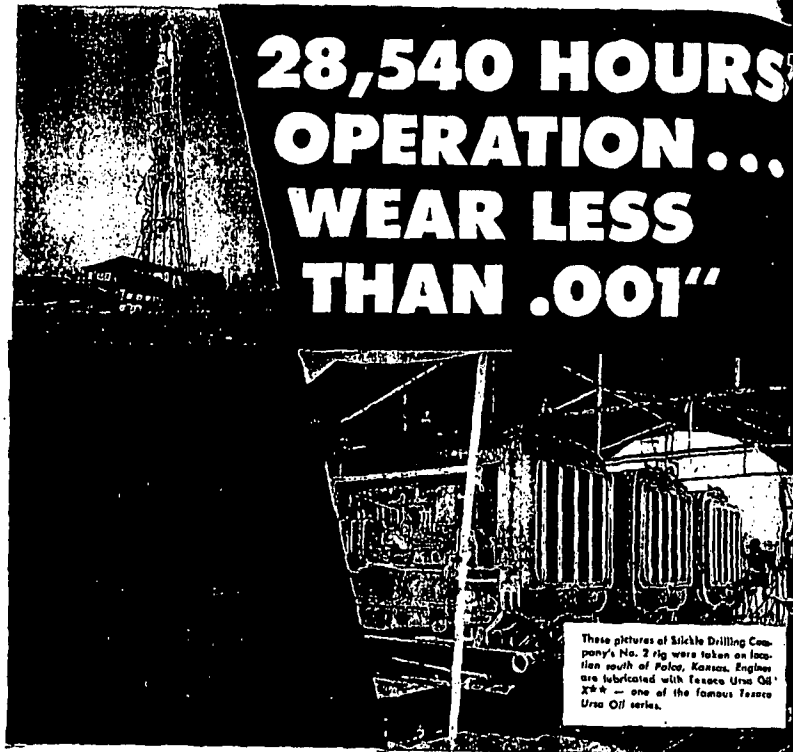


28,540 HOURS OPERATION... WEAR LESS THAN .001"



These pictures of Slickle Drilling Company's No. 2 rig were taken on location south of Polio, Kansas. Engines are lubricated with Texaco Urso Oil 328 — one of the famous Texaco Urso Oil series.

Slickle Drilling Company, Tulsa, Oklahoma, has long been getting outstanding performance from Diesels lubricated with Texaco Urso Oil. Typical are the three Caterpillar Diesels operating the No. 2 drilling rig. These were taken down for inspection after 28,540 hours of operation, and the following report gives the story:

"We found that Texaco Urso Oil had kept these engines ideally clean. Measured wear was under one-thousandth of an inch. Since then, the engines have been back in operation for over 10,000 additional hours without any down time."

You can get similar fine performance by using the rec-

ommended member of the famous Texaco Urso Oil series — a complete line of lubricating oils for Diesel, gas and dual-fuel engines. Whatever the type, size or speed of your engines, their operating conditions or fuel used, there is Texaco Urso Oil to assure clean, efficient performance with minimum maintenance costs and fuel consumption. The Texaco Urso Oil series is approved by leading engine builders and preferred by operators everywhere.

A Texaco Lubrication Engineer will gladly give you full information. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO URSA OILS

FOR ALL DIESEL, GAS AND DUAL-FUEL ENGINES

PHILIP SWAIN, EDITOR • SEPTEMBER 1953 • ESTABLISHED 1882

Power

3200 Psi in 1923

THIRTY YEARS AGO, in the spring of 1923, POWN received a phone call from a stranger named Mark Benson. He had just landed in New York from England and was encomped at the Commodore Hotel. He wanted to see an editor. I was then an assistant editor, and was sent over to see what it was all about.

Benson pulled out a big sheaf of diagrams, tables and calculations—all relating to his radical proposal to generate steam at the critical pressure of 3200 psi in a once-through boiler.

With his permission I photostated all the papers and sweated out the two long articles published in POWN, May 22 and 29, 1923. These excited much interest all around the world. Digests appeared in the leading engineering journals of England, Germany and Russia.

With the cooperation of the English Electric Co., Benson was aiming primarily to provide 1500-psi steam for turbine operation without paying the price of the heavy boiler drum required for that pressure. He reasoned that feedwater pumped through boiler tubes at pressures slightly above 3200 psi would turn quietly into steam at the point where the fluid reached the critical temperature of 706 F. There would be no boiling—no steam bubbles to disengage, so no drum would be needed.

The 3200-psi steam would be throttled to 1500 psi and superheated before going to the high-pressure turbine.

Presumably, the very moderate steam temperatures then permissible, and the very small capacity of the proposed pilot plant (1000 kw) made it uneconomical to operate the turbine at 3200 psi, despite the obvious power waste in pumping feedwater at more than 3200 psi to produce turbine throttle steam at 1500 psi.

Here are some of Benson's proposed conditions: boiler outlet 3200 psi (plus) and 730 F; throttling to 1500 psi

and superheating to 788 F; expansion to 200 psi in a tiny one-stage impulse turbine running at 20,000 to 25,000 rpm; reheating to 662 F; final expansion to 0.5 psi in a 7000-rpm gear-connected turbine. These were paper plans, not operating results. All pressures are absolute.

Now let's move on 13 years to March 12, 1936. I was in Berlin interviewing Dr. Gleichman, chief engineer of the big Siemens-Schuckertwerke. Dr. Gleichman kidded me about his bald head—said it was my fault. It seems that Siemens first heard of the Benson boiler through the POWN articles. Later, they bought the world patent rights from the English Electric Co. Gleichman said it took him years to get the unit working properly. As a result he lost a lot of sleep and tore out a lot of hair. Hence the bald head—which was my fault.

After 1929, however, Dr. Gleichman continued, it was a different story. He got the unit under control, but operating well below the critical pressure—anywhere from 1200 psi to 2500 psi, depending on the load. Further details may be found on page 246 of May, 1936 POWN if anybody is interested.

In time, the Benson boiler came into wide use in Germany—also in Russia under the name Ramsin. We don't know that it was ever commercially operated at critical pressure, but it did operate without a drum, which made it attractive to steel-poor Germany just before the second World War. At that time about 170 units were running on land and sea.

It's worth noting again that Benson's announced purpose was merely to eliminate the costly high-pressure boiler drum. Under the technical limitations of his time it does not appear that he planned to operate turbines at the critical pressure or higher. It is a far cry from his ingenious pioneer proposal to present plans for an ultra-high efficiency plant with a throttle pressure of 4500 psi.—PWS