

ADDRESS NAVY DEPARTMENT,
BUREAU OF SHIPS

Section 341

REFER TO FILE NO.

QC/NTMB(341)

NAVY DEPARTMENT

BUREAU OF SHIPS
WASHINGTON 25, D. C.



7 November 1945

Subj: Microfilm of German Technical Documents - Introductory
Statement for

1. During the course of its field trips to examine German synthetic oil plants and to interrogate German technical personnel, the members of the Oil Team of the U.S. Naval Technical Mission in Europe obtained a number of technical documents for examination. Some of these documents were directly related to certain subjects in which immediate reports were desired and were incorporated in Technical Reports as microfilm appendices. Other documents, while probably of equal technical value were, due to limitations of time and translation facilities, saved for more detail study and examination. These latter documents have been indexed and micro-filmed by the Bureau of Ships to preserve the technical information therein for future use and to make possible the dissemination necessary to give each activity an opportunity to study the particular topics of interest to it.
2. There follows an index to one box of these documents, and a microfilm of the original documents in the same sequence that they appear in the index. The box number is for convenience only. The contents of this film are not to be taken as a complete record of the information obtained on any subject nor have they been grouped by topic.
3. The Bureau of Ships Research Branch, would appreciate receiving a copy of any translations that may be made of these data in order to complete its technical files.

A handwritten signature in cursive script, reading "T. A. Solberg".

T. A. Solberg
By direction of
Chief of Bureau

FROM BUREAU OF SHIPS, NAVY DEPARTMENT, WASHINGTON 25, D. C.

Continued from Reel 188

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Low temperature carbonization of brown coal. File folder contains many reports, diagrams, reprints, etc., on this subject. Folder apparently came from Merseburg Ammonia Works and dates in 1950 or earlier.

Items included in this folder are data on heat of distillation of brown coal, plant cost data, description of processes which dry the coal before distillation, processes for cooling the gas.

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and abstracting oils, description of the so called Frank low temperature ovens with operating results, balances, characteristics of products etc., description of the Virbel low temperature carbonization process, a description of the low temperature carbonization plant, Wölferstein, a description of the Nietleben carbonization ovens, a description of the Plasmann low temperature carbonization process, a rather complete project data on the dephenolization of the liquor from low temperature carbonization by means of Tricoresyl phosphate, a description of the Triethanolamine process for removal of hydrogen sulphide and carbon dioxide from gas and a description of processes for removing the light oil from the gas. Several of the longer reports in this folder are in duplicate.

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Coal carbonization liquor dephenolization plant. A rather complete project set-up of about fifteen pages and two large drawings dated 1940, for a dephenolization plant, prepared by Friedrich Uhde. The process extracts the phenol from the liquor by means of an unnamed ester. This ester may possibly be Tricoresyl phosphate but is not so stated. The report includes a description of the equipment, cost of the plant, detailed operating cost, layout of the plant, etc.

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Researches on the recovery of phenols from phenol-containing oils or their fractions. A twenty-three page report with a three page supplement, containing several graphs and diagrams prepared by Dr. Herbert and Dr. Eisenlohr of the Moussonstrasse Laboratory dated September 18, 1940. In these researches the oils attained from low temperature carbonization of brown coal were contacted with liquor from the same process in order to secure a transfer of phenol from the oil to the liquor. By this means an enrichment of the liquor in phenol content was secured. Phenol was later extracted from the liquor by means of esters etc. Many data on distribution coefficients are given.

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The Phenosolvan process for dephenolization of coal distillation liquor etc. A series of descriptive reports and drawings of this process which was developed by I.G. and Lurgi. In this process the liquor is extracted with "phenosolvan" which is a mixture of esters of the lower aliphatic alcohols. The reports and drawings are dated from about 1940 to 1942 and consist approximately of about twelve pages of reports, four large drawings and a reprint of a published article by Dr. Herbert.

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Distillation of phenol and extraction of phenol from coal carbon liquor. A folder containing many reports and large drawings on the above subject. Most of these are rather recent data, from 1940 to 1943. They include flow diagrams and equipment, layout for distillation columns for separation of the various phenols, project setups for such plants, flow diagrams and project setups

- 41 for the extraction of phenols from oils and also some data on the extraction of phenols from coal carbonization liquor.
- 42 Second report of technical experts on the various sources of phenol and its homologs.
A statistical report of twenty-one pages and several large tables and statistical diagrams dated April 1944. This report is a statistical analysis of the qualities of phenols of various kinds available at the end of 1944 in Germany from by-product coke plants, low temperature carbonization plants, and hydrogenation plants. The report appears to be very complete from the standpoint of the statistical analysis of sources of phenol in Germany.
- 43 Investigation on sulphur dioxide preparation.
A brief report of two pages and four diagrams dated August 30, 1939, from Leuna Works on a laboratory investigation of the preparation of sulphur dioxide from sulphur and pure oxygen.
- 44 Investigations of extraction of pyridine.
A research report of seven pages and one page of photographs and diagrams dated March 25, 1938, on extraction of pyridine from water-pyridine mixtures by means of benzol.
- 45 The determination of ortho-, meta-, and para-cresols.
A laboratory report of eleven pages containing several graphs and tables from Leuna Works dated January 8, 1943. The report gives methods for determining the combined amounts of ortho- and meta-cresol and also the amount of para-cresol in a mixture of the three. The separate determination of ortho and meta-cresol was not possible by the methods used.
- 46 Removal of soot and dust from gases by the Oppauer Shaft Filter.
A report of eighteen pages and several diagrams from the Ammonia Laboratory of Oppau dated July 30, 1941. The report reviews the various processes for removal of soot and dust from gases and then describes the results of passing the gas through tall shafts containing various fillings.
- 47 Removal of dust (from gases).
A twenty-two page report of Dr. Geister dated December 3, 1936 on the subject of removing dust from gases by various methods, such as baffles, cyclone separators, filters, etc. This paper is largely a review of other work.
- 48 Preparation, separation, and purification of ethylene with related material on ethane and acetylene.
A folder of several reports and many large drawings, mostly from Oppau dated 1940 to 1943. This folder includes such items as drying of ethylene, recovery of ethane, propane and butane, recovery of ethylene from gas mixtures by means of Koppers' solutions, the cracking of ethane, production of ethylene from ethenol, flow diagrams of the Linde process on separation of

- 48 mixtures of methane, ethane and ethylene, and preparation of ethylene by thermal dehydrogenation of ethane by the process of Dr. Winkler and Dr. Hauber.
- 49 Preparation of acetylene.
A folder containing several reports and several large drawings and flow diagrams mostly of recent date, 1944-1945. Included are reports on preparation of carbon black, combined production of carbon black in acetylene, separation of acetylene from mixtures of gases, preparation of ethyl benzene from benzene, and catalytic hydrogenation of acetylene to ethylene, the Tatarinov Process, or preparation of acetylene, *etc.*
- 50 Report on an acceptance and a capacity test of a Linde-Frankl oxygen plant.
A report of three pages to which are attached a large number of tables of data, flow diagrams, etc., of the Linde-Frankl process for production of oxygen. The report is from the Leuna Works dated September 28, 1937. Results of the acceptance and capacity tests is given in the form of tables and a comparison is made of the actual figures with the guaranteed figures.
- 51 Miscellaneous data on the Linde-Frankl Process for oxygen recovery.
A miscellaneous file of unlabeled data, much of it consisting of diagrams in pencil, regarding this process.
- 52-A Diagram of active carbon plant at Lutzkendorf.
- 52-B Flow diagram of active carbon plant.
- 52-C Flow diagram of Lurgi Plant for the extraction of gasoline from synthesis gas by active carbon.
- 53 Processes for the catalytic recovery of sulphur from gases containing hydrogen sulphide.
Several very brief reports dated from 1939 to 1941 on the patent *claims* and such processes for laboratory and pilot plant investigations.
- 54 Conference at plant of Ruhr Benzin on November 17, 1939, on various technical matters.
An eleven page report on a conference attended by representatives of the Fischer-Tropsch Plants. Discussion included purification of gas at the different plants, the removal of organic sulphur from gas, discussions of catalysts regeneration of catalyst and corrosion difficulties.
- 55 Desulphurization process of Sachtleben, A.G.
A seven page report and one flow diagram dated April 24, 1939, of a process for removing H₂S from gas by means of reaction with sulphur dioxide.

- 56 The Claus oven for conversion of hydrogen sulphide into sulphur.
Two large drawings showing the construction of the Claus oven.
- 57 Combustion of hydrogen sulphide to sulphur in the Claus oven.
Two short reports containing various tables and diagrams from Leuna dated in 1931 and 1933 on the theory and operating results obtained from the production of sulphur by combustion of hydrogen sulphide.
- 58 Long hand notes in English by Navy investigator on the ^{Alkacid} Claus oven. ~~process~~
- 59 Memorandum on the calculation of the combustion temperature of mixtures of hydrogen sulphide and carbon dioxide.
A report of four pages and one diagram dated January 21, 1935, on this subject as it is related to the operation of the Claus oven.
- 60 Conference in Essen, on April 17, 1942 on Fischer-Tropsch Plant operation.
A thirteen page report of minutes on the meeting attended by the various representatives of the Fischer-Tropsch Plants.
Subject includes the catalyst for removal of organic sulphur, water recirculation through the catalyst chambers, active carbon corrosion problems, regeneration of the catalyst, etc.
- 61 The Alkacid process for removal of hydrogen sulphide and carbon dioxide from gas.
A series of very brief reports including tables of data of the removal of sulphur and carbon dioxide gases.
- 62 Laboratory reports on analyses of used and fresh gas-purification contact masses. 14 pages ranging in date from May 21, 1937 to Nov. 23, 1943. By C. Gerlach Böhlen, Leipzig.
- 63 Additional Development of the Alkacid and Claus Processes for Removal of hydrogen sulphide and carbon dioxide from gas. A 6-page report dated Oct. 2, 1936, of the Leuna Works. Describes the several solutions used in the Alkacid process and improvements in both processes resulting in greater efficiency and lower costs.
Author: Dr. Bähr.

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- 64 Investigation on the Removal of Reaction Heat in the Production of SO₂ from Liquid Sulfur and Oxygen. A report dated January 31, 1942 by Mr. Sommer of Leuna Works, 9 pages, 1 table, and 1 flow sheet, giving the motives of the investigation, description of the cooling apparatus, determination of the amount of heat transmission k from the experiments, mathematical determination of the amount of heat transmission k, and results and summary.
- 65 Investigations on the State of chemical Equilibrium in the Claus Process for Removal of Hydrogen Sulfide and Carbon Dioxide from Gases. A report by Dr. Orlicek of Leuna Works, dated July 11, 1941 consisting of 8 pages and 2 graphs, giving the calculation and measuring of equilibrium, and the valuation of the numerical values. The equilibrium of the numerical values. The equilibrium constants of the Claus oven reaction and their dependence on temperature are mathematically and experimentally determined. Aids to graphical calculation of the equilibrium are given in a series of important cases. The presence of H₂O and sulfur influences the state of equilibrium in the manner expected according to the law of mass action.
- 66 Manufacture of Synthesis gas in a Cowper oven from residual gas from hydrogenation processes according to experiments at Ludwigshafen on Nov. 3, 1938. A 2-page report from Leuna Works, dated Nov. 10, 1938 (signature illegible). The hydrogenation gas consisted of 40-45% hydrocarbons (CH₄ - C₅H₁₂); about 40% hydrogen and the remainder carbon dioxide, carbon monoxide, and nitrogen. A water gas of 88-89% carbon monoxide and hydrogen, of which 11-14% is carbon monoxide, was obtained.
- 67 Notes on the restarting up of Generator II. A 4-page report by Dr. Hanische of Leuna Works, dated October 18, 1932.
- 68 Flow diagram of water gas production. Undated, unsigned, pencil tracing of Treibstoffwerk "Rheinpreussen".
- 69A Undated, unsigned flow diagram of Treibstoffwerk "Rheinpreussen" for the production of synthesis gas by cracking coke-oven gas in a generator. Old process.
- 69B Undated, unsigned flow diagram of the gas cracking plant of Treibstoffwerk "Rheinpreussen."

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- 70A A layout plan of a plant for purification of carbon monoxide. Undated. No. A 1030-4 of Braunkohle-Benjamin A. G., Böhlen Works, Bldg. No. 109.
- 70B Flow diagram of a carbon monoxide purification plant. Undated, unsigned, and without company identification. No. U 1878-4.
- 71 A file folder containing 14 reports and two drawings on the Alkagid process for removal of hydrogen sulfide and carbon dioxide from gases. They give the operation of the process, developments and improvements, and description of several installations. Dates of reports range from May 30, 1934 to Jan. 18, 1944. There is also a 24-page report on a new process for the separation of ammonia and carbon dioxide or hydrogen sulfide by Dr. Bähr, Leuna Works, dated Aug. 22, 1938. It describes processes for the separation of ammonium sulfide and ammonium carbonate or bicarbonate solutions in ammonia and hydrogen sulfide and carbon dioxide. There are several schematic drawings of the apparatus used as well as tables illustrating operating conditions and results obtained.
- 72A One sheet having four graphs showing consumption of energy in CO₂ scrubbing, cost of CO₂ washing at most favorable pressure, and cost of two types of water gas.
- 72B Flow diagram of a light oil recovery plant for Didier-Kogag - Hinselmann, Essen, made by Aktiengesellschaft Sächsische Werke, Böhlen Gas Works. August 1940.
- 72C Layout of the high-pressure water piping in a water washer under pressure (Probably in a synthesis gas installation) Drawing of Aktiengesellschaft Sächsische Werke, May 29, 1942.
- 72D Flow diagram of a Lurgi gas purification experimental plant. Drawing dated Dec. 2, 1941 by Aktiengesellschaft Sächsische Werke.
- 72E Flow diagram of a water washer under pressure for Gesell für Linde's Eismaschinen A. Drawing dated Aug. 1940 by Akt. Sächsische Werke.
- 73 Removal of carbon oxysulfide from Gases. File Folder containing:
A report of 4 pages and 2 graphs by Drs. Häuber and Racky, Oppau, dated November 15, 1943, covering the removal of carbon oxysulfide from gases, solubility

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cont'd.

of caustic soda in various ^{glycol}col ethers, higher alcohols, regeneration of used solutions, and ethanolamine as absorption material for COS.

Drawing of Ammoniakwerk Merseburg G.m.b.H. dated Aug. 13, 1943 showing the plant layout of two COS installations.

Drawing of Ammoniakwerk Merseburg G.m.b.H. dated Aug. 30, 1938 showing detailed sections of various parts of the apparatus of a COS plant.

Drawing, dated March 30, 1942, showing the steam diagram of the COS plant.