

ENGINEERING

Waste Natural Gas Used to Increase Oil Well Yield

New Method Employing Smoke to Prevent Dread Tanker Explosions Also Described Before Petroleum Institute

THE BILLIONS of cubic feet of natural gas wasted to the atmosphere in the production of oil can be pumped back into the wells from which it came in order to force to the surface oil that would otherwise be lost.

Not only will gas returned to the wells increase production, but if little gas is allowed to escape from a producing well more oil will be obtained, it was brought out in a paper on improvements in production practice presented by W. W. Scott of the Humble Oil and Refining Co. of Houston, Texas, before the meeting of the American Petroleum Institute in Chicago this week.

"In any oil pool that depends upon gas movement for production, and one in which it is possible for a single operator or a group of operators to develop the pool as a unit," Mr. Scott said, "the cost of conserving gas and returning it to the reservoir will be amply repaid by reduction of lifting cost and increased production from the pool."

As an example of the important role played by natural gas in the production of oil, Mr. Scott mentioned the Sugarland field located in the Texas Gulf Coast area about 25 miles southwest of Houston, which, he said, holds a unique position among present day fields.

85 Per Cent of Gas Returned

"In this field," he continued, "it has been possible to produce oil in such a way as to allow the average pressure on the reservoir to fall off as slowly as possible with a given amount of production. . . All of the gas produced with the oil is collected and about 85 per cent or more has been compressed and returned to the reservoir. The injection pressure is approximately 1,400 pounds."

Greater ultimate production and lower pumping cost were declared to be the advantages of this procedure.

An exact scientific test of the benefits to be derived from returning gas to a pool which has reached its economic limit is being made in a field

of the Humble Co. near Olney, Young county, Texas, Mr. Scott said. Gas injection was started in January, 1930, and by October 1 almost 100,000,000 cubic feet had been forced into the pay sand, and the oil reservoir pressure lacked only a few pounds of reaching 400. Production at the most efficient rate will begin about December 1.

Preventing Disasters

Smoke brought from the fire boxes of engine room boilers and put in the same compartments with highly combustible petroleum products has been found effective in preventing explosions of oil tankers, the most serious source of disaster in the petroleum industry, engineers also reported to the Petroleum Institute. The method has also been applied with success to lessen the danger of explosion both of large petroleum stores on land and of oil in the actual production and refining processes.

The secret of lessening the combustion hazard with the products of a previous combustion depends upon the fact that smoke, or flue gas, is made up of a large amount of inert gases that will not react with oil or its vapors to cause an explosion. This gas is pumped into oil compartments to replace air which contains a dangerous amount of oxygen. Before it is introduced into the actual presence of oil it is thoroughly cooled and cleaned of soot in water scrubbers.

"When the average tanker is loading," explained H. H. Hall of the Standard Oil Co. of San Francisco, Calif., while describing the hazards of oil vapor, "vapor is expelled onto the deck through the ullage holes, and workmen must walk to and fro regulating the flow of oil into tanks, adjusting the ship's lines and other equipment, getting back and forth from quarters, etc. Then, when the ship discharges, air is normally drawn into the tanks to replace the oil as it flows out; and there is frequently just enough oil vapor left in a tank to make, with the air drawn in, a violently explosive mixture. . ."

The application of flue gas to fire protection is not new, but in the past it has been used almost exclusively to extinguish, not prevent, fire. The Shell Oil Company has used flue gas to protect its reservoirs for a number of years, Mr. Hall said.

Inactive nitrogen is the chief component of flue gas. It has a carbon dioxide content of approximately 9 to 13 per cent and oxygen only two to eight per cent. Hydrocarbon vapors normally present in oil refineries are explosive in ordinary air when their concentration is between one and 15 per cent. Higher concentrations tend to burn, but not to explode, it was brought out.

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