APPENDIX I. - GLOSSARY

In this report certain common words are used with special meanings. Other words and phrases are peculiar to the technology of synthetic liquid fuels. Accordingly, some definitions are provided below.

A.....See angstrom unit.

angstrom unit (abbr., A).....A minute unit of length equal to one ten-thousandth micron ($10^{-4}\mu$) or one hundred-millionth centimeter (10^{-8} cm.).

anthraxylon.....The smooth, glossy, jet-black material that is the characteristic portion of coal formed from the woody parts of plant remains. Microscopically, thin sections of such material are translucent and show a cellular structure like that of wood.

backward burning.....Progression of the ignition zone in a direction opposite to the flow of air. In underground gasification, for example, air is admitted ahead of the combustion zone, and products are withdrawn through the hot zone behind the flame.

barrel.....42 U. S. gallons.

Bayermasse.....Trade name for an impure iron oxide, obtained as a byproduct in manufacturing aluminum and used as a hydrogenation catalyst.

Bergius or Bergius - I. G. Farben process.....See text, Chapter 6, Hydrogenation of Coal

BIOS.....The British Intelligence Objectives Sub-Committee. The abbreviated title was used in publishing reports of World War II and post-WW-II observations by technical missions from the group.

boiling range of products.....Classification of products by the percentages boiling at various temperatures are based on these limits for the boiling range at atmospheric pressure:

Gasoline	Below 204°C.(400°F.).
Diesel oil	204°-316°C.(400°-600°F.).
Heavy distillate	316°-450°C.(600°-842°F.).
Wax	Above 450°C.(842°F.).

brown coal.....A brown, earthy coal of low rank, intermediate between bituminous coal and peat. In the United States the term is used rarely and then roughly synonymous with lignite, while in continental Europe it designates a more compact variety of coal.

C_{3+} fraction.....Portion of product consisting of hydrocarbons that contain three or more carbon atoms per molecule. This fraction includes LPG, gasoline, diesel oil, waxes, and other heavier products.

catalyst support.....A chemical incorporated into a catalyst, to provide mechanical form or strength.

c.f.m.....Abbr. for "cubic feet per minute." Used to describe the rate of flow of a gas or liquid. See also cubic feet (of gas).

CIOS.....The Combined (US and British) Intelligence Objectives Sub-Committee.

classification of products.....See boiling range of products.

coal paste.....A mixture of pulverized coal and pasting oil, prepared for use in hydrogenation of coal. The mix may also include catalyst and/or some inactive materials.

"coking" (in experimental or production equipment).....Refers not to conventional production of coke but to accumulation within the equipment of cokelike, sooty, or tarry products that may completely or partly close channels and interfere with flow of fluids through the unit.

contraction, percent (in Fischer-Tropsch synthesis.....The feed-gas volume, minus the tail-gas volume, divided by the feed-gas volume, times 100. All gas volumes are calculated for standard temperature and pressure.

conversion, percentage.....In discussing yields obtained (in various processes) on the basis of quantities of coal involved, unless otherwise specified the percentages are based on moisture- and ash-free coal and in general consider only coal handled as material in the process; coal used as fuel to produce heat or power needed for the process is excluded.

cubic feet (of gas).....Throughout most of this report, volumes of gas are reported as calculated as dry gas at the standard temperature (60°F.) and pressure (30 in. Hg) used by the gas industry. This value applies for Chapters 2, 3, 4, 5, and 8, particularly in discussion of gasification and gas purification. In Chapter 7, Fischer-Tropsch Synthesis, the metric standard conditions of dry gas at 0°C. and 760 mm. Hg are used instead.

entrained bed.....Catalyst or other particles dispersed in a gas or liquid stream, which flows at sufficient velocity to keep the particles suspended and flowing along with the fluid.

expanded bed.....A catalyst bed in which the particles are just beginning to be lifted but not carried along by the flow of gas or liquid, so the bed occupies a larger volume than when it is settled.

FIAT.....Field Information Agency Technical, an organization associated with United States military forces during and after World War II, to obtain and report technical information particularly from captured personnel and documents.

fixed bed.....A catalyst bed in which the particles are not moved by the flow of gas or liquid.

fluidized bed.....A catalyst bed through which gas flow is enough to keep the particles in motion so that they appear to be boiling.

forward burning.....Progression of ignition in the direction of airflow. In underground gasification, for example, air is admitted behind the combustion zone, and the products of combustion are withdrawn through the fresh coal ahead of the flame.

fused iron oxide catalyst.....The fused iron oxide catalyst used in process work on the Fischer-Tropsch synthesis was usually a commercial ammonia synthesis catalyst.

gas-synthesis process.....See text, Chapter 7, Fischer-Tropsch process.

grain (abbr., gr.).....A unit of weight, used to designate low concentrations of impurities in gases, as "containing 0.1 gr. per 100 cu.ft." There are 15.43 gr. per metric gram, and 7,000 gr. per pound.

gram (abbr. g. or gm.).....A unit of weight in the metric system. There are 28.35 gm. per avoirdupois ounce, and 453.6 gm. per avoirdupois pound.

heavy oil.....Product oil with a boiling range above 635°F. In coal hydrogenation this heavier fraction from the liquid-phase step is used as pasting oil.

heavy-oil-letdown (abbr., H.O.L.D.).....In coal hydrogenation, a mixture containing solids (ash, unconverted coal, catalyst, etc.) and heavy oils, which collects in and is withdrawn from the bottom of the hot catchpot.

high-rank coal.....See rank of coal.

H.O.L.D.....See heavy-oil-letdown.

hot catchpot.....In liquid-phase hydrogenation, a vessel through which the effluent stream from the reactor passes and in which the heavy oil, unconverted coal, ash, etc., are separated from the gases and vaporized hydrocarbons. (See also H.O.L.D.)

light oils.....In coal hydrogenation, a general term for oil that goes through the hot catchpot as uncondensed vapor; its boiling range is up to about 450° C. (842°F.). As first distilled, prior to any further fractionation, it includes gasoline, diesel oils, heavy distillate, and some heavy oil (light-oil bottoms).

low-rank coal.....See rank of coal.

L.P.G., LPG, or LP-gas.....Abbr. for liquefied petroleum gases, mostly propane and butane.

Luxmasse (syn., Lautamasse).....Trade name for an impure iron oxide, obtained as a byproduct in manufacture of aluminum and used as a coal hydrogenation catalyst.

m.a.f. coal.....Composition, weight, or heating value of coal, calculated on a moisture- and ash-free basis.

mesh.....Used to designate the size of coal or other particles, by the fineness of a screen (expressed as the number of its openings per linear inch) through which the particles will pass. Thus, a "10-mesh screen" indicates a screen with 10 openings per linear inch.

metric ton (in reporting some of foreign research).....1,000 kilograms, or 2,204.6 pounds.

middle oil.....Product oil with a boiling range between 400° and 635°F. This is the fraction, from liquid-phase hydrogenation of coal, that is used for vapor-phase hydrogenation.

ml.....Abbr. for the metric unit of volume, milliliter, which is one-thousandth of a liter. It is nearly but not quite the same as cubic centimeter (abbr., cc.), which was the small unit of volume formerly in common use for laboratory measurements (1 liter = 1,000 ml. = 1,000.027 cc.).

modified Fischer-Tropsch process.....See text, Chapter 7, Fischer-Tropsch Process.

motor-method octane number of gasoline.....See under octane number.

nonslagging operation.....See slagging.

octane number (of gasoline).....The results of standardized test of antiknock characteristics of a gasoline, expressed on a scale in which 0 represents value as poor as normal heptane (a highly knocking fuel) and 100 indicates value as high as that of isooctane. Octane numbers are determined by specific test procedures; the research method yields higher values for certain fuels than the motor method or road-test results.

oil-circulation process.....A Fischer-Tropsch process in which synthesis gas contacts a catalyst bed submerged in circulating cooling oil; the oil removes the heat of the reaction. (Called also, oil-recycle process.)

oil-recycle process.....See oil-circulation process.

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paste, coal.....See coal paste.

pasting oil (in coal hydrogenation).....A vehicle oil, usually a heavy oil, with which pulverized coal is mixed before it is injected into the high-pressure system.

PB number.....Technical information and research reports, particularly those based on information from wartime research or from enemy sources during and after World War II, have been made available to the general public by the U. S. Department of Commerce, Office of Technical Services. Such publications are designated in bibliographies by serial numbers preceded by the letters PB, the initials of the Publications Board, the former name of this agency.

percentage conversion.....See conversion, percentage.

producer gas.....A gas made by the reaction of coal or coke with air and steam in a generator. For gas from bituminous coal, a typical analysis is, in percent: H_2 about 14, CO 27, N_2 51, CO_2 4.5, and CH_4 3, with a heating value of about 160 B.t.u. per cu. ft.

p.s.i.g.....Pounds per square inch gage pressure, on a scale with zero reading at atmospheric pressure.

rank of coal.....Classification of coal based on the degree of coalification. Ranks of coal in ascending order are peat, lignite, subbituminous, bituminous, and anthracitic coal. With increase in rank, the moisture and volatile matter contents generally decrease, while the percentage of fixed carbon increases.

reaction space.....The volume in an equipment within which a reaction occurs.

research method octane number of gasoline.....See octane number.

s.c.f.m.....Abbr. for standard cubic feet per minute. See cubic feet (of gas).

selectivity of a catalyst.....The extent to which the catalyst can convert raw materials into those particular products most desired, rather than into less desirable byproducts.

sinter, sintering.....To change solids to a coherent solid mass by heating without thoroughly melting.

slagging operation (of a gasifier or furnace).....Operation of a unit at high enough temperatures to melt coal mineral matter, so that much or all of the ash can be removed in molten form. In nonslagging operation the waste remains solid and is removed finally as dry ash.

slurry Fischer-Tropsch process...A process in which synthesis gas contacts finely ground catalyst particles suspended in a high-boiling oil. Heat of reaction is removed by internal bayonet tubes or by circulating the slurry through an external heat exchanger.

solids (in coal hydrogenation)...Material insoluble in benzene.

space-time-yield.....The yield, in unit time, per unit volume of catalyst, and per unit volume of raw material passed through the catalyst.

space velocity.....The volume of feed material (measured under standard conditions) going through a reactor, per unit time, per unit volume of the reactor. Customarily the unit time is 1 hour. Volumes of gas are at standard conditions. In catalyzed reactions, such as the Fischer-Tropsch synthesis, the apparent volume occupied by the catalyst may be considered the reactor volume. Example: if 1,000 cu. ft. of gas goes through a reactor in 2 hours, and the reactor volume is 5 cu. ft., hourly space velocity is $\frac{1,000}{2 \times 5} = 100$.

standard cubic feet per minute (abbr., std. c.f.m. or s.c.f.m.).....Used to designate rate of flow of a gas or liquid, with the volume converted to standard conditions of temperature and pressure. See cubic feet (of gas).

std. cu. ft. or s.c.f. (of gas)..Abbr. for standard cubic feet. See cubic feet (of gas).

S.T.P.....Standard temperature and pressure, for calculating volumes of gas, in Chapter 7 (Fischer-Tropsch Synthesis) of this report, are the metric standard conditions of 0°C. and 760mm. Hg. Elsewhere in the report, particularly under Gasification and Gas Purification, the gas industry standards of 60°F. and 30 in. Hg are used.instead See cubic feet (of gas).

S. V. H.....Abbr. for hourly space velocity.

synthesis gas.....A gas manufactured especially for use in industrial processes, such as in making synthetic liquid fuels. Essential constituents are CO and H_2, in various proportions, originally with impurities that must be removed. See in this report, Chapters 3, 4, and 5, on the production and purification of synthesis gas.

synthetic ammonia catalyst.....See fused iron oxide catalyst.

synthine process.....See text, Chapter 7, Fischer-Tropsch process.

TEL.....Abbr. for tetraethyl lead, an antiknock additive to gasolines.

Terrana.....Trade name for a Bavarian fuller's earth, activated with acid, used as a catalyst support.

throughput.....The amount of material put through a process in a given time, such as the daily throughput of a retort.

TOM.....The Technical Oil Mission, a combined Government and industry task group that obtained technical data about petroleum and synthetic fuels from German and other sources during and after World War II.

ton, metric.....See metric ton.

vehicle oil.....See pasting oil.

water gas.....Gas generated by the reaction of steam with carbon, which is brought to incandescence by alternately blasting with air. For commercial gas from coke, a typical analysis is, in percent: H_2 about 50, CO 43, N_2 3, CO_2 3, and CH_4 0.5, with a heating value of about 300 B.t.u. per cu. ft.