DECLASSIFIED E.O. 12065 SECTION 3 (b)(1) NND 760

C. Cost Calculation of Soda Ash

a) When production 150 tons per day

Item	When ammonium chloride Fertilizer is not manufactured			When ammonium chloride fertilizer is manufactured		
	Quantity per ton T	@	Amount in yen	Quantity per ton T	@	Amount in yen
Salt	1.65	3,080	5,082	1.27	3,080	3,912
Ammonia	5 kg	56,400	282	5 kg	47,000	235
Limestone	1.50	590	885	0.713	590	421
Coke	0.19	7,050	1,340	0.099	7,050	698
Coal	0.30	5,200	1,560	0.30	5,200	1,560
Steam	2.50	720	1,800	0.553	720	398
Elec. power	200KWH	3.9	780	100KWH	3.9	390
Labor			1,800			1,467
Maintenance			1,624			1,291
Gen. exp.			200			118
Exp. of auxiliary dept.			710			413
Business exp.			700			410
Packing			1,850			1,850
TOTAL			18,613			13,163

b) When production 300 tons per day .

Item	When ammonium chloride fertilizer is not manufactured			When ammonium chloride fertilizer is manufactured		
	Quantity per ton T	@	Amount in yen	Quantity per ton T	@	Amount in yen
Salt	1.65	3,080	5,082	1.27	3,080	3,912
Ammonia	5 kg	56,400	282	5 kg	41,700	209
Limestone	1.50	590	885	0.713	590	421
Coke	0.19	7,050	1,340	0.099	7,050	698
Coal	0.30	5,200	1,560	0.30	5,200	1,560
Steam	2.50	720	1,800	0.553	720	398
Elec. power	200KWH	3.9	780	100KWH	3.9	390
Labor			1,032			815
Maintenance			1,123			814
Gen. exp.			115			70
Exp. of auxiliary dept.			522			321
Business exp.			401			240
Packing			1,850			1,850
TOTAL			16,772			11,698

D. Estimated Profits per Month

a) Estimated Profits per Month (150 T/D)

Ammonium Chloride Fertilizer

4,170 tons	sold @ ¥21,300	¥88,821,000	
" "	Cost " "17,187	"71,670,000	¥17,151,000

Soda Ash

4,170 tons	sold @ ¥18,950	¥79,021,000	
" "	cost @ ¥13,163	"54,890.000	¥24,131,000

Profit subject to taxation ---------- ¥41,282,000

b) Estimated Profit per Month (300 T/D)

Ammonium Chloride Fertilizer

8,340 tons	sold @ ¥21,300	¥177,642,000	
" "	cost " "15,401	"128,444,000	¥49,198,000

Soda Ash

8,340 tons	sold @ ¥18,950	¥158,043,000	
" "	cost " "11,698	" 97,561,000	¥60,482,000

Profit subject to taxation ---------- ¥109,680,000

DECLASSIFIED E.O. 11652 SECTION 3 (E)(2), MAR 1982

VI. Necessary Funds and Materials for Construction

A) Ammonia synthesis plant

Note : 1st project : 50,000 tons ammonium chloride fertilizer
2nd " : 100,000 " " " "

(1) Land

Item	Material (iron & steel) in ton			Required expense in 1,000 yen		
	1st	2nd	Total	1st	2nd	Total
Leveling	10	0	10	1,500	0	1,500

(2) Buildings and other structures

Item	Material (iron & steel) in ton			Required expense in 1,000 yen		
	1st	2nd	Total	1st	2nd	Total
Water gas plant	15	540	555	3,750	21,400	25,150
Producer gas plant	10	0	10	3,440	0	3,440
CO conversion plant	18	98	116	2,780	6,120	8,900
Synthesis plant	60	50	110	31,960	2,500	34,460
Cu-lye regeneration plant	5	55	60	440	3,250	3,690
Substation	3	0	3	2,150	0	2,150
Water station	5	0	5	270	0	270
Boiler room	80	1	80	2,400	0	2,400
Power generating plant	25	0	25	12,600	0	12,600
Machine shop	50	0	50	3,050	0	3,050
Storehouse	50	0	50	3,050	0	3,050
Miscellaneous	29	57	86	4,110	730	4,840
TOTAL	350	800	1,150	70,000	34,000	104,000

DECLASSIFIED E.O. 11652 SECTION 3 (E)(1)(2) NND 760

(3) Machines & equipment

Item	Material (iron & steel) in ton			Required expense in 1,000 yen		
	1st	2nd	Total	1st	2nd	Total
Water gas producer	100	903	1,003	8,000	71,000	79,000
Gas producer	80	0	80	9,600	0	9,600
CO converter	74	376	450	16,000	44,000	60,000
CO_2 removal	15	25	40	4,200	1,500	5,700
CO "	10	215	225	6,500	53,500	60,000
Ammonia synthesis	155	145	300	41,000	35,000	76,000
Electric facilities	75	52	125	20,000	8,000	28,000
Water facilities	20	0	20	2,800	0	2,800
Boiler facilities	100	0	100	20,000	0	20,000
Transportation facilities	160	40	200	32,000	12,000	44,000
Power generating plant	100	0	100	10,000	0	10,000
Miscellaneous	23	44	67	1,900	1,000	2,900
Machine shop	40	0	40	15,000	0	15,000
TOTAL	950	1,800	2,750	187,000	226,000	413,000

(4) Summation

Item	Material (iron & steel) in ton			Required expense in 1,000 yen		
	1st	2nd	Total	1st	2nd	Total
Land as in (1)	10	0	10	1,500	0	1,500
Building and other structure as in (2)	350	800	1,150	70,000	34,000	104,000
Machines and equipment as in (3)	950	1,800	2,750	187,000	226,000	413,000
Miscellaneous	90	0	90	31,500	10,000	41,500
TOTAL	1,400	2,600	4,000	290,000	270,000	560,000

B) Ammonium chloride fertilizer plant

(1) Land --- Tokuyama Soda Co., Ltd., 8355 Tokuyama, Tokuyama City.

(2) Buildings and other structures

Item	Material (iron & steel) in ton			Required expense in 1,000 yen		
	1st	2nd	Total	1st	2nd	Total
Distillation waste filtering plant	0	0	0	0	0	0
Evaporation plant	50	0	50	3,000	0	3,000
Reaction, filtering, drystalling plant	50	0	50	2,400	0	2,400
Drying plant	60	60	120	2,200	3,000	5,200
TOTAL	160	60	220	7,600	3,000	10,600

(3) Machines & equipment

Item	Material (iron & steel) in ton			Required expense in 1,000 yen		
	1st	2nd	Total	1st	2nd	Total
Reaction & filtering plant	49.5	32.5	82.0	1,840	1,095	2,933
Calcium carbonate drying plant	47.0	0	47.0	2,260	0	2,260
Evaporation plant	421.6	400.5	886.1	29,150	24,280	53,430
Crystallization & separation plant	28.3	70.4	98.7	1,480	2,310	3,790
Ammonium chloride drying plant	61.6	73.6	135.2	3,300	3,540	6,840
Refrigeration plant	0	1.3	1.3	0	60	60
Electric jobs	9.0	5.0	14.0	2,000	1,000	3,000
Miscellaneous	18.0	0	18.0	7,370	4,715	12,085
TOTAL	695.0	583.5	1,278.5	47,400	37,000	84,400

(4) Summation

Item	Material (iron & steel) in ton			Required expense in 1,000 yen		
	1st	2nd	Total	1st	2nd	Total
Buildings & other structures as in (2)	160	60	220	7,600	3,000	10,600
Machines & equipment as in (3)	695	583.3	1,278.3	47,400	37,000	84,400
Other misc. charge	0	0	0	5,000	0	5,000
TOTAL	855	643.3	1,498.3	60,000	40,000	100,000

IX. Funds

Funds required ;- (unit in 1,000 yen)

	1st project	2nd project	Total
For construction of ammonia synthesis plant	290,000	270,000	560,000
For construction of ammonium fertilizer plant	60,000	40,000	100,000
For operation	50,000	30,000	80,000
TOTAL	400,000	540,000	740,000

Method to raise the funds ;-

Construction to be financed by the counter part funds and operation by loar.

X. Time to start and finish the project

	1st project	2nd project
Time to start	as soon as permission granted	As soon as permission granted
Time to finish	In 10 months after start	In 18 months after start

山口縣德山市大字德山八三五五番地
德山郵便局私書函第八號
德山曹達株式會社
電話長三七番
發信略語（ソ）
又八（ソ）
振替口座廣島二六二一八番

TOKUYAMA SODA CO., LTD.,

8355 Tokuyama. City,
Yamaguchi Prefecture

Feb. 28, 1950

To : The Commander,
Chugoku Civil Affairs Region, Kure City

Sir,

Enclosed please find herewith a copy of the application in conformity with the new form which we have sent in to the Japanese Government for their permission to grant us the temporary use of a part of the Ex-Iwakuni Army Fuel Depot located in Iwakuni City and Waki Village, Kuga-gun, Yamaguchi-ken, for the manufacture of Ammonia in order to meet national aim of increasing the production of nitrogenous fertilizer as well as establishing Soda industry by Solvay process.

We should be very kind enough to extend to us all possible assistanses for the realization of our wishes.

Yours faithfully,

Tokuyama Soda Co., Ltd.

K. Nagaya

KAZUO NAGAYA
Managing Director
for YUKINOBU KAGEYAMA,
President

TOKUYAMA SODA CO., LTD.,

8355 Tokuyama.

COPY

APPLICATION FOR CONVERSION OF

DESIGNATED REPARATION PLANT

September 15, 1949

To : Mr. Hayato Ikeda, Minister of Finance

From : Yukinobu Kageyama, President of Tokuyama Soda Co., Ltd.

Address : 8355 Tokuyama-shi, Yamaguchi-ken

1) Name of Plant & Code No. : Iwakuni Ex-Army Fuel Depot, 45-5

2) Location of Plant : Shozoku, Iwakuni-shi, Yamaguchi-ken

3) Category : Chemical Industry

4) Production :

Present : None

Planned : Ammonia (Ammonium Chloride Fertilizer)

	Production of Ammonia	Production of Ammonium chloride Fertilizer
1st project :	14,000 tons per year	50,000 tons per year
2nd project :	25,000 tons "	100,000 tons "

5) Necessity for Conversion :

This company is engaged in the manufacture of soda by the Solvay process for thirty years. As a means for rationalization, research on ammonium chloride fertilizer has been carried out continuously for ten years. Resulting in the conformation that, as a fertilizer, ammonium chloride is not in any way inferior to ammonium sulphate, but on the contrary it works more effectively.

Conditions are grave, under the prevailing situation for industries using the Solvay process at present. The complete

cut in subsidy, also the leap in the production costs are extremely vital problems, and the only rational counter-measure is the manufacture of a by-product, ammonium chloride fertilizer.

In this process of soda manufacturing, filtrate of sodium bicarbonate (mother liquor) which contains 19% ammonium chloride and 7% (table) salt. This is evaporated and concentrated to produce the by-product, ammonium chloride, furthermore, in this process, salt content will be recovered. As in the past, ammonia is recovered by distilling the mother liquor but this process necessitates a stupendous amount of lime, coke (or anthracite coal) and steam. In addition, the salt content (approximately 30%) is wasted. To be specific, in manufacturing ammonium chloride, not only the natrium contents of the salt but the chlorine can be utilized completely, and it is possible to economize on lime, coke, steam, electricity and also labor etc., rendering a considerable decrease (by about 25% less) in production cost.

For details, it is requested that reference be made to : plan for synthetic ammonium plant and ammonium chloride fertilizer plant, attached herewith.

When ammonium chloride is manufactured, the expensive sulphuric acid can be dispensed with, which will make possible the supply of moderately priced fertilizer, contributing toward increase of food production.

The most important facility in the production of this ammonium chloride is the synthetic ammonium plant. Accordingly, in view of

operations, to insure the source of the ammonia supply is truly a matter of the utmost importance. Fortunately, there is a hydro-cracking equipment at the Iwakuni Ex-Army Fuel Depot and the manufacture of ammonia may be made possible by converting only a part of the interior structure of the hydro-cracking tower, requiring no other alternations.

To newly manufacture these ammonium synthetic facilities in our country is well-nigh impossible. If newly installed, an expenditure of more than 2,000 million yen and an extended period of three to four years will become necessary. Moreover, the manufacture of such high pressure vessels as the synthetic tower is impossible.

As mentioned in the preceding paragraphs, this plan is :

1. through reduction of import of salt,
2. decrease in the cost of soda production, stabilization of the soda industry, the key industry in the chemical industries,
3. contribution toward increasing of food production by the increased production of moderately priced fertilizer,
4. acquisition of foreign capital with fertilizer exports etc.,

firmly believed to be a great factor conducive to the rehabilitation of the industrial economy of our country.

6) Additional items of plant designate for reparation needed for the above production plan :

a) Land : Applied area 56,875 tsubo (46.5 acres)

Released area 34,846 " (28 ")

Tokuyama Soda Co., Ltd.

b) Building : 6,048 tsubo (4.5 acres)

c) Machinery and Equipment : 1,543 items

Attached List :

List of machinery and equipment to be used.

For Tokuyama Soda Co., Ltd.

Yukinobu Kageyama, President

TOKUYAMA SODA CO., LTD.,

8355 Tokuyama.

COPY

ACCOMPANYING LETTER

OF

RECOMMENDATION

December 20, 1949

A plan has been made recently, by this company for installation of a plant, for the manufacture of Ammonia, indispensable as raw material for the manufacture of ammonia chloride fertilizer, at the Ex-Army Fuel Depot, located at Wagi-son, Kuga-gun, Yamaguchi-ken and Shozoku, Iwakuni-shi :

1. To maintain and stabilize the Soda industry.

2. To produce moderately priced nitrogenous fertilizer.

This company desires to promote economic self-sustainance and to contribute to the national policy, we beg the approval and recommendation at your office.

Yukinobu Kageyama

For Tokuyama Soda Co., Ltd.

Tokuyama Soda Co, Ltd.

This is to certify that the application is revealed to be rational and proper.

Yasukane Murakami, Wagi-son Master, Kuga-gun, Yamaguchi-ken

Yakichi Tsuda, Mayor of Iwakuni-shi

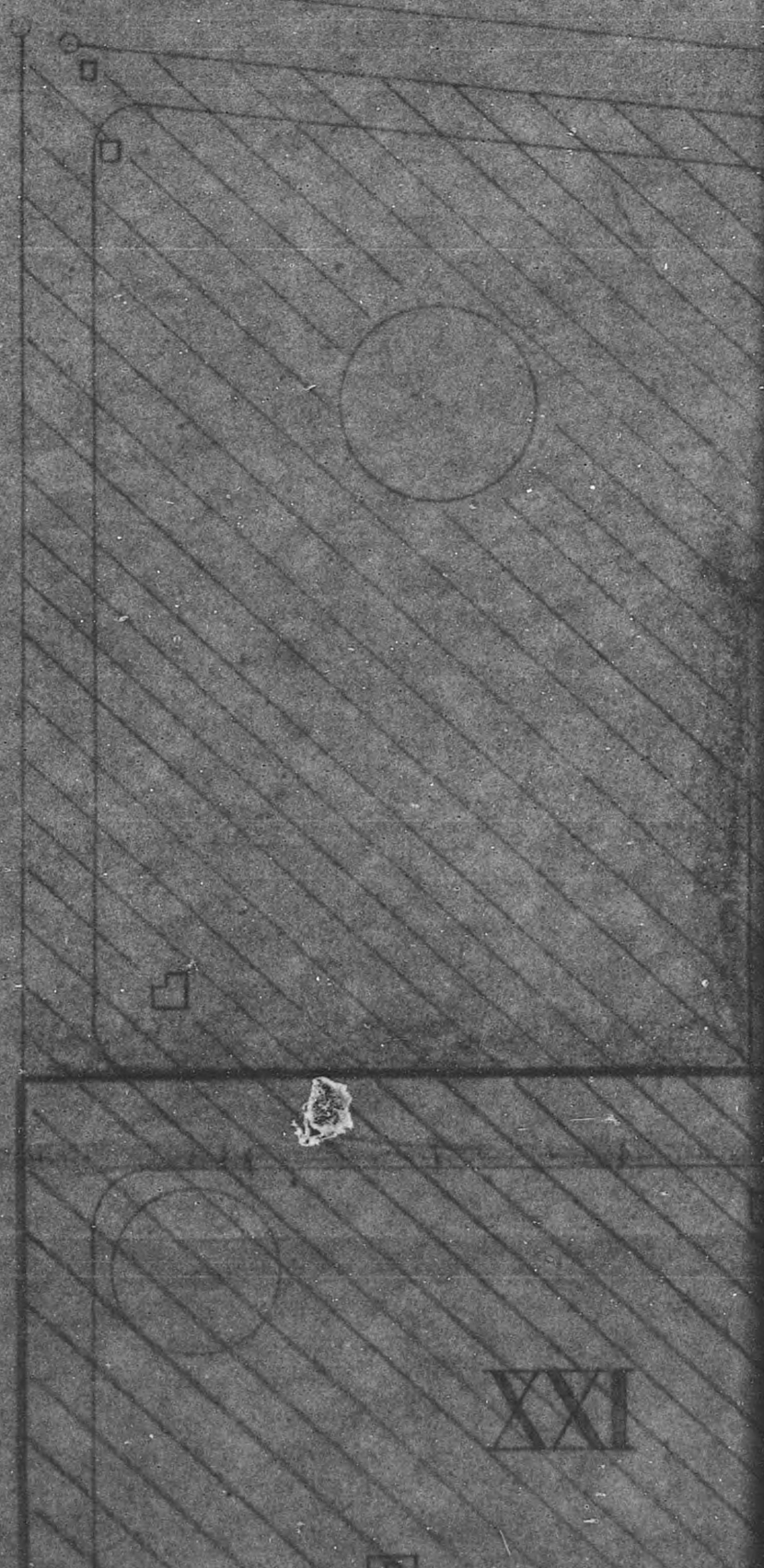
Tatsuo Tanaka, Governor of Yamaguchi-ken

PLAN OF FORMER

INDICATIN

APPLICATION. 56,873 T

INVENTORY NO.	PLANT NO.	NAME OF PLANT
F1	/	LUBURICATING OIL PLANT
F1	5	VACUM DISTILLATION PLANT
F1	10	ACID WASHING PLANT
6	6	SOLVENT EXTRACTION PLANT (DUO-SOL)
7	7	DEWAXING PLANT (BARI-SOL)
F1	8	CONTACT RERUN PLANT
36	36	SOLVENT EXTRACTION PLANT (EDELEANU)
F2	499	DRUM CLEANING PLANT.
F1	148	DRUM FILLING PLANT
F2	/	CRUDE OIL DISTILLATION PLANT
F2	21	NNO TIPE (2 UNITS)
3	3	CONTINUOUS GASOLINE TREATING PLANT
	24	HYDRO CRACKING PLANT
	25	WATER ELECTROLYSIS PLANT
F4	26	OXYGEN FILLING PLANT
F4		HYDROGEN PRODUCTION PLANT
	27	WATER GAS PLANT (P.G.C.)
F5	28	METHANE CRACKING PLANT (KOPPERS)
F5	29	CO CONVERTER



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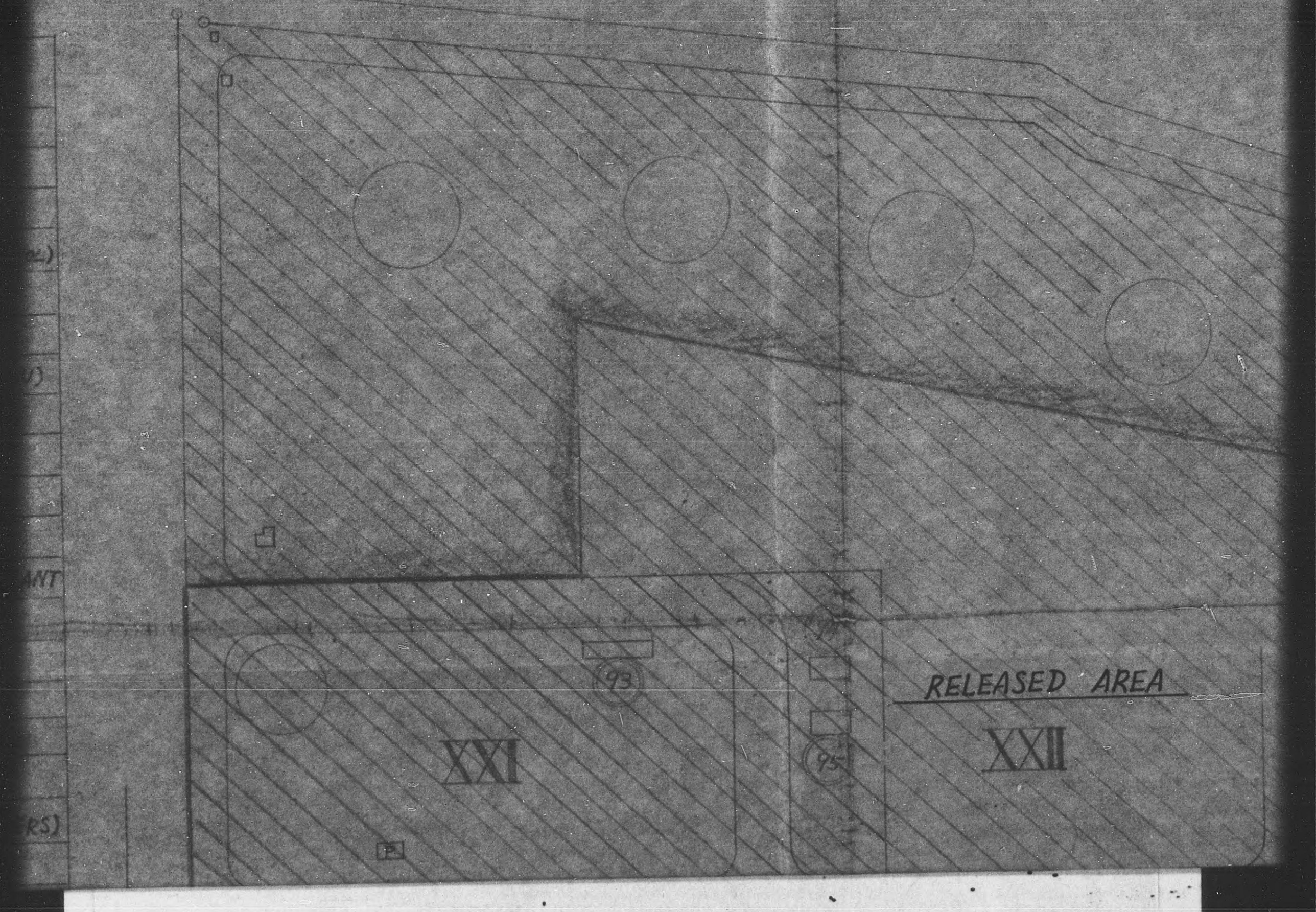
DECLASSIFIED E.O. 12065 SECTION 3 (E)(2) NND 963225

PLAN OF FORMER IWAKUNI ARMY FUEL

INDICATING INVENTRY NO. OF PLANTS

APPLICATION. 56,873 TSUBO (EXCLUDE, RELEASED AREA 34,846



WAKUNI ARMY FUEL DEPOT

INVENTRY NO. OF PLANTS

BO (EXCLUDE, RELEASED AREA 34.846 TSUBO) SCALE 1/2000

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FUEL DEPOT

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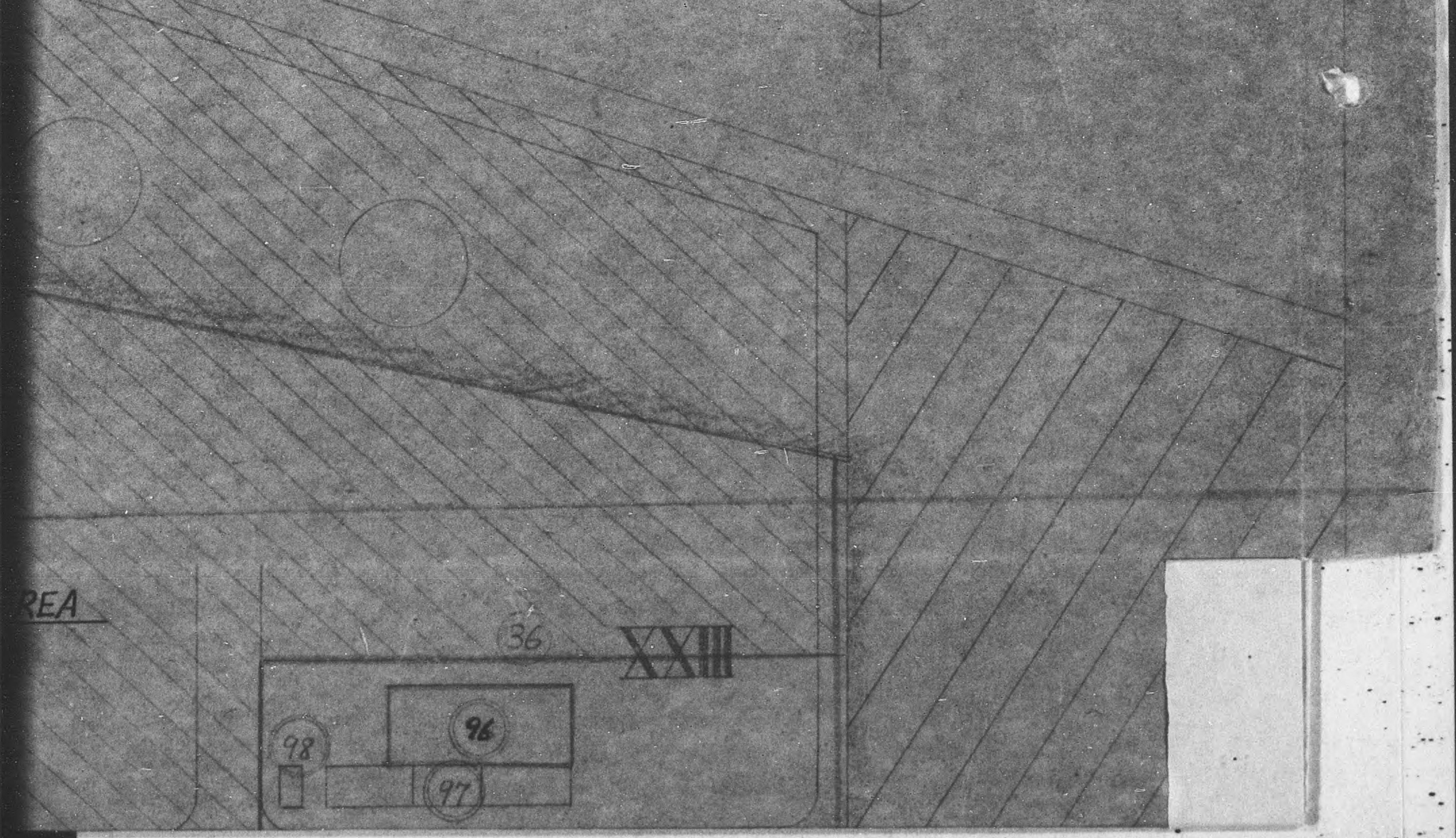
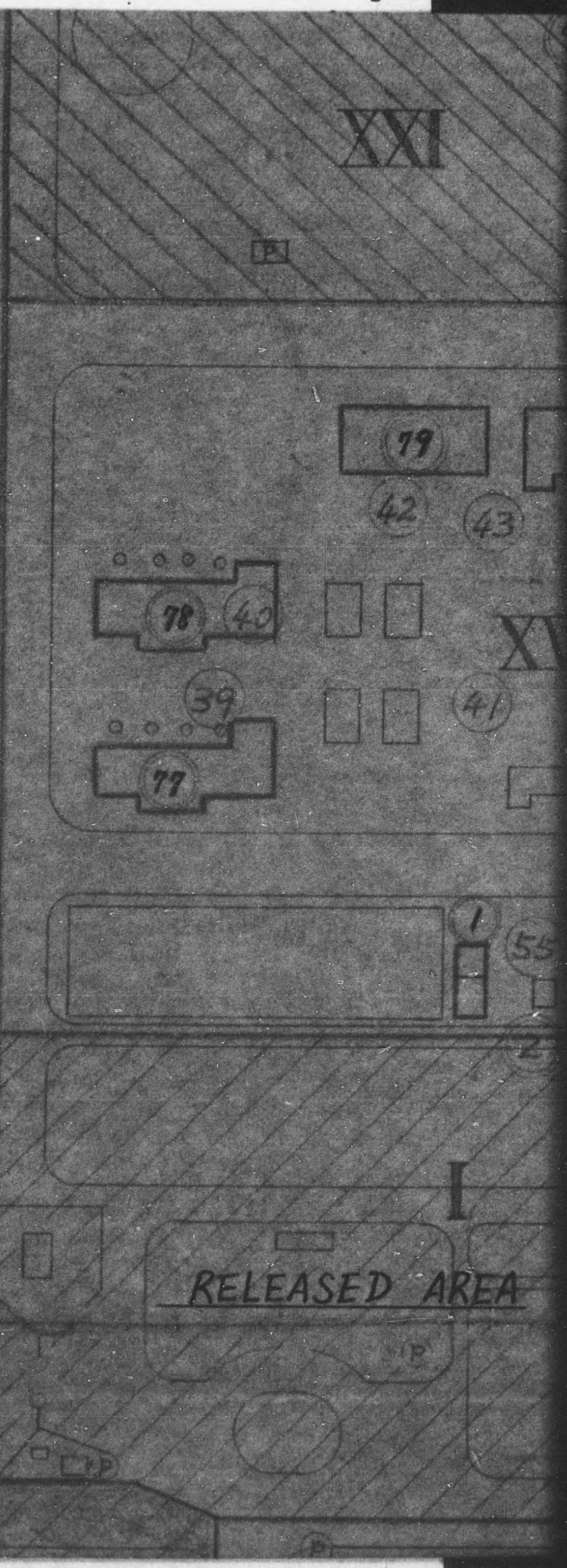
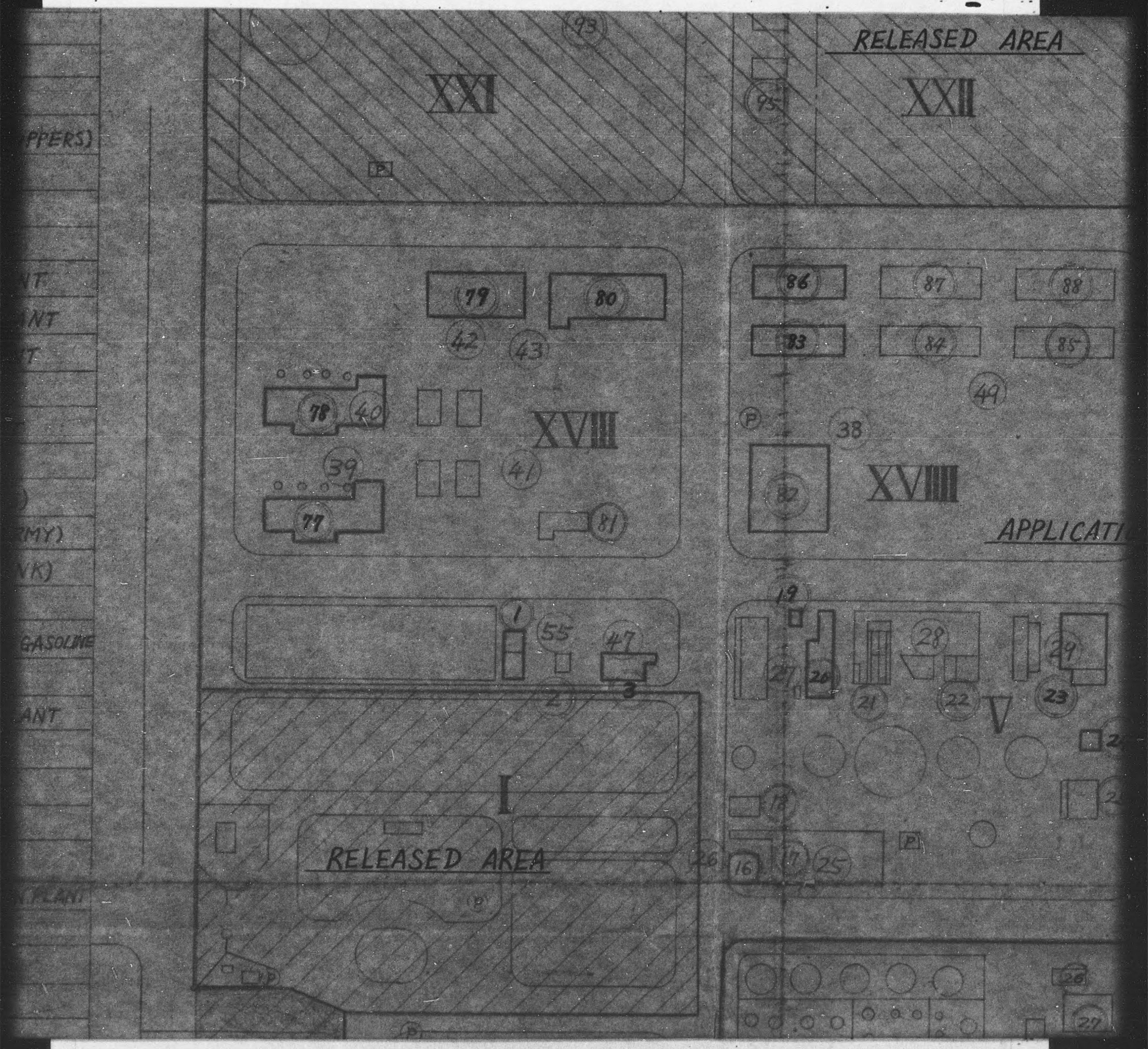


H4	26	OXYGEN FILLING PLANT
F3		HYDROGEN PRODUCTION PLANT
F1	27	WATER GAS PLANT (P.G.C.)
F5	28	METHANE CRACKING PLANT(KOPPERS)
F5	29	CO CONVERTER
F2	31	CO REMOVING PLANT
F2	30	CO_2 REMOVING PLANT
F2	33	HYDROGEN PURIFICATION PLANT
F	32	NITROGEN GAS SEPARATION PLANT
F2	34	LIQUID AIR SEPARATION PLANT
	43	ALCOHOL PLANT
	49	DRUM MANUFACTURING PLANT
		CRACKING PLANT
		NNC THERMAL TYPE (2 UNITS)
		CATALYTIC CRACKING PLANT (ARMY)
		CATALYTIC CRACKING PLANT (NNK)
		RERUN TOPPING PLANT
		CLAYTREATING PLANT FOR CRACKED GASOLINE
		CLAY DRYING FURNACE
		HIGH PRESSURE HYDROGENATION PLANT
		ISO-OCTANE PLANT
		GAS SEPARATION PLANT
		PROPANE REFINING PLANT
		NO.1 ISO-OCTANE PLANT
		BUTANE DEHYDRO POLYMERIZATION PLANT
		SPECIAL EMULSION PLANT
		NO.2 ISO-OCTANE PLANT
		CATALYST PLANT
		VACUUM LUB OIL PLANT

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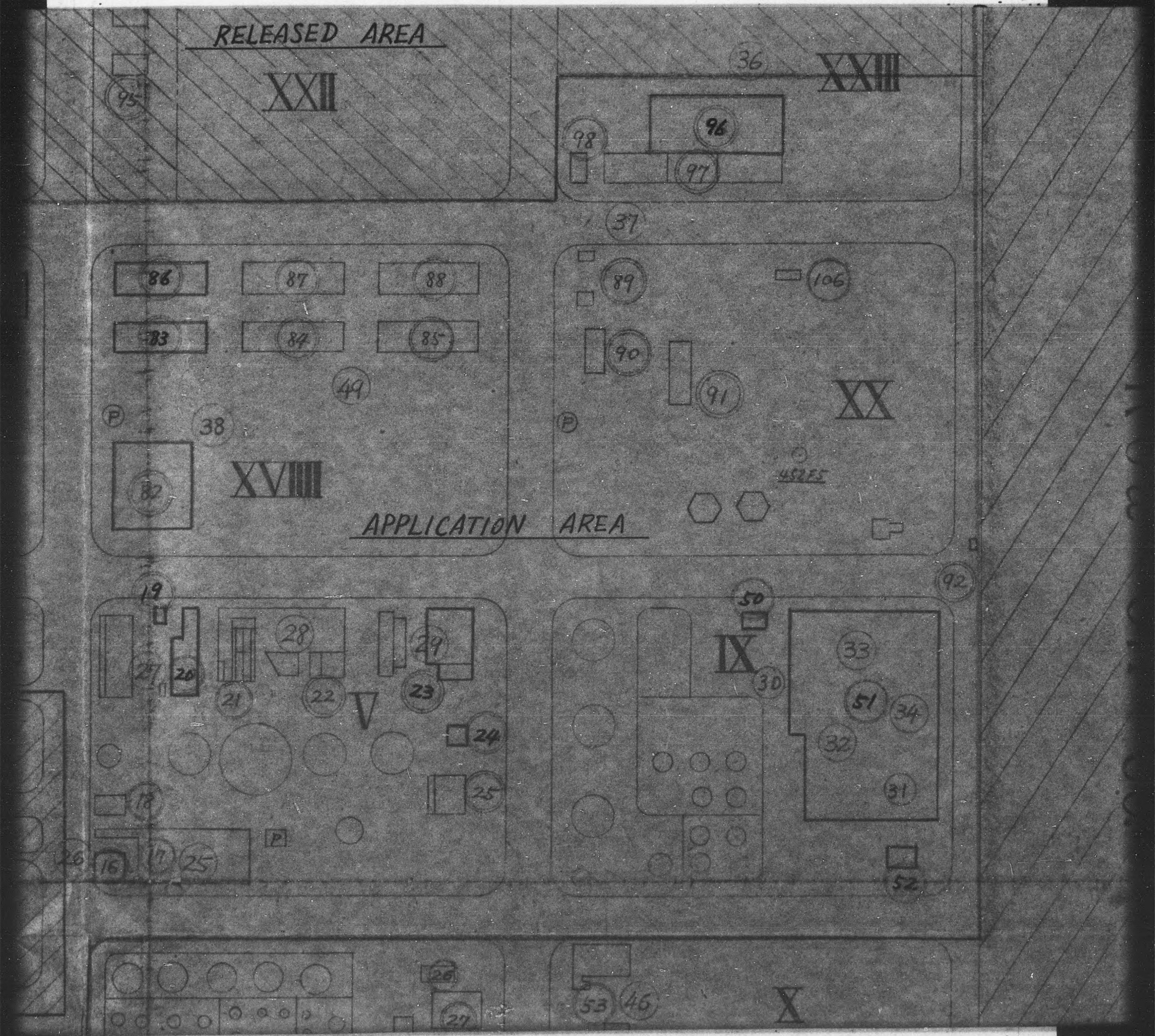
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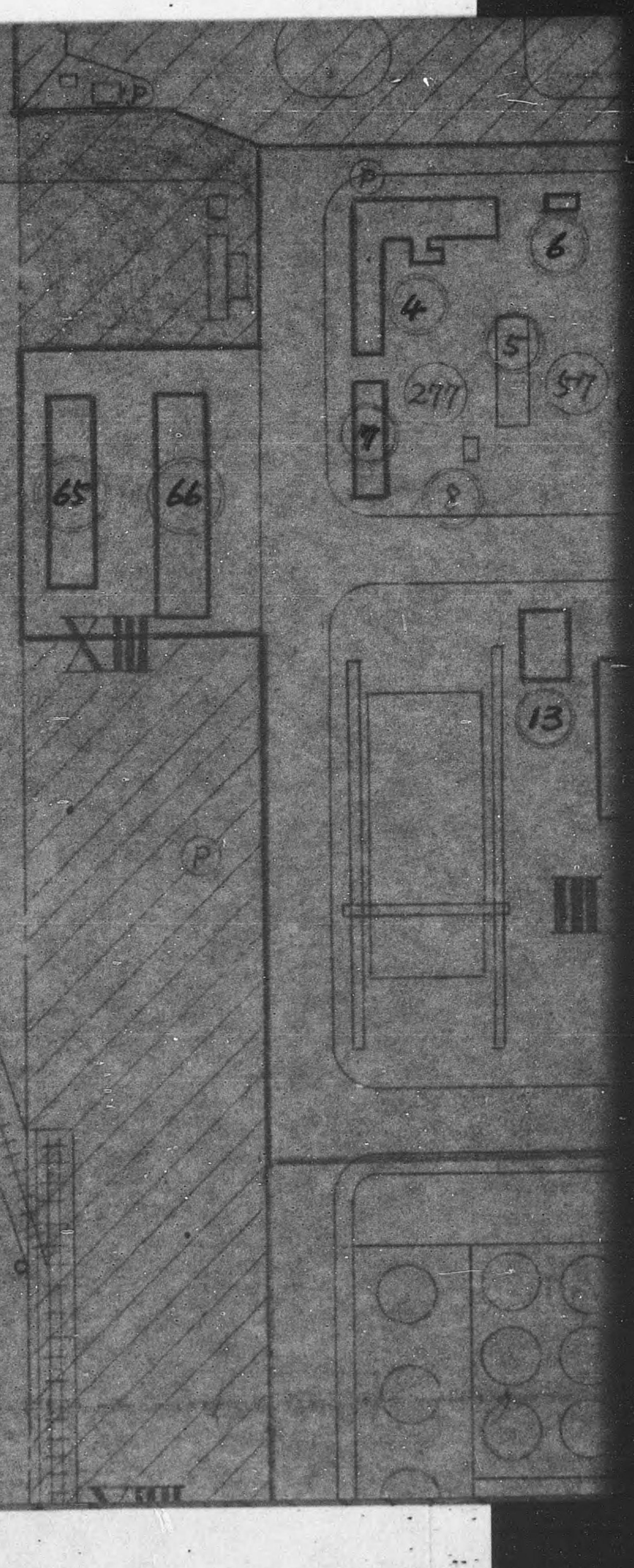
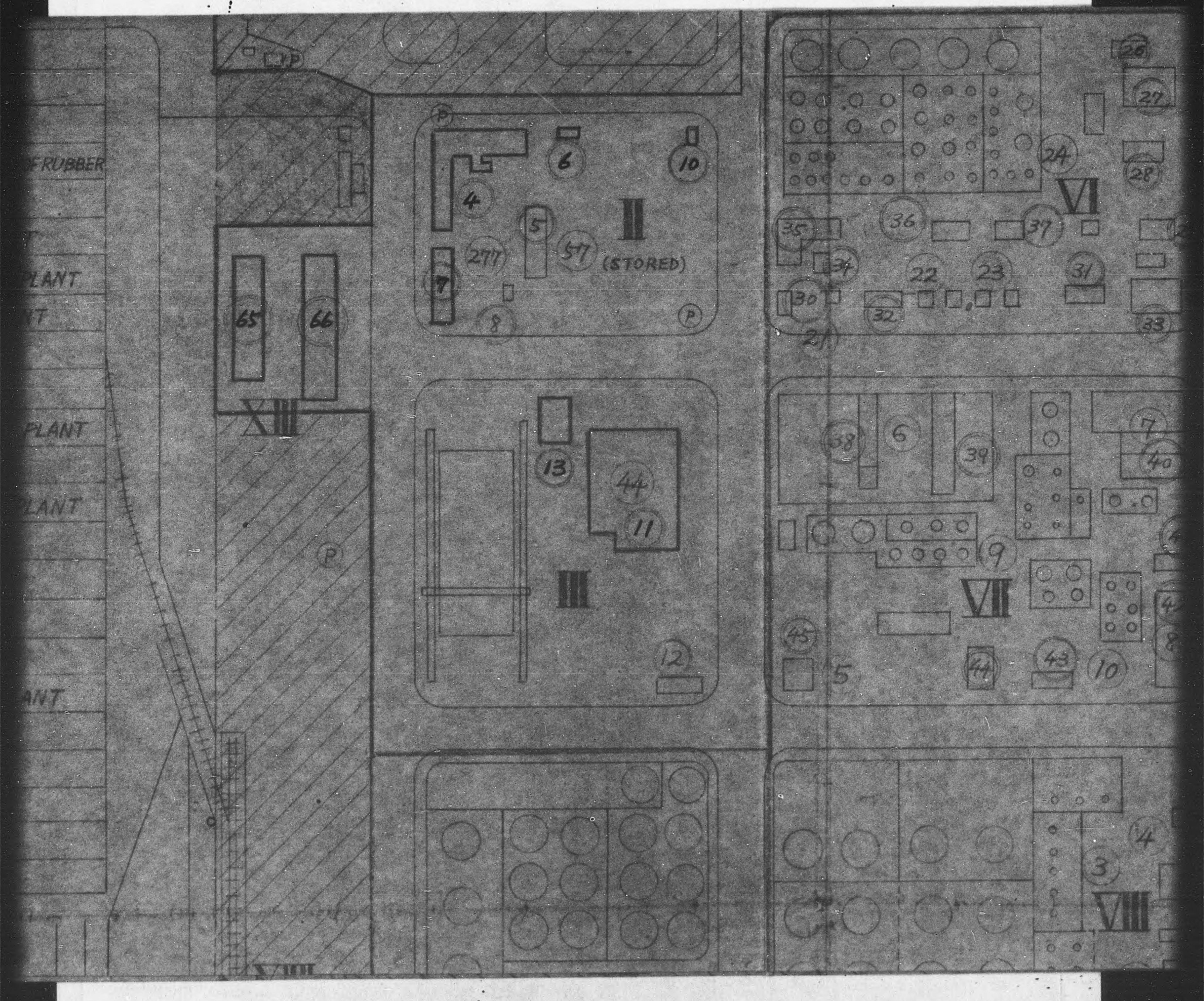
Koa Oil Co.

	NO.2	ISO-OCTANE PLANT
	49	CATALYST PLANT
F10		SYNTHETIC LUB OIL PLANT
F10	42	PLANT FOR DESTRUCTIVE DISTILLATION OF RUBBER
13	13	PARAFFINE CRACKING
	14	OLEFFINE POLYMERIZATION PLANT
15	15	CONTACT RERUN PLANT FOR POLY PLANT
F9	16	TANK AND PUMP FOR ABOVE PLANT
24	24	PITCH COKE PLANT
F11	31	PRODUCER GAS PLANT
F12	32	HIGH PRESSURE EXPERIMENTAL PLANT
	45	STEAM BOILER PLANT
	46	HIGH PRESSURE STEAM BOILER PLANT
F15	55	WATER FEEDING PUMP PLANT
F16	50	SEA WATER PUMPING PLANT
F17	42	CRUDE OIL TREATING PLANT
F18	144	WASTE ACID TREATIG PLANT
F19	57	5GALS. CAN MANUFACTURING PLANT
F20	246	5GALS. CAN FILLING PLANT
F21	44	POWER STATION
	47	SUBSTATION

: Released Area

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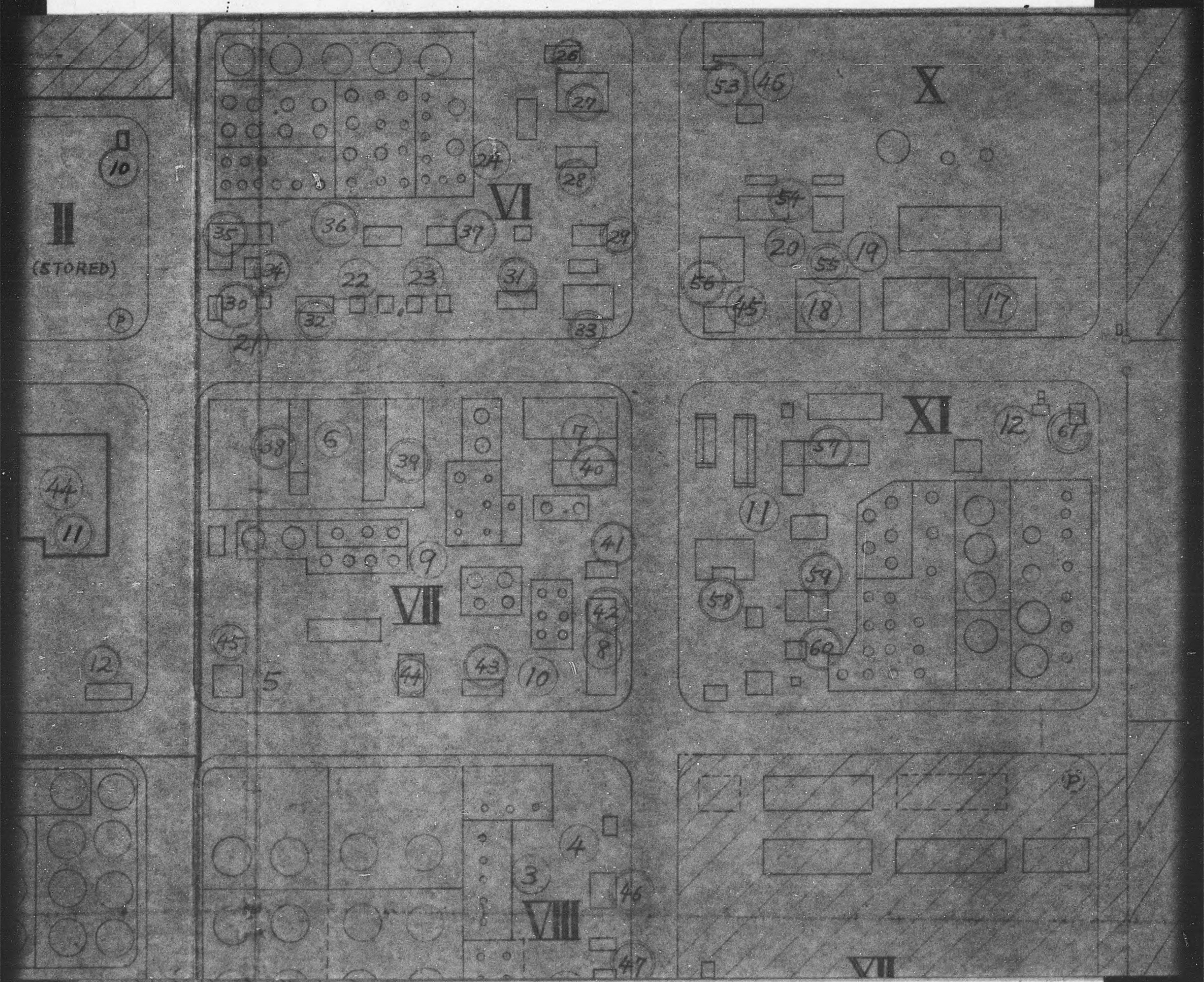

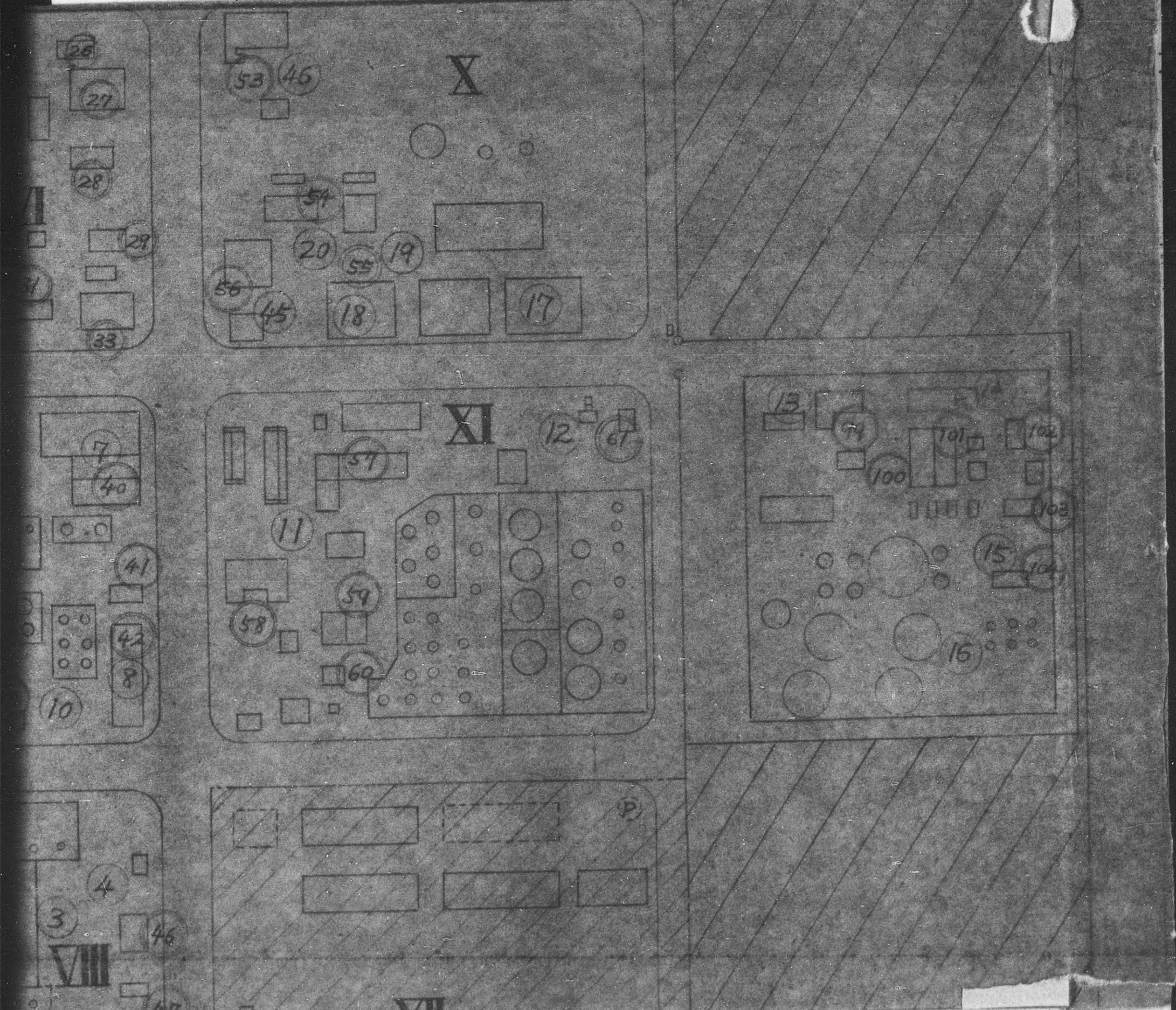
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F4	44	POWER STATION
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: Released Area

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: APPLICATION BLG.

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Quay

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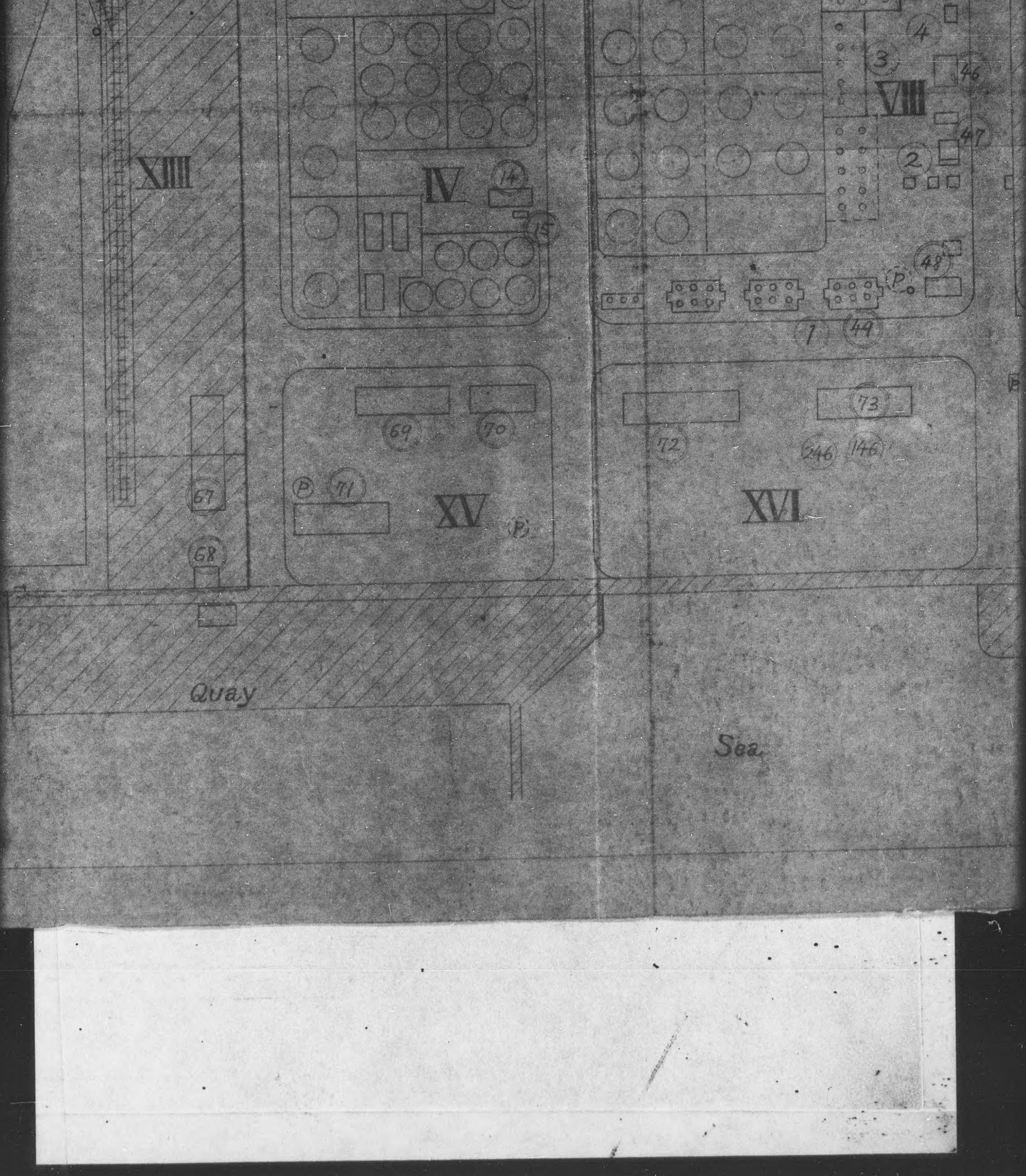

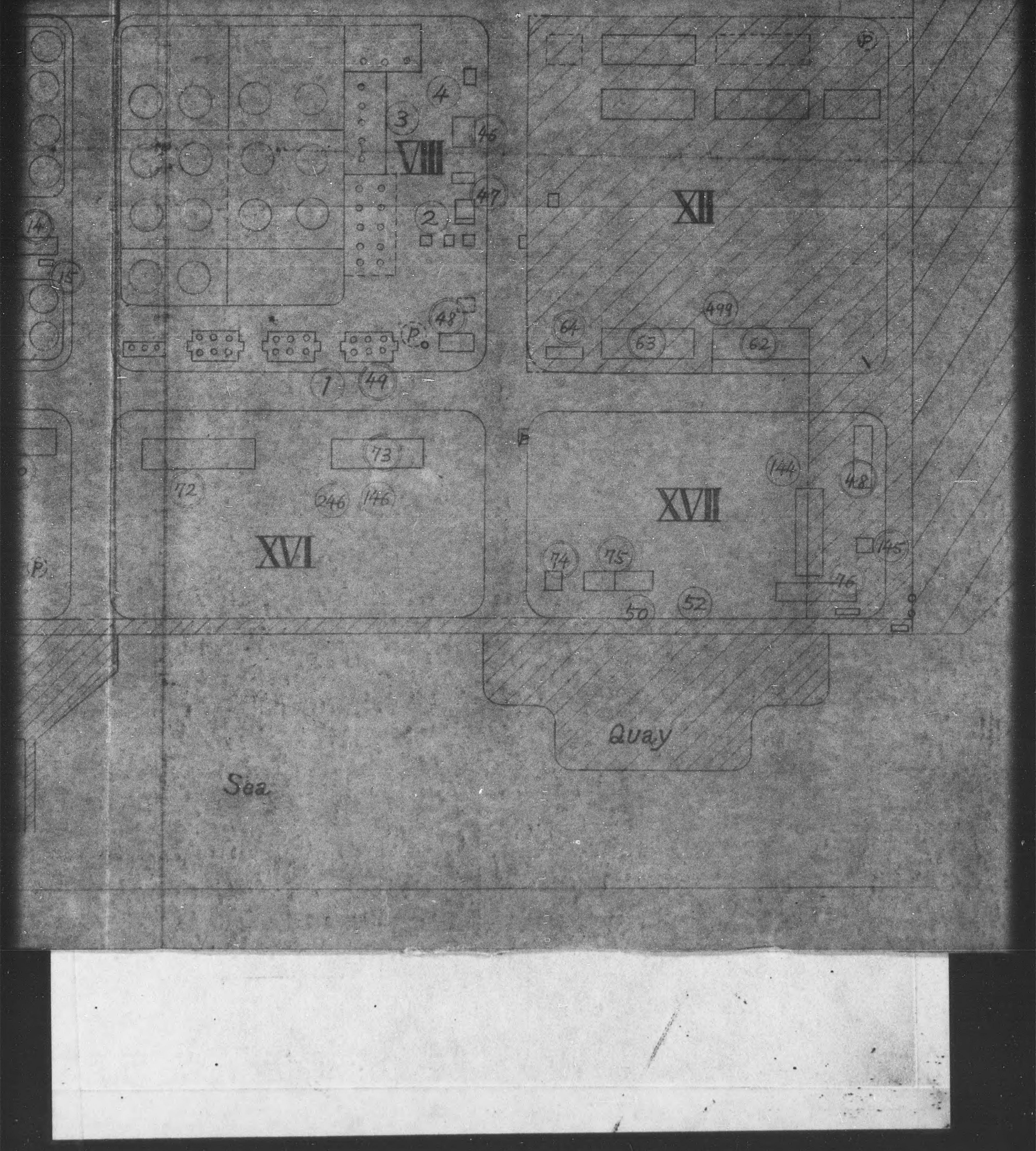
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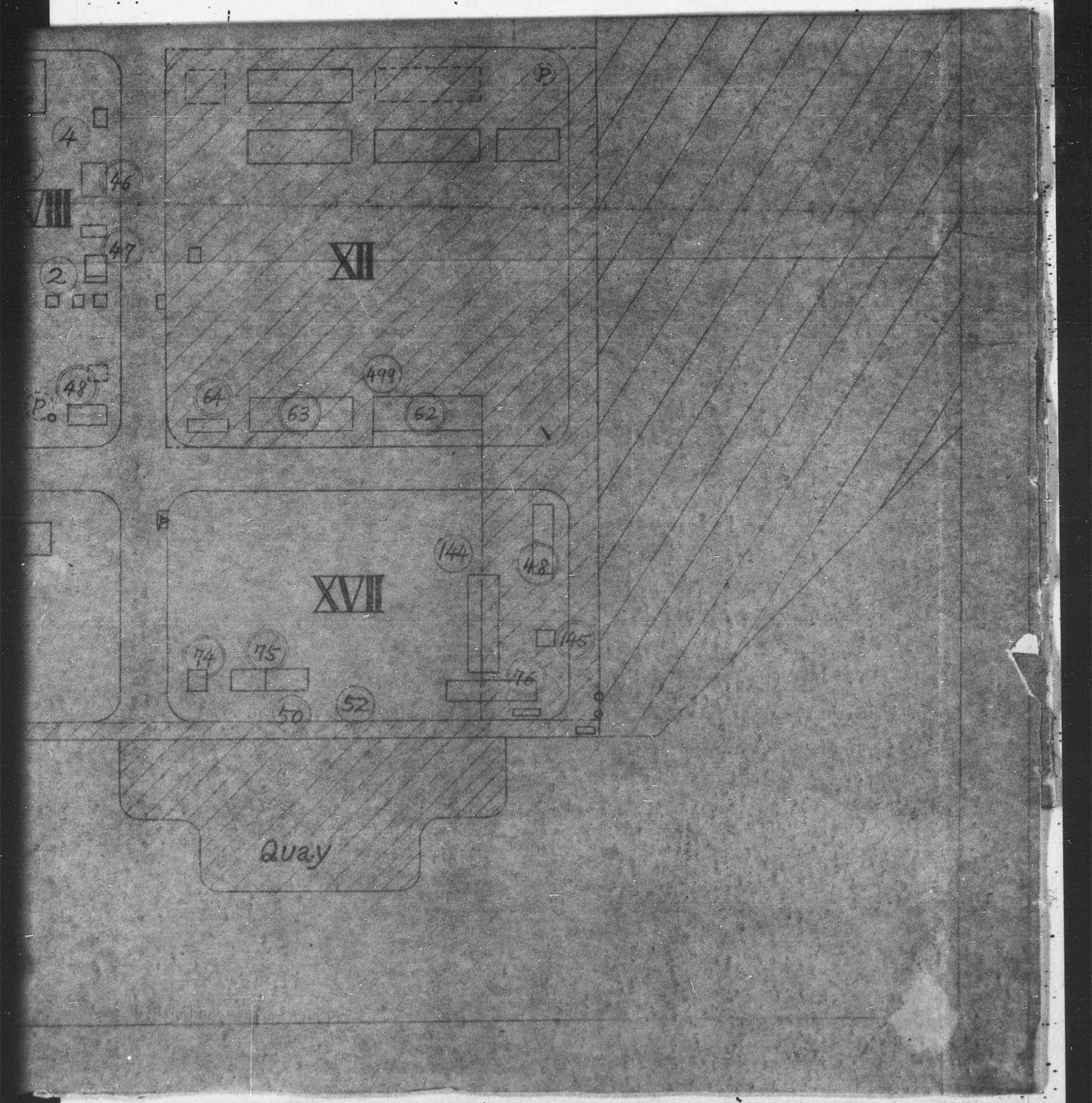
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LIST OF FACILITIES FOR APPLICATION,

CODE NO.: 45 — 5

NAME OF PLANT: IWAKUNI EX_ARMY FUEL DEPOT

ADDRESS OF PLANT: SHOZOKU, IWAKUNI_SHI, YAMAGUCHI_KEN.

I. LAND

AREA NO.	AREA (TSUBO)	REMARKS
I	2,235	SOME PART
II	3,513	
III	5,193	
V	7,028	
IX	6,763	
XIII	1,513	SOME PART
XVII	7,895	
XVIII	7,364	
XX	7,077	
XXII	2,917	SOME PART
ROAD	5,375	
TOTAL	56,873 TSUBO (46.457 ACRES)	

2. BUILDING.

AREA NO.	BUILDING NO.	NAME OF BUILDING	TOTAL AREA (TSUBO)	CONSTRUCTION
1	1	WATER FEEDING PUMP HOUSE	78	WOODEN, ONE STORIED.
〃	3	SUBSTATION	218	REINFOCED CONCRETE, TWO STORIED.
2	4	CENTRAL LABORATORY	472	REINFOCED CONCRETE, TWO STORIED.
〃	6	DRUG STOCK-ROOM	20	REINFOCED CONCRETE, ONE STORIED.
〃	7	C.F.R. ENGINE ROOM	112	〃
〃	10	POWER DISTRIBUTION HOUSE	18	STEEL, ONE STORIED
3	11	POWER STATION	680	STEEL AND REINFOCED CONCRETE, ONE STORIED
〃	13	ASH HANDLING PLANT	9	STEEL ONE STORIED
5	19	POWER DISTRIBUTION HOUSE	20	〃
〃	20	WATER GAS GENERATION PLANT	160	〃
〃	23	CO GAS CONVERSION PLANT	240	〃
〃	24	PUMP HOUSE	25	〃
9	50	〃	43	〃
〃	51	HYDRO CRACKING PLANT	1.142	STEEL TWO STORIED
〃	52	Cu-LYE REGENERATION PLANT	26	REINFOCED CONCRETE ONE STORIED
13	65	CONSUMER'S ASSOCIATION	205	WOODEN ONE STORIED
〃	66	KITCHEN	290	〃
18	77	BUTHANOL DEHYDRO POLYMERIZATION PLANT	417	STEEL ONE STORIED
〃	78	〃	391	〃
〃	79	RUBBER DESTRUCTION DISTILLATION PLANT	218	〃
〃	80	RUBBER STORE-ROOM	308	WOODEN ONE STORIED

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AREA NO.	BUILDING NO.	NAME OF BUILDING	TOTAL AREA (TSUBO)	CONSTRUCTION
18	83	CATALYST FACTORY	234	REINFORCED CONCRETE, ONE STORIED.
〃	86	CATALYST STOCK-ROOM	234	WOODEN, ONE STORIED.
23	96	SOLVENT EXTRACTION WORKSHOP (EDELEANU)	431	STEEL, ONE STORIED
19	82	PRODUCER GAS GENERATION PLANT	57	〃
		TOTAL	6.048 (49 ACRES)	

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3. MACHINERY.

WATER GAS PLANT.

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS.	QUAN-TITY	REMARKS
1F5	OVER. HEAD TRAVELLING CRANE	ELECTRIC. SPAN 12 M CAP. 1.5T. RAIL LENGTH 100M	1	GIRDER BOMB DAMAGED
2F5 ~ 4F5	MOTOR (FOR 1F5)	INDUCTION. 10 HP. 7.5 HP, 5 HP	3	
5F5	SCREEN	ROLLER TYPE. CAP. 17 T/H SEPARATION RANGE 30~50 mm	1	MOTOR MISSING
6F5	SKIP HOIST	ELECTRIC, CAP. 15 T/H 20 HP LIFT 30M, BACKET 5T.	1	
7F5	MOTOR (FOR 6F5)	INDUCTION 20 HP 1,170 R.P.M	1	
8F5	CONVEYER	BELT. CAP. 15 T/H 206 mm x 490 mm W. SPEED 45 M/MIN	1	BELT MISSING
9F5	MOTOR (FOR 8F5)	INDUCTION 5 HP 1,150 R.P.M	1	
10F5	COKE BANKER	HORIZONTAL CAP. 100 M³. LENGTH 18M	1	
11F5. 12F5	HOPPER	VERTICAL. CAP. 28 T/H 3.45 MH x 2.35 M φ	2	
13F5. 15F5	COKE CHARGING PART	AUTOMATIC CAP. 1.3 T/H	2	
17F5. 19F5	GAS GENERATOR	R.G.C. TYPE, CAP. 2.500 M³/H 2.6 M φ x 6.5 MH	2	
18F5. 20F5	MOTOR (FOR 17F5. 19F5)	INDUCTION 5 HP. 1.150 ~ 150 RPM	2	
21F5	COMBUSTION CHAMBER	VERTICAL. BRICK LINING 3.07 M φ x 9.66 MH	1	
22F5	WASTE HEAT BOILER	HORIZONTAL, FIRE TUBE WORKING PRESS. 6.5 Kg/cm²	1	
23F5. 24F5	GAS COOLING AND WASHING TOWER	VERTICAL, RIM TYPE 1.5 M φ x 10 MH	2	
25F5. 27F5	AIR BLOWER	IMPELLER, CAP. 40.000 M³/H PRESS. 1.600 mm/w.G. BORE 530 mm	2	
26F5. 28F5	MOTOR (FOR 25F5. 27F5)	INDUCTION 3.300 V 350 HP. 3.510 RPM.	2	
29F5. 31F5	PUMP (WATER FEED)	TURBINE. CAP. 8 M³/H SUC. PRESS. 0. DEL. PRESS. 100 M	2	
30F5. 32F5	MOTOR (FOR 29F5. 31F5)	INDUCTION 10 HP. 3,490 RPM.	2	
33F5. 34F5	PUMP (FOR JACKET & BOILER)	TURBINE 2 STAGE. CAP. 3 M³/H SUC. PRESS. 0. DEL. PRESS. 25 M	2	MOTOR MISSING
35F5. 36F5	PUMP (PRODUCE OF OIL. PRESS.)	PLANGER. 0.25 M³/MIN 80 RPM SUC. PRESS. 0. DEL. PRESS. 35 Kg/cm²	2	MOTOR MISSING

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INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUANTITY	REMARKS
37F5	OIL TANK	VERTICAL 1.7 Mϕ × 2 MH	1	
38F5	OIL PRESSURE ACCUMULATER	VERTICAL 35 kg/cm^2 2 Mϕ × 7.45 MH	1	
39F5. 40F5	STEAM DRUM (FOR JACKET, FOR BOILER)	HORIZONTAL, PRESS. 1~2 kg/cm^2 1.15 Mϕ × 2.5 ML	2	
41F5. 42F5	AUTOMATIC CONTROLLER	ELECTRIC, OIL PRESS. 35 kg/cm^2	2	ELECTRIC WIRE MISSING
43F5. 44F5	CONTROLLER BOX	HAND CONTROL OIL PRESS. 35 kg/cm^2	2	
45F5, 46F5	PRIMARY AIR VALVE	AUTOMATIC OPERATE SIZE 600 mm, FACE TO FACE 550 mm	2	
47F5. 48F5	SECONDARY AIR VALVE	〃 〃 〃 350 mm 〃 400 mm	2	
49F5. 50F5	BLOW GAS VALVE	〃 〃 〃 900 mm 〃 650 mm	2	
51F5. 52F5	TOP GAS VALVE	〃 〃 〃 500 mm 〃 550 mm	2	
53F5. 54F5	BOTTOM GAS VALVE	〃 〃 〃 500 mm 〃 550 mm	2	
55F5. 56F5	MAIN STEAM VALVE	〃 〃 〃 200 mm 〃 360 mm	2	
57F5. 58F5	TOP STEAM VALVE	〃 〃 〃 200 mm 〃 360 mm	2	
59F5. 60F5	BOTTOM STEAM VALVE	〃 〃 〃 200 mm 〃 360 mm	2	
61F5. 620F5	STACK VALVE	〃 〃 〃 600 mm	2	
63F5. 64F5	DISK VALVE	〃 〃 〃 500 mm	2	
65F5. 66F5	SLIDE VALVE	〃 〃 〃 600 mm 〃 320 mm	2	
67F5. 68F5	PLATE VALVE	〃 〃 〃 600 mm 〃 360 mm	2	
69F5. 70F5	INSTRUMENT BOARD	1.25 ML × 1 MW	2	WITH 12 METERS
71T5	PRESSURE GAUGE	RANGE 0~1500 mm/W.G	1	U TUBE MISSING
72F5	ASH CARRYING EQUIPMENT	STEEL HAND CAR Wt. of RAIL 8 kg L = 50 M	1	
73F5	OVER HEAD TRAVELLING CRAIN	ELECTRIC, CAP. 3 T 5 HP. SPAN 7 M, RAIL LENGTH 18 M	1	
74F5. 75F5	MOTOR (FOR 73F5)	3 HP. 5 HP 1.140 RPM	2	
76F5	GAS HOLDER	VERTICAL, RIVETED CAP. 5.000 M^3. DIA. 20.1 M	1	BOMB DAMAGE

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
77F5	VOLUME INDICATING ALARM EQUIPMENT	CAP. 0~10.000 M^3	1	BOMB DAMAGE
78F5 79F5	CHIMNEY	0.8 $M\phi$ × 13 MH	2	
80F5	〃	0.8 $M\phi$ × 28 MH	1	
81T5	SWITCH BOARD	3.300V ~ 110V 200A	1	
82F5, 83F5	ELECTRIC TRANSFORMER	PRIMARY 3.300V 3 PHASE SECONDARY 105/210V	2	METER MISSING
84F5, 85F5	OIL SWITCH	TO TYPE. 250V 3 PHASE 60 CYCLE. 60A	2	OIL TANK MISSING
86F5, 87F5	MAGNETIC ATTACHMENT	FL 75A TYPE	2	METER COVER MISSING
88F5 89F5	STARTER AND RESISTANCE	C2 TYPE. BB 200 TYPE 350 HP	2	
90F5, 91F5	SWITCH BOX	LM 102 TYPE 3.000~3.300V 50~60 CYCLE 350 HP	2	METER BOMB DAMAGE
92F5, 93F5	〃	LM 12X TYPE 220V 200A 60 CYCLE	2	
94F5~96F5	OIL SWITCH	TO TYPE 250V 3 PHASE 60 CYCLE 200A	3	
97F5~103F5	〃	〃 〃 〃 〃 30A	7	
104F5, 105F5	〃	IC TYPE 200~220V 15A	2	
106F5~108F5	VALVE	PLATE SIZE 680 mm FACE TO FACE 240 mm	3	
109F5, 110F5	〃	SLUICE 〃 600 mm 〃 450 mm	2	
111F5~114F5	〃	〃 〃 350 mm 〃 350 mm	4	
115F5	〃	〃 〃 450 mm 〃 420 mm	1	HANDLE MISSING
116F5	〃	STOP 〃 150 mm 〃 400 mm	1	
117F5	〃	SLUICE 〃 250 mm 〃 400 mm	1	
118F5 119F5	〃	〃 〃 150 mm 〃 270 mm	2	
120F5	〃	CHECK 〃 150 mm 〃 540 mm	1	
121F5~123F5	〃	SLUICE 〃 200 mm 〃 300 mm	3	
124F5	〃	〃 〃 300 mm 〃 300 mm	1	

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INV. NO..	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
125F5	VALVE	SLUICE SIZE 200mm FACE TO FACE 300mm	1	
126F5	〃	〃 〃 200mm 〃 500mm	1	
127F5	〃	〃 〃 150mm 〃 350mm	1	
NONE NUMBER	1 Pc.s VALVE	SLUICE SIZE 125mm	1	
〃	2 〃 〃	CHECK 〃 125mm	1	
〃	14 〃 〃	SLUICE 〃 100mm	1	
〃	15 〃 〃	STOP 〃 100mm	1	
〃	4 〃 〃	〃 〃 100mm	1	
〃	2 〃 〃	SLUICE 〃 100mm	1	
〃	2 〃 〃	CHECK 〃 65mm	1	
〃	2 〃 〃	SLUICE 〃 65mm	1	
〃	2 〃 〃	STOP 〃 50mm	1	
〃	19 〃 〃	〃 〃 50mm	1	
〃	19 〃 〃	〃 〃 40mm	1	
〃	25 〃 〃	〃 〃 25mm	1	
〃	15 〃 〃	〃 〃 16mm	1	
〃	10 〃 〃	〃 〃 12mm	1	
〃	PIPE	WELDING PIPE 690mmφ × 67ML	1	
〃	〃	〃 610mmφ × 40ML	1	
〃	〃	〃 560mmφ × 10ML	1	
〃	〃	〃 460mmφ × 71ML	1	
〃	〃	〃 360mmφ × 46ML	1	
〃	〃	〃 310mmφ × 20ML	1	

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INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUANTITY	REMARKS
NONE NUMBER	PIPE	GAS PIPE 250 mm φ x 63 ML	1	
〃	〃	DRAWN PIPE 270 mm φ x 42 ML	1	
〃	〃	〃 216 mm φ x 46 ML	1	
〃	〃	〃 165 mm φ x 104 ML	1	
〃	〃	GAS PIPE 150 mm φ x 46 ML	1	
〃	〃	DRAWN PIPE 150 mm φ x 24 ML	1	
〃	〃	GAS PIPE 100 mm φ x 121 ML	1	
〃	〃	〃 75 mm φ x 38 ML	1	
〃	〃	DRAWN PIPE 900 mm φ x 78 ML	1	
〃	〃	GAS PIPE 65 mm φ x 60 ML	1	
〃	〃	〃 50 mm φ x 108 ML	1	
〃	〃	DRAWN PIPE 64 mm φ x 197 ML	1	
〃	〃	〃 51 mm φ x 62 ML	1	
〃	〃	GAS PIPE 40 mm φ x 171 ML	1	
〃	〃	DRAWN PIPE 38 mm φ x 305 ML	1	
〃	〃	GAS PIPE 25 mm φ x 41 ML	1	
〃	〃	DRAWN PIPE 26 mm φ x 56 ML	1	
〃	〃	GAS PIPE 20 mm φ x 90 ML	1	
〃	〃	〃 12 mm φ x 160 ML	1	
TOTAL			164	

PRODUCER GAS PLANT.

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN. TITY	REMARKS
1F11	SKIP HOIST	ELECTRIC DRIVEN, CAP. 15T/H 10 HP, LIFT 30M, BACKET 1T	1	WIRE AND WHEEL MISSING
2F11	MOTOR (FOR 1F11)	INDUCTION, 10 HP, R.P.M UNKNOWN	1	
3F11	SPEED REDUCING GEAR (FOR 1F11)	STAGE 4, RATIO 1/60 DRUM DIA. 800mm, WIDTH 550mm	1	
4F11	CONVEYER	BELT, CAP. 15T/H WIDTH 400mm, LENGTH 26M	1	BELT MISSING ROLLER AND FRAME DAMAGE
5F11	MOTOR (FOR 4F11)	INDUCTION 7.5 HP R.P.M UNKNOWN	1	
6F11, 7F11	HOPPER	VERTICAL, CAP. 3T WITH COAL ADJUSTER	2	
8F11~10F11	GAS GENERATOR	P.G.C TYPE, CAP. 4,000 M3/H 3.2MID x 5MH	3	WITH COAL DISCHARGE EQUIPMENT
11F11 13F11	BLOWER	IMPELLER, CAP. 260 M3/MIN PRESS. 400mm/mG 1750 R.P.M	2	CASING BOMB DAMAGE
12F11, 14F11	MOTOR (FOR 11F11, 13F11)	INDUCTION 40 HP 1730 RPM	2	FRAME, STATER AND COIL BOMB DAMAGE
15F11~17F11	GAS COOLING AND WASHING TOWER	RIM TYPE 1.6MID x 8MH	3	BOMB DAMAGE
18F11~20F11	COAL TAR SEPARATOR	VERTICAL 0.85MID x 1.25MH	3	BOMB DAMAGE
21F11~23F11	WATER SEAL TANK	VERTICAL 0.61MID x 1.7MH	3	23F11 BOMB DAMAGE
24F11, 26F11	MOTOR (25F11, 27F11)	INDUCTION 40 HP, 1740 RPM	2	BOMB DAMAGE
25F11, 27F11	ROTARY WASHER	IMPELLER, CAP. 150 M3/MIN, 40 HP PRESS. 200mm/WG. BORE 300mm	2	
28F11, 29F11	PRESSURE CONTROLLER	BOX TYPE, AUTOMATIC WITH PRESSURE GAUGE 0~5 kg/cm2	2	BOMB DAMAGE
30F11	METER BOARD	STEEL PLATE, VERTICAL WITH 2 PCS PRESSURE GAUGE	1	
31F11	THERMOMETER	INDICATING, RANGE 20~600°C WITH 6 PCS THERMO-COUPLE	1	
32F11	〃	〃 〃 0~100°C 〃	1	
33F11	ASH CARRING EQUIPMENT	RAIL LENGTH 40M, Wt. OF RAIL 8 KG. GAUGE OF TRUCK 0.61M	1	
34F11~36F11	MOTOR (FOR 8F11, 9F11, 10F11)	REDUCING SYSTEM 5 HP, 1150~50 RPM	3	
37F11~39F11	SWITCH	MAGNET 15A, 220V, 3 POLE	3	POLE BROKEN
40F11~43F11	TAR SEPARATOR	VERTICAL, CYLINDER 1MΦ x 1.15MH	4	

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INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
44F11	VALVE	SLUICE SIZE 610mm FACE TO FACE 420mm	1	
45F11	〃	〃 〃 560mm 〃 〃 420mm	1	
46F11~50F11	〃	〃 〃 400mm 〃 〃 340mm	5	BODY DAMAGE AND HANDLE MISSING
51F11~53F11	〃	〃 〃 250mm 〃 〃 340mm	3	
54F11~56F11	〃	〃 〃 150mm 〃 〃 285mm	3	56F11 BODY DAMAGE
57F11	〃	〃 〃 150mm 〃 〃 310mm	1	HANDLE MISSING
58F11.59F11	〃	〃 〃 500mm 〃 〃 550mm	2	59F11 HANDLE MISSING
60F11~63F11	〃	〃 〃 150mm 〃 〃 285mm	4	63F11 BODY DAMAGE
64F11	〃	〃 〃 150mm 〃 〃 225mm	1	HANDLE MISSING
65F11	〃	〃 〃 150mm 〃 〃 400mm	1	BODY DAMAGE
66F11~69F11	〃	〃 〃 400mm 〃 〃 400mm	4	66F11.67F11 BOMB DAMAGE
70F11	〃	〃 〃 450mm 〃 〃 430mm	1	
71F11	〃	〃 〃 450mm 〃 〃 330mm	1	
72F11	〃	〃 〃 150mm 〃 〃 270mm	1	
NONE NUMBER	8 PCS VALVE	STOP SIZE 100mm	1	
〃	10 〃 〃	SLUICE 〃 75mm	1	
〃	2 〃 〃	STOP 〃 50mm	1	
〃	12 〃 〃	〃 〃 25mm	1	
〃	5 〃 〃	〃 〃 12mm	1	
〃	PIPE	WELDING PIPE 800mm OD × 12ML	1	
〃	〃	760mm OD × 20ML	1	10M BOMB DAMAGE
〃	〃	610mm OD × 240ML	1	31M MISSING
〃	〃	560mm OD × 165ML	1	

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
NONE NUMBER	PIPE	WELDING PIPE 600 mm OD × 80 ML	1	
〃	〃	〃 500 mm OD × 28 ML	1	
〃	〃	〃 300 mm OD × 36 ML	1	
〃	〃	〃 400 mm OD × 18 ML	1	
〃	6" PIPE	GAS PIPE 150 mm D × 50 ML	1	
〃	4" 〃	〃 100 mm D × 30 ML	1	
〃	3" 〃	〃 75 mm D × 68 ML	1	
〃	2" 〃	〃 50 mm D × 110 ML	1	
〃	1½" 〃	〃 38 mm D × 37 ML	1	
〃	1¼" 〃	〃 32 mm D × 22 ML	1	
〃	1" 〃	〃 25 mm D × 80 ML	1	
〃	¾" 〃	〃 16 mm D × 89 ML	1	
〃	½" 〃	〃 30 ML	1	
TOTAL			94	

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CARBON MONOXIDE CONVERSION PLANT.

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
284F5 286F5	THYSEN WASHER	CENTRIFUGAL, CAP. 100 M3/MIN PRESS. 600 mm/w.g, BORE 300 m.m	2	284F5 SMALL SHOT 7
285F5 287F5	MOTOR (FOR 284F5. 286F5)	INDUCTION 40 HP 1,455 RPM	2	
288F5	DESULPHURIZING BOX	CATALYTIC, CAP. 5.000 M3/H 4 BOXS (7M × 7M × 5M)	1	
289F5	OVER HEAD TRAVELLING CRANE	CAP. 500 KG, SPAN 7M RAIL LENGTH 28 M	1	
290F5 ~292F5	MOTOR (FOR 289F5)	INDUCTION 7HP 7HP. 850RPM, 5HP 1.125 RPM	3	
293F5. 295F5 297F5	BLOWER (RAW GAS)	TURBO FAN, CAP. 134 M3/MIN 4 STAGE, PRESS. 2.5 M/w.g, 3.500 RPM	3	
294F5. 296F5 298F5	MOTOR (FOR 293F5 297F5. 295F5)	INDUCTION 145 HP 3,550 RPM	3	
299F5 300F5	SATURATING AND COOLING TOWER	RIM TYPE 2.5 MD × 20 MH	2	TOWER UPPER PART SMALL SHOT 5
301F5 302F5	HEAT EXCHANGER	SHELL AND TUBE, PRESS. 2 KG/cm2 HEATING SURFACE 922 M2 TUBE 25 mm	2	
303F5 ~306F5	〃	〃 〃 1.5 KG/cm2 〃 1,285 M2 〃	4	
307F5 ~310F5	CATALYTIC. CO CONVERTOR	TEMP. 500°C, CAP. 6.000 M3/H DIA. 4.5 M	4	
311F5 ~314F5	CO COMBUSTION FURNACE	GAS BURNER TYPE, HORIZONTAL 1.25 MD × 2.35 ML	4	
315F5 316F5	COOLING TOWER	VERTICAL, RASCHIG RING 3 MD × 14.5 MH	2	
317F5. 319F5 321F5	INOKUCHI PUMP	TURBINE, CAP. 5 M3/MIN, BORE 200 mm PRESS. 30 M/w.g, 1.760 RPM	3	
318F5. 320F5 322F5	MOTOR (FOR 317F5. 319F5 321F5)	INDUCTION 50 HP 1.760 RPM	3	
323F5 ~326F5	PUMP	TURBINE, CAP. 4.2 M3/MIN PRESS. 20 M/w.g, BORE 200 mm, 1755 RPM	4	50 HP MOTOR MISSING
327F5	〃	〃 〃 〃 〃 30 M/w.g 〃 300 mm 〃	1	〃
328F5	〃	〃 〃 〃 〃 〃 〃 〃 200 mm 1,955 RPM	1	〃
329F5	FAN	PROPELLER, CAP. 3,080 M3/MIN. DIA. OF FAN 300 mm 15 HP	1	15 HP MOTOR MISSING
330F5 ~336F5	〃	〃 〃 2,080 M3/MIN 15 HP	7	〃
337F5 338F5	INSTRUMENT BOARD	1.1 ML × 2 MH, STEEL PLATE	2	
339F5	TRANSFORMER	INDOOR, 50 KVA 60 CYCLE 3.300 ~ 220 V	1	

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
29(47) 29(48)	TRANSFORMER	INDOOR, 50KVA, 60 CYCL. 3,300 ~ 220V	2	
340F5	SWITCH BOX	LM 112, 220V 60 CYCLE (FOR 25HP)	1	
341F5 ~ 343F5	〃	〃 3,300V 60HP	3	
NONE NUMBER	STEAM TRAP	FLOAT STEAM INLET 40mm	1	
〃	〃	〃 〃 25mm	1	
344F5 345F5	VALVE	SLUICE SIZE 200mm FACE TO FACE 300mm	2	
346F5 347F5	〃	〃 〃 250mm 〃 320mm	2	
348F5 349F5	〃	〃 〃 500mm 〃 415mm	2	
350F5 ~ 354F5	〃	〃 〃 200mm 320mm	5	
355F5	〃	〃 〃 200mm 〃 300mm	1	
356F5 357F5	〃	STOP 〃 150mm 〃 500mm	2	
358F5 ~ 363F5	〃	SLUICE 〃 165mm 〃 285mm	6	
364F5 365F5	〃	〃 〃 350mm 〃 350mm	2	
366F5 367F5	〃	〃 〃 220mm 〃 310mm	2	
368F5 369F5	〃	〃 〃 600mm 〃 450mm	2	
370F5 371F5	〃	〃 〃 165mm 〃 510mm	2	
372F5 ~ 374F5	〃	〃 〃 350mm 〃 350mm	3	
375F5 376F5	〃	〃 〃 200mm 〃 320mm	2	
377F5 378F5	〃	〃 〃 250mm 〃 320mm	2	
379F5	〃	〃 〃 350mm 〃 350mm	1	
380F5	〃	〃 〃 600mm 〃 440mm	1	
381F5 ~ 384F5	〃	〃 〃 250mm 〃 330mm	4	
385F5	〃	〃 〃 600mm 〃 440mm	1	

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INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
386F5	VALVE	SLUICE SIZE 300mm FACE TO FACE 440mm	1	
387F5	〃	〃 〃 250mm 〃 〃 330mm	1	
388F5 ～391F5	〃	〃 〃 350mm 〃 〃 350mm	4	388F5 BODY BOMB DAMAGE
392F5 ～396F5	〃	〃 〃 200mm 〃 〃 310mm	5	393F5 HANDLE BOMB DAMAGE
397F5	〃	STOP 〃 200mm 〃 430mm	1	
398F5 399F5	〃	SLUICE 500mm 400mm	2	BODY BOMB SHOTS
400F5 401F5	〃	ANGLE 〃 500mm 〃 900mm	2	400F5 BODY BOMB SHOTS
402F5	〃	〃 〃 800mm 〃 900mm	1	
403F5 ～407F5	〃	〃 〃 500mm 〃 900mm	5	
408F5	〃	STOP 〃 300mm 〃 850mm	1	
409F5	〃	SLUICE 〃 150mm 〃 240mm	1	
410F5	〃	〃 〃 900mm 〃 610mm	1	BODY DAMAGE BOMB SHOTS
411F5 ～414F5	〃	〃 〃 500mm 〃 420mm	4	411F5 BODY DAMAGE BOMB SHOTS
415F5	〃	〃 〃 900mm 〃 610mm	1	BODY DAMAGE BOMB SHOTS
416F5 417F5	〃	〃 〃 500mm 〃 420mm	2	416F5 BODY DAMAGE BOMB SHOTS
418F5 ～423F5	〃	〃 〃 400mm 〃 360mm	6	BOMB DAMAGE OR HANDLE MISSING
NONE NUMBER	25 P.C.S. VALVE	SLUICE SIZE 100mm	1	
〃	16 〃 〃	〃 〃 100mm	1	
〃	6 〃 〃	COCK 〃 75mm	1	
〃	VALVE	STOP 〃 75mm	1	
〃	8 P.C.S. VALVE	SLUICE 〃 50mm	1	
〃	18 〃 〃	STOP 〃 50mm	1	
〃	18 〃 〃	〃 〃 50mm	1	

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INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN. TITY	REMARKS
NONE NUMBER	64 P.C.S VALVE	STOP SIZE 25 mm	1	
〃	8 〃 〃	SLUICE 〃 25 mm	1	
〃	11 〃 〃	COCK 〃 25 mm	1	
〃	VALVE	〃 〃 20 mm	1	
〃	27 P.C.S VALVE	STOP 〃 20 mm	1	
〃	VALVE	〃 〃 12 mm	1	
〃	23 P.C.S VALVE	COCK 〃 12 mm	1	
〃	PIPE	WELDING PIPE 900 mm OD x 90 ML	1	
〃	〃	〃 750 mm OD x 58 ML	1	
〃	〃	〃 500 mm OD x 46 ML	1	
〃	〃	〃 400 mm OD x 255 ML	1	
〃	〃	〃 300 mm OD x 26 ML	1	
〃	〃	DRAWN PIPE 115 mm OD x 7 ML	1	
〃	〃	〃 90 mm OD x 36 ML	1	
〃	〃	〃 115 mm OD x 38 ML	1	
〃	〃	〃 90 mm OD x 70 ML	1	
〃	〃	WELDING PIPE 900 mm OD x 46 ML	1	
〃	〃	〃 500 mm OD x 98 ML	1	
〃	〃	DRAWN PIPE 220 mm OD x 94 ML	1	
〃	〃	〃 220 mm OD x 21 ML	1	
〃	〃	〃 175 mm OD x 36 ML	1	
〃	〃	GAS PIPE 150 mm OD x 82 ML	1	
〃	〃	CAST IRON 250 mm OD x 14 ML	1	

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INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
NONE NUMBER	PIPE	GAS PIPE 150 mm D x 30 ML	1	
"	"	DRAWN PIPE 115 mm OD x 21 ML	1	
"	"	" 90 mm OD x 164 ML	1	
"	"	" 60 mm OD x 175 ML	1	
"	"	GAS PIPE 50 mm D x 126 ML	1	
"	"	DRAWN PIPE 50 mm OD x 7 ML	1	
"	"	" 40 mm OD x 18 ML	1	
"	"	" 35 mm OD x 734 ML	1	
"	"	" 25 mm OD x 130 ML	1	
"	"	GAS PIPE 20 mm D x 800 ML	1	
TOTAL			184	

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CARBON DIOXIDE REMOVING PLANT

INV. NO.	NAME OF MACINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
424F5 425F5	CARBON DIOXIDE ABSORBER	VERTICAL, PRESS. 17 $^{Kg/cm^2}$ 1.8 MΦ × 32 MH	2	
426F5 427F5	WATER SEPARATOR	VERTICAL 0.8 MΦ × 3 MH	2	
428F5 430F5	FEED WATER POWER RECOVERING PUMP	CAP. 12 $^{M^3/MIN}$ 900 HP RECOVERING POWER 270 HP	2	
429F5 431F5	MOTOR (FOR 428F5 430F5)	INDUCTION 3.300 V 900 HP 1.775 RPM	2	
NONE NUMBER	CO_2 DISSIPATING TOWER	CONCRETE, HEXAGONAL H=21 M LENGTH OF ONE SIDE 7 M	2	
441F5. 446F5 447F5	MOTOR	INDUCTION 15 HP 1.730 RPM	3	
448F5. 449F5 451F5	〃	〃	3	
452F5	CARBON DIOXIDE WASHING TOWER	UNCONPLETED, VERTICAL 1.8 MΦ × 30 MH	1	
453F5 ~ 455F5	ELECTRIC TRANSFORMER	CAP. 75 KVA	3	
459F5	〃	〃 30 KVA	1	
463F5 464F5	〃	〃 25 KVA	2	
465F5	INSTRUMENT BOARD	2 STEEL PLATE 1.5 MH × 1.92 ML	1	
466F5	〃	STEEL PLATE 1.5 MH × 0.8 ML	1	
467F5 468F5	ELECTRIC DISTRIBUTING BOX	3,300 V, 3 PHASE 150A 900 HP, 60 CYCLE	2	METER AND WIRE MISSING
469F5 470F5	ELECTRIC RESISTANCE	3.300 V, 900 HP	2	
471F5 472F5	ELECTRIC CONTROLLER	3.300 V 900 HP	2	
473F5 ~475F5	VALVE	SLUICE SIZE 350 ^{mm} FACE TO FACE 435 ^{mm}	3	
476F5 477F5	〃	〃 GEAR OPERATE SIZE 350 ^{mm}. FACE TO FACE 720 ^{mm}	2	
478F5 479F5	〃	CHECK. SIZE 350 ^{mm} FACE TO FACE 730 ^{mm}	2	
480F5	〃	SLUICE 〃 250 ^{mm} 〃 〃 340 ^{mm}	1	
481F5 ~ 483F5	〃	〃 〃 250 ^{mm} 〃 〃 285 ^{mm}	3	483F5 HANDLE MISSING
484F5	〃	〃 〃 150 ^{mm} 〃 〃 270 ^{mm}	1	

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
NONE NUMBER	3 P.C.S. VALVE	SLUICE SIZE 125""	1	
"	29 " "	" " 100""	1	
"	8 " "	STOP " 100""	1	
"	4 " "	SLUICE " 75""	1	
"	4 " "	" " 70""	1	
"	14 " "	STOP " 60""	1	
"	VALVE	" " 50""	1	
"	7 PCS VALVE	" " 40""	1	
"	4 " "	" " 30""	1	
"	3 " "	" " 25""	1	
"	3 " "	" " 20""	1	
"	11 " "	" " 12""	1	
"	PIPE	WELDING PIPE 350 mm OD x 80 ML	1	
"	"	" " x 186 ML	1	
"	"	DRAWN PIPE 255 mm OD x 60 ML	1	
"	"	" 100 mm OD x 120 ML	1	
"	"	" 76 mm OD x 8 ML	1	
"	"	" 38 mm OD x 45 ML	1	
"	"	GAS PIPE 100 mm OD x 80 ML	1	
"	"	75 mm OD x 20 ML	1	
"	"	50 mm OD x 30 ML	1	
"	"	20 mm OD x 30 ML	1	
TOTAL			65	

CARBON MONOXIDE REMOVING PLANT

INV. NO.	NAME OF MACINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
485F5 ~ 487F5	COPPER SOLUTION WASHER	VERTICAL, MATERIAL SS 400mm ID x 50mm t x 12MH	3	
488F5	AMMONIA LIQUOR WASHER	〃 〃 〃 〃 〃 〃	1	
489F5	CONDENSED WATER WASHER	〃 〃 〃 〃 〃 〃	1	
490F5 ~ 492F5	HIGH PRESSURE LIQUID SEPARATOR	〃 〃 〃 400mm ID x 50mm t x 3MH	3	
493F5	AMMONIACAL WATER EXPANSION TANK	VERTICAL 1.2MID x 1.3MH	1	
494F5	CONDENSED WATER EXPANSION TANK	〃 〃 〃	1	
495F5	AMMONIACAL WATER FILTER	VERTICAL 300mmD x 800mmH	1	
496F5	CONDENSED WATER FILTER	〃 〃 〃	1	
497F5	AMMONIACAL WATER COOLER	SHELL AND TUBE 400mm OD x 5.5ML	1	
498F5	CONDENSED WATER COOLER	〃 〃 〃 〃	1	
499F5, 504F5 509F5	COPPER SOLUTION CHARGE PUMP	3 PLANGER, BORE 48mm 100RPM PRESS. 300kg/cm², CAP. 0.275M³/MIN	3	
500F5, 505F5 510F5.	MOTOR (FOR 499F5. 504F5 509F5)	INDUCTION 3,300V 300 HP 585 RPM.	3	510F5 SWITCH BOX MISSING
501F5 506F5	SWITCH BOX	OIL SWITCH, 3,000 ~ 3,300V 50 ~ 60 CYCLE, 200A	2	
502F5. 507F5 511F5	STARTER	FOR MOTOR RESISTANCE, 300HP	3	
503F5. 508F5 512F5.	AIR RECEIVER	VERTICAL 400mmD	3	
513F5 ~ 515F5	AMMONIACAL WATER CHARGE PUMP	3 PLANGER, BORE 15mm, 155RPM PRESS. 300kg/cm², CAP. 0.275M³/MIN	3	
516F5 ~ 518F5	MOTOR (FOR 513F5 ~ 515F5)	INDUCTION 25 HP	3	
519F5	COPPER SOLUTION EXPANSION TANK	VERTICAL 2.4MD x 4.7MH	1	
520F5	COPPER SOLUTION COOLER	SHELL AND TUBE 400mmD x 5.5ML	1	
521F5	VACUUM TANK	VERTICAL 2.4MD x 5MH	1	
522F5	VACUUM SEPARATER TANK	VERTICAL 0.8MD x 2.45MH	1	
523F5	SUCTION TANK	VERTICAL 1.5MD x 2.5MH	1	

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN. TITY	REMARKS
524F5	LIQUID SEPARATOR FILTER	VERTICAL 0.75MD × 2.3MH	1	
525F5 526F5	COPPER SOLUTION FILTER	〃 0.6 MD × 1.7MH	2	
527F5 528F5	TURBINE PUMP	2 STAGE, BORE 50mm CAP. 0.167 M³/MIN. PRESS. 3 Kg/cm²	2	
529F5. 531F5 533F5	AIR COMPRESSOR AND VACUUM PUMP	CAP. 10.8 M³/MIN, PRESS. 1 Kg/cm² VACUUM 600 mm/Hg. BORE 100mm	3	
530F5 532F5 534F5	MOTOR (FOR 529F5. 531F5 533F5)	INDUCTION 25 HP 580 RPM	3	
535F5	OIL SEPARATOR	VERTICAL 0.7 MD × 1.2 MH	1	
536F5	PREPARATION TANK	〃 0.1 MD × 2.7 MH	1	
537F5	SETTING TANK	〃 2.4 MD × 4.7 MH	1	
538F5	MUD SEPARATOR	〃 1.7 MD × 2.6 MH	1	
539F5	SEPARATOR	0.5 MD × 1 MH	1	
540F5	FILTER PRESS	SIZE 600×600mm × 31 PLATE	1	
541F5 542F5	FEED WATER PUMP	CAP. 0.34 M³/MIN DEL. PRESS. 2.5 kg/cm², BORE 75mm	2	
543F5	AMMONIACAL LIQUOR COOLER	SHELL AND TUBE 400 mm D × 3 ML	1	
544F5	AMMONIACAL WATER TANK	VERTICAL 2.3 MD × 3 MH	1	
545F5 ~ 547F5	LIQUEFIED AMMONIA TANK	HORIZONTAL 1.3 MD × 9.5 ML	3	
548F5	ELECTRIC HOIST	CAP. 5T HEIGHT OF LIFT 5M	1	
549F5	MOTOR (FOR 548F5)	INDUCTION 7.5 HP 750 R.P.M	1	
550F5	SWITCH BOARD	220V 100A	1	
551F5	〃	220V 60A	1	
552F5 ~ 554F5	SWITCH BOX	OIL SWITCH BOX 220V 3 PHASE	3	
555F5	METER BOARD	4 PRESSURE RECORDER 1 PRESSURE INDICATOR	1	
556F5 ~ 565F5	VALVE	SLUICE SIZE 150mm FACE TO FACE 240mm	10	
566F5 ~ 571F5	〃	〃 〃 200mm 〃 〃 300mm	6	

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INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
572F5 ~ 578F5	VALVE	SLUICE SIZE 150mm FACE TO FACE 240mm	7	
NONE NUMBER	19 P.C.S. VALVE	GLOVE , SIZE 6mm	1	
〃	20 〃 〃	〃 〃 〃	1	
〃	14 〃 〃	〃 〃 12mm	1	
〃	41 〃 〃	〃 〃 19mm	1	
〃	2 〃 〃	SLUICE 〃 〃	1	
〃	26 〃 〃	STOP 〃 〃	1	
〃	10 〃 〃	GLOVE 〃 25mm	1	
〃	10 〃 〃	SLUICE 〃 〃	1	
〃	3 〃 〃	GLOVE 〃 〃	1	
〃	12 〃 〃	STOP 〃 〃	1	
〃	8 〃 〃	GLOVE 〃 40mm	1	
〃	6 〃 〃	SLUICE 〃 〃	1	
〃	23 〃 〃	STOP 〃 〃	1	
〃	VALVE 〃	GLOVE 〃 50mm	1	
〃	7 P.C.S. VALVE	〃 〃 〃	1	
〃	6 〃 〃	STOP 〃 〃	1	
〃	4 〃 〃	GLOVE 〃 〃	1	
〃	6 〃 〃	SLUICE 〃 65mm	1	
〃	10 〃 〃	GLOVE 〃 75mm	1	
〃	20 〃 〃	SLUICE 〃 〃	1	
〃	VALVE	〃 〃 100mm	1	
〃	22 P.C.S. VALVE	〃 〃 〃	1	

DECLASSIFIED E.O. 12065 SECTION 3.3(b)(1), NARS Date

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
NONE NUMBER	VALVE	SLUICE SIZE 125 mm	1	
〃	5 PCS VALVE	〃 〃 〃	1	
〃	PIPE	DRAWN PIPE 19 mm OD x 120 ML	1	
〃	〃	GAS PIPE 21 mm D x 25 ML	1	
〃	〃	〃 27 mm D x 20 ML	1	
〃	〃	DRAWN PIPE 38 mm OD x 185 ML	1	
〃	〃	GAS PIPE 34 mm D x 120 ML	1	
〃	〃	DRAWN PIPE 45 mm OD x 175 ML	1	
〃	〃	GAS PIPE 48 mm D x 70 ML	1	
〃	〃	DRAWN PIPE 65 mm OD x 350 ML	1	
〃	〃	GAS PIPE 60 mm D x 200 ML	1	
〃	〃	DRAWN PIPE 75 mm OD x 45 ML	1	
〃	〃	〃 90 mm OD x 140 ML	1	
〃	〃	〃 90 mm OD x 20 ML	1	
〃	〃	〃 115 mm OD x 45 ML	1	
〃	〃	115 mm OD x 75 ML	1	
〃	〃	GAS PIPE 165 mm D x 25 ML	1	
〃	〃	〃 165 mm D x 110 ML	1	
〃	〃	〃 216 mm D x 75 ML	1	
			135	
TOTAL				

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HYDRO CRACKING PLANT.

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUANTITY	REMARKS
1F3 13F3 25F3	GAS COMPRESSOR (FOR HYDROGEN)	SINGLE ACTING CAP. 67 M^3/MIN DEL. PRESS 30 KG/CM^2	3	13F3 LUBRICATER MISSING
2F3 14F3 26F3	MOTOR (FOR 1F3 13F3 25F3)	SYNCHRONOUS HP 800 138.5 R.P.M.	3	
3F3 15F3 27F3	MOTOR (FOR 1F3 13F3 25F3)	INDUCTION 10 HP 1440 R.P.M.	3	
4F3 16F3 28F3	COOLER (FOR 1ST STAGE)	SHELL AND TUBE HEATING AREA 42 M^2	3	
5F3 17F3 29F3	COOLER (FOR 2ND STAGE)	SHELL AND TUBE HEATING AREA 50 M^2	3	
6F3 18F3 30F3	COOLER (FOR 3RD STAGE)	SHELL AND TUBE HEATING AREA 76 M^2	3	
7F3 19F3 31F3	SEPARATOR (FOR 1ST STAGE)	VERTICAL $0.8^{M\phi} \times 2^{MH}$	3	
8F3 20F3 32F3	SEPARATOR (FOR 2ND STAGE)	VERTICAL $0.6^{M\phi} \times 3.3^{MH}$	3	
9F3 21F3 33F3	SEPARATOR (FOR 3RD STAGE)	VERTICAL $0.55^{M\phi} \times 2.3^{MH}$	3	
10F3 22F3 34F3	SEPARATOR (FOR LAST)	VERTICAL $0.42^{M\phi} \times 1.8^{MH}$	3	
11F3 23F3 35F3	TRAP	FLOAT TYPE INLET SIZE 25 ""	3	
12F3 24F3 36F3	OIL RECOVERY TANK	VERTICAL $0.26^{M\phi} \times 1.4^{MH}$	3	
37F3 49F3 60F3	GAS COMPRESSOR (FOR HYDROGEN)	SINGLE ACTING CAP. 50 M^3/MIN DEL. PRESS. 300 KG/CM^2	3	
38F3 50F3 61F3	MOTOR (FOR 37F3 49F3 60F3)	SYNCHRONOUS 1250 HP. 136 R.P.M.	3	
39F3 62F3	MOTOR (FOR 37F3 60F3)	INDUCTION 10 HP. 1440 R.P.M.	2	50F3 10HP. MOTOR MISSING
40F3 51F3 63F3	COOLER (FOR 1ST STAGE)	SHELL AND TUBE HEATING AREA 16.8 M^2	3	
41F3 52F3 64F3	COOLER (FOR 2ND STAGE)	SHELL AND TUBE HEATING AREA 16.8 M^2	3	
42F3 53F3 65F3	COOLER (FOR 3RD STAGE)	SHELL AND TUBE HEATING AREA 16.8 M^2	3	
43F3 54F3 66F3	DRAIN SEPARATOR	VERTICAL $0.3^{M\phi} \times 3^{MH}$	3	
44F3 55F3 67F3	DRAIN SEPARATOR	VERTICAL $0.6^{M\phi} \times 2.26^{MH}$	3	
45F3 56F3 68F3	DRAIN SEPARATOR	VERTICAL $0.5^{M\phi} \times 3.2^{MH}$	3	
46F3 57F3 69F3	DRAIN SEPARATOR	VERTICAL $0.8^{M\phi} \times 3^{MH}$	3	

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
47F3 58F3 70F3	DRAIN SEPARATOR	VERTICAL 0.36 MΦ x 3 MH	3	
48F3 59F3 71F3	OIL RECOVERY TANK	VERTICAL 0.8 MΦ x 1.39 MH	3	
72F3	GAS COMPRESSOR (FOR HYDROGEN)	SINGLE ACTING CAP. 100 M³/MIN DEL. PRESS. 300 KG/CM²	1	
73F3	MOTOR (FOR 72F3)	SYNCHRONOUS 2400 HP. 128.5 R.P.M.	1	
74F3	MOTOR (FOR 72F3)	INDUCTION 15 HP. 675 R.P.M.	1	
75F3	COOLER (FOR 72F3)	SHELL AND TUBE HEATING AREA 50 M²	1	
76F3	COOLER (FOR 72F3)	SHELL AND TUBE HEATING AREA 28 M²	1	
77F3	DRAIN SEPARATOR	VERTICAL 0.72 MΦ x 2.5 MH	1	
78F3	DRAIN SEPARATOR	VERTICAL 0.85 MΦ x 3.5 MH	1	
79F3	DRAIN SEPARATOR	VERTICAL 0.6 MΦ x 1.2 MH	1	
80F3	DRAIN SEPARATOR	VERTICAL 0.3 MΦ x 1 MH	1	
81F3	DRAIN SEPARATOR	VERTICAL 0.6 MΦ x 1.2 MH	1	
82F3 83F3	DRAIN SEPARATOR	VERTICAL 0.28 MΦ x 0.9 MH	2	
84F3	OIL RECOVERY TANK	VERTICAL 1.0 MΦ x 1.47 MH	1	
85F3 ~ 92F3	GAS COMPRESSOR (FOR HYDROGEN)	SINGLE ACTING CAP. 6.000 M³/H DEL. PRESS. 290 ~ 300 KG/CM²	8	
93F3	HYDROGEN AND OIL HEAT EXCHANGING TOWER	1.264 MΦ x 10.5 MH 200 KG/CM²	1.	MATERIAL NI-CR-MO
94F3	HEAT EXCHANGING TOWER	1.264 MΦ x 10.5 MH 200 KG/CM²	1.	MATERIAL NI-CR-MO
95F3 96F3	1ST. 2ND. PREHEAT TOWER	1.264 MΦ x 10.5 MH 200 KG/CM²	2	SHELL MISSING
97F3 98F3	1ST. 2ND. REACTION TOWER	1.264 MΦ x 10.5 MH 200 KG/CM²	2	MATERIAL NI-CR-MO
99F3	HIGH PRESSURE GAS SEPARATING TOWER	1.264 MΦ x 10.5 MH 200 KG/CM²	1	MATERIAL NI-CR-MO.
100F3	HIGH PRESSURE WASHING TOWER	1.264 MΦ x 10.5 MH 200 KG/CM²	1	MATERIAL NI-CR-MO
101F3 102F3	HIGH PRESSURE GAS HOLDER	0.53 MΦ x 10.5 MH 300 KG/CM²	2	MATERIAL 18 : 8
103F3 104F3	HIGH PRESSURE VESSEL	1.264 MΦ x 10.5 MH 300 KG/CM²	2	MATERIAL NI-CR-MO

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
105F3~108F3	HIGH PRESSURE VESSEL	1.0 $^{M\phi}$ x 7 ^{MH} 300 $^{Kg/CM^2}$	4	MATERIAL CR-MO
109F3	HIGH PRESSURE VESSEL	0.7 $^{M\phi}$ x 7 ^{MH} 300 $^{Kg/CM^2}$	1	MATERIAL CR-MO
110F3 111F3	FURNACE	PIPE STILL TYPE 7.3 ^{MH} x 5.5 ^{MW} x 6 ^{ML}	2	110F3 BRICK WORKING 20% UNCONPLETED
112F3 113F3	HIGH PRESSURE COOLER	DUPLE TUBE TYPE COOLING AREA 113 $^{M^2}$ 200 $^{Kg/CM^2}$	2	
114F3 115F3	LOW PRESSURE SEPARATOR	1.62 $^{M\phi}$ x 5 ^{ML} 20 $^{Kg/CM^2}$	2	
116F3	ACCUMLATOR (FOR HYDROGEN)	VERTICAL 1.0 $^{M\phi}$ x 10 ^{MH} 20 $^{Kg/CM^2}$	1	
117F3 118F3	ACCUMLATOR (FOR NITROGEN)	VERTICAL 1.6 $^{M\phi}$ x 5.4 ^{MH} 20 $^{Kg/CM^2}$	2	
119F3 ~ 122F3	ACCUMLATOR (FOR NITROGEN)	VERTICAL 1.0 $^{M\phi}$ x 5.95 ^{MH} 20 $^{Kg/M^2}$	4	
123F3 124F3	WORTHINGTON PUMP	CAP. 0.17 $^{M^3/MIN}$ DUPLEX TYPE 300 x 300 x 500 ^{MM} 300 $^{Kg/CM^2}$	2	
125F3 127F3	TURBINE PUMP	MOTOR DRIVEN CAP. 1 $^{M^3/MIN}$ SUC. PRESS. 1 ^{M} / W.G.	2	
126F3 128F3	MOTOR (FOR 125F3 127F3)	INDUCTION 10 HP. 1735 R.P.M.	2	
131F3~135F3	WORTHINGTON PUMP	DUPLEX TYPE CAP. 0.5 $^{M^3/MIN}$ 200 x 150 x 250 ^{MM} 3.0 $^{Kg/CM^2}$	5	
136F3~138F3	OIL CATALYSER TANK	VERTICAL 1.5d $^{M\phi}$ x 1.8 ^{MH}	3	
139F3 140F3	REACTED OIL TANK	HORIZONTAL TYPE 1.2 $^{M\phi}$ x 2.5 ^{ML}	2	
141F3 142F3	WORTHINGTON PUMP	DUPLEX TYPE CAP. 0.5 $^{M^3/MIN}$ 250 x 250 x 220 ^{MM}	2	
143F3~145F3	FILTER PRESS	650 x 650 ^{MM} 50 PLATES	3	
146F3	FILTER RECEIVER	VERTICAL 2.45 $^{M\phi}$ x 3.95 ^{MH}	1	
147F3	BLOW DOWN TANK	HORIZONTAL 2.5 $^{M\phi}$ x 7.5 ^{ML}	1	
148F3 149F3	STABILIZER	VERTICAL 1.47 $^{M\phi}$ x 25 ^{MH} 4.7 $^{Kg/CM^2}$	2	TOWER 20% UNCOMPLETED
150F3 151F3	WASHING OIL HEAT EXCHANGER	HEATING AREA 30 $^{M^2}$ 0.7 $^{M\phi}$ x 5.55 ^{ML}	2	
152F3 153F3	STABILIZER HEAT EXCHANGER	HEATING AREA 20 $^{M^2}$ 0.36 $^{M\phi}$ x 5 ^{ML}	2	
154F3	STABILIZER REBOILER	HEATING AREA 60 $^{M^2}$ 0.7 $^{M\phi}$ x 5 ^{ML}	1	
155F	STABILIZER REFLUX CONDENSER	COOLING AREA 80 $^{M^2}$ 0.7 $^{M\phi}$ x 4 ^{ML}	1	

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
156F3 157F3	STABILIZER REFLUX DRUM	VERTICAL 1.6 MΦ x 6 MH 5 KG/CM²	2	
158F3 159F3	STABILIZER COOLER	HEATING AREA 24.2 M²	2	
160F3 161F3	SODA WASHING TOWER	VERTICAL 1.3 MΦ x 7 MH	2	
162F3 163F3	MEDIATE TANK	VERTICAL CAP. 12 KL 1.4 MΦ x 5.5 MH 5 KG/CM²	2	
164F3	SODA TANK	VERTICAL CAP. 8 KL 2.2 MΦ x 2.6 MH	1	
165F3~170F3	SODA MEASURING TANK	VERTICAL 1.85 MΦ x 3.1 MH	6	
171F3 172F3	SODA TANK	VERTICAL 1.85 MΦ x 1.8 MH	2	
173F3 174F3	SODA SEPARATOR	HORIZONTAL 1.3 MΦ x 8.8 ML	2	
175F3 176F3	TANK (FOR WASHING OIL)	VERTICAL CAP. 20 KL 2 MΦ x 5.6 MH PRESS. 500 MM/W.G	2	
177F3 178F3	AUXILIARY TANK	HORIZONTAL CAP. 40 KL 2.5 MΦ x 9 ML	2	
179F3 180F3	HEATER OF WASHING OIL	HORIZONTAL HEATING AREA 30 M² 7 MΦ x 5 ML	2	
181F3 182F3	WASHING OIL COOLER	VERTICAL 2.8 MΦ x 1.03 MH	2	
183F3 184F3	WATER SEPARATOR	HORIZONTAL 1.3 MΦ x 8.8 ML	2	
185F3~188F3	WORTHINGTON PUMP	DUPLEX CAP. 0.2 M³/MIN 190 x 150 x 250 MM 6 KG/CM²	4	
189F3~191F3	WORTHINGTON PUMP	DUPLEX CAP. 0.83 M³/MIN 300 x 250 x 275 MM 5 KG/CM²	3	
195F3~197F3	SODA INJECTION PUMP	CAP. 2 L/MIN 3 PLANGER	3	3 MOTOR MISSING
198F3~201F3	WORTHINGTON PUMP	DUPLEX CAP. 60 L/MIN 125 x 75 x 125 MM 10 KG/CM²	4	
202.204.206 208.210F3	TURBINE PUMP	MOTOR DRIVEN ONE STAGE CAP. 3.3 M³/MIN 5 KG/CM²	5	
203.205.207 209.211F3	MOTOR (FOR 202.204.206 208.210F3)	INDUCTION 60 HP. 1760 R.P.M.	5	
212F3 214F3 216F3	TURBINE PUMP	MOTOR DRIVEN TWO STAGE CAP. 3.3 M³/MIN 10 KG/CM²	3	
213F3 215F3 217F3	MOTOR (FOR 212.214.216F3)	INDUCTION 125 HP. 1760 R.P.M.	3	
218F3 219F3 220F3	AIR COMPRESSOR	SINGLE ACTING, STEAM DRIVEN CAP. 0.25 M³/MIN 195x150x300 MM	3	
221F3	AIR RECEIVER	VERTICAL 0.75 MΦ x 1.85 MH 3 KG/CM²	1	

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
222F3~228F3	OIL TANK	VERTICAL CAP. 500 KL 9 Mϕ x 8.7 MH	7	222~227F3 SIDE PLATES DAMAGE
229F3	OIL TANK	VERTICAL CAP. 50 KL 4.75 Mϕ x 3 MH	1	
230F3	OIL TANK	VERTICAL CAP. 9 KL 2 Mϕ x 3 MH	1	
231F3	GAS HOLDER	VERTICAL CAP. 10.000 M3 26.5 Mϕ x 28.5 MH 200 MM/W.G.	1	STAY 50% & SIDE PLATE 70% DAMAGE
232F3 233F3	GAS HOLDER	VERTICAL CAP. 5,000 M3 20.5 Mϕ x 25 MH 200 MM/W.G.	2	STAY & SIDE PLATE BURNT DAMAGE
234F3	OVER HEAD TRAVELLING CRANE	CAP. 25 T LIFT 6 M SPAN 16.5 M	1	
235F3~238F3	MOTOR (FOR 234F3)	INDUCTION 13 HP. 13HP. 7 HP. 27 HP.	4	
239F3	OVER HEAD TRAVELLING CRANE	CAP. 150 T LIFT UNKNOWN SPAN 14.8 M	1	
240F3~243F3	MOTOR (FOR 239F3)	INDUCTION 67 HP. 67 HP. 53 HP. 20 HP	4	
244F3 246F3	HOIST	CAP. 5 T LIFT 4 M	2	
245F3 247F3	MOTOR (FOR 244F3 246F3)	INDUCTION 7.5 HP. 750 R.P.M.	2	
248F3	WORTHINGTON PUMP	SIMPLEX CAP. 75 L/MIN 150 x 100 x 250 MM 10 KG/CM2	1	
249F3 250F3	BLOWER	IMPELLER TYPE CAP. 30 M3/MIN 400 MM/W.G.	2	2 MOTOR MISSING
251F3 252F3 254F3	WORTHINGTON PUMP	DUPLEX 150x125x200 MM	3	
255F3 257F3 259F3	TURBINE PUMP	MOTOR DRIVEN BORE 300 MM	3	
256F3 258F3 260F3	MOTOR (FOR 255.257.259F3)	CAP. 100 HP. 1455 R.P.M.	3	
261F3	KAGANO PUMP	CAP. UNKNOWN BORE 75 MM	1	MOTOR MISSING
262F3 263F3	BLOWER CASE	MATERIAL STEEL BLOWER ACCESSORY	2	
264F3 265F3	MOTOR	INDUCTION 40 HP.	2	
267F3~270F3	MOTOR	INDUCTION 25 HP.	4	
271F3	MOTOR	INDUCTION 7.5 HP. 1400/1700 R.P.M	1	
272F3	BEARING BED	DIA. OF SHAFT 50 MM	1	
273F3	BEARING BED	" " 40 MM	1	

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
275F3	ACCESSORY OF GAS COMPRESSOR	800 HP	1	
276F3 277F3	MOTOR	INDUCTION 7.5 HP. 720/860 R.P.M.	2	277F3 BED 20% DAMAGE
278F3 279F3	WORTHINGTON PUMP	CAP. 0.25 M^3/MIN 190 x 150 x 250 MM	2	
283F3~289F3	TRANSFORMER	CAP. 439 KVA 3400 V/345 V	7	
290F3	BATTERY	110 V 2 V X 55 PIESES	1	
291F3 292F3	RECTIFIRE	DC. 125 AC. 210/220 CAP. 125 KW	2	REFLEX MISSING
293F3	〃	DC. 100/160 AC. 220	1	〃 〃
294F3~300F3	VOLTAGE REGULATOR		7	294F3 REFLEX MISSING
301F3~307F3	OIL CIRCUIT BREAKER	11,500 V 400 A	7	MAGNET SWITCH MISSING
308F3	〃 〃 〃	3,500 V 800 A	1	〃 〃
309F3~313F3	〃 〃 〃	6.600 V 200 A	5	〃 〃
314F3~316F3	〃 〃 〃	3,500 V 500 A	3	〃 〃
317F3 318F3	〃 〃 〃	3,500 V 100 A	2	〃 〃
319F3 320F3	〃 〃 〃	V. A. UNKNOWN	2	〃 〃
321F3	MAGNET. SWITCH (112 P.C.S.)	100 V	1	32 SWITCH CASES MISSING
322F3~327F3	TRANSFORMER	CAP. 75 KVA 3450 V/210 V	6	
328F3~337F3	〃	〃 50 KVA 〃	10	
338F3 339F3	〃		2	
340F3~343F3	〃	CAP. 15 KVA 3450 V/210 V	4	
344F3~346F3	STARTING REACTOR	CAP. 510 KVA	3	
347F3 348F3	SWITCH BOARD		2	RELAYS DAMAGED
349F3 350F3	SWITCH BOX		2	349F3 350F3 DAMAGED
351F3	OIL CIRCUIT BREAKER	3.500 V 1.000 A	1	

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
352F3	METER BOARD	2.6 MW x 2.5 MH	1	METER MISSING
353F3	〃 〃	2 MW x 2.2 MH	1	
354F3	〃 〃	2.5 MW x 2.1 MH	1	METER UNCOMPLETED
355F3~357F3	SWITCH BOARD	3.300 V 125 HP	3	
358F3~362F3	〃 〃	3.300 V 60 HP	5	358F3 AMMETER DAMAGE
363F3	EXCITER	110 V 30 KW 1750 R.P.M.	1	
364F3	MOTOR (FOR 363F3)	50 HP. 1750 R.P.M.	1	
365F3 367F3 369F3	EXCITER	110 V 13 KW 1450 R.P.M.	3	
366F3 368F3 370F3	MOTOR (FOR 365.367.369F3)	21 HP. 1450 R.P.M.	3	
371F3 373F3 375F3	EXCITER	110 V 16 KW 1450 R.P.M.	3	
372F3 374F3 376F3	MOTOR (FOR 371.373.375F3)	25 HP. 1450 R.P.M.	3	
NONE NUMBER	VALVE	GLOVE SIZE 150 mm FACE TO FACE 300 mm	1	
〃	〃	SLUICE 〃 350 〃 〃 〃 400 〃	1	
〃	〃	〃 〃 400 〃 〃 〃 450 〃	1	
〃	〃 (3 PCS)	〃 〃 550 〃 〃 〃 400 〃	1	
〃	〃 (3 PCS)	〃 〃 600 〃 〃 〃 500 〃	1	
〃	〃 (4 PCS)	〃 〃 900 〃 〃 〃 600 〃	1	
377F3	〃	〃 〃 400 〃 〃 〃 450 〃	1	
378F3	〃	〃 〃 400 〃 〃 〃 400 〃	1	
379F3	〃	〃 〃 400 〃 〃 〃 450 〃	1	
380F3~386F3	〃	〃 〃 400 〃 〃 〃 400 〃	7	
387F3 388F3	〃	〃 〃 150 〃 〃 〃 350 〃	2	
389F3	〃	GLOVE 〃 150 〃 〃 〃 350 〃	1	

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
390F3	VALVE	SLUICE SIZE 350 MM FACE TO FACE 400 MM	1	
391F3~398F3	〃	〃 〃 250 〃 〃 400 〃	8	
399F3 400F3	〃	GLOVE 〃 250 〃 〃 720 〃	2	
401F3	〃	〃 〃 150 〃 〃 520 〃	1	
402F3 403F3	〃	SLUICE 〃 150 〃 〃 340 〃	2	
404F3 405F3	〃	GLOVE 〃 250 〃 〃 720 〃	2	
406F3	〃	〃 〃 150 〃 〃 520 〃	1	
407F3 408F3	〃	SLUICE 〃 150 〃 〃 340 〃	2	
409F3 410F3	〃	CHECK 〃 250 〃 〃 600 〃	2	
411F3	〃	SLUICE 〃 175 〃 〃 270 〃	1	
412F3	〃	〃 〃 200 〃 〃 320 〃	1	
413F3	〃	〃 〃 175 〃 〃 270 〃	1	
414F3 415F3	〃	CHECK 〃 175 〃 〃 380 〃	2	
416F3	〃	SLUICE 〃 175 〃 〃 270 〃	1	
417F3	〃	CHECK 〃 175 〃 〃 275 〃	1	
418F3	〃	SLUICE 〃 175 〃 〃 370 〃	1	
419F3	〃	CHECK 〃 175 〃 〃 380 〃	1	
420F3 421F3	〃	SLUICE 〃 200 〃 〃 320 〃	2	
422F3	〃	〃 〃 175 〃 〃 270 〃	1	
423F3	〃	CHECK 〃 175 〃 〃 380 〃	1	
424F3	〃	SLUICE 〃 200 〃 〃 320 〃	1	
425F3	〃	〃 〃 175 〃 〃 270 〃	1	
426F3	〃	CHECK 〃 175 〃 〃 350 〃	1	

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
427F3	VALVE	SLUICE SIZE 200 mm FACE TO FACE 320 mm	1	
428F3	〃	〃 〃 175 〃 〃 270 〃	1	
429F3	〃	CHECK 〃 175 〃 〃 380 〃	1	
430F3	〃	SLUICE 〃 200 〃 〃 320 〃	1	
431F3	〃	〃 〃 175 〃 〃 270 〃	1	
432F3	〃	CHECK 〃 175 〃 〃 380 〃	1	
433F3~436F3	〃	SLUICE 〃 200 〃 〃 300 〃	4	
437F3	〃	〃 〃 150 〃 〃 270 〃	1	
438F3	〃	〃 〃 200 〃 〃 300 〃	1	
439F3~442F3	〃	GLOVE 〃 200 〃 〃 600 〃	4	
443F3~445F3	〃	SLUICE 〃 150 〃 〃 350 〃	3	
446F3 447F3	〃	〃 〃 150 〃 〃 300 〃	2	
448F3	〃	〃 〃 150 〃 〃 500 〃	1	
449F3~451F3	〃	GLOVE 〃 150 〃 〃 300 〃	3	
452F3	〃	SLUICE 〃 200 〃 〃 300 〃	1	
453F3 454F3	〃	〃 〃 250 〃 〃 300 〃	2	
455F3	〃	〃 〃 150 〃 〃 270 〃	1	
456F3	〃	GLOVE 〃 150 〃 〃 500 〃	1	
457F3~459F3	〃	SLUICE 〃 150 〃 〃 200 〃	3	
460F3~462F3	〃	GLOVE 〃 200 〃 〃 550 〃	3	
463F3 464F3	〃	〃 〃 150 〃 〃 500 〃	2	
465F3	〃	SLUICE 〃 200 〃 〃 400 〃	1	
NONE NUMBER	〃 (9 PCS)	GLOVE 16 MND	1	

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
NONE NUMBER	VALVE (13 PCS)	GLOVE 16 MMD	1	
"	" (3 PCS)	SLUICE "	1	
"	" (33 PCS)	GLOVE 21 MMD	1	
"	" (49 PCS)	" "	1	
"	" (4 PCS)	" "	1	
"	" (5 PCS)	SLUICE "	1	
"	" (47 PCS)	GLOVE 25 MM	1	
"	" (37 PCS)	" "	1	
"	" (15 PCS)	STOP "	1	
"	" (5 PCS)	GLOVE 38 MM	1	
"	" (20 PCS)	" "	1	2 SPINDLES DAMAGE
"	" (3 PCS)	" "	1	
"	" (44 PCS)	STOP "	1	HANDLES DAMAGE
"	" (4 PCS)	SLUICE "	1	
"	" (17 PCS)	GLOVE 50 MM	1	2 HANDLES DAMAGE
"	" (68 PCS)	" "	1	2 SPINDLES DAMAGE
"	" (7 PCS)	" "	1	
"	" (31 PCS)	STOP "	1	
"	" (16 PCS)	SLUICE "	1	
"	" (10 PCS)	" 65 MM	1	
"	" (24 PCS)	GLOVE 75 MM	1	3 HANDLES 2SPIN-DLES DAMAGE
"	" (13 PCS)	" "	1	
"	" (8 PCS)	SLUICE "	1	

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
NONE NUMBER	VALVE (3 PCS)	GLOVE 110 MMD	1	2 HANDLES DAMAGE
〃	〃 (26 PCS)	〃 〃	1	HANDLES DAMAGE
〃	〃 (10 PCS)	〃 〃	1	
〃	〃 (111 PCS)	SLUICE 〃	1	3 SPINDLES 12 HANDLES DAMAGE
〃	〃 (8 PCS)	〃 〃	1	
〃	〃 (3 PCS)	REGULATION 25 mm	1	
〃	〃 (3 PCS)	〃 50 mm	1	
〃	〃 (2 PCS)	〃 75 mm	1	
〃	〃 (3 PCS)	〃 100 mm	1	
〃	PIPE	GAS PIPE 21 MM¢ x 700 ML	1	
〃	〃	〃 28" x 700"	1	50 M DAMAGE
〃	〃	〃 34" x 355"	1	
〃	〃	DRAWN PIPE 40" x 300"	1	
〃	〃	GAS PIPE 48" x 100"	1	
〃	〃	DRAWN PIPE 50" x 90"	1	
〃	〃	〃 65" x 430"	1	
〃	〃	GAS PIPE 60" x 1400"	1	355 M DAMAGE
〃	〃	〃 60" x 550"	1	
〃	〃	〃 65" x 625"	1	
〃	〃	DRAWN PIPE 65" x 355"	1	
〃	〃	〃 65" x 285"	1	
〃	〃	〃 75" x 315"	1	
〃	〃	〃 75" x 130"	1	

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
NONE NUMBER	PIPE	GAS PIPE 76 MMD X 125 ML	1	
"	"	" 89 " X 560 "	1	215 M BOMB DAMAGE
"	"	DRAWN PIPE 90 " X 445 "	1	
"	"	GAS PIPE 114 " X 3560 "	1	650 M BOMB DAMAGE
"	"	" 114 " X 300 "	1	
"	"	DRAWN PIPE 115 " X 500 "	1	
"	"	" 115 " X 290 "	1	
"	"	GAS PIPE 165 " X 250 "	1	35 M BOMB DAMAGE
"	"	" 165 " X 120 "	1	
"	"	DRAWN PIPE 140 " X 225 "	1	
"	"	" 170 " X 230 "	1	
"	"	GAS PIPE 216 " X 200 "	1	
"	"	" 216 " X 350 "	1	
"	"	" 267 " X 295 "	1	
"	"	DRAWN PIPE 270 " X 280 "	1	
"	"	GAS RIPE 318 " X 25 "	1	
"	"	WELDED PIPE 350 " X 900 "	1	220 M BOMB DAMAGE
"	"	" 400 " X 145 "	1	15 M BOMB DAMAGE
"	"	" 600 " X 40 "	1	
"	"	" 700 " X 200 "	1	45 M BOMB DAMAGE
"	STEAM TRAP	FLOAT TYPE 19 MM	1	
"	STEAM TRAP (2 PCS)	" 25 MM	1	
TOTAL			529	

DECLASSIFIED E.O. 12065 SECTION 3.3(b), NARA DATE 12-18-95

HYDROGEN PURIFICATION PLANT

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
668F5 681F5	COMPRESSOR (FOR N2 GAS)	SINGLE ACTING CAP. 1860 $^{(13)}$/H DEL. PRESS. 200. $^{KG}/_{CM^2}$	2	
669F5 682F5	MOTOR (FOR 668. 681F5)	SYNCHRONOUS 3.300 V 730 HP. 120 R.P.M.	2	
670F5 683F5	COOLER (FOR 668. 681F5)	VERTICAL 1.65 $^{M\phi}$ × 2.4 ^{MH}	2	
671F5 684F5	COOLER "	VERTICAL 0.77 $^{M\phi}$ × 3.4 ^{MH}	2	
672F5 685F5	COOLER "	VERTICAL 0.66 $^{M\phi}$ × 3.4 ^{MH}	2	
673F5 686F5	DRAIN SEPARATOR	VERTICAL 2.4 $^{M\phi}$ × 1.45 ^{MH}	2	
674F5 687F5	DRAIN SEPARATOR	VERTICAL 2.2 $^{M\phi}$ × 1.43 ^{MH}	2	
675F5 688F5	DRAIN SEPARATOR	VERTICAL 0.5 $^{M\phi}$ × 2 ^{MH}	2	
676F5 689F5	DRAIN SEPARATOR	VERTICAL 0.37 $^{M\phi}$ × 1.7 ^{MH}	2	
677F5 690F5	DRAIN SEPARATOR	VERTICAL 0.3 $^{M\phi}$ × 1.7 ^{MH}	2	
678F5 691F5	VALVE	SLUICE SIZE 150 MM FACE TO FACE 500 MM	2	
679F5 692F5	SWITCH BOX	STAND TYPE 5~150 A	2	692F5 METER 80% DAMAGE
680F5 693F5	GAUGE (5 PCS)	FOR N_2 GAS PRESSURE GAUGE	2	693F5 GAUGE 60% DAMAGE
TOTAL			26	

SUBSTAION & DISTRIBUTION PLANT

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
47 (80)	TRANSFORMER	20 KVA 3.300 V/210-105 V	1	
47 (81)	〃	75 〃 〃	1	
47 (101) 47 (102)	〃	350 〃 44.000 V/3.450 V	2	
47 (103)	〃	75 〃 3,300 V/210-105 V	1	
47 (6)	PANEL	500 × 2,300 × 75 MM	1	METER & POWER-FACTOR MISSING
47 (7)	〃	〃 〃 〃	1	〃 〃
47(8) ~ 47(12)	CONTROL PANEL	〃 〃 〃	5	WATTHOUR METER MISSING
47 (13)	〃	〃 〃 〃	1	O.C.B. MISSING
47(14) ~ 47(17)	〃	〃 〃 〃	4	WATTHOUR METER MISSING
47(25)	〃	〃 〃 〃	1	VOLT METER BROKEN
47 (28)	〃	〃 〃 〃	1	
47(61) ~ 47(64)	〃	400 × 2,300 × 75 MM	4	RELAY AMMETER WATTMETER BROKEN
47(74) 47(75)	〃	400 × 800 × 40 MM	2	METER & LEVER SWITCH MISSING
47(90)	〃	〃 〃 〃	1	VOLT METER AMMETER MISSING
47(91)	〃	〃 〃 〃	1	VOLT METER LEVER SWITCH MISSING
47(96)	〃	〃 〃 〃	1	
47(97) ~ 47(100)	〃	600 × 2,300 × 40 MM	4	GLASS OF OVER CURRENTRELAY BROKEN
47(34) 47(35)	MERCURY ARC RECTIFIER	AC. 220 V DC. 100 V	2	AMMETER GLASS VALVE MISSING
47(65)	STATIC CONDENSER	3 φ 25 KVA 3.300 V	1	
47 (104)	〃 (2)	〃 〃 〃	1	
1136	〃 (12)	〃 〃 〃	1	
47(68) ~ 47(70)	CURRET LIMITING REACTOR	18 KVA 1 φ 3,300 V	3	

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
47(71) 47(73)	POLE OIL SWITCH (4)	3 ϕ 3,300 V 100 A	2	
47(78) 47(95)	〃	〃 〃 〃	2	47(78) 2 PCS
1138 - 1	〃	〃 〃 80 A	1	
1138 - 2	〃	〃 〃 100 A	1	
47 (85)	〃 (3)	〃 〃 200 A	1	
47 (85)	〃	〃 〃 60 A	1	
47 (37)	AUTO - TRANSFORMER	125 KVA 3 ϕ 3,300 V/220 V	1	
47(39) 47(40)	TRANSFORMER	3 KVA 3 ϕ 3,300 V/220 V	2	
47(76)	〃	50 〃 1 ϕ 〃	1	
47(77)(87)(92)	〃	25 〃 〃 〃	3	
47(94) 1139	〃	20 〃 〃 〃	2	
47(55)	INDUCTION VOLTAGE REGULATOR	100 KVA 3,300 V 1650 V	1	MOTOR MISSING
47(72)	〃	〃 〃 〃	1	
47(167)	〃	30 〃 3,300 V/300 ± 300	1	MOTOR MISSING
44 (180)	TRANSFORMER	350 〃 1 ϕ 44,000 V/3,300 V	1	
44 (181)	〃	200 〃 〃 〃	1	CORE & COIL MISSING
44 (182)	〃	〃 〃 〃	1	
47 (180)	〃	20 KVA 1 ϕ 3,300 V/210-105 V	1	
47(43) ~ 47(46)	CONTROL PANEL	400 x 2,300 x 75 MM	4	GLASS OF OVER RELAY BROKEN
140	CURRENT LIMITING REACTOR (6)		1	
47 (54)	POLE OIL SWITCH (4)	3 ϕ 3,300 V 100 A	1	
47 (58)	〃 (4)	〃 〃 〃	1	
47 (82)	〃	〃 〃 〃	1	

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
47 (83)	POLE OIL SWITCH (3)	3 ϕ 3,300 V 100 A	1	
47 (84)	" (2)	" " "	1	
1137 1141	"	" " "	2	
NONE NUMBER	BUS BAR	6 MM × 100 MM 500 ML	1	
			77	
TOTAL				

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WATER FEEDING PUMP PLANT

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
7F15 11F15	PUMP	CAP. 8.35 M3/MIN HEAD 75 M BORE 300 MM	2	
8F15	MOTOR (FOR 7F15)	220 HP. 3,300 V 1755 R.P.M.	1	
9F15	CONTROLLER (FOR 8F15)	3 φ 2ND. 1,000 V	1	
10F15	PUMP	RECIPRO SIZE 250×200×250 M.M	1	
12F15	SPEED REDUCER	1:47 250 HP	1	
13F15	DIESEL ENGINE	4 CYLINDERS 375 R.P.M 130 M.M D STROKE 155 M.M	1	
14F15	AIR COMPRESSOR	VERTICAL 1 HP CAP. UNKNOWN	1	
15F15	GASOLINE ENGINE (FOR 14F15)	CAP. R.P.M. UNKNOWN	1	
16F15	PUMP	BELT DRIVEN HEAD 15 M	1	
17F15	TANK	0.9 M φ × 1.2 MH CAP. 9 KL	1	
TOTAL			11	

ELECTRIC POWER STATION

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
1F21	BELT CONVEYER	CAP. 100T/H MOTOR 440V 15KW TRAVELLING DISTANCE 118M	1	BELT 150M MISSING FRAME 5M BROKEN
2F21~7F21	COAL FEEDER	TABLE TYPE CAP. 7T/H MOTOR 2HP	6	MOTOR MISSING
8F21~11F21	AUTOMATIC BALANCE FEEDER	HOPPER TYPE CAP. 10T/H	4	MANY PART MISSING
12F21~17F21	PULVERIZER	BONNET TUBE MILL TYPE 160HP CAP. 7T/H 200MESH 80~85% 900RPM	6	MOTOR MISSING
18F21~23F21	EXHAUST FAN	INVOLUTE TYPE 75HP CAP. 360M3/MIN PRESS. 400mmH2O	6	18F21 19F21 MOTOR MISSING
24F21	OIL PUMP FOR BURNER	ROTARY TYPE CAP. 28M3/H FEED 28M3/H	1	MOTOR MISSING
25F21~32F21	BURNER	VERTICAL TYPE NOZZLE 2 FEED PIPE 254mmφ	3	
33F21. 34F21	STEAM BOILER	SECTIONAL HEADER TYPE CAP. 65T/H PRESS. 35Kg/cm2	2	
35F21.36F21	SUPER HEATER	HORIZONTAL LOOP TYPE HEATING SURFACE 300M2	2	
37F21.38F21	ECONOMIZER	HEATING TUBE TYPE HEATING SURFACE 455M2	2	
39F21.40F21	AIR HEATER	PLATE TYPE HEATING SURFACE 2,000M2	2	
41F21~44F21	FORCE DRAUGHT FAN	MULTI VANE TYPE 90HP CAP. 900M3/MIN. PRESS. 200mmH2O	4	
45F21~50F21	INDUCED DRAUGHT FAN	MULTI VANE TYPE 175HP CAP. 1,650 M3/MIN PRESS. 200mmH2O	6	49F21 COIL DAMAGE
51F21. 52F21	CHIMNEY AND FLUE DUCT	STEEL PLATE 3.5MφX17.5MH. 6.3MWX1.5MH	2	
53F21. 54F21	SOFTENING DEVICE OF FEED WATER	2.7Mφ X 2.4MH	2	MEDICAL LIQUID SOL'. TANK MISSING
55F21. 56F21	RAW WATER PUMP	ROTARY TYPE 10HP CAP. 120M3/H HEAD 12M	2	MOTOR MISSING
57F21. 58F21	SEA WATER PUMP	ROTAPY TYPE 7.5HP CAP. 85M3/H HEAD 12M	2	MOTOR MISSING
59F21. 60F21	STEAM REDUCER AND DISUPER HEATING DEVICE	CAP. 55T/H MOTOR 15HP	2	MOTOR MISSING
61F21	BOILER FEED WATER TANK	SPHERICAL TYPE CAP. 30M3 3Mφ X 5MH	1	
62F21. 63F21	BOILER FEED WATER PUMP	6 STAGES TURBINE STEAM TURBINE DRIVEN CAP. 165T/H. PRESS. 33Kg/cm2	2	
64F21. 65F21	SPECIAL GAUGE AND BOARD OF BOILER	STEAM FLOW METER ETC.	2	ALL METER BROKEN
66F21	SPECIAL GAUGE FOR TURBINE ROOM	GAUGE BOARD ETC.	1	"
67F21	SPECIAL GAUGE FOR STEAM CONVERTER AND EVAPORATOR	GAUGE BOARD ETC.	1	"

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
44(45)	PIPING FOR BOILER ROOM	MAIN STEAM PIPE ETC	1	
68F21.69F21	JET PUMP	ROTARY TYPE CAP. $5M^3/MIN$. HEAD 20^M	2	MOTOR MISSING
70F21.71F21	ASH HANDLING MECHANISM	CAP. 15T/H 15HP CHANE $430^{mm}W \times 8.5^{ML}$	2	〃
44(99) 44(196)	PIPING AND SCREEN FOR ASH HANDLING EQUIPMENT	CAST IRON $200^{mm}\phi \times 105^{ML}$ VALVE, SCREEN ETC.	2	
72F21.73F21	STEAM TURBINE	EXTRACTION TYPE 3.600RPM CAP. 4.000KW PRESS $33^{Kg/cm^2}$	2	GOVERNER.MOTOR MISSING
74F21.75F21	TURBO GENERATOR	T.A.E TYPE CAP. 5.000 KVA 3300^V 3.600RPM	2	DIAL.THERMOMETER BROKEN
76F21.77F21	EXCITER	S.T.E. 207 D.C. 30KW 3,600RPM 110^V	2	CARBON BRUSH MISSING
78F21.79F21	AIR COOLER	COOLING AREA $280M^2$	2	
80F21	TEMPERATURE INDICATOR PANEL	MARBLE INDICATOR $0 \sim 120^{\circ}C$	1	INDICATOR BROKEN
81F21.82F21	CONDENSER	HORIZONTAL SURFACE CONDENSER COOLING AREA $400M^2$	2	7.5HP MOTOR MISSING
83F21~86F21	CONDENSATE PUMP	CAP. $25^{M^3/MIN}$ SUC. 120^{mm} DEL. 75^{mm}	4	〃
87F21.88F21	AIR EJECTOR	2 STAGE STEAM EJECTOR TYPE STEAM PRESS. $33^{Kg/cm^2}$	2	
89F21~91F21	STEAM CONVERTOR	$1.6M\phi \times 10^{ML}$ HEATING SURFACE $315M^2$	3	
92F21	1ST FEED WATER PREHEATER	$750^{mm}\phi \times 2.9^{ML}$ HEATING SURFACE $30M^2$	1	
93F21	2ND FEED WATER PREHEATER	$1M\phi \times 3.9^{ML}$ HEATING SURFACE $50M^2$	1	
94F21.95F21	CONDENSATE WATER PUMP FOR STEAM CONVERTOR	VOLUTE PUMP TYPE CAP. $75^{M^3/MIN}$ 1,800RPM	2	10HP MOTOR MISSING
96F21.97F21	MAIN EVAPORATOR UTILIZING EXHAUST GAS	KARANDRIA CAP. 20T/H HEATING AREA $160M^2$	2	
98F21	1ST FEED WATER PREHEATER FOR EVAPORATOR	HORIZONTAL HEATING AREA $40M^2$	1	
99F21~101F21	MAIN EVAPORATOR	KARANDRIA $1.8M\phi \times 4MH$ CAP. 22T/H HEATING AREA $75M^2$	3	
102F21	EVAPORATOR FOR CONDENSER	COOLING APEA $320M^2$ $1.5M\phi \times 4ML$	1	
103F21	COOLER FOR EXTRACTION PUMP	STEAM EJECTER TYPE $500^{mm}\phi \times 1.5^{ML}$	1	
104F21	2ND FEED WATER PREHEATER FOR EVAPORATOR	HORIZONTAL SURFACE HEATING TYPE HEATING AREA $5M^2$	1	
105F21.106F21	FEED PUMP FOR EVAPORATOR VACUUM PUMP	CAP. $50^{M^3/H}$ DIA. 100^{mm}	2	20HP MOTOR MISSING

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
107F21	CONDENSATE PUMP FOR EVAPORATOR CONDENSER	VOLUTE PUMP CAP. $30^{M^3/H}$ DIA. SUC = 130^{mm} DEL = 75^{mm}	1	10 HP MOTOR MISSING
108F21. 109F21	BRINE PUMP	VOLUTE PUMP CAP. $30^{M^3/H}$ DIA. SUC = 50^{mm} DEL = 38^{mm}	2	2 HP MOTOR MISSING
110F21. 111F21	CONDENSATE PUMP	VOLUTE PUMP CAP. $30^{M^3/H}$ DIA. SUC = 130^{mm} DEL = 75^{mm}	2	5 HP MOTOR MISSING
112F21	AIR SEPARATER	HORIZONTAL. CYLINDRICAL CAP. $130^{M^3/H}$ $1.8^{M}\phi \times 4^{ML}$	1	
113F21	VENT CONDENSER	HORIZONTAL. CYLINDRICAL COOLING AREA 15^{M^2} $0.5^{M}\phi \times 1.5^{ML}$	1	
114F21	OIL PURIFIRE	CAP. $200^{GAL/H}$ 1HP	1	MOTOR MISSING
115F21	ATMOSPHERIC RELIEF VALVE	ACTION STEAM PRESS $11^{Kg/cm^2}$ CAP. 50 T/H	1	
116F21	〃	ACTION STEAM PRESS $6^{Kg/cm^2}$ CAP. 50 T/H	1	
44(46)	PIPING FOR TURBINE ROOM	STEAM PIPE AND WATER PIPE ETC.	1	
117F21. 119F21 121F21.	COOLING WATER PUMP	CAP. $200^{M^3/MIN}$ HEAD 20M BORE 500^{mm} 870RPM	3	
118F21. 120F21 122F21.	INDUCTION MOTOR	230HP 870RPM	3	
NONE NUMBER	3 PCS VALVE	GATE SIZE 500^{mm} FACE TO FACE 500^{mm}	1	
〃	3 〃 〃	〃 〃 482^{mm} 〃 500^{mm}	1	
〃	PIPE	WELDING PIPE 452^{mm} O.D. X 45ML	1	
〃	〃	〃 (UNDER GROUND) 760^{mm} O.D. X 480ML	1	
123F21. 124F21	AUTOMATIC VOLTAGE REGULATOR PANEL	STEEL PLATE D.C. 110^{V}	2	RELAY BROKEN
125F21. 126F21	FIELD SWITCH PANEL AND GENERATOR FIELD RHEOSTAT	D.C. 110^{V} MOTOR OPERATED	2	CONTROL MOTOR FUSE SIGNAL MISSING AMP. LAMP SHUNT
127F21. 128F21	MAIN SWITCH BOARD (GENERATOR)	SHEET IRON PANEL $0.6^{M} \times 2.3^{M} \times 75^{mm}$	2	CONTROL MOTOR FUSE SIGNAL MISSING METER & RELAY BROKEN
129F21	MAIN SWITCH BOARD (TIE LINE)	〃 〃 $0.5^{M} \times 2.3^{M} \times 75^{mm}$	1	WATT HOUR METER MISSING
130F21 ~ 132F21	MAIN SWITCH BOARD (MAIN STATION SERVICE)	〃 〃 $0.4^{M} \times 2.35^{M} \times 75^{mm}$	3	METER AND RELAY BROKEN
133F21	MAIN SWITCH BOARD (STATION TRANSFORMER)	〃 〃 〃	1	RELAY METER AND LAMP BROKEN
134F21	MAIN SWITCH BOARD (COAL HANDLING PLANT TRANSFORMER)	〃 〃 $0.4^{M} \times 2.55^{M} \times 75^{mm}$	1	AC METER WATT HOUR METER MISSING
187F21 ~ 189F21	REACTOR	TYPE RT-2 1 PHASE 3300^{V} 60 CYCLE 100KVA	3	

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
190F21	2 STATIC CONDENSER	25KVA 3φ 3,300V	1	
191F21	PANEL	4 MARBLE PANEL 0.6M x 3M x 40m/m	1	METER MISSING
135F21. 136F21	LAMP SIGNAL DEVEICES	D.C. 110V	2	SIGNAL LAMP MISSING SWITCH BROKEN
137F21. 138F21	SWITCH CUBICLE	SHEET IRON SWITCH CUBICLE WITH O.C.B. 30A. A.C. METER ETC.	2	〃 〃
139F21. 140F21	〃	〃 〃 〃 〃 75A. 〃	2	139F21 SIGNAL LAMP MISSING
141F21. 142F21	〃	〃 〃 〃 〃 30A. 〃	2	GLASS OF RELAY BROKEN
143F21. 144F21	〃	〃 〃 〃 〃 75A 〃	2	〃
145F21. 146F21	〃	〃 〃 〃 〃 30A 〃	2	〃
147F21. 148F21	〃	〃 〃 〃 〃 75A 〃	2	
149F21. 150F21	〃	〃 〃 〃 〃 30A 〃	2	
151F21. 152F21	〃	〃 〃 〃 〃 75A 〃	2	
153F21	〃	〃 〃 〃 〃 100A 〃	1	
154F21	〃	〃 〃 〃 〃 150A 〃	1	
155F21. 156F21	〃	〃 〃 〃 〃 100A 〃	2	
157F21. 158F21	〃	〃 〃 〃 〃 30A 〃	2	158F21 RELAY BROKEN
159F21. 160F21	〃	〃 〃 〃 〃 75A 〃	2	
161F21. 162F21	〃	〃 〃 〃 〃 30A 〃	2	RELAY BROKEN
163F21. 164F21	〃	〃 〃 〃 〃 75A 〃	2	164F21 4-RELAY BROKEN
165F21~172F21	CONTROL DESK BOARD	SHEET IRON DESK BOARD WITH 3 CONTROL SWITCH ETC.	8	SIGNAL LAMP BROKEN
173F21. 174F21	〃	34 〃 〃	2	〃
175F21. 176F21	MOTOR GENERATOR	511.25 KW 1,732 R.P.M.	2	A.C. MOTOR AND D.C. EXCITER MISSING
177F21. 178F21	PANEL	1-MARBLE PANEL WITH VOLT AMP. METER ETC.	2	RECTIFIER MISSING
179F21	MERCURY ARC RECTIFIER	TYPE M35-12-20	1	

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
198F21	PANEL	3 SECTION MARBLE BOARD WITH METER AND SWITCH ETC.	1	
180F21	BUS BAR	COPPER 6 mm x 100 mm x 120 ML	1	
181F21	MAIN CABLE	SINGLE CONDUCTOR 400 mm² x 120 ML	1	
182F21	OVER HEAD TRAVELLING CRANE	CAP. 20T WITH 20. 15. 10. 5 KW MOTOR	1	WIRE ROPE MISSING
183F21	TRANSFORMER	TYPE H.C.R. 200 KVA 1 ϕ 3300 V/210.105	1	
192F21. 193F21 194F21.	〃	TYPE H.C.R. 200 KVA 1 ϕ 3300 V/210. 105	3	
185F21	〃	50 KVA 1 ϕ 3300 V/210, 105	1	
186F21	〃	5 KVA 1 ϕ 3300 V/210, 105	1	
TOTAL			202	

BUTHANOL DEHYDRO POLYMERIZATION PLANT

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
374F9 ~ 4182F9	BUTHYLENE TANK	CAP. 52 KL 2.5 MΦ × 10.5 ML	9	
189F9 ~ 214F9	〃	〃 〃 〃	16	
TOTAL			25	

TRANSPORT PLANT

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUAN-TITY	REMARKS
613	TRAM WAY	8 Kg 3,120 ML	1	
TOTAL			1	

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METHANE CRACKING PLANT

INV. NO.	NAME OF MACHINERY	BRIEF SPECIFICATIONS	QUANTITY	REMARKS
143FS 145FS	THYSENS WASHER	CENTRIFUGAL CAP. 333 M^3/MIN PRESS. 50 mm/W.G. 125 HP	2	
144FS 146FS	MOTOR (FOR 143FS 145FS)	INDUCTION 125HP. 900 R.P.M.	2	
149FS 151FS	AIR BLOWER	TURBOFAN CAP. 667 M^3/MIN PRESS 400 mm/W.G. 125 HP	2	
150FS 152FS	MOTOR (FOR 149FS 151FS)	INDUCTION 125HP 1.800 R.P.M	2	
155FS 157FS	WASTE GAS BLOWER	TURBOFAN CAP. 400 M^3/MIN 250°C PRESS 120 mm/W.G. 20 HP.	2	
156FS 158FS	MOTOR (FOR 155FS 157FS)	INDUCTION 20 HP. 1200 R.P.M.	2	
159FS	PUMP (FOR WATER FEED BOILER)	TURBINE CAP. 125 L/MIN PRESS 30 M/W.G. 3 HP 5 STAGE	1	MOTOR MISSING
160FS	HOT WATER PUMP	TURBINE CAP. 5 M^3/MIN PRESS 2.0 M/W.G 60 HP	1	
161FS	MOTOR (FOR 160FS)	INDCTION 60 HP 1800 R.P.M.	1	
162FS 164FS	COLD WATER PUMP	TURBINE CAP. 5 M^3/MIN PRESS 45 M/W.G 100 HP	2	
163FS 165FS	MOTOR (FOR 162FS 164FS)	INDUCTION 3,300 V 100 HP 1,800 R.P.M.	2	
166FS 168FS	WASTE WATER PUMP	TURBINE CAP. 1.65 M^3/MIN PRESS 11.2 M/W.G 7.5 HP	2	
167FS 169FS	MOTOR (FOR 166FS 168FS)	INDUCTION 7.5 HP 1,800 R.P.M.	2	
172FS 173FS	AIR COMPRESSOR	RECIPROCATING 40 HP. CAP. 6.31 M^3/MIN PRESS 7 KG/CM^2	2	MOTOR MISSING
174FS	AIR ACCUMULATOR	VERTICAL CAP. 12 M^3 PRESS 6 KG/CM^2	1	
175FS	AUTOMATIC PRESSURE REGULATOR	ASCANIA TYPE	1	
199FS	FUEL GAS HOLDER	VERTICAL CAP. 5,000 M^3 PRESS 200 mm/W.G 20.1 MD	1	BODY 30% DAMAGE BY BOMBING
200FS	CO_2 GAS HOLDER	VERTICAL CAP. 2.000 M^3 PRESS 200 mm/W.G 16 MD	1	BODY 10% DAMAGE BY BOMBING
201F3	RAW GAS HOLDER	VERTICAL CAP. 5,000 M^3 PRESS 200 mm/W.G 20.1 MD	1	BODY 10% DAMAGE BY BOMBING
TOTAL			30	
SUM TOTAL			1543	

Plan for

Synthetic Ammonium Plant

and

Ammonium Chloride Fertilizer Plant

Tokuyama Soda Co., Ltd.

September, 1949

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I. Significance of the project

A. History of the project

It is needless to say that the manufacture of ammonium chloride fertilizer is essential to the economical management of ammonia soda industry as is widely known to the experts concerned. Realizing the importance of this project, this company had made necessary preparation to build synthetic ammonia plant by 1939 when the development of Sino-Japanese incident made it impossible to purchase the main machines. In consequence, the project had to be abondoned.

Since 1935, we have a number of our laboratory staff engaged in the experiments of manufacturing ammonium chloride and ascertaining its fertilizer effect. In July, 1941 we received bounty from the Ministry of Commerce & Industry to build a pilot plant. Various researches were made while we put out 150 tons between February and May, 1942, with the plant of 2 tons per day.

We first tried Schreib process. By keeping free ammonia at 3% and by cooling mother liquor with salt, precipitating ammonium chloride was easily obtained.(1) There was, however, a problem because the filtrate, after ammonium chloride is filtered out, contained too much ammonium chloride and other impurities to make sodium bicarbonate therefore. We, therefore, tried later the evaporation process. Corrosion is the problem in this process. By our basic researches on corrosion, we discovered that the addition of phosphates could successfully prevent the corrosion in manufacturing, for which we have a patent pending.(2)

We also have a patent with regard to moisture-absorbing problem of ammonium chloride.(3) By granulating, the surface area of ammonium chloride can be made much less and hygroscopy can be decreased.

By way of preventing the solidification of ammonium chloride, the addition of calcium carbonate has been contrived. The addition of calcium acid phosphates also serves this purpose.

Since the end of the war, our soda plant was rehabilitated and at the same time this project had been closely examined before we formulated this project.

Although we have no equipment for making synthetic ammonia, we have ascertained that, by utilizing idle equipment of former army fuel plant at Iwakuni, we can complete the equipment for manufacturing synthetic ammonia. This is why the synthetic ammonia has been included in this project.

B. Fertilizer effect of ammonium chloride

Since 1941, researches in the fertilizer effect of ammonium chloride were made at the Imperial University of Tokyo.(4) We also made experiments at Tokuyama on 1,000-tsubo land as well as pots in a laboratory to ascertain the fertilizer effect of ammonium chloride and its blended fertilizers.(5)

With regard to paddy, which is the main agricultural product in Japan and for which the majority of fertilizer is consumed, ammonium chloride is considered a more perfect fertilizer than ammonium sulphate by the Japanese scholars' circle. Frequently, ammonium sulphate has its sulphate reduced to sulphide and consequently does paddy a serious harm. On the other hand, chlorides strengthen the stems and leaves of plants and helps resist bacilli, insects and storm. This applies to other plants, especially textile plants where strength is required. Dr. Russel of England is also agreed with us and says that chlorides are better in areas where rain-fall is much.(6) In Japan whose rain-fall is more than

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that of England, ammonium chloride is considered no less effective than ammonium sulphate.

(1) "Manufacturing method of ammonium chloride" in the Laboratory Report of Tokuyama Soda Co., Vol.I

(2) Japanese patent pending for manufacturing method of ammonium chloride from mother liquor of ammonia soda process with the use of phosphates.

(3) Japanese patent for manufacturing method of granulated ammonium chloride.

(4) "Experiments of fertilizer effect of ammonium chloride" in the agricultural Department Report of Imperial University of Tokyo, Vol. II

(5) "Researches in the fertilizer effect of ammonium chloride" in the Laboratory Report of Tokuyama Soda Co., Vol. II

(6) "Plant nutrition and crop production," by Dr. Russel.

II. Synopsis of the project

A. Synthetic ammonia

The synthetic ammonia plant requires a capacity of 13,200 tons per year to produce 50,000 tons fertilizer when the usual loss of ammonia in soda plant is taken into account. The high pressure hydro-cracking equipment in the former army fuel plant at Iwakuni remains entirely intact through the bombing. With some minor repair job, the conversion to synthesis of ammonia can be accomplished at no big amount of expense. This plant may be used as ammonia synthesis plant with small reconstruction, rearrangement of pipe and repairing of machines and buildings. The capacity of the plant, as for ammonia, is estimated 40 tons per day under present condition. If we multiply twice the capacity of crude gas plant, we can produce 80 tons per day ammonia. This corresponds to 100,000 tons of 20.6% nitrogen fertilizer.

In view of the insufficient electric power in Yamaguchi Prefecture, we shall, in stead of electrolytic process, take up water gas

process using coke for material, and copper lye process to refine the gas. Fauser system will be taken up at 300 atmospheric pressure to make synthetic ammonia. Our first project is a plant with a capacity to manufacture 40 tons of ammonia per day, equivalent to app, 50,000 tons in term of ammonium sulphate. The ammonia thus manufactured at Iwakuni is sent to soda plant at Tokuyama in the form of ammonia water and ammonium carbonate solution for soda manufacturing by our tank boat.

B. Ammonium chloride fertilizer

On top of existing equipment of ammonia soda process will be added ammonium chloride manufacturing equipment consisting of reaction tank, separator & drier for calcium carbonate; evaporator, crystallizor, separator & drier for ammonium chloride crystallization; evaporator, separator & drier for salt recovery. The existing equipment of our company can be utilized for most of these purposes.

III. Synopsis of the Method of Manufacture

A. Synthetic Ammonia

Following is the method for making synthetic ammonia as adopted in this project.

Material hydrogen is made with P.G.C. water-gas producer using coke for its material. Water gas is then mixed with producer gas to make up the ratio of hydrogen and nitrogen 3 : 1. This crude gas is de-sulphurized by dry process. Hydrogen content is increased by converting carbon monoxide to carbon dioxide with P.G.C. converter. This converted gas is compressed at 300 atmospheric pressure through copper lye washer and ammonia washer. Carbon monoxide and dioxide are absorbed in the course of refining process. The refined gas is made into ammonia through Fauser synthesis tower and the ammonia is put into tank boat and carried to soda plant.

B. Ammonium chloride rertilizer

Several methods are contrived to make ammonium chloride in ammonia soda process. In the present project, mother liquor is taken at as high concentration as possible arter sodium bicarbonate is separated and most of such liquor will be used as material liquid ror making ammonium chloride. A part or waste liquor distillation in the ammonia soda process is added thereto so as rree ammonia in the mother liquor is approximately in an equivalent portion with calcium chloride in the waste liquor. The rree ammonia then turns into ammonium chloride and precipitated calcium carbonate gets crystalized. The calcium carbonate, arter separated and dried, is mixed with rinished ammonium chloride to keep it dry. After calcium carbonate is separated, the riltrate (mother liquor) is mixed with cycling liquid and boiled up to halr its quantity and then cooled to 15°C to get precipitating ammonium chloride. After ammonium chloride is separated, the remaining liquid contains ammonium and salt in about the same proportion as in the original liquor. Therefore, it can be utilized with the mother liquor. This is what we have Patent No. 131341 ror.

With an equipment to produce 150 tons soda ash per day, about 150 tons ammonium chloride can be manuractured, but we estimate the production or ammonium chloride at 125 tons per day. With the arore-said calcium carbonate added, ammonium chloride rertilizer containg 20.6% nitrogen is manuractured at the rate or 150 tons per day.

IV. Characteristics or the Method or Manuracturing Ammonium chloride Fertilizer under this project

There will be no objection to the manuracture or ammonium chloride rertilizer in view or scarcity or materials ror making sulphuric acid, requirement ror increased production or nitrogen rertilizer, and the necessity or complete utilization or chlorine and sodium

contents in salt used in ammonia soda industry.

Synthesis or ammonia is a well known industry and no explantion is necessary. Quite a rew methods or making ammonium chloride are made public, each having merits and demerits. The characteristics of the method we are to take up follow :-

(1) No material salt of high purity is required as in Zahn process. The same quality of salt as is now used in ammonia soda plant well do.

(2) Ammonium chloride is crystalized when cooled to atnospheric temperature.

(3) The evaporation-process has a disadvantage or corrosion or evaporators due to the decomposition or ammonium chloride. The free ammonia in the liquor is eliminated by the addition or a part or the distillation waste liquor to the mother liquor. The corrosion is remarkably decreased by the addition or phosphate, ror which we have a patent pending. Thus corrosion problem is rairly settled in our company.

(4) Ammonia soda industry being a highly rabricated one, the manurac-turing or soda will be put to a great disadvantage of complicated with additional cycling process or ammonium chloride. In our project, manuracturing or soda and manuracturing or ammonium chloride are independent of each other is operation.

(5) In our project, the rate or utilization or salt is set at app. 94% in consideration or its loss in cycling process and minimized steam consumption. The rate is theoretically 100%.

(6) In consideration or future use or recovered salt and Brine in the country, Schreib system or Zahn process requiring pure salt is not suitable.

DECLASSIFIED E.O. 12065 SECTION 3 (E)(1) MAR 1978

V. Profit & Loss

A) Cost Calculation of Ammonia

Item	When production 40 tons per day			When production 80 tons per day			Remarks
	Quantity per ton	@	Amount in yen	Quantity per ton	@	Amount in yen	
Coke	2.39	6,000	14,340	2.006	6,000	12,040	
Coal	5.00	2,000	10,000	5.05	2,000	10,100	Use for steam & elec. power
Elec. power	820 KWH	1.75	1,435	890	1.75	1,558	Purchase
Maintenance			5,750			4,267	
Labor			6,500			4,620	[illegible]0 & 850 men/day
Overhead exp.			4,450			2,644	
Depreciation			2,360			2,660	Depreciation in 10 years
Rent			1,020			693	
Interest			2,570			2,890	10% per annum
Freight			450			450	
TOTAL			48,875			41,922	

B) Cost Calculation of Ammonium Chloride Fertilizer

Item	Quantity per ton	When production 150 tons per day @	Amount in yen	When production 300 tons per day @	Amount in yen	Remarks
	T					
Ammonia	0.280	48,875	13,685	41,922	11,738	
Steam	2.9	700	2,030	700	2,030	for evaporation
Coal	0.166	2,000	332	2,000	332	for drying product 4,200 Cal.
Elec. power	66 KWH	1.75	116	1.75	116	
Maintenance			524		387	
Labor			559		453	200 & 300 men/day
Overhead exp.			310		233	
Depreciation			198		172	
Interest			500		344	
Total			18,254		15,805	
Cost for recovered salt	0.250	5,752	-1,438	5,360	-1,340	
NET TOTAL COST			16,816		14,465	

C. Cost Calculation of Soda Ash

a) When production 150 tons per day

Item	When ammonium chloride fertilizer is not manufactured			When ammonium chloride fertilizer is manufactured		
	Quantity per ton	@	Amount in yen	Quantity per ton	@	Amount in yen
Salt	1.65	3,080	5,082	1.27	3,080	3,912
Ammonia	5 kg	59,000	295	5 kg	48,875	244
Limestone	1.30	690	897	0.713	690	492
Coke	0.19	6,000	1,140	0.099	6,000	594
Coal	0.30	4,800	1,440	0.30	4,800	1,440
Steam	2.50	700	1,750	0.553	700	387
Elec. power	200KWH	1.75	350	100 KWH	1.75	175
Labor			1,800			1,129
Maintenance			1,824			1,689
Gen. exp.			1,125			742
Depreciation			60			43
Business exp.			700			471
Packing			1,850			1,850
Total			18,313			13,168
Cost for recovered salt			-	0.250	5,752	∔1,438
NET TOTAL COST			18,313			14,606

b) When production 300 tons per day

Item	When ammonium chloride fertilizr is not manufactured			When ammonium chloride fertilizer is manufactured		
	Quantity per ton	@	Amount in yen	Quantity per ton	@	Amount in yen
	T			T		
Salt	1.65	3,080	5,082	1.27	3,080	3,912
Ammonia	5 kg	59,000	295	5 kg	41,922	210
Limestone	1.30	690	897	0.713	690	492
Coke	0.19	6,000	1,140	0.099	6,000	594
Coal	0.30	4,800	1,440	0.30	4,800	1,440
Steam	2.50	700	1,750	0.553	700	387
Elec. power	200KWH	1.75	350	100KWH	1.75	175
			1,493			970
Labor			1,123			850
Maintenance			1,067			625
Gen. exp.			33			24
Depreciation			401			300
Business exp.			1,850			1,850
Packing			16,921			11,829
Total			-	0.250	5,360	41,340
Cost for recovered salt			16,921			13,169
NET TOTAL COST						

DECLASSIFIED E.O. 12065 SECTION 3 (E)(2), MAR 6, 1978

D. Estimated Profits per Month

a) Estimated Profits per Month (150 T/D)

Ammonium Chloride Fertilizer

4,170 tons sold	@¥17,440	¥72,724,800	
" " cost	"¥16,816	¥70,122,720	¥2,602,080

Soda Ash

4,170 tons sold	@¥15,000	¥62,550,000	
" " cost	"¥14,606	¥60,907,020	¥1,642,980
Profit subject to taxation ----------			¥4,245,060

b) Estimated Profit per Month (300 T/D)

Ammonium Chloride Fertilizer

8,340 tons sold	@¥17,440	¥145,449,600	
" " cost	"¥14,465	¥120,638,100	¥24,811,500

Soda Ash

8,340 tons sold	@¥15,000	¥125,100,000	
" " cost	"¥13,169	¥109,829,460	¥15,270,540
Profit subject to taxation ----------			¥40,082,040

DECLASSIFIED E.O. 12065 SECTION 3 (b), NARS Date

VI. Necessary Funds and Materials for Construction

A) Ammonia synthesis plant

Note : 1st project : 50,000 tons ammonium chloride fertilizer
2nd " : 100,000 " " " "

(1) Land

Item	Material (iron & steel) in ton			Required expense in 1,000 yen		
	1st	2nd	Total	1st	2nd	Total
Leveling	10	0	10	1,500	0	1,500

(2) Buildings and other structures

Item	Material (iron & steel) in ton			Required expense in 1,000 yen		
	1st	2nd	Total	1st	2nd	Total
Water gas plant	15	540	555	13,650	16,260	29,910
Producer gas plant	10	0	10	3,440	0	3,440
CO conversion plant	18	98	116	3,880	26,100	29,980
Synthesis plant	60	50	110	30,200	2,100	32,300
Substation	10	0	10	800	0	800
Water station	5	0	5	700	0	700
Power plant	25	0	25	11,000	0	11,000
Machine shop	50	0	50	2,000	0	2,000
Storehouse	50	0	50	3,050	0	3,050
Miscellaneous	107	112	219	8,980	1,390	10,370
TOTAL	350	800	1,150	77,700	45,850	123,550

(3) Machine & equipment

Item	Material (iron & steel) in ton			Required expense in 1,000 yen		
	1st	2nd	Total	1st	2nd	Total
Water gas producer	100	903	1,003	29,000	129,800	158,800
Gas producer	80	0	80	8,000	0	8,000
CO converter	74	376	450	23,500	55,230	78,730
CO_2 removal	15	25	40	25,800	6,500	32,300
CO "	10	215	225	6,000	26,900	32,900
Ammonia synthesis	155	145	300	30,000	40,000	70,000
Electric facilities	73	52	125	17,000	20,000	37,000
Water facilities	20	0	20	3,000	0	3,000
Power plant	100	0	100	29,500	0	29,500
Transportation facilities	160	40	200	41,100	16,500	57,600
Machine shop	40	0	40	10,000	0	10,000
Miscellaneous	123	44	167	2,000	1,600	3,600
TOTAL	950	1,800	2,750	224,900	296,530	521,430

(4) Summation

Item	Material (iron & steel) in ton			Required expense in 1,000 yen		
	1st	2nd	Total	1st	2nd	Total
Land as in (1)	10	0	10	1,500	0	1,500
Building and other structure as in (2)	350	800	1,150	77,700	45,850	123,550
Machines and equipment as in (3)	950	1,800	2,750	224,900	296,530	521,430
Miscellaneous	90	0	90	25,900	17,620	43,520
TOTAL	1,400	2,600	4,000	330,000	360,000	690,000

B) Ammonium chloride fertilizer plant

(1) Land --- Tokuyama Soda Co., Ltd., 8355 Tokuyama, Tokuyama City.

(2) Buildings and other structures

Item	Material (iron & steel) in ton			Required expense in 1,000 yen		
	1st	2nd	Total	1st	2nd	Total
Distillation waste filtering plant	0	0	0	0	2,000	2,000
Evaporation plant	50	0	50	14,000	3,000	17,000
Reaction, filtering, drystalling plant	50	0	50	7,400	2,000	9,400
Drying plant	60	60	120	6,200	3,000	9,200
TOTAL	160	60	220	27,600	10,000	37,600

(3) Machines & equipment

Item	Material (iron & steel) in ton			Required expense in 1,000 yen		
	1st	2nd	Total	1st	2nd	Total
Reaction & filtering plant	49.5	32.5	82.0	1,840	1,095	2,935
Calcium carbonate drying plant	47.0	0	47.0	2,260	0	2,260
Evaporation plant	481.6	400.5	882.1	44,150	29,280	73,430
Crystallisation & separation plant	28.3	70.4	98.7	6,480	5,300	11,780
Ammonium chloride drying plant	61.6	73.6	135.2	3,300	3,540	6,840
Refrigeration plant	0	1.3	1.3	0	60	60
Electric jobs	9.0	5.0	14.0	2,000	1,000	3,000
Miscellaneous	18.0	0	18.0	7,370	4,715	12,085
TOTAL	695.0	583.3	1,278.3	67,400	45,000	112,400

(4) Summation

Item	Material (iron & steel) in ton			Required expense in 1,000 yen		
	1st	2nd	Total	1st	2nd	Total
Buildings & other structures as in (2)	160	60	220	27,600	10,000	37,600
Machines & equipment as in (3)	695	583.3	1,278.3	67,400	45,000	112,400
Other misc. charge	0	0	0	5,000	5,000	10,000
TOTAL	855	643.3	1,498.3	100,000	60,000	160,000

IX. Funds

Funds required ;- (unit in 1,000 yen)

	1st project	2nd project	Total
For construction of ammonia synthesis plant	330,000	360,000	690,000
For construction of ammonium fertilizer plant	100,000	60,000	160,000
For operation	50,000	170,000	220,000
TOTAL	480,000	590,000	1,070,000

Method to raise the funds ;-

Construction to be financed by the counter part funds and operation by loar.

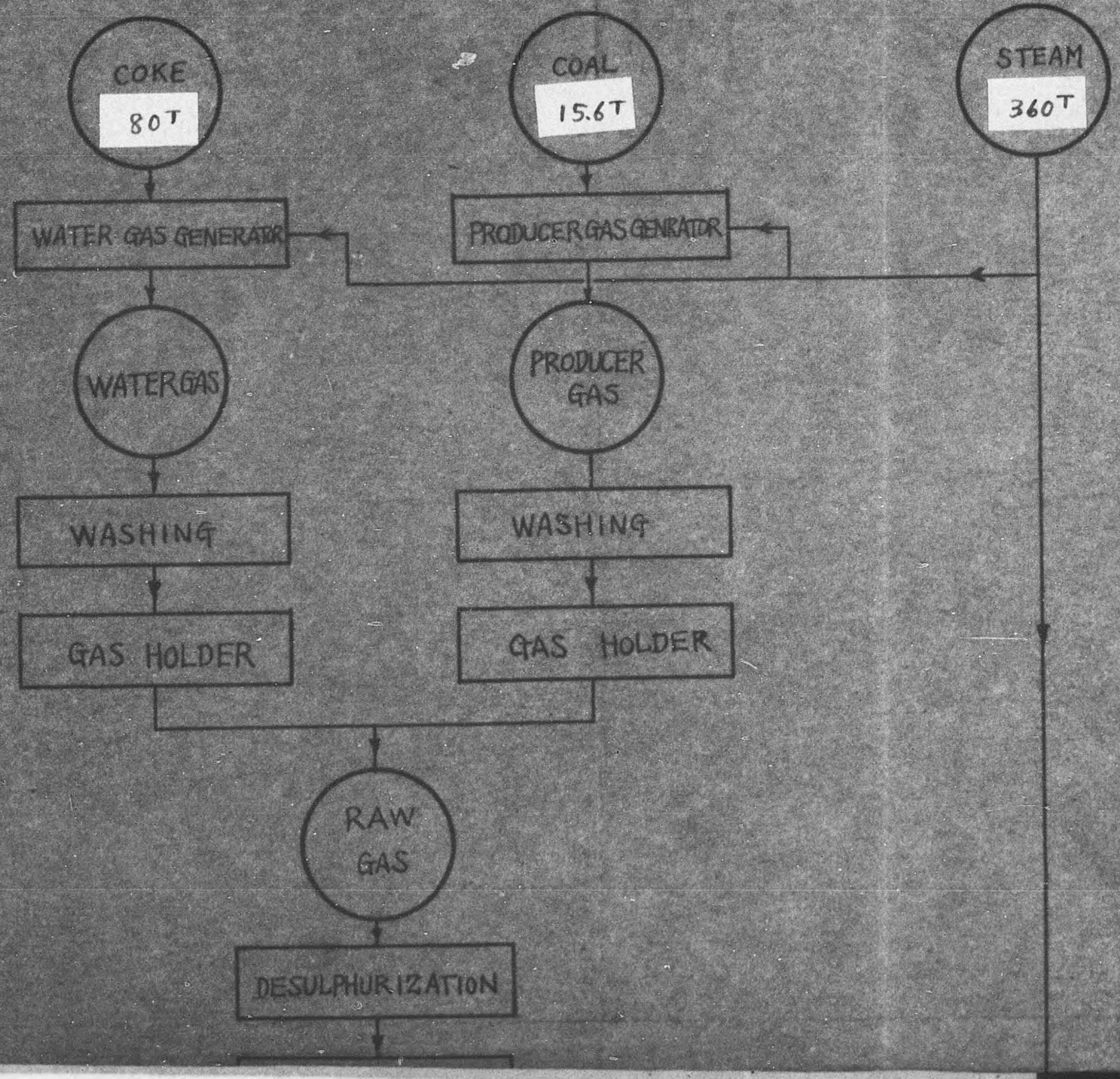
X. Time to start and finish the project

	1st project	2nd project
Time to start	As soon as permission granted	As soon as permission granted
Time to finish	In 10 months after start	In 18 months after start

FLOW SHEET OF AMMONIA SYNTHESIS PROCE

(40 TONS PER DAY)

TOKUYAMA

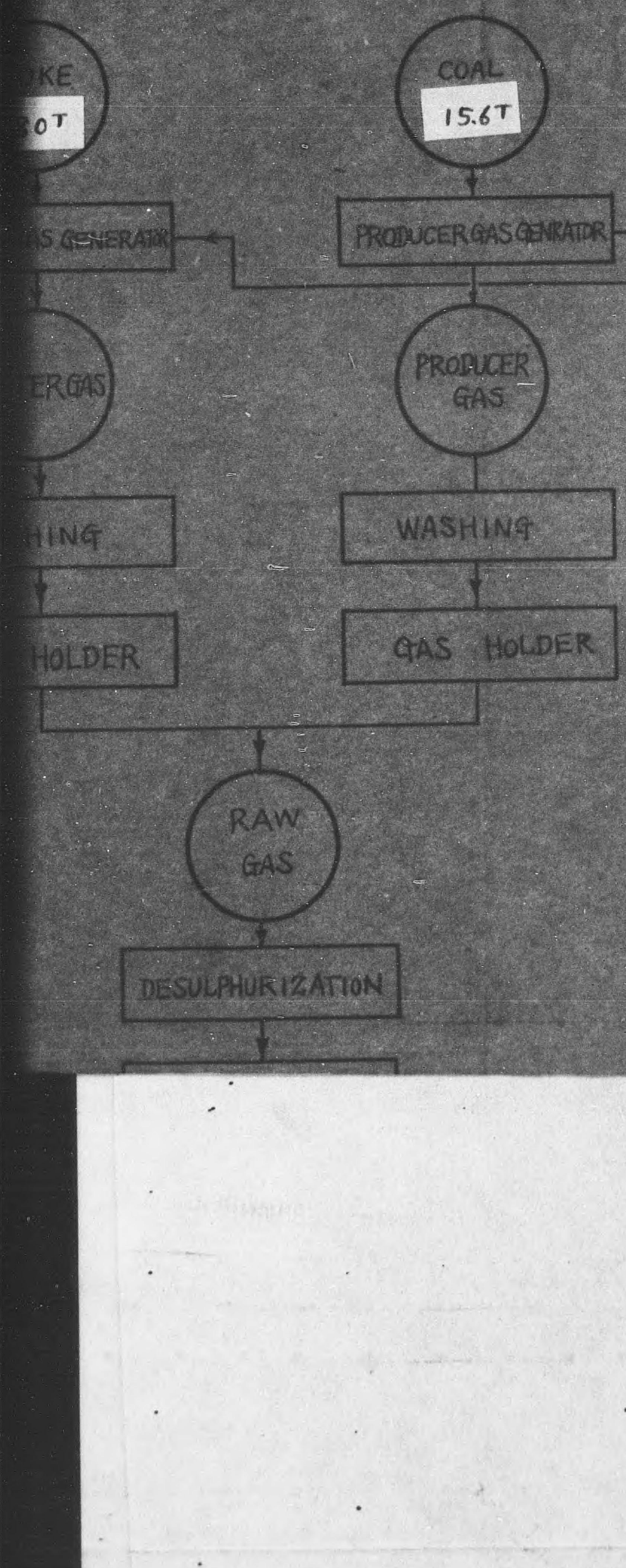


SHEET OF AMMONIA SYNTHESIS PROCESS

(40 TONS PER DAY)

TOKUYAMA SODA CO., LTD.

AUG. 1949



GAS

DESULPHURIZATION

Co CONVERTER

COOLING TOWER

GAS HOLDER

COMPRESSOR

CO_2 GAS

CO_2 DISSIPATING TOWER

CO_2 - SCRUBBER

COMPRESSOR

Cu-LYE REGENERATION

Cu-LYE WASHER

NH_3 LIQUOR WASHER

WASHER

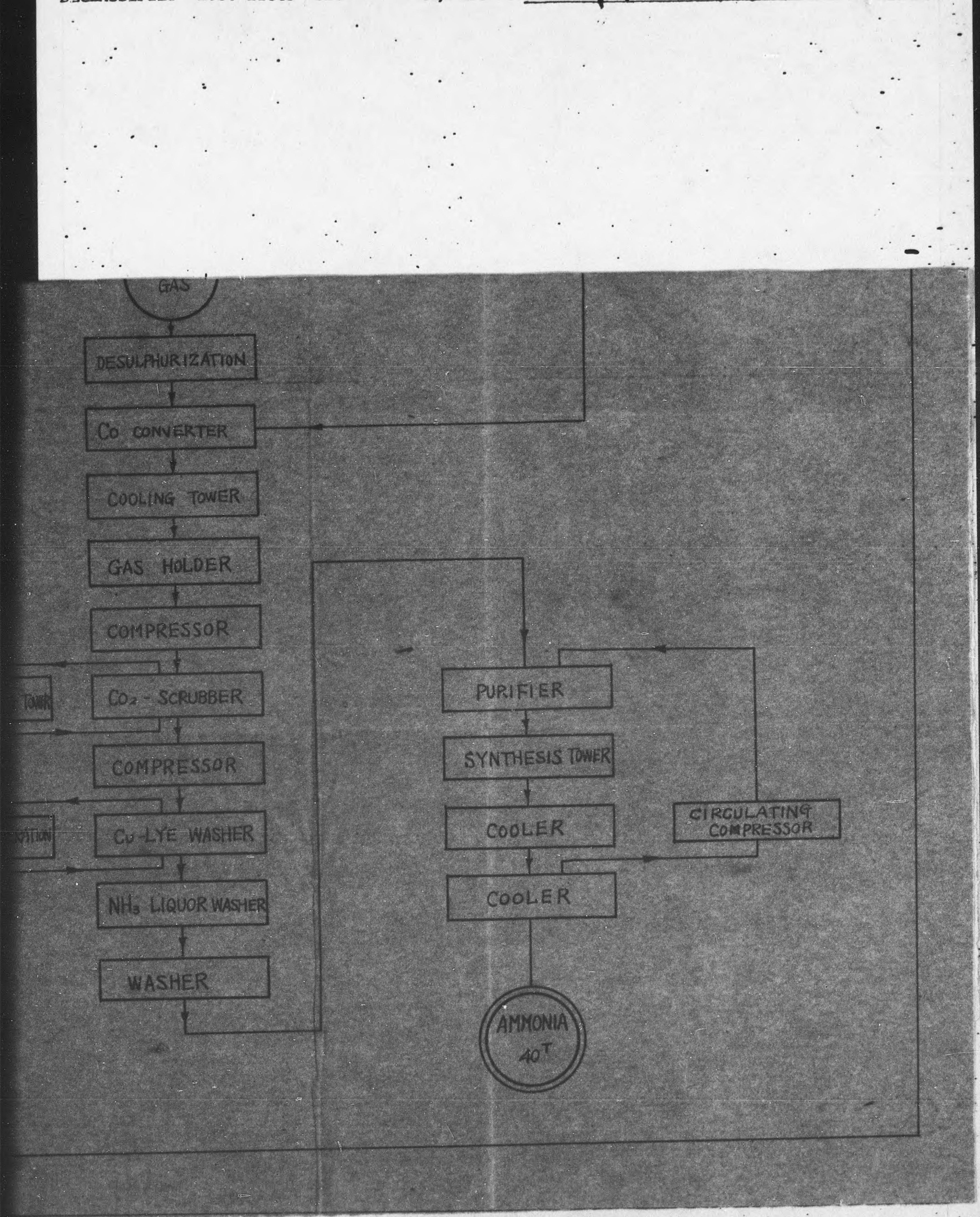
PURIFIER

SYNTHESIS TOWER

COOLER

COOLER

AMMONIA
40 T


GAS
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CIRCULATING COMPRESSOR
AMMONIA
40T