CAMCO is a Story of Progress in Gas Lift Equipment

With the use of high pressure gas generally proved as the most economical means of artificially producing oil wells, Camco . . . in a short span of years . . . has met the challenge of this comparatively new theory in oil production with a steady stream of new and improved gas lift products. Camco, in fact, entered the gas lift equipment field with a program pledged to continuous research and improvement and advancements developed and pioneered by Camco are in use today throughout major fields in the United States and foreign lands. The newest in Camco's list of improvements is the Retrievable Gas Lift Valve. This equipment . . . the first of its kind ever introduced to the oil industry . . . has been used successfully in several wells in South Louisiana and South Texas for nearly two years. With Camco Retrievable gas lift equipment, Camco Retrievable Valves may be placed in any selected mandrel at will, or removed, without disturbing any of the other valves in the string, even though the valves may be both above and below the valve to be removed.



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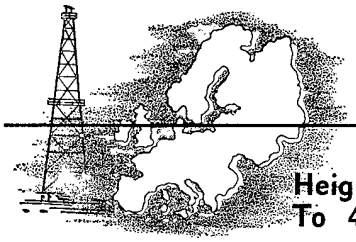


YUGOSLAVIA

Heightened Activity During 1950 Pushes Production Up To 489,000 Barrels, Or 49,000 Over Previous Year's

TITO'S regime attacked the problem of petroleum exploration and production during 1950 with unusual vigor. The net increase in production to an estimated 489,000 barrels of oil, 49,000 barrels more than the 1949 output of 440,000 barrels, for an average of about 1339 barrels per day.

Yugoslavia's production is in three regions—Croatia, Bosnia, and Serbia. Croatia's fields, clustering around the capital of Zagreb, produced an average of not more than 1270 barrels daily during the year. Heaviest producing field in the region is Gojilo, 60 miles east of Zagreb.

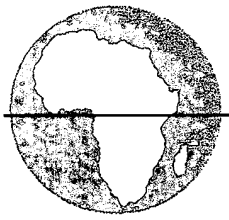
Field limits are not very well known in the Lendova field, 100 miles north of Zagreb, although the deeper Miocene and older formations held interest.

At least three prospective fields are in the Serbia region, on the eastern side of Yugoslavia bordering Roumania and Bulgaria. Information on Serbia is lacking; however, the Velika Greda field, southeast of Belgrade, has one well drilled to 4000 feet. It is a small producer. One gas well is in Becy, in the province of Voyvodina bordering Hungary and Roumania.

In the Bosnia region two wells were drilling near the town of Tuzla. Both reached limestone at 2600 feet with an indication of production.

During the early part of the year, 26 rigs were in operation. Twelve were being used in Lendova field. A wildcat was scheduled to begin near the Lake of Scutari in the province of Montenegro, with a portable rig.

The principal refinery in Yugoslavia's small network is at Rijeka (Fiume), but most of the products consumed are imported refined.



ALGERIA

Important Oil Structure Discovered in Oran Hinterland; Monthly Average Crude Production Hiked to 582 Barrels

MONTHLY average crude production in Algeria during the first nine months of 1950 reached 582 barrels, giving a total output for the year of approximately 6984 barrels. La Societe Nationale de Recherche et d'Exploitation des Petroles en Algerie (SN REPAL) discovered an important new oil structure in the hinterland of Oran, in addition to those previously in operation in the Oued Guetterini Valley between Aumale and Sidi-Aissa. Also interested in the new oil development, an extension of the field, was the Societe des Petroles d'Aumale and the Raffineries Algeriennes S. A.

Early in November, two rigs were put into operation near Aumale. More wells were to be drilled in the field at Oued Guetterini.

Algerian refinery operations were given a boost when the Governor General of Algeria inaugurated the new pilot refinery of Oued Djenan, which is connected to the oil fields by pipe line.

The French government's Oil Department sent a mission of geologists to southern Algeria to ascertain whether the Moroccan oil structures extend to the east, after the announcement that Dutch geologists exploring southern Lybia found there an extension of the Suez Canal oil structures.

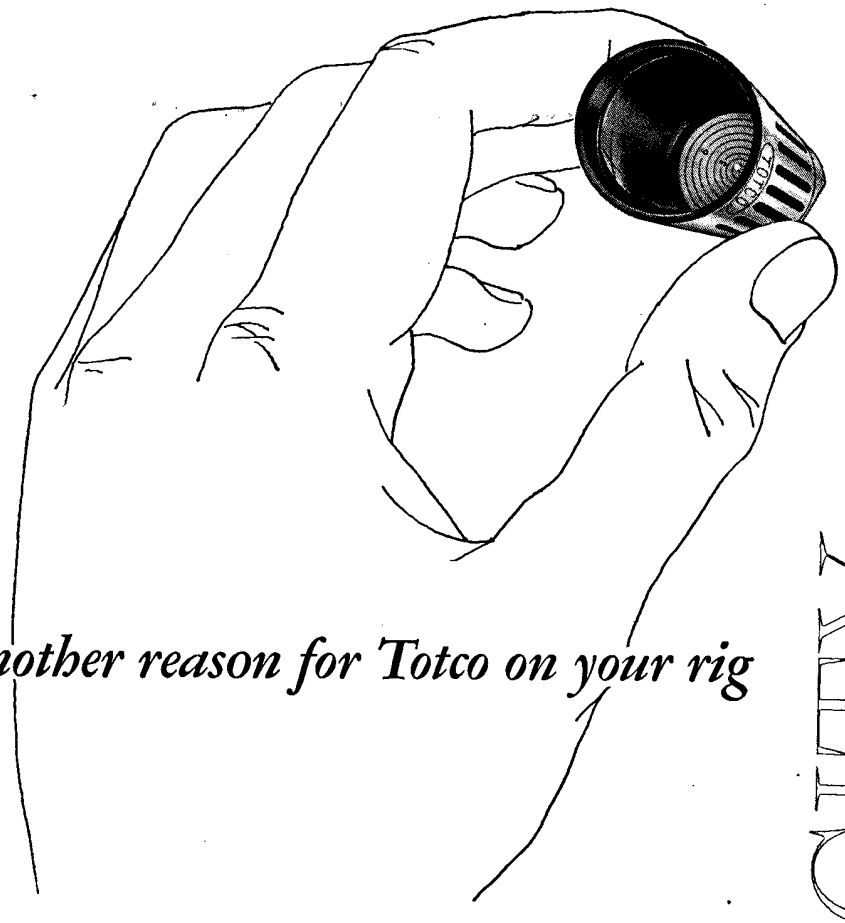
EGYPT

Year's Production Increases 278,000 Barrels Over 1949; Deeper Drilling Likely in Rejuvenating Hurghada Field

WITH a 1950 production estimated at 16,275,000 barrels, Egyptian oil output rose 278,000 barrels over the 1949 total of 15,997,000 barrels. Some extension drilling was marked by a well brought in during the year at Hurghada, the country's oldest commercial oil field, which gave hope for increased production throughout the area. Efforts to rejuvenate the field, where 43 wells have been pumping at an average daily rate of approximately 23 barrels, were expected to include deeper drilling. The new well averaged 250 barrels a day in a two-week test with a three-fourths inch choke.

The Hurghada operation was believed to be of only local significance, and stepout drilling there failed to reveal any further extensions to the field, where production has entered upon a natural decline.

The Anglo-Egyptian Oilfields, Ltd., (Shell) completed in 1950 a stepout well in the northwest of the Sudr lease. The well was completed successfully in a shallow horizon,



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Run in and out on measuring line.

Dropped down drill pipe; picked up with core barrel overshot.

Dropped down drill pipe; recovered when bit is changed.

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Run in and out on ordinary sand line.

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PETROLEUM EQUIPMENT SUPPLIERS MEMBER ASSOCIATION

but the extent of the new accumulation appeared to be very limited.

On Anglo-Egyptian's Ras Matarma license production was found with the completion of Well 6 in an horizon corresponding to that in which production was found at Sudr and Asl. Development work was suspended pending the ultimate outcome of negotiations with the Egyptian government regarding the license/lease situation.

Anglo-Egyptian continued development on the Asl lease, apparently locating and defining production limits. Drilling was continued on the Nebwi license, but the license was relinquished after the fifth exploration failure.

Until Parliament recessed in August, Anglo-Egyptian was engaged with the government in discussions aimed at obtaining satisfactory operating conditions on a basis which would encourage development and expansion. Under the existing mining law, Anglo-Egyptian would be precluded from converting into leases such licenses for prospecting as might be obtained.

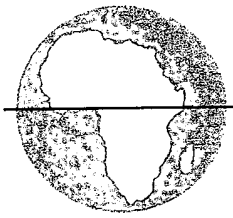
Also concerned in parliamentary action on legal barriers which have virtually halted oil exploration is Socony-Vacuum Oil Company, Inc., which has awaited favorable government action for 2½ years.

Exploration permits covering 418 square miles were obtained by an independent group of Cairo business men. Involved areas range from the Gulf of 'Aqaba, along both sides of the Gulf of Suez, in the Fayoum sector north of Cairo, and near Sollum, on the northwestern frontier toward the Mediterranean.

ETHIOPIA

SINCLAIR Petroleum Company was continuing seismograph work after abandoning Gumburo 1 in the Ogaden area. The test was spudded in 1949, and drilling was suspended April 7, 1950, after going past 10,000 feet. The wildcat was carefully cored and tested to obtain geologic data as to formation and stratigraphy. On the basis of core analysis, the company continued an extensive geophysical program. An airborne magnetometer survey was completed during the year.

Choice of location for the second projected exploratory test was deferred until geophysical and geological studies are further advanced and collated. The first test was made after three years of exploration activity, and the location was in the fastness of the Gumburo Hills. Drilling equipment was moved in from base headquarters at Dire Dawa, 475 sandy, brushy road miles distant, and rig and campsite facilities were erected amid unfavorable conditions. For the initial test, more than 3000 tons of equipment and material were shipped to Ethiopia from the United States.



MOROCCO

Discovery of Sidi-Fili Field Helps to Increase 1950 Production by 147,050 Barrels Over Previous Year's

DISCOVERY of the Sidi-Fili field and other successful drilling activities increased the 1950 production 147,050 barrels over that of 1949.

The Oued Mellah field was defined by the completion of 25 holes which include 13 producing wells, three with distinct oil shows and nine dry.

The 1950 program resulted in the drilling of 80 tests with 48 of the operations conducted in the region of the

Pipe Lines in Morocco

COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Capacity (Bbls. Daily)	Year Completed
Société Chérifienne des Pétroles.....	Bou Draa	Petitjean	1	2	280	1940
	Tselfat	Petitjean	12.3	2	280	1938
	Ain Hamra	Karia (railway)	2.3	2	150	1943

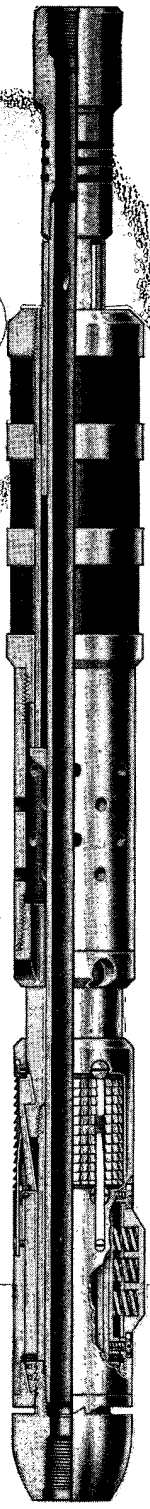
Morocco Oil Production and Geological Data

REGION and FIELD	Year of Discovery	PRODUCING WELLS END OF 1950			CRUDE OIL PRODUCTION (Barrels)				Proved Area (Acres)	Gravity of Oil (API)	Formation, Name and Kind	Geologic Age	DEPTH (Feet)		Avg. Thickness of Pay (Feet)	Type of Structure
		Flowing	Art. Lift	Total	Daily End of 1950	Year 1949	Year 1950	Cumulative Through 1950					Min. to Top of Pay	Max. to Bottom of Pay		
PLAINE DU RHARB:																
Ain Hamra.....	1918	..	19	19	60	2,790	9,140	77,140	300	45	Tortonian, Sand	Miocene	400	4500	10	Lenses
Bou Draa.....	1936	..	1	1	...	.....	180	158,330	340	45	Toarcian, Lime	Liassic	600	2500	15	Anticline
Oued Beth.....	1947	13	..	13	650	136,300	208,900	448,900	120	35	Primary, Lime and sandstone	Primaire	3280	3400	60	Faults
Oued Mellah.....	1948	15	..	15	220	.....	66,200	66,200	n.a.	35	Primary, Lime and sandstone	Primaire	1800	n.a.	n.a.	Faults
Sidi Fili.....	1950	3	..	3	200	.....	3,000	3,000	n.a.	38	Primary, Lime and sandstone	Primaire	n.a.	4500	n.a.	Faults
Tselfat.....	1934	..	2	2	10	5,080	3,800	153,600	130	45	Toarcian Domerian, Lime	Liasic	300	5500	40	Anticline
Total.....	....	31	22	53	1,140	144,170	291,220	907,170	....	..	.....	.....	....	....	....	.....

NOTE: All operations by Société Chérifienne des Pétroles.

TIW CONTROL HEAD PACKERS

for positive seal in single or dual completions



TIW Type JSA-C Packer with hold-down slips gives positive zone separation

- Hydraulic fracturing of formations
- Dual zone completions
- High pressure acidizing
- Injection well completions

A production packer for use between zones in dual completions, this packer stays set against high differential pressure from either direction, and allows flow from either zone with the other zone shut in.

Spring loaded hold-down slips permit repeated resetting easily, without pulling from the hole. This packer sets and releases the same as if it had no hold-down slips.

TIW Type JSA-C Circulating Packer cuts deep well completion time

- Single zone completions
- Testing casing and cement jobs
- Improving natural flow
- Perforation washing
- Acidizing

This heavy duty packer saves time in running in deep wells because extra large bypass area prevents fluid from washing off packing elements.

Circulating ports in top end of mandrel allow circulating above packer. Available without circulating ports for circulating below packer or running screen below packer.

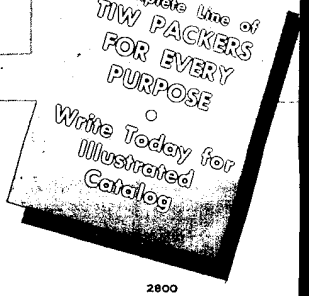
SPECIAL CONSTRUCTION FEATURES FOR POSITIVE SET...SEAL...RELEASE

SET — Automatic bottom to eliminate left-hand rotation of tubing string. Three-piece protected slips assure positive setting at desired level.

SEAL — Ring-type packing elements give positive seal against high pressure. Three O-rings give positive seal between sealing bushing and barrel.

RELEASE — Heavy-duty friction blocks for positive release from automatic bottom. Chrome-plated slip mandrel prevents sticking and assures easy release.

Mechanical parts Parkerized to prevent corrosion.



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MOROCCO—Continued

Oued Bath, Oued Mellah and Sidi-Fili fields. The remaining wildcat operations were confined to the Rharb plains and the Prerif hills. Approximately 20 percent of the activity was confined to exploratory operations which exceeded the 7000-foot mark.

Increased capacity of the Petitjean refinery permitted the processing of 291,220 barrels of crude in 1950, a figure which more than doubles the 1949 production.

Drilling in Morocco

REGION and FIELD	WELLS COMPLETED IN 1949				WELLS COMPLETED IN 1950				Wells Drilling End of 1950
	Oil	Dry	Total Wells	Total Footage	Oil	Dry	Total Wells	Total Footage	
Plaine du Rharb:									
Ain Hamra	..	..	..	.....	6	..	6	5,000	1
Oued Beth	11	33	44	141,000	16	32	48	140,000	4
Wildcats	..	12	12	75,240	..	21	21	117,800	4
Total	11	45	56	216,240	22	53	75	262,800	9

TUNISIA

ABOUT 18 million acres are under concession for petroleum exploration in Tunisia. The French-Tunisia government-controlled company, Societe d'Etudes et de Recherches Petrolieres en Tunisia (SEREPT), holds more than 10 million acres in concessions. Gulf Oil Corporation and the Shell Group signed separate concession agreements with the French government for development rights in Tunisia early in 1950. SEREPT has a 35 percent interest with Gulf and Shell in separate companies. Societe Nord Africaine des Petroles (SNAP), formed by Gulf and SEREPT, holds 4,885,000 acres under concession while Shell and SEREPT have a concession exceeding 3,742,000 acres. SNAP has carried out on its concession geological, airborne magnetometer, gravimeter and seismograph surveys leading to the selection of an initial drilling location. SNAP field headquarters are in the city of Sfax.

OTHER AFRICA

MOZAMBIQUE Gulf Oil Company (Gulf Oil Corporation subsidiary) is continuing active exploration of its 47,000-square-mile concession covering the broad coastal plain of Southern Mozambique between Lourenco Marques and the Save River. Following an aerial photographic survey and airborne magnetometer survey which were completed in 1949, extensive surface geological, gravimeter and structural drill programs were carried out. During the last half of 1950 about 25,000 feet of structural hole was drilled and electro-logged. The company maintains its principal office at Lourenco Marques.

IRAN

Record 1950 Output of 241,425,000 Barrels Points Up Western World's Need for Country's Total Production

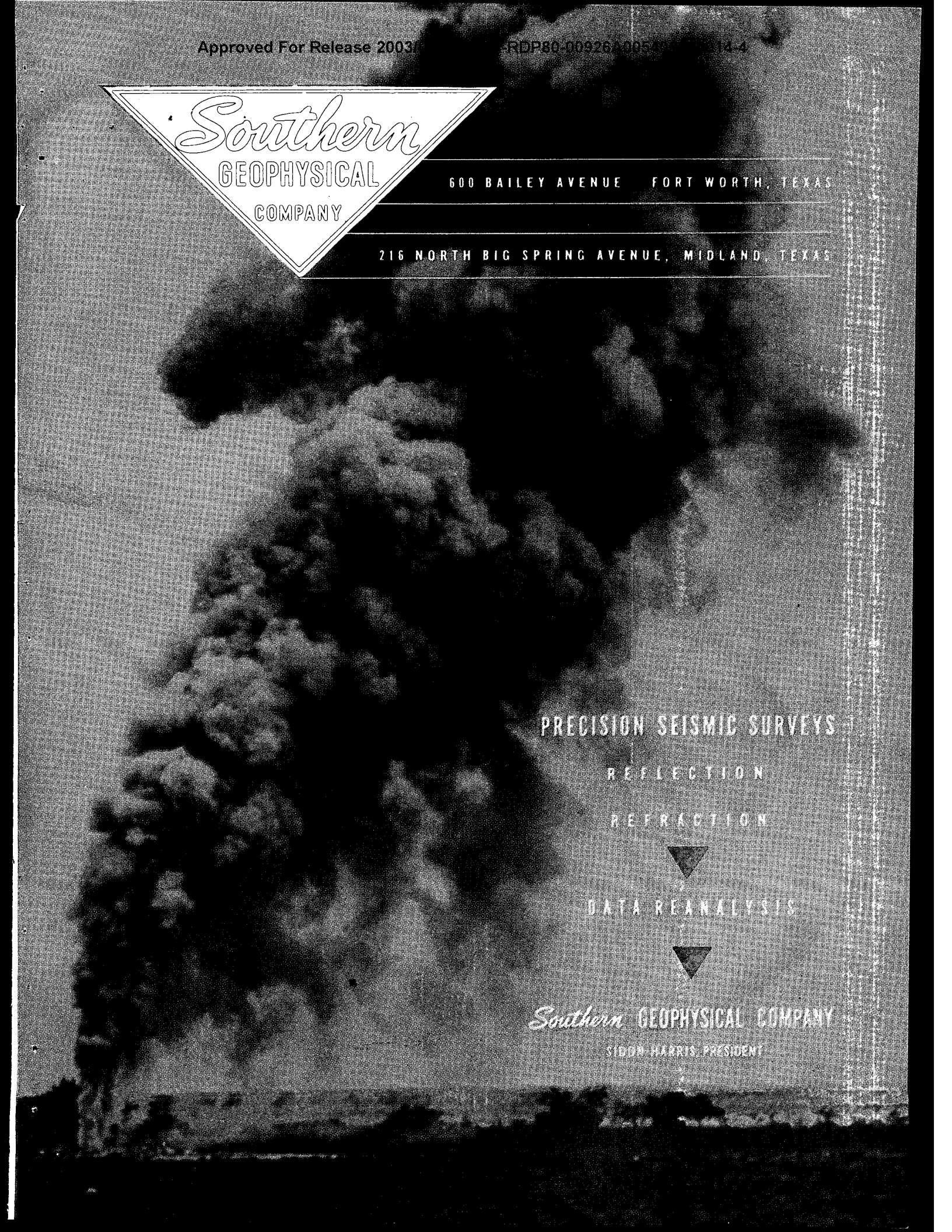
IRAN'S pertoleum industry set a record production in 1950 of 241,425,000 barrels, 36,576,000 more than the 1949 output of 204,849,000 barrels. This 18 percent increase pointed up the importance of an amicable settlement of the nationalization dispute, both to Iran's national economy and to the markets of the free world.

Assisting the political extremists' nationalistic movement at every turn were Communistic elements who apparently hoped to turn Iranian oil from the direction of free world markets to those in Russia and its satellite countries. Or failing in that, the Communists would like to neutralize this vital production.

For a half century, Iranian crude has been controlled by Anglo-Iranian Oil Company, in which the British Government holds controlling stock. If British personnel pulled out completely, Iran would be faced with the gigantic task of assuming physical control of AIOC properties without the immediate technical know-how required to produce, transport, refine, or export the oil.

Efforts to settle the dispute were stalemated after the British government asked the International Court of Justice at The Hague to invoke arbitration or to declare that Iran was violating world law by nationalizing privately-owned oil properties and after AIOC asked the court to appoint an arbitrator. This action was taken under the terms of the 60-year 1933 agreement by which AIOC obtained Iranian oil concessions. Although the agreement was to run until 1993, Iran's Premier Mohammed Mossadegh termed it valueless, and said his government was of the opinion that the International Court of Justice was not competent to handle the case.

Despite U. S. disapproval, Premier Mossadegh threatened to give the Abadan refinery a holiday. AIOC had cut Abadan production to approximately 197,600 barrels



daily, less than half of its capacity, in a slowdown aimed at postponing a complete shutdown.

Additional importance attached in world capitals to the solving of the Iranian nationalization issue was caused in 1950 by mounting petroleum activity.

AIOC completed eight wells on its concessions in 1950, six of which were oil producers and two were dry holes. These new wells increased the total producing in Iran to 77, with 11 additional drilling at the close of the year. The high total production and the relatively small number of wells resulted in average output of slightly less than 8000 barrels daily for each well. Out of six attempts, five producers were brought in during 1949. The 1950 increase in footage was 24,831 over the previous year's figure of 59,183 feet.

All fields took part in the rising production except Haft Kel field, which had a decline of 2,205,000 barrels from 1949. The largest increase in output was in the Agha Jari field, which recorded a rise of nearly 40 percent over 1949 to a total of 117,785,000 barrels. Two wells were completed in the Agha Jari field during 1950, bringing the total at the end of the year to 16 producing and four additional wells drilling.

While no important wildcat completions were made in Iran during the year, successful field wells drilled increased proven acreage to 160,740 compared with 151,940 acres at the end of 1949. The extensions to proven acreage were made in the Agha Jari, Lali, and Naft Safid fields.

Crude runs to the two refineries at Abadan and Kermanshah reached 502,400 barrels daily at the end of 1950, approximately equal to the total throughput capacity. This compared with daily average runs of 482,400 barrels at the end of 1949. Crude oil pipe line capacity of the Anglo-Iranian system was increased by 10,000 barrels to 774,200 barrels daily.

Between March 20 and April 17, 1950, employes at some of the company's oil field or oil loading areas, including Agha Jari and Bandar Mashur, were on strike at different times. Reason for the strike was a small reduction in the level of certain outstation allowances previously paid. Previously, the employes and the Ministry of Labor had accepted the decreases because of the current high scale of social amenities now existing in the areas as compared with the pioneering period when the allowances were arranged.

By April 17, all strikes were settled. A scale of allowances in conformity with amenities provided were to be agreed on after an investigation.

At Abadan refinery, 300 students and apprentices went on strike March 24 for various improvements in their working conditions. Some of their requests were granted and all returned to work by March 31.

Pipe Lines of Iran

COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Capacity (Barrels Daily)	Year Completed
CRUDE OIL LINES:						
Anglo-Iranian Oil Co., Ltd....	Agha Jari	Abadan	97	12 & 16	230,000	1945–50
	Agha Jari	Mashur	42	12 & 16		
	Agha Jari	Mashur	45	20 & 22	170,000	1949
	Gach Saran	Abadan	166	12	45,000	1940–50
	Haft Kel	Abadan	136	12		
	Haft Kel	Marid	124	12		
	Haft Kel	Kut Abdullah	61	12	220,000	1929–38
	Naft Safid	Wais	32	10 & 12		
	Masjid-i-Sulaiman	Abadan	133	10 & 12	80,000	1916–17
Kermanshah Pet. Co., Ltd. (Anglo-Iranian)	Lali	Masjid-i-Sulaiman	40	8-10-12	26,000	1948
	Naft-i-Shah	Kermanshah	146	3	3,200	1935

Drilling in Iran

PROVINCE and FIELD	WELLS COMPLETED IN 1949				WELLS COMPLETED IN 1950				Wells Drilling End of 1950
	Oil	Dry	Total Wells	Total Footage	Oil	Dry	Total Wells	Total Footage	
KHUZISTAN:									
Agha Jari.....	2	1	3	17,941	2	...	2	32,093	4
Lali.....	1	...	1	12,668	1	...	1	20,226	3
Naft Safid.....	2	...	2	28,574	3	2	5	31,701	4
Total.....	5	1	6	59,183	6	2	8	84,020	11

Refineries of Iran

COMPANY	Location of Plant	Crude Charging Capacity (Barrels Daily)	Cracking Capacity (Barrels Daily)	Daily Crude Runs End of 1950	Type of Refinery
Anglo-Iranian Oil Company, Ltd....	Abadan	500,000	100,000	500,000	Skimming, cracking, asphalt
Kermanshah Pet. Company, Ltd. (Anglo-Iranian) ..	Kermanshah	2,300	.....	2,400	Skimming

Iran Oil Production, Producing Wells and Geological Data

PROVINCE and FIELD	Year of Discovery	Producing Oil Wells End of 1950 Flowing	CRUDE OIL PRODUCTION				Estimated Proven Area (Acres)	Gravity of Oil (API)	PRODUCING FORMATION			Minimum to Top of Pay	Maximum to Bottom of Pay	Average Thickness of Pay	Type of Structure
			Daily End of 1950	Year 1949	Year 1950	Cumulative Through 1950			Name	Kind	Age				
FARS:															
Gach Saran.....	1928-37	4	50,000	14,612,000	15,403,000	120,637,000	38,400	32.8	Asmari	Limestone	Olig.-Mio.	4,000	7,000	1,500	Anticline
KERMANSHAH:															
Naft-i-Shah.....	1923	2	4,000	1,162,000	1,272,000	13,210,000	3,840	42.8	Kalhur	Limestone	Olig.-Mio.	2,600	2,700	250	Anticline
KHUZISTAN:															
Agha Jari.....	1937-38	16	370,000	84,319,000	117,785,000	365,258,000	28,400	35.8	Asmari	Limestone	Olig.-Mio.	6,000	9,000	600	Anticline
Haft Kel.....	1928	20	188,000	72,691,000	70,468,000	968,481,000	28,800	39.0	Asmari	Limestone	Olig.-Mio.	3,000	4,000	900	Anticline
Lali.....	1938	3	13,000	3,022,000	5,563,000	11,565,000	5,000	36.0	Asmari	Limestone	Olig.-Mio.	5,000	7,000	1,200	Anticline
Masjid-i-Sulaiman..	1908	27	63,000	21,208,000	21,753,000	861,996,000	34,500	37.8	Asmari	Limestone	Olig.-Mio.	2,000	3,000	1,000	Anticline
Naft Safid.....	1934-38	5	30,000	7,835,000	9,181,000	31,009,000	15,400	35.4	Asmari	Limestone	Olig.-Mio.	5,000	6,000	900	Anticline
Pazanun (Condensate).....	1937	..	.....	.....	.....	6,500,000	6,400	....	Asmari	Limestone	Olig.-Mio.	6,000	8,000	700	Anticline
Total.....	....	77	718,000	204,849,000	241,425,000	2,378,656,000	160,740	....	.....	.....	.....	.....	....	....	.....

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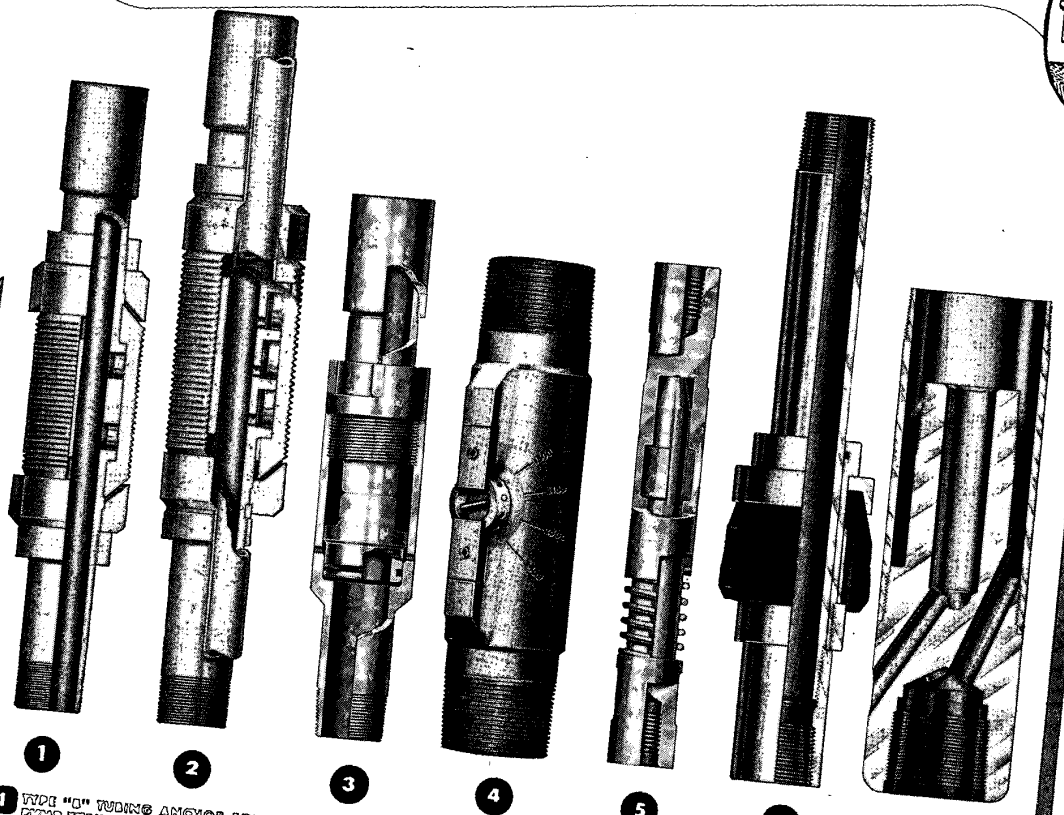

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3 TYPE "A" TUBING DRAIN AND TUBING NIPPLE SUB—The Type "A" Tubing Drain is a combination tool that permits drainage of tubing by simple top-hole manipulation of the tubing string and a means of up-jarring tubing strings stuck by corrosion and scale. Draining of tubing requires only a ¼ turn right and slight pick up on the tubing string.

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IRAQ

Drilling Activity Increases 100 Percent Over 1949; Ten Kirkuk Field Wells Yield 158,909 Barrels Daily

IRAQ'S 1950 crude production of 46,760,206 barrels was an increase over the previous year of 15,031,166 barrels, giving the country a cumulative total of 495,082,759 barrels. The majority of this production came from the prolific Kirkuk field, where ten wells were flowing at the end of the year and were yielding 158,909 barrels per day.

Drilling activity increased 100 percent over 1949, when nine wells, with combined footage of 29,939, were completed. The 18 completions in 1950 reached a total footage of 109,346, an increase of 79,407 feet over the previous year. Six wells were being drilled as the year closed.

Further development in the next two or three years was presaged by plans which will increase production and gain for Iraq a broader role in the international oil picture.

While Iraq production was discovered in 1927, it was not until 1934 that its oil found a place on the market. The initial production, also located in the Kirkuk field, was several hundred miles from deep water, and transportation was lacking. However, with the completion in 1934 of the first pipe line, Iraqi oil began flowing into world trade channels and production rose. A broader petroleum future for Iraq now, as then, is pinned to an enlarged gathering system to handle increasing production from Kirkuk.

A contract was awarded in 1950 to Arabian Bechtel Company for construction of a new addition to the nation's pipe line system. The line, 556 miles long, with a diameter of 30 inches, and a rated capacity of approximately 260,000 barrels per day, will stretch from Kirkuk to Banias, north of Tripoli on the Mediterranean Sea. Completion was expected in 1952.

A drilling program was in operation in 1950 at Zubair, southwest of Basrah, where exploratory tests were conducted in 1948 by the Basrah Petroleum Company, with favorable results. Basrah Petroleum is a member of the Iraq Petroleum group, which operates the Kirkuk field and holds concessions covering almost all of Iraq. Iraq Petroleum Company is owned jointly by Anglo-Iranian (British), Compagnie Francaise des Petroles (French), Royal Dutch-Shell (Dutch-British), and the Near East Development Corporation (Socony-Vacuum, Standard

Drilling in Iraq

PROVINCE and FIELD	WELLS COMPLETED IN 1949			WELLS COMPLETED IN 1950			Wells Drilling End of 1950
	Oil	Total Wells	Total Footage	Oil	Total Wells	Total Footage	
BASRAH:							
Zubair	..	..	..	3	3	64,861	4
KIRKUK:							
Kirkuk	9	9*	29,939	12	12	32,654	1
MOSUL:							
Ain Zalah	..	..	..	3	3	11,831	1
Total	9	9	29,939	18	18	109,346	6

* Includes 4 observation wells.

Refineries of Iraq

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Type of Refinery	Operating Status
Iraq Government	Baiji	....	.....	Planned
Iraq Pet. Co., Ltd.	Kirkuk	1,500	Skimming	Operating
	Kirkuk	2,280	Skimming	Building
	K-3 Station	1,500	Skimming	Operating
	K-3 Station	6,450	Skimming	Building
Anglo-Iranian Oil Co., Ltd.	Alwand	7,500	Skimming	Operating

* NOTE: Refineries at Kirkuk and K-3 Station supply only petroleum products for Iraq Petroleum Co.'s own operations.

Iraq Oil Production and Geological Data

PROVINCE and FIELD	Operating Company	Year of Discovery	PRODUCING WELLS END OF 1950		CRUDE OIL PRODUCTION (Barrels)				Proved Area (Acres)	Gravity of Oil (API)	Formation Name and Kind	Geologic Age	DEPTH (Feet)		Avg. Thickness of Pay (Feet)	Type of Structure
			Flowing	Total	Daily at End of 1950	Year 1949	Year 1950	Cumulative Through 1950					Min. to Top of Pay	Mav. to Bottom of Pay		
BASRAH:																
Zubair	Basrah Pet. Co. Ltd.	1949	..	5[1]	.....	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....
DIYALA:																
Naft Khaneh	Khanaquin Oil Co., Ltd. (Anglo-Iranian)	....	..	..	.....	2,864,520	.....	27,229,938	.....	42.8	Asmari, Limestone	Mio.-Eoc.	3000	....	200-300	Anticline
KIRKUK:																
Kirkuk	Iraq Pet. Co. Ltd.	1927	10	10[2]	158,909	28,864,520	46,760,206	467,852,821	83,500	36	Quarah Chauq, Limestone	Mio.-Eoc.	950	3200	800	Closed Anticline
MOSUL:																
Ain Zalah	Mosul Pet Co.	1940	..	9[1]	.....	.....	.....	.....	3,600	32	Ain Zallah, Limestone	Cret. or Mio.	5000	6000	200	Closed Anticline
Qaiyarah	.....	1927	..	1[3]	.....	.....	.....	.....	12,000	20	Shallow Zone Main Limestone, Limestone	Miocene	700	1000	600	Anticline
Total	.....	....	10	25	158,909	31,729,040	46,760,206	495,082,759	.....	....	.....	.....	.....	.....	.....	.....

[1] Shut in; field not yet on a producing basis. [2] Does not include 29 shut-in wells and 15 observation wells. [3] Produced intermittently.

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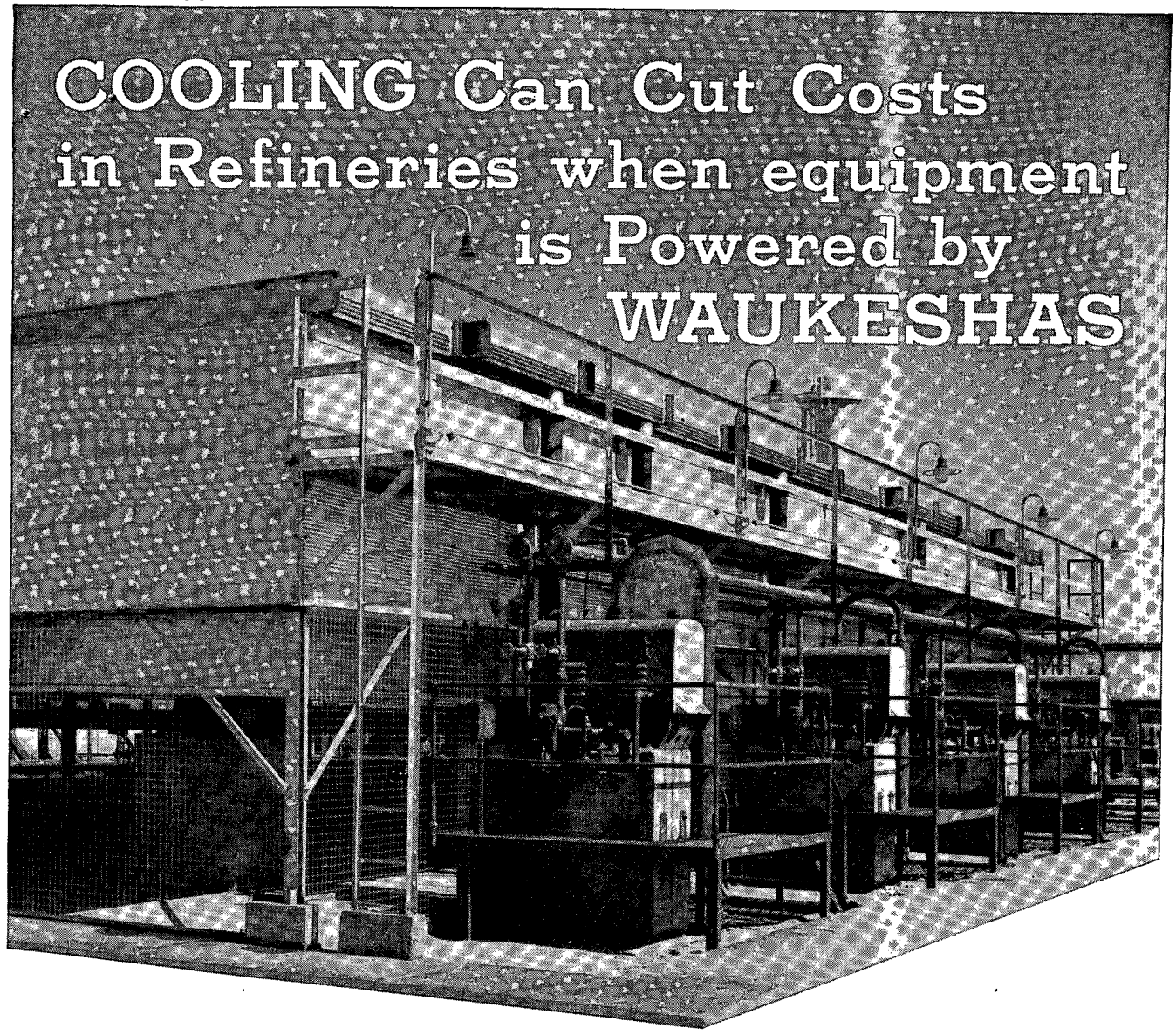

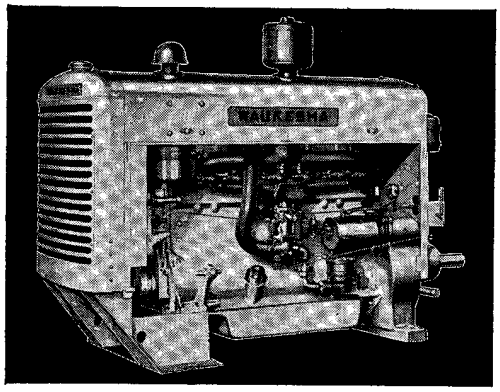

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Oil Co., (N.J.)), each with 23.75 percent of the shares.

Surveys were completed for a pipe line route from Zubair to Fao, on the Persian Gulf. Construction began toward the end of 1950, and a major part of it was expected to be completed in 1951. Exports from Fao were scheduled to begin about the middle of 1952, offering outlets to the Far East and Australasia.

Mutual agreement was reached in 1950 on increased royalty payments to the Iraq government. Iraq Petroleum agreed to increase the rate from four to six gold shillings or from $1.80 to $2.70 for each 7½ barrels produced for export. Iraq government officials said increased royalty will yield approximately $47,600,000 additional revenue for the period January 1, 1950, to October, 1954, when the former exchange and royalty agreement will expire. This agreement, the climax to prolonged controversy, was said to have been made with the understanding that Iraq would seek no further royalty increases in 1954. However, in 1951, IPC offered Iraq an equal share in the profits after the premier said the company might be nationalized unless his country were given more royalty.

Nevertheless, Doc. Nadim el Pachachi, director of the Iraqi Ministry of Economics, has since said Iraq would take legal action to obtain higher royalties. The object of the action would be to require the company to pay royalties at the free world market exchange rate for gold, rather than at the official London rate as it does now. If Iraq wins the suit, it would gain a 30 percent increase or more in its sterling receipts.

Crude Oil Pipe Lines of Iraq

COMPANY	Origin	Terminus	Length (Miles)	Diam. (Inches)	Capacity (Bbls. Daily)	Year Completed
Iraq Pet. Co., Ltd.	Kirkuk	Haifa	620	12¾	90,000 B.P.D.	1934
	Kirkuk	Tripoli	530	12¾		1934
	Kirkuk	Haifa	620	16	180,000 B.P.D.	Suspended
	Kirkuk	Tripoli	530	16		In Use
	Kirkuk	Banias	556	26–32	275,000	Building
	Naft Khaneh	Alwand	24	4–6	8,600	1927
	Zubair	Fao	72	12¾	50,000	Building

KUWAIT

Production Increases 40 Percent Over Year Before; 13 Successful Oil Wells Are Completed During 1950

KUWAIT had a continued increase in crude production in 1950, with output rising about 40 percent over 1949 to reach 125,722,396 barrels for the 12-month period. All production of the Sheikdom comes from the Burgan field, growth of which has been rapid in its 4½ years of actual operation. Production at the end of last year amounted to an average of 403,369 barrels daily from 78 wells, compared with 271,258 barrels a day from 61 wells a year earlier. In addition to the wells on production, 18 completed wells had not been connected at the close of the year. Last year's output brought cumulative production for the field to 284,355,520 through the end of 1950.

Thirteen successful oil wells were completed in the field in 1950 for a total footage of 61,188. This compared with 49 successful oil wells finished in 1949 for a total footage of 232,468. No wildcat wells were completed during 1950, but at the close of the year a deep test was drilling in the center of the Burgan field. The test was seeking deep limestone production in the area underlying the series of sandstone formations that form the producing horizon of this field. Two others were in operation in the field proper at the end of the year.

While an accurate estimate of the increase in proven acreage made as a result of the 1950 drilling program in the field is not available, it is believed proven reserves in the Burgan field total in excess of 11 billion barrels, or about 13 percent of the world's known reserves of petroleum. Based on this estimate, indications are that about 1 billion barrels of reserves were proved during 1950.

The 25,000-barrel-a-day refinery at Mena-al-Ahmadi, 16 miles from the Burgan field, completed its first full year of operations in November, 1950. The plant successfully maintained its designed throughput throughout the year. The 34-mile products pipe line from the refinery to Shuwaikh also completed its first year of operations last November. This line has a capacity of 4000 barrels daily. The handling of the Sheikdom's production for export was facilitated by the increased capacity of the oil jetty, an improvement over the previously used submarine loading lines to tankers.

The entire Sheikdom of Kuwait is under lease to Kuwait Oil Company, Ltd., jointly owned by Gulf Oil Corporation and Anglo-Iranian Oil Company, Ltd. The grant covers approximately 6000 square miles. It was made in 1934 and only the Burgan field has been developed for commercial oil production. The field was discovered in 1938, but because of the war full exploitation did not start until nearly nine years later.

Data on Burgan Field

Operating Company	Kuwait Oil Company, Ltd. (Gulf Oil Corporation and Anglo-Iranian)
Year of Discovery	1938
Producing Wells End of 1950—Oil	78
Shut in Wells End of 1950	18
Wells Completed in 1950—Oil	13
Field Wells Drilling End of 1950	3
Production in 1949	89,903,444 Barrels
Production in 1950	125,722,396 Barrels
Cumulative Production to End of 1950	284,355,520 Barrels
Daily Production at End of 1950	403,369 Barrels
Gravity of Oil (API)	32.5 Degrees
Producing Formation—Local Name	n.a.
Kind	Sand
Age	Middle Cretaceous
Minimum depth to top of pay	3,600 Feet
Maximum depth to bottom of pay	4,800 Feet
Type of Structure	Anticline
Concession Area	3,839,996 Acres (All of Kuwait)

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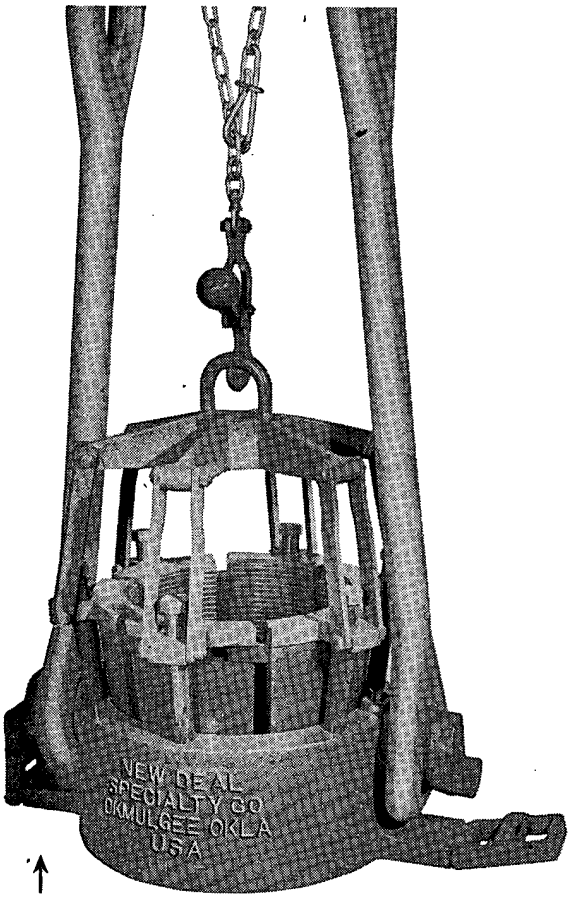

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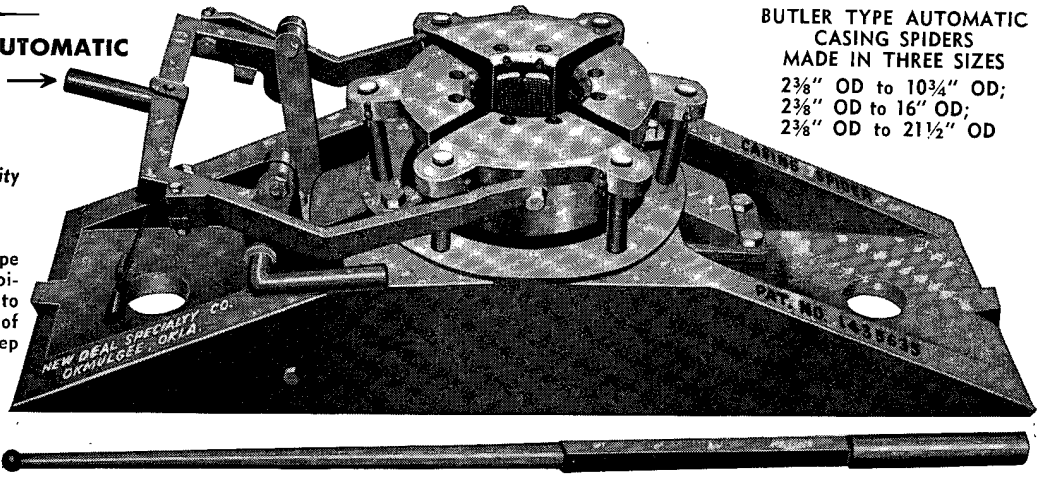

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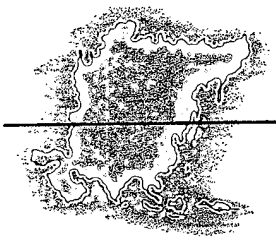


NEUTRAL ZONE

Exploration in Area Between Kuwait and Saudi Arabia Fails to Tap Production; Further Drilling Anticipated

EXPLORATION in the Neutral Zone between Kuwait and Saudi Arabia failed to discover oil in 1950. American Independent Oil Company and Pacific Western Oil Corporation, two independent enterprises, are jointly trying to find a pay formation between the great oil reservoirs of Kuwait and Saudi Arabia.

Pacific Western and Aminoil completed their first test, Wafra 1, on February 4. Wafra 2, about two miles west of the initial exploration, was started February 22 but drilling was suspended June 9 without result. Wafra 3 reached 5000 feet October 20, and no crude traces were discovered. As the year closed, another test west of Wafra 3 was being considered.

Aminoil owns half of the Neutral Zone concession. Pacific Western owns the other half, and has agreed to give King Ibn Saud a 25 percent share of oil in addition to a 55-cent per barrel royalty in return for the concession.

QATAR

Production Jumps 10,707,000 Barrels Above 1949 Total; Controversy Settled Over Offshore Drilling Concession

QATAR'S crude production took a tremendous jump in 1950 to 11,457,000 barrels, which was 10,707,000 barrels more than the previous year's output of 750,000 barrels. This increase established a two-year cumulative total of 12,207,000 barrels for the new commercial crude producer, which became an exporter at the close of 1949.

Daily average production rose from 2055 barrels during 1949 to 31,389 in 1950—an increase of 1427.6 percent. Qatar's production in September alone amounted to approximately 35,776 barrels a day.

A controversy was settled in July over an offshore drilling concession, held jointly by The Superior Oil Company and the Central Mining and Investment Corporation, a London firm. The concession in question covered a 12-mile belt around the Qatar peninsula and included about 6 million acres of seabed. Petroleum Development Company (Qatar), Ltd., previously had obtained a 75-year lease on the entire peninsula, and a question arose as to whether the Petroleum Development lease included some of the offshore territory. An agreement was reached by the companies involved and the Sheikdom of Qatar whereby Petroleum Development's concession includes that portion of the seabeds three miles from shore, around the peninsula, and Superior's concession begins at the three-mile mark.

SAUDI ARABIA—BAHREIN

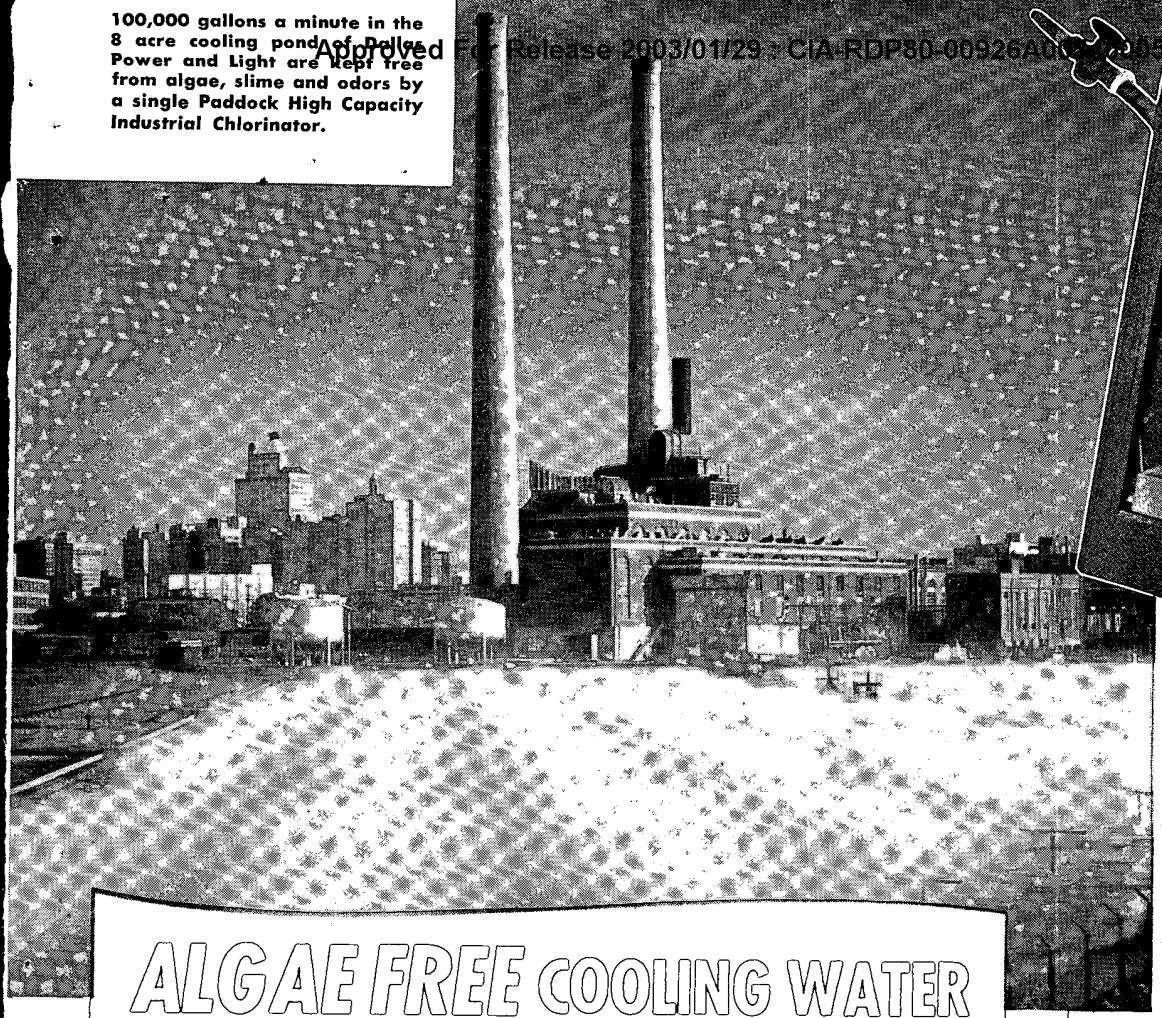
Tapline Cuts 3500 Miles Off Haul to European Markets; Production Up 25.5 Million Barrels Over Previous Year

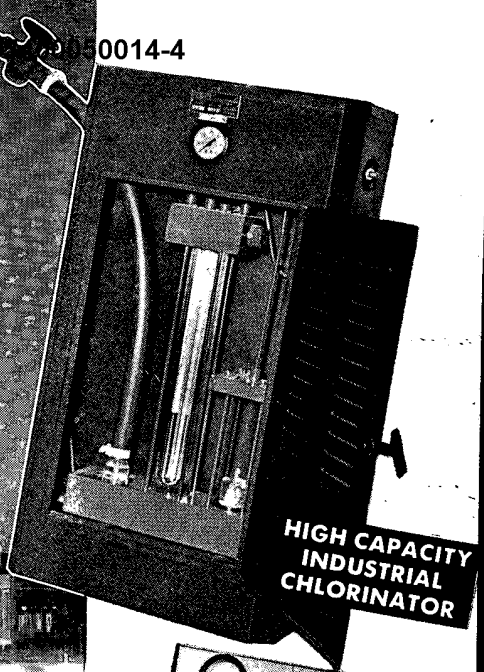
SAUDI ARABIA, second largest producing nation in the Middle East, continued its important position in world oil output in 1950 with production increasing about 15 percent over 1949. Total output for the year was 199,546,638 barrels, a rise of approximately 25.5 million barrels over the preceding 12-month period. Daily average for 1950 amounted to 547,000 barrels with output at the end of the year at 617,872 barrels a day. Cumulative production through 1950 totaled 718,606,491 barrels.

Operations of Arabian American Oil Company, owned 30 percent each by The Texas Company, Standard Oil Company of California, Standard Oil Company (N.J.), and 10 percent by Socony-Vacuum Oil Company, were highlighted by two significant developments at the close of 1950. Early in December oil deliveries started through the 1068-mile Tapline from the Persian Gulf to Sidon, Lebanon, on the eastern Mediterranean. This $230 million engineering project, in effect, moved the oil fields of Saudi Arabia about 3500 miles nearer the markets of western Europe. The 30- and 31-inch carrier, with daily capacity of 315,000 barrels, is operated between Qatif and Qaisumah by Aramco, and from the latter point to the Sidon terminus by its subsidiary, Trans-Arabian Pipe Line Company.

The most important change in Saudi Arabian oil came at the close of December with the signing of a revolutionary agreement which provided that the Saudi Arabian government, retroactive to January 1, 1950, will receive in royalties, income taxes and other levies an amount

100,000 gallons a minute in the 8 acre cooling pond of Dallas Power and Light are kept free from algae, slime and odors by a single Paddock High Capacity Industrial Chlorinator.





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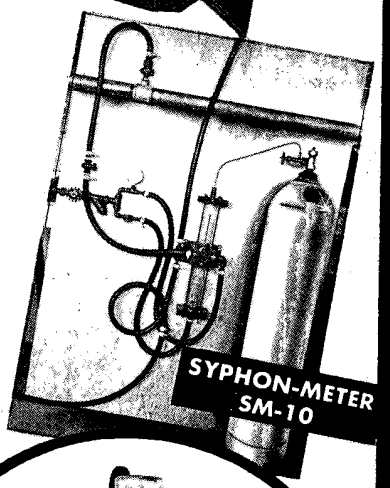

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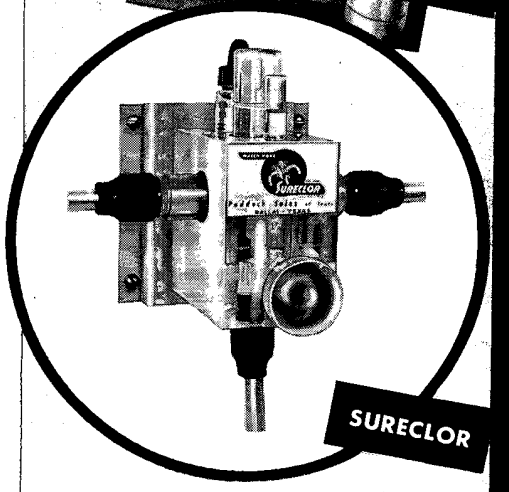

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- **SYPHON-METER SM-10**

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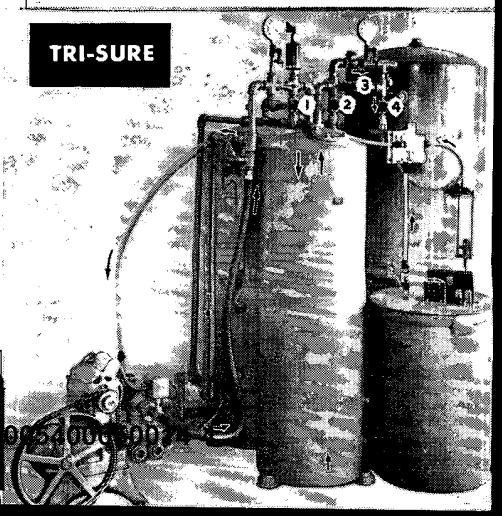

PADDOCK SALES OF TEXAS

3727 Atwell Dixon 1769 Cable: PECO Dallas, Texas

equal to Aramco's net income after U.S. income taxes and other charges. In return the company received several monetary concessions from the government.

While no important wildcat wells were drilled during 1950, a total of 21 field wells were completed, resulting in 19 new oil producers with the two dry wells drilled for observation purposes. At the end of the year, oil production was coming from 95 wells in three fields, with an additional five wells being drilled. In the latter part of January, 1951, Aramco spudded in its first offshore test, 20 miles south of Ras el Mashaab and three miles out in the Persian Gulf. The 1950 development drilling campaign greatly expanded the proven acreage for oil production in Saudi Arabia. An additional 60,700 acres were added, bringing the total to 190,700 proven acres at the close of the year.

Production in the Abqaiq field in 1950 totaled 161,573,842 barrels from 59 wells, an increase of 23,493,441 barrels over 1949. The Dammam field's output rose 2,364,605 barrels to 33,730,873 barrels for the year, and production of the Qatif field was 4,241,923 barrels, a decline of 320,040 barrels from 1949. Production in the Haradh, Fadhili and Abu Hadriya fields still is closed in for lack of pipe lines. The Ain Dar field, a 1948 discovery, was placed on production for the first time late in the year following completion of a 28-mile pipe line with capacity of 160,000 barrels a day connecting the field with the Abqaiq field. The latter has pipe line connections to the Qatif and Dhahran fields, Tapline and the Ras Tanura and Bahrein Island refineries.

In addition to the Trans-Arabian pipe line, the oil fields of Sauda Arabia are connected by a 220-mile crude pipe line system, including a 34-mile line from the Dhahran field to Bahrein Petroleum Company, Ltd.'s 155,000-barrel daily refinery at Awali, Bahrein Island. This line is owned jointly by Aramco and Bahrein Petroleum, the latter a jointly-owned company of Standard of California and The Texas Company.

Crude oil production of Bahrein Island in 1950 rose 30,227 barrels over the previous year to 11,015,711 barrels. Daily average production at the end of the year was 30,180 barrels. Cumulative output of this field through 1950 totaled 120,915,266 barrels. Four successful field wells were completed during the year bringing total producers to 69.

Drilling in Saudi Arabia and Bahrein

Country and Field	Wells Completed in 1949					Wells Completed in 1950				Wells Drilling End of 1950
	Oil	Gas	Dry	Total Wells	Total Footage	Oil	Dry	Total Wells	Total Footage	
SAUDI ARABIA:										
Abqaiq	8	..	3	11	n.a.	7	..	7	50,693	..
Ain Dar	5	..	..	5	n.a.	6	1*	7	50,421	3
Dammam	..	1	..	1	n.a.	1	..	1	884	1
Fadhili	1	..	..	1	n.a.	..	..	..	.....	..
Haradh	2	..	..	2	n.a.	3	..	3	19,540	1
Qatif	3	..	..	3	n.a.	2	1*	3	22,109	..
Total Sadui Arabia	19	1	3	23	152,460	19	2	21	143,647	5
BAHREIN:										
Bahrein	2	..	..	2	4,600	4	..	4	9,711	1

* Observation well. n.a.—Not available.

Pipe Lines of Saudi Arabia

COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Capacity (Barrels Daily)	Year Completed
CRUDE OIL LINES:						
Arabian American Oil Company	Abqaiq	Dhahran	40	14	105,000	1947
	Abqaiq	Dhahran	38	12 & 14	100,000	1946
	Abqaiq	Qatif	45	30	315,000	1948
	Ain Dar	Abqaiq	28	22	160,000*	1950
	Dhahran	Ras Tanura	23	12	123,000	1946
	Dhahran	Ras Tanura	35	10	65,000	1939
	Dhahran†	Bahrein	34	12	125,000	1945
	Qatif	Qaisumah	270	30 & 31	315,000	1950
	Qatif	Ras Tanura	18	20 & 22	273,000	1948
Trans-Arabian Pipe Line Company	Qaisumah	Sidon, Lebanon	753	30 & 31	315,000	1950

* Capacity prior to installation of pumps.
† Half owned by Bahrein Petroleum Company.

Refineries of Saudi Arabia and Bahrein

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Barrels Daily)	Daily Crude Runs End of 1949 (Bbls.)	Type of Refinery
SAUDI ARABIA:					
Arabian American Oil Co.	Ras Tanura	140,000	20,000 Reforming	157,501	Crude Still Reforming Asphalt
BAHREIN:					
Bahrein Petroleum Co.,Ltd.	Awali	155,000	15,000 Thermal; 16,000 Catalytic 19,500 Thermal Reforming	155,000	Complete Except Lube and Wax

Saudi Arabia and Bahrein Oil Production and Geological Data

COUNTRY and FIELD	Year of Discovery	Producing Wells End of 1950	CRUDE OIL PRODUCTION (Barrels) Daily at End of 1950	Year 1949	Year 1950	Cumulative Through 1950	Estimated Proven Area (Acres)	Gravity Oil (API)	Formation, Name & Kind	Geologic Age	Depth (Feet) Minimum to Top of Pay	Average Thickness of Pay	Type of Structure
SAUDI ARABIA:													
Abqaiq	1941	59	521,342	138,080,401	161,573,842	483,569,655	86,400	39	Arab, Lime	Jurassic	5710	245	Anticline
Ain Dar	1948	..	.....	.....	.....	.....	45,800	35	Arab, Lime	Jurassic	6583	162	Anticline
Abu Hadriya	1940	..	.....	.....	.....	9,579	n.a.	36	Hadriya, Lime	Jurassic	10115	120	n.a.
Dammam	1936	30	86,226	31,366,265	33,730,873	220,170,853	9,100	34	Bahrein, Lime	Cretaceous	n.a.	n.a.	Faulted
									Arab, Lime	Jurassic	4200	400	Dome
Fadhili	1949	..	.....	.....	.....	.....	n.a.	38	Fadhili, Lime	Jurassic	9768	n.a.	n.a.
Haradh	1949	..	.....	.....	.....	.....	28,100	34	Arab, Lime	Jurassic	6185	n.a.	Anticline
Qatif	1945	6	10,304	4,561,963	4,241,923	14,856,404	21,300	30–38	Arab, Lime	Jurassic	6912	187	Anticline
Total	....	95	617,872	174,008,629	199,546,638	718,606,491	.....	..	.....	.....	....	....	.....
BAHREIN:													
Bahrein	1932	69	30,180	10,985,484	11,015,711	120,915,266	10,000	..	Bahrein, Lime	Cretaceous	2000	200	Anticline

NOTE: Fields in Saudi Arabia operated by Arabian American Oil Company.
Bahrein field operated by Bahrein Petroleum Company, Ltd.

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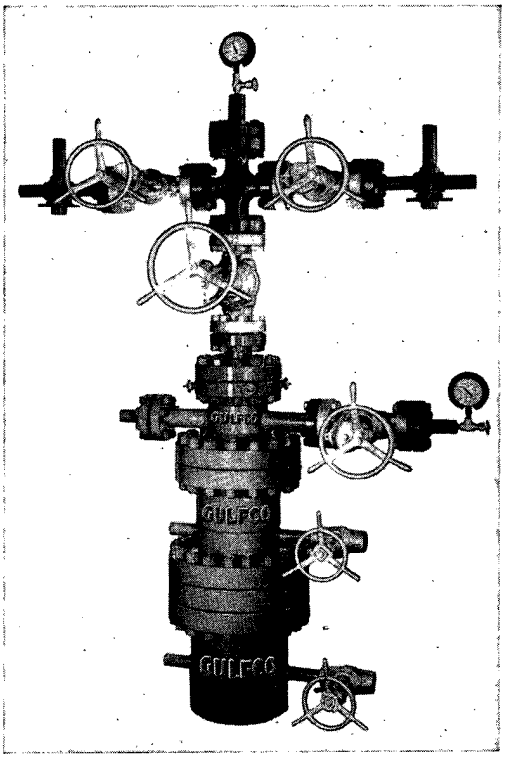

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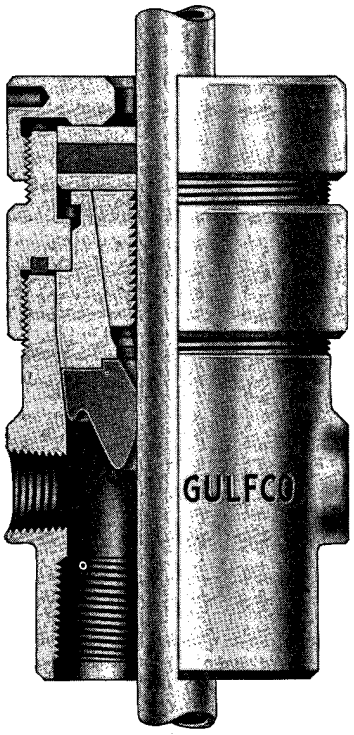

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TURKEY

Lack of Refining Facilities Curbs Ramandag Production; Government Agency Concentrates on Exploratory Drilling

LACK of refining activities created a forced restriction of production from Turkey's one oil field, Ramandag, in the province of Siirt. Present production from the field's three wells, only about 500 barrels of 21-gravity oil daily, is processed by a small topping plant at the field which produces gasoline and fuel oil for the needs of local drilling and transportation machinery.

Attempts are now being made by Mining Research and Exploration Institute (MTA), the government operating agency, to obtain a 3000-barrel capacity refinery, but actual operation is not expected to start until 1953, at the earliest.

The government agency now estimates the proved area of the Ramandag field at 1730 acres, and believes the field's possible reserves to be upward of 70 million barrels. Such estimates (which have been placed by some sources as high as 250 million barrels) are based by and large on the presence of numerous surface oil seeps which occur throughout the country.

Until adequate refinery and pipe line facilities make accelerated production possible, the institute has concentrated on exploratory drilling, rather than productive. Five wildcats were drilled in 1950, four near Ramandag and the fifth at Agzikara in the province of Adana, in the southern part of the country near the Syrian border. One of the Ramandag wells, MTA Raman 23, proved productive when it was completed in October, 1950, finding a petroliferous zone in the Massive limestone of Upper Cretaceous age at 4473 feet. Another well in the same area, Raman 19, produces an oil-water mixture at a rate of 75 barrels per day from the same zone. Both of the wildcat areas are anticlines with stratigraphy similar to that of the Ramandag field.

BURMA

Output Doubled Despite Labor Strife, Other Troubles; Burmah Oil Plans Additional Drilling in Chauk Field

BURMA crude production in 1950 averaged 1000 barrels daily, approximately double the estimated 1949 output, in the face of continuing labor strife, postwar confusion, financial difficulties, and diminishing rebel depredations.

No new wells were drilled in Burma during the year; however, the Burmah Oil Company (Burma Concessions), Ltd., was making plans to resume drilling in its Chauk field to maintain the volume of production.

To improve the quality of Chauk refinery products, arrangements were made at the end of the year to move a two-stage crude distillation unit and other refinery equipment from Syriam, near Rangoon, to Chauk. First cargoes of this equipment, all of which were scheduled to be sent up the newly-opened Irawaddy River, were expected to reach Chauk early in 1951. Burmah Oil said a year or more would be required to erect the complete plant.

The Burmese government renewed negotiations with Burmah Oil directed toward joint participation in the reconstruction effort. An earlier government effort to raise money for this purpose failed. At that time, Burmah Oil discharged its excess personnel. The matter was handed to the Industrial Court when labor unions contested the discharges, but the Industrial Court's subsequent awards did not meet with company agreement. The case then was referred to the Supreme Court of Burma.

Burma's internal situation, serious in 1948 and 1949 when insurgents were on the march, improved considerably by the end of 1950. Order was restored by government forces in many sections of the country, and the Irawaddy—a 1000-mile river highway from north to south—was opened again to traffic, though shipments over it had to be guarded from shore attacks in some up-country districts.

Opening of the river enabled convoys of oil barges and river flats to move products from Chauk to Mandalay and elsewhere. Frequency of these river deliveries increased in the closing months of the year.

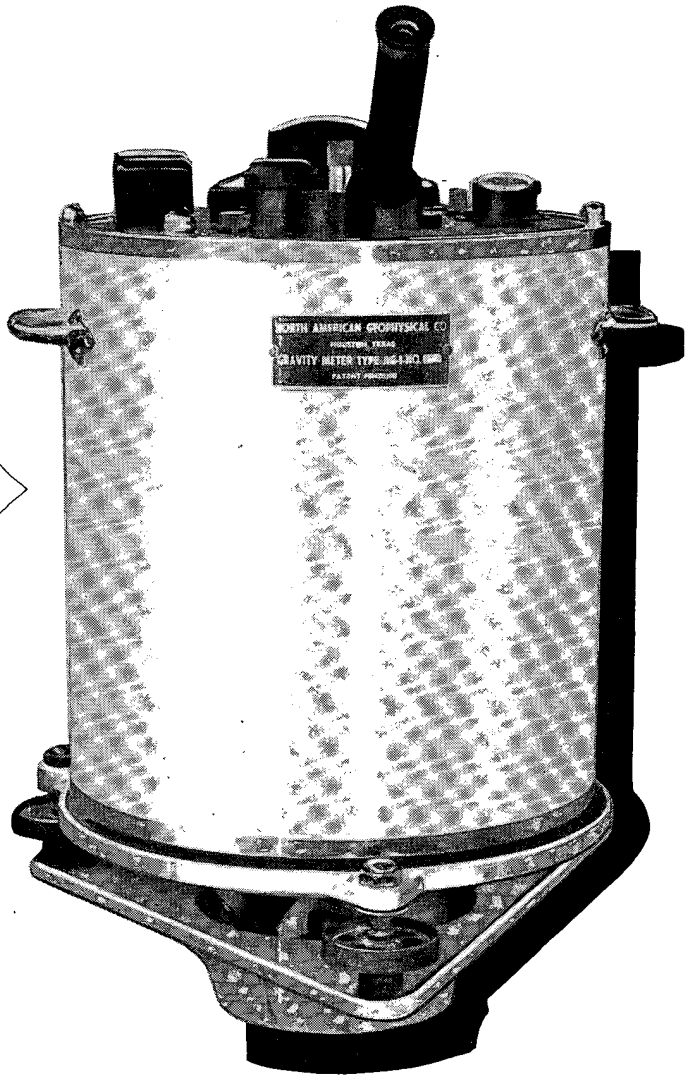
Yenangyaung and Yenangyat fields and certain areas of the Chauk field proved unworkable in 1950. Burmah Company's 320-mile pipe line linking these Central Burma fields with Syriam could not be rehabilitated from demolitions carried out in 1942 to deny its use to Japanese invaders. Since 1946, when the Burmah, Indo-Burma and British Burma oil companies returned to the country, refining operations have been confined exclusively to Chauk.

The Burmese government confirmed in 1950 that large quantities of oil were being smuggled from Burma into Communist China over the wartime Burma Road.

Burma took a serious view of the smuggling and called on all foreign importers to account for their sales, which reportedly had been increased 300 percent shortly before confirmation of the smuggling operations.

Tighter customs regulations were expected to result from this disclosure.

A DEPENDABLE GRAVITY METER FOR ACCURATE SURVEYS



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CHINA

Year's Production Gain Estimated at 73,000 Barrels; Russian-Chinese Firms Formed for Activity in Sinkiang

ESTIMATES on China's crude production for 1950 place the nation's output at an estimated 803,000 barrels, reflecting an increase of 73,000 barrels over 1949's total of 730,000 barrels. The average production per day in 1950 was 2200 barrels, a 10 percent increase over the average of 2000 barrels a day during the previous year.

According to claims from Russia, the Chinese Communist government is attempting to extend production in the northwestern part of the country. This action, according to the questionable source, was decided upon at a 1950 Peking oil conference at which a three-year program of oil industry reconstruction was approved.

Moscow also claimed during the year that crude production had been discovered in the Northern China province of Shensi.

In December properties of Standard-Vacuum Oil Company, in which control is shared by Standard Oil Company (N. J.) and Socony-Vacuum Oil Company, and California-Texas Oil Company were confiscated. The seizures included stocks, transportation, storage, and marketing facilities on the Chinese mainland, principally in Shanghai. In addition, Cathay Oil Company and British Asiatic Petroleum Company (Shell) crude stocks were taken over by the Communist government.

Joint Russian-Chinese oil companies have been established to conduct exploration activities and petroleum development in the province of Sinkiang. Organization of the companies followed agreements reached after a Russian-Chinese negotation during March. Similar joint companies have been established in other Communist satellite countries of eastern Europe.

North of Tibet, Sinkiang is just across the border from the Russian region of Kirgiz, where the Russians have several oil fields.

INDIA

Increase of 1,157,000 Barrels Reported Over 1949; Petroleum Concessions Allowed to Continue Ten Years

INDIA'S crude production rose to an estimated 3,051,000 barrels in 1950, a marked increase of 1,157,000 barrels over the 1949 output of 1,894,000 barrels.

Burmah Oil Company (India Concessions), Ltd., said oil traces were reported at the company's Barsilla (Assam) test. Drilling reports said some signs were found in sandstone rock cores from about 4000 feet.

Barsilla, about 15 miles south of Sibsagar and southwest of Digboi in the Assam jungle, has heretofore shown no sign of oil accumulations. Assam Oil Company, Ltd., which is wholly owned by Burmah Oil, produces India's only oil at Digboi.

Assam Oil's exploration program in Eastern India was continuing as the year ended, with preparations for a wildcat in the Naga Hills jungle of Assam. The test will be at Nichuguard, about ten miles from Manipur Road, a town on the Assam Railway northeast of Calcutta. Site for the well already is cleared.

Pointing up the exploration effort in India since the nation received its complete independence, the government has decided to permit previously held concessions for petroleum development to continue for ten years. These concessions were open to private capital, though companies other than British entities were limited to a minority interest, which might affect the amount of exploration activity.

INDONESIA AND BRITISH BORNEO

Restored Fields Yield Postwar Peak of 80 Million Barrels; Standard-Vacuum Achieves Successful Year of Exploration

DESPITE continued internal political strife and unrest in the East Indies, crude production from the rehabilitated and accessible fields that were all but wiped out during the war reached a postwar peak in 1950 of an estimated 80 million barrels. The gain last year of 10 million barrels over 1949, however, was the smallest year-to-year increase since the first initial attempt was made to re-enter the area following the cessation of hostilities. The production increase in 1949 over the preceding year was nearly 20 million barrels higher, and the increase in 1948 over 1947 was 32 million barrels. Indonesia had a noticeable increase in production in 1950, with the largest portion of the area's total output coming from Borneo, Southern Sumatra and Brunei.

Standard-Vacuum Petroleum Mij. experienced its most successful exploratory year in the postwar period, completing eight wildcat wells, resulting in two new oil field discoveries. The Betun field in Southern Sumatra was

discovered in January with the initial well drilled to 6920 feet. The five wells in the field at the end of 1950 were producing an average of 1953 barrels daily. Total production for 1950 was 335,394 barrels. Production is from the Talang Akar sand at 6100-900 feet.

The Karan field, also in the Radja area of Southern

Indonesia and British Borneo Oil Production and Geological Data

COUNTRY and FIELD	Year of Discovery	Producing Wells End of Period: Flowing	Art. Lift	Total	CRUDE OIL PRODUCTION (Barrels): Daily End of Period	Year 1949	Year 1950	Cumulative	Gravity of Oil (API)	Formation, Name and Kind	Geologic Age	Producing Depths (Feet)	Type of Structure
BORNEO:													
*Anaggana-Moeara[1]	1902	3	91	94	3,320	1,465,200	709,000	62,599,200	19–33	Balikpapan and Poeloe Balang, Sand	Miocene	380–3200	Anticline
*Bunju[1]	1930	....	....	....	....	....	....	369,000	32, 40, 24	Sadjau Series, Sand	Pliocene	1970–3100	Anticline
*Sambodja[1]	1910	1	44	45	1,210	436,100	229,900	53,749,000	14–34	Balikpapan and Poeloe Balang, Sand	Miocene	160–4400	Anticline
*Sanga Sanga[1]	1897	....	86	86	3,120	1,268,000	626,200	145.229,200	18–36	Balikpapan and Poeloe Balang, Sand	Miocene	430–2900	Anticline
*Sangatta[1]	1940	....	....	....	....	450	260	710	36	Poeloe Balang Series, Sand	Miocene	1640–4200	Anticline
*Tandjung[1]	1938	1	....	1	90	73,100	40,500	462,600	40	n.a., Sand, Grit	Eocene	2500–4300	Anticline
*Tarakan[1]	1906	4	459	463	7,600	2,875,200	1,366,000	162,695,200	20	Sadjau Series, Sand	Pliocene	195–2400	Anticline
BRUNEI:													
Seria[2]	1929	n.a.	n.a.	n.a.	n.a.	24,696,579	†29,700,000	†207,940,340	19–33	n.a., Sand	Tertiary	1600–6900	Anticline
CERAM:													
*Boela-Lemoen[1]	1897	....	....	....	....	....	....	8,203,000	23	Boela, Sand	Pliocene, Triassic	240– 920	Anticline Faulted
JAVA:													
*Kawengan[1]	1926	7	28	35	9,260	....	946,800	40,094,700	34	Ngrajong, Sandy Limestone	Miocene	1750–2700	Anticline
*Kruka[1]	1929	....	61	61	1,390	528,200	261,400	7,654,600	30	Globegerinae, Limestone	Miocene	970–1600	Anticline
*Ledok[1]	1896	....	....	....	....	....	....	21,125,000	43	Wonotjolo Ngrajong, Sand	Miocene	320–3200	Anticline
*Lidah Kulon[1]	1896	....	....	....	....	....	....	33,369,000	24	Globegerinae, Limestone	Miocene	490–1330	Anticline
Loesi[3]	1932	....	....	....	....	....	....	505,000	40	Ledok, Sand	Miocene	1325–1400	Anticline
Ngliron[3]	1940	....	....	....	....	....	....	10,000	40	Orbitoid, Sand	Miocene	3500–3600	Anticline
*Nglobo-Semanggi Banjuasin[1]	1897	....	....	....	....	....	....	18,044,000	43	Wonotjolo Ngrajong, Sand	Miocene	370–3350	Anticline
Petak[3]	1914	....	....	....	....	....	....	781,000	40	Orbitoid, Sand	Miocene	2400–2600	Anticline
Tremboel[3]	1917	....	....	....	....	....	....	355,000	40	Orbitoid, Sand	Miocene	2350–2700	Anticline
NETHERLANDS NEW GUINEA:													
*Klamono[4]	1936	2	14	16	4,990	1,743,800	865,500	2,754,300	19	Klasafet, Limestone	Miocene	300	Anticline
Mogoi[4]	1940	....	....	....	....	....	....	459	46	Klasafet, Limestone	Miocene	1250	Anticline
Wasian[4]	1940	....	....	....	....	....	....	862	48	Klasafet, Limestone	Miocene	2900–3225	Anticline
SARAWAK:													
Miri[5]	1911	n.a.	n.a.	n.a.	n.a.	417,761	See Brunei	See Brunei	21–35	n.a., Sand	Tertiary	300–3050	Anticline
SUMATRA (North):													
*Dj-Rajeu[1]	1929	....	....	....	....	....	....	559,000	54	Seuroela, Sand	Pliocene	2520–2590	Anticline
*Gebang[1]	1936	....	....	....	....	....	....	135,000	54	Keutapang, Sand	Miocene	2970–3480	Anticline
*Pangkalan-Soesee[1]	1917	....	....	....	....	....	....	6,287,000	56	Keutapang, Sand	Miocene	1550–2100	Anticline
*Paleoh Tabuhan[1]	1937	....	....	....	....	....	....	3,283,000	52	Keutapang, Sand	Miocene	3300–3500	Anticline
Pase[3]	1937	....	....	....	....	....	....	52,000	23–30	Keutapang, Sand	Miocene	1600–2200	Anticline
*Perlak[1]	1900	....	....	....	....	....	....	47,870,000	57	Keutapang, Sand	Miocene	160–2200	Anticline
*Pulu Pandjang[1]	1928	....	....	....	....	....	....	11,243,000	55	Keutapang, Sand	Miocene	1640–2400	Anticline
*Rantau[1]	1929	....	....	....	....	....	....	55,513,000	48	Keutapang, Sand	Miocene	1040–2560	Anticline
*Serang Djaja[1]	1926	....	....	....	....	....	....	7,551,000	64	Keutapang, Sand	Miocene	3660–4150	Anticline
*Telaga Said, Darat, K. Gadjah[1]	1893	....	....	....	....	....	....	23,621,000	51	Grensklei, Sand	Miocene	210– 720	Anticline
SUMATRA (Central):													
Lirik[3]	1941	2	....	2	50	....	15,216	257,216	34	Lakat, Sand	Miocene	1450–1700	Anticline
SUMATRA (South):													
*Babat[1]	1901	1	21	22	90	2,180	12,500	8,150,500	38	Lower Palembang, Sand	Miocene	100–1050	Anticline
*Badjubang[1]	1927	14	14	28	4,490	656,600	835,300	26,285,900	46	Lower Palembang, Sand	Miocene	2700–3100	Anticline
Benakat[3]	1933	121	....	121	10,451	3,038,552	3,335,043	46,221,245	38	Talang Akar, Sand	Miocene	1550–1650	Anticline
Betun[3]	1950	5	....	5	1,953	....	335,394	335,394	36	Talang Akar, Sand	Miocene	6100–6900	Anticline
*Betung[1]	1923	....	....	....	....	....	....	2,100,000	40	Lower Palembang, Sand	Miocene	180– 195	Anticline
Djirak[3]	1930	121	....	121	6,524	1,759,833	2,312,513	27,137,204	38	Talang Akar, Sand	Miocene	600–2800	Anticline
*Gunung Kemala[1]	1938	3	....	3	1,190	30,300	115,100	466,500	n.a.	Lower Telissa, Sand	Miocene	n.a.	Anticline
Karan[3]	1950	1	....	1	13	....	8,005	8,005	29	Talang Akar, Sand	Miocene	5850–5950	Anticline
*Karang Ringing[1]	1903	....	....	....	....	....	....	1,572,000	42	Middle, Lower Palembang, Sand	Pliocene, Miocene	160–1200	Anticline
*Kenali Asam[1]	1931	41	....	41	7,720	2,363,500	1,238,300	22,805,800	22–46	Lower Palembang, Upper Telissa, Sand	Miocene	1700–4100	Anticline
*Kloung[1]	1914	....	....	....	....	....	....	27,382,000	40	Lower Telissa, Sand	Miocene	2300–2600	Anticline
Kruh[3]	1948	11	....	11	962	231,553	394,996	678,254	n.a.	n.a., n.a.	n.a.	n.a.	n.a.
*Limau[1]	1928	5	3	8	1,490	529,400	348,900	6,782,300	25	Lower Telissa, Sand	Miocene	5200–5450	Anticline
*Mangudjaja[1]	1935	2	49	51	2,470	229,000	424,300	10,548,950	24	Middle Palembang, Sand	Pliocene	660–2200	Anticline
*Meruoa Senami[1]	1938	....	....	....	....	....	640	95,700	48	Upper Telissa, Sand	Miocene	2400–2650	Anticline
*Muara Enim (Batu Kras)[1]	1903	....	16	16	230	....	34,470	28,206,500	46	Middle, Lower Palembang, Sandy shale sand	Miocene, Pliocene	300–1150	Anticline
*North Lembak[1]	1941	....	....	....	....	n.a.	1,470	2,110	40	Lower Telissa, Sand	Miocene	5250	n.a.
Radja[3]	1941	11	....	11	3,545	741,342	889,700	1,795,373	40	Talang Akar, Sand	Miocene	6200–7200	Anticline
Selo[3]	1938	....	....	....	....	....	....	47,000	38	Talang Akar, Sand	Miocene	1600–1900	Anticline
*Suban Djerigi[1]	1905	....	1	1	740	276,900	129,000	34,103,890	46	Middle, Lower Palembang, Sandy shale sand	Miocene, Pliocene	1300–2500	Anticline
Talang Akar-Pendopo[3]	1922	302	....	302	32,419	15,856,860	13,976,130	159,648,094	38	Talang Akar, Sand	Miocene	2100–2750	Anticline
*Talang Djimar[1]	1937	40	....	40	17,300	6,468,900	2,648,900	43,309,800	28	Lower Telissa, Sand	Miocene	3600–4200	Anticline
*Tandjung Luntar[1]	1912	....	....	....	....	....	....	4,072,000	56	Middle Palembang, Sand	Pliocene	2200–2800	Anticline
*Tandjung Tiga[1]	1940	16	....	16	5,960	1,234,260	988,200	2,280,460	25	Lower Telissa, Sand	Miocene	4400–4600	Anticline
*Tempino[1]	1931	39	....	39	6,300	2,229,900	1,216,700	39,513,600	48	Lower Palembang, Sand	Miocene	1930–2700	Anticline
Total	....	742	887	1,629	133,915	69,153,470	....	....	....	....	....	....	....

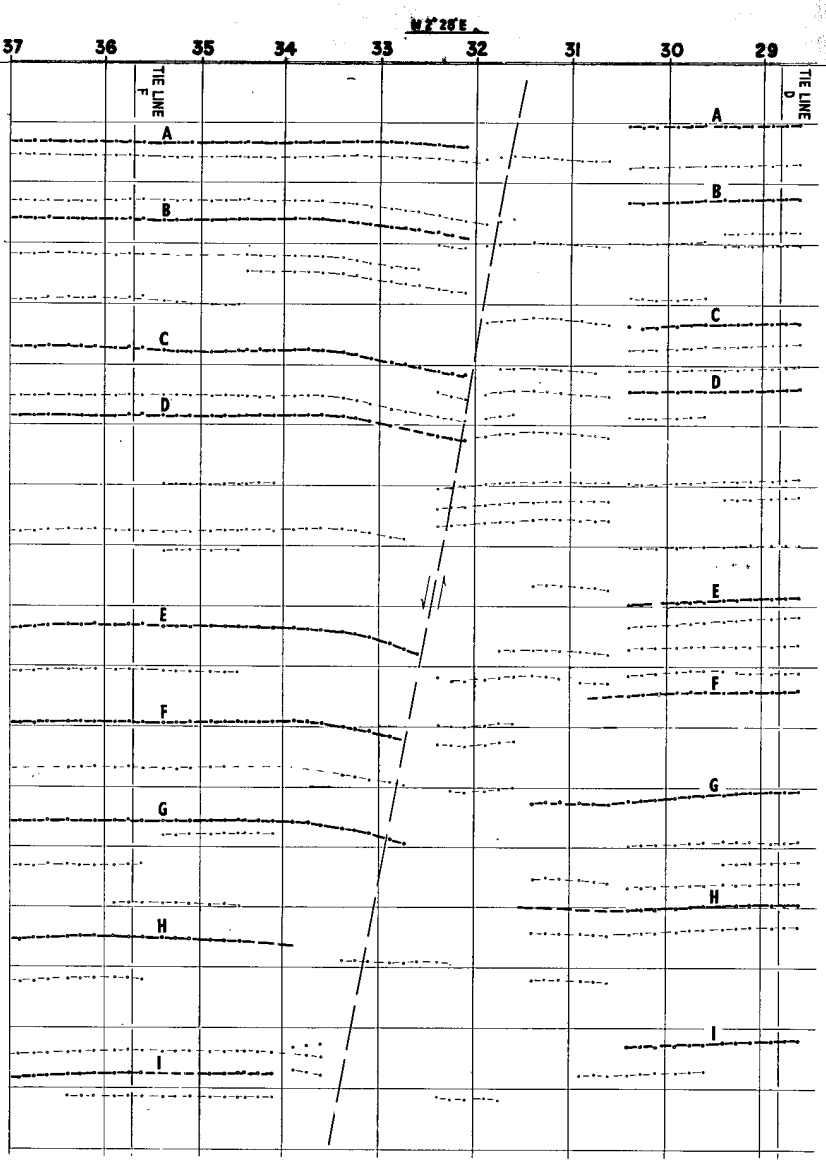
* 1950 figures for first six months only. Cumulative to June 30, 1951. † Includes Miri field in Sarawak. [1] N. V. De Bataafsche Petroleum Maatschappij (Shell) [2] British Malayan Petroleum Company, Ltd. [3] N. V. Standard-Vacuum Pet. Mij. [4] Nederlandsche Nieuw Guinee Pet. Mij. [5] Sarawak Oilfields, Ltd.

INCREASING THE RESOLVING POWER OF THE REFLECTION SEISMOGRAPH

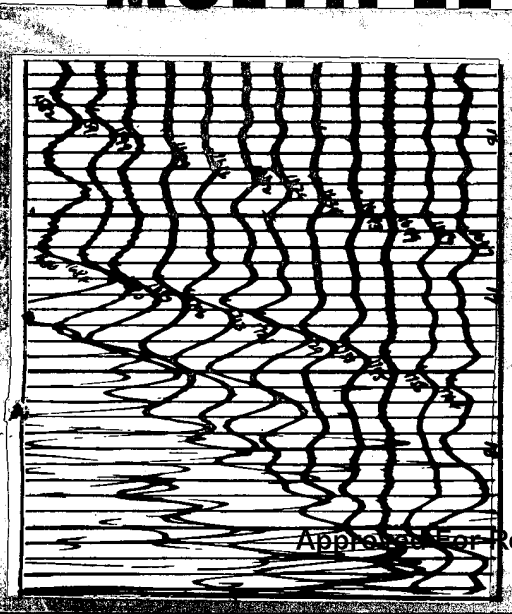
A new method of computation eliminates personal errors and increases precision, thereby increasing the resolving power of the reflection seismograph to the point where small faults and structures, as well as pinchouts, can be delineated with greater accuracy.

By this method we compute from 6 to 12 depths from each shot point for every horizon. While the client has the advantage of this increased information, the cost is not increased, because one man does the computing with the aid of a machine. This method does not increase the cost of field work.

A means has been developed for obtaining weathered layer corrections for each detector. As an example of the value of this procedure we cite seven straight wildcat oil and gas wells in the Jackson County trend, with an average depths accuracy of less than plus or minus 15 feet.



MULTIPLE REFRACTION METHODS



The multiple refraction method is of particular value in areas where the reflection method is not easily applicable. This, in general is true of Southern Florida, Southeast Colorado, and Western Oklahoma. Multiple refraction methods have a distinct advantage over reflection methods in areas covered by caliche or other broken material.

Sumatra, was discovered in September and the single producing well had a total production of 8005 barrels during the year. This also is a Talang Akar sand producer with the pay at 5850-950 feet. Standard-Vacuum also completed 33 field wells, of which 29 were oil producers and the remaining four dry holes. Heaviest drilling was in the Talang Akar-Pendopo field of Southern Sumatra with nine completions resulting in nine new oil wells. The company had five additional wells drilling at the end of the year.

N. V. Caltex Pacific Petroleum Mij., which did not resume operations on its concessions in Central Sumatra until 1949, completed its first postwar well in the Minas field in February. The company completed 14 commercial oil wells during 1950, all of which are closed in pending installation of gathering and shipping facilities. These facilities are not expected to be completed until 1952 at the earliest. From all indications the Minas field will be capable of substantial production and it is probable large crude reserves will be proved by drilling contemplated for the field. Company officials estimate each well has a production potential of about 1000 barrels daily of 36-gravity crude.

Caltex Pacific now estimates its total proven reserves of its three fields covering a 2½-million-acre concession at 500 million barrels. The company is drilling a test well in central Sumatra, but no information on its progress or result was available.

Refineries of Indonesia, British Borneo

COUNTRY and COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Daily Crude Runs End of 1950 (Bbls.)	Type of Refinery
BORNEO:					
N. V. de Bataafsche Pet. Mij.	Balikpapan	8,500	.....	n.a.	Skimming
JAVA:					
N. V. de Bataafsche Pet. Mij.	Tjepoe	n.a.	n.a.	n.a.	n.a.
	Wonokromo	1,500	.....	n.a.	Skimming-Asphalt
SARAWAK:					
Sarawak Oilfields, Ltd.	Lutong	35,000	.....	n.a.	Skimming
SUMATRA:					
N. V. de Bataafsche Pet. Mij.	Pladjoe	50,000	7,500	n.a.	Skim-Crk.
	P. Brandan	n.a.	n.a.	n.a.	n.a.
N. V. Standard-Vacuum Pet. Mij.	Palembang	64,000	31,000	59,000	Skim-Crk.

Drilling in Indonesia and British Borneo

COUNTRY and FIELD	Wells Completed in 1949					Wells Completed in 1950				Wells Drilling End of Period
				Total				Total		
	Oil	Gas	Dry	Wells	Footage	Oil	Dry	Wells	Footage	
BORNEO:										
Anggana-Muara*	1	..	..	1	273	..	..	..	.....	..
Bunju*	2	..	..	2	7,784	3	..	3	10,061	2
Sanga Sanga*	..	..	..	....	.....	..	..	..	.....	1
Sangatta*	1	..	..	1	4,777	..	..	..	.....	1
Tandjung*	2	..	..	2	12,880	1	1	2	10,051	1
Tarakan*	1	..	4	5	8,770	2	..	2	3,507	..
Wildcats*	..	..	..	....	.....	..	..	..	2,480	1
BRUNEI:										
Seria	14	1	3	18	102,124	n.a.	n.a.	n.a.	n.a.	n.a.
JAVA:										
Gunung Anjar*	..	..	..	....	.....	..	..	..	1,009	1
Kawengan*	..	..	..	....	.....	..	..	..	2,536	1
Kruka*	..	2	..	2	4,577	..	..	..	.....	..
Pulungan*	..	..	..	....	.....	..	1	1	3,261	..
NETHERLANDS NEW GUINEA:										
Klaga*	..	..	..	....	.....	..	1	1	151	..
Klamono*	2	..	..	2	1,354	5	..	5	3,504	1
North Klamono*	..	..	..	....	.....	..	1	1	n.a.	1
Wildcats*	..	..	1	1	3,222	..	1	1	7,462	3
SARAWAK:										
Miri	1	..	1	2	8,911	n.a.	n.a.	n.a.	n.a.	n.a.
SUMATRA (Central):										
Minas	..	..	..	....	.....	9	..	9	n.a.	2
SUMATRA (North):										
Wildcats*	..	..	..	....	.....	..	..	..	5,118	1
SUMATRA (South):										
Benakat	..	..	..	....	.....	2	..	2	3,200	..
Betun	..	..	..	....	.....	4	1	5	35,000	1
Djirak	..	..	..	....	.....	8	3	11	8,000	1
Gunung Kemala*	1	..	..	1	6,548	1	1	1	11,520	1
Karang Djaja	..	..	..	....	.....	..	..	....	5,082	1
Karangan	..	..	..	....	.....	..	..	1	1,137	..
Kenali Asam*	..	..	..	....	.....	1	..	1	4,344	1
Kruh	..	..	..	....	.....	1	..	1	3,300	..
Lebong	..	..	..	....	.....	..	4	4	2,106	..
Limau*	2	2	..	4	10,923	..	..	..	5,151	1
Lirik-Ukui	..	..	..	....	.....	2	..	2	3,7 0	1
Minas	..	..	..	....	.....	10	..	10	20,632	1
North Lembak	..	..	..	....	.....	..	1	1	5,936	..
Radja	..	..	..	....	.....	3	..	3	21,200	..
Talang Akar-Pendopo	49	1	1	51	149,189	9	..	9	27,000	2
Talang Djimar*	4	..	..	4	9,254	..	..	..	4,354	1
Tandjung Tiga*	7	..	..	7	33,195	4	2	6	29,137	2
Sumatra, Miscellaneous	23	1	6	30	121,731	..	..	..	.....	..
Wildcats	1	1	..	2	8,558	2	6	8	36,348	2
Total	111	8	16	135	494,070	67	23	90	276,287	31

* 1950 figures for first six months only. Footage of wells drilling is included.
n.a.—Not available.

JAPAN

Increased Wildcatting Contributes to Rising Output; Industry Given Impetus by Secondary Recovery Survey

JAPAN'S crude production during 1950 averaged slightly more than 5609 barrels per day, an increase of 1907 over the 1949 daily production average of 3702 barrels. The increase of 696,299 barrels over the 1949 total production of 1,351,344 barrels was the result of increased productivity of wildcat attempts combined with rising production from established fields.

Nineteen wildcats were completed during the year, resulting in three oil producers and one gasser. The three producers were drilled in the Niigata prefecture, where seven other exploratory tests failed.

Japan's largest oil-producing area, the Akita prefecture, produced 1,503,725 barrels of crude during the year, an increase of 637,931 barrels over the 1949 production of 865,794 barrels.

During the year, 162 wells were completed, with 54 producing oil, 67 gas, and 41 dry holes. Total footage, including wildcats, in 1950 was 301,118, an increase of 137,834 feet over 1949, when 72 wells were brought in. Of the 72 wells, only 34 produced oil and nine produced gas. Dry holes totaled 29.

According to an opinion expressed in a review of the

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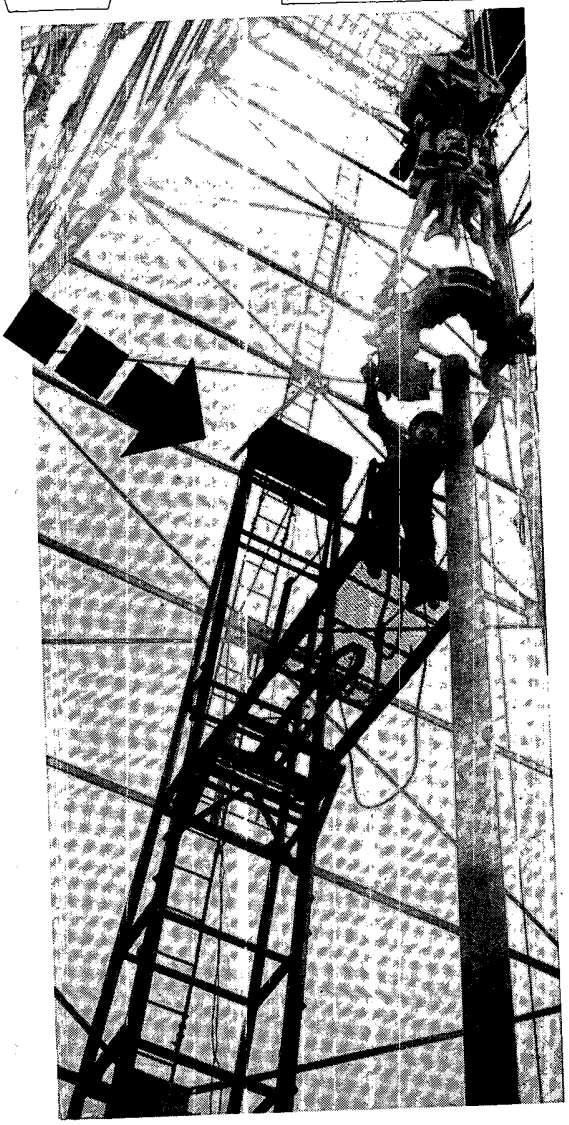

An outstanding new development for the drilling industry, the Safety Adjustable Stabbing Board, is gaining widespread acceptance.

The board was developed with Safety to the Crew as the first concern. It has been proven to be almost absolutely accident proof.

This board has a wide working range of from 18 ft. to 45 ft. for setting casing — saving 3 to 6 hours when running a 6,000 to 12,000 ft. string of mixed length pipe. In addition to its use as a Stabbing Board, there are many other ways in which you can save enormous time with this adjustable board, such as — Greasing the Traveling Block, Repairing the Swivel, Attaching and Removing Mud Hose, Hooking up for Drill Stem Tests, and Painting Traveling Block while in operation. Just by the pressing of the lever marked "UP" and "DOWN" allows the derrick man to raise and lower the platform to any desired position.

Drilling Contractors using this Board, highly recommend it. We invite you to call us and arrange for a demonstration — *YOU WILL BE AMAZED!*

- **OPERATES BY COMPRESSED AIR or ELECTRICITY**
- **BOARD FOLDS BACK OUT OF WAY**
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BOX 1209 — — KILGORE, TEXAS

petroleum and natural gas producing industry for 1950, prepared by Leo W. Stach, Natural Resources Section, General Headquarters, Supreme Commander of the Allied Forces in the Pacific, and published by permission of Chief, Natural Resources Section, Japan's petroleum resources were by no means exhausted; however, the revival of the industry was dependent on the location of new reserves.

Additional impetus has been given the industry as a result of a survey of prospects for secondary recovery from Japanese fields nearing the depletion point. This prospect, together with a stable labor situation, improved drilling efficiency, sound finances and continued exploration, contributed to a steady increase in production throughout the year.

The official SCAP report gave this roundup of field status: Narahashi field, Yamagata Prefecture, which was discovered in 1947, was completely drilled up in 1950 and produced 71,904 barrels, as compared with 44,175 barrels in 1949. Nishiyama field, Niigata Prefecture, produced 79,341 barrels during the year, an increase of 32

Drilling in Japan

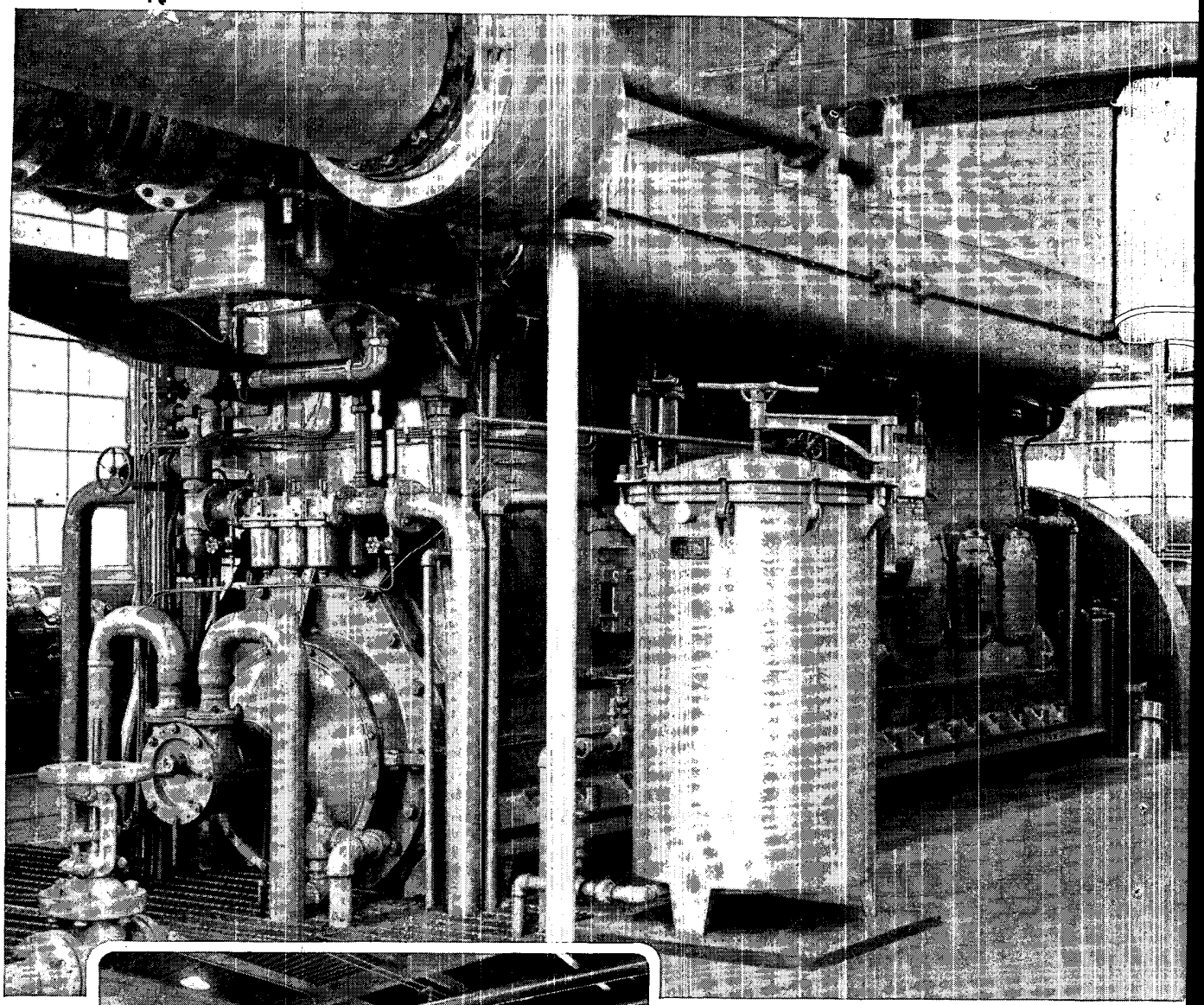
Prefecture and Field	Wells Completed in 1949					Wells Completed in 1950				
				Total					Total	
	Oil	Gas	Dry	Wells	Footage	Oil	Gas	Dry	Wells	Footage
AKITA:										
Hachimori	3	..	2	5	8,108	5	..	5	10	16,846
Hibiki	..	..	..	..	.....	1	..	2	3	750
Katsurazaka	..	..	..	..	.....	1	..	..	1	3,059
Kotaki	..	..	..	..	.....	1	..	..	1	2,626
Koya	4	..	1	5	17,471	..	..	..	...	.....
Michikawa	..	..	..	..	.....	1	..	..	1	677
Omonogawa	4	..	..	4	5,364	..	..	..	...	.....
Sawame	1	..	2	3	5,047	..	..	..	...	.....
Sotoasahikawa	4	..	..	4	17,305	..	..	..	...	.....
Yabase	2	..	..	2	6,642	19	..	3	22	91,508
Wildcats	..	..	3	3	7,570	..	..	4	4	13,469
CHIBA:										
Mobara	..	..	..	..	.....	..	30	..	30	34,574
ISHIKAWA:										
Wildcats	..	..	..	..	.....	..	1	..	1	654
IWATE:										
Iwate	..	..	..	..	.....	..	3	..	3	574
NIIGATA:										
Betsuyama	2	..	..	2	10,247	..	..	..	...	.....
Echigo-Kurokawa	2	..	..	2	1,919	12	..	1	13	*8,558
Gozu	1	1	..	2	7,115	..	..	..	...	.....
Haguro	..	..	2	2	2,982	..	..	..	...	.....
Imo	..	..	1	1	3,330	..	..	..	...	.....
Ishiji	..	..	1	1	3,527	..	..	..	...	.....
Iwafune	..	..	..	..	.....	..	3	..	3	2,361
Kaji	2	..	..	2	4,215	..	..	6	6	14,492
Kajikawa	1	..	2	3	7,750	..	..	..	...	.....
Miyagawa	..	..	..	..	.....	1	..	..	1	3,280
Nakajo	..	..	2	2	3,400	..	..	..	...	.....
Niigata	..	3	..	3	4,496	..	27	2	29	39,206
Niitsu	..	..	..	..	.....	..	..	2	2	2,372
Nishiyama	..	..	..	..	.....	3	1	2	6	27,460
Sekiya	..	3	..	3	5,463	..	..	..	...	.....
Shibata	..	..	..	..	.....	..	..	1	1	2,140
Tsubame	..	2	1	3	4,244	..	..	..	...	.....
Wildcats	..	..	5	5	13,762	3	..	7	10	*20,730
OSAKA:										
Osaka	..	..	..	..	.....	..	1	..	1	344
SHIZUOKA:										
Sagara	..	..	..	..	.....	1	..	..	1	n.a.
TOYAMA:										
Takaoka	..	..	..	..	.....	..	1	..	1	2,364
YAMAGATA:										
Innai	..	..	1	1	4,122	..	..	..	...	.....
Narahashi	8	..	1	9	6,947	6	..	2	8	8,483
Nishi-Ishinazaka	..	..	2	2	3,214	..	..	..	...	.....
Wildcats	..	..	3	3	9,044	..	..	4	4	*4,591
Total	34	9	29	72	163,284	54	67	41	162	301,118

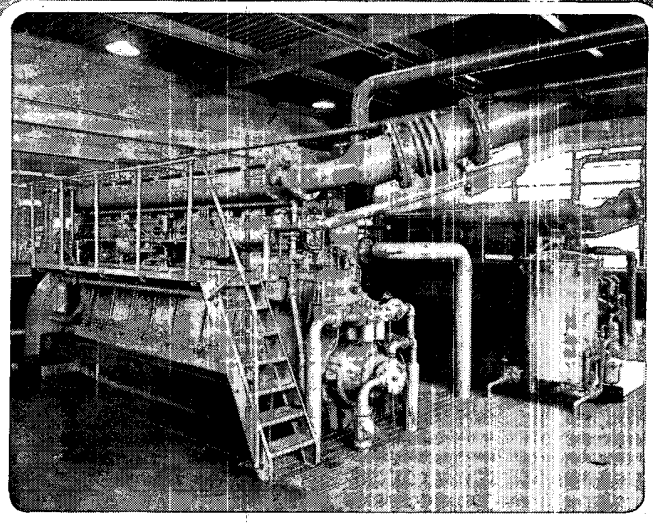
* Footage for all wells not available.

Oil Production in Japan

Prefecture and Field	Year of Discovery	Producing Wells End of 1950	CRUDE OIL PRODUCTION (Barrels)			
			Daily End of 1950	Year 1949	Year 1950	Cumulative Through 1950
AKITA:						
Asahikawa[1, 2]	1908	103*	58	20,285	21,192	4,219,681
Michikawa[1, 2]	1922	74*	70	29,242	29,319	.....
Asanai[1]	1940	17	3	.....	1,311	9,627
Hachimori[1, 3, 4, 5, 6]	1938	46	165	71,138	60,524	615,791
Hanekawa[1]	1919	26	12	3,824	3,749	219,583
Hibiki[7]	n.a.	12	9	1,271	3,604	88,450
Innai[1]	1922	132	360	119,982	139,634	4,430,373
Iwako[3]	1939	....	....	.....	.....	9,950
Kamihama[1]	1940	13	78	19,499	26,128	118,045
Kamioguni[1]	n.a.	66	96	23,946	34,859	1,175,805
Katsurane[1]	1919	70	25	7,837	8,031	721,744
Katsurazaka[1]	1928	22	71	26,808	26,797	365,362
Katte[1]	1919	68	23	8,768	8,414	615,864
Kotaki[1]	1938	38	49	12,819	13,403	207,102
Kurokawa[1]	1912	95	75	20,606	28,286	7,390,398
Matsugasaki[1]	1941	....	....	.....	.....	335
Niida[1]	1938	5	8	2,579	2,961	130,343
Tanaka[1]	n.a.	....	....	.....	.....	557
Toyoiwa[1]	1902	4	6	3,560	2,674	33,054
Toyokawa[1, 3]	1912	167	88	25,900	30,025	5,137,688
Urayama[1]	1912	60	28	8,485	10,261	.....
Uchimichikawa[1]	1921	....	....	31	.....	31,881
Yabase[1]	1934	346	3,332	459,214	1,051,553	11,152,672
Total Akita	....	1,364	4,556	865,794	1,503,725	36,674,305
HOKKAIDO:						
Atsuta[1]	n.a.	8	3	969	1,025	22,993
Furuoi[1]	1905	58	17	6,654	7,429	325,800
Ishikari[1]	1903	87	32	11,548	11,372	888,591
Karumai[1]	1906	33	9	3,025	3,234	390,335
Kasuporo[1]	1923	2	1	.....	302	40,142
Kinausu[8]	1936	....	....	.....	.....	126
Kitatoyotomi[1]	n.a.	....	....	120	.....	143
Koetoi[1]	1922	7	4	1,145	1,325	31,794
Menashi[1]	1915	6	2	226	416	13,747
Toyotomi[1]	1930	....	....	.....	.....	5,670
Wakkanai[1]	1914	....	....	.....	.....	5,785
Yuchi[8]	1939	....	....	698	204	6,745
Total Hokkaido	....	201	68	24,385	25,307	1,731,871
NAGANO:						
Asakawa[9]	n.a.	n.a.	n.a.	.....	105	105
NIIGATA:						
Amaze[1]	1873	2	1	164	141	2,986
Betsuyama[1]	n.a.	....	....	.....	.....	366,638
Echigo-Kurokawa[1, 3, 10]	1941	120	67	23,103	21,664	189,551
Gozu[1]	1902	17	8	4,768	3,114	50,714
Higashiyama[1]	1874	238	194	70,799	71,996	7,051,858
Ishiji[1]	1934	....	....	.....	.....	166,000
Izumozaki[10]	n.a.	n.a.	1	214	301	25,490
Kaji[3]	1945	2	11	14,530	8,186	38,934
Kajikawa[1]	n.a.	1	18	8,982	8,483	17,465
Kashiwazaki[1]	1936	1	1	195	274	9,424
Kengamine[1]	1941	1	1	315	314	1,019
Kuwazone[1]	1945	....	....	.....	.....	176
Maki[1, 10]	1900	146*	13	4,491	4,789	922,715
Miyagawa[1]	1895	31	7	2,113	2,630	1,941,981
Niitsu[1, 3, 10]	1874	685	413	136,965	153,147	18,207,955
Nishiyama[1]	1898	214	210	52,628	79,341	12,645,576
Ohmo[1]	1916	46	23	10,756	10,299	1,361,258
Shibata[1]	1945	6	19	8,982	7,152	74,776
Takamachi[1]	1924	66	27	8,775	9,635	3,247,299
Teradomari[1]	1898	....	....	.....	.....	2,685
Torigoe[1]	n.a.	43	7	1,560	2,177	87,150
Tsukioka[3]	1941	....	....	.....	.....	296
Total Niigata	....	1,619	1,021	349,340	383,643	46,411,946
SHIZUOKA:						
Sagara[11, 12]	1908	n.a.	1	150	238	28,965
YAMAGATA:						
Chokaisan[1]	1922	24	15	12,058	10,782	382,596
Ishinazaka[1]	1944	15	119	54,144	51,375	435,414
Narahashi[1]	1947	18	124	44,175	71,904	127,449
Nishi-Ishinazaka[1]	n.a.	....	....	541	97	808
Yadaregawa[1]	n.a.	....	....	.....	.....	63
Total Yamagata	....	57	258	110,918	134,158	946,330
Other small fields[12]	....	n.a.	1	757	467	n.a.
Total Japan	....	3,241	5,905	1,351,344	2,047,643	85,793,522

[1] Imperial Oil Company.
[2] Karita Industrial Company.
[3] Daido Oil Company.
[4] Nippon Mining Company.
[5] Fuji Mining Company.
[6] Eguchi Mining Company.
[7] Nichibei Oil Industrial Company.
[8] Hokkaido Oil Development Company.
[9] Shinetsu Oil Company.
[10] Niigata Oil Production Association.
[11] Saito Oil Company.
[12] Others.
* Data from Imperial Oil Company only.
n.a.—Not available.





Cooper-Bessemer LS-8 supercharged gas-diesel, 1,715 hp, in Mid-Valley Clarkson station. Number of these units on line will soon total 15 . . . 3 in each of 5 different stations, including new stations at Pyrmont, Ohio, and Simpsonville, Kentucky and Minter City, Miss.

Cooper-Bessemer JS-8 gas-diesel (before supercharging) in Haynesville, La., station. This and 3 other original JS's are being converted, an increase from 800 to 1200 hp each. In addition 5 new supercharged JS's are being added, one each in Longview and Haynesville main stations, plus 3 in the new Stevenson booster station.

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MORE POWER TO THE MID-VALLEY LINE

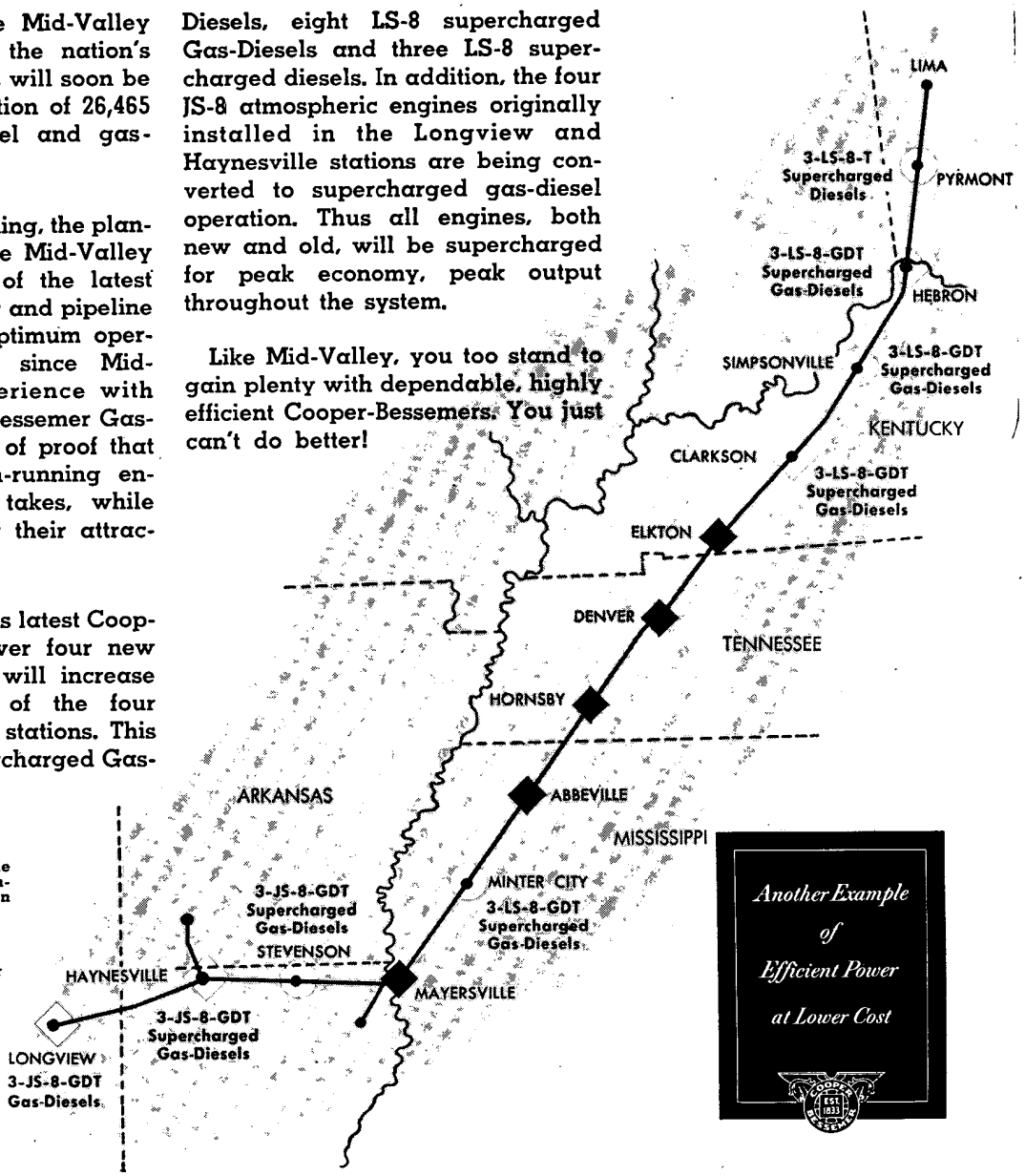
...with 16 additional Cooper-Bessemer supercharged diesels and gas-diesels

○ The capacity of the Mid-Valley Line, already one of the nation's largest oil line systems, will soon be expanded by the addition of 26,465 Cooper-Bessemer diesel and gas-diesel horsepower.

From the very beginning, the planning that went into the Mid-Valley Line took advantage of the latest developments in power and pipeline engineering to gain optimum operating economy. And since Mid-Valley has had experience with their original Cooper-Bessemer Gas-Diesels, there's plenty of proof that these modern, smooth-running engines have what it takes, while considerably bettering their attractive guarantees.

The Mid-Valley Line's latest Cooper-Bessemers will power four new booster stations, and will increase the power in each of the four original engine-driven stations. This calls for five JS-8 supercharged Gas-Diesels, eight LS-8 supercharged Gas-Diesels and three LS-8 supercharged diesels. In addition, the four JS-8 atmospheric engines originally installed in the Longview and Haynesville stations are being converted to supercharged gas-diesel operation. Thus all engines, both new and old, will be supercharged for peak economy, peak output throughout the system.

Like Mid-Valley, you too stand to gain plenty with dependable, highly efficient Cooper-Bessemers. You just can't do better!



Map of Mid-Valley Pipe Line Company's 1000-mile system including new stations and station expansions.

- Original Cooper-Bessemer powered stations
- New Cooper-Bessemer powered stations
- Electric powered stations (original and new)

Another Example of Efficient Power at Lower Cost

by Cooper-Bessemer

MOUNT VERNON, OHIO AND GROVE CITY, PENNA.

Tulsa Shreveport St. Louis Los Angeles Chicago Caracas, Venezuela

percent over 1949, as a result of extension drilling in the Betsuyama area at the north end of the field.

Total production of natural gas for the year was 2,438,974 Mcf, an increase over the previous year.

Japan's percentage success rate for exploratory drilling of 58 percent for outposts and 66 percent on new pool tests, maintained the standard achieved during the past few years as a result of exploration screening by the Petroleum Resources Development Promotion Council, established as an advisory body to the Japanese Mining Bureau on the recommendation of the Natural Resources Section.

The most significant addition to reserves, said the Natural Resources Section report, was 8,539,300 barrels at Yabase field, which resulted from extension activity to determine productive area limits of the deep reservoirs, Zones 8 and 9, discovered in 1949 and early 1950.

Small extensions were proved in Hachimori and Katsurazaka fields, Akita Prefecture, Narahashi field, Yamagata Prefecture, and the Betsuyama extension of Nishiyama field, Niigata Prefecture; a new fault block pool in Kotaki field, Akita Prefecture. Total proved additional reserves from these fields amounted to 140,976 barrels.

PAKISTAN

Two New Companies Organized After Oil Laws Revised; Output from Four Fields Goes Over 1 Million Barrels

REVISION of laws governing oil operations in Pakistan resulted in the formation of two new companies in 1950. Organization of the firms was necessitated by the regulations, similar to those applying to foreign companies in Canada and Venezuela, which specify that applicants for oil development licenses be either nationals of Pakistan or companies incorporated in Pakistan. The new companies are Pakistan Petroleum, Ltd., a subsidiary of Burmah Oil Company, and Pakistan Oilfields, Ltd., an Attock Oil Company affiliate.

Prospecting licenses were also granted a third company, a subsidiary of Indo-Burma Oil Company, Ltd., making a total of 32 prospecting licenses and four exploration licenses issued under the new laws for operations in East and West Pakistan.

Pakistan's new laws regulate all phases of the industry, from the first geological survey to the final disposition of products. Qualified applicants may be granted exploration licenses which cover an area of 5000 square miles, with the provision that the licensee carry out an exploratory program at a minimum annual expenditure of about $1515 per 100 square miles. The exploratory license covers only preliminary geological surveys and core drilling. For more extensive exploration the operator must secure a prospecting license, which requires him to spend at least $15,150 for every 100 square miles.

When the holder of a prospecting license successfully carries out the conditions of that license, he is then able to obtain an Oil Mining Lease, which covers an initial period of 30 years. The regulations further specify that as soon as production of oil reaches a prescribed minimum, the concessionaire is obligated to set up a refinery capable of processing at least 50 percent of the output for products designated by the government.

Production in Pakistan continued to rise. Production in 1950 was close to 1¼ million barrels, compared with 936,000 barrels in 1949. All production is from four fields in the Punjab: Khaur, Dhulian, Joya Mair and Balkassar.

Illustrating the production increase during 1950 was Pakistan Petroleum's flowing Chakwal 2 well in Balkassar field in Punjab, Jhelum district, which in 1950 produced 444,224 barrels, compared with 72,692 in 1949. At the end of the year daily production from this well was averaging 950 barrels.

Attock Oil Company's fields remain the greatest producers in Pakistan, and accounted for about 680,000 barrels of crude during 1950. Pakistan Petroleum, however, is more active in drilling and exploratory operations, and has undertaken a sizable drilling program. It has also pioneered in modern techniques such as shooting and acidizing, but as yet without success.

PHILIPPINES

Three Wells Drilled in 1950 on Luzon, Cebu Islands; Geological Parties Map Areas in Arguson and Davao

THE search for oil in the Philippines is still confined to the drilling activity of Philippine Oil Development Company, a local corporation largely Filipino-American-owned, and the geological reconnaissance conducted by government field parties working under the Philippine Bureau of Mines.

In 1950 PHODCO drilled three wells. Two shallow holes were drilled in the province of Pampanga on the island of Luzon to explore the shallow gas showing in the Macabebe-Minalin area, but both were dry down to 4215 feet, the limit of the portable rig used. The third well, No. 4 in a leasehold in Daanbantayan, at the northern tip of Cebu Island, was drilled to explore further the area, considering the persistent gas showing in well No. 3.

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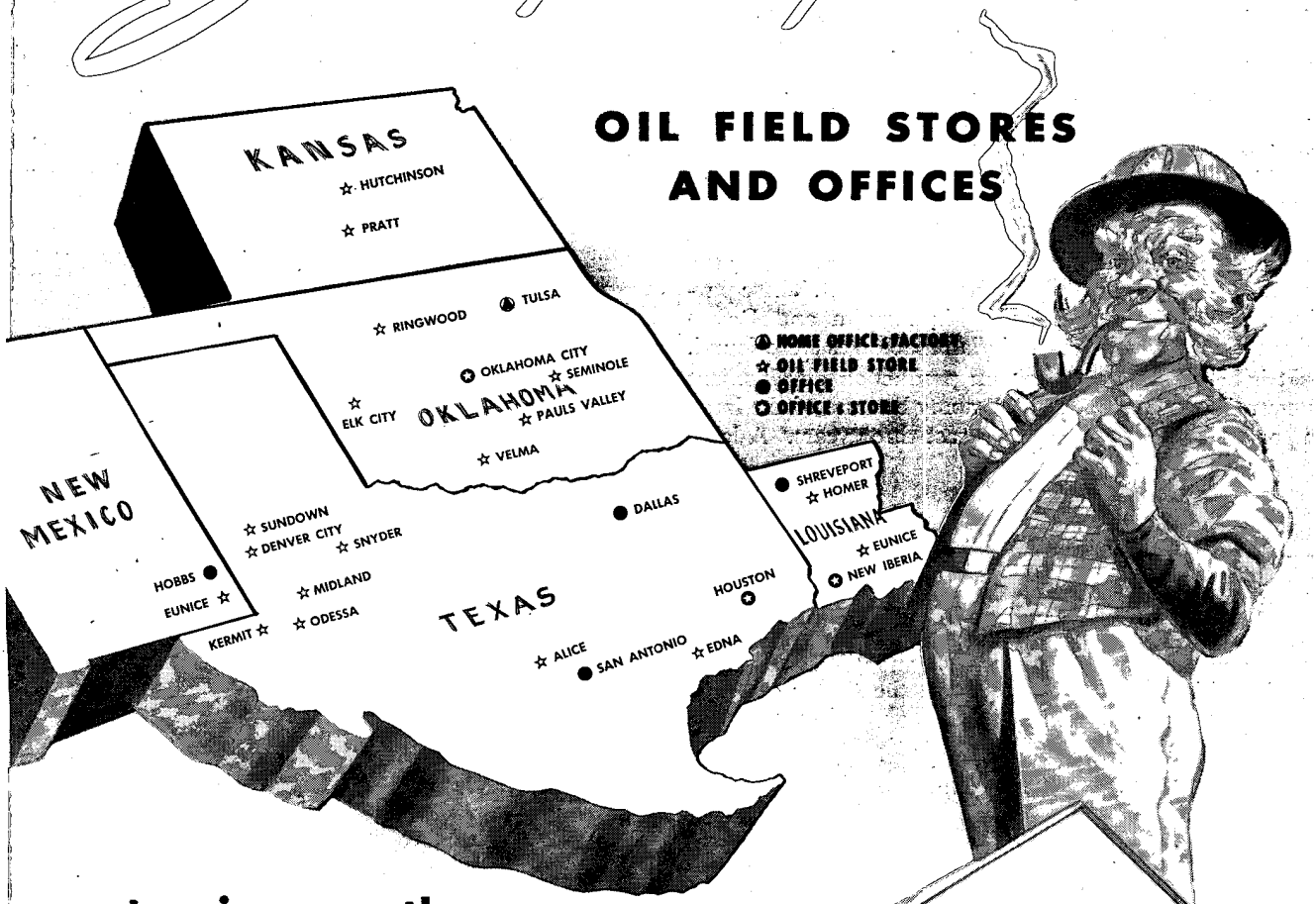

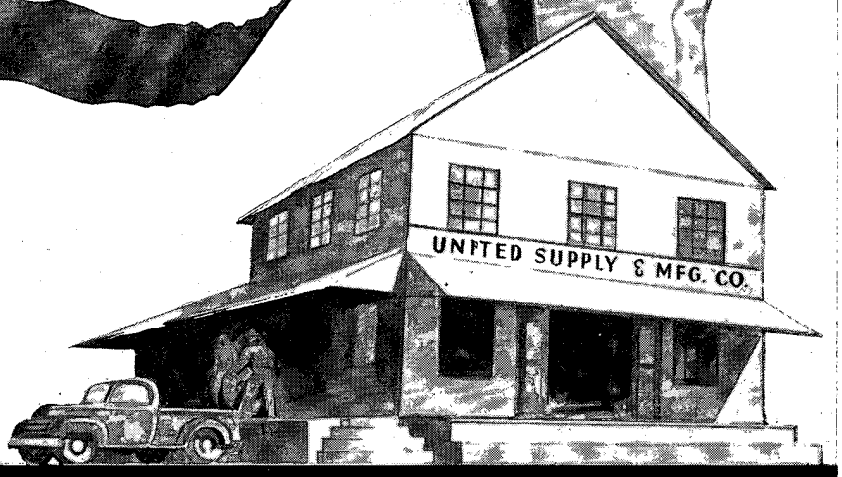

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A standard rotary reached basement at 5908 feet at the end of the year. The gas zones were tested but the results had not been released. If results warrant, a production test will be attempted. From an old well drilled on this island in 1896 the Japanese bailed oil during their occupation of the island in World War II. Oil continues to rise to the surface.

Another local entity, Maglihi Petroleum Mining Association, was prosecuting its patent application for its holding on Bondoc Peninsula in Southern Luzon under an old mining law.

Under a new oil law enacted in 1949 to promote petroleum resources, the Bureau of Mines sent three geological reconnaissance parties to areas not covered by the prewar survey undertaken by the government. These parties mapped geologically areas in Agusan and Davao where strong emanations of inflammable gas were found.

It is believed that petroleum production development is essential to the country's economy because of the large imports of oil products for the past three years. A local company, the Luzon Stevedoring Company, was considering the possibility of producing gasoline from its huge rock asphalt deposit in the province of Leyte (eastern Visayas). Because of extensive seepages in the area, Luzon Stevedoring was seeking an exploration concession under the new oil law.

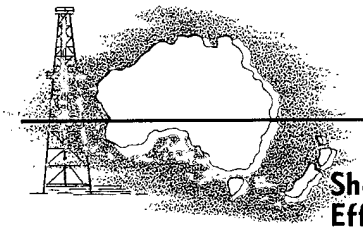
The new law limits participation in oil development to private enterprise 60 percent Filipino-owned, but under the so-called "parity" amendment to the Philippine Constitution, citizens of the U. S. and business enterprises owned or controlled by U. S. citizens are given equal rights until 1974. The law permits foreigners to operate as contractors to the government-owned National Development Company.

Explorations concessions are granted to qualified private enterprises over a maximum area of 2,470,000 acres for a total term of ten years. Minimum annual expenditures are required and increase in each year of exploration. Exploitation concessions are granted over a maximum area of 1,235,000 acres for an initial term of 25 years and are renewable for a like period.

NEW ZEALAND

THE ONLY two oil fields of any importance in New Zealand are now all but defunct. Both fields, Moturoa and Taranaki near New Plymouth in Taranaki district of North Island, have been the center of much past wildcat activity, which has failed to discover commercial quantities of oil.

The acute shortage of petroleum and petroleum products during and after the war made rationing mandatory since practically all the oil consumed by New Zealand is imported. The shipping problem during the war prevented sizable imports and the shortage of tankers immediately following the war made it necessary to limit the use of oil on the islands. With the easing of the tanker problem, rationing was lifted in June, 1950, and the consumption of gasoline, fuel oil, kerosine, and lubricating oil increased.



AUSTRALIA

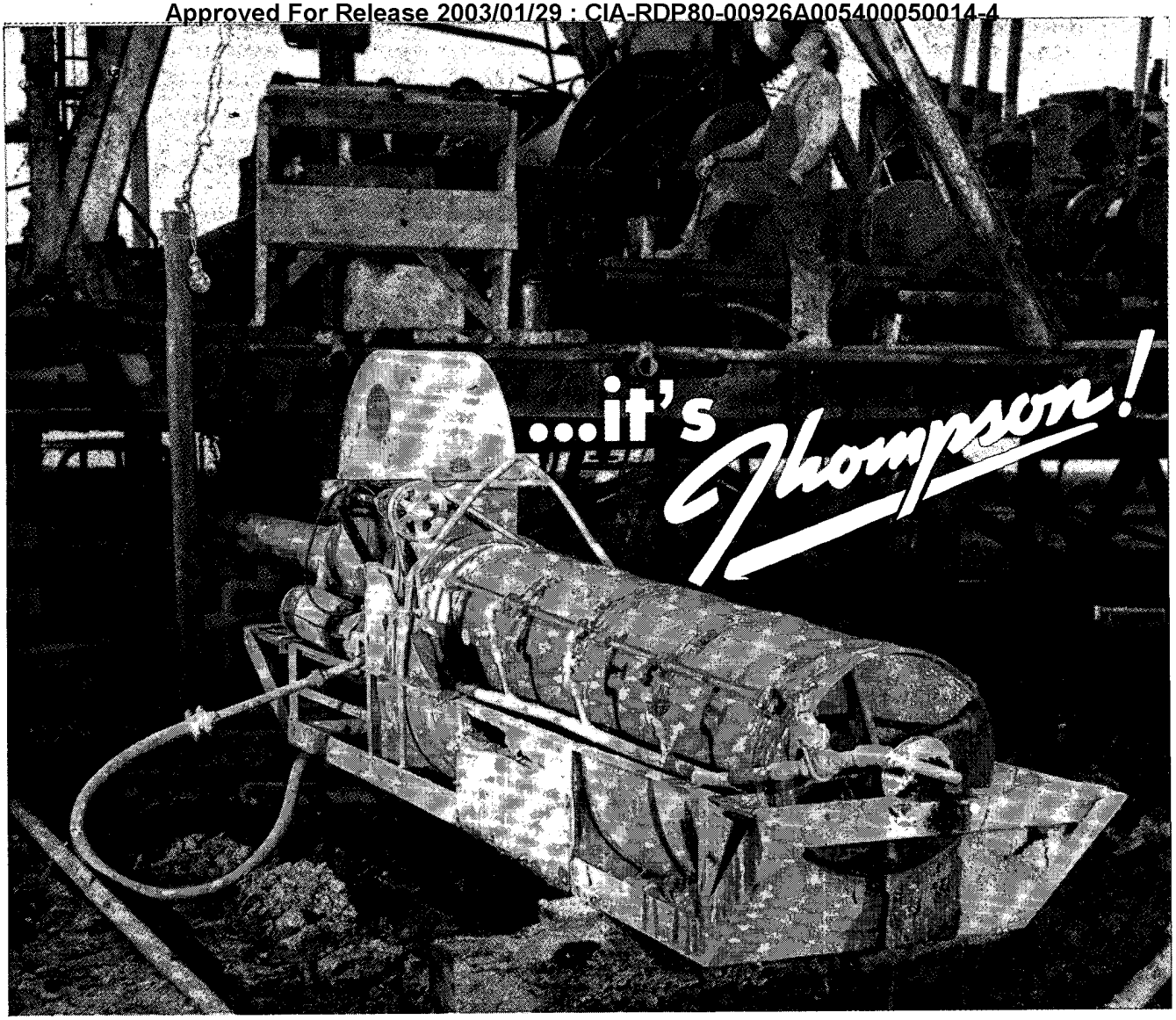
Shell Abandons Queensland Activity After Test Fails; Efforts Continue to Increase Heavy Crude Recovery

OUTLOOK for oil production in Australia is not encouraging. Shell (Queensland) Development Company, a Royal Dutch Shell subsidiary, has abandoned its search for oil in the state of Queensland where it has spent some $2,240,000 in an intensive search since the end of World War II. The decision by Shell Development to discontinue exploration in Queensland came after an unsuccessful attempt in the central part of the state. Shell's Morella 1, a wildcat about 50 miles south of Rolleston in central Queensland, was a projected 10,000-foot well when spudded in May, 1950. After drilling to 4525 feet where igneous basement rock was encountered, the well was abandoned. A show of oil was found near 3000 feet.

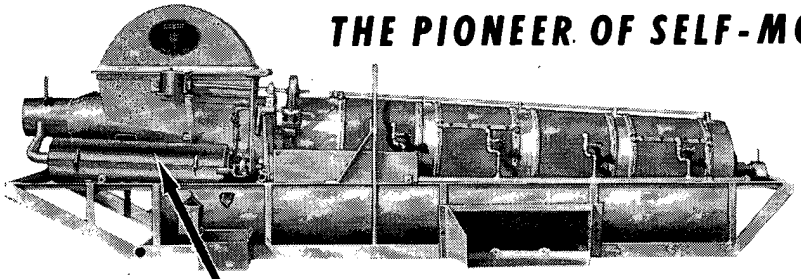
Remaining oil activity in Australia was an attempt to increase recovery of heavy crude from the shallow Lakes Entrance area, 200 miles east of Melbourne in Victoria. Principal work was in horizontal drilling in some of the 44 wells in the field to increase drainage. Results were not fruitful.

Australia has operated a shale oil plant in New South Wales, but having only produced about 65,476 barrels of gasoline annually at a financial loss to the government, a decision was made to shut down operations. The state of New South Wales, backed by the country's major unions and public opinion, is demanding that the shale oil project be continued.

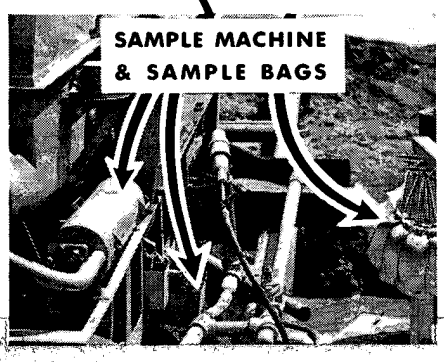
While actual drilling has not succeeded, geophysical and geological investigations continue. Standard-Vacuum Oil Company and Anglo-Iranian Oil Company have taken interests in geological and geophysical programs in various parts of Australia. The Commonwealth and some state governments along with local companies are doing some surveying. It was recently announced that aerial magnetometer surveys in the Lakes Entrance district of Victoria will be made by geophysicists of the Australian Bureau of Mineral Resources, and that similar surveys will be made in other parts of Australia.



THE PIONEER OF SELF-MOTIVATFD SEPARATORS



- ○ PROVEN PERFORMANCE
- ○ ECONOMICAL OPERATION
- ○ SAVES DRILLING COSTS



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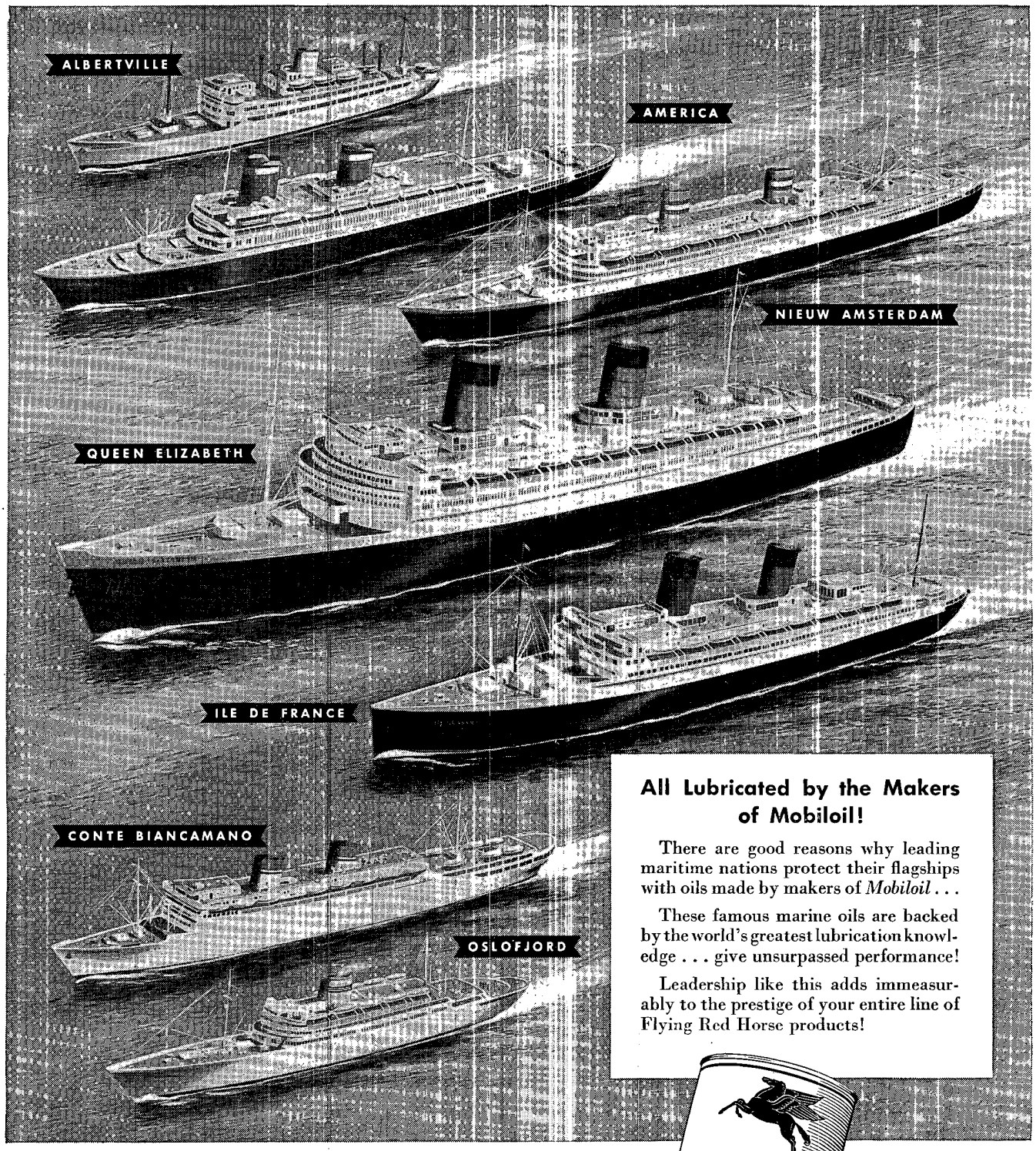

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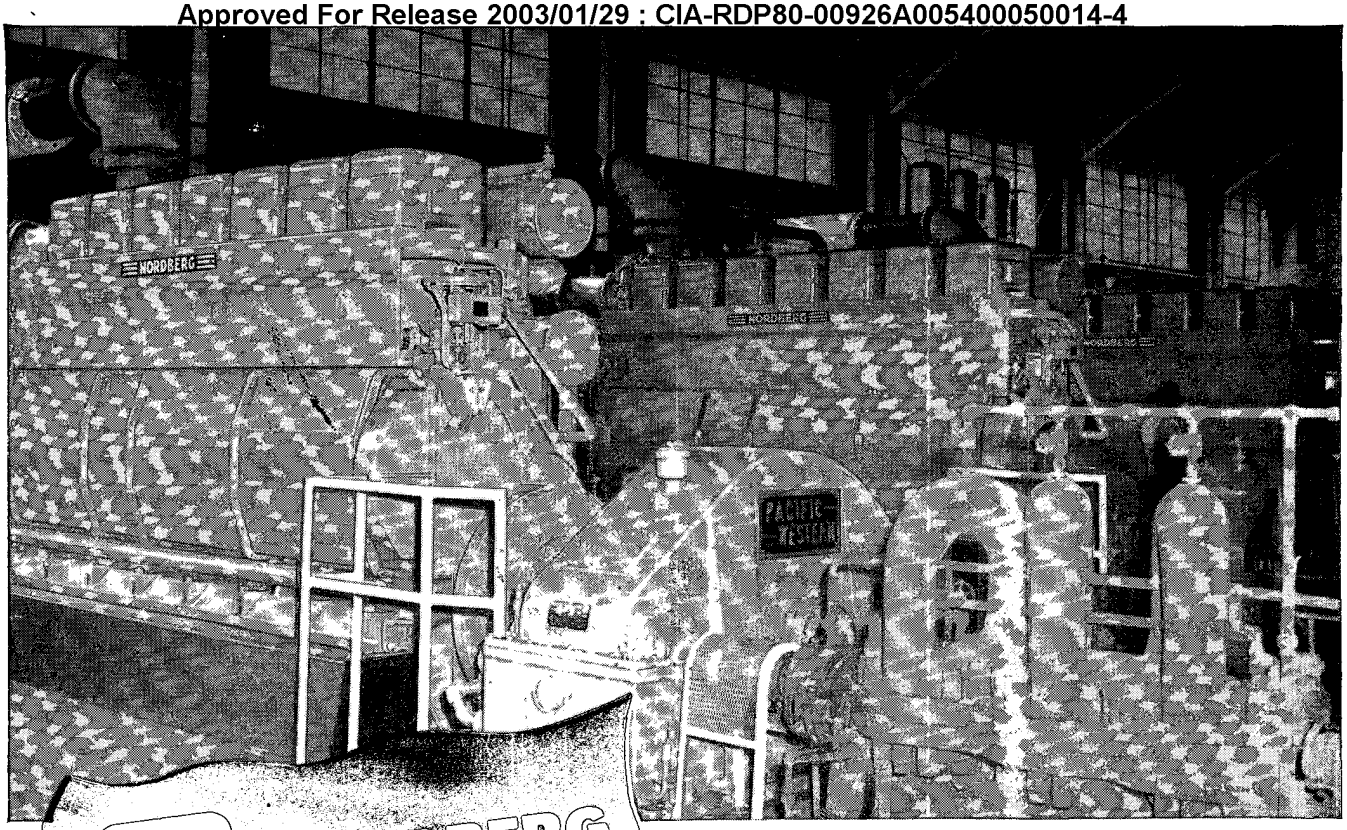
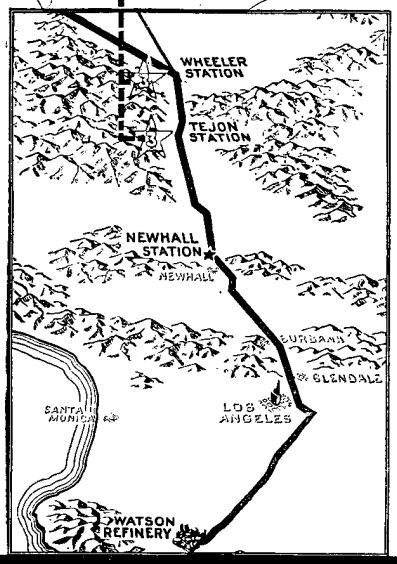


6 NORDBERG Duafuel* ENGINES supply 6300 horsepower for new RICHFIELD PIPE LINE



ILLUSTRATED here are three of six Nordberg Duafuel* Engines installed in the Tejon and Wheeler Ridge pump stations of the new Richfield Oil Corporation 14-in. pipe line, which connects the company's production in the San Joaquin and Cuyama Valley fields with the Los Angeles area. These dependable 7-cylinder Supercharged Nordberg Duafuel* engines each develop 1050 hp at 450 rpm, and are designed to operate on natural gas plus Cuyama Crude as pilot oil, on straight Cuyama Crude, or with any proportion of either fuel. Instantaneous conversion from one fuel to another allows the most economical fuel to be used at all times.

For main line or booster stations—wherever you must keep petroleum products on the move with plenty of power—you can count on Nordberg engines to do a dependable, economical job, day-in, day-out. Built in a wide range of sizes up to 9600 hp, including 2 and 4-cycle types, and Diesel, Natural Gas and Duafuel* models. (*Trade Mark*)

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NORDBERG DIESEL ENGINES

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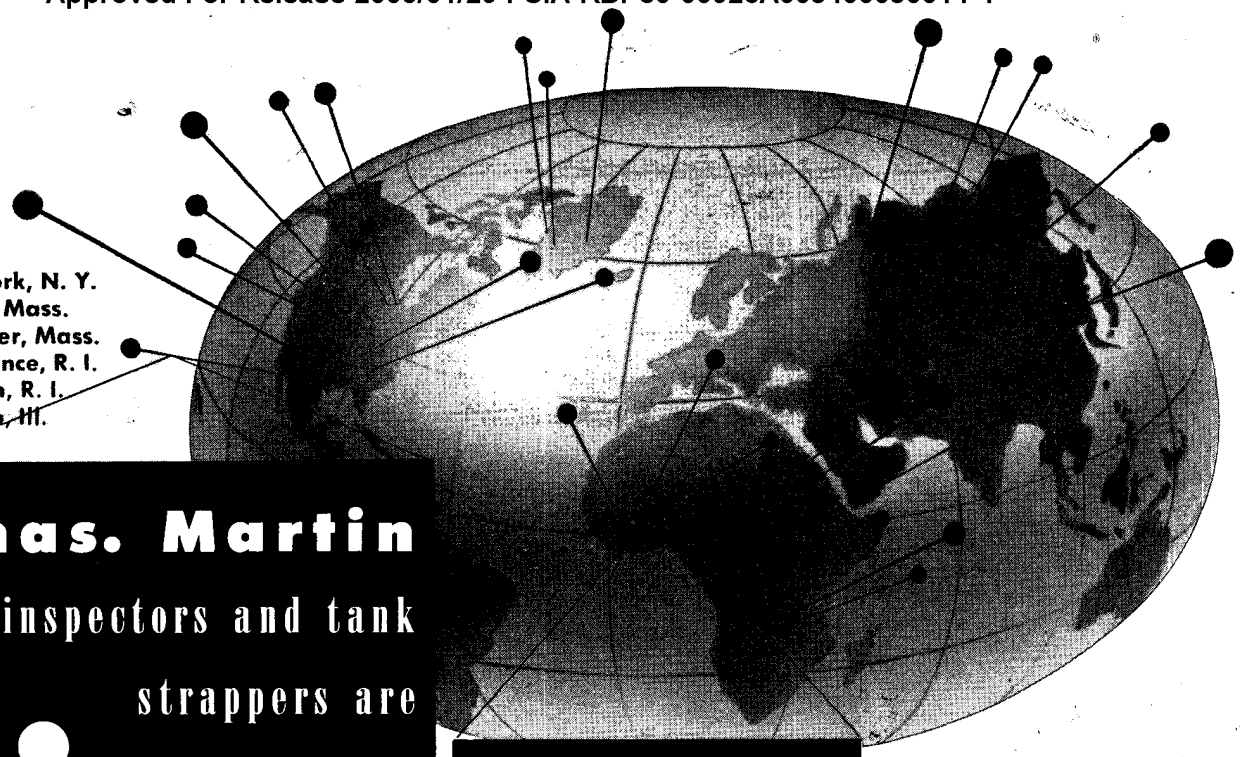

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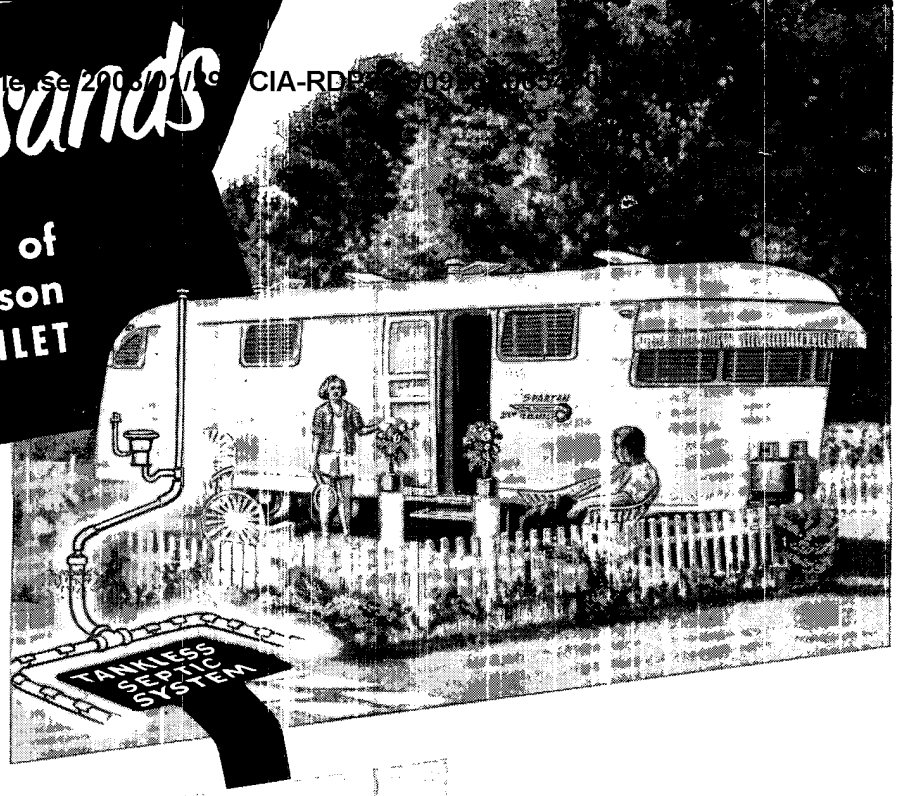

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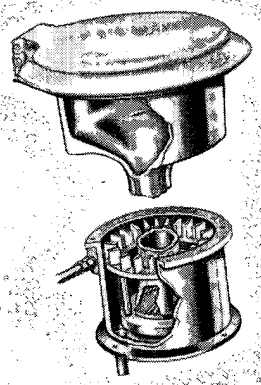

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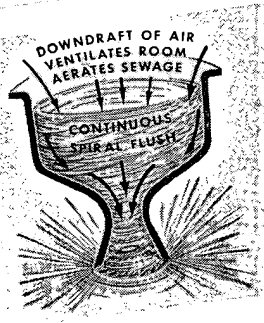

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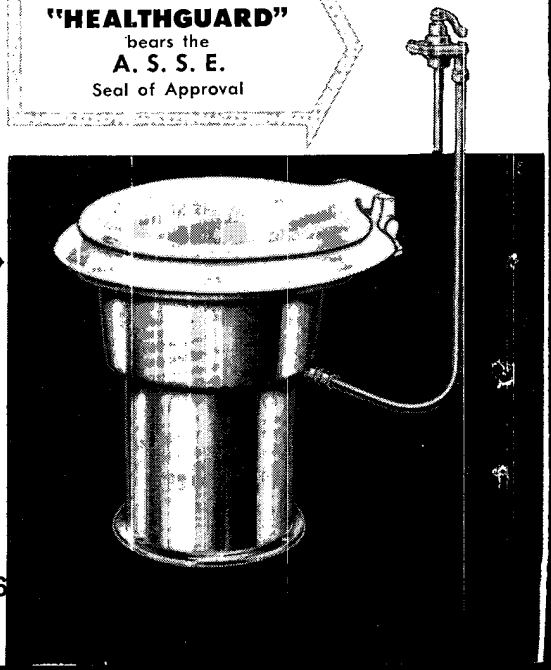

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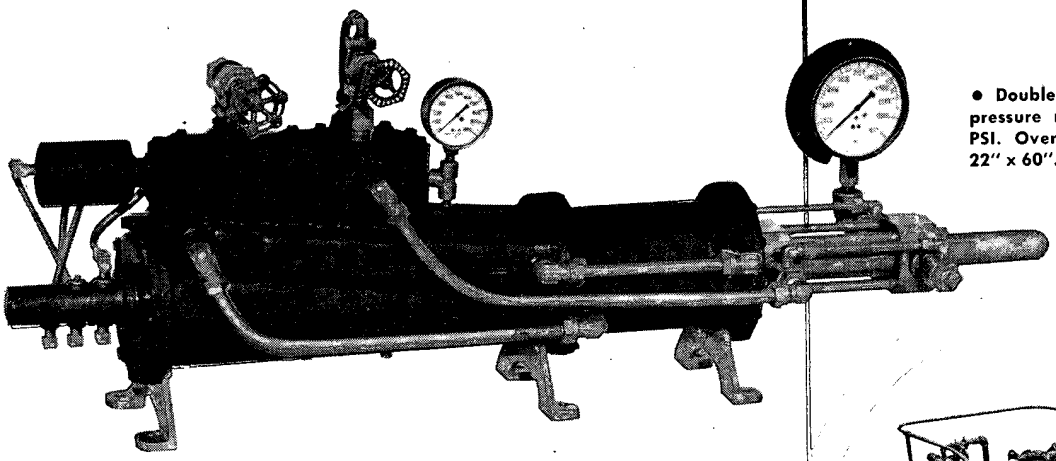

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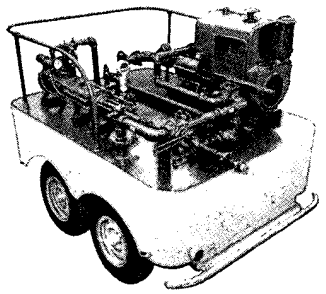
McFarland Double Powered Pressure Conversion Pumps

Pioneer of this type pumps, McFarland now gives you a Double Powered unit for high discharge pressures from low input pressures.

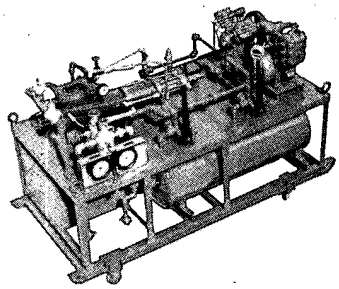
The pressure booster cylinder provides a pressure range of 0 to 20,000 PSI. Choice of intermediate pressures is possible because discharge pressures are in direct ratio to input powering pressures. The booster cylinders are interchangeable so that the complete range of discharge pressures is available with any size pump, simply by installing the correct size pressure booster.

McFarland Double Powered units are ideal for operating pressure operated blowout preventers . . . for hydrostatic testing of valves, pipe, fittings, pipe lines, tanks, boilers and other pressure vessels and equipment.

Write us for complete information and operating data on these Double Powered units.



• Trailer mounted, hydrostatic testing unit for field testing pipe, separators, tanks, boilers, and other pressure vessels. The Unit has a McFarland 6 - 5¼ - 6B testing pump equipped with a recirculating valve. The trailer body is the tank for water used in testing. Testing units are also available mounted on truck or skids.



• Custom-built McFarland unitized blowout preventer unit designed to operate one Hydril and two Cameron QRC blowout preventers. It includes pump, fluid tank, motor compressor unit with air compressor and control valves. McFarland units can be built to customer requirements for operating one or more safety devices.

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1630 ROBERTS STREET HOUSTON 3, TEXAS

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Over the period of more than 30 years, WORLD OIL has been a history of original ideas that have helped to make it a practical working tool for men in the exploration, drilling, producing and pipeline business.

That this kind of thinking has provided oil men with the most useful of all oil publications is evidenced year after year by the increasing number of men who find it profitable to *read WORLD OIL regularly*. Today, more oil producing men pay to read WORLD OIL than any other oil paper.

HERE ARE SOME WORLD OIL EDITORIAL **FIRSTS**

1919	Introduced *Annual Review Number* (now Annual Review Forecast Issue), first publication to provide complete industry statistics in a single source book.
1922	Noting sharp differences in job interests and reading interests between men in oil *producing* and men in oil *refining*, the first specialized oil papers for each division were established: The Oil Weekly (now WORLD OIL) for exploration-drilling-production-pipe line; PETROLEUM REFINER for oil refining, natural gasoline and petrochemistry.

Established 1916 as The Oil Weekly

WORLD OIL

The **GULF PUBLISHING PUBLICATION Specialized for**

Exploration, Drilling, Production, Pipe Line Operations and Management

1928	First publication to send an editor to all oil fields of the world, a regular WORLD OIL practice now.
1929	Introduced the Composite Catalog of Oil Field and Pipe Line Equipment, now the equipment bible of the industry, to make complete data on oil country products available to buyers where they need it, when they need it.
1937	First to make annual estimates of crude reserves, thus informing the industry whether or not it is finding enough new oil to meet rising demands. WORLD OIL, as The Oil Weekly, did this even before the A.P.I. started its estimates of reserves.
1937	First to present annual forecasts on drilling and footage, information which has served equipment manufacturers and drilling contractors as a guide to future business conditions.
1942	First to publish wildcat discovery data in summarized form.
1945	Established international technical and historical petroleum library under direction of professional librarian and made its facilities available to the industry.
1946	Issued the World Oil Atlas, now the annual *International Operations Issue*, first publication to feature full-color maps and annual statistical data on every country where oil is sought or produced.
1947	Started publishing map series on principal pipe line systems of U. S. Introduced monthly box score of pipe line construction underway and planned.
1947	WORLD OIL changed from weekly to monthly publication, adopting a new editorial technique for the industry—with emphasis on interpreting oil news, increasing the top-notch how-to-do-it operating articles in every issue.
1947	First to introduce sectionalized editorial content, whereby the editors are able to publish a balance of articles of interest to men in drilling, production and pipe line—plus analysis of the news and international features.
1949	Introduced first regular Exploration editorial section to appear in any oil paper.
1949	Introduced "Report from the Observatory," a monthly report of oil's current business conditions and future prospects—an analysis of the best views obtainable in the industry.
1950	Introduced World Oil Graphics. A series of full page cartoons designed to encourage proper care of equipment.

ADVERTISERS' INDEX

* The asterisk indicates that detailed information on products and services of the firm will be found in current 18th (1951) edition of The Composite Catalog of Oil Field and Pipe Line Equipment.

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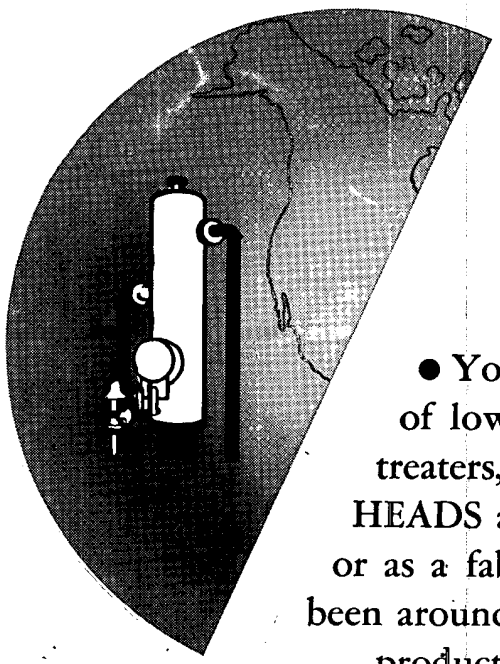

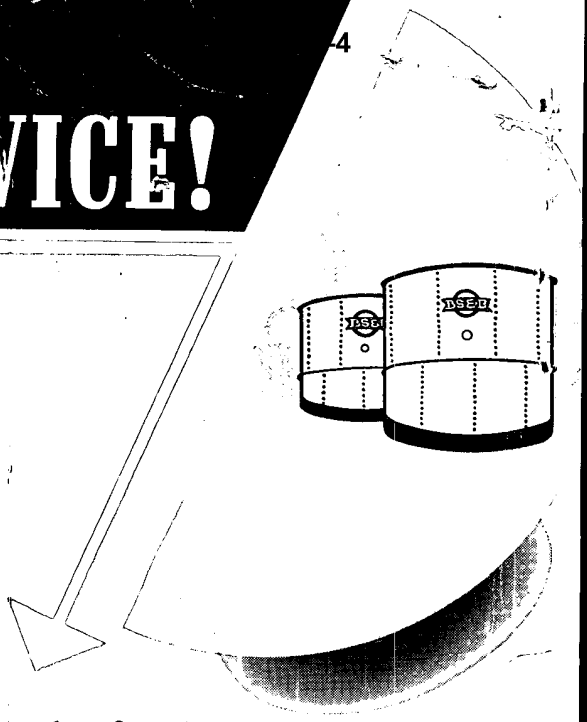

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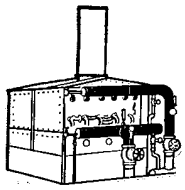

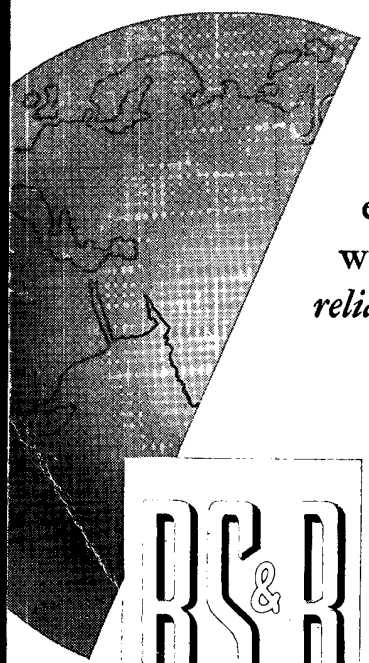

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