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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
OFFICE OF SYNTHETIC LIQUID FUELS
LOUISIANA, MISSOURI

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GENERAL PROBLEMS OF SYNTHESIS

Meeting at the Schaffgotsch Benzin G.m.b.H.,
May 15-17, 1941

The following general operations have been discussed in connection with a fire in a paraffin tank.

The Pintsch generator installation works satisfactorily. The splitting of coke gas performed there has an efficiency of around 50%. Condensates in the synthesis gases have been observed here as well. Their normal concentration is between 2 - 3 g. Occasionally, however, values as high as 8 g/m^3 have been observed.

In spite of the high concentration of the condensibles, the final purification works satisfactorily, even when the final purification installation works at full load. The summary below shows the operation efficiency of the individual towers and the temperatures

Date	Temp. Front	Middle	Back	Load m^3/h	Organic sulfur contents Front	Middle	Back
1/20/41	185	170	-	5,000	15.75	0.6	0.3
2/20/41	205	193	193	7,000	14.27	2.5	0.16
3/20/41	215	197	197	7,000	12.9	4.15	0.2
4/20/41	230	230	220	10,000	10.8	4.43	0.23
5/10/41	270	250	260	10,000	12.65	5.00	0.20

I have received no official statement regarding the synthesis. The discussion of synthesis was evidently avoided. I have been informed in private, that the tubular ring reactor (Ruhrbenzin system) worked entirely satisfactorily and can be emptied with no trouble. No water leaks have been observed. The simple 22 mm tubes of the simple synthesis reactors present great difficulties even when simply operated with residual gas, and permit the emptying of the reactors after starting with residual gas only after drilling out the individual tubes. It has been indicated that the conversion in such reactors was unsatisfactory, but no numerical data have been given.

With the small number of reactors, only around 25,000 m^3/h of synthesis gas is used. The number of reactors is being increased by the installation of new reactors of the Krupp system (star inserts). It passes my understanding that a third reactor system is being considered on the strength of the experience gained.

Pressure condensation with the acid removal has next been discussed. No exact information is as yet available on the operation of the alkali washing, because the difficulties with paraffin fog have made it impossible to run longer test periods. These paraffine fogs interfered not only in the pressure condensation, but also resulted in the plugging-up back of the condensation and caused trouble in the pressure oil scrubbing. It is hoped that the paraffine fog will be overcome by a new arrangement of the paraffine separators and their reconstruction.

The following data were given for the oil scrubbing: with about 60% of the normal load, 0.75 g gasoline were found in the residual gas from the 68.3 g/m^3 of the end gas, which corresponds to a 98.9% efficiency of oil scrubbing. 1.09 g C_3 hydrocarbons remain in the residual gas from the 18.53 g in the end gas. The C_3 recovery amounts therefore to 94.2%. 0.8 g C_4 hydrocarbons in the residual gas from 18.5 g. in the end gas means an efficiency of 96.7%. The daily values actually represented average values for a great number of determinations, as I have been able to convince myself. After pressure releasing the wash oil and distilling a crude gasoil of the approximate composition given below was left behind:

CO_2	C_nH_m	C_2H_4	CO	H_2	CH_4 and higher	N_2	C number	weight/ liter
33.0	5.0	3.0	5.0	3.0	47.0	4.0	2.0-3.0	1.85

The CO_2 content of the gasoil has formerly been reduced to 1.5% CO_2 by an alkaline wash. The scrubbing caused difficulties and losses, and efforts are being made at present to use the gasoil without scrubbing out CO_2. Details will be furnished to me.