JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET LOCATION SHEET

CONFIDENTIAL

SUMITOMO LIGHT METALS CO., SHIMIZU PLANT

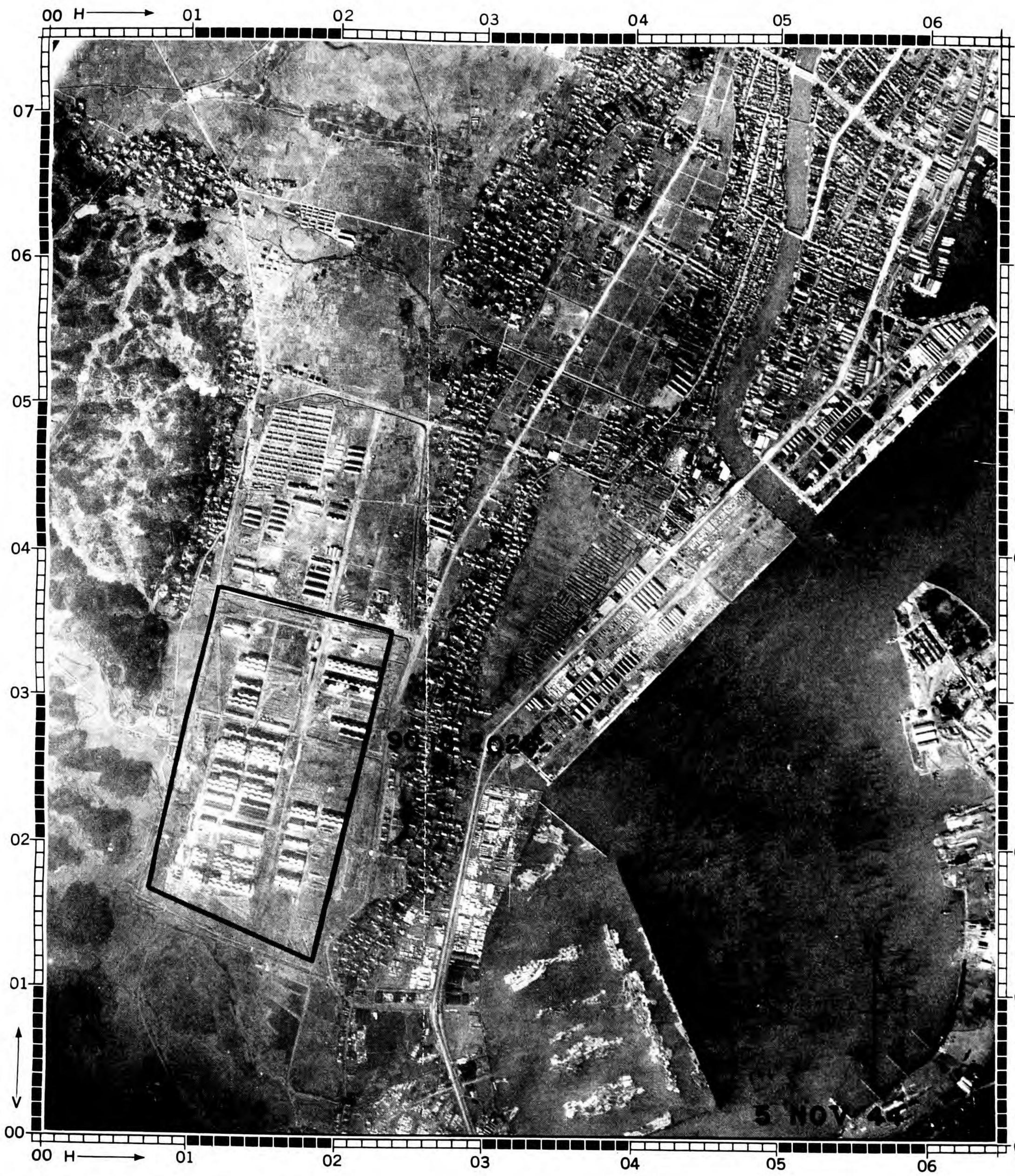
SHIMIZU **JAPAN**

SHEET No.	90.18-2023—TL
DATE	16 May 1945
TARGET No.	90.18-2023
CATEGORY	End Prdt. Ind. Aircraft
COORDINATES	34°59′N 138°29′E
ALTITUDE	10 feet

SIGNIFICANCE:

This plant was originally known as Shimizu Nippon Gakki and is reported to be producing plywood and alloy aircraft parts. It is also reported to be making wings and fuselages.

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft.



LARGE SCALE ILLUSTRATION—SCALE APPROX.: 1:16,900

SMALL SCALE ILLUSTRATION—SCALE APPROX.: 1:64,000

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NARA. Date 4-5-77

JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET LOCATION SHEET

SUMITOMO LIGHT METALS CO., SHIZUOKA PLANT

SHIZUOKA JAPAN

SHEET No. 90.18-2024–TL
DATE . . . . . 16 May 1945
TARGET No. 90.18-2024
CATEGORY . . . . End Prdt. Ind.—Aircraft
COORDINATES . . . . 34°58′N 138°25′E
ALTITUDE . . . . . 40 feet

SIGNIFICANCE:

This plant is reported to be producing aircraft parts although it is not known whether they are engine or airframe parts. The machine shop type buildings suggest that engine parts are more likely to be the product rather than airframe components.

LARGE SCALE ILLUSTRATION–SCALE APPROX.: 1:16,900

SMALL SCALE ILLUSTRATION–SCALE APPROX.: 1:64,000

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JOINT TARGET GROUP, WASHINGTON, D.C.
TARGET INFORMATION SHEET

Sheet No. 90.20-193 TI/I
Date 13 Feb. 1945
Page No. 1 (3 pages)

Obj. Folder 90.20
Obj. Area 90.20
AAF Target No. 90.20-193

Place Nagoya (Japan)
Air Target
System Aircraft

Lat.: 35° 11'N
Long: 136° 57'E
Alt.: 62 feet

NAME OF TARGET **MITSUBISHI AIRCRAFT ENGINE WORKS**
(Mitsubishi Jukogyo KK; Nagoya Hatsudoki Seisakusho)

ALL PREVIOUS SHEETS CANCELLED

NOTE: The information supplied in the following sheets is based upon the condition and activity of the plant prior to bombing attacks. This revision to the Target Information Sheet of 16 Dec. 1944 is for the purpose of incorporating recent intelligence only and no attempt is made to assess the effects of bombing, which is done in a special Bomb Damage Assessment Report issued separately. In evaluating this plant as a target, however, it is important that the latest Bomb Damage Assessment Report be considered.

SIGNIFICANCE

This plant is currently estimated to be one of the two largest Japanese producers of combat aero-engines. It manufactures both Army and Navy types and probably turns out more than 1600 operational engines per month, or 40 per cent of the Japanese total. Both the older types under 1500 HP and the newer 1800 or more HP engines are known to be made here. The plant has not yet reached maximum production.

A large proportion of the engines manufactured goes to the Mitsubishi Aircraft Works, TARGET 90.20-194, but engines are also sent to the assembly plants of Kawanishi Aircraft Co., Naruo Plant, TARGET 90.25-18; Aichi Aircraft, Eitoku Plant, TARGET 90.20-1729; Nakajima Aircraft Co., Koizumi Plant, TARGET 90.13-1545, and Kawasaki Aircraft Co., Akashi Plant, TARGET 90.25-1547.

LOCATION

In the NE section of Nagoya city, about 2.5 miles E of Nagoya Castle and about 8 miles NE of Nagoya Harbor piers (TARGET 90.20-251) at the mouth of the Hori River. The Chigusa Factory of Nagoya Arsenal (TARGET 90.20-196) is about 1000 feet to the S; the Mitsubishi Electric Mfg. Co. is about 1000 feet to the W. The southern branch of the Shonai River, making its northern loop around the city, passes by the N edge of the E section (Plant No. 2) of the target. The compound is adjacent to built-up area on the N, S, and W, to open country on the E and to wooded park land on the SE.

DESCRIPTION AND LAYOUT

(Refer to Illustration No. 90.20-193 P4). There are two distinct sections in this plant. The older, (Plant No. 1), is a rough rectangle which measures about 3000 feet E-W and averages about 1800 feet N-S. The newer portion, (Plant No. 2), is also a rough rectangle measuring about 4200 feet E-W by 800 feet N-S. Most of the main machining and assembly buildings lie in two compact groups, one in the older or western section and the other in the extreme eastern portion of the new plant. There are scattered foundry, machining and storage buildings between the two main sections.

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PRIMARY OBJECTIVES

(Refer to Illustration No. 90.20-193 P4). The machine shops in both the old section on the W and the new section on the E. These buildings and their areas are:

Building No.	Plant No. 2 Function	Approx. Area
105	Machine Shop & Assembly	530,000
114	Machine Shop	87,000
121	Machine Shop and/or Tool Shop	87,000
122	Machine Shop and/or Tool Shop	51,000
123	Machine Shop and/or Tool Shop	51,000
29b and c	Machine Shop and Heat Treatment	420,000
62b, c, and d	Machine Shop and Heat Treatment	460,000
8	Valve Shop	65,000
	Total	1,751,000

CONSTRUCTION & VULNERABILITY

Major buildings are of single-story, medium-span (30 by 60 feet), sawtooth-roof construction. Construction is steel frame covered with corrugated asbestos and iron roofing and siding. Fire divisions in the important buildings are large. Administration buildings, which are concentrated in Plant No. 1, are of multi-story reinforced concrete construction. Engine test cells are of reinforced concrete.

WEAPON RECOMMENDATIONS

Instructions with regard to weapons will usually be given in Field or Operational Orders, but in the absence of such specific instructions and to assist Planners in formulating such orders the following information is given:

A combined attack with H.E. and incendiary weapons is recommended. A preliminary structural and occupancy analysis indicates that the following weapons would be most effective:

AN-M64 500-lb G.P., fuzed 0.1 sec. nose/0.01 sec. tail.
(.01 sec. nose fuzes, M139, should be used if available).

AN-M50 4-lb I.B. (in M17 clusters)

The 500-lb G.P. is recommended as the most effective weapon as the primary buildings, housing machine shops, are of normal spans, and therefore not subject to spreading collapse. The 0.01 sec. fuzing will cause the bomb to explode 6 to 10 feet beneath the roof and thereby greatly damage machines as well as the structure. The 1000-lb G.P., fuzed similarly to the 500-lb bomb would be alternate H.E. choice.

The principal structures are well separated and non-combustible, making the spread of fire unlikely. The multiplicity of hits obtainable with the AN-M50 bomb is desirable in order to ignite the combustible portions of the contents. Penetration will be good as the roofs are light. AN-M47 70-lb incendiary would be an alternate choice.

CAMOUFLAGE, DECOYS AND SMOKE SCREENS

Photography of 23 Nov. 1944 shows all main buildings effectively camouflaged with disruptive painting. The use of decoys or smoke screens has not been reported.

ADDITIONAL INFORMATION

Ground intelligence is sufficient to indicate with considerable accuracy the types of engines manufactured at this plant. The following table lists the principal engines produced, the plane in which the engine is used and the plant at which the plane is made.

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TARGET INFORMATION SHEET *(Contd.)*

Engine	For Planes	Made By	Target No.
	Army Types		
Type I 1050 (1) (Ha 102)	Topsy	Mitsubishi Nagoya	90.20-194
	Nick	Kawasaki Akashi	90.25-1547
	Dinah	Mitsubishi Nagoya	90.20-194
Type 99 900 (2)	Sonia	Mitsubishi Nagoya	90.20-194
		Tachikawa Army Air Arsenal	90.17-2008
	Thelma	Kawasaki Kagamigahara	90.20-240
Ha 104, and other high-powered engines	Peggy		
	Steve	Mitsubishi Nagoya	90.20-194
	Ki 83		
	Edna	"Air Depot"	?
	Clara		
	Pat	Tachikawa Aircraft	90.17-792
	Navy Types		
Kinsei 43/44 (3)	Jake	Watanabe Aircraft	90.35-662
	Kate	Hiro Naval Aircraft	90.30-660
53	Tabby	Showa Aircraft	90.17-791
54	Paul, Val	Aichi Eitoku	90.20-1729
62 (4)	Judy	Aichi Eitoku	90.20-1729
Zuisei 13	Pete	Omura Aircraft	90.36-1627
Kasei 13/24	Norm, Rex	Kawanishi Naruo	90.25-18
	Luke	Mitsubishi Nagoya	90.20-194
21	Betty	Mitsubishi Nagoya	90.20-194
		Mitsubishi Mishima	90.27-1681
22	Emily	Kawanishi Fukae	90.25-1702
23	Jack	Mitsubishi Nagoya	90.20-194
25	Jill	Nakajima Koizumi	90.13-1545
	Frances	Mitsubishi Nagoya	90.20-194
	Betty	Mitsubishi Mishima	90.27-1681
Ha 104 (Navy Equivalent)	"Taizan"	Mitsubishi Nagoya	90.20-194

NOTES: (1) *Believed to be manufactured also by Tachikawa Army Air Arsenal (TARGET 90.17-2008).*

(2) *Hitachi Aircraft has probably taken over production of this engine at its Tachikawa Plant (TARGET 90.17-2009).*

(3) *Believed to be manufactured now by Hitachi Tachikawa (TARGET 90.17-2009) and Hiro Naval Aircraft (TARGET 90.30-660).*

(4) *It is not known to what extent this engine is used in Judy, which is normally powered by the in-line Atsuta engine.*

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Sheet No. 90.20-193DA
Date 9 Jan. 1945
Page No. 1 (5 pages)

JOINT TARGET GROUP, WASHINGTON, D.C.
ECONOMIC DAMAGE ASSESSMENT REPORT NO. 2

Obj. Folder 90.20
Obj. Area 90.20
AAF Target No. 90.20-193
NAME OF TARGET MITSUBISHI AIRCRAFT ENGINE WORKS

Place Nagoya City (Japan)
Category Aircraft

Lat.: 35°11' N
Long: 136°57' E
Alt.: 62 feet

PARTICULARS OF ATTACK

On 13 December 1944, this plant was attacked by 70 B-29's of the 21st B.C. Approximately 179 tons of bombs (divided nearly equally between 500 lb. M76 I.B. and 500 lb. GP bombs) were dropped from a planned base altitude of 27,000 feet.

PREVIOUS REPORTS

None.

SUMMARY OF CONCLUSIONS

1. The older section of the factory (Plant #1) received widespread damage. 25 percent of the plant was damaged, three quarters being superficial and only one quarter structural.

2. The critical buildings in Plant #1, the machine shops, received 3 percent structural damage and 28 percent superficial damage.

3. Loss in output will depend largely on the extent to which internal fire accompanied the bomb damage to the machine shops - the range being between 1400 and 3300 engines.

a. Minimum assumptions of internal damage indicate a net loss of one month's production of standard Mitsubishi engines or about 1400 engines. Half of this loss will be from material destroyed in process of manufacture; half from shut down while production is being restored.

b. Maximum assumptions of damage increase this loss to a total of a little less than 2½ months production or 3300 engines. It is believed that one months production will be lost by destruction of material in process of fabrication and one and about one-half month's additional output will be lost while facilities are being repaired.

4. Most of the physical damage to buildings should be repaired within one month's time.

5. The plant will probably not be dispersed unless re-attacked. If there is any dispersal, it is likely that operations formerly carried out in the large machine and assembly shop most seriously hit (building 62) will be moved.

6. The damage to the new plant (Plant #2) affected only the foundry and should not be reflected in any appreciable loss of Ha-104 or similar new, high powered engines.

7. Both plants, and especially Plant #2, are ready for immediate re-attack.

PHYSICAL DAMAGE

The damage to this factory was almost entirely confined to the older of the two plants comprising this target. This part of the factory, "Plant #1" (see illustration DP2) received 144,000 square feet of structural damage and 464,000 square feet of superficial damage. In the new section of "Plant #2" only the building identified

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as the foundry was hit. This building received 12,000 square feet of structural and 94,000 square feet of superficial damage.

The following damage appears to have been done:

Plant #1

Probable Function (Building #)	Total Area in 1000s of sq. ft.	Structural Damage in 1000s of sq. ft.	% Total	Superficial Damage in 1000s of sq. ft.	% Total
Machine Tool Shops, Heat Treatment 62b-d, 29c-g, 74, 38	1246.6	37.1	3	354.4	28
Engine Assembly (29a, 62a)	338.0	35.2	10	82.9	25
Test	103.5	0	0	0	0
Forge, Foundry (7a,b, 66, 67)	145.2	0		0	0
Storage (1-6,13-18,20, 39,46,58,68-73, 75)	269.2	49.9	19	18.5	7
Non-productive and unidentified	359.9	22.1	6	85	2
Total Plant #1	2462.4	144.3	6	463.6	19
		Plant #2			
Machine and Tool Shops (105b, 113, 114, 121-123)	732.9	0	0		
Engine Assembly (1052)	110.0				
Test (101-104)	32.9				
Foundry (80)	208.8	12.1	6	94.1	45
Storage (76-79,81-88,90-98,100,107-112, 115-120,124)	275.5				
Non-Productive, etc.	180.6				
Total Plant #2	1540.7	12.1	1	94.4	6
Total Both Plants	4003.1	156.4	4	557.7	14

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By _____ NARA, Date 4-6-11

Plant No. 1

ECONOMIC ASSESSMENT

Assessment of the damage to this factory - especially to Plant #1 - is made difficult by insufficient information as to the internal functions of the main buildings, and by the difficulty in determining how widespread fire damage to contents has actually been.

DAMAGE TO MACHINE SHOPS

As noted in the above table, about 3 percent of the machine shop area was structurally damaged and 28 percent received superficial damage, a total of 31 percent. This large amount of superficial damage alone would not interfere with the plant operations for more than one month. It is also believed that the structural damage, taken by itself, if unaccompanied by any widespread internal fire, is insufficient to have knocked out any one production process for more than one or two weeks time. If internal fire has been relatively widespread, however, the output of several important components may be curtailed for a one to two months' period.

The following table summarizes the estimated loss to the various machine processes.

Building	Function	HE hits	Assuming little internal fire damage		Assuming large fire damage	
			Loss of material in process	Net loss of future components due to repairs	Loss of material in process	Net loss of future components due to repairs
62 C	Manifolds	2	2-4 days	±1 week	2-4 days	2-4 weeks
	cyl. barrels	1(?)	1 day	½-1 week	1 day	½-1 week
	Crankcases	-	--	--	±1-2 wks.	½-1 month
	Valves	1	1 day	½-1 week	1 week	±1 month
	Crankshifts	1	4-7 days	½-1 week	2-3 wks.	±1 month
29b	---	1	1 day	½-1 week	½-1 week	½-1 week
74	---	4	3 days	± 2 weeks	±2 weeks	±1½ months

Since, in all probability, the machine functions performed in buildings 62, 29 and 74 are parallel, the damage to them is not cumulative but is controlled by the maximum damage estimated for any one department. Under the minimum assumptions stated above, the equivalent of about 3 days output would be destroyed in process and the entire loss, including repair time, would be the equivalent of 2½ weeks' production. Under the maximum assumptions stated above, the immediate loss might amount to 2 weeks' output of some unknown component or components (in building 74) and an additional loss of 6 weeks' output due to fairly widespread damage to machining processes.

DAMAGE TO ENGINE ASSEMBLY

Both of the engine assembly sections of Plant #1 were hit, one of them (building 62-A) quite heavily.

It seems likely that well over three-quarters of all engines in stocks, assembly, strip and inspection, and reassembly in building 62a were destroyed. As internal fire damage was far less in building 29a, the loss amounted to approximately one-eighth of the total number of engines in assembly in that building. In all, about half of the total number of engines being assembled in Plant #1 - one week's output at the most was lost.

The repair time to this process will depend purely on time required to make repairs to buildings since the replacement time of stocks, on work tables is negligible.

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DAMAGE TO OTHER PROCESSES

Damage to warehouses and storage areas was moderately severe, amounting to 25 percent of the total. A large percentage of the damage is believed to have been done to incoming raw materials (buildings 24, 49, 51, 58, etc.) which can not be assessed in terms of lost engines. At best, it seems unlikely that more than the equivalent of one-half of one weeks engine output was lost by destruction of these buildings.

Plant No. 2

DAMAGE TO PLANT NO. 2

Damage to the foundry (building 80) was scattered and largely superficial and unless a large percentage of the patterns were destroyed, it is not likely that the loss will be seriously reflected in finished aircraft. This damage can be repaired within three weeks and a shortening of the pipe lines between finished castings and assembly should compensate for this loss in the second month following the attack.

LOSS OF OUTPUT

The losses to contents and processes is summarized as follows:

Plant #1

Process	Minimum Net Loss	Maximum Net Loss
Machinery contents	½ - 1 week	2 - 3 weeks
Machinery processes	2 weeks	6 weeks
Assembly contents	1 week	1 week
Assembly processes	---	---
Stock contents	½ week	½ week
Stock processes	---	---
Total contents	2 - 2½ weeks	3½ - 4½ weeks
Total processes	2 weeks	6 weeks
Total loss	4 - 4½ weeks	9½ - 10½ weeks

Monthly output of Plant #1 is believed to be about 1400 of the Standard Mitsubishi models - the Kinsei, Kasei; Type 1, 1050, Type 100, 1450, etc., used on both Army and Navy aircraft. No estimate can be made as to whether one service or the other will be more seriously affected. The above estimates suggest that the minimum loss would be about 1400 engines; maximum loss would amount to about 3,300 engines. It is estimated that, under minimum assumptions, it would take four weeks and under maximum assumptions, 10 weeks, to restore the plant to normal output.

U.S., British and German experience suggests that the superficial damage and the smaller areas of structural damage (all but the large area of damage in buildings 62a and 74e), can be repaired within one months time. The larger areas of structural damage in buildings 62a and 74e can be shut off from the rest of the plant without undue strain on the productive capacity and will have little bearing on the net loss of engines.

FUTURE TARGET VALUE

The newer portion of this factory, Plant #2, was scarcely hit. Buildings west of building 62 in Plant #1, were not severely damaged and reattack will complicate the recovery of this plant and set forward the date at which full production is attained.

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Undamaged contents of building 62 might be dispersed to other sites in Nagoya but the speed with which repairs can be made suggests that it will be repaired.

The whole target is now ready for reattack although full production will not be attained until one month after attack.

LIST OF ILLUSTRATIONS & SCHEDULE

The supporting documents for this report are as follows:

90.20-193 DPI - Unannotated post attack photograph.

90.20-193 DP2 - Industrial damage plan and bomb fall plot.

90.20-193 DS - Industrial damage schedule.

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NARA Date 4-5-77

JOINT TARGET GROUP-WASHINGTON, D. C.

TARGET NO. 90.20-193

MITSUBISHI AIRCRAFT ENGINE WORKS

NAGOYA CITY, JAPAN

ILLUSTRATION NO. 90.20-193 PI

APPROX. COORDINATES 35° 11' N 136° 57' E

ISSUED DEC. 1944

PHOTOGRAPHED 23 NOV. 1944

RESTRICTED

0 2000 4000 6000 FEET

0 ½ 1 MILE

1:32 000 APPROX

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RESTRICTED

TYPE A

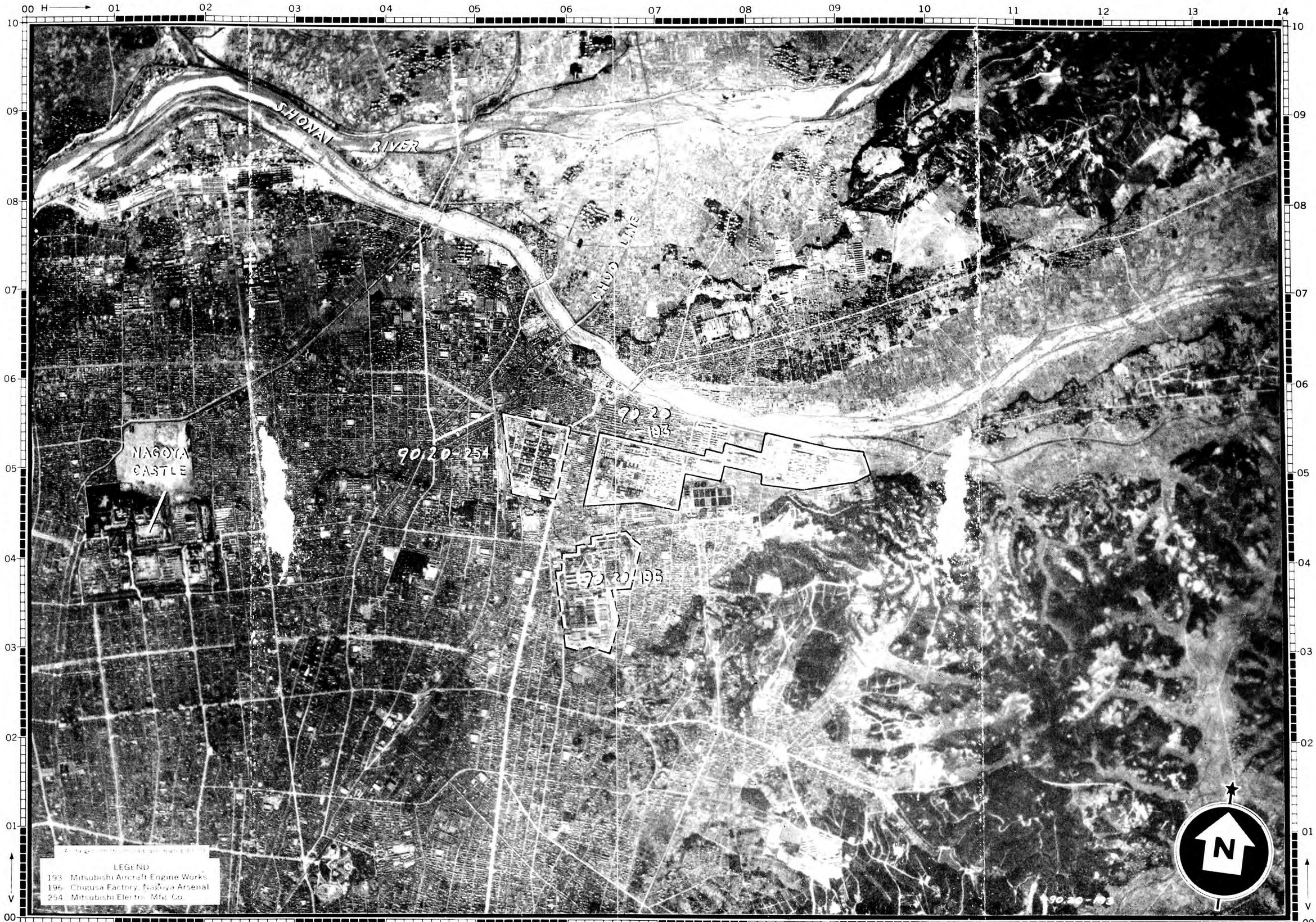
JOINT TARGET GROUP
WASHINGTON, D. C.

MITSUBISHI AIRCRAFT ENGINE WORKS
NAGOYA JAPAN

0 2000 4000 6000 FEET
0 ½ 1 MILE
1:32 000 APPROX.

RESTRICTED

ILLUSTRATION No. . . **90.20-193 P2/1**
DATE . . . . . **29 April 1945**
TARGET No. **90.20-193**
COORDINATES . . . **35°11'N 136°57'E**
PHOTOGRAPHED **23 November 1944**



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May be taken into the air if data is trimmed off

NARA Date 4-6-77

JOINT TARGET GROUP-WASHINGTON, D. C.

TARGET NO. 90.20-193

MITSUBISHI AIRCRAFT ENGINE WORKS

NAGOYA CITY, JAPAN

ILLUSTRATION NO. 90.20-193 P 3

APPROX. COORDINATES 35° 11' N 136° 57' E

ISSUED DEC. 1944

PHOTOGRAPHED 23 NOV. 1944

RESTRICTED

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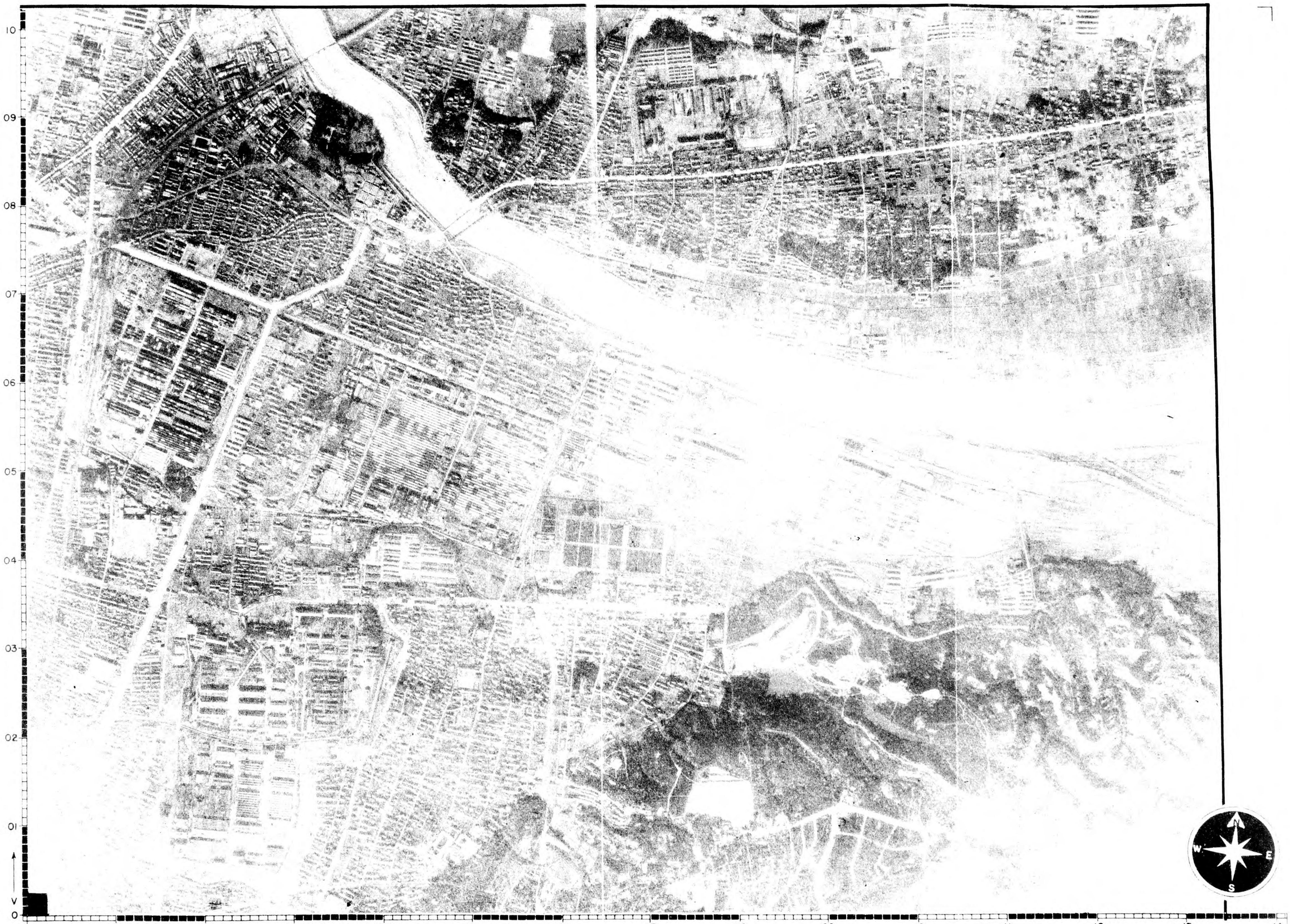
0 ½ 1 MILE

12 000 APPROX.



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RESTRICTED

TYPE B

NARA Date 4/5/77

JOINT TARGET GROUP-WASHINGTON, D. C.

TARGET NO. 90.20-193 — MITSUBISHI AIRCRAFT ENGINE WORKS — ILLUSTRATION NO. 90.20-193 P4

NAGOYA CITY, JAPAN

APPROX. COORDINATES 35° 11' N 136° 57' E

PHOTOGRAPHED 23 NOV. 1944

ISSUED DEC. 1944

CONFIDENTIAL

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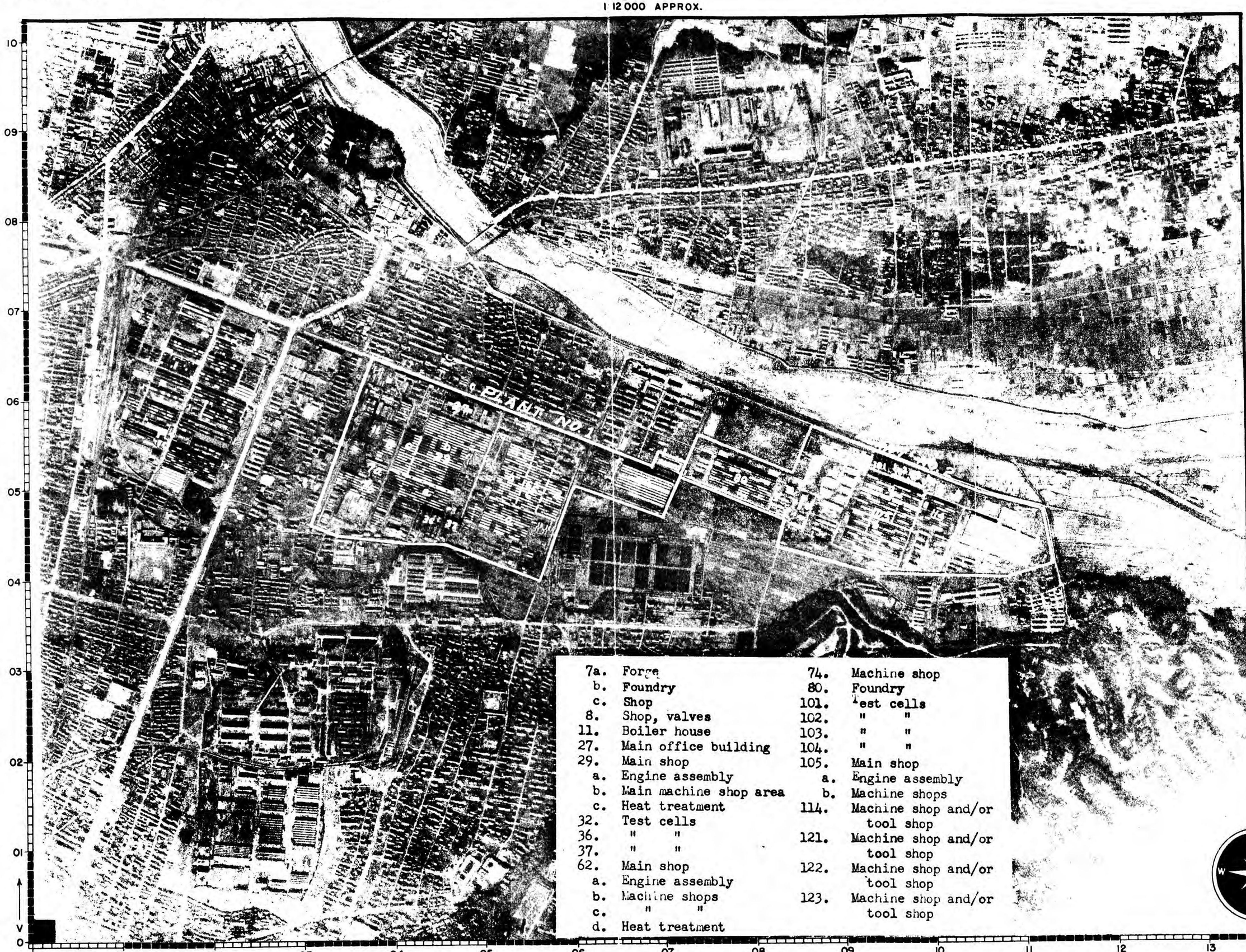

7a.	Forge	74.	Machine shop
b.	Foundry	80.	Foundry
c.	Shop	101.	Test cells
8.	Shop, valves	102.	" "
11.	Boiler house	103.	" "
27.	Main office building	104.	" "
29.	Main shop	105.	Main shop
a.	Engine assembly	a.	Engine assembly
b.	Main machine shop area	b.	Machine shops
c.	Heat treatment	114.	Machine shop and/or tool shop
32.	Test cells	121.	Machine shop and/or tool shop
36.	" "	122.	Machine shop and/or tool shop
37.	" "	123.	Machine shop and/or tool shop
62.	Main shop		
a.	Engine assembly		
b.	Machine shops		
c.	" "		
d.	Heat treatment		

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By _____ NARA, Date 4-6-77

JOINT TARGET GROUP, WASHINGTON, D. C.

TARGET INFORMATION SHEET

SHEET . . . . . 90:20-194—TI
DATE . . . . . 29 May 1945
PAGE 1

MITSUBISHI AIRCRAFT WORKS, NAGOYA AIRFRAME PLANT
(MITSUBISHI JOKOGYO, NAGOYA KOKUKI)

NAGOYA — JAPAN

TARGET 90:20-194
OBJ. AREA 90:20
OBJ. FOLDER 90:20
CATEGORY
End Prdt. Ind.—Aircraft

LAT. . . . . 35° 05′ N
LONG. . . . . 136° 54′ E
ALT. . . . . 15 feet

Note: This Target Information Sheet is issued to show the status and importance of the target following serious damage by air attack or removal of buildings. The sheet evaluates the target in the light of all intelligence available to JTG relating to damage and repair at the date of issue.

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft in place of 90:20-194 TI/1.

SIGNIFICANCE

Prior to attack this was the largest assembly plant in Japan producing both Army and Navy planes. Two precision attacks, and possibly the Nagoya area attacks have resulted in the destruction and removal of approximately 30 percent of the original building area. Because the damage was concentrated in assembly buildings and a part of the plant not yet in production the loss of aircraft output was not high and the Japanese might have quickly restored the plant to almost full operation.

Post-attack photography of poor quality, however, shows little repair, and the razing and stripping of some buildings. Little activity is seen at the plant. It appears likely that the equipment in the plant has been dispersed and production resumed in other locations. The plant still contains a large area of usable buildings and is probably still making some components and sub-assemblies for Mitsubishi planes. Production of completed aircraft is less likely. Thus, the plant has probably lost much of its pre-attack value. Final assessment of the target value of this plant cannot be made until photography of sufficient quality to permit detailed study of activity is obtained.

LOCATION

(Refer to Illustration No. 90:20-194 P2/1.) On reclaimed land at the NE corner of Nagoya Harbor. It is about 6.5 miles S of Nagoya Castle and about 7.25 miles SW of the large Mitsubishi Aircraft Engine Works (TARGET 90:20-193). The compound is bounded on the NW by the Nagoya Steam Power Plant No. 1 (TARGET 90:20-195), on the W by the waters of Nagoyo Harbor, and on the N and S by ship canals. The canal previously bordering the plant on the E has been filled in to make way for expansion.

DESCRIPTION AND LAYOUT

(Refer to Illustrations 90:20-194 P4/1 and 90:20-194 DP2.) This plant is divided into 5 principal areas which suffered varying degrees of damage. Area A, the section formerly devoted to production of Navy planes, received 20% roof damage in the machine shop section; Area B reported to be the section manufacturing Army aircraft, 15% of roof area in the critical sub-assembly buildings; Area C, a new section believed to have been planned for the production of an unidentified new plane, nearly 35% roof damage and substantial structural damage; and Area D, an experimental section, about 15% roof damage. Area E, consisting chiefly of warehouses and an apprentice school received little damage.

Since nothing is known as to the extent of dispersal or as to what, if anything, is made in the plant at this time, no production flow can be traced.

PRIMARY OBJECTIVES

No primary objectives can be selected at this time. Any undamaged roof area can be used for sub or final assembly of either aircraft or parts.

CONSTRUCTION AND VULNERABILITY

(Refer to Illustration 90:20-194 DP 2.) Major buildings are primarily of medium to long span, one-story, sawtooth roof construction, many with exposed chords. Buildings vary from 20 to 40 feet high at the eaves, and are predominantly fully framed in exposed steel with roofs and probably walls of corrugated asbestos and iron. Auxiliary buildings throughout the plant are predominantly one-story shed-type structures most of which are framed and sheathed in wood and have pitched roofs.

WEAPON RECOMMENDATIONS

Instructions with regard to weapons will usually be given in Field or Operational Orders, but in the absence of such instructions and to assist Planners in formulating such orders the following information is given:

An attack with a combination of high explosive and incendiary bombs is recommended. A preliminary structural and occupancy analysis of the plant indicates that weapons should be selected as follows:

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By ____ NARA, Date 4-6-11

JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET INFORMATION SHEET

SHEET . . . . . 90:20-194—TI
DATE . . . . . 29 May 1945
PAGE 2

	High Explosive	Fuzing	Incendiary
Preferred:	1000-lb GP	0.01 N/ND T	AN-M50 4-lb or
	or 2000-lb GP	0.01 N/ND T	AN-M69 6-lb (in
	or 500-lb GP	0.01 N/ND T	aimable clusters for high altitude attack
Alternative:	250-lb GP	0.025 N/ND T	AN-M47 70-lb AN-M76 500-lb Fire Bomb

Not recommended: 100-lb GP
SAP or AP bombs
Depth bombs

Notes: (a) The 250-lb GP and Fire bomb are recommended for low altitude attacks only. In minimum altitude attacks use 8-15 sec. delay fuzing.

(b) Use 0.1 N or 0.025 N fuzes if 0.01 N fuzes are not available and 0.01 T fuzes if ND T fuzes are not available. ND tail fuzing is recommended since most of the buildings have light roof material and are best destroyed by blast effects.

(c) The above recommendations are on a weight for weight basis.

ADDITIONAL INFORMATION

Loss of aircraft output due to the attacks was not as great as usual from 30% roof damage due to the fact that most of the damage was either in final assembly sections, which contain little equipment, or in Area C, not believed to be in production when attacked. If the equipment in the plant has been dispersed and production restored at other locations, as seems probable, the total loss of aircraft output was probably no more than 175/200 planes. The drop in target value of the plant is due less to the damage sustained than to the apparent dispersal of undamaged equipment.

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft after 90:20-194 TI page 1.

By ____ NARA, Date 4-6-77

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JOINT TARGET GROUP, WASHINGTON, D.C.

Sheet No. 90.20-194 DA
Date 24 February 1945
Page No. 1 (1 pages)

SUMMARY ECONOMIC DAMAGE ASSESSMENT REPORT NO. 5

Obj Folder 90.20
Obj Area 90.20
AAF Target No. 90.20-194

Place Nagoya (Japan)
Air Target System Aircraft

Lat: 35° 05'N
Long: 136° 54'E
Alt: 15 feet

MITSUBISHI AIRCRAFT WORKS

PARTICULARS OF ATTACK

On 18 Dec 44 this plant was attacked by 63 B-29's of the XXI Bomber Command. 19 of these planes bombed visually, the remaining 44 by instruments. 593 x 500 lb GP and 24 x 500 lb IB bombs were dropped from 28,000 - 32,000 feet - a total of 154 tons. The plant was re-attacked on 14 Jan 45 by 40 B-29's. 15 planes bombed visually and 25 by instruments. 377 x 500 lb GP bombs - 94.25 tons - were dropped from 29,000 - 32,000 feet.

PREVIOUS REPORTS

None.

PLANT FUNCTION

The largest airframe plant in Japan in size; this plant makes both Navy and Army types. The plant is divided into 5 sections: Area A, in which Navy fighters (Jack, Zeke/Sam) and bombers (Betty) are fabricated; Area B, devoted to the production of Army bombers and reconnaissance planes (Dinah, Sonia, Peggy, Taizan, etc.); Area C, a new plant believed to be just coming into production of unidentified type or types; Area D, engaged in production of unknown types as well as possibly supplying wings for Area B and housing apprentice school, etc.; Area E, general parts fabrication, storage.

DAMAGE ASSESSMENT

1. The following damage has been done to this plant:

Area	Total Plan Size (1000 sq ft)	Structural Damage 1000 sq ft	% Area	Superficial Damage 1000 sq ft	% Area
A	1817.7	169.2	9	245.5	14
B	1472.3	32.4	2	186.3	13
C	1045.6	189.2	18	204.2	20
D	767.0	72.0	9	0	0
E	574.7	10.0	2	0	0
Total	5677.3	472.8	8	636.0	11

2. This has resulted in the following estimates of output loss:

Betty	3 weeks net loss	35 - 40 planes
Jack	3 weeks net loss	35 - 40 planes
Zeke/Sam	2 weeks net loss	60 planes
Army Bombers and Recce	1 weeks net loss or possibly more	35 planes
New Planes of Unknown Type	2 - 3 months net loss	number unknown

3. Despite widespread superficial damage, little or no repair activity is apparent one month after the first attack, which suggests dispersal from the damaged section and possibly from the undamaged sections as well.

4. The target value of the plant is considerably reduced but unless more complete intelligence shows very great dispersion of production formerly carried on here, it must still be considered one of the important assembly plants in Japan.

Holders of JTG. Folders should insert this sheet in Air Target System Folder Japanese Aircraft with corresponding material

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NARA Date 4-5-77

JOINT TARGET GROUP • WASHINGTON, D. C.

MITSUBISHI AIRCRAFT WORKS

Nagoya Japan

TARGET No. 90.20-194

COORDINATES 35°05'N. 136°54'E

PHOTOGRAPHED 19 JANUARY 1945

0 500 1000 1500 2000 2500 3000 FEET

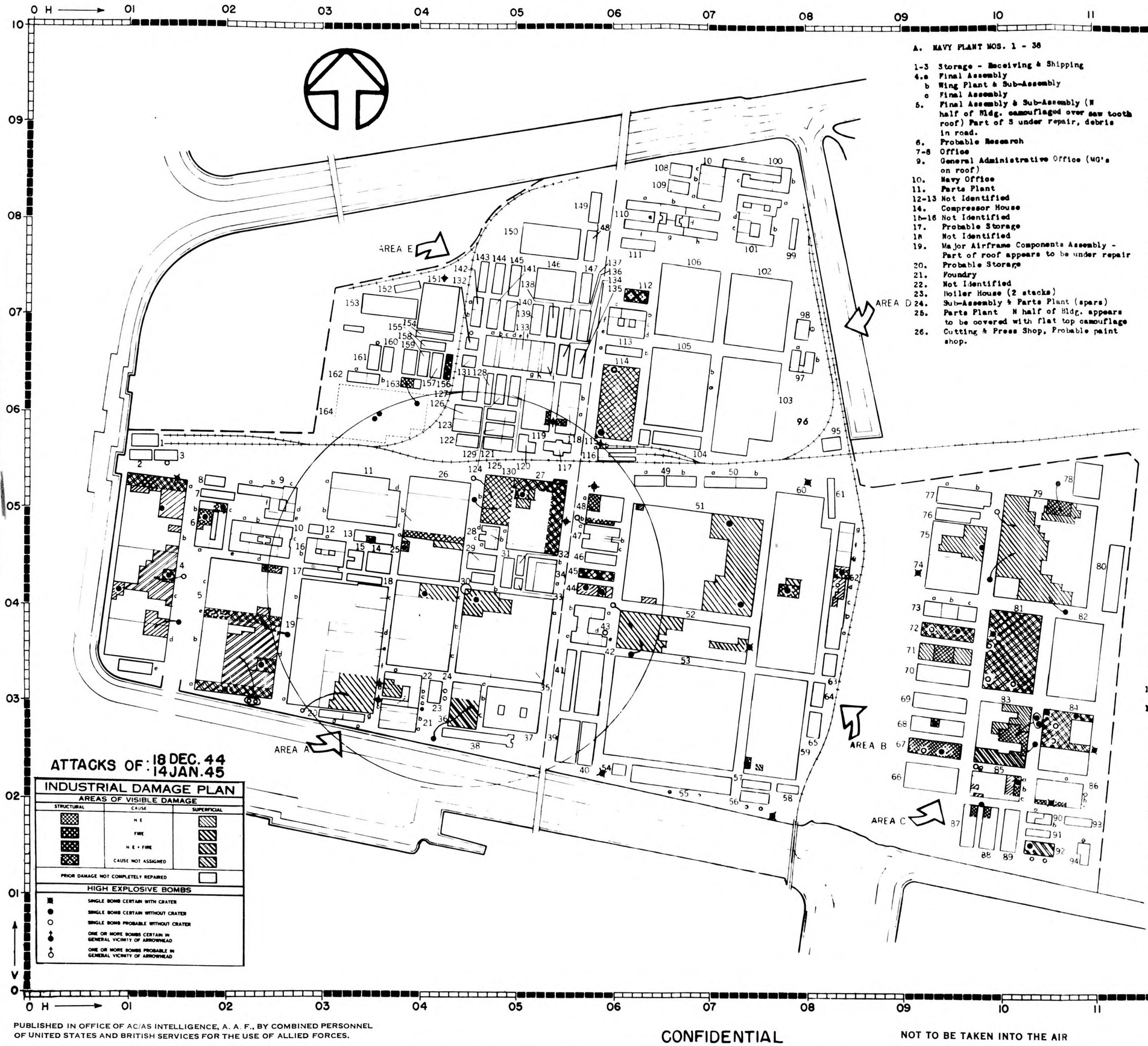
0 1/4 1:6000 APPROX. 1/2 MILE

ILLUSTRATION No. 90.20-194 DP 2

ISSUED 24 FEB. 1945

CONFIDENTIAL

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT WITH CORRESPONDING MATERIAL



ATTACKS OF: 18 DEC. 44
14 JAN. 45

INDUSTRIAL DAMAGE PLAN

AREAS OF VISIBLE DAMAGE

STRUCTURAL	CAUSE	SUPERFICIAL
	H E	
	FIRE	
	H E + FIRE	
	CAUSE NOT ASSIGNED	

PRIOR DAMAGE NOT COMPLETELY REPAIRED

HIGH EXPLOSIVE BOMBS

- SINGLE BOMB CERTAIN WITH CRATER
- SINGLE BOMB CERTAIN WITHOUT CRATER
- SINGLE BOMB PROBABLE WITHOUT CRATER
- ONE OR MORE BOMBS CERTAIN IN GENERAL VICINITY OF ARROWHEAD
- ONE OR MORE BOMBS PROBABLE IN GENERAL VICINITY OF ARROWHEAD

A. NAVY PLANT NOS. 1 - 38

1-3 Storage - Receiving & Shipping
4.a Final Assembly
b Wing Plant & Sub-Assembly
c Final Assembly
5. Final Assembly & Sub-Assembly (N half of Bldg. camouflaged over saw tooth roof) Part of S under repair, debris in road.
6. Probable Research
7-8 Office
9. General Administrative Office (MG's on roof)
10. Navy Office
11. Parts Plant
12-13 Not Identified
14. Compressor House
15-16 Not Identified
17. Probable Storage
18 Not Identified
19. Major Airframe Components Assembly - Part of roof appears to be under repair
20. Probable Storage
21. Foundry
22. Not Identified
23. Boiler House (2 stacks)
24. Sub-Assembly & Parts Plant (spars)
25. Parts Plant N half of Bldg. appears to be covered with flat top camouflage
26. Cutting & Press Shop, Probable paint shop.
27.a Press Shop
b Metal Shaping & Cutting
28-34 Not Identified
35-36 Machine Shops
37. Material Warehouse - 3 floors (A/A on roof)
38. Warehouse

B. ARMY A/C PLANT NOS. 39 - 65

39. Warehouse
40. Machine Shop
41. Storage
42. Machine Shop
43. Office
44-45 Probable Office
46-47 Not Identified
48-50 Storage
51. Final Assembly
52. Fuselage Assembly
53. Sub-Assembly
54. Not Identified
55. Press and Hammer Shop
56. Boiler House
57-58 Not Identified
59. Components & Parts
60. Component Erection
61. Not Identified
62. Storage Hangar Type
63-65 Not Identified

C. ARMY A/C UNIT 66 - 94 (New Plant area, does not appear to be in full production)

66. Parts storage
67-73 Parts & Storage
74-75 Hangar Type Bldgs. Pos. Dis-Assembly & Shipment
76. Not Identified
77. Office
78. Unidentified Hanger Type Bldg.
79. Final Assembly & Major Assembly
80. Warehouse
81-82 Sub-Assembly
83-84 Components Erections & Parts Assembly
85-86 Press Shop
87-89 Material Preparation & Sheet Cutting
90. Storage
91. Probable Shop
92. Boiler House - 2 stacks
93. Storage
94. Storage

D. NANKO PLANT & YOUTH SCHOOL

95. Shop Building
96. Components/Parts Storage (Removed)
97. Not Identified
98. Boiler House - 1 large stack
99. Not Identified
100. Office - Experimental Engineering
101. Office A/A on roof
102. Final & Major Assembly
103. Sub-Assembly
104. Shop & Storage
105. Sub-Assembly
106. Final & Major Assembly
107. Shop Building
108-109 Not Identified
110. Reported Youth School
111-112 Probable Youth School
113. Reported Dispensary - Physical Exams.
114. Not Identified
115. Sub-Assembly - wings
116. RR Siding Warehouses

E. APPRENTICE SHOP & WAREHOUSE AREA

117. Mitsubishi Hospital
118. Warehouse
119. Parts Shop
120. Mitsubishi Hospital
121-126 Apprentice Shops
127-131 Probable Associated with Apprentice School
132. Boiler House - 1 stack
133-145 Warehouse
146. Probable Parts Plant
147-149 Warehouse
150. Probable Parts Plant
151. Machine Shop-- parts (Removed)
152. Not Identified
153. Warehouse Type Bldgs.
154. Not Identified
155-161 Probable Warehouses
162-163 Not Identified
164. Barracks Type Bldgs. Probable Youth School Dormitories

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JOINT TARGET GROUP
WASHINGTON, D. C.

MITSUBISHI AIRCRAFT WORKS
NAGOYA JAPAN

0 2000 4000 6000 FEET
0 ½ 1 MILE
1:32 000 APPROX.

RESTRICTED

ILLUSTRATION No. . . **90.20-194 P2/1**
DATE . . . . . **29 April 1945**
TARGET No. **90.20-194**
COORDINATES . . . **35°05'N 136°54'E**
PHOTOGRAPHED **23 November 1944**

All targets on this mosaic are in area 90.20

LEGEND

194	Mitsubishi Aircraft Works
195	Nagoya Steam Power Plant No. 1
198	Aichi Aircraft Works, Atsuta Plant
247b	Daido Electric Steel, Atsuta Plant
247c	Daido Electric Steel, Tsukiji Plant
247d	Daido Electric Steel, Minami Plant
251	Nagoya Harbor
456	Toho Gas Work Synthetic Oil Plant, Nagoya
1598	Nagoya Steam Power Plant No. 2
1729	Aichi Aircraft Works, Eitoku Plant
2010	Aichi Aircraft Engine Works, Nagoya Plant
2040	Sumitomo Duralumin Mill, Nagoya Plant

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft in place of 90.20-194 P2.

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RESTRICTED

NARA Date 4-5-77

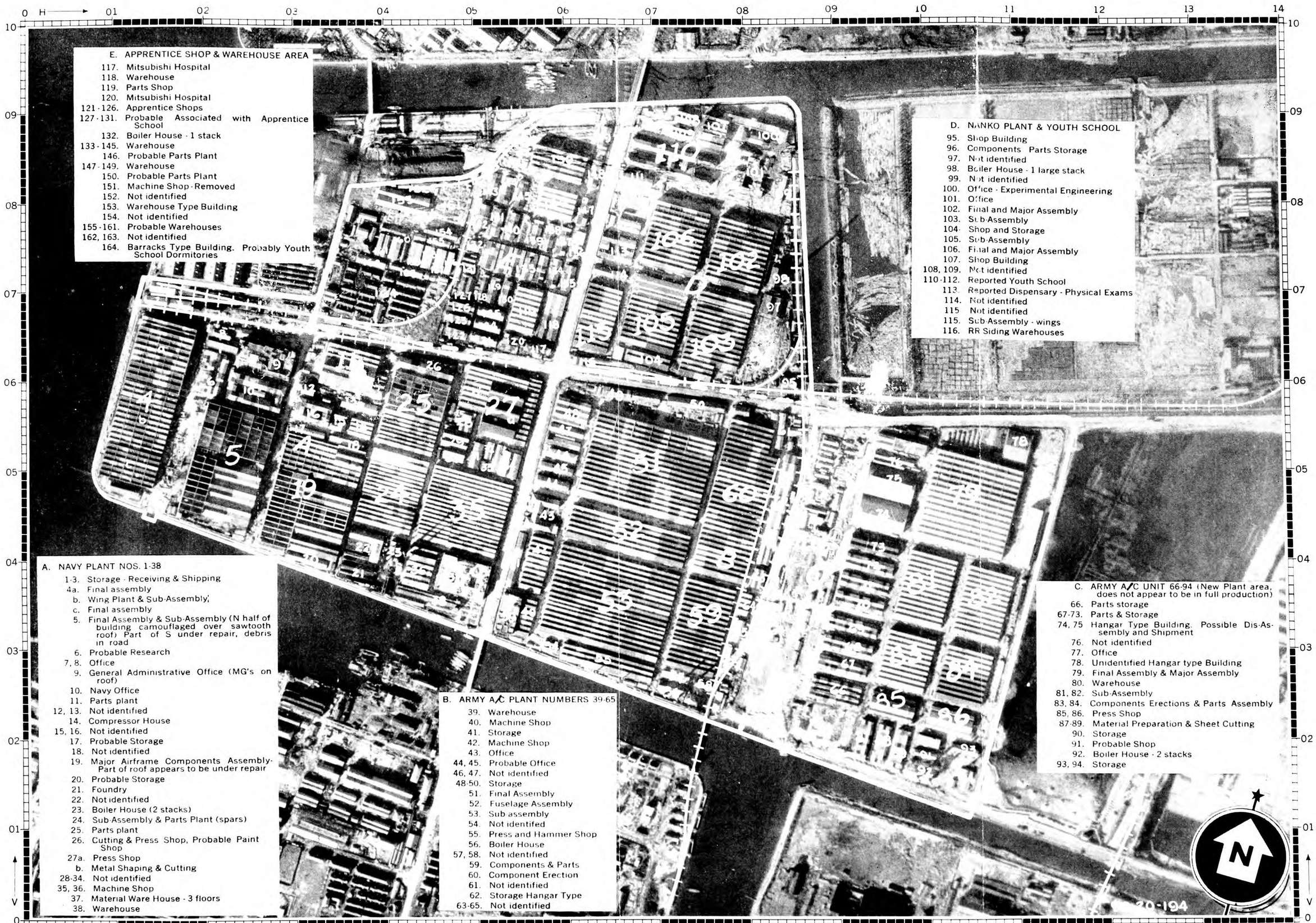
JOINT TARGET GROUP
WASHINGTON, D. C.

MITSUBISHI AIRCRAFT WORKS
NAGOYA JAPAN

CONFIDENTIAL

ILLUSTRATION No. . . 90.20-194 P4/1
DATE . . . . . 19 April 1945
TARGET No. 90.20-194
COORDINATES . . . 35°05'N 136°54'E
PHOTOGRAPHED . 18 December 1944

0 500 1000 1500 2000 2500 3000 FEET
0 1/4 1:6000 APPROX. 1/2 MILE



A. NAVY PLANT NOS. 1-38
- 1-3. Storage - Receiving & Shipping
- 4a. Final assembly
- b. Wing Plant & Sub-Assembly
- c. Final assembly
- 5. Final Assembly & Sub-Assembly (N half of building camouflaged over sawtooth roof) Part of S under repair, debris in road
- 6. Probable Research
- 7, 8. Office
- 9. General Administrative Office (MG's on roof)
- 10. Navy Office
- 11. Parts plant
- 12, 13. Not identified
- 14. Compressor House
- 15, 16. Not identified
- 17. Probable Storage
- 18. Not identified
- 19. Major Airframe Components Assembly-Part of roof appears to be under repair
- 20. Probable Storage
- 21. Foundry
- 22. Not identified
- 23. Boiler House (2 stacks)
- 24. Sub-Assembly & Parts Plant (spars)
- 25. Parts plant
- 26. Cutting & Press Shop, Probable Paint Shop
- 27a. Press Shop
- b. Metal Shaping & Cutting
- 28-34. Not identified
- 35, 36. Machine Shop
- 37. Material Ware House - 3 floors
- 38. Warehouse

B. ARMY A/C PLANT NUMBERS 39-65
- 39. Warehouse
- 40. Machine Shop
- 41. Storage
- 42. Machine Shop
- 43. Office
- 44, 45. Probable Office
- 46, 47. Not identified
- 48-50. Storage
- 51. Final Assembly
- 52. Fuselage Assembly
- 53. Sub assembly
- 54. Not identified
- 55. Press and Hammer Shop
- 56. Boiler House
- 57, 58. Not identified
- 59. Components & Parts
- 60. Component Erection
- 61. Not identified
- 62. Storage Hangar Type
- 63-65. Not identified

C. ARMY A/C UNIT 66-94 (New Plant area, does not appear to be in full production)
- 66. Parts storage
- 67-73. Parts & Storage
- 74, 75 Hangar Type Building. Possible Dis-Assembly and Shipment
- 76. Not identified
- 77. Office
- 78. Unidentified Hangar type Building
- 79. Final Assembly & Major Assembly
- 80. Warehouse
- 81, 82. Sub-Assembly
- 83, 84. Components Erections & Parts Assembly
- 85, 86. Press Shop
- 87-89. Material Preparation & Sheet Cutting
- 90. Storage
- 91. Probable Shop
- 92. Boiler House - 2 stacks
- 93, 94. Storage

D. NANKO PLANT & YOUTH SCHOOL
- 95. Shop Building
- 96. Components Parts Storage
- 97. Not identified
- 98. Boiler House - 1 large stack
- 99. Not identified
- 100. Office - Experimental Engineering
- 101. Office
- 102. Final and Major Assembly
- 103. Sub-Assembly
- 104. Shop and Storage
- 105. Sub-Assembly
- 106. Final and Major Assembly
- 107. Shop Building
- 108, 109. Not identified
- 110-112. Reported Youth School
- 113. Reported Dispensary - Physical Exams
- 114. Not identified
- 115 Not identified
- 115. Sub-Assembly - wings
- 116. RR Siding Warehouses

E. APPRENTICE SHOP & WAREHOUSE AREA
- 117. Mitsubishi Hospital
- 118. Warehouse
- 119. Parts Shop
- 120. Mitsubishi Hospital
- 121-126. Apprentice Shops
- 127-131. Probable Associated with Apprentice School
- 132. Boiler House - 1 stack
- 133-145. Warehouse
- 146. Probable Parts Plant
- 147-149. Warehouse
- 150. Probable Parts Plant
- 151. Machine Shop - Removed
- 152. Not identified
- 153. Warehouse Type Building
- 154. Not identified
- 155-161. Probable Warehouses
- 162, 163. Not identified
- 164. Barracks Type Building. Probably Youth School Dormitories

Holders of Joint Target Group folders should insert this sheet in Air Target System Folder: Japanese Aircraft Replacing Sheet 90.20-194 P4.

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By _____ NARA, Date 4-11-77

JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET INFORMATION SHEET

Sheet No.	90.20–240–TI/1
Date	30 March 1945
Page	1
Target No.	90.20–240
Obj. Area	90.20
Obj. Folder No.	90.20
Air Target System	Aircraft
Lat.	35° 24′N
Long.	136° 52′E
Alt.	136 feet

KAWASAKI AIRCRAFT
KAGAMIGAHARA PLANT
(Kawasaki Kokuki Kogyo, Gifu Kojo)
KAGAMIGAHARA • • • • • JAPAN

ALL PREVIOUS SHEETS CANCELLED

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT IN PLACE OF 90.20–240 TI

SIGNIFICANCE

This plant is believed to assemble the Tony SE in-line fighter, the army 2E bomber Lily and other Kawasaki aircraft. Prior to attack of 19 February 1945 on the Kawasaki Aircraft, Akashi Plant (Target 90.25–1547), this company ranked third among Japan's principal aircraft manufacturers, producing roughly 15 percent of Japanese combat aircraft. It manufactures aircraft for the army only.

LOCATION

(Refer to Illustration No. 90.20–240 P2.) Adjacent to and N of the Kagamigahara Military Airport (Target 90.20–249) and about 5 miles E of the town of Gifu. The Kagamigahara Machinery Works (Target 90.20–1812) is about 1.7 miles to the W; the Mitsubishi Aircraft, Kagamigahara Plant (Target 90.20–1833) post assembly and test hangars are about 800 feet to the SE. Adjacent on the W is the small Ogaki Iron Works (Target 90.20–1811). The Kiso River, flowing generally E–W, lies to the S with its nearest point about 1.5 miles S.

DESCRIPTION AND LAYOUT

(Refer to Illustrations No. 90.20–240 P3, P5, and P6.) The target area is irregular in shape extending 3,200 feet N–S and 2,500 feet E–W at its longest dimensions. It is divided into 3 sections by the E–W Takayama RR and a trolley line coming in from Gifu. Built-up area is 1.58 million square feet. The section N of the Takayama RR is relatively new and consists primarily of two large sub-assembly and assembly buildings (59 and 60). It is believed that parts assembled here are manufactured at some of the large factories in the Gifu region reported to have been taken over by Kawasaki. The buildings S of the Gifu trolley line (Nos. 1–4) appear to be engaged primarily in post-assembly and pre-flight testing. They constitute only a small proportion of the built-up area of the plant.

The major part of the Kawasaki plant with just under 1 million square feet of built-up area lies between the Takayama RR and the trolley line. Warehouses and administrative buildings are in the southern part of this area. The principal assembly building (No. 24) is in the center of the area with a smaller assembly building (No. 25) immediately to the E. Just E of 25 are the experimental department and wind tunnel (Nos. 26–28). The machine press shop (No. 21) is somewhat to the W of the main assembly building. Parts manufacture and component assembly is centered in the three large buildings (Nos. 31, 32, and 35).

PRIMARY OBJECTIVES

(Refer to Illustrations No. 90.20–240 P3, P5, and P6.) The primary objectives of this plant, listed in approximate order of productive importance, are as follows:

Primary
60
24
31
32
59
35
25
21

The primary buildings house the bulk of the plant's sub and final assembly facilities, as well as parts and metal fabrication processes. Building 21, a reported machine shop, has two boilers, two drop hammers, lathes, drills, planers, etc. The loss of these units would seriously curtail production, and destroy considerable material in process.

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182 T-1

By ____ NARA. Date 4-6-77

JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET INFORMATION SHEET

Sheet No. 90.20–240–TI/1
Date 30 March 1945
Page 2

CONSTRUCTION AND VULNERABILITY

(Refer to Illustration 90.20–240 P3, P5, and P6.)

Primary and secondary objectives listed in order of importance:

Building No.	Plan area (square feet)	Roofs [1]	Combustibility	HE vulnerability [2]
60	144,000	Light	Noncombustible	V4
24 b–e	112,800	Light	Noncombustible	V5
24a, f–g	77,700	Light	Noncombustible	V4
31	115,000	Light	Noncombustible	V4
32 a, c–j	98,400	Light	Noncombustible	V4
32 b	16,800	Light	Noncombustible	V5
59	161,000	Light	Noncombustible	V4A
35	48,000	Light	Noncombustible	V4
25 a	23,800	Light	Noncombustible	V5
25 b	26,200	Light	Noncombustible	V4A
21	24,300	Light	Combustible	V4

[1] Light weight roofs are readily penetrated by all types of incendiary bombs. Initiation of HE tail fuzes by these roofs cannot be depended upon except for bombs striking structural members (30 to 40 percent of bombs striking buildings).

[2] HE vulnerability classifications are explained in JTG Memorandum No. JTG/M/3/1 which is now in process of revision. In brief, a single vulnerability classification is assigned types of industrial buildings which behave in a similar manner when attacked with the same HE weapon. These vulnerability classes are arranged in order of vulnerability to HE attack, with very invulnerable multi-story, earthquake-proof structures assigned the classification V1. The other classifications V2, V3, V4, V5 are progressively more vulnerable types, V5 being the most vulnerable large span, arched hangar type structures. Most one-story buildings fall in class V4.

Classification of buildings:

	Primary and secondary objectives	Whole target
Total plan area of—		
Buildings (square feet)	848,000	1,582,000
Total floor area (square feet)	853,000	1,707,000
Combustibility (based on plan area):		
Fire resistant (R)	----------	2%
Noncombustible (N)	97%	63%
Combustible (C)	3%	35%
HE Vulnerability:		
V1 (least vulnerable)	----------	2%
V2	----------	----------
V3	----------	4%
V4	60%	65%
V4A	22%	17%
V5	18%	12%

Susceptibility of contents to IB (whole target): Fair (average industrial fire occupancy). For detailed study of susceptibility of structures and contents to incendiary attack refer to Illustration No. 90.20–240 P5.

WEAPON RECOMMENDATIONS

Reference should be made to Weapon Recommendations Sheet No. 90.20–240 WR1 for high and medium altitude attack and to Weapon Recommendations Sheet No. 90.20–240 WR2 for low altitude attack.

CAMOUFLAGE, DECOYS AND SMOKE SCREENS

Photography of 23 November 1944 shows disruptive roof painting on all major buildings. There is no evidence of smoke screens or decoys.

ADDITIONAL INFORMATION

This plant is often referred to by the Japanese as the Gifu plant. The aircraft believed to be assembled here are:

SE fighter Tony (in-line engine)
SE fighter Rob
Twin In-line Engine Fighter (possibly Ki 88)
2E bomber Lily
2E dive bomber (Ki 66)
2E transport Thelma

It is reported that several plants in the Gifu area have been taken over by Kawasaki and are now manufacturing airframe parts. Airframe parts for Kawasaki are also reported to be made by the Okamoto Industrial Co. in Nagoya. It is reported that engines are installed in Lily at the Kagamigahara Army Branch Depot adjacent to the S. Aircraft parts are also reported to be sent from Akashi where Kawasaki has a large airframe and aero-engine plant (Target 90.25–1547).

Engines used in Kawasaki planes are manufactured at the Mitsubishi Engine Works (Target 90.20–193) and at the Kawasaki Engine Works in Akashi (Target 90.25–1547). The attacks on these engine plants may limit the number of completed Kawasaki planes until engine production is restored, but it is possible that the Kagamigahara Plant will continue to produce airframes even while engine production is low.

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT AFTER 90.20–240 TI/1, PAGE 1.

By ____ NARA. Date 4-6-77

JOINT TARGET GROUP, WASHINGTON, D. C.

WEAPON RECOMMENDATIONS SHEET

Sheet No.	90.20–240 WR1
Date	10 April, 1945
Page	1
Target No.	90.20–240
Obj. Area	90.20
Obj. Folder No.	90.20
Air Target System	Aircraft
Lat.	35°24′N
Long.	136°52′E
Alt.	136 feet

KAWASAKI AIRCRAFT, KAGAMIGAHARA PLANT

GIFU . . . . . JAPAN

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT, WITH OTHER 90.20–240 MATERIAL.

HIGH AND MEDIUM ALTITUDE ATTACK

(See also 90.20–240 T/1 and associated target illustrations)

AIMING POINT

For maximum damage to the primary objectives, the aiming point should be the Eastern part of building 32 (Illustrations No. 90.20–240 P3, P5).

WEAPONS AND FUZING

	HE	Fuze	IB
Preferred	1,000-lb GP	0.01 N/ND T	AN-M50 4-lb (in aimable clusters).
Alternative	2,000-lb GP	0.01 N/ND T	AN-M69 6-lb (in aimable clusters).
	500-lb GP	0.01 N/ND T	AN-M47 70-lb. AN-M76 500-lb.

Not recommended: Smaller GP bombs; SAP or AP bombs; Depth bombs.

NOTE

(a) Use 0.1 N fuzes if 0.01 N fuzes are not available and 0.01 T fuzes if ND T fuzes are not available. ND tail fuzing is recommended as buildings have light roof material and are best damaged by blast effects.

(b) The above recommendations are on a weight for weight basis.

LOADING TABLE FOR INITIAL ATTACK

The table below is prepared for an initial attack on this target. For its application to later attacks see JTG Memorandum No. 3/1.

Loading table for preferred combination of bombs[1]

Tons (actual) dispatched	Percent of bombs dispatched falling within 1,000 feet of aiming point											
	10%			15%			20%			30%		
	Tons		F[2] %	Tons		F[2] %	Tons		F[2] %	Tons		F[2] %
	HE	IB		HE	IB		HE	IB		HE	IB	
50	---	---	---	25	25	15	20	30	15	15	35	20
100	35	65	20	25	75	25	20	80	30	15	65	35
200	35	165	35	25	175	40	20	180	45	20	180	50
400	35	365	45	100	300	50	160	240	55	220	180	60
800	380	420	55	500	300	60	---	---	---	---	---	---
1,000	580	420	60	---	---	---	---	---	---	---	---	---

[1] If alternative bombs are used, the distribution of the load between HE and IB should be the same. The expected percent of damage will, of course, be lower.

[2] Expected percent of serious damage to the whole target.

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195 T-3

By _____ NARA. Date 4-6-77

JOINT TARGET GROUP, WASHINGTON, D. C.

WEAPON RECOMMENDATIONS SHEET

KAWASAKI AIRCRAFT, KAGAMIGAHARA PLANT (Kawasaki Kokuki Kogyo, Gifu Kojo)

GIFU . . . . . JAPAN

Sheet No.: 90.20–240 WR2
Date: 17 April 1945
Page: 1

Target No.: 90.20–240
Obj. No. Area: 90.20
Obj. Folder No.: 90.20
Air Target System: Aircraft

Lat.: 35°24′ N
Long.: 136°52′ E
Alt.: 136 feet

ALL PREVIOUS SHEETS CANCELLED

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT WITH OTHER 90.20-240 MATERIAL

LOW ALTITUDE ATTACK
(See also 90.20–240 TI and associated illustrations)

TYPE OF ATTACK

This sheet applies primarily to an attack by carrier-based aircraft, fighter bombers, or other similar aircraft which carry out dive, glide, low level, or minimum altitude attacks.

BUILDINGS CONSIDERED

Data are given below for an attack on primary buildings only (illustrations No. 90.20–240 P3, P5). Other buildings are of insufficient importance to merit specific attack.

WEAPONS AND FUZING

A pure HE attack (no incendiaries) may be launched against the buildings specified in table I; a pure IB attack (no HE) may be launched against the building specified in table II. The choice of a particular HE or IB weapon for attack on a given building can be made by considering both the number of hits on that building required for the various bombs (see tables below) and the stowage capabilities of the aircraft to be used. The proper fuzings for the HE weapons to be used against the individual buildings are given in table I below, with the exception that for minimum altitude attacks a 8 to 15 sec. delay is required for safety to the aircraft. *The use of SAP, AP, smaller GP, or depth bombs is not recommended for this target.*

NUMBER OF HITS

TABLE I (HE).—*Number of hits required to achieve 50 percent serious damage to individual important buildings* [1]

Buildings in order of importance to production (illustration No. 90.20–240 P3, P5)	Number of hits			Fuzing [2]
	500-lb. GP	1,000-lb. GP	2,000-lb. GP	
60	24	12	7	Against all buildings use. 0.01 N/ND T fuzing.
24	22	11	5	
31	19	10	5	
32	18	9	5	
59	45	16	7	
35	8	4	2	
25	7	3	2	
21	4	2	1	
Total number of bombs	147	67	34	
Total tons [3]	38.8	33.1	35.5	

TABLE II (IB)

Buildings (illustration No. 90.20–240 P3, P5)	Number of hits							
	Clusters				Individual bombs		Fire bombs	
	M50		M69					
	M6	M7	M12	M13	M47	M76	58 gal.	150 gal.
21	9	3	8	2	8	4	2	2

[1] To obtain the number of hits required to achieve 30 percent serious damage to individual important buildings, multiply the appropriate entry in the table by 0.5; for 70 percent serious damage, multiply 1.7.

[2] Use 0.1 N fuzes if 0.01 N fuzes are not available and 0.01 T fuzes if ND T fuzes are not available. ND tail fuzing is recommended as buildings have light roof material and are best damaged by blast effects.

[3] Tonnages based on actual (not nominal) weight of bombs.

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196T-6

NARA Date 4/5/77

JOINT TARGET GROUP • WASHINGTON, D. C.

TARGET No. 90.20–240

COORDINATES 35° 24′ N 136° 52′ E

PHOTOGRAPHED 23 NOVEMBER 1944

KAWASAKI AIRCRAFT WORKS, KAGAMIGAHARA PLANT
KAGAMIGAHARA, JAPAN

0 2000 4000 6000 FEET

0 ½ 1 MILE

1:32 000 APPROX.

ILLUSTRATION No. 90.20–240 P1

ISSUED 22 JANUARY 1945

RESTRICTED

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RESTRICTED

May be taken into the air if data is trimmed off

TYPE A

CONFIDENTIAL

JOINT TARGET GROUP
WASHINGTON, D. C.

KAWASAKI AIRCRAFT WORKS
KAGAMIGAHARA PLANT
GIFU JAPAN

0 500 1000 1500 2000 2500 3000 FEET
0 1/4 1:6000 APPROX. 1/2 MILE

ILLUSTRATION No.	90.20-240 P3/1
DATE	19 April 1945
TARGET No.	90.20-240
COORDINATES	35°24'N 136°52'E
PHOTOGRAPHED	23 November 1944

Holders of Joint Target Group folders should insert this sheet in Air Target System Folder: Japanese Aircraft Replacing Sheet 90.20-240 P3.

LEGEND

1-4. Post Assembly and Pre-Flight testing
5. Unidentified
6. Mess Hall
7. Main Office Building (three story)
8, 9. Offices
10-14. Storage (Raw materials)
15. Gasometer, probably used for heating and heat treatment furnaces
16. Probable Boilerhouse
17-20. Storage
21. Machine Shop, includes boiler room with two boilers. Two (2), 2000 ton drop hammers, lathes, drills, planers etc.
22, 23. Storage
24. A/C Final Assembly Building
24a. Paint Shop and Fabric Dept.
Machine Shop occupies E bay of this building
Two types of A/C assembled in this building
25. A/C Final Assembly, some Sub assembly of wings, tails, fuselages
26, 27. Experimental Department
28. Wind Tunnel Department
28a. Office Unit
28b. Probable wind tunnel
28c. Carpenter (Model) Shop
29. Transformer Station.
30. Welding Shop
31. Wing and fuselage parts Mfg. Drafting Dept. at W end of building; Products: Small parts, wing tips, wind shields, canopies etc., some wing and fuselage assembly at W end of building.
32. Wing and Fuselage Assembly
33. Probable Boiler House and Power Plant
34. Mess Hall
35. Wing and fuselage parts manufacture includes Sheet Metal Department
36. Probable, personnel offices, time office etc, is connected to RR station by pedestrain overpass.
37-56. Probable School
57. Possible foundry
58. Unidentified
59. A/C assembly
60. Shop building, probable sub-assembly
61. Storage
62, 63. Offices

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ANNOTATED HALF IS NOT TO BE TAKEN INTO THE AIR.

By _____ NARA, Date 4-11-77

JOINT TARGET GROUP, WASHINGTON, D. C.
FUNCTIONAL IDENTIFICATION

Sheet No.	90.20–240 P6
Date	30 March 1945
Page	1
Target No.	90.20–240
Obj. No. Area	90.20
Obj. Folder No.	90.20
Air Target System	Aircraft
Lat.	35°24′ N
Long.	136°52′ E
Alt.	136 feet.

KAWASAKI AIRCRAFT, KAGAMIGAHARA PLANT

KAGAMIGAHARA • • • • • • • JAPAN

Building No.	*Function of Building*
1–4	Post-assembly and pre-flight testing.
5	Unidentified.
6	Mess hall.
7	Main office building (three story).
8, 9	Offices.
10–14	Storage (raw materials).
15	Gasometer, probably used for heating and heat treatment furnaces.
16	Probable boilerhouse.
17–20	Storage.
21	Machine shop; includes boiler room with two boilers, two (2) 2,000-ton drop hammers, lathes, drills, planers, etc.
22, 23	Storage.
24	A/C final assembly building.
a	Paint shop and fabric department.
	Machine shop occupies east bay of this building.
	Two types of A/C assembled in this building.
25	A/C final assembly, some sub-assembly of wings, tails, fuselages.
26, 27	Experimental department.
28	Wind tunnel department.
a	Office unit.
b	Probable wind tunnel.
c	Carpenter (model) shop.
29	Transformer station.
30	Welding shop.
31	Wing and fuselage parts manufacturing.
	Drafting department at west end of building.
	Products: Small parts, wing tips, windshields, canopies, etc.; some wing and fuselage assembly at west end of building.
32	Wing and fuselage assembly.
33	Probable boilerhouse and power plant.
34	Mess hall.
35	Wing and fuselage parts manufacturing includes sheet metal department.
36	Probable personnel offices, time office; etc., is connected to railroad station by pedestrian overpass.
37–56	Probable school.
57	Possible foundry.
58	Unidentified.
59	A/C assembly.
60	Shop building, probable sub-assembly.
61	Storage.
62, 63	Offices.

(Based on F/A Report No. 27, AC/AS, Intelligence, Photographic Division, dated 4 January 1945.)

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182 T-3

NARA Date 1-24-11

TARGET NO. 90.20-240

APPROX. COORDINATES 35°24′ NORTH
136°52′ EAST

PHOTOGRAPHED 23 NOVEMBER 1944

JOINT TARGET GROUP - WASHINGTON, D. C.

KAWASAKI AIRCRAFT
KAGAMIGAHARA PLANT
GIFU, JAPAN

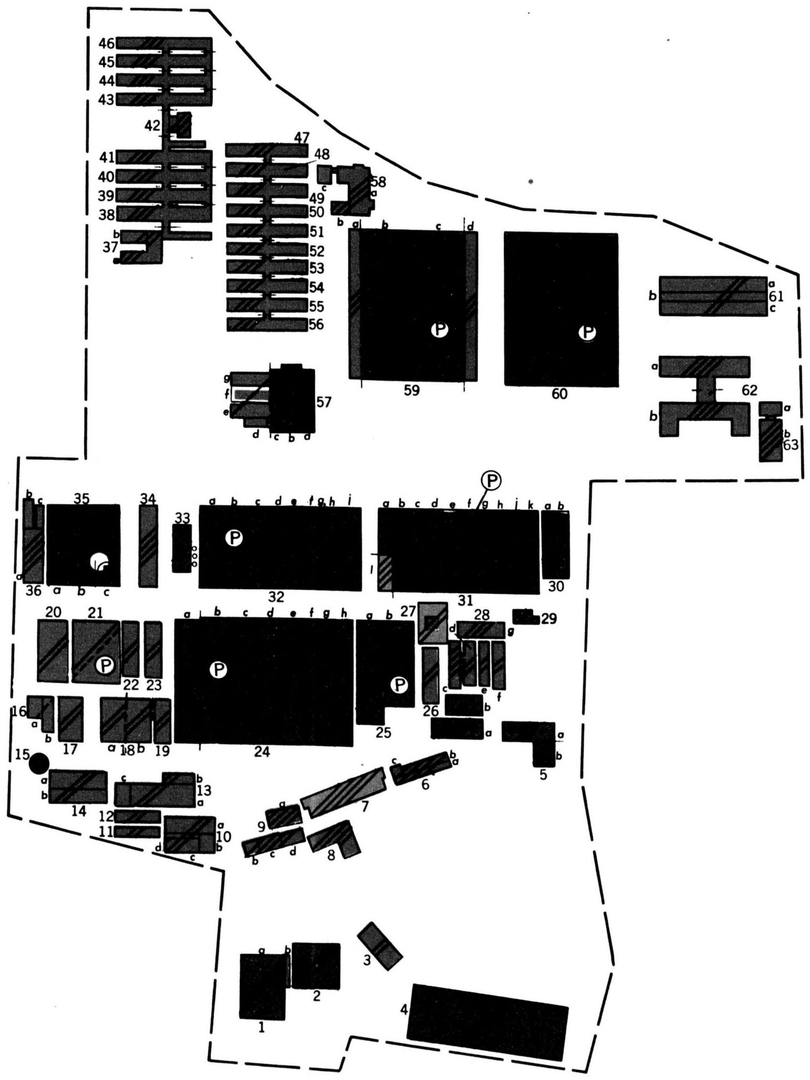
SCALE 1:6,000

500 0 500 1000 FEET

ILLUSTRATION NO. 90.20-240-P5

ISSUED 3 MARCH 1945

CONFIDENTIAL



HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER JAPANESE AIRCRAFT WITH CORRESPONDING MATERIAL

FIRE SUSCEPTIBILITY PLAN

PRIMARY BUILDINGS	(P)	FIRE WALL, CERTAIN	
SECONDARY BUILDINGS	(S)	FIRE WALL, PROBABLE	

BUILDINGS		CONTENTS	
COMBUSTIBLE		NON-COMBUSTIBLE	
NON-COMBUSTIBLE		SLIGHTLY COMBUSTIBLE	
FIRE RESISTANT		MODERATELY COMBUSTIBLE	
COMBINATION I.E. COMBUSTIBLE ROOF RESISTANT FLOORS		HIGHLY COMBUSTIBLE	
		EXTREMELY COMBUSTIBLE	
WATER TANK	(W)	INTERMEDIATE VALUES	

AREA IN SQ. FT.	PRIMARY	ALL BLDGS. SHOWN
NO. OF BUILDINGS	8	70
NO. OF FIRE DIVISIONS	13	78
PLAN AREA	848,000	1,582,000
TOTAL FLOOR AREA	853,000	1,707,000
SITE AREA	5,200,000	

PREPARED BY AERONAUTICAL CHART SERVICE, AAF.

Published in Office of AC/AS Intelligence, A.A.F., by combined personnel of U.S. and British Services for the use of Allied Forces

By _____ NARA, Date 4-10-11

JOINT TARGET GROUP, WASHINGTON, D. C.

TARGET INFORMATION SHEET

Sheet No.	90.20–1729–TI
Date	11 April 1945
Page	1 (of 2 Pages)
Target No.	90.20–1729
Obj. Area.	90.20
Obj. Folder No.	90.20
Air Target System	Aircraft
Lat.:	35°05′N
Long.:	136°51′E
Alt.:	15 feet

AICHI AIRCRAFT WORKS, EITOKU PLANT (Aichi Kokuki, Eitoku Seisakusho) NAGOYA . . . . . JAPAN

ALL PREVIOUS SHEETS CANCELLED

THIS SHEET CONTAINS MATERIAL AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE ACT, 50 U.S.C., 31 AND 32, AS AMENDED. ITS TRANSMISSION OR THE REVELATION OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW. ALL HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT, WITH OTHER 90.20–1729 MATERIAL.

SIGNIFICANCE

The largest of the several plants of the Aichi Aircraft Works. It is believed to be manufacturing the major components and assembling all of Aichi's aircraft. Aichi Aircraft Works is not a large producer in terms of total Japanese aircraft production, but it manufactures important combat types for the Navy, including the standard Navy dive bomber Judy, and is a major developer of new aircraft types. There is a very close relationship between Aichi and the Navy. This is one of the newer Japanese airframe plants—built in and after 1941.

LOCATION

(Refer to Illustration No. 90.20–1729 P2). In the extreme SW part of Nagoya City on reclaimed land between the Shonai River mouth and Nagoya Harbor. It is bordered on the W by the Shonai River and on the SE by a canalized portion of the Nagoya Harbor. The Nagoya Airfield, used as a flyaway field, is due S of the plant on the point of the reclaimed land. The target is in an isolated position.

DESCRIPTION AND LAYOUT

(Refer to Illustration No. 90.20–1729 P3). The producing area of the target is roughly rectangular, measuring about 2100 feet E–W and 2500 feet N–S. A 600 foot wide panhandle extends S from the SE corner for about 1100 feet.

Additional ground intelligence will be required to determine exactly the production flow within the plant. The building arrangement indicates four probable sub-assembly and assembly lines. Judys are probably manufactured in buildings 33–39; there are Judys parked outside of building 39. In addition, some metal shaping, cutting, pressing, and heating is probably done in buildings 33–36 for planes assembled here and in the other sections of the plant.

Buildings 50–57 appear to constitute a second sub-assembly/assembly line, buildings 76 and 77 a third, and buildings 22 and 23 a fourth production line. Post-assembly operations probably occur in the hangar-type structures 41 and 42. Stores are concentrated along the SE edge of the plant site. Some small parts manufacture and workshops are in the NE corner.

PRIMARY OBJECTIVES

(Refer to Illustration No. 90.20–1729 P3). The sub and major assembly buildings constitute the principal target areas. Several of these (buildings 22, 23, 37, 38, 39, 51 and 56) lie in a straight N–S line. Buildings 33, 35, 36 and 50, probably performing most of the metal shaping, cutting, pressing, and heating, comprise a second important target area.

CONSTRUCTION AND VULNERABILITY

(Refer to Illustration No. 90.20–1729 P3). Principal buildings, constituting more than half the total building area, are about evenly divided into two types: (1) large 1-story steel-framed structures of long span and greater than normal height, with exposed-chord sawtooth roofs; (2) somewhat smaller 1-story steel-framed structures (possibly wood-framed in some cases) of short to normal span and normal height, with exposed-chord sawtooth, conventional sawtooth, and double-pitched roofs. Roof surfaces are all of light sheet material, probably noncombustible on most major buildings. Minor buildings are generally small and combustible.

WEAPON RECOMMENDATIONS

Instructions with regard to weapons will usually be given in Field or Operational Orders, but in the absence of such instructions and to assist Planners in formulating such orders the following information is given:

An attack with a combination of high explosive and incendiary bombs is recommended. A preliminary structural and occupancy analysis of the plant indicates weapons should be selected as follows:

	HE	Fuzing	IB
Preferred	1,000-lb GP or 2,000-lb GP	0.01 N/ND T 0.01 N/ND T	AN-M50 4-lb. or AN-M69 6-lb (in aimable clusters for high altitude attack).
Alternative	500-lb GP	0.01 N/ND T	AN-M47 70-lb. AN-M76 500-lb.

Not recommended: Smaller GP bombs; SAP, AP bombs; Depth bombs.

NOTES

(a) Use 0.1 N fuzes, if 0.01 N fuzes are not available, and 0.01 T if ND T are not available. ND tail fuzing is recommended as most of the buildings have light roof material.

(b) The above recommendations are on a weight for weight basis.

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By _____ NARA. Date 4-6-77

JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET INFORMATION SHEET

Sheet No. 90.20–1729–TI
Date 11 April 1945
Page 2 (of 2 Pages)

CAMOUFLAGE, DECOYS AND SMOKE SCREENS

Photography of 19 January 1945 shows almost no camouflage at this plant. There is also no evidence of smoke screens or of decoy buildings.

ADDITIONAL INFORMATION

Assembly and manufacture of the principal parts for the following Navy aircraft are believed to take place at this plant: SE dive-bomber, Judy; SE fighter, Denko; SE reconnaissance bombers, Grace, Val, and Seiran; SE reconnaissance, Paul. Engines for these planes are supplied by the Aichi Aircraft Engine Works, Nagoya Plant (TARGET 90.20–2010), the Mitsubishi Aircraft Engine Works (TARGET 90.20–193), and the Nakajima Aircraft, Musashino-Tama Plant (TARGET 90.17–357).

Aichi has several other plants in the Nagoya area. Together with the many other aircraft plants in this area they are probably supplying parts for the planes assembled at the Eitoku plant. Aircraft were formerly manufactured at the Aichi Aircraft Works, Atsuta Plant (TARGET 90.20–198). While it is believed that this plant has converted to ordnance manufacture it may still manufacture some aircraft parts. Stabilizers for Judy appear to be manufactured at the Mizuho Plant (TARGET 90.20–199) of the company. Aichi also has a large establishment at Bonimura, E of Nagoya (TARGET 90.20–1730). This is probably a test field and modification center.

Bomb Damage: Although not the primary target, this plant was damaged in the incendiary strike on Nagoya city of 12 March 1945. Approximately 400 thousand square feet (15 per cent) of the plant roof area was damaged. Building 76 was the only important production building to sustain major damage. A large proportion of the storage buildings were also wiped out. The plant, however, remains largely intact.

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT, AFTER 90.20–1729-T1, PAGE 1.

NARA Date 4/30/11

RESTRICTED

AICHI AIRCRAFT WORKS, EITOKU PLANT
NAGOYA JAPAN

0 2000 4000 6000 FEET
0 ½ 1 MILE
1:32 000 APPROX.

ILLUSTRATION No. . . . **90.20-1729 P1**
DATE . . . . . **12 May 1945**
TARGET No. **90.20-1729**
COORDINATES . . . **35° 05'N 136° 51'E**
PHOTOGRAPHED . . **19 January 1945**

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder. Japanese Aircraft with other 90.20.1729 material.

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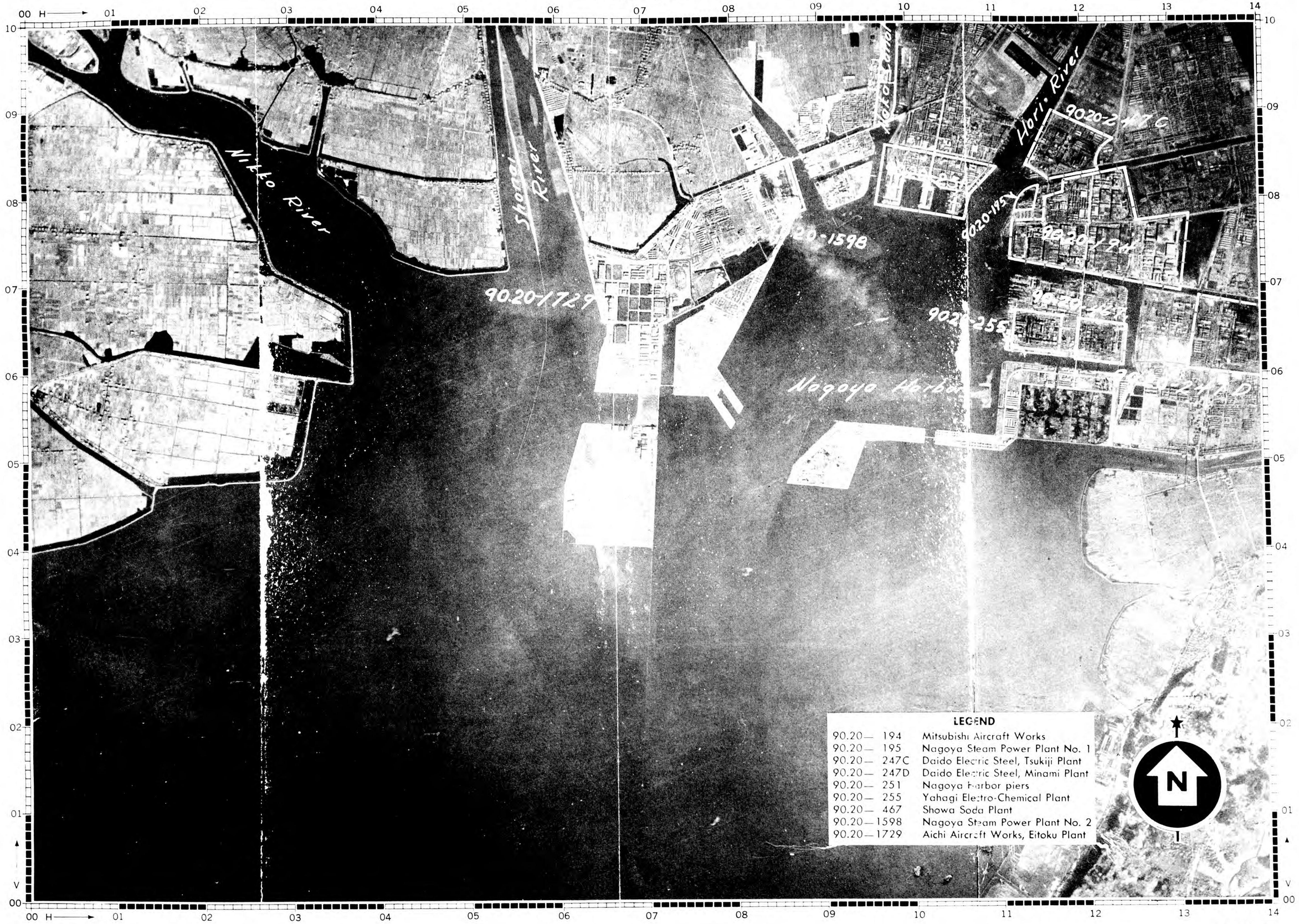
JOINT TARGET GROUP WASHINGTON, D.C.

AICHI AIRCRAFT WORKS, EITOKU PLANT
NAGOYA JAPAN

0 2000 4000 6000 FEET
0 ½ 1 MILE
1:32 000 APPROX.

RESTRICTED

ILLUSTRATION No. . . . 90.20-1729 P2
DATE . . . . . 12 May 1945
TARGET No. 90.20-1729
COORDINATES . . . 35°05'N 136°51'E
PHOTOGRAPHED . . 19 January 1945



LEGEND

90.20—	194	Mitsubishi Aircraft Works
90.20—	195	Nagoya Steam Power Plant No. 1
90.20—	247C	Daido Electric Steel, Tsukiji Plant
90.20—	247D	Daido Electric Steel, Minami Plant
90.20—	251	Nagoya Harbor piers
90.20—	255	Yahagi Electro-Chemical Plant
90.20—	467	Showa Soda Plant
90.20—	1598	Nagoya Steam Power Plant No. 2
90.20—	1729	Aichi Aircraft Works, Eitoku Plant

N

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft with other 90.20-1729 material.

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RESTRICTED

NARA Date 1-24-11

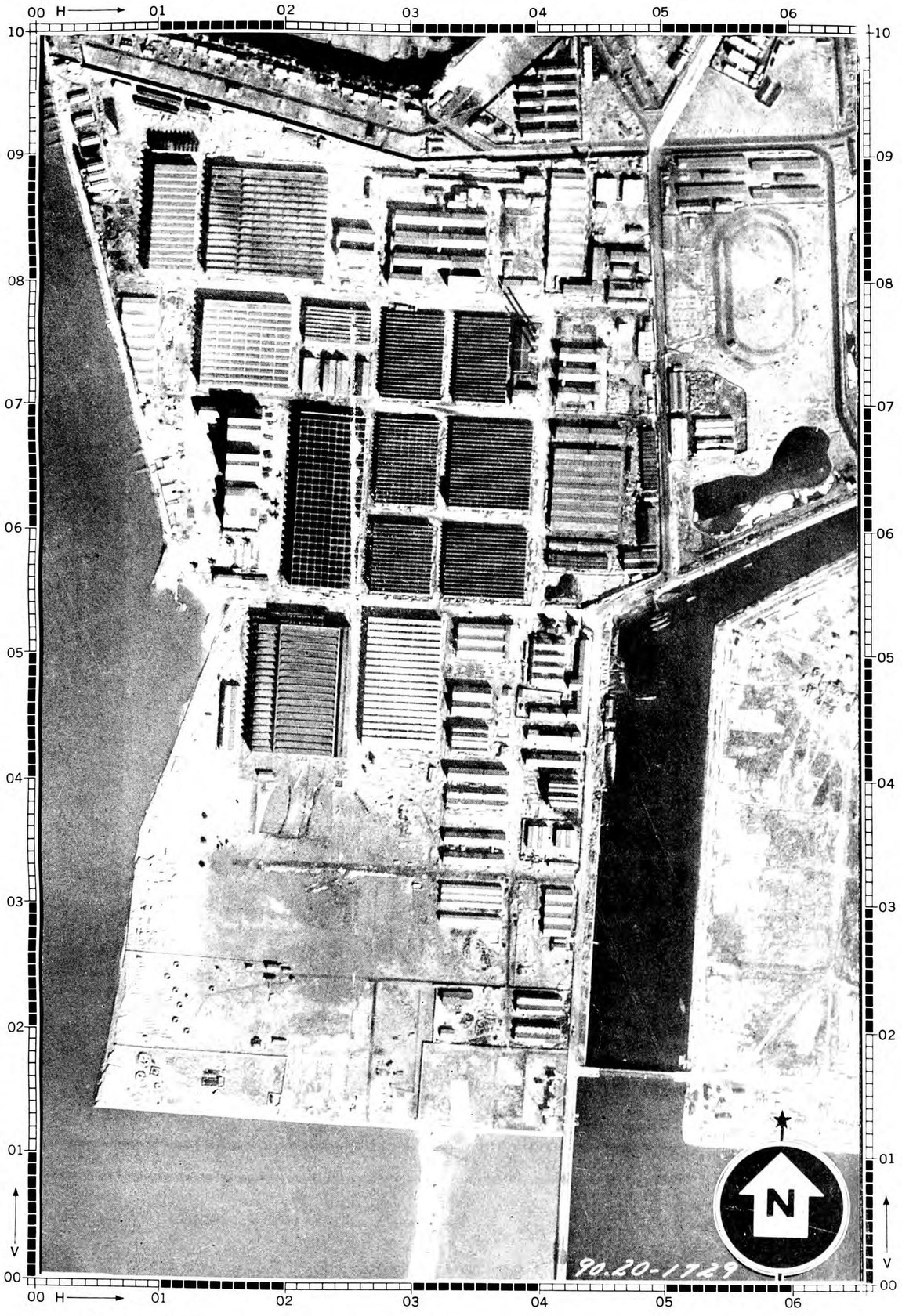
CONFIDENTIAL

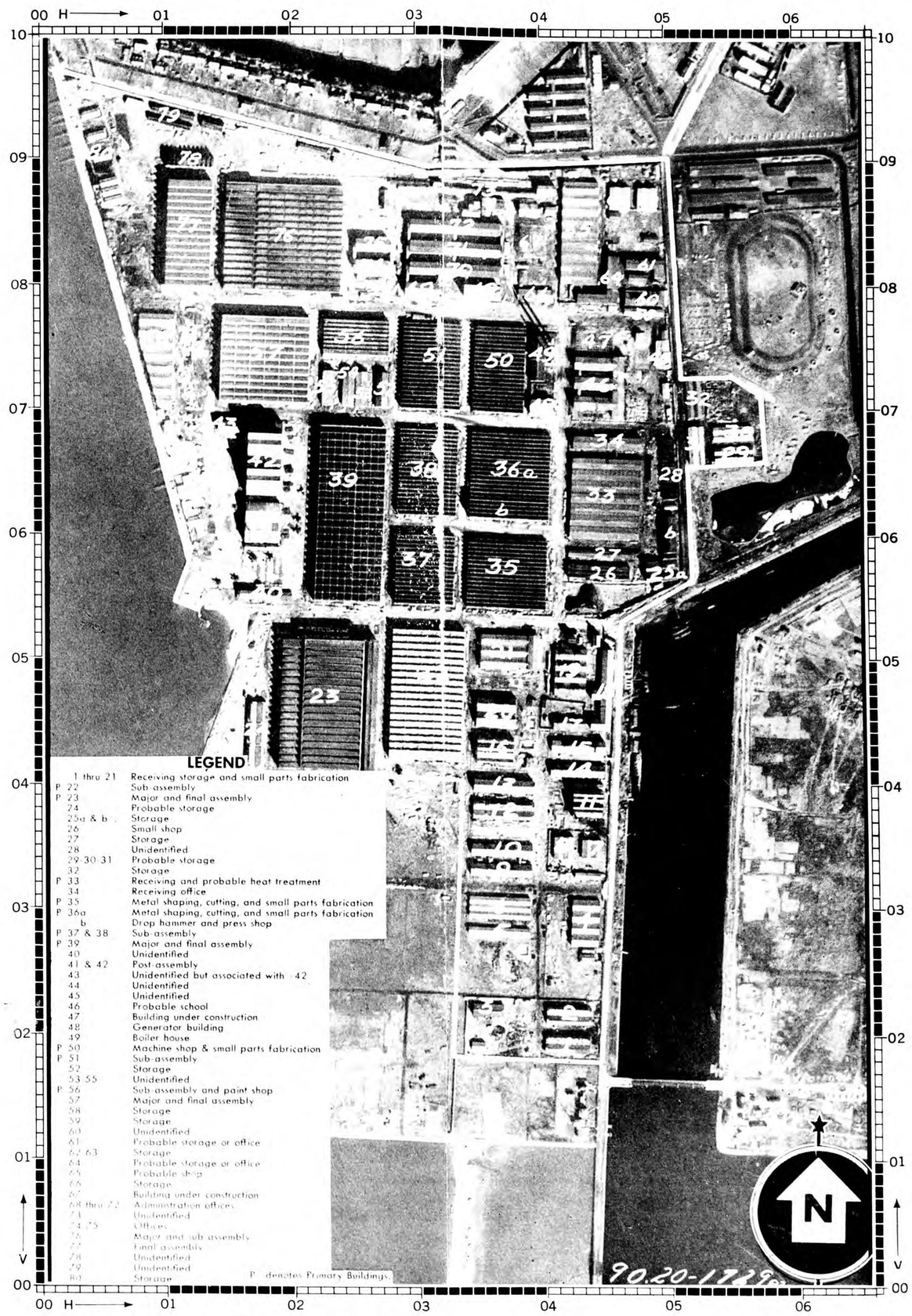
JOINT TARGET GROUP
WASHINGTON, D. C.

AICHI AIRCRAFT WORKS, EITOKU PLANT
NAGOYA JAPAN

0 500 1000 500 2000 2500 3000 FEET
0 1/4 1:6000 APPROX. 1/2 MILE

ILLUSTRATION No.	90.20-1729 P3
DATE	12 May 1945
TARGET No.	90.20-1729
COORDINATES	35°05'N 136°51'E
PHOTOGRAPHED	19 January 1945





LEGEND

1 thru 21	Receiving storage and small parts fabrication
P 22	Sub-assembly
P 23	Major and final assembly
24	Probable storage
25a & b	Storage
26	Small shop
27	Storage
28	Unidentified
29-30-31	Probable storage
32	Storage
P 33	Receiving and probable heat treatment
34	Receiving office
P 35	Metal shaping, cutting, and small parts fabrication
P 36a	Metal shaping, cutting, and small parts fabrication
b	Drop hammer and press shop
P 37 & 38	Sub-assembly
P 39	Major and final assembly
40	Unidentified
41 & 42	Post-assembly
43	Unidentified but associated with 42
44	Unidentified
45	Unidentified
46	Probable school
47	Building under construction
48	Generator building
49	Boiler house
P 50	Machine shop & small parts fabrication
P 51	Sub-assembly
52	Storage
53 55	Unidentified
P 56	Sub-assembly and paint shop
57	Major and final assembly
58	Storage
59	Storage
60	Unidentified
61	Probable storage or office
62 63	Storage
64	Probable storage or office
65	Probable shop
66	Storage
67	Building under construction
68 thru 72	Administration offices
73	Unidentified
74 75	Offices
76	Major and sub assembly
77	Final assembly
78	Unidentified
79	Unidentified
80	Storage

P denotes Primary Buildings.

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft with other 90.20-1729 material.

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ANNOTATED HALF IS NOT TO BE TAKEN INTO THE AIR

CONFIDENTIAL

By _____ NARA, Date 4-5-77

JOINT TARGET GROUP, WASHINGTON, D. C.

TARGET INFORMATION SHEET

Sheet No.	90.20–1833–TI
Date	11 April 1945
Page	1
Target No.	90.20–1833
Obj. Area	90.20
Obj. Folder No.	90.20
Air Target System:	Aircraft
Lat.	35°24′N
Long.	136°53′E
Alt.	136 feet

MITSUBISHI AIRCRAFT, KAGAMIGAHARA PLANT

(Mitsubishi Jukogyo KK, Kagamigahara Kakunoko)

GIFU • • • • • • • • • • • • • JAPAN

ALL PREVIOUS SHEETS CANCELLED

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT, WITH OTHER 90.20–1833 MATERIAL.

SIGNIFICANCE

This plant is apparently engaged in assembly and post assembly operations only, and its loss would not seriously restrict Mitsubishi's aircraft production. Some army planes manufactured and assembled at the Mitsubishi Aircraft Works at Nagoya Harbor (TARGET 90.20–194) are reported to be broken down and brought here by road for re-assembly, flight testing, post assembly operations and fly-away. The presence near the plant of many planes identified as probably Zekes and the absence of Zekes at the Nagoya airport, Mitsubishi's closest fly-away field, suggests that they too may be handled here.

LOCATION

(Refer to Illustration 90.20–1833 P2). On the N side of the Kagamigahara Military Airport (TARGET 90.20–249) about 1300 feet SE of Kawasaki Aircraft Works, Kagamigahara Plant (TARGET 90.20–240). It is about 5 miles E of the town of Gifu and 21 miles N of Mitsubishi Aircraft Works (TARGET 90.20–194). The Kiso River flowing generally E–W lies to the S about 1.25 miles at its nearest point.

DESCRIPTION AND LAYOUT

(Refer to Illustration 90.20–1833 P3). Most of the buildings are hangar-type such as might be found on almost any airfield. They are relatively small, the largest being approximately 60,000 square feet while the majority are less than 30,000 square feet. There are no apparent machine shops or sub-assembly buildings. The presence on the ground of such completed aircraft sections as wings substantiates the reported assembly and post-assembly type of operations.

Ground intelligence is insufficient to determine definitely the plant's boundaries, and some of the buildings to the W and N of the indicated site may also belong to the plant.

PRIMARY OBJECTIVES

None of the buildings appear to be appreciably more important than the others.

CONSTRUCTION AND VULNERABILITY

(Refer to Illustration No. 90.20–1833 P3). Practically all buildings are one-story hangars of moderate size, steel-framed, of normal height, and with double-pitched truss roofs of normal to long span surfaced with lightweight noncombustible sheet material. Buildings 13 and 14 have saw-tooth roofs.

WEAPON RECOMMENDATIONS

Instructions with regard to weapons will usually be given in Field or Operational Orders, but in the absence of such instructions and to assist Planners in formulating such orders the following information is given:

An attack with a combination of high explosive and incendiary bombs is recommended. A preliminary structural and occupancy analysis of the plant indicates the following weapons should be selected:

	HE	Fuzing	IB
Preferred	1,000-lb GP	0.01 N/ND T	AN-M50 4-lb or AN-M69 6-lb (in aimable clusters when dropped in high altitude attack).
Alternative	500-lb GP	0.01 N/ND T	AN-M47 70-lb.
	2,000-lb GP	0.01 N/ND T	AN-M76 500-lb.

Not recommended: Smaller GP bombs; SAP, AP bombs; Depth bombs.

NOTES

(a) Use 0.1 N fuzes if 0.01 N fuzes are not available, and 0.01 T if ND T are not available. ND tail fuzing is recommended as most of the buildings have light roof material, and are best destroyed by blast effects.

(b) The above recommendations are on a weight for weight basis.

CAMOUFLAGE, DECOYS AND SMOKE SCREENS

Photography of 23 November 1944 shows some disruptive roof painting and yellow, green and brown camouflage has been reported. There is no indication of smoke screens or decoys.

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NARA Date 1-30-77

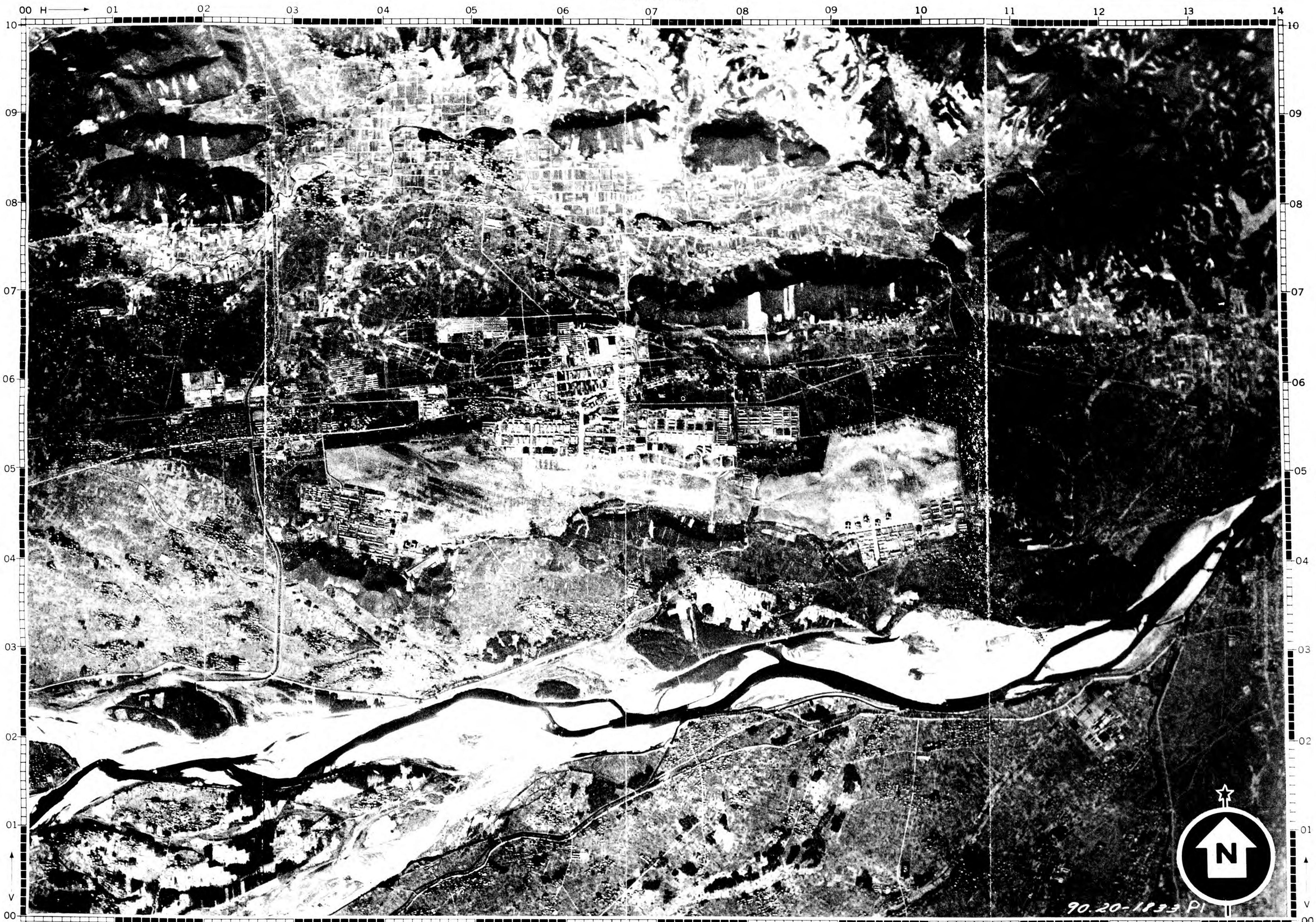
JOINT TARGET GROUP
WASHINGTON, D. C.

MITSUBISHI AIRCRAFT, KAGAMIGAHARA PLANT
GIFU JAPAN

RESTRICTED

ILLUSTRATION No. . . . **90.20-1833 P1**
DATE . . . . . **12 May 1945**
TARGET No. **90.20-1833**
COORDINATES . . . **35°24'N 136°53'E**
PHOTOGRAPHED **23 November 1944**

0 2000 4000 6000 FEET
0 ½ 1 MILE
1:32 000 APPROX.



Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft with other 90.20-1833 material.

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RESTRICTED

NARA Date 4-5-77

RESTRICTED

MITSUBISHI AIRCRAFT, KAGAMIGAHARA PLANT
GIFU JAPAN

ILLUSTRATION No.	90.20-1833 P2
DATE	12 May 1945
TARGET No.	90.20-1833
COORDINATES	35 24'N 136 53'E
PHOTOGRAPHED	23 November 1944

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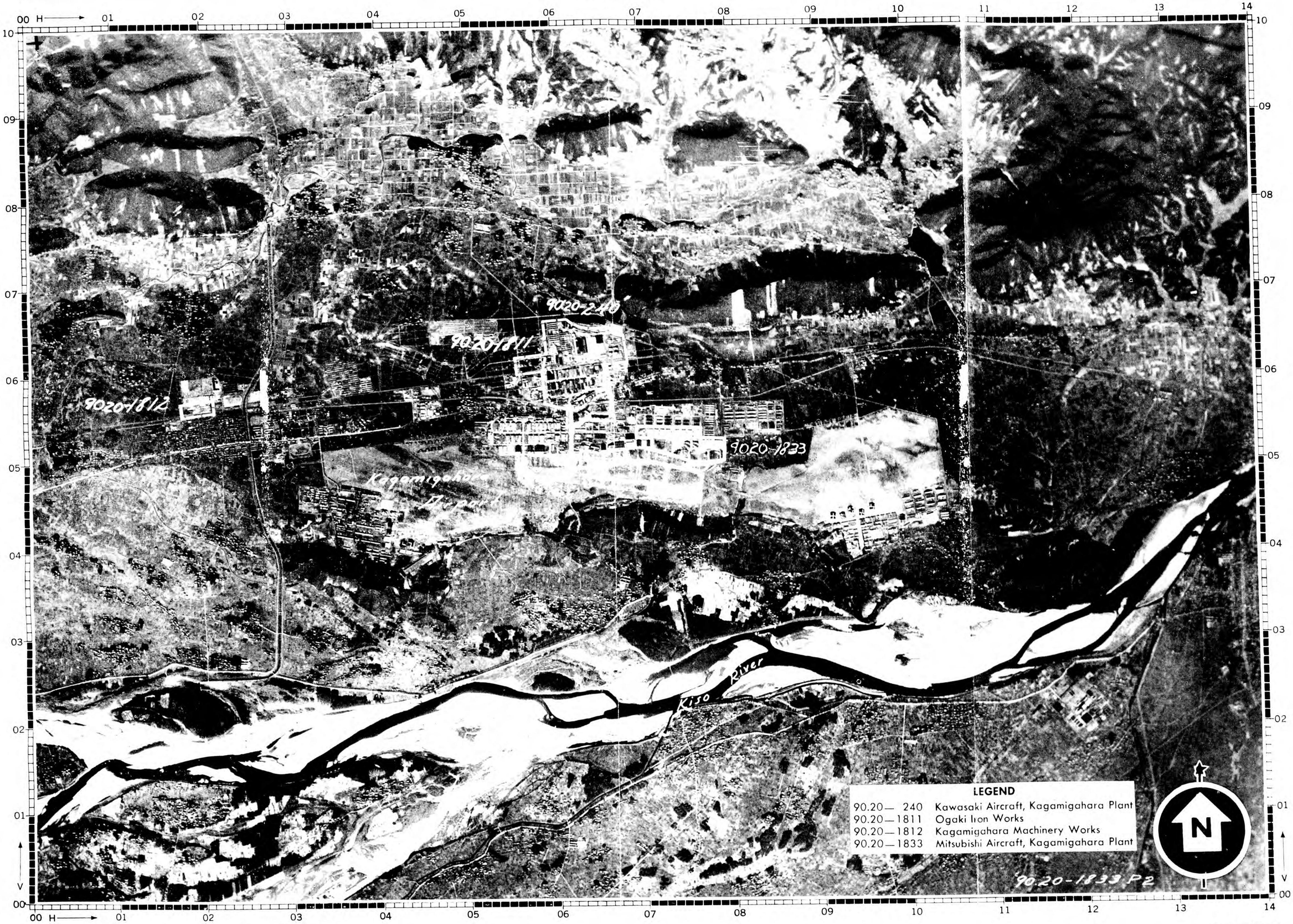
0 ½ 1 MILE
1:32 000 APPROX.



Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft with other 90.20 1833 material.

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RESTRICTED

NARA Date 1-31-11

JOINT TARGET GROUP
WASHINGTON, D. C.

MITSUBISHI AIRCRAFT, KAGAMIGAHARA PLANT
GIFU JAPAN

0 500 1000 1500 2000 2500 3000 FEET
0 1/4 1:6000 APPROX. 1/2 MILE

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ILLUSTRATION No. . . . **90.20-1833 P3**
DATE . . . . . **12 May 1945**
TARGET No. **90.20-1833**
COORDINATES . . . **35°24'N 136°53'E**
PHOTOGRAPHED **23 November 1944**

LEGEND

All Buildings are Primary

1-7	Final Assembly Hangars
8, 9	Post Assembly and Testing
10, 11	Not identified—probably Storage Sheds
12	Probable Shop Building
13, 14	Testing Hangars

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft with other 90.20-1833 material.

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NARA. Date 4-5-77

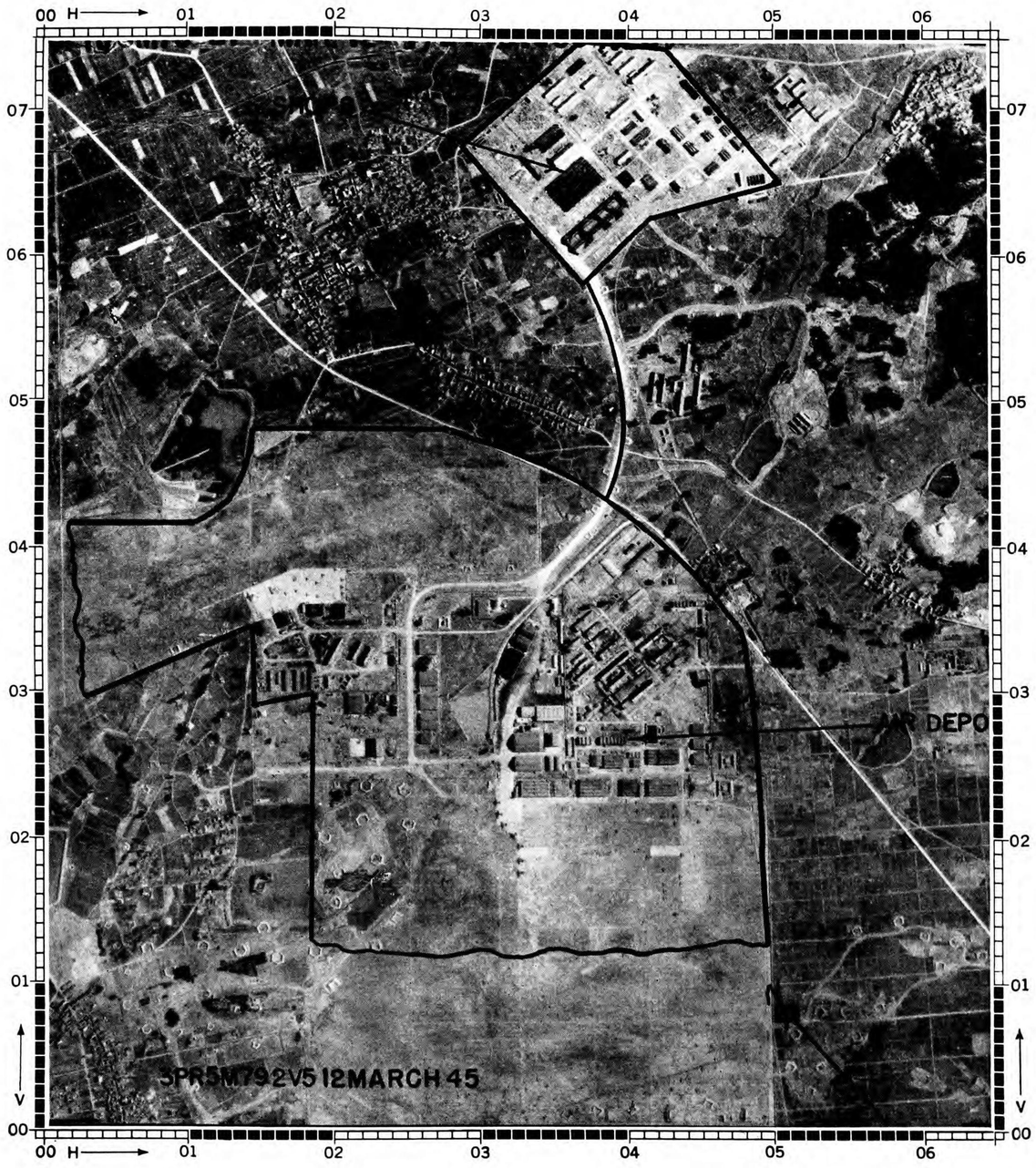
JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET LOCATION SHEET

SUZUKA NAVAL AIR BASE
KAMBE JAPAN

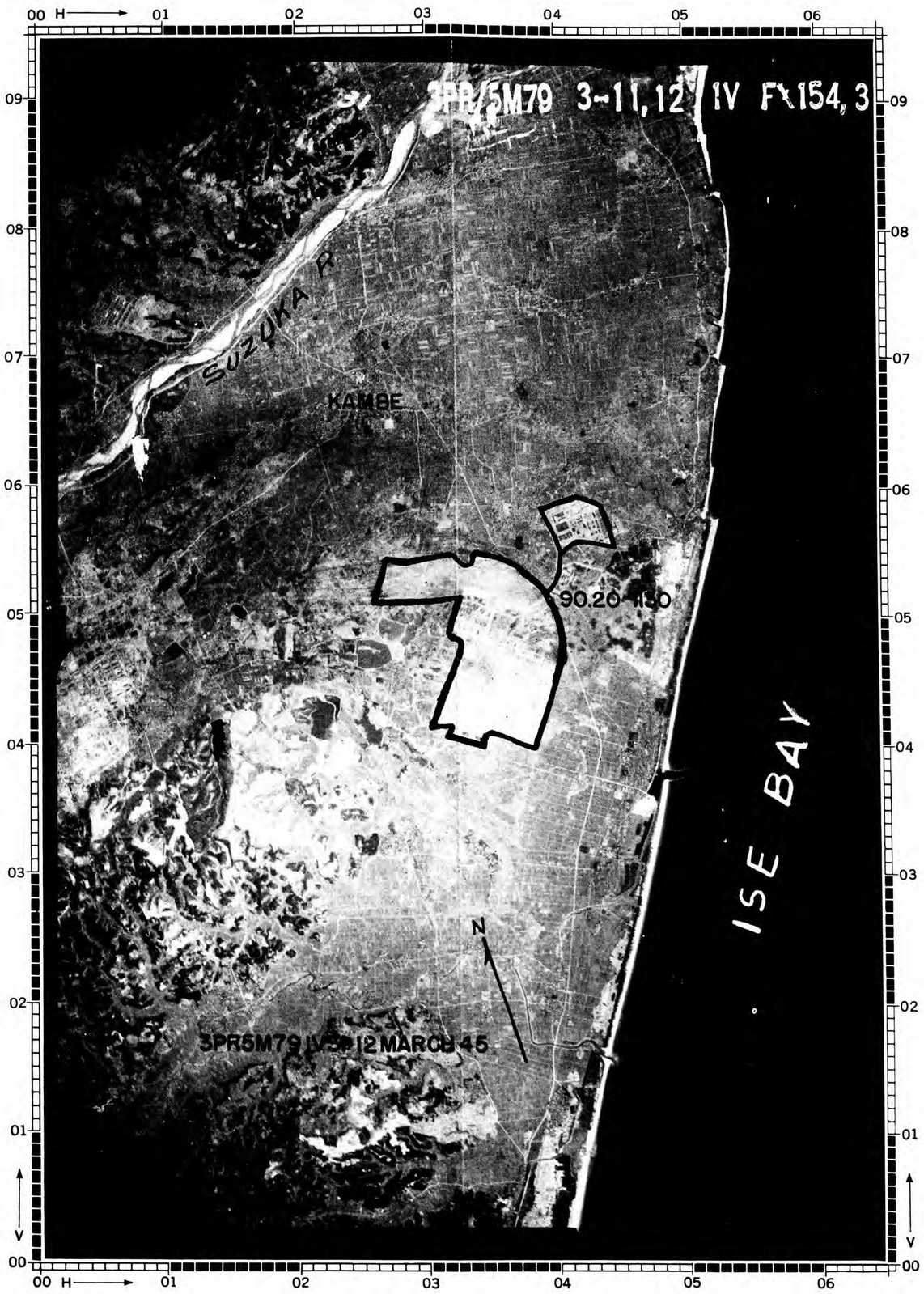
SHEET No. .....90.20-1130—TL
DATE.....9 May 1945
TARGET No. 90.20-1130
AIR TARGET SYSTEM
End Prdt. Ind.—Aircraft
COORDINATES ....34°52'N 136°35'E
ALTITUDE .....10 feet

SIGNIFICANCE:

Naval Air Base and Depot having shops reported to be used by Mitsubishi. These shops, north of the Depot and connected with it by a runway, are reported to be used for final assembly but are more likely to be engaged in post assembly or aircraft modification.



LARGE SCALE ILLUSTRATION—SCALE APPROX.: 1:15,500



SMALL SCALE ILLUSTRATION—SCALE APPROX.: 1:62,000

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By ____ NARA. Date 4-6-77

JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET INFORMATION SHEET

Sheet No.	90.20–1635–TI
Date	7 April 1945
Page	1
Target No.	90.20–1635
Obj. Area	90.20
Obj. Folder No.	90.20
Air Target System	Aircraft
Lat.	34°54′ N
Long.	136°57′ E
Alt.	15 feet

NAKAJIMA AIRCRAFT
HANDA PLANT

HANDA . . . . . JAPAN

ALL PREVIOUS SHEETS CANCELLED

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT WITH OTHER 90.20–1635 MATERIAL

NOTE: This TARGET INFORMATION SHEET is issued in advance of adequate photography and ground intelligence as an aid to planning and evaluation of new information. The only aerial photography of this plant now available is not of sufficient scale or quality to permit a detailed functional or structural analysis (3PR/4M17, IV 15 and 16PL 87BS/3416AC–4M13, IV 30).

SIGNIFICANCE

This plant may be manufacturing Myrt or Jill or both, or may be engaged in subcontracting work only. It was reported to have taken over production of Rufe in 1942 from Nakajima Aircraft, Koizumi Plant (TARGET 90.13–1545), but Rufe is now out of production. Additional ground and photo intelligence will be required to determine the relative importance of this target in the aircraft industry.

LOCATION

About 13 miles SSE of Nagoya Harbor, between Handa town and Handa airstrip and about 2600 feet NW of Chita Bay at its closest point. Bounded on the E by a channel to the bay separating the plant from the airstrip, on the N by the Taketoyo Railroad line, on the W in part by the Aguhi River and in part by a secondary street, and on the SE by flats. The main channel of the river runs through the plant.

DESCRIPTION AND LAYOUT

The plant consists of two sections, an older and smaller plant S of the river converted from the Toyo Cotton Spinning Mill as indicated in Air Objective Folder 90.20, page 56 and M 12, and a large new plant N of the river designed specifically for aircraft manufacture.

The older section, a rectangle measuring about 1850 feet N–S and 1550 feet E–W with about 225,000 square feet plan area of productive buildings probably manufactures parts and complete smaller aircraft sections.

The new section, a rectangle measuring about 3100 feet E–W and 2500 feet N–S, with about 800,000 square feet plan area of productive buildings, probably houses metal preparation and some sub-assembly in its W half and major and final assembly in its E half (if finished planes are being produced).

Between 23 November and 18 December new construction is apparent including a probable duplication of the plant's largest building (roughly 275,000 square feet in area).

PRIMARY OBJECTIVES

Primary Objectives can not be determined from present photography.

CONSTRUCTION AND VULNERABILITY

The older section of the plant consists of a compact group of rather large one-story buildings with sawtooth roofs, of short span and normal height which may be either steel or wood-framed and probably with lightweight non-combustible sheet material for roofing, practically surrounded by two-story dormitories which are probably combustible. The newer section appears to be composed mostly of large one-story sawtooth-roofed buildings of height greater than normal. Materials and details are not determinable from available air cover, but the height and assumed function of the buildings suggest exposed-chord roof trusses of long span, which normally would be of steel with lightweight non-combustible sheet roofing.

WEAPON RECOMMENDATIONS

Instructions with regard to weapons will usually be given in Field or Operational Orders, but in the absence of such instructions and to assist Planners in formulating such orders the following information is given:

An attack with a combination of high explosive and incendiary bombs is recommended. A preliminary analysis of the plant from available photography indicates the following weapons should be selected:

	HE	Fuzing	IB
Preferred	1,000 lb G. P	0.01 N/ND T	AN–M50 4-lb or AN–M69 6-lb (in aimable clusters when dropped from high altitude).
Alternative	2,000-lb G. P	0.01 N/ND T	AN–M47 70-lb.
	500-lb G. P	0.01 N/ND T	AN–M76 500-lb.
Not recommended.	Smaller G.P. bombs AP, SAP bombs. Depth bombs.		

NOTES

(a) Use 0.1 N fuzes if 0.01 N fuzes are not available, and 0.01 T if ND T are not available. ND tail fuzing is recommended as most of the buildings have light roof material, and are best destroyed by blast effects.

(b) The above recommendations are on a weight for weight basis.

CAMOUFLAGE, DECOYS AND SMOKE SCREENS

Photography of 18 December 1944 shows that most of the buildings have disruptive roof painting. There is no indication of decoys or smoke screens.

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NARA. Date 4-4-77

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JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET LOCATION SHEET

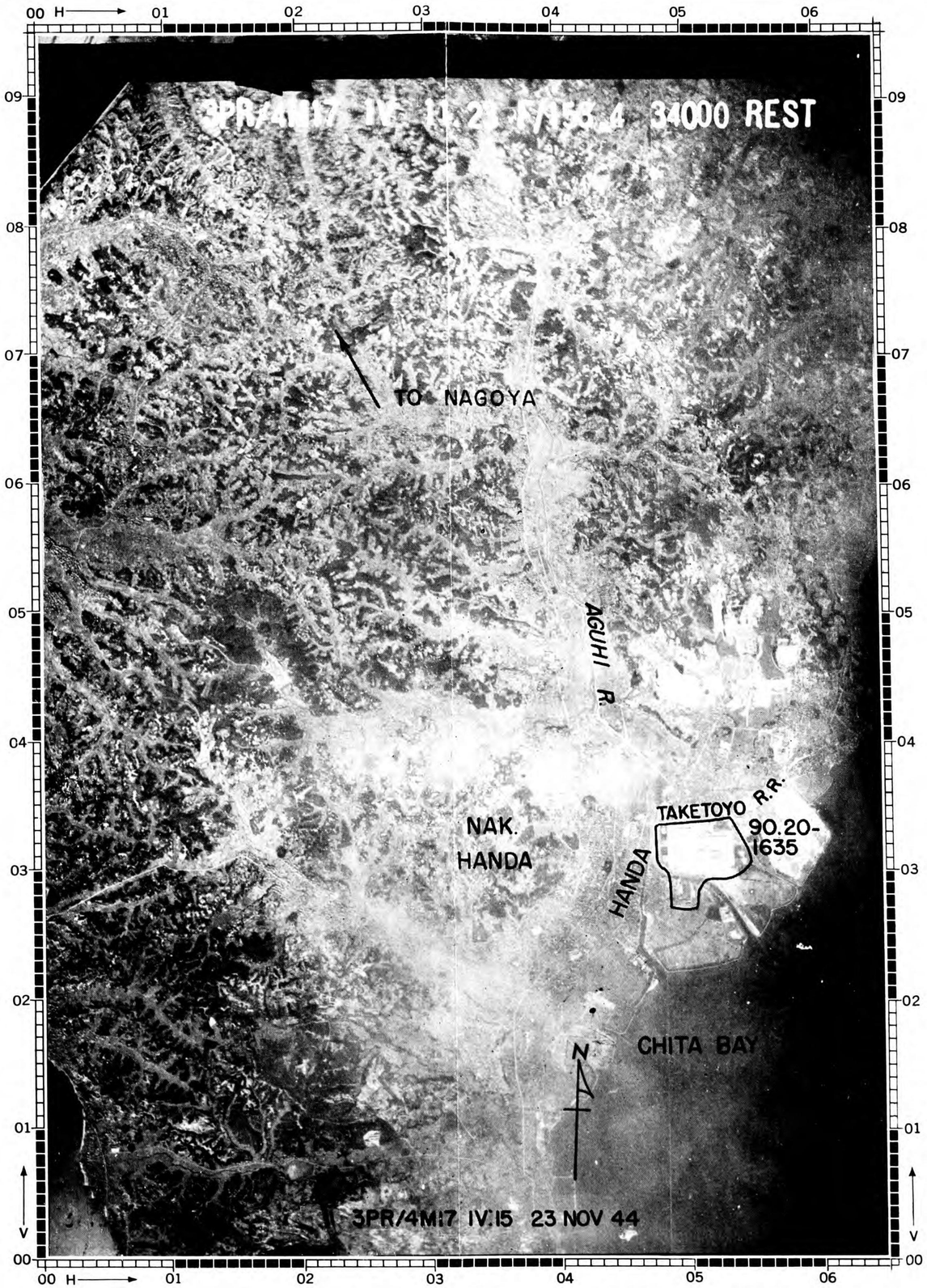
NAKAJIMA AIRCRAFT, HANDA PLANT
HANDA JAPAN

SHEET No. . . . . 90.20-1635—TL
DATE . . . . . 14 May 1945
TARGET No. 90.20-1635
CATEGORY . . . . End Prdt. Ind.—Aircraft
COORDINATES . . . . 34°54'N 136°57'E
ALTITUDE . . . . . 15 feet

SIGNIFICANCE:

This plant may be manufacturing Myrt or Jill or may be engaged only in subcontracting work. It may become a more important unit in the Nakajima complex as a result of damage to the principal Nakajima Airframe Plants at Ota and Koizumi, Targets 90.13-1544 and 90.13-1545, respectively.

LARGE SCALE ILLUSTRATION—SCALE APPROX.: 1:27,500



SMALL SCALE ILLUSTRATION—SCALE APPROX.: 1:68,000

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Sheet No. 90.20-2010-TI/1
Date 10 Feb. 1945
Page No. 1 (5 pages)

JOINT TARGET GROUP, WASHINGTON, D.C.
TARGET INFORMATION SHEET

Obj. Folder 90.20
Obj. Area 90.20
AAF Target No. 90.20-2010

Place Nagoya (Japan)
Air Target
System - Aircraft

Lat.: 35° 07' N
Long: 136° 54' E
Alt.: 10 feet

NAME OF TARGET **AICHI AIRCRAFT ENGINE WORKS, NAGOYA PLANT**

ALL PREVIOUS SHEETS CANCELLED

NOTE: Air Objective Folder Nagoya, 90.20, issued 6 July 1944, lists this installation as a reported new engine plant - an extension of Aichi Aircraft Works, Atsuta Plant, (TARGET 90.20-198). This new plant is now designated as Aichi Aircraft Engine Works (TARGET 90.20-2010) to distinguish it from the larger old plant (TARGET 90.20-198) reported now concentrating on torpedoes, shells, and other munitions.

SIGNIFICANCE

This plant produces the 1200 HP, 12 cylinder in-line Atsuta engine used in the Navy single-engine dive bomber Judy, and the new SE bomber Seiran. Estimated monthly production is 185 engines, a small fraction of total Japanese aero-engine output. Mines, torpedoes, and other ordnance are also reported in production here.

LOCATION

In Nagoya city, 4 miles S of Nagoya Castle and about 2 miles NNE of Nagoya Harbor piers (TARGET 90.20-251). Two branches of the Hori River join about 1600 feet to the E. From this point the river flows SW into Nagoya Harbor about 2 miles SSW of the plant. An E-W canal now terminates at the SW corner of the plant compound. The old section of this canal along the S side of the plant is partly filled in. A main NE-SW highway separates the plant from the older Aichi Works (TARGET 90.20-198) adjacent on the E.

DESCRIPTION AND LAYOUT

(Refer to Illustration No. 90.20-2010 P3, P5, and P6). The total target area extends about 1350 feet E-W and varies in width from about 600 feet on the W side to 1100 feet on the E. The area is compactly built-up. The important machine tools used in engine manufacture are contained in the large L-shaped building 3 which has a total area of 275,000 square feet. Engine assembly is also believed carried on in this building. Additional engine parts manufacture and machining facilities are immediately adjacent to the W in building 18; the foundry (building 6) is adjacent on the N. The cluster of small buildings in the NW corner of the compound is used for the manufacture of 13 mm ammunition.

No engine test cells can be identified at the plant on photography of 23 November 1944. Engine testing is presumably performed at the company's Tsukiji plant (TARGET 90.20-1828) at Nagoya Harbor which has at least 7, and possibly 12 test cells.

PRIMARY OBJECTIVES:

(Refer to Illustration No. 90.20-2010 P3, P5, and P6). The largest building (3) and building 18 housing the important machine shops, engine assembly and parts processes. Their destruction would destroy the plant's principal machine tool area.

The entire plant lies within a 1000-foot radius of building 18, the recommended aiming point for high level attack.

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JOINT TARGET GROUP - WASHINGTON, D.C.

TARGET INFORMATION SHEET. *(Contd.)*

CONSTRUCTION & VULNERABILITY

(Refer to illustration No. 90.20-2010 P3, P5, and P6).

	Primary Objectives (Buildings 3 and 18)	Whole Target (All buildings shown on Fire Plan)
Area of buildings:	322,000 square feet.	506,600 square feet.
Construction type:	All steel framed, with short spans in 92 per cent, normal to long spans (possibly with traveling cranes) in 8 per cent.	79 per cent steel framed, with traveling cranes probably in 5 per cent. 19 per cent timber framed. 2 per cent reinforced concrete framed.
Roofs:	Practically all sawtooth roofs. All lightweight non-combustible sheet roofing.	67.5 per cent sawtooth, non-combustible. 7.5 per cent pitched, non-combustible. 23 per cent pitched, combustible. 2 per cent flat, fire-resistant.
Floors:	Generally of fire-resistant materials.	
Number of stories:	All single-story.	85 per cent single story. 15 per cent multi-story.
Number of fire divisions:	2 in 2 buildings.	19 in 21 buildings.

The Fire Susceptibility Plan indicates the vulnerability of each building and its contents. With the exception of the offices and cafeterias (buildings 1 and 2), the combustibility of the contents is slight. It is estimated that 25 per cent of the productive capacity of the plant can be destroyed by fire.

WEAPON RECOMMENDATIONS

The most effective weapons for a high level attack against this target are a combination of:

AN-M64 500-lb G.P., fuzed 0.01 sec. nose/0.01 sec. tail
(If M139 nose fuzes unavailable, the 0.1 sec. delay nose fuze should be used.)

AN-M47 70-lb incendiary.

Weight for weight, the 500-lb bomb has proved to be the most effective against the short span, relatively low buildings such as the primary objectives of this plant. The 0.01 sec. fuzing gives the best expectancy of detonating the bomb beneath the roof, thereby causing maximum damage to contents as well as to structures.

Experience has shown that where fire divisions are large and few in number and where contents are only slightly combustible, the AN-M47 is slightly better than the AN-M50 4-lb incendiary (in M17 clusters). Additional fire damage may be expected from the effects of high explosive bombs.

The following Loading Table shows the per cent of serious damage to the target which can be expected for different weights of attack and different accuracies of bombing. Accuracy is measured by the per cent of bombs dispatched expected to fall within 1000 feet of the aiming point. (Reference should be made to Joint Target Group Memorandum No. 3, "Explanation of Weapon Recommendations and Loading Tables Given in Target Information Sheets", dated 27 December 1944.)

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TARGET INFORMATION SHEET *(Contd.)*

Table I

LOADING TABLE - MOST EFFECTIVE WEAPONS (1)

HE: AN-M64 500-lb G.P., fuzed 0.01 sec. nose/ 0.01 sec. tail (0.1 sec. nose if M139 nose fuzes unavailable)
IB: AN-M47 70-lb.

AICHI AIRCRAFT ENGINE WORKS, NAGOYA PLANT

Total Load In Tons (4)	Per cent of bombs dispatched expected to fall within 1000 feet of the aiming point (2)											
	10%			15%			20%			30%		
	HE	IB	F(3)	HE	IB	F(3)	HE	IB	F(3)	HE	IB	F(3)
	Tons (4)			Tons (4)			Tons (4)			Tons (4)		
75										15	60	15%
100							20	80	13%	35	65	18
150				25	125	15%	50	100	18	85	65	23
200	35	165	13%	70	130	18	100	100	21	135	65	28
300	110	190	17	170	130	23	200	100	27	235	65	36
400	210	190	21	270	130	27	300	100	33	335	65	44
500	310	190	24	370	130	32	400	100	38	435	65	51
600	410	190	27	470	130	36	500	100	44	535	65	58
700	510	190	30	570	130	39	600	100	49	635	65	64
800	610	190	33	670	130	44	700	100	54	735	65	68
900	710	190	36	770	130	48	800	100	58	835	65	72
1000	810	190	38	870	130	51	900	100	62	935	65	76
1100	910	190	41	970	130	55	1000	100	65	1035	65	80
1200	1010	190	44	1070	130	58	1100	100	68	1135	65	83
1300	1110	190	46	1170	130	61	1200	100	71	1235	65	

NOTES: (1) Because of the small difference in effectiveness of the various G.P. bombs, there will be only a small error if this table is used for the 1000 and 2000-lb G.P.'s. (The 1000 and 2000-lb bombs are 95 per cent as effective against this target as the 500-lb G.P.) Also, there will be only a negligible error if this table is used for the AN-M50 4-lb incendiary as the difference in effectiveness between the AN-M50 and AN-M47 is less than 5 per cent.

(2) In the examples following this table, this quantity is called the "Index of Mission Efficiency". It is a measure of bombing accuracy, and bears no relation to the size of the target.

(3) Expected fraction (per cent) of serious damage to the target.

(4) Load is given in tons of actual (not nominal) weight of bombs.

Method of Use:

1. Determine Index of Mission Efficiency:

   (a) Estimate per cent of dispatched planes bombing primary target.
   (b) Estimate per cent of bombs over target expected to fall within 1000 feet of aiming point.
   (c) Multiply (a) by (b) and round off to nearest percentage figure in table.

2. Read under computed Index of Mission Efficiency and opposite the total load dispatched the recommended high explosive-incendiary loading and the expected per cent of damage.

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Examples Illustrating Use of Loading Table:

1. *To find the best HE-IB combination and resulting per cent of damage for a given force:*

Given: Planes expected to bomb primary target, 70 per cent of mission. Percent of bombs over target expected to fall within 1000 feet of aiming point, 30 per cent. Mission of 100 planes with total load of 300 tons.

Solution: 70 per cent x 30 per cent equals 21 per cent; i.e., 20 per cent is Index of Mission Efficiency. Opposite 300 tons in 20 per cent column find loading:

HE 200 tons equals 67 plane loads at 3 tons per plane.
IB 100 tons equals 33 plane loads at 3 tons per plane.

Fraction of damage: 27 per cent.

Hence, for optimum loading 67 planes will carry HE and 33 planes IB, but if groups of 12 are to carry only one kind of bomb per group, this may be revised to 5 groups of HE and 3 groups of IB.

2. *To find force required to achieve recommended level of damage:*

Given: Recommended level of damage, 50 per cent. Same Index of Mission Efficiency as in Example 1. Individual A/C bomb load 3 tons.

Solution: In 20 per cent Mission Efficiency column take:
F equals 49 per cent and find loading:

	HE 600 tons
	IB 100 tons
Total	700 tons

requiring a total force of 233 A/C or 20 groups of 12 A/C.

The Loading Table has been prepared from an analysis of the target before attack. If the important buildings of the target have suffered only slight damage in an early attack, it will still be suitable for determining the best loading, but after substantial damage to the important buildings has resulted, a new analysis of the target should be made and a new Loading Table prepared.

If the target has suffered substantial damage in earlier attacks, and no new Loading Table is available, the following general rules can be applied:

a. If previous attacks have destroyed most of the important combustible buildings (or buildings with highly combustible contents) on the site, as shown in the Fire Susceptibility Plan (Illustration No. 90.20-2010 P5), loads carried on subsequent attacks should consist wholly of the recommended HE weapon.

b. If the proportion of combustible buildings remaining is about the same as before attack (e.g., because the bomb pattern has covered only part of the site), the original Loading Table may again be used to calculate the best mixture of He and IB for a subsequent attack.

c. If it has not been possible to assess damage in the earlier attack, the Loading Table should be used to determine the cumulative load. For example, if 300 tons have previously been dispatched, and 200 tons are to be sent in a second attack, and the Index of Mission Efficiency is 20 per cent, the Loading Table shows the cumulative load (500 tons) should be divided into 400 tons HE and 100 tons IB. If 200 tons HE and 100 tons IB were sent in the first attack, 300 tons HE and no IB should be dispatched in the second attack.

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TARGET INFORMATION SHEET *(Contd.)*

LEVEL OF DAMAGE

Serious damage (structural plus severe fire damage) of the following approximate levels will result in the net production loss shown below:

Fraction of Damage	Months of Net Production Loss
25 per cent	1 to 3 months
50 per cent	3 to 5 months
70 per cent	5 to 8 months

Damage of approximately 70 per cent to the vital machine shops would destroy a major portion of the machine tools and completely halt production for at least four months. Net production loss would be between 5 and 8 months's of the pre-attack output rate. In the aero-engine industry, experience indicates diminishing returns do not take effect until levels of damage exceeding 70 per cent are reached.

At lesser levels, net production loss will vary depending upon whether bombs strike essential processes in key production lines, such as those making cylinder heads, crankshafts, gears, etc. Also, there is more chance for removal of undamaged or salvageable equipment to nearby plants or for utilization of undamaged facilities within the plant more fully, thus curtailing production loss. Damage of less than 25 per cent will probably be repaired rather quickly, and unless vital processes are hit, loss should be relatively unimportant.

The total tonnage which must be dispatched to cause these levels of damage may be estimated from the Loading Table as explained and illustrated under "Method of Use" of the Table.

CAMOUFLAGE, DECOYS AND SMOKE SCREENS

Photography of 23 November 1944 shows some disruptive roof painting. There is no evidence of decoy buildings and no smoke screens have been reported.

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TARGET INFORMATION SHEET

ANNEX I

Sheet No. 90.20-2010 TI/IA
Date 20 Feb. 1945
Page No. 1 (2 pages)

Obj. Folder 90.20
Obj. Area 90.20
AAF Target No. 90.20-2010
NAME OF TARGET AICHI AIRCRAFT ENGINE WORKS, NAGOYA PLANT

Place Nagoya (Japan)
Air Target System: Aircraft

Lat.: 35°07'N
Long: 136°54'E
Alt.: 10 feet

(Note: This annex is issued for use by the Navy in conjunction with Target Information Sheet 90.20-2010 TI/I, issued by the Joint Target Group on 10 Feb. 1945.)

NAVAL CARRIER-BASED AIR ATTACK

Introduction: This sheet is for the use of Naval carrier-based aircraft which are better adapted for attacking the important individual buildings rather than the target as a whole. In view of the complexities involved in estimating bombing accuracies and stowage capabilities of carrier-based aircraft, this discussion is limited to stating the number of hits with various bombs required to achieve given levels of damage on individual buildings. No attempt is made to convert these to number of bombs or planes to be dispatched.

Buildings and Their Importance to Production: Only those buildings rated as "Primary" or "Secondary" on the Fire Susceptibility Plan, Illustration No. 90.20-2010 P5, are taken into consideration; other buildings are of minor productive value and do not merit specific attack. The buildings are listed in Table I below in the order of their importance to production, the relative value of which is indicated by the number in the column headed "I.P." (Index of Importance to Production). These indices, based on a scale 10 to 1 (buildings rated 10 being of greatest importance), refer to this target only and should not be used to compare buildings in different targets.

Number of Hits: Table I below gives the number of hits by various HE bombs to achieve 30, 50 and 70 per cent serious damage to specific buildings. For other levels of damage within this range, the required number of hits can be obtained by interpolation.

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT

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By _____ NARA, Date 4-11-11

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Table I

Number of Hits Required to Achieve 30, 50 and 70 Percent Serious Damage to Individual Buildings

(Refer to Illustration No. 90.20-2010 P5)

Building No.	I.P.	Fraction of Serious Damage	Number of Hits 500-lb GP	1000-lb GP	2000-lb GP
3a-h	10	30%	28	16	8
		50%	55	32	15
		70%	82	48	23
18	2	30%	5	3	1
		50%	9	5	2
		70%	13	8	4
6ab	1	30%	4	2	1
		50%	8	4	2
		70%	12	7	3

Examples of Use of Table I:

1. Problem: To obtain the required number of hits with 500-lb GP bombs on Building 3a-h to achieve 30 percent serious damage.

   Solution: The table gives 28 hits as the number required to achieve 30 percent serious damage.

2. Problem: To obtain the required number of hits with 2000-lb GP bombs on Building 18 to achieve 60 percent serious damage.

   Solution: The table gives 2 hits for 50 percent and 4 hits for 70 percent serious damage. By interpolation 3 hits are required.

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TARGET NO. 90.20-2010

APPROX. COORDINATES 35° 07′ N 136° 54′ E

PHOTOGRAPHED 23 NOV. 1944

JOINT TARGET GROUP-WASHINGTON, D. C.

AICHI AIRCRAFT ENGINE WORKS

NAGOYA CITY, JAPAN

0 2000 4000 6000 FEET

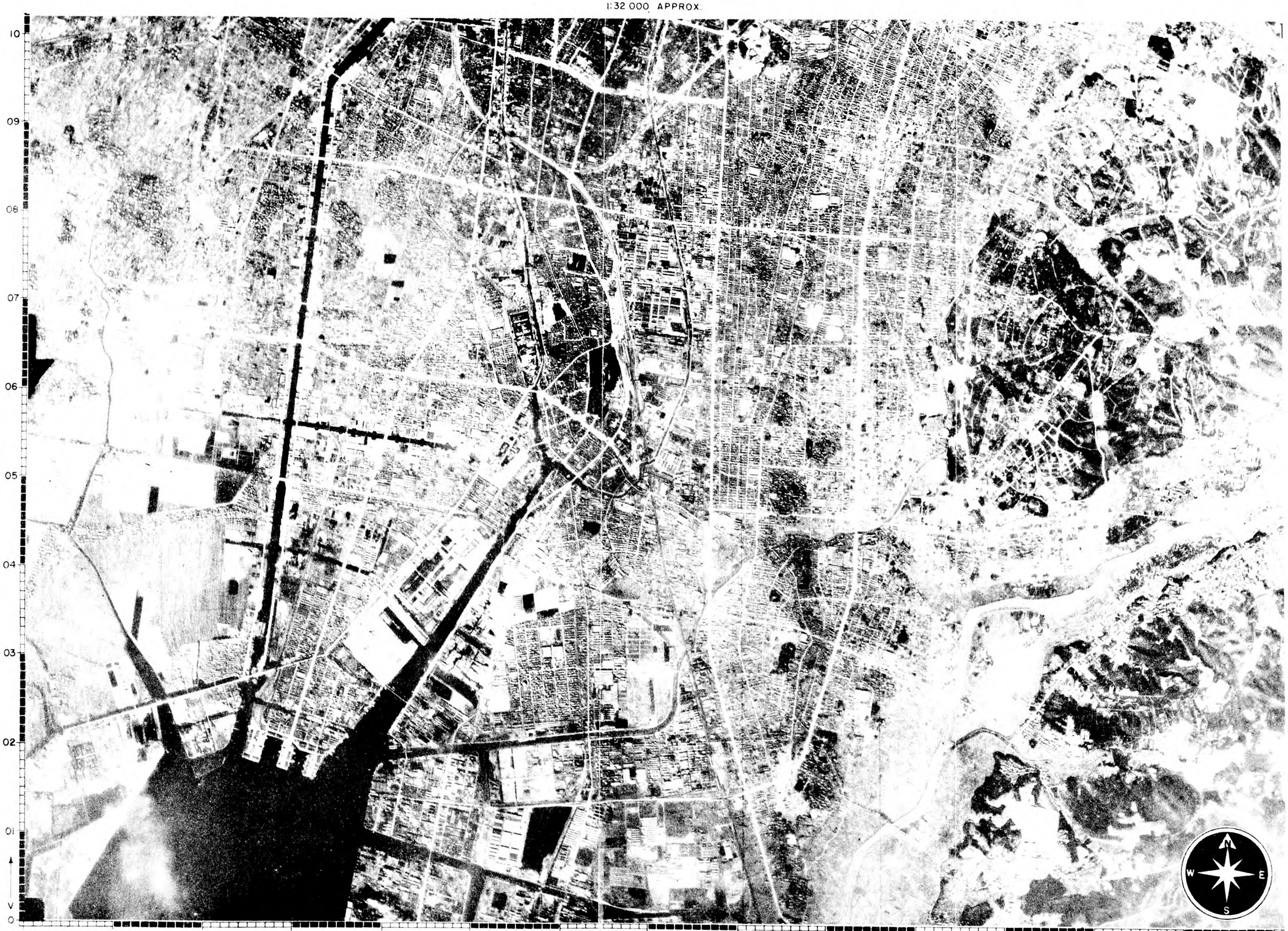
0 ½ 1 MILE

1:32 000 APPROX.

ILLUSTRATION NO. 90.20-2010 P1

ISSUED JANUARY 1945

RESTRICTED



0 H → 01 02 03 04 05 06 07 08 09 10 11 12 13 14

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TYPE A

JOINT TARGET GROUP WASHINGTON, D.C.
NARA Date 4-30-77

RESTRICTED

AICHI AIRCRAFT ENGINE WORKS, NAGOYA PLANT

NAGOYA JAPAN

ILLUSTRATION No.	**90.20-2010 P2/1**
DATE	**29 April 1945**
TARGET No.	**90.20-2010**
COORDINATES	**35°07'N 136°54'E**
PHOTOGRAPHED	**23 November 1944**

0 2000 4000 6000 FEET
0 ½ 1 MILE
1:32 000 APPROX.

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft in place of 90.20-2010 P2.

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NARA Date 4-5-11

JOINT TARGET GROUP
WASHINGTON, D. C.

AICHI AIRCRAFT ENGINE WORKS, NAGOYA PLANT

NAGOYA JAPAN

CONFIDENTIAL

ILLUSTRATION No. . 90.20-2010 P3/1
DATE . . . . . 19 April 1945
TARGET No. 90.20-2010
COORDINATES . . 35°07'N 136°54'E
PHOTOGRAPHED . 23 November 1944

0 500 1000 1500 2000 2500 3000 FEET
0 1/4 1:6000 APPROX. 1/2 MILE

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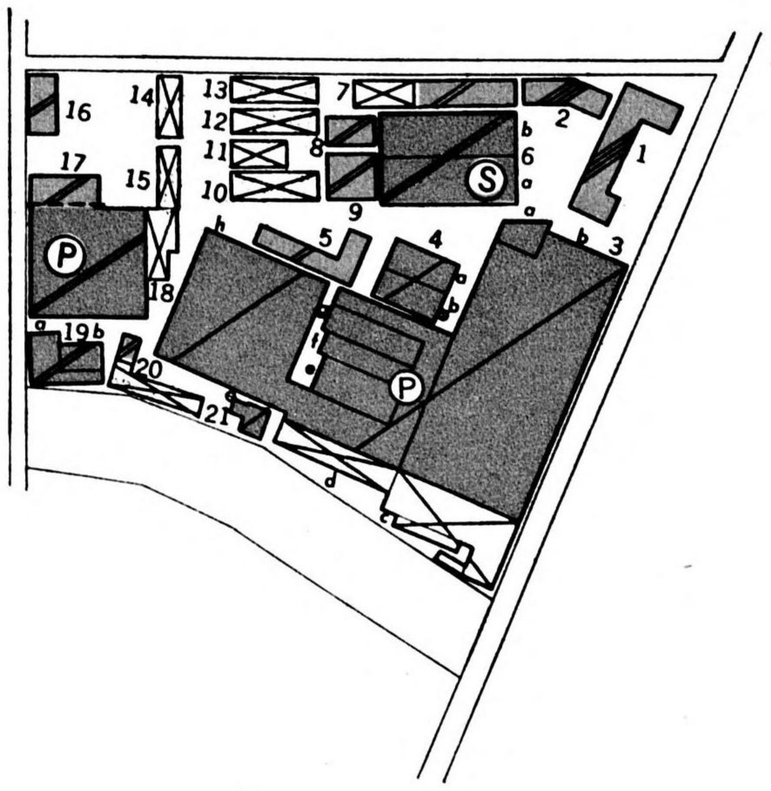
JOINT TARGET GROUP WASHINGTON, D. C.
FIRE SUSCEPTIBILITY PLAN

AICHI AIRCRAFT ENGINE WORKS
NAGOYA, JAPAN

ILLUSTRATION NO. 90.20-2010-P5/1
DATE 17 MAY 1945
TARGET NO. 90.20-2010
COORDINATES 35°07′N 136°54′E
PHOTOGRAPHED 12 MARCH 1945

SCALE 1:6,000
500 0 500 1000 FEET



LEGEND

1. Offices and cafeteria
2. Offices
P 3. Engine parts manufacture and assembly
4. Probable foundry or parts manufacture
5. Probable parts manufacture
6. Foundry and storage
7. Storage
8, 9. Unidentified
10, 11. Probable storage (Destroyed)
12, 13. Probable storage (Removed)
14, 15. Probable storage (Destroyed)
16, 17. Possible 13 mm. ammunition manufacture
P 18. Engine parts manufacture
19, 20. Unidentified
21. Boiler house

P denotes Primary Building.

NOTE:
⊠ Denotes buildings destroyed or removed.

FIRE SUSCEPTIBILITY PLAN			
PRIMARY BUILDINGS	Ⓟ	FIRE WALL, CERTAIN	
SECONDARY BUILDINGS	Ⓢ	FIRE WALL, PROBABLE	
BUILDINGS		**CONTENTS**	
COMBUSTIBLE		SUSCEPTIBILITY TO INCENDIARIES:	
NON-COMBUSTIBLE		NONE	
FIRE RESISTANT		POOR	
COMBINATION I.E. COMBUSTIBLE ROOF RESISTANT FLOORS		FAIR	
		GOOD	
WATER TANK	Ⓦ	EXCELLENT	

AREA IN SQ. FT.	PRIMARY	SECONDARY	ALL BLDGS. SHOWN
NO. OF BUILDINGS	2	1	15
NO. OF FIRE DIVISIONS	2	1	15
PLAN AREA	287,000	41,000	423,000
TOTAL FLOOR AREA	287,000	41,000	484,000
SITE AREA	800,000		

PREPARED BY AERONAUTICAL CHART SERVICE, AAF.

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT IN PLACE OF PAGE 90.20-2010 P5

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Sheet No. 90.20-2010-P 6
Date 10 Feb. 1945
Page No. 1 (1 pages)

JOINT TARGET GROUP, WASHINGTON, D.C.
FUNCTIONAL IDENTIFICATION SHEET

(To be read in conjunction with Illustration No. 90.20-2010 P5)

Obj. Folder 90.20
Obj. Area 90.20
AAF Target No. 90.20-2010

Place Nagoya, (Japan)
Air Target
System - Aircraft

Lat.: 35° 07' N
Long: 136° 54' E
Alt.: 10 feet

NAME OF TARGET **AICHI AIRCRAFT ENGINE WORKS, NAGOYA PLANT**

ALL PREVIOUS SHEETS CANCELLED

Building No.	Function of Building
1	Offices and cafeterias.
2	Offices.
3	Engine parts manufacture and assembly.
4	Probable foundry or parts manufacture.
5	Probable parts manufacture.
6	Foundry and storage.
7	Storage.
8, 9	Unidentified.
10 - 15	Probable storage.
16, 17	Possible location of reported 13 mm ammunition manufacture.
18	Engine parts manufacture.
19, 20	Unidentified.
21	Boiler house.

(Based on F/A Report No. 10, AC/AS, Intelligence, Photographic Division, dated 13 December 1944.)

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JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET LOCATION SHEET

MITSUBISHI AIRCRAFT, KIORIMO PLANT
NAGOYA JAPAN

SHEET No. . . . . 90.20-2129—TL
DATE . . . . . 9 May 1945
TARGET No. 90.20-2129
AIR TARGET SYSTEM
End Prdt. Ind.—Aircraft
COORDINATES . . . . 35°09'N 136°51'E
ALTITUDE . . . . . 16 feet

SIGNIFICANCE:

This plant makes engine parts for Mitsubishi and may be turning out completed engines as a result of dispersal of the Mitsubishi Aircraft Engine Works, Target 90.20-193. The S portion is a converted textile mill; the N section is new. Both sections suffered slight damage in a Nagoya Urban Area attack.

LARGE SCALE ILLUSTRATION—SCALE APPROX.: 1:5750

SMALL SCALE ILLUSTRATION—SCALE APPROX.: 1:63,000

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JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET LOCATION SHEET

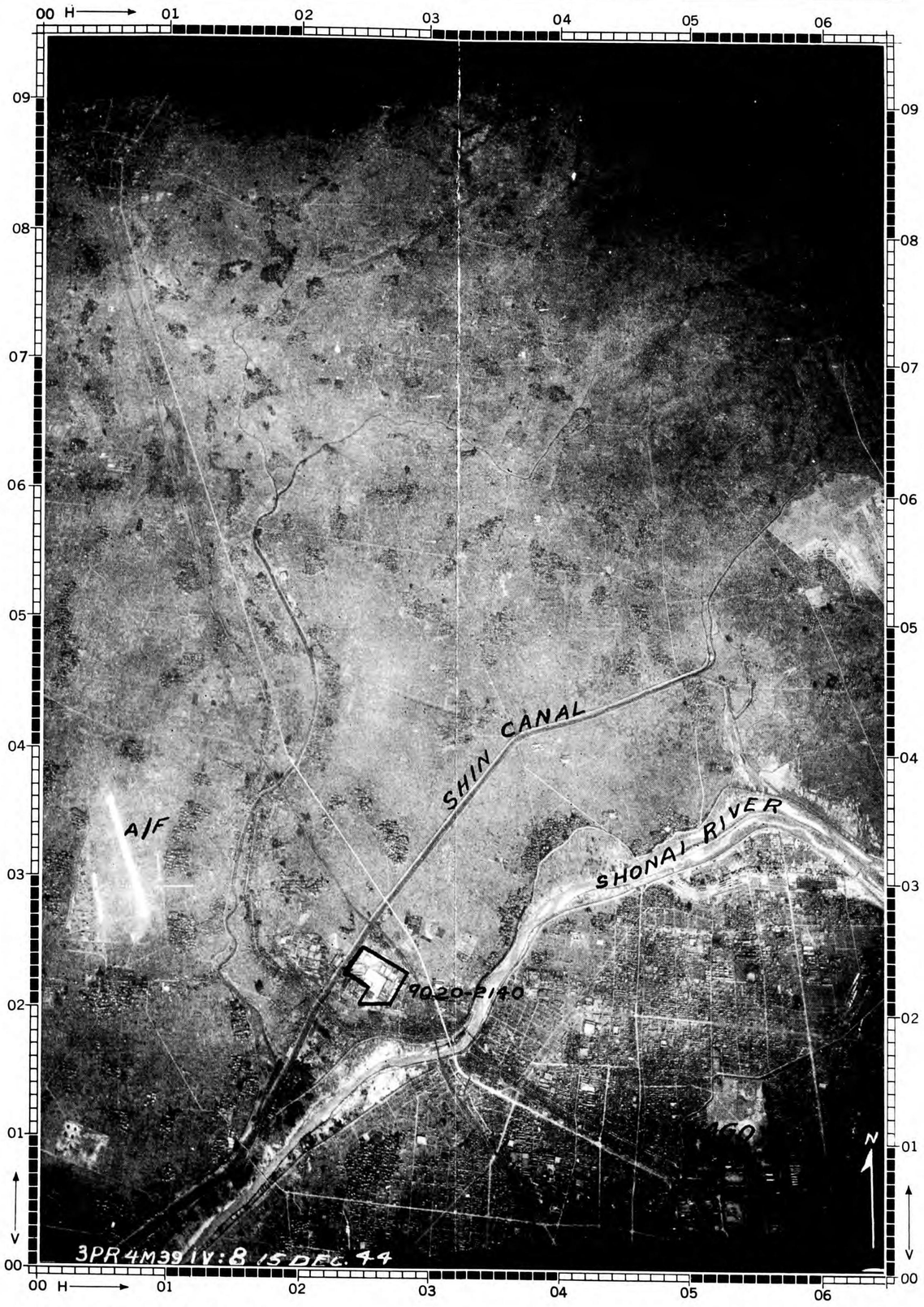
MITSUBISHI AIRCRAFT, Fugi Textile Plant
NAGOYA JAPAN

SHEET No. .....90.20-2140—TL
DATE.....12 May 1945
TARGET No. 90.20-2140
CATEGORY...End Prdt. Ind.—Aircraft
COORDINATES ....35°12'N 136°51'E
ALTITUDE .....18 feet

SIGNIFICANCE:

This is a large textile mill reported to be making cylinders for Mitsubishi Aircraft. It is likely that other aircraft engine parts are also made here. In addition this plant is thought to be an important unit in the Mitsubishi dispersal program.

LARGE SCALE ILLUSTRATION—SCALE APPROX.: 1:9600



SMALL SCALE ILLUSTRATION—SCALE APPROX.: 1:64,000

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JOINT TARGET GROUP, WASHINGTON, D. C.

TARGET INFORMATION SHEET

SHEET . . . 90:21-2012—TI
DATE . . . . . 29 May 1945
PAGE 1

TARGET 90:21-2012
OBJ. AREA 90:21
OBJ. FOLDER . . New Target
CATEGORY
End Prdt. Ind.—Aircraft

LAT. . . . . 34° 40′ N
LONG. . . . . 137° 46′ E
ALT. . . . . 15 feet

NAKAJIMA AIRCRAFT, HAMAMATSU PLANT

HAMAMATSU **JAPAN**

Note: This Target Information Sheet is issued to show the status and importance of the target following serious damage. Previously issued information concerning construction, vulnerability, primary objectives, fire susceptibility, etc., is no longer applicable.

SIGNIFICANCE

The first good cover of this plant, on 5 November 1944, showed it to be fairly large and still under construction. There was at that time no evidence of the type of engine for which production was planned. The next photography, on 7 February, showed that one building which was still under construction on 5 November had been finished, but that 8 out of 11 large buildings had been completely removed. No repair has been seen in more recent cover. The plant can now have little, if any, importance in the Japanese aircraft industry, although the eight test cells built prior to 5 November have not been removed and could be used.

LOCATION

In the NE outskirts of Hamamatsu approximately 1.5 miles W of Tokaido Mainline RR bridge over the N-S Tenryu River, about 10 miles E of the Hamana Lagoon, and about one mile N of a point where the E-W Mainline RR crosses a canal that forms the western boundary of the plant site. The Mikitahara Army Airfield is about one mile to the NW.

DESCRIPTION AND LAYOUT

(Refer to Illustration 90:21-2012 P3.) The only remaining building is No. 12, the small almost square building immediately E of building 12 (building 10), the two smaller buildings immediately S of it, and the test cells. Since nothing is known about production, if any, at this plant, no production flow can be traced.

PRIMARY OBJECTIVES

None.

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft in place of 90:21-2012 TI dated 18 January 1945.

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JOINT TARGET GROUP, WASHINGTON, D. C.

TARGET INFORMATION SHEET

SHEET . . . 90:23-1167—TI
DATE . . . . . 14 April 1945
PAGE 1

JAPAN INTERNATIONAL AIRCRAFT, OKUBO PLANT

(Nippon Kokusai Koku Kogyo KK, Okubo Kojo)

OKUBO **JAPAN**

TARGET 90:23-1167
OBJ. AREA 90:23
OBJ. FOLDER . . New Target
CATEGORY
End Prdt. Ind.—AIRCRAFT

LAT. . . . . 34° 52′ N
LONG. . . . . 135° 46′ E
ALT. . . . . 43 feet

ALL PREVIOUS SHEETS CANCELLED

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft with other 90:23-1167 material.

SIGNIFICANCE

This plant appears to be making some aircraft parts and assembling trainer aircraft and gliders. Its destruction would not seriously effect Japanese combat air strength. Japan International Aircraft Co. has several other plants and produces transports, propellers, and rocket-propelled suicide planes in addition to trainers and gliders.

LOCATION

(Refer to Illustration No. 90:23-1167 P2.) About 4 miles S of Kyoto and 2 miles S of Fushimi at the town of Okubo. It is situated just E of the Ogura Airfield. The NW-SE flowing Kizu River passes about 4,000 feet to the SW at its nearest point. Photographs show that Lake Ogura, formerly about 1 mile N of the plant, has now been drained. The plant is bounded on the E by the main line electric railroad between Kyoto and Nara and on the S and W by a narrow canal. The target is in relatively open country.

DESCRIPTION AND LAYOUT

(Refer to Illustration No. 90:23-1167 P4.) The site is roughly rectangular measuring about 4,500 feet E-W through the main buildings, and averaging about 2,200 feet N-S. There are two principal built-up areas: One in the SW quarter containing the main plant, and on the SE corner containing living quarters, possibly an industrial school, and some small parts manufacture.

Production flow in the main plant is from E to W with metal fabrication and small parts manufacture probably starting in medium-sized buildings (9, 16, 17) near the E and post assembly operations performed in the large building (4) nearest the W boundary. The proportion of subassembly area seems somewhat low indicating that some completed parts are possibly brought in from other plants.

A large building (20) near the center of the site appears to be doing work requiring jigs and fixtures and has been tentatively identified as parts manufacture and assembly. It does not fit into the apparent flow line, however, and may be a part of planned expansion or engaged in experimental work. There are extensive areas of excavation indicating considerable planned expansion.

PRIMARY OBJECTIVES

(Refer to Illustration No. 90:23-1167 P4.) The subassembly buildings and more important fabricating shops: Buildings 6, 8, 9, 10, 11, and possibly 20.

CONSTRUCTION AND VULNERABILITY

(Refer to Illustration No. 90:23-1167 P4.) All major buildings are large one-story structures with sawtooth roofs predominating, probably steel-framed and with noncombustible, lightweight sheet roofing. Buildings 4, 5, and 6 have long spans and greater than normal height; other major buildings are of short to normal span and normal height. Minor buildings are small, one-story, probably combustible, and mostly with double-pitched roofs.

WEAPON RECOMMENDATIONS

Instructions with regard to weapons will usually be given in Field or Operational Orders, but in the absence of such instructions and to assist planners in formulating such orders the following information is given:

An attack with a combination of high explosive and incendiary bombs is recommended. A preliminary structural and occupancy analysis of the plant indicates the following weapons should be selected:

	High explosive	Fuzing	Incendiary
Preferred	1,000-lb. GP	0.01 N/ND T.	AN-M50 4-lb. or AN-M69 6-lb. (in aimable clusters when dropped from high altitude).
Alternative	2,000-lb. GP or 500-lb. GP.	0.01 N/ND T.	AN-M47 70-lb. AN-M76 500-lb.
Not recommended	Smaller GP bombs SAP, AP bombs, Depth bombs.	.....	

NOTES.—(a) Use 0.1 N fuzes if 0.01 N fuzes are not available, and 0.01 T if ND T are not available. ND tail fuzing is recommended as most of the buildings have light roof material, and are best destroyed by blast effects.
(b) The above recommendations are on a weight for weight basis.

CAMOUFLAGE, DECOYS, AND SMOKE SCREENS

Photography of 15 December 1944 reveals that almost all of the buildings have disruptive roof painting. There is no indication of decoys or smoke screens.

ADDITIONAL INFORMATION

The following are reported to be manufactured by Japan International Aircraft Co.:

Japanese designation	Allied code name	Description
Ki 59	Thalia	Type RO 2E Transport.
	Teresa	2E Transport.
Ki 76	.....	Liaison.
Ki 86	.....	Trainer.
Ku 1	.....	6-passenger troop transport glider.
Ku 7	.....	Large transport glider.
Ku 8	.....	14-passenger glider.
		Rocket propelled suicide aircraft.

The largest of the company's other plants is located at Hiratsuka (Target 90:17-2015), and is probably manufacturing propellers and wooden fuselages for either noncombat type aircraft or gliders.

The company is reported to have taken over the Japan Rayon Plant at Uji, about 1 mile NE of the Okubo Plant, but there is no photographic indication of aircraft manufacture there.

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JOINT
TARGET
GROUP
WASHINGTON, D. C.

JAPAN INTERNATIONAL AIRCRAFT, OKUBO PLANT

OKUBO — JAPAN

RESTRICTED

ILLUSTRATION No. . . **90.23-1167 P1**
DATE . . . . . **29 April 1945**
TARGET No. **90.23-1167**
COORDINATES . . . **34°53'N 135°46'E**
PHOTOGRAPHED . **15 December 1944**

0 2000 4000 6000 FEET
0 ½ 1 MILE
1:32 000 APPROX.

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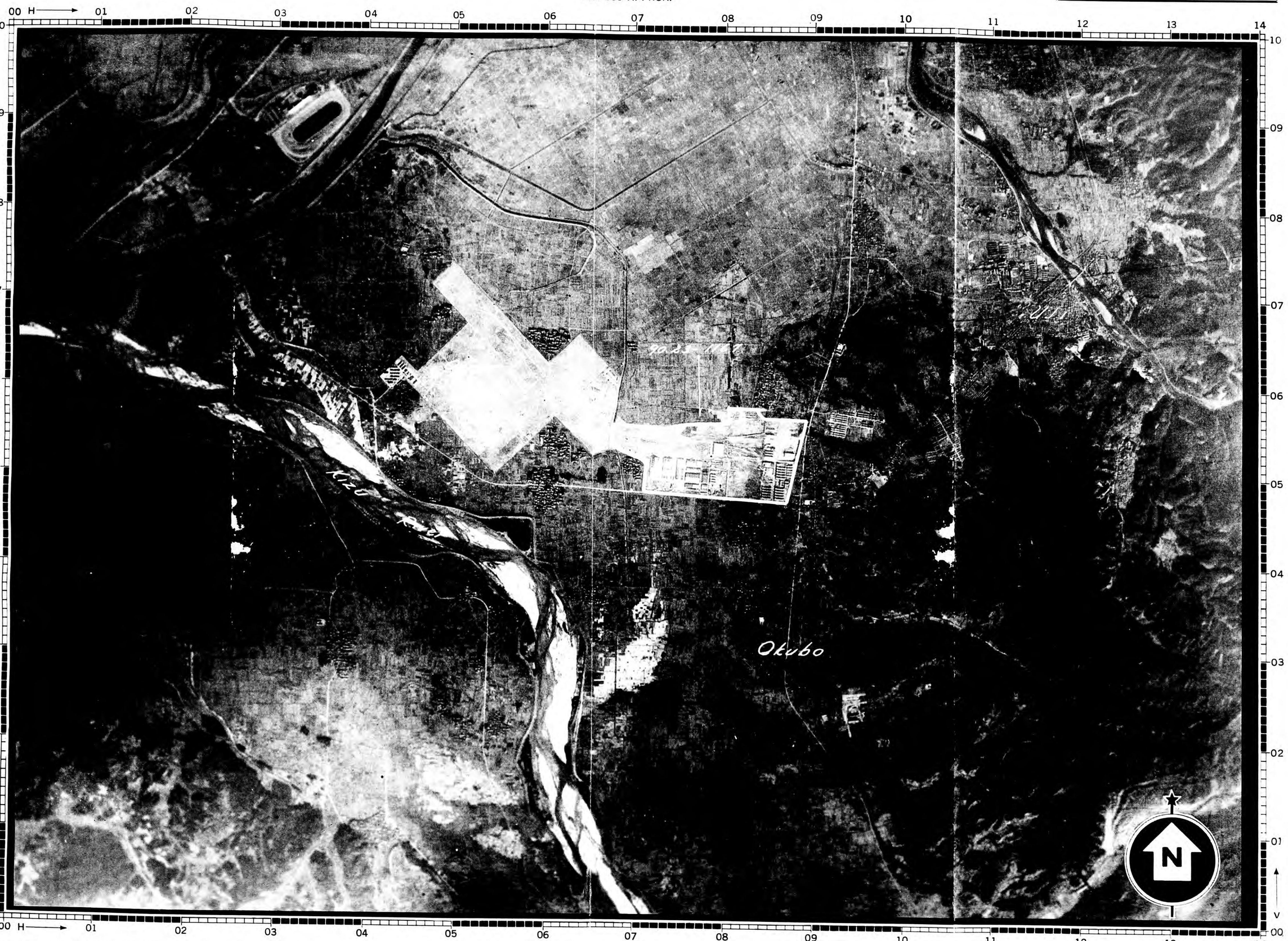
JOINT TARGET GROUP
WASHINGTON, D. C.

JAPAN INTERNATIONAL AIRCRAFT, OKUBO PLANT
OKUBO — JAPAN

RESTRICTED

ILLUSTRATION No... **90.23-1167 P2**
DATE..... **29 April 1945**
TARGET No..... **90.23-1167**
COORDINATES...**34°53'N 135°46'E**
PHOTOGRAPHED.**15 December 1944**

0 2000 4000 6000 FEET
0 ½ 1 MILE
1:32 000 APPROX.



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JOINT
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WASHINGTON, D. C.

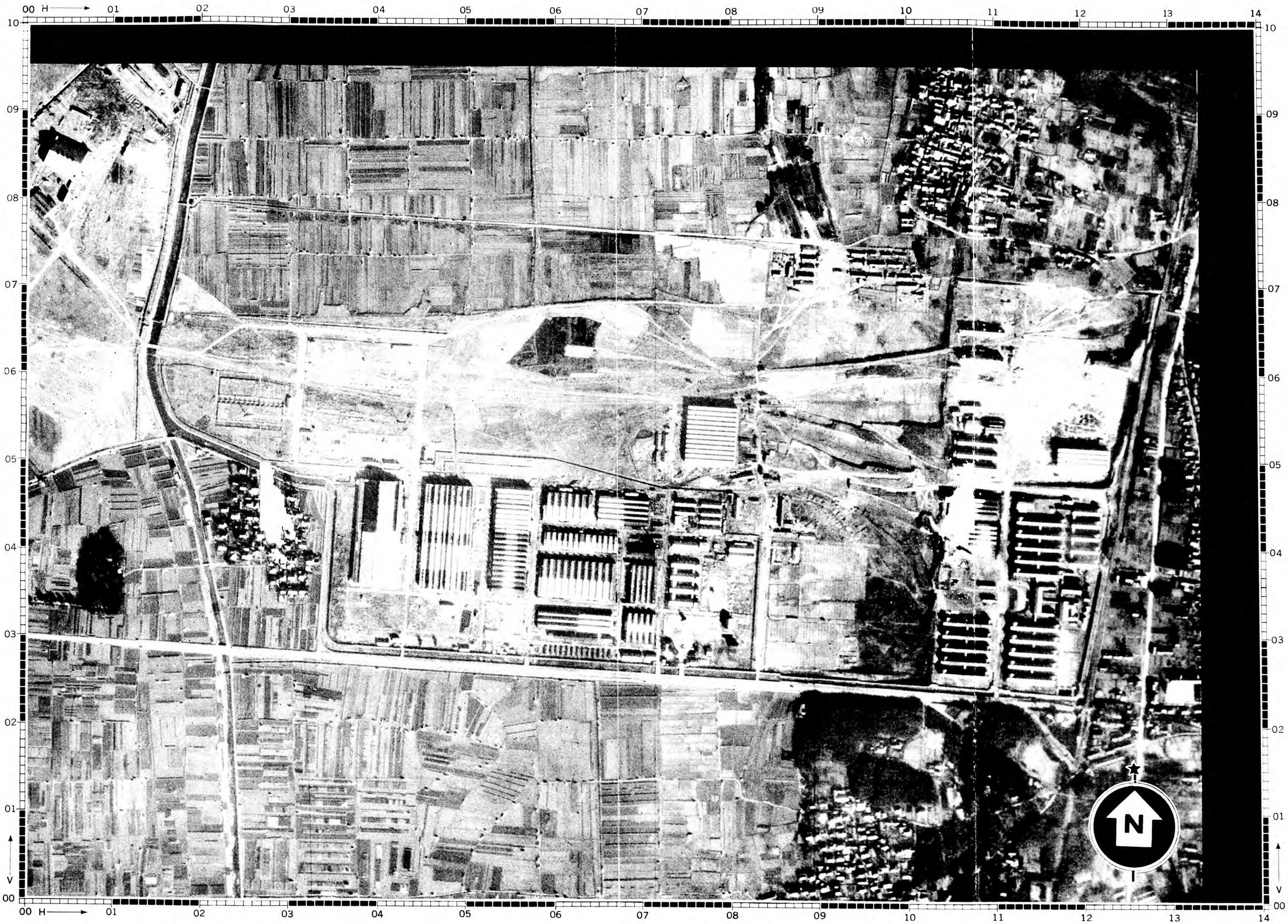
JAPAN INTERNATIONAL AIRCRAFT
OKUBO PLANT

OKUBO JAPAN

0 500 1000 1500 2000 2500 3000 FEET
0 1/4 1:6000 APPROX. 1/2 MILE

RESTRICTED

ILLUSTRATION No... **90.23-1167 P3**
DATE..... **29 April 1945**
TARGET No..... **90.23-1167**
COORDINATES...**34°53'N 135°46'E**
PHOTOGRAPHED.**15 December 1944**



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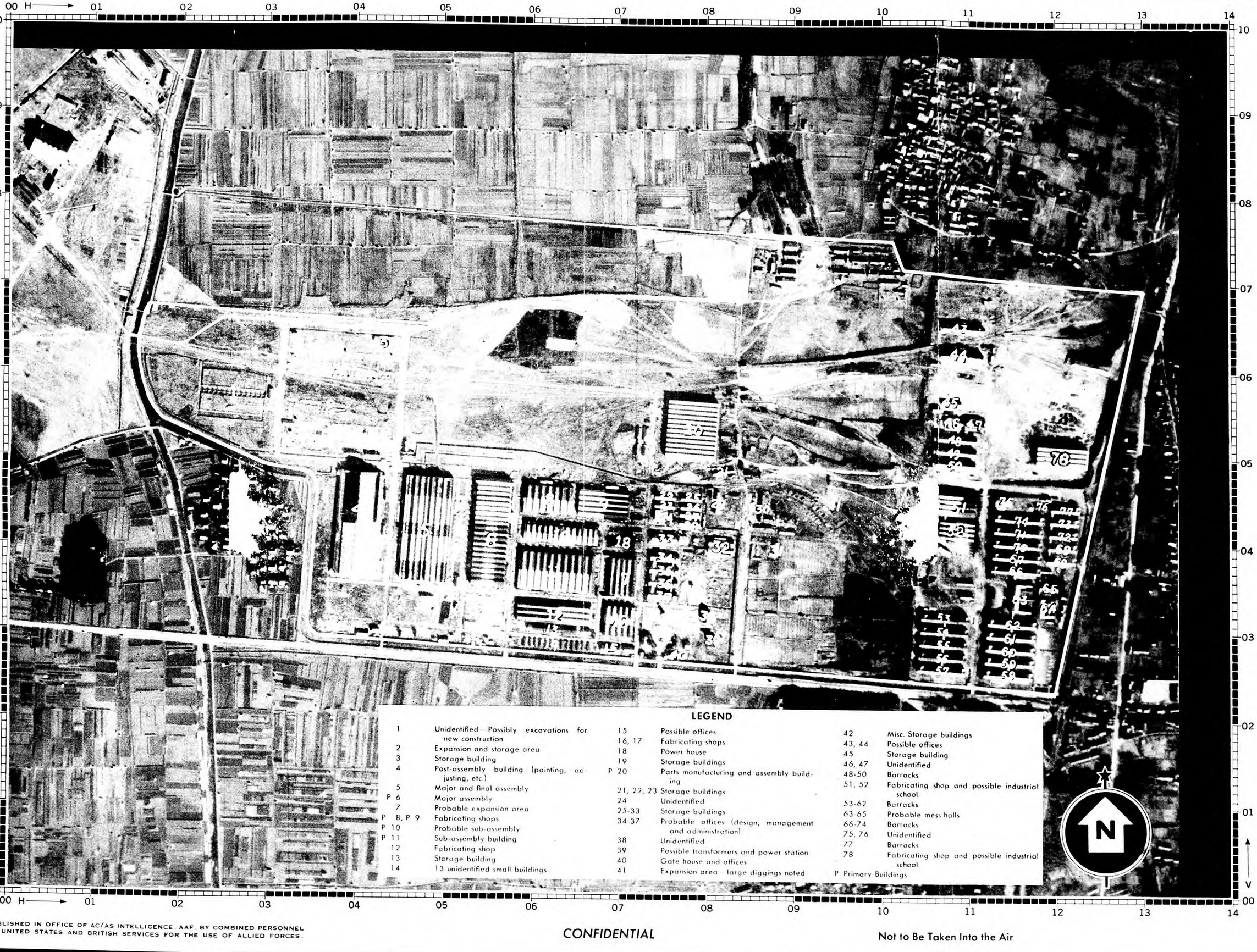
JOINT TARGET GROUP
WASHINGTON, D. C.

JAPAN INTERNATIONAL AIRCRAFT, OKUBO PLANT
OKUBO — JAPAN

CONFIDENTIAL

ILLUSTRATION No... **90.23-1167 P4**
DATE..... **29 April 1945**
TARGET No..... **90.23-1167**
COORDINATES...**34°53'N 135°46'E**
PHOTOGRAPHED.**15 December 1944**

0 500 1000 1500 2000 2500 3000 FEET
0 1/4 1:6000 APPROX. 1/2 MILE



LEGEND

1	Unidentified—Possibly excavations for new construction	15	Possible offices	42	Misc. Storage buildings
2	Expansion and storage area	16, 17	Fabricating shops	43, 44	Possible offices
3	Storage building	18	Power house	45	Storage building
4	Post-assembly building (painting, adjusting, etc.)	19	Storage buildings	46, 47	Unidentified
5	Major and final assembly	P 20	Parts manufacturing and assembly building	48-50	Barracks
P 6	Major assembly	21, 22, 23	Storage buildings	51, 52	Fabricating shop and possible industrial school
7	Probable expansion area	24	Unidentified	53-62	Barracks
P 8, P 9	Fabricating shops	25-33	Storage buildings	63-65	Probable mess halls
P 10	Probable sub-assembly	34-37	Probable offices (design, management and administration)	66-74	Barracks
P 11	Sub-assembly building	38	Unidentified	75, 76	Unidentified
12	Fabricating shop	39	Possible transformers and power station	77	Barracks
13	Storage building	40	Gate house and offices	78	Fabricating shop and possible industrial school
14	13 unidentified small buildings	41	Expansion area—large diggings noted	P	Primary Buildings

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft with other 90.23-1167 material.

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NARA Date 4-5-77

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JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET LOCATION SHEET

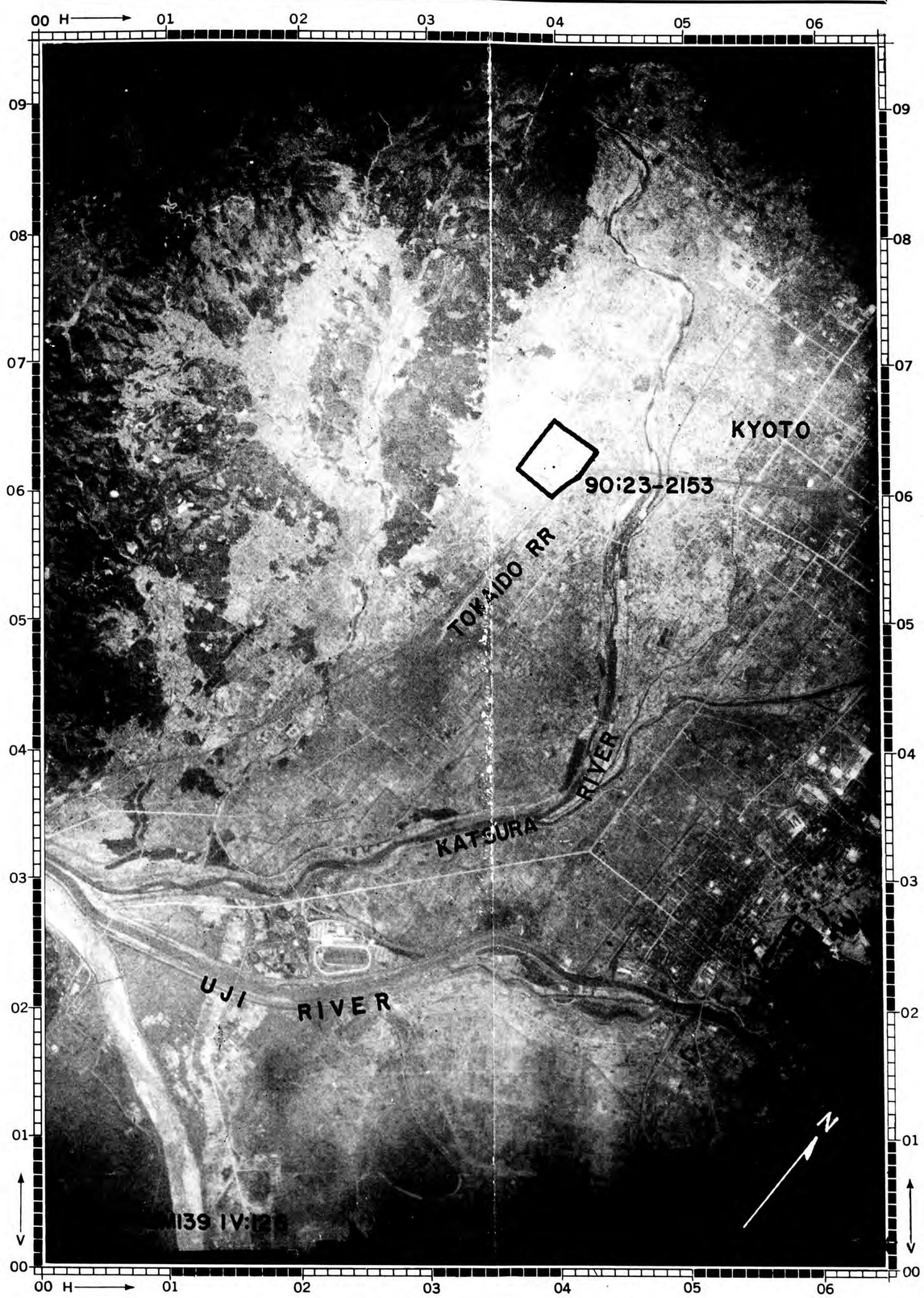
KYOTO AIRCRAFT ENGINE PLANT
KYOTO JAPAN

SHEET No. .....90.23-2153—TL
DATE.....24 May 1945
TARGET No. 90.23-2153
CATEGORY..End Product Ind.—Aircraft
COORDINATES ....34°58'N 135°43'E
ALTITUDE .....65 feet

SIGNIFICANCE:

An aircraft engine plant with 14 or possibly twenty engine test cells thought to be a Mitsubishi Plant but which may be a Kawanishi Plant. Engine production capacity if fully utilized would probably be in the vicinity of three to four hundred engines per month.

LARGE SCALE ILLUSTRATION—SCALE APPROX.: 1:16,000



SMALL SCALE ILLUSTRATION—SCALE APPROX.: 1:64,000

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By NARA, Date 4-5-77

JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET LOCATION SHEET

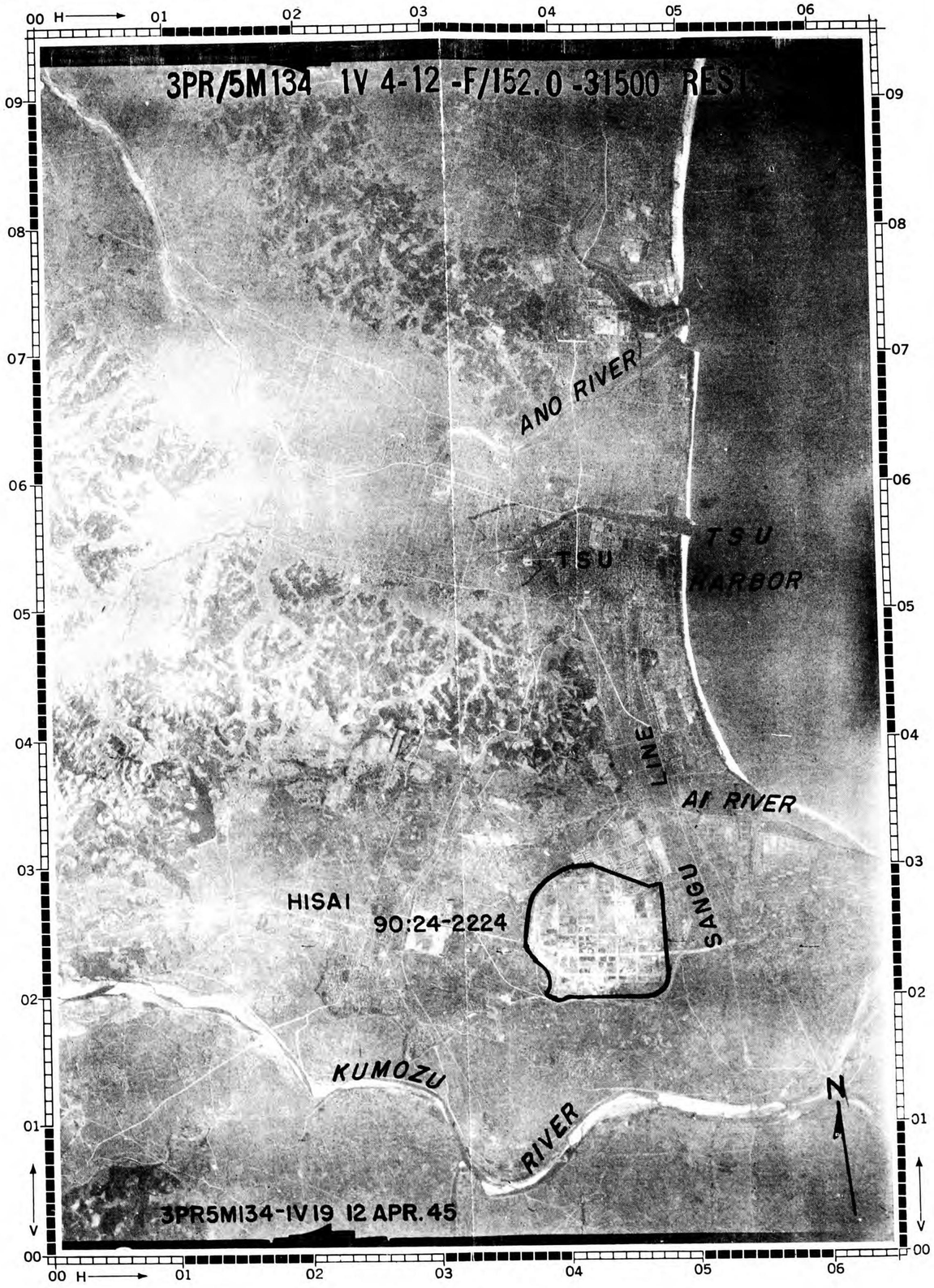
TSU NAVAL AIRCRAFT FACTORY
TSU JAPAN

SHEET	90:24-2224—TL
DATE	4 June 1945
TARGET	90:24-2224
CATEGORY	End Prdt. Ind.—AIRCRAFT
COORDINATES	34°40'N 136°30'E
ALTITUDE	10 feet

SIGNIFICANCE:

Reported as a branch naval arsenal producing engines for Navy aircraft in connection with Mitsubishi. Test cells at the plant site confirms connection with engines but the plant may serve as an engine repair center rather than as a producer of new engines. However, it is a likely dispersal location for the bombed-out Mitsubishi plants in Nagoya and Shizuoka.

LARGE SCALE ILLUSTRATION—SCALE APPROX.: 1:15,750



SMALL SCALE ILLUSTRATION—SCALE APPROX.: 1:63,000

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By _____ NARA. Date 4-6-77

NOT TO BE TAKEN INTO AIR CONFIDENTIAL 90.25-18 T1
9 Sept. 1944

T A R G E T I N F O R M A T I O N S H E E T

Ref: Obj. Folder
Osaka (90.25)
15 June 1944

Place: Naruo
Objective Area: 90.25
Category: Aircraft

Lat. : 34°42'N
Long.: 135°22'E
Alt. : 15 feet

KAWANISHI AIRCRAFT CO., NARUO
(Kawanishi Kokuki K.K., Naruo Seisakusho)

AAF Target No. 90.25-18

T I S

ALL PREVIOUS SHEETS ARE CANCELLED

NOTE: As an aid to planning, and evaluation of new reconnaissance and other intelligence, this TARGET INFORMATION SHEET is issued in advance of reconnaissance photography of the target. It is correspondingly subject to revision.

SIGNIFICANCE: Kawanishi is the only known Japanese producer of multi-engined flying boats. Some float-planes are also manufactured by this company, and there are indications of recent entry into the fighter aircraft field. There is also some production of propellers, fuel pumps, and other components, and there have been reports of limited engine production.

The installations at Naruo is the original plant of the company. It is reported that a branch factory of approximately equal size was built at FUKAE (TARGET 1702) in 1940. Together these two plants are believed to account for possibly 5% of the total Japanese production of both aircraft and aero-engines.

LOCATION: The plant is located on the N shore of OSAKA BAY just to the S of the village of NARUO. The city of KOBE is about 10 miles to the W. The NARUO River enters OSAKA BAY a short distance to the NW of the plant, and across this river is a large race track. The MUKO River flows along the SE edge of the plant site (the MUKO River dries up in dry seasons). There is an airplane runway in the SW corner of the plant site and a seaplane anchorage in Osaka Bay to the SW.

DESCRIPTION: The present total target area is unknown, but the major axis is believed to lie in a NW-SE direction. In 1939 the buildings occupied an area approximately 750 by 750 ft. but it is known that there has been considerable expansion to the N and NW. The older buildings were of steel frame, brick, and concrete construction with galvanized iron saw toothed roofs. New construction is reported to be entirely of steel and concrete. A large 3 or 4 story building occupied the E part of the site. There was also a power house in addition to a number of other buildings.

CRITICAL POINTS: Accurate evaluation of the relative importance and vulnerability of the various units of this plant will depend upon aerial reconnaissance and additional ground intelligence. Generally speaking, ASSEMBLY SHOPS and MACHINE SHOPS are critical points.

By _____ NARA, Date 4-2-11

TARGET INFORMATION SHEET (Cont'd)

ADDITIONAL INFORMATION:

Among the aircraft produced by Kawanishi are:

1. Four engined flying boat patrol bomber MAVIS
   a. With KINSEI Model 42 engines supplied by Mitsubishi Engine Works (TARGET 193)

2. Four engined flying boat patrol bomber EMILY

It is also believed that this company has manufactured:

3. KYOFU No. 15 experimental seaplane fighter

4. SHIDEN Model 11 (Experimental Kyokuchi Fighter)
   a. With HOMARE engine.

Distribution:A

NARA. Date 9-5-77

CONFIDENTIAL

JOINT TARGET GROUP
WASHINGTON, D. C.

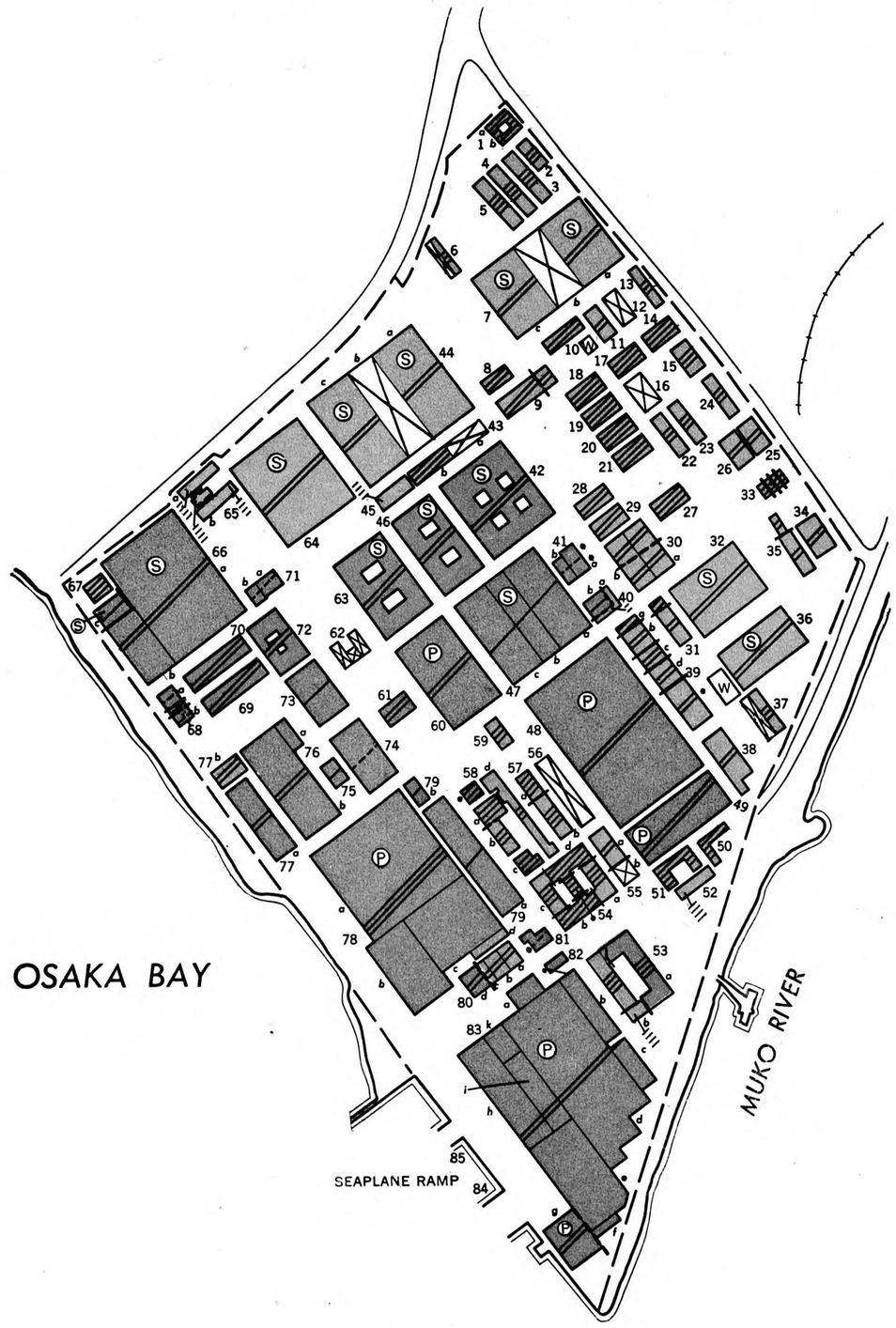
FIRE SUSCEPTIBILITY PLAN

KAWANISHI AIRCRAFT CO.,
NARUO PLANT,
NARUO, JAPAN

SCALE 1:6,000

500 0 500 1000 FEET

SHEET 90:25-18-P5
DATE 29 MAY 1945
TARGET 90:25-18
COORDINATES 34°42′N 135°22′E
PHOTOGRAPHED 18 JAN 1945 17 MAR 1945



LEGEND

Bldg. No.	Function
1	Possible canteen
2-5	Living quarters
6	Storage (partly removed)
7	Parts manufacture (7b removed)
8,9	Storage
10	Shop building
11	Storage
12	Storage (removed)
13	Probable garage
14,15	Probable shops
16	Probable shop (removed)
17	Probable shop
18-29	Storage
30	Probable parts manufacture, machining
31	Storage
32	Probable parts machining, sub-assembly
33	Unidentified revetted building
34,35	Storage
36	Shop building
37	Garage (partly removed)
38,39	Shops
40	Unidentified
41	Boiler house
42	Probable machine shop
43	Storage (43a removed)
44	Probable parts and components assembly (44b removed)
45	Probable mess
46	Small parts fabrication and machining
47	Sheet metal forming (probable hammer, presses in 47b)
P 48,49	Major sub-assembly buildings
50-52	Probable messes
53	Office building
54	Probable engineering offices
55	Offices (55b removed)
56	Offices (removed)
57	Offices
58	Probably related to engineering offices
59	Storage
P 60	Major sub-assembly building
61	Shops
62	Unidentified (removed)
63	Probable machine shops and small parts assembly
64	Probable machine shops and assembly (reported propeller manufacture)
65	Office
66	Parts manufacture, probable engine; some final assembly
67	Related to building 66
68	Two engine test cells
69,70	Probable engine parts manufacture
71	Boiler house
72	Machine shops
73	Possible foundry
74	Forge, press, hammer shop
75	Unidentified
76	Aircraft sub-assembly
77	Probable storage
P 78	Aircraft assembly (78a, final assembly; 78b, components assembly)
79a	Sheet metal parts manufacture
79b	Possible dye foundry
80	Probable parts sub-assembly, storage
81,82	Boiler houses
P 83	Aircraft assembly
84,85	Seaplane ramps
P	denotes Primary Buildings

NOTE:
⊠ Denotes buildings removed. These buildings are not included in figures below.

FIRE SUSCEPTIBILITY PLAN

PRIMARY BUILDINGS (P) FIRE WALL, CERTAIN
SECONDARY BUILDINGS (S) FIRE WALL, PROBABLE

BUILDINGS	CONTENTS
COMBUSTIBLE	SUSCEPTIBILITY TO INCENDIARIES:
NON-COMBUSTIBLE	NONE
FIRE RESISTANT	POOR
COMBINATION	FAIR
I.E. COMBUSTIBLE ROOF RESISTANT FLOORS	GOOD
WATER TANK (W)	EXCELLENT

AREA IN SQ. FT.	PRIMARY	SECONDARY	ALL BLDGS. SHOWN
NO. OF BUILDINGS	5	10	81
NO. OF FIRE DIVISIONS	6	13	116
PLAN AREA	869,500	826,300	2,457,700
TOTAL FLOOR AREA	869,500	1,314,700	3,450,100
SITE AREA	5,325,000		

PREPARED BY AERONAUTICAL CHART SERVICE, AAF.

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT WITH OTHER MATERIAL 90-25-18

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By ____ NARA. Date 4-6-77

NOT TO BE TAKEN INTO AIR CONFIDENTIAL 90.25-1547 T1
9 Sept 1944

T A R G E T I N F O R M A T I O N S H E E T

Ref: Obj. Folder
Osaka (90.25)
15 June 1944

Place: Akashi
Obj. Area: 90.25
Category: Aircraft

Lat : 34°39'N
Long : 134°57'E
Alt : 50 feet

KAWASAKI AIRCRAFT, AKASHI PLANT
(Kawasaki Kokuki, Akashi Seisakusho)

AAF Target No. 90.25-1547

T I S

ALL PREVIOUS SHEETS ARE CANCELLED

NOTE: As an aid to planning, and evaluation of new reconnaissance and other intelligence, this TARGET INFORMATION SHEET is issued in advance of reconnaissance photography of the target. It is correspondingly subject to revision.

SIGNIFICANCE: Planned for mass production, this is believed to be the main Kawasaki plant for the manufacture of aero-engines, but detailed information is lacking. Some aircraft assembly is also reported to take place at this location. All known production is for the Army.

Kawasaki is one of the large industrial concerns of Japan engaged in shipbuilding and the manufacture of marine engines. As a producer of both operational aircraft and aero-engines this company ranks next to Mitsubishi and Nakajima.

LOCATION: The plant is located about 2 miles NW of the town of AKASHI between the main government RR and a local narrow guage electric line. The village of FUJIE is less than ½ mile to the S. Adjacent to the plant site to the NW is a small airfield. About 1½ miles to the NW is a small oval race track. The center of AKASHI STRAIT is less than 3 miles to the SE. The city of KOBE is approximately 12 miles to the E.

DESCRIPTION: The dimensions of the target area are unknown but the major axis is believed to lie in a NW-SE direction. The buildings are of modern (1941) construction and reported to have saw toothed roofs.

CRITICAL POINTS: Accurate evaluation of the relative importance and vulnerability of the different units of this installation will depend upon aerial reconnaissance and additional ground intelligence. Generally speaking, the TEST BEDS and MACHINE SHOPS are the most vital parts of an aero-engine plant. Should it be confirmed that aircraft assembly takes place at this location, consideration should be given to the ASSEMBLY SHOPS.

ADDITIONAL INFORMATION:
The existance and location of this plant are fairly well established. It is believed that the following Kawasaki engines are produced here:

1. Type 2 1150 H.P. engine
   a. For use in LILY

2. Type 2 1100 H.P. in line engine
   a. For use in TONY

Distribution:A

NARA. Date 4-11-77

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JOINT TARGET GROUP, WASHINGTON, D.C.

Sheet No. 90.25-1547 DA
Date 6 March 1945
Page No. 1 (2 pages)

SUMMARY ECONOMIC DAMAGE ASSESSMENT REPORT NO. 6

Obj. Folder 90.25
Obj. Area 90.25
AAF Target No. 90.25-1547
NAME OF TARGET

Place . AKASHI (Japan)
Air Target
System Aircraft

Lat.: 34° 39' N
Long: 134° 57' E
Alt.: 50 feet

KAWASAKI AIRCRAFT, AKASHI PLANT

PARTICULARS OF ATTACKS

On 19 Jan 1945 the XXI Bomber Command made a visual attack on the primary target at Akashi at an altitude of 25,000 to 27,000 feet. A total of 80 aircraft were airborne carrying 788-500 lb GP bombs, of which 62 aircraft dropped 610 bombs over the primary target.

PREVIOUS REPORTS

None.

PLANT FUNCTION

This plant makes aero-engines, airframes and in addition has a third section devoted to an as yet unidentified function. (1) The aero-engine section totals 1,347,000 sq ft of plan area (Section B, Buildings 16 through 55) and makes the Type 2, 1100 in line engine used in the Tony fighter and the Type 2, 1150 radial engine used in the Lily bomber. Current monthly output is estimated to be 500 with eventual capacity in the 600 - 700 per month range. (2) The airframe section (Section D, Buildings 71 through 94) totals 1,287,000 sq ft of floor area. The Nick fighter bomber is made here. Current production figures are 75 per month, but it is felt that eventual capacity is 150 per month. (3) The third section (Section C, Buildings 56 through 70) is believed to be making components for either the aero-engine or the airframe section. A third possibility is that this section sends airframe components to the Kawasaki plant at Kagamigahara (Target 90.20-240).

DAMAGE ASSESSMENT

1. This plant was severely damaged. The aero-engine section received 19 percent structural and 35 percent superficial damage and, in addition, content damage under much of the area of superficial damage was extensive. The airframe plant received 16 percent structural and 12 percent superficial damage.

2. Loss is believed to be four months' output or about 2000 engines consisting of one month's loss to material in process and three months' loss due to replacement and repair time. In the absence of further attacks on Nakajima and Aichi engine plants this loss might be reduced to three months' loss - 1500 engines - as these plants could supply the Akashi plant with some components. This should result in a loss of 525 Tony fighters and 275 Lily bombers because of the engine shortage.

3. Loss of airframes is believed to be $2\frac{1}{2}$ months' output including $\frac{1}{2}$ month's production in process and two months' production during recovery. At the current rate, this amounts to 185 planes.

4. The engine plant should reach full production in six months time; the airframe plant in four months time.

EVIDENCE OF DISPERSAL AND REPAIR

Coverage on 20 and 28 February shows considerable movement of trucks and cars on the roads near this plant, which suggests some dispersal of facilities. Cover taken 6 February, nearly three weeks after the attack, shows that considerable reroofing has been done to buildings 40, 43, and 46 in the engine section and a slight amount to building 85 of the airframe section.

Both European experience and Japanese practice to date suggest that little or no repair will be done to the severely damaged section of the main machine shop in the engine section (building 38) but that less severely damaged buildings will continue to be repaired and will produce some engine components. Present indications

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FUTURE TARGET VALUE

are that Mitsubishi plans to disperse airframe production formerly carried on in the damaged sections of its Nagoya plant. If Kawasaki follows this pattern, dispersion of airframe production at Akashi can be expected.

While 70 percent structural damage was not inflicted on this plant, it now has little target value, since most of the undamaged equipment has probably been moved out. The future target value depends upon the extent of reconstruction which can not now be predicted. Reconnaissance photography should be obtained not later than two months after 10 February, the date of the attack.

(P)

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JOINT TARGET GROUP • WASHINGTON, D. C.

TARGET No. 90.25–1547

KAWASAKI AIRCRAFT, AKASHI PLANT
AKASHI, JAPAN

ILLUSTRATION No. 90.25–1547 DP

COORDINATES 34° 39′ N 134° 57′ E

PHOTOGRAPHED 20 JANUARY 1945

0 500 1000 1500 2000 2500 3000 FEET
0 ¼ 1:6000 APPROX. ½ MILE

ISSUED 6 MARCH 1945

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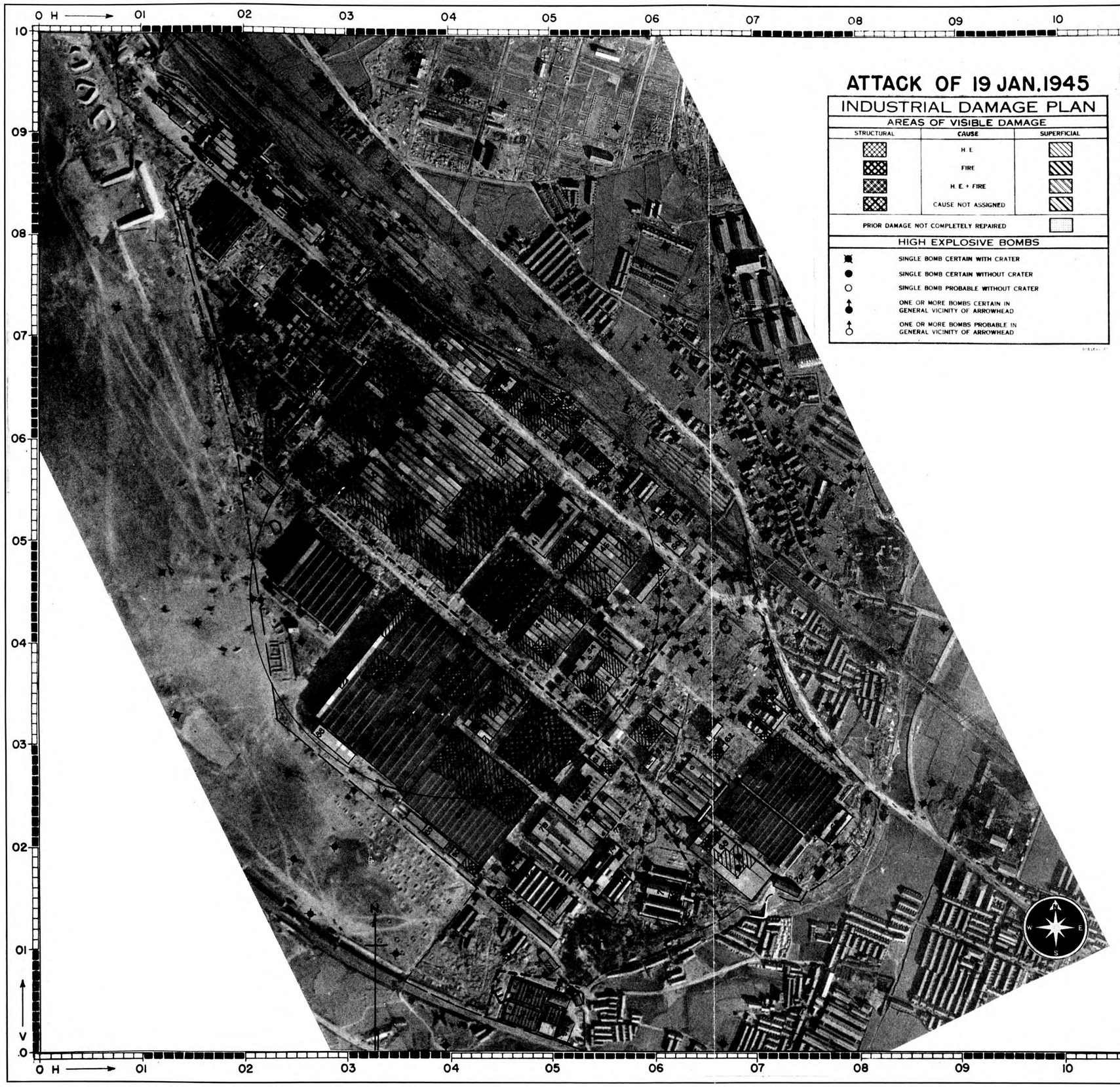

ATTACK OF 19 JAN. 1945

INDUSTRIAL DAMAGE PLAN

AREAS OF VISIBLE DAMAGE

STRUCTURAL	CAUSE	SUPERFICIAL
	H.E.	
	FIRE	
	H.E. + FIRE	
	CAUSE NOT ASSIGNED	
PRIOR DAMAGE NOT COMPLETELY REPAIRED		

HIGH EXPLOSIVE BOMBS

- SINGLE BOMB CERTAIN WITH CRATER
- SINGLE BOMB CERTAIN WITHOUT CRATER
- SINGLE BOMB PROBABLE WITHOUT CRATER
- ONE OR MORE BOMBS CERTAIN IN GENERAL VICINITY OF ARROWHEAD
- ONE OR MORE BOMBS PROBABLE IN GENERAL VICINITY OF ARROWHEAD

A. ENGINEERING AND EXPERIMENT (1-15)

1-2	OFFICES
3-5	EXPERIMENT
6	SHOP BUILDING
7-8	STORAGE
9	SHOP BUILDING
10	BOILER HOUSE
11	EXPERIMENT
12	UNIDENTIFIED
13	UNDERCONSTRUCTION-FOOTING EXCAVATIONS-TO BE IDENTICAL TO NO. 9
14A	ENGINE DEVELOPMENT
B	POSSIBLE THRU-TYPE ENGINE TEST
15	CONTRACTOR'S HUT

B. AERO ENGINE MANUFACTURE (16-55)

16	TESTING FACILITIES IN CONNECTION WITH TEST CELLS
17-23	TEST CELLS (28)
24-25	UNIDENTIFIED
26	SHOP BUILDING
27	UNIDENTIFIED
28-29	SHOP BUILDING
30	STORES
31	FINAL ENGINE ASSEMBLY
32-33	DISASSEMBLY; ASSEMBLY & DISPATCHED
34-36	RECEIVING & STORAGE
37	STORAGE FOR 38
38	MACHINING
39	HEAT TREATING, ANODIZING, PLATING, ETC.
40	FOUNDRY-CASTING, COKE MAKING, ETC.
40A	FOUNDRY TYPE BUILDING
41	ADMINISTRATION
42-43	RECEIVING & STORAGE
44	TOOL SHOP
45-46	MACHINING
47-50	RECEIVING & STORAGE
51	BICYCLE SHED
52	STORAGE
53	PRESS FORGE
54	MAINTENANCE
55	UNIDENTIFIED

C. COMPONENT PARTS MANUFACTURE (56-70)

56-58	UNIDENTIFIED
59	TRANSFORMER STATION
60	POSSIBLE CAFETERIA
61	BOILER HOUSE
62	UNIDENTIFIED
63	SHOP BUILDING
63A	SHOP BUILDING
64-65	STORAGE
66-67	SHOP TYPE BUILDING
68	HEAVY GANTRY TYPE SHOP BUILDING
69	SMALL SHOP
70	STORAGE

D. AIRCRAFT ASSEMBLY AND FABRICATION (71-94)

71	CAFETERIA
72-73	STORAGE
74	SHOP BUILDING
75	FOUNDRY
76	WOOD WORKING & PATTERN SHOP
77	FORGE
78	SHEET METAL & FABRICATION
79	STORAGE
80	ENGINEERING & ADMINISTRATION
81	UNIDENTIFIED
82	MACHINING
83	SUB-ASSEMBLY
84	FOUNDRY & HEAT TREATING FOR AREA "B"
85	SUB-ASSEMBLY-6 BAYS S.E. END FINAL ASSEMBLY-6 BAYS N.W. END
86	POST ASSEMBLY
87	SMALL SHOP BUILDING
88	PAINT SHOP
89-94	RECEIVING & STORAGE

E. APPRENTICE SCHOOL SECTION (95-100)

95-97	SHOP TYPE BUILDINGS-POSSIBLE LABORATORIES
98	CLASSROOMS
99	CLASSROOMS
100	BOILER HOUSE

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JOINT TARGET GROUP, WASHINGTON, D. C.

TARGET INFORMATION SHEET

Sheet No.	90.25–1702–T1
Date	9 April 1945
Page	1
Target No.	90.25–1702
Obj. Area	90.25
Obj. Folder No.	90.25
Air Target System	Aircraft
Lat.	34°43′N
Long.	135°17′E
Alt.	10 feet

KAWANISHI AIRCRAFT, FUKAE PLANT
(Kawanishi Kokuki, Fukae Kojo)
FUKAE . . . . . JAPAN

ALL PREVIOUS SHEETS CANCELLED

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER; JAPANESE AIRCRAFT WITH OTHER 90.25–1702 MATERIAL

SIGNIFICANCE

The relative importance of this target in the Japanese aircraft industry is not great. Kawanishi's four engine flying boat Emily is manufactured and assembled at this new and modern plant, The floor space is greater than Emily production would require, and two-engine planes of dimensions roughly similar to Frances have been photographed here. It is possible that such planes are also manufactured in this plant although there is no ground intelligence of a two-engine plane manufactured by Kawanishi.

LOCATION

(Refer to Illustration 90.25–1702 P2). On the Fukae waterfront on the narrow coastal plain between Kobe and Osaka. It is located about 1.25 miles NE of the Sumiyoshi River mouth and about 4200 feet W of the Ashiya River mouth. Over half the plant extends out from the normal shore line on a wide filled-in pier-like area, and the remainder is bounded by secondary streets. There are no other important listed targets in the vicinity.

DESCRIPTION AND LAYOUT

(Refer to Illustration 90.25–1702 P3). The target area is roughly rectangular in shape, measuring about 1500 feet NE-SW along the water side, and about 1700 feet NW-SE and covering about 55 acres. There are four large and many small buildings. Metal shaping, cutting, pressing, and small parts manufacture is probably done in the large building (26) inland of the center of the plant and in a smaller building (25) at the center. Building 26 may also house some sub-assembly; sub-assembly is also probably done in a large building (41) near the SW corner. Major and final assembly is believed contained in the largest building (21) on the waterfront; post assembly work is believed done in the large building (15) NE of building 21. A service apron and seaplane ramps adjoin building 21 on the NE.

PRIMARY OBJECTIVES

(Refer to Illustration No. 90.25–1702 P3). Buildings 21, 25, 26 and 41.

CONSTRUCTION AND VULNERABILITY

(Refer to Illustration No. 90.25–1702 P3). All major buildings are large 1-story steel-framed structures of greater than normal height, generally with long-span sawtooth roofs, and surfaced with non-combustible lightweight sheet material. Buildings 4 and 11 are reported to be the only wooden buildings in the target.

WEAPON RECOMMENDATIONS

Instructions with regard to weapons will usually be given in Field or Operational Orders, but in the absence of such instructions and to assist Planners in formulating such orders the following information is given:

An attack with a combination of high explosive and incendiary bombs is recommended. A preliminary structural and occupancy analysis of the plant indicates the following weapons should be selected:

	HE	Fuzing	IB
Preferred	1,000-lb G. P. or 2,000-lb G. P.	0.01 N/ND T 0.01 N/ND T	AN–M50 4-lb or AN–M69 6-lb (in aimable clusters when dropped from high altitude.
Alternative	500-lb G. P.	0.01 N/ND T	AN–M47 70-lb. AN–M76 500-lb.
Not recommended.	Smaller G.P. bombs. SAP, AP bombs. Depth bombs.		

NOTES

(a) Use 0.1 N fuzes if 0.01 N fuzes are not available, and 0.01 T if ND T are not available. ND tail fuzing is recommended as most of the buildings have light roof material, and are best destroyed by blast effects.

(b) The above recommendations are on a weight for weight basis.

CAMOUFLAGE, DECOYS AND SMOKE SCREENS

Photography of 18 and 20 January 1945 shows little attempt at camouflage except for disruptive painting on a small portion of the roof area. There is no indication of smoke screens or decoys.

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191 T–5

NARA Date 4-19-77

RESTRICTED

JOINT TARGET GROUP
WASHINGTON, D. C.

KAWANISHI AIRCRAFT, FUKAE PLANT

FUKAE JAPAN

0 2000 4000 6000 FEET
0 ½ 1 MILE
1:32 000 APPROX.

ILLUSTRATION No. . . . 90.25-1702 P1
DATE . . . . . 12 May 1945
TARGET No. 90.25-1702
COORDINATES . . . 34°43'N 135°17'E
PHOTOGRAPHED . . 18 January 1945

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NARA Date 4-5-77

JOINT TARGET GROUP WASHINGTON, D. C.

KAWANISHI AIRCRAFT, FUKAE PLANT

FUKAE JAPAN

0 2000 4000 6000 FEET

0 ½ 1 MILE

1:32 000 APPROX.

RESTRICTED

ILLUSTRATION No. . . . **90.25-1702 P2**
DATE. . . . . **12 May 1945**
TARGET No. **90.25-1702**
COORDINATES . . . **34°43'N 135°17'E**
PHOTOGRAPHED . . **18 January 1945**

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NARA Date 4-4-77

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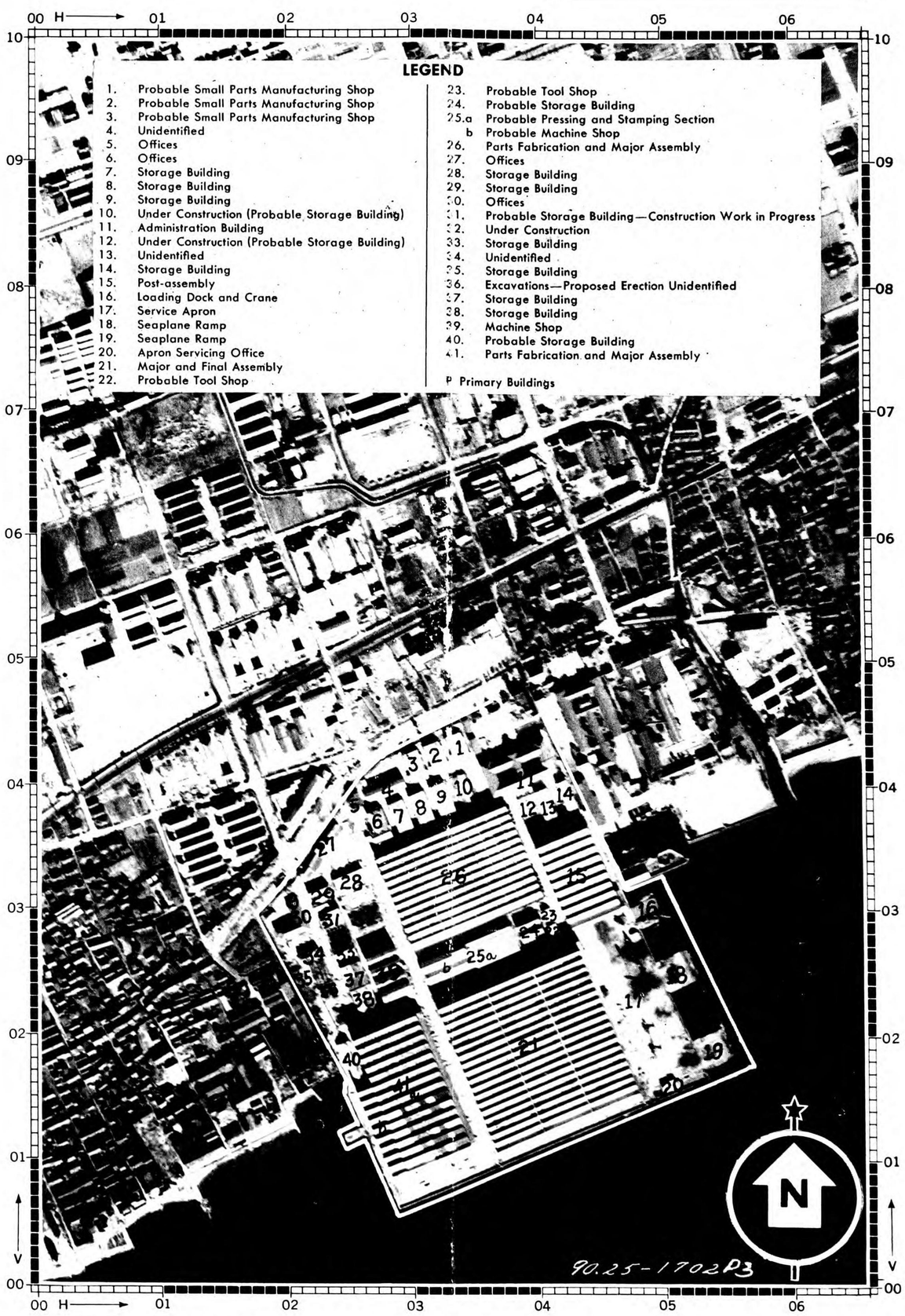
JOINT TARGET GROUP
WASHINGTON, D. C.

KAWANISHI AIRCRAFT, FUKAE PLANT

FUKAE — JAPAN

0 500 1000 1500 2000 2500 3000 FEET
0 1/4 1:6000 APPROX. 1/2 MILE

ILLUSTRATION No. . . . **90.25-1702 P3**
DATE . . . . . **12 May 1945**
TARGET No. **90.25-1702**
COORDINATES . . . **34°43'N 135°17'E**
PHOTOGRAPHED . . **18 January 1945**



LEGEND

1. Probable Small Parts Manufacturing Shop
2. Probable Small Parts Manufacturing Shop
3. Probable Small Parts Manufacturing Shop
4. Unidentified
5. Offices
6. Offices
7. Storage Building
8. Storage Building
9. Storage Building
10. Under Construction (Probable Storage Building)
11. Administration Building
12. Under Construction (Probable Storage Building)
13. Unidentified
14. Storage Building
15. Post-assembly
16. Loading Dock and Crane
17. Service Apron
18. Seaplane Ramp
19. Seaplane Ramp
20. Apron Servicing Office
21. Major and Final Assembly
22. Probable Tool Shop
23. Probable Tool Shop
24. Probable Storage Building
25.a Probable Pressing and Stamping Section
b Probable Machine Shop
26. Parts Fabrication and Major Assembly
27. Offices
28. Storage Building
29. Storage Building
30. Offices
31. Probable Storage Building—Construction Work in Progress
32. Under Construction
33. Storage Building
34. Unidentified
35. Storage Building
36. Excavations—Proposed Erection Unidentified
37. Storage Building
38. Storage Building
39. Machine Shop
40. Probable Storage Building
41. Parts Fabrication and Major Assembly

P Primary Buildings

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By ____ NARA, Date 4-6-77

JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET INFORMATION SHEET

SHEET . . . 90:25-2041—TI
DATE . . . . . 15 May 1945
PAGE 1

SUMITOMO KANZAKI PROPELLER PLANT

AMAGASAKI — JAPAN

TARGET 90:25-2041
OBJ. AREA 90:25
OBJ. FOLDER . . New Target
CATEGORY
End Prdt. Ind.—Aircraft

LAT. . . . . 34° 44′ N
LONG. . . . . 135° 25′ E
ALT. . . . . 10 feet

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SIGNIFICANCE

The most important propeller plant in Japan engaged in the fabrication of the hub assemblies for an estimated 60 percent of the propellers used on Japanese combat aircraft. Built during 1940-1941, by 1943 it had become the principal propeller plant of the Sumitomo Company, whose propellers are used on most Navy planes as well as for a number of Army types including Helen and the important fighters Tojo and Tony. It also has facilities for experimentation with new types, notably contra-rotating and hydromatic propellers for use with high powered engines.

LOCATION

(Refer to Illustration No. 90:25-2041 P2.) In the N outskirts of Amagasaki, about 3 miles N of the mouth of the Shin Yodo River, 1.4 miles W of the Kanzaki River and 2 miles ESE of the Tokaido Mainline Railroad Bridge across the Muko River. Bounded on the N by the Tokaido Mainline Railroad, on the E by a main N-S highway and on the S and W by minor streets and the narrow Shoge River.

DESCRIPTION AND LAYOUT

(Refer to Illustrations No. 90:25-2041 P3, P5.) The target site is roughly rectangular except for a relatively small area W of the Shoge River probably for finished stores. The E boundary measures about 4000 feet, and the N boundary about 4600 feet. Total area is 3,940,000 square feet of which the plan area of buildings is 1,571,000 square feet.

There are two parallel N-S rows of large buildings. Four (18, 19, 21, 22) of 100,000 square feet plan area each and one (30) of 128,000 square feet at the N, house main machining facilities. Four smaller shops (29, 43, 44, 45) at the S house light machining and benchwork processes. Another 100,000 square foot building (20) on the Shoge River bank W of the other main buildings and between two bridges to the finished stores area, also houses main machining facilities.

It is not known whether final assembly of propellers and machining of blades is now done here. At one time final assembly was done in building 23, E of the machine shops, but ground information suggests that blade machining and final assembly is now done at Sumitomo's other propeller plant, in Osaka (Sumitomo Metal Industry Co. and Sumitomo Aluminum Co. TARGET 90:25-263A).

Raw materials may be brought in and finished products delivered by barge. The small buildings N of the machine shops probably handle incoming stores. Small buildings in the S half of the target site house further storage, plant administration and maintenance, a school (58-71) and research (possibly 54).

PRIMARY OBJECTIVES

(Refer to Illustration No. 90:25-2041 P3, P5.) Primary objectives are the six principal machine shops (18-22, 30) housing important machine tools, damage to which would seriously curtail propeller output. Secondary objectives are the remaining identified machining and benchwork facilities (29, 43, 44, 45). Intelligence is not sufficient to determine order of importance among either primary or secondary objectives.

CONSTRUCTION AND VULNERABILITY

(Refer to Illustration No. 90:25-2041 P3, P5.) Primary and secondary objectives:

Building No.	Plan area (sq. ft.)	Stories	Roof[1]	Combustibility	HE vulnerability[2]
18	100,000	1	Light	Noncombustible	V4
19	100,000	1	Light	Noncombustible	V4
20	100,000	1	Light	Noncombustible	V4
21	100,000	1	Light	Noncombustible	V4
22	100,000	1	Light	Noncombustible	V4
30	128,000	1	Light	Noncombustible	V4
29a	24,000	4	4-6″ concrete	Resistant	V1
29b	24,000	1	Light	Noncombustible	V4
43a-e	71,000	4	Light	Noncombustible / Resistant	V1
43f-g	13,000	1	4-6″ concrete	Resistant	V4
44a-e	72,000	4	4-6″ concrete	Resistant	V1
44f-g	12,000	1	4-6″ concrete	Resistant	V4
45	50,000	1	Light	Noncombustible	V4

[1] Lightweight roofs are readily penetrated by all types of incendiary bombs. Initiation of HE tail fuzes by these roofs cannot be depended upon except for bombs striking structural members (30 to 40 percent of bombs striking buildings).

[2] For explanation of HE vulnerability classifications refer to JTG Memorandum No. JTG/M-3/1, dated 26 March 1945 (Nontechnical), or No. JTG/M8 (technical).

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JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET INFORMATION SHEET

Classification of Buildings:

	Primary and Secondary Objectives	Whole Target
Total plan area of buildings (square feet)	894,000	1,571,000
Total floor area of buildings (square feet)	1,395,000	2,386,000
HE vulnerability (percent of total plan area in each class):		
V1 (least vulnerable) 4-story	19%	11%
3-story	....	1%
2-story	....	1%
V2	....	....
V3 2-story	....	16%
V4 1-story	81%	71%
V5 (most vulnerable)	....	....
Combustibility (percent of total plan area in each class):		
Fire resistant (R) 4-story	11%	7%
3-story	....	1%
2-story	....	1%
1-story	3%	2%
Noncombustible (N) 1-story	78%	54%
Combustible (C) 2-story	....	16%
1-story	....	15%
Mixed N/R 4-story	8%	4%
Combustibility (percent of total FLOOR area in "Combustible" class)	....	31%
Susceptibility of contents to incendiary bombs (whole target)[3]	Fair	Fair

[3] Degrees: none, poor, fair (i.e., average industrial fire occupancy), good, excellent. For detailed study of fire susceptibility of structures and contents refer to Illustration No. 90:25-2041 P5).

WEAPON RECOMMENDATIONS

Reference should be made to Weapon Recommendations Sheet No. 90:25-2041-WR1 for high and medium altitude attack and to Weapon Recommendations Sheet No. 90:25-2041-WR2 for low altitude attack.

CAMOUFLAGE, DECOYS, AND SMOKE SCREENS

There is no evidence of camouflage on photography of 28 January 1945. No smoke screen or decoys have been reported.

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft after 90:25-2041 TI page 1.

JOINT TARGET GROUP, WASHINGTON, D. C.

WEAPON RECOMMENDATIONS SHEET

SHEET No. **90.25-2041—WR1**
DATE. . . . . **19 May 1945**
PAGE **1**

SUMITOMO KANZAKI PROPELLER CO.

TARGET No. . **90.25-2041**
OBJ. AREA **90.25**
OBJ. FOLDER No. **New Target**
CATEGORY **End Prdt. Ind.— Aircraft**

AMAGASAKI — JAPAN

LAT. . . . . **34°44'N**
LONG. . . . . **135°25'E**
ALT. . . . . **10 feet**

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft with other 90.25-2041 material.

HIGH AND MEDIUM ALTITUDE ATTACK

(See also 90.25-2041—TI and associated target illustrations.)

AIMING POINT

(Refer to Illustrations No. 90.25-2041 P3, P5). For maximum damage to primary and secondary objectives the aiming point should be in the vicinity of building 30.

WEAPONS AND FUZING

	High Explosive	Fuzing	Incendiary
Preferred:	1000-lb GP	0.01 N/ND T	AN-M50 4-lb or AN-M69
or	500-lb GP	0.01 N/ND T	6-lb (in aimable clusters)
Alternative:	2000-lb GP	0.01 N/ND T	AN-M47 70-lb
			AN-M76 500-lb

Not recommended: Smaller GP bombs
SAP or AP bombs
Depth bombs

Notes: (a) Use 0.025 N or 0.1 N fuzes if 0.01N fuzes are not available and 0.01 T fuzes if ND T fuzes are not available. ND tail fuzing is recommended since most of the buildings have light roof material and are best destroyed by blast effects.

(b) The above recommendations are on a weight for weight basis.

LOADING TABLE FOR INITIAL ATTACK

The table below is prepared for an initial attack against this target. For its application to later attacks see Joint Target Group Memorandum No. 3/1.

Loading Table for Preferred Combination of Bombs[2]

Tons (actual) Dispatched	Percent of bombs dispatched falling within 1000 feet of aiming point (building 30).							
	10%		15%		20%		30%	
	Tons HE — IB	F[1] %	Tons HE — IB	F[1] %	Tons HE — IB	F[1] %	Tons HE — IB	F[1] %
100	35— 65	15	25— 75	25	20— 80	30	15— 85	35
200	35—165	30	25—175	35	20—180	40	30—170	45
500	45—455	45	200—300	45	270—230	50	330—170	55
1000	545—455	50	700—300	55	770—230	60	830—170	65
1500	1045—455	55	1200—300	65	.....	..	.....	..
2000	1545—455	60	.....	..	.....	..	.....	..

(1) Expected percent of serious damage to the whole target.

(2) If alternative bombs are used, the distribution of the load between HE and IB should be the same. The expected percent of damage will, of course, be lower.

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By _____ NARA, Date 4-10-77

JOINT TARGET GROUP, WASHINGTON, D. C.

WEAPON RECOMMENDATIONS SHEET

SHEET No. 90.25-2041—WR2
DATE.....19 May 1945
PAGE 1

TARGET No. .90.25-2041
OBJ. AREA 90.25
OBJ. FOLDER No. New Target
CATEGORY End Prdt. Ind.—Aircraft

SUMITOMO KANZAKI PROPELLER CO.

AMAGASAKI JAPAN

LAT. .....34°44'N
LONG. .....135°25'E
ALT. .....10 feet

LOW ALTITUDE ATTACK

(See also 90.25-2041—TI and associated target illustrations.)

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft with other 90.25-2041 material.

TYPE OF ATTACK

This sheet applies primarily to an attack by carrier based aircraft, fighter bombers, or other similar aircraft which carry out dive, glide, low level, or minimum altitude attacks.

Data is given in Table I (right) for an area attack against the target (Illustrations No. 90.25-2041 P3, P5).

If it is desired to attack individual important buildings in the target, a pure HE attack (no incendiaries) may be launched against the primary and secondary buildings specified in Table II at the right (Illustrations No. 90.25-2041 P3, P5).

WEAPONS AND FUZING

For Area Attack (Table I)

	High Explosive	Fuzing	Incendiary
Preferred:	1000-lb GP	0.01 N/ND T	AN-M50 4-lb or AN-M69
	or 500-lb GP	0.01 N/ND T	6-lb (in clusters)
Alternative:	2000-lb GP	0.01 N/ND T	AN-M47 70-lb
	250-lb GP	0.025 N/ND T	AN-M76 500-lb
			Fire bombs

Not recommended: Smaller GP bombs
SAP or AP bombs
Depth bombs

Notes: (a) Use 0.025 N or 0.1 N fuzes if 0.01 N fuzes are not available, and 0.01 T fuzes if ND T fuzes are not available. ND tail fuzing is recommended since most of the buildings have light roof material and are best destroyed by blast effects.

(b) Use of 8-15 sec. delay fuzing is necessary for minimum altitude attacks.

(c) The above recommendations are on a weight for weight basis.

For An Attack Against Individual Important Buildings (Table II)

The choice of a particular HE weapon for the attack against individual important buildings can be made by considering the recommendations above, the number of hits required for the various bombs (see Table II at the right), and the stowage characteristics of the aircraft to be used. The proper fuzing for the HE weapon to be used is also given in Table II, with the exception that for minimum altitude attacks on 8-15 sec. delay is required for safety of the aircraft.

ATTACK DATA

The numbers of tons which must be delivered on the target area to achieve various levels of serious damage are given in Table I below. These requirements assume that the bombing results in a random distribution of bombs over the area.

TABLE I

Number of Tons on the Target Required for Various Percentages of Serious Damage

Percent Serious Damage	Tons on Target (Preferred Bombs)			Tons on Target Pure HE (Preferred Bombs)
	HE	IB	Total	
30%	4	20	24	118
50%	59	51	110	236
70%	284	51	335	422

TABLE II

Number of Hits Required to Achieve 50% Serious Damage to Individual Important Buildings[1]

Primary and Secondary buildings. (Ill. No. 90.25-2041 P3, P5)	Number of Hits[3]				Fuzing[2]
	250-lb GP	500-lb GP	1000-lb GP	2000-lb GP	
18	53	17	9	5	0.01 N/ND T
19	53	17	9	5	0.01 N/ND T
20	53	17	9	5	0.01 N/ND T
21	53	17	9	5	0.01 N/ND T
22	53	17	9	5	0.01 N/ND T
30	69	22	11	6	0.01 N/ND T
29	—	65	31	15	0.1 N/0.025 T
43	—	183	88	43	0.1 N/0.025 T
44	—	184	88	43	0.1 N/0.025 T
45	27	9	4	2	0.01 N/ND T
Total Number of Hits		548	267	134	
Total Tons[4]		144.2	132.1	139.6	

[1]To obtain the number of hits required to achieve 30% serious damage to individual important buildings, multiply the appropriate entry in Table II above by 0.5; for 70% serious damage, multiply by 1.7.

[2]The use of 0.1 N/0.025 fuzing is recommended against the VI buildings which have heavy roof material and are multi-story.

[3]If the number of hits for a particular bomb is not given, that bomb is not recommended.

[4]Tonnages are based on actual (not nominal) weight of bombs.

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JOINT TARGET GROUP
WASHINGTON, D. C.

SUMITOMO KANZAKI PROPELLER PLANT

AMAGASAKI JAPAN

0 2000 4000 6000 FEET
0 ½ 1 MILE
1:32 000 APPROX.

RESTRICTED

ILLUSTRATION 90:25-2041 P1
DATE . . . . . 15 May 1945
TARGET 90:25-2041
COORDINATES . . . 34°44'N 135°25'E
PHOTOGRAPHED . . 28 January 1945

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JOINT TARGET GROUP WASHINGTON, D.C.

SUMITOMO KANZAKI PROPELLER PLANT

AMAGASAKI JAPAN

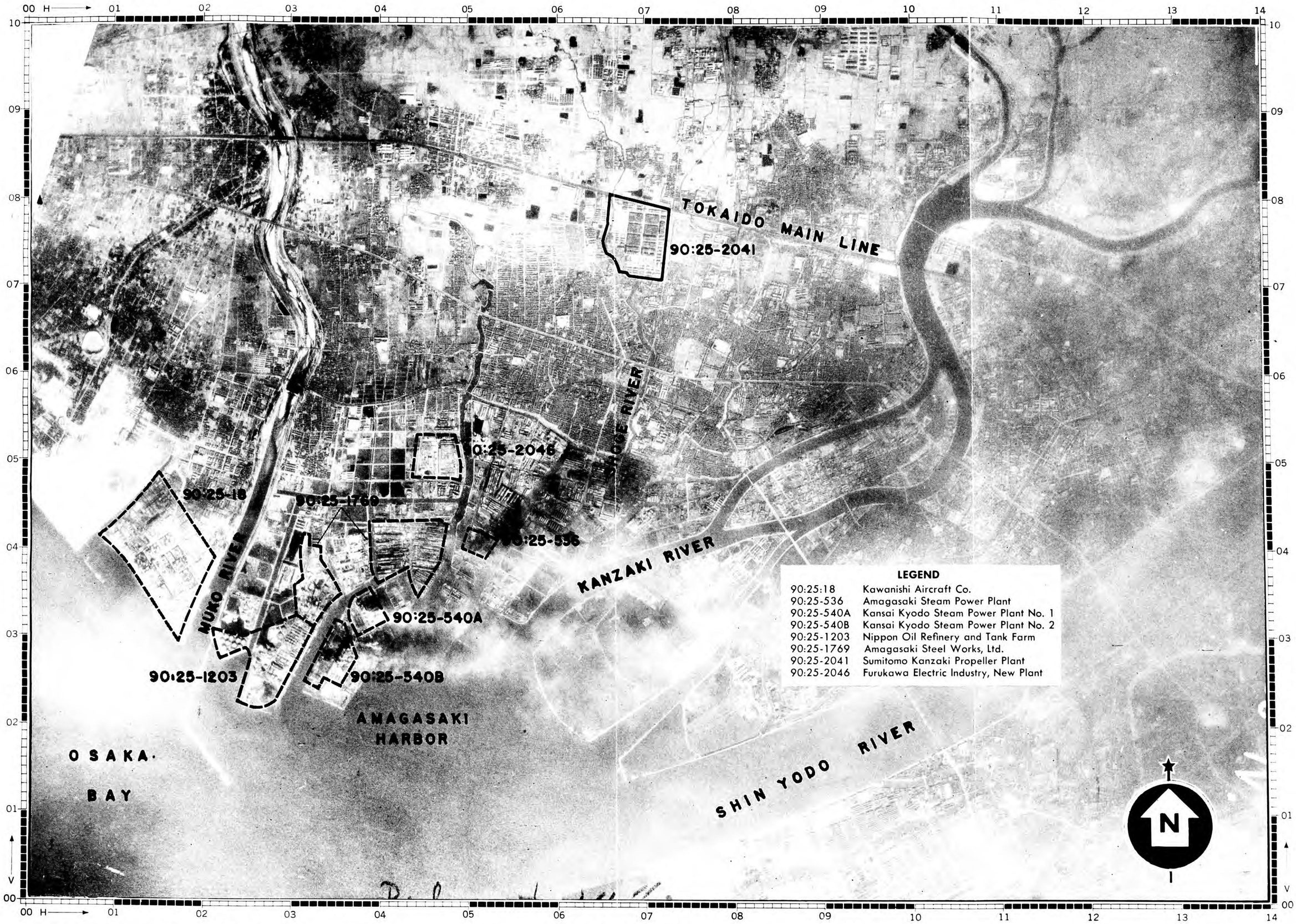
0 2000 4000 6000 FEET

0 ½ 1 MILE

1:32 000 APPROX.

RESTRICTED

ILLUSTRATION **90:25-2041 P2**
DATE . . . . . **15 May 1945**
TARGET **90:25-2041**
COORDINATES . . . **34°44'N 135°25'E**
PHOTOGRAPHED . . **28 January 1945**



LEGEND

90:25:18	Kawanishi Aircraft Co.
90:25-536	Amagasaki Steam Power Plant
90:25-540A	Kansai Kyodo Steam Power Plant No. 1
90:25-540B	Kansai Kyodo Steam Power Plant No. 2
90:25-1203	Nippon Oil Refinery and Tank Farm
90:25-1769	Amagasaki Steel Works, Ltd.
90:25-2041	Sumitomo Kanzaki Propeller Plant
90:25-2046	Furukawa Electric Industry, New Plant

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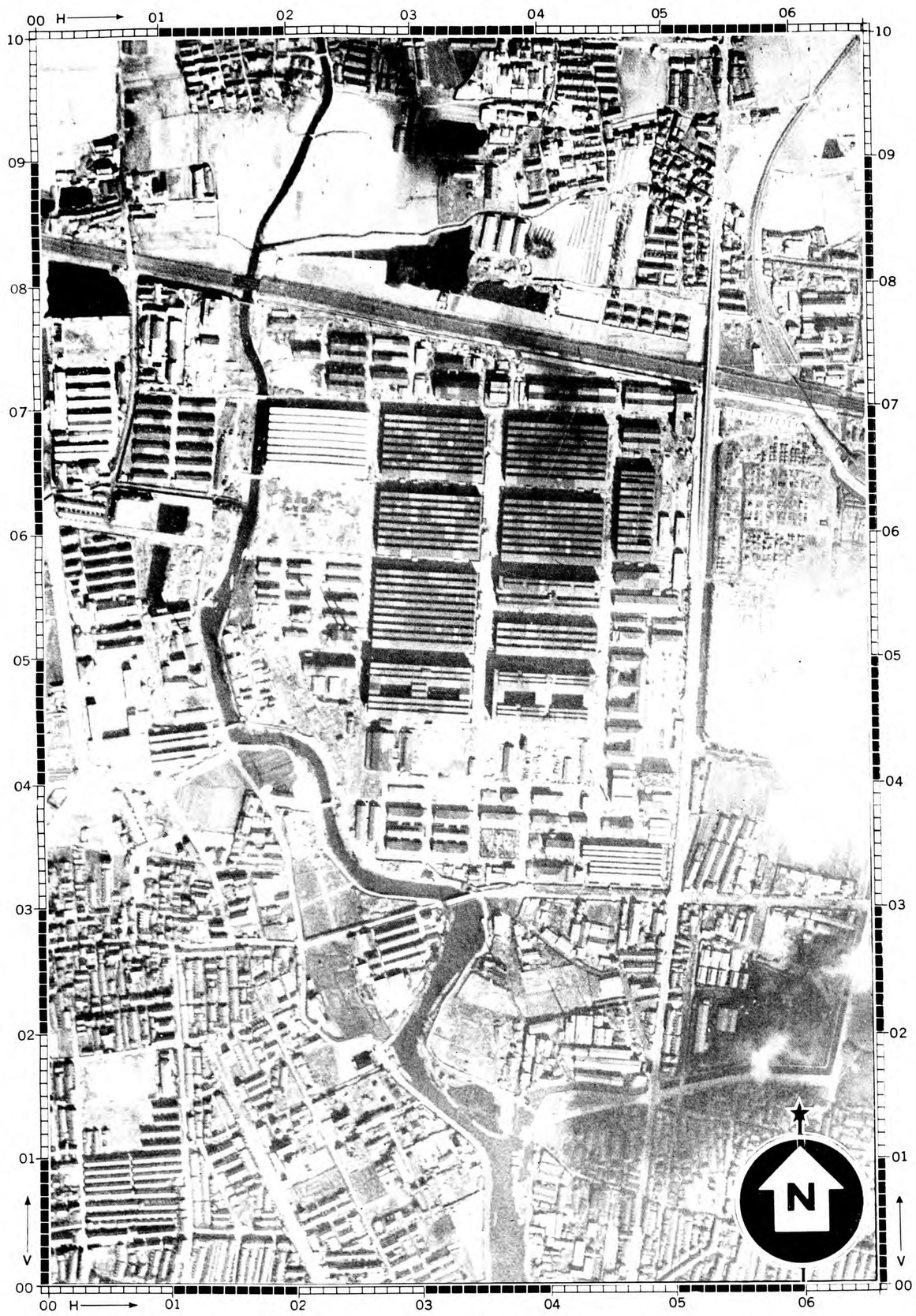
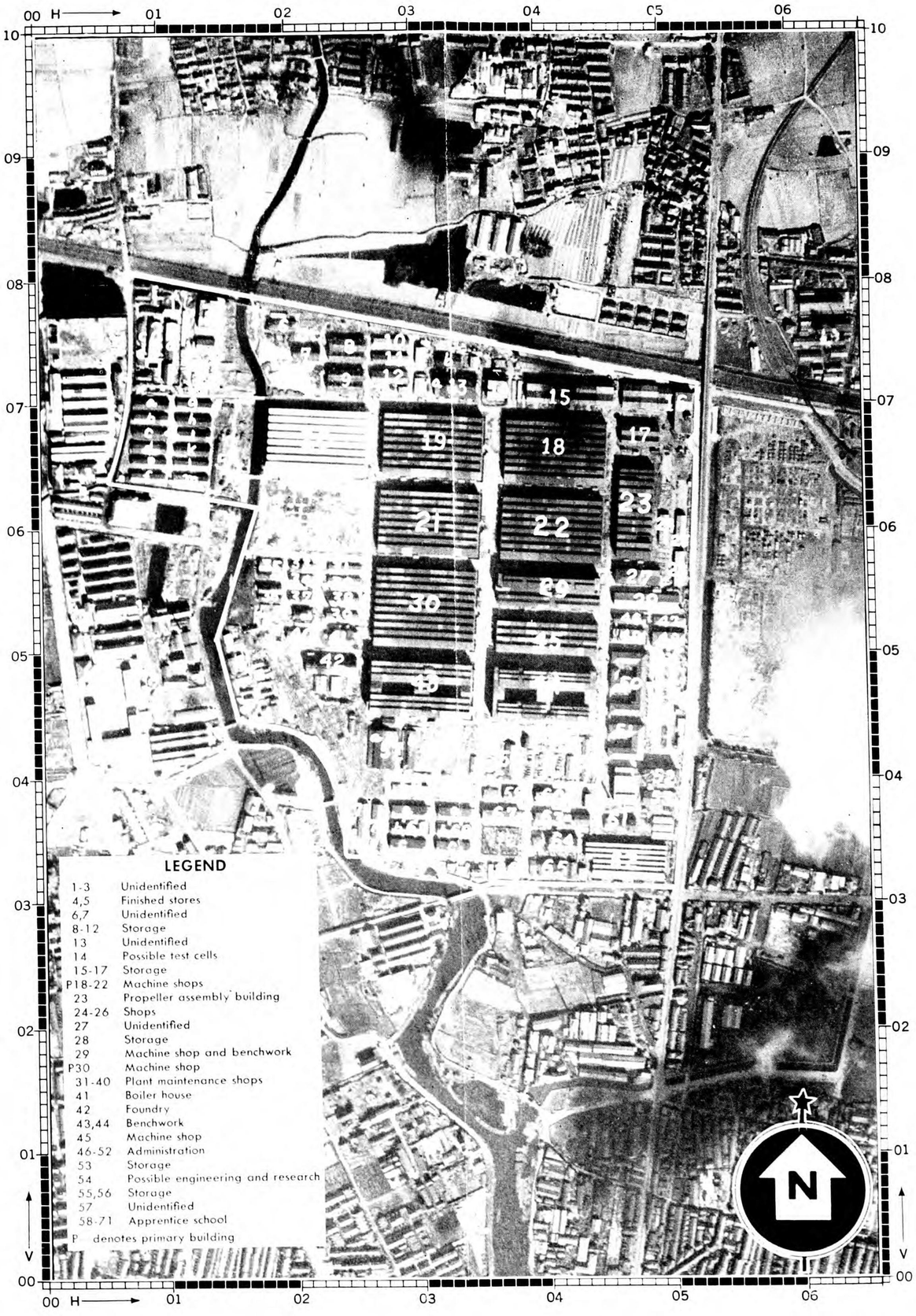
SUMITOMO KANZAKI PROPELLER PLANT

AMAGASAKI JAPAN

ILLUSTRATION	90:25-2041 P3
DATE	15 May 1945
TARGET	90:25-2041
COORDINATES	34°44'N 135°25'E
PHOTOGRAPHED	28 January 1945

0 500 1000 1500 2000 2500 3000 FEET
0 1/4 1:6000 APPROX. 1/2 MILE





LEGEND

1-3	Unidentified
4,5	Finished stores
6,7	Unidentified
8-12	Storage
13	Unidentified
14	Possible test cells
15-17	Storage
P18-22	Machine shops
23	Propeller assembly building
24-26	Shops
27	Unidentified
28	Storage
29	Machine shop and benchwork
P30	Machine shop
31-40	Plant maintenance shops
41	Boiler house
42	Foundry
43,44	Benchwork
45	Machine shop
46-52	Administration
53	Storage
54	Possible engineering and research
55,56	Storage
57	Unidentified
58-71	Apprentice school

P denotes primary building

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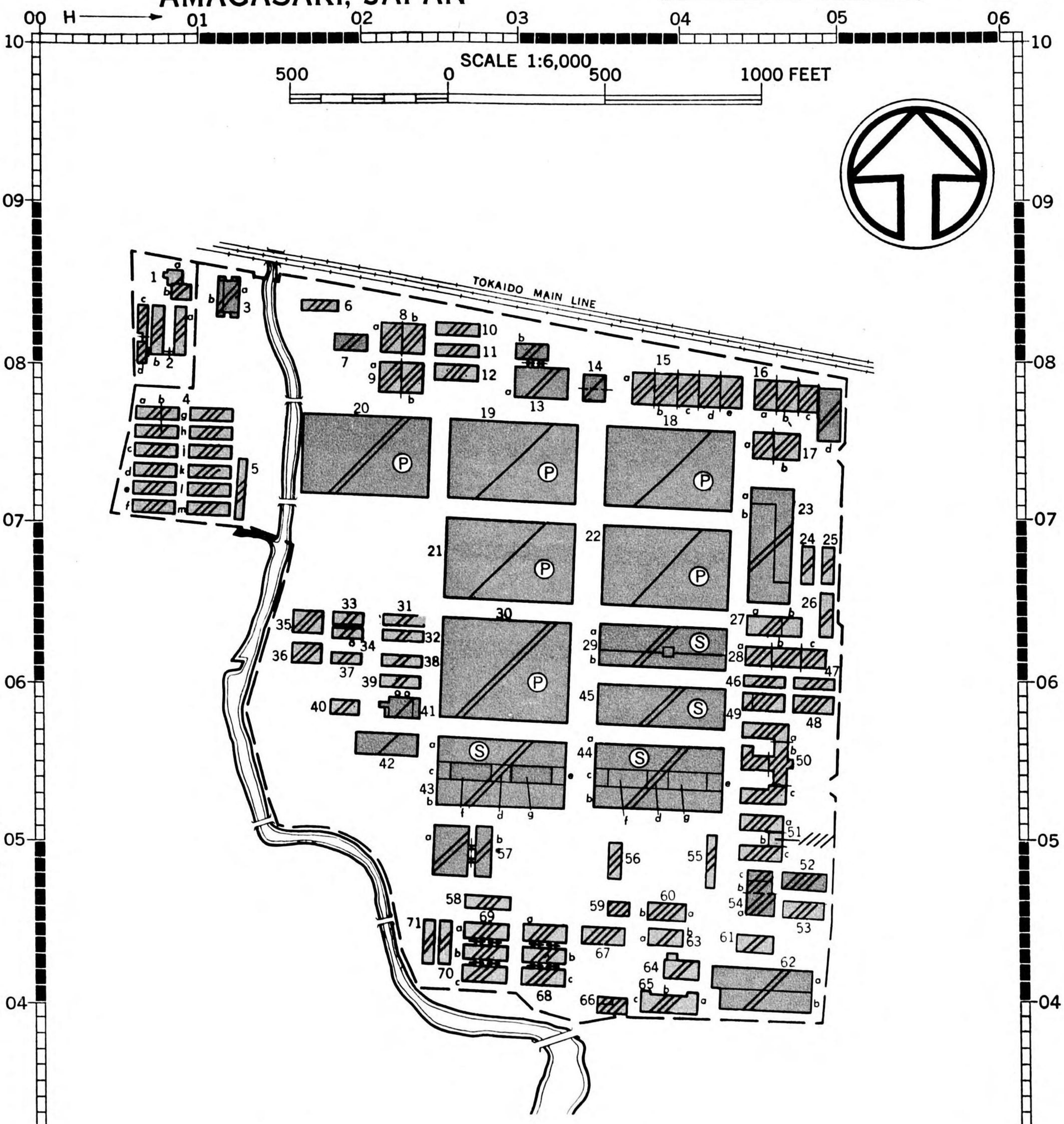
JOINT TARGET GROUP WASHINGTON, D. C.
FIRE SUSCEPTIBILITY PLAN

SUMITOMO KANZAKI PROPELLER PLANT, AMAGASAKI, JAPAN

ILLUSTRATION NO. 90.25 - 2041 - P5
DATE 4 MAY 1945
TARGET NO. 90.25 - 2041
COORDINATES 34°44′N. 135°25′E.
PHOTOGRAPHED 28 JANUARY 1945



LEGEND

1-3	Unidentifled
4, 5	Finished stores
6, 7	Unidentified
8-12	Storage
13	Unidentified
14	Possible test cells
15-17	Storage
P 18-22	Machine shops
23	Propeller assembly building
24-26	Shops
27	Unidentified
28	Storage
29	Machine shop & benchwork
P 30	Machine shop
31-40	Plant maintenance shops
41	Boiler house
42	Foundry
43, 44	Benchwork
45	Machine shop
46-52	Administration
53	Storage
54	Possible engineering & research
55, 56	Storage
57	Unidentified
58-71	Apprentice school

P - denotes primary building.

Note:
Secondary Buildings 29a, 43a-e, 44a-e and 49 are Multistory. Other Secondary and all Primary Buildings are Single Story.

FIRE SUSCEPTIBILITY PLAN

PRIMARY BUILDINGS (P) FIRE WALL, CERTAIN
SECONDARY BUILDINGS (S) FIRE WALL, PROBABLE

BUILDINGS	CONTENTS
COMBUSTIBLE	SUSCEPTIBILITY TO INCENDIARIES:
NON-COMBUSTIBLE	NONE
FIRE RESISTANT	POOR
COMBINATION I.E. COMBUSTIBLE ROOF RESISTANT FLOORS	FAIR
WATER TANK (W)	GOOD
	EXCELLENT

AREA IN SQ. FT.	PRIMARY	SECONDARY	ALL BLDGS. SHOWN
NO. OF BUILDINGS	6	4	82
NO. OF FIRE DIVISIONS	6	4	110
PLAN AREA	628,000	266,000	1,571,000
TOTAL FLOOR AREA	628,000	767,000	2,386,000
SITE AREA	3,940,000		

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NARA. Date 9-5-77

JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET LOCATION SHEET

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KAWANISHI AIRCRAFT, TAKARAZUKA PLANT

TAKARAZUKA JAPAN

SHEET No. .....90.25-2137—TL
DATE.....8 May 1945
TARGET No. 90.25-2137
AIR TARGET SYSTEM
End Prdt. Ind.—Aircraft
COORDINATES ....34°47'N 135°22'E
ALTITUDE .....66 feet

SIGNIFICANCE:

This plant is believed to be making important aircraft parts for the Kawanishi Aircraft Co. There have been a number of reports that Kawanishi manufactures engines and propellers, and that this is one of their engine plants. However, there is no direct evidence of combat aircraft engines or propellers made by Kawanishi.

LARGE SCALE ILLUSTRATION—SCALE APPROX.: 1:10,000

SMALL SCALE ILLUSTRATION—SCALE APPROX.: 1:60,000

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By _____ NARA, Date 4-5-77

JOINT TARGET GROUP, WASHINGTON, D. C.

TARGET INFORMATION SHEET

Sheet No.	90.27–1681–TI/2
Date	6 April 1945
Page No	1
Target No.	90.27–1681
Obj. Area	90.27
Obj. Folder No.	New Target
Air Target System:	Aircraft
Lat.	34°31′ N
Long.	133°44′ E
Alt.	10′

MITSUBISHI AIRCRAFT, MISHIMA PLANT

TAMASHIMA . . . . . JAPAN

ALL PREVIOUS SHEETS CANCELLED

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER—JAPANESE AIRCRAFT REPLACING 90.27–1681 TI/

SIGNIFICANCE

This is a new Mitsubishi plant still under construction. Production of Betty bombers was begun early in 1944 and at present output is estimated by MID at 25 per month. The huge size of the plant—nearly 3.5 million square feet—suggests that eventual monthly capacity may well be 150–200 planes of this type. Peak production will probably not be reached before 1946 but the plant might become quite important before that time, especially if facilities from the Nagoya plant are moved here.

LOCATION

On the coast, 1.5 miles south of the town of Tsurashima, 3.25 miles southeast of the city of Tamashima. The plant and airfield are on a small irregular peninsula which is bounded on the east by the East Takahashi River and on the west by a shallow inlet. Ohira Mountain, a wooded area, lies 2 miles north. An elongated cantonment area extends toward this mountain from the factory area.

DESCRIPTION AND LAY-OUT

(Refer to Illustration No. 90.27–1681 P4.) The total target area is about 4,000 feet east-west by 3,100 feet north-south, roughly rectangular in shape. This plant is one of the first known Japanese attempts to disperse within a site area. The built-up area (including buildings under construction) is relatively low, amounting to slightly over 25 percent. A considerable amount of building construction and site preparation is in evidence on the photography of 8 December 1944 and 16 February 1945. Construction was continuing on buildings 8 and 17. In general, the material flow in this plant is from the east side to the west side. Those buildings in the eastern third of the plant are mainly devoted to raw material preparation and metal forming. The center portion is mainly devoted to subassembly while the western section contains the final assembly buildings. A test field with hangars lies immediately south of the factory area. A long cantonment for workers lies north of the plant.

PRIMARY OBJECTIVES

(Refer to Illustrations No. 90.27–1681 P4, P5, and P6.) The primary and secondary objectives, listed in approximate order of productive importance are as follows:

Primary	*Secondary*
41	17
51	58
71	12
47	74
	66
	72
	75

Destruction of the primary buildings would curtail production greatly in the vital subassembly and metal fabrication sections of the plant. Final assembly, machining, heat treating, and wood-working are among the processes believed housed in the secondary units. While buildings 63 to 65 are not shown on Illustration No. 90.27–1681 P5 as secondary objectives, this group contains the foundry and the drop hammer shop and their loss also would affect production to a considerable extent.

CONSTRUCTION AND VULNERABILITY

(Refer to Illustration No. 90.27–1681 P4, P5, and P6.)

Primary and secondary objectives listed in order of importance:

Building No.	Plan area (sq. ft.)	Roof [1]	Combustibility	HE vulnerability [2]
41	232, 500	Light	Noncombustible	V4
51	232, 500	do	do	V4
71	192, 700	do	do	V4
47	232, 500	do	do	V4
17	402, 800	do	do	V4
58	302, 400	do	do	V4
12	278, 000	do	do	V4
74	75, 000	do	do	V4
66	39, 600	do	do	V4
72	57, 800	do	do	V4
75	48, 100	do	do	V4

[1] [2] See footnotes on p. 2.

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189T–3

By ____ NARA, Date 4-5-77

JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET INFORMATION SHEET

Sheet No. 90.27–1681–TI/2
Date 6 April 1945
Page No. 2 (of 2 pages)

Classification of buildings:

	Primary and secondary objectives	Whole target
Total plan area of buildings (square feet)	2,093,900	3,100,000
Total floor area (square feet)	2,093,900	3,340,000
Combustibility (based on plan area):	*Percent*	*Percent*
Fire resistant (R)		0.5
Noncombustible (N)	100	74.5
Combustible (C)		25
HE vulnerability (based on plan area):		
V1 (least vulnerable)		.5
V2		
V3		6
V4	100	93.5
V5 (most vulnerable)		

[1] Lightweight roofs are readily penetrated by all types of incendiary bombs. Initiation of HE tail fuzes by these roofs cannot be depended upon except for bombs striking structural members (30 to 40 percent of bombs striking buildings).

[2] HE vulnerability classifications are explained in JTG Memorandum No. JTG/M/3/1 which is now in process of revision. In brief, a single vulnerability classification is assigned types of industrial buildings which behave in a similar manner when attacked with the same HE weapon. These vulnerability classes are arranged in order of vulnerability to HE attack, with very invulnerable multi-story, earthquakeproof structures assigned the classification V1. The other classifications V2, V3, V4, V5 are progressively more vulnerable types, V5 being the most vulnerable large span, arched hangar type structures. Most 1-story buildings fall in class V4.

Susceptibility of contents to IB (whole target): Fair (average industrial fire occupancy). For detailed study of susceptibility of structures and contents to incendiary attack refer to Illustration No. 90.27–1681 P5.

WEAPON RECOMMENDATIONS

Refer to Weapon Recommendations Sheet No. 90.27–1681 WR1 for high and medium altitude attack and to Weapon Recommendations Sheet No. 90.27–1681 WR2 for low altitude attack.

CAMOUFLAGE, DECOYS, AND SMOKE SCREENS

Photography of 8 December 1944 shows no attempt at camouflage. Photography of 16 February 1945 shows some disruptive roof painting. Use of decoys or smoke screens has not been reported.

ADDITIONAL INFORMATION

The line-up of over 20 bombers within the plant area in photography of 8 December 1944, and 15 or more on 16 February 1945, suggests that either some final assembly functions are being carried on out of doors until building 17 is completed, or that some production problem on a component or part has necessitated this temporary alinement.

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER—JAPANESE AIRCRAFT AFTER 90.27–1681 TI/2, PAGE 1

By ____ NARA, Date 4-5-77

JOINT TARGET GROUP, WASHINGTON, D. C.

WEAPON RECOMMENDATIONS SHEET

Sheet No.	90.27–1681 WR1
Date	5 April 1945
Page	1
Target No.	90.27–1681
Obj. Area	90.27
Obj. Folder	New Target
Air Target System	Aircraft
Lat.	34°31′N
Long.	133°44′E
Alt.	10 feet

MITSUBISHI AIRCRAFT, MISHIMA PLANT

TAMASHIMA . . . . . JAPAN

ALL PREVIOUS SHEETS CANCELLED

HIGH AND MEDIUM ATTACK

(See also 90.27–1681 TI/2 and associated target illustrations)

AIMING POINT

For maximum damage to primary objectives the aiming point should be the West portion of building 47. (Illustrations No. 90.27–1681 P4, P5.)

WEAPONS AND FUZING

	HE	Fuze	IB
Preferred	1,000-lb. GP	0.01 N/ND T.	AN–M50 4-lb. (in aimable clusters).
Alternative	500-lb. GP 2,000-lb. GP	0.01 N/ND T. 0.01 N/ND T.	AN–M69 6-lb. (in aimable clusters). AN–M47 70-lb. AN–M76 500-lb.
Not recommended.	Smaller GP bombs. SAP and AP bombs. Depth bombs.		

NOTES

(a) Use 0.1 N fuzes, if 0.01 N fuzes are not available.

(b) The 500-lb. GP and 2000-lb. GP bombs are both approximately 95 percent as effective as the 1000-lb. GP bombs.

LOADING TABLE FOR INITIAL ATTACK

Loading table for preferred combination of bombs [1]

[This table is prepared for an initial attack on this target. For its application to later attacks see JTG Memorandum No. 3/1]

Tons (actual) dispatched	Percent of bombs dispatched falling within 1,000 feet of aiming point											
	10%			15%			20%			30%		
	Tons—		F [2] %	Tons—		F [2] %	Tons—		F [2] %	Tons—		F [2] %
	HE	IB		HE	IB		HE	IB		HE	IB	
100	40	60	15	35	65	20	30	70	20	25	75	25
200	40	160	25	35	165	30	30	170	30	25	175	35
400	40	360	35	90	310	40	120	280	40	170	230	45
800	390	410	45	490	310	50	520	280	50	570	230	55
1,200	790	410	50	890	310	60	920	280	60	-----	-----	----
1,600	1,190	410	60	-----	-----	----	-----	-----	----	-----	-----	----

[1] If alternative bombs are used, the distribution of the load between HE and IB should be the same. The expected percent of damage will, of course, be lower.

[2] Expected percent of serious damage to the whole target.

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT, WITH OTHER 90.27–1681 MATERIAL

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191 T–1

By _____ NARA, Date 4-11-77

JOINT TARGET GROUP, WASHINGTON, D. C.

WEAPON RECOMMENDATIONS SHEET

MITSUBISHI AIRCRAFT, MISHIMA PLANT

TAMASHIMA . . . . . JAPAN

Sheet No.	90.27–1681 WR2
Date	5 April 1945
Page	1
Target No.	90.27–1681
Obj. Area	1927
Obj. Folder	New Target
Air Target System	Aircraft
Lat.	34°31′N
Long.	133°44′E
Alt.	10 feet

ALL PREVIOUS SHEETS CANCELLED

THIS SHEET CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE ACT, 50 U.S.C., 31 AND 32, AS AMENDED. ITS TRANSMISSION OR THE REVELATION OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW. HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT, WITH OTHER 90.27–1681 MATERIAL

LOW ALTITUDE ATTACK

(See also No. 90.27–1681 T1/2 and associated target illustrations)

TYPE OF ATTACK

This sheet applies primarily to an attack by carrier based aircraft, fighter bombers, or other similar aircraft which carry out dive, glide, low level, or minimum altitude attacks.

BUILDINGS CONSIDERED

Data are given below for an attack on primary and/or secondary buildings only (see Ill. No. 90.27–1681 P4, P5). Other buildings are of insufficient importance to merit specific attack.

WEAPONS AND FUZING

A pure HE attack (no incendiaries) may be launched against the buildings specified in the table below. The choice of a particular HE weapon for attack on a given building can be made by considering both the number of hits on that building required for the various bombs (see the table below) and the stowage capabilities of the aircraft to be used. The proper fuzings for the HE weapons to be used against the individual buildings are given in the table below, with the exception that for minimum altitude attacks a 4–5 sec. delay is required for safety to the aircraft. The use of SAP, AP, smaller GP, or depth bombs is not recommended for this target.

NUMBER OF HITS

Number of hits required to achieve 50 percent serious damage to individual important buildings [1]

Buildings in order of importance to production (Ill. No. 90.27–1681 P4, P5)	Number of hits			Fuzing [2]
	500-lb. GP	1,000-lb. GP	2,000-lb. GP	
41	39	20	11	Against all buildings use 0.01 N/ND T fuzing.
51	39	20	11	
71	33	17	9	
47	39	20	11	
17	68	35	19	
58	51	26	14	
12	47	24	13	
74	13	7	3	
66	7	3	2	
72	10	5	3	
75	8	4	2	

[1] To obtain the number of hits required to achieve 30 percent serious damage to an individual important building, multiply the appropriate entry in the table by 0.5; for 70 percent serious damage, multiply by 1.7.

[2] Use 0.1 N fuzes, if 0.01 N fuzes are not available.

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191 T–4

NARA Date 4-24-77

JOINT TARGET GROUP • WASHINGTON, D. C.

TARGET No. 90.27–1681

COORDINATES 34° 31′ N 133° 44′ E

PHOTOGRAPHED 8 DECEMBER 1944

MITSUBISHI AIRCRAFT, MISHIMA PLANT
TAMASHIMA, JAPAN

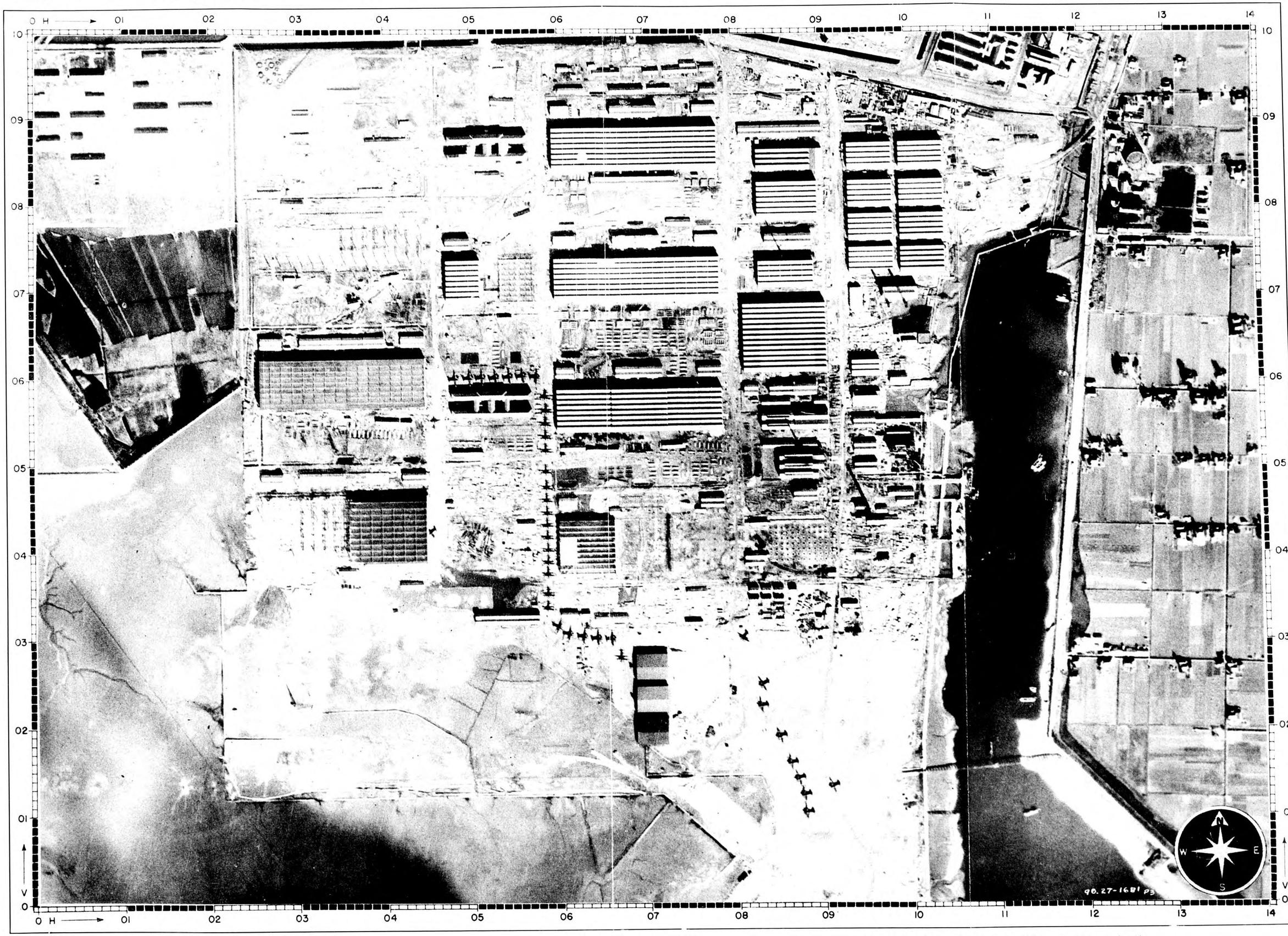
ILLUSTRATION No. 90.27–1681 P3

ISSUED 7 MARCH 1945

RESTRICTED

0 500 1000 1500 2000 2500 3000 FEET

0 ¼ 1:6000 APPROX. ½ MILE



HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT.

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May be taken into the air if data is trimmed off

JOINT TARGET GROUP • WASHINGTON, D. C.

TARGET No. 90.27–1681

MITSUBISHI AIRCRAFT, MISHIMA PLANT
TAMASHIMA, JAPAN

ILLUSTRATION No. 90.27–1681 P4

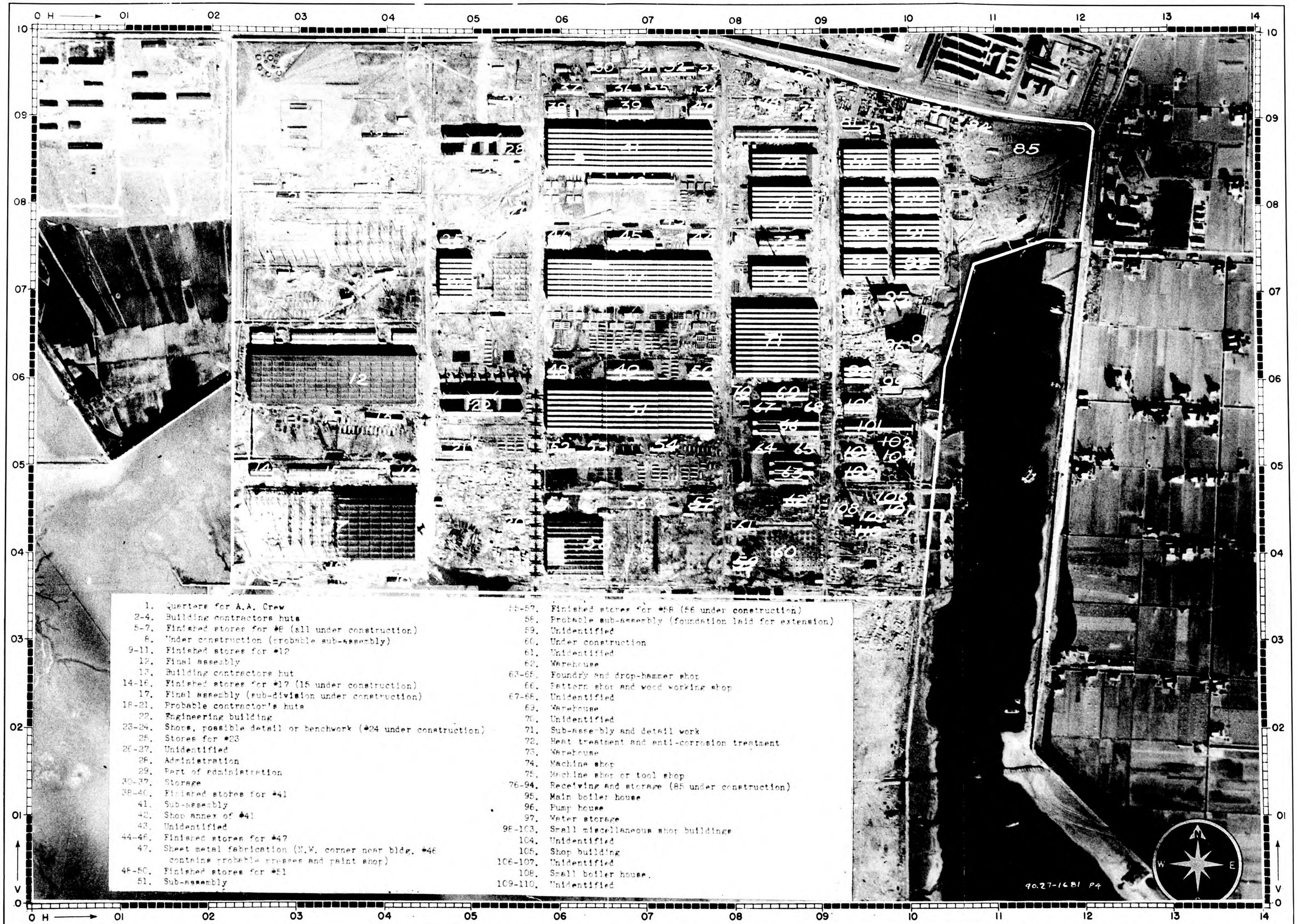
COORDINATES 34° 31′ N 133° 44′ E

PHOTOGRAPHED 8 DECEMBER 1944

0 500 1000 1500 2000 2500 3000 FEET
0 ¼ 1:6000 APPROX. ½ MILE

ISSUED 7 MARCH 1945

CONFIDENTIAL



1. Quarters for A.A. Crew
2-4. Building contractors huts
5-7. Finished stores for #8 (all under construction)
8. Under construction (probable sub-assembly)
9-11. Finished stores for #12
12. Final assembly
13. Building contractors hut
14-16. Finished stores for #17 (15 under construction)
17. Final assembly (sub-division under construction)
18-21. Probable contractor's huts
22. Engineering building
23-24. Shops, possible detail or benchwork (#24 under construction)
25. Stores for #23
26-27. Unidentified
28. Administration
29. Part of administration
30-37. Storage
38-40. Finished stores for #41
41. Sub-assembly
42. Shop annex of #41
43. Unidentified
44-46. Finished stores for #47
47. Sheet metal fabrication (N.W. corner near bldg. #48 contains probable presses and paint shop)
48-50. Finished stores for #51
51. Sub-assembly
52-53. Finished stores for #58 (56 under construction)
54. Probable sub-assembly (foundation laid for extension)
59. Unidentified
60. Under construction
61. Unidentified
62. Warehouse
63-65. Foundry and drop-hammer shop
66. Pattern shop and wood working shop
67-68. Unidentified
69. Warehouse
70. Unidentified
71. Sub-assembly and detail work
72. Heat treatment and anti-corrosion treatment
73. Warehouse
74. Machine shop
75. Machine shop or tool shop
76-94. Receiving and storage (85 under construction)
95. Main boiler house
96. Pump house
97. Water storage
98-103. Small miscellaneous shop buildings
104. Unidentified
105. Shop building
106-107. Unidentified
108. Small boiler house.
109-110. Unidentified

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT.

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JOINT TARGET GROUP, WASHINGTON, D. C.
FUNCTIONAL IDENTIFICATION

Sheet No.	90.27–1681 P6
Date	6 April 1945
Page No.	1
Target No.	90.27–1681
Obj. Area	90.27
Obj. Folder No.	New Target
Air Target System:	Aircraft
Lat.	34°31′ N
Long.	133°44′ E
Alt.	10′

MITSUBISHI AIRCRAFT, MISHIMA PLANT

TAMASHIMA . . . . . JAPAN

ALL PREVIOUS SHEETS CANCELLED

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER—JAPANESE AIRCRAFT WITH OTHER 90.27–1681 MATERIALS

(To be read in conjunction with Illustration No. 90.27–1681 P5.)

Building No.	*Function of building*
1	Quarters for AA crew.
2–4	Building contractors' huts.
5–7	Finished stores for No. 8 (all under construction).
8	Under construction (probable subassembly).
9–11	Finished stores for No. 12.
12	Final assembly.
13	Building contractors' hut.
14–16	Finished stores for No. 17 (15b under construction).
17	Final assembly (subdivision "b" under construction).
18–21	Probable contractors' huts.
22	Engineering building.
23, 24	Shops, possible detail or benchwork (No. 24 under construction).
25	Stores for No. 23.
26, 27	Unidentified.
28	Administration.
29	Part of administration.
30–37	Storage.
38–40	Finished stores for No. 41.
41	Subassembly.
42	Shop annex of No. 41.
43	Unidentified.
44–46	Finished stores for No. 47.
47	Sheet metal fabrication (northwest corner near building No. 46 contains probable presses and paint shop).
48–50	Finished stores for No. 51.
51	Subassembly.
55–57	Finished stores for No. 58 (56 "b" under construction).
58	Probable subassembly (area "b" under construction).
59	Unidentified.
60	Under construction.
61	Unidentified.
62	Warehouse.
63–65	Die foundry and drop-hammer shop.
66	Pattern shop and wood working shop.
67, 68	Unidentified.
69	Warehouse.
70	Unidentified.
71	Subassembly and detail work.
72	Heat treatment and anticorrosion treatment.
73	Warehouse.
74	Machine shop.
75	Machine shop or tool shop.
76–94	Receiving and storage (85 under construction).
95	Main boiler house.
96	Pump house.
97	Water storage.
98–103	Small miscellaneous shop buildings.
104	Unidentified.
105	Shop building.
106, 107	Unidentified.
108	Small boiler house.
109–110	Unidentified.

There are a large number of probable reinforced concrete air-raid shelters 10 by 40 feet dispersed about the plant. The greatest concentration is in the vicinity of the subassembly area.

(Based on F/A Report No. 56, AC/AS, Intelligence. Photographic Division, dated 31 January 1945.)

NOTE.—Illustration No. 90.27–1681 P5 shows buildings 17 and 58 as primary objectives. They should be listed as secondary.

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189-T2

NARA Date 4-24-11

TARGET NO. 90.27-1681
APPROX. COORDINATES 34°31′ NORTH
133°44′ EAST
PHOTOGRAPHED 8 DECEMBER 1944

JOINT TARGET GROUP - WASHINGTON, D. C.

MITSUBISHI AIRCRAFT

MISHIMA PLANT
TAMASHIMA, JAPAN

ILLUSTRATION NO. 90.27-1681-P5

ISSUED 28 FEBRUARY 1945
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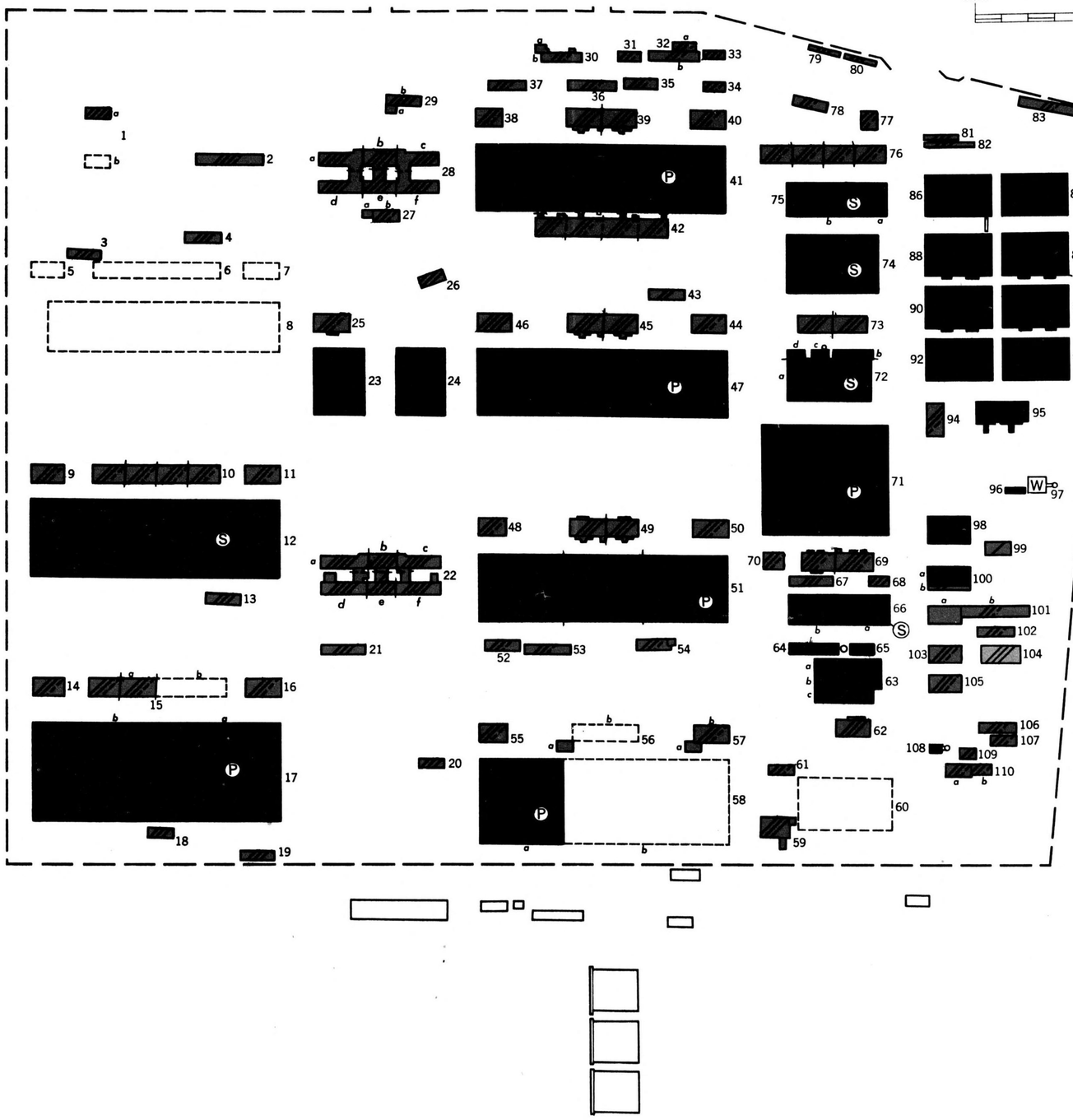
HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT

SCALE 1:6,000
500 0 500 1000 FEET



FIRE SUSCEPTIBILITY PLAN

PRIMARY BUILDINGS	(P)	FIRE WALL, CERTAIN	
SECONDARY BUILDINGS	(S)	FIRE WALL, PROBABLE	

BUILDINGS		CONTENTS	
COMBUSTIBLE		NON-COMBUSTIBLE	
NON-COMBUSTIBLE		SLIGHTLY COMBUSTIBLE	
FIRE RESISTANT		MODERATELY COMBUSTIBLE	
COMBINATION I.E. COMBUSTIBLE ROOF RESISTANT FLOORS		HIGHLY COMBUSTIBLE	
		EXTREMELY COMBUSTIBLE	
WATER TANK	(W)	INTERMEDIATE VALUES	

AREA IN SQ. FT.	PRIMARY	ALL BLDGS. SHOWN
NO. OF BUILDINGS	6	103
NO. OF FIRE DIVISIONS	8	133
PLAN AREA	1,390,000	3,100,000
TOTAL FLOOR AREA	1,390,000	3,340,000
SITE AREA	13,400,000	

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JOINT TARGET GROUP, WASHINGTON, D. C.

TARGET INFORMATION SHEET

SHEET . . . 90:27-2047—TI
DATE . . . . . 25 May 1945
PAGE 1

TARGET 90:27-2047
OBJ. AREA 90:27
OBJ. FOLDER . . New Target
CATEGORY
End Prdt. Ind.—AIRCRAFT

LAT. . . . . 34° 50′ N
LONG. . . . . 134° 43′ E
ALT. . . . . 44 feet

KAWANISHI AIRCRAFT, HIMEJI PLANT

HIMEJI **JAPAN**

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft with other 90:27-2047 material.

SIGNIFICANCE

This plant, the former Nippon Keori Textile Mill, appears to be the second most important aircraft plant of the Kawanishi Aircraft Co. Ground intelligence and the presence in photography of 20 January 1945 of numerous single-engine aircraft within the target area indicate that the plant assembles and probably manufactures major parts of George, one of the newer and more important of the Navy fighter types.

LOCATION

(Refer to Illustration No. 90:27-2047 P2). In the E outskirts of Himeji city, about 2000 feet E of Himeji Castle. It is situated about 2000 feet W of the generally N-S flowing Ichi River, about 4 miles N of its mouth on the Inland Sea. The Sanyo Mainline RR between Kobe and Okayama passes about 2800 feet S. A branch line runs N to form the W boundary of the plant, the other boundaries being major or minor city streets.

DESCRIPTION AND LAYOUT

(Refer to Illustrations No. 90:27-2047 P3, P5.) The plant site is irregular in shape. The longest boundary runs NE-SW about 2000 feet, and its greatest width is about 1650 feet. The plant site is about 45 percent built-up.

The only sizable buildings added since the plant operated as a textile mill are the final and post assembly building (45), in the S corner, an adjacent possible paint shop (41) and a small parts shop (13) in the E corner. Because of its previous use, there have probably been some departures from the usual aircraft production flow lines. Metal preparation and small parts manufacture probably occur in the NE section of the plant (buildings 11, 12, 13, and 16), principal sub-assembly (34a and 36) and major and final assembly (34b and 35) in the center of the plant, and final and post assembly (40, 45) and painting (41) in the S section. Machine shop work appears to be performed in smaller buildings (19, 20, 31a) to the NW.

Photography of 2 April 1945 shows buildings 14, 29 and 44, all small, and parts of the main workers' quarters (9) in N corner of the site have been removed, probably to reduce the fire hazard. There is some possibility of fire spread from the surrounding residential areas.

The relatively high proportion of final and post assembly floorspace at this plant and the apparent lack of final assembly space at Kawanishi's main aircraft plant at Naruo (TARGET 90:25-18) suggest the possibility that major aircraft sections manufactured at the Naruo plant may be brought to his plant for final assembly.

PRIMARY OBJECTIVES

(Refer to Illustration No. 90:27-2047 P3, P5.) The sub-assembly and final assembly buildings (34, 35, 36) across the center of the site are the primary objectives whose loss would most reduce production. Buildings (11, 12, 13, 16) to the NE, housing metal preparation, small parts, and benchwork processes are the secondary or next most vital objectives. It is not practicable to determine priorities between the individual buildings comprising either set of objectives.

CONSTRUCTION AND VULNERABILITY

(Refer to Illustration No. 90:27-2047 P3, P5.)

Primary and Secondary Objectives:

Building No.	Plan area (sq. ft.)	Stories	Roof[1]	Combustibility	HE vulnerability[2]
34a, b	108,800	1	Light	Noncombustible	V4A
34c	3,100	2	Light	Noncombustible	V3
34d	2,500	3	Light	Noncombustible	V3
35	48,100	1	Light	Noncombustible	V4
36	54,400	1	Light	Noncombustible	V4A
11	44,800	1	Light	Noncombustible	V4
12	44,800	1	Light	Noncombustible	V4
13	77,500	1	Light	Noncombustible	V4
16	42,000	1	Light	Noncombustible	V4

[1]Lightweight roofs are readily penetrated by all types of incendiary bombs. Initiation of HE tail fuzes by these roofs cannot be depended upon except for bombs striking structural members (30 to 40 percent of bombs striking buildings).

[2]For explanation of HE vulnerability classifications refer to JTG Memorandum No. JTG/M-3/1, dated 26 March 1945 (nontechnical), or No. JTG/N-8 (technical).

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JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET INFORMATION SHEET

Classification of Buildings:

	Primary and Secondary Objectives	Whole Target
Total plan area of buildings (square feet)	426,000	913,900
Total floor area of buildings (square feet)	434,100	1,040,600
HE vulnerability (percent of total plan are in each class):		
V1 (least vulnerable)	....	....
V2 1-story	....	....
V3 3-story	0.5%	1%
2-story	0.5%	12%
V4 1-story	60%	67%
V4A 1-story	39%	20%
V5 (most vulnerable) 1-story	....	....
Combustibility (percent of total plant area in each class):		
Fire resistant (R)	....	....
Noncombustible (N) 3-story	0.5%	Negl.
2-story	0.5%	2%
1-story	99.0%	69%
Combustible (C) 3-story	....	1%
2-story	....	11%
1-story	....	17%
Combustibility (percent of total FLOOR area in "Combustible" class)	....	36%
Susceptibility of contents to incendiary bombs (whole target)[3]	Fair	Fair

[3]Degrees: none, poor, fair (i.e., average industrial fire occupancy), good, excellent. For detailed study of fire susceptibility of structures and contents refer to Illustration No. 90.27:2047 P5).

WEAPON RECOMMENDATIONS

Reference should be made to Weapon Recommendations Sheet No. 90:27-2047–WR1 for high and medium altitude attack and to Weapon Recommendations Sheet No. 90:27-2047–WR2 for low altitude attack.

CAMOUFLAGE, DECOYS, AND SMOKE SCREENS

A portion of the roof area has received disruptive painting. No evidence of smoke screens or decoys has been received.

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft after 90:27-2047 TI page 1.

JOINT TARGET GROUP, WASHINGTON, D. C.

WEAPON RECOMMENDATIONS SHEET

SHEET . 90:27-2047—WR1
DATE . . . . . 26 May 1945
PAGE 1

TARGET 90:27-2047
OBJ. AREA 90:27
OBJ. FOLDER . . New Target
CATEGORY
End Prdt. Ind.—Aircraft

LAT. . . . . 34° 50′ N
LONG. . . . . 134° 43′ E
ALTITUDE . . . . . 44 feet

KAWANISHI AIRCRAFT, HIMEJI PLANT

HIMEJI JAPAN

HIGH AND MEDIUM ALTITUDE ATTACK

(See also 90:27-2047—TI and associated target illustrations.)

INTRODUCTION

(Refer to Illustrations No. 90:27-2047 P4, P5.) Photography of 2 April 1945 shows that buildings 9 (sections b, d, g, k, and m), 29, and 44 have been removed, and consequently are not considered to be part of the target.

ATTACK DATA

Aiming Point

(Refer to Illustrations No. 90:27-2047 P4, P5.) For maximum damage to primary and secondary buildings the center of the bomb pattern should be in the vicinity of building 34.

Weapons and Fuzing

	High Explosive	Fuzing	Incendiary
Preferred:	1000-lb GP	0.01 N/ND T	AN-M50 4-lb or
	or 2000-lb GP	0.01 N/ND T	AN-M69 6-lb (in aimable clusters)
Alternative:	500-lb GP	0.01 N/ND T	AN-M47 70-lb
	250-lb GP	0.025 N/ND T	AN-M76 500-lb

Not recommended: Smaller GP bombs
SAP or AP bombs
Depth bombs

Notes: (a) Use 0.025 N or 0.1 N fuzes if 0.01 N fuzes are not available, and 0.01 T fuzes if ND tail fuzes are not available. ND tail fuzing is recommended since most of the buildings have light roof material and are best destroyed by blast effects.

(b) The above recommendations are on a weight for weight basis.

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft with other 90:27-2047 material.

Loading Table

The table below is prepared for an initial attack against this target. For its application to later attacks see JTG Memorandum No. 3/1.

Loading Table for Preferred Combination of Bombs[2]

Tons (actual) Dispatched	Percent of bombs dispatched falling within 1000 feet of aiming point (building 34).							
	10%		15%		20%		30%	
	Tons HE-IB	F[1] %	Tons HE-IB	F[1] %	Tons HE-IB	F[1] %	Tons HE-IB	F[1] %
100	30— 70	25	20— 80	35	15— 85	40	10— 90	50
200	30—170	40	20—180	50	15—185	50	70—130	55
400	30—370	50	150—250	55	210—190	60	270—130	65
600	230—370	55	350—250	60	....	..	....	..
800	430—370	60	....	..	....	..	....	..

[1] The percent of serious damage to the whole target.

[2] If alternative bombs are used, the distribution of the load between HE and IB should be the same. The percent of serious damage will, of course, be lower.

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By ____ NARA. Date 4/9/77

JOINT TARGET GROUP, WASHINGTON, D. C. —
WEAPON RECOMMENDATIONS SHEET

SHEET . 90:27-2047—WR2
DATE . . . . . 26 May 1945
PAGE 1

KAWANISHI AIRCRAFT, HIMEJI PLANT

HIMEJI JAPAN

TARGET 90:27-2047
OBJ. AREA 90:27
OBJ. FOLDER . . New Target
CATEGORY
End Prdt. Ind.—Aircraft

LAT. . . . . 34° 50′ N
LONG. . . . . 134° 43′ E
ALTITUDE. . . . . 44 feet

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft with other 90:27-2047 material.

LOW ALTITUDE ATTACK

(See also 90:20-2047—TI and associated target illustrations.)

INTRODUCTION

This sheet applies primarily to an attack by carrier based aircraft, fighter bombers, or other similar aircraft which carry out dive, glide, low level, or minimum altitude attacks.

(Refer to Illustrations No. 90:27-2047 P4, P5.) Photography of 2 April 1945 shows that buildings 9 (sections b, d, g, k and m), 29, and 44 have been removed, and consequently are not considered to be part of the target.

Data are given below for an area attack against the target as a whole and an attack against individual important buildings.

DATA FOR AREA ATTACK

Weapons and Fuzing

	High Explosive	Fuzing	Incendiary
Preferred:	1000-lb GP or 2000-lb GP	0.01 N/ND T 0.01 N/ND T	AN-M50 4-lb or AN-M69 6-lb (in clusters)
Alternative:	500-lb GP 250-lb GP	0.01 N/ND T 0.025 N/ND T	AN-M47 70-lb AN-M76 500-lb Fire bombs (minimum altitude only)
Not recommended:	Smaller GP bombs SAP or AP bombs Depth bombs		

Notes: (a) The use of 8-15 sec. delay fuzing is necessary for minimum altitude attacks.

(b) Use 0.025 N or 0.1 N fuzes if 0.01 N fuzes are not available, and 0.01 T fuzes if ND T fuzes are available. ND tail fuzing is recommended since most of the buildings have light roof material and are best destroyed by blast effects.

(c) The above recommendations are on a weight for weight basis.

Tons on Target

The numbers of tons which must be delivered on the site area of the target to achieve various levels of serious damage are given in Table I. These requirements assume that the bombing results in a random distribution of bombs over the area.

TABLE I

Number of Tons on Target Area Required for Various Percentages of Serious Damage

Percent Serious Damage to Target Area	Tons on Target — Mixed Attack (Preferred bombs)			Tons on Target — Pure HE Attack (Preferred bombs)
	HE	IB	Total	
30%	2	6	8	46
50%	2	21	23	91
70%	76	25	101	158

DATA FOR ATTACK AGAINST IMPORTANT BUILDINGS

Weapons and Fuzing

The choice of a particular HE weapon for the attack of individual important buildings can be made by considering the recommendations above, the number of hits required for the various bombs (see Table II below), and the stowage characteristics of the aircraft to be used. The proper fuzing for the HE weapon to be used is also given in Table II, with the exception that for minimum altitude attacks an 8-15 sec. delay is required for safety to the aircraft.

Number of Hits

Table II below gives the number of hits required to achieve 50 percent serious damage to individual important buildings.

TABLE II

Number of Hits Required to Achieve 50% Serious Damage to Individual Important Buildings[1]

Buildings in order of importance to production. (Ill. No. 90:27-2047 P4, P5)	Number of Hits — 250-lb GP	500-lb GP	1000-lb GP	2000-lb GP	Fuzing
34	164	35	13	7	For 250-lb GP: 0.025 N/ND T
35	26	8	4	2	
36	75	15	5	3	
11	29	8	4	2	For other GP: 0.01 N/ND T
12	29	8	4	2	
13	41	13	7	4	
16	22	7	4	2	
Total Number of Hits	386	94	41	22	
Total Tons [2]	50.0	24.7	20.3	22.9	

[1] To obtain the number of hits required to achieve 30% serious damage to individual important buildings, multiply the appropriate entry in Table II by 0.5; for 70% serious damage, multiply by 1.7.

[2] Tonnages are based on actual (not nominal) weight of bombs.

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By _____ NARA, Date 4-11-77

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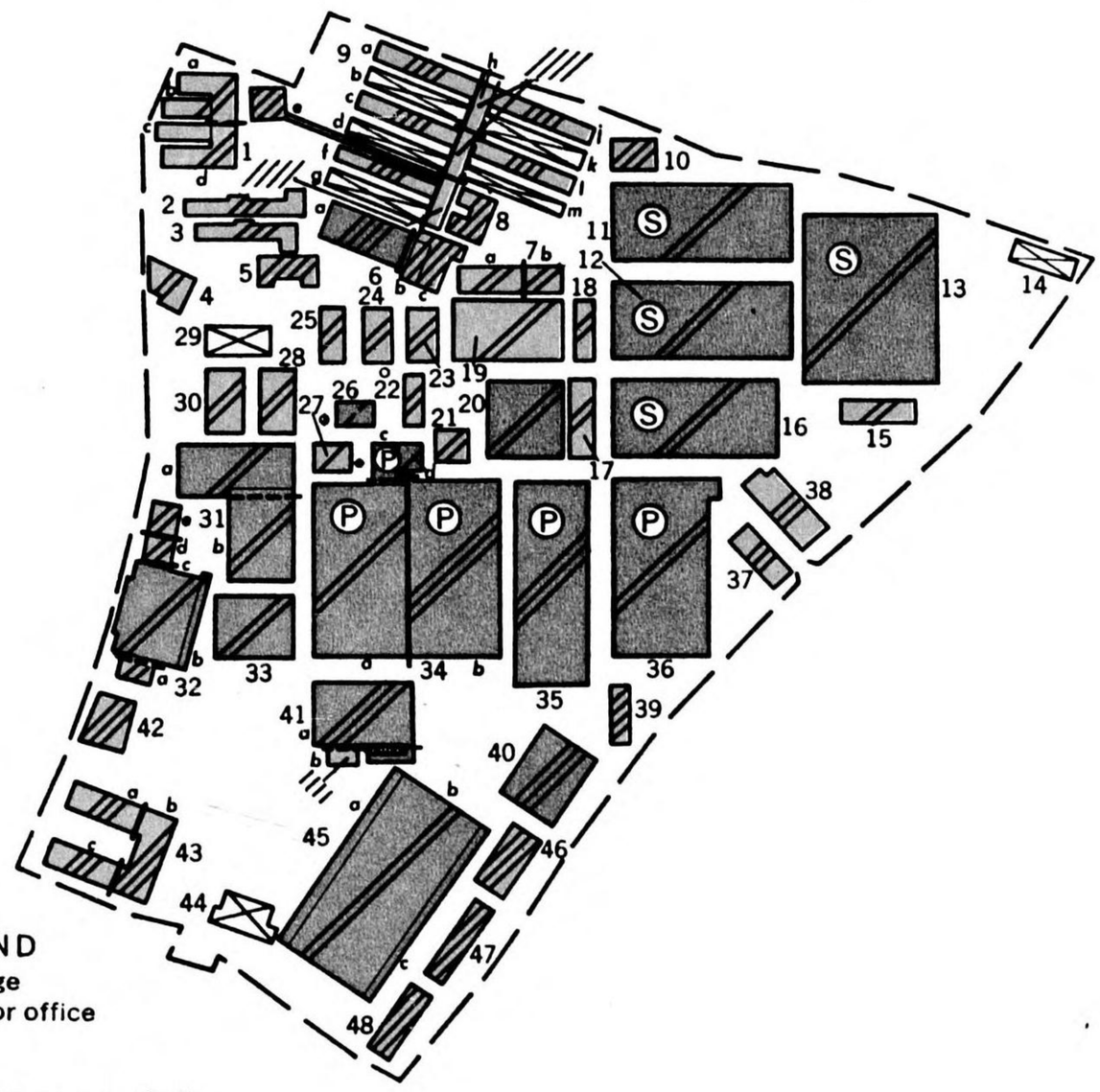
JOINT TARGET GROUP-WASHINGTON, D. C.
FIRE SUSCEPTIBILITY PLAN

KAWANISHI AIRCRAFT,
HIMEJI PLANT,
HIMEJI, JAPAN

ILLUSTRATION	90.27-2047-P5
DATE	14 May 1945
TARGET	90.27-2047
COORDINATES	34°50′N 134°43′E
PHOTOGRAPHED	20 Jan 1945 and 2 April 1945

SCALE 1:6,000
500 0 500 1000 FEET

N



LEGEND

1 Possible storage
2,3 Quarters and/or office
4 Unidentified
5 Office
6 Possible canteen or mess hall
7 Unidentified
8 Office
9 Workers' quarters
10 Storage
11 Metal shaping, cutting, etc.
12,13 Small parts manufacture, bench work
14 Storage
15 Unidentified
16 Small parts manufacture, bench work
17,18 Storage
19,20 Machine shop
21 Storage
22 Unidentified
23-25 Storage
26 Boiler house
27,28 Storage
29 Office
30 Storage
31a Shop
31b Machine shop
32 Warehouse
33 Shop
P 34a Sub-assembly
P 34b Major and final assembly
P 34c Unidentified
P 35 Major and final assembly
P 36 Sub-assembly
37 Garage
38 Storage
39 Office
40 Post assembly
41 Possible paint shop
42 Storage
43 Unidentified
44 Storage
45 Final and post assembly
46-48 Storage

P denotes Primary Buildings

NOTE:
⊠ Buildings Removed.
Figures below do not include those for Buildings Removed.

FIRE SUSCEPTIBILITY PLAN

PRIMARY BUILDINGS (P) FIRE WALL, CERTAIN
SECONDARY BUILDINGS (S) FIRE WALL, PROBABLE

BUILDINGS	CONTENTS
COMBUSTIBLE	SUSCEPTIBILITY TO INCENDIARIES:
NON-COMBUSTIBLE	NONE
	POOR
	FAIR
	GOOD
WATER TANK (W)	EXCELLENT

AREA IN SQ. FT.	PRIMARY	SECONDARY	ALL BLDGS. SHOWN
NO. OF BUILDINGS	3	4	46
NO. OF FIRE DIVISIONS	5	4	66
PLAN AREA	216,900	209,100	913,900
TOTAL FLOOR AREA	225,000	209,100	1,040,600
SITE AREA	2,110,000		

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By _____ NARA, Date 4-11-77

T A R G E T I N F O R M A T I O N S H E E T

Ref: Obj. Folder
Kure (90.30)
22 August 1944

Place: Kure
Obj. Area: 90.30
Category: Aircraft

Lat.: 34°13' N
Long: 132°37' E
Alt.: 10 feet

HIRO NAVAL AIRCRAFT FACTORY

AAF TARGET No. 90.30-660

T I S

ALL PREVIOUS SHEETS CANCELLED

NOTE: As an aid to planning, and evaluation of new reconnaissance and other intelligence, this TARGET INFORMATION SHEET is issued in advance of reconnaissance photography of the target. It is correspondingly subject to revision.

SIGNIFICANCE: This plant is a major repair and maintenance depot for land and floatplanes, but also produces a small number of planes and engines, and manufactures some components.

LOCATION: This plant is at Hiro, about 4 miles E of the Kure Naval Arsenal. It is S of the Hiro Arsenal and located on reclaimed land on the coast.

DESCRIPTION: The layout and precise location of this plant are not known, and general intelligence is very fragmentary. No photos or maps are available.

CRITICAL POINTS: (See above).

By ____ NARA. Date 4-11-77

JOINT TARGET GROUP, WASHINGTON, D. C.

TARGET INFORMATION SHEET

SHEET . . . 90:33-1306—TI
DATE . . . . . 26 May 1945
PAGE 1

TARGET 90:33-1306
OBJ. AREA 90:33
OBJ. FOLDER
90:33; 90:37; 90:38
CATEGORY
End Prdt. Ind.—Aircraft

LAT. . . . . 32° 58′ N
LONG. . . . . 131° 55′ E
ALT. . . . . 15 feet

SAEKI NAVAL AIR STATION

SAEKI JAPAN

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft with other 90:33-1306 material.

SIGNIFICANCE

A complete modern airbase and supply depot and a replacement shop for naval planes, with facilities for heavy seaplanes, floatplanes and medium land-based planes, now of reduced importance because of damage suffered by air attacks. Reported also engaged in navy land-based and floatplane training. Attacked by both B-29's and carrier-based planes. Photograph of 21 April shows damage or removal of 15 of the 89 buildings observed on 1 January, including all of the major hangars. The damage does not appear to be such as to interfere with the supply depot operations.

LOCATION

(Refer to Illustration No. 90:33-1306 P2.) On Saeki Bay about 10 miles W of Tsurumi Point, the easternmost tip of Kyushu. It is situated for the most part on two islands, E of the town of Saeki, separated by the Bansho, Nakaye and Nagashima Rivers. There are storage areas along the mainland bank of the Nagashima River, the westernmost of the three. The main railroad around E Kyushu skirts a hill W of the target and town and a spur runs to the main warehouse area.

DESCRIPTION AND LAYOUT

(Refer to Illustration No. 90:33-1306 P4.) The easternmost island between the Bansho and Nakaye Rivers is known as Mejima and used for land based planes. An airfield occupies the N half, with four maintenance hangars (62, 64, 65, 66, all damaged by 21 April) and an operations and control tower (62) on the western edge of the field. The S half of the island is principally an aircraft dispersal area, with fairly extensive warehouse facilities near its S tip.

A seaplane base is W of the airfield on an island known as Nagashima between the Nakaye and Nagashima Rivers. Maintenance seaplane hangars (33, 34, damaged by 21 April) and a concrete apron (32) adjoin Saeki Bay. The N part of Nagashima also contains headquarters buildings (25-27), a radio station (44), and extensive storage facilities (especially 46-58). Two boat basins where over 40 lighters and other craft have from time to time been observed, are on either side of the Nagashima River mouth.

The extensive storage facilities confirm the target's use as a major supply depot. Shortage of shops, however, suggests that repairs, overhaul, and modification are not a major activity. Building 28 near the headquarters building is the only one which appears to be a machine shop.

PRIMARY OBJECTIVES

(Refer to Illustration No. 90:33-1306 P4.) With all important hangars damaged by 21 April, the machine shop, building 28, constitutes the primary objective. Secondary targets include the concentrated storage facilities to the S of the seaplane base (buildings 46-58).

CONSTRUCTION AND VULNERABILITY

Hangars are long span, gable roofed structures, damage cover indicating heavy wood frame construction sheathed with corrugated asbestos. HE vulnerability classification is V5 (see JTG/M-3/1). Storage structures are predominantly one-story, wood frame buildings of short to medium span, HE vulnerability classification being V4. Buildings are dispersed in small to moderate sized groups over a large area.

WEAPON RECOMMENDATIONS

(Refer to Illustration No. 90:33-1306 P4.) Instructions with regard to weapons will usually be given in Field or Operational Orders, but in the absence of such instructions and to assist Planners in formulating such orders the following information is given: (Reference should also be made to General Analysis of Typical Military Targets, Part I, Airfields, published by JTG on 28 February 1945.)

Main Buildings (1-66)

An attack with a combination of incendiary and high explosive bombs is recommended, with incendiaries as the major weapon (high explosive bombs should not exceed 25 percent of the total load). A preliminary structural and occupancy analysis indicates weapons should be selected as follows:

	High Explosive	Fuzing	Incendiary
Preferred:	1000-lb GP or 2000-lb GP or 500-lb GP	0.01 N/ND T (8-15 sec T fuzes for minimum altitude attacks)	AN-M50 4-lb or AN-M69 6-lb (in aimable clusters for high altitude attack)
Alternative:	250-lb GP	0.01 N/ND T (8-15 sec T fuzes for minimum altitude attacks)	AN-M47 70-lb AN-M76 500-lb Fire bombs (Napalm filled gas tanks)

Not recommended: 100-lb GP
SAP or AP bombs
Depth bombs

Note: (a) If 0.01 N fuzes are not available, use either 0.1 or 0.025 N, and if ND T fuzes are not available, use 0.01 T. ND T fuzing is recommended as the hangars and shops have light roofs and are best destroyed by blast effects.

(b) The above recommendations are on a weight for weight basis.

(c) Fire bombs are recommended as alternative selections for low altitude attacks only.

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By ____ NARA. Date 4/6/11

JOINT TARGET GROUP, WASHINGTON, D. C.
TARGET INFORMATION SHEET

Airfield (67)

	High Explosive	Fuzing	Incendiary
Preferred:	100-lb GP or 250-lb GP or 500-lb GP	0.1N/0.025 T and none/LD T	No incendiaries are recommended
Alternative:	1000-lb GP	0.1 N/0.025 T and none/LD T	
Not recommended:	2000-lb GP SAP or AP bombs Depth bombs		

Note: (a) The above fuzings are designed to crater and deny the enemy the use of the airfield. LD T fuzes should be set for 2-24 hour delays.

(b) Above recommendations are on a weight for weight basis.

Ammunition Dump (68) and Aircraft Dispersal Area (69)

	High Explosive	Fuzing	Incendiary
Preferred:	Strafing (minimum altitude only) 20-lb Frag	inst. N/none	AN-M50 4-lb or AN-M69 6-lb. Incendiaries are recommended against the ammunition dump only.
Alternative:	Rockets (minimum altitude only) 100-lb GP	inst. N/NDT	
Not recommended:	Other GP bombs SAP or AP bombs Depth bombs		

Note: (a) The above recommendations are on a weight for weight basis.

(b) Grounded aircraft probably will be found in most of the uncovered revetments within dispersal area.

Warehouse Area (70-89)

An attack with a combination of incendiary and high explosive bombs is recommended, with incendiaries as the major weapon (high explosive bombs should not exceed 25 percent of the total load). Weapons should be selected as follows:

	High Explosives	Fuzing	Incendiary
Preferred:	500-lb GP or 1000-lb GP	0.01 N/ND T	AN-M50 4-lb or AN-M69 6-lb (in aimable clusters for high altitude attack)
Alternative:	250-lb GP or 2000-lb GP	0.01 N/ND T	AN-M47 70-lb Fire bombs (napalm filled gas tanks)
Not recommended:	100-lb GP SAP or AP bombs Depth bombs		AN-M76 500-lb

Note: (a) If 0.01 N fuzes are not available, use either 0.1 or 0.025 N, and if ND T fuzes are not available, use 0.01 T. ND fuzing is recommended as the warehouses are best destroyed by blast effects.

(b) The above recommendations are on a weight for weight basis.

(c) Fire bombs are recommended as an alternative selection for low altitude attack only.

CAMOUFLAGE, DECOYS, AND SMOKE SCREENS

Photography of 1 January, 28 March and 21 April 1945 indicates no camouflage, decoys, or smoke screens.

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft after 90:33-1306 TI page 1.

NARA Date 4-5-77

RESTRICTED

SAEKI NAVAL AIR STATION

SAEKI JAPAN

0 2000 4000 6000 FEET

0 ½ 1 MILE

1:32 000 APPROX.

ILLUSTRATION 90:33-1306 P1
DATE . . . . . 26 May 1945
TARGET 90:33-1306
COORDINATES . . . 32 58'N 131 55'E
PHOTOGRAPHED . . . 1 January 1945

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft.

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NARA. Date 1-31-77

JOINT TARGET GROUP
WASHINGTON, D. C.

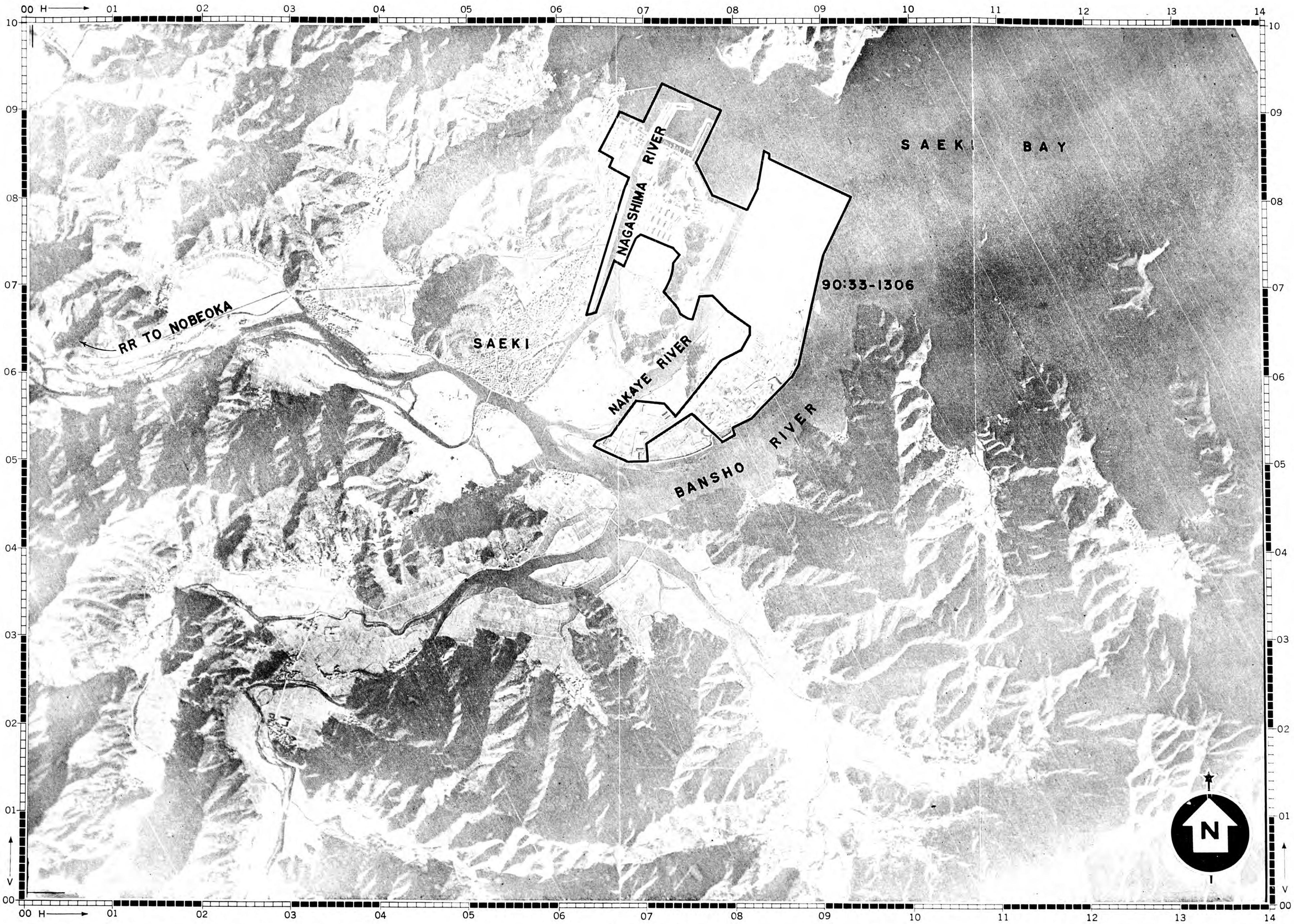
SAEKI NAVAL AIR STATION

SAEKI **JAPAN**

0 2000 4000 6000 FEET
0 ½ 1 MILE
1:32 000 APPROX.

RESTRICTED

ILLUSTRATION	**90:33-1306 P2**
DATE	**26 May 1945**
TARGET	**90:33-1306**
COORDINATES	**32°58'N 131°55'E**
PHOTOGRAPHED	**1 January 1945**



Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft.

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