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October 23 The petroleum industry; by E J Sadler, Vice president, Standard Oil Company of New Jersey

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Questions following the lecture on "The Petroleum Oil Industry"
by
Mr. E. J. Sadler, Vice President, Standard Oil Company
of New Jersey

Q. In connection with the storage of oil do you consider that it would be of more benefit to allow the oil to remain in the ground or carry these large storage quantities? In the case of storage and taking into consideration the loss of oil by evaporation, fires, economic waste and other expenditures, would it be of more value to the oil industry as a whole to allow the oil to remain in the ground and take it out as the supply and demand indicate or continue to carry these enormous quantities above the ground?

A. In our own business I was more instrumental than any one else in being afraid of shortage of crude oil. We had 75 million barrels when we were running 4 or 5 million barrels a day. We decided to cut it down. The cost of carrying was excessive, due to both physical and financial losses and we decided to cut it down to a hundred days supply. We actually cut it down to sixty days supply and considered that excessive. 250 million barrels is the daily run now and we have about 120 days supply. Seeing the enormous potential production, I think the United States would be better off with fifty days supply of crude oil out of the ground than with 120 days. That is both from a financial and practical standpoint, and also from the standpoint of physical waste.

Q. In case of an emergency there would be a great deal of exploratory work done for new fields at great depths. What do you think of seismographic method of exploration?

A. Aside from the surface geology there are a number of geophysical methods, seismographic methods, refraction and reflection shooting. In the different areas depending on location you will find one of the other better. In seismographic work it is necessary to take into consideration the different horizons. If the terrain is homogeneous you get no seismographic results. If you have heavy lime stone strata you have different facilities for the seismographic method; it depends on the locality. Going further, oil must be found where there are structures - where they are inclined. When you find structure it doesn't mean that you have found oil, because oil must be formed in bituminous beds and must have migrated there and not have been wasted through seepage. So the method depends upon the nature of the country.

Q. What was the effect of the N.R.A. code on the petroleum industry with special reference to production? Did it limit production through proration?

A. The N.R.A. did to some extent limit production through proration. There were two diverse influences; one was that the allowable production was almost too great; and in the second place, it increased the cost and it established an arbitary price for crude oil that was higher than the products. When products were $80 per barrel the crude oil price was fixed at one dollar, and that encouraged a great deal of unnecessary drilling because it was based upon production of the well and not on reserves. It was not a sound production practice and it imposed an economic burden on the industry by forcing people to drill wells that should not have been drilled.

Q. In California I understand that they are allowed to produce as much as they can.

A. California has constantly produced more than the allowable amount indicated by the Bureau of Mines. The allowable amount indicated was more excessive than in other areas. These are expressions of personal opinion but I think they are sound. California today is producing nearer her potential capacity than Texas.

Q. Has there been any change in the industry since the code has stopped; any difference in production?

A. a. Not very much.

b. The conservation agencies have tried to follow the advice of the Bureau of Mines. An indication is given of the appropriate allowable and conservation agencies fix production.

Q. About the storage of oil above ground - do I understand from your answer that fifty days supply is what the Navy would need or what they should have? Do you care to give an estimate of what the Navy should have?

A. My own judgement is that the Navy would not want to store crude but would want to store products so it would store to the extent and in those places its requirements dictated. Their requirements are not in the ratio of the yields that come naturally from the crudes.

Q. I understand you to say that reserves constitute about one half of the world's supply. In view of the estimated increase in percentage of consumption would you care to estimate how long the reserves in the U. S. would last?

A. That is a very controversial subject. This is only a wild guess but I would say that ultimate reserves in the U. S. might be five times their proven reserves or slightly less. If their proven reserves are twelve billion barrels, with all discoveries I would say that the U. S. might count on fifty to sixty million barrels on ultimate recovery. Of course when you go into the hydrogenation of coal for motor fuel etc., that

increases it.

Q. What has happened in the petroleum industry since the N.R.A. in regards to market practice, labor, wages, hours, etc?

A. In our own business as to wages and hours there has been no change. As to market practices, I think that they have always been bad and now maybe they are a little worse.

Q. Do you think there has been any definite policy on the part of Great Britain to encourage tapping of American Reserves and discourage opening of foreign fields to increase the price of production?

A. That is absolutely fantastic. They have 50 per cent of the Anglo-Persian which has 250 billion barrels.

Q. To what extent have water areas been explored for new sources?

A. They have done some drilling at Lake Maracaibo and Santa Barbara. Here they have run out into the ocean but they are the only water operations that I know of. There are indications of oil in the Gulf of Paria but there never has been exploration except in shallow and inclosed water and that is done by the seismograph.

Q. Do geologists know the maximum depth that oil occurs in pools?

A. The occurence of oil is based on five essentials that I have given you. As you go deeper the cost increases and the yield

decreases. Generally speaking the more prolific drillers are the younger ones, largely tertiary for the reason that they are more porous and have more room to accumulate. You find oil in the U. S. in the ordovician - that is older even than the Pennsylvania rocks.

Q. At about what price level is the hydrogenation of coal and shale possible?

A. Coal is far ahead of shale and my guess is that a ten cent market would allow you to make hydrogenated gasoline from coal. We now have a wholesale price on the Gulf of four or five cents.

Q. Then it is not necessary that Italians pay up to ten cents?

A. No, we sell at five to Italian subsidiaries. They have a six or seven cent cost of distribution, freight cost of one cent a gallon, and the rest is tax.

Q. For providing a conservative producing unit what in your opinion is the ideal size of the typical unit in refining?

A. I think twenty thousand barrels a day. We have profitable refineries at 500 barrels but ordinarily I would say a twenty or twenty-five thousand barrel refinery is as small as can be profitable.

Q. I understand that the major difficulty in the oil industry for some years back has been over production and that in 1933 they had a price as low as ten cents a barrel causing several producers to close down. Because of the universal demand for such

items as gasoline and fuel oil and to eliminate a lot of the financial difficulties that had been causing the price fluctuations what do you consider would be the benefit, if any, of placing an item like gasoline on a public utility status the same as illuminating gas or electric power and allowing the oil company to obtain a profit on a reinvestment basis the same as other public utilities?

A. My practical experience is that I have never seen a very efficient government.

Q. You would not advocate it?

A. Overproduction from a financial standpoint has been the bane of existence in the oil business for a number of years. You saw the Federal operation of the railroads and the Federal operation of Agriculture and I think that any industry that gets into Government control, other than restricting of production, is just due for misery and chaos.

Q. Since 1911 and the dissolution of the Standard Oil Company in the field of production would you say that any monopoly exists today?

A. I will say that some of our late children have been worse than anybody's we know of.

Q. Has there been any attempt either Federal or State to control prices?

A. There was an attempt in the N.R.A. under the code to do that. Fundamentally the code raised this issue; whether we would work for the survival of the fittest or the survival of

the unfittest. All the small company units insisted on having price differentials that would let them exist. We have five times too many service stations in the U.S.; the public cannot support them; the industries cannot support them. We sell gasoline at five cents a gallon in New York Harbor and you pay twenty cents in the service stations. There is a spread between the prices at the refinery and the prices charged to the consumer that is more than the wholesale prices the refinery got and there is a duplication of service and facilities. You go to a service station - the fellow wipes off your wind shield and you drive away. The public pays for that.

Q. With reference to crude oil how is that price established?

A. The price of crude oil has always fluctuated. Normally it should bear a close relation to the total realized from the products. If the products sell in the aggregate for one dollar, and the transportation cost is eight cents, and the refining cost is nineteen cents, then the public is paying at the well so much for crude. A reasonable profit should be the price of crude. There has been great agitation in the United States for a higher price on crude and we have paid a higher price than was warranted. There has been a fluctuation in price since November a year ago. It sold then for two and a half cents and now sells for five.

Q. Who established that price?

A. That was maintained during the code largely through Mr. Ickes Department, the Petroleum Conservation Board and a committee of about a dozen from the oil industry. There are two committees under the Interior Department. The opposition in those quarters was such that noone dared touch the price of crude.

Q. What is the refinement possible in the production of crude oil as differentiated from the other?

A. That is what is left. That can be processed further to coke and some gas.

Q. If we hazard a guess that in ten years a Diesel engine will be in general use - the motive power for practically all automobiles and airplanes, how will the refinery industry adjust itself to that situation?

A. Our best information insofar as land transportation is concerned - the automobile industry - is that they believe that the advent of the Diesel engine will be very slow. Many places in Europe on account of the high tax of gasoline and the low tax on diesel fuel, they are equipping trucks and boats with diesel engines, but I suppose when they get in greater use they will tax them just the same. One fourth of the world's production is diesel fuel. According to our recent developments and tests for high speed and low speed Diesels, we have established five standard diesel fuels. There is a wide range and one fourth of the world's production would be available.

Q. What is the essential difference between the so called polymerization process and the hydrogenation process?

A. Hydrogenation is a building up process. You take the heaviest products and build them up gradually with catalysts and by adding hydrogen to any point that you want. That is hydrogenation. We also have dehydrogenation. Polymerization is where we have two molecules joined together. By polymerization you can join two or three and cause a change in their molicular weight. There are three polymerization processes one of which is the Phillips-Kellogg process, one is the hot sulphuric acid process and the other is the process used in Chicago. They have different characteristics. The polymerization process makes high octane fuel, maybe thirty-five gravity, octane 80-82. But these octanes are only good for automobile fuels. If you take 80 octane synthetic fuel at 300 temperature you get one result and it is good fuel but if you run up to 375 it will fade. For aircraft engines the octane number with this polymerization process does not make much difference.

Q. You did not make clear to me the difference between the hydrogen, molicular and Phillips methods?

A. In the polymerization method you get into long chain molecules and short chain, and the chemical processes are varied so they do not produce similar products.

Q. What is the catalyst used in the hydrogenation process - is that a local product?

A. There are many of them. They tried almost every element and combination of elements in getting the best catalysts. For differ nt products and different processes, different catalysts are better.

Q. Then the supply of catalysts is sufficient in case of an emergency?

A. We have up to now imported all our catalysts from our German friends who have the best hydrogenation processes. We are now building the first catalyst plant in the United States and it will be completed in eighty or ninety days. So far as the availability of raw material is concerned I think catalysts could be made in the United States - as much as you want. The catalyst does not waste; it is rejuvenated but if the proper catalyst is used there is very little real loss. This activity declines and that is how we arrive at the value of one against the other. If it runs up our operating cost we reject it as a catalyst in that operation.