

ENERGY OIL COMMITTEE

WESTERN AXIS SUBCOMMITTEE

ESTIMATED REFINERY OUTPUT IN AXIS

EUROPE -- 1943

The present estimate of refinery output in 1943 has been considerably changed, as compared with the estimate of June (EOC 45-2) which was based on minimum cracking and maximum black product manufacture. This change was the result of a drastic reduction in the estimate for synthetic gasoline supplies in Axis Europe and the consequent necessity for showing more gasoline from petroleum by cracking.

Other factors, which have caused changes, are the reduced estimate of Hungarian crude production as compared to the former estimate and the practical cessation of Italian refining in August. Additional items of intelligence have become available since last June and they have been given effect in the present report. An appraisal of bomb damage of Ploesti was made, indicating no curtailment of overall product output but a drastic reduction in spare capacity. This, added to the effective loss of the Italian refineries and some bomb damage in Germany, has brought the Air Forces within reach of the possibility of actually shutting back crude production. The entire crude handling capacity presently available to the Axis amounts to only about 12,000,000 tons per year. This presupposes that the few operable refineries in Southern France and the Low Countries could not be supplied with Rumanian oil in addition to saturating the excess German capacity.

The refinery capacity figures as given represent the approximate average yearly maxima, taking into account the necessary shutdown periods and based upon normal feed stocks and normal product yields.

The refinery lists are believed to be complete for the countries covered. There are three very minor units in Rustchuk, Bulgaria, just across the river from Rumania, and one in Riga, Latvia, which have not been listed.

On the following page is shown (Table A) the estimated approximate distribution of crude to refineries and the product output by countries. Following Table A are given brief discussions of the refinery situations, country by country, with tables of capacity figures and comments, refinery by refinery. Appendix A is attached showing the average yields from European crudes. Finally, a set of data sheets is appended (Appendix B) indicating the ownership, the location and the type of process equipment contained in each of the refineries of Europe.

Note: Refinery layout drawings and location maps are available in the IAW, Foreign Division, New York, covering a large number of the European refineries, together with reports giving further details regarding the refinery equipment. "The map of Hamburg showing the refinery sites is believed to be unusually accurate". Part of this more detailed information is also expected to be available in the Petroleum Facilities reports being prepared by PAW.

TABLE A

ESTIMATED EUROPEAN REFINERY OUTPUT FOR 1943

(Figures in thousands of metric tons yearly)

Figures in parentheses are percentage yields, on crude.

	Crude Production	Distribution to Refineries	Crude Handled	Gasolines	Kerosine, G.O. Diesel Oil	Lubes	Fuel Oil etc.	Ref'y Fuel and loss
I Germany	993	993	993	223 (22.5)	153 (15.4)	212 (21.4)	338 (34.0)	67 (6.7)*
II Czechoslovakia	32	32	32	63 (10)	202 (32)	127 (20)	183 (29)	57 (9)
III Austria	1000	400	500	60 (12)	135 (27)	125 (25)	135 (27)	45 (9)
IV Hungary	800	600	600	144 (24)	270 (45)	24 (4)	108 (18)	54 (9)
V Italy & Albania	11 & 66	77	177	41 (23)	75 (42)	9 (5)	37 (21)	15 (9)
VI Yugoslavia	49	49	49	12 (24)	22 (45)	2 (4)	9 (18)	4 (9)
VII Rumania	5067	5067	5067	2102 (41.5)	1064 (21)	152 (3)	1166 (23)	583 (11.5)
VIII Poland	400	400	400	80 (20)	138 (34.3)	48 (12)	108 (27)	26 (6.7)*
IX Estonia	95	95	95	10 (11)	38 (40)	-	42 (44)	5 (5)
X France, etc.	95	95	95	22 (23)	25 (26)	21 (22)	22 (23)	5 (6)
TOTAL	8608	8608	8608	2757	2122	720	2148	861

* Coal used as refinery fuel

I German Refineries

It is believed that the German refineries are still being operated primarily on German crude as set forth in report EOC 45-2. There is considerable crude handling capacity in these refineries over and above that required for German crude but it is doubtful whether Austrian or Hungarian crude has had to be imported to take care of surpluses in those countries since Czechoslovakian and Polish refineries are also available.

The German output of petroleum products in 1945, as shown in Table A, is postulated upon (1) a production of lubes approximating two thirds of the maximum obtainable from German stock and (2) a production of gasoline somewhat higher than that of kerosene, gas oil and diesel oil. This distribution was made to conform generally with the estimated consumption requirements. It was accomplished by the assumed cracking of about 26% of distillate stocks. This cracking stock of say 280,000 tons per year is within the cracking capacity of German equipment.

The majority of German refineries are simple lube finishing plants and it is possible that some lube distillates are brought in from Austria for treatment. This possibility however, has been discounted in the present study since ample lube finishing equipment exists in closer proximity to the Austrian crude fields.

It is to be noted that some changes have been made in the list of German refineries since the last report, in order to include certain units which were previously mentioned by name only. Aerial reconnaissance up to November 1945 has indicated that the overall bombing damage to German refineries has been insignificant and that at least three refineries have actually been expanded. Table I, following, gives an indication of the present refinery status.

TABLE I.

INDUSTRIAL PLANTS.

	Capacity in thousands of metric tons yearly.	Remarks
<u>Hamburg District</u>		
1- HAWAG (Osternoor-Erumbüttel) (6-800)	400	Undamaged but apparently inactive
2- Europäische Tanklager (Petroleumhafen)	400	Undamaged and probably active
3- Rhania Ossag (Hamburg)	550	Undamaged and probably active
4- Ebano Asphaltwerke (Hamburg)	400	Damaged Aug. '43. Possibly inactive
5- Rhania Ossag (Hamburg)	-	130 - Damaged but repaired Oct. '43.
6- Albrecht (Grasbrook)	-	30 - Damaged and unrepaired Oct. '43.
7- Schlicmann (Grasbrook)	-	65 - Slight damage; probably active
8- Deutsche Petroleum (Wilhelmsburg-Hafen)	-	65 - Probably repaired after slight damage
9- Schindler (Wilhelmsburg-Hafen)	-	40 - Undamaged
10- Rhania Ossag (Wilhelmsburg)	-	70* - Slightly damaged.
11- Deutsche Vacuum (Bismarckstr.)	-	16 - Badly damaged Mar. '43. Inactive
<u>Hannover District</u>		
12- Deuna & Lohse (Hildesheim)	300	Slight damage Sept. '43.
13- Schindler (Hildesheim)	-	20 - Active
14- Deutsche Gasolin (Hildesheim)	-	40 - Active and being extended
15- Niedersachsen-Werke (Hildesheim)	-	10 - No report
<u>Braun</u>		
16- Deutsche Vacuum (Oelberg)	-	60 - Apparently undamaged Aug. '43.
<u>Emmerich</u>		
17- Deutsche Gasolin (Emmerich)	-	60 - Damaged in '40. Active July '43.
<u>Salzbergen</u>		
18- Preag-Winterhüll (Salzbergen)	-	50 - Active
<u>Portmünd</u>		
19- Schmidt-Werke (Portmünd)	-	50 - No report
<u>Mannheim</u>		
20- Rhania Ossag (Mannheim)	-	115** - Badly damaged
<u>Düsseldorf (Düsseldorf)</u>		
21- Rhania Ossag	-	67* - No report
TOTAL	1800	600

Omitted are bulk stations with small rectifying equipment and small tube filling plants (Hildesheim, Ravensburg, Cologne-Kolner Benzin, Berlin-Bromberg, Berlin, Bismarck-Zeller & Gaslin, Pirna-Pexas, Erman-Werke); also coal and lignite tar plants (Rositz-Ilbe, Krump, Durchsitz, Breda, etc.); also the Volter plant at Freital-Bresden. Also omitted is the small refinery reported at Hainstadt or Haydebrack near the Naide oil fields.

**Includes 300 asphalt manufacture

II Czechoslovakian Refineries

These seven refineries are spread out across the northern part of the country, except Bratislava which is in the south near the junction of the Austrian and Hungarian boundaries and practically in the Vienna refining district. The area for stock was formerly received from Galicia and then from Rumania but now, as shown in Table I, it is believed that the Czechoslovakian refineries are operated on 600,000 tons per year of Austrian crude and 400,000 tons per year of local crude.

These refineries in general have ample lube facilities but there is only one small cracker still. It has been assumed that only virgin gasoline was cracked in local and only two thirds of the maximum possible lube oil and that the emphasis was laid on diesel oil manufacture. This accords with estimated consumption requirements and with the refinery equipment known to exist.

The following Table II lists the Czechoslovakian refineries as they appeared at the time of latest intelligence.

TABLE II

CZECHOSLOVAKIAN REFINERIES

	Crude Capacity in thousands of metric tons yearly	<u>Remarks</u>
<u>Bratislava</u>		
22 Apollo	150 ✓	Very old but modernized
<u>Kralupy</u>		
23 Lederer-Benzol Verband	60	Very old and unmodernized
<u>Kolin</u>		
24 Vacuum Oil Company	90	Very old but modernized
<u>Pardubice</u>		
25 Fanto Werke	200 ✓	Very old but modernized
<u>Novy Bohumín (Oderberg)</u>		
26 Fanto Werke	60	Very old and unmodernized
<u>Privoz (Moravska Ostrava)</u>		
27 Privozer Mineralol	50	Very old and unmodernized
<u>Dubova</u>		
28 Government refinery	90	New and modern
TOTAL	700	

This list ignores the "Vesta" plant at Prstena (10,000 tons per year) and the Rutgers plant at Strazske (5,000 tons per year). It does not show the Munkacs, CSAP and Lexina-Nichalany plants since they are included in the Hungarian list. It does not show the Rutgers plant at Vitkovice which works on coal tar.

TABLE II

CZECHOSLOVAKIAN REFINERIES

Crude Capacity
in thousands of
metric tons
yearly

Remarks

22	<u>Bratislava</u> Apollo	150	Very old but modernized
23	<u>Kralupy</u> Lederer-Benzol Verband	60	Very old and unmodernized
24	<u>Kolin</u> Vacuum Oil Company	90	Very old but modernized
25	<u>Pardubice</u> Fanto Werke	200	Very old but modernized
26	<u>Novy Bohumin (Cderberg)</u> Fanto Werke	60	Very old and unmodernized
27	<u>Privoz (Moravska Ostrava)</u> Privozer Mineralol	50	Very old and unmodernized
28	<u>Dubova</u> Government refinery	90	New and modern

TOTAL 700

III. Austrian Refineries

The Austrian refineries are presumably working at full capacity on Austrian and Hungarian crudes. In view of the shortage of refinery capacity in Hungary, some Hungarian crude is probably refined in Austria and a large portion of the Austrian crude sent to refineries in Czechoslovakia.

For the purposes of Table A of this report and to conform approximately with the estimated Axis requirements, the output from Austrian refineries operating on 400,000 tons per year of Austrian crude and 100,000 tons of Hungarian crude has been estimated at 12% gasoline, 37% kerosine and gas oils, 25% lube and 27% fuel oil. This accords with the fact that all Austrian refineries except Lobau have lube equipment and none have cracking equipment.

Recent reconnaissance has shown that the Lobau refinery is still under construction and that its 1945 capacity was probably in the neighborhood of 200,000 tons instead of 500,000 as previously assumed. There have also been indefinite reports of expansion at the Floridsdorf refinery and of construction of small portable refineries in the crude fields of Austria but for lack of confirmation they are ignored in the present study.

The following Table III lists the Austrian refineries and gives such comments on their present status as are available.

TABLE III

AUSTRIAN REFINERIES

		Crude Capacity in thousands of metric tons <u>yearly</u>	<u>Remarks</u>
9	<u>Floridsdorf (Vienna)</u> Shell Floridsdorfer	100	Modernization in 1927-8. Recent <i>June 16</i> extension to 150 reported.
10	<u>Korneuburg (Vienna)</u> Creditul Linier	50	Pipe still of obsolete design.
11	<u>Kaarau (Vienna)</u> Vacuum Oil Company	60	Old refinery. Pipe still built <i>June 16</i> in 1933-4.
12	<u>Wosendorf (Vienna)</u> Osterreichische Fanto	40	Old refinery, enlarged in 1937.
13	<u>Schwechat (Vienna)</u> Nova	50	Built in 1927-8. <i>June 16</i> <i>Not a refinery. It was built in 1927-8.</i>
14	<u>Lobau (Vienna)</u> Wintershall-Fluorath	200	Built during 1942-3 and being <i>June 16</i> expanded.
TOTAL		500	

The above list ignores the small portable units supposed to exist near the producing fields. It also ignores bulk stations and the following unimportant installations:

Neupark (Salzburg): Small size and out of use for many years.
Drossing: Equipment dismantled for use at Schwechat in 1937-8.

Wintershall

IV Hungarian Refineries

The Hungarian refineries are now working at full capacity on Hungarian crude and some additional equipment has been installed since the last report. Furthermore it is assumed that certain minor plants formerly shutdown have been put back into service.

No change, from the last report, has been made herein as regards percentage of the various products manufactured, thereby taking no account of the small experimental cracking coil which has been reported at the new Petzardo refinery.

The following Table IV indicates the approximate operating rate of each of the plants now believed to be in service.

TABLE IV

HUNGARIAN REFINERIES

	<u>Crude Capacity in thousands of metric tons yearly</u>	<u>Remarks</u>
<u>Budapest</u>		
35 Shell	175 <i>14 June</i>	Recent expansion report
36 Magyar Petroleum-Group	60	Activity confirmed <i>4-11-55</i>
37 Asvanyol-Fanto <u>Almasfuzito</u>	60	Recent expansion report <i>La. 11/17-18/55 (1955)</i>
38 Vacuum Oil Co. <u>Nyirbogyo</u>	125 <i>14 June</i>	Recent expansion report
39 Nyirbogyo Petroleum <u>Szoreg</u>	20	Activity confirmed
40 Szoregi Petroleum <u>Munkacs (Munkacsvo)</u>	30	Activity confirmed
41 Del Karpati Petroleum <u>Potfurdo</u>	20	
42 Hungarian Hydrobenzin <u>Csap</u>	100 <i>14 June</i>	Recent expansion report
43 Schonberg <u>Alsobahlyi*</u>	10	
44 Weinberger and Ortnor	10	
TOTAL	600 700	

This list ignores the small Nevi refinery of the Panto company located in the northern part of Budapest and shutdown for some years. It also ignores the small unit at Tokod as probably inactive. A new refinery is reported under construction at Ujsiony near Komarom.

*Location of Weinberger and Ortnor refinery also reported as Laguna Mihalany.

V Italian Refineries

During 1943, bombing, demolition and capture of certain Italian refineries took place and it is not believed that crude imports were continued after the month of August, even from Albania. The crude supplies for the year, therefore, are taken as 100,000 tons from Hungary 66,000 tons from Albania and 11,000 tons local Italian production. It is believed that lube distillates were imported in lieu of crude in certain cases in order to take advantage of the modern Italian lube equipment. For this reason Table A shows 5% overall lube production from the stocks handled although the lube content of Hungarian crude is only about 7% maximum and that of Italian crude and of Albanian crude (without hydrogenation) is negligible.

Since the outbreak of war there has always been a large excess of refining capacity in Italy. At present there are two refineries in Allied hands, one destroyed, five immobilized for lack of crude imports and only two very small units, near the Italian crude fields, in operation. Thus the output of products from Italy, thought to have been only 161,000 tons in 1943, is expected to be in the neighborhood of only 10,000 tons in 1944.

The following Table V lists the Italian refineries and shows the present status.

APPENDIX V

ITALIAN REFINERIES

		Grade Capacity in thousands of metric tons yearly	Remarks
- 45	<u>Tiume</u> Romsa <i>A.G.I.P.</i>	150 <i>10</i>	Old plant reconstructed
- 46	<u>Trieste</u> Aquila	350 <i>19 June</i>	Modern refinery built in 1936-7
- 47	SIAP <u>Venice</u>	150	Old equipment
- 48	AGIP Roma	450 <i>9+10 June</i>	New stills and crackers
- 49	Permolio Milan	30	Very minor
- 50	Lombardia Spezia	10	Obsolete
- 51	INPET-Shell Leghorn	350 <i>Out</i>	Similar to Venice
- 52	ANIC Fornovo Taro	250 <i>Out</i>	Reported completely destroyed
- 53	Petrolifera Fiorenzuola	50	Four small shell stills
- 54	Petroli Naples	10	Very minor
- 55	Raff. Napoli-Vacuum* Bari	220 <i>Out</i>	Reported completely destroyed
- 56	ANIC	250 <i>Out</i>	Captured by Allies, intact. Modern
TOTAL		2250	

In addition to the above list there are very small specialty plants as follows: Milan (Permolio)-white oils and naphthas; Milan (RIOT)-white oils; Rivarola (PIRA)-white oils; Genoa (Carbol)-asphalt; Vado Ligure-white oil; Ragusa, Sicily (ASD)-road oil from rock.

*In connection was the shutdown ENIT plant.

VI Yugoslavian Refineries

Three refineries were established to deal with artificial crude mixtures which were brought up the Danube and its tributaries, from Rumania. Under present circumstances it is considered probable that Rumanian oil is not imported but that the small production of Yugoslavian crude is sent to the local refineries for handling.

This crude is not dissimilar to the Hungarian and is probably worked up, without cracking, for the approximate percentages of products shown in Table A. The capacity of the refineries is small, individually and collectively, and due to the shortage of crude oil it is probable that only one or two of them are working.

The following Table VI lists the refineries as now supposed to exist.

TABLE VI

YUGOSLAVIAN REFINERIES

Crude Capacity
in thousands of
metric tons
yearly

Remarks

57	<u>Brod</u> Standard-Vacuum Oil Co.	100	A small pipe still and vacuum shells.	<i>10/10/44</i>
58	<u>Caprag (Sisak)</u> Shell Company	100	Shell stills, atmospheric and vacuum.	<i>14/3/44</i>
59	<u>Csijek</u> Ipcoil	20	A few small shell stills.	<i>14/3/44</i>

TOTAL

220

270

Ignored are the government plant reported to be under construction at Briderovo and the insignificant installation at Dravograd (Gall).

50

TABLE VI

YUGOSLAVIAN REFINERIES

	<u>Crude Capacity in thousands of metric tons yearly</u>	<u>Remarks</u>
<u>Brod</u> 57 Standard-Vacuum Oil Co.	100	A small pipe still and vacuum shells.
<u>Canrag (Sisak)</u> 58 Shell Company	100	Shell stills, atmospheric and vacuum.
<u>Osiiek</u> 59 Ipoil	20	<u>A few small shell stills.</u>
TOTAL	220	

Ignored are the government plant reported to be under construction at Smederevo and the insignificant installation at Dravograd (Gall). Smederevo seen early in 1944 to have a small pipe still, a boiler house, three 70' tanks and seven 20' tanks besides a few small buildings.

VII Rumanian Refineries

The Rumanian refineries have been partially restored after the August bombing but it is understood that both Steaua Romana at Campina and Credit Minier at Brazi are still completely out of action and no serious attempt has been made to restore them. They represent a capacity of two million tons per year of products.

The reconsideration of refinery operations during 1943, based on the smaller estimate for wartime production, results in the conclusion that considerable cracking has been practiced at Ploesti instead of a very limited amount as formerly assumed. It is now deemed most probable that about 28% of virgin gas is cut out from the crude and 13% of cracked gasoline is added. This involves the cracking of about 1,500,000 tons per year of crude bottoms and almost 500,000 tons per year of distilled stock, which is within the processing capacity available. The lube production is now believed to be in the neighborhood of 3% instead of 6% as formerly assumed. The balance of the products are divided 21% to kerosine, gas oil and diesel oil and 23% to fuel oil, wax, asphalt, etc.

It may be noted that, in view of the shutting down of Campina and Brazi, it is now believed that several plants of obsolete design are back in service. The list as shown below in Table VII probably includes all of the refineries in Rumania of any degree of operability.

TABLE VII

ROMANIAN PETROLEUM

	<u>Crude Capacity</u> in thousands of metric tons yearly	<u>Remarks</u>
<u>Ploesti</u>		
- 60 Astra Roman.	1780	Damaged but repaired.
- 61 Concordia Vega	1480	Damaged but repaired.
- 62 Romane Americane	1170	Undamaged
- 63 Unirea Orion	780	Damaged but repaired
- 64 Unirea Speranta	440	Undamaged
- 65 Colombia Aquila	535	Severely damaged but partially repaired
- 66 Petrol Block	485	Is a standby refinery
- 67 Xenia	290	Undamaged
- 68 Decia	180	Undamaged
- 69 Petrolmin.	180	Undamaged
70 Noris	80	Undamaged
<u>Bucarest</u>		
- 71 Prichova	200	Undamaged
- 72 Petrol Block	85	Undamaged
<u>Clujina</u>		
- 73 Steaua Roman.	1500	Completely knocked out
<u>Brazi</u>		
- 74 Credit Minier	535	Completely knocked out
<u>Hrasov</u>		
- 75 Petrogan	85	Undamaged
<u>Moinesti</u>		
- 76 Steaua Roman.	60	Undamaged
<u>Ruciu Srat</u>		
- 77 Romano Eoliana Venus	40	Undamaged
TOTAL	9805	

The following former refineries are believed to have been dismantled; Ploesti-Redevanta, Fratta, Conata; Baicoi-Credit Minier Aurora; Targovist-Carmen, Grigorasescu; Doljesti-Credit Minier; Huzau-Petrol Block Sitaru; Orsova-Credit Minier. Several other installations exist but are of such small size as to be inconsequential.

TABLE VIIROMANIAN PETROLINERIES

	Crude Capacity in thousands of metric tons <u>yearly</u>	<u>Remarks</u>
<u>Ploesti</u>		
60 Astra Romana	1750 -	Damaged but repaired.
61 Concordia Vega	1450 -	Damaged but repaired.
62 Romano Americana	1170 -	Undamaged.
63 Unirea Orion	730 -	Damaged but repaired.
64 Unirea Speranta	440 -	Undamaged.
65 Colombia Aquila	535 -	Severely damaged but partially repaired.
66 Petrol Block	485 -	Was a standby refinery.
67 Kenia	290 -	Undamaged.
68 Dacia	120 -	Undamaged.
69 Petrolmina	150 -	Undamaged.
70 Moris	60 -	Undamaged.
<u>Bucarest</u>		
71 Pranova	200 -	Undamaged.
72 Petrol Block (Titan)	55 -	Undamaged.
<u>Campina</u>		
73 Steaua Romana	1500 -	Completely knocked out.
<u>Brazi</u>		
74 Credit Minier	535 -	Completely knocked out.
<u>Brasov</u>		
75 Photogen	35 -	Undamaged.
<u>Moinesti</u>		
76 Steaua Romana	60 -	Undamaged.
<u>Ramnicu Sarat</u>		
77 Romano Belgiana Venus	40 -	Undamaged.
TOTAL		9605

The following former refineries are believed to have been dismantled; Ploesti-Redevanta, Fratia, Cometa; Baicoi-Credit Minier Aurora; Targoviste-Carmen, Grigorescu; Doicesti-Credit Minier; Buzau-Petrol Block Saturn; Orsova-Credit Minier. Several other installations exist but are of such small size as to be inconsequential. Redevanta is supposed to have installed a new still since the war.

VIII Polish Refineries

The Polish refineries are small and numerous. Crude capacity totalling close to one million tons per year could be mustered if necessary, by reviving the many very small plants which have been shutdown for some years. The country is only called upon to refine about 400,000 tons per year which is half the capacity of the nine active refineries.

The yields of products have not been changed from those shown in the previous report, namely 80% gasoline and 13% lubes, although there might be justification for showing an increased gasoline yield. The three cracking units in Poland are of small capacity and are of use primarily for increasing gasoline knock rating.

The following Table VIII gives the capacities of the significant refineries, including those that have been shutdown for a long period.

TABLE VIII

POLISH REFINERIES

	Crude Capacity in thousands of metric tons yearly	<u>Remarks</u>
✓ 78 <u>Czechowice (Dziadziice)</u> Vacuum Oil Co.	75	
✓ 79 <u>Jedlicze</u> Galicya Malopolska <u>Trzebinja</u>	75	
✓ 80 <u>Polski, Zriankowe Malopolska</u> <u>Nieglowice</u>	100	
✓ 81 <u>Jaslo-Cartenberg & Schreier</u> <u>Drohobycz</u>	70	
✓ 82 <u>Folmin</u>	160	Damaged by bombing but repaired
✓ 83 <u>Galicya</u>	140	
✓ 84 <u>Nafta-Malopolska</u> <u>Glinik-Mariampolski</u>	60	
✓ 85 <u>Galicya Malopolska</u> <u>Zniesienie</u>	80	
✓ 86 <u>Gazy Ciemne-Przemyslu Nafta</u> <u>Limanowa</u>	40	
✓ 87 <u>Limanowa</u> <u>Ustrzyki Dolne</u>	100	Has been shutdown for some time
✓ 88 <u>Panto-Malopolska</u> <u>Krosno</u>	50	Has been shutdown for some time
✓ 89 <u>Stawiariski</u>	20	Has been shutdown for some time
TOTAL	970	

The former refineries at Libusza (Standard Nobel) and Drohobycz (BROS) are understood to have been completely dismantled. Certain units formerly existing at the following places, of less than 10,000 tons capacity are considered inconsequential: Katorica, Skawina, Targowiska, Strozl, Kieczany, Gorlice, Ropica, Mykietynce, Ligata, Stanislawow, Grabowiec, Derezyce, Lesko, Hubicze, Boryslaw, Wierbiaz, Drohobycz, Gleboka, Bolechow, Madzara.

TABLE VIII
POLISH REFINERIES

	Crude Capacity in thousands of metric tons <u>yearly</u>	<u>Remarks</u>
<u>Czechowice (Dziedzice)</u>		
78 Vacuum Oil Co.	75	Not using Polish crude.
<u>Jedlicze</u>		
79 Galicya Malopolska	75	
<u>Trzebinja</u>		
80 Polski, Zwiaskowe Malopolska	100	Handles imported crude. Has French equipment (1).
<u>Nieglowice</u>		
81 Jaslo-Gartenberg & Schreier	70	French process units ac- quired (2).
<u>Drohobycz</u>		
82 Polmin	160	Damaged by bombing but repaired (3).
83 Galicya	140	Damaged by bombing but repaired (4).
84 Nafta-Malopolska	50	May have been dismantled.
<u>Glinik-Mariampolski</u>		
85 Galicya Malopolska	80	
<u>Zniesienie</u>		
86 Gazy Ziernie-Przemyslu Nafta	40	
<u>Limanowa</u>		
87 Limanowa	100	Has been shutdown for some time (5).
<u>Ustrzyki Dolne</u>		
88 Fanto-Malopolska	50	Has been shutdown for some time.
<u>Krosno</u>		
89 Stawiarski	20	Has been shutdown for some time (5).
TOTAL		970

The former refineries at Libusza (Standard Nobel) and Drohobycz (DEOS) are understood to have been completely dismantled. Certain units formerly existing at the following places, of less than 10,000 tons capacity are considered inconsequential: Katowice, Skawina, Targowiska, Strozl, Kleczany, Gorlice, Ropica, Mykietynce, Ligata, Stanislawow, Grabowiec, Derezyce, Lesko, Hubicze, Boryslaw, Wierbiaz, Drohobycz, Gleboka, Bolechow, Hadworna.

- (1) Pipe stills, solvent treating and dewaxing, Houdry unit from Dunkirk, Gravenchon and Berre were sent to Trzebinja and Nieglowice.
- (2) Treated 4300 Tons in February 1943.
- (3) Treated 8000 Tons in February 1943.
- (4) Treated 6200 Tons in February 1943.
- (5) Now believed to be simply a bulk storage plant.

IX. Estonian Refineries

The Estonian oil refineries exist in connection with the retorting works for the so-called oil shale. This is not a true oil shale but a bituminous marl (Kukersite) of such high oil content that it can be ignited with a match. Over one million tons of the rock were produced in 1943. Half of this amount was sold for use as such and half was retorted for the production of crude oil now believed to have amounted to about 95,000 tons in 1943. This is an increase of 20,000 tons over the estimate made in the last report. (In 1939 shale production was 1,452,900 tons of which 969,400 were retorted to produce 178,900 tons of crude oil).

This crude oil is about 20°API and shows about 12% off at 300°F. It is highly phenolic but after treatment yields about 11% of finished gasoline and, with cracking, 40% tractor fuel, diesel oil, etc. The refinery fuel and loss is in the neighborhood of only 5% showing that oil products are not used for refinery fuel.

The following Table IX shows the 1943 operating rates of the four oil works. The ultimate capacity of these plants is unknown but, due to various difficulties, it is believed that the 1943 capacity of these plants was not greatly in excess of the operating rate.

TABLE IXESTONIAN REFINERIES

		<u>Operating rate in thousands of metric tons per year in 1943</u>	<u>Remarks</u>
	<u>Kohtla-Jarve</u>		
—	90 Polewkivi Toostus (Werk III)	40	Most important
	<u>Kohtla</u>		
✓	91 Consolidated Goldfields (Werk V)	12	Relatively new
	<u>Kivioli</u>		
✓	92 Eesti Kivioli (Werk I)	30	Reports of fires and sabotage
	<u>Sillamägi-Vaivari</u>		
✓	93 Olikonsortium (Werk IV)	13	Out of commission until June '43.
	TOTAL	95	

X French and Lowlands Refineries

These refineries are all shutdown for lack of feed stock except for some extremely minor activity in the retreating of used lubricating oil, synthetic plant residuals, etc. and except for the refining of an estimated 95,000 tons of Pechelbrenn crude and Autun shale oil. Furthermore, the majority of these refineries are in no condition to operate due to the deliberate destruction of tankage and the dismantling of process equipment. Notable exceptions are the four Mediterranean refineries and the small units operating on indigenous stocks.

These indigenous stocks are believed to have amounted in 1945 to 80,000 tons of crude oil and 15,000 tons of shale oil. The estimated overall yields are 23% gasoline, and 22% lubes as in the last report.

The following Table X shows all the refineries of France, Belgium, Holland and Scandinavia with figures for former capacity and remarks as to present status.