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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
COAL TO OIL DEMONSTRATION BRANCH
LOUISIANA, MISSOURI

~~RECORDED DATA ON HYDROGENATION~~

May 12, 1943

1) GERMAN HYDROGENATION WORKS

Plant	Start of construction	Date of start of operations	Capacity, to prod. (including gas)
Leuna	1926	1927	650 000
Böhlen	1934/35	1936	200 000
Magdeburg	1935	1936	200 000
Scholven	1935	1936	250 000
Welheim	1936	1937	150 000
Gelsenberg	1937	1939	400 000
Zeitz	1937	1939	300 000
Lützkendorf	1937	1940	50 000
Wesseling	1938	1941	250 000
Pölitz	1938	1940	450 000
Brüx	1940	1942	650 000
Blechhammer	1940	1943	650 000
			4 200 000

2) FOREIGN HYDROGENATION WORKS

Works	Firm	Operations started	Capacity to prod/ye
Baton Rouge	Standard Oil of La.	1930	250 000
Dayway	Standard Oil	1930	250 000
Billingham	I.C.I.	1935	150 000
Bari	ANIC	1938	120 000
Livorno	ANIC	1938	120 000
Abaden	Anglo Iranian	about 1938	200 000 — iso octane
Baton Rouge	Standard Oil of La.		
Richmond	Standard Oil of Cal.		
Port Arthur	Gulf Oil Co.		
Aruba	Lago Oil & Transp. Corp.		
Pernis	Bat. Petr. Mij.		

3) GERMAN HYDROGENATION FIRMS (BESIDES I.G.)

Superintention Counsel
Representation
Former I.G. employees in it

4) OUR PATENT OWNERSHIP IN THE FIELD OF HYDROGENATION

About	900	applications
Over	3000	German and Foreign patents
About	300	German patents
About	300	patent applications in Germany in the course of examination

5) HYDROGENATION AGREEMENTS

Partners and Date

a) Germany

Brabag through Böhlen	1935
" through Magdeburg	1937
" through Zeitz	1940
Mathias Stinnes Company	1937
Wintershall A.G.	1938
Hydrierwerk Scholven A.G.	1940
Hydrierwerke Pölitz A.G.	1941
Gelsenberg Benzin A.G.	1942
Union Rheinische Braunkohlen Kraftstoff A.G.	1942
Sudetendeutsche Treibstoffwerke A.G.	before the close
Oberschlesische Hydrierwerke A.G.	before the close

DHD and AT agreements were made as additions to most of these agreements

b) Abroad

St.O.Co.of New Jersey	Four Party Agreement	1929
(Hydro Patents Co.	founded	1930
I.H.P. and I.H.E.C.	founded	1931
I.H.P. - I.C.I.	agreement	1934
I.H.P. - A.N.I.C.	agreement	1936

6) LICENSE RETURNS FROM HYDROGENATION

a) Germany

Earlier license revenue total	about 30 000 000.- RM
including 1942	about 12 000 000.- RM
estimated for the following years per year	15-20 000 000.-RM

b) Abroad

Single payments from the Standard Oil Co.	200 000 000.- RM (?
Former current licenses	1-2 000 000.- RM

7) DEVELOPMENT OF COSTS IN HYDROGENATION

	Production (without power gas)	RM/to liquid products
1927	1 076 to	18 700.-
1930	82 000 to	470.-
1933	108 000 to	255.-
1936	332 000 to	215.-
1940	397 000 to	215.-
1941	502 000 to	188.-

Large losses until 1935, which reached a total of almost RM 400,000,000. Profits since 1936, so that, when adding the single payment from the Standard Oil Company, all the former losses have been more than absorbed.

Hydrogenation values form	47%
Including methanol and related fields of the present values of the Ge production	57%

8) COST OF EXPERIMENTATION, LUDWIGSHAFEN, 498

The total cost of experimental work in the high pressure field since 1924 was:

about 170 000 000.- RM.

The maximum costs were reached in 1927 and amounted to

45 000 000.- RM.

The expenditures during the later years varied between

6 and 9 000 000.- RM/year

9) IMPORTANT HYDROGENATION FIGURES

a) Development of production since 1929

	Total production	Of this, aviation gasoline
1939	1.16 Mill. to	23%
1940	1.5 " "	40%
1941	2.1 " "	40%
1942	2.7 " "	48%
End 1943 (estimated)	4.2 " "	48%

b) Proportion of hydrogenation to total German fuel production

Total fuel production 1941	5.2 Mill. to
by hydrogenation	2.1 Mill. to = 40%

The proportion of the individual hydrogenation:

Aviation gasoline	95%
Motor gasol	29%
Diesel oil	58%
Fuel oil	9%
Power gas	84%
Lubricating oil	1%
Paraffin	1%

c) Total production figures for a production of around 4 million te fuel by hydrogenation

Raw materials	Coal	16 Mill. to bituminous coal
	Oil, tar, pitch	1.6 " to
Operating personnel	52 000 men	
Capital investment	about 3 billion RM	
Iron for construction	about 2.2 million to	
Value of yearly production (at 200.- RM/te)	about 800 000 000.- RM	

10) OTHER FIELDS OF OPERATIONS

Methanol
Hydrocarbon syntheals
(Circulation processes, foam process)
Paraflow
Cylinder oil
Propylene lubricating oil
Propane process

Aromatization)
DHD process)
Production of toluene
Production of kybol
Catalytic cracking

Chemistry of solid aromatics