55TH BOMBARDMENT WING (HV)

OPERATIONS AGAINST OIL OBJECTIVES

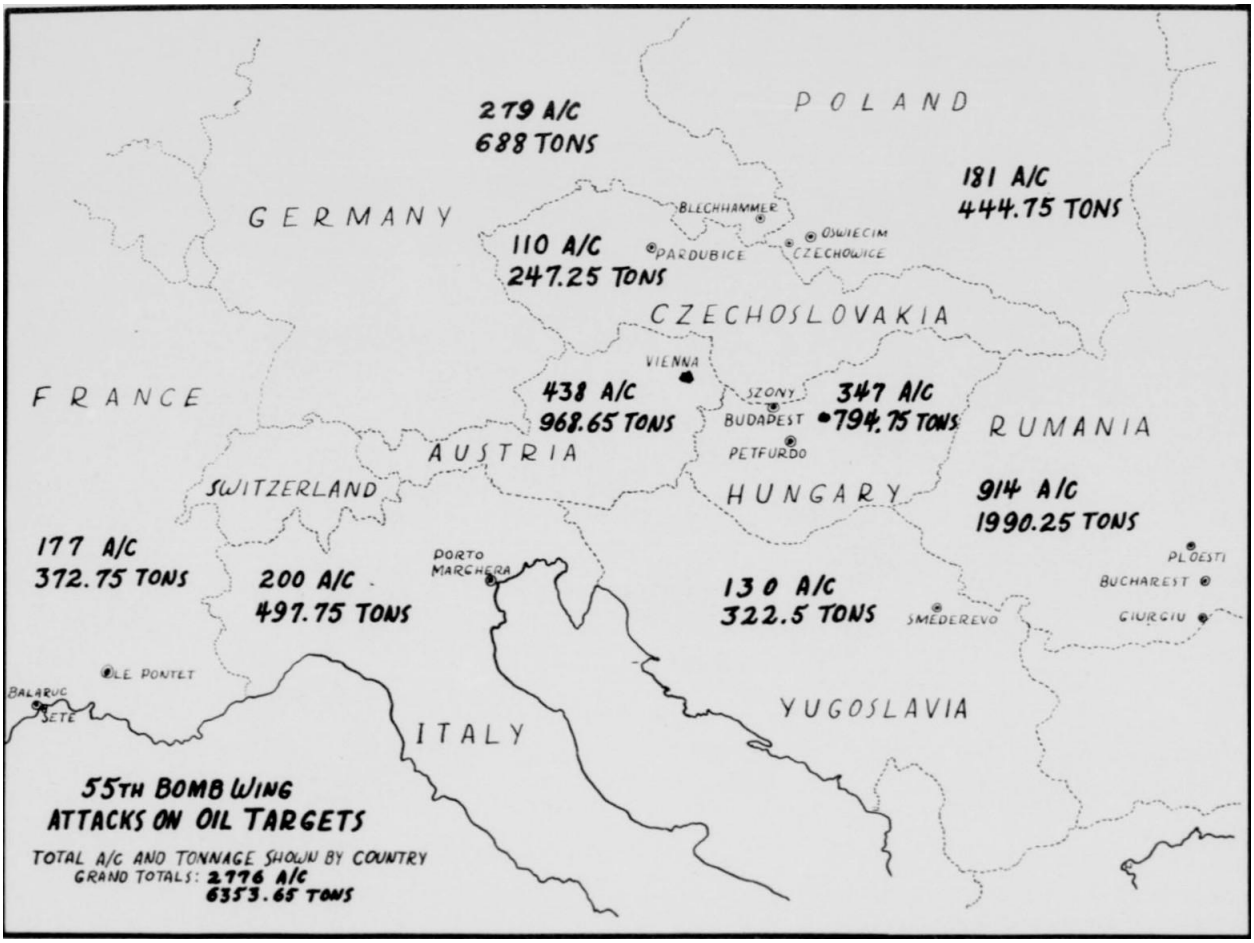
Special Studies in Precision Bombing

Special Study No. 8, Part I.

(18 May 1944 - 17 September 1944)

FIFTEENTH AIR FORCE
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I. INTRODUCTION

"As of 31 August it was estimated that, as a result of air attacks and Rumanian capitulation, total German oil production for the month of August had been reduced to 39 per cent of pre-attack capacity." So stated the United States Strategic Air Force in Europe, Air Intelligence Summary Number 45. The month of August also marked the most successful period of attacks against oil targets by the 55th Bombardment Wing. From 18 May 1944 to 17 September 1944, the Wing shared in the major strategic effort to destroy or reduce the sources, refineries and storage of crude oil, synthetic oil and allied products available to the Axis.

To participate in the destruction of priority oil targets, the 55th Bombardment Wing devoted a high percentage of its operations during the May - September period. Each attack contributed to the steadily mounting evidence that the air, ground and naval forces of the enemy were suffering from a critical need of fuel products. More concrete evidence to the dire need of oil products by the

enemy is the fact that his air opposition steadily decreased through July and August, and actually reached the lowest ebb in the first two weeks of September.

Operations were executed against oil targets in nine different countries: Rumania, Austria, Hungary, Germany, Italy, Poland, France, Yugoslavia and Czechoslovakia. The countries are listed in the order of the total tonnage dropped in each geographic area.

The greatest air opposition occurred over Austria, Rumania and Czechoslovakia, respectively. The highest number of encounters took place in the month of June, with 286 enemy aircraft attacking the various groups of the Wing. This number decreased to 89 encounters in July, but increased to the figure of 122 in August, the increase due to the heavy air opposition met on the mission to Pardubice, Czechoslovakia. Two missions were flown against oil targets in September with no enemy aircraft encountered. The heaviest flak was experienced over Austria, Rumania and Germany.

To show graphically the percentage of effort as well as the general situation of enemy opposition on the missions against the vital fuel sources, in comparison to the total summary of the Wing operations against all types of targets in the same period as covered by this report of attacks against oil, the following table of statistics is exhibited:

Period: 18 May 1944 to 17 September 1944

	Totals	Oil Targets	Percentages
Aircraft Bombing	8034	2776	34.5
Tonnage	18471.95	6353.65	34.3
Encounters:	1281	525	40.9
Destroyed	260	142	54.6
Prob. Dest.	119	61	51.2
Damaged	102	49	48.0
Losses:			
To flak	67	33	49.2
To e/a	54	17	31.5
Missing	62	28	45.1

The amount of air opposition encountered, the intensity and the volume of flak experienced, the effective as well as the non-effective smoke screens, and the extensive use of blast walls constructed by the enemy prove the high value the enemy placed on these priority targets attacked by the 55th Bombardment Wing.

By the same token, the Severe opposition encountered accounts for the percentage of losses which appears higher than those incurred against industrial and communications targets. The decrease in enemy fighter opposition conclusively proved the inability of the enemy to provide interception of bombers for protection of the targets.

The concentrated campaign against oil targets from 18 May to 17 September, involving missions ranging from France to Rumania, from Italy to Poland, show the culmination of a gigantic strategic plan, of which the 55th Bombardment Wing proved a necessary part. Lives were lost, equipment was expended, long hours of both ground and air duty were required -- these factors spelled success of the plan and the slow but definite crumbling of enemy defenses and resources.

A. RUMANIAN OIL TARGETS (18 MAY - 18 AUGUST)

1. PLOESTI Oil Fields

The Fifteenth Air Force flew 24 missions (20 daylight and 4 night) against Ploesti oil and related targets. The 55th Bombardment Wing participated in 9 of these missions, 8 of which were centered on oil industries at Ploesti. The Ploesti fields represented a potential production of 709,000 tons per month of crude oil. It was estimated that at the beginning of the attacks on 5 April 1944, actual production was 458,000 tons per month, of which amount 177,000 tons represented maximum gas production -- approximately 1/3 of the total Axis gasoline output.

In 8 attacks the 55th Bombardment Wing shared in a great strategic air offensive perhaps never to be equaled in air combat. These missions were executed under the fiercest opposition that the enemy could offer against the Wing over any target. Coupled with air opposition in strength, the enemy had carefully added flak defenses to the target so that Ploesti became the third most heavily defended city in all Axis Europe. Careful study of statistics not only reveals the ultimate success of bombing, but also explains the increase in flak batteries and the corresponding decreases in enemy opposition.

Flak defenses were so dispersed that an approach to any target within the Ploesti area necessitated subjection to flak. It was known that the defenses totaled 245 heavy guns and 280 light guns; later a figure placed the heavy guns at slightly over 300. Flak in most instances was IAH and the duration as long as 12 minutes. On the 8 attacks the Wing had 843 sorties, with ten bombers definitely lost to flak;

a percentage of losses of 1.2 per cent, a percentage markedly less than the Air Force average. Actually, one group of the Wing, which flew 7 missions over Ploesti, did so without the loss of a single aircraft to flak or fighters.

On every attack enemy air opposition was expected. It is interesting how the capabilities of the enemy were reduced from 18 May to the last attack on 18 August. The e/a were composed mainly of ME-109s and FW-190s, with the possibility of a few fighters from the Rumanian Air Force. The decrease in expected and actually encountered aircraft can be attributed to repeated bombardment attacks, strafing of airdromes and lack of fuel. For the attack of 18 May, Intelligence estimates placed the air opposition likely to be as high as 200 e/a in the target area, with the possible interception enroute or on return of at least 25 SEF from the Nis area. In fact, this area was always a threat to bombers, especially to stragglers, until strafing and heavy bombardment attacks forced the enemy to withdraw his fighters from this sector. The estimate of capabilities of enemy air strength reduced gradually through May and June until by 28 July, 60-70 e/a were capable of interception over Ploesti and surrounding areas, with the threat at Nis reduced to 15 e/a. On the last attack by this Wing, the small number of 35-40 e/a was estimated, with the likelihood of interception slight, and with no expectation of interception from Nis. The actual number of enemy aircraft encountered parallels the general retrogression of estimates, although in most cases the totals were markedly less than estimated capabilities. In the month of May on the two attacks, there were 28 encounters; in June, with one attack, 72 encounters; in July, with three attacks, 15 encounters; in August, with two attacks, there were no encounters. A grand total of 115 enemy fighters were encountered on the 8 attacks by this command. 30 e/a were destroyed, 12 probably destroyed and 18 damaged. A total of 60 enemy fighters were destroyed or damaged. In relation to the total of 188 e/a destroyed by the Air Force in 1487 encounters, the 55th Bombardment Wing in 115 encounters (approximately 7.7% of the total Air Force encounters) destroyed 30 e/a. Thus, 26% of the number of e/a attacking were destroyed by the 55th Wing, as compared to the 12.6% of the Air Force average of e/a shot down in 1487 encounters. During all these operations the Wing lost 8 B-24s. This represents a loss ratio of 6.9%, well beyond the Air Force average of losses to enemy aircraft per hundred encounters. However, it must be noted that one group lost no aircraft to fighters and two groups lost only one bomber per group to enemy fighters. The abnormal percentage of losses was sustained by one group which on one mission had 40 encounters. The e/a were very aggressive and experienced, and by a series of passes through the bomber formation succeeded in destroying six B-24 aircraft. In comparison to the total number of sorties flown, losses to enemy aircraft represent a percentage of slightly less than 1%. It is noted that the last mission of

18 August was accomplished without the loss of a single bomber to enemy aircraft, flak or any other reason.

The 55th Bombardment Wing on these 6 missions had as targets the Romano Americana, Astra Romana, Concordia Vega, Unirea Sperantza, Dacia Romana, Redeventza and Standard Refineries. Brief details are as follows:

Astra Romana, situated on the southern edge of the town, was the largest oil refinery in Europe. When at its peak of production the plant was capable of producing 18% of the total Rumanian oil.

Romano Americana Refinery had capacities of production of 1,100,000 tons prior to Air Force attacks.

Concordia Vega Refinery had capacities of 1,300,000 tons per annum when at maximum production.

Unirea Sperantza Refinery, situated on the SE side of the city of Ploesti, had a cracking unit rated at capacity of 1,000 tons per day. It also possessed storage facilities of 33,000 tons.

Dacia Romana Refinery ranked as one of the smaller refineries in the Ploesti fields, with an estimated annual output of 150,000 metric tons.

Standard Petrol Block taken in its entirety with subunits had refining capacity of 950,000 tons per year.

Without engaging in a detailed study of the protection that the enemy installed in addition to flak batteries, it can be stated that he had taken every precaution to defend the prized oil installations. Approximately 2,000 smoke generators were effectively used to conceal the targets. Fires were started to confuse bombardiers into dropping outside the refineries. Well organized fire brigades were present during attacks to extinguish fires caused by bombings. Careful attention was given to the construction of blast walls which were designed to protect vital pipe lines and other installations from shock damage as well as from fragments of bombs. After study of various reconnaissance photographs and bomb strike photos, and the careful examination of the refineries after Ploesti was seized by the Russians, it was revealed to Allied headquarters that the enemy had been vigorous and thorough in the preparation and maintenance of his defenses.

The 55th Bombardment Wing, as did other units, received some of its most valuable training in various types of bombing methods on the Ploesti attacks which

later served well on missions against other priority targets. Early in the strategic plan it was realized that the effective smoke screen would make visual bombing impossible. Consequently most of the success of the attacks rested upon the offset and PFF methods of bombing. It is not necessary, nor is it possible, to give details of the damage inflicted by this Wing. Most of the missions against Ploesti were mass attacks executed during adverse conditions as indicated above, and consequently the main aim was to hit or damage general areas as well as the primary objectives. Each attack lessened the oil reserves and refining capacities available to the Axis. The attacks also served to grant support to the Russian drive, and eventually exercised influence on the Rumanian government and populace which led to capitulation to the Allies.

2. GIURGIU (23 June 1944)

The Danube River port of Giurgiu, situated 36 miles SW of Bucharest and opposite Ruse, is one of the best inland ports in Eastern Europe. The most important Danube River port in Rumania, Giurgiu has pipe line connections with Ploesti and thus occupies a strategic location for the shipment of oil to Central Europe. Rough estimates were that 75-100,000 tons per month were dispatched westward from this port. The 55th Wing, with 117 B-24 a/c, dropped 233 tons on the oil and storage installations on 23 June 1944.

Flak encountered was S-MAH, with one unit subject to fire for 3 minutes. Two a/c were lost to flak. As a matter of interest, it is noted that Major Walter A. Smith, Jr., a Squadron Commander, lost on this mission, was responsible for the splendid and efficient organization of a POW camp in Bulgaria. Undoubtedly his efforts to maintain discipline, safeguard health and boost morale was the greatest contributing factor in the return of several hundred Allied airmen.

Five ME-109s were encountered by one B-24 on return in the Nis area. One e/a was probably destroyed.

Four days after the attack, on 27 June, reconnaissance was flown covering the quay loading sector. A good concentration of hits was scored on the central and NE parts of the loading quay, with fresh damage to tracks, rolling stock and sheds. The quayside was damaged. Several small sheds were destroyed. The railway station received blast damage. Damage was inflicted on the Pumping Station area. The attack was successful to the extent that extensive repairs were necessary, and that the facilities so damaged substantially reduced the maximum amount of oil

dispatched by water and rail. The damage reported includes that inflicted by three other groups of the Fifteenth Air Force on the same day.

3. BUCHAREST: Titan and Prahova Oil Refineries (28 June 1944)

In addition to two prior attacks against communication targets at Bucharest, the 55th Bombardment Wing on 28 June attacked the Titan and Prahova Oil Refineries, with two groups on each refinery. At the time of the attack it was estimated that the two refineries had a combined production of 250,000 tons per year.

Bucharest then lay in a "hotbed" of flak defenses. With Ploesti to the south, the flak "alley" around Campina between Ploesti and Bucharest, and the city's 122 heavy gun defenses, the target was a formidable one to the bombers. Flak intensity ranged from MIH-IAH with one unit experiencing IAH flak for 4 minutes. No aircraft was lost to flak.

Three of the bombardment groups had encounters with enemy fighters, with one unit attacked by the enemy in strength. Intelligence estimates placed the possible air interception at 80-95 e/a from the Bucharest area, with a slight possibility of 20 ME-109s attempting interception from Sofia against the bombers during penetration or withdrawal. All of the attacks occurred between the initial point and the target with some attacks continuing off the target. Most of the enemy fighters were ME-109s and FW-190 with a few JU-88s and ME-110s. Of the total 48 encounters, 35 e/a were destroyed or damaged (15 destroyed, 16 probably destroyed, 4 damaged). One B-24 a/c was lost to fighters. Of the enemy fighters attacking, 73% were destroyed or damaged; losses per hundred encounters for the bombers were approximately 2%.

Approximately one hour after the attack on the refineries, a reconnaissance was made over the target. The Prahova Refinery received severe damage. Damage was also inflicted on rail yards and on the residential section.

1) Four storage tanks destroyed; three more tanks damaged.
2) Possible boiler house half destroyed and one intermediate or finished product tank destroyed. Two more were damaged.
3) Administration building probably damaged.
4) Probable oil fire in small oil storage area near rail junction consisting of 7 large tanks and several smaller tanks.

The attack on the Titan Oil Refinery was not so successful es the one on Prahova. One group missed the target. The second attack unit of the second group scored hits in the target area, starting fires with minor damage to storage facilities.

B. AUSTRIAN OIL TARGETS (16 JUNE - 22 AUGUST)

In a period slightly more than two months, the 55th Bombardment Wing made four attacks on priority oil targets in the Vienna area. Three different refineries were attacked with one refinery, the Florisdorf, attacked twice. These missions were executed against strong enemy air opposition as well as against. severe flak.

Intense, accurate flak was encountered on all missions. At the time of the attack, Vienna, the second most heavily defended city in Axis Europe, had total known heavy defenses of 316 guns, and with the adjacent area defenses overlapping, the figure assumed the grand total of 500 guns. For instance, on the mission of 8 July the formation was subject to flak for 5-10 minutes. Percentage of losses to flak per 100 sorties was 2.6%. The percentage of losses to flak in relation to number of aircraft over the target was 2.7%, which is not high for missions over areas defended as strongly as Vienna.

On three of the four attacks, air opposition in strength was encountered. On the mission to Korneuburg, on 22 August, no fighters attacked the bombers. On the previous missions, a total of 228 e/a were encountered. The gunners destroyed, probably destroyed or damaged 85 e/a, slightly more than 39% of the attacking aircraft. Our losses to enemy fighters were 3 bombers, or approximately 1.3% of the total number of encounters.

1. LOBAU Oil Refinery (16 June 1944)

The Lobau Oil Refinery is primarily an oil treatment end blending plant, with a small distillation unit. The plant was built prior to the war. It is possible that the plant has pipe connections with the synthetic oil plant st Brux; this would provide additional basis to the belief that the plant engages extensively in a blending process. The refinery was not considered a priority target until a sizeable dent had been placed in the production of larger refineries.

On 16 June 1944, 132 B-24 a/c attacked the Lobau Refinery at Vienna. The brunt of the attack fell on the southern end of the works area. Much damage was inflicted upon numerous installations, although preliminary assessment from reconnaissance photos shows little damage to the primary objectives.

1) Buried oil storage possibly damaged.

2) One 80’ diameter storage tank destroyed.
3) Pipe lines serving canal docks cut.
4) Foundations for new tanks damaged.
5) Railway sidings cut.

The British Ministry of Home Security made a more careful study of the damage inflicted as a result of the attack on 16 June and a later one on 26 June; the damage is considered widespread as a result of the joint attacks. Loss in production estimated at 50,000 tons of oil, or almost a two months output, was expected to occur in the two months following the attack. Roughly 50% of the visible tankage facilities have been damaged or destroyed. It was estimated after these attacks that full production could not be reached until the middle of August, 1944,

2. FLORISDORF Oil Refinery (26 June and 8 July)

In less than a two week period the 55th Bombardment Wing twice attacked the Florisdorf Oil Refinery in Vienna. This refinery ranked as the twelfth largest Axis refinery outside of Rumania, and the largest crude oil distillation plant in Austria. Production was estimated at 100,000 tons per annum. Previous to the two attacks, the refinery had been bombed on 16 June, causing little damage.

The first attack of 26 June inflicted severe damage on the plant, but not on the three primary objectives, thus necessitating a second attack on 8 July. On this attack one group had 72.8% of all bombs plotted within 1,000' of mean point of impact. Photo reconnaissance confirms the result of the second attack.

Primary Objectives

1) Trumble crude oil distillation unit sustained blast damage.
2) Old batch still sustained blast damage.

Secondary Objectives

1) Boiler house (paraffin) shows roof damage.
2) Central pumphouse has heavy roof damage.
3) Main boiler house suffered roof damage.
4) Fire department building destroyed.
5) Filter press completely destroyed.
6) Wex factory heavily damaged.
7) Pump house suffered severe damage.
8) 8 storage tanks destroyed or damaged.

3. KORNEUBURG Oil Refinery (22 August)

The 55th Bombardment Wing attacked the Korneuburg Refinery on 22 August 1944 with 96 a/c. The refinery, located 10 miles North of Vienna, was one of the smaller plents producing mostly lubricating oil, with an annual capacity of 48,000 tons. Two days after the attack a photo reconnaissance was flown over the target. Hazy quality of the prints precluded careful assessment. Smoke covering the target made a detailed assessment of strike photos impossible, especially concerning the primary objectives. A large warehouse was destroyed; the oil treatment plant was seriously damaged, two unidentified installations received direct hits, and railway lines were severed.

C. HUNGARIAN OIL TARGETS (14 JUNE-17 SEPTZMBER)

The source of oil and allied products in Hungary represented a large share in the oil products available to the Axis outside of Germany and Rumania. The 55th Bombardment Wing conducted three missions against oil targets in Hungary in the period from 14 June to 17 September. It is noteworthy that these operations were executed without the loss of a single aircraft due to enemy action. No enemy aircraft were encountered but flak was present at all targets to some degree, and at Budapest with intensity.

1. PETFURDO Oil Refinery (14 June)

The attack on the Petfurdo Oil Refinery was an integral part of a Fifteenth Air Force plan executed against oil targets in Northwestern Hungary, targets whose aggregate capacity represented 400,000 to 500,000 tons per year. 141 B-24s dropped 277.25 tons on the refinery. A few enemy fighters were observed but no encounters took place. Flak encountered ranged from SIH to SAH; a factor to be considered was that although the target was defended by only 8 guns; the location was such that the route passed near the Lake Belaton area, with its dispersed flak defenses.

Smoke obscured target area from bombing prevented an accurate assessment from bomb photos. The bomb fall plot of one group revealed 44% of all bombs fell within 1,000’of the mean point of impact. Damage assessment based on photos taken 16 June show that severe damage was caused to nearly all installations. Two days after the attack there was no sign of repair activity.

1) Direct hits destroyed one of the cooling towers.
2) Two sheds of the gas generation plant gutted; a direct hit tore a large hole in the side of the compression building.
3) Seven tanks in the cracking plant destroyed, end four more damaged.
4) Three large tanks in the tankage arca destroyed.

5) One half of the main building in the air liquefaction plant destroyed.
6) One end of the ammonia synthesis building blasted off.
7) Direct hits have destroyed one shed and installations near the nitric acid plant.
8) Nitric acid building partially destroyed.
9) Part of the sulphuric acid plant received internal damage,
10) Shed in Poss cracking still 1/3 destroyed.
11) Many craters around the underground storage tanks.

2. SZONY Oil Rofinery (28 August)

Located on the South bank of the Danube River and 4 miles SE of Komarom, the Szony Oil Refinery is one of the smaller refineries in Axis Europe. 0n 28 August, 103 a/c of the 55th Bombardment Wing at attacked the refinery, dropping 255 tons of bombs. Bombing was accomplished visually. SIH-SAH flak was encountered for a brief period.

Three days after the attack, on 31 August, a reconnaissance was flown. Photos showed that the damage was heaviest in the NE end of the refinery, but new damage was inflicted upon the distillation unit.

Primary Objectives

1) A control house of the distillation unit almost destroyed.
2) Pump house damaged.
3) Light damage to boiler house.

Secondary Objectives

1) Six tanks destroyed; two storage tanks damaged.
2) Maintenance and repair shops 1/4 destroyed by two direct hits.
3) Considerable damage to unidentified buildings and sidings, containing wagons and stock piles.

3. MAGYAR and SHELL-KOOL/Z Oil Refineries (17 September)

On 17 September the Fifteenth Air Force attacked communications and oil targets in Budapest. The two oil targets assigned to the 55th Bombardment Wing were the Megyar and Shell-Refineries. Two groups were assigned to each target.

Although the attacks were executed without enemy air opposition, the bombers were subject to moderate to intense flak from the 146 guns at Budapest. The defenses were composed of 105mm as well as 88mm heavy guns, and so disposed that the attacking forces were subject to AMA for five minutes.

The Shell Oil Refinery was the largest plant in entire Hungary. The plant had annual production capacity of 175,000 tons with storage facilities of 40,000 tons. The plant occupied territory covering 22 acres.

Four days after the attack, a reconnaissance showed the following assessment of the heavy destruction inflicted by two groups of B-24s:

1) Distillation plant damaged; blast wall broken at two points, and roof of North building destroyed.
2) Boiler house more than half destroyed.
3) Central pumphouse completely destroyed.
4) Fire foam installation probably damaged.
5) Treating plant partially destroyed and heavily damaged.
6) Crude oil pumphouse damaged.
7) East end of grease manufacturing plant destroyed by direct hit.
8) Scattered damage in asphalt plant.
9) 23 storage tanks destroyed; 40 storage tanks damaged.
10) Rail lines cut adjacent to refinery; quays damaged.

The Magyar Oil Refinery was in partial operation at the time of the attack by the 55th Bombardment Wing. A former attack had limited the production for some time. The refinery, otherwise known as the Hungarian Petroleum Company, had been known to be producing mainly lubricating oils and low grade fuel oils, with the annual capacity estimated to be 80,000 tons.

Less than two hours after the attack reconnaissance a/c were over the target for partial coverage. No statement of damage could be made as the whole plant was obscured by smoke. From two points in the central area of the refinery large columns of smoke were rising. The day following the bomber attack another reconnaissance was flown with good coverage and excellent photos. The refinery was very heavily hit, and as late as 21 September no visible effort had been made to clear debris or begin repair work.

1) Distillation unit seriously damaged

(Primary objective)

2) Boiler house and power plant destroyed

(Secondary objective)

3) Boiler house of lubricating oil plant gutted (Secondary objective).
4) Further damage to lubricating oil plant.
5) Six storage tanks destroyed.

6) Probable purification unit; west set of buildings approximately half destroyed. East set of buildings suffered damage.
7) Administration buildings destroyed or damaged.
8) Processing towers destroyed.
9) Storage and dispatch units heavily damaged.
10) Railway lines within refinery area cut.

D. GERMAN OIL TARGETS (7 JULY-27 AUGUST)

In June 1944, the British Air Ministry stated that "the destruction of the Blechhamner plants would be the most serious blow the German oil supply could suffer from air attack." The village of Blechhammer is situated in Eastern Germany near the German-Polish border, about 27 miles SE of Oppeln. It lies between the Adolf Hitler Canal on the north and the Kaudrzin-Gleiwitz railway on the south. Both the North and the South plants use the Bergius process for synthetic oil production.

1. BLECHHAMMER North (7 July-7 August)

The Blechhammer North oil plant has been under construction for at least three years, possibly longer. It was estimated that by March 1944, the North plant would be capable of producing 250,000-500,000 tons. However, this maximum figure evidently was never reached. The 55th Bombardment Wing made two attacks on the plant, on 7 July and again on 7 August.

At the time of the attack of 7 July, intelligence estimates placed the current production at 120,000 tons per year, which if earlier figures were correct would place the production at about 50% of maximum capacity. The Fifteenth Air Force had an additional three groups of B-24s attacking the plent on the same date. 98 e/c of this Wing dropped 241.25 tons (182,25 were 500 GP and 59 tons wore M-47 incendiaries). Bombing was accomplished through difficulties, since another 3-24 Wing preceded the 55th Wing to its assigned target and B-17s attacked the South plant as well. The target was completely smoke obscured. Damage assessment of 8 July was impossible due to poor quality of reconnaissance photos. The photos revealed that no damage was inflicted upon the Western quarter of the plant. A later reconnaissance on 16 July revealed that no damage was inflicted upon major installations, and that the refinery appeared to be very active, This attack included operations of three other groups of the Air Force. On 7 August three Wings of the Fifteenth Air Force attacked the Blechhammor South Oil Refinery. The 55th Wing with 88 a/c dropped 219 tons of 500 GP bombs on Blechhammer North. Bombing

was accomplished visually, with difficulty. A partially effective smoke screen was in operation, and smoke drifted over the Worth target from the attack on the South plant. Only the bombs from the lead and last groups could be plotted due to smoke obscured areas. The percentages of bombs dropped within 1,000' of the briefed mean point of impact for these two groups wore 45.1% end 13.4%, respectively. On 8 August a reconnaissance was flown over the North plant. The photos showed that the attack was centered on the refinery. The refinery is of such a dispersed nature that the damage was correspondingly limited. Evidently the attack was successful to the extent that the plant was inoperative at the time of the reconnaissance mission. To render the plant ineffective, it would be necessary to destroy the water gas generator, but such destruction is highly improbable; thus to cease production entirely other vital installations must be destroyed or seriously damaged. Photos showed the following results on secondary objectives:

1) Boiler house damaged with 8 direct hits.
2) Three large cooling towers holed and damaged.
3) Two units in C02 washing plant seriously damaged.
4) Probable blast damage to conversion unit and adjacent pipe lines.
5) Direct hit damaged 1/4 of main compressor house.
6) Roof damage to probable coal preparation house.
7) Blast damage to injection and paste preparation house.
8) Two primary products tanks destroyed and one damaged.
9) A number of stores buildings completely destroyed.

2. BLECHHAMMIER South (27 August)

The size of the South plant is comparable to that of the North. The combined plants at Blechhammer represent one of the four largest synthetic plants in Axis Europe. On 27 August, 93 B-24 a/c dropped 227.75 tons of 500 1b GP bombs on the South refinery. Smoke screens were operating but were relatively ineffective. Detailed assessment from strike photos was not possible due to smoke obscured target. Reconnaissance of 2 September shows that the main weight of the attack fell on the center and on the northern part of the plant, which contains most of the vital installations.

1) Compressor house damaged.
2) Boiler house damaged.
3) Generator hall roof 1/2 destroyed.
4) One gasholder destroyed, two damaged.
5) Cooling tower seriously damaged.

6) Two tanks destroyed.

Another Wing attacked this target on the same day.

a. Enemy Opposition, Fighters and Flak

The Germans had taken great efforts to defend the synthetic plants with a concentration of heavy guns. Both plants are approximately equally defended. Fron late July to the end of August the enemy increased the total number of heavy guns from 125 to 158. Surrounding areas made the Blechhammer targets an even more hazardous mission. The defenses of Gleiwitz (155 guns) and Ostrava (55 guns) made approaches and rallies difficult to decide and necessitated strict adherence to planned courses. All three attacks drew IAH flak with the exception of one unit on the Blechhammer South mission which reported M-IIH flak. Duration of flak at the North target averaged 5-10 minutes. At the South plant the average was 5 minutes. Six B-24 a/c were lost to flak on the three missions which represents a percentage of loss of 2% on the basis of 299 sorties.

The enemy opposed the bombers on both missions to Blechhammer North with some strength. No opposition was encountered on the 27 August mission against Blechhammer South. A total of well over 100 e/a was observed, with 41 aggressive encounters reported from the first two missions. The fighters consisted of FW-190s, ME-109s and ME-110s, with the ME-109s predominating. A total of 18 e/a were accounted for (10 destroyed, 3 probably destroyed and 5 damaged), approximately 44% of the e/a attacking. No bombers were definitely lost to fighters. However, several of the aircraft listed as missing were probably damaged by enemy fighters.

E. ITALIAN OIL TARGETS (6 JULY-13 JULY)

1. PORTO MARGHERA Oil Storages

The 55th Bombardment Wing attacked the oil storage at Porto Merghera on 6 July and again on 13 July. The attacks occurred while the Wing was participating in more important missions against Rumania, Silesie and Austria. The oil storages at Porto Merghere were attacked to destroy the dwindling supply of reserve oil available to the enemy. These storages represented one of the three remaining depots in Northern Italy, with five large storage areas, one containing 44 tanks of various sizes, with total storage capacity well over 250,000 tons.

The largest area at the time of the attack was defended by 23 guns. Flak encountered varied from S-MAH. The mission on 13 July incurred SAH flak for a duration of four minutes. Three enemy aircraft were seen on the first mission with no encounters. On the last attack 16 e/a were seen with no encounters reported.

The first attack on the Porto Marghera oil storages inflicted partial damage on tanks.

1) One large tank destroyed.
2) One large tank damaged.
3) One medium tank destroyed and one damaged.
4) Considerable damage on adjoining industrial areas.
5) Twelve direct hits cutting all lines to Venice.

On 13 July, the 55th Bombardment Wing attacked the storages for the second time. Slight damage was inflicted on the storage tanks. Post attack reconnaissance shows a great deal of destruction on the Nazionale Alumino (Monto Catini) Plant, which produced 7% of all aluminum of the Axis.

1) One large oil tank destroyed.
2) One medium tank damaged.
3) One large building of the S.A. Ventrecoke Glasswerke destroyed.
4) Coke ovens of the S.A. Ventrecoke Glassworke destroyed.
5) Two vital buildings of the Monte Catini chemical works partially destroyed.
6) Several buildings of the Italian Zinco and Nazionale Alumino destroyed.

Two other groups of B-24s attacked this target on the same day.

F. POLISH OIL TARGETS (29 AUGUST-13 SEPTEMBER)

1. CZECHOWICE (DZIEDZICE) Oil Refinery (20 August)

Located l½ miles NE of Czechowice, this refinery constitutes one of the two largest installations in Poland. The plant had been active since 1939. After the capture of the Drohobycz Refinery by the Russians, the Dziedzice assumed higher priority as an Allied target. Actually the refinery represented the most important crude oil plant in German controlled Poland.

Maximum capacity of production was estimated at 90,000 tons per year, with the current production prior to the attack by the 55th Bombardment Wing totaling 48,000 tons per year. With adequate cracking plant facilities, Czechowice could produce 25,000 tons of gas per year.

No flak was encountered at the target. The enemy had capabilities in strength to attack the bombers with mostly SEF. Either due to the decision of the controller or to lack of fuel for the aircraft, no attempt at interception was made. A total of 14 e/a was observed enroute and in the target area, with no display of aggressiveness on the part of the enemy.

On 20 August, with three groups of B-24s, the 55th Bombardment Wing attacked the Czechowice Oil Refinery. Bombing was accomplished visually. One group made an excellent pattern and percentages show that 79.2% of all bombs fell within 1,000' of the briefed mean point of impact. Post reconnaissance shows the results of fine bombing.

1) Crude oil distillation plant damaged.
2) Boiler house at least half destroyed.
3) Benzine distillation plant very seriously damaged.
4) Pump house damaged.
5) Contrifugating plant three-quarters destroyed.
6) Storehouse one half destroyed.
7) Four large storage tanks destroyed.
8) Gasholder destroyed.

2. OSWIECIM (I.G.FARBEN) Synthetic Rubber and Oil Plant (13 September)

The synthetic rubber plant of this complex was fourth in production after Schkopau, Huls and Ludwigshafen/Oppau. Following the successful attacks on Huls, the Oswiecim plant became more important to the Axis. Rubber production capabilities were estimated at the time of the 55th Wing attack to be 100,000 tons per year.

Early in the war Allied Military Commands had reason to believe that the rubber plant had been modified to make possible large scale production of synthetic oil. The latest reports, based on ground intelligence, showed the refinery capable of 3,000 tons of synthetic oil per month.

Perhaps the most valid proof to substantiate the importance of Oswiecim as a synthetic oil and rubber center can be explained by the study of the flak defenses. On the Fifteenth Air Force attack of 20 August, MIH flak was encountered. According to Photo Interpretation Reports, flak defenses in number of heavy guns progressed from 45 through 65, 85 and 94, reaching a total of 114 by 25 August. The 55th Bombardment Wing experienced IAH flak from 3-8 minutes during the attack.

The enemy offered no air opposition to the attack on this vital target.

Bombing was accomplished by PFF methods. A smoke screen was partially effective. The buildings and installations of the Oswiecim plant are widely dispersed, consequently the damage was not as heavy as might have been otherwise expected. Post raid assessment shows the following major damage inflicted by the 55th Bomb Wing attack on 13 September:

1) Serving tower, serving the main distillation unit, destroyed.
2) The CO2 and CO removal plant and the injector house received minor blast damage.
3) Water gas plant suffered blast damage.
4) Stores end construction offices completely destroyed.
5) Gas conversion plant slightly damaged.
6) Two stores buildings severely damaged.
7) Miscellaneous unidentified buildings damaged, or destroyed.

G. FRENCH OIL TARGETS (25 JUNE-6 AUGUST)

1. SETE and BALARUC Refineries (25 June)

On 25 June two groups of the 55th Bombardment Wing attacked the Sete and Balaruc oil refineries and storages in Southern France.

Next to Marseilles, Sete is the most important port in Southern France. At Sete, the refinery is owned by the Vacuum Oil Company. The throughout capacity was estimated at 210,000 tons per year and cracking capacity at 150,000 tons per year. An unconfirmed report stated that the plant had facilities for the extraction of oil from grape pips. Storage capacity was estimated at 70,000 tons.

SIH flak was encountered at both Sete and Balaruc for two minutes. Six e/a were observed, with no encounters. No a/c were lost or missing on these operations over Southern France.

Reconnaissance shows:

Sete

1) Many craters NE side of oil storage.
2) One medium storage tank destroyed.
3) One medium storage tank badly damaged.
4) Adjoining buildings damaged.
5) Heavy damage to goods station, M/Y and rolling stock.

Balaruc

1) M/V docked at refinery set on fire.

2) Direct hits on storage tanks.
3) Several unidentified industrial installations damaged.
4) Some damage to rail lines.

2. LE PONTET Oil Storage (6 August)

On 6 August one group of the 55th Bombardment Wing attacked the Le Pontet oil storages in the Avignon area. The attack was part of the "softening up" process of enemy activities in Southern France prior to the invasion. All a/c returned to base.

MIH flak was encountered for a period of 3-5 minutes. Seven ME-109s were observed with no encounters. Damage to oil storage was not extensive.

1) One small tank destroyed.
2) One medium tank damaged.
3) Adjoining industrial areas damaged.
4) Rail lines West of target cut.

H. YUGOSLAVIAN OIL TARGETS (11 JUNE-3 JULY)

1. SMEDEREVO Oil Refinery (11 June)

On 11 June three groups of the 55th Bombardment Wing attacked the Smederevo oil refinery and train ferry. Although a very small refinery, compared to the Rumanian and Central European refineries, this had importance as a result of sustained operations against larger plants, as well as for its strategic location on the Danube. The town is situated 25 miles SE of Beograd on the south bank of the Danube River. Late in May, 1944, it was observed that additional construction was underway. Ground sources revealed that crude oil was piped to Giurgiu and thence transported by barges to smaller refineries along the Danube. The Smederevo refinery furnished an ideal plant for such refining.

The attack was so executed to avoid the heavily defended Beograd area, and no flak was encountered at the target. No enemy aircraft were seen. The operation was executed without loss of aircraft.

Reconnaissance shows that although the main weight of the bombing extended to the North and East, a very heavy concentration of craters was seen in the refinery.

1) One or two small tanks in the distillation plant destroyed.
2) Minor blast damage to other sections of the unit.
3) Two office buildings completely destroyed.

4) Rail sidings cut.

2. BELGRADE Shell Oil Depot (3 July)

On 3 July, 28 B-24s of one group of the 55th Bombardment Wing attacked the oil storages at Belgrade. The Shell Depot was used as a distribution center for gas, diesel oil and kerosene for German forces in Yugoslavia and Greece. At the time of the attack it was estimated that the storages represented roughly 9,000 tons. Ideally located for distribution, the depot also had such a position that stock could be easily replenished from Rumania via the Danube River.

28 a/c dropped 70 tons of 500 lb GP bombs by visual means. No e/a were encountered. Flak was MIH. The operation was executed without loss of aircraft. The attack left the target in flames and smoke. The largest concentration of bombs fell in the Eastern half of the target area. A reconnaissance flown on 8 July shows that almost one-third of its storage capacity was destroyed, which would reduce the capacity to 14,000 tons.

1) Pumping and filling station completely destroyed.
2) One large and two medium storage tanks destroyed.
3) Administrative buildings one-half destroyed.

I. CZECHOSLOVAKIAN OIL TARGETS (24 AUGUST)

1. PARDUBICE (FANTO) Oil Refinery (24 August)

The Fanto Oil Refinery, at Pardubice, is situated 58 miles East of Prague. It was the largest oil refinery in Czechoslovakia, and ranked as the fifth largest of all Axis refineries, that is for crude oil products, outside of Rumania. Annual capacity was estimated at 180,000 tons, or roughly 1.28% of available Axis refining capacity. In August, intelligence reports indicated a production of 3,000 tons of gasoline per month. After apparently successful attacks on the Odertal and Korneuburg refineries, this plant assumed top priority, especially after the attacks on Ploesti were concluded.

On 24 August, 110 B-24 a/c from the four groups of the 55th Bombardment Wing attacked the Fanto Oil Refinery. No flak was expected, although a previous night attack had encountered SIH. The Wing was subject to possible fighter attacks while enroute to the target, from the Villaorba area, Vienna and from an estimated 40-50 SEF transferred from the Nuremburg sector. It is important also to consider that at this period the enemy had been tending to single one group or one squadron for mass attacks.

On this mission the enemy fighter controller selected the 55th Bomb Wing for his fighter interceptors. Reports from bomber crews indicate that the enemy dispatched approximately 90-115 SEF, predominantly ME-109s with the remainder of the force composed of FW-190s. The attacks took place in the Linz-Steyr area immediately after the rally point which was west of Perdubice. The e/a were very aggressive and must have been piloted by the most experienced pilots. For forty minutes they engaged the Wing formation as well as the fighter escort. The effort, although a brave attack, cost the enemy a total of 53 aircraft destroyed, probably destroyed or damaged by bomber gunners, out of 88 encounters. Our losses to enemy aircraft were 5 bombers, a number due mostly to the aggressive attacks centered on one group. The fighters aided in forcing the bombers slightly off course, which, due to close proximity to Steyr, caused the loss of one bomber to flak.

Prior to the attack by this Wing, the refinery had been attacked by a night force of 65 bombers on 21/22 July. Consequently the day attack stands as the initial and the sole attack in strength on the target. From post reconnaissance photos, there is no question that the Wing executed superior bombing so that the refinery could be considered removed from the priority list for some time. The attack stands as an excellent example of the precision bombing of installations partially protected by blended camouflage. The lead bombardment group scored 81.1% of bombs plotted within the 1,000' radius of the briefed mean point of impact.

Post reconnaissance photos taken on 28 August show the following assessment:

Primary Objectives

1) Distillation plant - all buildings hit, badly damaged.
2) Shell stills severely damaged.

Secondary Objectives

1) Boiler house - 2/3 of roof destroyed, remainder of house well blasted.
2) One building, possibly a new boiler house - possible internal damage.

Miscellaneous Installations

1) All three office buildings damaged.
2) Packing and storage buildings one-half destroyed.
3) Lubo oil filtration and wax separation plant 2/3 destroyed.
4) Possible new distillation building damaged.
5) Oil treatment plant one-half gutted.
6) Workshops 2/3 destroyed.
7) 19 oil storage tanks destroyed, 2 damaged.

STATISTICAL SUMMARY

RUMANIA
18 May 1944 - 18 August 1944

Target	A/C	Tonnage	Losses	E/A	Flak	Missing	Accidents	Encounters	Claims
Concordia Vega	62	124.00	2	1	1	0	0	20	7-6-6
Dacia Romana	179	357.00	14	7	5	1	1	73	19-3-10
Standard	86	213.75	1	0	0	1	0	1	1-0-0
Romano Americana	171	375.5	1	0	1	0	0	1	0-0-0
Astra Romana	127	310.75	6	0	2	4	0	0	0-0-0
Unirea Sperantza	36	89.00	2	0	1	1	0	13	2-3-1
Redeventza	27	58.00	0	0	0	0	0	7	1-0-1
Giurgiu	117	233.00	2	0	2	0	0	5	0-1-0
Titan	45	110.25	1	1	0	0	0	45	13-16-4
Prahova	64	119	0	0	0	0	0	3	2-0-0
	914	**1990.25**	**29**	**9**	**12**	**7**	**1**	**168**	**45-29-22**

AUSTRIA
16 June 1944 - 22 August 1944

Lobau	132	258.25	2	0	2	0	0	80	13-9-9
Florisdorf	210	473.15	14	3	9	2	0	148	37-11-6
Korneuburg	96	237.25	2	0	1	1	0	0	0-0-0
	438	**968.65**	**18**	**3**	**12**	**3**	**0**	**228**	**50-20-15**

HUNGARY
14 June 1944 - 17 September 1944

Petfurdo	141	277.25	0	0	0	0	0	0	0-0-0
Szony	103	255.00	0	0	0	0	0	0	0-0-0
Magyar	48	118.50	0	0	0	0	0	0	0-0-0
Shell	55	144.00	0	0	0	0	0	0	0-0-0
	347	**794.75**	**0**	**0**	**0**	**0**	**0**	**0**	**0-0-0**

GERMANY
7 July 1944 - 27 August 1944

Target	A/C	Tonnage	Losses	E/A	Flak	Missing	Accidents	Encounters	Claims
Blechhammer	**279**	**688.00**	**16**	**0**	**6**	**10**	**0**	**41**	**10-3-5**

ITALY
6 July 1944 - 13 July 1944

Porto Marghera	**200**	**497.75**	**0**	**0**	**0**	**0**	**0**	**0**	**0-0-0**

POLAND
20 August 1944 - 13 September 1944

Czechowice	85	209.00	0	0	0	0	0	0	0-0-0
Oswiecim	63	235.75	0	0	0	0	0	0	0-0-0
	181	**444.75**	**0**	**0**	**0**	**0**	**0**	**0**	**0-0-0**

FRANCE
225 June 1944 - 6 August 1944

Balaruc	68	133.75	0	0	0	0	0	0	0-0-0
Le Pontet	42	105.00	0	0	0	0	0	0	0-0-0
Sete	67	134.00	0	0	0	0	0	0	0-0-0
	177	**372.75**	**0**	**0**	**0**	**0**	**0**	**0**	**0-0-0**

YUGOSLAVIA
11 June 1944 - 3 July 1944

Smederevo	102	252.50	0	0	0	0	0	0	0-0-0
Shell	28	70.00	0	0	0	0	0	0	0-0-0
	130	**322.50**	**0**	**0**	**0**	**0**	**0**	**0**	**0-0-0**

CZECHOSLOVAKIA
24 August 1944

Pardubice	**110**	**247.25**	**7**	**5**	**1**	**1**	**0**	**88**	**37-9-7**

Grand Total

Country	A/C	Tonnage	Losses	E/A	Flak	Missing	Accidents	Encounters	Claims
Rumania	914	1990.25	29	9	12	8	1	168	45-29-22
Austria	438	968.65	18	3	12	3	0	228	50-20-15
Hungary	347	794.75	0	0	0	0	0	0	0-0-0
Germany	279	688.00	16	0	6	10	0	41	10-3-5
Italy	200	497.75	0	0	0	0	0	0	0-0-0
Poland	181	444.75	8	0	2	6	0	0	0-0-0
France	177	372.75	0	0	0	0	0	0	0-0-0
Yugoslavia	130	322.50	0	0	0	0	0	0	0-0-0
Czechoslovakia	110	274.25	7	5	1	1	1	0	37-9-7
	2776	**6353.65**	**78**	**17**	**33**	**28**	**1**	**525**	**142-61-49**