

SINCLAIR REFINING COMPANY

Reel 26
Bag 2463-N
Frame 900000310-13

(Re: Preparation of Precipitated
Iron Catalysts)

1650

Report on Conference at Oppau
April 20, 1943

S-6

Re: Cobalt Supply

Dr. Kölbl had been commissioned by Dr. Altpeter of the Reichsamt to study the issues originating from the actual cobalt scarcity jointly with the several plants which had already treated them. First, he visited the Development Departments of the Fischer-synthesis plants and Lurgi; at present, he was contacting I.G. Dr. Koelbel wants to start his studies by finding out, what experiences with iron catalysts are available, on what scale the tests have been run, and how the future cooperative effort could be organized.

The Operating Conditions of the Middle Pressure Converter Units.

For the time being the cobalt catalyst can only be replaced in the converter units which operate under medium pressure. By their actual technical equipment, the following operating conditions are fixed, so that the iron catalyst to be used, must be adjusted to them:

Maximum temperature 225° (previously only 220°; the 225° have now become possible on reinforcing the vapor section subsequently).

Maximum pressure 10 atü (to be sure, the converter units have been constructed for 12 atü, but the compressors can not handle more than 10 atü.)

Stock Composition:

Water gas. However, in view of the fact that the prior converters are available, any ratio between water gas and the actual ratio may be changed, e.g., CO:H₂ = 1:1.2, up to = 1:2.

Rheinpreussen Experiments.

In the subsequent discussion in regard to these conditions, Dr. Koelbel reported about the vapor-phase synthesis tests made by Rheinpreussen. They have studied there two iron-based catalysts on a larger scale, that is: the first catalyst in a 1 m³ converter with a volume charge of 100:l. This catalyst operates at a temperature range of 225-235°C, that is, at too high a temperature.

The second catalyst, which may turn out to be a cobalt substitute, has run up till now for six months in a 100 ltr-converter and requires a temperature of 218°C for a 90% CO conversion rate. The catalyst favors CO₂ formation. That means that the consumption ratio differs from that of the charge stock. The yields are 120 g/Nm³ (0.29 kg/ltr/cat.space/day, as against an average of 0.33 kg/ltr/day for the cobalt catalyst). Technically a 2-steps-process is planned, whereby a readjustment of the feed stock is planned between the 1. and 2. converter by adding a stock rich in carbon monoxide.

Other possibilities:

Operating in the liquid phase

This possibility, too, was discussed in detail. Unanimously we were agreed upon the fact that regardless whether we shall operate with fixed or suspended catalysts, so much alteration in the actual synthesis units would be required that this possibility would only come in second line. Only when all attempts fail to get ahead by simply replacing the catalyst, these operation possibilities will be tested in the actual apparatus.

On the other hand, we were all agreed that it would be expedient to test the liquid-phase operation in the presence of an iron catalyst from beginning to end, and at that, independently from any existent production units, which would hamper the studies from the start, by imposing special limitations. When once such a process will have been developed on a technical scale, there will be lesser risks involved in remodeling the actual medium-pressure synthesis units.

The cobalt-catalyst in the pressureless synthesis units.

Dr. Koelbel estimates the medium pressure units to represent one-fifth of the total synthesis units existent. If we succeed in replacing perfectly the cobalt catalyst in the medium pressure units, a supply sufficient for several years will thereby be gained for the pressureless units. However, we ought to plan already now for tackling the major project of finding a substitute also for this catalyst.

Up till now, no pure iron catalysts are known which would operate under the actual conditions of the pressureless Fischer synthesis. Berlin thinks, on the basis of prior experiences, that such preliminary studies ought to be started without delay.

(Some lines were not translated - MB)