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One Letter of Dr. Kurt Sennewald to Mr. Rudolf Rohrbach.
Manager of a Portlane Cement Plant.

re: Oil shale carbonization at the Wuste Plant.

November 24, 1944

The worst bottlenecks in the erection of new oil-shale processing plants have always been the extensive crushing and screening units to be constructed. Because of the low percentage of oil contained in the shale, these upgrading plants are as spacious as large ore-upgrading plants, even though the oil production be of comparatively modest magnitude. When the shale-oil production in Esthonia was developed in accordance with projects planned by myself, we met with considerable difficulties in this respect, even though there the shale yields 20% of oil, and not 4% as in Wurttemberg. Nevertheless, we stuck to the principle of upgrading the shale, even though we made great exertions to simplify the production of shale oil.

Only when the change in the military situation in the fall of 1943 made it inexcusable to erect large complex plants, we began to consider the possibility of operating without upgrading, of course, at the expense of the output to be obtained.

Our tests showed that the yield of not-upgraded Esthonian shale would reach 40-50% of the Fischer-analysis in the pile process. To be sure, the Esthonian shale used in our experiments had been mined underground, and its type of granulation differs widely from that of the Wurttemberg shale, which is mined in open work & it is considerably more homogeneous.

Whoever has seen the mining of Wurttemberg shale with a dredger will reject the idea that it could be processed without crushing. However we are still conducting experiments, investigating how large will be the decline in output if we operate without screening off the shale fines, or if we screen them only superficially. Thereby, we started from the consideration that a crusher is still a comparatively simple construction element, whereas the erection of a complete upgrading plant results in a considerable burden on the carbonization process. 50% of the Fischer output could thus be attained. But with a shale of such low oil contents as the Wurttemberg type, we are bound to look for processes which result in high rates of output. It is no doubt simpler to screen the shale than to mine and carbonize a twofold quantity of unscreened shale, for obtaining the same quantity of oil.

That is why the pilot plant at Schomberg has been planned with a crushing and screening unit, from the very beginning. Part of the screens has been delivered half a year ago. But the delivery of the crusher was nine months late, and then it arrived in a very poor shape.

Whenever we considered economies in the upgrading process, we did so as a war-time emergency measure. The reaction of solid materials or that taking place in solid materials is so dependent upon the size of the granules that we could not help being aware of it.

A number of tests showed that hammer crushers and gyroscope crushers (Hammer-und Kreiselbrecher) are most suitable. Finally, we chose gyroscope crushers because the Eahlwerke could supply as many of them as we needed.

I think that a limestone admixture does not cause trouble during the carbonization process if the granules are of a sufficiently small size. Our tests have proved this fact with your material as well as with Esthonian shale which contains a higher percentage of limestone. Nevertheless, it is economically profitable to eliminate limestone if it can be readily done.

The method of igniting a pile in bad weather and all the problems connected with the ignition process are without any doubt the technically most unsatisfactory part of the entire pile process. That is also why we are assuming that we can operate only three hundred days a year.

Strong lateral winds do not affect the low temperature carbonization process. We are not worried about that matter.

With respect to the condensation processes we had to make a compromise. For a long time, we had been afraid that it would not be possible to exploit the Wurttemberg oil shale presence by means of carbonization by burning off the shale, because the water supply was unsufficient. We made a decisive step in the elimination of this difficulty when we recognized that by freeing the carbonization gases from fog (electrofilter) practically all the oil is separated. That is due to the fact that the temperature of the gases issuing from the pile is a very low one, a out 60°C. From the very beginning we had to give up the idea of producing benzine, because this production would have required a comprehensive equipment and in particular a largewater supply.

Thus, this part of the plant represents a compromise, too.

The cooling effect of the rock water in the pile replaces the cooling water which could not have been provided for otherwise thus enabling us to produce more oil than would be warranted by the water supply available.

The disposal of the carbonization water is carried out in a simple manner, the lack of a sufficient water supply preventing again the working up of the carbonization gases for energy purposes.

The phenol water is injected into the combustion chambers of the carbonization gas and thus disposed of.

K. Sennewald

Dr. Both
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