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AICHI ORDNANCE PLANT

DAMAGE ASSESSMENT TABLE

90.20 - 198

Building No. USSBS	JTG	CIU	OAS	Bldg. Area	Structural (1000s sq. ft) A	JTG	CIU	OAS	Superficial (1000s sq. ft) A	JTG	CIU	OAS	Removed (1000s sq. ft) A	R	R
	1a														
	1b														
	1c														
2e		1a		4.9	4.9		1.0								
2f	2A	1b	1	23.8		31.2			23.8		7.5	19.6			
		1c									19.0				
2a	2a	2a		17.2	3.9	5.2			13.3		18.0				
2b	2b	2b		25.2	25.2	0.9	25.0								
2c	2c	2c	2	14.7	4.2	3.2	4.0	35.4	10.5		12.0				
	2f					37.0				19.4					
2d	2d	2d		4.2	4.2	0.8	4.0								
22a	2e	3a	3	2.3	2.3	2.7	2.4	2.3							
22c		3b		0.8	0.8		2.6			12.6	13.0	12.0			
22b	22	4	4						1.0						
3a	3a	22		1.0		1.0	1.7		0.4						
3b	3b	21		0.4		1.0	1.4		1.1						
3c	3c			2.3	1.2										
4	4		20	4.0	0.8					5.8	12.0				
5a	5a	19a		4.5						1.7	10.0				
5b	5b	19b		5.3					9.7	2.5	9.6				
5c	5c	19c		9.7		3.0			7.2			15.5			
5d	5e		19	7.2				9.7							
5f				1.4	1.4				2.9		3.5				
5e	5f	19d		2.9											
5g	5d					0.6									
6	6			1.4	1.4	1.7						22.2			
7a	7a		18	2.5	2.5	3.0		12.7							
7b	7b	18b		10.6	10.6	10.8	9.6								
7c	7c	18c		42.1	3.5	9.0	5.0		38.6	38.0	45.0				
	8	8				1.0	4.0						4.0		
			17												
9	9	24	24	3.9	3.9	4.5				3.8					
11c	12b	25	25			1.5		3.6		2.4					
13a	13a	26	26	2.4	2.4	3.0									
11a	11a	27		1.8	1.8	0.6	25.3								
11b	11b			0.2	0.2	1.0				2.2					
12a	12a	28	28	3.5	3.5	6.3									

PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS EXHIBIT H
90.20-198 AICHI ORDNANCE PLANT
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AICHI ORDNANCE PLANT

DAMAGE ASSESSMENT TABLE

90.20 - 198

Building No. USSBS	JTG	CIU	OAS	Bldg. Area	Structural (1000s sq. ft) A	JTG	CIU	OAS	Superficial (1000s sq. ft) A	JTG	CIU	OAS	Removed (1000s sq. ft) A	R	R
12f				0.7					0.7						
13b	13c	29	29	6.1	3.1	3.0									
12c				3.3					3.3						
10a	10a	13a	16	39.0	32.5	50.2	32.5		5.5						
10d	10d	13b		1.2		1.6	3.2								
10c	10b	15c		12.0			1.5		12.0	1.9					
	10c					1.3				9.4					
10e	10e					0.3									
10f	10f		15	8.6	1.7			45.7	6.9	8.2		8.3			
10g	10g	15b		10.3			15.0		10.3	12.0	20.0				
10h	10h			7.2	1.4				5.8	7.2					
10j	10j	15a		14.3	14.3		15.0			14.4					
14a	14a	31a	31	5.4	5.4	5.4					27.0				
14b	14b	31b		22.0	9.7	20.3	7.6		12.3	9.5					
15a	15a	31c		1.8	1.8	1.2	1.4								
15b	15b			1.4	1.4	1.9									
16	16	30	30	2.6	2.6					1.0	3.3				
17a	17b	34	33	1.8	1.8			3.1				4.3			
17b	17a	33		4.8	4.8					5.2	3.0				
18	18		34	1.7	1.7							0.8			
19a	19a	32b		18.2					18.2	17.8	18.0				
19b	19b			1.3					1.3	1.5					
19c	19c		32	14.1	2.8			21.8	11.3	17.8		18.5			
19d	19d	32a		1.7					1.7	2.1	21.0				
19e	19e			0.6						1.0					
	19f									1.6					
20	20			1.6		0.7				1.1					
21	21			0.8		1.7									
22b	22	4	4	12.6					12.5	12.6	13.0	12.0			
23	23a			57.6	46.1	6.4			11.6	4.4					
	23b					14.1				7.5					
	23c	14	14			6.4	30.0	68.6		2.0	30.0				
	23d					16.1									
28	28			8.6	8.6	9.2									
24a	24a	35a		13.0	3.0	1.7			10.0	5.1	17.0				
	24b		35			4.0				2.8		37.8			
24b	24c	35b		23.8					23.8	9.6	25.0				
	24g					4.1				10.3					

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AICHI ORDNANCE PLANT 90.20 - 198

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AICHI ORDNANCE PLANT	DAMAGE ASSESSMENT TABLE	90.20 - 198

Building No.				Bldg. Area	Structural (1000's sq. ft)					Superficial (1000's sq. ft)					Removed (1000's sq. ft)		
USSBS	JTG	CIU	OAS		A	JTG	CIU	OAS		A	JTG	CIU	OAS		A	R	R
25	25	5	5	9.8	8.7	4.8	3.0	3.4			7.8						
26a	26a	13b		2.3	2.3	3.1	2.2										
26b		13a	13	1.3	1.3		8.4	3.0									
26c	26b			6.1	6.1	8.3											
27a	27a	12b		3.2	3.2	2.8	2.7										
27b	27b	12a	12	1.5		0.4	2.7	1.1									
27c	27c			0.9	0.9	0.8											
29	29	11	11	13.5	13.5	3.0	2.5	7.8			2.2						
30	30	38a		1.7													
31	31a	36	36	43.2	20.3	24.0				22.9	9.0						
	31b					6.0					4.4	30.0					
32	32	37	37	13.1	7.1	4.3		13.7		6.0	8.3	16.0					
33a	33a	38b	38	5.8	1.9	5.7		13.5		3.9	11.0	25.0	8.8				
33b	33b			16.0	12.2	5.3				3.8	2.7						
33c				0.6													
33d				0.6													
34	34a			5.0	5.0	2.4											
	34b	6a				8.5	7.8										
35a	35a	6b	6	1.1	1.1	3.4	8.4	15.0									
35c		6c		0.5	0.5		3.5										
35b	35b			1.0	1.0	2.1											
36	36			4.5	4.5	6.5											
	37a					21.0											
37a	37b	10h		62.6	36.1	12.4	17.0			26.5	12.8	50.0					
	37c					11.5					9.5						
37b	37d	10g		40.4	15.6	8.0	3.0			24.8	35.2	40.0					
39c	39c	10f		4.9	4.9		7.5										
39d	39b	10d		7.2	7.2		11.0										
39e	39a		10	4.5	4.5	3.3		325.8					4.5				
39a	39d			66.3	3.1	8.3				53.5	53.4						
	39c					7.2											
	39e	10a				16.3					9.0	70.0					
39b	39f	10b		201.7	112.5		47.0			89.1	34.8	147.0					
	39g	10c				89.3					55.0	4.0					
	39h										5.7						
38a	38a	7a		70.5	24.3	26.2	20.0			45.9	50.5	24.0					
38b		7b	7	13.9				47.8		13.9		46.0	30.4				

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AICHI ORDNANCE PLANT	DAMAGE ASSESSMENT TABLE	90.20 - 198

Building No.				Bldg. Area	Structural (1000's sq. ft)					Superficial (1000's sq. ft)					Removed (1000's sq. ft)		
USSBS	JTG	CIU	OAS		A	JTG	CIU	OAS		A	JTG	CIU	OAS		A	R	R
		7c										1.4					
40a				0.2						0.2							
40b	40	39	39	3.1	3.1	4.6											
41c	39j	40	40	1.1	1.1	0.5					2.5						
41a	41a	41	41	2.6						2.6	5.1						
41d	41b			0.6	0.6	1.2	18.6					19.0					
41b	41c	42	42	2.3	0.7	3.4											
42	42a	43	43	3.0		6.1				3.0							
	42b										0.4						
43	43	9a		3.6	0.3												
44a	44	9b		12.5							31.5						
44b				18.7													

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AICHI ORDNANCE PLANT 90.20 - 198
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90.20-198 AICHI ORDNANCE PLANT

Reported
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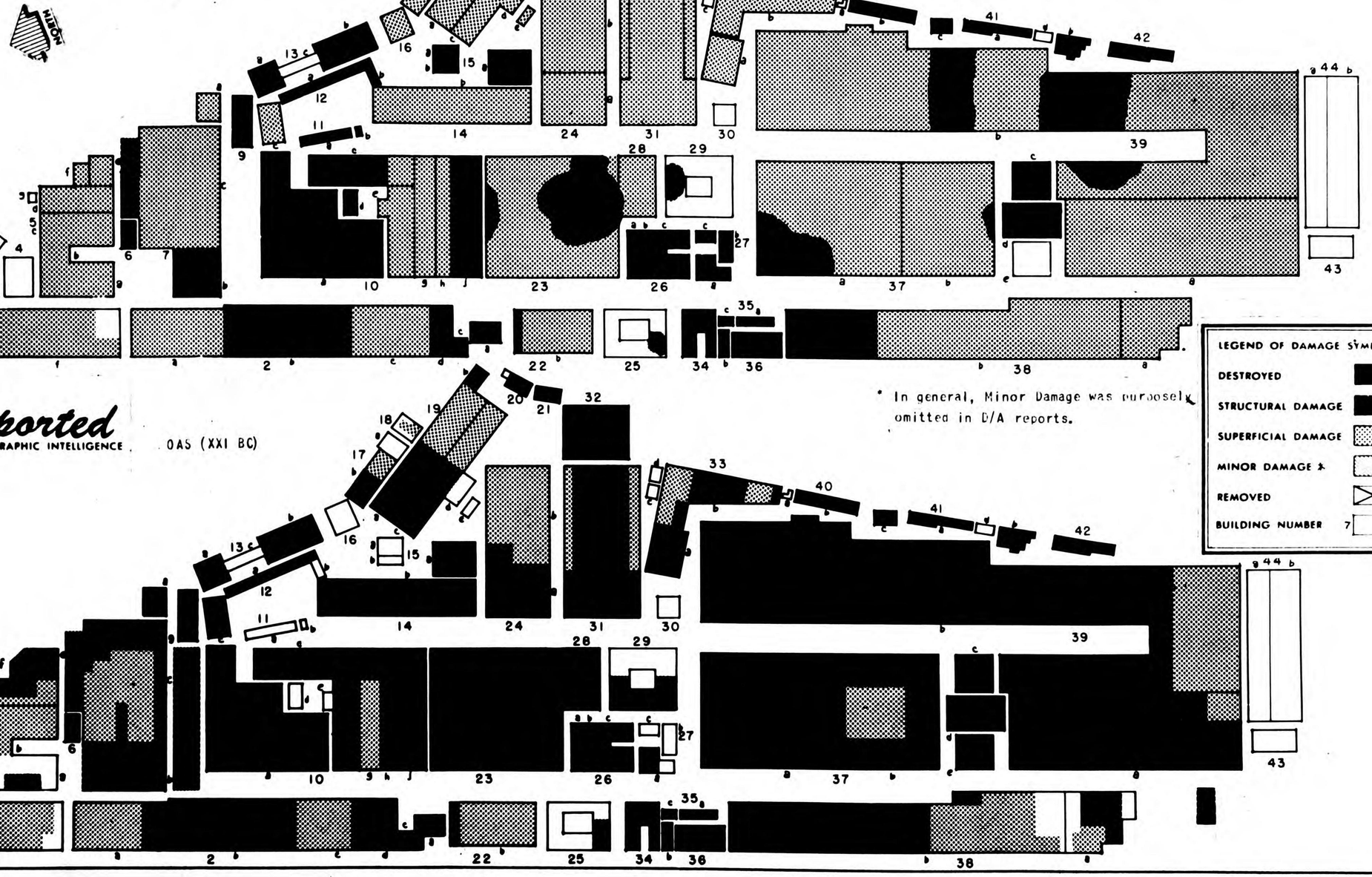
CIU (XXI BC)



LEGEND OF DAMAGE SYMBOLS

DESTROYED	
STRUCTURAL DAMAGE	
SUPERFICIAL DAMAGE	
MINOR DAMAGE *	
REMOVED	
BUILDING NUMBER	7

* In general, Minor Damage was purposely omitted in D/A reports.

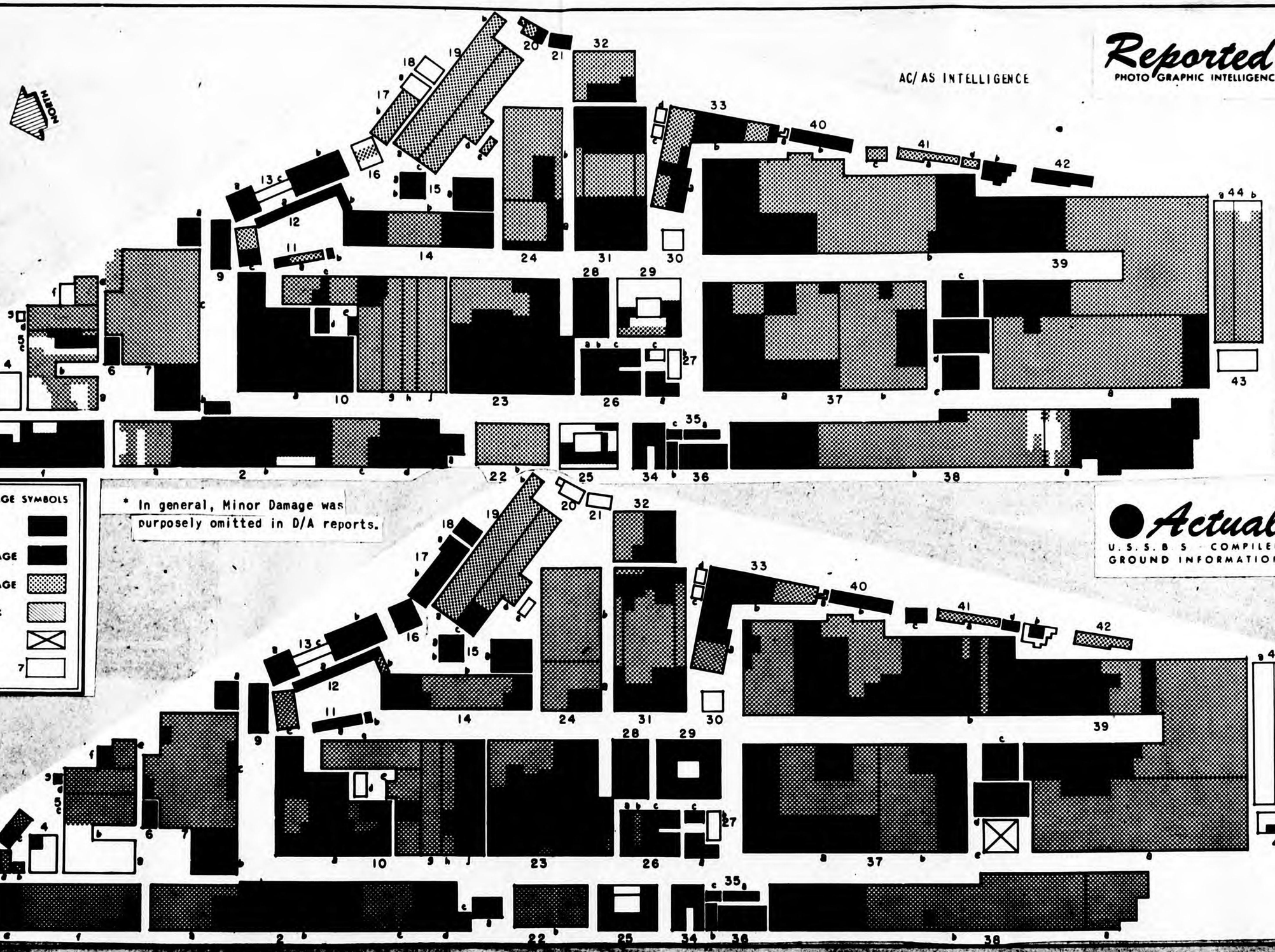
Reported
PHOTOGRAPHIC INTELLIGENCE

OAS (XXI BC)

AICHI ORDNANCE PLANT 90.20 - 198

AC/AS INTELLIGENCE

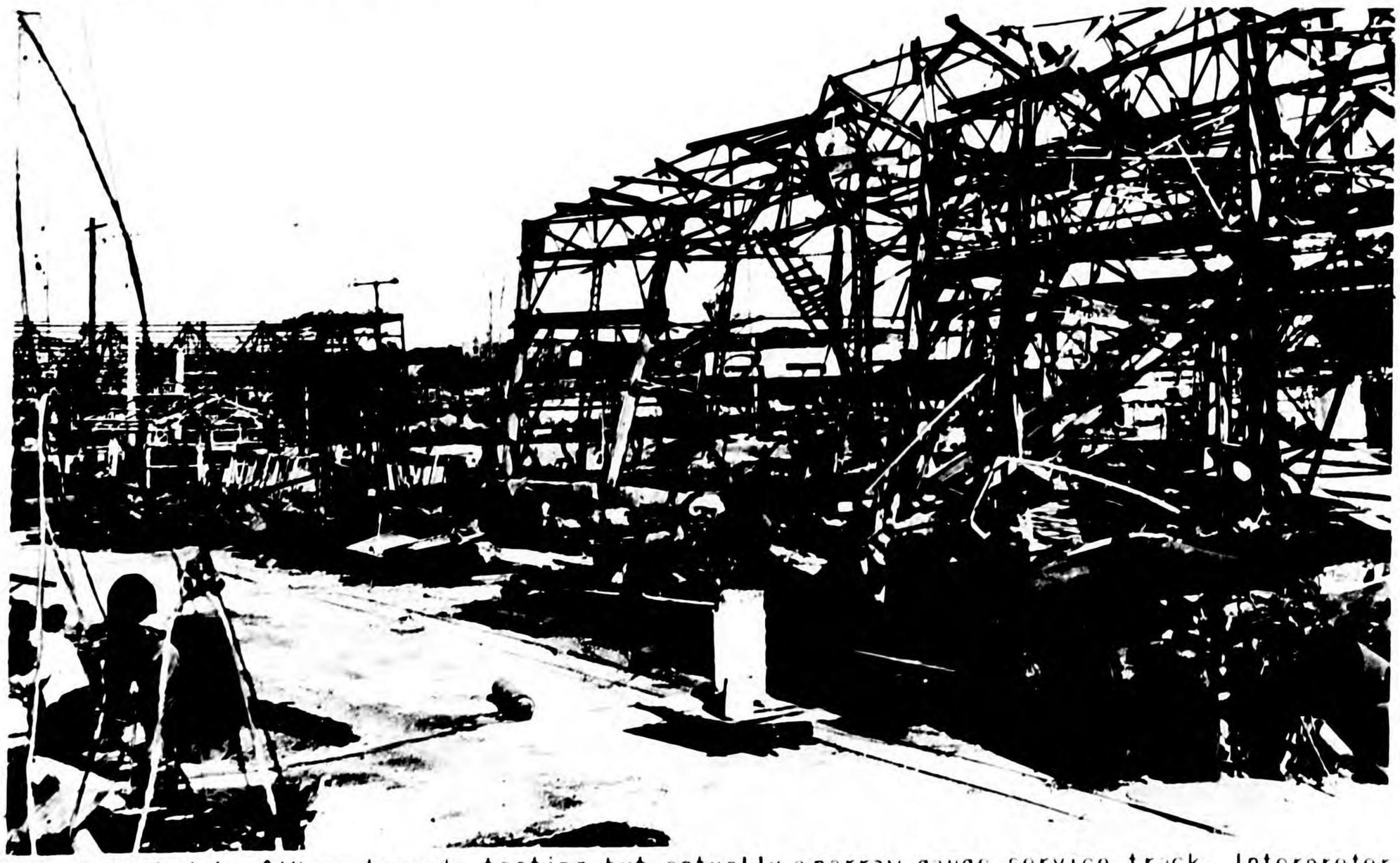
Reported
PHOTOGRAPHIC INTELLIGENCE



Actual
U.S.S.B.S. COMPILED GROUND INFORMATION

AICHI ORDNANCE PLANT 90.20 - 198

A Reported by JTG as superficially damaged. Structural damage of this type (where roof appears undisturbed from the air) is almost impossible to detect. (Bldg 2B)



B Reported by CIU as torpedo testing but actually a narrow gauge service track. Interpreter overlooked real torpedo testing (which was partially housed) and in attempting to confirm ground information chose this installation as the most reasonable. (Bldg 14B)

EXHIBIT J

KURE NAVAL ARSENAL

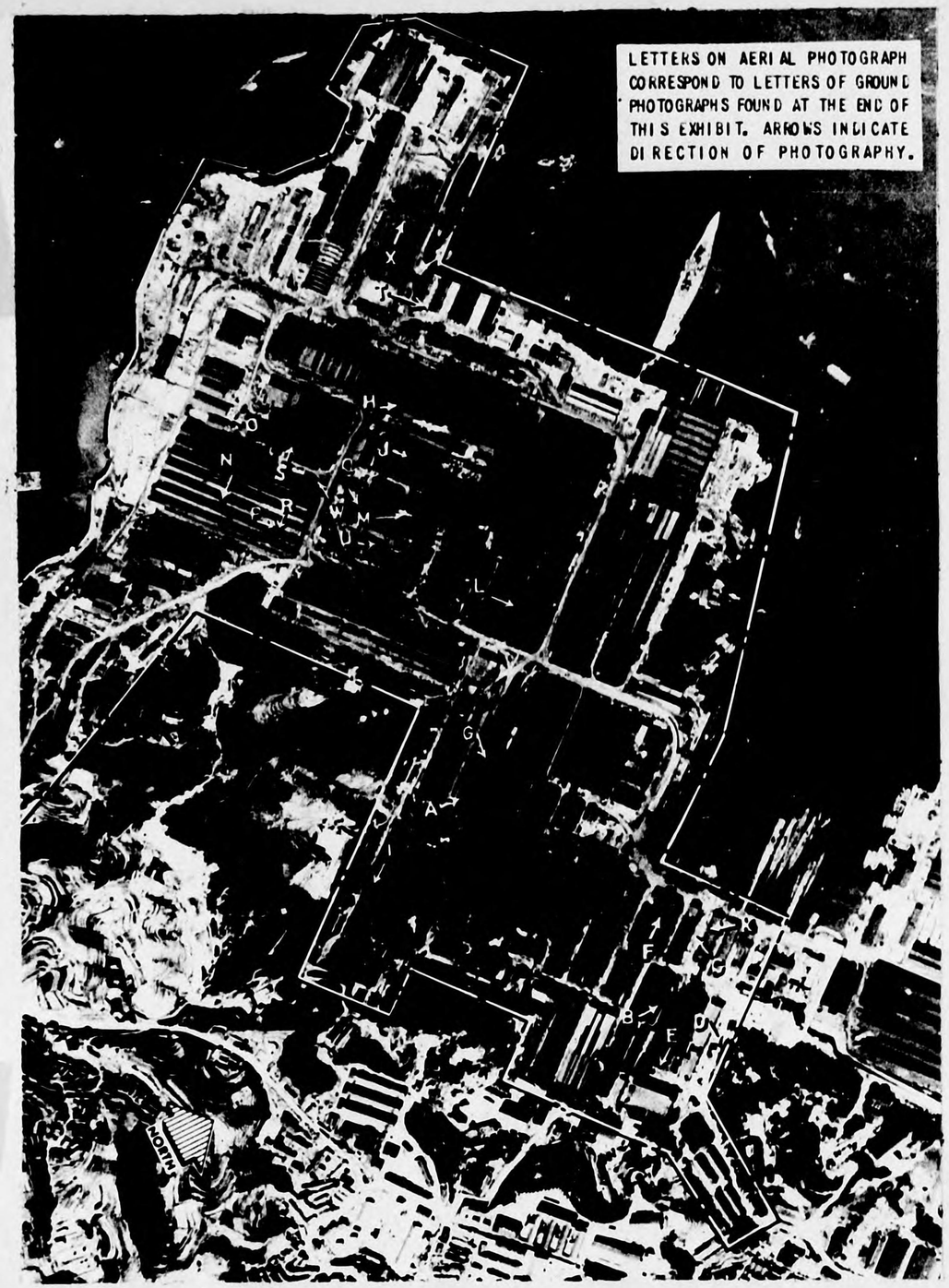
90.30-657 A

LAT. 34° 13'N - LONG. 132° 32'E

KURE, JAPAN

See Exhibit P for abbreviations used in this exhibit.

90.30-657 A KURE NAVAL ARSENAL



KURE NAVAL ARSENAL 90.30 - 657 A

1. DESCRIPTION OF TARGET

a. The Kure Naval Arsenal was the principal arsenal for the Japanese Navy. The plant produced in its four major departments (as was reported): (1) armor plate, (2) ordnance (naval guns, bombs, and shell casings), (3) torpedoes, (4) electrical and radio equipment.

b. The arsenal is located 2 miles south of Kure City on Kure Wan.

c. The plant comprises 122 listed structures with a total built-up area of approximately 3,840,000 square feet.

2. SUMMARY

a. Interpretation of building functions was only fair, although the bulk of the important buildings were correctly or nearly correctly identified. Of a total of 122 structures, field data are available on 110, and of these:

(1) 63 were identified correctly.
(2) 14 were identified as having similar occupancy.
(3) 13 were unidentified.
(4) 20 were identified incorrectly.

b. Interpretation of structural types was poor. Out of 123 buildings and subdivisions checked in all construction type categories, 70 were correct. Inaccurate interpretation of cranes and their capacities was the source of much of the error. Interpretation of combustibility was good. Of 122 buildings and subdivisions checked, 93 were correct.

c. Damage assessment was fairly accurate, although there was considerable variance between reported and actual damage for a number of individual buildings. The amount of structural damage in particular, was underestimated. Table I summarizes the damage situation.

TABLE I

	ACTUAL Sq Ft	REPORTED Sq Ft
Destroyed	224,900	250,100
Structural Damage	570,600	411,515
Superficial Damage	1,760,200	2,217,895
Total Damage	2,555,700	2,879,510

3. SOURCE OF DATA

a. Reported

(1) AC/AS Intelligence F/A and S/A Report #62, 25 June 1945

(2) CIU (XXI BC) D/A Report #149, 27 June 1945

b. Field Data

(1) USSBS (G-2, PIC) field notes, Japanese blue prints, building areas, and other data.

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4. FUNCTIONAL ANALYSIS

a. Use of Plant

Reported: Manufacture of naval ordnance, armor plate, torpedoes, electrical and radio equipment.

Actual: As reported.

b. Boundaries

(1) Plant boundaries were correct as reported.

(2) Several building boundaries were in error.

c. Building Identification (F/A Table)

Note: Buildings 1-54 comprise the adjoining Kure Naval Shipbuilding Yard, (90.30 - 657 A)

d. Summary of Tabulation

TABLE 2

F/A ACCURACY FACTOR	TOTAL BUILDINGS No. Bldgs	%
Correct	63	57
Of Similar Occupancy	14	13
Unidentified	13	12
Incorrect	20	18
Total	110	100

Total Plant 67

e. Remarks

(1) Reliable detailed ground information was available on certain sections of the arsenal (in the torpedo department, for example) and contributed much to the accuracy of the analysis.

(2) Reported building outlines were often incorrect. In several instances, separate buildings were shown as parts of adjoining buildings, or a single building was shown as more than one building.

(3) Buildings of similar structural types, e.g., storage, small shops, mess halls, etc., were frequently incorrectly identified.

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FUNCTIONAL ANALYSIS TABLE — KURE NAVAL ARSENAL — 90.30 - 657A

BUILDING NUMBER JTG	PRIMARY FUNCTION REPORTED JTG	PRIMARY FUNCTION ACTUAL	EVALUATION JTG CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR
55		Design & Drafting Dept	x				85
a		Design & Drafting Dept					
b		Storage (Electrical Equip.)	x				85
56							
		Electrical Shop				x	0
57		Electrical Bldg				x	0
58		Electrical Shop					
59		(Manufacturing & Repair)	x				85
60		Steam-Elec. Power House	x				100
61		School (For Arsenal Tech.)				x	15
62		School (For Arsenal Tech.)				x	15
63		Recreation Bldg & Lecture Hall				x	15
64		Electrical Equip. Assembly	x				100
65		Elec. Shop (Repair and Assembly Motors & Generators	x				85
66		Machine Shop	x				100
67		Elec. Equip. Assembly	x				85
68		Offices and Storage	x				70
69			x				78
		Shed (Storage)					
a		Metal Shop - Training					
b		Apprentices					
		Storage	x				70
70							
a							
b							
71		Tool Making Shop	x				85
c		(Torpedo Works)					
b							

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FUNCTIONAL ANALYSIS TABLE

KURE NAVAL ARSENAL — 90.30 - 657A

BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED JTG	ACTUAL	EVALUATION JTG CORRECT	JTG SIMILAR	JTG UNIDENT	JTG WRONG	F/A CORRECT	F/A SIMILAR	F/A UNIDENT	F/A WRONG	F/A ACCURACY FACTOR
71 c												
d												
e												
72		Shop (Torpedo Mechanisms)	Shop making parts for torpedo motors	x								100
73		Shop (Torpedo Materials Section)	Testing shop for torpedo motors	x								100
74		Shop (Torpedo Mechanisms)	Machine Shop (Torpedo Works)	x								100
a												
b												
c												
75		Shop (Torpedo Mechanisms)	Machine Shop (Torpedo Works)	x								100
76		Shop (Torpedo Mechanisms)	Plating & Bending Pipes (High Press. Torpedo Lines)	x								100
a												
b												
c												
77		Casting Plant	Casting & Welding Works	x								100
a												
b												
c												
d												
e												
78		Shops	Torpedo Assembly Shops	x								85
79		Shops	Warehouse - Later an office		x							70
80		Shop	Casting Shop	x								85
81		Shop	Storage & Craneways		x							70
82		Unidentified	Transformer Station			x						45
83		Shop	Paint Shop Projectiles & Bombs	x								85
84		Shop	Crusher Shop - Crushing Casting Sand	x								85

EXHIBIT J PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS
90.30-657 A KURE NAVAL ARSENAL

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FUNCTIONAL ANALYSIS TABLE

KURE NAVAL ARSENAL — 90.30 - 657A

BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED JTG	ACTUAL	EVALUATION JTG CORRECT	JTG SIMILAR	JTG UNIDENT	JTG WRONG	F/A CORRECT	F/A SIMILAR	F/A UNIDENT	F/A WRONG	F/A ACCURACY FACTOR
85		Shop	Air Compressor Bldg				x					15
86		Shop	Forging Shop	x								85
87		Shop	Light Ammunition Mfg	x								87
a												
b												
c												
d												
e												
f												
g												
h		Heat Treatment & Probable Forge Facilities										
j												
k												
88		Boiler House	Steam Power Plant	x								100
a												
b												
89		Forging & Casting	Forging Casting	x								100
a			Forging									
b			Casting									
90		Shops	Shop - Mfg. Projectiles	x								98
a												
b		Machine Shop Section										
91		Offices - Ordnance Hdqts	Offices	x								100
a			Offices									
b			Design									
c			Hdqts - Gun Section									
d												
e			Design									
f			Storage of Designs									
92		Shops (Shell Factory)	Tool Making Shop		x							85
a												

EXHIBIT J PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS
KURE NAVAL ARSENAL 90.30 - 657 A

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KURE NAVAL ARSENAL	FUNCTIONAL ANALYSIS TABLE	90.30 - 657A

BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED JTG	ACTUAL	EVALUATION JTG CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR
93		Shops (Shell Factory)	Machine Shop-Shells&Bombs	x								100
94		Heavy Industry (Reported Gun Mount Factory)	Shops of Gun Mount Factory	x								100
a			Apprentice Shop									
b			Ammo Storage									
c			Machining, Fitting, Assembly									
d												
e			Forging									
f												
g												
h												
j			Gun Mount Assembly									
95		Shops	Warehouse			x						15
96		Unidentified	Offices		x							45
a												
b												
c												-
97		Shop (Reported Forge Shop)	Machine Shop		x							80
98		Small Boiler House	Offices			x						0
99		Forge	Heavy Forging Shops	x								100
a												
b												
c												
d												
100		Shop	Steel Production			x						15
a												
b												
c												
d		Overhead Crane										
101		Gasometer	Gasometer	x								100
102		Shops (Storage Battery Plant)	Manufacture Storage Batteries for S/S	x								100

PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS EXHIBIT J
90.30-657 A KURE NAVAL ARSENAL
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KURE NAVAL ARSENAL	FUNCTIONAL ANALYSIS TABLE	90.30 - 657A

BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED JTG	ACTUAL	EVALUATION JTG CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR
103		Shops (Storage Battery Plant)	Batteries for Midget Subs	x								100
104		Shops (Storage Battery Plant)	Batteries for Midget Subs	x								100
105		Machine Shop	Heat Treatment Shop				x					8
a												
b												
106		Heavy Industry	Steel Working Shop - Gun Turrets, Midget Sub. Ass	x								78
a		Machine Shop	Steel Working Shop - Steel Plates for Turrets & Subs									
b		Gun - Tube Factory	Steel Working Shop - (Steel Plates)									
c		Gun - Tube Factory	Steel Working Shop - (Steel Plates)									
d		Gun - Tube Factory	Steel Working Shop - (Steel Plates)									
e		Gun - Tube Factory	Gun Turret Manufacture									
f		Gun - Turret Factory	Gun Turret Manufacture									
g		Gun - Turret Factory	Gun Turret Manufacture									
h		Gun - Turret Factory	Gun Turret Manufacture									
j		Gun - Turret Factory	Gun Turret Manufacture									
k		Gun - Turret Factory	Midget Sub Assembly									
l		Gun - Turret Factory	Midget Sub Assembly									
m		Gun - Turret Factory	Midget Sub Assembly									
n		Overhead Crane	Overhead Crane									
107			Heavy Industry		x							73
a			Steel Machining - Armour Plate, Shells & Eng. Blocks									
b			Steel Machining - Armour Plate, Shells & Eng. Blocks									
c		Secondary Rolling Mills	Steel Machining - Armour Plate, Shells & Eng. Blocks									
d			Bombs & Shell Production									
e		Secondary Rolling Mills	Machining Plate & Engine (Also Plate Cutting)									
f		Open Hearth Bldg	Machining Plate & Engine (Also Shells)									
g			Machining Plate & Engine									
h		Secondary Rolling Mills	Machining Plate & Engine									
j		Secondary Rolling Mills	Plate Rolling Cutting, Bending									
k		Secondary Rolling Mills	Engine (Mills) & Boiler Room									
l			Annealing Furnaces									

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EXHIBIT J PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS
KURE NAVAL ARSENAL 90.30 - 657A

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FUNCTIONAL ANALYSIS TABLE

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BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED JTG	ACTUAL	EVALUATION JTG CORRECT	JTG SIMILAR	JTG UNIDENT	JTG WRONG	F/A CORRECT	F/A SIMILAR	F/A UNIDENT	F/A WRONG	F/A ACCURACY FACTOR	
107m		Open Hearth Bldg	Annealing Furnaces										
n			Steam Engines Offices, Tool Storage										
o			Rolling Mills (Armor Plate)										
108		Bldgs associated with 107	Gas Producer Bldg (Primary)			x						45	
109		Bldgs associated with 107	Gas Producer Bldg (Secondary)			x						45	
110		Machine Shop	Bomb & Shell Production	x								85	
a													
b													
c													
d													
111		Shop	Machine Shop	x								85	
a			General Repair Shop &										
b			Torpedo Machining										
112		Heat Treating Shop	Boiler House				x					0	
113		Associated with 107				x						45	
114		Associated with 107	Boiler House				x					0	
115		Heat Treatment Shop	Boiler House				x					0	
116		Shop	Fabricating Shop (Structural Steel)	x								85	
a			Steel Columns, Beams, Girders, etc.										
b			Steel Columns, Beams, Girders, etc.										
c			Non Ferrous Metals Shop										
d													
e		Overhead Crane	Overhead Crane										
117		Small Shop	Laboratory (Metallurgical & Test Off.)				x					0	
118		Bldg associated with 120	Gas Producer Bldg			x						45	
119		Bldg associated with 120	Electric Steel Furnaces			x						45	
120		Forge & Casting Plant			x							85	
a			Forging Shop										
b			Steel Production (Open) Hearths										
c			Charging Room										
d													

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BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED JTG	ACTUAL	EVALUATION JTG CORRECT	JTG SIMILAR	JTG UNIDENT	JTG WRONG	F/A CORRECT	F/A SIMILAR	F/A UNIDENT	F/A WRONG	F/A ACCURACY FACTOR	
120e			Storage										
f		Overhead Crane	Overhead Crane-Ingot Yard										
121		Associated with Bldg 120	Annealing Furnaces			x						45	
122		Associated with Bldg 120	Gas - Producer Bldg			x						45	
a													
b													
123		Associated with Bldg 120				x						45	
a			Mess Hall										
b		Overhead Crane	Scrap Yard										
124		Open Hearth & Prob. Elect. Furn. Bldg	Steel Prod. - Open Hearths	x								100	
a													
b													
c													
d													
e													
f													
g													
h													
j													
k													
l		Overhead Crane											
m													
125		Small Shop	Metallurgical Laboratory				x					15	
126		Coal & Ore Yard	Coal & Ore Storage	x								100	
127		Plant Maintenance Shops	No Data										
128		Plant Maintenance Shops	No Data										
129		Plant Maintenance Shops	No Data										
a													
b													
130		Plant Maintenance Shops	No data										
131		Plant Maintenance Shops	No data										

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BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED JTG	ACTUAL	EVALUATION JTG CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR JTG
132		Plant Maintenance Shops	No date					
133		Plant Maintenance Shops	No data					
134		Plant Maintenance Shops	No date					
a								
b								
c								
d								
e								
135		Boiler House	Boiler House & Storage	x				100
136		Associated with Bldg 140	Gas Producer Bldg		x			45
137		Open Hearth Bldg	#3 Steel Manuf Plant	x				100
a								
b								
c		Overhead Crane						
d								
e								
138		Machine Shop	Gun Barrel Machine Shops	x				85
a			Offices, Tool Cribs, Mainte.					
b			Gun Barrel Machining					
c			Gun Barrel Machining					
d			Gun Barrel Machining					
e			Gun Barrel Machining					
f			Gun Barrel Machining					
g			Heavy Machining					
h			Storage Yard - Gun Barrels					
j								
k		Gantry						
139		Large Shop	Gun Liner Fitting & Annealing	x				85
140		Shop	Repair Shop - Precision Instruments- Gas Producer Building				x	50

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BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED JTG	ACTUAL	EVALUATION JTG CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR JTG
141		Small Shop	Annealing Furnaces		x			70
142		Warehouse	Storage	x				85
143		Warehouse	Storage	x				85
144		Boiler House	Electric Power House	x				85
a								
b								
145		Prob. Machine Shop	Machine Shop (Shells)	x				80
146		Warehouse	Storage	x				85
147		Warehouse	Storage	x				85
148		Storage Sheds	Storage	x				85
149		Storage Sheds	Storage	x				85
150				x				100
a		Floating Crane	Floating Crane					
b		Floating Crane	Floating Crane					
151		Storage Yard	Storage Yard	x				85
a		Hammerhead Crane						
152		Warehouse	Warehouse	x				85
153		Warehouse						
154		Warehouse	Pump House - Air Compressors				x	15
155		Warehouse						
156		Machine Shop	Machine Shop	x				85
a			Boring & Shaping of					
b			Torpedo Cases					
c								
157		Unidentified	Torpedo Assembly & Repair			x		45
a			Shop Machining					
b			Testing					
c			Assembly					
d			Repair Shop					
e			Shipping Room					
f			Office					

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BUILDING NUMBER JTG	PRIMARY FUNCTION REPORTED JTG	EVALUATION JTG CORRECT	JTG SIMILAR	JTG UNIDENT	JTG WRONG	ACTUAL	F/A ACCURACY FACTOR JTG	F/A ACCURACY FACTOR CORRECT	F/A ACCURACY FACTOR SIMILAR	F/A ACCURACY FACTOR UNIDENT	F/A ACCURACY FACTOR WRONG
157g	Fuel Oil Pier				x	Torpedo Testing Office	15				
158	Storage Type Bldg				x	Boiler Room	15				
159	Storage Type Bldg				x	Plating Shop	15				
160	Storage Type Bldg										
a											
b											
c											
161	Coal Yard	x				Coal Yard	100				
a	Offices										
b	Overhead Cranes					Overhead Cranes					
c	Overhead Cranes					Overhead Cranes					
d	Hammerhead Crane					Hammerhead Crane					
e	Hammerhead Crane					Hammerhead Crane					
162	Office & Storage Type Bldg	x				Repair & Storage Sheds	76				
163	Office & Storage Type Bldg	x				Repair & Storage Sheds	78				
164	Office & Storage Type Bldg	x				Repair & Storage Sheds	78				
165	Office & Storage Type Bldg	x				Repair & Storage Sheds	78				
166	Office & Storage Type Bldg	x				Repair & Storage Sheds	78				
167	Warehouse		x			Garage & Mess Hall	70				
168	Prob. Office										
169	Storage Type Sheds	x				Storage & Repair	85				
170	Storage Type Sheds	x				Storage & Repair	85				
171	Storage Type Sheds	x				Storage & Repair	85				
172	Storage Type Sheds	x				Storage & Repair	85				
173	Storage Type Sheds	x				Storage & Repair	85				
174	Unidentified				x	Warehouse	45				
175	Storage Yard	x				Storage Yard	100				
a	2 - Hammerhead Cranes					2 Hammerhead Cranes					
b	Fuel Oil Pier					Fuel Oil Pier					
c	Fuel Oil Pier					Fuel Oil Pier					
176 a&b	100T and 150T Cranes										

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5. STRUCTURAL ANALYSIS

a. Check on Scale Measurement

(1) Linear dimensions were 98 per cent correct.

(2) Area figures were 92 per cent correct based on Japanese figures of 31 sample buildings.

b. S/A (See S/A Table)

c. Summary of Tabulation

(1) Construction Types

TABLE 3

Construction Type	No. Bldgs	No. Corr	% Corr
A1.1	1	1	100
A1.2	1	0	0
A2.3	10	6	60
B1	27	19	71
B2	20	2	10
D	30	27	90
E1	9	5	56
E2	19	9	47
F1	4	0	0
F2	1	0	0
S	1	1	100
Total	123	70	57

(2) Combustibility

TABLE 4

Building Combustibility	No. Bldgs	No. Corr	% Corr
Combustible (C)	49	35	71
Non-Combustible (N)	67	54	81
Fire-Resistant (R)	6	4	67
Total	122	93	76

d. Remarks

(1) "A" Category: Most of the buildings were correctly identified as being single story buildings. The greatest error was in reporting cranes where none existed.

(2) "B" Category: The greatest error was in not reporting cranes where they were present. When cranes were reported, their capacity was generally overestimated.

(3) "D" Category: The greatest error was in reporting the number of floors.

(4) "E" Category: The greatest errors were in reporting the number of floors, and in reporting load-bearing wall buildings as frame structures.

(5) In computing most building areas, Japanese figures were used. On some minor buildings where japanese figures were not available, the reported areas were used.

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STRUCTURAL ANALYSIS TABLE

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BUILDING NUMBER	1000'S OF SQ. FT. PLAN AREA		NUMBER OF FLOORS		SIZE OF BAY		ROOF MATERIAL		COMBUSTIBILITY OF BUILDING		CONSTRUCTION TYPE	
	ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED	ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED
						in ft.						
55	9.9	11.2							C	C		
a	1.6	3.4	1	2		12	W	Lt	C	C	E-2	E-2
b	6.3	7.8	2	3		12	W	Lt	C	C	F-1	E-2
56	17.5	12.6	2	2		12	W	Lt	C	C	F-1	E-2
57	11.3	11.0	2	2		12	W	Lt	C	C	F-2	E-2
58	11.1	11.0	2	2		12	W	Lt	C	C	F-1	E-2
59	8.6	9.0	3	3		20	Conc	4½"Conc	R	R	E-1	E-1
60	48.6	58.6		1					N			
a		5.8	2			20	SM		N		E-2	
b		13.3	1			45	SM		N		B-1	
c		13.0	2			40	SM	Lt	N	N	E-2	A-2.3
d		3.9				25	SM		N		E-2	
e		2.8	1			25	SM		N		E-2	
f	7.8	7.8	1			80	Conc	4½"Conc.	N	N	A-1.2	A-2.3
g	6.9	7.1	3			75	SM				A-1.1	
61	8.2	9.8	2	2			SM	Lt	C	C	E-2	E-2
a	4.1	4.9				35						
b	4.1	4.9				35						
62	7.8	9.8	2	2		35	SM	Lt	C	C	E-2	E-2
a	3.9	4.9										
b	3.9	4.9										
63	15.3	10.0	2	2		27	SM	Lt	C	C	E-2	E-2
64	19.7	22.0	3	3		20 x22	Conc	4½"Conc	R	R	F-1	E-1
65	17.4	15.9							N			
a	3.1	3.6	2	2		45	SM	Lt	N	N		E-2
b	14.3	12.3	2	3		26 x60	SM	Lt	N	N	B-1	B-2
66	26.8	27.6							C	N		
a	17.9	18.4	Mezz	1		80	SM/W	Lt	C	N	B-2	B-2
b		9.2	2	1		40	W	Lt	C	N	E-2	B-2
67	8.8	9.9	2	1		45	SM	Lt	N	N	D	D
68	10.7	11.1	2	1		60	SM	Lt	C	N	E-2	A-2.3

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BUILDING NUMBER	1000'S OF SQ. FT. PLAN AREA		NUMBER OF FLOORS		SIZE OF BAY		ROOF MATERIAL		COMBUSTIBILITY OF BUILDING		CONSTRUCTION TYPE	
	ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED	ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED
69	12.5	13.1							C			
a	3.1	3.8	2	1		30	W	Lt	C	C	D	D
b	9.4	9.3	1	1		60	W	Lt	C	N	D	D
70	9.2	11.0							C	C		
a	3.2	4.3	1	1		45	W	Lt	C	C	D	D
b	6.0	7.7	1	1		45	W	Lt	C	C	D	D
71	25.4	26.7	1	1								
a		1.8	1			40	W	Lt	C	N	B-2	D
b		1.8	1			40	W		C			
c	5.3	5.6	1			20	W		C			
d	13.7	14.4	1			45	W	Lt	C	N		B-1
e	2.9	3.1	1			15	W		C			
72	12.7	12.1	1	1		55	SM	Lt	N	N	A-2.3	A-2.3
73	8.5	9.0	2	1		45	SM	Lt	N	N	E-2	D
74	55.0	61.4		1			SM	Lt	N	N	B-2	B-1
a		56.6	1-1/42			48			N			
b		2.4	1			30			N			
c		2.4	1			30			N			
75	35.8	37.0	1	1		48	SM	Lt	N	N	B-2	B-1
76		16.4		1				Lt	N	C	A-2.3	A-2.3
a		4.3	1			25	SM		N			
b		10.0	1			27	SM		N			
c		2.1	1			15	SM		N			
77	89.2	80.4							C			
a		16.5	1	1		100x28	W	Lt	C	N	B-1	B-1
b		1.7	1	1		30	W		C			
c		18.0	1			45	W	Lt	C	N	B-1	B-2
d		28.2	1	1		50	SM		C			
e		16.0	1	1		40	SM		C			
78	40.0	39.6	1	1		60	W/SM	Lt	C	N	B-2	A-2.3
79	9.9	9.9	1	1		45	W	Lt	C	N	D	D
80	7.8	7.4	3	2		40	SM	Lt	N	C	E-2	E-2

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BUILDING NUMBER	1000'S OF SQ. FT. PLAN AREA		NUMBER OF FLOORS		SIZE OF BAY		ROOF MATERIAL		COMBUSTIBILITY OF BUILDING		CONSTRUCTION TYPE	
	ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED	ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED
81												
a	9.6	10.2	1	1		60	SM	LT	N	N	B-2	B-2
b												
82	1.4	2.4	1	2		40	SM	LT	N	C	D	E-2
83	13.5	13.8	1	1		55	SM	LT	N	N	B-2	A-2.3
84	4.0	5.0	1	1		45	SM	LT	N	C	D	D
85	3.5	3.6	1	1		45	W/T	LT	C	C	D	D
86	7.0	7.0	1	1		45	SM	LT	N	C	D	D
87	82.2	89.5	1						N			
a		10.0	1			42	SM		N		A-1.1	
b		4.4	1			55	SM		N		A-1.3	
c		6.4	1			20	SM		N			
d		12.5	1			50	SM	LT	N	N		A-2.3
e		6.6				40						
f		6.8				40						
g		8.5				50						
h		11.0				5						
j		12.1				55		LT			B-2	B-1
k		11.0				50						
88	5.3	8.0	1	1			SM	LT	N	N	D	D
a		1.2				15						
b		6.8				65						
89	22.0	19.7		1					C	N		
a		15.3	1			45	W	LT			D	B-1
b		4.4	2			30	W	LT			E-1	B-1
90	108.0	90.1	1	1			SM	LT	N	N	B-2	B-1
a		57.7				37						
c		32.4				37 x 20						
91	33.7	35.3		2				LT	Mixed	C	E-2	E-2
a	10.8	7.8		2		45	SM		N	C		
b		8.3		2		12			R	C		
c	14.0	11.5		3		12	W		C	C		

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BUILDING NUMBER	1000'S OF SQ. FT. PLAN AREA		NUMBER OF FLOORS		SIZE OF BAY		ROOF MATERIAL		COMBUSTIBILITY OF BUILDING		CONSTRUCTION TYPE	
	ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED	ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED
91d	2.1	1.8		2		14	SM		N	C		
e	with C	3.6		3		12	SM		N	C		
f	7.1	7.5		3		12	W/T		C	C		
92	55.0	58.5	1	1			SM	LT	N	N	B-2	A-2.3
a		23.4				50						
b		33.1				42						
93	47.0	48.8	1	1		42	SM	LT	N	N	B-2	A-2.3
94	232.0	239.3	1	1			SM	LT	N	N		
a	13.4	6.3				50			N	N	E-2	B-1
b		14.8				45			N	N	A-2.3	A-2.3
c	57.6	59.0				50			N	N	B-1	B-1
d	46.0	47.2				45			N	N	B-1	B-1
e	8.8	9.0				45			N	N	B-1	B-1
f	44.4	45.4				40			N	N	B-1	B-1
g	4.3	4.4				40			N	N		B-1
h	26.0	26.6				45			N	N	B-1	B-1
j	32.7	23.6				23			N	N	B-1	A-1.1
95	22.1	21.2	3	1		80	SM	LT	N	N	E-2	B-1
96	16.5	15.3	3						R	R		
a	4.6	4.3		2		22	Conc 8"	Conc 4'6"	R	R	E-1	E-1
b	8.3	7.7		2		18		"	R	R	E-1	E-1
c	3.5	3.3		3		18		"	R	R	E-1	E-1
97	78.0	81.4	1	1		52	SM	LT	N	N	B-1	B-1
98	2.1	2.4		1		30		LT		N	D	D
99	109.1	110.1	1	1			SM	LT	N	N	B-1	B-1
a	35.0	35.4				60						
b		20.2				45						
c	73.7	18.0				40						
d		17.0				85						
e		19.5				30						
100	38.4	38.4	1	1			SM	LT	N	N	B-1	B-1
a		5.1				30						

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STRUCTURAL ANALYSIS TABLE

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BUILDING NUMBER		1000'S OF SQ. FT. PLAN AREA		NUMBER OF FLOORS		SIZE OF BAY		ROOF MATERIAL		COMBUSTIBILITY OF BUILDING		CONSTRUCTION TYPE	
		ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED	ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED
100b		30.2	28.5			61.1'	60						
c			2.8				35						
d													
101			3.8		1			S	LT	N	N	S	S
102		17.7	18.0	1	1		60	W	LT	C	N	B-2	A-2.3
103		4.8	6.9	1	1		55	W	LT	C	N	B-2	D
104		5.4	5.0	2	2		22	Conc	45° Conc	R	R	E-1	E-1
105		26.4	26.2	1	1			SM	LT	N	N	B-2	A-1.1
a			23.8				24						
b			2.4				20						
106		418.9	422.5	1	1			SM	LT	N	N	B-1	B-1
a			80.5				48						
b			36.8				55						
c			50.3				75						
d			40.2				60						
e			25.6				35						
f			5.3				35						
g			70.0				70						
h			61.0				45						
j			24.6				30						
k			3.3				25						
l			16.1				70						
m			8.8				70						
n													
107		622.0	618.5	1				SM	LT	N	N		
a		5.5	10.5	1	1	30'	30	SM					B-1
b		33.2	33.2	1	1		38	SM					B-1
c		36.0	32.4	1	1	120'	110	SM				B-1	B-2
d			20.2	1	1		26	SM					A-1.1
e		106.0	91.5	1	1	60,50,70	62	SM				B-1	B-2
f	with "o"	195.0	100.6	1	1	90	38	SM				B-1	B-1
g		16.0	17.6	1	1	45	45	SM				B-1	B-2

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STRUCTURAL ANALYSIS TABLE

90.30 - 657A

BUILDING NUMBER		1000'S OF SQ. FT. PLAN AREA		NUMBER OF FLOORS		SIZE OF BAY		ROOF MATERIAL		COMBUSTIBILITY OF BUILDING		CONSTRUCTION TYPE	
		ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED	ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED
107h		18.7	19.5	1	1	50	50	SM					B-2
j		57.4	60.9	1	1		65	SM				B-1	B-2
k		16.4	16.0	1	1		45	SM				A-2.3	B-2
l		8.7	8.8	1	1		36	SM					B-2
m		94.0	92.8	1	1		80	SM				A-2.3	B-1
n		35.0	33.6	1	1	42	40	SM					B-1
o	with "f"	195.0	80.9	1	1		46	SM					B-1
108		13.7	16.6	2	1		45	SM	LT	N	N	E-2	B-1
109		4.8	5.4	1	1		35	SM	LT	N	N	E-2	D
110		21.2	24.6					SM		N	N	B-2	
a			16.2	2	2		40	SM	LT			B-2	E-2
b			2.9	2	2		33	SM	LT				E-2
c			20.2	1	1		26	SM	LT				A-1.1
d			3.3	1	2		33	SM	LT				E-2
111		51.6	51.7	1	1			SM	LT	N	N		A-2.3
a			7.5				30	SM	LT			B-2	A-2.3
b			44.2				65	SM	LT			B-1	A-2.3
112		10.5	10.6	1	1		45	SM	LT	N	N	A-2.3	A-2.3
113			12.6	1	1		45	SM	LT	N	N		A-2.3
114			11.3	1	1		45	SM	LT	N	N		A-2.3
115		11.4	11.0	1	1		50	SM	LT	N	N	A-2.3	B-2
116		58.1	61.2		1				LT	N	N		B-1
a		22.7	23.7	1			95	SM	LT	N	N	B-1	B-1
b		17.8	19.7	1			50	SM	LT	N	N	B-2	B-1
c		17.3	3.6	2		3	23	SM	LT	N	N	A-2.3	B-1
d			14.2				45		LT	N	N		B-1
e													
117		2.6	6.3	2	1		45	W	LT	C	N	E-1	D
118		6.7	7.0	1	1		45	SM	LT	N	N	D	D
119		7.2	6.9	1	1		55	SM	LT	N	N	B-2	D
120		46.6	52.9		1			SM	LT	N	N	B-1	B-1
a			12.0	1			60	SM	LT	N	N	B-1	B-1

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EXHIBIT J PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS
KURE NAVAL ARSENAL 90.30 - 657 A

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KURE NAVAL ARSENAL	STRUCTURAL ANALYSIS TABLE	90.30 - 657A

BUILDING NUMBER	1000'S OF SQ. FT. PLAN AREA		NUMBER OF FLOORS		SIZE OF BAY		ROOF MATERIAL		COMBUSTIBILITY OF BUILDING		CONSTRUCTION TYPE	
	ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED	ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED
120b		9.0	2			45	SM	LT	N	N	B-1	B-1
c		23.8	2			48	SM	LT	N	N	B-1	B-1
d		4.8	1			30	SM	LT	N	N	B-1	B-1
e		3.3	1			55	SM	LT	N	N	B-1	B-1
f												
121	7.4	6.3	1	1		28	SM	LT	N	N	D	D
122	7.4	9.5	2	1		45	SM	LT	N	N	D	D
a	2.1	2.7										
b	5.3	6.8										
123	10.7	10.6	2	1			SM	LT	N	N	D	A-2.3
a		7.782.9				45&30						
b												
124	155.0	164.4	1	1			SM	LT	N	N	B-1	B-1
a		5.0	1			25	SM	LT	N	N		B-1
b		39.1	1			45	SM	LT	N	N		B-1
c		42.1	1			55	SM	LT	N	N		B-1
d		30.6				40		LT	N	N	B-1	B-1
e		2.0	1			25	SM	LT	N	N		B-1
f		5.1	1			30	SM	LT	N	N		B-1
g		6.0	1			30	SM	LT	N	N		B-1
h		13.3	1			45	SM	LT	N	N		B-1
j		13.3	1			45	W	LT	C	N		B-1
k	7.0	7.9	1			30	SM	LT	N	N		S-1
l												
m	3.9	5.6		1		30		LT		N		D
125	4.7	6.0		3		12		LT		C		E-2
127		6.6		1		30		LT		C		D
128		5.0		2		12		LT		C		E-2
129		7.4		1				LT		C		D
a		4.5				45						
b		2.9				30						
130		6.3		1		30		LT		C		D

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KURE NAVAL ARSENAL	STRUCTURAL ANALYSIS TABLE	90.30 - 657A

BUILDING NUMBER	1000'S OF SQ. FT. PLAN AREA		NUMBER OF FLOORS		SIZE OF BAY		ROOF MATERIAL		COMBUSTIBILITY OF BUILDING		CONSTRUCTION TYPE	
	ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED	ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED
131		8.3		1		50		LT		C		D
132		4.3		1		45		LT		C		D
133		4.8		1		30		LT		C		D
134		23.1		1		45		LT		C		A-2.3
a		5.6				17						
b		5.6				17						
c		5.6				17						
d		2.7				17						
e		3.6										
135	3.8	4.3	1	1		45	SM	LT	N	N	D	D
136	10.0	10.4	2	1		45	SM	LT	N	N	E-2	A-2.3
137	44.2	22.2	1	1			SM	LT	N	N		B-1
a		15.2	1			12x55	SM		N		B-1	B-1
b		7.0	2			45	SM		N		B-1	B-1
c												B-1
d												B-1
e												B-1
138	273.0	298.6	1	1			SM	LT	N	N	B-1	B-1
a	13.0	14.4	1			25	W		N	N	B-1	B-1
b	38.0	42.0	1		54	60	SM		N	N	B-1	B-1
c	38.0	42.0	1		54	60	SM		N	N	B-1	B-1
d	38.0	42.0	1		54	60	SM		N	N	B-1	B-1
e	38.0	42.0	1		54	60	SM		N	N	B-1	B-1
f	38.0	42.0	1		54	60	SM		N	N	B-1	B-1
g	38.0	42.0	1		54	60	SM		N	N	B-1	B-1
h		5.9	1			20	SM		N	N	B-1	B-1
j		24.3	1			60	SM		N	N	B-1	B-1
k												
139	27.3	30.9	1	1		27x95	SM	LT	N	N	B-1	B-1
140		20.4	2	1		60	SM	LT	N	N	E-2	B-1
140			2				W		C		D	
141		9.0	1	1		46	SM	LT	N	C	D	D

KURE NAVAL ARSENAL	STRUCTURAL ANALYSIS TABLE	90.30 - 657A

BUILDING NUMBER	1000'S OF SQ. FT. PLAN AREA		NUMBER OF FLOORS		SIZE OF BAY		ROOF MATERIAL		COMBUSTIBILITY OF BUILDING		CONSTRUCTION TYPE	
	ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED	ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED
142		7.7	1	1		45	W/SM	LT	C	C	D	D
143		17.6	1	1		48	W/SM	LT	C	C	A-2.3	A-2.3
144	9.4	16.7	2								F-1	
a		6.3		1		45	12" Conc	LT 4' 6"	N	C		D
b	9.4	10.4	2	1		95			R			A-2.3
145	28.2	28.8	1	1		23	SM	LT	N	C	A-1.1	A-1.1
146		8.8	1	1		40	W/SM	LT	C	C	D	D
147		12.0	1	1		65	W/SM	LT	C	C	A-2.3	A-2.3
148		9.0		1		50	W	LT	C	C		D
149		4.2		1		30	W	LT	C	C		D
150												
a												
b												
151												
a												
152		9.4		1		55		LT				D
153		8.4	1	1		60	W	LT	C	C	D	D
154		8.4	1	1		60	W/SM	LT	C	C	D	D
155		10.4		2		32		LT		C		E-2
156	82.6	97.0	1				SM	LT	N	N	B-2	B-1
a		86.9	1	1		95x24	SM		N			
b		4.5	1	1		20	SM		N			
c		5.6	1	1		20	SM					
157	89.9	83.6	1	1			SM	LT	N	N	B-2	B-1
a	7.4	6.9				55	SM		N	N	B-2	B-1
b	23.8	24.0				80	SM		N	N	B-2	B-1
c	23.8	18.0				60	SM		N	N	B-2	B-1
d	17.1	17.9				55	SM		N	N	B-2	B-1
e	6.6	5.6				30	SM		N	N	B-2	B-1
f	11.2	11.2				46	SM		N	N	B-2	B-1
g												
158	11.5	12.5	2	2		12	SM	LT	N	C	E-2	E-2

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KURE NAVAL ARSENAL	STRUCTURAL ANALYSIS TABLE	90.30 - 657A

BUILDING NUMBER	1000'S OF SQ. FT. PLAN AREA		NUMBER OF FLOORS		SIZE OF BAY		ROOF MATERIAL		COMBUSTIBILITY OF BUILDING		CONSTRUCTION TYPE	
	ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED	ACTUAL	REPORTED JTG	ACTUAL	REPORTED JTG	ACTUAL	REPORTED
159	11.3	12.5	2	2		12	SM	LT	N	C	E-2	E-2
160		13.0	1	1		40	W/SM	LT	C	C	D	D
a		6.8										
b		4.4										
c		1.8										
161												
a		5.1		1		30	W	LT	C	C		D
b												
c												
d												
e												
162	13.1	6.0	1	2		13	W	LT	C	C		E-2
163		2.4	1	1		40	W	LT	C	C	D	D
164	6.7	6.0	1	2		13	W	LT	C	C		E-2
165	13.1	12.0	1	2		13	W	LT	C	C		E-2
166	13.1	8.0	1	2		12 to 14	W	LT	C	C		E-2
167	17.4	15.3	2	2		45	W	LT	C	C	E-2	E-2
168	7.2	6.4	1	1		40	W	LT	C	C		D
169	2.7	2.4	1	1		30	W	LT	C	C	D	D
170	4.4	3.9	1	1		40 15	W	LT	C	C	D	D
171	4.4	3.9	1	1		30	W	LT	C	C	D	D
172	4.4	3.9	1	1		22	W	LT	C	C	D	D
173	3.0	2.7	1	1		45	W	LT	C	C	D	D
174	16.5	17.5	1	1		35	W	LT	C	C		A-2.3
175												
a												
b												
c												
176												
a												
b												

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KURE NAVAL ARSENAL 90.30 - 657 A EXHIBIT J PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS

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6. DAMAGE ASSESSMENT

a. D/A (See D/A Table)

b. Summary of Tabulation

TABLE 5

	ACTUAL		REPORTED	
	Sq Ft	% Dam	Sq Ft	% Dam
Total Building Area	3,841,000		3,995,200	
Damage				
Destroyed	224,900	6	250,100	6.3
Structural	570,600	15	411,515	10.3
Superficial	1,760,200	46	2,217,895	55.4
Total Damage	2,555,700	67	2,897,510	72

In general, Minor Damage was purposely omitted in D/A reports.

c. Remarks

(1) While the total damage assessment is fairly accurate, the reported and actual figures on structural damage for many individual buildings are not always in close agreement.

(2) Inherent limitations to photographic interpretation account for the underestimate of the amount of structural damage. For example, the cutting of a column by a direct hit would not be observed if the roof structure were still intact.

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KURE NAVAL ARSENAL 90.30 - 657 A

KURE NAVAL ARSENAL — DAMAGE ASSESSMENT TABLE — 90.30-657A

BUILDING NUMBER	BUILDING AREA (1000'S SQ. FT.)	STRUCTURAL (1000'S SQ. FT.) ACTUAL	STRUCTURAL (1000'S SQ. FT.) REPORTED	MINOR * (1000'S SQ. FT.) ACTUAL	MINOR * (1000'S SQ. FT.) REPORTED	SUPERFICIAL (1000'S SQ. FT.) ACTUAL	SUPERFICIAL (1000'S SQ. FT.) REPORTED	DESTROYED (1000'S SQ. FT.) ACTUAL	DESTROYED (1000'S SQ. FT.) REPORTED
NTG									
55	9.9	9.9	11.2						
a	1.6								
b	8.3								
56	17.6	6.9	8.4				1.5		
57	11.3	5.1	7.35						
58	11.1								
59	9.5		32.2				13.4		
60	48.8	) 9.5							
a									
b									
c									
d									
e	7.8			7.8					
f	6.9			6.3					
g	8.2				3.15				
61	4.1								
a	4.1								
b	7.8			14.7					
62	3.9								
a	3.9								
b	15.3					.38			
63	19.7					.33			
64	17.4								
65	3.1								
a	14.3							4.9	
b	25.3	1.5							
66	17.9								
a		1.5							
b	3.8								
67	10.7								
68	12.5								
69	3.1								
a									
b									
c									
d									
e									
f									
g									
70	3.1								
a									
b									
c									
d									
e									
f									
g									
71	3.1								
a									
b									
c									
d									
e									
f									
g									
72	3.1								
a									
b									
c									
d									
e									
f									
g									
73	3.1								
a									
b									
c									
d									
e									
f									
g									
74	3.1								
a									
b									
c									
d									
e									
f									
g									
75	3.1								
a									
b									
c									
d									
e									
f									
g									
76	3.1								
a									
b									
c									
d									
e									
f									
g									
77	3.1								
a									
b									
c									
d									
e									
f									
g									
78	3.1								
a									
b									
c									
d									
e									
f									
g									
79	3.1								
a									
b									
c									
d									
e									
f									
g									
80	3.1								
a									
b									
c									
d									
e									
f									
g									

* In general, Minor Damage was purposely omitted in D/A reports.

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KURE NAVAL ARSENAL	DAMAGE ASSESSMENT TABLE	90.30-657A

BUILDING NUMBER	BUILDING AREA	STRUCTURAL (1000'S SQ. FT.)			SUPERFICIAL (1000'S SQ. FT.)			MINOR * (1000'S SQ. FT.)			DESTROYED (1000'S SQ. FT.)		
JTG	1000'S SQ. FT.	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED
b	9.4												
70	9.2	9.2											
a	3.2	3.2				2.15							
b	6.0	6.0	3.85			1.93							
71	25.4	16.4	26.7		3.7								
a													
b													
c	5.3	5.3											
d	13.7	8.2			3.7								
e	2.9	2.9											
72	12.7	5.6			7.1								
73	8.5												
74	55.0												
a													
b													
c													
75	36.0												
76													
a													
b													
c													
77	89.2					9.0							
a					18.4								
b					1.9								
c					5.2								
d													
e													
78	40.0												
79	9.9												
80	7.8							7.8					
81					9.5								
a	9.5				9.5	10.2							
b													

*In general, Minor Damage was purposely omitted in D/A reports.

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KURE NAVAL ARSENAL	DAMAGE ASSESSMENT TABLE	90.30-657A

BUILDING NUMBER	BUILDING AREA	STRUCTURAL (1000'S SQ. FT.)			SUPERFICIAL (1000'S SQ. FT.)			MINOR * (1000'S SQ. FT.)			DESTROYED (1000'S SQ. FT.)		
JTG	1000'S SQ. FT.	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED
82	1.4										1.4	2.4	
83	13.5	2.7			10.6	13.8							
84	4.0								5.0				
85	3.5	0.6											
86	7.0												
87	82.2	36.9	12.5		12.2	21.9							
a						10.0							
b						4.4							
c						6.4							
d		23.6	12.5		12.2								
e													
f													
g													
h						1.1							
j		8.3											
k													
88	5.3							5.3	8.0				
a													
b													
89	22.0								19.7				
a					3.6								
b													
90	108.0	7.2			94.0			7.2					
a			5.77			51.93							
b									32.4				
91	33.7	4.8				9.0						35.3	
a	10.6	2.5			4.3								
b													
c	14.0										11.2		
d	2.1										2.1		
e	WITH "C"	2.3											
f	7.1										7.1		
92	55.0	19.5			34.5	56.5							

*In general, Minor Damage was purposely omitted in D/A reports.

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KURE NAVAL ARSENAL 90.30 - 657A

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KURE NAVAL ARSENAL

DAMAGE ASSESSMENT TABLE

90.30-657A

BUILDING NUMBER		BUILDING AREA	STRUCTURAL (1000'S SQ. FT.)			SUPERFICIAL (1000'S SQ. FT.)			MINOR * (1000'S SQ. FT.)			DESTROYED (1000'S SQ. FT.)		
JTG		1000'S SQ. FT.	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED
a														
b														
93		47.0	1.8			45.2	48.3							
94		232.0	46.0			133.0	223.1		1.7					
a		13.4	5.1			7.6	6.3		0.8					
b							14.8							
c		57.6	9.3	4.0		47.5	55.0							
d		45.0	6.6			39.4	47.2							
e		8.3	1.3			5.9	9.0		0.9					
f		44.4	13.3			37.3	48.0							
g		4.3					4.4							
h		26.0	3.4			22.6	25.6							
j		32.7	5.4			27.2	11.8							
95		22.1	18.0	21.2								4.2		
96		16.5	2.0			4.0								
a		4.6		12.0										
b		8.3												
c		3.6												
97		78.0	14.3	20.0		62.1	61.4							
98		2.1										2.1	2.4	
99		109.1	13.3	13.75		35.0	82.5							
a		35.0	5.0			30.0								
b														
c		73.7	8.3			65.0								
d														
e														
100		33.4	6.9	1.32		31.5	34.58							
a														
b		30.2												
c														
d														
101														
102		17.7										17.7	18.0	

*In general, Minor Damage was purposely omitted in D/A reports.

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DAMAGE ASSESSMENT TABLE

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BUILDING NUMBER		BUILDING AREA	STRUCTURAL (1000'S SQ. FT.)			SUPERFICIAL (1000'S SQ. FT.)			MINOR * (1000'S SQ. FT.)			DESTROYED (1000'S SQ. FT.)		
JTG		1000'S SQ. FT.	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED
103		4.8	4.1	5.1		0.7								
104		5.4		0.5					5.4					
105		26.4	26.4	26.2										
a														
b														
106		413.9	23.9	15.6		131.8	198.7							
a							20.0			20.0				
b				9.2			16.61			11.0				
c							40.3			10.0				
d							27.2			13.0				
e				5.1			12.3							
f				1.3			4.0							
g							35.0							
h							30.5							
j							12.3							
k														
l														
m														
n														
107		622.0	134.5			361.2	483.0							
a		5.5	4.5			1.0								
b		33.2				16.6	8.3			4.15				
c		36.0	2.2			15.0	24.3							
d							10.0							
e		106.0	32.8			68.1	78.5		4.3	13.0				
f	WITH "O"	195.0	26.8			82.4	88.1							
g		16.0	5.3			10.7	17.6							
h		18.7	3.4			13.3				19.5				
j		57.4	19.2			38.2	45.9			15.0				
k		16.4	3.0			13.5	16.0							
l		8.7				8.7	8.8							
m		94.0	13.5			80.4	92.8							
n		35.0	23.7	16.8		11.3	16.8							

*In general, Minor Damage was purposely omitted in D/A reports.

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PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS EXHIBIT J
KURE NAVAL ARSENAL 90.30 - 657 A

KURE NAVAL ARSENAL	DAMAGE ASSESSMENT TABLE	90.30-657A

BUILDING NUMBER		BUILDING AREA	STRUCTURAL (1000'S SQ. FT.)			SUPERFICIAL (1000'S SQ. FT.)			MINOR * (1000'S SQ. FT.)			• DESTROYED (1000'S SQ. FT.)		
JTG		1000'S SQ. FT.	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED
o		WITH "f"	WITH "f"			WITH "f"	80.9							
108		13.7	4.7			5.4	10.0			2.5				
109		4.8	1.5			3.3							1.8	
110		21.2				21.2	21.3			18.6				
a														
b														
c														
d														
111		51.6	2.6			39.0	49.0							
a		7.6	0.8			5.0								
b		44.0	1.8			34.0								
112		10.5	3.5	2.65		2.6	7.91							
113		14.1					2.6			10.0				
114		14.0				1.8				11.3				
115		11.4	2.1			9.6	11.0							
116		58.1	32.7	61.2		25.1								
a		22.7	15.1			7.6								
b		17.8	8.9			8.9								
c		17.3	8.7			8.6								
d														
e														
117		2.6	1.3			0.7	1.6		0.6	4.7				
118		6.7							1.1					
119		7.2	3.6			3.6							5.9	
120		46.6		2.45			24.0			26.5				
a			2.9			11.2								
b														
c														
d														
e														
f														
121		7.4				4.2	0.8			5.5				
122		7.4				7.4				9.5				

*In general, Minor Damage was purposely omitted in D/A reports.

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90.30-657 A KURE NAVAL ARSENAL EXHIBIT J PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS

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KURE NAVAL ARSENAL	DAMAGE ASSESSMENT TABLE	90.30-657A

BUILDING NUMBER		BUILDING AREA	STRUCTURAL (1000'S SQ. FT.)			SUPERFICIAL (1000'S SQ. FT.)			MINOR * (1000'S SQ. FT.)			DESTROYED (1000'S SQ. FT.)		
JTG		1000'S SQ. FT.	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED
a		2.1				2.1								
b		5.3				5.3								
123		10.7												
a			9.3										10.6	
b														
124		155.0	3.8			54.3	90.4		96.9	74.0				
a														
b														
c														
d														
e														
f														
g														
h														
j														
k		7.0												
l														
m		3.9							1.8					
125		4.7	2.8									1.9	6.0	
127		NONE												
128		NONE												
129		NONE												
a														
b														
130		NONE												
131		NONE												
132		NONE												
133		NONE											4.8	
134		23.1		11.6									11.6	
a														
b														
c														
d														

*In general, Minor Damage was purposely omitted in D/A reports.

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KURE NAVAL ARSENAL 90.30 - 657 A EXHIBIT J PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS

CONFIDENTIAL

KURE NAVAL ARSENAL

DAMAGE ASSESSMENT TABLE

90.30-657A

BUILDING NUMBER		BUILDING AREA	STRUCTURAL (1000'S SQ. FT.)			SUPERFICIAL (1000'S SQ. FT.)			MINOR * (1000'S SQ. FT.)			DESTROYED (1000'S SQ. FT.)		
JTG		1000'S SQ. FT.	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED
e														
135		3.8	3.8									3.8	4.3	
136		10.0	2.9										7.8	
137		44.0				44.0								
a										10.1				
b										4.7				
c														
d														
e														
138		273.0	31.5	34.0		171.5	172.3			34.0				
a		13.0	4.4			3.6								
b		38.0	2.7											
c		38.0	2.7											
d		38.0	6.8			163.0			9.5					
e		38.0	9.5											
f		38.0	5.4											
g		38.0												
h														
j														
k														
139		27.3	7.4			19.9	23.2							
140		5.1		20.4		5.1								
141		9.0										9.0	9.0	
142		7.7										7.7	7.7	
143		17.6					5.8					17.6	17.6	
144		9.4												
a														
b		9.4												
145		23.2	10.4			17.8								
146		3.8										3.8	8.8	
147		12.6										12.6	12.0	
148		9.0	4.5			4.5								
149		4.2												

*In general, Minor Damage was purposely omitted in D/A reports.

EXHIBIT J PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS

90.30-657 A KURE NAVAL ARSENAL

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KURE NAVAL ARSENAL.

DAMAGE ASSESSMENT TABLE

90.30-657A

BUILDING NUMBER		BUILDING AREA	STRUCTURAL (1000'S SQ. FT.)			SUPERFICIAL (1000'S SQ. FT.)			MINOR * (1000'S SQ. FT.)			DESTROYED (1000'S SQ. FT.)		
JTG		1000'S SQ. FT.	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED
152		9.4												
153		8.4										8.4	8.4	
154		8.4										6.3	6.3	
155		10.4										10.4	10.4	
156		82.6	3.1	21.5		79.5	43.6			8.3				
a														
b														
c														
157		89.3	11.4			8.9	15.0			5.0				
a		7.4	5.0			2.5								
b		23.8	3.2			3.2								
c		23.8	3.2			3.2								
d		17.1												
e		6.6												
f		11.2												
g														
158		11.5												
159		11.3											3.25	
160							3.25							
a		13.0	4.35											
b														
c														
161													5.1	
a														
b														
c														
d														
e														
162		13.1										13.1	6.0	
163		2.4										6.7	6.0	
164		6.7										13.1	12.0	
165		13.1										13.1		
166		13.1												

*In general, Minor Damage was purposely omitted in D/A reports.

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EXHIBIT J PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS

KURE NAVAL ARSENAL 90.30 - 657 A

11435

KURE NAVAL ARSENAL

DAMAGE ASSESSMENT TABLE

90.30-657A

BUILDING NUMBER		BUILDING AREA	STRUCTURAL (1000'S SQ. FT.)			SUPERFICIAL (1000'S SQ. FT.)			MINOR * (1000'S SQ. FT.)			DESTROYED (1000'S SQ. FT.)		
JTG		1000'S SQ. FT.	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED
167		17.4										5.86	5.1	
168		7.2										7.2	6.4	
169		2.7										2.7		
170		4.4										4.4		
171		4.4										4.4	3.9	
172		4.4										4.4		
173		3.0										3.0	2.7	
174		16.5										16.5	17.5	

*In general, Minor Damage was purposely omitted in D/A reports.

PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS EXHIBIT J-1

90.30-657 A KURE NAVAL ARSENAL

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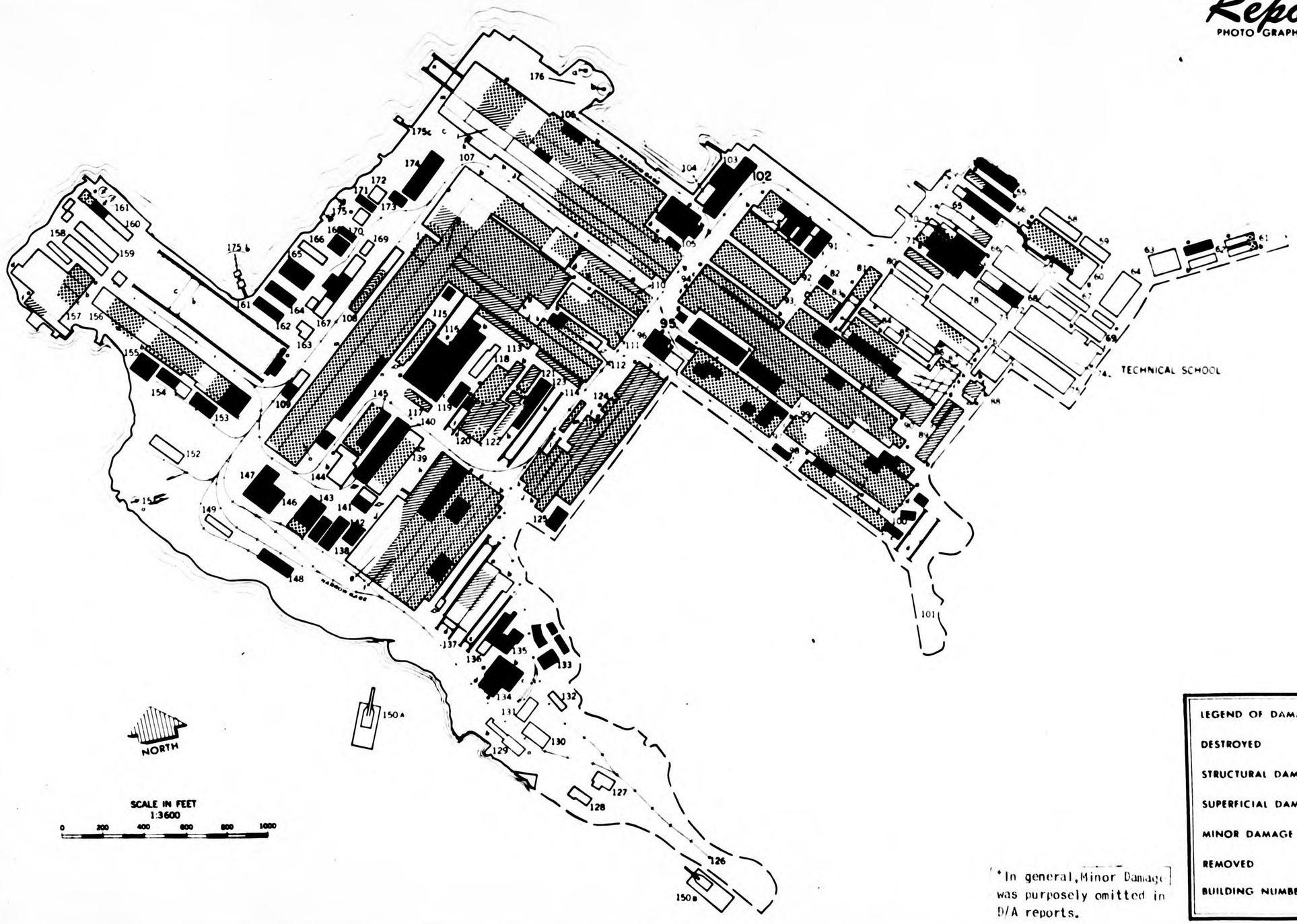
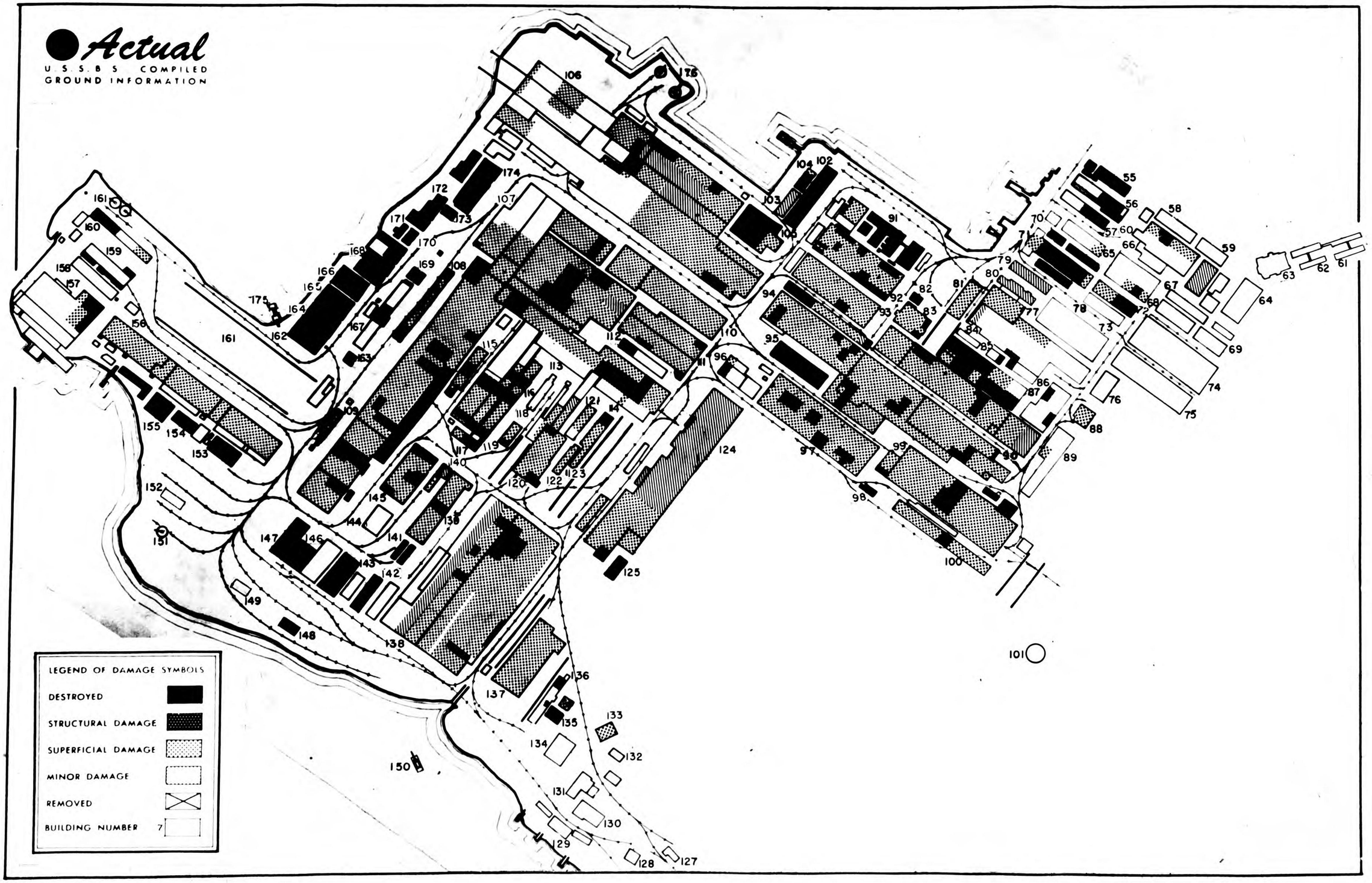
90.30-657 A KURE NAVAL ARSENAL

Reported
PHOTOGRAPHIC INTELLIGENCE



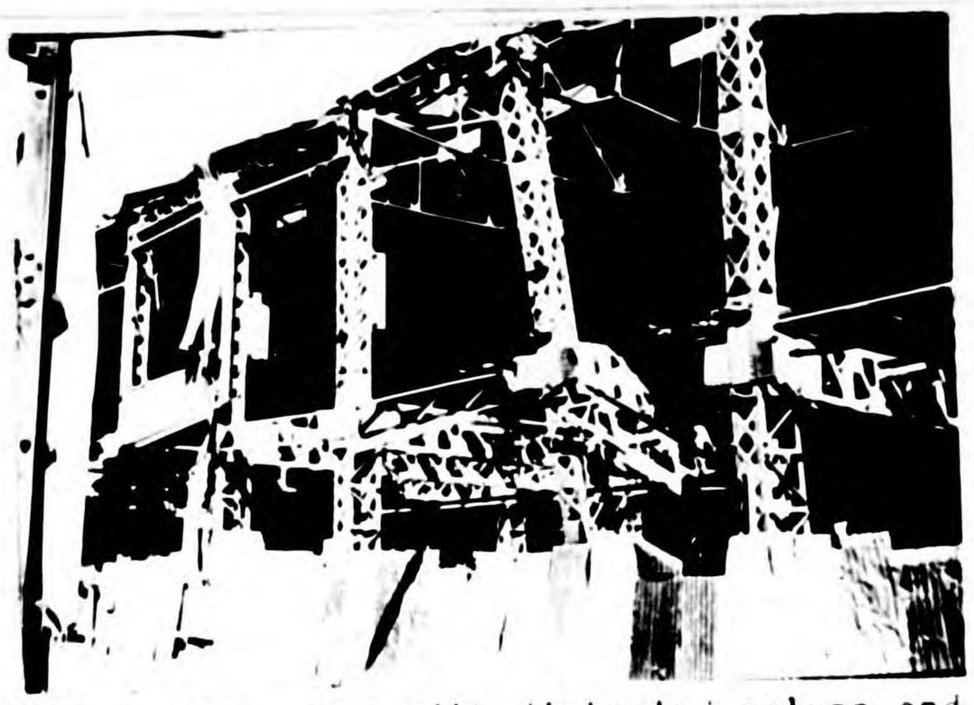
KURE NAVAL ARSENAL 90.30 - 657 A

● *Actual*
U.S.S.B.S. COMPILED
GROUND INFORMATION



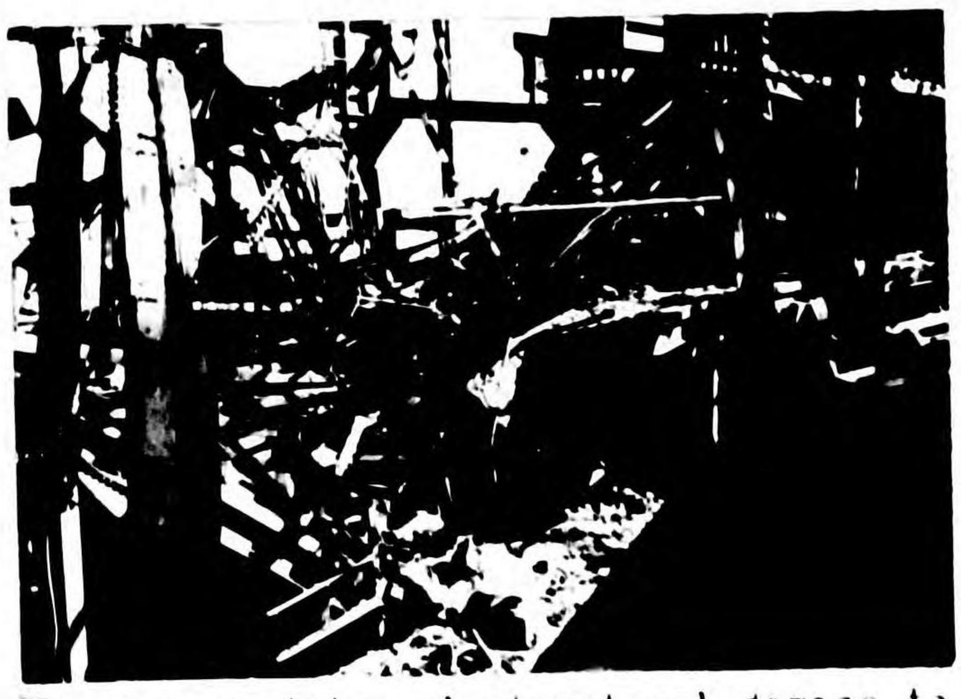
KURE NAVAL ARSENAL 90.30-657 A

A Exterior view of blast damage to precision instrument shop. (East end of bldg 97)

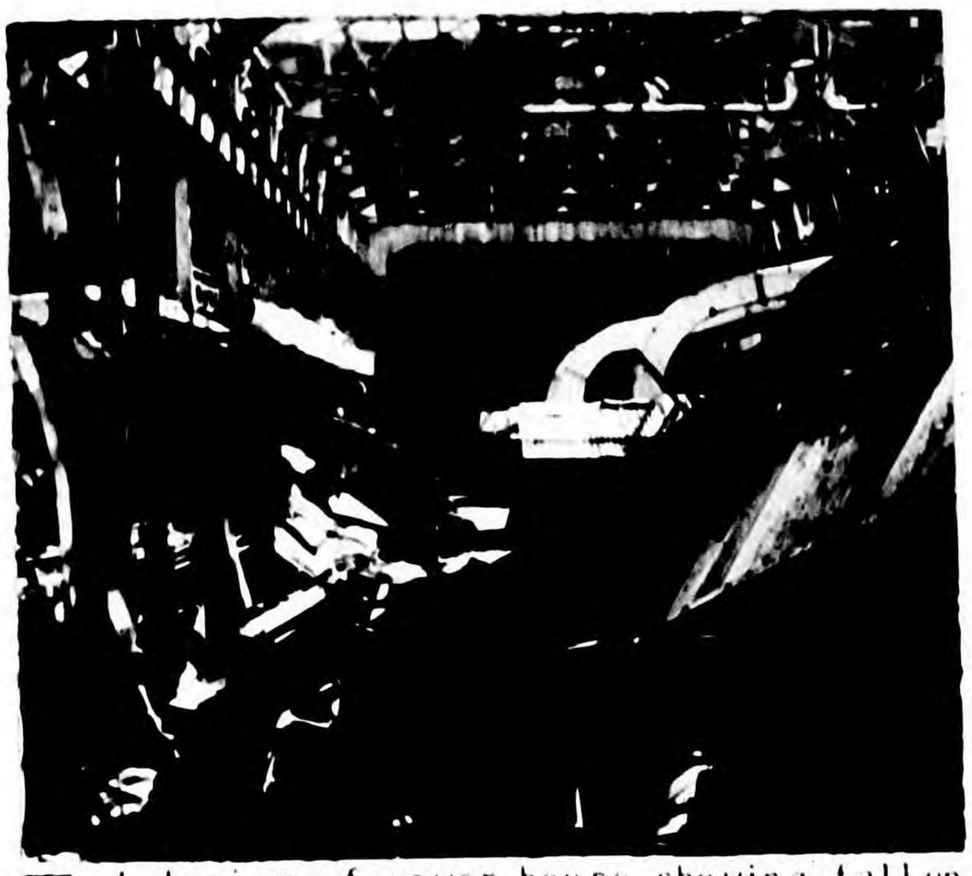


B Machine shop with distorted column and beams. This type of structural damage not visible in vertical photographs. (Southeast corner of bldg 66)

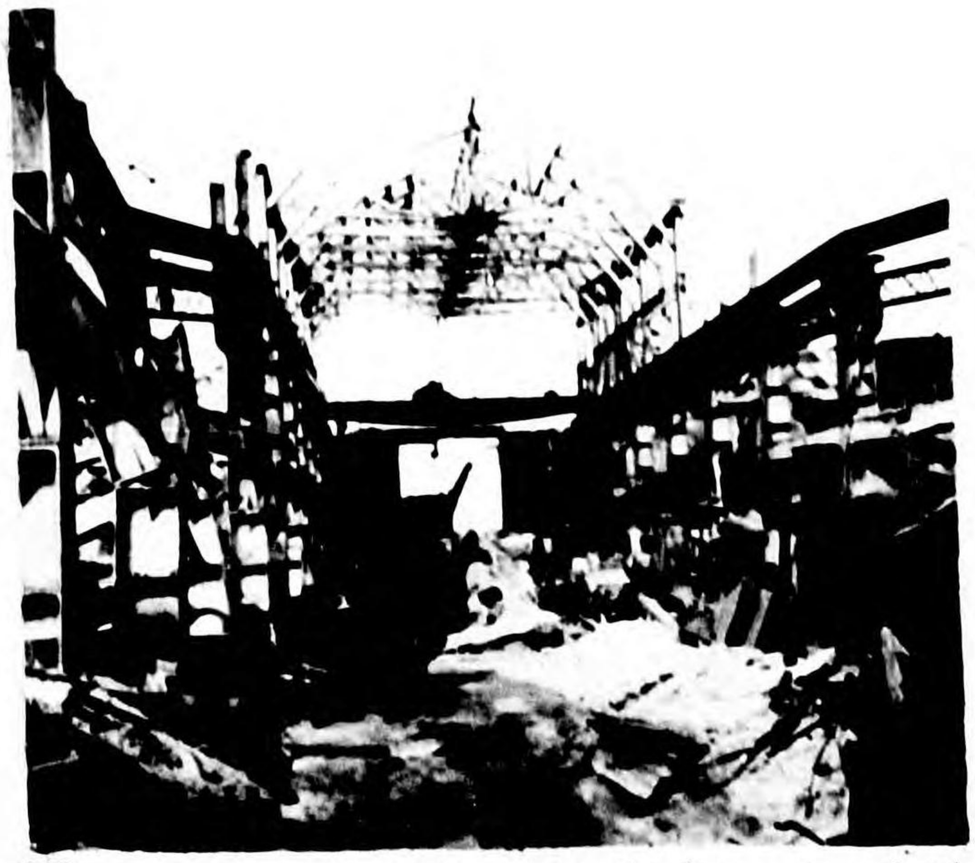
C Damage to 18 inch walls and wood roof structures. (Inside of east end of bldg 56 looking toward bldg 57)



D Severe internal structural damage to power house. (Bldg 60-a,b)



E Interior of power house showing fallen gantry with two turbines in background. (Bldg 60-b looking east)



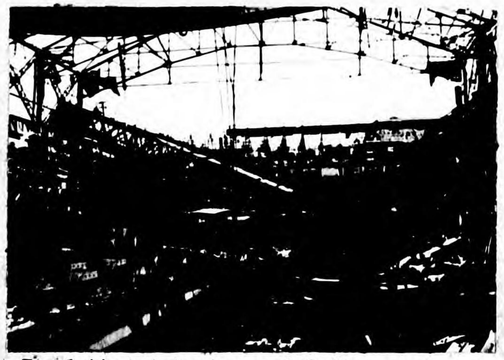
F Interior of tool works in torpedo plant Notice damage to cast-iron gantry supports. (Bldg 71)

90.30-657 A KURE NAVAL ARSENAL

G Precision instrument machine shop showing interior structural damage of type frequently not visible from vertical photographs. (Bldg 97, Northwest portion)

H Extreme structural collapse of framing. (East bay of bldg 107 n)

I General view of covered gantry showing roof damage which is predominately superficial. (Bldg 100)



J Gutted interior and fallen gantry in heavy structures fabricating shop. (Bldg 116)

K Drafting department in foreground, showing masonry structure completely demolished. (Bldg 55-a)

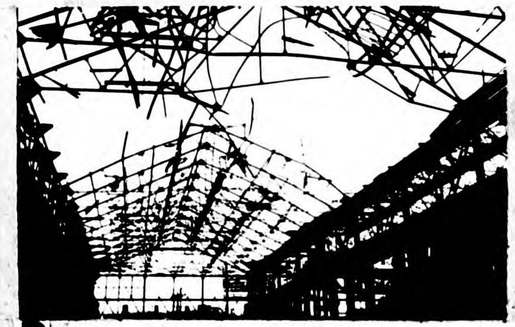
L Damage caused by a direct hit on boilers, brickwork and structural members. (Bldg 112)

KURE NAVAL ARSENAL 90.30 - 657 A

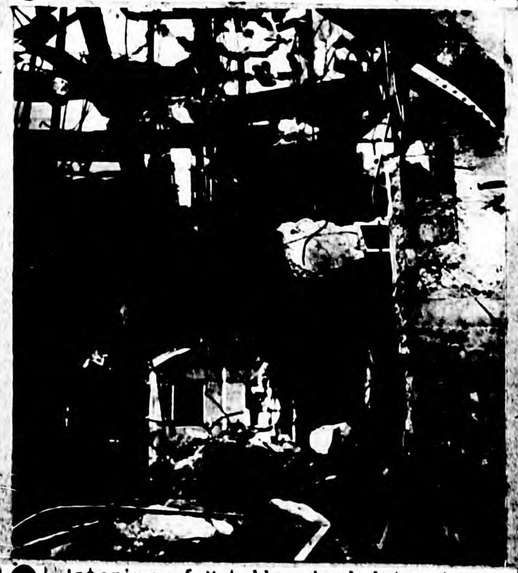
M Twisted framework of non-ferrous metals shop. Note bomb crater in foreground. (Bldg 116 b,c. Bldg 117 on left)

N Blasted beam and gantry rail in bay (f) of gun barrel shop. (Bldg 138)

O Scattered brickwork of annealing furnaces resulting from a direct hit. (Bldg 141)



P Destruction of roof framing and covering to bay (d) of gun barrel shop. (Bldg 138)



Q Interior of Metallurgical laboratory. This damage was caused by two direct hits.

R Destroyed column in gun barrel machine shop. This type of structural damage is not visible from vertical photographs. (Bldg 138 - bay f)

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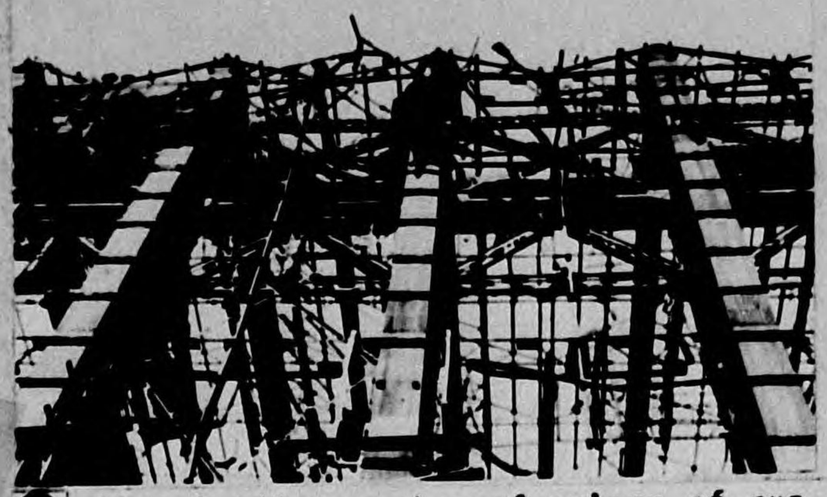
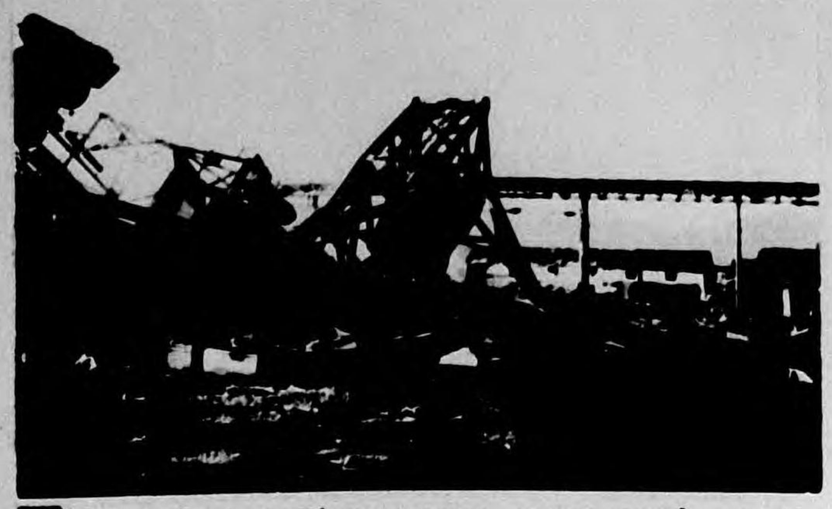
90.30-657 A KURE NAVAL ARSENAL

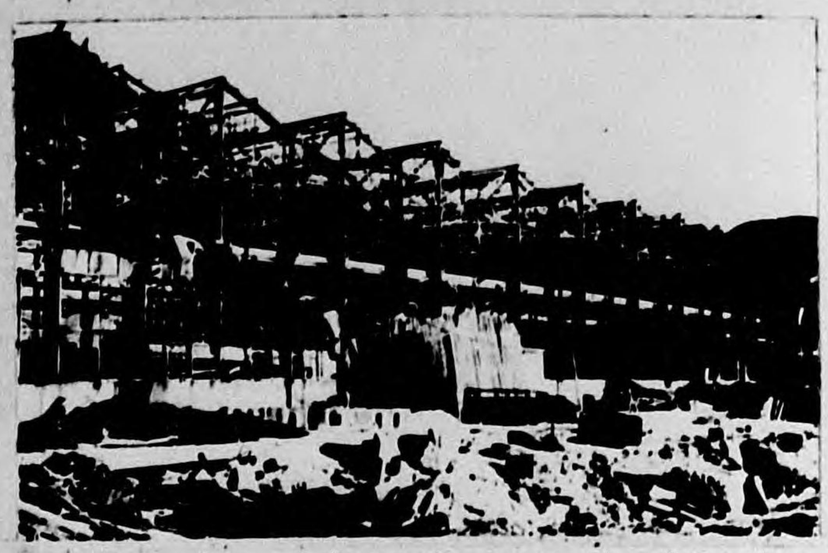


S Direct hit upon top of column of gun liner shop. (Bldg 139 - South side)



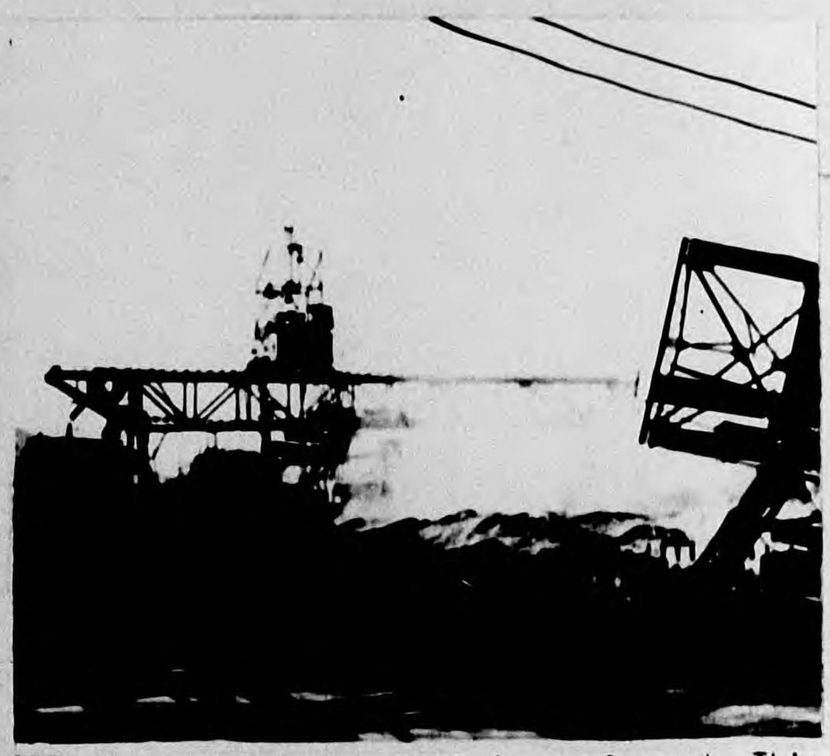
T Wrecked gantry crane over coal yard. (Bldg 161)

U Electric furnace bldg and exterior gantry. The bldg was reported 100% structurally damaged but investigation revealed only ¼ of the bldg sustained this damage. Note structural damage to gantry in foreground. (Bldg 119)



V Exterior of torpedo case shaping shop showing blast effect on bldg cover. This type damage generally interpreted correctly. (Bldg 156)

W Metallurgical and testing laboratory. This reinforced concrete bldg was rocked from its foundations by a heavy concentration of bombs at Northeast corner. (Bldg 117).



X Note smoldering fire in coal yard. This has been burning since the June 22 raid, when it had been ignited by bombs. (Bldg 161)

EXHIBIT K

NIPPON VEHICLE MANUFACTURING CO.

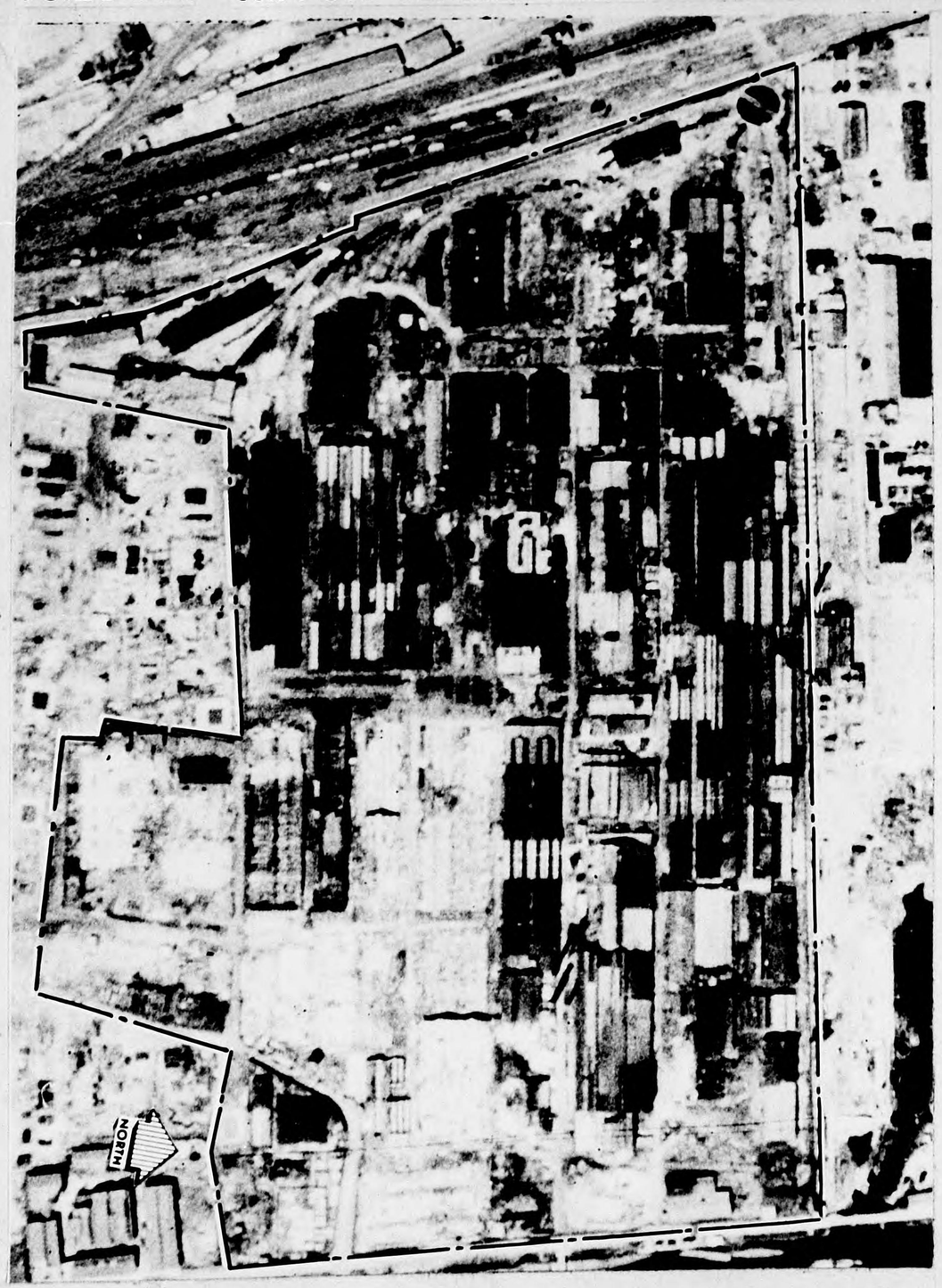
90.20-241

LAT. 35° 07 'N - LONG. 136° 54 'E

NAGOYA, JAPAN

See Exhibit P for abbreviations used in this exhibit.

90.20-241 NIPPON VEHICLE MANUFACTURING CO.



NIPPON VEHICLE MANUFACTURING CO. 90.20-241

1. DESCRIPTION OF TARGET

a. Nippon Vehicle Manufacturing Co. (Japan Rolling Stock Manufacturing Co., Ltd.), Nagoya was the second largest manufacturer of boilers, railroad cars and locomotives in Japan before the war.

b. The plant is located between the east branch of the Hori River and the Tokkaido Mainline Railroad, south of the Atsuta branch of the Nagoya Arsenal, approximately 3 miles northeast of Nagoya Harbor and 3¼ miles south east of the Nagoya Railroad Station.

c. The plant comprises 48 listed buildings and has a built-up area of approximately 814,000 square feet.

2. SUMMARY

a. The interpretation of building functions was only fair. Of a total of 48 buildings:

(1) 18 were identified correctly
(2) 9 were identified as having similar occupancy
(3) 6 were unidentified
(4) 15 were identified incorrectly

b. The structural analysis was good. The comparison, however, was made on only 21 buildings on which comparable data were available. The interpretation of the combustibility was very accurate: 16 out of a total of 17 combustible buildings were reported as such. Determination of structural materials was also accurate.

c. The limited damage assessment report checks very closely with field data, as shown in Table I.

TABLE I

	ACTUAL	REPORTED
	Sq Ft	Sq Ft
Structural Damage	54,600	55,700
Superficial Damage	232,700	213,200
Total Damage	286,700	268,900

3. SOURCE OF DATA

a. Reported

(1) AC/AS Intelligence Building Construction Analysis, 17 April 1945
(2) AC/AS Intelligence Limited Damage Report #41, 10 July 1945

b. Field Data

(1) USSBS (G-2, PIC) field notes including Japanese damage and production data.

90.20-241 NIPPON VEHICLE MANUFACTURING CO.

4. FUNCTIONAL ANALYSIS

a. Use of Plant

Reported: Railroad car and locomotive manufacture, possible tank manufacture.

Actual: Railroad car, locomotive and accessories manufacture.

b. Boundaries

Interpretation of plant boundaries was fairly accurate. Found to be associated with the plant and not reported as such were a group of 9 buildings (a foundary, 4 machine shops, an apprentice school, and several smaller buildings) which were located on the opposite side of an adjacent canal. There was no physical connection between the two groups of buildings.

c. Building Identification (F/A Table)

d. Summary of Tabulation:

TABLE 2

F/A ACCURACY FACTOR		PRIMARY BUILDINGS No. Bldgs	PRIMARY BUILDINGS %	TOTAL BUILDINGS No. Bldgs	TOTAL BUILDINGS %
Total Plant 64.6	Correct	6	67	18	37.5
Primary Buildings 83.5	Of Similar Occupancy	2	22	9	18.7
	Unidentified	0	—	6	12.5
	Incorrect	1	11	15	31.3
	Total	9	100	48	100.0

c. Remarks

The character of many buildings in this plant was such that their use could be readily changed without affecting their appearance, thereby making identification by photographic interpretation alone rather difficult.

NIPPON VEHICLE MANUFACTURING CO. 90.20-241

FUNCTIONAL ANALYSIS TABLE

NIPPON VEHICLE MANUFACTURING COMPANY — 90-20-241

BUILDING NUMBER	PRIMARY	REPORTED FUNCTION	ACTUAL FUNCTION	EVALUATION: CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR
1		Prob. Car Shed	Car Shed	x				95
2		Storage	Kitchen & Dining Room				x	15
3		Storage	Car Shed		x			70
4		Boiler Shop	Machine Shop		x			85
5		Boiler & Boiler Tube Shop	R. R. Car Assembly				x	85
6	x	Freight Car Assembly	R. R. Car Assembly	x				100
7	x	Passenger Car Assembly	Paint Shop				x	0
8		Finishing, Painting Etc.	Locomotive Boiler Shop				x	70
9	x	Passenger Car Assembly	R. R. Car Assembly	x				100
10		Prob. Offices	Storage-Bicycles				x	20
11		Photo Room & Mess Hall	Administration	x				100
12		Offices	Administration		x			45
13		Unidentified	Dining Room-Workers		x			100
14		Reported Medical Ctr	Dispensary		x			45
15		Unidentified	Offices				x	0
16		Timber Storage	Carpenter Shop	x				100
17		Woodworking Shop	Lumber Drying Bldg		x			45
18		Unidentified	Carpenter Shops				x	15
19-20		Storage	Pattern Shop (Wood)				x	15
21		Storage	Carpenter & Lumber Cutting	x				100
22		Saw Mill	Wood Working Shop	x				100
23		Woodworking Shop	(a) Boiler House (a) Sand Removal	x			x(a)	60
24(a) (b)		(a) Boiler House (a) Prob. Storage (b)	Machine Shop		x			85
25	x	Car Assembly Shop	R. R. Car Assembly	x				100
26	x	Passenger Car Assembly	Plate Shop	x				100
27	x	Metal Work Shop	Storage Bldg	x				100
28		Storage Bldgs	Pipe Storage	x				100
29		Storage	Boiler Shop			x		85
30		Passenger Car Shed	Storage			x		85
31		Storage & Drafting	Storage					100
32-33		Storage		x				

FUNCTIONAL ANALYSIS TABLE

NIPPON VEHICLE MANUFACTURING COMPANY — 90-20-241

BUILDING NUMBER	PRIMARY FUNCTION REPORTED	ACTUAL	EVALUATION: CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR
34	Storage	Warehouse Office		x			70
35	Storage	Machine Shop				x	15
36	x Heavy Shop	Forge		x			85
37	Prob. Trans. or D.C. Converters	Compressors-Air		x			85
38	Storage	Dining Room				x	15
39	Unidentified	Sand Casting (Foundry)			x		45
40	x Foundry	Foundry	x				100
41	Storage	Storage	x				100
42	Storage	Machine Shop				x	15
43	Storage	Scrap Recovery		x			70
44	Unidentified	Machine Shop			x		45
45	Prob. Misc. Storage	Boiler Shop				x	20
46	x Prob. Assembly of Cars Or Locomotives - Machining	Machine Shop	x				80
47	Pass: Car or Locomotive Shed	Track Shop				x	25
48	Unidentified	Boiler Shop			x		45
49	Turntable	Turntable	x				100

5. STRUCTURAL ANALYSIS

a. Check on Scale Measurement

Building 8 was measured to determined scale check. Linear dimensions were 97 percent correct.

b. S/A (See S/A Table)

c. Summary of Tabulation

(1) Construction Type

TABLE 3

Construction Type	No. Bldgs	No. Corr	% Corr
Wood Frame (W)	14	13	93
Steel Frame (S)	6	4	67
Reinforced Concrete (R/O)	1	0	0
Total	21	17	81

(2) Combustibility

TABLE 4

Building Combustibility	No. Bldgs	No. Corr	% Corr
Combustible (C)	17	16	94
Non-Combustible (N)	3	3	100
Fire-Resistant (R)	1	0	0
Total	21	19	91

90.20-241 NIPPON VEHICLE MANUFACTURING CO.

STRUCTURAL ANALYSIS TABLE

90-20-241

NIPPON VEHICLE MANUFACTURING COMPANY

BUILDING NUMBER	1000'S OF SQ FT PLAN AREA		NUMBER OF FLOORS		SIZE OF BAY		ROOF MATERIAL		COMBUSTIBILITY OF BUILDING		CONSTRUCTION TYPE	
	ACTUAL	REPORTED	ACTUAL	REPORTED JT3	ACTUAL	REPORTED	ACTUAL	REPORTED JT3	ACTUAL	REPORTED JT3	ACTUAL	REPORTED
1			1	1			SM/W	C	C	C	W	W
2			2	1			SM/W	C	C	C	W	W
3			2	1			SM/W	C	C	C	W	W
4			1	1			SM/W	C	C	C	W	W
5			1	1			SM/W	C	C	C	W	W
6			1	1			SM/W	C	C	C	S	S
8	20,000	19,800	1	1			N	N	C	C	S	W
9			1	1			SM/W	C	C	C	W	W
20			1	1			SM/W	C	C	C	W	W
22			1	1			W	N	C	N	S	W
25			1	1			SM	N	N	N	S	S
27			1	1			SM/W	C	C	C	W	W
28			2	1			T/W	C	C	C	W	W
30			1	1			W&SM	C	C	C	W	W
36			1	1			SM	N	N	N	S	S
37			2	1			C	N	R	N	R/C	S
38			2	1			SM/W	C	C	C	W	W
39			1	1			W&SM	C	C	C	W&S	W
40			1	1			SM	N	N	N	S	S
42			1	1			W&CA	C	C	C	W	W
44			1	1			W&CA	C	C	C	W	W

NIPPON VEHICLE MANUFACTURING CO. 90.20-241

6. DAMAGE ASSESSMENT

a. D/A (See D/A Table)

b. Summary of Tabulation

TABLE 5

	ACTUAL		REPORTED	
	Sq Ft	% Dam	Sq Ft	% Dam
Total Building Area			813,600	
Damage				
Structural	54,600	18.9	55,700	20.7
Superficial	232,700	81	213,200	79.4
Total Damage	286,700	35.2	268,900	33

* In general, Minor Damage was purposely omitted in D/A reports.

c. Remarks

Three attacks were made on this plant: 8 January 1945, 17 May 1945, and 26 June 1945. Only the first two, however, were considered in the AC/AS Intelligence report. Therefore, damage data for the first two raids only were considered in the tabulation.

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NIPPON VEHICLE MANUFACTURING COMPANY

DAMAGE ASSESSMENT TABLE

90-20-241

BUILDING NUMBER	BUILDING AREA	STRUCTURAL (1000'S SQ. FT.)			SUPERFICIAL (1000'S SQ. FT.)			(1000'S SQ. FT.)			REMOVED (1000'S SQ. FT.)		
	1000'S SQ. FT.	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED
7	15.2	15.2	15.2	-									
8	19.8	3.5	-		16.3	16.5							
9	26.1	6.0	6.0		20.1	20.1							
10	7.4	7.4	3.9			3.5							
11a-b	5.3	4.5	4.5		-	-							
c	1.3	-	-		-	-							
12	7.3	7.3	7.3										
13	5.2	5.2	5.2										
14	6.5	6.5	6.5										
15	7.0	7.0	7.0										
16	7.8	7.8	7.8										
17	7.2	7.2	7.2										
18	5.9	5.9	2.0		-	1.9							
21	3.6	3.6	3.6										
22	28.0	28.0	28.0										
23	31.8	31.8	31.8										
24a	6.3	-	0.3		3.1	-							
b	6.3	6.3	6.3										
c	3.1	3.1	3.1										
26	23.6	23.6	23.6										
30a	8.0	8.0	-										
b	5.0	1.3	-										
31	13.5	13.5	13.5										
32	4.2	4.2	4.2										
33	4.4	4.4	4.4										
36	36.8	-	-		4.5	4.1							
43	3.9	3.9	3.9										
46	126.7	13.5	11.5		10.0	9.6							
48	19.0	4.0	4.0		-	-							

NOTE: Bldgs. not listed here were listed as having no visible damage.

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90.20-241 NIPPON VEHICLE MANUFACTURING CO.

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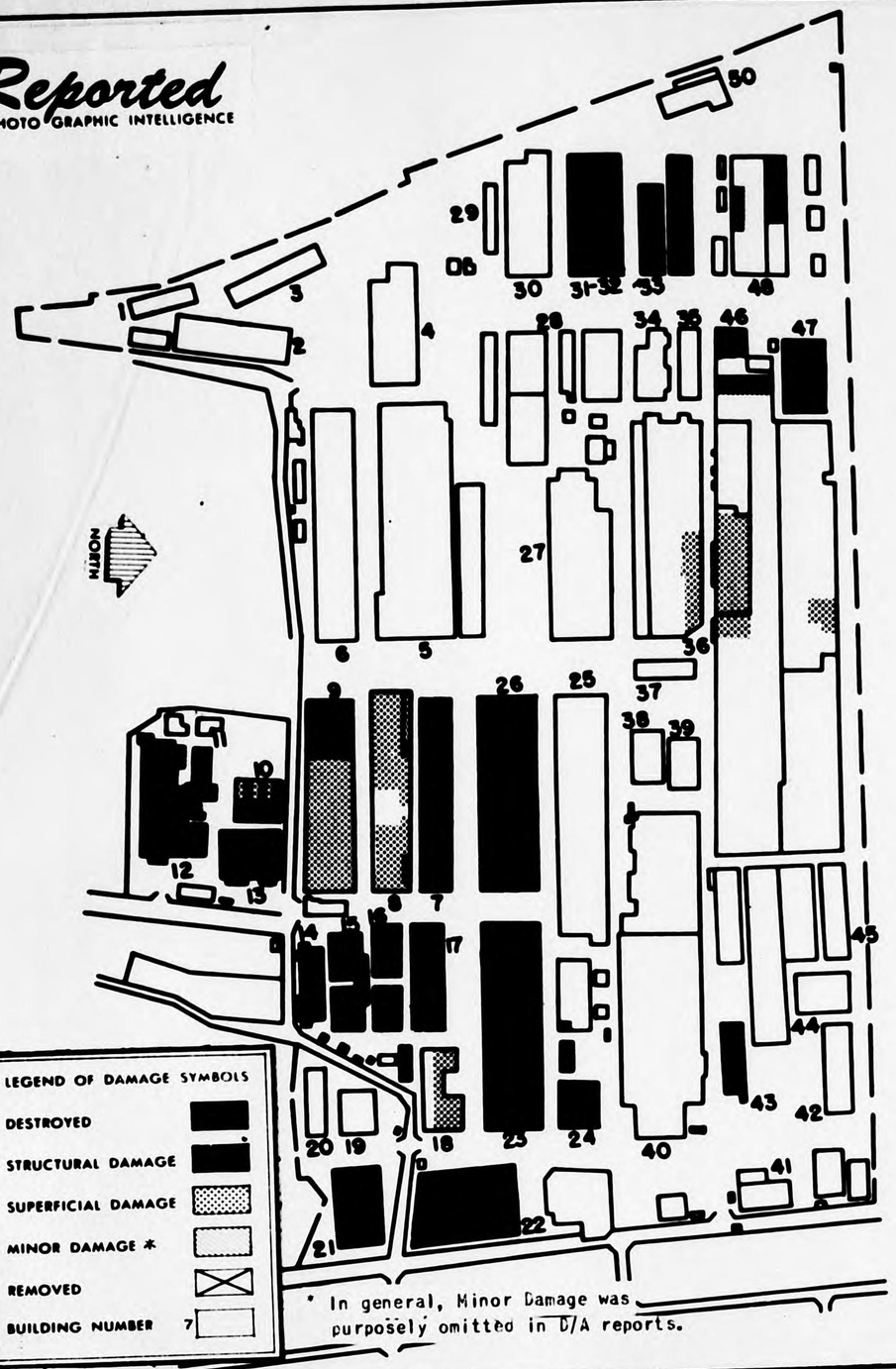
90.20-241 NIPPON VEHICLE MANUFACTURING CO.

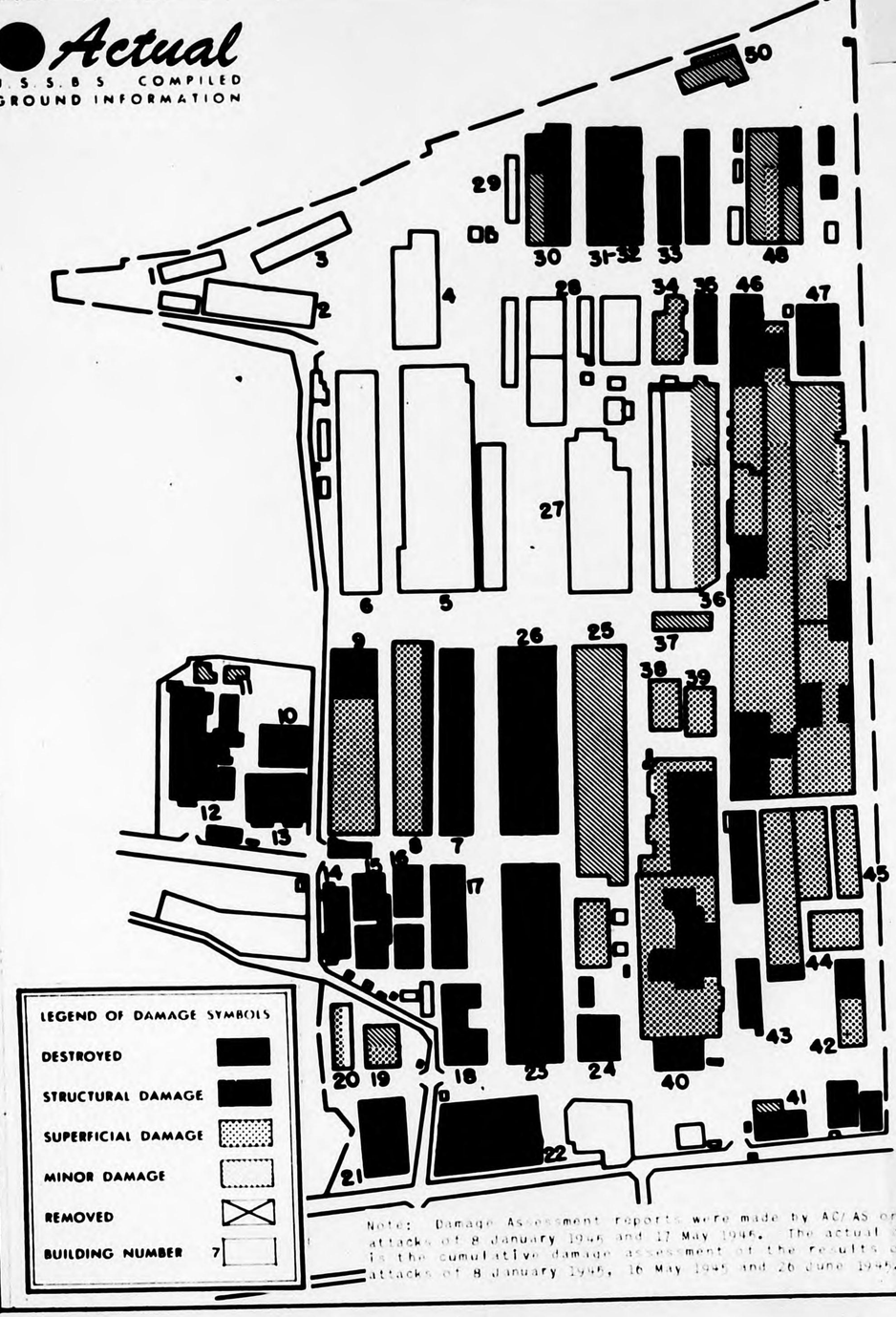
Reported
PHOTOGRAPHIC INTELLIGENCE



* In general, Minor Damage was purposely omitted in D/A reports.

NIPPON VEHICLE MANUFACTURING CO. 90.20-241

Actual
U.S.S.B.S. COMPILED GROUND INFORMATION



Note: Damage Assessment reports were made by AC/AS only on attacks of 8 January 1945 and 17 May 1945. The actual damage is the cumulative damage assessment of the results of the attacks of 8 January 1945, 16 May 1945 and 26 June 1945.

EXHIBIT L

SUMITOMO METAL INDUSTRY CO.

& SUMITOMO ALUMINUM CO.

90.25 - 263 A

LAT. 34° 40'N - LONG. 135° 26'E

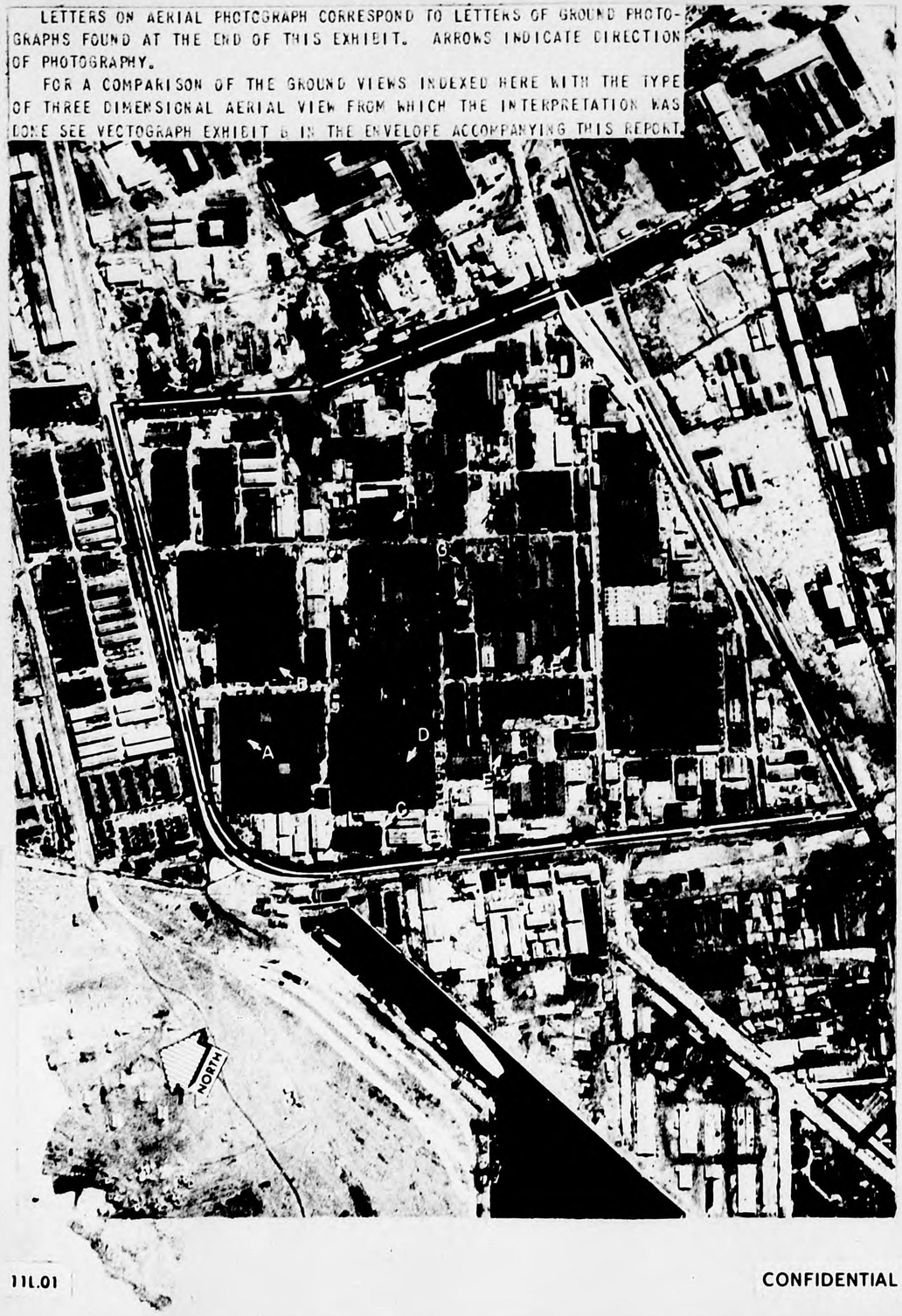
OSAKA, JAPAN

See Exhibit P for abbreviations used in this exhibit.

90.25-263A SUMITOMO METAL INDUSTRY CO.

LETTERS ON AERIAL PHOTOGRAPH CORRESPOND TO LETTERS OF GROUND PHOTOGRAPHS FOUND AT THE END OF THIS EXHIBIT. ARROWS INDICATE DIRECTION OF PHOTOGRAPHY.

FOR A COMPARISON OF THE GROUND VIEWS INDEXED HERE WITH THE TYPE OF THREE DIMENSIONAL AERIAL VIEW FROM WHICH THE INTERPRETATION WAS DONE SEE VECTOGRAPH EXHIBIT B IN THE ENVELOPE ACCOMPANYING THIS REPORT.



SUMITOMO METAL INDUSTRY CO. 90.25-263A

1. DESCRIPTION OF TARGET

a. This target (also known as the Sumitomo Sakurijima Plant and the Sumitomo Light Metal Industry Co., Osaka Plant) was one of the four or five large producers of propellers for Japanese combat aircraft. In addition, it accounted for large quantities of copper, aluminum, and duralumin products essential to aircraft production. It was one of the prime targets in the Osaka Area.

b. The plants are located in northwestern Osaka, north of and near the mouth of the Aji River.

c. The two plants comprise 121 listed structures with a built-up area of approximately 2,200,000 square feet.

2. SUMMARY

a. Functional analysis of the primary buildings was good. The overall interpretation of building functions was, however, less accurate because of too much guess work as to the functions of secondary buildings. Of 103 buildings having comparable data there were:

(1) 24 identified correctly
(2) 42 identified as having similar occupancy
(3) 12 unidentified
(4) 25 identified incorrectly

b. The structural analysis was good, particularly with regard to building combustibility. Errors in the interpretation of the number of floors per building accounted for most errors in the construction types. In that category 70 out of 97 buildings were correctly analyzed. For combustibility, 85 out of 95 buildings were correct.

c. No damage assessment was made.

3. SOURCE OF DATA

a. Reported.

(1) AC/AS Intelligence F/A Report #191, 30 June 1945.
(2) AC/AS Intelligence Building Construction Analysis.

b. Field Data.

(1) USSBS (G-2 PIC) field notes.

90.25-263 A SUMITOMO METAL INDUSTRY CO.

4. FUNCTIONAL ANALYSIS

a. Use of Plant.

Reported: Production of sheets, plates, tubes, bars, castings, and forgings of non-ferrous metals and alloys. Possible aircraft propeller production.

Actual: As reported. The northern plant produced light metal products: the southern plant produced propellers.

b. Boundaries.

As reported. The two plants were separated by the road just north of buildings #111 and #62.

c. Building identification (F/A Table).

d. Summary of Tabulation.

TABLE I

F/A ACCURACY FACTOR		PRIMARY BUILDINGS No. Bldgs	PRIMARY BUILDINGS %	TOTAL BUILDINGS No. Bldgs	TOTAL BUILDINGS %
Total Plant 60	Correct	13	43	24	23
Primary Buildings 73	Of Similar Occupancy	12	40	42	41
	Unidentified	2	7	12	12
	Incorrect	3	10	25	24
	Total	30	100	103	100

e. Remarks.

Most of the primary buildings were correctly or nearly correctly analyzed for function. Analysis of secondary buildings was much less accurate due to a tendency to to call any unknown building "storage" or "workshop".

SUMITOMO METAL INDUSTRY CO. 90.25-263A

FUNCTIONAL ANALYSIS TABLE

SUMITOMO METAL INDUSTRY CO.
SUMITOMO ALUMINUM CO.

90.25 - 263A

BUILDING NUMBER AC/AS	PRIMARY	REPORTED FUNCTION AC/AS	ACTUAL FUNCTION	EVALUATION CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR
1		Stores or Workshops	Warehouse-Tools& Equipment	x				75
2		Stores or Workshops	Warehouse-Tools& Equipment	x				75
3		Stores or Workshops	Warehouse-Tools& Equipment	x				75
4		Stores or Workshops	Warehouse-Tools& Equipment	x				75
5		Stores or Workshops	Warehouse-Tools& Equipment	x				75
6		Stores or Workshops	Warehouse-Tools& Equipment	x				75
7		Stores or Workshops	Warehouse-Tools& Equipment	x				75
8		Unidentified	Air Compressor		x			45
9		Unidentified Workshop	Woodwashing (Soda)	x				85
10		Engineering Workshop	Rolling Mill - Aluminum Sheet	x				70
11		Stores or Workshops	(Not determined)				x	
12		Stores or Workshops	Woodwashing (Soda)		x			75
13	X	Stores or Workshops	Heat Treatment - Nitrate	x				75
14		Stores or Workshops	Woodwashing	x				75
15	X	Unidentified Workshop	Sub Station				x	15
16		Stores	(Not determined)					
17	X	Probable Rolling Mill	Pipe Manufacture (Extrusion)	x				80
18		Stores	Finished products storage	x				85
19		Stores	(Not determined)					
20	X	Foundry	Pipe Manufacture - Also Wire		x			70
21		Stores	Storage - Tool and Equipment	x				85
22	X	Machine Shop	Maintenance & Repair Bldg		x			70
23		Stores	Storage - Raw Material		x			85
24		Stores	Storage - Raw Material		x			85
25		Stores	Storage - Raw Material	x				85
26		Unidentified Workshops	Vehicle Maintenance		x			70
27		Unidentified Workshops	Crating Manufacture		x			70
28		Unidentified Workshops	Mess Hall				x	15
29		Unidentified	Storage - Finished Product			x		45
30		Warehouse	Shipment - Finished Product		x			70
31	X	Foundry	Copper Smelter	x				85

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SUMITOMO METAL INDUSTRY CO.
SUMITOMO ALUMINUM CO.

FUNCTIONAL ANALYSIS TABLE

90.25 - 263A

BUILDING NUMBER AC/AS	PRIMARY	FUNCTION REPORTED AC/AS	ACTUAL	EVALUATION CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR
32		Unidentified	Not determined					
33		Unidentified	Not determined					
34	X	Foundry	Copper Smelter	x				85
35	X	Stores or Workshop	Storage - Raw Material		x			78
36	X	Unidentified	Ingot Pouring-Billet Making			x		45
37	X	Unidentified	Ingot Pouring-Billet "			x		45
38	X	Unidentified Workshop	Ingot Pouring-Billet "	x				85
39	X	Foundry or Forge	Ingot Pouring-Billet "	x				100
40	X	Machine Shop	Cleaning of Ingots & Treatment		x			70
41	X	Unidentified Workshops	Cleaning of Ingots	x				85
42		Unidentified Workshops	Offices		x			70
43	X	Unidentified Workshops	Steam Boiler Room			x		15
44		Unidentified Workshops	Office		x			70
45	X	Unidentified Workshops	Experimental Laboratory	x				85
46	X	Machine Shop or Assembly	Extrusion		x			70
47		Stores	Equipment Testing			x		15
48		Stores						
49		Office or Stores	Offices		x			85
50		Office	Office	x				100
51		Unidentified				x		45
52		Stores or Workshop						
53		Stores or Workshop	Mess Hall - Office Workers			x		15
54		Stores or Workshop	(Part of Bldg 53)			x		15
55		Stores or Workshop						
56		Office or Stores	Main Office		x			85
57		Office or Stores	Research Laboratory		x			70
58	X	Machine Shop	Maintenance & Repair		x			70
59		Office						
60		Office	Research Laboratory		x			70
61		Stores or Workshop	Storage		x			78
62	X	Machine Shop or Assembly	Blade plant(70% Steel, 30% Wood)		x			78

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90.25-263A SUMITOMO METAL INDUSTRY CO. CONFIDENTIAL

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SUMITOMO METAL INDUSTRY CO.
SUMITOMO ALUMINUM CO.

FUNCTIONAL ANALYSIS TABLE

90.25 - 263A

BUILDING NUMBER AC/AS	PRIMARY	FUNCTION REPORTED AC/AS	ACTUAL	EVALUATION CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR
63		Unidentified	Warehouse			x		45
64		Stores or Workshop	Mess Hall				x	15
65		Stores or Workshop	Mess Hall				x	15
66		Stores or Workshop	Mess Hall				x	15
67		Stores or Workshop	Warehouse		x			78
68		Small Workshop	Warehouse		x			70
69		Possible Furnace House	Warehouse				x	10
70		Possible Furnace House	Warehouse - Raw Material				x	10
71		Stores or Workshop	Storage-Tools & Equipment		x			78
72		Stores or Workshop	Storage-Tools & Equipment		x			78
73		Stores or Workshop	Storage-Tools & Equipment		x			78
74	X	Probable Rolling Mill	Copper Rolling Mill	x				85
75	X	Stores or Workshop	Heat Treatment		x			78
76		Stores or Workshop	Air Compressor				x	15
77	X	Stores or Workshop	Sub Station				x	15
78		Stores or Workshop						
79	X	Probable Rolling Mill	Copper Extrusion	x				85
80		Stores or Office	Mess Hall				x	15
81		Unidentified Workshops	Mess Hall & Dispensary				x	15
82	X	Unidentified Workshops	Manufacture - Brass Ammo. Casing	x				85
83	X	Composite Workshop - Rolling Mill	Foundry		x			70
84	X	Unidentified Workshop	Foundry	x				85
85		Stores						
86		Stores or Workshop	Roller Storage		x			78
87		Unidentified	Locker Rm. - Women			x		45
88		Unidentified Workshop	Water Treatment - Washing	x				85
89		Unidentified Workshop	Water Treatment - Washing	x				85
90	X	Unidentified Workshop	Plate Shaping - Angle - Channel	x				85
91		Office or Stores	Labor Office,		x			78
92		Office or Stores						
93		Unidentified				x		45

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SUMITOMO METAL INDUSTRY CO. 90.25-263A

90.25-263 A SUMITOMO METAL INDUSTRY CO.

FUNCTIONAL ANALYSIS TABLE

SUMITOMO METAL INDUSTRY CO.
SUMITOMO ALUMINUM CO.

90.25 - 263A

BUILDING NUMBER AC/AS	PRIMARY	REPORTED FUNCTION AC/AS	ACTUAL FUNCTION	EVALUATION CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR
94	X	Engineering Workshop	Aluminum Plate Shop	X				85
95	X	Probable Boiler House	Boiler House	X				95
96		Stores or Workshop	Office - Employees TimeCard				X	15
97		Stores or Workshop	Guard House				X	15
98		Stores or Workshop	Locker Room				X	15
99		Stores or Workshop						
100		Stores or Workshop	Storage-Bearings-Accessories		X			78
101		Stores or Workshop					X	45
102		Stores or Workshop						
103		Unidentified						
104		Stores or Workshop	Labor Office				X	15
105		Stores or Workshop	Labor Office			X		15
106		Stores or Workshop	Office - Time Card			X		15
107		Stores or Workshop	Guard House			X		15
108		Stores or Workshop	Lockers			X		15
109		Unidentified	Scrap Assembly		X			45
110		Machine Shop or Assembly	Accessory Plant		X			78
111	X	Stores or Workshop	Mess Hall		X			15
112		Stores or Workshop	Baths		X			15
113		Stores or Workshop	Warehouse - Supplies		X			73
114		Stores or Workshop	Office - Shop Supervisors		X			45
115		Unidentified	Tool Making Plant	X				85
116		Unidentified Workshop	Guard House		X			45
117		Unidentified	Tool Making Plant	X				85
119		Unidentified Workshop	Experimental Shop-Propeller Testing		X			78
119		Stores or Workshop	(Not part of plant)					
120		Stores	(Not part of plant)					
121		Stores						

SUMITOMO METAL INDUSTRY CO. 90.25-263A

5. STRUCTURAL ANALYSIS

a. Check on Scale Measurement.

Linear dimensions were 8 per cent greater than reported.

b. S/A (See A/A Table).

c. Summary of Tabulation.

(1) Construction type

TABLE 2

Construction Type	PRIMARY BUILDINGS No. Bldgs	PRIMARY BUILDINGS No. Corr	PRIMARY BUILDINGS % Corr	TOTAL BUILDINGS No. Bldgs	TOTAL BUILDINGS No. Corr	TOTAL BUILDINGS % Corr
A1.1	2	2	100	2	2	100
A1.3	1	1	100	1	1	100
A2.3	7	7	100	9	8	88
B2	12	5	42	14	6	43
D	5	5	100	49	46	94
E2	1	1	100	22	7	32
Total	28	21	75	97	70	72

(2) Combustibility

TABLE 3

Building Combustibility	PRIMARY BUILDINGS No. Bldgs	PRIMARY BUILDINGS No. Corr	PRIMARY BUILDINGS % Corr	TOTAL BUILDINGS No. Bldgs	TOTAL BUILDINGS No. Corr	TOTAL BUILDINGS % Corr
Combustible (C)	4	2	50	67	63	94
Non-combustible (N)	23	20	87	26	21	81
Fire-Resistant (R)	2	1	50	2	1	50
Total	29	23	79	95	85	90

d. Remarks.

The chief error in the structural analysis was in reporting the number of floors of the smaller buildings, which resulted in a misclassification of building types.

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SUMITOMO METAL INDUSTRY CO. SUMITOMO ALUMINUM CO.	STRUCTURAL ANALYSIS TABLE	90.25-263A

BUILDING NUMBER	1000'S OF SQ. FT. PLAN AREA		NUMBER OF FLOORS		SIZE OF BAY		ROOF MATERIAL		COMBUSTIBILITY OF BUILDING		CONSTRUCTION TYPE	
AC/AS A2	ACTUAL	REPORTED AC/AS	ACTUAL	REPORTED AC/AS	ACTUAL	REPORTED	ACTUAL	REPORTED AC/AS	ACTUAL	REPORTED AC/AS	ACTUAL	REPORTED
1		4.1		1				LT		C		D
2		5.8	1	1			W	LT	C	C	D	D
3		2.1	1	1			W	LT	C	C	D	D
4		2.6	1	1			W	LT	C	C	D	D
5		3.6	1	1			W	LT	C	C	D	D
6		1.6	2	1			W	LT	C	C	E2	D
7		5.2	2	1			W	LT	C	C	E2	D
8		2.3	1	1			W	LT	C	C	D	D
9		2.6	1	1			W	LT	C	C	D	D
10		22.7	1	1			CI/SF	LT	N	N	32	32
11		2.4		1				LT		C	D	D
12		7.4	1	1			W	LT	C	C	D	D
13		1.0	1	1			CI/SF	LT	N	C	D	D
14		2.7	1	1			W	LT	C	C	D	D
15		4.8	1	1			CI/SF	LT	N	C	D	D
16		5.4		1				LT		C		D
17		170.8	1	1			CI/SF	LT	N	N	32	32
18		12.3	1	1			W	LT	C	C	D	D
19		3.6		1				LT		C		D
20		25.3	1	1			CI/SF	LT	N	N	32	31
21		3.8	1	1			W	LT	C	C	D	D
22		35.6	1	1			CI/SF	LT	N	N	32	A1.1
23		5.2	1	1			W	LT	C	C	D	D
24		5.2	1	1			W	LT	C	C	D	D
25		5.2	1	1			W	LT	C	C	D	D
26		2.0	1	1			W	LT	C	C	D	D
27		5.8	1	1			W	LT	C	C	D	D
28		8.7	1	1			W	LT	C	C	D	D
29		1.6	1	1			W	LT	C	C	D	D
30		12.6	1	1			W	LT	C	C	D	D
31		18.8	1	1			CI/SF	LT	N	N	32	31

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90.25-263A SUMITOMO METAL INDUSTRY CO.
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SUMITOMO METAL INDUSTRY CO. SUMITOMO ALUMINUM CO.	STRUCTURAL ANALYSIS TABLE	90.25-263A

BUILDING NUMBER	1000'S OF SQ. FT. PLAN AREA		NUMBER OF FLOORS		SIZE OF BAY		ROOF MATERIAL		COMBUSTIBILITY OF BUILDING		CONSTRUCTION TYPE	
AC/AS A2	ACTUAL	REPORTED AC/AS	ACTUAL	REPORTED AC/AS	ACTUAL	REPORTED	ACTUAL	REPORTED AC/AS	ACTUAL	REPORTED AC/AS	ACTUAL	REPORTED
32		0.7		1				LT		C	D	D
33		0.7		1				LT		C	D	D
34		12.8	1	1			CI/SF	LT	N	N	32	32
35		26.7	1	2			CI/SF	LT	N	C	32	E2
36		3.8	1	1			CI/WF	LT	C	C	A2.3	A2.3
37		3.8	1	1			W	LT	C	C		A2.3
38		12.6	1	1			/SF	LT	N	N	A2.3	A2.3
39		11.6		1				LT		N		32
40		10.0	1	1			W	LT	C	N	A2.3	A2.3
41		12.3	1	1			/SF	LT	N	N	A2.3	A2.3
42		7.3		1				LT		C		D
43		15.4	1	1			CI/SF	LT	N	N	A2.3	A2.3
44		4.2	1	1			W	LT	C	C	D	D
45		9.0	2	3			Conc	Conc	R	R	E2	E2
46		63.4	1	1			CI/SF	LT	N	N	A1.1	A1.1
47		4.0	2	3			CI/WF	LT	C	C	E2	E2
48		1.1		1				LT		C		D
49		5.1	2	3			CI/WF	LT	C	C	E2	E2
50		8.8	2	3			CI/WF	LT	C	C	E2	E2
51		1.3		1				LT		C		D
52		1.7		1				LT		C		D
53		4.9	1	1			CI/WF	LT	C	C	D	D
54		0.9		1				LT		C		D
55		0.8		1				LT		C		D
56		6.1	2	3			CI/WF	LT	C	C	E2	E2
57		6.0	1	2,3			CI/SF	LT	N	C	32	E2
58		30.0	1	1			CI/SF	LT	N	N	32	A2.3
59		4.4		2				LT		C		E2
60		5.2	1	2			T/WF	LT	C	C	A2.3	E2
61		8.2	1	1			CI/WF	LT	C	C	D	D
62		95.7	1	1			CI/SF	LT	N	N	A1.1	A1.1
63		2.1	1	1			CA/WF	LT	C	C	D	D

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PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS EXHIBIT 1
90.25-263A SUMITOMO METAL INDUSTRY CO.

SUMITOMO METAL INDUSTRY CO.
SUMITOMO ALUMINUM CO.

STRUCTURAL ANALYSIS TABLE

90.25-263A

BUILDING NUMBER		1000'S OF SQ. FT. PLAN AREA		NUMBER OF FLOORS		SIZE OF BAY		ROOF MATERIAL		COMBUSTIBILITY OF BUILDING		CONSTRUCTION TYPE	
AC/AS A2		ACTUAL	REPORTED AC/AS	ACTUAL	REPORTED AC/AS	ACTUAL	REPORTED	ACTUAL	REPORTED AC/AS	ACTUAL	REPORTED AC/AS	ACTUAL	REPORTED
64			5.7	1	2			T/WF	LT	C	C	D	E2
65			3.8	1	1			T/WF	LT	C	C	D	D
66			5.7	2	1			CI/WF	LT	C	C	E2	E2
67			3.8	2	2			CA/WF	LT	C	C	E2	E2
68			3.8	2	1			CA/WF	LT	C	C	E2	D
69			13.2	2	1			T/WF	LT	C	N	E2	A2.3
70			14.2	2	1			T/WF	LT	C	C	E2	A2.3
71			4.8	1	1			W	LT	C	C	D	D
72			6.4	1	1			W	LT	C	C	D	D
73			4.2	1	2			W	Wood	C	C	D	E2
74			120.5	1	1			CI/SF	LT	N	N	32	32
75			13.6	1	1			/SF	LT	N	N	A2.3	A2.3
76			5.6	1	1			W	LT	C	C	D	D
77			4.2	1	1			Conc	LT	R	C	D	D
78			4.2		2				LT		C		E2
79			128.4	1	1			CI/SF	LT	N	N	32	32
80			6.1		2				LT		C		E2
81			1.8	2	1				Conc	C	R	E2	D
82			8.8	1	1			/SF	LT	N	N	D	D
83			39.5	1	1			CI/SF	LT	N	N	32	32
84			10.4	1	1			CI/SF	LT	N	N	32	A2.3
85			1.5		1				LT		C		D
86			11.5	1	1			W	LT	C	C	D	D
87			6.2	2	1			W	LT	C	C	E2	D
88			1.5	1	1			W	LT	C	C	D	D
89			2.6	1	1			W	LT	C	C	D	D
90			25.1	1	1			CI/SF	LT	N	N	A2.3	A2.3
91			5.4	1	2			W	Wood	C	C	D	E2
92			2.5		1				Wood		C		D
93			3.0		1				Wood		C		D
94			80.4	1	1			CI/SF	LT	N	N	32	A2.3
95			4.0	1	1			W	LT	C	N	D	D

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EXHIBIT L PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS

90.25-263 A SUMITOMO METAL INDUSTRY CO.

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SUMITOMO METAL INDUSTRY CO.
SUMITOMO ALUMINUM CO.

STRUCTURAL ANALYSIS TABLE

90.25-263A

BUILDING NUMBER		1000'S OF SQ. FT. PLAN AREA		NUMBER OF FLOORS		SIZE OF BAY		ROOF MATERIAL		COMBUSTIBILITY OF BUILDING		CONSTRUCTION TYPE	
AC/AS A2		ACTUAL	REPORTED AC/AS	ACTUAL	REPORTED AC/AS	ACTUAL	REPORTED	ACTUAL	REPORTED AC/AS	ACTUAL	REPORTED AC/AS	ACTUAL	REPORTED
96			5.2	1	1			W	LT	C	C	D	D
97			3.6	1	1			W	Wood	C	C	D	D
98			2.4		1				Wood		C		D
99			40.2	1	1			CI/WF	LT	C	C	A2.3	A2.3
100			3.0		1				LT		C		D
101			4.0		1				LT		C		D
102			4.7	1	1			CA/WF	LT	C	C	D	D
103			0.9		1				LT		C		D
104			1.9		1				LT		C		D
105			1.7	2	1			/WF	LT	C	C	E2	D
106			3.4	2	1			T/WF	LT	C	C	E2	D
107			3.0	2	1			CI/WF	LT	C	C	E2	D
108			4.6	2	1			CI/WF	Wood	C	C	E2	D
109			3.1	2	1			CI/WF	LT	C	C	E2	D
110			2.1	1	1			CA/WF	LT	C	C	D	D
111			148.0	1	1			CI/SF	LT	N	N	A1.3	A1.3
112			8.1	2	1			T/WF	LT	C	C	E2	D
113			5.5	2	1			CA/WF	LT	C	C	E2	D
114			7.6	2	1			CA/WF	LT	C	C	D	D
115			1.8	1	1			T/WF	LT	C	C	D	D
116			11.8	1	1			CA/WF	LT	C	C	D	D
117			1.6	1	1			CI/SF	LT	N	C	D	D
118			5.9	1	1			T/WF	LT	C	C	D	D
119			3.9	1	1			T/WF	LT	C	C	D	D
120			4.2		1				LT		C		D
121			5.4		1				LT		C		D

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EXHIBIT L PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS

90.25-263A SUMITOMO METAL INDUSTRY CO.

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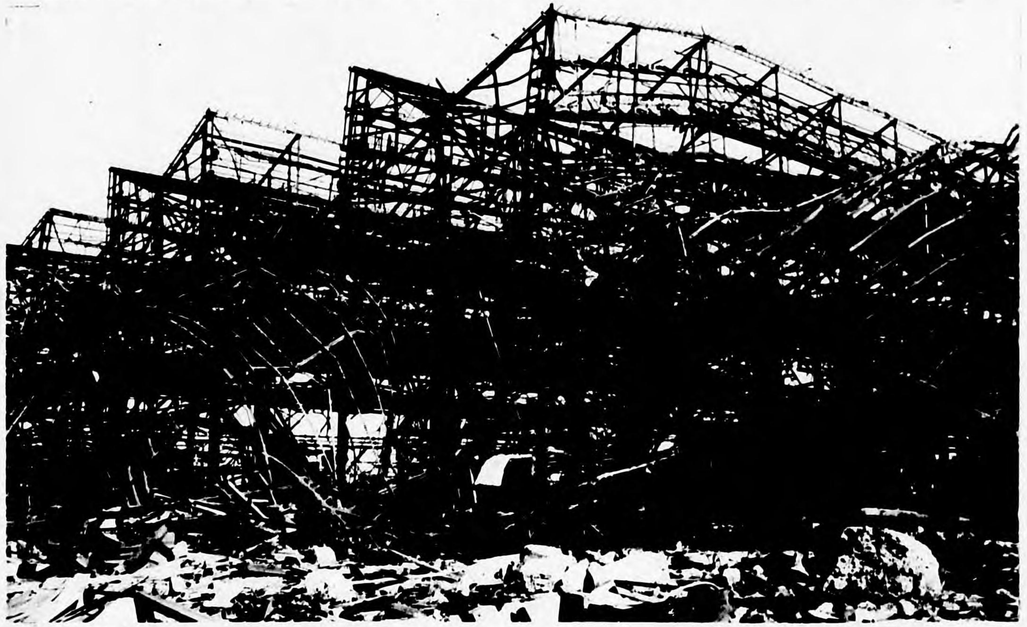
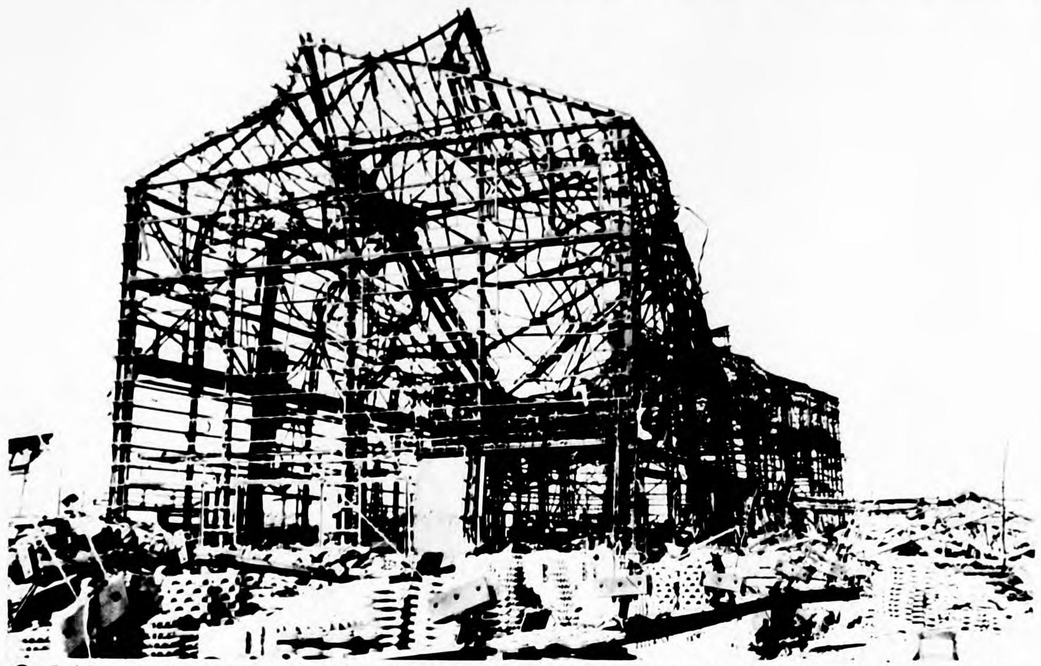
90.25-263 A SUMITOMO METAL INDUSTRY CO.

A Structural damage caused by direct hit on column and overhead traveling crane and rails. Note fallen crane in background and concrete observation box in foreground. (Bldg 10)

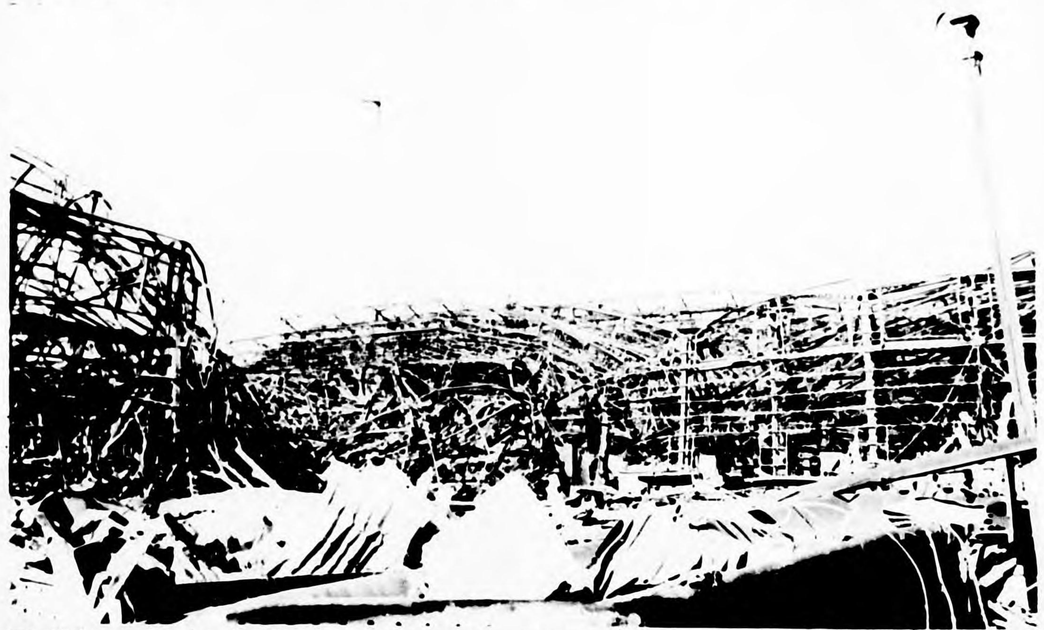


B Destruction of wooden building in foreground and severe structural damage to steel framed building caused by direct hits. (Bldg 17)

SUMITOMO METAL INDUSTRY CO. 90.25-263A



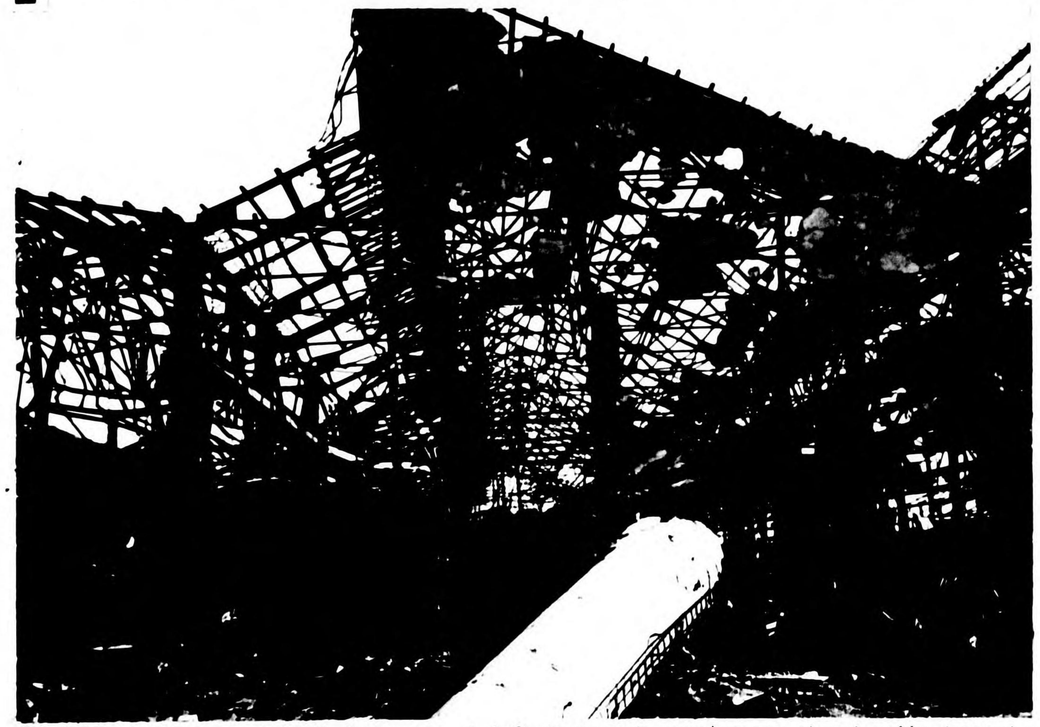
C Entire steel frame structurally damaged. Center section destroyed by direct hit. (Bldg 84)



D Widespread structural damage caused by numerous hits. Building in foreground completely destroyed. (Bldg 83)

90.25-263 A SUMITOMO METAL INDUSTRY CO.

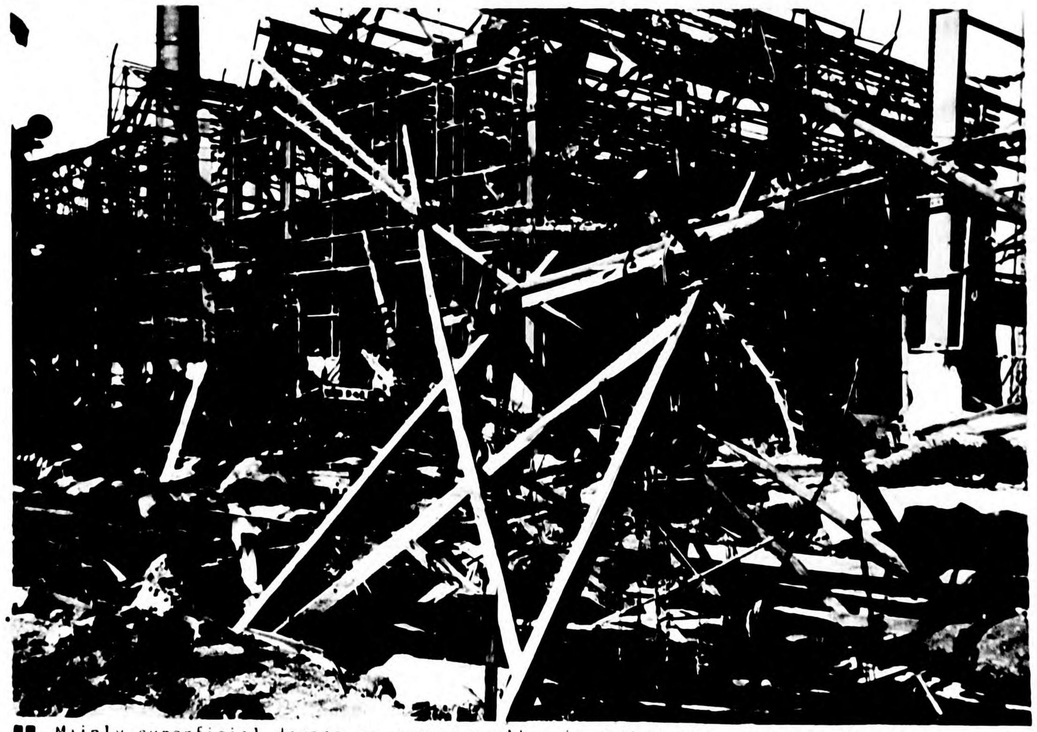
E Boiler house destroyed by a series of hits. Notice stack across boilers. (Bldg 95)



F 2 types of damage illustrated - bay at left destroyed - center bay structurally damaged - (Bldg 74)

SUMITOMO METAL INDUSTRY CO. 90.25-263A

G Damage caused by direct hits on a heavily constructed building. (Bldg 78)



H Mainly superficial damage on copper smelter in background. Bomb crater in foreground marks location of underground shelter. Wooden post on left is memorial to bodies left in shelter. (Bldg 31)

EXHIBIT M

SHOWA FERTILIZER COMPANY

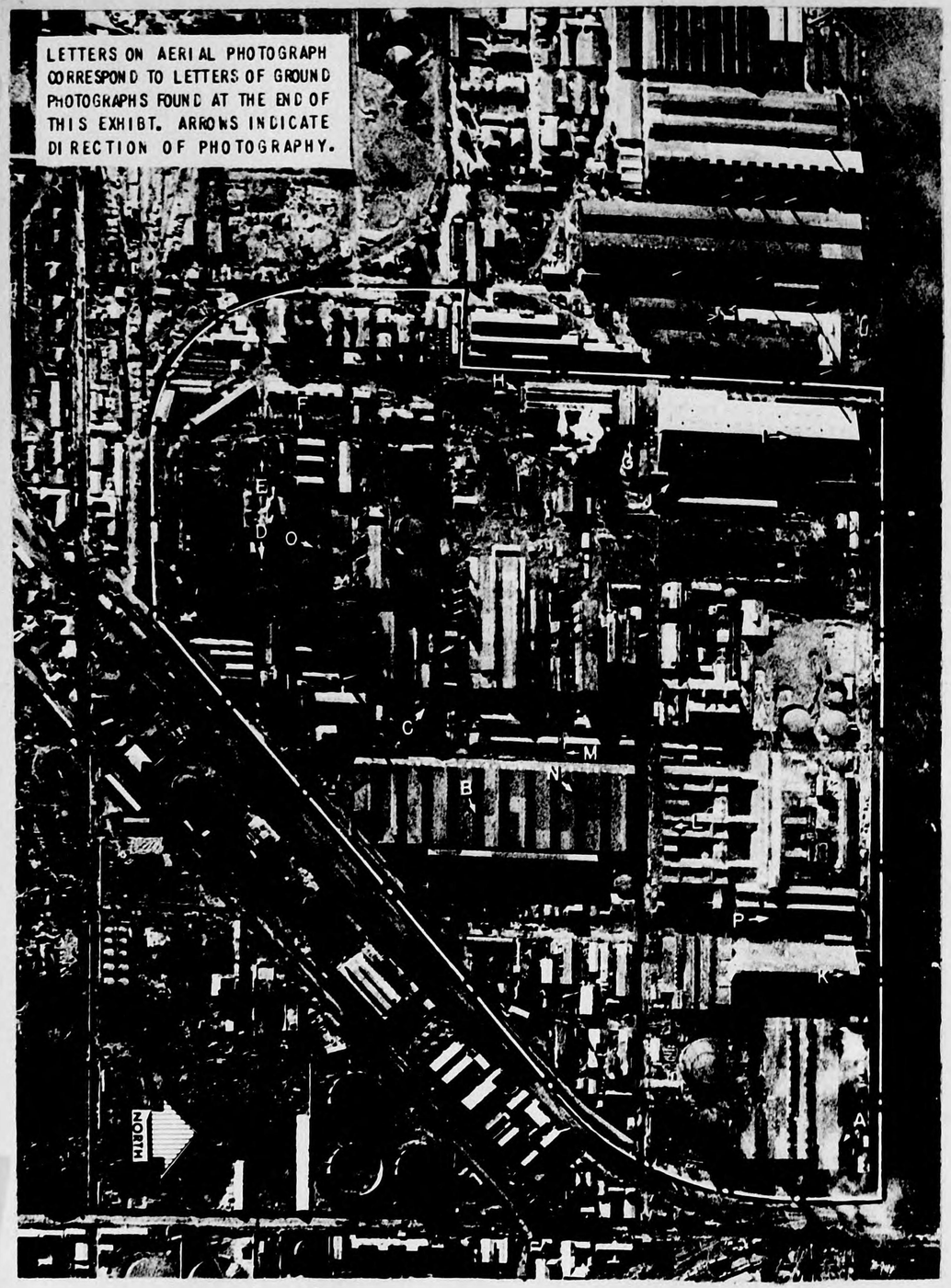
90.17-137

LAT. 35° 30 'N - LONG. 139° 43 'E

KAWASAKI, JAPAN

See Exhibit P for abbreviations used in this exhibit.

90.17-137 SHOWA FERTILIZER COMPANY



SHOWA FERTILIZER COMPANY 90.17-137

1. DESCRIPTION OF TARGET

a. Showa Fertilizer Co., Ltd. was one of the largest producers of ammonium sulfate fertilizer in Japan. Other important products were sulfuric acid, nitric acid, and ammonium nitrate.

b. The plant is located on reclaimed land in the highly industrialized Kawasaki Waterfront area, about 2¼ miles SSW of Kawasaki Railroad Station.

c. The plant comprises 79 listed structures.

2. SUMMARY

a. The interpretation of building functions for the entire plant was fair. For ease in reporting, the plant was divided into two parts primarily on an age basis. The older part was designated area "A", the newer, area "B".

b. The functional analysis of area "A" was based upon prewar information, and was excellent.

c. The functional analysis of area "B" was poor for the reason that, except for several correctly identified primary structures, the bulk of the buildings were unidentified. Two unidentified structures, a steam plant and an outdoor transformer yard should have been identified. The analysis of area "B" did, however, indicate considerable study of process techniques which were not easily associated with specific buildings.

d. Of the total of 79 buildings:

(1) 33 were identified correctly.
(2) 38 were unidentified.
(3) 6 were identified incorrectly.

3. SOURCE OF DATA

a. Reported.

(1) AC/AS Intelligence F/A Report #66, 28 February 1945

b. Field Data.

(1) USSBS (G-2, PIC) field notes, including blue prints and other data obtained from Japanese plant officials.

4. FUNCTIONAL ANALYSIS

a. Use of Plant.

Area "A"

Reported: Manufacture of ammonium sulfate from synthetic ammonia and sulfuric acid.
Actual: As reported.

Area "B"

Reported: Manufacture of ammonium sulfate from synthetic ammonia and sulfuric acid. Also suspected manufacture of nitric acid and ammonium nitrate.

Actual: Manufacture of ammonium sulfate from synthetic ammonia and sulfuric acid. Manufacture of nitric acid and ammonium nitrate.

b. Boundaries.

Correct as reported.

c. Building Identification (F/A Table).

d. Summary of Tabulation

TABLE 1

TOTAL PLANT
F/A ACCURACY FACTOR
Total plant 63.9
Primary buildings 81

	No. Bldgs	%
Correct	33	43
Unidentified	38	49
Incorrect	6	8
Total	77	100

TABLE 2

AREA "A"
F/A ACCURACY FACTOR
All buildings 85.3
Primary buildings 99.6

	PRIMARY BUILDINGS		ALL BUILDINGS	
	No. Bldgs	%	No. Bldgs	%
Correct	5	100	13	93
Unidentified	0	–	0	–
Incorrect	0	–	1	7
Total	5	100	14	100

TABLE 3

AREA "B"
F/A ACCURACY FACTOR
All buildings 57.2
Primary buildings 62.2

	PRIMARY BUILDINGS		ALL BUILDINGS	
	No. Bldgs	%	No. Bldgs	%
Correct	7	41	20	32
Unidentified	10	59	38	60
Incorrect	0	–	5	8
Total	17	100	63	100

e. Remarks.

(1) Reliable prewar drawings of the building layout of AREA "A" were available, and were largely responsible for the high accuracy of the functional analysis of this section of the plant.

(2) Though the overall identification of building functions of AREA "B" was poor (because of the large number of unidentified buildings) several of the primary buildings were correctly identified, principally by photographic interpretation. It appears that once the process of a chemical plant as complex as this is known, the function of a reasonable number of key buildings - and possibly of secondary buildings - may be identified, assuming sufficient study of the process involved.

(3) Two unidentified structures, a steam plant and an outdoor transformer yard, should have been identified.

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SHOWA FERTILIZER CO., LTD.

FUNCTIONAL ANALYSIS TABLE

90.17 - 137

BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED JTG AREA "A"	ACTUAL	EVALUATION CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR CORRECT	SIMILAR	UNIDENT	WRONG
1	x	Ammonia Synthesis	Ammonia Synthesis #1	x				98			
a		Synthesis	Synthesis								
b		Compressors & Poss, Synthesis	Compressors & Air Liq								
c		Air Liq & Nitrogen Separation	Air Compressors								
2		Nitrogen Gas Holder	Gasometer (Nitrogen)	x				100			
3		Hydrogen Gas holder	Gasometer (Hydrogen)	x				100			
4		Poss. Bottling Liq. Ammonia and Ammonia	Recovery Plant for scent lubricating oil				x	10			
5		Boiler House	Removed								
6		Offices	Offices	x				85			
7		Storage	Warehouse	x				85			
8		Distilled Water Plant (Ass. with Bldg 13)	Distilled Water Plant & Air Compressor	x				100			
9	x	Ammonium Sulfate Manuf & Stor (Fertilizer)	Ammonium Sulfate Manuf & Stor (Fertilizer)	x				100			
a		Ammonium Sulfate Storage	Ammonium Sulfate Silo (Storage)								
b		Ammonium Sulfate Drying	Ammonium Sulfate Drying								
c		Ammonium Sulfate Manuf	Ammonium Sulfate Manuf								
d		Fan Room	Blower Room								
10	x	Sulfuric Acid Plant (Chamber Process)	Sulfuric Acid Plant (Chamber Process)	x				100			
a		Pump Room	Pump Room								
b		Sulfuric Acid Towers	Sulfuric Acid Towers								
c		Sulfuric Acid Towers	Sulfuric Acid Towers								
d		Sulfuric Acid Towers	Sulfuric Acid Towers								
e		Pyrites Storage	Pyrites Storage								
f		Unidentified	?								
g		Unidentified	?								
n		Unidentified	?								
j		Pyrites Burning	Pyrites Roasting								

PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS EXHIBIT M
90.17-137
SHOWA FERTILIZER COMPANY CONFIDENTIAL

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SHOWA FERTILIZER CO., LTD.

FUNCTIONAL ANALYSIS TABLE

90.17 - 137

BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED JTG AREA "A"	ACTUAL	EVALUATION CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR CORRECT	SIMILAR	UNIDENT	WRONG
10 k		Unidentified	Glover Tower								
l		Unidentified	Glover Tower								
m		Unidentified	Glover Tower								
n		Unidentified	Pump Room								
o		Unidentified	Pump Room								
p		Unidentified	Acid Tower								
q		Lead Chambers	Lead Chambers								
r		Lead Chambers	Lead Chambers								
s		Lead Chambers	Lead Chambers								
t		Lead Work Shop									
11		Sulfuric Acid Tank	Sulfuric Acid Tank	x				100			
12		Oxygen Gas Holder	Oxygen Gas Holder	x				100			
13	x	Water Electrolysis Plant	Water Electrolysis Plant	x				100			
14	x	D.C. Rectifiers	D.C. Rectifiers Bldg	x				100			
15		Transformer Yard	Transformer Yard	x				100			
		"AREA B"									
16		Tanks (Some for Sulfuric Acid)	Sulfuric Acid Tank	x				85			
17		Tanks (Some for Sulfuric Acid)	Sulfuric Acid Tank	x				85			
18		Tanks (Some for Sulfuric Acid)	Sulfuric Acid Tank	x				85			
19		Tanks (Some for Sulfuric Acid)	Sulfuric Acid Tank	x				85			
20		Pile Material Poss. Sulfur or Pyrites	Pyrites	x				63			
21	x	Sulfuric Acid Plant - Contact Process	Sulfuric Acid Plant - Contact Process	x				100			
22	x	Sulfuric Acid Plant - Contact Process	Sulfuric Acid Plant - Contact Process	x				100			
23	x	Sulfuric Acid Plant - Contact Process	Sulfuric Acid Plant - Contact Process	x				100			
24	x	Sulfuric Acid Plant - Contact Process	Sulfuric Acid Plant - Contact Process	x				100			
25		Sulfuric Acid Plant - Contact Process	Sulfuric Acid Plant - Contact Process	x				100			
26	x	Unidentified	Boiler House			x		45			
27	x	Unidentified	Ammonia Synthesis (Catalysis) #2			x		45			
28	x	Compressor House & Ammonia Synthesis	Air Liquefaction, Nitrogen & Gas Compression	x				93			

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SHOWA FERTILIZER COMPANY
EXHIBIT M PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS 90.17-137

SHOWA FERTILIZER CO., LTD.

FUNCTIONAL ANALYSIS TABLE

90.17 - 137

BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED JTG AREA "B"	FUNCTION ACTUAL	EVALUATION CORRECT	SIMILAR	UNIDENT	WRONG	CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR
29		Unidentified	Water Reservoir-Pump House			x						45
30		Unidentified	Methanol Tank			x						45
31		Unidentified	Storehouse			x						45
32		Unidentified	Soda Recovery			x						45
33		Unidentified	Carbon Dioxide Wash - Water Recovery			x						45
34		Unidentified	Carbon Dioxide Scrubbing Tower			x						45
35		Unidentified	Catalyst Manufacture			x						45
36		Gas Holder (Gas ?)	Nitrogen Gas Holder	x								85
37		Gas Conversion & CO2 Absorbtion	Gas Converter Bldg	x								100
38		Unidentified	Hydrogen Sulfide Absorbtion (Sulfur Removal)			x						45
39		Unidentified	Blower Room			x						45
40	x	Steam Plant	Boiler House	x								100
41		Gas Plants - Prob. Water Gas	Function questionable, Bldg empty									
42		Unidentified	Gas Generator Bldg			x						45
43		Unidentified	Oxygen Compression and Bottling			x						45
44		Gas Holder for Water Gas	Gas Holder for Water Gas	x								100
45		Gas Holder for Water Gas	Gas Holder for Oxygen				x					0
46		Gas Holder for Water Gas	Gas Holder for Oxygen				x					0
47		Fuel Piles - prob Coke	Coke Yard	x								85
48		Unidentified	Water Gas Generator			x						45
49		Steam Plant & Water Gas	Water Gas Generator	x								100
50		12 Sulfur Removal Tanks	Sulfur Removal Tanks	x								100
51		Gas Conversion & CO2 Absorbtion	Gas Converter	x								100
52		Gas Holders for Purified Hydrogen	Gas Holder-Converter Gas				x					0
53		Gas Holders for Purified Hydrogen	Gas Holder-Water Gas				x					0
54		Gas Holders for Purified Hydrogen	Gas Holder-Oxygen				x					0

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90.17-137
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SHOWA FERTILIZER CO., LTD.

FUNCTIONAL ANALYSIS TABLE

90.17 - 137

BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED JTG AREA "B"	FUNCTION ACTUAL	EVALUATION CORRECT	SIMILAR	UNIDENT	WRONG	CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR
55		Unidentified	Storehouse			x						45
56		Unidentified	Repair Shop			x						45
57		Unidentified	Storehouse			x						45
58		Unidentified	Storehouse			x						45
59		Unidentified	Storehouse			x						45
60		Unidentified	Locomotive Shop			x						45
61		Unidentified	Water Reservoir & Pump Hse			x						45
62		Unidentified	Laboratory			x						45
63		Unidentified	Nitric Acid Concentration			x						45
64	x	Unidentified	Nitric Acid Absorb Towers			x						45
65	x	Unidentified	Ammonia Oxydation Plant			x						45
66		Unidentified	Nitric Acid Stor & Bottl			x						45
67		Unidentified	Office (Nitric Acid Dept)			x						45
68	x	Unidentified	Ammonia Oxydation			x						45
69	x	Unidentified	Ammonia Oxydation			x						45
70	x	Unidentified	Ammonia Oxydation & Nitric Acid Concentration			x						45
71	x	Unidentified	Nitric Acid Absorbing & Concentration Houses			x						45
72		Unidentified	Pump House			x						45
73		Unidentified	Water Purifying Plant Storehouse & Repair Shed			x						45
74	x	Unidentified	Ammonium Nitrate Manuf			x						45
75		Unidentified	Water Pump Room			x						45
76		Unidentified	Storehouse			x						45
77		Unidentified	Transformer Yard			x						45
78	x	Unidentified	Blower Room - Ammonium Sulfate Liquor Tanks			x						45
79	x	Ammonium Sulfate Manuf & Storage	Ammonium Sulfate Manuf & Storage	x								100
		Ammonium Sulfate Manuf & Drying	Amm Sul Manuf Centrif Sep									

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SHOWA FERTILIZER COMPANY
EXHIBIT M PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS
90.17-137
11M.08

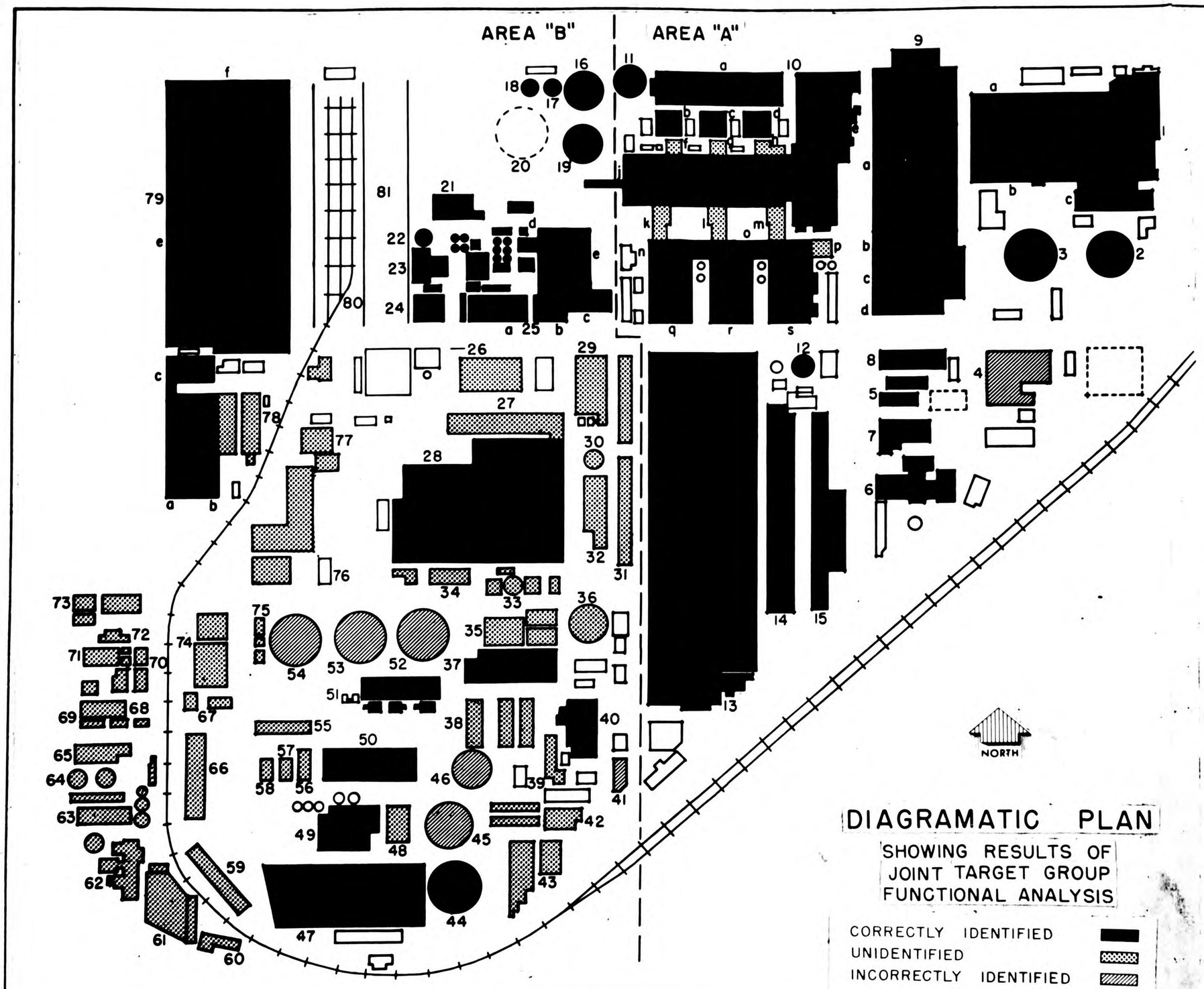
SHOWA FERTILIZER CO.,LTD.

FUNCTIONAL ANALYSIS TABLE

90.17 - 137

BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED JTG AREA "B"	ACTUAL	EVALUATION CORRECT	SIMILAR	UNIDENT	WRONG	CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR	
79 b		Ammonium Sulfate Manuf & Drying	Amm. Sul. Man. Saturation Rm										
c		Ammonium Sulfate Manuf & Drying	Ammonium Sulfate Drier Room										
d			Conveyor										
e		Connected with Conveyor for Loading	Conveyor										
f		Ammonium Sulfate Storage	Ammonium Sulfate										
			(Fertilizer) Silo										
g		Connected with Conveyor for Loading	Conveyor										
80		Large Stock Yards & Overhead Cranes	Coal Yard & Overhead Cranes	x								85	
81		Large Stock Yards & Overhead Cranes	Storage Yard & Overhead										
			Cranes	x								85	

SHOWA' FERTILIZER COMPANY 90.17-137

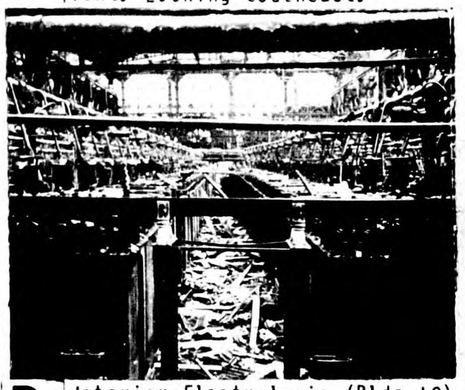


DIAGRAMATIC PLAN

SHOWING RESULTS OF JOINT TARGET GROUP FUNCTIONAL ANALYSIS

CORRECTLY IDENTIFIED
UNIDENTIFIED
INCORRECTLY IDENTIFIED

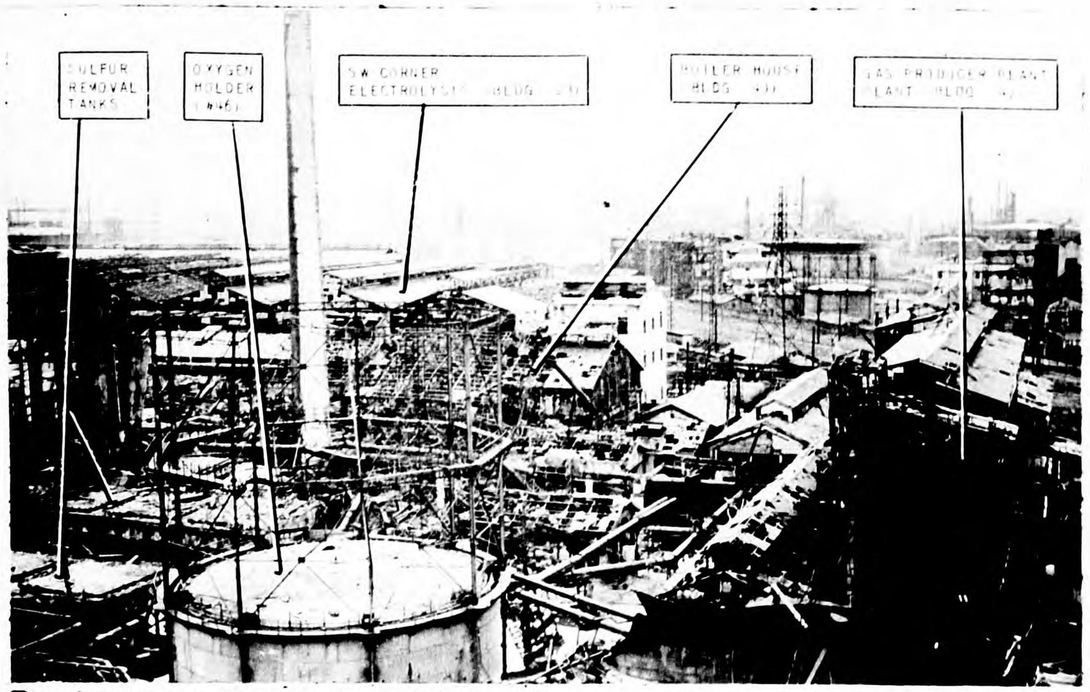
A Ammonia Synthesis Plant 1 (Bldg 1) and wrecked copper-liquor recovery plant. Looking Southeast.



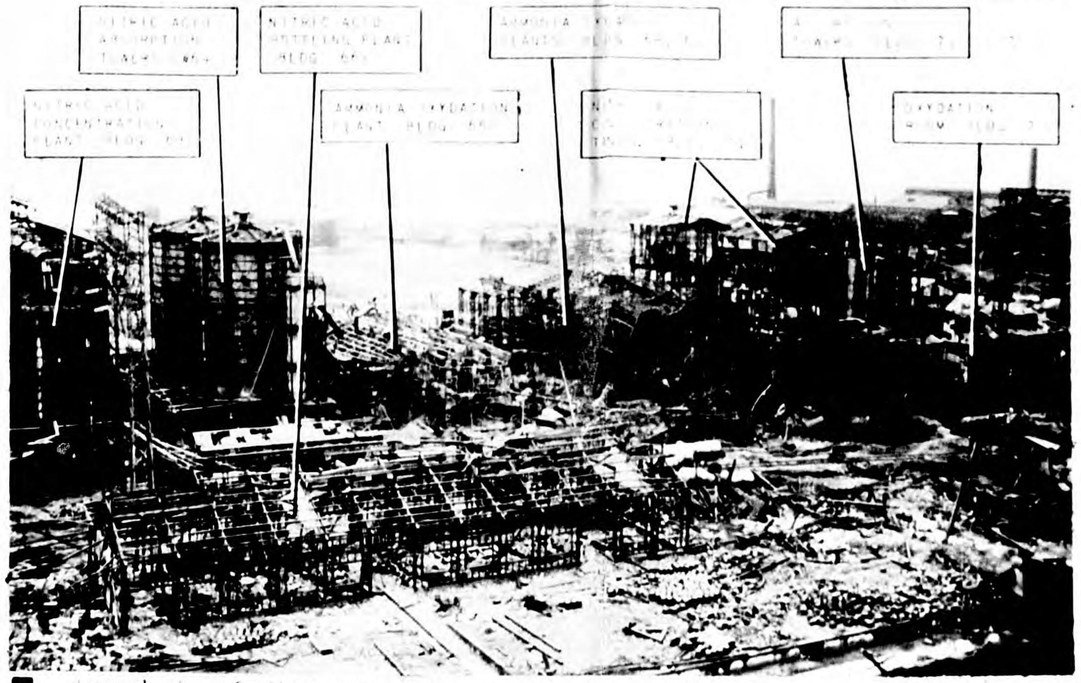
B Interior Electrolysis (Bldg 13) showing electrolytic cells. Looking East.

C Ammonia Synthesis Plant 2 - Gas Compression Building (Bldg 28).
1. Carbon Dioxide Absorbing Towers (Bldg 34) - Left
2. Concrete Water Tower (Bldg 33) - Left center
3. Wrecked Nitrogen Tank (Bldg 36) - Center-Looking Northwest

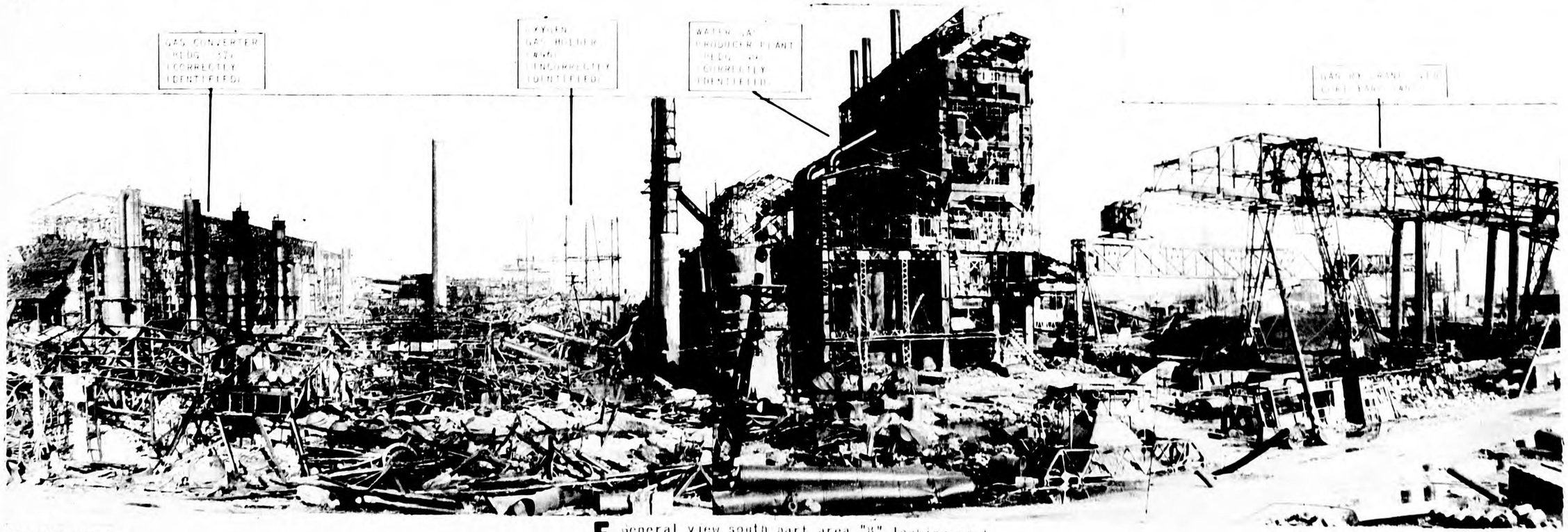
SHOWA FERTILIZER COMPANY 90.17-137



D General view SE corner area "J" looking E.



E General view of nitric acid plant. SW corner area "a" looking W. (unidentified)



F General view south part area "B" looking east.

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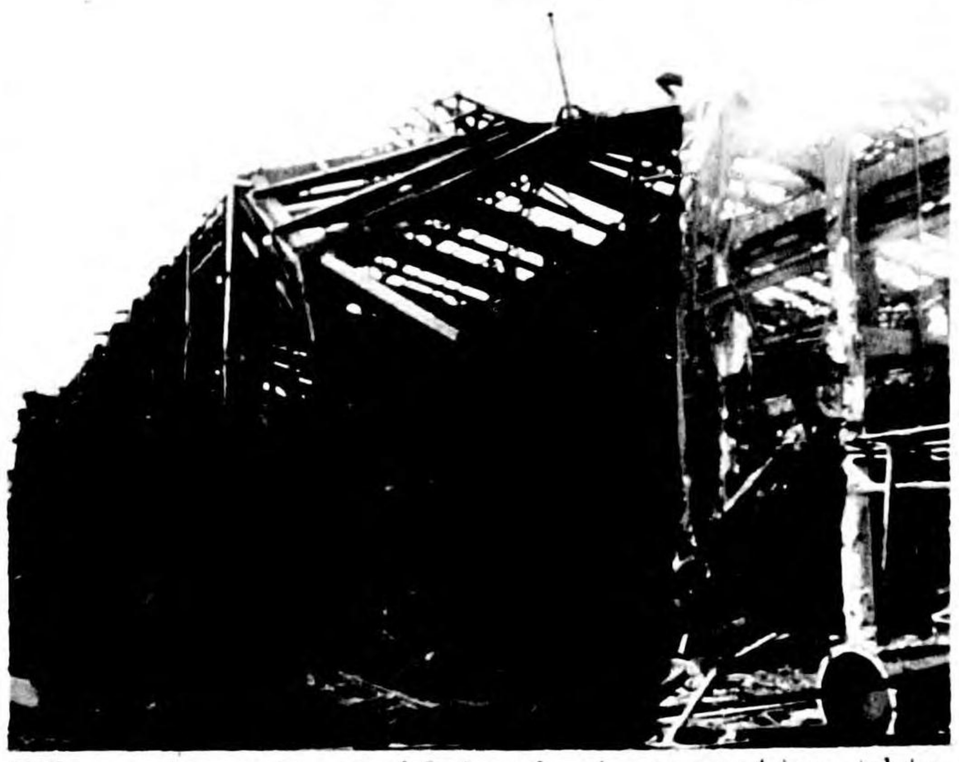
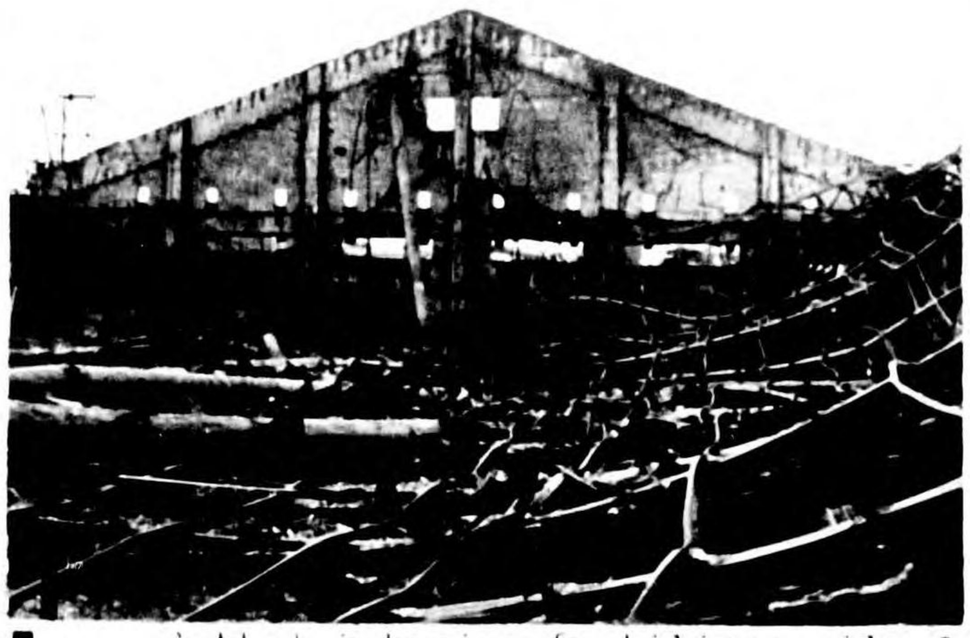
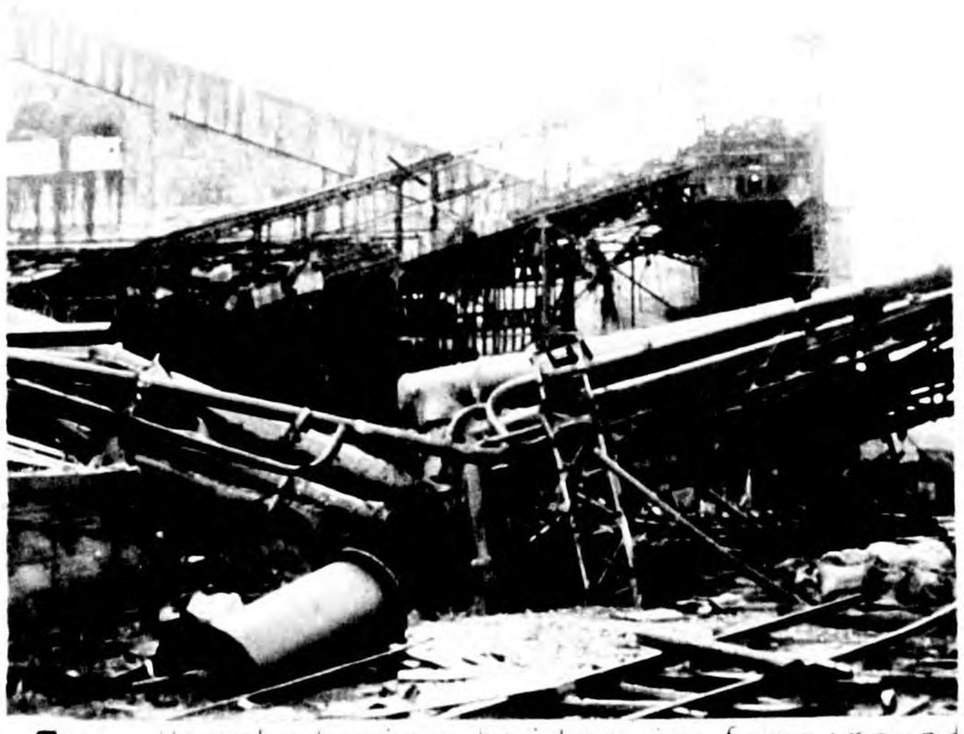
G Ammonium sulfate plant, blower room, Bldg 73 looking W. (Unidentified)



H Ammonium sulfate plant separation bldg 79 looking N. (correctly identified)

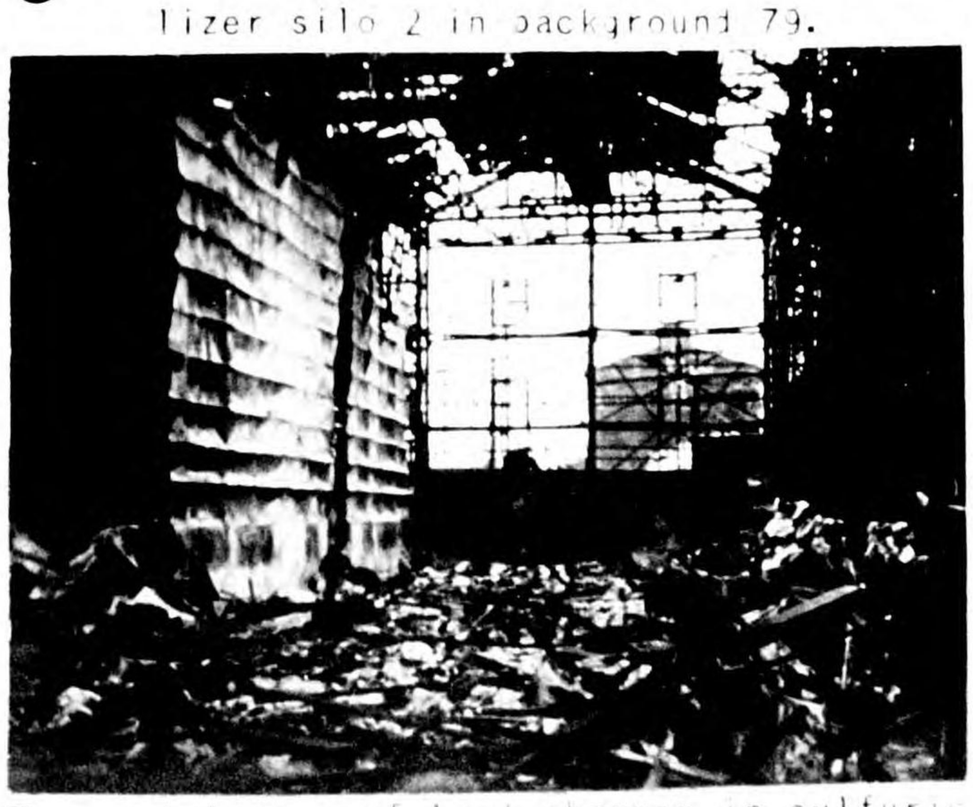


I Gutted interior fertilizer silo 2, bldg 79 looking N. (correctly identified)

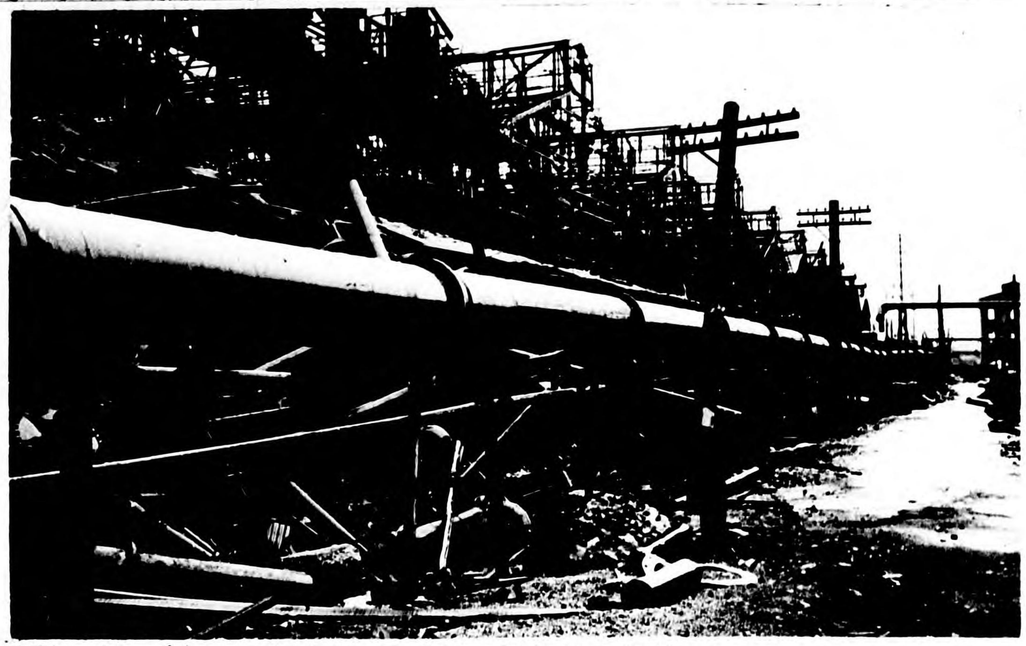


J Wrecked pipe bridge in foreground ammonium sulfate conveyor to fertilizer silo 2 in background 79.

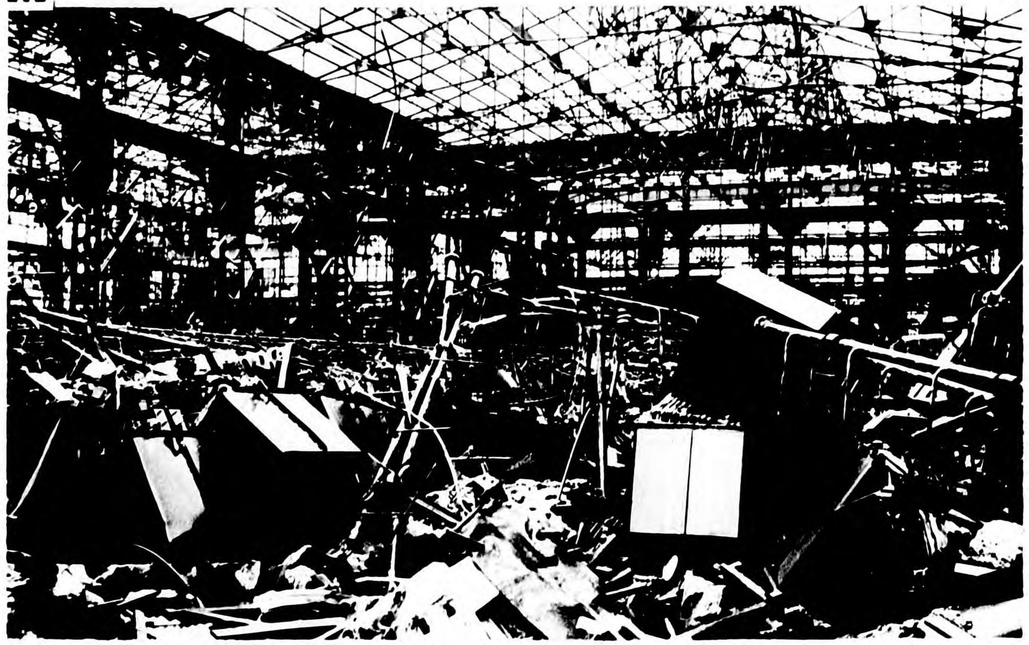
K Interior of fertilizer silo 1, bldg 1 looking N. (correctly identified)



L Interior of lead chamber in sulfuric acid plant bldg 10. (correctly identified)



M South side of electrolysis building 13 looking South.



N Interior of electrolysis building 13, showing wrecked electrolytic cells. (correctly identified)

O Sulfur removal tanks 50 (correctly identified)

P Wrecked sulfuric acid tank cars, looking W between fertilizer silo 1, Bldg 3 and sulfuric acid plant Bldg 10.

EXHIBIT N

NIPPON OIL REFINERY

90.25-1203

LAT. 34° 42 'N - LONG. 135° 24 'E

AMAGASAKI, JAPAN

See Exhibit P for abbreviations used in this exhibit.

90.25-1203 NIPPON OIL REFINERY

LETTERS ON AERIAL PHOTOGRAPH CORRESPOND TO LETTERS OF GROUND PHOTOGRAPHS FOUND AT THE END OF THIS EXHIBIT. ARROWS INDICATE DIRECTION OF PHOTOGRAPHY.

FOR A COMPARISON OF THE GROUND VIEWS INDEXED HERE WITH THE TYPE OF THREE DIMENSIONAL AERIAL VIEW FROM WHICH THE INTERPRETATION WAS DONE SEE VECTOGRAPH EXHIBIT A IN THE ENVELOPE ACCOMPANYING THIS REPORT.

NIPPON OIL REFINERY 90.25 - 1203

1. DESCRIPTION OF TARGET

a. The Nippon Oil Refinery, Amagasaki, was the most important refinery in the Osaka Area.

b. The refinery is located on reclaimed land east of the mouth of the Muko River on the west side of Amagasaki Harbor.

c. Field investigation revealed that the target area was occupied by two separate companies, the north portion by the Nippon Oil Refinery, the south portion by a synthetic oil plant allied to the Amagasaki Iron Works. There were a total of 101 listed structures in the area, comprising a built-up area of 610,700 sq. ft.

2. SUMMARY

a. The overall interpretation of building functions was good, particularly of the primary buildings. Of the 97 buildings checked:

(1) 54 were identified correctly.
(2) 16 were identified as having similar occupancy.
(3) 11 were unidentified.
(4) 16 were identified incorrectly.

b. No structural analysis was made.

c. Two CIU (XXI BC) Damage Assessment Reports were used to obtain the cumulative damage estimates. The amount and character of damage was very much underestimated as shown in Table I. The small size and generally complex pattern of the types of equipment comprising a major part of an oil refinery makes recognition of damage very difficult.

TABLE I

	ACTUAL Sq Ft	REPORTED Sq Ft
Structural Damage	567,900	396,600
Superficial Damage	18,300	76,500
Minor Damage *	24,100	15,000
Total Damage	610,300	488,100

* In general, Minor Damage was purposely omitted in D/A reports.

3. SOURCE OF DATA

a. Reported.

(1) AC/AS Intelligence F/A Report #99, 24 March 1945
(2) CIU (XXI BC) Industrial Report #54, 5 July 1945
(3) CIU (XXI BC) D/A Report #155, 29 July 1945
(4) CIU (XXI BC) D/A Report #191, 21 July 1945

b. Field Data.

(1) USSBS (G-2, PIC) field notes.

90.25 - 1203 NIPPON OIL REFINERY

4. FUNCTIONAL ANALYSIS

a. Use of Plant.

Reported: Refinery and synthetic oil plant.
Actual: As reported.

b. Boundaries.

As reported. Two separate companies, one, the Nippon Oil Refinery, the other, a synthetic oil plant, associated with the Amagasaki Iron Works were found to be within the target area.

c. Building Identification (F/A Table).

d. Summary of Tabulation.

TABLE 2

F/A ACCURACY FACTOR

		PRIMARY BUILDINGS		TOTAL BUILDINGS	
		No. Bldgs	%	No. Bldgs	%
Total Plant 72	Correct	19	86	54	56
Primary Buildings 84	Of Similar Occupancy	—	—	16	16
	Unidentified	—	—	11	12
	Incorrect	3	14	16	16
	Total	22	100	97	100

e. Remarks.

The identification of secondary structures in this target was the more difficult. The bulk of the listed primary structures were large storage tanks.

FUNCTIONAL ANALYSIS TABLE

NIPPON OIL REFINERY — 90.25-1203

BUILDING NUMBER JTG	PRIMARY	REPORTED: Joint Target Group	FUNCTION: ACTUAL	EVALUATION: CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR
			Catylist Making Building			x		45
			Employees Entrance Bicycle Racks			x		45
			Warehouse - Finished Products		x			78
			Warehouse - Finished Products		x			78
			Warehouse - Finished Products		x			78
			Warehouse - Finished Products		x			78
			Warehouse - Finished Products		x			78
			Warehouse - Finished Products		x			78
			Employees bath room - wash room		x			65
			Machine Shop & Drum repair				x	20
			Garage & Shipping of Fuel			x		45
			Gasoline Storage Tanks	x				85
			Material Store Houses	x				100
			Material Store Houses	x				100
			Can filling Room - Drum			x		70
			Can Manufacturing				x	15
			Can Manufacturing & Drum Filling				x	15
			Drum Storage	x				85
			Boiler Room	x				85
			Pump house - Stor. Propane & Butane			x		45
			Crude Distillation Unit	x				85
			Thermal cracking & Calylitic Cracking	x				100
			Product Tanks	x				100
			Product Tanks	x				100
			Product Tanks	x				100
			Product Tanks	x				100
			Product Tanks	x				100
			Product Tanks	x				100
			Laboratory & Pumphouse		x			82
			Office		x			88
			Storage Tanks	x				85
1		Unidentified						
2		Unidentified						
3		Storage or Quarters						
4		Storage or Quarters						
5		Storage or Quarters						
6		Storage or Quarters						
7		Storage or Quarters						
8		Storage or Quarters						
9		Probable Storage						
10		Probable Storage						
11		Unidentified						
12		Small Tanks						
13		Storage Building						
14		Storage Building						
15		Storage Building						
16		Storage Building						
17		Storage Building						
18		Storage Building						
19		Still						
20		Unidentified						
21		Cracking or Secondary Distillati on						
22		Cracking or Secondary Distillation Thermal						
23		(8) Run down tanks						
24		(8) Run down tanks						
25		(4) Run down tanks						
26		(6) Intermediate Tanks						
27		(6) Intermediate Tanks						
28		(4) Intermediate Tanks						
29		Possible Office or Laboratory						
30		Possible Office or Laboratory						
31	x	(12) Storage Tanks Approx. 50' Dia.						

NIPPON OIL REFINERY

FUNCTIONAL ANALYSIS TABLE

90.25-1203

BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED: Joint Target Group	ACTUAL	EVALUATION: CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR
32		(3) Tanks without tops (1) 25' (2) 40'	Storage Tanks	x				85
33		(4) Tanks 40' Diameter	Storage Tanks	x				85
34		(1) Tank 40' Diameter	Storage Tanks	x				85
35		(5) Horizontal pressure Tanks	Gasoline treating Plant		x			70
36		Lube Oil Plant	Slops dehydration			x		0
37		Unidentified	Sulfuric Acid Plant		x			45
38	x	(4) Storage tanks Approx. 50' Diameter	Storage Tanks	x				100
39		(5) Small tanks (3) 40' (2) 20'	Storage Tanks	x				100
40		Storage Shed	Warehouse	x				100
41		Shop Building	Open Storage			x		0
42		Tanks 35' Diameter	Water Tanks & Foamite Pumps	x				85
43	x	Tank 145' Diameter	Crude Oil Storage Tanks	x				85
44	x	Tank 145' Diameter	Crude Oil Storage Tank	x				85
45	x	Tank 50' Diameter	Crude Oil Storage Tank	x				85
46		Gas Holder 100' Diameter	Gas Holder	x				100
47		Gas Holder 100' Diameter	Gas Holder	x				100
48		Gas Holder 100' Diameter	Gas Holder	x				100
49		Gas Holder 115' Diameter	Gas Holder	x				100
50		Small Gas Holder	Gas Holder	x				100
51		Small Gas Holder	Gas Holder	x				100
52		(3) Small tanks	Tanks	x				100
53		Possible Pump House	Pump House & Laboratory	x				90
54		Unidentified	Hydrogen Plant			x		45
55		Poss. Gas purification building	Oxygen Plant				x	10
56		Poss. Gas purification building	Oxygen Plant				x	10
57		Poss. Gas purification building	Compressor House				x	10
58	x	Possible Water gas plant	Gas Purification Equipment				x	10
59	x	Possible Water gas plant	Water gas plant	x				90
60		Unidentified	Producer gas plant			x		45
61		Unidentified	Coal Dryer			x		45
62		Probable boiler house	Steam plant	x				95

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PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS EXHIBIT N

90.25-1203 NIPPON OIL REFINERY

NIPPON OIL REFINERY

FUNCTIONAL ANALYSIS TABLE

90.25-1203

BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED: Joint Target Group	ACTUAL	EVALUATION: CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR
63		Gas Convertors	Gas Cracking Plant				x	0
64		Unidentified	Cooling Water Sump			x		45
65		Small Cascade Cooling Tower	Cooling Tower	x				100
66	x	(4) Hydrogen Sulphide removal columns (Cover removed from one)	Desulfurization Plant	x				100
67		Control building	Desulphurization Plant				x	0
68	x	(4) Organic sulphur removal - tower	Compressor House				x	0
69		Gantry crane servicing 66-68	Final Desulphurization Plant				x	0
70		Cascade cooling tower and probable pump house	Cooling house - pump house	x				98
72		Compressor house	Blower house		x			85
71		Poss. Splitting of Coke oven gas	Main Electric Substation				x	10
73	x	Contact oven house	Reactor Building				x	0
74		Office	Office & Warehouse	x				85
75		Office	Office & Warehouse	x				85
76		(2) Tanks	(2) Small Tanks	x				85
77		Boiler house	Steam plant	x				100
78		Storage Building	Office & Warehouse	x				85
79		Storage Building	Office & Warehouse	x				85
80		Storage Building	Office & Warehouse	x				85
81		Unidentified — Gas Separation Plant & Compressor Pump-house				x		45
82		Unidentified — Gas Separation Plant - Butane Storage				x		45
83		Removal of oils by activated Carbon	Gas Separation Plant		x			85
84		Intermediate tanks	Steam Still		x			85
85	x	Storage Tank 85' Diameter	NOT ASSOCIATED WITH PLANTS IN THE TARGET AREA.					
86	x	Storage Tank 85' Diameter						
87	x	Storage Tank 65' Diameter						
88		Pump house & Sheds						
89	x	Tank farm - Storage Tanks 114' Diameter	Storage Tanks Crude Oil or Refined Oil	x				100
90	x	" " " " " "	" " " " " "	x				100
91	x	" " " " " "	" " " " " "	x				100

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EXHIBIT N PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS

NIPPON OIL REFINERY 90.25 - 1203

90.25-1203

FUNCTIONAL ANALYSIS TABLE

NIPPON OIL REFINERY

BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED: Joint Target Group	ACTUAL: Crude Oil or Refined Oil	EVALUATION: CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR
92	x	Tank Farm - Storage Tanks	Storage Tanks	x				100
93	x	" " "	" "	x				100
94	x	" " "	" "	x				100
95	x	" " "	" "	x				100
96	x	" " "	" "	x				100
97	x	" " "	" "	x				100
98	x	" " "	" "	x				100
99	x	" " "	" "	x				100
100	x	" " "	" "	x				100
101		Pump house	"				x	0

5. DAMAGE ASSESSMENT

a. D/A: (See D/A Table).

b. Summary of Tabulation.

TABLE 3

	PRIMARY BUILDINGS				TOTAL BUILDINGS			
	ACTUAL		REPORTED		ACTUAL		REPORTED	
	Sq Ft	% Dam	Sq Ft	% Dam	Sq Ft	% Dam	Sq Ft	% Dam
Total Building Area	217,500		217,500		610,700			
Damage								
Structural	207,500	95	136,900	63	567,900	92	396,600	65
Superficial	2,000	1	0	0	18,300	3	76,500	12
Minor *	6,100	3	0	0	24,100	4	15,000	2
Total Damage	215,600	99	136,900	63	610,300	99	488,100	79

* In general, Minor Damage was purposely omitted in D/A reports.

c. Remarks.

The intricate and highly condensed building layout of some chemical plants and all oil refineries makes it very difficult for the photographic interpreter to assess damage, since no regular outline of damage is seen, but rather a tangle of outdoor chemical equipment, which even when undamaged was difficult to identify.

NIPPON OIL REFINERY

DAMAGE ASSESSMENT TABLE

90.25-1203

BUILDING NUMBER	BUILDING AREA	STRUCTURAL (1000'S SQ. FT.)			SUPERFICIAL (1000'S SQ. FT.)			MINOR * (1000'S SQ. FT.)			REMOVED (1000'S SQ. FT.)		
JTS		ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED
1	3.1	3.1		3.1									
2	12.4	5.2		7.4				6.2					
3	4.1	4.1		4.1									
4	4.3	4.3		4.3									
5	4.3	4.3		4.3									
6	4.1				2.5			1.6		4.1			
7	4.4	4.4		4.4									
8	4.4	4.4		4.4									
9	5.9	5.9	5.9										
10	5.6	5.6		5.6									
11	0.4	0.4		0.4									
12	12.6							10.1					
13	6.5	6.5		1.3						5.2			
14	6.5	6.5	3.2	6.5									
15	6.6	6.6					6.6						
16	5.0	5.0		5.0									
17	6.7	5.0		6.7	1.7								
18	6.7	3.4			3.4		6.7						
19	2.4	1.2			1.2		2.4						
20	5.2	3.1		3.1	2.1		2.1						
21	4.7	4.7		2.4			2.4						
22	7.7	7.7		7.7									
23	3.0	3.0		2.3									
24	3.0	3.0		3.0									
25	1.5	1.5		1.5									
26	4.2	4.2		2.8									
27	4.2	4.2		2.1									
28	2.8	2.8	2.8	2.1									
29	4.8	4.8	1.2	4.8									
30	3.0	3.0		3.0									
31	20.3	18.7	5.1	5.1	1.6								
32	4.7	4.7	4.7										
33	6.1	6.1		6.1									

*In general, Minor Damage was purposely omitted in D/A reports.

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EXHIBIT N PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS

NIPPON OIL REFINERY 90.25-1203

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NIPPON OIL REFINERY

DAMAGE ASSESSMENT TABLE

90.25-1203

BUILDING NUMBER	BUILDING AREA	STRUCTURAL (1000'S SQ. FT.)			SUPERFICIAL (1000'S SQ. FT.)			MINOR * (1000'S SQ. FT.)			REMOVED (1000'S SQ. FT.)		
JTS		ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED
35	10.9	10.9		10.9									
36	6.4	6.4		6.4									
37	3.3	3.3				3.3							
38	8.6	8.6		4.3									
39	4.5	4.5		4.5									
40	3.0	3.0	1.5										
41	4.4	4.4	4.4										
42	1.9	1.9											
43	12.5	12.5		12.5									
44	12.5	12.5		12.5									
45	6.1	6.1		6.1									
46	8.8	8.8	8.8										
47	8.8	8.8				8.8							
48	8.7	8.7	8.7										
49	11.3	11.3	11.3										
50	1.8	1.8				1.8							
51	7.7	7.7				7.7							
52	3.7	3.7	1.2	3.7		1.2							
53	3.2	3.2	3.2	3.2									
54	2.3	2.3	or dest	0.7						1.6			
55	9.0	9.0				9.0							
56	4.9	4.9				4.9							
57	2.2	2.2				2.2							
58	1.7	1.7											
59	4.2	4.2		4.2									
60	3.7	3.7				3.7							
61	3.0	3.0				3.0							
62	5.3	5.3	5.3										
63	1.9	1.9					1.9	Damaged					
64	4.6	4.6	4.6										
65	6.2	6.2	3.1										
66	5.0	5.0		5.0									
67	3.6	3.6		or dest			3.6						

*In general, Minor Damage was purposely omitted in D/A reports.

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EXHIBIT N PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS

NIPPON OIL REFINERY 90.25 - 1203

11N.11

NIPPON OIL REFINERY

DAMAGE ASSESSMENT TABLE

90.25-1203

BUILDING NUMBER		BUILDING AREA	STRUCTURAL (1000'S SQ. FT.)			SUPERFICIAL (1000'S SQ. FT.)			MINOR * (1000'S SQ. FT.)			REMOVED (1000'S SQ. FT.)		
JTG			ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED
68		2.8	2.8		2.8									
69		2.1	2.1		1.0									
70		5.2	5.2					5.2		Damaged				
71		8.2	8.2		4.1						4.1			
72		0.8	0.8		0.8									
73		40.3	30.3			2.0			6.1	sm. dam.	many holes			
74		5.8	5.8	5.8										
75		4.1	4.1	4.1										
76		1.1	1.1		0.5									
77		2.4	2.4	2.4										
78		6.4	6.4	6.4										
79		6.6	6.6		6.6									
80		4.4	4.4		4.4									
81		5.4	5.4		5.4									
82		2.8	2.8		2.8									
83		5.0	5.0		5.0									
84		1.2	1.2		1.2									
85		5.7	5.7	5.7										
86		5.7	5.7	5.7										
87		2.2	2.2	2.2										
88		1.7	1.7	1.7										
89		9.9	9.9	9.9										
90		9.9	9.9	9.9										
91		9.9	9.9	9.9										
92		9.9	9.9										9.9	
94		9.9	9.9	9.9										
95		9.9	9.9	9.9										
96		9.9	9.9											
97		9.9	9.9										9.9	
98		9.9	9.9	9.9										
99		9.9	9.9	9.9										
100		9.9	9.9	9.9										
101		3.8	3.8			3.8								

*In general, Minor Damage was purposely omitted in D/A reports.

OMITTED FROM LIST

BUILDING NUMBER		BUILDING AREA	STRUCTURAL (1000'S SQ. FT.).		
JTG			ACTUAL	REPORTED	REPORTED
34		1.3	1.3		1.3
93		9.9	9.9		

PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS | EXHIBIT N
90.25-1203 NIPPON OIL REFINERY
CONFIDENTIAL
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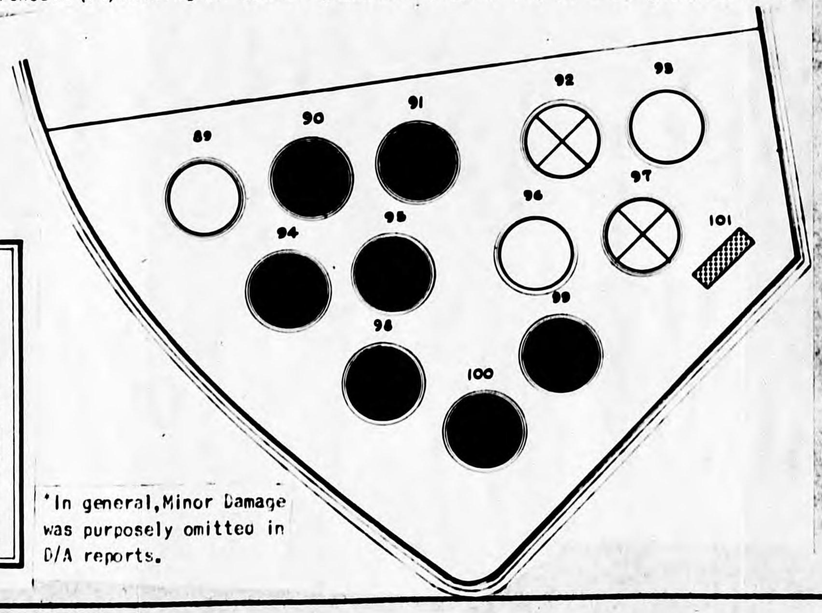
90.25-1203 NIPPON OIL REFINERY

Reported
PHOTOGRAPHIC INTELLIGENCE

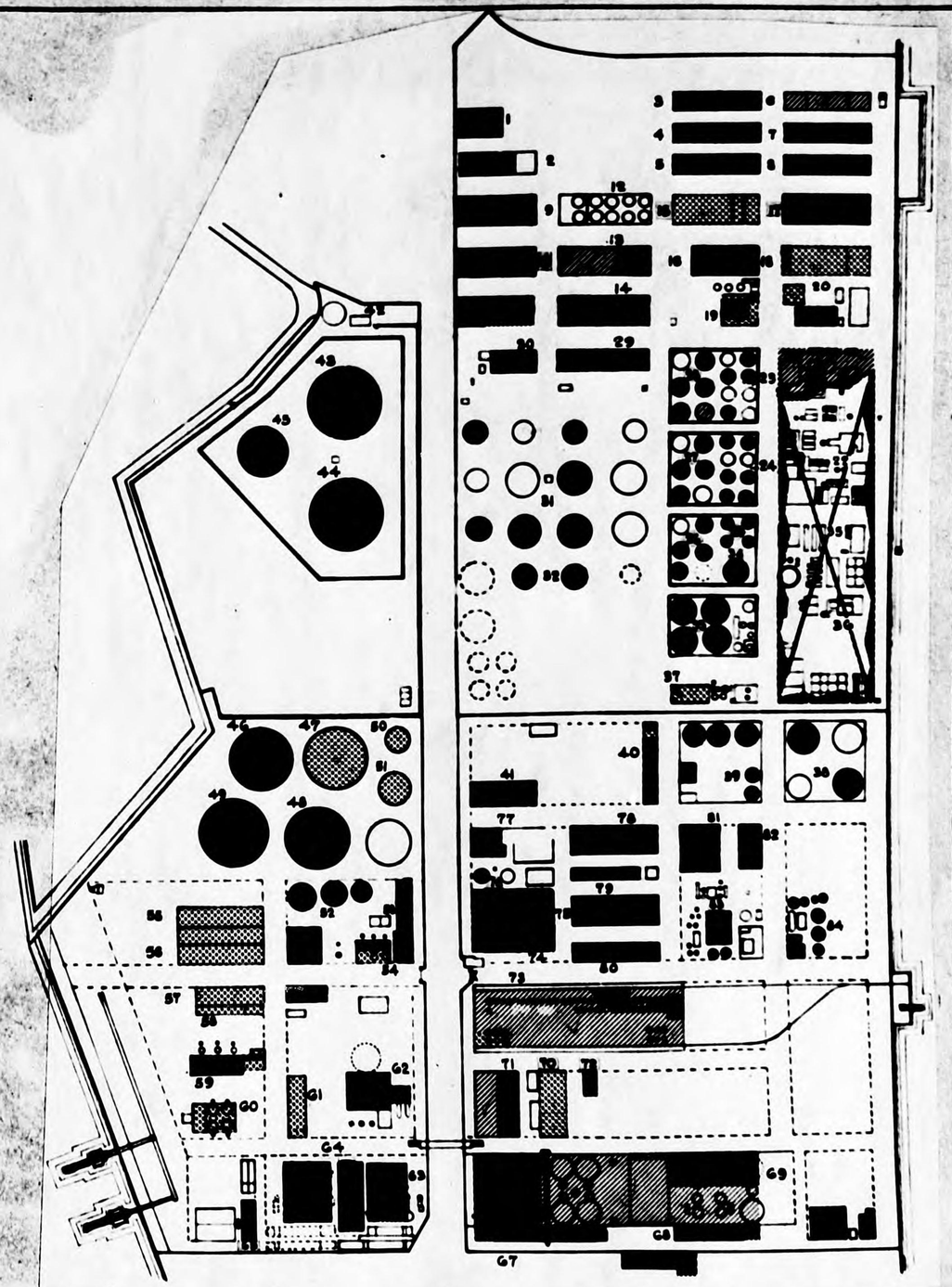
A View from office and warehouse (75) looking NW toward gasholder (48) showing part of gasholder (47).



LEGEND OF DAMAGE SYMBOLS

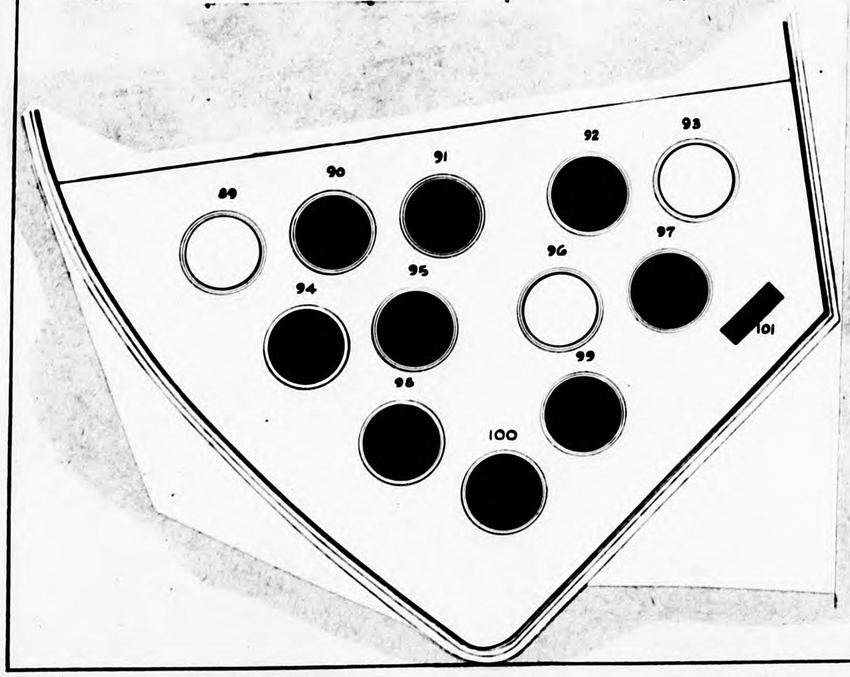
- DESTROYED
- STRUCTURAL DAMAGE
- SUPERFICIAL DAMAGE
- MINOR DAMAGE *
- REMOVED
- BUILDING NUMBER 7

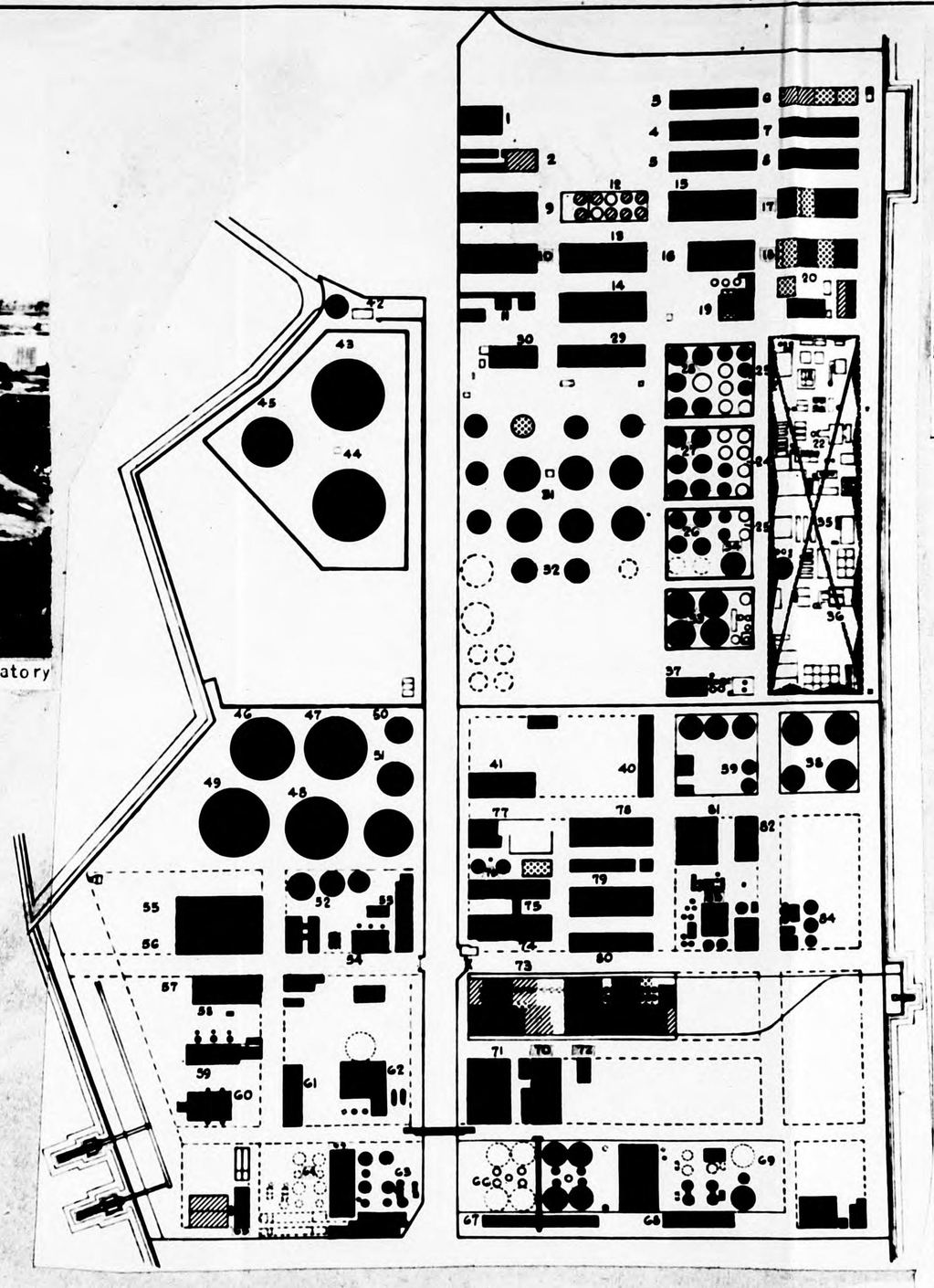
*In general, Minor Damage was purposely omitted in D/A reports.



NIPPON OIL REFINERY 90.25 - 1203

D View from crude oil distillation unit 21, looking NW toward laboratory and pump house (29). Tank farm in left background.





● *Actual*
U.S.S.B.S. COMPILED GROUND INFORMATION

SEE VECTOGRAPH EXHIBIT A IN THE ENVELOPE ACCOMPANYING THIS REPORT FOR A THREE DIMENSIONAL VIEW OF THE NIPPON OIL REFINERY TAKEN AT APPROXIMATELY THE SAME TIME AS GROUND PHOTOGRAPHS ELSEWHERE IN THIS EXHIBIT.

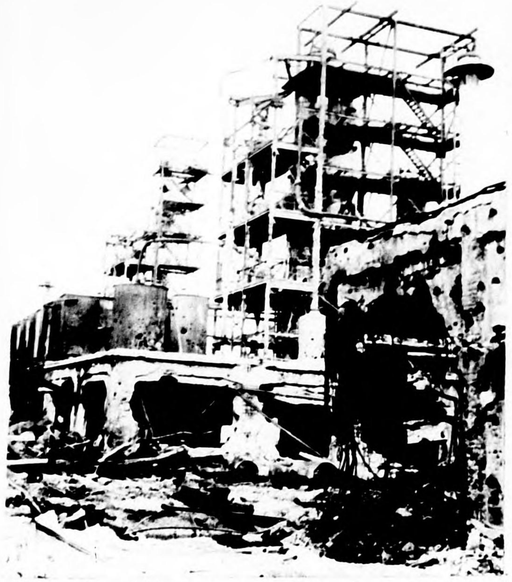
LEGEND OF DAMAGE SYMBOLS

- DESTROYED
- STRUCTURAL DAMAGE
- SUPERFICIAL DAMAGE
- MINOR DAMAGE
- REMOVED
- BUILDING NUMBER 7

NIPPON OIL REFINERY 90.25 - 1203

C Intense fire caused by drums filled with gasoline. View of building No. 8 looking NE.

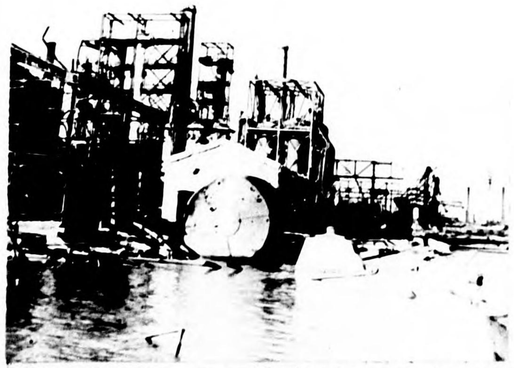
D View of storage tanks from building No. 21 looking SW toward building No. 58.



E Damage caused by blast, fire and fragments. View from tank No. 34 looking NE toward units Nos. 21 and 22.

F Notice damage from fragmentation as well as explosions. Photo taken from tank No. 34 looking NW toward unit No. 31.

G Fragmentation damage to pipe lines and tanks are clearly visible from tank No. 34 looking NNE toward Nos. 27 and 28.



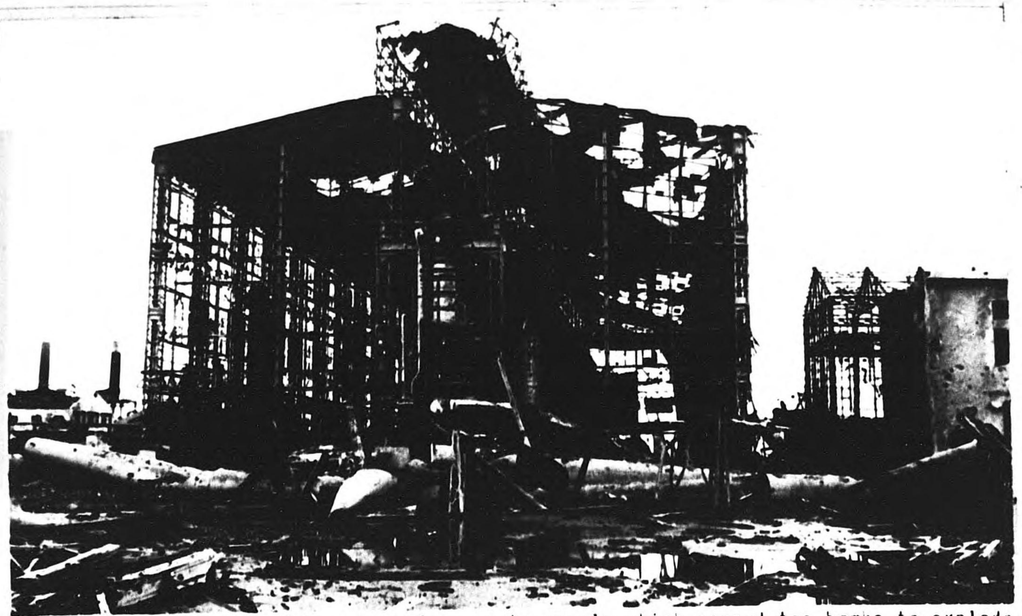
H View from seawall NE of No. 38 looking N. toward No. 35.

I Notice stack fallen across building. Photo from position NE of unit No. 38 looking NE toward building No. 36.

J View of tank group taken from road SE of tank No. 50 looking NE toward unit No. 31.

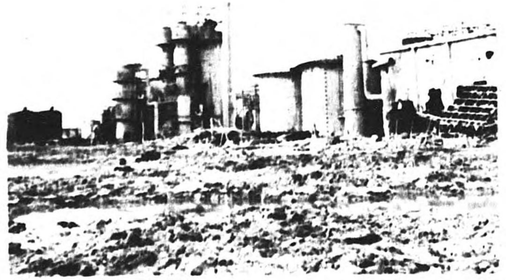
K Photo from position SE of building No. 32 looking N toward tank No. 39.

L White tone to tower on left caused by intense fire. View from between buildings No. 73 and 80 looking NE toward unit No. 83.



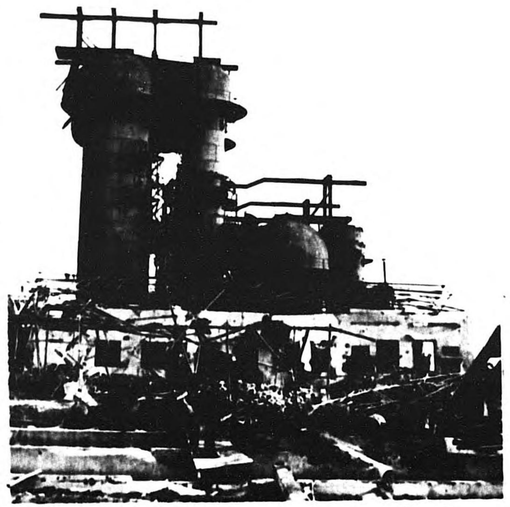
M The roof of this building was of concrete panels which caused the bombs to explode higher than anticipated. Ordinarily this roof would have been of corrugated metal or asbestos. View from between buildings Nos. 54 and 62 looking SE toward building No. 73.

N Notice relatively small damage to equipment due to fact that bombs exploded in roof structure building No. 73.

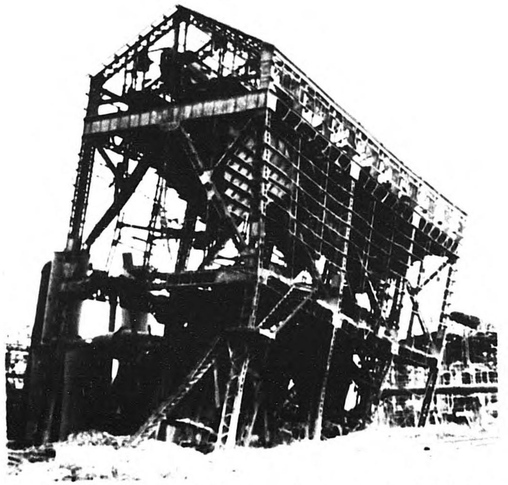


O View SW of building No. 68 looking NW toward unit No. 63.

P View SW of building No. 68 looking NE toward unit 68 and overhead crane.



Q View from between buildings No. 60 and 65 looking SE toward unit No. 63.



R View from NW of building No. 60 looking E toward building No. 59, building No. 73 in background.

EXHIBIT P

ABBREVIATIONS USED IN EXHIBITS B THROUGH N

1. General:

JTG	Joint Target Group
CIU	Central Interpretation Unit, XX Air Force
AC/AS	Assistant Chief of Air Staff, Intelligence
XXI BC	Twenty-first Bomber Command
OAS	Operations Analysis Section, XXI BC
R	Reported
A	Actual

2. Combustibility:

C	Combustible
N	Non-combustible
R	Fire-resistant

3. Construction:

B	Brick
Load B	Load bearing
B/U	Built-up roofing
C; Conc	Concrete
CA	Corrugated asbestos
CI	Corrugated iron
FB	Fiber board
LB	Load bearing construction
LT	Light construction
M	Metal
RC; R/C	Reinforced concrete
RC/F	Reinforced concrete frame
S	Steel
SF; S/F	Steel frame
SM	Sheet metal
T	Tile or slate
W	Wood
WF	Wood frame

4. For building construction types (A1.1, B2, etc) and HE vulnerability classifications (V1, V2, etc) see Text Table and paragraph .

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4. For building construction types (A1.1, B2, etc) and HE vulnerability classifications (V1, V2, etc) see Text Table and paragraph .

VECTOGRAPH EXHIBIT A - NIPPON OIL REFINERY, AMAGASAKI

The Nippon Oil Refinery at Amagasaki was the most important oil refinery in the Osaka area. A comparison of this three dimensional view with the ground photographs of individual buildings in Exhibit N will indicate the difficulty a photographic interpreter encounters in making a functional or structural analysis or a damage assessment.

See aerial photograph at the beginning of Exhibit N for key to location of individual buildings shown in ground photographs. Function of and damage to individual buildings are also given in Exhibit N.

VECTOGRAPH EXHIBIT B - SUMITOMO METAL INDUSTRY COMPANY, OSAKA

The Sumitomo Metal Industry Company (also known as the Sumitomo Sakurijima Plant and and the Sumitomo Light Metal Industry Company, Osaka Plant) was a large propeller producing plant. It also accounted for large quantities of light metals essential for aircraft production and was one of the prime targets in the Osaka area. This vectograph may be compared with ground photographs of individual buildings in Exhibit L. The key to location of buildings shown in ground photographs is given on the aerial photograph at the beginning of Exhibit L.

PHOTOGRAPHIC INTELLIGENCE INDUSTRIAL ANALYSIS

VECTOGRAPH EXHIBITS

UNITED STATES STRATEGIC BOMBING SURVEY

European War

LIST OF REPORTS

The following list of studies is a bibliography of completed reports resulting from the German survey. Reports numbers 1, 2, and 3 can be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C. Permission to examine the remaining reports may be had by writing to the headquarters of the Survey at Gravelly Point, Washington 25, D. C.

1 The United States Strategic Bombing Survey: Summary Report (European War)
2 The United States Strategic Bombing Survey: Over-all Report (European War)
3 The Effects of Strategic Bombing on the German War Economy

AIRCRAFT DIVISION

(By Division and Branch)

4 Aircraft Division Industry Report
5 Inspection Visits to Various Targets (Special Report)

Airframes Branch

6 Junkers Aircraft and Aero Engine Works, Dessau, Germany
7 Erla Maschinenwerke G m b H, Heiterblick, Germany
8 A T G Maschinenbau, G m b H, Leipzig (Mockau), Germany
9 Gothaer Waggonfabrik, A G, Gotha, Germany
10 Focke Wulf Aircraft Plant, Bremen, Germany
11. Messerschmitt A G, Augsburg, Germany — Over-all Report; Part A; Part B; Appendices I, II, III
12 Dornier Works, Friedrichshafen & Munich, Germany
13 Gerhard Fieseler Werke G m b H, Kassel, Germany
14 Wiener Neustaedter Flugzeugwerke, Wiener Neustadt, Austria

Aero Engines Branch

15 Bussing NAG Flugmotorenwerke G m b H, Brunswick, Germany
16 Mittel-Deutsche Motorenwerke G m b H, Taucha, Germany
17 Bavarian Motorworks Inc, Eisenach & Durrenhof, Germany
18 Bayerische Motorenwerke A G (BMW) Munich, Germany
19 Henschel Flugmotorenwerke, Kassel, Germany

Light Metal Branch

20 Light Metals Industry of Germany — Part I, Aluminum; Part II, Magnesium
21 Vereinigte Deutsche Metallwerke, Hildesheim, Germany
22 Metallgussgesellschaft G m b H, Leipzig, Germany
23 Aluminiumwerk G m b H, Plant No. 2, Bitterfeld, Germany
24 Gebrueder Giulini G m b H, Ludwigshafen, Germany
25 Luftschiffbau Zeppelin G m b H, Friedrichshafen on Bodensee, Germany
26 Wieland Werke A G, Ulm, Germany
27 Rudolph Rautenbach Leichtmetallgiessereien. Solingen, Germany
28 Lippewerke Vereinigte Aluminiumwerke A G, Lunen, Germany
29 Vereinigte Deutsche Metallwerke, Heddernheim, Germany
30 Duerener Metallwerke A G, Duren Wittenau-Berlin & Waren, Germany

AREA STUDIES DIVISION

31 Area Studies Division Report
32 A Detailed Study of the Effects of Area Bombing on Hamburg
33 A Detailed Study of the Effects of Area Bombing on Wuppertal
34 A Detailed Study of the Effects of Area Bombing on Dusseldorf
35 A Detailed Study of the Effects of Area Bombing on Solingen
36 A Detailed Study of the Effects of Area Bombing on Remscheid
37 A Detailed Study of the Effects of Area Bombing on Darmstadt
38 A Detailed Study of the Effects of Area Bombing on Lubeck
39 A Brief Study of the Effects of Area Bombing on Berlin, Augsburg, Bochum, Leipzig, Hagen, Dortmund, Oberhausen, Schweinfurt, and Bremen

CIVILIAN DEFENSE DIVISION

40 Civilian Defense Division—Final Report
41 Cologne Field Report
42 Bonn Field Report
43 Hanover Field Report
44 Hamburg Field Report—Vol I, Text; Vol II, Exhibits
45 Bad Oldesloe Field Report
46 Augsburg Field Report
47 Reception Areas in Bavaria, Germany

EQUIPMENT DIVISION

Electrical Branch

48 German Electrical Equipment Industry Report
49 Brown Boveri et Cie, Mannheim Kafertal, Germany

Optical and Precision Instrument Branch

50 Optical and Precision Instrument Industry Report

Abrasives Branch

51 The German Abrasive Industry
52 Mayer and Schmidt, Offenbach on Main, Germany

Anti-Friction Branch

53 The German Anti-Friction Bearings Industry

Machine Tools Branch

54 Machine Tools & Machinery as Capital Equipment
55 Machine Tool Industry in Germany
56 Herman Kolb Co, Cologne, Germany
57 Collet and Engelhard, Offenbach, Germany
58 Naxos Union, Frankfort on Main, Germany

MILITARY ANALYSIS DIVISION

59 The Defeat of the German Air Force
60 V-Weapons (Crossbow) campaign
61 Air Force Rate of Operation
62 Weather Factors in Combat Bombardment Operations in the European Theatre
63 Bombing Accuracy, USAAF Heavy and Medium Bombers in the ETO
64 Description of RAF Bombing

MORALE DIVISION

Medical Branch

65 The Effect of Bombing on Health and Medical Care in Germany

MUNITIONS DIVISION

Heavy Industry Branch

66 The Coking Industry Report of Germany
67 Coking Plant Report No. 1, Sections A, B, C, & D
68 Gutehoffnungshuette, Oberhausen, Germany
69 Friedrich-Alfred Hutte, Rheinhausen, Germany
70 Neunkirchen Eisenwerke A G, Neunkirchen, Germany
71 Reichswerke Hermann Goering A G, Hallendorf, Germany
72 August Thyssen Huette A G, Hamborn, Germany
73 Friedrich Krupp A G, Borbeck Plant, Essen, Germany
74 Dortmund Hoerder Huetteinverein, A G, Dortmund, Germany
75 Hoesch A G, Dortmund, Germany
76 Bochumer Verein fuer Gusstahlfabrikation A G, Bochum, Germany

Motor Vehicles and Tanks Branch

77 German Motor Vehicles Industry Report
78 Tank Industry Report
79 Daimler Benz A G, Unterturkheim, Germany
80 Renault Motor Vehicles Plant, Billancourt, Paris
81 Adam Opel, Russelheim, Germany
82 Daimler Benz-Gaggenau Works, Gaggenau, Germany
83 Maschinenfabrik Augsburg-Nurnberg, Nurnberg, Germany
84 Auto Union A G, Chemnitz and Zwickau, Germany
85 Henschel and Sohn, Kassel, Germany
86 Maybach Motor Works, Friedrichshafen, Germany
87 Voigtlander Maschinenfabrik A G, Plauen, Germany
88 Volkswagenwerke, Fallersleben, Germany
89 Bussing NAG, Brunswick, Germany
90 Muehlenbau Industrie A G (Miag) Brunswick, Germany
91 Friedrich Krupp Grusonwerke, Magdeburg, Germany

Submarine Branch

92 German Submarine Industry Report
93 Maschinenfabrik Augsburg-Nurnberg A G, Augsburg, Germany
94 Blohm and Voss Shipyards, Hamburg, Germany
95 Deutschewerke A G, Kiel, Germany
96 Deutsche Schiff und Maschinenbau, Bremen, Germany
97 Friedrich Krupp Germaniawerft, Kiel, Germany
98 Howaldtswerke A G, Hamburg, Germany
99 Submarine Assembly Shelter, Farge, Germany
100 Bremer Vulkan, Vegesack, Germany

Ordnance Branch

101 Ordnance Industry Report
102 Friedrich Krupp Grusonwerke A G, Magdeburg, Germany
103 Bochumer Verein fuer Gusstahlfabrikation A G, Bochum, Germany
104 Henschel and Sohn, Kassel, Germany
105 Rheinmetall-Borsig, Dusseldorf, Germany
106 Hermann Goering Werke, Braunschweig, Hallendorf, Germany
107 Hannoverische Maschinenbau, Hanover, Germany
108 Gusstahlfabrik Friedrich Krupp, Essen, Germany

OIL DIVISION

109 Oil Division Final Report
110 Oil Division Final Report, Appendix
111 Powder, Explosives, Special Rockets and Jet Propellants, War Gases and Smoke Acid (Ministerial Report #1)
112 Underground and Dispersal Plants in Greater Germany
113 The German Oil Industry, Ministerial Report Team 78
114 Ministerial Report on Chemicals

Oil Branch

115 Ammoniakwerke Merseburg G m b H, Leuna, Germany 2 appendices
116 Braunkohle Benzin A G, Zeitz and Bohlen, Germany
Wintershall A G, Luetzkendorf, Germany
117 Ludwigshafen-Oppau Works of I G Farbenindustrie A G, Ludwigshafen, Germany
118 Ruhroel Hydrogenation Plant, Bottrop-Boy, Germany, Vol I, Vol II
119 Rhenania Ossag Mineraloelwerke A G, Harburg Refinery, Hamburg, Germany
120 Rhenania Ossag Mineraloelwerke A G, Grassbrook Refinery, Hamburg, Germany
121 Rhenania Ossag Mineraloelwerke A G, Wilhelmsburg Refinery, Hamburg, Germany
122 Gewerkschaft Victor, Castrop-Rauxel, Germany, Vol I & Vol II
123 Europaeische Tanklager und Transport A G, Hamburg, Germany
124 Ebano Asphalt Werke A G, Harburg Refinery, Hamburg, Germany
125 Meerbeck Rheinpreussen Synthetic Oil Plant—Vol I & Vol II

Rubber Branch

126 Deutsche Dunlop Gummi Co., Hanau on Main, Germany
127 Continental Gummiwerke, Hanover, Germany
128 Huels Synthetic Rubber Plant
129 Ministerial Report on German Rubber Industry

Propellants Branch

130 Elektro Chemischewerke, Munich, Germany
131 Schoenebeck Explosive Plant, Lignose Sprengstoff Werke G m b H, Bad Salzemen, Germany
132 Plants of Dynamit A G, Vormal, Alfred Nobel & Co, Troisdorf, Clausthal, Drummel and Duneberg, Germany
133 Deutsche Sprengchemie G m b H, Kraiburg, Germany

OVERALL ECONOMIC EFFECTS DIVISION

134 Overall Economic Effects Division Report
Gross National Product ... | Special papers
Kriegs Eil Berichte ... | which together
Herman Goering Works ... | comprise the
Food and Agriculture ... | above report

PHYSICAL DAMAGE DIVISION

135 Villacoublay Airdrome, Paris, France
136 Railroad Repair Yards, Malines, Belgium
137 Railroad Repair Yards, Louvain, Belgium
138 Railroad Repair Yards, Hasselt, Belgium
139 Railroad Repair Yards, Namur, Belgium
140 Submarine Pens, Brest, France
141 Powder Plant, Angouleme, France
142 Powder Plant, Bergerac, France
143 Coking Plants, Montigny & Liege-Belgium
144 Fort St. Blaise Verdun Group, Metz, France
145 Gnome et Rhone, Limoges, France
146 Michelin Tire Factory, Clermont-Ferrand, France
147 Gnome et Rhone Aero Engine Factory, Le Mans, France
148 Kugelfisher Bearing Ball Plant, Ebelspach, Germany
149 Louis Breguet Aircraft Plant, Toulouse, France
150 S. N. C. A. S. E. Aircraft Plant, Toulouse, France
151 A. I. A. Aircraft Plant, Toulouse, France
152 V Weapons in London
153 City Area of Krefeld
154 Public Air Raid Shelters in Germany
155 Goldenberg Thermal Electric Power Station, Knapsack, Germany
156 Brauweiler Transformer & Switching Station, Brauweiler, Germany
157 Storage Depot, Nahbollenbach, Germany
158 Railway and Road Bridge, Bad Munster, Germany
159 Railway Bridge, Eller, Germany
160 Gustloff-Werke Weimar, Weimar, Germany
161 Henschel and Sohn G m b H, Kassel, Germany
162 Area Survey at Pirmasens, Germany
163 Hanomag, Hanover, Germany
164 M A N Werke Augsburg, Augsburg Germany
165 Friedrich Krupp A G, Essen, Germany
166 Erla Maschinenwerke, G m b H, Heiterblick, Germany
167 A T G Maschinenbau G m b H, Mockau, Germany
168 Erla Maschinenwerke G m b H, Mockau, Germany
169 Bayerische Motorenwerke Durrerhoff, Germany
170 Mittel-Deutsche Motorenwerke G m b H, Taucha, Germany
171 Submarine Pens Deutsche-Werft, Hamburg, Germany
172 Multi-Storied Structures, Hamburg, Germany
173 Continental Gummiwerke, Hanover, Germany
174 Kassel Marshalling Yards, Kassel, Germany
175 Ammoniskwerke, Mersburg-leuna, Germany
176 Brown Boveri et Cie, Mannheim, Kafertal, Germany
177 Adam Opel A G, Russelheim, Germany
178 Daimler-Benz A G, Unterturkheim, Germany
179 Valentin Submarine Assembly, Farge, Germany
180 Volkswaggonwerke, Fallersleben, Germany
181 Railway Viaduct at Bielefeld, Germany
182 Ship Yards Howaldtswerke, Hamburg, Germany
183 Blohm and Voss Shipyards, Hamburg, Germany
184 Daimler-Benz A G, Mannheim, Germany
185 Synthetic Oil Plant, Meerbeck-Hamburg, Germany
186 Gewerkschaft Victor, Castrop-Rauxel, Germany
187 Kloekner Humblolt Deutz, Ulm, Germany
188 Ruhroel Hydrogenation Plant, Bettrop-Boy, Germany
189 Neukirchen Eisenwercke A G, Neukirchen, Germany
190 Railway Viaduct at Altenbecken, Germany
191 Railway Viaduct at Arnsburg, Germany
192 Deurag-Nerag Refineries, Misburg, Germany
193 Fire Raids on German Cities
194 I G Farbenindustrie, Ludwigshafen, Germany, Vol I & Vol II
195 Roundhouse in Marshalling Yard, Ulm, Germany
196 I G Farbenindustrie, Leverkusen, Germany
197 Chemische-Werke, Huels, Germany
198 Gremberg Marshalling Yard, Gremberg, Germany
199 Locomotive Shops and Bridges at Hamm, Germany

TRANSPORTATION DIVISION

200 Transportation Division Report
201 Rail Operations Over the Brenner Pass
202 Effects of Bombing on Railroad Installations in Regensburg, Nurnberg and Munich Divisions.
203 German Locomotive Industry During the War
204 Wehrmacht Traffic Over the German Railroads

UTILITIES DIVISION

205 German Electric Utilities Industry Report
206 1 to 10 in Vol I "Utilities Division Plant Reports"
207 11 to 20 in Vol II "Utilities Division Plant Reports"
208 21 Rheinische-Westfalische Elektrizitatswerk A G

CONFIDENTIAL

EXHIBIT N

NIPPON OIL REFINERY

90.25-1203

LAT. 34° 42 'N - LONG. 135° 24 'E

AMAGASAKI, JAPAN

See Exhibit P for abbreviations used in this exhibit.

90.25-1203 NIPPON OIL REFINERY

LETTERS ON AERIAL PHOTOGRAPH CORRESPOND TO LETTERS OF GROUND PHOTOGRAPHS FOUND AT THE END OF THIS EXHIBIT. ARROWS INDICATE DIRECTION OF PHOTOGRAPHY.

FOR A COMPARISON OF THE GROUND VIEWS INDEXED HERE WITH THE TYPE OF THREE DIMENSIONAL AERIAL VIEW FROM WHICH THE INTERPRETATION WAS DONE SEE VECTOGRAPH EXHIBIT A IN THE ENVELOPE ACCOMPANYING THIS REPORT.

NIPPON OIL REFINERY 90.25 - 1203

1. DESCRIPTION OF TARGET

a. The Nippon Oil Refinery, Amagasaki, was the most important refinery in the Osaka Area.

b. The refinery is located on reclaimed land east of the mouth of the Muko River on the west side of Amagasaki Harbor.

c. Field investigation revealed that the target area was occupied by two separate companies, the north portion by the Nippon Oil Refinery, the south portion by a synthetic oil plant allied to the Amagasaki Iron Works. There were a total of 101 listed structures in the area, comprising a built-up area of 610,700 sq. ft.

2. SUMMARY

a. The overall interpretation of building functions was good, particularly of the primary buildings. Of the 97 buildings checked:

(1) 54 were identified correctly.
(2) 16 were identified as having similar occupancy.
(3) 11 were unidentified.
(4) 16 were identified incorrectly.

b. No structural analysis was made.

c. Two CIU (XXI BC) Damage Assessment Reports were used to obtain the cumulative damage estimates. The amount and character of damage was very much underestimated as shown in Table I. The small size and generally complex pattern of the types of equipment comprising a major part of an oil refinery makes recognition of damage very difficult.

TABLE I

	ACTUAL Sq Ft	REPORTED Sq Ft
Structural Damage	567,900	396,600
Superficial Damage	18,300	76,500
Minor Damage *	24,100	15,000
Total Damage	610,300	488,100

* In general, Minor Damage was purposely omitted in D/A reports.

3. SOURCE OF DATA

a. Reported.

(1) AC/AS Intelligence F/A Report #99, 24 March 1945
(2) CIU (XXI BC) Industrial Report #54, 5 July 1945
(3) CIU (XXI BC) D/A Report #155, 29 July 1945
(4) CIU (XXI BC) D/A Report #191, 21 July 1945

b. Field Data.

(1) USSBS (G-2, PIC) field notes.

90.25 - 1203 NIPPON OIL REFINERY

4. FUNCTIONAL ANALYSIS

a. Use of Plant.

Reported: Refinery and synthetic oil plant.
Actual: As reported.

b. Boundaries.

As reported. Two separate companies, one, the Nippon Oil Refinery, the other, a synthetic oil plant, associated with the Amagasaki Iron Works were found to be within the target area.

c. Building Identification (F/A Table).

d. Summary of Tabulation.

TABLE 2

F/A ACCURACY FACTOR

		PRIMARY BUILDINGS		TOTAL BUILDINGS	
		No. Bldgs	%	No. Bldgs	%
Total Plant 72	Correct	19	86	54	56
Primary Buildings 84	Of Similar Occupancy	—	—	16	16
	Unidentified	—	—	11	12
	Incorrect	3	14	16	16
	Total	22	100	97	100

e. Remarks.

The identification of secondary structures in this target was the more difficult. The bulk of the listed primary structures were large storage tanks.

NIPPON OIL REFINERY 90.25 - 1203

FUNCTIONAL ANALYSIS TABLE

NIPPON OIL REFINERY — 90.25-1203

BUILDING NUMBER JTG	PRIMARY	REPORTED: Joint Target Group	FUNCTION	ACTUAL	EVALUATION: CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR
				Catylist Making Building			x		45
				Employees Entrance Bicycle Racks			x		45
				Warehouse - Finished Products	x				78
				Warehouse - Finished Products	x				78
				Warehouse - Finished Products	x				78
				Warehouse - Finished Products	x				78
				Warehouse - Finished Products	x				78
				Warehouse - Finished Products	x				78
				Employees bath room - wash room				x	65
				Machine Shop & Drum repair			x		20
				Garage & Shipping of Fuel	x				45
				Gasoline Storage Tanks	x				85
				Material Store Houses	x				100
				Material Store Houses	x				100
				Can filling Room - Drum		x			70
				Can Manufacturing				x	15
				Can Manufacturing & Drum Filling				x	15
				Drum Storage	x				85
				Boiler Room	x				85
				Pump house - Stor. Propane & Butane			x		45
				Crude Distillation Unit	x				85
				Thermal cracking & Calylitic Cracking	x				100
				Product Tanks	x				100
				Product Tanks	x				100
				Product Tanks	x				100
				Product Tanks	x				100
				Product Tanks	x				100
				Product Tanks	x				100
				Laboratory & Pumphouse		x			82
				Office		x			88
				Storage Tanks	x				85
1		Unidentified							
2		Unidentified							
3		Storage or Quarters							
4		Storage or Quarters							
5		Storage or Quarters							
6		Storage or Quarters							
7		Storage or Quarters							
8		Storage or Quarters							
9		Probable Storage							
10		Probable Storage							
11		Unidentified							
12		Small Tanks							
13		Storage Building							
14		Storage Building							
15		Storage Building							
16		Storage Building							
17		Storage Building							
18		Storage Building							
19		Still							
20		Unidentified							
21		Cracking or Secondary Distillati on							
22		Cracking or Secondary Distillation							
23		(8) Run down tanks							
24		(8) Run down tanks							
25		(4) Run down tanks							
26		(6) Intermediate Tanks							
27		(6) Intermediate Tanks							
28		(4) Intermediate Tanks							
29		Possible Office or Laboratory							
30		Possible Office or Laboratory							
31	x	(12) Storage Tanks Approx. 50' Dia.							

FUNCTIONAL ANALYSIS TABLE

NIPPON OIL REFINERY — 90.25-1203

BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED: Joint Target Group	FUNCTION ACTUAL	EVALUATION: CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR
32		(3) Tanks without tops (1) 25' (2) 40'	Storage Tanks	x				85
33		(4) Tanks 40' Diameter	Storage Tanks	x				85
34		(1) Tank 40' Diameter	Storage Tanks	x				85
35		(5) Horizontal pressure Tanks	Gasoline treating Plant		x			70
36		Lube Oil Plant	Slops dehydration			x		0
37		Unidentified	Sulfuric Acid Plant		x			45
38	x	(4) Storage tanks Approx. 50' Diameter	Storage Tanks	x				100
39		(5) Small tanks (3) 40' (2) 20'	Storage Tanks	x				100
40		Storage Shed	Warehouse	x				100
41		Shop Building	Open Storage			x		0
42		Tanks 35' Diameter	Water Tanks & Foamite Pumps	x				85
43	x	Tank 145' Diameter	Crude Oil Storage Tanks	x				85
44	x	Tank 145' Diameter	Crude Oil Storage Tank	x				85
45	x	Tank 50' Diameter	Crude Oil Storage Tank	x				85
46		Gas Holder 100' Diameter	Gas Holder	x				100
47		Gas Holder 100' Diameter	Gas Holder	x				100
48		Gas Holder 100' Diameter	Gas Holder	x				100
49		Gas Holder 115' Diameter	Gas Holder	x				100
50		Small Gas Holder	Gas Holder	x				100
51		Small Gas Holder	Gas Holder	x				100
52		(3) Small tanks	Tanks	x				100
53		Possible Pump House	Pump House & Laboratory	x				90
54		Unidentified	Hydrogen Plant			x		45
55		Poss. Gas purification building	Oxygen Plant				x	10
56		Poss. Gas purification building	Oxygen Plant				x	10
57		Poss. Gas purification building	Compressor House				x	10
58	x	Possible Water gas plant	Gas Purification Equipment				x	10
59	x	Possible Water gas plant	Water gas plant	x				90
60		Unidentified	Producer gas plant			x		45
61		Unidentified	Coal Dryer			x		45
62		Probable boiler house	Steam plant	x				95

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90.25-1203 NIPPON OIL REFINERY

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FUNCTIONAL ANALYSIS TABLE

NIPPON OIL REFINERY — 90.25-1203

BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED: Joint Target Group	FUNCTION ACTUAL	EVALUATION: CORRECT	SIMILAR	UNIDENT	WRONG	F/A ACCURACY FACTOR
63		Gas Convertors	Gas Cracking Plant				x	0
64		Unidentified	Cooling Water Sump		x			45
65		Small Cascade Cooling Tower	Cooling Tower	x				100
66	x	(4) Hydrogen Sulphide removal columns (Cover removed from one)	Desulfurization Plant	x				100
67		Control building	Desulphurization Plant				x	0
68	x	(4) Organic sulphur removal - tower	Compressor House				x	0
69		Gantry crane servicing 66-68	Final Desulphurization Plant				x	0
70		Cascade cooling tower and probable pump house	Cooling house - pump house	x				98
72		Compressor house	Blower house		x			85
71		Poss. Splitting of Coke oven gas	Main Electric Substation				x	10
73	x	Contact oven house	Reactor Building				x	0
74		Office	Office & Warehouse	x				85
75		Office	Office & Warehouse	x				85
76		(2) Tanks	(2) Small Tanks	x				85
77		Boiler house	Steam plant	x				100
78		Storage Building	Office & Warehouse	x				85
79		Storage Building	Office & Warehouse	x				85
80		Storage Building	Office & Warehouse	x				85
81		Unidentified	Gas Separation Plant & Compressor Pump-house			x		45
82		Unidentified	Gas Separation Plant - Butane Storage			x		45
83		Removal of oils by activated Carbon	Gas Separation Plant		x			85
84		Intermediate tanks	Steam Still		x			85
85	x	Storage Tank 85' Diameter	NOT ASSOCIATED WITH PLANTS IN THE TARGET AREA.					
86	x	Storage Tank 85' Diameter						
87	x	Storage Tank 65' Diameter						
88		Pump house & Sheds						
89	x	Tank farm - Storage Tanks 114' Diameter	Storage Tanks Crude Oil or Refined Oil	x				100
90	x	" " " " " "	" " " " " "	x				100
91	x	" " " " " "	" " " " " "	x				100

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NIPPON OIL REFINERY 90.25 - 1203

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FUNCTIONAL ANALYSIS TABLE

NIPPON OIL REFINERY — 90.25-1203

BUILDING NUMBER JTG	PRIMARY	FUNCTION REPORTED Joint Target Group	FUNCTION REPORTED	FUNCTION ACTUAL	EVALUATION CORRECT	EVALUATION SIMILAR	EVALUATION UNIDENT	EVALUATION WRONG	EVALUATION CORRECT	EVALUATION SIMILAR	EVALUATION UNIDENT	EVALUATION WRONG	F/A ACCURACY FACTOR
92	x	Tank Farm - Storage Tanks	114" Diameter	Storage Tanks Crude Oil or Refined Oil	x								100
93	x	" " " "	" "	" " " "	x								100
94	x	" " " "	" "	" " " "	x								100
95	x	" " " "	" "	" " " "	x								100
96	x	" " " "	" "	" " " "	x								100
97	x	" " " "	" "	" " " "	x								100
98	x	" " " "	" "	" " " "	x								100
99	x	" " " "	" "	" " " "	x								100
100	x	" " " "	" "	" " " "	x								100
101		Pump house		" " " "				x					0

5. DAMAGE ASSESSMENT

a. D/A: (See D/A Table).

b. Summary of Tabulation.

TABLE 3

	PRIMARY BUILDINGS				TOTAL BUILDINGS			
	ACTUAL		REPORTED		ACTUAL		REPORTED	
	Sq Ft	% Dam	Sq Ft	% Dam	Sq Ft	% Dam	Sq Ft	% Dam
Total Building Area	217,500		217,500		610,700			
Damage								
Structural	207,500	95	136,900	63	567,900	92	396,600	65
Superficial	2,000	1	0	0	18,300	3	76,500	12
Minor *	6,100	3	0	0	24,100	4	15,000	2
Total Damage	215,600	99	136,900	63	610,300	99	488,100	79

* In general, Minor Damage was purposely omitted in D/A reports.

c. Remarks.

The intricate and highly condensed building layout of some chemical plants and all oil refineries makes it very difficult for the photographic interpreter to assess damage, since no regular outline of damage is seen, but rather a tangle of outdoor chemical equipment, which even when undamaged was difficult to identify.

NIPPON OIL REFINERY

DAMAGE ASSESSMENT TABLE

90.25-1203

BUILDING NUMBER	BUILDING AREA	STRUCTURAL (1000'S SQ. FT.)			SUPERFICIAL (1000'S SQ. FT.)			MINOR * (1000'S SQ. FT.)			REMOVED (1000'S SQ. FT.)		
JTS		ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED
1	3.1	3.1		3.1									
2	12.4	5.2		7.4				6.2					
3	4.1	4.1		4.1									
4	4.3	4.3		4.3									
5	4.3	4.3		4.3									
6	4.1				2.5			1.6		4.1			
7	4.4	4.4		4.4									
8	4.4	4.4		4.4									
9	5.9	5.9	5.9										
10	5.6	5.6		5.6									
11	0.4	0.4		0.4									
12	12.6							10.1					
13	6.5	6.5		1.3						5.2			
14	6.5	6.5	3.2	6.5									
15	6.6	6.6					6.6						
16	5.0	5.0		5.0									
17	6.7	5.0		6.7	1.7								
18	6.7	3.4			3.4		6.7						
19	2.4	1.2			1.2		2.4						
20	5.2	3.1		3.1	2.1		2.1						
21	4.7	4.7		2.4			2.4						
22	7.7	7.7		7.7									
23	3.0	3.0		2.3									
24	3.0	3.0		3.0									
25	1.5	1.5		1.5									
26	4.2	4.2		2.8									
27	4.2	4.2		2.1									
28	2.8	2.8	2.8	2.1									
29	4.8	4.8	1.2	4.8									
30	3.0	3.0		3.0									
31	20.3	18.7	5.1	5.1	1.6								
32	4.7	4.7	4.7										
33	6.1	6.1		6.1									

*In general, Minor Damage was purposely omitted in D/A reports.

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90.25-1203 NIPPON OIL REFINERY

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NIPPON OIL REFINERY

DAMAGE ASSESSMENT TABLE

90.25-1203

BUILDING NUMBER	BUILDING AREA	STRUCTURAL (1000'S SQ. FT.)			SUPERFICIAL (1000'S SQ. FT.)			MINOR * (1000'S SQ. FT.)			REMOVED (1000'S SQ. FT.)		
JTS		ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED
35	10.9	10.9		10.9									
36	6.4	6.4		6.4									
37	3.3	3.3				3.3							
38	8.6	8.6		4.3									
39	4.5	4.5		4.5									
40	3.0	3.0	1.5										
41	4.4	4.4	4.4										
42	1.9	1.9											
43	12.5	12.5		12.5									
44	12.5	12.5		12.5									
45	6.1	6.1		6.1									
46	8.8	8.8	8.8										
47	8.8	8.8				8.8							
48	8.7	8.7	8.7										
49	11.3	11.3	11.3										
50	1.8	1.8				1.8							
51	7.7	7.7				7.7							
52	3.7	3.7	1.2	3.7		1.2							
53	3.2	3.2	3.2	3.2									
54	2.3	2.3	or dest	0.7						1.6			
55	9.0	9.0				9.0							
56	4.9	4.9				4.9							
57	2.2	2.2				2.2							
58	1.7	1.7											
59	4.2	4.2		4.2									
60	3.7	3.7				3.7							
61	3.0	3.0				3.0							
62	5.3	5.3	5.3										
63	1.9	1.9					1.9	Damaged					
64	4.6	4.6	4.6										
65	6.2	6.2	3.1										
66	5.0	5.0		5.0									
67	3.6	3.6		or dest			3.6						

*In general, Minor Damage was purposely omitted in D/A reports.

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EXHIBIT N PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS

NIPPON OIL REFINERY 90.25 - 1203

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NIPPON OIL REFINERY

DAMAGE ASSESSMENT TABLE

90.25-1203

BUILDING NUMBER		BUILDING AREA	STRUCTURAL (1000'S SQ. FT.)			SUPERFICIAL (1000'S SQ. FT.)			MINOR * (1000'S SQ. FT.)			REMOVED (1000'S SQ. FT.)		
JTG			ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED	ACTUAL	REPORTED	REPORTED
68		2.8	2.8		2.8									
69		2.1	2.1		1.0									
70		5.2	5.2					5.2		Damaged				
71		8.2	8.2		4.1						4.1			
72		0.8	0.8		0.8									
73		40.3	30.3			2.0			6.1	sm. dam.	many holes			
74		5.8	5.8	5.8										
75		4.1	4.1	4.1										
76		1.1	1.1		0.5									
77		2.4	2.4	2.4										
78		6.4	6.4	6.4										
79		6.6	6.6		6.6									
80		4.4	4.4		4.4									
81		5.4	5.4		5.4									
82		2.8	2.8		2.8									
83		5.0	5.0		5.0									
84		1.2	1.2		1.2									
85		5.7	5.7	5.7										
86		5.7	5.7	5.7										
87		2.2	2.2	2.2										
88		1.7	1.7	1.7										
89		9.9	9.9	9.9										
90		9.9	9.9	9.9										
91		9.9	9.9	9.9										
92		9.9	9.9										9.9	
94		9.9	9.9	9.9										
95		9.9	9.9	9.9										
96		9.9	9.9											
97		9.9	9.9										9.9	
98		9.9	9.9	9.9										
99		9.9	9.9	9.9										
100		9.9	9.9	9.9										
101		3.8	3.8			3.8								

*In general, Minor Damage was purposely omitted in D/A reports.

OMITTED FROM LIST

BUILDING NUMBER		BUILDING AREA	STRUCTURAL (1000'S SQ. FT.).		
JTG			ACTUAL	REPORTED	REPORTED
34		1.3	1.3		1.3
93		9.9	9.9		

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90.25-1203 NIPPON OIL REFINERY
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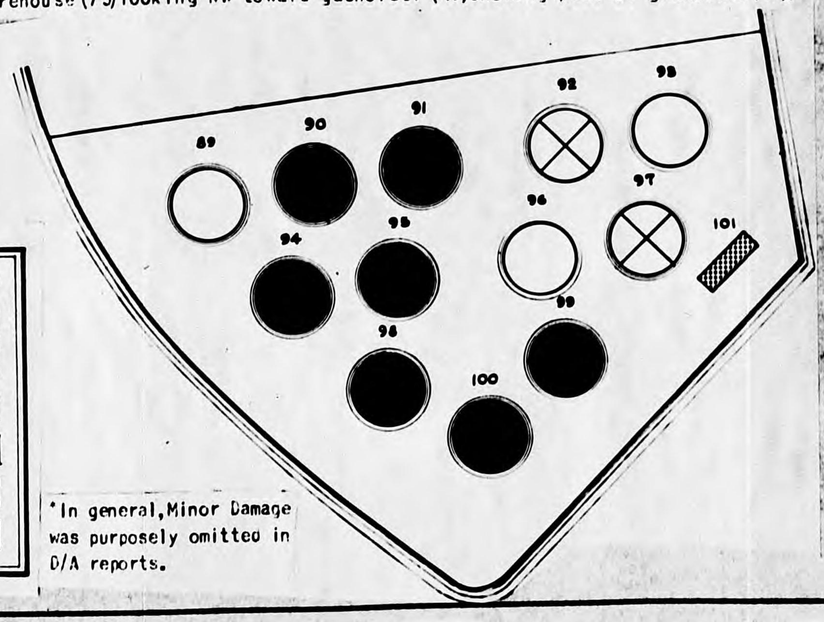
90.25-1203 NIPPON OIL REFINERY

Reported
PHOTOGRAPHIC INTELLIGENCE

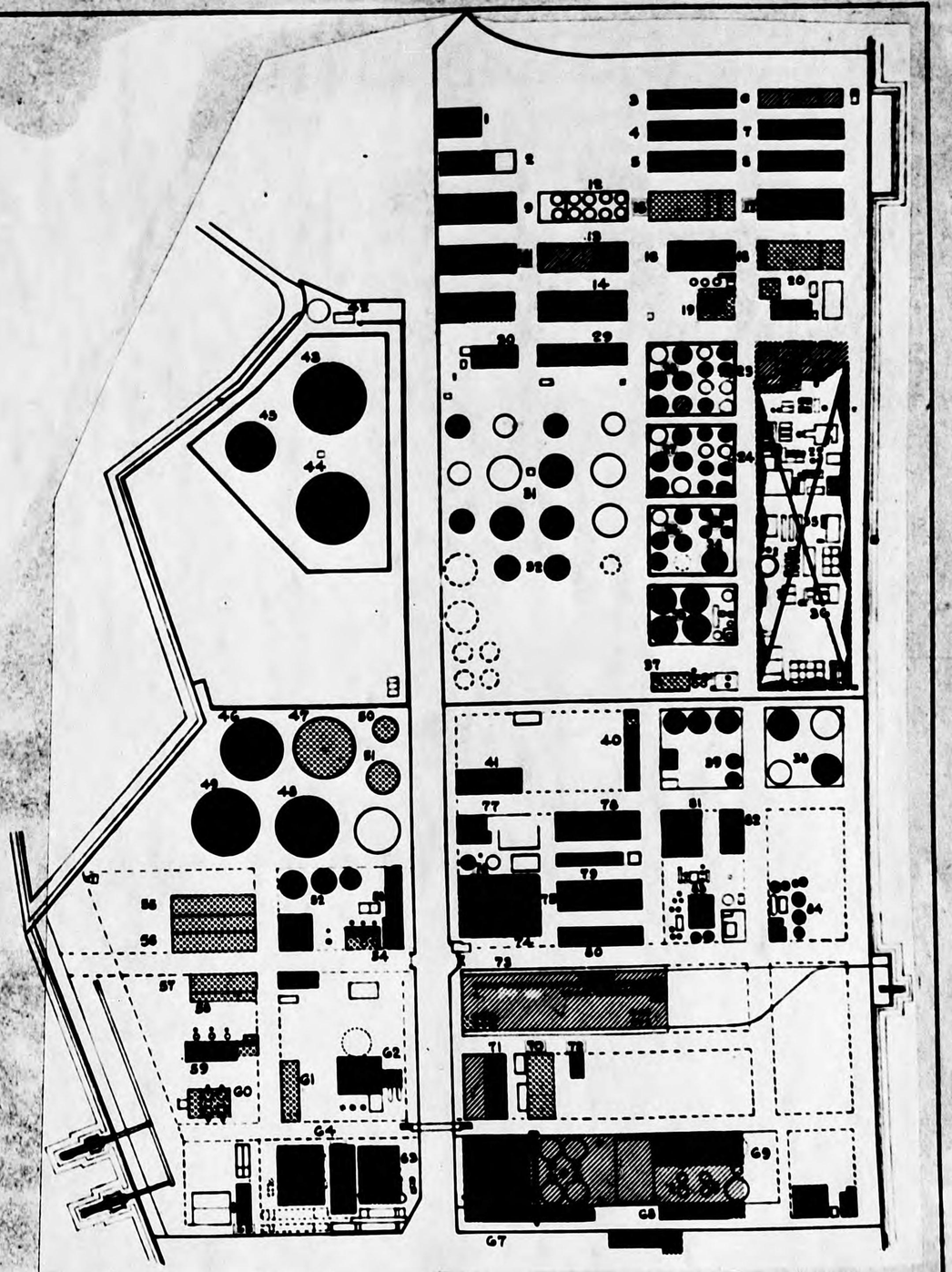
A View from office and warehouse (75) looking NW toward gasholder (48) showing part of gasholder (47).



LEGEND OF DAMAGE SYMBOLS

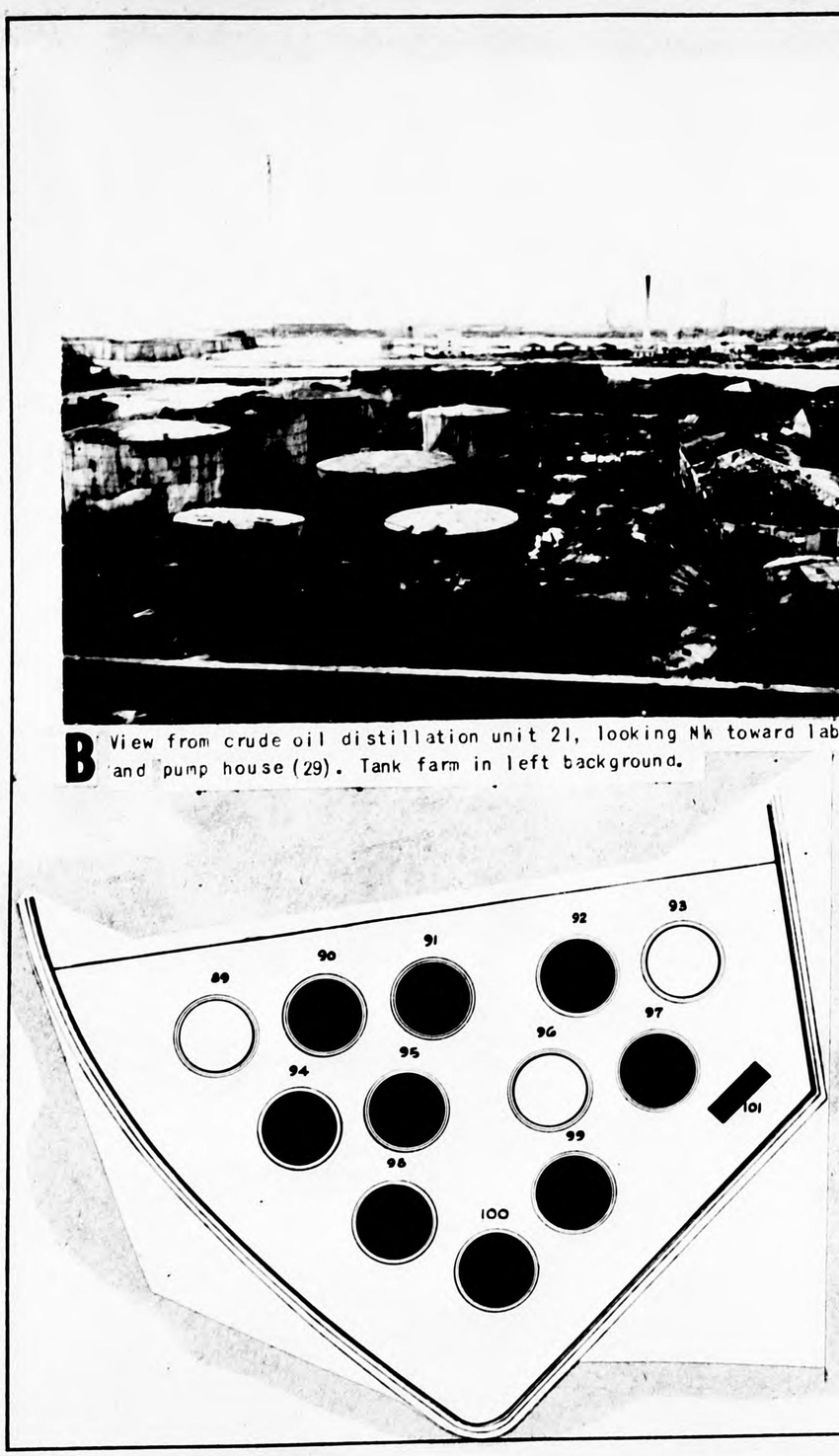
DESTROYED	
STRUCTURAL DAMAGE	
SUPERFICIAL DAMAGE	
MINOR DAMAGE *	
REMOVED	
BUILDING NUMBER 7	

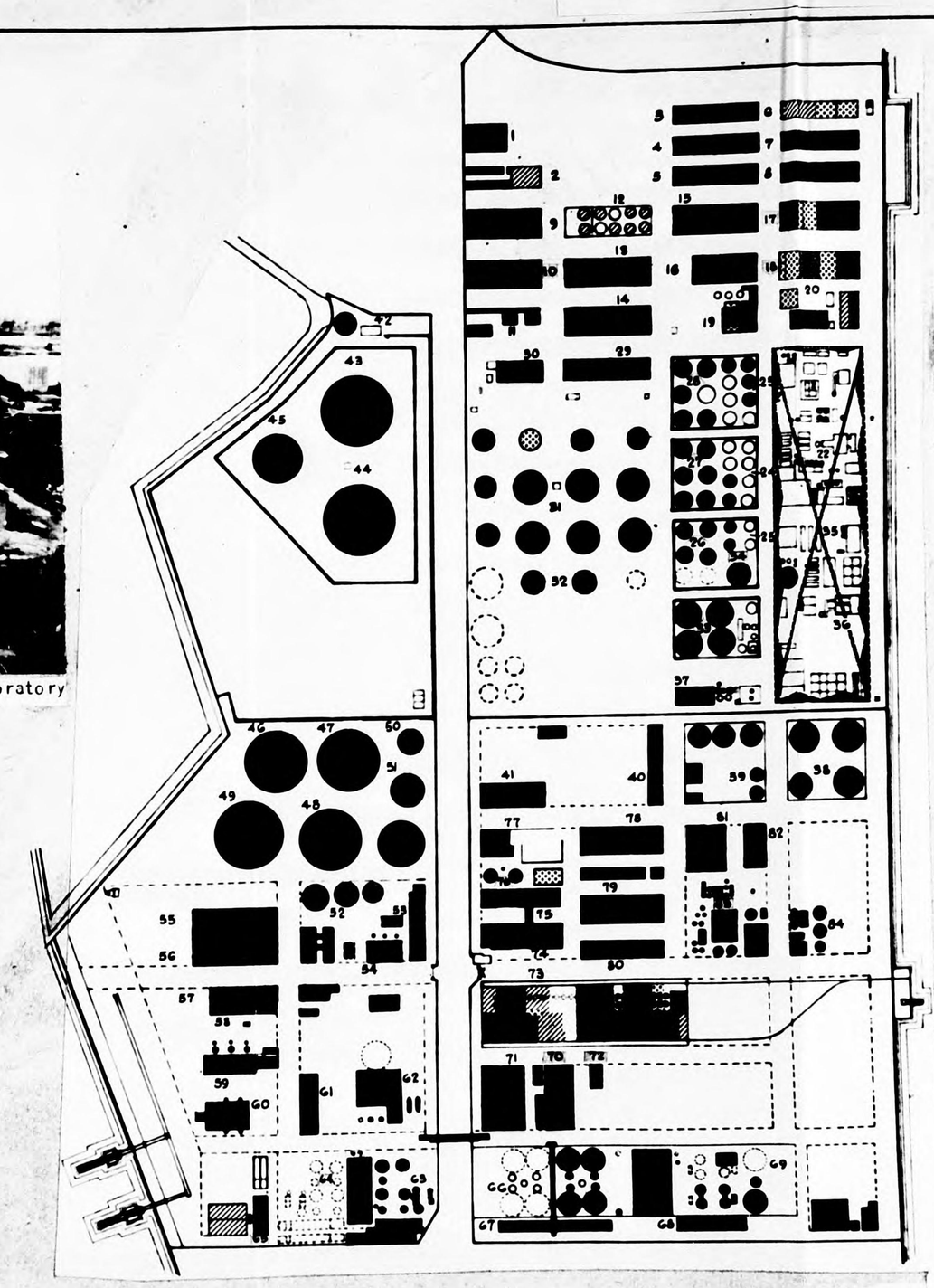
*In general, Minor Damage was purposely omitted in D/A reports.



NIPPON OIL REFINERY 90.25 - 1203

B View from crude oil distillation unit 21, looking NW toward laboratory and pump house (29). Tank farm in left background.





● *Actual*
U. S. S. B. S. COMPILED GROUND INFORMATION

SEE VECTOGRAPH EXHIBIT A IN THE ENVELOPE ACCOMPANYING THIS REPORT FOR A THREE DIMENSIONAL VIEW OF THE NIPPON OIL REFINERY TAKEN AT APPROXIMATELY THE SAME TIME AS GROUND PHOTOGRAPHS ELSEWHERE IN THIS EXHIBIT.

NORTH

LEGEND OF DAMAGE SYMBOLS

DESTROYED	
STRUCTURAL DAMAGE	
SUPERFICIAL DAMAGE	
MINOR DAMAGE	
REMOVED	
BUILDING NUMBER	7

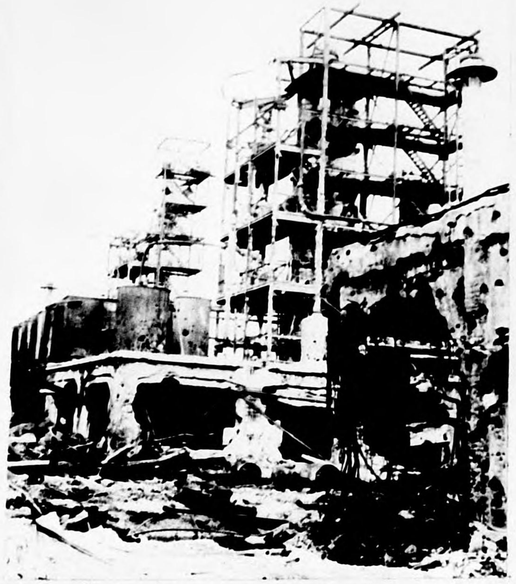
EXHIBIT N / PHOTOGRAPHIC INTELLIGENCE — INDUSTRIAL ANALYSIS

NIPPON OIL REFINERY 90.25 - 1203

C Intense fire caused by drums filled with gasoline. View of building No. 5 looking NE.

D View of storage tanks from building No. 21 looking SW toward building No. 54.

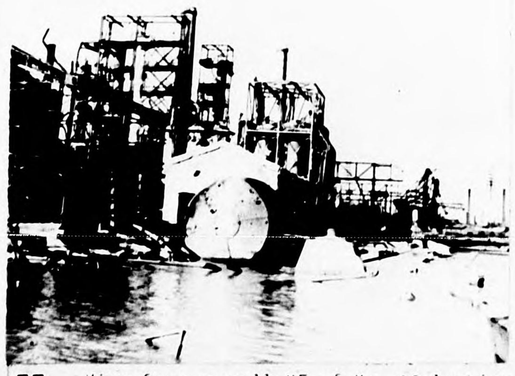
90.25-1203 NIPPON OIL REFINERY



E Damage caused by blast, fire and fragments. View from tank No. 34 looking NE toward units Nos. 21 and 22.

F Notice damage from fragmentation as well as explosions. Photo taken from tank No. 34 looking NW toward unit No. 31.

G Fragmentation damage to pipe lines and tanks are clearly visible from tank No. 34 looking NNE toward Nos. 27 and 28.



H View from seawall NE of No. 38 looking N. toward No. 35.

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NIPPON OIL REFINERY 90.25 - 1203

I Notice stack fallen across building. Photo from position NE of unit No. 38 looking NE toward building No. 36.

J View of tank group taken from road SE of tank No. 50 looking NE toward unit No. 31.

K Photo from position SE of building No. 32 looking N toward tank No. 39.

L White tone to tower on left caused by intense fire. View from between buildings No. 73 and 80 looking NE toward unit No. 83.

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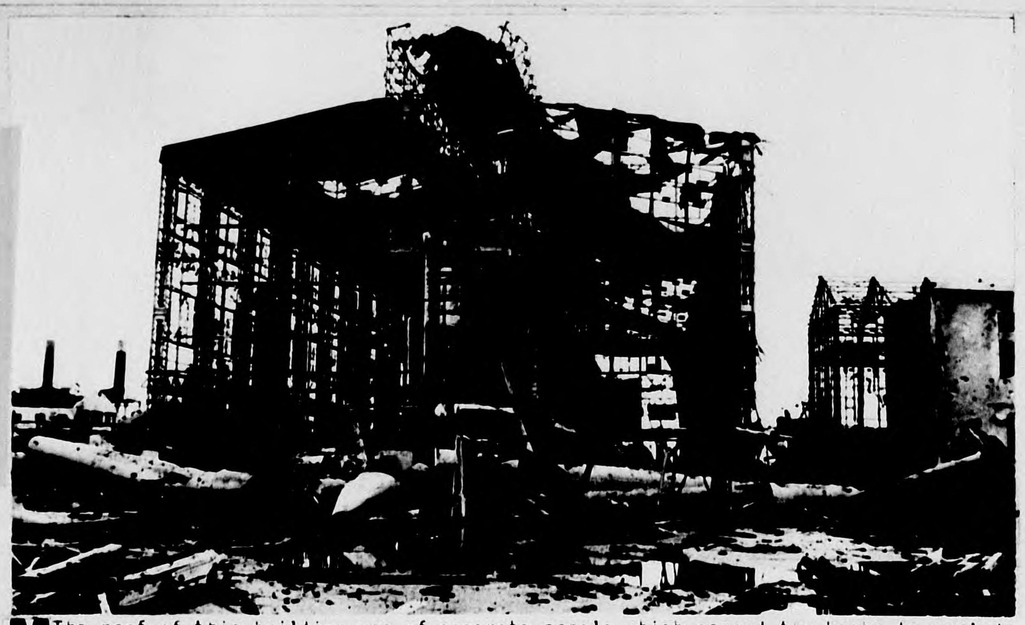
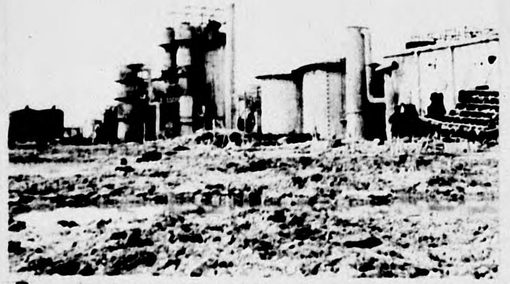
90.25-1203 NIPPON OIL REFINERY



M The roof of this building was of concrete panels which caused the bombs to explode higher than anticipated. Ordinarily this roof would have been of corrugated metal or asbestos. View from between buildings Nos. 54 and 62 looking SE toward building No. 73.

N Notice relatively small damage to equipment due to fact that bombs exploded in roof structure building No. 73.

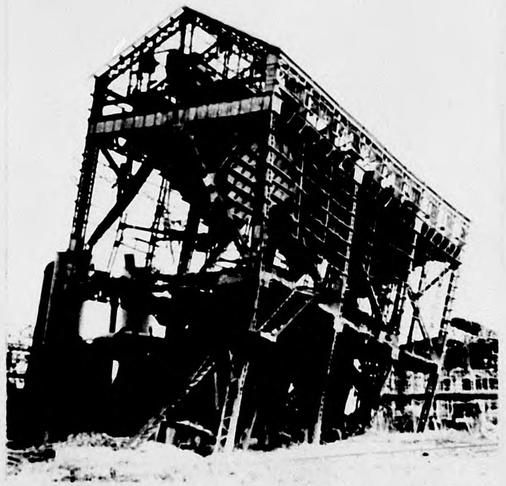
NIPPON OIL REFINERY 90.25 - 1203



O View SW of building No. 68 looking NW toward unit No. 63.

P View SW of building No. 68 looking NE toward unit 68 and overhead crane.

Q View from between buildings No. 60 and 65 looking SE toward unit No. 63.



R View from NW of building No. 60 looking E toward building No. 59, building No. 73 in background.