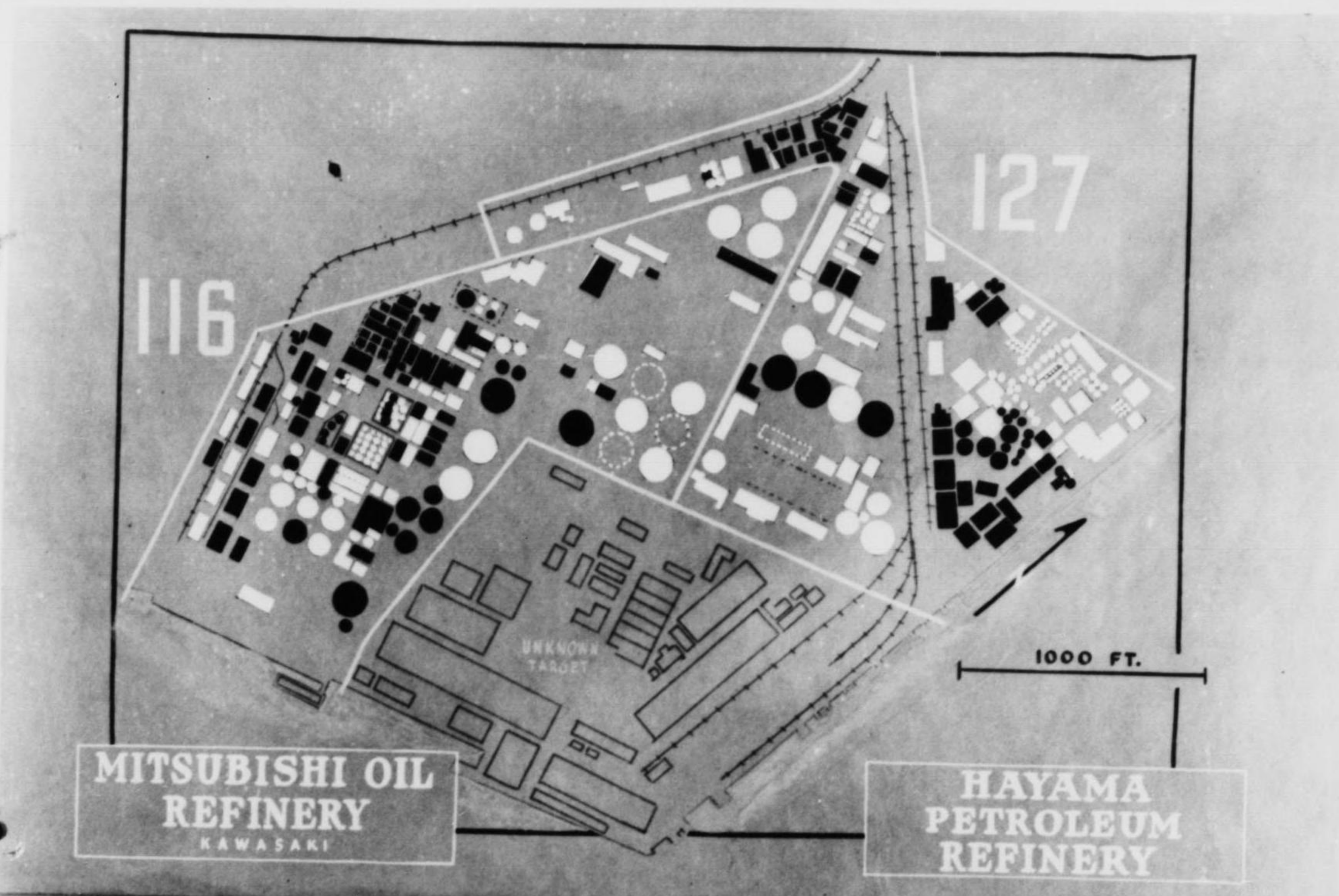


III a (20)

MITSUBISHI OIL REFINERY

1 of 2

112



**MITSUBISHI OIL
REFINERY**
KAWASAKI

**HAYAMA
PETROLEUM
REFINERY**

MISSION NO	291	310		
DAMAGE	325 STORAGE 127 STORAGE 200 STORAGE	116 PLANT 127 STORAGE 127 STORAGE		
WINGS	315	315		
DATE	25/26 JULY 45	1/2 AUG, 45		
DAY/NIGHT	NIGHT	NIGHT		
BOMB TYPE	G.P.	G.P.		
AV. LOAD	18,664			
A/C AIRBORNE	83	128		
A/C BOMB. P.T.	75	117		
TONS ON P.T.	650	1053.5		
ALTITUDE	16,500-18,100	16,950		
BOMB. METH.	3R-72V	112R-3V-2RV		
CLAIMS	0	0-2-0		
LOSSES	1	0		

M64-500
.1 Nose
.25 Tail

CONFIDENTIAL

NOT TO BE TAKEN
INTO THE AIR ON
COMBAT MISSIONS

TARGET: 90.17-116

OBJECTIVE AREA: 90.17-TOKYO

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

TARGET 90.17 - 116

MITSUBISHI OIL REFINERY, KAWASAKI

Latitude: 35° 30' N
Longitude: 139° 44' E
Elevation: 10 ft.

1. LOCATION AND IDENTIFICATION: The target is located on reclaimed land on the Kawasaki waterfront in Tokyo Bay. It is on the third large block of land southwest of the Tama River being approximately 2.9 miles southwest of the river's mouth. It is on the fifth block of land ENE of the Tsurumi River and about 2.5 miles ENE of the mouth of that river. This target is adjacent to the HAYAMA PETROLEUM REFINERY (Target 90.17-127) and for purpose of attack by air the facilities of both plants may be considered as one target. Adjoining the combined target areas on the northeast is a section of the JAPAN STEEL TUBE CO. (Target 90.17-52); on the northwest is the SHOWA FERTILIZER (90.17-137). Directly east of the combined target area is a ship canal and on the south end it is bounded by Tokyo Bay. To the southwest, at a distance of approximately five nautical miles is the horn-shaped projection of land forming the southern limits of Yokohama harbor.

2. PLANT DESCRIPTION: The MITSUBISHI OIL REFINERY covers an area of 2,600,000 sq. ft. There are ten storage tanks 120 ft. in diameter with a capacity of 80,000 bbls. each, and two cracking stills approximately 80 ft. high. The target contains fifteen buildings each over 3,000 sq. ft. in area.

The combined areas of MITSUBISHI OIL REFINERY and HAYAMA PETROLEUM REFINERY describe a very irregular shape measuring about 3500 ft. north-south and 2200 ft. east-west at its longest dimensions. This compound is 20 percent built-up. The refining units are in the northeastern and southwestern sections of the area; the main storage runs through the center. The larger MITSUBISHI OIL REFINERY occupies the south and central section of the area with its refining units compactly built in the west central part of its compound. The main section of the smaller HAYAMA PETROLEUM REFINERY forms an irregular area roughly describing a rectangle in shape. The greater part of the refining units are in the compact, congested northeastern section of its compound.

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This refinery's storage tanks are located in the southwestern section of its compound and adjacent to the northeastern half of Target 90.17-116, and together the tankage of these plants form a central area of relatively dispersed storage tanks.

MITSUBISHI OIL REFINERY has additional storage tanks and open storage to the south of its refining units.

3. IMPORTANCE: The MITSUBISHI OIL REFINERY, one of the four largest crude oil refineries of Japan, produces aviation lube, aviation gasoline, benzine, asphalt and wax. It has an estimated crude capacity of 7,900 bbls. per day, and a cracking capacity of about one-third that amount. The estimated tankage capacity is 872,000 bbls.

Together with Target 90.17-127 the MITSUBISHI OIL REFINERY represents ten per cent of the Inner Zone refining capacity and sixteen per cent of the Inner Zone cracking capacity.

5 September 1945.

TARGET SECTION, A-2
TWENTIETH AIR FORCE

S E C R E T

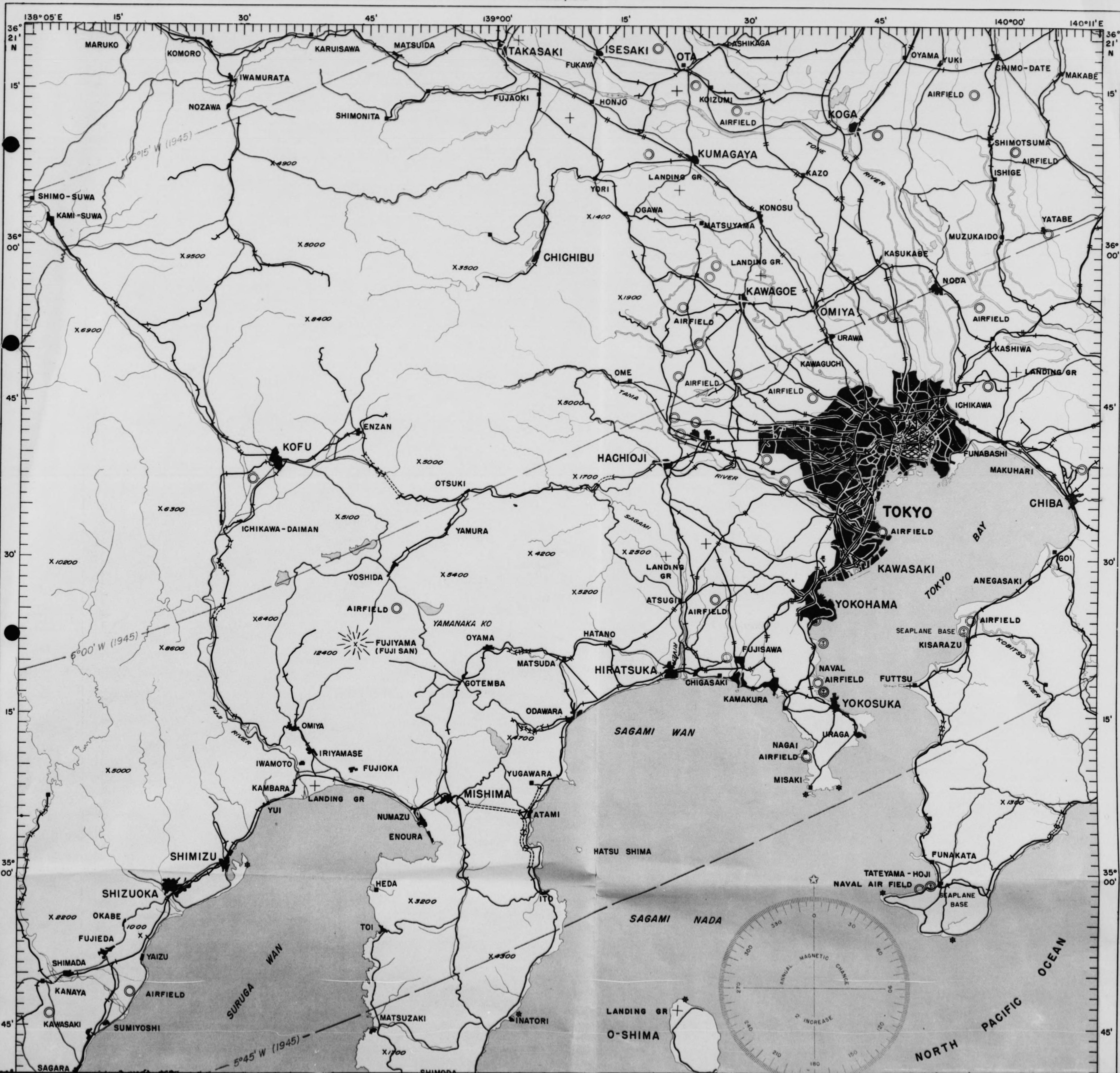
MISSION RESUME

Mission Number 291 3 August 1945

1. Date: 25/26 July 1945
2. Target: Mitsubishi Oil Refinery (90.17 - 116) and Hayama Petroleum Center at Kawasaki (90.17 - 127)
3. Participating Unit: 315th Bombardment Wing
4. Number A/C Airborne: 83
5. % A/C Bombing Primary: 90.36% (75 primary and 1 opportunity)
6. Type of Bombs and Fuzes: AN-M64, 500# G.P., 1/10 sec. delay nose and 1/40 sec. delay tail.
7. Tons of Bombs Dropped: 650 tons on primary, 9 tons on opportunity and 18 tons by Wind-Run A/C
8. Time Over Primary: 252323K - 260003K
9. Altitude of Attack: 16,500 - 18,100
10. Weather Over Target: 0/10 - 4/10
11. Total A/C Lost: 1
12. Resume of Mission: Photo reconnaissance showed 32% of storage tank units, and 1 furnace, 1 asphalt loading unit, 1 can manufacturing plant and 2 warehouses of the Mitsubishi Oil Refinery (90.17 - 116) was destroyed and 36% of the storage tanks, 5 U/I buildings, 7 probable office buildings, and 4 maintenance sheds of Hayama Petroleum Co. (90.17 - 127) was destroyed. Targets were visible to only 3 A/C. Flak was of heavy caliber, moderate to intense, accurate to inaccurate. Intense S/L activity was encountered and rope was used with barying success. Two Wind-Run A/C bombed Shimizu Aluminum Plant at Shimizu. Seven A/C were non-effective. Three B-29's landed at Iwo Jima. The aircraft that was lost suffered a direct flak hit over the target. No E/A. Average bomb load: 18,664 lbs. Average fuel reserve: 1109 gallons.

S E C R E T

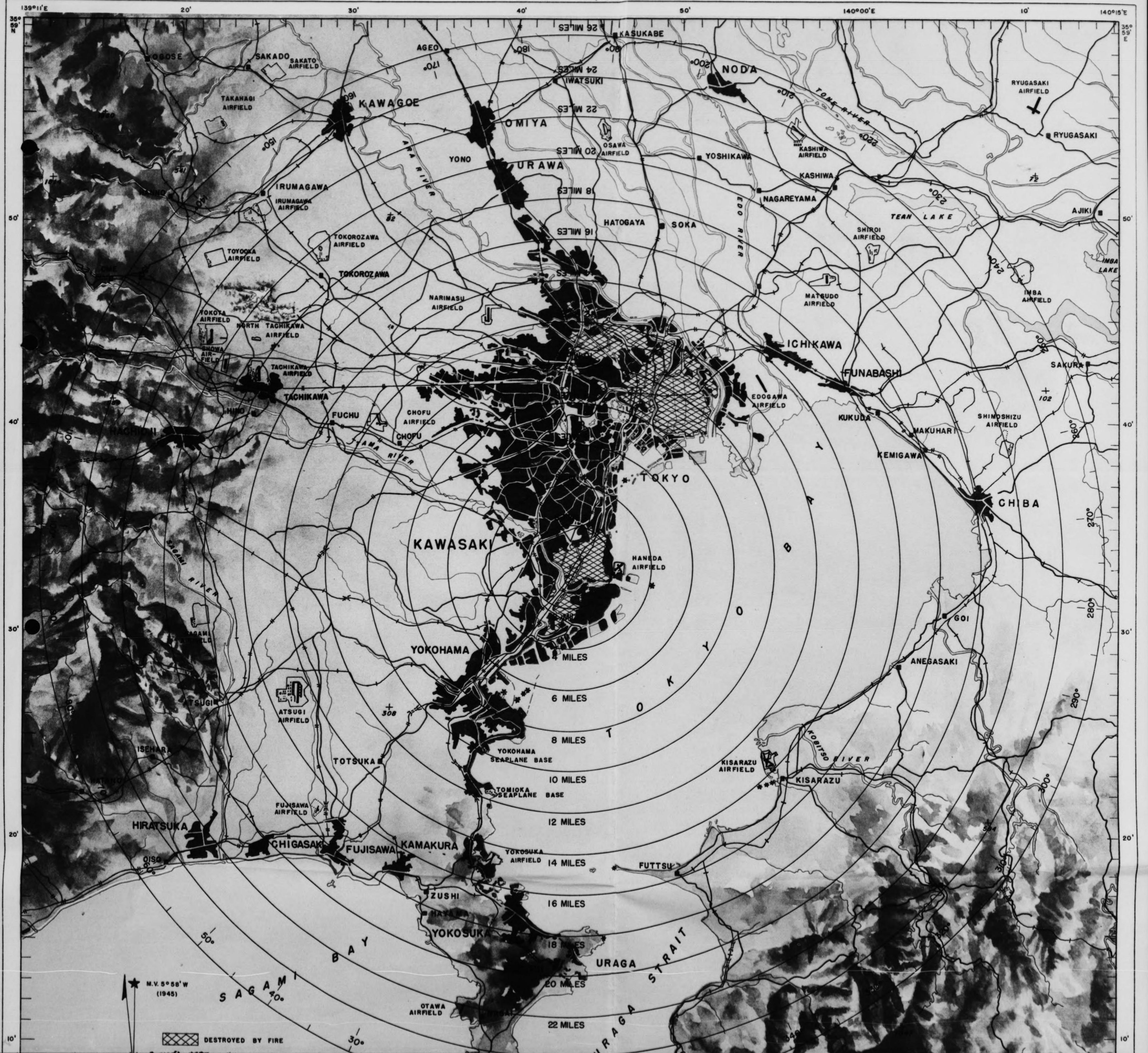
MARCH, 1945

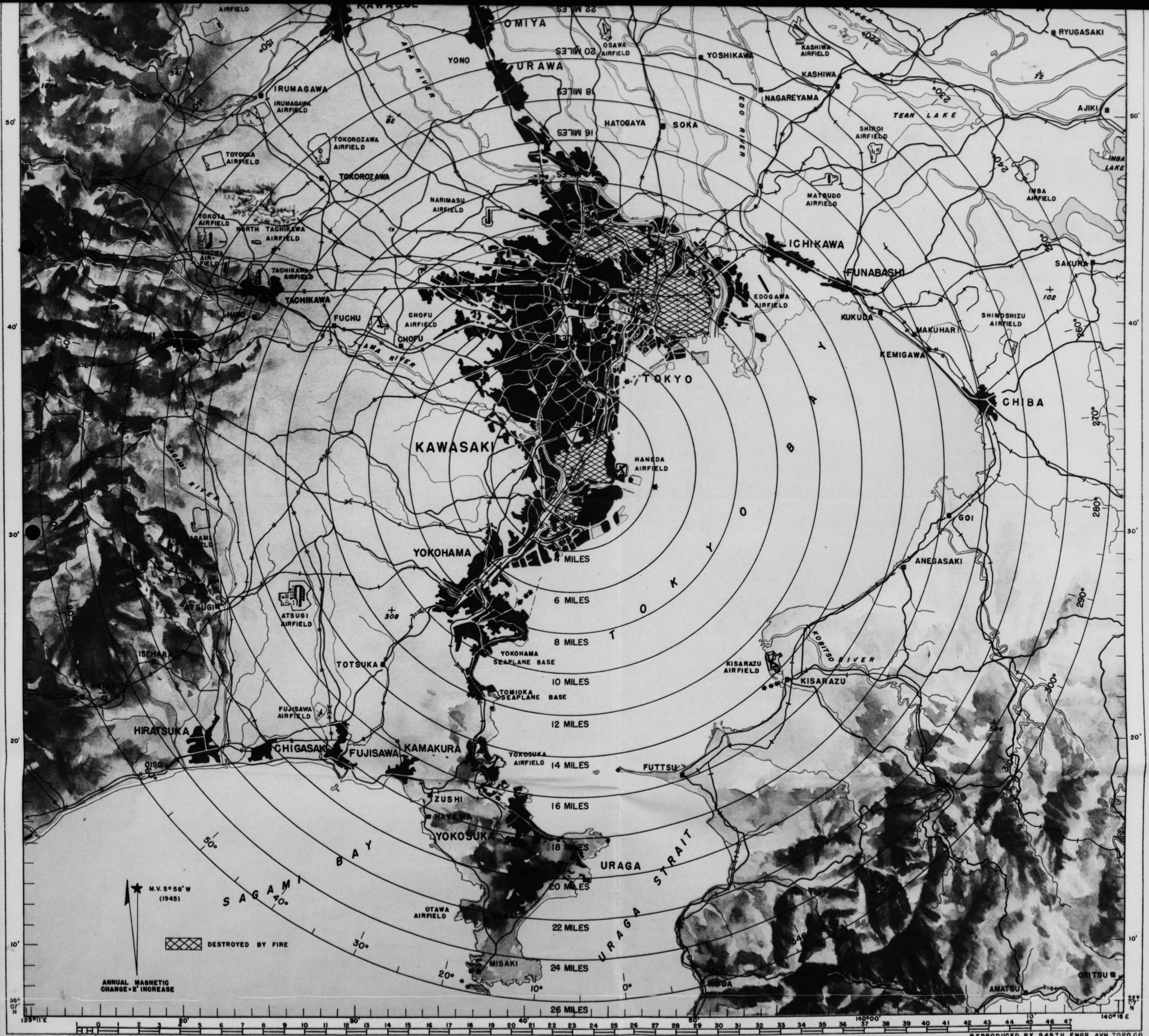


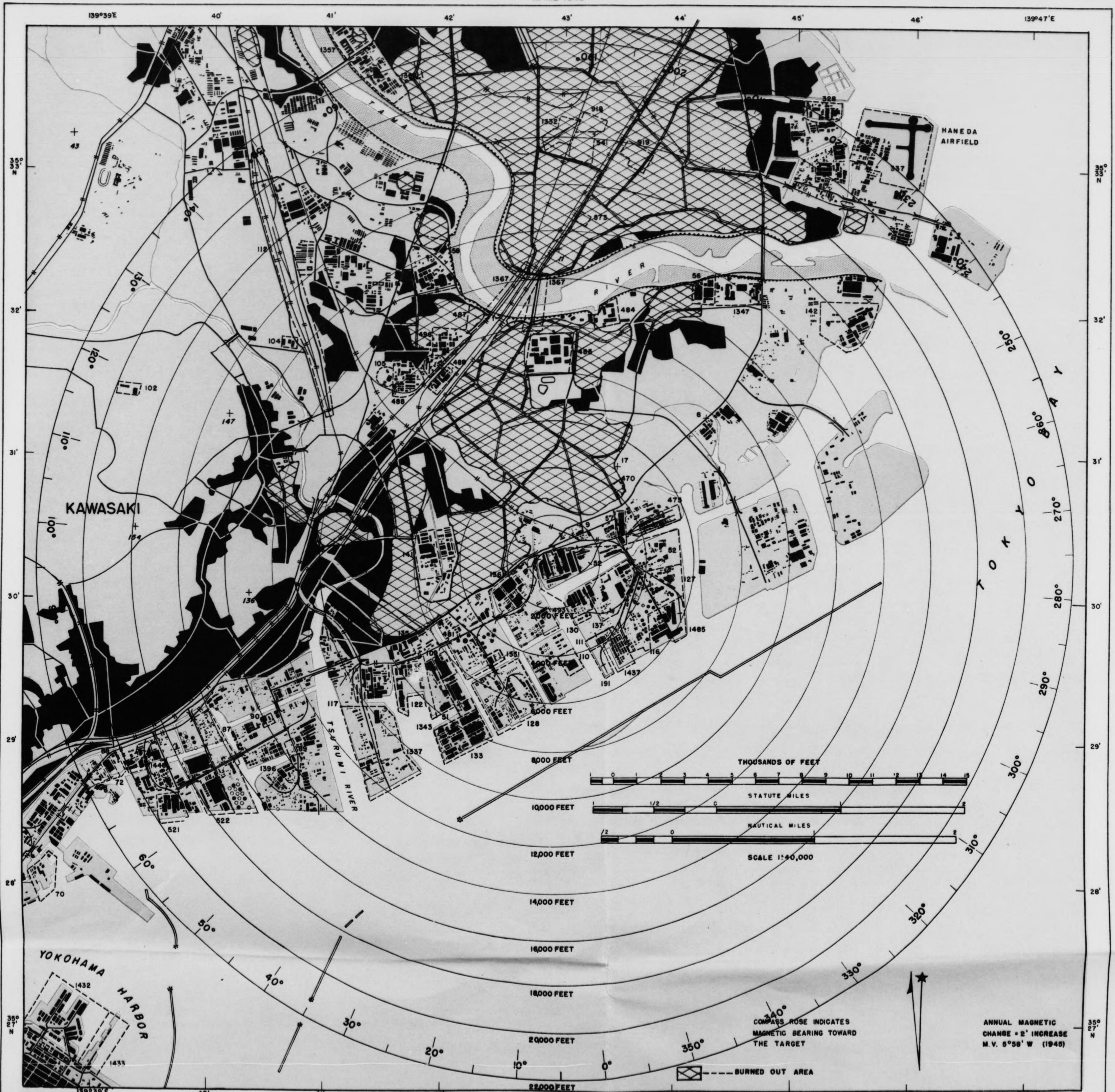


KAWASAKI AREA

TARGET NO 90.17-918 NIIGATA IRON WKS (35° 33' N-139° 43' E) ELEV APPROX 10 FEET
ALL DISTANCES IN NAUTICAL MILES







NO	DESIGNATION	ELEV	NO	DESIGNATION	ELEV	NO	DESIGNATION	ELEV	NO	DESIGNATION	ELEV	NO	DESIGNATION	ELEV
88	JAPAN STEEL TUBE CO.	10'	102	ASAKI SUBSTATION	10'	127	HAYAMA PETROLEUM REFINERY	10'	328	WATANABE STEEL WORKS	10'	496	FACTORY NO.1 TOKYO-SHIBAWA ELEC. CO.	10'
89	ASANO IRON WORKS	10'	104	NIHON ELEC. POWER TRANSFORMING STATION	10'	128	PETROLEUM CENTER	10'	337	HANEIDA AIRPORT	10'	498	KURADA IRON WORKS	10'
90	FUJI STEEL WKS OF IMPER IRON & STEEL CO.	10'	105	KAWASAKI SUBSTATION	10'	129	NIHON SUPER FUEL COMPANY	10'	470	TOKYO ELEC. POWER STATION	10'	501	JAPAN (SHAWA) ELEC. CHEM. CO.	10'
91	ORIENTAL STEEL PRODUCTS CO.	10'	106	RAILROAD TRANSFORMER STATION	10'	130	ASSAISHI PETROLEUM CO.	10'	478	ASANO CEMENT CO.	10'	502	NISSAN AUTO CO.	10'
92	TOKYO SPECIAL STEEL & CHROME WORKS	10'	108	OKI ELECTRIC CO. PLANT NO.2	10'	131	SHIBAWA ENGINEERING WORKS	10'	481	TOKYO GAS CO. TSURUMI BRANCH	10'	503	ORIENTAL OTIS ELEVATOR CO.	10'
70	ASANO DOCKYARD	10'	110	TOKYO ELEC. PR. SEN. ST. TSURUMI PLANT	10'	132	DOOP AUTO WORKS	10'	484	SHOWA WIRE CABLE CO.	10'	573	MIYATA ENGINEERING WORKS	10'
72	FORD MOTOR CO.	10'	111	KAWASAKI ELEC. PR. PLT. FOR JAP. GOV. R.R.	10'	133	FUJI ELECTRIC WORKS	10'	488	FUJI SPINNING MILLS	10'	516	NIHATA IRON WORKS	10'
												1347	JAPAN SERVICE CO.	10'
												1351	TOKYO NAKAJIMA IRON WORKS	10'
												1357	TOKYO SPEC. MACH. MFG. CO.-JAP. PHYSICO-CHEM. CO.	10'
												1362	KATASHIN ELEC. ENGR. CO.	10'
												1367	TAMA RIVER BRIDGES	10'
												1396	TSURUMI SODA CO.	10'
												1432	YOKOHAMA HARBOR PASSENGER WHARVES	10'



NO	DESIGNATION	ELEV	NO	DESIGNATION	ELEV	NO	DESIGNATION	ELEV	NO	DESIGNATION	ELEV	NO	DESIGNATION	ELEV	NO	DESIGNATION	ELEV
88	JAPAN STEEL TUBE CO.	10'	102	ASAKI SUBSTATION	10'	127	HAYAMA PETROLEUM REFINERY	10'	328	WATANABE STEEL WORKS	10'	496	FACTORY NO.1 TOKYO-SHIBAWA ELEC. CO.	10'	1847	JAPAN SERVICE CO.	10'
89	ASANO IRON WORKS	10'	104	NIPOON ELEC. POWER TRANSFORMING STATION	10'	128	PETROLEUM CENTER	10'	337	HANEDA AIRPORT	10'	498	KURADA IRON WORKS	10'	1361	TOKYO NAKAJIMA IRON WORKS	10'
90	FUJI STEEL WKS. OF IMPER. IRON & STEEL CO.	10'	105	KAWASAKI SUBSTATION	10'	129	NIPOON SUPER FUEL COMPANY	10'	470	TOKYO ELEC. POWER STATION	10'	501	JAPAN (SHAWA) ELEC. CHEM. CO.	10'	1357	TOKYO SPEC. MACHINERY CO.-JAP. PHYSICO-CHEM. CO.	10'
91	ORIENTAL STEEL PRODUCTS CO.	10'	106	RAILROAD TRANSFORMER STATION	10'	130	ASSAISHI PETROLEUM CO.	10'	475	ASANO CEMENT CO.	10'	502	NISSAN AUTO CO.	10'	1362	KATASHIH ELEC. ENGIN. CO.	10'
92	TOKYO SPECIAL STEEL & CHROME WORKS	10'	109	OKI ELECTRIC CO. PLANT NO.2	10'	133	SHIBAWA ENGINEERING WORKS	10'	481	TOKYO GAS CO. TSURUMI BRANCH	10'	541	ORIENTAL OTIS ELEVATOR CO.	10'	1367	TAMA RIVER BRIDGES	10'
93	ABANO DOCKYARD	10'	110	TOKYO ELEC. PR. GEN. ST. TSURUMI PLANT	10'	135	COOP AUTO WORKS	10'	484	SHOWA WIRE CABLE CO.	10'	573	MIYATA ENGINEERING WORKS	10'	1396	TSURUMI SODA CO.	10'
94	FORD MOTOR CO.	10'	111	KAWASAKI ELEC. PR. PLY. FOR JAP. GOV. R.R.	10'	136	FUJI ELECTRIC WORKS	10'	485	FUJI SPINNING MILLS	10'	918	MIYATA IRON WORKS	10'	1432	YOKOHAMA HARBOR PASSENGER WHARVES	10'
95	OSUNA OIL CO.	10'	112	TSUBOI SHUNTING YARDS	10'	137	SHAWA FERTILIZER	10'	487	MEIJI SUGAR FACTORY	10'	919	TOKYO MEASURING INSTRUMENT CO.	10'	1433	MAIN PIER	10'
96	JAPAN-AMERICAN OIL CO.	10'	116	MITSUBISHI OIL REFINERY	10'	141	YOKOHAMA RUBBER CO.	10'	489	FACTORY NO.2 TOKYO-SHIBAWA ELEC. CO.	10'	1332	ROLLING STOCK WORKS	10'	1437	MITSUBISHI PIECE GOODS WHARF & WAREHOUSES	10'
97	EASTERN PETROLEUM REFINERY CO.	10'	117	MITSUBISHI OIL CO. & OHYODA TANKS	10'	142	UNIDENTIFIED ARMS PLANT	10'	489	NIPOON ELEC. WIRE & CABLE CO.	10'	1337	TSURUMI ARMY & NAVY STORES	10'	1446	EAST ASIA DEV. CO. WAREHOUSES	10'
98	ORIENTAL OIL CO.	10'	122	TSURUMI STEEL & SHIPBUILDING CO. OF ASANO CO.	10'	191	MITSUBISHI COAL DEPOT	10'	493	TOKYO STEAM POWER PLANT	10'	1348	ISHIKAWAJIMA MOTOR CO.	10'	1485	SOMANACHURIAN WHARF & WAREHOUSES	10'



MAG DEC
5° 52'W
ANNUAL
CHANGE
2' INC



KAWASAKI AREA
PETROLEUM CENTER
TARGET NO. 90.17 - 128
35°29'N - 139°42'E
ELEVATION 15 FT. (APPROX.)
JULY 1945

APPROX SCALE

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000

A-2 SECTION
XXI BOMBER COMMAND
3D PHOTO RCN SQ PHOTOS
28 MAY 1945



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MAG DEC
5° 52'W
ANNUAL
CHANGE
2' INC



KAWASAKI AREA
PETROLEUM CENTER
TARGET NO. 90.17 - 128
35°29'N - 139°42'E
ELEVATION 15 FT. (APPROX.)
JULY 1945

A-2 SECTION
XXI BOMBER COMMAND
3D PHOTO RCN SQ PHOTOS
28 MAY 1945
PREPARED BY 949TH ENGR AVN TOPO CO

APPROX SCALE

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 FEET

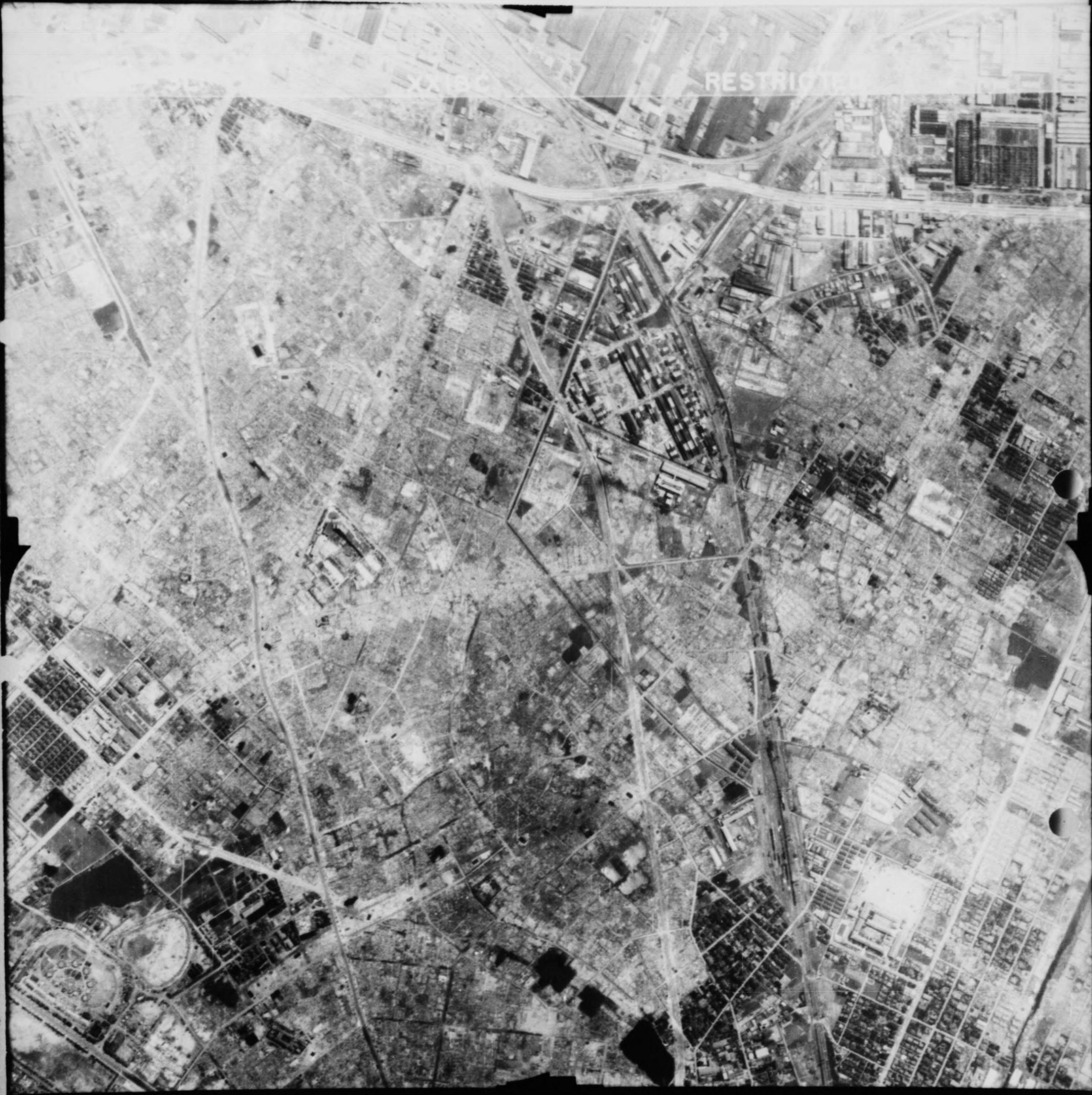
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15

Target 116

For additional photography, see folder on Target 127.

X-130

RESTRICTED



7150 RESTRICTED
7151 EASTMAN OF COURSE SAFETY
EAST



SPR5M162-3L

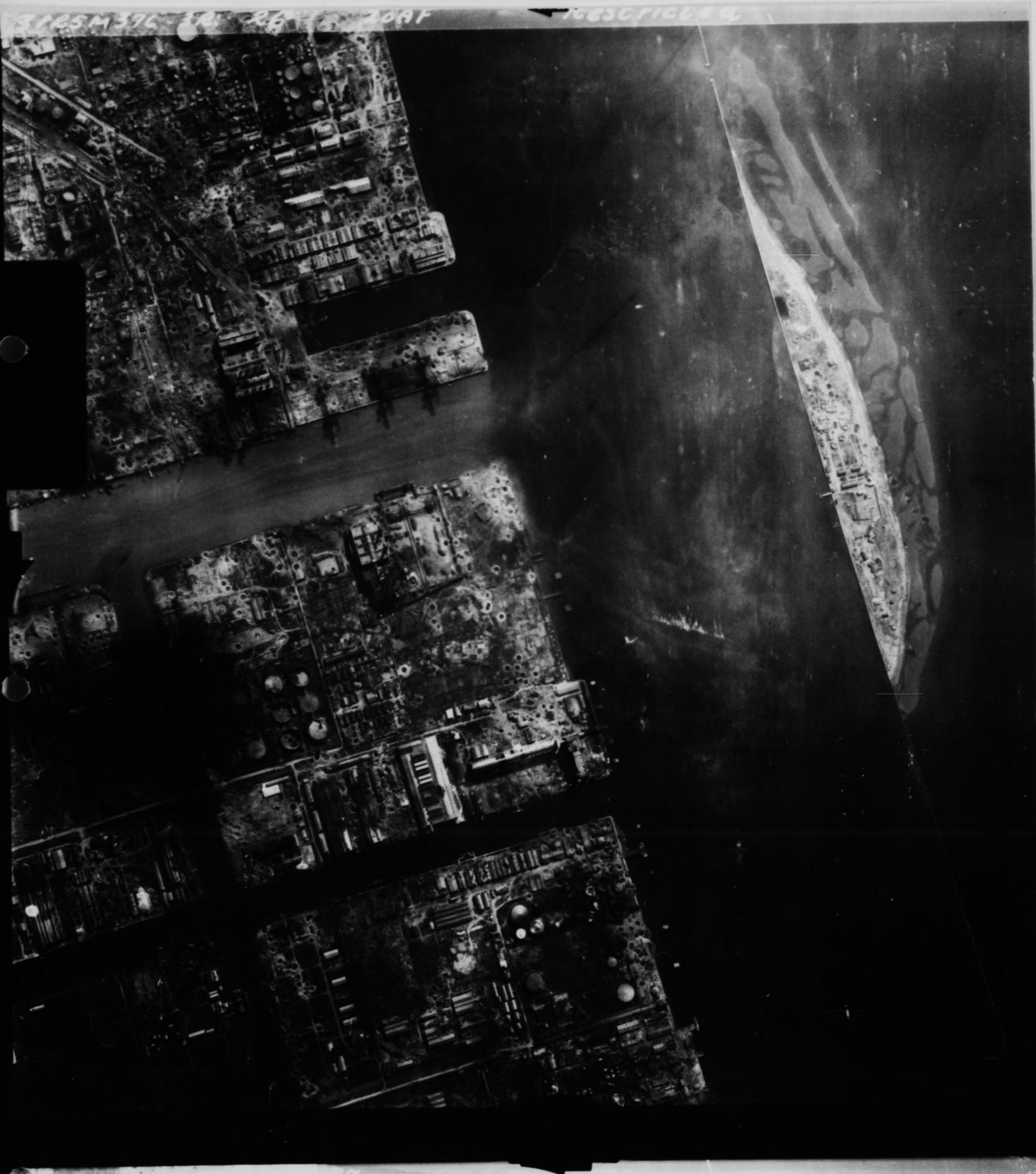
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RESTRICTED

EASTMAN REGULAR SAFETY

7154 EASTMAN REGULAR SAFETY





3125M-76-14 26 1097

DESCRIBER

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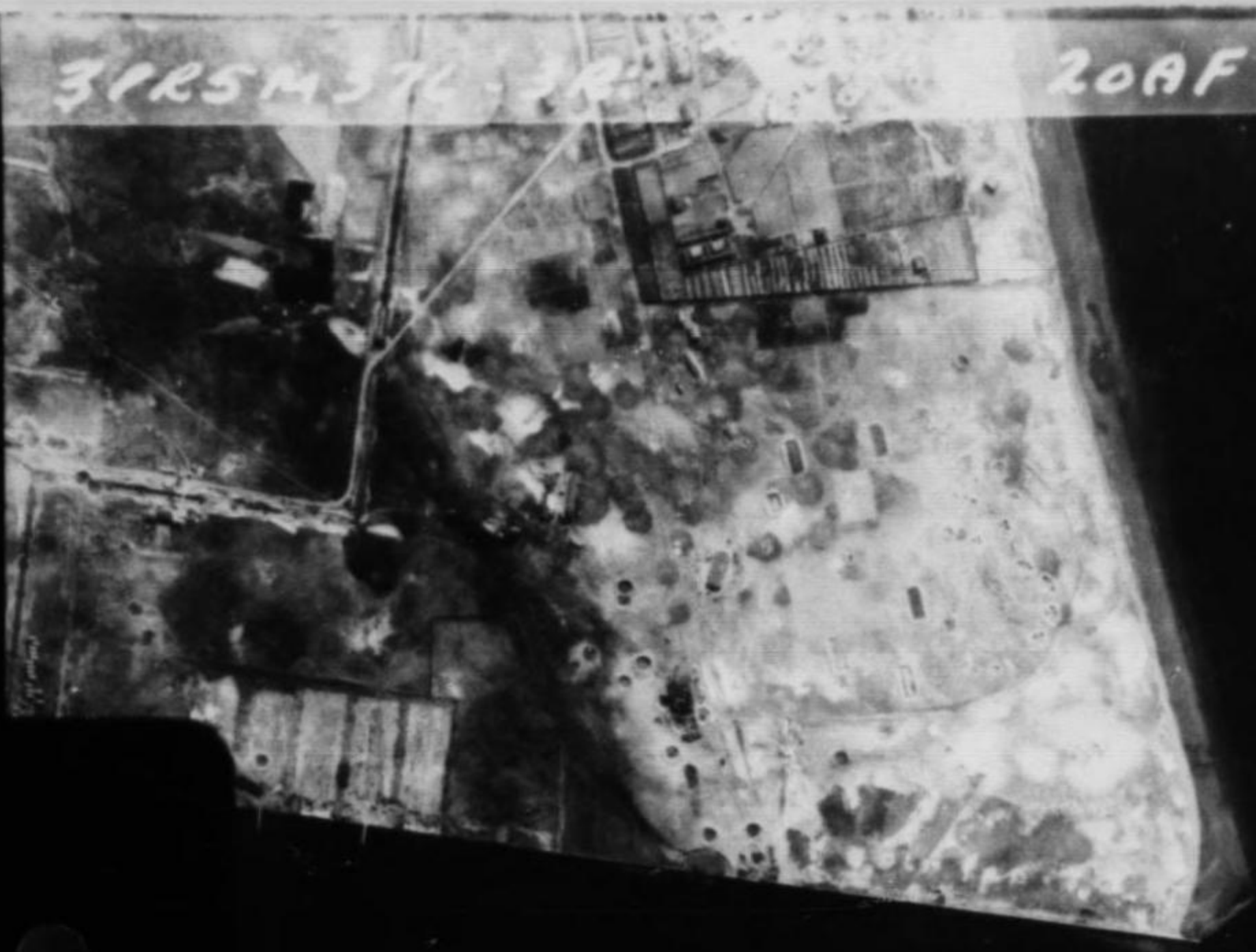
Restricted



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Restricted





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3PR5M376-3L

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RESTRICTED

CONFIDENTIAL

C. I. U.
XXI BOMBER COMMAND
APO 234, c/o POSTMASTER
SAN FRANCISCO, CALIFORNIA

10 August 1945

DAMAGE ASSESSMENT REPORT 173

90.17-116 Mitsubishi Oil Refinery
90.17-127 Hayama Petroleum Refinery

20 Air Force Mission 291, 25-26 July 1945 315th Wing
20 Air Force Mission 310, 1-2 August 1945 315th Wing

Note: For assessment of damage to primary target (90.17-128, Petroleum Center), see CIU Damage Assessment Report 174.

SUMMARY

Photos show the Mitsubishi Oil Refinery to be practically inoperative. Twelve of 14 primary buildings, as outlined by Ref. A, are destroyed. The Hayama Petroleum Refinery sustained crippling damage, 40% of its primary structures being destroyed.

Damage and destruction encompasses practically all of Target 116, particularly the central, western and central sections of the plant.

Most of the destruction at Target 127 is located in the southern half of the plant area. Residential and office areas in the NW part of the target received extensive damage. A refinery unit and tank section, located in the NE part of the plant, remains apparently undamaged. Four piers were destroyed. A RR yard received several direct hits.

A total of 537,400 barrels or 38% of the storage tank capacity (1,404,400 bbls.) were destroyed or damaged at the Mitsubishi Oil Refinery. In addition, 13,625 barrels or 30.4% of the intermediate tank capacity (44,750 bbls.) were destroyed or damaged.

At the Hayama Refinery 334,000 barrels or about 44% of the storage tank capacity (761,600 bbls.), and 26,100 barrels or about 26% of the intermediate tank capacity (100,800 bbls) were damaged or destroyed.

A functional diagram or building analysis noting barrel capacity of these refineries is not available. The scale of photos was based on Ref. A. Shadow factor and barrel capacities were computed from photos of 3PRAM 37A-5R: 36-38 (scale 1/9500 - shadow factor 0.46).

Photos are unsuitable for determining the exact damage caused by either strike, however, the major portion of the damage was inflicted by Mission 310.

Damage to targets adjacent to the primary target:

- 90.17-52 Japan Steel Tube Co. (4 sections)
 - A. SE section - total damage - severe
 - B. NE section - total damage - negligible
 - C. NW section - total damage - moderate
 - D. SW section - total damage - severe
- 90.17-111 Kawasaki Electric Power Plant - total damage - severe
- 90.17-137 Showa Fertilizer - total damage - severe
- 90.17-191 Mitsubishi Coal Depot - total damage - severe
- 90.17-1437 Mitsubishi Piece-goods Wharf & Warehouses - total damage - severe.

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SUMMARY OF DAMAGE TO TANKAGE - TARGET 116

	<u>Storage</u>	<u>Intermediate Storage</u>
Orig. Capacity - bbls.	1,404,400	44,750
Total damage and removal-bbls	537,400	13,625
Percent:	38	30.4

ITEMIZATION OF DAMAGE - TARGET 116

<u>ANNOT. NO.</u>	<u>IDENTIFICATION</u>	<u>DESCRIPTION OF DAMAGE</u>
4	Warehouse - 8400 sq. ft.	25% structural damage, 25% gutted and 50% minor roof damage.
5	Warehouse	Completely destroyed
7	Unidentified	Square portion of this small building received minor roof damage. An adjoining long, narrow building was destroyed.
8	Unidentified 13,800 sq. ft.	Half of this building was structurally damaged.
9	Two 18' diameter storage tanks 3000 bbls.	Both tanks are distorted. There is a bomb crater about 50' S/W of these tanks.
10	Warehouse	Roof damaged
11	Workers building	Destroyed
12	Office type building	Destroyed
13	Workers residences - numerous homes occupying a roughly rectangular area of approx. 20,000 sq. ft.	Devastated
14	1 storage tank 75' diameter - 25,000 bbls. 1 storage tank 15,500 bbls	Large tank structurally damaged. Smaller tank " "
15	Warehouse	Destroyed
16	Unidentified	Destroyed
17	Unidentified	Destroyed
18a	Poss. processing building	Destroyed
19	Warehouse	Destroyed
20	Unidentified	Destroyed
*21	Iso-octane unit	Destroyed
*22	Iso-octane unit	Probably received some damage when No. 21 was destroyed.
23	Furnace	Minor damage
*25	Iso-octane unit	Destroyed
*26	Iso-octane unit	Destroyed
27	Poss. processing building	Destroyed
29	Intermediate tank 1,300 bbl	Structurally damaged
30	Furnace	Minor roof damage
32	Horizontal tanks - 1725 bbls	Destroyed
33	Storage tank - 2600 bbls	Structurally damaged
34	" " 8000 bbls	Destroyed
35	Storage tank 12500 bbls	Destroyed
36	Storage tank 80000 bbls	Destroyed
40	Storage tank 80000 bbls	Destroyed
44	Unidentified - near a storage tank - 1600 bbls	Minor damage
*45	Furnace	Structurally damaged
*46	"	Structurally damaged
*47	Cracking unit	Structurally damaged. A crater is visible in the immediate vicinity.
48	Cracking unit	Structural damage caused by near misses.

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D/A REPORT 173, cont'd.

ANNOT. NO.	IDENTIFICATION	DESCRIPTION OF DAMAGE
49	Cracking Unit	Same as No. 48
50	Intermediate tanks (1) 2200 bbls (5) 3000 bbls (1) 800 bbls	Structural damage - 3 or 4 near misses visible.
51	Storage tanks - (2) 4400 bbls	Minor damage - crater visible - approx 50' S of these tanks
52	Research laboratory	Structurally damaged
53	Offices	Minor roof damage
54	Personnel bldg	Destroyed
55	Probable shipping offices	Destroyed - 3 craters visible in the immediate vicinity
56	Warehouse	Destroyed
57	Warehouse	Gutted
58	Office	Destroyed
59	Boiler house	Destroyed, chimney remaining
60	Storage tank - 4000 bbls	Top apparently destroyed
61	Possible pump house	Minor roof damage
62	Chemical laboratory	Gutted
63	2 inter. tanks - 2200 bbls 3 " " 1500 bbls	Structurally damaged Destroyed
64	Possible treating plant	Damaged - crater close by
65	Possible treating plant	Damaged roof
66	Inter. tank - 900 bbls	Destroyed
*67	Primary distilling unit	(Structurally damaged. Two craters 100'-110' S of units.)
*68	" " "	
70	1 storage tank - 4000 bbls	Destroyed
71	1 " " 28000 bbls	"
72	1 " " 25000 bbls	"
73	1 " " 80000 bbls	"
74	1 " " 3600 bbls	"
*75	Furnace	"
*76	Vacuum distillation unit	"
77	11 storage tanks - 4,800 bbls	Destroyed
78	1 storage tank - 1700 bbls	Structural damage
79	1 storage tank - 1700 bbls	Structural damage
83a	Pump house	Minor roof damage
84	2 storage tanks	Minor damage
85	Pump house	Structural damage
86	5 storage tanks - 10,000 bbls	Possibly structurally damaged. Craters in immediate vicinity.
88	1 storage tank - 7000 bbls	Same as No. 86
89	1 " " 5500 bbls	Damaged, crater immediately N of tank
92	1 " " 5500 bbls	Destroyed
99	1 " " 25000 bbls	Structurally damaged.
98	1 " " 25000 bbls	Minor damage on top cover
101	1 " " 80000 bbls	Damage to top
102	Oil bunkering pier	Pipe line from wharf destroyed. Pier shows a crater.
103	Open storage area	Cratered
104	Warehouse	Structural damage
105	" (drum storage)	Structural damage
106	Warehouse	Minor roof damage
108	Warehouse	Minor roof damage
109	Can mfg. plant	Structural damage
110	Warehouse	Half of bldg sustained minor damage; the other half is gutted.
111	Warehouse	Destroyed
112	"	Minor roof damage
113	Drum Mfg. plant	Louver on roof destroyed
114	Tank car loading rack bldg.	Roof damaged

*Primary buildings.

SUMMARY OF DAMAGE TO TANKAGE - TARGET 127

	<u>STORAGE</u>	<u>INTERMEDIATE STORAGE</u>
Orig.* Capacity - bbls	761,600	100,800
Total damage - bbls	334,000	26,100
Percent:	43.6	25.9

IDENTIFICATION OF DAMAGE - TARGET 127

<u>ANNOT.</u> <u>NO.</u>	<u>IDENTIFICATION</u>	<u>DESCRIPTION OF DAMAGE</u>
3	Probable office	Destroyed
4	Unidentified	Destroyed
5	Unidentified	Minor roof damage
10	Warehouse	Destroyed
11	Unidentified	Roof damage
12	Still	Destroyed - crater visible about 40' E of unit.
13	Unidentified	Roof damage
15	Unidentified	Roof damage
18	Probable storage	Roof damage
19	Not identified	Roof damage
23	Storage tank - 80,000 bbls	Minor damage - crater between tanks
24	" " " "	Minor damage - hole on top
26	" " " "	Structurally damaged
27	Unidentified	Destroyed
28	"	2 small bldgs. destroyed. One small bldg. sustained minor damage to roof.
29	Unidentified	Minor damage
32	Unidentified	Destroyed
33	2 horizontal tanks - 500 bbls, one building	Destroyed
36	Not identified	Minor roof damage
37	" "	Destroyed
44	Warehouse (16,600 sq. ft.)	Destroyed
46	Possible drum plant	Minor roof damage
48	Possible drum plant	30% gutted
*49	Stills and fractioning columns	Minor damage
60	Storage tank - 25,000 bbls	Minor damage to top
70	Storage tank - 25,000 bbls	Structural damage
76	Tanks - storage - 13,000 bbls	" "
77	Storage tank - 20,000 bbls	" "
75	Inter. tanks - 24,400 bbls	" "
78	Storage tank - 15,000 bbls	Minor damage to top
79	" " - 10,000 bbls	Minor damage
80	Warehouse	Structural damage
81	"	Destroyed
82	"	"
83	Unidentified miscellaneous store and maintenance sheds	"
84	Same as No. 83	Destroyed
85	" " " "	Destroyed
86	" " " "	Destroyed
87	Prob. warehouse and oil pier	Structural damage
*88	Still	Destroyed
*90	"	"
94	Office group	Rough triangular built-up area (22,000 sq. ft.) destroyed.
*95	Still	Destroyed
96	Unidentified	"
97	Unidentified	"
98	Unidentified	Gutted

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D/A Report 173, cont'd.

ANNOT.
NO.

IDENTIFICATION

DESCRIPTION OF DAMAGE

99. 2 intermediate tanks, 1400 bbls Destroyed

*Primary buildings.

References: A. JTG 90.17-116/117 P4, 29 April 1944
B. AOF 90.17-Tokyo Area 15 September 1943
C. Functional Analysis Report No. F/A-67, AC/AS 16 February 1945

Photos: Pre-strike: 3PR4M37A-5R: 36-38 13 December 1944 - good quality
3PR5M1C2-3L: 122 30 April 1945 - good quality
Post-strike: 3PR5M376-2: 19, 20; 3R: 26-28 5 August 1945 - fair
quality.
3PR5M362-2: 88, 89 28 July 1945 - very poor quality
3PR5M355-4L: 84, 85 25 July 1945 - good quality

Inclosures: 1. Annotated enlargement 3PR5M1C2-3L: 122
2. Post-strike print 3PR5M376-2: 20

Approved: *Richard C. Bar...*
HAMILTON D. DARBY
MAJOR, AC

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07.7 015140470



PO . STRIKE
TARGET 90.17-116/127
20AF- MISSIONS 291, 310
25-26 JULY & 1-2 AUG. '45
D.A. REPORT 173
C.I.U.- 20 AF

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NOT TO BE TAKEN
INTO THE AIR ON
COMBAT MISSIONS

TARGET: 90.17-127

OBJECTIVE AREA: 90.17-TOKYO

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

TARGET 90.17 - 127

HAYAMA PETROLEUM REFINERY, KAWASAKI

Latitude: 35° 30' N
Longitude: 139° 44' E
Elevation: 10 ft.

1. LOCATION AND IDENTIFICATION: The target is located on reclaimed land on the Kawasaki waterfront in Tokyo Bay. It is on the third large block of land southwest of the Tama River being approximately 2.9 miles southwest of the river's mouth. It is on the fifth block of land ENE of the Tsurumi River and about 2.5 miles ENE of the mouth of that river. This target is adjacent to the MITSUBISHI OIL REFINERY (Target 90.17-116) and for purpose of attack by air the facilities of both plants may be considered as one target. Adjoining the combined target areas on the northeast is a section of the JAPAN STEEL TUBE CO. (Target 90.17-52); on the northwest is the SHOWA FERTILIZER (Target 90.17-137). Directly east of the combined target area is a ship canal and on the south it is bounded by Tokyo Bay. To the southwest, at a distance of approximately five nautical miles is the horn-shaped projection of land forming the southern limits of Yokohama harbor.
2. PLANT DESCRIPTION: The HAYAMA PETROLEUM REFINERY covers an area of approximately 2,240,000 sq. ft. The combined areas of this refinery and MITSUBISHI OIL REFINERY (Target 90.17-116) describe a very irregular shape measuring about 3500 ft. north-south and 2200 ft. east-west at its longest dimensions. This compound is 20 per cent built-up. The refining units are in the northeastern and southwestern sections of the area; the main storage runs through the center. The larger MITSUBISHI OIL REFINERY occupies the south and central section of the area with its refining units compactly built in the west central part of its compound. The main section of the smaller HAYAMA PETROLEUM REFINERY forms an irregular area roughly describing a rectangle in shape. The greater part of the refining units are in the compact, congested northeastern section of its compound. This refinery's storage tanks are located in the southwestern section of its compound and adjacent to the northeastern half of Target 90.17-116, and together the tankage of these plants form a central area of relatively dispersed storage tanks.
3. IMPORTANCE: The HAYAMA PETROLEUM REFINERY ranks as one of the area's largest refineries. It has an estimated crude capacity of 2,750 bbls. per day, with a cracking capacity of

S E C R E T

MISSION RESUME

Mission Number 291 3 August 1945

1. Date: 25/26 July 1945
2. Target: Mitsubishi Oil Refinery (90.17 - 116) and Hayama Petroleum Center at Kawasaki(90.17 -127)
3. Participating Unit: 315th Bombardment Wing
4. Number A/C Airborne: 83
5. % A/C Bombing Primary: 90.36% (75 primary and 1 opportunity)
6. Type of Bombs and Fuzes: AN-M64, 500# G.P., 1/10 sec. delay nose and 1/40 sec. delay tail.
7. Tons of Bombs Dropped: 650 tons on primary, 9 tons on opportunity and 18 tons by Wind-Run A/C
8. Time Over Primary: 252323K - 260003K
9. Altitude of Attack: 16,500 - 18,100
10. Weather Over Target: 0/10 - 4/10
11. Total A/C Lost: 1
12. Resume of Mission: Photo reconnaissance showed 32% of storage tank units, and 1 furnace, 1 asphalt loading unit, 1 can manufacturing plant and 2 warehouses of the Mitsubishi Oil Refinery (90.17 - 116) was destroyed and 36% of the storage tanks, 5 U/I buildings, 7 probable office buildings, and 4 maintenance sheds of Hayama Petroleum Co. (90.17 - 127) was destroyed. Targets were visible to only 3 A/C. Flak was of heavy caliber, moderate to intense, accurate to inaccurate. Intense S/L activity was encountered and rope was used with barying success. Two Wind-Run A/C bombed Shimizu Aluminum Plant at Shimizu. Seven A/C were non-effective. Three B-29's landed at Iwo Jima. The aircraft that was lost suffered a direct flak hit over the target. No E/A. Average bomb load: 18,664 lbs. Average fuel reserve: 1109 gallons.

S E C R E T

S E C R E T

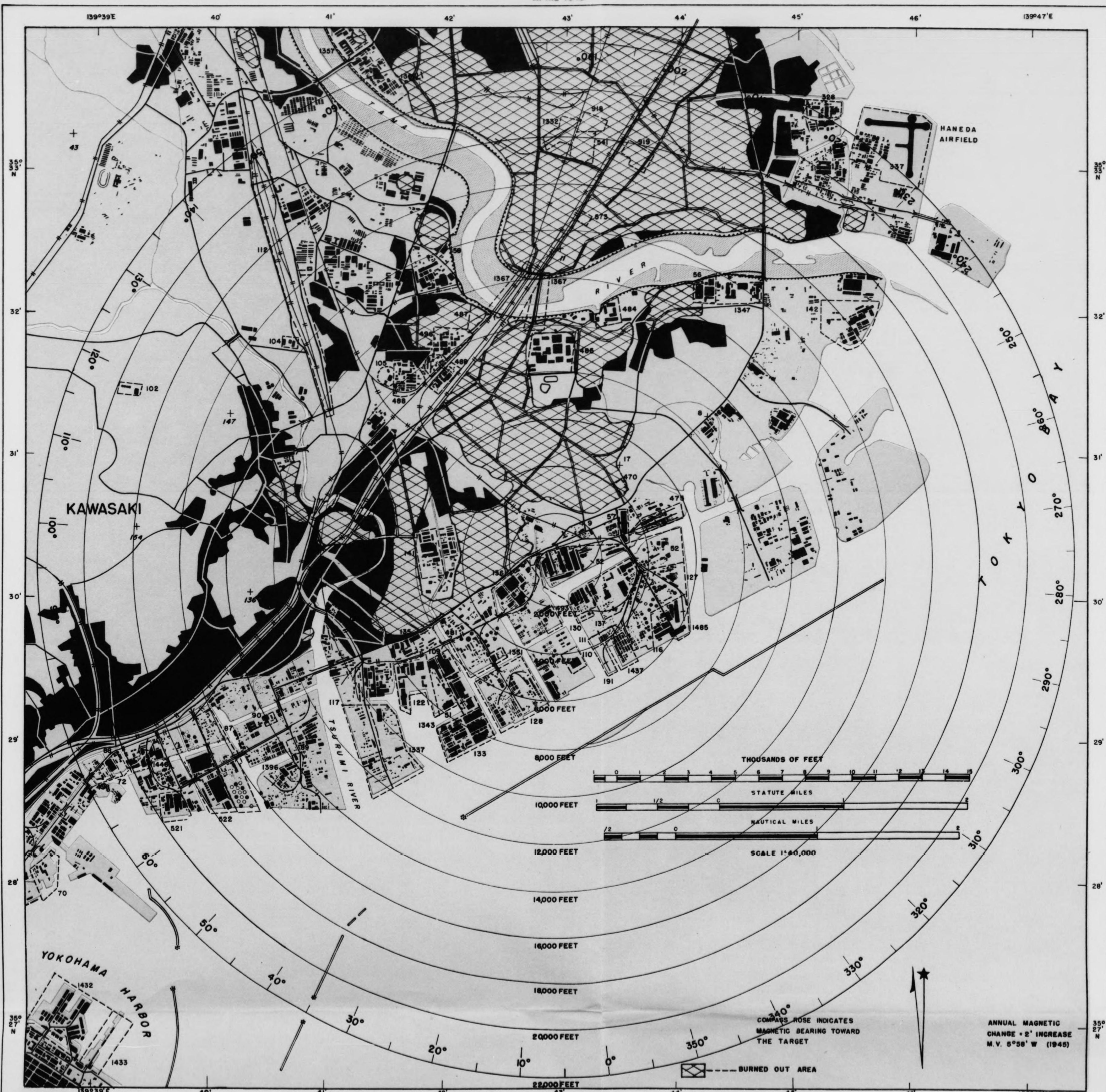
MISSION RESUME

Mission Number 310 14 August 1945

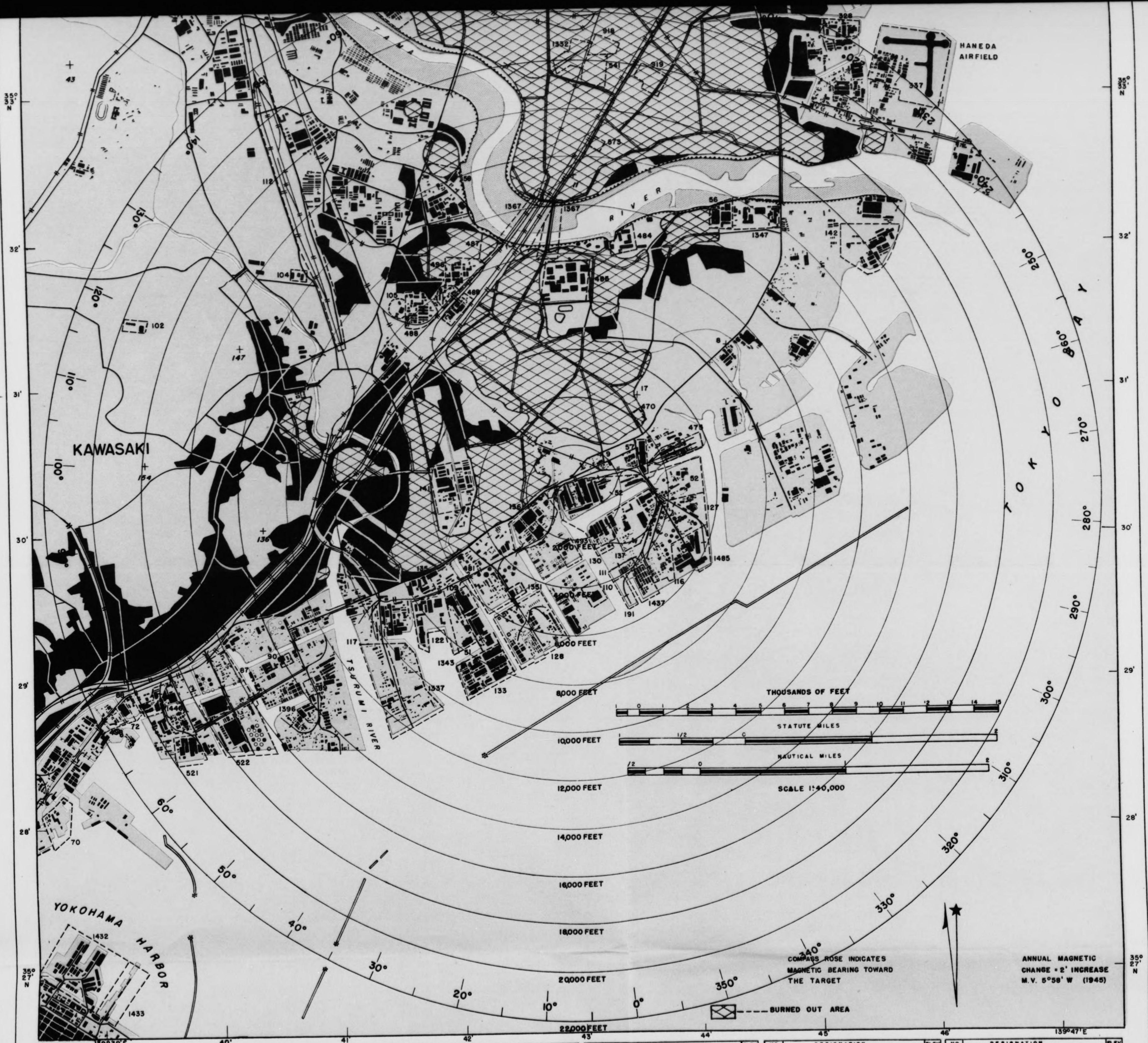
1. Date: 1/2 August 1945
 2. Target: Kawasaki Petroleum Center at Hayama and Mitsubishi Oil Refinery (90.17 -128,127, and 116)
 3. Participating Unit: 315th Bombardment Wing
 4. Number A/C Airborne: 128
 5. %A/C Bombing Primary: 93.75% (120 primary and 2 opportunity)
 6. Type of Bombs and Fuzes: M64, 500# G.P. bombs fuzed with 1/10 sec. delay nose and 1/40 sec. delay tail.
 7. Tons of Bombs Dropped: 1017.3 tons on primary and 26 tons on opportunity.
 8. Time Over Primary: 012314K - 020046K
 9. Altitude of Attack: 16,400 - 18,600
 10. Weather Over Target: 0/10 - 10/10
 11. Total A/C Lost: 0
 12. Resume of Mission: Photo reconnaissance revealed the following results of Missions 291 and 310:
 - 116 - Mitsubishi Oil Refinery - 41% of storage tank capacity destroyed.
 - 127 - Hayama Petroleum Center - 43% of storage tank capacity and 35% of intermediate tank capacity damaged.
 - 128 - Kawasaki Petroleum Center - 35% of storage capacity and 15% intermediate tank capacity destroyed.
- Six A/C were non-effective. Flak was heavy, medium, meager to intense and accurate. Flak damaged 22 A/C. Thirty to 35 E/A made 9 attacks. No claims. One Wind-Run A/C is not included in the above total. Six A/C bombed visually and 114 bombed by radar. Seven B-29's landed at Iwo Jima. Average bomb load: 18,410 lbs. Average fuel reserve: 1039 gallons.

S E C R E T





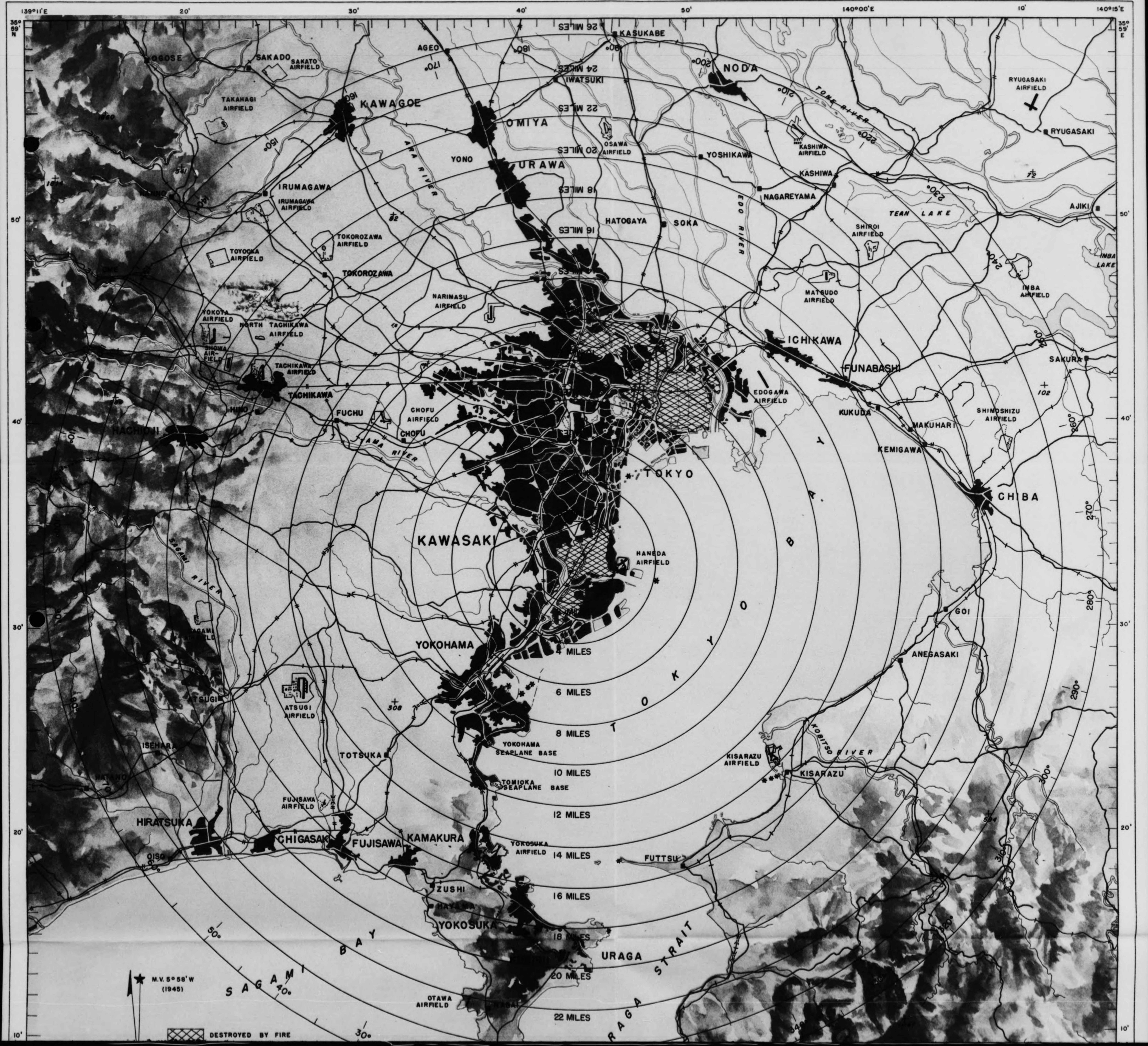
NO	DESIGNATION	ELEV	NO	DESIGNATION	ELEV	NO	DESIGNATION	ELEV	NO	DESIGNATION	ELEV	NO	DESIGNATION	ELEV
82	JAPAN STEEL TUBE CO.	10'	102	ABAKI SUBSTATION	10'	127	HAYAMA PETROLEUM REFINERY	10'	328	WATANABE STEEL WORKS	10'	496	FACTORY NO 1 TOKYO-SHIBAWA ELEC. CO.	10'
81	ABANO IRON WORKS	10'	104	NIPPON ELEC. POWER TRANSFORMING STATION	10'	128	PETROLEUM CENTER	10'	337	HANEDA AIRPORT	10'	498	KURADA IRON WORKS	10'
86	FUJI STEEL WKS. OF IMPER. IRON & STEEL CO.	10'	105	KAWASAKI SUBSTATION	10'	129	NIPPON SUPER FUEL COMPANY	10'	470	TOKYO ELEC. POWER STATION	10'	581	JAPAN (SHAWA) ELEC. CHEM. CO.	10'
87	ORIENTAL STEEL PRODUCTS CO.	10'	106	RAILROAD TRANSFORMER STATION	10'	130	ASSAISHI PETROLEUM CO.	10'	478	ABANO CEMENT CO.	10'	582	NISSAN AUTO CO.	10'
												1347	JAPAN SERVICE CO.	10'
												1381	TOKYO HAKAJIMA IRON WORKS	10'
												1387	TOKYO SPEC. MACH. MFG. CO.-JAP. PHYSIO-CHEM. CO.	10'
												1382	KATASHIRI ELEC. ENGIN. CO.	10'

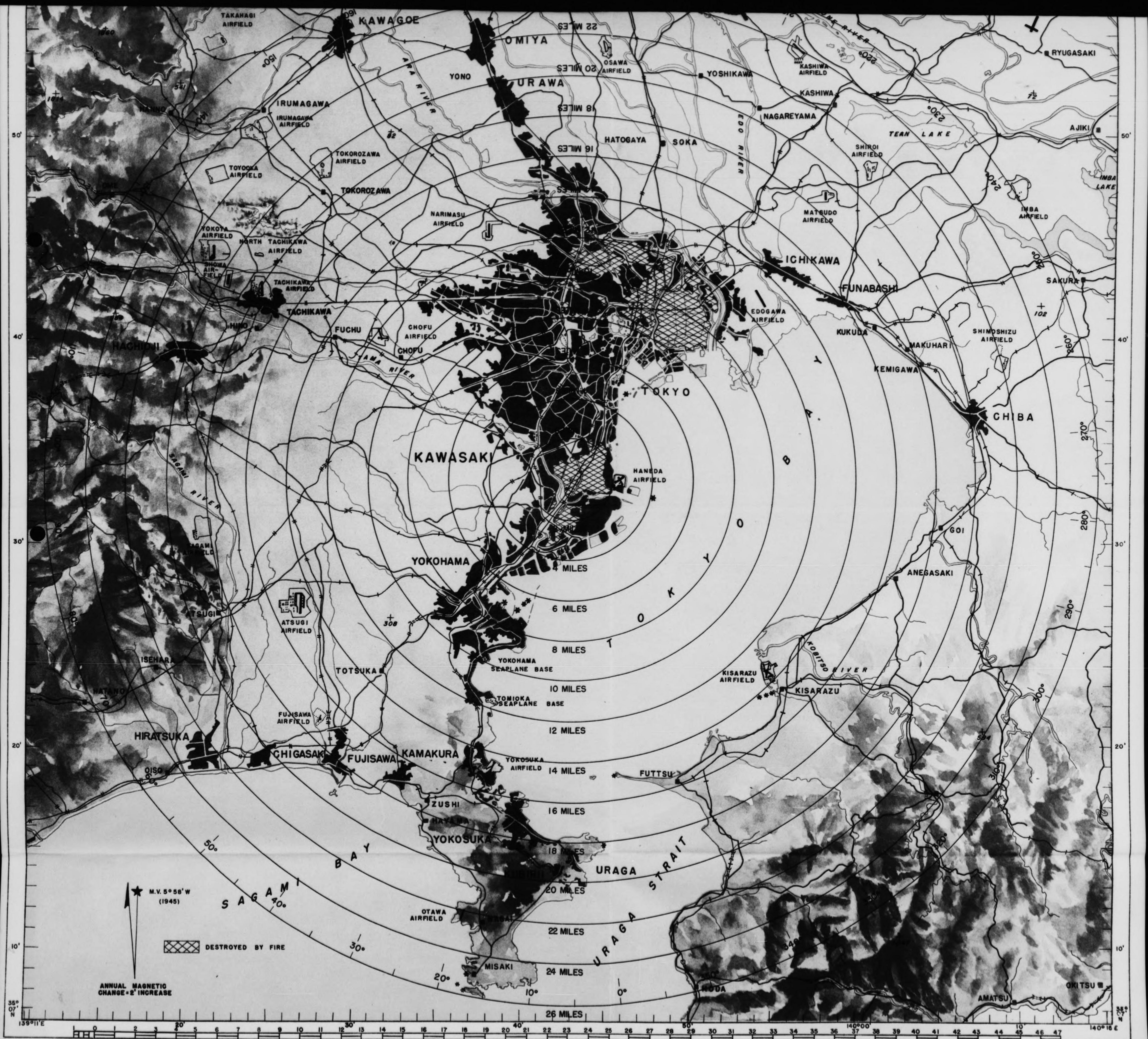


NO	DESIGNATION	ELEV	NO	DESIGNATION	ELEV	NO	DESIGNATION	ELEV	NO	DESIGNATION	ELEV	NO	DESIGNATION	ELEV	NO	DESIGNATION	ELEV
88	JAPAN STEEL TUBE CO.	10'	102	ASAKI SUBSTATION	10'	127	HAYAMA PETROLEUM REFINERY	10'	328	WATANABE STEEL WORKS	10'	498	FACTORY NO1 TOKYO-SHIBAWA ELEC. CO.	10'	1347	JAPAN SERVICE CO.	10'
89	ABANO IRON WORKS	10'	104	NIPPON ELEC. POWER TRANSFORMING STATION	10'	128	PETROLEUM CENTER	10'	337	HANEDA AIRPORT	10'	498	KURADA IRON WORKS	10'	1351	TOKYO NAKAJIMA IRON WORKS	10'
90	ORIENTAL STEEL PRODUCTS CO.	10'	105	KAWASAKI SUBSTATION	10'	129	NIPPON SUPER FUEL COMPANY	10'	470	TOKYO ELEC. POWER STATION	10'	521	JAPAN (SHAWA) ELEC. CHEM. CO.	10'	1357	TOKYO SPEC. MACH. MFG. CO.-JAP. PHYSICO-CHEM. CO.	10'
91	FUJI STEEL WORKS OF IMPER. IRON & STEEL CO.	10'	106	RAILROAD TRANSFORMER STATION	10'	130	ASSAISHI PETROLEUM CO.	10'	478	ASANO CEMENT CO.	10'	522	NISSAN AUTO CO.	10'	1362	KATASHIRI ELEC. ENGIN. CO.	10'
92	ORIENTAL STEEL PRODUCTS CO.	10'	107	OKI ELECTRIC CO. PLANT NO2	10'	131	SHIBAWA ENGINEERING WORKS	10'	481	TOKYO GAS CO. TSURUMI BRANCH	10'	541	ORIENTAL OTIS ELEVATOR CO.	10'	1367	TAMA RIVER BRIDGES	10'
93	TOKYO SPECIAL STEEL & CHROME WORKS	10'	108	TOKYO ELEC. PR. GEN. ST. TSURUMI PLANT	10'	133	GOOP AUTO WORKS	10'	484	SHOWA WIRE CABLE CO.	10'	573	MIYATA IRON WORKS	10'	1396	TSURUMI SODA CO.	10'
94	ASANO DOCKYARD	10'	109	KAWASAKI ELEC. PR. PLT. FOR JAP. GOV. R.R.	10'	135	FUJI ELECTRIC WORKS	10'	486	FUJI SPINNING MILLS	10'	573	MIYATA IRON WORKS	10'	1432	YOKOHAMA HARBOR PASSENGER WHARVES	10'
95	FORD MOTOR CO.	10'	110	TSUBOI SHUNTING YARDS	10'	136	SHAWA FERTILIZER	10'	487	MEIJI SUGAR FACTORY	10'	591	TOKYO MEASURING INSTRUMENT CO.	10'	1433	MITSUBISHI PIECE GOODS WHARF & WAREHOUSES	10'
96	OSURA OIL CO.	10'	111	MITSUBISHI OIL CO. & CHIYODA TANKS	10'	137	YOKOHAMA RUBBER CO.	10'	488	FACTORY NO2 TOKYO-SHIBAWA ELEC. CO.	10'	1332	ROLLING STOCK WORKS	10'	1437	EAST ASIA DEV. CO. WAREHOUSES	10'
97	JAPAN-AMERICAN OIL CO.	10'	112	TSURUMI STEEL & SHIPBUILDING CO. OF ASANO CO.	10'	141	UNIDENTIFIED ARMS PLANT	10'	489	NIPPON ELEC. WIRE & CABLE CO.	10'	1337	TSURUMI ARMY & NAVY STORES	10'	1448	EAST ASIA DEV. CO. WAREHOUSES	10'
98	EASTERN PETROLEUM REFINERY CO.	10'	117		10'	142	MITSUBISHI COAL DEPOT	10'	493	TOKYO STEAM POWER PLANT	10'	1345	ISHIKAWAJIMA MOTOR CO.	10'	1488	COMANCHURIAN WHARF & WAREHOUSES	10'
99	ORIENTAL OIL CO.	10'	122		10'	191		10'									

KAWASAKI AREA

TARGET NO 90.17-918 NIIGATA IRON WKS (35° 33' N-139° 43' E) ELEV APPROX 10 FEET
ALL DISTANCES IN NAUTICAL MILES





★ M.V. 5° 58' W
(1945)

✖ DESTROYED BY FIRE

ANNUAL MAGNETIC
CHANGE = 2" INCREASE



MAG DEC
 5° 52'W
 ANNUAL
 CHANGE
 2' INC



KAWASAKI AREA
PETROLEUM CENTER
 TARGET NO. 90.17-128
 35°29'N - 139°42'E
 ELEVATION 15 FT. (APPROX)
 JULY 1945

APPROX SCALE

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000

A-2 SECTION
 XXI BOMBER COMMAND
 3D PHOTO RCN SQ PHOTOS
 28 MAY 1945



MAG DEC
5° 52'W
ANNUAL
CHANGE
2' INC



KAWASAKI AREA
PETROLEUM CENTER
TARGET NO. 90.17 - 128
35°29'N - 139°42'E
ELEVATION 15 FT. (APPROX.)
JULY 1945

A-2 SECTION
XXI BOMBER COMMAND
3D PHOTO RCN SQ PHOTOS
28 MAY 1945
PREPARED BY 949TH ENGR AVN TOPO CO

APPROX SCALE

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 FEET

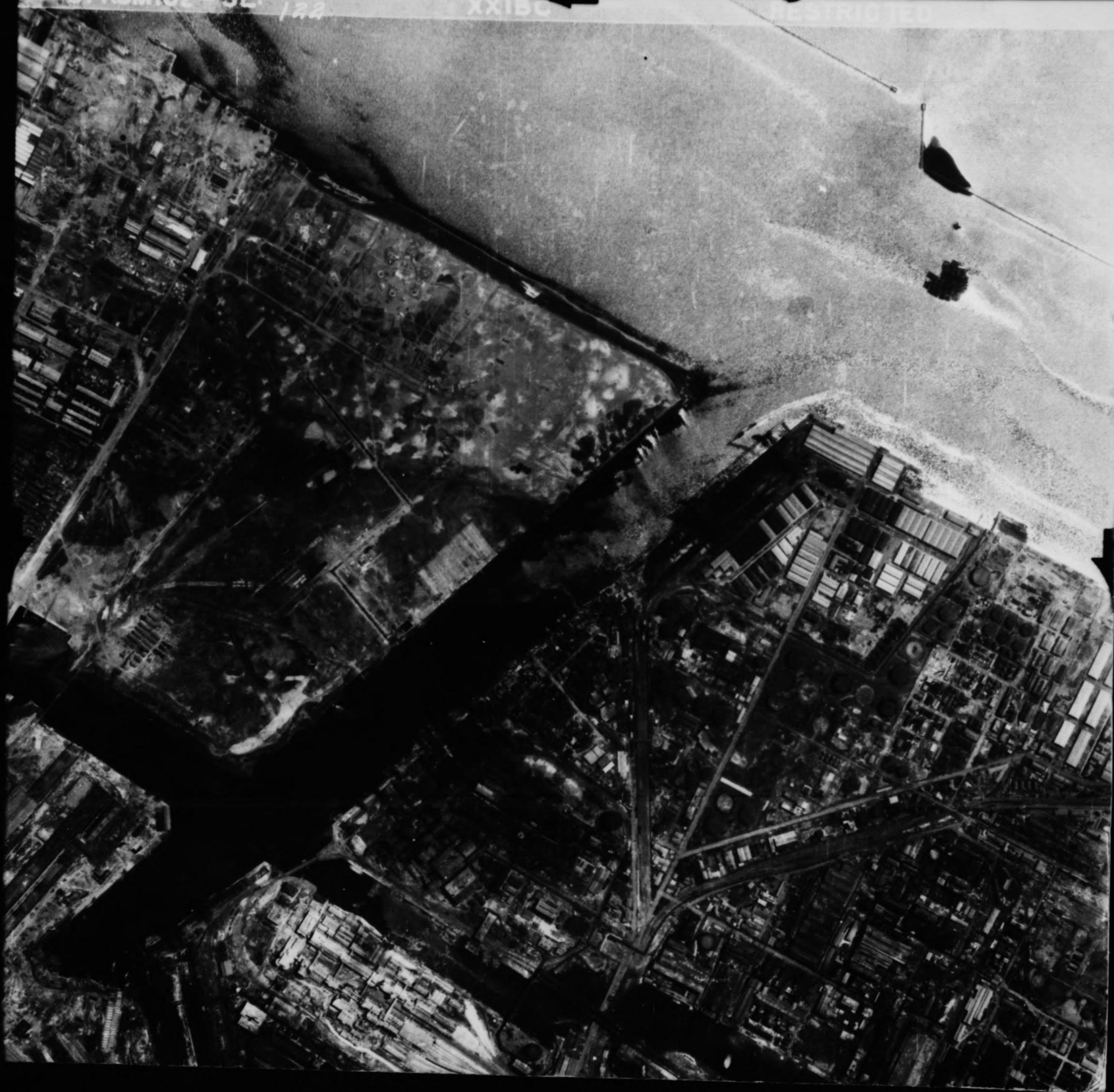
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15

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122

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RESTRICTED



3PR5M182-3L: 121

XX1BC

RESTRICTED



22

20

RESTRICTED

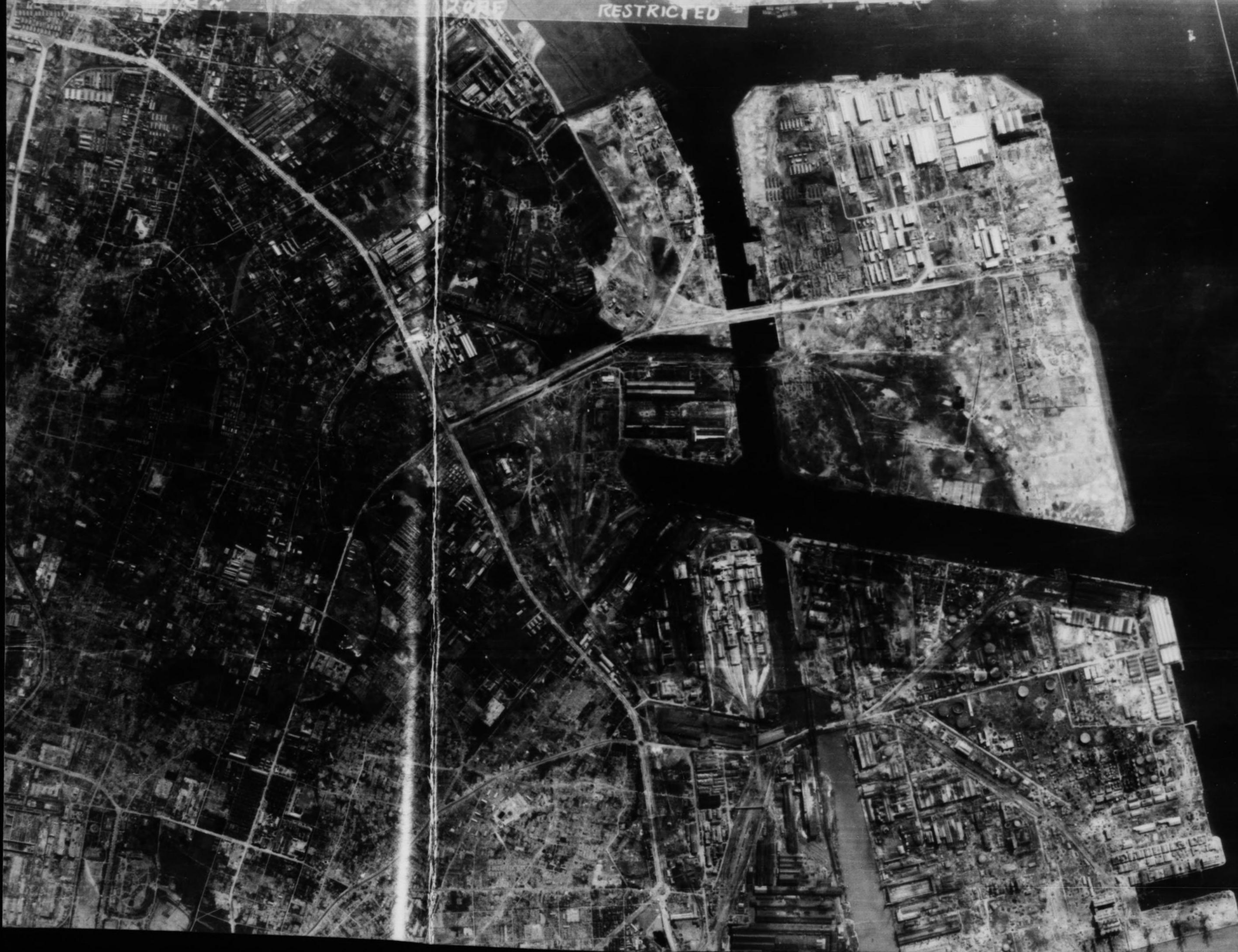


3PR5M376-2

21

20RE

RESTRICTED





3PR 5 M376-2

1124

007F

RESTRICTED

3PR5M376-2

19

2085

RESTRICTED



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C. I. U.
XXI BOMBER COMMAND
APO 234, c/o POSTMASTER
SAN FRANCISCO, CALIFORNIA

10 August 1945

DAMAGE ASSESSMENT REPORT 173

90.17-116 Mitsubishi Oil Refinery
90.17-127 Hayama Petroleum Refinery

20 Air Force Mission 291, 25-26 July 1945 315th Wing
20 Air Force Mission 310, 1-2 August 1945 315th Wing

Note: For assessment of damage to primary target (90.17-128, Petroleum Center), see CIU Damage Assessment Report 174.

SUMMARY

Photos show the Mitsubishi Oil Refinery to be practically inoperative. Twelve of 14 primary buildings, as outlined by Ref. A, are destroyed. The Hayama Petroleum Refinery sustained crippling damage, 40% of its primary structures being destroyed.

Damage and destruction encompasses practically all of Target 116, particularly the central, western and central sections of the plant.

Most of the destruction at Target 127 is located in the southern half of the plant area. Residential and office areas in the NW part of the target received extensive damage. A refinery unit and tank section, located in the NE part of the plant, remains apparently undamaged. Four piers were destroyed. A RR yard received several direct hits.

A total of 537,400 barrels or 38% of the storage tank capacity (1,404,400 bbls.) were destroyed or damaged at the Mitsubishi Oil Refinery. In addition, 13,625 barrels or 30.4% of the intermediate tank capacity (44,750 bbls.) were destroyed or damaged.

At the Hayama Refinery 334,000 barrels or about 44% of the storage tank capacity (761,600 bbls.), and 26,100 barrels or about 26% of the intermediate tank capacity (100,300 bbls) were damaged or destroyed.

A functional diagram or building analysis noting barrel capacity of these refineries is not available. The scale of photos was based on Ref. A. Shadow factor and barrel capacities were computed from photos of 3PRAM 37A-5R: 36-38 (scale 1/9500 - shadow factor 0.46).

Photos are unsuitable for determining the exact damage caused by either strike, however, the major portion of the damage was inflicted by Mission 310.

Damage to targets adjacent to the primary target:

90.17-52 Japan Steel Tube Co. (4 sections)
A. SE section - total damage - severe
B. NE section - total damage - negligible
C. NW section - total damage - moderate
D. SW section - total damage - severe
90.17-111 Kawasaki Electric Power Plant - total damage - severe
90.17-137 Showa Fertilizer - total damage - severe
90.17-191 Mitsubishi Coal Depot - total damage - severe
90.17-1437 Mitsubishi Piece-goods Wharf & Warehouses - total damage - severe.

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D/A Report 173, cont'd.

SUMMARY OF DAMAGE TO TANKAGE - TARGET 116

	<u>Storage</u>	<u>Intermediate Storage</u>
Orig. Capacity - bbls.	1,404,400	44,750
Total damage and removal-bbls	537,400	13,625
Percent:	38	30.4

ITEMIZATION OF DAMAGE - TARGET 116

ANNOT.

<u>NO.</u>	<u>IDENTIFICATION</u>	<u>DESCRIPTION OF DAMAGE</u>
4	Warehouse - 8400 sq. ft.	25% structural damage, 25% gutted and 50% minor roof damage.
5	Warehouse	Completely destroyed
7	Unidentified	Square portion of this small building received minor roof damage. An adjoining long, narrow building was destroyed.
8	Unidentified 13,800 sq. ft.	Half of this building was structurally damaged.
9	Two 18' diameter storage tanks 3000 bbls.	Both tanks are distorted. There is a bomb crater about 50' S/W of these tanks.
10	Warehouse	Roof damaged
11	Workers building	Destroyed
12	Office type building	Destroyed
13	Workers residences - numerous homes occupying a roughly rectangular area of approx. 20,000 sq. ft.	Devastated
14	1 storage tank 75' diameter - 25,000 bbls. 1 storage tank 15,500 bbls	Large tank structurally damaged. Smaller tank " "
15	Warehouse	Destroyed
16	Unidentified	Destroyed
17	Unidentified	Destroyed
18a	Poss. processing building	Destroyed
19	Warehouse	Destroyed
20	Unidentified	Destroyed
*21	Iso-octane unit	Destroyed
*22	Iso-octane unit	Probably received some damage when No. 21 was destroyed.
23	Furnace	Minor damage
*25	Iso-octane unit	Destroyed
*26	Iso-octane unit	Destroyed
27	Poss. processing building	Destroyed
29	Intermediate tank 1,300 bbl	Structurally damaged
30	Furnace	Minor roof damage
32	Horizontal tanks - 1725 bbls	Destroyed
33	Storage tank - 2600 bbls	Structurally damaged
34	" " 8000 bbls	Destroyed
35	Storage tank 12500 bbls	Destroyed
36	Storage tank 80000 bbls	Destroyed
40	Storage tank 80000 bbls	Destroyed
44	Unidentified - near a storage tank - 1600 bbls	Minor damage
*45	Furnace	Structurally damaged
*46	"	Structurally damaged
*47	Cracking unit	Structurally damaged. A crater is visible in the immediate vicinity.
48	Cracking unit	Structural damage caused by near misses.

ANNOT. NO.	IDENTIFICATION	DESCRIPTION OF DAMAGE
49	Cracking Unit	Same as No. 48
50	Intermediate tanks (1) 2200 bbls (5) 3000 bbls (1) 800 bbls	Structural damage - 3 or 4 near misses visible.
51	Storage tanks - (2) 4400 bbls	Minor damage - crater visible - approx 50' S of these tanks
52	Research laboratory	Structurally damaged
53	Offices	Minor roof damage
54	Personnel bldg	Destroyed
55	Probable shipping offices	Destroyed - 3 craters visible in the immediate vicinity
56	Warehouse	Destroyed
57	Warehouse	Gutted
58	Office	Destroyed
59	Boiler house	Destroyed, chimney remaining
60	Storage tank - 4000 bbls	Top apparently destroyed
61	Possible pump house	Minor roof damage
62	Chemical laboratory	Gutted
63	2 inter. tanks - 2200 bbls 3 " " 1500 bbls	Structurally damaged Destroyed
64	Possible treating plant	Damaged - crater close by
65	Possible treating plant	Damaged roof
66	Inter. tank - 900 bbls	Destroyed
*67	Primary distilling unit	(Structurally damaged. Two craters
*68	" " "	100'-110' S of units.)
70	1 storage tank - 4000 bbls	Destroyed
71	1 " " 28000 bbls	"
72	1 " " 28000 bbls	"
73	1 " " 80000 bbls	"
74	1 " " 3600 bbls	"
*75	Furnace	"
*76	Vacuum distillation unit	"
77	11 storage tanks - 4,800 bbls	Destroyed
78	1 storage tank - 1700 bbls	Structural damage
79	1 storage tank - 1700 bbls	Structural damage
83a	Pump house	Minor roof damage
84	2 storage tanks	Minor damage
85	Pump house	Structural damage
86	5 storage tanks - 10,000 bbls	Possibly structurally damaged. Craters in immediate vicinity.
88	1 storage tank - 7000 bbls	Same as No. 86
89	1 " " 5500 bbls	Damaged, crater immediately N of tank
92	1 " " 5500 bbls	Destroyed
99	1 " " 25000 bbls	Structurally damaged.
98	1 " " 25000 bbls	Minor damage on top cover
101	1 " " 80000 bbls	Damage to top
102	Oil bunkering pier	Pipe line from wharf destroyed. Pier shows a crater.
103	Open storage area	Cratered
104	Warehouse	Structural damage
105	" (drum storage)	Structural damage
106	Warehouse	Minor roof damage
108	Warehouse	Minor roof damage
109	Can mfg. plant	Structural damage
110	Warehouse	Half of bldg sustained minor damage; the other half is gutted.
111	Warehouse	Destroyed
112	"	Minor roof damage
113	Drum Mfg. plant	Louver on roof destroyed
114	Tank car loading rack bldg.	Roof damaged

*Primary buildings.

D/A Report 173, cont'd.

SUMMARY OF DAMAGE TO TANKAGE - TARGET 127

	<u>STORAGE</u>	<u>INTERMEDIATE STORAGE</u>
Orig.* Capacity - bbls	761,600	100,000
Total damage - bbls	334,000	26,100
Percent:	43.8	25.9

ITEMIZATION OF DAMAGE - TARGET 127

<u>ANNOT.</u> <u>NO.</u>	<u>IDENTIFICATION</u>	<u>DESCRIPTION OF DAMAGE</u>
3	Probable office	Destroyed
4	Unidentified	Destroyed
5	Unidentified	Minor roof damage
10	Warehouse	Destroyed
11	Unidentified	Roof damage
12	Still	Destroyed - crater visible about 40' E of unit.
13	Unidentified	Roof damage
15	Unidentified	Roof damage
18	Probable storage	Roof damage
19	Not identified	Roof damage
23	Storage tank - 80,000 bbls	Minor damage - crater between tanks
24	" " " "	Minor damage - hole on top
26	" " " "	Structurally damaged
27	Unidentified	Destroyed
28	"	2 small bldgs. destroyed. One small bldg. sustained minor damage to roof.
29	Unidentified	Minor damage
32	Unidentified	Destroyed
33	2 horizontal tanks - 500 bbls, one building	Destroyed
36	Not identified	Minor roof damage
37	" "	Destroyed
44	Warehouse (16,600 sq. ft.)	Destroyed
46	Possible drum plant	Minor roof damage
48	Possible drum plant	30% gutted
*49	Stills and fractioning columns	Minor damage
68	Storage tank - 25,000 bbls	Minor damage to top
70	Storage tank - 25,000 bbls	Structural damage
76	Tanks - storage - 13,000 bbls	" "
77	Storage tank - 20,000 bbls	" "
75	Inter. tanks - 24,400 bbls	" "
78	Storage tank - 15,000 bbls	Minor damage to top
79	" " - 10,000 bbls	Minor damage
80	Warehouse	Structural damage
81	"	Destroyed
82	"	"
83	Unidentified miscellaneous store and maintenance sheds	"
84	Same as No. 83	Destroyed
85	" " " "	Destroyed
86	" " " "	Destroyed
87	Prob. warehouse and oil pier	Structural damage
*88	Still	Destroyed
*90	"	"
94	Office group	Rough triangular built-up area (22,000 sq. ft.) destroyed.
*95	Still	Destroyed
96	Unidentified	"
97	Unidentified	"
98	Unidentified	Gutted

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D/A Report 173, cont'd.

<u>ANNOT. NO.</u>	<u>IDENTIFICATION</u>	<u>DESCRIPTION OF DAMAGE</u>
99.	2 intermediate tanks, 1400 bbls	Destroyed

*Primary buildings.

References: A. JTG 90.17-116/117 P4, 29 April 1944
B. AOF 90.17-Tokyo Area, 15 September 1943
C. Functional Analysis Report No. F/A-67, AC/AS 16 February 1945

Photos: Pre-strike: 3PR4M37A-5R: 36-38 13 December 1944 - good quality
3PR5M1C2-3L: 122 30 April 1945 - good quality
Post-strike: 3PR5M376-2: 19, 20; 3R: 26-28 5 August 1945 - fair
quality.
3PR5M362-2: 88, 89 28 July 1945 - very poor quality
3PR5M355-4L: 84, 85 25 July 1945 - good quality

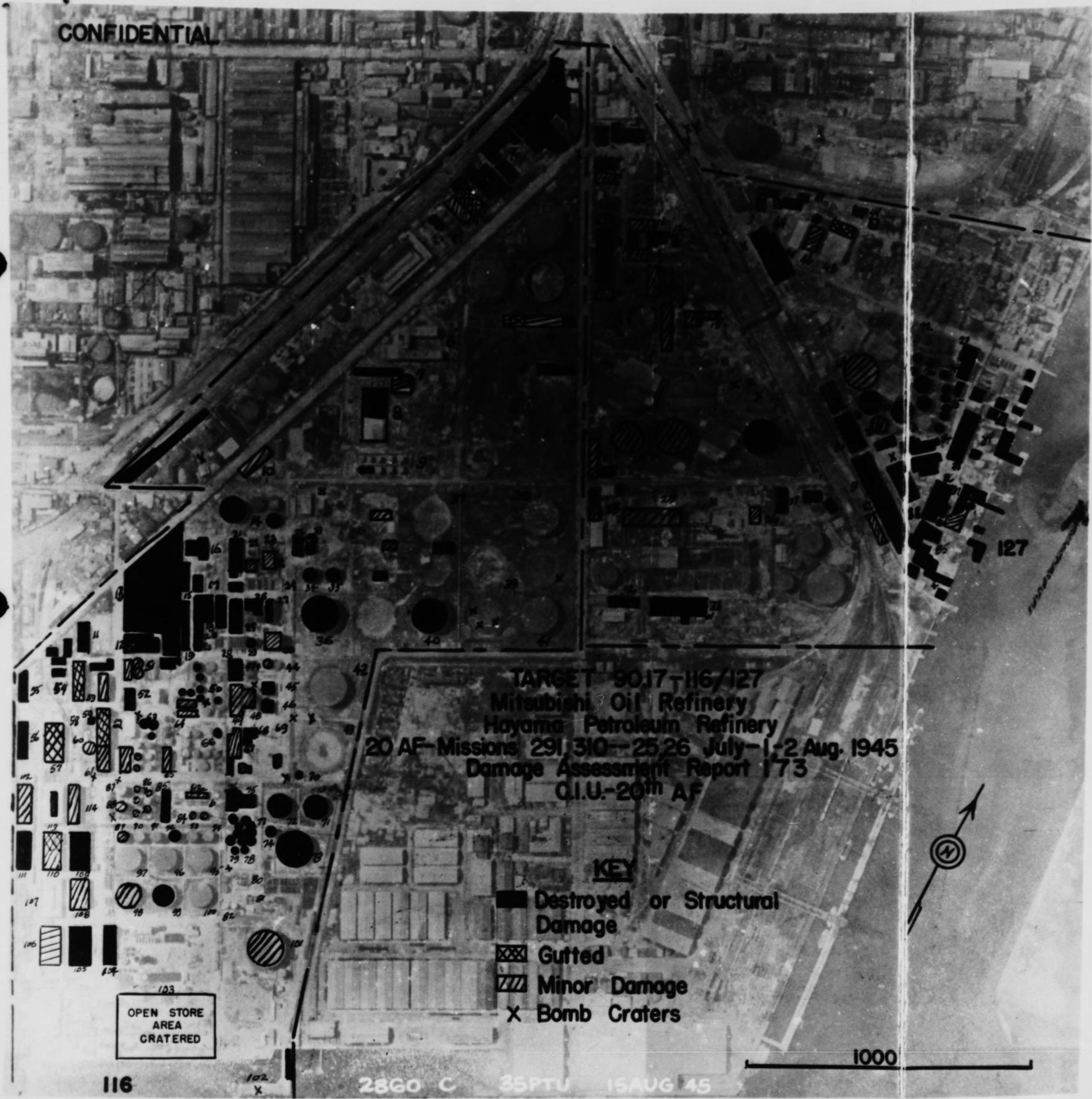
Inclosures: 1. Annotated enlargement 3PR5M1C2-3L: 122
2. Post-strike print 3PR5M376-2: 20

Approved *R. D. C. Bassett*
/s/ HAMILTON D. DARBY
MAJOR, AC

DISTRIBUTION: "B"

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TARGET 9017-116/127
Mitsubishi Oil Refinery
Hayama Petroleum Refinery
20 AF Missions 291, 310 - 25, 26 July - 1, 2 Aug. 1945
Damage Assessment Report 173
C.I.U.-20th AF

- KEY**
- Destroyed or Structural Damage
 - ▣ Gutted
 - ▨ Minor Damage
 - X Bomb Craters

OPEN STORE
AREA
CRATERED

1000

116

102 X

2860 C 35PTU 15AUG 45

CONFIDENTIAL

077 010 2.00



PO . STRIKE

TARGET 90.17-116/127
20AF- MISSIONS 291, 310
25-26 JULY & 1-2 AUG. '45
D.A. REPORT 173
C.I.U.- 20 AF

COVER USED		AC/AS INTELLIGENCE PHOTOGRAPHIC DIVISION PHOTO-INTELLIGENCE SECTION LIMITED DAMAGE INTERPRETATION NO. <u>32</u>	CONFIDENTIAL	D/P
MISSION	3PR/5M 182		DATE	7 JUNE 45
PRINTS	2: 78-80 3R:120-3 3L:120-122		INTERPRETER	V. Smith, 1/lt AC
DATE	30 APR 45		SHEET NO.	1 OF 3
QUALITY	Good to hazy		AREA NO.	TARGET NO.
SCALE	1:9450		90:17	116
DATE OF ATTACK	status			

TARGET	MITSUBISHI OIL REFINERY	LOCATION	TOKYO, JAPAN
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This Limited Damage Interpretation has been undertaken in accordance with the conditions as checked below:

- | | | | |
|-------------------------------------|--|-------------------------------------|---|
| <input type="checkbox"/> | Photography is inadequate in scale | <input type="checkbox"/> | Damage is below 10% of built-up area |
| <input checked="" type="checkbox"/> | Photography is inadequate in quality | <input type="checkbox"/> | Total damage is less than 50,000 sq. ft. |
| <input checked="" type="checkbox"/> | Stereo coverage is lacking or incomplete | <input type="checkbox"/> | Excessive time between attack and photography |
| <input type="checkbox"/> | Detailed interpretation is not required | <input checked="" type="checkbox"/> | Other factors as noted below |

REF. NO.	BUILDING		VISIBLE DAMAGE		DESCRIPTION OF DAMAGE
	AREA	STRUCT'L	SUPERF'L		
1	A				No damage visible
	b				Destroyed
	c				No damage visible
2					Protective wall about "c" destroyed. South end of building chipped off.
3					Roof gone. Damaged prior to 13/14 April.
					Tank O.K.. Pipe line connecting #3 to #1 is severely damaged.
	(A)				Near Miss. Building may have suffered some damage.
	(1)				Foundation being laid? See sketch #1
4					No visible damage
5					Destroyed
6					Building looks intact, although area about it has had several mix bursts.
	A				Two-thirds of building demolished
	B				Superficial damage to roof
	c				No visible damage
7					Wall distorted, roof sagging
8					Equipment north of building is damaged. Roof damaged in spots.
9					Tanks intact, pipe line damaged.
10	A				No damage visible
	B				No damage visible
	C				Roof stripped
11	A				No damage visible
	B				No damage visible
	C				No damage visible
12					Slightly damaged (photos hazy)
13					No damage visible
					Blast walls about the houses severely damaged. Two houses have edges chipped off. (photos hazy)
14					Apparently intact
15					Apparently intact
16					Roof stripped, partially in prior attack
17	A				No damage visible
					Roof burnt; Connecting equipmt damaged (destroyed at east)

TOTALS			APPROVED BY:
SITE	SITE AREA		<i>for</i> <i>Chas Ishier</i> Lee W. Kilgore, Major AC Chief, Evaluation Branch Photographic Division AC/AS, Intelligence
	BUILT-UP AREA		
	% OF SITE BUILT-UP		
DAMAGE	AREA OF DAMAGE		
	% OF BUILT-UP AREA		

ALL AREAS ARE PLAN AREAS IN THOUSANDS OF SQUARE FEET

MIPIG 4589

AREA NO.	TARGET NO.	LIMITED DAMAGE INTERPRETATION	CONFIDENTIAL	D/P
90:17	116	NO. 32	SHEET NO. 2	OF 3
18	A	No apparent damage		
	B	No apparent damage		
19		No apparent damage		
20		No apparent damage		
21		No apparent damage. Equipment to south is O.K.		
22	-----	No apparent damage. Cover too hazy to note details in equipment.		
23		Same as #22		
24		Five tanks destroyed. South and east blast walls destroyed		
25		No apparent damage (cover hazy)		
26 to 30, incl.	-----	No apparent damage (cover hazy)		
31	A	Possible roof-sag		
	B	O.K.		
	C	O.K.		
32		Destroyed		
33		No visible damage (cover hazy)		
34		No visible damage		
35	-----	No visible damage		
36		Roof damaged prior to attack of 13/14 April		
37		Roof damage and gaping holes in tank sides show on December 44 cover. Tank removed before 30 Apr 45		
38		No visible damage		
39		Destroyed (possibly removed)		
40	-----	Edges of roof frayed. Sides damaged		
41		No visible damage		
42		No visible damage		
43		Destroyed or removed		
44		Of two tanks, one may be damaged. (cover hazy)		
45		No visible damage		
46		No visible damage		
47	-----	Equipment connecting #47 to #48 is severely damaged. Details of towers are hazy on cover.		
	A	Roof seemingly damaged prior to 13 Dec 44 and repaired by 30 Apr 45.		
48		Northeast end of equipment chipped off. See sketch 2		
49		North end of equipment damaged prior to 13 Dec. 44 Southern severely damaged. Repairs to north end are in progress at this cover.		
50	-----	Of twelve tanks, three severely damaged prior to 13 Dec. 44. Debris of one cleared by 30 April 45		
	A	Outside equipment damaged		
	B	Small building adjoining B is destroyed. No visible damage to B. (cover is hazy)		
51 to 62, incl.		No visible damage		
62	A	Two-thirds destroyed		
63		Of nine tanks, one small tank severely damaged and one slightly damaged		
64		Two tanks severely damaged, also equipment to east.		
65	-----	No visible damage		
66		Two tanks destroyed prior to 13 Dec 44. Three others destroyed in attack of 13/14 April 45		
67		No visible damage		
68		Demolished		
69		Demolished; chimney still standing		
	A	Small building destroyed		
	B	-----		
	C	Destroyed		
70		Severely damaged		
71 to 74, incl.		No visible damage		
75		Cover is too hazy to distinguish details.		
76		Possible damage to southwest corner of unit, see sketch		

AREA NO. 90.17	TARGET NO. 116	LIMITED DAMAGE INTERPRETATION NO. <u>32</u>	CONFIDENTIAL	D/P
			SHEET NO. 3 OF 3	

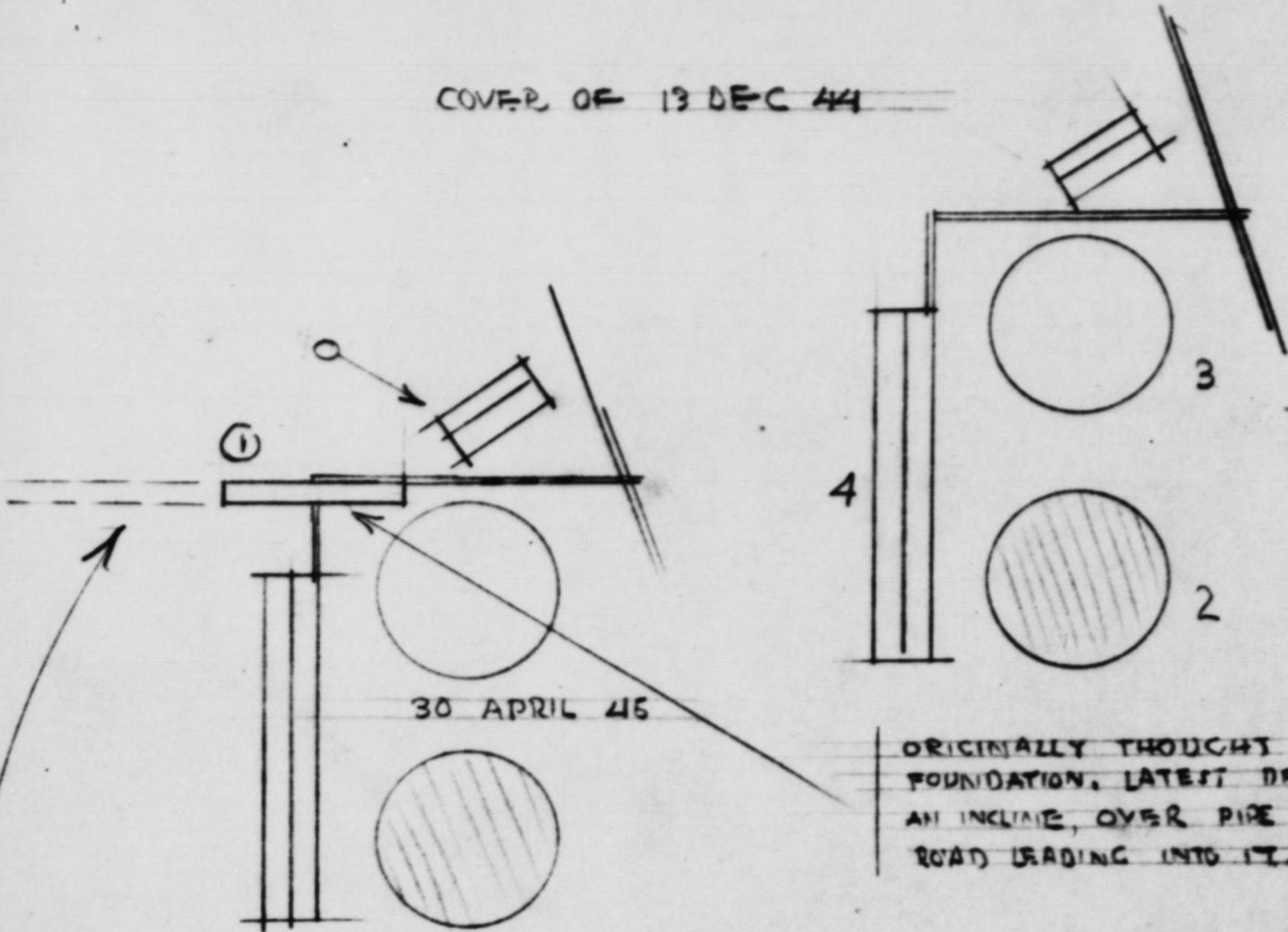
77		Pipes connecting #77 to #76 destroyed; confirming, to a certain extent, damage noted in #76. Of eleven tanks, five are severely damaged with possible damage to others (cover is too hazy to distinguish detail). Equipment east of tanks is damaged.
78	-----	Destroyed
79		Destroyed
80	A	Severely damaged, debris strewn about
81	A	Possible damage to one tank
82		Southern unit and stack severely damaged
83	A	Possible damage to building south of two tanks
	B	Equipment connecting 83A to 85 is damaged. Possible damage to southwest wall of building
84		Of two units of equipment, western unit is destroyed and eastern unit superficially damaged
85		Six tanks destroyed, with possible damage to 7th
86		Northern end of building wiped off
87		Two tanks destroyed and two severely damaged
88		Possible superficial damage to roof
89 to 94, incl.	-----	Possible superficial damage to roof
95 to 100, incl.		Roof of #90 is bent. Possible damage to other roofs. (cover is hazy)
101		No visible damage
	A	No visible damage
	B	No visible damage
102		No visible damage. (No 40" post-attack stereo)
103		Demolished (")
	A	Demolished (")
	B	Small section knifed off (")
	C	No visible damage (")
	D	No visible damage (")
	E	Demolished (")
	F	Demolished (")
	G	Demolished (")
104		No visible damage (cover hazy)"
	A	No damage visible (")")
	B	No visible damage (")")
	C	No visible damage (")")
105 to 115, incl.	-----	No visible damage (")")

DAMAGE SKETCHES

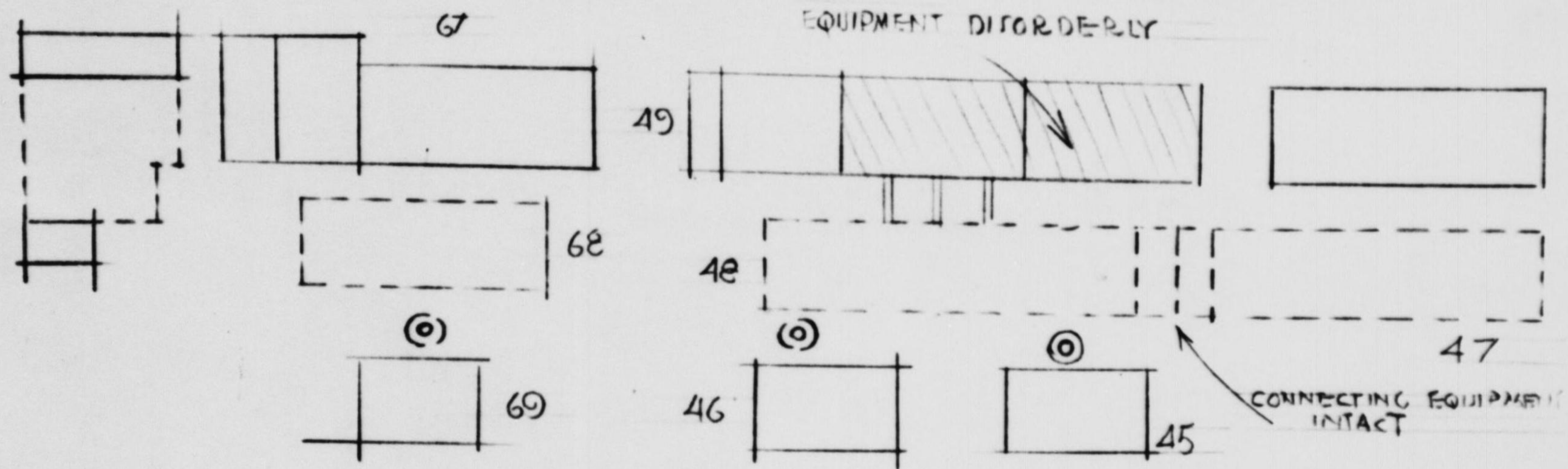
○
MITSUBISHI OIL REFINERY
TOKYO - BAY

SKETCH No 1

COVERD. OF 13 DEC 44

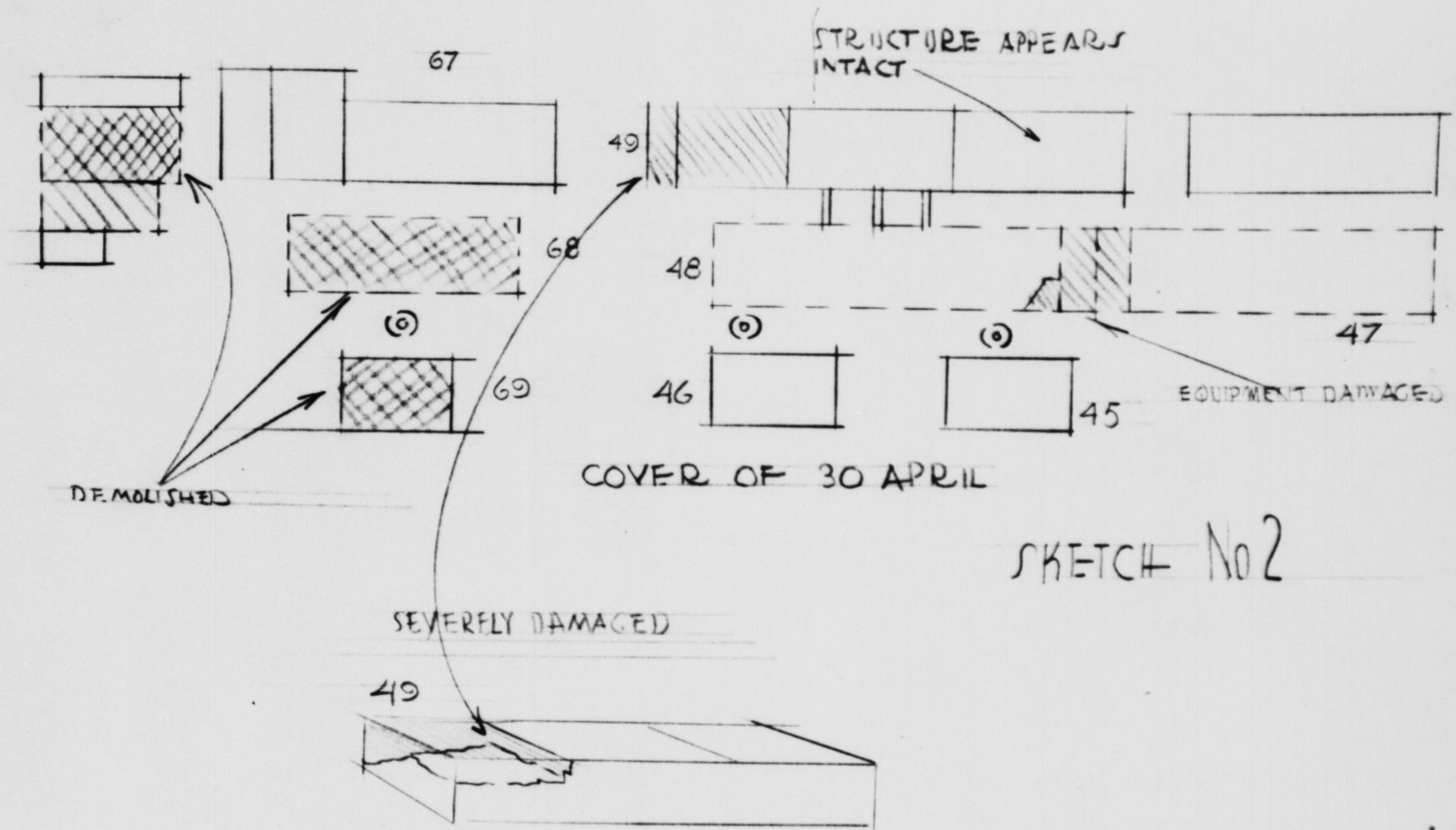


NEW ROAD?



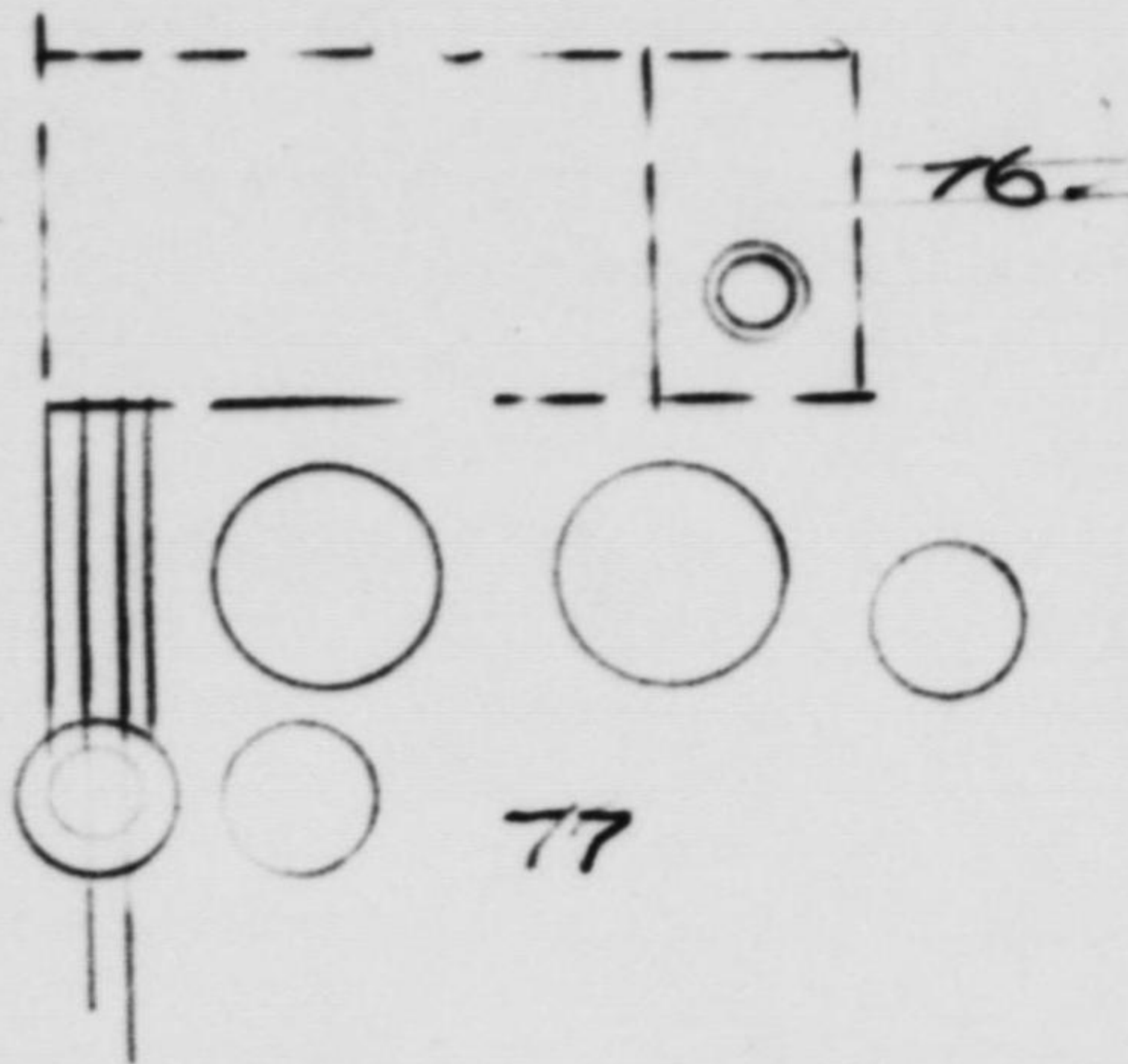
COVER OF 13 DEC 44

SKETCH No 2



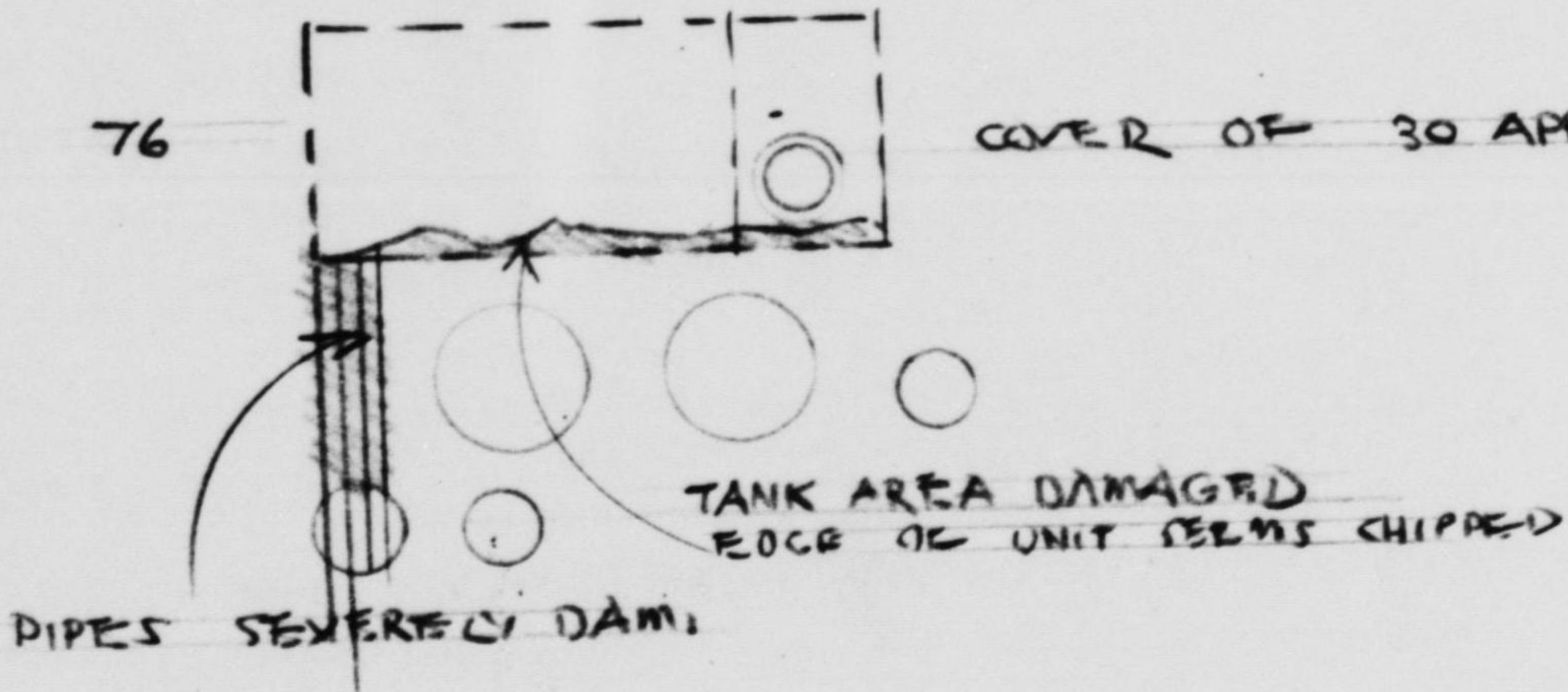
SKETCH No. 3

COVER OF 13 DEC 44



76

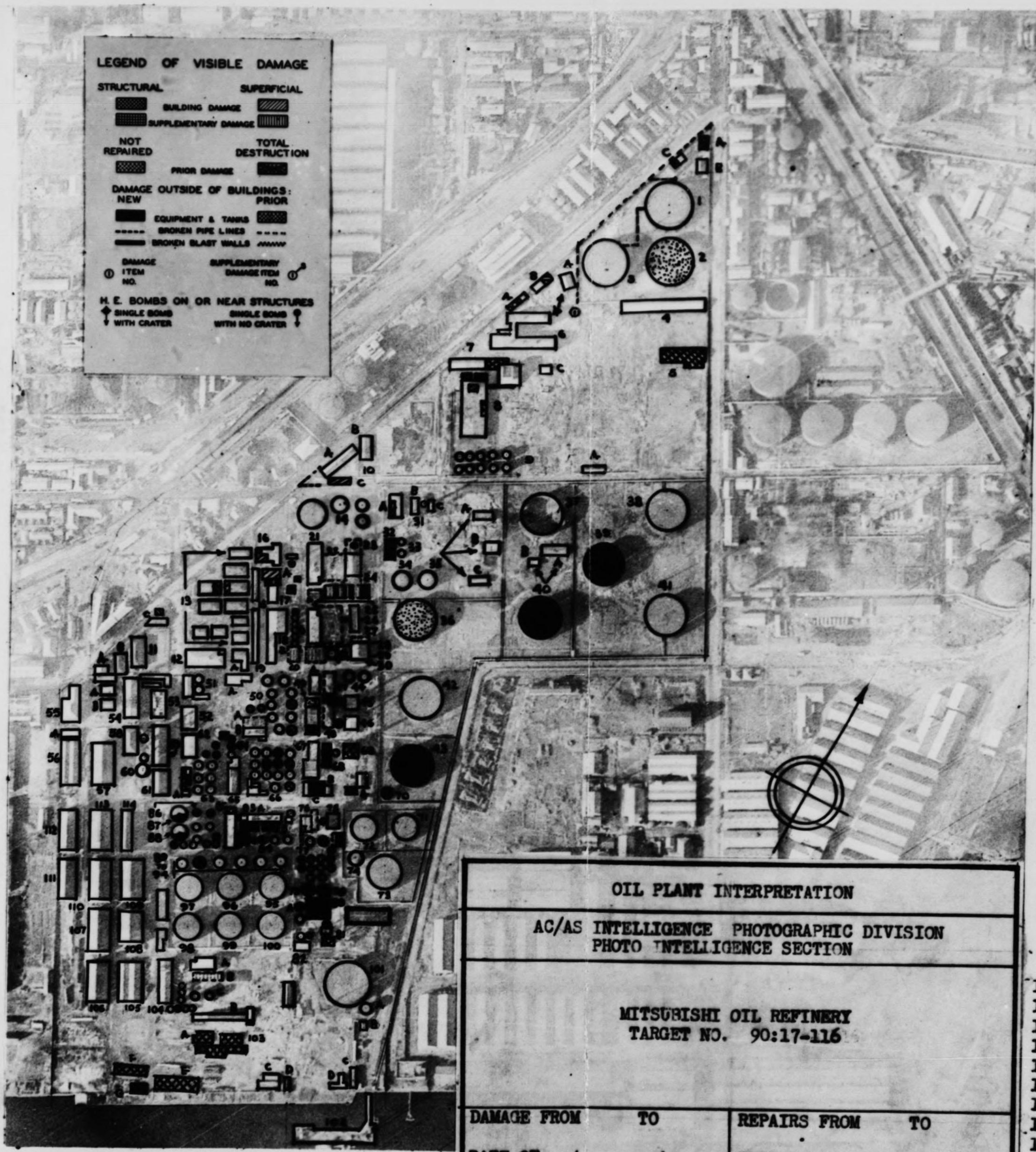
COVER OF 30 APR 45



1. Crude Oil Storage Tank
2. " " " "
3. " " " "
4. Warehouse
5. " " " "
6. Unidentified
7. " " " "
8. " " " "
9. 10 Storage Tanks
10. Warehouse
11. Workers Building
12. Office Type Building
13. Workers Residences
14. 4 Storage Tanks
15. Warehouse
16. Unidentified
17. Unidentified
- 18a. Possible Processing Building
- 18b. Probable Butane Tanks
19. Warehouse
20. Unidentified
21. Iso-octane Unit
22.)
23. Furnace
24. Accumulators and Horizontal Tanks
25.) Iso-octane Unit
26.)
27. Possible Processing Building
28. Accumulators and Horizontal Tanks
29. Intermediate Tank
30. Furnace
31. Boiler and Power House
32. 3 Horizontal Tanks
33. Storage Tank
34. Storage Tank
35. Storage Tank
36. Storage Tank
37. Storage Tank
38. Storage Tank
39. Storage Tank
40. Storage Tank
41. Storage Tank
42. Storage Tank
43. Storage Tank
44. Unidentified
45. Furnace
46. Furnace
47.) Cracking Unit
48.)
49.)
50. Intermediate Tanks
51. Storage Tanks
52. Research Laboratory
53. Offices
55. Probable Shipping Offices

LEGEND OF VISIBLE DAMAGE

STRUCTURAL		SUPERFICIAL	
[Symbol]	BUILDING DAMAGE	[Symbol]	BUILDING DAMAGE
[Symbol]	SUPPLEMENTARY DAMAGE	[Symbol]	SUPPLEMENTARY DAMAGE
[Symbol]	NOT REPAIRED	[Symbol]	TOTAL DESTRUCTION
[Symbol]	PRIOR DAMAGE	[Symbol]	PRIOR DAMAGE
DAMAGE OUTSIDE OF BUILDINGS:			
[Symbol]	EQUIPMENT & TANKS	[Symbol]	EQUIPMENT & TANKS
[Symbol]	BROKEN PIPE LINES	[Symbol]	BROKEN PIPE LINES
[Symbol]	BROKEN BLAST WALLS	[Symbol]	BROKEN BLAST WALLS
[Symbol]	DAMAGE ITEM NO.	[Symbol]	SUPPLEMENTARY DAMAGE ITEM NO.
[Symbol]	H. E. BOMBS ON OR NEAR STRUCTURES	[Symbol]	SINGLE BOMB WITH CRATER
[Symbol]	SINGLE BOMB WITH CRATER	[Symbol]	SINGLE BOMB WITH NO CRATER



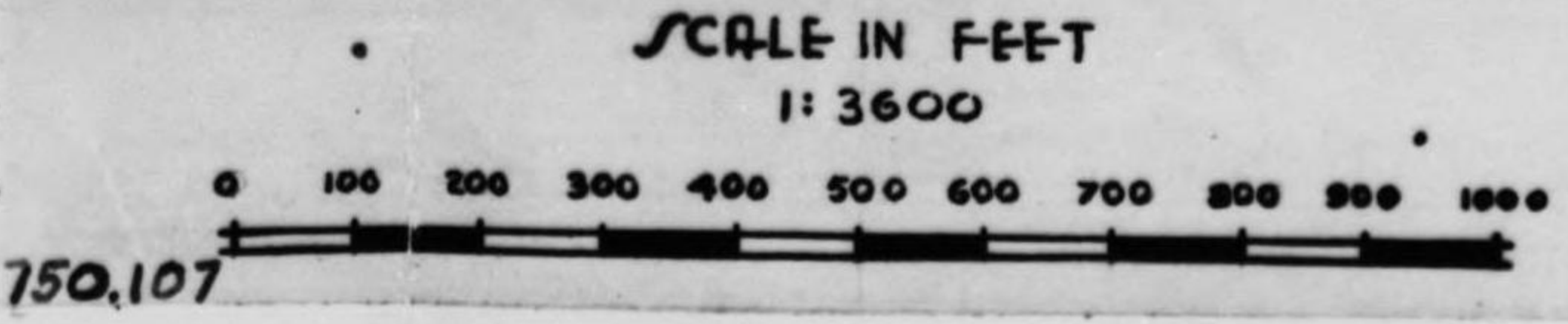
54. Personnel Building
56. Warehouse
57. Warehouse
58. Possible Offices
59. Boiler House
60. Storage Tank
61. Possible Pump House
62. Chemical Laboratory
63. Intermediate Tanks
64.) Possible Treating Plant
65.)
66. Gasoline Intermediate Storage Tanks
67.) Primary Distillation Unit
68.)
69. Furnace
70. Storage Tank
71. Storage Tank
72. Storage Tank
73. Storage Tank
74. Storage Tank
75. Furnace
76. Vacuum Distillation Unit
77. Storage Tanks
78. Storage Tank
79. Storage Tank
80. Pressure Distillate Re-run Unit
81. Asphalt Loading Unit
82. Storage Tanks
- 83a. Pump House (Possible Association with Gasoline Treating)
- 83b. Horizontal Tanks (Possible Association with Gasoline Treating)
84. Storage Tanks
85. Pump House
86. Storage Tanks
87. Storage Tanks
88. Storage Tank
89. Storage Tank
90. Storage Tank
91. Storage Tank
92. Storage Tank
93. Storage Tank
94. Storage Tank
95. Storage Tank
96. Storage Tank
97. Storage Tank
98. Storage Tank
99. Storage Tank
100. Storage Tank
101. Storage Tank
102. Oil Bunkering Pier
103. Open Storage Area
104. Warehouse
105. Warehouse
106. Warehouse
107. Warehouse
108. Warehouse
109. Can Manufacturing Plant
110. Warehouse
111. Warehouse
112. Warehouse
113. Drum Manufacturing Plant
114. Tank Car Loading Rack Building

OIL PLANT INTERPRETATION

AC/AS INTELLIGENCE PHOTOGRAPHIC DIVISION
PHOTO INTELLIGENCE SECTION

MITSUBISHI OIL REFINERY
TARGET NO. 90:17-116

DAMAGE FROM	TO	REPAIRS FROM	TO
DATE OF ATTACK	13/4 APRIL '45	REPORT NUMBER	D/P 32



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750,107

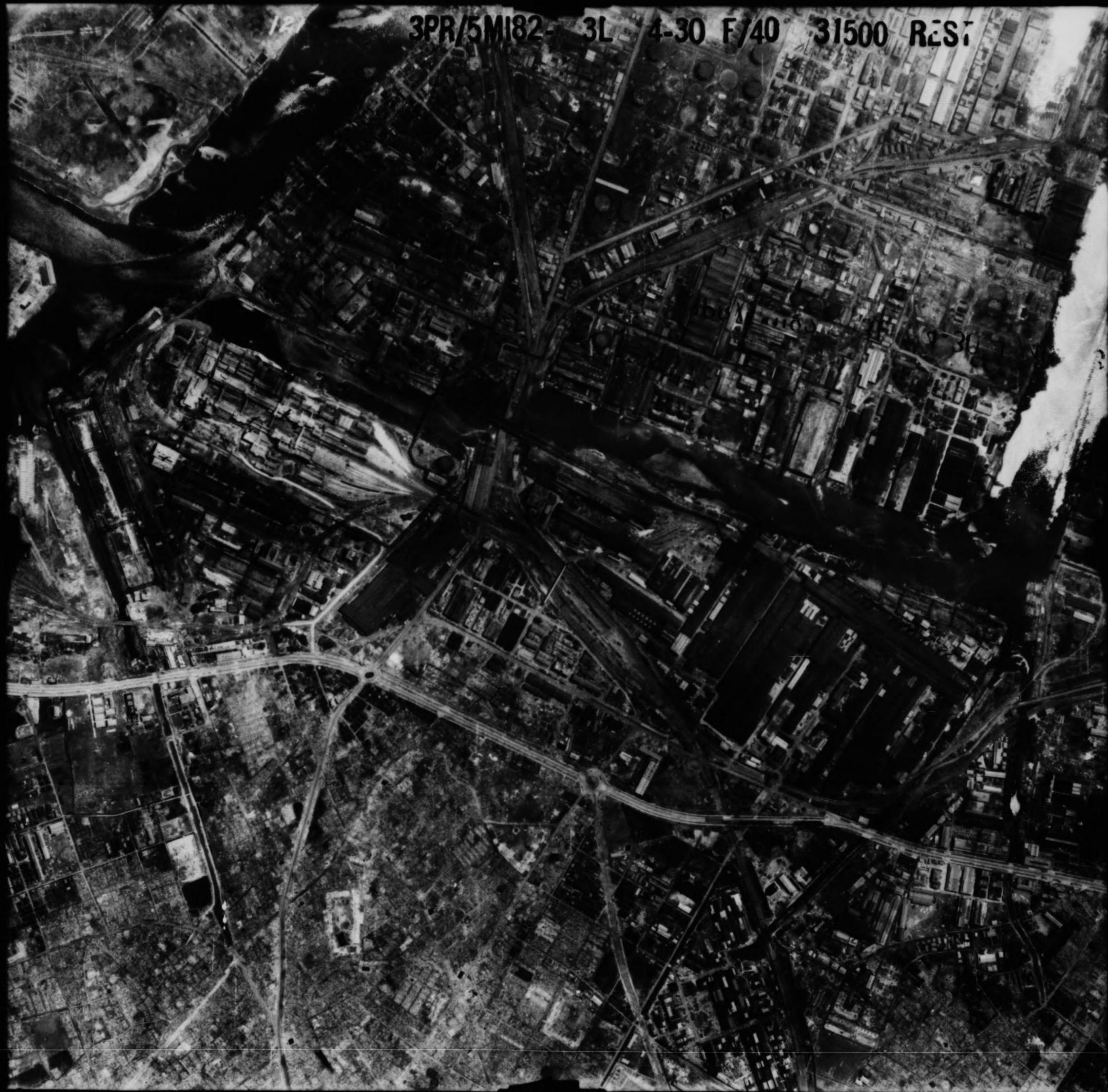
122

3PR/5MI82- 3L 4-30 F/40 31500 RLS



END ST# 1 R 123

3PR/5MI82- 3L 4-30 F/40 31500 REST





3PR/5MI82- 3L 4-30 F/40 31500 REST

3PR/5MI82- 3L 4-30 F/40 31500 REST

3PR/5M182- 3R 4-30 F/40 31500 REST



16734

120

3PR/5MI82 BR 04-30 F/40 31500 REST

120



16734

23110
3PR5M182-3R: 123-XY13.C. 4:30: 1252K-40: 31500-3609N 13918E1

3530N 13944E

RESTRICTED

7566 EASTMAN TOPOGRAPHIC SALES

16734

122 3PR/5MI82- 3R 4-30 F/40 31500 R-37



16734

1 TSPM 5 A 321

16734

8956 EASTMAN REGULAR SAFETY

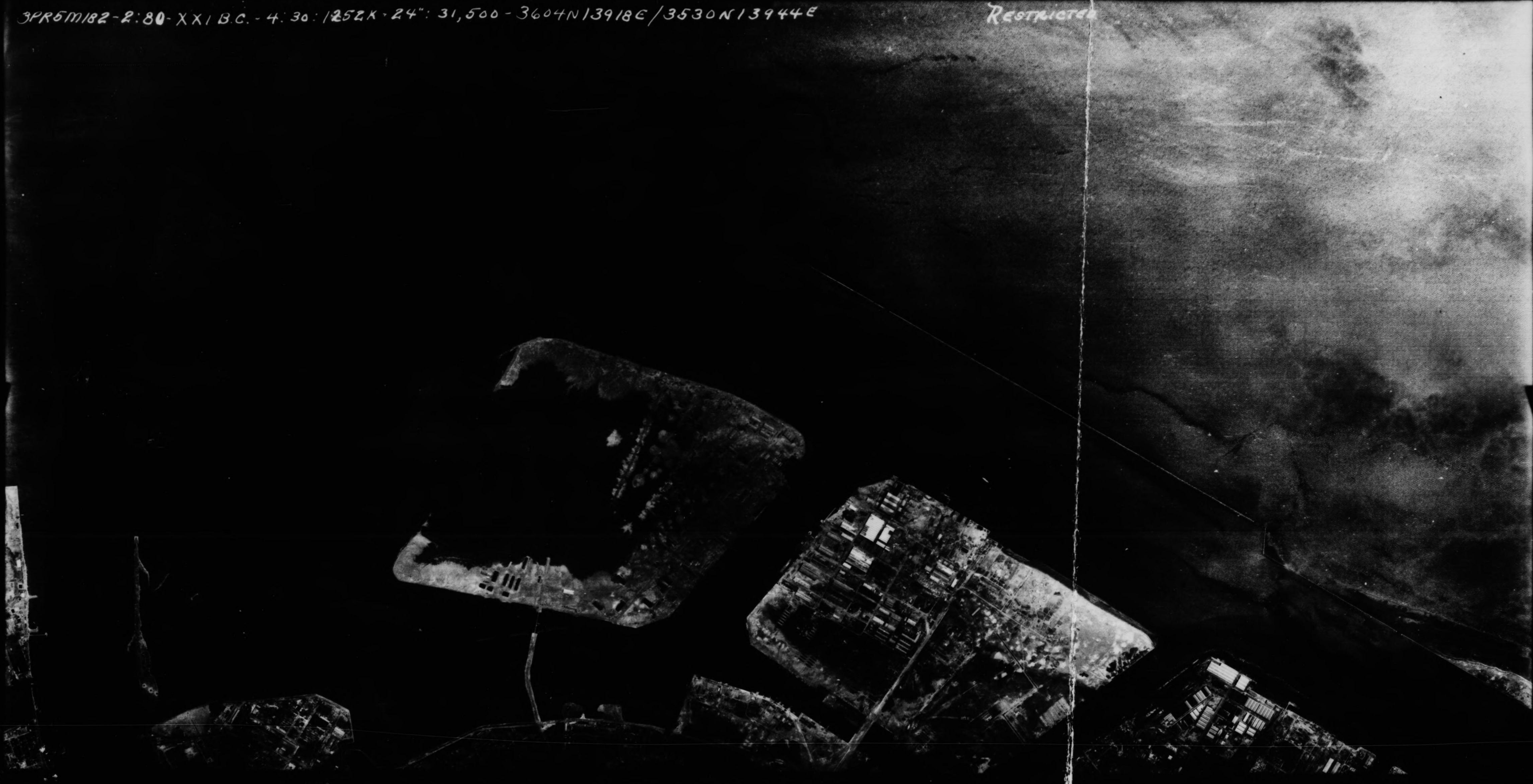
8957 EASTMAN REGULAR SAFETY

8958 EASTMAN REGULAR SAFETY

8959 EASTMAN REGULAR SAFETY

3PR5M182-2:80-XXI B.C. - 4:30:1252K-24": 31,500-3604N13918E/3530N13944E

RESTRICTED



RESTRICTED

16734

8960 EASTMAN REGULAR SAFETY

8961 EASTMAN REGULAR SAFETY

8962 EASTMAN REGULAR SAFETY

8963 EASTMAN REGULAR SAFETY

8964 EASTMAN

79

XX1BC 4-30 524 3100 1007



16734



3PR/5M182 2V XX1BC 4-30 F/24 31500 REST

SAFETY

8965 EASTMAN REGULAR SAFETY

8966 EASTMAN REGULAR SAFETY

8967 EASTMAN REGULAR SAFETY

8968 EASTMAN REGULAR SAFETY

5. OAS
file 116/127

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C. I. U.
XXI BOMBER COMMAND
APO 234, c/o POSTMASTER
SAN FRANCISCO, CALIFORNIA

10 August 1945

DAMAGE ASSESSMENT REPORT 173

90.17-116 Mitsubishi Oil Refinery
90.17-127 Hayama Petroleum Refinery

20 Air Force Mission 291, 25-26 July 1945 315th Wing
20 Air Force Mission 310, 1-2 August 1945 315th Wing

Note: For assessment of damage to primary target (90.17-128, Petroleum Center), see CIU Damage Assessment Report 174.

SUMMARY

Photos show the Mitsubishi Oil Refinery to be practically inoperative. Twelve of 14 primary buildings, as outlined by Ref. A, are destroyed. The Hayama Petroleum Refinery sustained crippling damage, 40% of its primary structures being destroyed.

Damage and destruction encompasses practically all of Target 116, particularly the central, western and central sections of the plant.

Most of the destruction at Target 127 is located in the southern half of the plant area. Residential and office areas in the NW part of the target received extensive damage. A refinery unit and tank section, located in the NE part of the plant, remains apparently undamaged. Four piers were destroyed. A RR yard received several direct hits.

A total of 537,400 barrels or 38% of the storage tank capacity (1,404,400 bbls.) were destroyed or damaged at the Mitsubishi Oil Refinery. In addition, 13,625 barrels or 30.4% of the intermediate tank capacity (44,750 bbls.) were destroyed or damaged.

At the Hayama Refinery 334,000 barrels or about 44% of the storage tank capacity (761,600 bbls.), and 26,100 barrels or about 26% of the intermediate tank capacity (100,300 bbls) were damaged or destroyed.

A functional diagram or building analysis noting barrel capacity of these refineries is not available. The scale of photos was based on Ref. A. Shadow factor and barrel capacities were computed from photos of 3PR4M 37A-5R: 36-38 (scale 1/9500 - shadow factor 0.46).

Photos are unsuitable for determining the exact damage caused by either strike, however, the major portion of the damage was inflicted by Mission 310.

Damage to targets adjacent to the primary target:

- 90.17-52 Japan Steel Tube Co. (4 sections)
 - A. SE section - total damage - severe
 - B. NE section - total damage - negligible
 - C. NW section - total damage - moderate
 - D. SW section - total damage - severe
- 90.17-111 Kawasaki Electric Power Plant - total damage - severe
- 90.17-137 Showa Fertilizer - total damage - severe
- 90.17-191 Mitsubishi Coal Depot - total damage - severe
- 90.17-1437 Mitsubishi Piece-goods Wharf & Warehouses - total damage - severe.

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D/A Report 173, cont'd.

SUMMARY OF DAMAGE TO TANKAGE - TARGET 116

	<u>Storage</u>	<u>Intermediate Storage</u>	
Orig. Capacity - bbls.	1,404,400	44,750	1449
Total damage and removal-bbls	537,400	13,625	551
Percent:	38	30.4	

ITEMIZATION OF DAMAGE - TARGET 116

<u>ANNOT.</u>	<u>IDENTIFICATION</u>	<u>DESCRIPTION OF DAMAGE</u>
NO.		
4	Warehouse - 8400 sq. ft.	25% structural damage, 25% gutted and 50% minor roof damage.
5	Warehouse	Completely destroyed
7	Unidentified	Square portion of this small building received minor roof damage. An adjoining long, narrow building was destroyed.
8	Unidentified 13,800 sq. ft.	Half of this building was structurally damaged.
9	Two 18' diameter storage tanks 3000 bbls.	Both tanks are distorted. There is a bomb crater about 50' S/W of these tanks.
10	Warehouse	Roof damaged
11	Workers building	Destroyed
12	Office type building	Destroyed
13	Workers residences - numerous homes occupying a roughly rectangular area of approx. 20,000 sq. ft.	Devastated
14	1 storage tank 75' diameter - 25,000 bbls. 1 storage tank 15,500 bbls	Large tank structurally damaged. Smaller tank " "
15	Warehouse	Destroyed
16	Unidentified	Destroyed
17	Unidentified	Destroyed
18a	Poss. processing building	Destroyed
19	Warehouse	Destroyed
20	Unidentified	Destroyed
*21	Iso-octane unit	Destroyed
*22	Iso-octane unit	Probably received some damage when No. 21 was destroyed.
23	Furnace	Minor damage
*25	Iso-octane unit	Destroyed
*26	Iso-octane unit	Destroyed
27	Poss. processing building	Destroyed
29	Intermediate tank 1,300 bbl	Structurally damaged
30	Furnace	Minor roof damage
32	Horizontal tanks - 1725 bbls	Destroyed
33	Storage tank - 2600 bbls	Structurally damaged
34	" " 8000 bbls	Destroyed
35	Storage tank 12500 bbls	Destroyed
36	Storage tank 80000 bbls	Destroyed
40	Storage tank 80000 bbls	Destroyed
44	Unidentified - near a storage tank - 1600 bbls	Minor damage
*45	Furnace	Structurally damaged
*46	"	Structurally damaged
*47	Cracking unit	Structurally damaged. A crater is visible in the immediate vicinity.
48	Cracking unit	Structural damage caused by near misses.

SUMMARY OF DAMAGE TO TANKAGE - TARGET 127

	<u>STORAGE</u>	<u>INTERMEDIATE STORAGE</u>
Orig.* Capacity - bbls	761,600	100,800
Total damage - bbls	334,000	26,100
Percent:	43.8	25.9

ITEMIZATION OF DAMAGE - TARGET 127

<u>ANNOT. NO.</u>	<u>IDENTIFICATION</u>	<u>DESCRIPTION OF DAMAGE</u>
3	Probable office	Destroyed
4	Unidentified	Destroyed
5	Unidentified	Minor roof damage
10	Warehouse	Destroyed
11	Unidentified	Roof damage
12	Still	Destroyed - crater visible about 40' E of unit.
13	Unidentified	Roof damage
15	Unidentified	Roof damage
16	Probable storage	Roof damage
19	Not identified	Roof damage
23	Storage tank - 80,000 bbls	Roof damage
24	" " " "	Minor damage - crater between tanks
26	" " " "	Minor damage - hole on top
27	Unidentified	Structurally damaged
28	"	Destroyed
29	Unidentified	2 small bldgs. destroyed. One small bldg. sustained minor damage to roof.
32	Unidentified	Minor damage
33	2 horizontal tanks - 500 bbls, one building	Destroyed
36	Not identified	Minor roof damage
37	" "	Destroyed
44	Warehouse (16,600 sq. ft.)	Destroyed
46	Possible drum plant	Minor roof damage
48	Possible drum plant	30% gutted
*49	Stills and fractioning columns	Minor damage
60	Storage tank - 25,000 bbls	Minor damage to top
70	Storage tank - 25,000 bbls	Structural damage
76	Tanks - storage - 13,000 bbls	" "
77	Storage tank - 20,000 bbls	" "
75	Inter. tanks - 24,400 bbls	" "
78	Storage tank - 15,000 bbls	Minor damage to top
79	" " - 10,000 bbls	Minor damage
80	Warehouse	Structural damage
81	"	Destroyed
82	"	"
83	Unidentified miscellaneous store and maintenance sheds	"
84	Same as No. 83	Destroyed
85	" " " "	Destroyed
86	" " " "	Destroyed
87	Prob. warehouse and oil pier	Structural damage
*88	Still	Destroyed
*90	"	"
94	Office group	Rough triangular built-up area (22,000 sq. ft.) destroyed.
*95	Still	Destroyed
96	Unidentified	"
97	Unidentified	"
98	Unidentified	Gutted

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D/A REPORT 173, cont'd.

ANNO.	NO.	IDENTIFICATION	DESCRIPTION OF DAMAGE
	49	Cracking Unit	Same as No. 48
	50	Intermediate tanks (1) 2200 bbls (5) 3000 bbls (1) 600 bbls	Structural damage - 3 or 4 near misses visible.
	51	Storage tanks - (2) 4400 bbls	Minor damage - crater visible - approx 50' S of these tanks
	52	Research laboratory	Structurally damaged
	53	Offices	Minor roof damage
	54	Personnel bldg	Destroyed
	55	Probable shipping offices	Destroyed - 3 craters visible in the immediate vicinity
	56	Warehouse	Destroyed
	57	Warehouse	Gutted
	58	Office	Destroyed
	59	Boiler house	Destroyed, chimney remaining
	60	Storage tank - 4000 bbls	Top apparently destroyed
	61	Possible pump house	Minor roof damage
	62	Chemical laboratory	Gutted
	63	2 inter. tanks - 2200 bbls 3 " " 1500 bbls	Structurally damaged Destroyed
	64	Possible treating plant	Damaged - crater close by
	65	Possible treating plant	Damaged roof
	66	Inter. tank - 900 bbls	Destroyed
	*67	Primary distilling unit	(Structurally damaged. Two craters 100'-110' S of units.)
	*68	" " "	
	70	1 storage tank - 4000 bbls	Destroyed
	71	1 " " 28000 bbls	"
	72	1 " " 28000 bbls	"
	73	1 " " 30000 bbls	"
	74	1 " " 3600 bbls	"
	*75	Furnace	"
	*76	Vacuum distillation unit	"
	77	11 storage tanks - 4,800 bbls	Destroyed
	78	1 storage tank - 1700 bbls	Structural damage
	79	1 storage tank - 1700 bbls	Structural damage
	83a	Pump house	Minor roof damage
	84	2 storage tanks	Minor damage
	85	Pump house	Structural damage
	86	5 storage tanks - 10,000 bbls	Possibly structurally damaged. Craters in immediate vicinity.
	88	1 storage tank - 7000 bbls	Same as No. 86
	89	1 " " 5500 bbls	Damaged, crater immediately N of tank
	92	1 " " 5500 bbls	Destroyed
	99	1 " " 25000 bbls	Structurally damaged.
	98	1 " " 25000 bbls	Minor damage on top cover
	101	1 " " 30000 bbls	Damage to top
	102	Oil bunkering pier	Pipe line from wharf destroyed. Pier shows a crater.
	103	Open storage area	Cratered
	104	Warehouse	Structural damage
	105	" (drum storage)	Structural damage
	106	Warehouse	Minor roof damage
	108	Warehouse	Minor roof damage
	109	Can mfg. plant	Structural damage
	110	Warehouse	Half of bldg sustained minor damage; the other half is gutted.
	111	Warehouse	Destroyed
	112	"	Minor roof damage
	113	Drum Mfg. plant	Louver on roof destroyed
	114	Tank car loading rack bldg.	Roof damaged

*Primary buildings.

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SUMMARY OF DAMAGE TO TANKAGE - TARGET 127

	<u>STORAGE</u>	<u>INTERMEDIATE STORAGE</u>
Orig.* Capacity - bbls	761,600	100,800
Total damage - bbls	334,000	26,100
Percent:	43.8	25.9

ITEMIZATION OF DAMAGE - TARGET 127

<u>ANNOT. NO.</u>	<u>IDENTIFICATION</u>	<u>DESCRIPTION OF DAMAGE</u>
3	Probable office	Destroyed
4	Unidentified	Destroyed
5	Unidentified	Minor roof damage
10	Warehouse	Destroyed
11	Unidentified	Roof damage
12	Still	Destroyed - crater visible about 40' E of unit.
13	Unidentified	Roof damage
15	Unidentified	Roof damage
16	Probable storage	Roof damage
19	Not identified	Roof damage
23	Storage tank - 80,000 bbls	Minor damage - crater between tanks
24	" " " "	Minor damage - hole on top
26	" " " "	Structurally damaged
27	Unidentified	Destroyed
28	"	2 small bldgs. destroyed. One small bldg. sustained minor damage to roof.
29	Unidentified	Minor damage
32	Unidentified	Destroyed
33	2 horizontal tanks - 500 bbls, one building	Destroyed
36	Not identified	Minor roof damage
37	" "	Destroyed
44	Warehouse (16,600 sq. ft.)	Destroyed
46	Possible drum plant	Minor roof damage
48	Possible drum plant	30% gutted
*49	Stills and fractioning columns	Minor damage
68	Storage tank - 25,000 bbls	Minor damage to top
70	Storage tank - 25,000 bbls	Structural damage
76	Tanks - storage - 13,000 bbls	" "
77	Storage tank - 20,000 bbls	" "
75	Inter. tanks - 24,400 bbls	" "
78	Storage tank - 15,000 bbls	Minor damage to top
79	" " - 10,000 bbls	Minor damage
80	Warehouse	Structural damage
81	"	Destroyed
82	"	"
83	Unidentified miscellaneous store and maintenance sheds	"
84	Same as No. 83	Destroyed
85	" " " "	Destroyed
86	" " " "	Destroyed
87	Prob. warehouse and oil pier	Structural damage
*88	Still	Destroyed
*90	"	"
94	Office group	Rough triangular built-up area (22,000 sq. ft.) destroyed.
*95	Still	Destroyed
96	Unidentified	"
97	Unidentified	"
98	Unidentified	Gutted

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77XOM 316-2-20

POST STRIKE

TARGET 90.17-116/127
20AF- MISSIONS 291, 310
25-26 JULY & 1-2 AUG. '45
D.A. REPORT 173
C.I.U.- 20 AF

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

Sheet No.: 90.17-116/127-TI
Date: 17 April 1945
Page: 1 (of 2 pages)

Target No.: 90.17-116,127
Obj. No.: 90.17
Obj. Folder No. 90.17
Air Target System:

Petroleum

Lat.: 35°30' N
Long.: 139°44' E
Alt.: 10 feet

MITSUBISHI OIL REFINERY
HAYAMA PETROLEUM REFINERY

KAWASAKI JAPAN

ALL PREVIOUS SHEETS CANCELLED

SIGNIFICANCE

These adjacent targets together are the largest among the extensive facilities on the Kawasaki-Yokohama waterfront for refining crude oil and storing oil and oil products; their combined tankage is believed to be the eighth largest in the Inner Zone. Their refineries are apparently not operating, some tankage has been removed, and many of the tanks may be empty.

Mitsubishi Oil Refinery is believed to be the fourth largest Inner Zone crude oil refinery. Estimated capacities: Crude refining 2,850,000 barrels per year, about 7 percent of Inner Zone capacity; cracking 1,000,000 barrels, about 8 percent; iso-octane 36,500 barrels; tankage 872,000 barrels.

Hayama Petroleum Refinery is believed to be the tenth largest Inner Zone crude oil refinery. Estimated capacity: Crude refining 1,320,000 barrels per year, about 3 percent of Inner Zone capacity; cracking 1,000,000 barrels, about 8 percent; iso-octane 14,600 barrels; tankage 600,000 barrels.

LOCATION

(Refer to illustration No. 90.17-116/127 P2.) On the Kawasaki waterfront in Tokyo Bay. The target complex is located on the E side of the third large block of reclaimed land SW of the Tama River mouth. It is about 2.9 miles SW of the mouth of the Tama River and about 2.5 miles E-NE of the mouth of the Tsurumi River. The target is bounded on the NE by a section of the Japan Steel Tube Co. (Target 90.17-52), on the NW by Showa Fertilizer (Target 90.17-137), on the E by a ship canal, and on the S end by Tokyo Bay. Other installations on the same block of reclaimed land are a second section of the Japan Steel Tube Co. at the NW corner and the Kawasaki Electric Power Plant (Target 90.17-111) on the W central edge.

DESCRIPTION AND LAYOUT

(Refer to illustration No. 90.17-116/127 P3.) The total target area is very irregular in shape, measuring about 3,500 feet N-S and 2,200 feet E-W at its longest dimensions. It consists of two complete and independent installations. Refining

units are in the NE and SW; the main storage runs through the center.

The larger Mitsubishi Oil Refinery (Target 90.17-116) occupies the S and central section of the area. Refining units are compactly built in the W central part of its compound. Tankage and open storage are at the S end, warehouses along the W side. The NE half, adjacent to Hayama Refinery, is occupied by relatively dispersed storage tanks.

The main section of the smaller Hayama Petroleum Refinery (Target 90.17-127) adjoins the Mitsubishi Refinery on the NE. Roughly rectangular, it is divided into two triangles by NE-SW multiple railroad tracks. The bulk of the refining units are in the compact, congested NE section, storage in the SW section adjacent to the Mitsubishi Refinery. A narrow strip, or panhandle occupied by reported asphalt or distillation units and gas holders extends across the N end and down the NW side of the Mitsubishi Refinery. The functions of this equipment are not identified sufficiently to verify reports that it produces synthetic oil.

PRIMARY OBJECTIVES

(Refer to illustration No. 90.17-116/127 P3.)

A. Attack against storage. The larger tanks, Mitsubishi 1, 3, 36, 38-43, 71-73, 95-101; Hayama 6, 16, 22-26, 69-71, 76-79.

B. Attack against refineries. Primary: The distillation and cracking units, Mitsubishi 45, 49, 67-69, 75, 76, 80. Hayama 49, 50, 58, 60, 61, 88-90, 93, 95. Iso-octane units, Mitsubishi 21, 22, 25, 26. Secondary: The larger tanks listed above, and the boiler houses, Mitsubishi 31, 59.

CONSTRUCTION AND VULNERABILITY

(Refer to illustration No. 90.17-116/127 P3.) The combined built-up area of the two targets is probably less than 20 percent and covers three categories:

1. The process equipment which consists mainly of steel cylindrical vessels, open steel structures, furnaces, a few small buildings, pumps, piping, etc.
2. Steel storage tanks of the cylindrical type with fixed roofs (approx, one-half of built-up area).

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE PETROLEUM WITH OTHER 90.17-116/127 MATERIAL

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

Sheet No.: **90.17-116/127-TI**
Date: **17 April 1945**
Page: **2 (of 2 pages)**

3. Warehouses (approximately 20 low one-story buildings of less than 7,000 square feet each, and probably of noncombustible construction).

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:

A preliminary analysis indicates that weapons should be selected on the following basis:

A. Attack designed against storage tanks.

	HE	Fuze	Incen- diary
Preferred.....	100-lb. GP.....	0.025 N/0.025 T, long delay.	None.
Poor alternative.....	250-lb. GP, 500-lb. GP.	Same.....	None.
Not recommended.....	Larger GP bombs, SAP or AP bombs, Depth bombs, Frag- mentation bombs.

NOTES.—(a) Use 0.1 N fuzes if 0.025 N fuzes are not available.
(b) 5 percent of the HE bombs should be fuzed long delay.

B. Attack designed against refining installations.

	HE	Fuze	Incen- diary
Preferred.....	500-lb. GP.....	Inst N/ND T, long delay.	None.
Alternative.....	250-lb. GP.....	0.01 N/0.01 T, long delay.	None.
Not recommended.....	Other GP bombs, SAP or AP bombs, Depth bombs.

NOTES.—(a) Use 0.1 fuzes if 0.01 N fuzes are not available.
(b) 5 percent of the HE bombs should be fuzed long delay.

**CAMOUFLAGE, DECOYS AND SMOKE
SCREENS**

Photography of 13 December 1944 shows no attempt at camouflage or use of decoys. No use of smoke screens has been reported in this area.

ADDITIONAL INFORMATION

Additional facilities on the reclaimed land within about 2 miles W of these targets bring the total crude oil refining capacity of this Kawasaki area to an estimated 6,170,000 barrels or 15 percent of the Inner Zone total, and its storage capacity to an estimated 3,310,000 barrels, or 5 percent.

Two small refineries in the same block of reclaimed land as Hayama and Mitsubishi, the Aikoku Petroleum Refinery (Target 90.17-147) and Asaishi Petroleum Co. (Target 90.17-130) appear to have been removed except for 6 medium and small tanks with a capacity of about 58,300 barrels at Asaishi.

The Army Oil Storage (Target 90.17-2038) in the middle of the next 2 blocks of reclaimed land to the W contains 21 storage tank sites, but only 10 tanks with an estimated capacity of 550,000 barrels appear to be intact.

The Petroleum Center (Target 90.17-128) at the W end of the area has an estimated refining capacity of 2,000,000 barrels per year, and storage capacity of 1,230,000 barrels although it has 30 sites from which tanks have been or are being removed.

In photography of November and December 1944 the only evidence of any of these Kawasaki waterfront facilities being used was change in the level of three floating roof tanks at the Petroleum Center.

Another group of oil installations is located within 2.5 miles of Petroleum Center on the first two blocks of reclaimed land SW of Tsurumi River. These include the Ogura Oil Co. (TARGET 90.17-87) and scattered tank farms, with a refining capacity of about 3,300,000 barrels per year and storage capacities of 1,988,500 barrels.

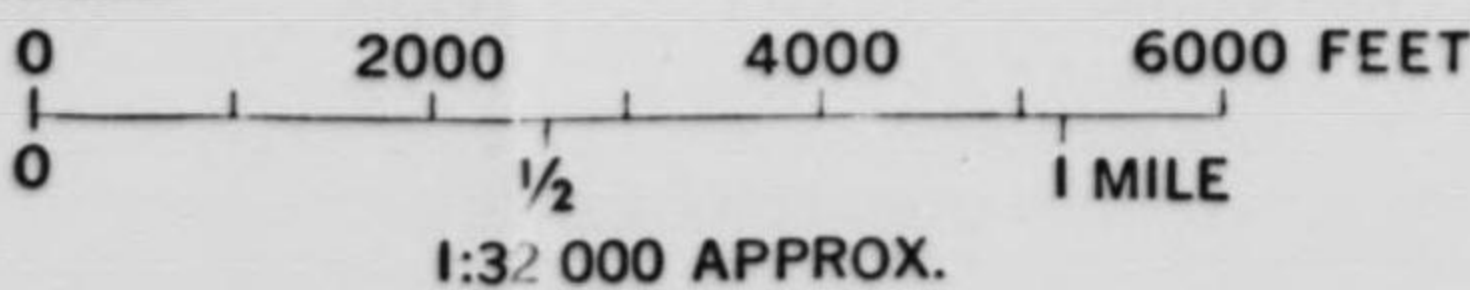
HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE PETROLEUM WITH OTHER 90.17-116/127 MATERIAL

RESTRICTED

**JOINT
TARGET
GROUP**
WASHINGTON, D. C.

**MITSUBISHI OIL REFINERY (90.17-116)
HAYAMA PETROLEUM REFINERY (90.17-127)
KAWASAKI JAPAN**

ILLUSTRATION No. **90.17-116/127 P1**
DATE **29 April 1945**
TARGET No. **90.17-116/127**
COORDINATES . . **35°30'N 139°44'E**
PHOTOGRAPHED **13 December 1944**



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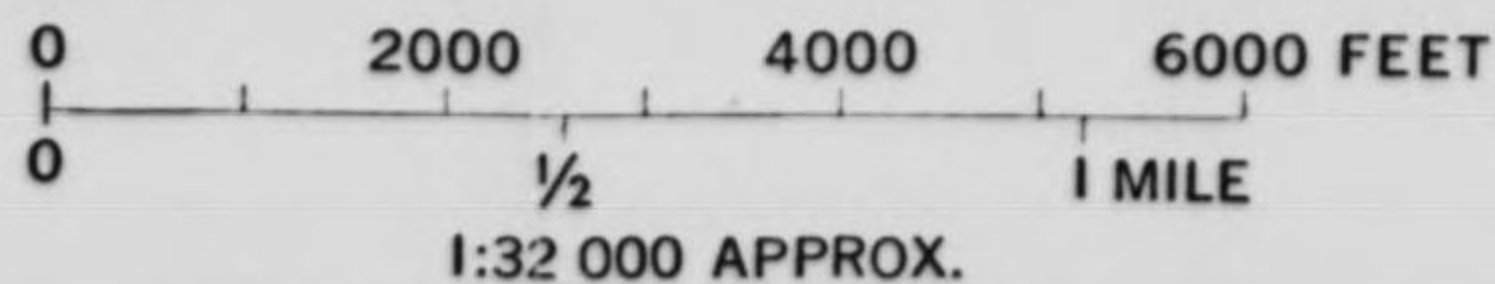
90.17-116/127

**JOINT
TARGET
GROUP**
WASHINGTON, D. C.

**MITSUBISHI OIL REFINERY (90.17-116)
HAYAMA PETROLEUM REFINERY (90.17-127)
KAWASAKI JAPAN**

RESTRICTED

ILLUSTRATION NO. **90.17-116/127 P2**
DATE **29 April 1945**
TARGET No. **90.17-116/127**
COORDINATES . . **35°30'N 139°44'E**
PHOTOGRAPHED . **13 December 1944**



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LEGEND

90.17- 51	Asano Iron Works
90.17- 52	Japan Steel Tube Co.
90.17- 110	Tokyo Electric Power Station, Tsurumi Plant
90.17- 111	Kawasaki Electric Power Plant
90.17- 116	Mitsubishi Oil Refinery
90.17- 122	Tsurumi Steel and Shipbuilding Co.
90.17- 127	Hayama Petroleum Refinery
90.17- 128	Petroleum Center
90.17- 130	Asaishi Petroleum Co.
90.17- 133	Shibaura Engineering Works, Ltd.
90.17- 136	Fuji Electric Works
90.17- 137	Showa Fertilizer
90.17- 481	Tokyo Gas Co., Tsurumi Branch
90.17- 488	Tokyo-Shibaura Electric Co., Factory No. 2, Yanagi Plant
90.17- 493	Tokyo Steam Power Plant
90.17- 496	Tokyo-Shibaura Electric Co., Factory No. 1, Harikawa Plant
90.17-2026	Ebara Mfg. Co., Kamata Plant
90.17-2038	Army Oil Storage
90.17-4011	Tokyo-Shibaura Electric Co., Factory No. 3, Komukai Plant

Note: The following targets are not listed in the Air Target Index:
90.17-130 Asaishi Petroleum Co.
90.17-136 Fuji Electric Works
90.17-481 Tokyo Gas Co., Tsurumi Branch

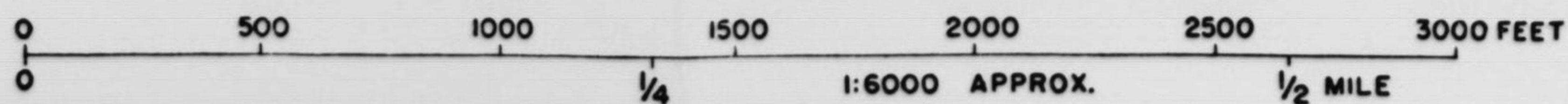


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JOINT
TARGET
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WASHINGTON, D. C.

MITSUBISHI OIL REFINERY (90.17-116)
HAYAMA PETROLEUM REFINERY (90.17-127)
KAWASAKI JAPAN

ILLUSTRATION No. 90.17-116/127 P3
DATE 29 April 1945
TARGET No. 90.17-116/127
COORDINATES . . 35°30'N 139°44'E
PHOTOGRAPHED 13 December 1944



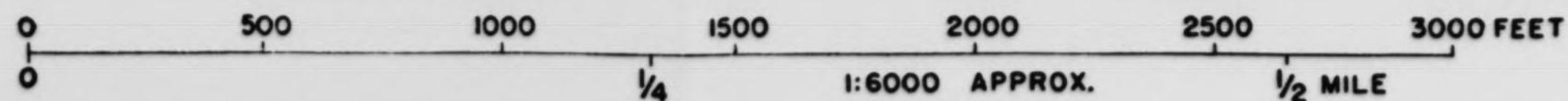
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**JOINT
TARGET
GROUP**
WASHINGTON, D. C.

**MITSUBISHI OIL REFINERY (90.17-116)
HAYAMA PETROLEUM REFINERY (90.17-127)
KAWASAKI JAPAN**

CONFIDENTIAL

ILLUSTRATION No. 9017-116/127 P4
DATE 29 April 1945
TARGET No. 90.17-116/127
COORDINATES . . . 35°30'N 139°44'E
PHOTOGRAPHED . 13 December 1944



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LEGEND

- | | | | |
|------------------|--|------------------|---|
| 90.17-116 | | 90.17-127 | |
| 1 | Crude Oil Storage Tank Diam. 120' | 1-3 | Probable Offices |
| 2 | Crude Oil Storage Tank Diam. 120' (Possibly Dismantled) | 4, 5 | Not identified |
| 3 | Crude Oil Storage Tank Diam. 120' | 6 | Oil storage tank 85' Diam. |
| 4, 5 | Warehouse | 7 | (2) Intermediate tanks |
| 6-8 | Unidentified | 8 | 9 or 10 run down tanks |
| 9 | 10 Storage Tanks 5 Tanks Diam. 18'
5 Tanks Diam. 25' | 9-15 | Reported Asphalt or Tar Distillation Plant |
| 10 | Warehouse | 9 | (2) Furnace stills |
| 11 | Workers Building | 10 | Probable storage |
| 12 | Office Type Building | 11 | Not identified |
| 13 | Workers Residences | 12 | Still |
| 14 | 4 Storage Tanks—1 Tank Diam. 75'
3 Tanks Diam. 36' | 13 | Not identified |
| 15 | Warehouse | 14 | 6 or more tanks |
| 16, 17 | Unidentified | 15 | Not identified |
| 18a | Possible Processing Building | 16 | Oil storage tank 65' Diam. |
| 18b | Probable Butane Tanks | 17 | Oil storage tank 90' Diam. Empty or being torn down. |
| 19 | Warehouse | 18 | Probable storage |
| 20 | Unidentified | 19 | Not identified |
| P 21, P 22 | Iso-octane unit | 20 | Conveyor house small gas holder 25' Diam. nearby |
| 23 | Furnace | 21 | Not identified |
| 24 | Accumulators and Horizontal Tanks | 22 | Oil storage tank 145' Diam. |
| P 25, P 26 | Iso-octane unit | 23 | Oil storage tank 120' Diam. |
| 27 | Possible Processing Building | 24 | Oil storage tank 120' Diam. |
| 28 | Accumulators and Horizontal Tanks | 25 | Oil storage tank 120' Diam. |
| 29 | Intermediate Tank Diam. 30' | 26 | Oil storage tank 120' Diam. |
| 30 | Furnace | 27-29 | Not identified |
| 31 | Boiler and Power House | 30 | Coal storage pile—gantry crane |
| 32 | 3 Horizontal Tanks Length 30' Diam. 10' | 31 | Gas holder 75' Diam. (Wet type) |
| 33 | Storage Tank Diam. 20' | 32 | Not identified |
| 34, 35 | Storage Tanks Diam. 40' | 33 | Storage—(8) Horizontal tanks S of building |
| 36 | Storage Tank Diam. 120' (Possible Repairs) | 34 | Storage |
| 37 | Storage Tank Diam. 120' (Roof Removed) | 35 | (4) Horizontal stills |
| 38-43 | Storage Tank Diam. 120' | 36-38 | Not identified |
| 44 | Unidentified | 39 | Oil storage tank 55' Diam. |
| P 45, 46 | Furnaces | 40 | Oil storage tank 25' Diam. |
| 47-P 49 | Cracking Unit | 41 | Oil storage tank 78' Diam. |
| 50 | Intermediate Tanks 2 Tanks Diam. 30'
6 Tanks Diam. 20' (1 Possible Dismantling)
1 Tank Diam. 18' | 42 | Oil storage tank 114' Diam. |
| 51 | Storage Tanks (2) Diam. 30' | 43 | Office Building |
| 52 | Research Laboratory | 44 | Warehouse |
| 53 | Offices | 45, 46 | Possible drum plant |
| 54 | Personnel Building | 47 | (4) Small tanks—Empty |
| 55 | Probable Shipping Offices | 48 | Possible drum plant |
| 56, 57 | Warehouse | P 49, P 50 | Stills and fractionating columns |
| 58 | Possible Offices | 51 | (14) Run down tanks |
| 59 | Boiler House | 52 | (6) Run down tanks |
| 60 | Storage Tank Diam. 55' | 53 | Intermediate tank 30' Diam. |
| 61 | Possible Pump House | 54 | (8) Intermediate tanks |
| 62 | Chemical Laboratory | 55 | (11) Horizontal tanks—Probably butane |
| 63 | Intermediate Tanks 6 Tanks Diam. 25'
3 Tanks Diam. 20' (1 Possible Dismantling) | 56 | 12 Run down tanks |
| 64, 65 | Possible Treating Plant | P 58 | Not identified—Building |
| 66 | Gasoline Intermediate Storage Tanks 1 Tank Diam. 30'
11 Tanks Diam. 25' | 59 | Still |
| P 67, P 68 | Primary Distillation Unit | P 60, P 61 | (6) Intermediate tanks |
| P 69 | Furnace | 62 | Still and fractionation |
| 70 | Storage Tank Diam. 30' | 63 | Not identified |
| 71 | Storage Tank Diam. 78' | 64 | (9) Intermediate tanks |
| 72 | Storage Tank Diam. 78' | 65 | Not identified |
| 73 | Storage Tank Diam. 102' | 66 | Still |
| 74 | Storage Tank Diam. 30' | 67 | Not identified |
| P 75 | Furnace | 68-71 | Loading tanks |
| P 77 | Vacuum Distillation Unit | 72 | Oil storage tanks 85' Diam. Camouflaged |
| 77 | Storage Tanks 6 Tanks Diam. 15'
4 Tanks Diam. 20' | 73, 74 | Unidentified Building |
| 78, 79 | Storage Tanks Diam. 30' | 75 | (11) Intermediate tanks |
| P 80 | Pressure Distillate Re-run Unit | 76 | (3) Oil storage tanks (1) 54', (2) 45' Diams. |
| 81 | Asphalt Loading Unit | 77 | Oil storage tank 72' Diam. |
| 82 | Storage Tanks 2 Tanks Diam. 19'
2 Tanks Diam. 22' | 78 | Oil storage tank 65' Diam. |
| 83a | Pump House (Possible Association with Gasoline Treating) | 79 | Oil storage tank 55' Diam. |
| 83b | Horizontal Tanks (Possible Association with Gasoline Treating) | 80, 81 | Warehouse |
| 84 | Storage Tanks 2 Tanks Diam. 19'
2 Tanks Diam. 22' | 82 | Warehouse (9) loading tanks E of building on RR Siding. |
| 85 | Pump House | 83-86 | Unidentified miscellaneous store and maintenance shed. |
| 86 | Storage Tanks (5) Diam. 25' | 87 | Probable warehouse and oil pier |
| 87-94 | Storage Tanks Diam. 36' | P 88, P 89 | Still and oil tank near pier |
| 95-100 | Storage Tanks Diam. 78' | P 90 | Still |
| 101 | Storage Tank Diam. 120' | 91 | Probable intermediate tanks |
| 102 | Oil Bunkering Pier | 92 | Horizontal tanks |
| 103 | Open Storage Area | P 93 | Still |
| 104 | Warehouse | 94 | Office group |
| 105 | Warehouse (Drum Storage) | P 95 | Still |
| 106-108 | Warehouse | 96-98 | Not identified |
| 109 | Can Manufacturing Plant | 99 | (6) Intermediate tanks |
| 110-112 | Warehouse | 100 | Possible compressor building |
| 113 | Drum Manufacturing Plant | 101 | Gas holder 50' Diam. |
| 114 | Tank Car Loading Rack Building | 102 | Possible gas generators |
| | | 103, 104 | Gas holders (Wet type) 75' Diam. |

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TARGET SUMMARY

NO. 90.17 - 116/127 NAME Mitsubishi Oil Refinery & Hayama Petroleum Refinery

DATE _____ COORDINATES _____

LOCATION 2.9 miles SW of the mouth of the Tama River and 2.5 mi ENE of Tsurumi R.

FUNCTION Storing oil and oil products and refining crude oil.

TYPE STRUCTURE _____

TOTAL AREA 5,005,800 Sq. Ft. BUILT UP AREA 18.3 %

PLANNING			EXECUTION		
AIM. PT. _____	RAD _____	FT _____	DATE _____	MISSION _____	
BOMBING METHOD _____			FO _____	WING _____	
REF. <u>AAF AOF 90.17</u>			BOMBING METHOD _____		
<u>ATSF 90.17-116/127-TI, AC/AS</u>			FORCE _____	AXIS _____	
IP _____			ALT. _____	BOMBS/A/C _____	
AXIS _____	ALT. _____		A/C LOST _____	AS _____	IPH _____
AIR SPEED _____					

BOMBS			BOMBS		
TYPE _____			TYPE _____		
FUZE _____			FUZE _____		
IN. SET _____			IN. SET _____		
TONS AB _____			TONS AB _____		
TONS BPT _____			TONS BPT _____		
M/N TAR CIRCLE _____			M/N TAR CIRCLE _____		
FORCE _____			FORCE _____		

WIND	DIRECTION	VELOCITY	WIND	DIRECTION	VELOCITY
AT ALT. _____			AT ALT. _____		
SURFACE _____			SURFACE _____		
EXP'D DEN. _____	T/A _____	EXP'D F _____	WEATHER OVER TARGET _____		
REMARKS _____			REMARKS _____		

PHOTOS				PHOTOS			
MISSION	ROLL	PRINTS	DATE	MISSION	ROLL	PRINTS	DATE
<u>248</u>	<u>3R</u>	<u>115</u>					
<u>254</u>	<u>1V</u>	<u>44</u>					

RESULTS

DENSITY _____	T/A _____	AREA DAMAGED _____	SQ. FT
FRACTION OF DAMAGE _____		STRUCTURAL _____	SQ. FT
REMARKS _____		SUPERFICIAL _____	SQ. FT
		TOTAL DAMAGE TO DATE _____	SQ. FT

088

file 116/127

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C. I. U.
XXI BOMBER COMMAND
APO 234, c/o POSTMASTER
SAN FRANCISCO, CALIFORNIA

15 July 1945

INDUSTRIAL REPORT NO. 70

90.17-116 MITSUBISHI OIL REFINERY
90.17-127 HAYAMA PETROLEUM REFINERY

PHOTOS: 3PR4M1-1V: 20 1 November 1944
4M37A-2: 50 13 December 1944
5M22-1V: 4, 5 28 January 1945
5M157-1V: 109; 3: 105 22 April 1945
5M182-1V: 74, 75; 2: 78, 79; 3L: 120-122 30 April 1945
5M248-1V: 51, 52; 2: 60-62; 3R: 115, 116 28 May 1945
5M250-1V: 57, 58; 2: 46; 3R: 82 29 May 1945
5M254-1V: 43-45; 4R: 211-213 31 May 1945

PREVIOUS REPORTS: 3PR PIR No. 33 14 December 1944
CIU Industrial Survey Report 2 27 February 1945

REFERENCES: A. AAF Air Objective Folder 90.17
B. ATSF, Sheet No. 90.17-116/127-T1, AC/AS Intelligence
17 April 1945

SUMMARY

These adjacent targets considered together make up the largest unit of the extensive facilities on the Kawasaki-Yokohama waterfront for refining crude oil, and for storing oil and oil products. The target complex is located about 2.9 miles SW of the mouth of the Tama River and approximately 2.5 miles ENE of the mouth of the Tsurumi River.

AREA DATA

Total ground area: 5,005,800 sq.ft.
Refining ground area: 599,400 sq.ft.
Target 116: 291,600 sq.ft.
Target 127: 307,800 sq.ft.
Total roof area, including tank area: 900,104 sq.ft.
Approximate percent built-up: 18.3
Storage capacity total: 1,472,000 bbls. (40 USG)
Crude 163,294 sq.ft.; 1,072,000 bbls. (40 USG)
Refined 106,940 sq.ft.; 400,000 bbls. (40 USG)

ANALYSIS

The overall target area is irregularly shaped, measuring about 3500' N-S and 2200' E-W at its longest dimensions.

The larger Mitsubishi Oil Refinery (Target 116) occupies the S and central portion of the target area, with its refining units (Area B) built in the west central part of the compound. Storage tanks and open storage are S of the refining units and warehouses are along the W side of the area. Irregularly scattered storage tanks separate the built-up sections of the two targets.

The smaller Hayama Petroleum Refinery (Target 127) is located in the NE section of the target area and is divided in two triangular plots by multiple RR tracks. The refining units (Area A) are in the NE corner of the target area.

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Industrial Report 70, Cont'd.

A narrow strip (Area C), occupied by reported asphalt or distillation units and gas holders, extends along the NW side of Target 116. The actual function of this equipment is not identified sufficiently to verify reports that synthetic oil is being produced here.

Both plant sites have adequate RR and wharf facilities to handle large scale shipping. The following railroads serve the area: Keihiu Electric, Tsurumirinko, Nanbu Electric and the Tokaido Main Line.

Two tanks, numbers 22 and 25, are in the process of being camouflaged with screening or netting attached to rectangular frames.

Inclosures: Annotated blow-up of 3PR5M248-3R: 115
Annotated print 3PR5M254-1V: 44
Copy of JTG Illustration No. 90.17-116/127 P4

Approved.....

E.W. Webster 1st Lt. AC
for HAMILTON D. DARBY,
MAJOR, AC

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3PR 5M 254 IV-44



90.17-116
MITSUBISHI
OIL REFINERY

90.17-127
HAYAMA
PETROLEUM REFINERY
INDUSTRIAL REPORT 70
SCALE=1/60,000

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3PR5M 248-31R: 65



90.17-116/127
MITSUBISHI OIL REFINERY



515

A

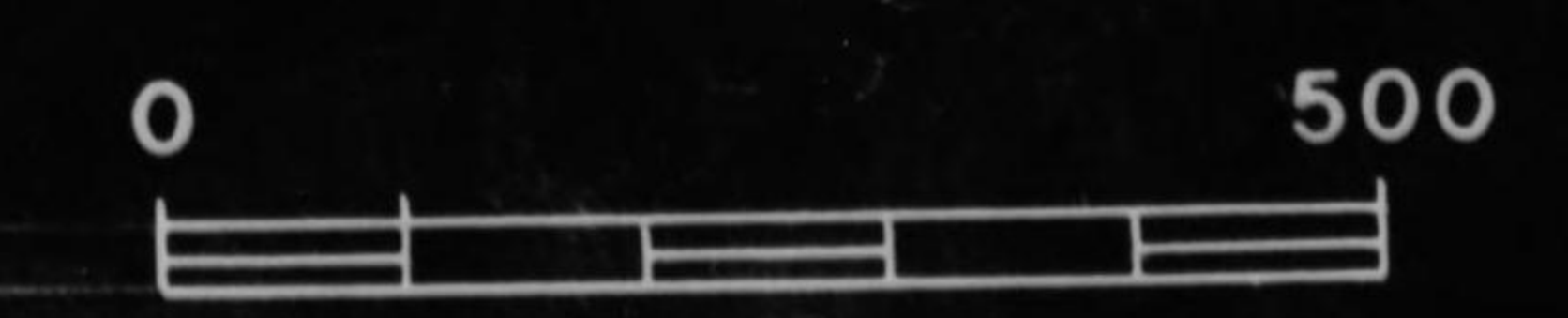
127

C

B

116

90.17-116/127
 MITSUBISHI OIL REFINERY
 HAYAMA PETROLEUM REFINERY
 INDUSTRIAL REPORT 70
 C.I.U. XXI BOM.COM.
 SCALE IN FEET

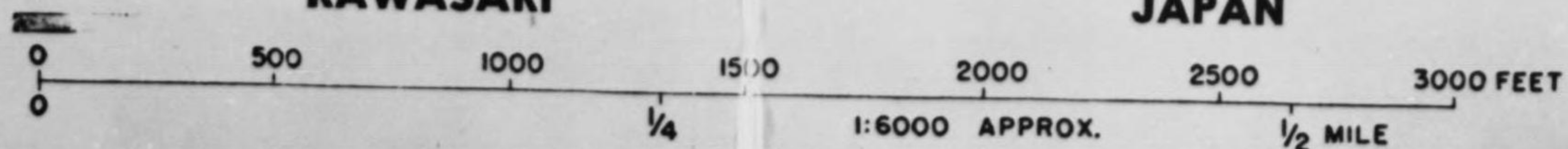


**JOINT
TARGET
GROUP**
WASHINGTON, D. C.

**MITSUBISHI OIL REFINERY (90.17-116)
HAYAMA PETROLEUM REFINERY (90.17-127)
KAWASAKI
JAPAN**

CONFIDENTIAL

ILLUSTRATION No. 9017-116/127 P4
DATE 29 April 1945
TARGET No. 90.17-116/127
COORDINATES . . . 35°30'N 139°44'E
PHOTOGRAPHED . 13 December 1944



Holdings of Joint Target Group Folders should insert this sheet in Air Target System Folder, Japanese Petroleum with other 90.17-116/127 material.

- 90.17-116**
- 1 Crude Oil Storage Tank Diam. 120'
 - 2 Crude Oil Storage Tank Diam. 120' (Possibly Dismantled)
 - 3 Crude Oil Storage Tank Diam. 120'
 - 4, 5 Warehouse
 - 6-8 Unidentified
 - 9 10 Storage Tanks 5 Tanks Diam. 18' 5 Tanks Diam. 25'
 - 10 Warehouse
 - 11 Workers Building
 - 12 Office Type Building
 - 13 Workers Residences
 - 14 4 Storage Tanks—1 Tank Diam. 75' 3 Tanks Diam. 36'
 - 15 Warehouse
 - 16, 17 Unidentified
 - 18a Possible Processing Building
 - 18b Probable Butane Tanks
 - 19 Warehouse
 - 20 Unidentified
 - P 21, P 22 Iso-octane unit
 - 23 Furnace
 - 24 Accumulators and Horizontal Tanks
 - P 25, P 26 Iso-octane unit
 - 27 Possible Processing Building
 - 28 Accumulators and Horizontal Tanks
 - 29 Intermediate Tank Diam. 30'
 - 30 Furnace
 - 31 Boiler and Power House
 - 32 3 Horizontal Tanks Length 30' Diam. 10'
 - 33 Storage Tank Diam. 20'
 - 34, 35 Storage Tanks Diam. 40'
 - 36 Storage Tank Diam. 120' (Possible Repairs)
 - 37 Storage Tank Diam. 120' (Roof Removed)
 - 38-43 Storage Tank Diam. 120'
 - 44 Unidentified
 - P 45, 46 Furnaces
 - 47-P 49 Cracking Unit
 - 50 Intermediate Tanks 2 Tanks Diam. 30' 6 Tanks Diam. 20' (1 Possible Diam. 18' Dismantling)
 - 51 Storage Tanks (2) Diam. 30'
 - 52 Research Laboratory
 - 53 Offices
 - 54 Personnel Building
 - 55 Probable Shipping Offices
 - 56, 57 Warehouse
 - 58 Possible Offices
 - 59 Boiler House
 - 60 Storage Tank Diam. 55'
 - 61 Possible Pump House
 - 62 Chemical Laboratory
 - 63 Intermediate Tanks 6 Tanks Diam. 25' 2 Tanks Diam. 20' (1 Possible Dismantling)
 - 64, 65 Possible Treating Plant
 - 66 Gasoline Intermediate Storage Tanks 1 Tank Diam. 30' 11 Tanks Diam. 25'
 - P 67, P 68 Primary Distillation Unit
 - P 69 Furnace
 - 70 Storage Tank Diam. 30'
 - 71 Storage Tank Diam. 78'
 - 72 Storage Tank Diam. 78'
 - 73 Storage Tank Diam. 102'
 - 74 Storage Tank Diam. 30'
 - P 75 Furnace
 - P 76 Vacuum Distillation Unit
 - 77 Storage Tanks 6 Tanks Diam. 15' 4 Tanks Diam. 20'
 - 78, 79 Storage Tanks Diam. 30'
 - P 80 Pressure Distillate Re-run Unit
 - 81 Asphalt Loading Unit
 - 82 Storage Tanks 2 Tanks Diam. 19' 2 Tanks Diam. 22'
 - 83a Pump House (Possible Association with Gasoline Treating)
 - 83b Horizontal Tanks (Possible Association with Gasoline Treating)
 - 84 Storage Tanks 2 Tanks Diam. 19' 2 Tanks Diam. 22'
 - 85 Pump House
 - 86 Storage Tanks (5) Diam. 25'
 - 87-94 Storage Tanks Diam. 36'
 - 95-100 Storage Tanks Diam. 78'
 - 101 Storage Tank Diam. 120'
 - 102 Oil Bunkering Pier
 - 103 Open Storage Area
 - 104 Warehouse
 - 105 Warehouse (Drum Storage)
 - 106-108 Warehouse
 - 109 Can Manufacturing Plant
 - 110-112 Warehouse
 - 113 Drum Manufacturing Plant
 - 114 Tank Car Loading Rack Building

- LEGEND**
- 90.17-127**
- 1-3 Probable Offices
 - 4, 5 Not identified
 - 6 Oil storage tank 65' Diam.
 - 7 (2) Intermediate tanks
 - 8 9 or 10 run down tanks
 - 9-15 Reported Asphalt or Tar Distillation Plant
 - 9 (2) Furnace stills
 - 10 Probable storage
 - 11 Not identified
 - 12 Still
 - 13 Not identified
 - 14 6 or more tanks
 - 15 Not identified
 - 16 Oil storage tank 65' Diam.
 - 17 Oil storage tank 90' Diam. Empty or being torn down.
 - 18 Probable storage
 - 19 Not identified
 - 20 Conveyor house small gas holder 25' Diam. nearby
 - 21 Not identified
 - 22 Oil storage tank 145' Diam.
 - 23 Oil storage tank 120' Diam.
 - 24 Oil storage tank 120' Diam.
 - 25 Oil storage tank 120' Diam.
 - 26 Oil storage tank 120' Diam.
 - 27-29 Not identified
 - 30 Coal storage pile—gantry crane
 - 31 Gas holder 75' Diam. (Wet type)
 - 32 Not identified
 - 33 Storage—(8) Horizontal tanks S of building
 - 34 Storage
 - 35 (4) Horizontal stills
 - 36-38 Not identified
 - 39 Oil storage tank 55' Diam.
 - 40 Oil storage tank 25' Diam.
 - 41 Oil storage tank 78' Diam.
 - 42 Oil storage tank 114' Diam.
 - 43 Office Building
 - 44 Warehouse
 - 45, 46 Possible drum plant
 - 47 (4) Small tanks—Empty
 - 48 Possible drum plant
 - P 49, P 50 Stills and fractionating columns
 - 51 (1) Run down tanks
 - 52 (6) Run down tanks
 - 53 Intermediate tank 30' Diam.
 - 54 (8) Intermediate tanks
 - 55 (1) Horizontal tanks—Probably butane
 - 56 12 Run down tanks
 - 57 Not identified—Building
 - P 58 Still
 - 59 (6) Intermediate tanks
 - P 60, P 61 Still and fractionation
 - 62 Not identified
 - 63 (9) Intermediate tanks
 - 64 Not identified
 - 65 Still
 - 66 Not identified
 - 67 Loading tanks
 - 68-71 Oil storage tanks 85' Diam. Camouflaged
 - 72 (11) Intermediate tanks
 - 73, 74 Unidentified Building
 - 75 (11) Intermediate tanks
 - 76 (3) Oil storage tanks (1) 54'; (2) 45' Diams.
 - 77 Oil storage tank 72' Diam.
 - 78 Oil storage tank 65' Diam.
 - 79 Oil storage tank 55' Diam.
 - 80, 81 Warehouse
 - 82 Warehouse (9) loading tanks E of building on RR Siding.
 - 83-86 Unidentified miscellaneous store and maintenance shed.
 - 87 Probable warehouse and oil pier
 - P 88, P 89 Still and oil tank near pier
 - P 90 Still
 - 91 Probable intermediate tanks
 - 92 Horizontal tanks
 - P 93 Still
 - 94 Office group
 - P 95 Still
 - 96-98 Not identified
 - 99 (6) Intermediate tanks
 - 100 Possible compressor building
 - 101 Gas holder 50' Diam.
 - 102 Possible gas generators
 - 103, 104 Gas holders (Wet type) 75' Diam.
- P/ Primary Buildings

**INDUSTRIAL REPORT 70
REVISED BY C.I.U. XXI BOM.COM.
NO'S 55,56,37,39 REMOVED IN
TARGET I16**

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PHOTO INTELLIGENCE SECTION
EVALUATION BRANCH
PHOTOGRAPHIC DIVISION
AC/AS, INTELLIGENCE

FUNCTIONAL ANALYSIS REPORT NO. F/A-67
Date 16 February 1945

TARGET NO: 90.17-116
NAME OF TARGET: MITSUBISHI OIL REFINERY
LOCATION: KAWASAKI, TOKYO, JAPAN COORDINATES: 35°30' N- 139°44' E
PHOTOGRAPHY: Date 13 Dec 44 Mission 3PR/4M37A Print Nos. 2V49, 50
5R36-38

* Mosaic prepared from this photography

1. This report has been prepared from a study of aerial photographs and a consideration of evaluated ground information supplied by the Joint Target Group.
2. FUNCTION:
Comprised of several fractionating towers and treatment units as well as large bulk storage areas, the KAWASAKI REFINERY of the MITSUBISHI OIL CO. is reported to be one of the more important producers of aviation gasoline by polymerization. In addition to high octane gasoline, the plant produces motor gasoline, kerosene, fuel oil, lubricating oil and asphalt.
3. LOCATION:
This refinery is located halfway between TOKYO and YOKOHAMA on reclaimed land, east of the mouth of the TSURUMI RIVER. Situated in a highly industrialized waterfront area, the plant site occupies about 57 acres, irregularly shaped, with 900 feet of waterfrontage.
4. SERVICES:
A bunkering pier (#102) and waterfront wharves on YOKOHAMA HARBOR facilitate tanker service to the refinery at several berths.
Railroad sidings to the warehouse area and tank car loading racks afford rail connections with the following railroads serving the area:
 - (a) KEIHIN ELECTRIC R.R.
 - (b) TSURUMIRINKO R.R.
 - (c) HANBU ELECTRIC R.R.
 - (d) TOKAIDO MAIN LINE R.R.

5. IDENTIFICATION OF FACILITIES:

<u>BUILDING</u>	<u>OCCUPANCY</u>	
1	Crude Oil Storage Tank	Diam 120'
2	" " " "	" 120' (Possibly Dismantled)
3	" " " "	" 120'
4	Warehouse	
5	"	
6	Unidentified	
7	"	
8	"	
9	10 Storage tanks	5 Tanks Diam 18' 5 Tanks " 25'

- 1 -

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F/A-67 Cont'd

10	Warehouse		
11	Workers Building		
12	Office Type Building		
13	Workers Residences		
14	4 Storage Tanks - 1 Tank	Diam. 75'	
	3 Tanks	Diam. 36'	
15	Warehouse		
16	Unidentified		
17	Unidentified		
18a	Possible Processing Building		
b	Probable Butane Tanks		
19	Warehouse		
20	Unidentified		
21 - 22	Iso-octane unit		
23	Furnace		
24	Accumulators and Horizontal Tanks		
25 - 26	Iso-octane unit		
27	Possible Processing Building		
28	Accumulators and Horizontal Tanks		
29	Intermediate Tank	Diam. 30'	
30	Furnace		
31	Boiler and Power House		
32	3 Horizontal Tanks	Length 30'	Diam. 10'
33	Storage Tank	Diam. 20'	
34	Storage Tank	Diam. 40'	
35	Storage Tank	Diam. 40'	
36	Storage Tank	Diam. 120'	(Possible Repairs)
37	Storage Tank	Diam. 120'	(Roof Removed)
38	Storage Tank	Diam. 120'	
39	Storage Tank	Diam. 120'	
40	Storage Tank	Diam. 120'	
41	Storage Tank	Diam. 120'	
42	Storage Tank	Diam. 120'	
43	Storage Tank	Diam. 120'	
44	Unidentified		
45	Furnace		
46	Furnace		
47 - 48 - 49	Cracking Unit		
50	Intermediate Tanks	2 Tanks Diam. 30'	
		6 Tanks Diam. 20'	
			(1 Possible Dis-
			mantling)
		1 Tank Diam. 18'	
51	Storage Tanks (2)	Diam. 30'	
52	Research Laboratory		
53	Offices		
54	Personnel Building		
55	Probable Shipping Offices		
56	Warehouse		
57	Warehouse		
58	Possible Offices		
59	Boiler House		
60	Storage Tank	Diam. 55'	
61	Possible Pump House		
62	Chemical Laboratory		
63	Intermediate Tanks	6 Tanks Diam. 25'	
		3 Tanks Diam. 20'	
			(1 Possible Dis-
			mantling)
64 - 65	Possible Treating Plant		
66	Gasoline Intermediate Storage Tanks	1 Tank Diam. 30'	
		11 Tanks Diam. 25'	
67 - 68	Primary Distillation Unit		

F/A-67 Cont'd

69	Furnace
70	Storage Tank Dian. 30'
71	Storage Tank Dian. 78'
72	Storage Tank Dian. 78'
73	Storage Tank Dian. 102'
74	Storage Tank Dian. 30'
75	Furnace
76	Vacuum Distillation Unit
77	Storage Tanks 6 Tanks Dian. 15'
	4 Tanks Dian. 20'
78	Storage Tank Dian. 30'
79	Storage Tank Dian. 30'
80	Pressure Distillate Re-run Unit
81	Asphalt Loading Unit
82	Storage Tanks 2 Tanks Dian. 19'
	2 Tanks Dian. 22'
83	(a) Pump House (Possible Association with Gasoline Treating)
	(b) Horizontal Tanks (Possible Association with Gasoline Treating)
84	Storage Tanks 2 Tanks Dian. 19'
	2 Tanks Dian. 22'
85	Pump House
86	Storage Tanks (5) Dian. 25'
87	Storage Tanks Dian. 36'
88	Storage Tank Dian. 36'
89	Storage Tank Dian. 36'
90	Storage Tank Dian. 36'
91	Storage Tank Dian. 36'
92	Storage Tank Dian. 36'
93	Storage Tank Dian. 36'
94	Storage Tank Dian. 36'
95	Storage Tank Dian. 78'
96	Storage Tank Dian. 78'
97	Storage Tank 78'
98	Storage Tank 78'
99	Storage Tank 78'
100	Storage Tank 78'
101	Storage Tank 120'
102	Oil Bunkering Pier
103	Open Storage Area
104	Warehouse
105	Warehouse (Drum Storage)
106	Warehouse
107	Warehouse
108	Warehouse
109	Can Manufacturing Plant
110	Warehouse
111	Warehouse
112	Warehouse
113	Drum Manufacturing Plant
114	Tank Car Loading Rack Building

6. NOTES:

- (a) 5 Tanks removed in #36 to #41 area;
- (b) Tanks #1, 2, 3 possible blast walls with buttresses
- (c) 1 Tank removed #66 area
- (d) 1 Tank removed #86 area
- (e) Area #103 - misc. loose stores, possible construction and repair parts and Materials.
- (f) Several tall pylons, evidently for lightning arrestors, are observed in and about the storage tank areas,