DECLASSIFIED E.O. 12065 SECTION 3-402/NNDG NO.

GHQ/SCAP Records (RG 331, National Archives and Records Service)

Description of contents

(1) Box no. 3012

(2) Folder title/number: (12)
Tokuyama Soda K. Tokuyama Kojyo

(3) Date: Mar. 1948 - May 1951

(4) Subject:

Classification	Type of record
9621	z

(5) Item description and comment:

Tokuyama

(6) Reproduction: (Yes) No

(7) Film no. Sheet no.

(Compiled by *National Diet Library*)

DECLASSIFIED E.O. 12065 SECTION 3-402/NNDG NO. [redacted]

ORIGINAL

TOKUYAMA SODA CO., LTD.

8355, Tokuyama.

May 5th, 1951

To the Commander,
Chugoku Civil Affairs, Kure City.

Report on the Production during April, 1951

Name of Products	Quantity (m. tons)
a. Soda Ash	4,000
b. Caustic Soda (Solid)	1,255
" (Liquid)	1,790
c. Portland Cement (JES Type)	19,269
d. Calcium Chloride	684
e. Sodium Silicate	271
f. Magnesium Carbonate	97
g. Ammonium Chloride (for Industrial Use)	194

For Tokuyama Soda Co., Ltd.

N. Tanabe

Director
(N. Tanabe)

FILE X-66
Tokuyama Area
Soda
Plant File

DECLASSIFIED E.O. 12065 SECTION 3-402/NNDG NO. [redacted]

TOKUYAMA SODA CO., LTD.,

8355 Tokuyama. City, Yamaguchi Pref.

ORIGINAL

Mar. 5th, 1951

To the Commander,
Chugoku Civil Affairs, Kure City.

Report on the Production
during February 1951 .

Name of Products	Quantity
a. Soda Ash	3,273
b. Caustic Soda (Solid)	1,032
" (Liquid)	1,138
c. Portland Cement I type	1,500
" JES "	9,695
d. Calcium Chloride	0
e. Sodium Silicate	79
f. Magnesium Carbonate	100
g. Ammonium Chloride (for Industrial Use)	186
" (Fertilizer)	0

For Tokuyama Soda Co., Ltd.

M. Tanabe
Director

AND INDUSTRY
FILE
Tokuyama Soda
File

DECLASSIFIED E.O. 12065 SECTION 3 102/MSB NO.

FLOW SHEET OF

SODA ASH PLANT

COKE 12.3 T

LIME STONE 107 T

LIME KILN

MILK OF LIME

CARBON DIOXIDE

SALT 231 T

SEA WATER

SATURATED BRINE

PURE SATURATED BRINE

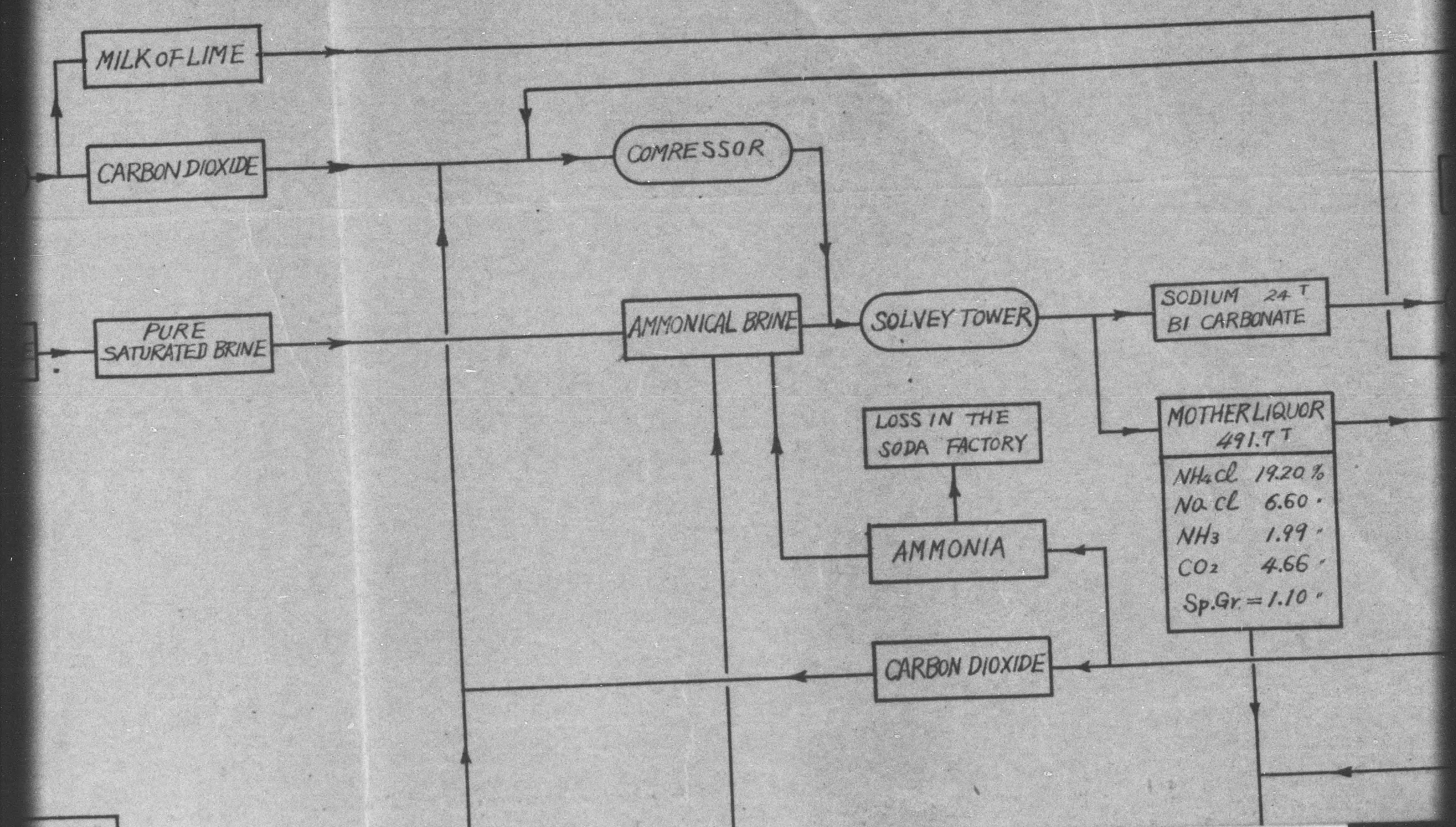
AMMONIA PLANT

STEAM

DECLASSIFIED E.O. 12065 SECTION 3 402/MRS NO.

FLOW SHEET OF AMMONIUM CHLORIDE FERT

(150 TONS PER DAY)

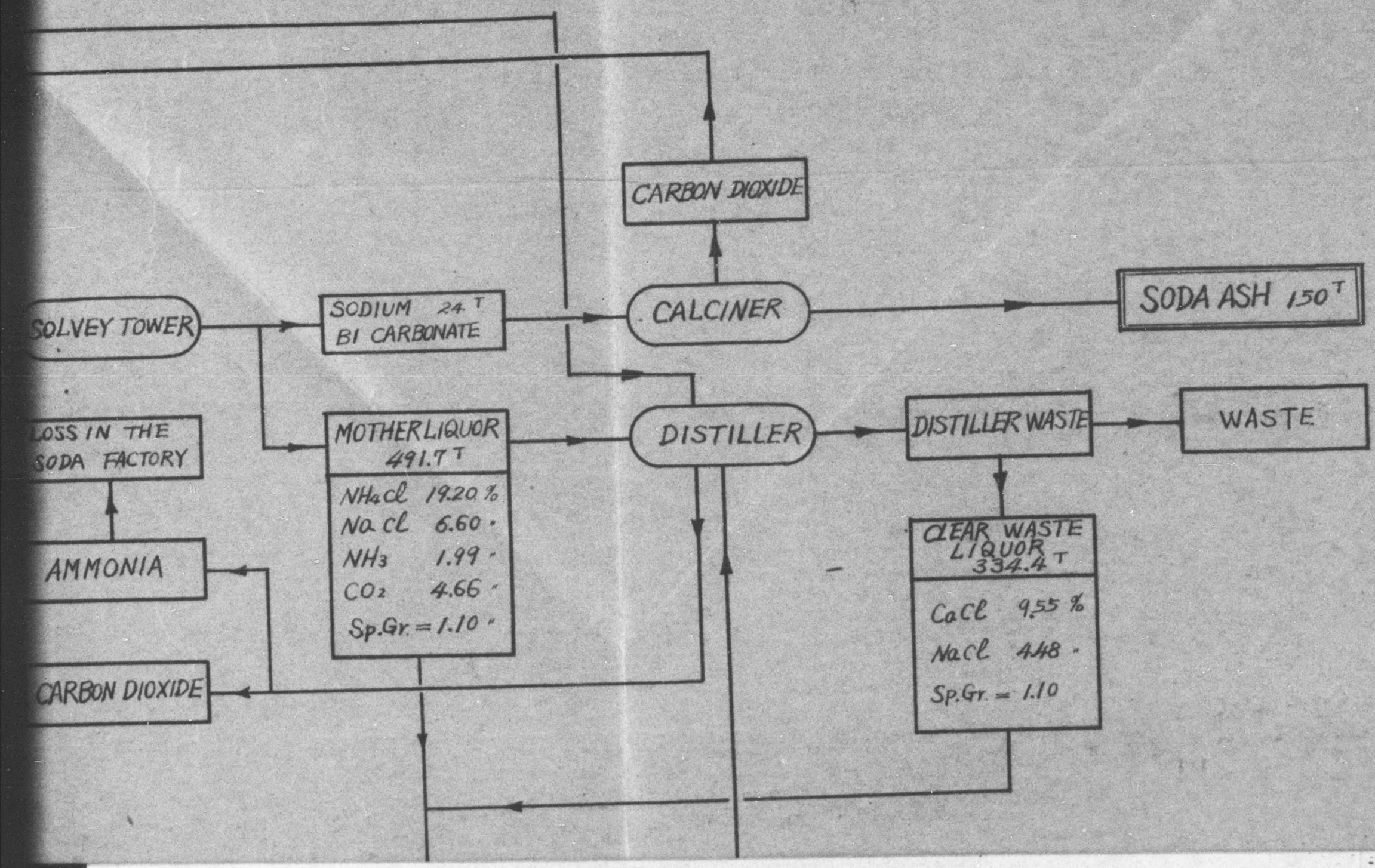


DECLASSIFIED E.O. 12065 SECTION 3 NND/NRS NO.

UM CHLORIDE FERTILIZER

R DAY)

TOKUYAM SODA CO., LTD
AUG. 1949



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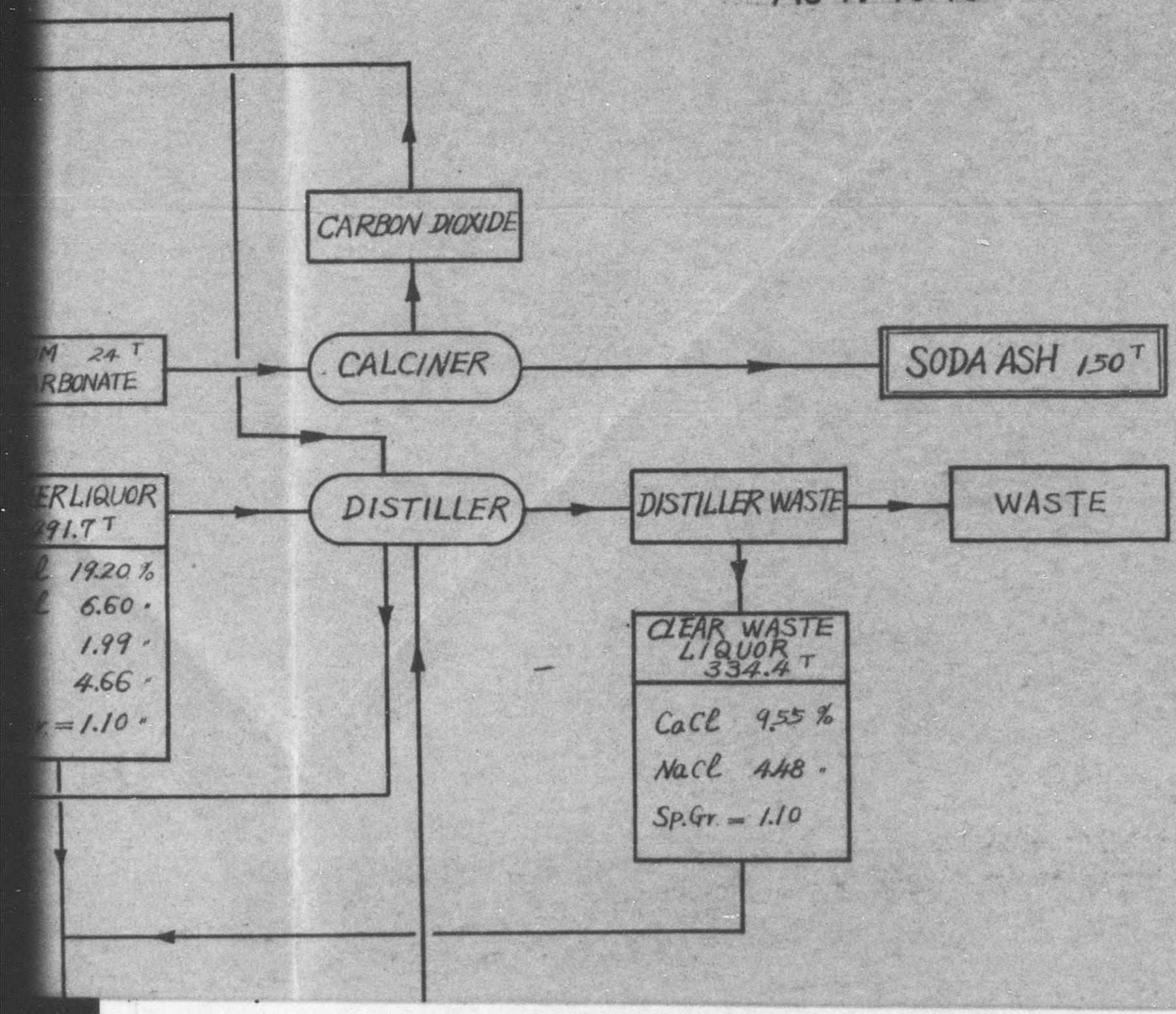
DE FERTILIZER

TOKUYAM SODA CO., LTD
AUG. 1949



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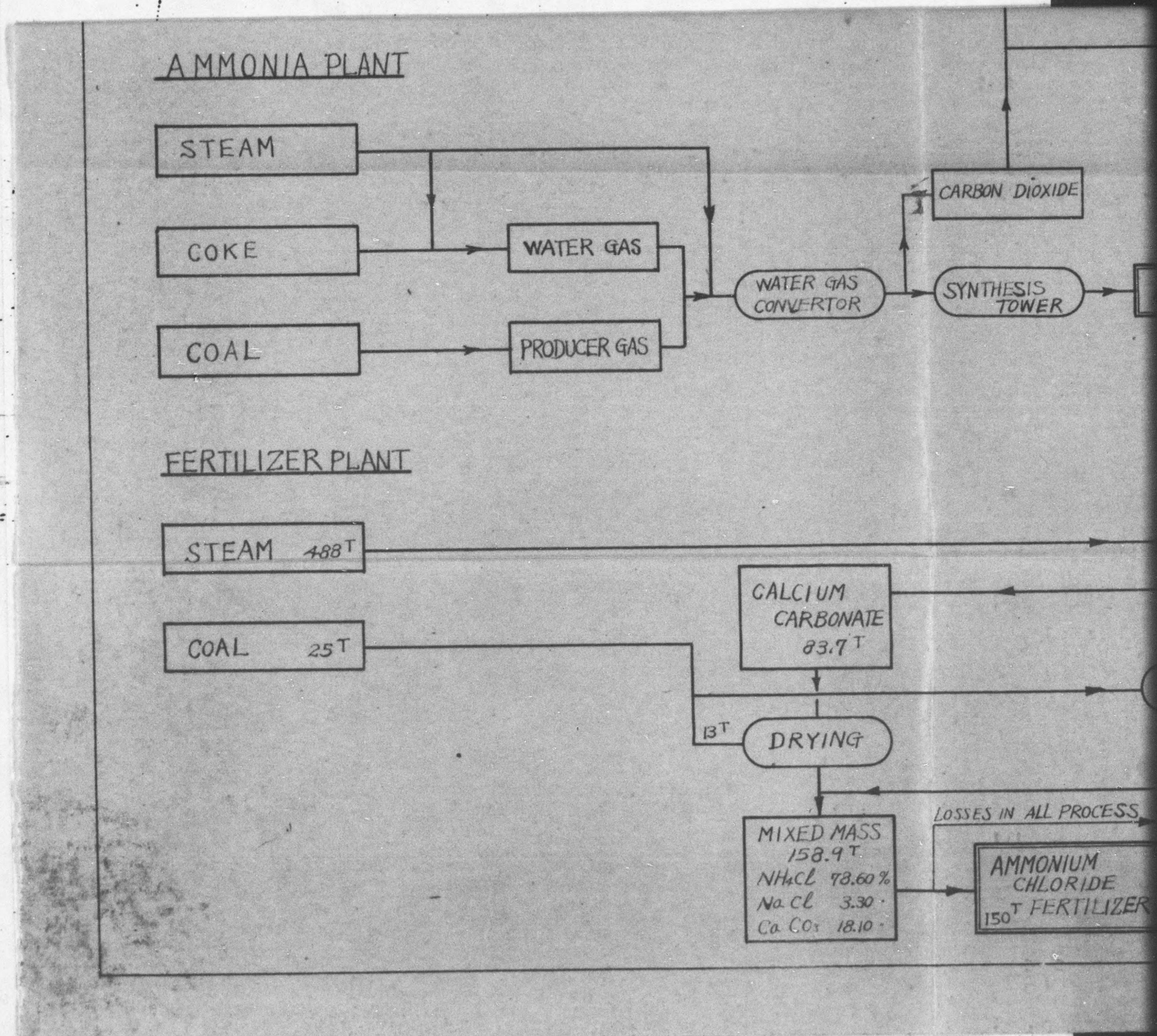

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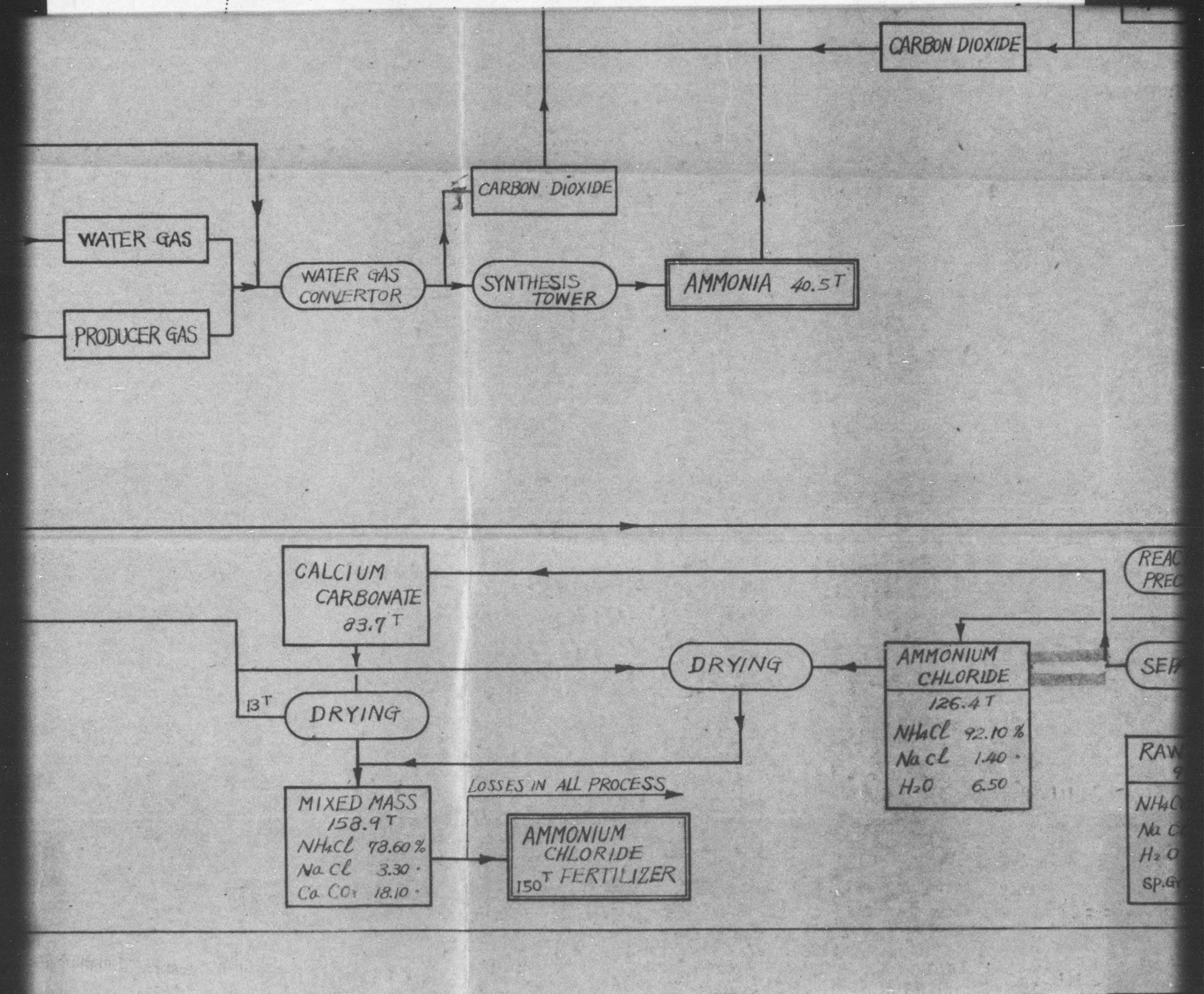

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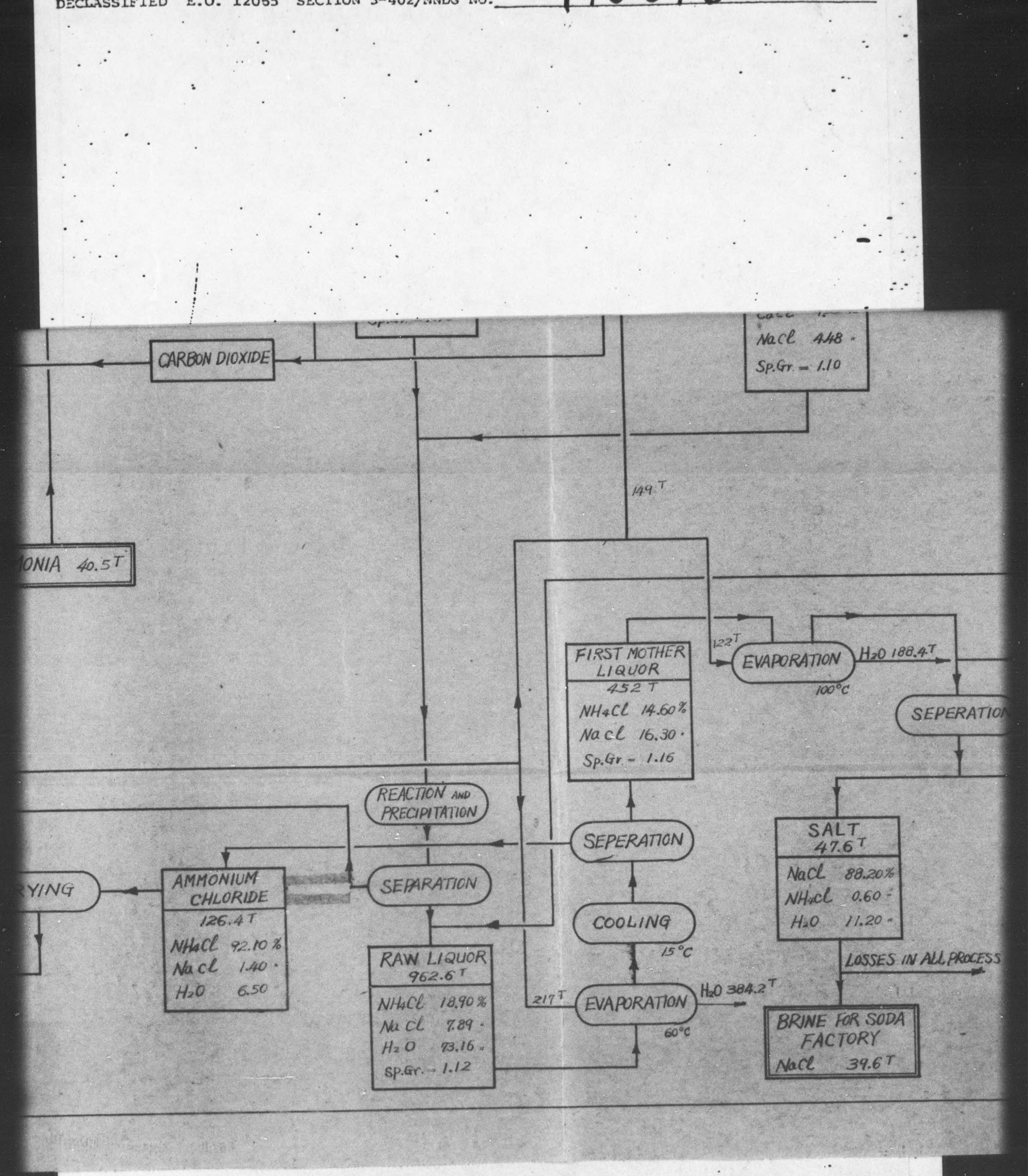

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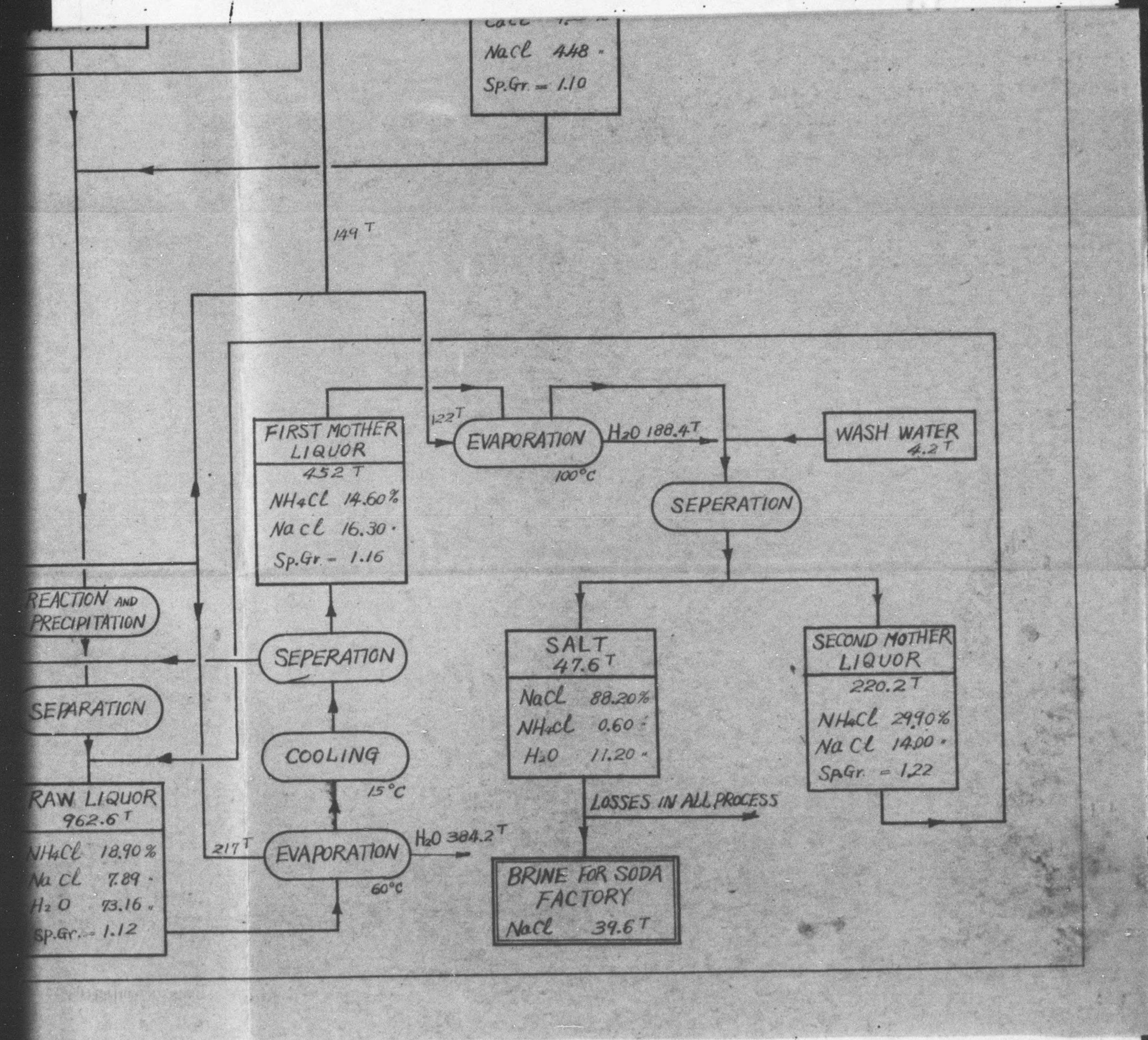

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COPY

Application to Borrow the State-owned Property for Temporary Use

Mr. Hayato Ikeda, Minister of Finance

Mr. Heitaro Inagaki, Minister of International Commerce & Industry

Gentlemen :

We hereby apply to borrow a part of the former Iwakuni Army Fuel Plant in Yamaguchi Prefecture for the manufacture of ammonia as per documents attached herewith.

Tokuyama Soda Co., Ltd.,

8355 Tokuyama City

Yukinobu Kageyama, President

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I. Reason for Application

II. Object of the Projects

III. Extent of the Application

IV. Attached Documents

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1. Reason for Application

We are now engaged in making soda by ammonia-soda process with imported salt. 75% of the salt is converted to soda but the balance is wasted. Out of converted portion of the salt, sodium content is utilized while chlorine is not. On the other hand, ammonium sulphate is partly imported due to the shortage of pirites. Sulphuric acid contained in ammonium sulphate has no fertilizer value.

Our researches on ammonium chloride dates back to more than ten years ago. Now that fertilizer value is verified to be no less than that of ammonium sulphate, we intend to manufacture on industrial basis the ammonium chloride by way of utilizating salt in ammonia-soda industry and economizing sulphuric acid in ammonium sulphate industry.

In the present manufacturing process of soda, ammonium chloride is produced in the Solvay tower. It is at present distilled and the recovered ammonia is used over and over again. The liquor coming out of Solvay tower is filtered and condensed. Then ammonium chloride is made and salt is completely recovered: of course, ammonia must be supplied as required. This results in the saving of coal and limestone for the manufacture of soda. In order to make ammonium chloride our an industrial scale, it is necessary to own the equipment of ammonia synthesis. It so happens that the hydro-cracking equipment of the former army plant can be used for ammonia synthesis. That is why we make an application hereby.

Out of the former hydro-cracking equipment, what is necessary for ammonia synthesis is listed in the attached particulars.

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With some renovation inside the high pressure cylinders, the equipment can turn out 50,000 tons ammonium chloride a year without further alteration.

A flow sheet is herewith attached to show how the equipment is converted to carry out ammonia synthesis.

Since we are convinced that the manufacture of ammonium chloride is the best way of rationalization of soda and fertilizer industries, we are anxious to have upon permission to use the former hydrocracking equipment for a source of ammonia.

II. Object of the Projects

Manufacture of ammonia

First project : to make 13,200 tons ammonia a year

Second project: to make 26,400 " " " "

III. Extent of Application

(A) Land as per attached layout of former Iwakuni fuel plant

(B) Building as per attached layout of former Iwakuni fuel plant

(C) Machines Equipment what is under "For 50,000 tons" in the Particulars of Machines & Equipment of the Projects.

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Plan for Synthetic Ammonium Plant and Ammonium Chloride Fertilizer Plant

Tokuyama Soda Co., Ltd.

September, 1949

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Contents

I. Significance of the project

A : History of the project

B : Fertilizer effect of ammonium chloride

II. Synopsis of the project

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B : Ammonium chloride fertilizer

III. Synopsis of the method of manufacture

A : Synthetic ammonia

B : Ammonium chloride fertilizer

IV. Characteristics of the method of manufacturing ammonium chloride fertilizer under this project

V. Profit and loss

A : Cost calculation of ammonia

B : Cost calculation of ammonium chloride fertilizer

C : Cost calculation of soda ash

D : Estimated profit per month

VI. Necessary funds and materials for construction

VII. Particulars of machines and equipment

A : Synthetic ammonia plant

B : Ammonium chloride fertilizer plant

VIII. Diagrams

A : Diagrams of synthetic ammonia

B : Diagram of ammonium chloride fertilizer

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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 therefrom. 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

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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.

(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 maltiply twice the capacity of crude gas plant, we can produce 80 tons per day ammonia. Tnis 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

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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, crystallizer, 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 concerted 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.

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B. Ammonium chloride fertilizer

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 after sodium bicarbonate is separated and most of such liquor will be used as material liquid for making ammonium chloride. A part of waste liquor distillation in the ammoniua soda process is added thereto so as free ammonia in the mother liquor is approximately in an equivalent portion with calcium chloride in the waste liquor. The free ammonia then turns into ammonium chloride and precipitated calcium carbonate gets crystalized. The calcium carbonate, after separated and dried, is mixed with finished ammonium chloride to keep it dry. After calcium carbonate is separated, the filtrate (mother liquor) is mixed with cycling liquid and boiled up to half 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 for.

With an equipment to produce 150 tons soda ash per day, about 150 tons ammonium chloride can be manufactured, but we estimate the production of ammonium chloride at 125 tons per day. With the aforesaid calcium carbonate added, ammonium chloride fertilizer containg 20.6% nitrogen is manufactured at the rate of 150 tons per day.

IV. Characteristics of the Method of Manufacturing Ammonium Chloride Fertilizer under this project

There will be no objection to the manufacture of ammonium chloride fertilizer in view of scarcity of materials for making sulphuric acid, requirement for increased production of nitrogen fertilizer, and the necessity of complete utilization of chlorine and sodium

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contents in salt used in ammonia soda industry.

Synthesis of ammonia is a well known industry and no explanation is necessary. Quite a few methods of 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 atmospheric temperature.

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

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

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

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

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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	2.5	7,050	17,625	2.5	7,050	17,625	
Coal	1.35	3,838	5,181	1.35	3,838	5,181	
Elec. power	3,200KWH	1.1	3,520	3,000	1.1	3,300	
Maintenance			5,000			4,000	
Labor			6,000			3,830	550 & 700 man/day
Overhead exp.			3,800			2,280	
Depreciation			2,050			2,050	depreciation in 10 yrs.
Interest			2,580			2,420	10% per annum
TOTAL			45,756			40,686	

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B) Cost Calculation of Ammonium Chloride Fertilizer

Item	Quantity per ton	When production 150 tons per day @	When production 150 tons per day Amount in yen	When production 300 tons per day @	When production 300 tons per day Amount in yen	Remarks
Ammonia	T 0.264	47,000	12,408	41,700	11,009	Containing transportation Cost
Steam	2.9	720	2,088	720	2,088	for evaporation
Coal	0.1665	2,214	369	2,214	369	for drying product 3,800 Cal.
Elec. power	66 KWH	1.3	86	1.3	86	
Maintenance			533		400	
Labor			350		228	
Packing			850		850	
Overhead exp.			139		113	
Depreciation			149		110	
Interest			165		148	
TOTAL			17,187		15,401	

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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

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b) When production 300 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
	T			T		
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

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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

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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

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(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	25	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

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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	481.6	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	583.3	1,278.3	47,400	37,000	84,400

DECLASSIFIED E.O. 12065 SECTION 3-402/NNDS N.S.

(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

DECLASSIFIED E.O. 12065 SECTION 3-402/NNDS NO. [redacted]

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	340,000	740,000

Method to raise the funds ;-

Construction to be financed by the counter port 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

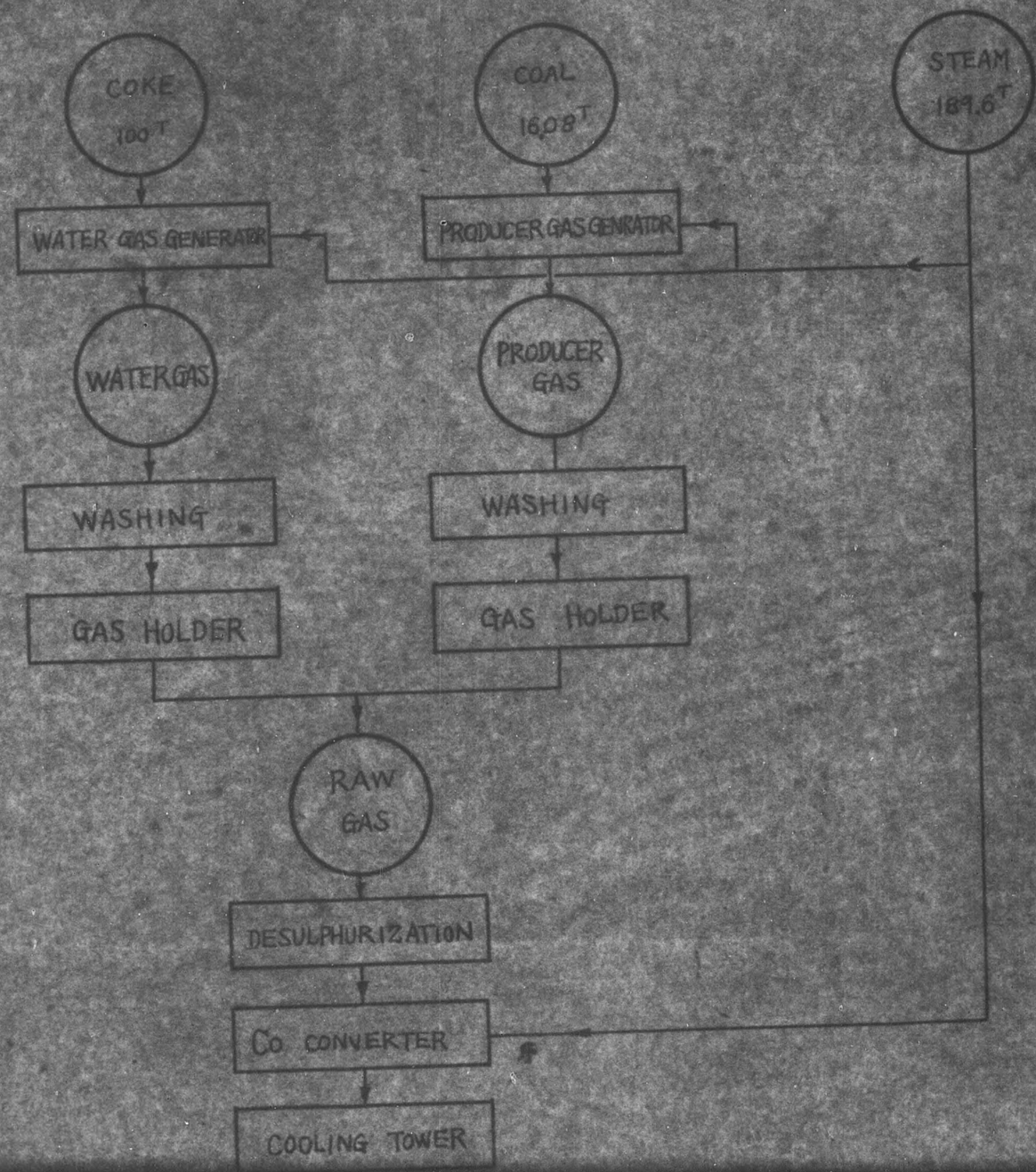
DECLASSIFIED E.O. 12065 SECTION 3 462/NNDS NO.

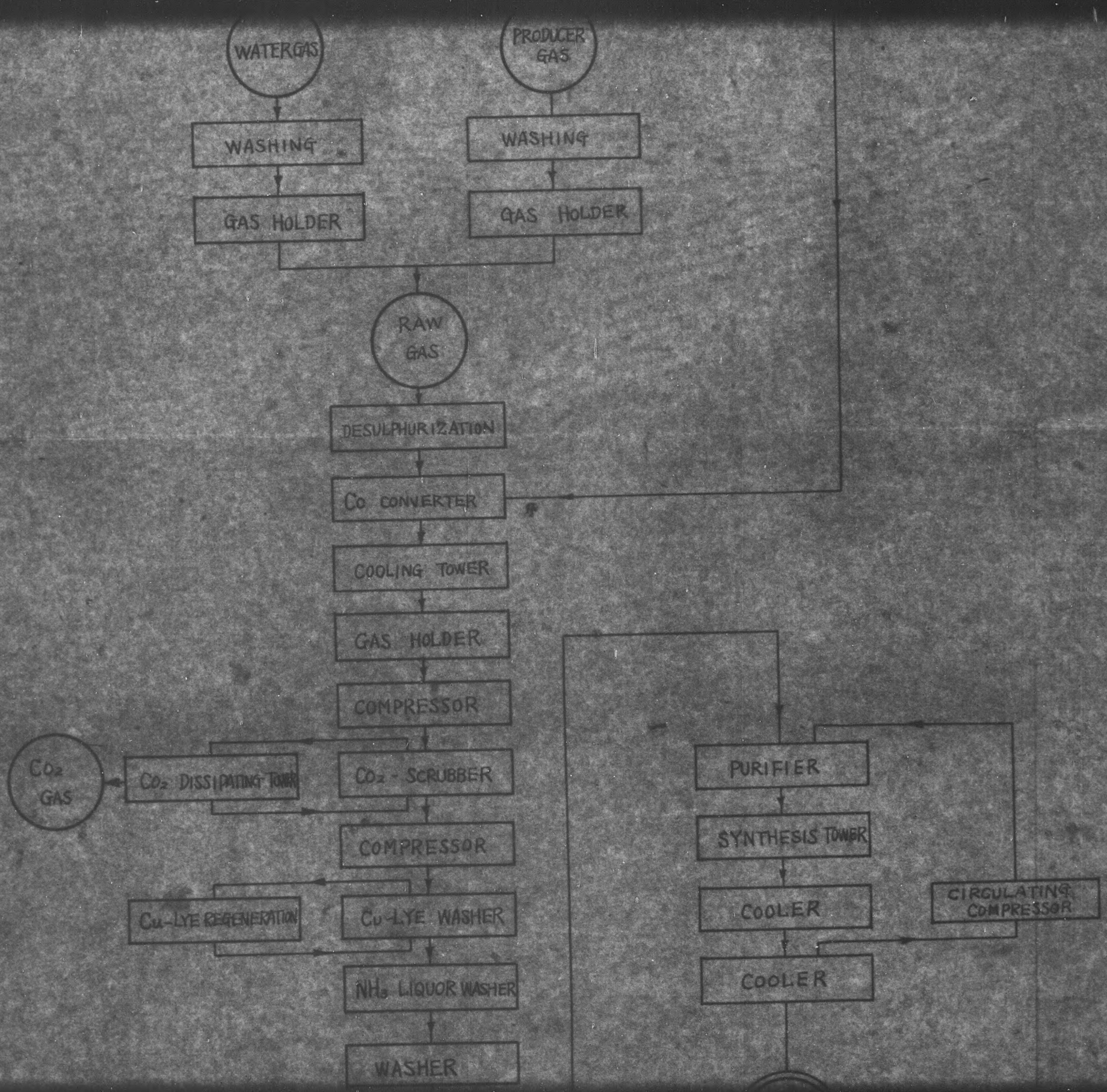
FLOW SHEET OF AMMONIA SYNTHESIS PROCESS

(40 TONS PER DAY)

TOKUYAMA SODA CO., LTD.

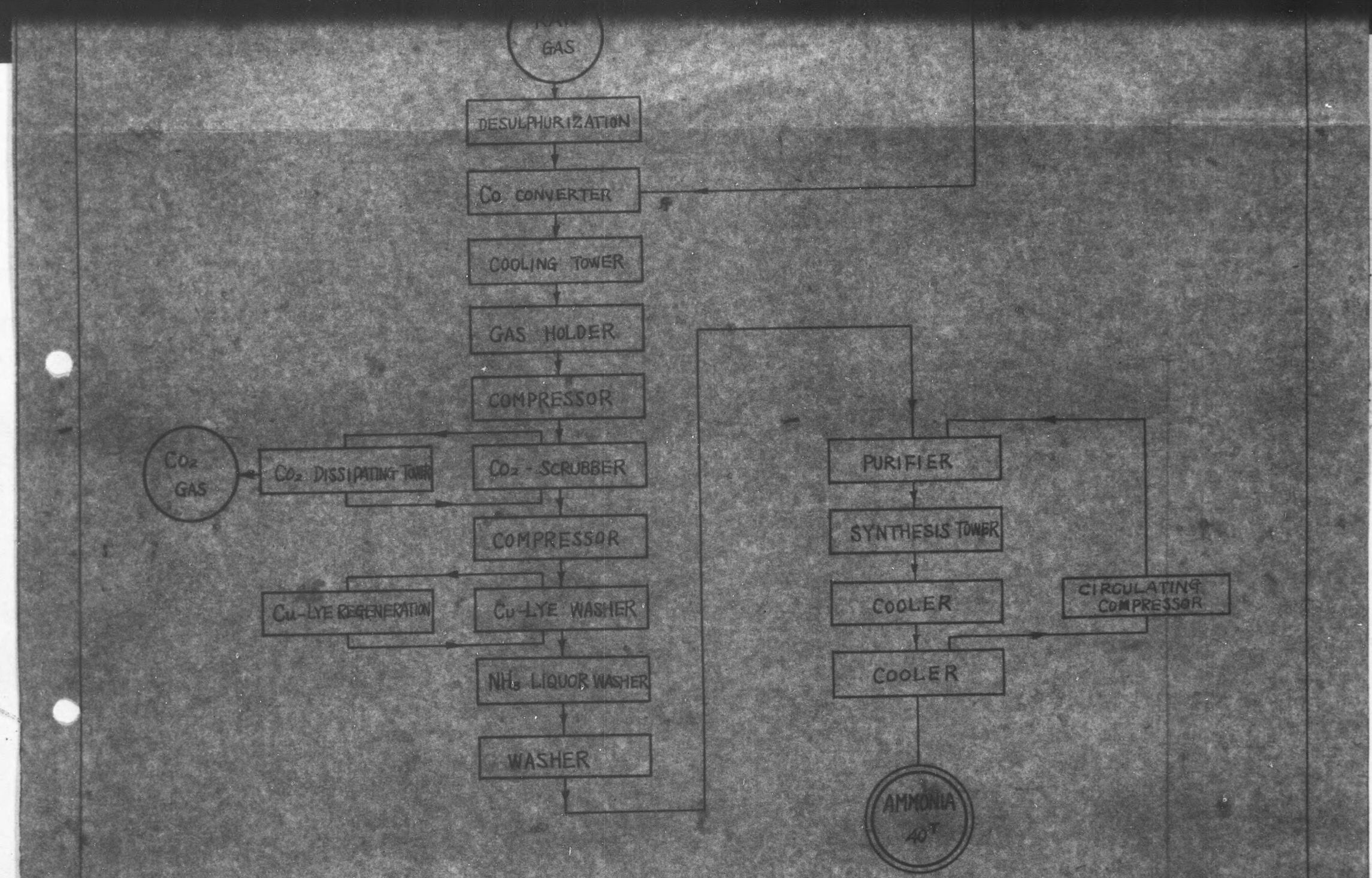
AUG. 1949





DECLASSIFIED E.O. 12065 SECTION 3 402/NNDS NO.

DECLASSIFIED E.O. 12065 SECTION 3 NSC MEMO



DECLASSIFIED E.O. 12065 SECTION 3-402/NNDG NO. [redacted]

FLOW SHEET OF

SODA ASH PLANT

COKE 123 T

LIME STONE 107 T

LIME KILN

MILK OF LIME

CARBON DIOXIDE

SALT 231 T

SATURATED BRINE

PURE SATURATED BRINE

SEA WATER

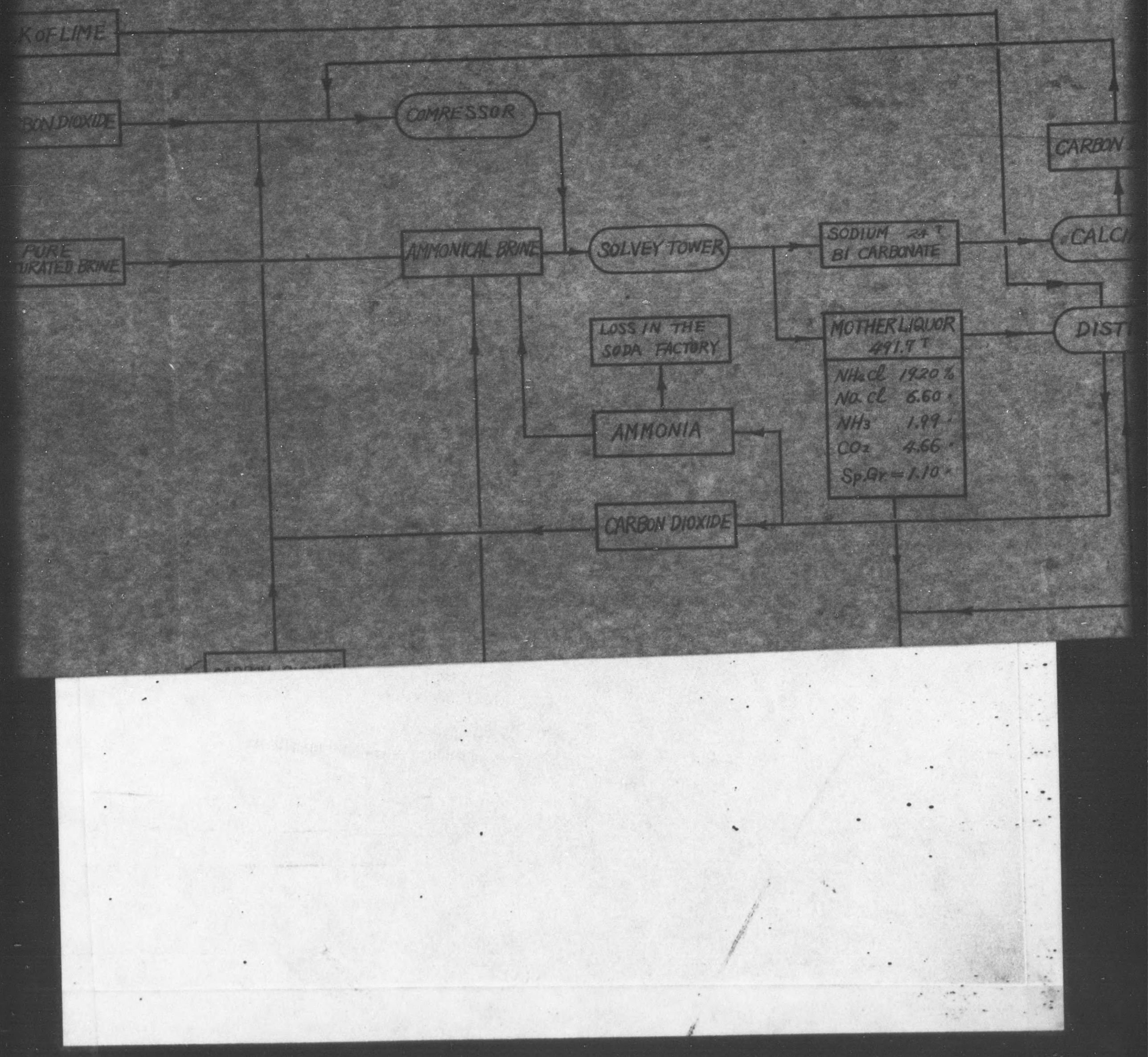
AMMONIA PLANT

STEAM

DECLASSIFIED E.O. 12065 SECTION 3-402/NNDG NO. [redacted]

LOW SHEET OF AMMONIUM CHLORIDE FERTILI

(150 TONS PER DAY)



DECLASSIFIED E.O. 12065 SECTION 3-402/NNDG NO. [redacted]

...IUM CHLORIDE FERTILIZER

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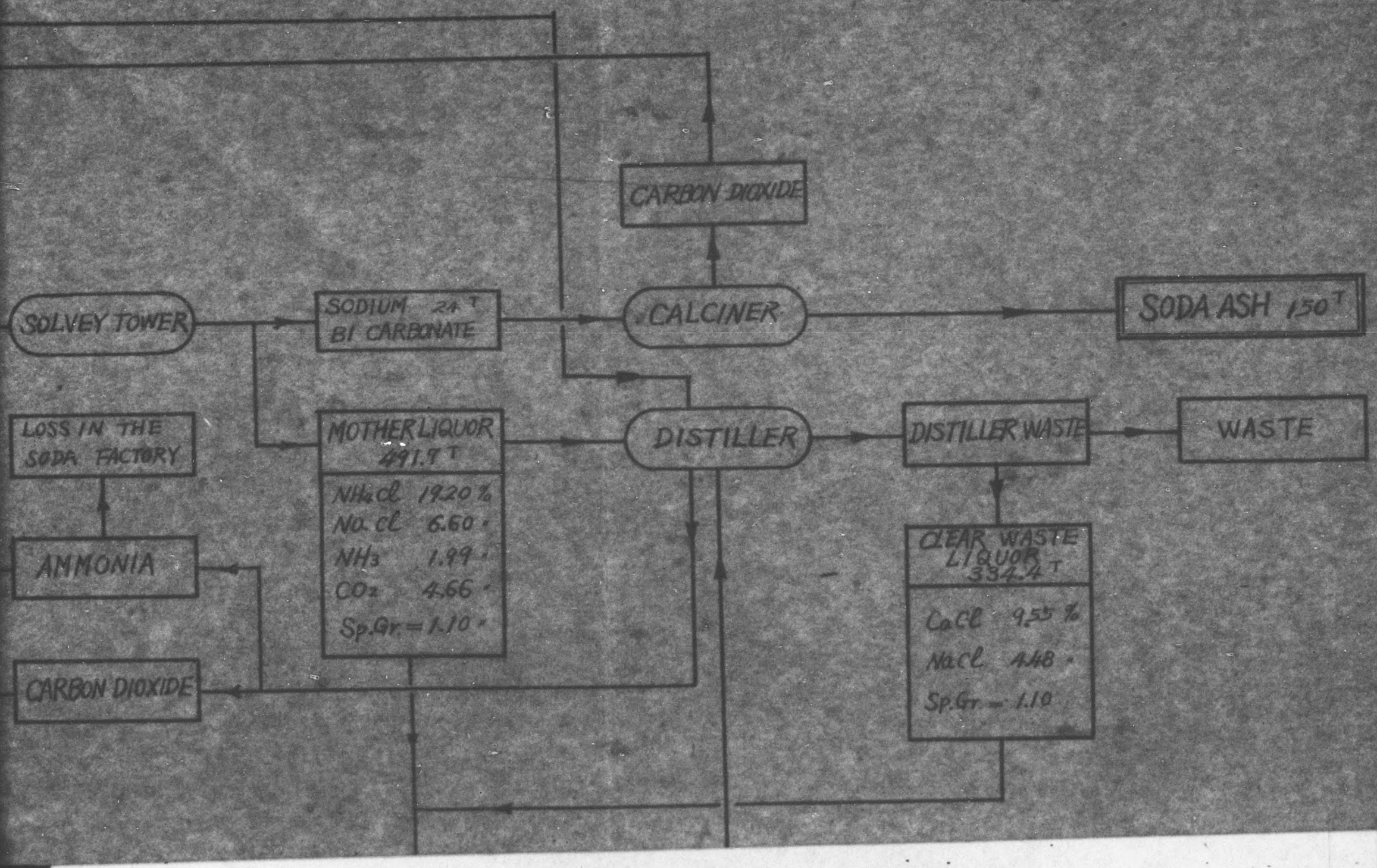
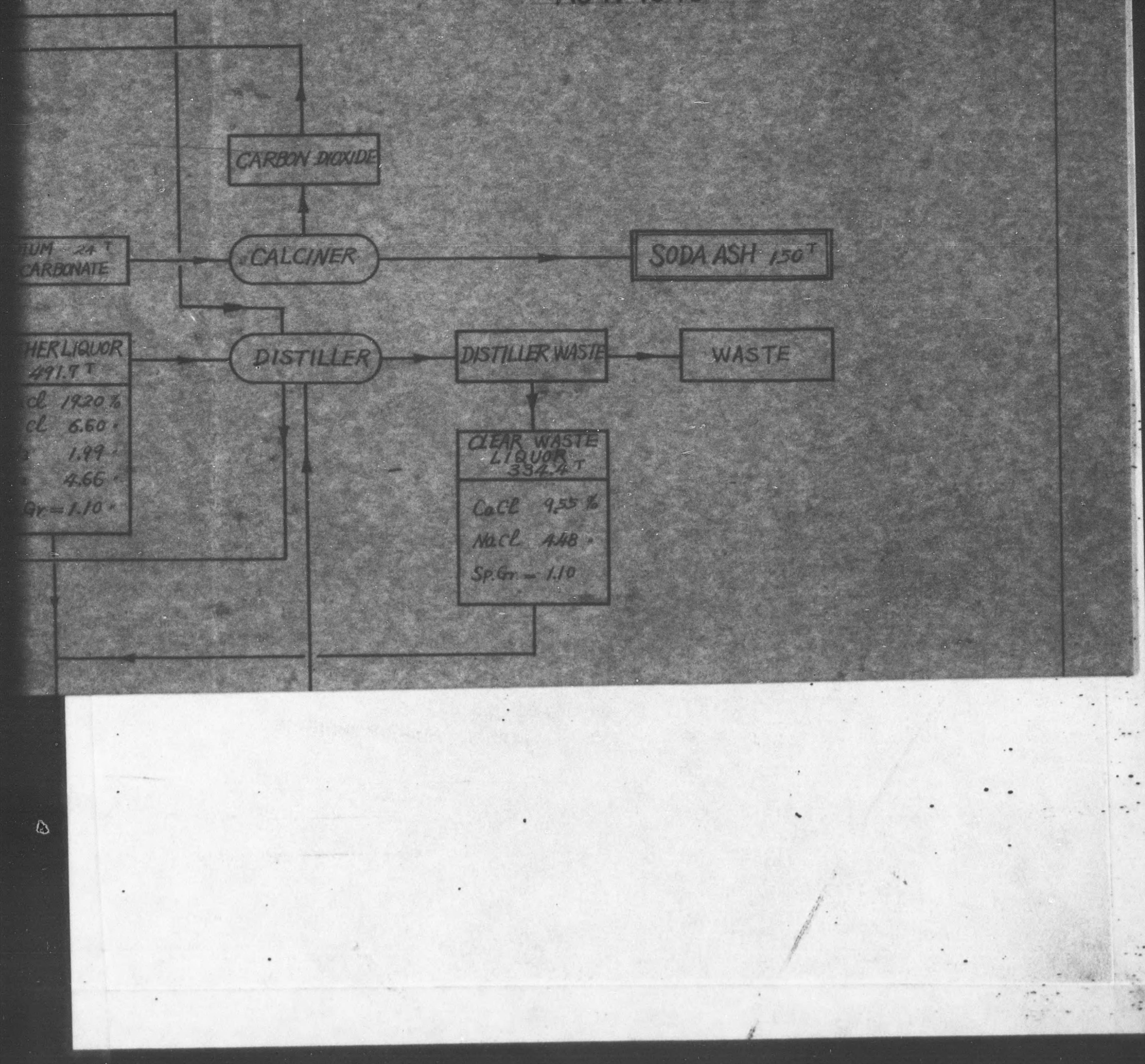
TOKUYAM SODA CO., LTD
AUG. 1949



DECLASSIFIED E.O. 12065 SECTION 3-402/NNDS NO. [redacted]

IDE FERTILIZER

TOKUYAM SODA CO., LTD
AUG. 1949



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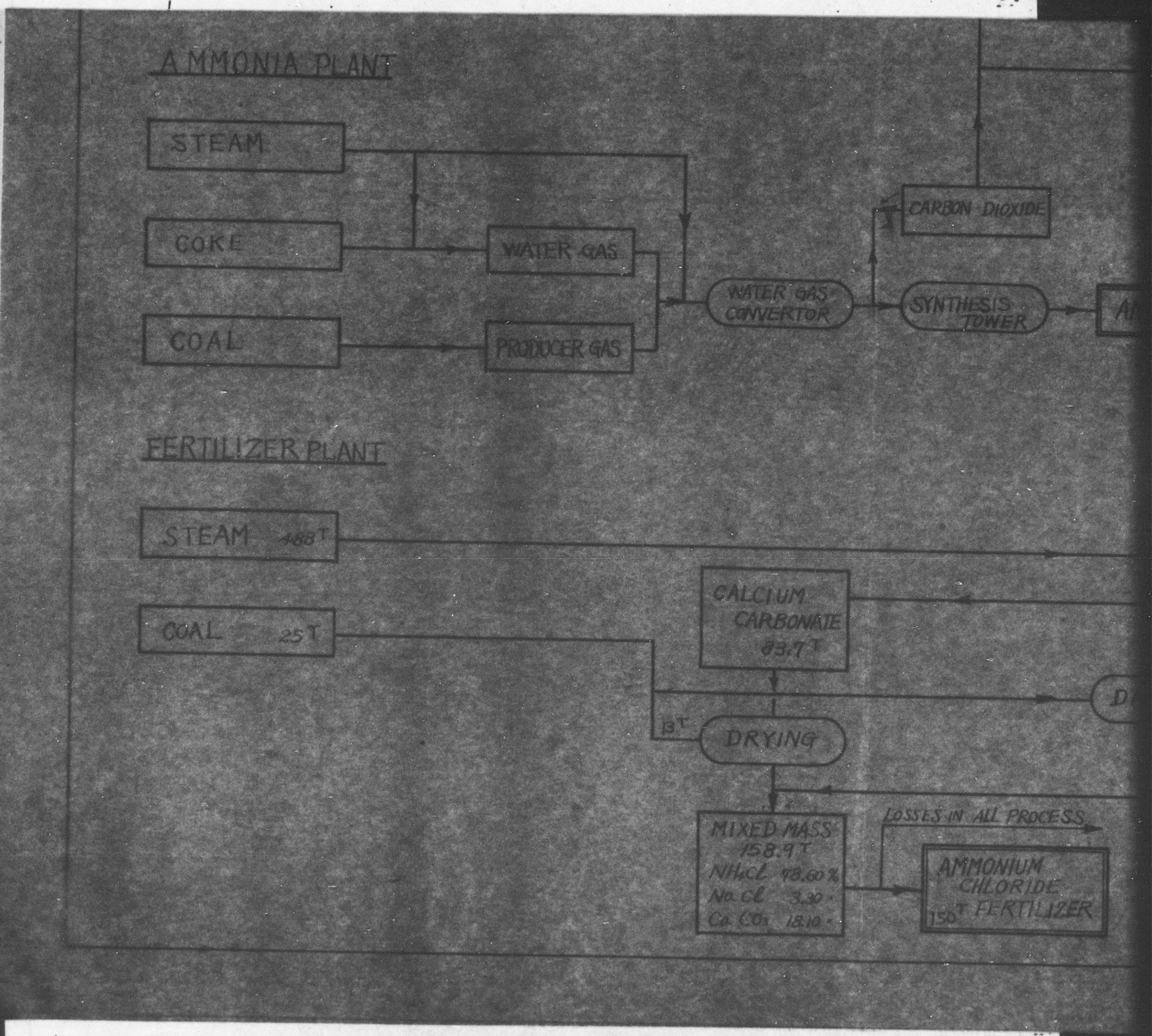

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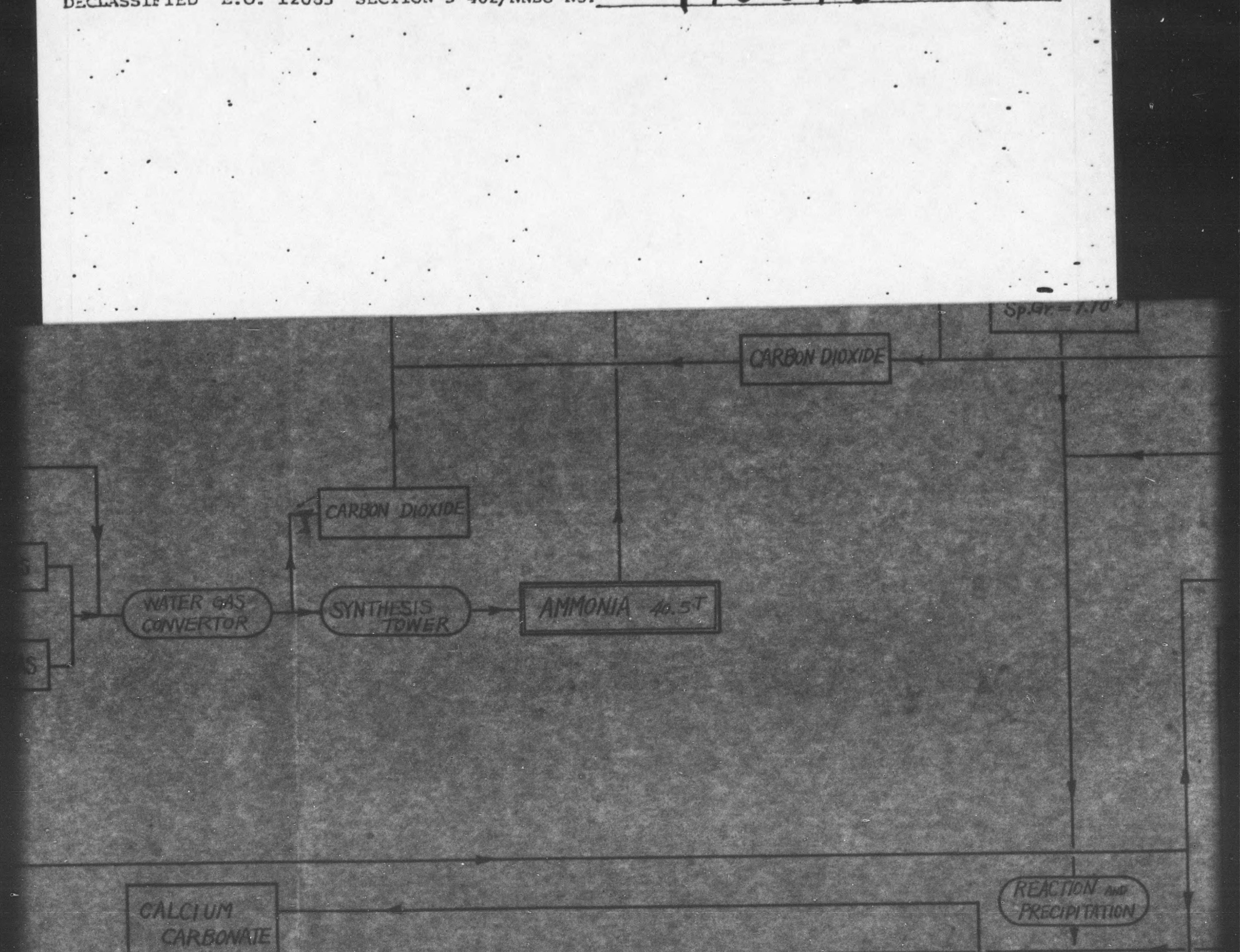

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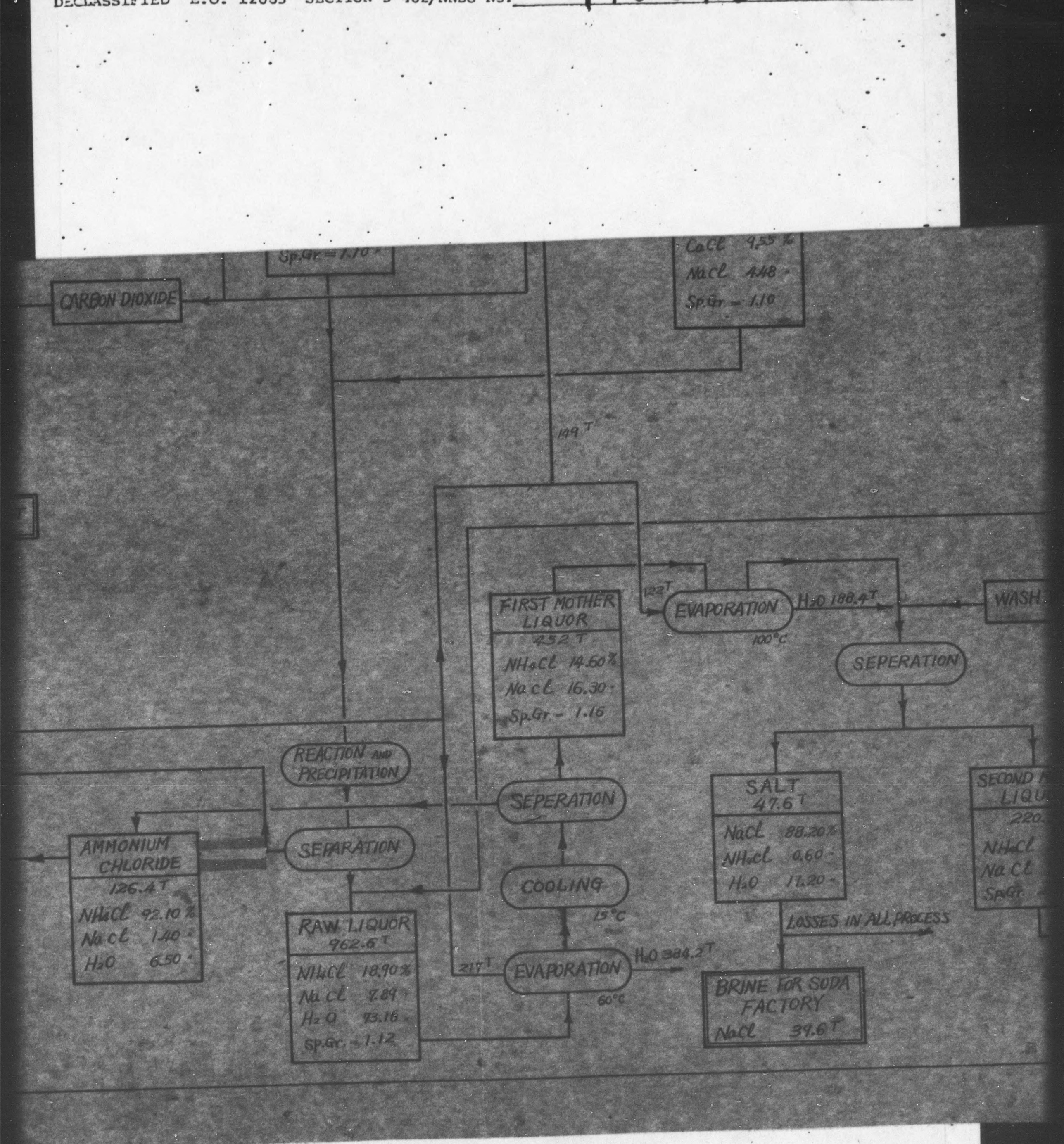

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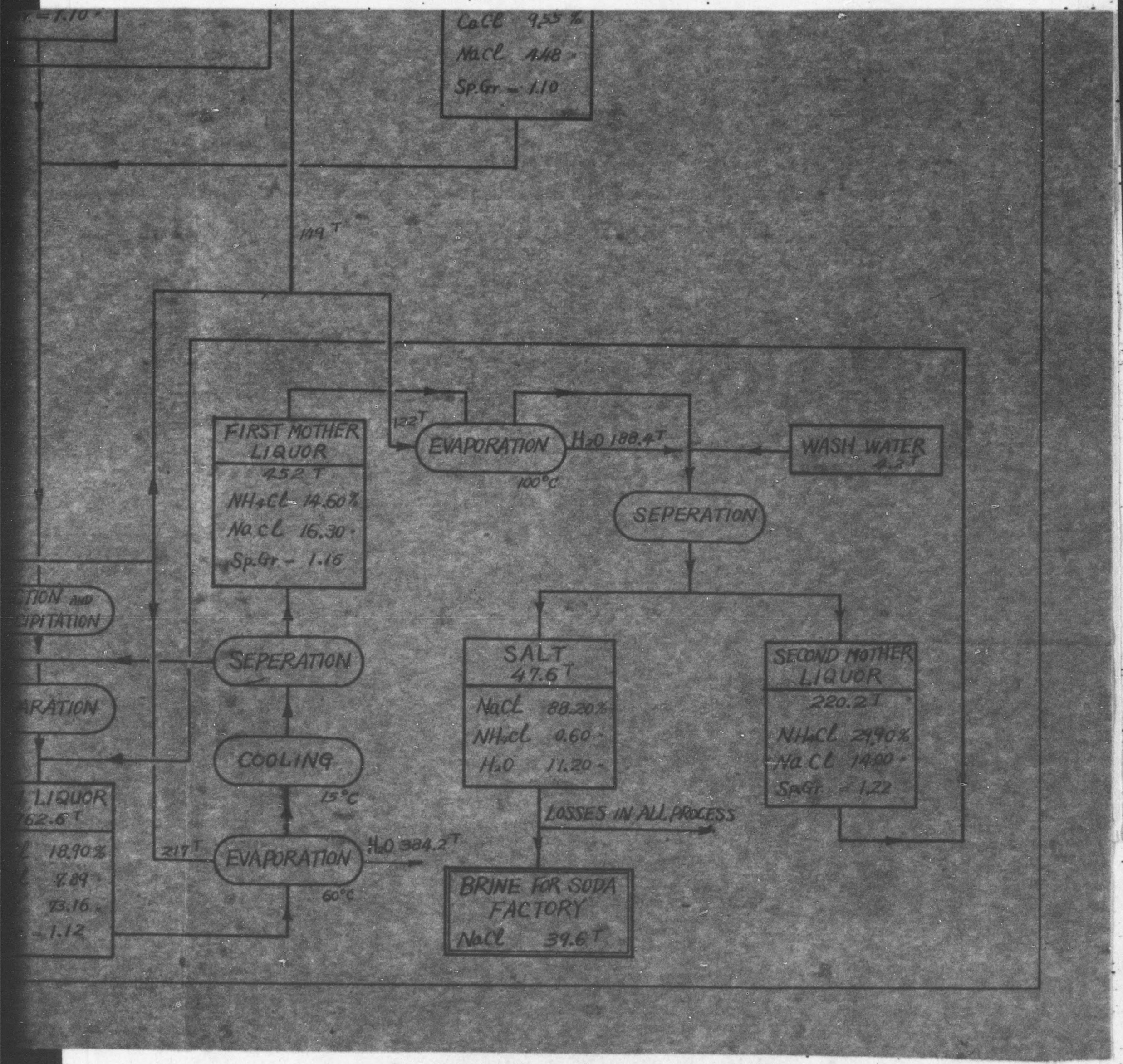


DECLASSIFIED E.O. 12065 SECTION 3 102/MNES NO.

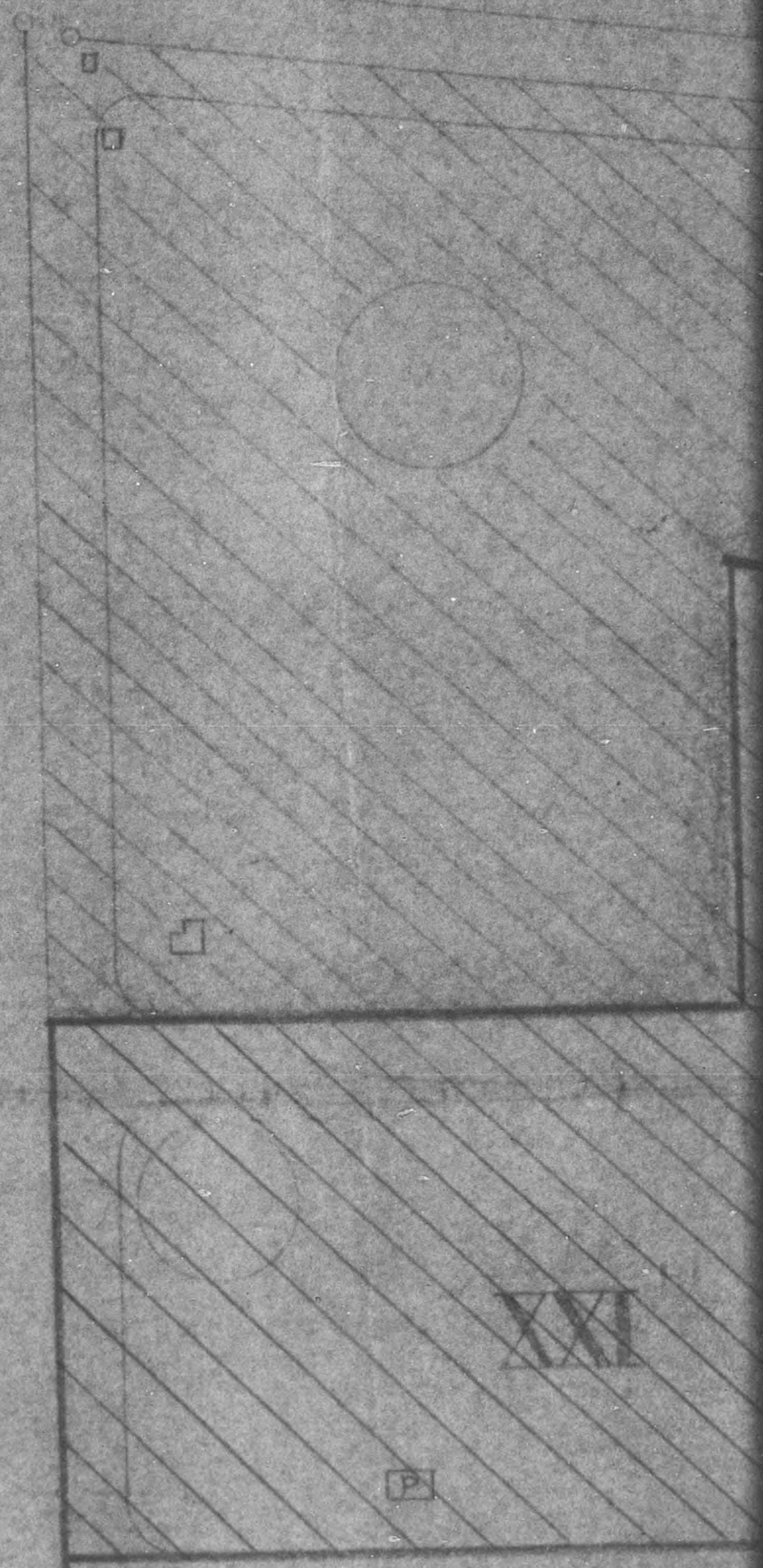
F21 44 POWER STATION

PLAN OF FORMER

INDICATIN

使用申請土

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)
F1	499	DRUM CLEANING PLANT
F1	146	DRUM FILLING PLANT
F2		CRUDE OIL DISTILLATION PLANT
F2	21	NNO TIPE (2UNITS)
3	3	CONTINUOUS GASOLINE TREATING PLANT
F3		HYDRO CRACKING PLANT
F4	25	WATER ELECTROLYSIS PLANT
F4	26	OXYGEN FILLING PLANT
F5		HYDROGEN PRODUCTION PLANT
F5	27	WATER GAS PLANT (P.G.C.)
F5	28	METHANE CRACKING PLANT (KOPPERS)
F5	29	CO CONVERTER
F5	31	CO REMOVING PLANT
F5	30	CO_2 REMOVING PLANT
F5	33	HYDROGEN PURIFICATION PLANT
F5	32	NITROGEN GAS SEPARATION PLANT



79

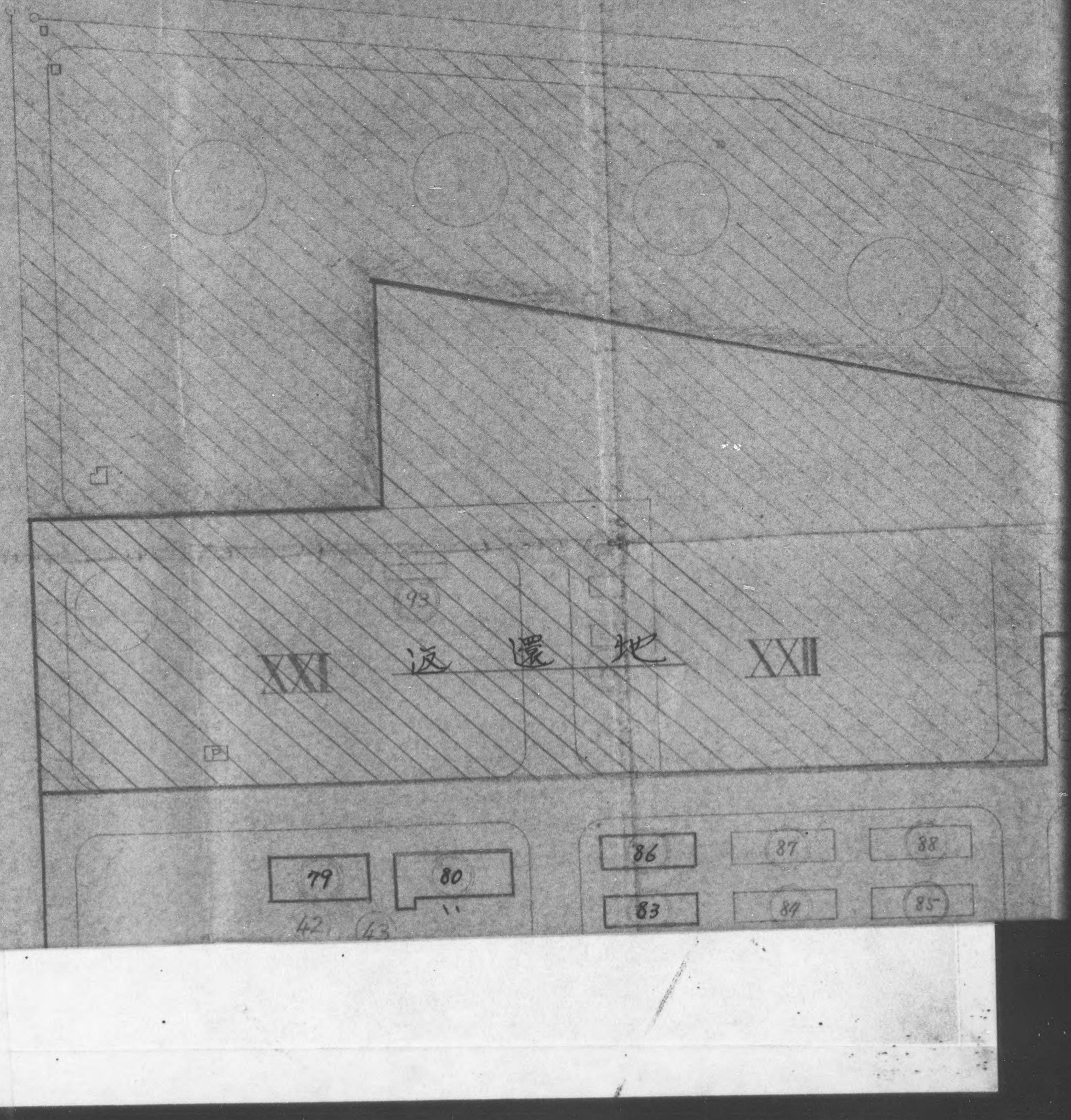
42 43

DECLASSIFIED E.O. 12065 SECTION 3 402/NNBS NO.

AN OF FORMER IWAKUNI ARMY FUEL D

INDICATING INVENTRY NO. OF PLANTS

使用申請土地及建物 70,500坪（返還地 33,800坪を含む）



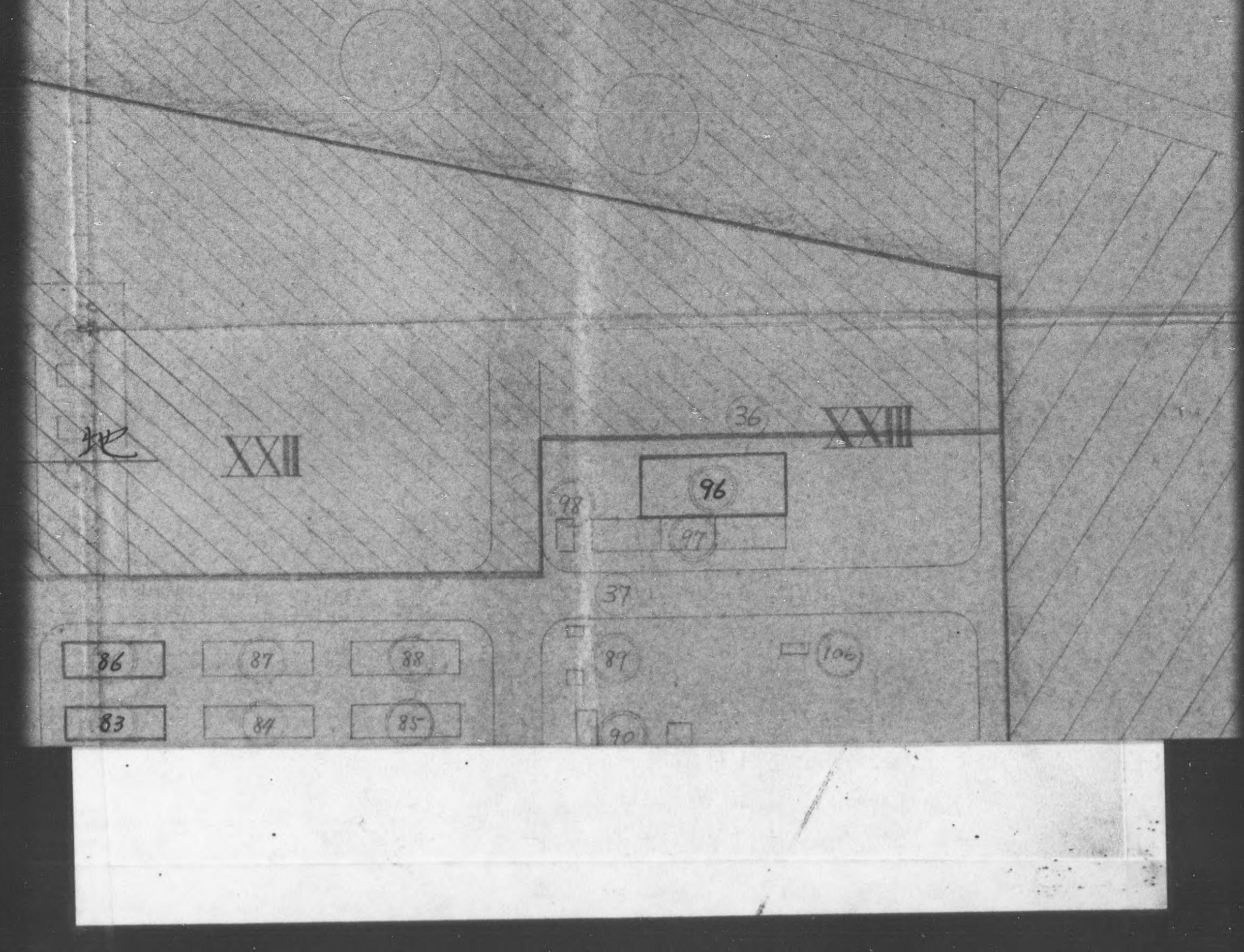
DECLASSIFIED E.O. 12065 SECTION 3 402/NNBS NO.

UNI ARMY FUEL DEPOT

TRY NO. OF PLANTS

70,500坪（返還地 33,800坪を含む）

SCALE 1/2000



DECLASSIFIED E.O. 12065 SECTION 3 402/NNBS NO:

FUEL DEPOT

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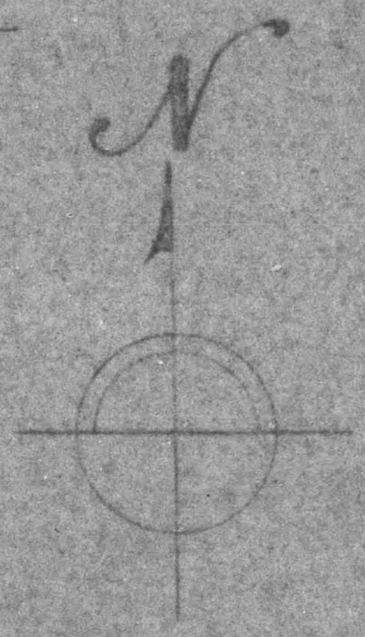
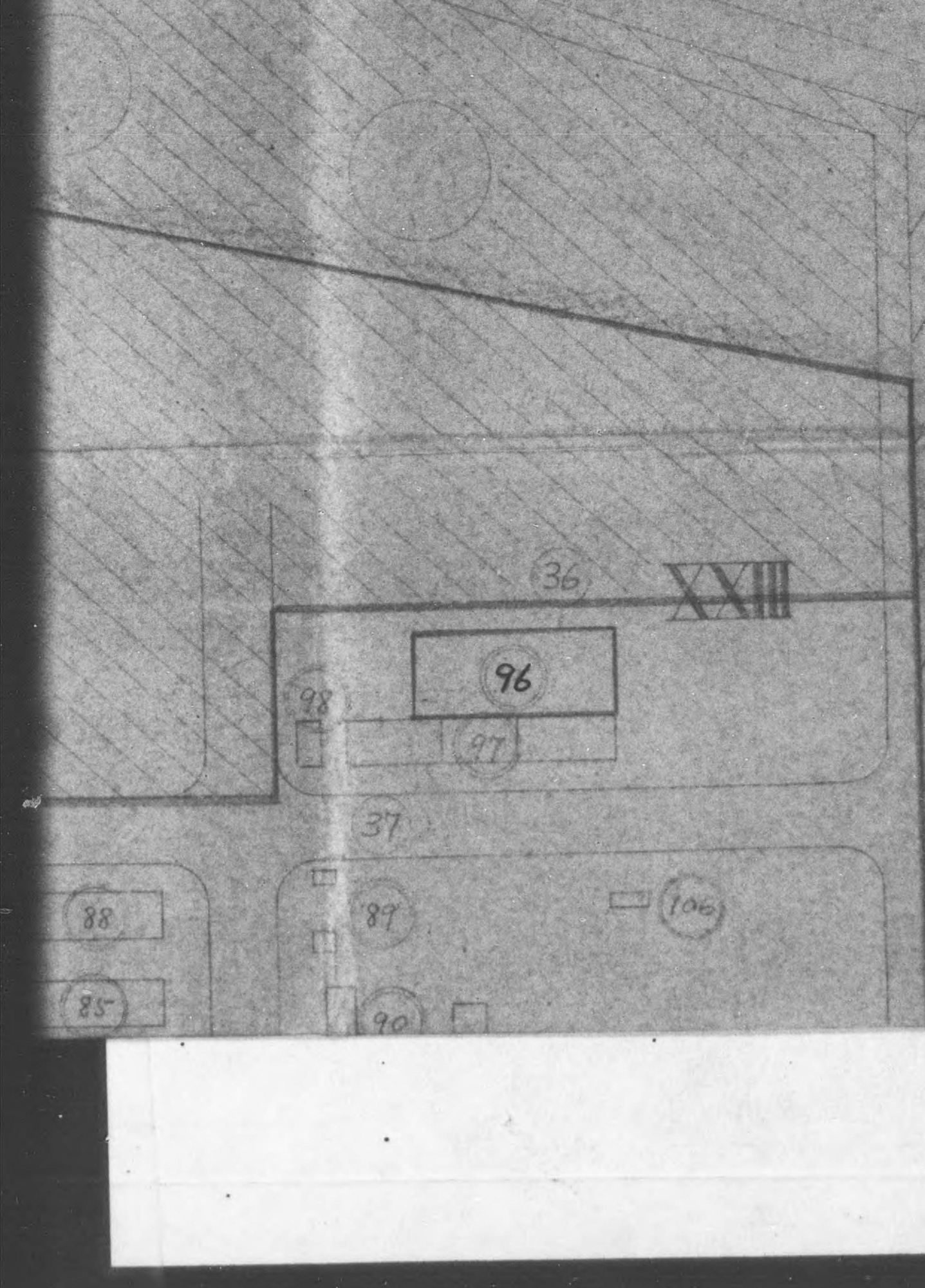
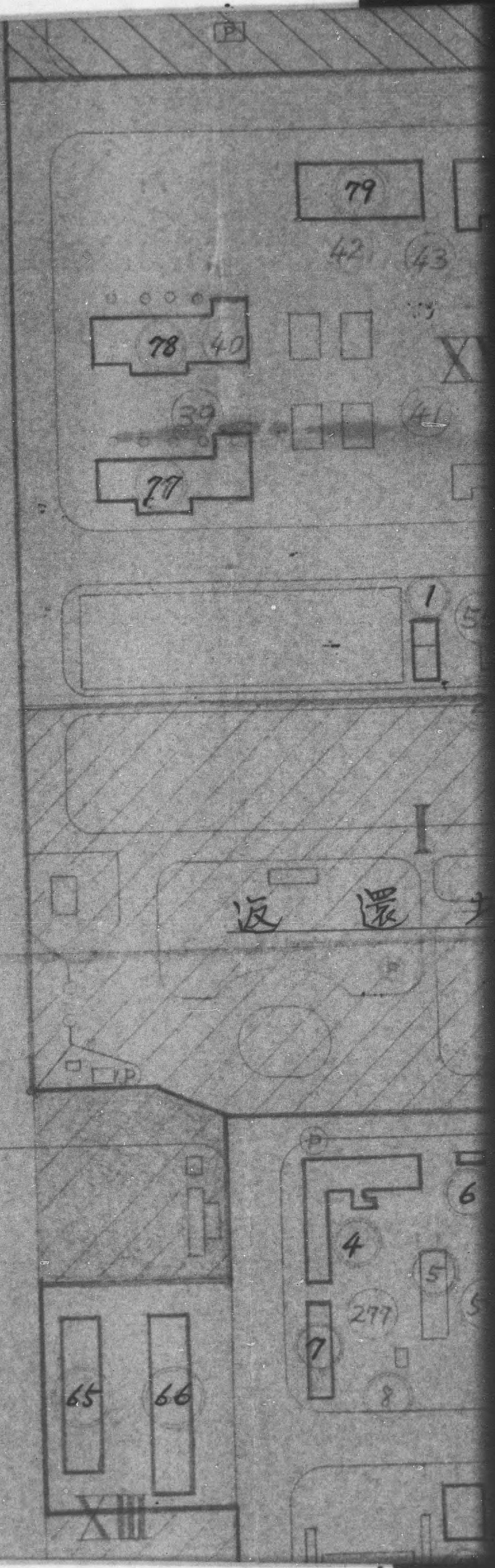
SCALE 1/2000





DECLASSIFIED E.O. 12065 SECTION 3 402/NNSG NO.

F5	29	CO CONVERTER
F5	31	CO REMOVING PLANT
F5	30	CO_2 REMOVING PLANT
F5	33	HYDROGEN PURIFICATION PLANT
F5	32	NITROGEN GAS SEPARATION PLANT
F5	277	LIQUID AIR SEPARATION PLANT
F6	43	ALCOHOL PLANT
F7	499	DRUM MANUFACTURING PLANT
/	/	CRACKING PLANT
22	22	NNC THERMAL TYPE (2 UNITS)
11	11	CATALYTIC CRACKING PLANT (ARMY)
23	23	CATALYTIC CRACKING PLANT (NNK)
12	12	RERUN TOPPING PLANT
F8	4	CLAYTREATING PLANT FOR CRACKED GASOLINE
F8	48	CLAY DRYING FURNACE
35	35	HIGH PRESSURE HYDROGENATION PLANT
F9	/	ISO-OCTANE PLANT
18	18	GAS SEPARATION PLANT
20	20	PROPANE REFINING PLANT
17	17	NO.1 ISO-OCTANE PLANT
19	40	BUTENE-DENYDRO POLYMERIZATION PLANT
19	19	SPECIAL EMULSION PLANT
F9	41	NO.2 ISO-OCTANE PLANT
49	49	CATALYST PLANT
F10	/	SYNTHETIC LUB OIL PLANT
F10	42	PLANT FOR DESTRUCTIVE DISTILLATION OF RUBBER
13	13	PARAFFINE CRACKING
14	14	OLEFFINE POLYMERIZATION PLANT
15	15	CONTACT RERUN PLANT FOR POLY PLANT
16	16	TANK AND PUMP FOR ABOVE PLANT
24	24	PITCH COKE PLANT
F11	38	PRODUCER GAS PLANT
F12	39	HIGH PRESSURE EXPERIMENTAL PLANT



DECLASSIFIED E.O. 12065 SECTION 3 402/NNSG NO.

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39 41 77 81

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返 還 地

26 16 25

24 VI

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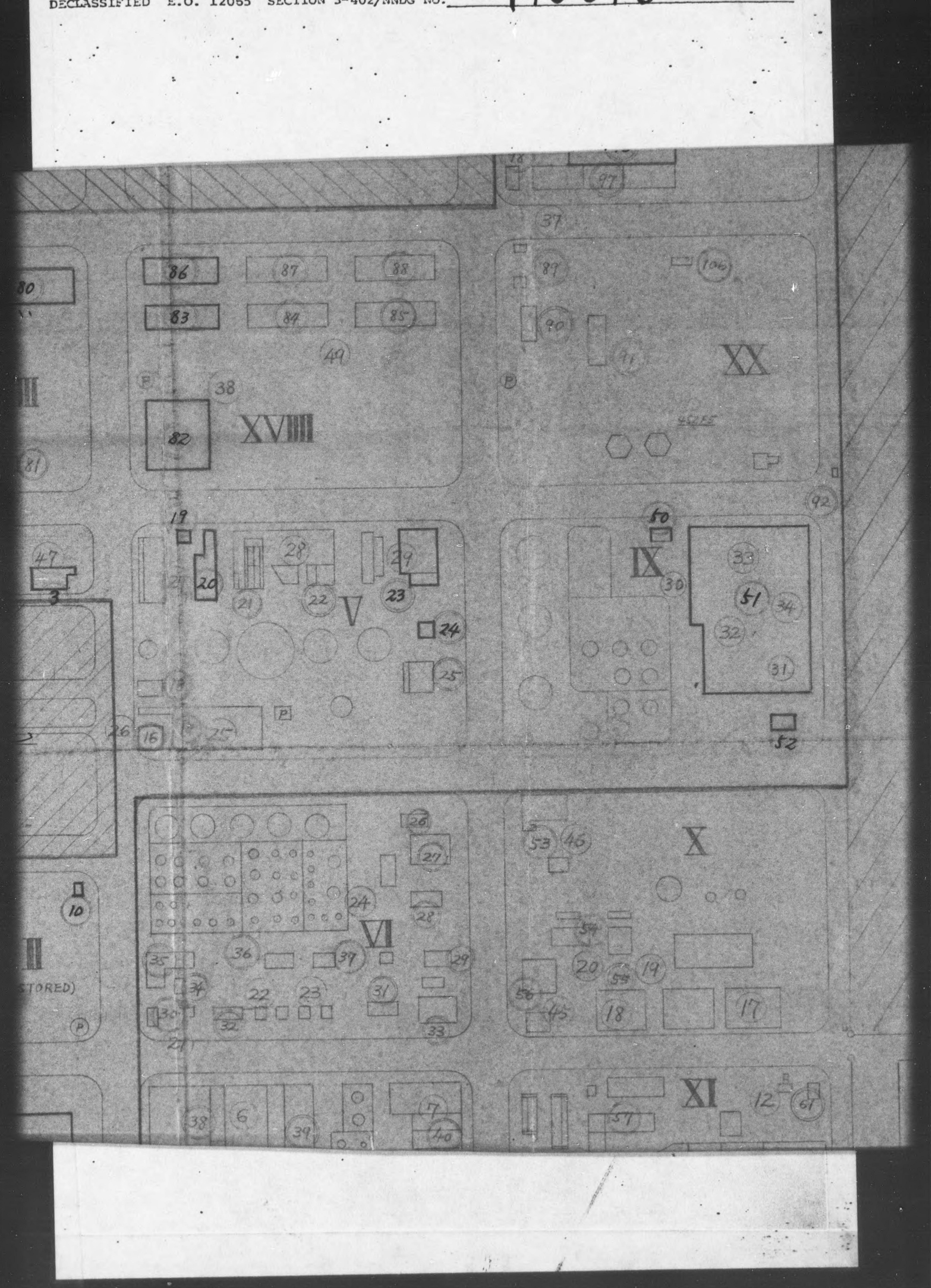
4 6 10 5 57 277 7 8 II (STORED)

65 66 XIII

38 6 39

DECLASSIFIED E.O. 12065 SECTION 3-402/NNDG NO.



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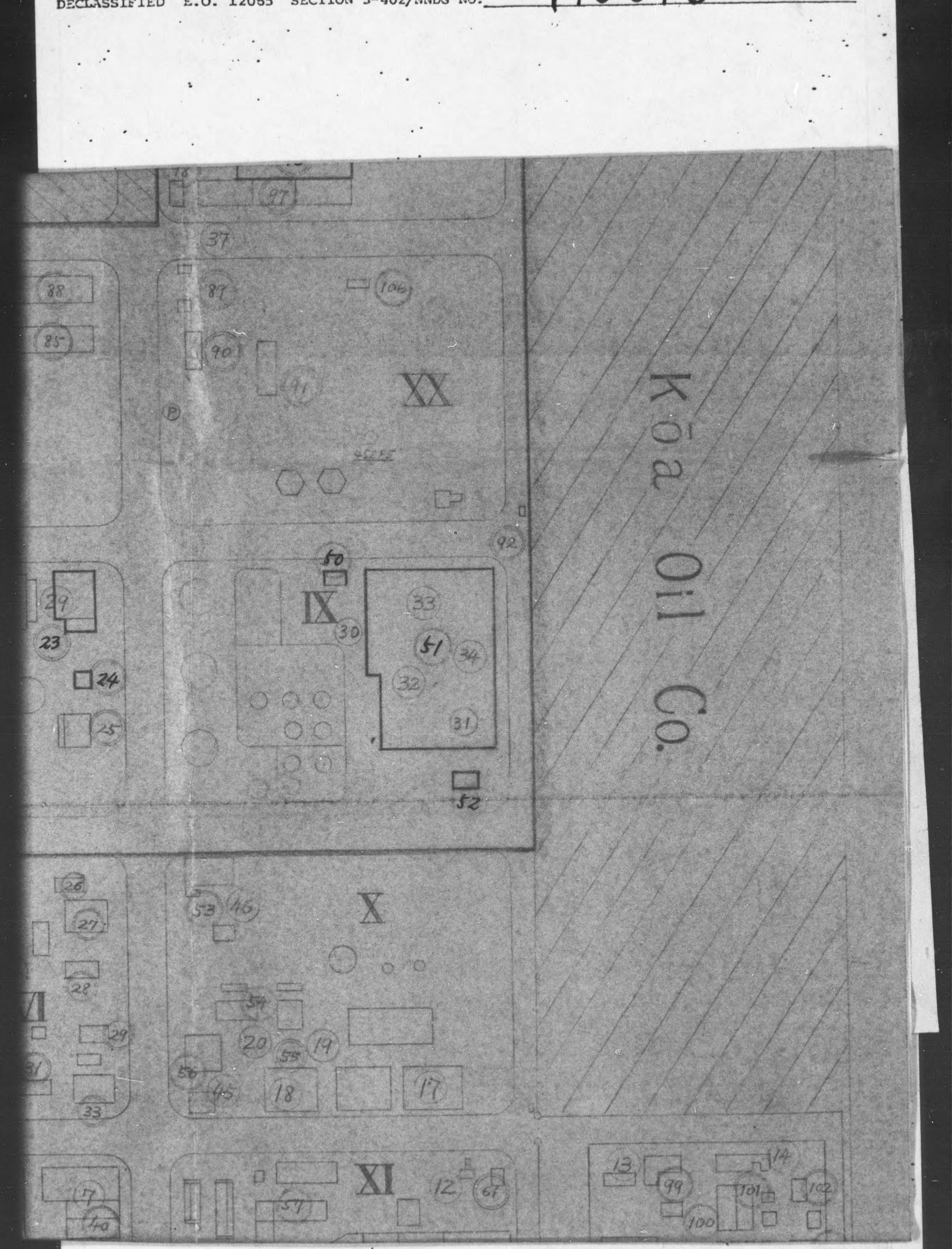

DECLASSIFIED E.O. 12065 SECTION 3-402/NNDG NO. [redacted]

15	15	CONTACT RERUN PLANT FOR POLY PLANT
16	16	TANK AND PUMP FOR ABOVE PLANT
24	24	PITCH COKE PLANT
F11	38	PRODUCER GAS PLANT
F12	37	HIGH PRESSURE EXPERIMENTAL PLANT
F13	46	STEAM BOILER PLANT
F14	45	HIGH PRESSURE STEAM BOILER PLANT
F15	55	WATER FEEDING PUMP PLANT
F16	50	SEA WATER PUMPING PLANT
F17	52	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.

: Plant No.

: Building No.

65 66 7 279 57 9 13 XIII P III XIII 69 P 71 67 68

Quay

DECLASSIFIED E.O. 12065 SECTION 3-402/NNDG NO:

65
66
XIII
277
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(STORED)
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XIII
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146
XVI
Quay
Sea

DECLASSIFIED E.O. 12065 SECTION 3-402/NNDG NO:

III

IV

VII

VIII

XI

XII

XV

XVI

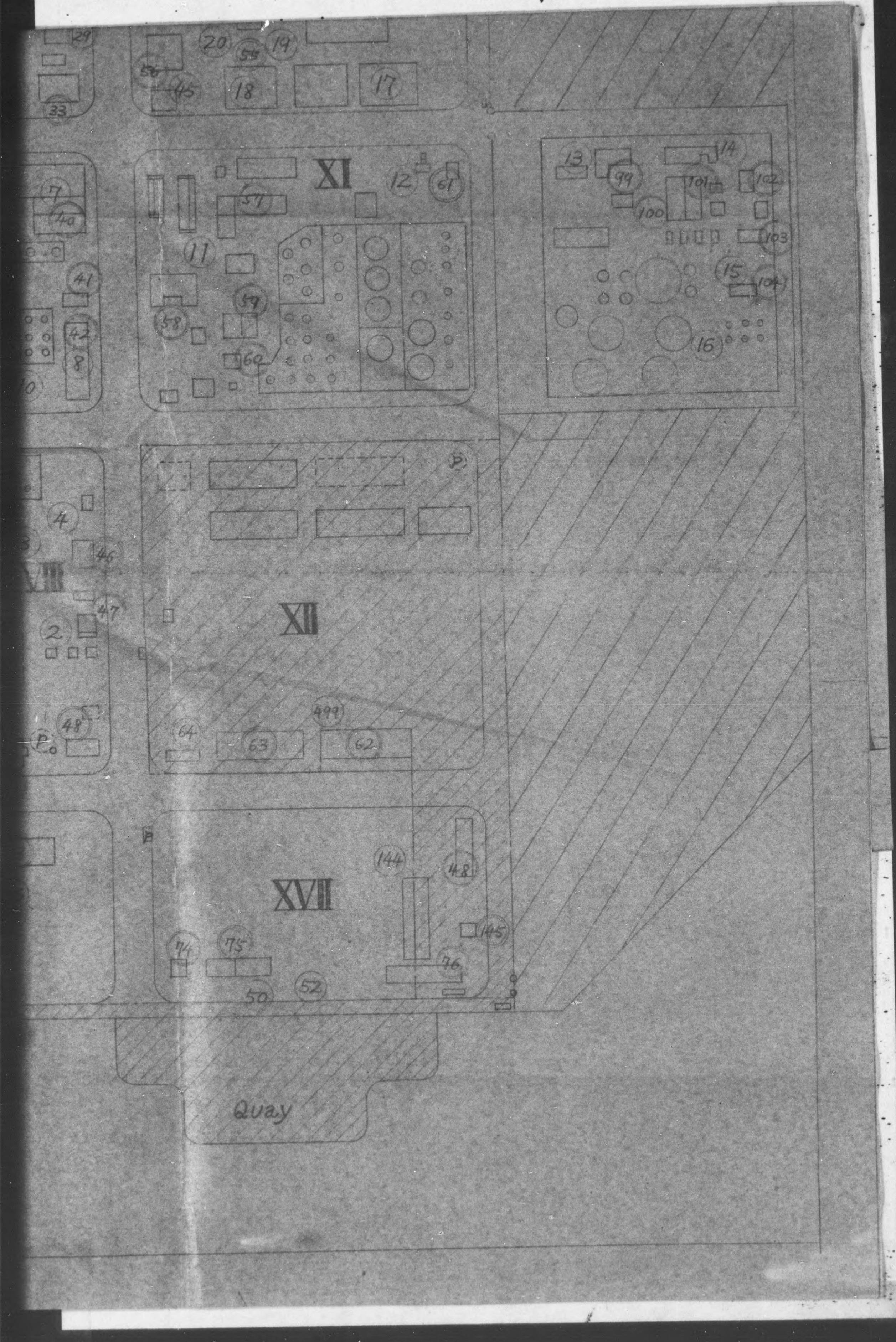
XVII

(STORED)

Sea

Quay

DECLASSIFIED E.O. 12065 SECTION 3 402/MNSC NO.



DECLASSIFIED E.O. 12065 SECTION 3 402/NNSS No.

REPORTS

ON

TOKUYAMA SODA CO., LTD.

July, 1949

DECLASSIFIED E.O. 12065 SECTION 3-402/NNDS N.S.

History and Present Status of Operation

July, 1949

LOCATION

Head Office : 8355 Tokuyama City, Yamaguchi Pref.
Factory : " "
Branches : Tokyo, Osaka, Ube & Kokura cities.
Limestone Quarry : Omine, Yamaguchi Pref.

PRODUCTS

Caustic Soda :	by Solvay Process
Soda Ash :	" "
Calcium Chloride :	" "
Sodium Silicate :	by Soda Ash Process
Basic Magnesium Carbonate :	by-product of Solvay Process
Portland Cement :	by-product using waste lime and boiler ash.
Gypsum :	from Solvay Process waste liquor and salt cake.

HISTORY IN BRIEF

1918 Established. Initial production capacity : 50 tons of soda ash and 20 tons of caustic soda per day.
1932 Plant enlarged to produce 600 tons of crude soda and 300 tons of caustic soda daily.
1933 Plant enlarged further to produce 800 tons of crude soda and 400 tons of caustic soda.
1937 Cement factory with production capacity of 1,000 tons a day and electric power plant were completed.
1938 Gypsum manufacturing factory with daily production capacity of 50 tons, magnesium carbonate plant of 5 tons daily and calcium chloride plant of 35 tons daily were completed.
1940 Commenced operation of sodium silicate manufacturing plant producing 20 tons daily.
1942 Completed potassium chloride manufacturing plant producing 1,000 tons annually.
1945 Operation of plant was suspended owing to damages received in air raid which destroyed magnesium carbonate plant, potassium chloride plant, store house, office and dormitory.
1946 Operation of cement factory, potassium fertilizer factory and manufacture of chemicals was resumed.
1948 Operation of soda ~~ash~~ plant was resumed.

PLANTS AND MAIN EQUIPMENT

Power Plant

	Capacity per unit	No. of Unit		
		Workable & Working	Repairable	Total
Boiler	65 tons/Hour	3	-	3
Generator and Turbine	10,000 KW (Back Pressure)	1	-	1
	4,500 KW (Bleeder)	1	-	1

DECLASSIFIED E.O. 12065 SECTION 3 402/NNBS NO.

Soda Ash Plant

	Capacity per unit	No. of Workable & Working	Unit Repairable	Total
Lime Kiln	400 T/D Limestone	3	2	5
Brine Purification	200 M^3/H Brine	1	-	1
Ammonia Absorber	200 T/D Soda Ash	4	2	6
Ammonia Distiller	100 T/D "	4	6	10
Solvay Tower	150 T/D "	5	2	7
Calciner	60-40 T/D "	6	-	6
Causticizing Equipment				
Bicarbonate Decomposer	130 T/D Caustic soda	3	-	3
Causticizing Equipment	100 T/D "	3	2	5
Pressure Evaporator	100 T/D "	3	-	3
Vaccum Evaporator	40 T/D "	7	1	8
Caustic Pot	7 T/D "	25	33	58

Cement Plant

Principal Equipment :

Item	Type	Number	Capacity (max.)	Capacity (safe)	Remarks
Crusher	Hammer	1	50 T/H	35 T/H	75 HP
"	"	1	100 "	70 "	120 "
"	"	1	40 "	30 "	30 "
Raw Material Mill	Unidan	2	25 "	21 "	2.4x14 M 1,200 HP
Rotary Kiln with grate cooler	Unax Kiln	2	25 "	19 "	3.6x85.6 M 100 HP
Cement Mill	Unidan	2	25 "	21 "	2.6x14 M 1,500 HP
Bag Packer	Bates	2	40 "	40 "	4 nozzle

DECLASSIFIED E.O. 12065 SECTION 3 402/NNBS NO:

MONTHLY MANUFACTURING CAPACITY (in metric tons)

	Capacity	
	Designed & repairable capacity	Working Capacity
Crude Soda (total ash)	9,000	9,000
Soda ash	5,300	5,300
Caustic soda	6,300	1,200
Cement	16,100	16,100
Calcium Silicate	1,800	1,050
Sodium Silicate	580	580
Basic Magnesium Carbonate	150	0
Gypsum	1,500	0

PRESENT MOST ECONOMICAL OPERATIONS

Crude soda (total ash)	7,500	tons	per	month
Soda ash	3,000	"	"	"
Caustic soda	3,300	"	"	"
Cement	15,000	"	"	"

PRODUCTION OF SODA : (in metric tons)

Year	Crude Ash	Soda Ash	Caustic Soda
1935	176,660	51,500	89,400
1936	188,701	57,500	93,713
1937	192,213	47,578	103,511
1938	196,874	29,774	112,214
1939	182,601	33,278	106,751
1940	177,579	42,477	95,782
1941	113,686	32,294	58,423
1942	83,565	33,421	35,816
1943	85,927	42,617	38,079
1944	54,004	22,063	22,815
1945	5,517	1,877	2,599
1946	4,448	1,116	2,144
1947	-	-	-
1948(July-Dec)	20,436	2,858	12,218
1949(Jan-June)	28,851	13,569	10,735

(Record for 1918 to 1934 was lost in fire)

PRODUCTION OF CEMENT : (in metric tons)

Year	Production	Remarks
1938	54,125	Started in May, 1938
1939	85,753	
1940	126,978	
1941	123,709	
1942	52,699	Shortage of coal
1943	83,149	do
1944	51,413	One of the two rotary kilns operated.
1945	9,194	do
1946	20,045	do
1947	16,341	do
1948	54,705	do 6,715tons exported.
1949 (Jan-June)	40,456	do 5,820 tons exported.

DECLASSIFIED E.O. 12065 SECTION 3 402/NNBS NO.

ARRANGEMENT OF THE PLANTS :

Please refer to the sheet attached.

Factory Area : 520,000 square meters (128,5 acres)
Floor Space : 73,000 square meters (18.0 ")

OPERATIVES :

2,325 men

114 women

DECLASSIFIED E.O. 12065 SECTION 3 402/MRS NO.

Outstanding Features of Tokuyama Soda Co., Ltd.

I. LOCATION :

a) The port of Tokuyama to be designated as foreign trade port.

Tokuyama is an excellent natural harbor. To be named as foreign trade port gives added significance to soda plants which invariably are dependent upon imported salt, and in the case of Tokuyama Port, the designation places Tokuyama Soda Plant on a decidedly advantageous position over fellow soda plants.

b) Shore facilities complete with piers allowing 10,000 ton vessels alongside.

Tokuyama Soda Plant is, in fact, a part and parcel of the port. The plant's piers accommodate ocean-going vessels of 10,000 tons alongside. Loading an unloading facilities are complete.

c) Coal brought to the plant exclusively by sea.

Coal used by the plant comes largely from Ube collieries. Other raw materials are also brought in mostly by sea. The cost of raw materials, therefore is comparable to what they cost where they are produced, thanks to the low cost of transportation by water. Finished products are also shipped out by sea.

d) Railway siding in the plant yard, connecting Tonda station on the Sanyo Trunk Line.

e) Plant's proximity to consumers and ready access by sea.

Chemical fibre plants, the major consumers of caustic soda, are located mostly on the shore of Inland Sea. Tokuyama Soda Plant is within an easy reach of any of these consumers by sea.

f) Ample supply of boiler water.

Water from Nishikigawa hydroelectric dam, which flows by the plant, and the 1,000,000 ton water reservoir of the plants own provide the plant with an ample supply of soft-water required for boiler use. The temperature of the water here changes little by seasons. Furthermore, the temperature of the water near the bottom of the reservior is around 50°F. even under mid-summer temperature of 100°F.

II. TECHNICAL IMPROVEMENTS.

a) 15% saving in steam consumption.

By the adoption of pressure Steam Evaporator Drum, which is exclusively used by Tokuyama Soda Plant, 15% economy has been attained in steam consumption for concentrating caustic soda. This is accomplished as follows :

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Instead of water, dilute liquid caustic soda is fed into Steam Exchanger of Back Pressure Turbine. The Steam Exchanger now serves as such and also as Pressure Steam Evaporator, and in these pressure evaporators, liquid caustic soda is concentrated, with a resultant saving in steam of 15%. (Please refer to attached Diagrams)

b) Efficient use of 3,200 calorie coal.

Efficient use of 3,200 calorie coal from Ube colliery has been made possible by Double Feeding Stoker and Steam Injecting Apparatus. (Please refer to experimental data and graph attached)

c) Tokuyama Soda Plant being the pioneer in the manufacture of liquid caustic soda in Japan.

It was once thought by Japanese soda people that caustic soda of high purity was not obtainable unless solidifying it. However, Tokuyama's success in refining liquid soda has made caustic soda in liquid form available to consumers cheaply, not to mention the saving in coal otherwise necessary for solidifying.

III. EFFORT TOWARD RATIONALIZATION OF THE PLANT.

a) Wastes and residues being utilized as materials for manufacture of Portland Cement at the plant results in economy in the cost of products as the labor and expenses for disposition and removal of these waste matters otherwise necessary are saved. Lime sifts, precipitated lime which is the residue of causticizing soda ash, and coal ash are the major items of waste matters at the plant. Incidentally, the quality of cement thus produced by Tokuyama was complimented upon by the Eighth Army authority as being of good export quality. (Please refer to Diagram attached)

b) By-products and related chemicals.

We are now manufacturing calcium chloride, and sodium silicate, and are planning to resume manufacturing basic magnesium carbonate and gypsum.

c) Efforts being made relative to export of products

A large amount of Tokuyama's caustic soda was exported before the war. And of the 10,000 tons Japan exported in 1948, Tokuyama's share was 7,000 tons. Portland cement is being currently exported in large amounts. Their qualities, packing as well as deliveries have been well commented by the Board of Trade as well as exporters.

d) Repair and improvement of the major facilities of the plant.

The work is being pushed vigorously. The Soda Ash Calciners, Ammonia Distillers, Lime Kiln and Solvay Towers hav e since past two years been repaired and improved, and a marked improvement in capacity and efficiency has been made.

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e) No effort being spared in saving and economizing on fuel and raw materials.

The Thermo Supervisory Committee of the plant is making a constant effort to improve boilers, caustic pots, and other thermo equipments. Heat economy program is rigidly enforced. Machine oil requipments at the plant, for instance, has declined by 30% lately.

f) Management and employees making united effort toward rehabilitation of the plant.

Management Consultation Council of the plant is being made the best use of. Management and labor union problems have all been settled by the council. And setting aside immediate and personal gains, everyone is making his and her utmost in the rehabilitation of the plant.

DECLASSIFIED E.O. 12065 SECTION 3 402/MNDS NO: [redacted]

REPORT ON THE USE OF LOW CALORIE COAL FROM UBE COLLIERY BY TOKUYAMA SODA COMPANY

Development and adoption of special equipments by Tokuyama Soda Plant which made it possible to use low calorie coal from Ube colliery of 3,200 calories successfully and efficiently.

In 1940 when power plant was built, the standard fuel was coal of 5,000 calories.

In 1944 when the Double Feeding Stoker was developed and installed in order to use Ube low calorie coal, buring successfully coal of 3,800 calories.

In July 1948 the development and adoption of Steam Injecting Apparatus made it possible to use coal of 3,200 calories with efficiency.

Boiler

Type :	Mitsubishi Vertical Three Drum Water Tube Type.
Number :	3 sets
Heating Surface Area :	1,300 m^2
Characteristics of Steam :	
Steam Pressure	30 Kg/cm^2
Super Heated Temperature	400°C
Capacity :	
Economical Evaporation	50 T/H
Rated Evaporation	65 T/H
Standard Fuel :	5,000 cal.

Officiel Comments :

The successful and efficient use of low calorie coal attained by Tokuyama Soda Company drew the attention of Japanese Government. Boiler of Tokuyama Soda Company was tested by Japanese Government in May, 1949.
The result of the official test as follows :-

The Result of Boiler Test with Low Grade Coal
(Tokuyama Soda Co.)

Date of Test		May 5th		May 6th	
Time		09:00-17:00		10:00-18:00	
Boiler Number		No. 1	No. 3	No. 1	No. 3
Steam					
Maximum Output	t/H	32.000	42.000	47.000	37.000
Average Output	"	28.750	38.250	42.625	33.750

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Steam	Output ratio to maximum capacity	%	44.3	58.8	67.1	51.9
	Steam Temperature	°C	325	342	328	344
	Enthalpy	Kcal/kg	731	740	733	742
Coal						
	Feed Water Temperature	°C	106	106	110	110
	Wet Coal consumed	Kg/H	8,580	12,913	12,816	11,900
	Hygroscopic moisture	%	4.2	4.2	4.0	6.7
	Analysis :					
	Water	%	6.92	6.90	6.91	6.76
	Volatile Matter	%	26.84	27.65	26.42	26.69
	Fixed carbon	%	19.64	19.07	20.60	20.60
	Ash	%	46.60	46.37	46.07	45.95
	Calorific Value (Gross)	Kcal/kg	5,280	5,310	5,340	5,330
	Calorific Value (Net)	"	5,078	5,107	5,137	5,127
Efficiency						
	Gross calorie base	%	66.6	59.2	67.2	57.8
	Net calorie base	%	71.8	63.5	72.0	62.4
	Steam-coal ratio		3.50	3.10	3.81	3.05

How the equipment works :

Double Feeding Stoker (Please refer to the diagram)

By primary feeding 3/5 to 4/5 of coal is fed from ordinary stoker, and the remaining 2/5 to 1/5 is fed over the arch of boiler (secondary feeding) to accelerate burning.

Steam Injecting Apparatus (Please refer to diagram)

App. 1% of steam raised in the boiler is released and blown into the burning chamber for the purpose of mixing air and fuel sufficiently. The temperature in the chamber then rises and combustion is accelerated. From the color of flame and analysis of carbon dioxide, it is quite obvious of these results.

Distinctive features of Double Feeding Stoker and Steam Injecting Apparatus and their merits over pulverizer.

Drying and pulverizing of coal is not necessary as in the case of

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Pulverizer. Hence, less electricity and operating charges are required.

It is simple in structure. Hence, there is less possibility of break-down. The wear and tear of boiler from using low calorie coal is less. Repair charges are also smaller.

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Nationalization to Bring the Cost Down

(1) Cost of materials is cut by about 6,870,000 yen a month by two ways.

(a) Budgeting the materials consumption.

For making a ton of soda ash :-

	Aimed at	May '49
Salt (90%) :	1.70 tons	1.56 tons
Limestone :	1.50	1.67
Coke :	0.18	0.18
Ammonia :	0.005	0.0056

For making a ton of caustic soda :-

	Aimed at	May '49
Salt (90%) :	2.58 tons	2.18 tons
Limestone :	3.90	4.21
Coke :	0.494	0.47
Ammonia :	0.007	0.0078

As compared with February, the following saving can be expected in July when 2,550 tons soda ash and 1,350 tons caustic soda are to be made.

Salt	535.5 tons	@¥3,430.	¥1,840,000.
Limestone	604.5 "	@¥ 660.	400,000.
Coke	262.5 "	@¥5,660.	1,490,000.
Ammonia	8.5 "	@¥59,750.	510,000.
			¥4,240,000

(b) Cutting the purchase prices.

With the exception of salt and coal, purchase prices of raw materials have been reduced by 23% average.

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Following reduction can be expected in the purchases in July when 2,550 tons soda ash and 1,350 tons caustic soda are to be made.

	Formerly	July	Reduction
For making soda :			
Limestone	¥4,700,000	¥3,640,000	¥1,060,000
Ammonia	1,430,000	1,290,000	140,000
For making cement :			
Lime sifts	¥3,970,000	2,760,000	1,210,000
Others	1,290,000	1,070,000	220,000
	1,139,000	876,000	2,630,000

(2) Labor expenses have been reduced by about 8,600,000 yen a month by two ways.

(a) Overtime has been minimized and various allowances cut or reduced according to the revised system of allowances, with the result that the allowances in June is reduced by 6,000,000 yen, about 20% of May allowances.

(b) Coolies have been replaced with 330 employees, thus saving 2,600,000 yen a month.

(3) Rationalization of indirect charges has brought about a saving of 8,600,000 yen.

(a) By strict budgeting system, 6,600,000 yen has been saved a month.

(i) 1,600,000 yen has been cut a month on indirect factory expenses and overhead expenses.

(ii) 5,000,000 yen has been saved a month by strictly keeping the maintenance charges within bounds allowed in official prices.

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(b) By cutting the purchases and construction costs, 2,000,000 yen has been saved a month.

On new purchases of supplies ¥500,000

On new constructions ¥1,500,000

In view of the rationalization exercised by the end of June, a reduction of cost is expected at least by 24,100,000 yen a month.

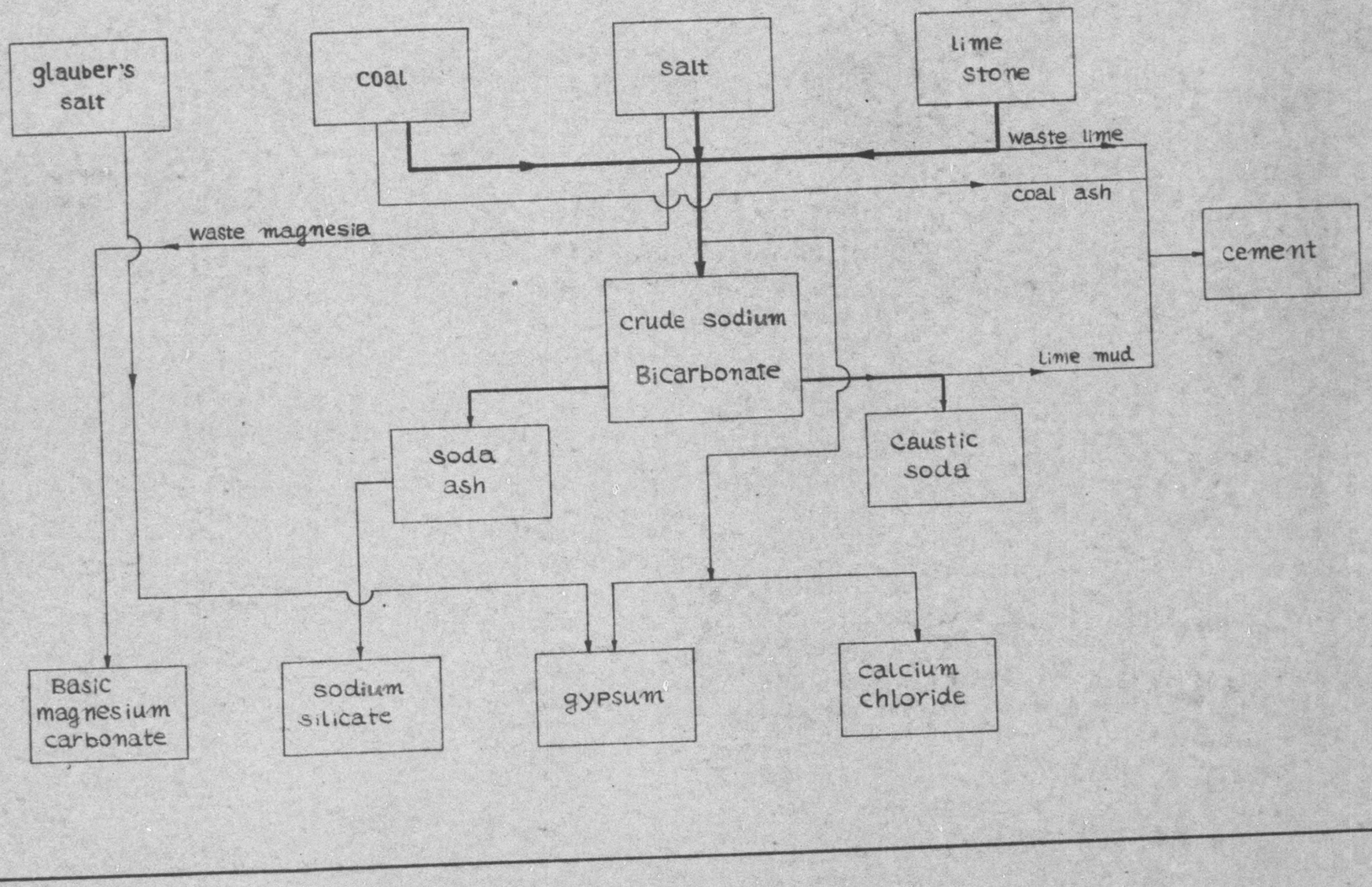
Total cost allowed on basis of old official prices until April 11,1949 .....¥145,690,000 a month.

Total actual cost then .....¥147,570,000 〃

Total cost allowed on basis of new official prices on and after April 12, 1949 ..... ¥123,840,000 〃

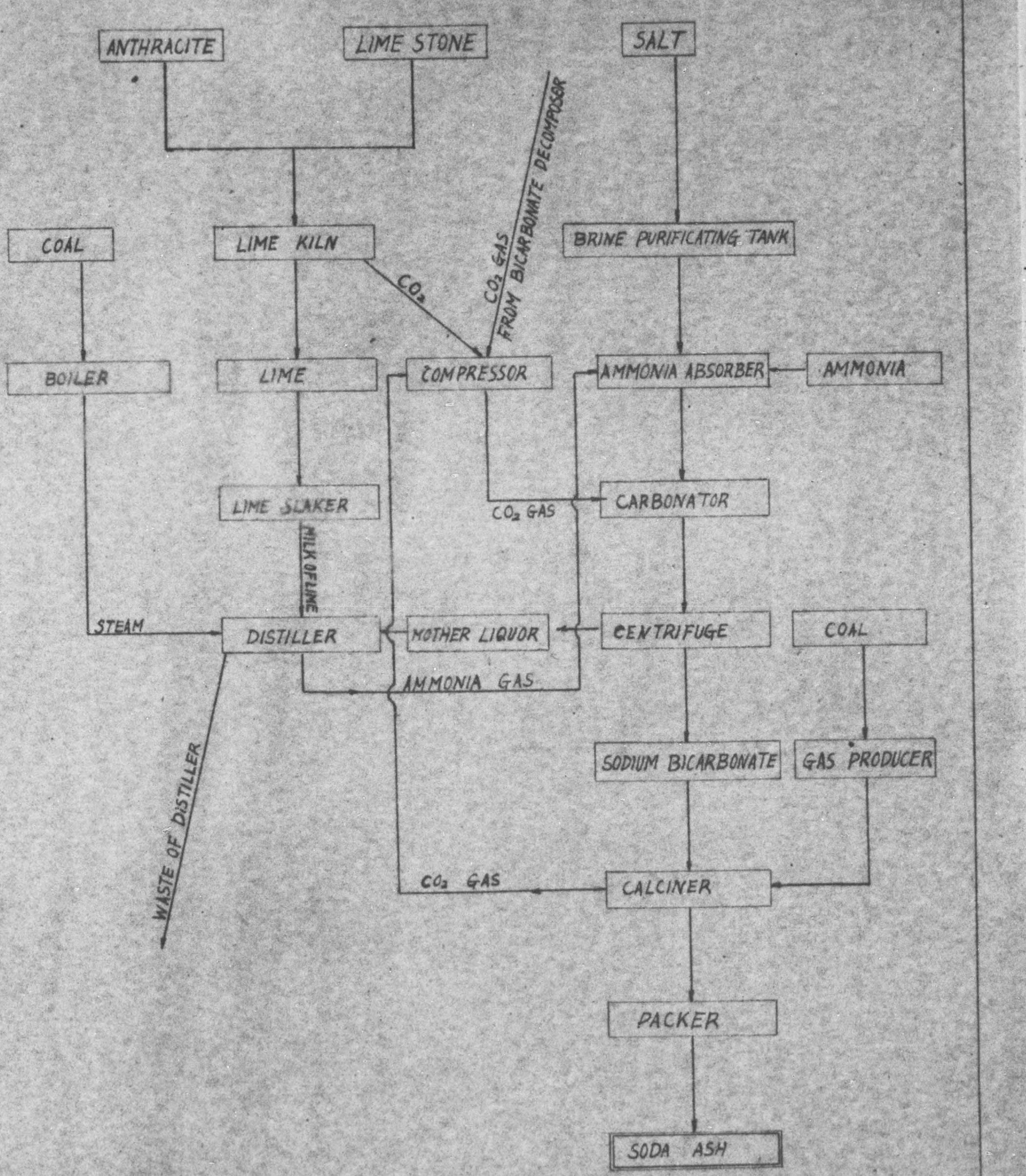
The new total cost (after rationalization) for July onward ..... ¥123,470,000 〃

Diagram no. 1-a



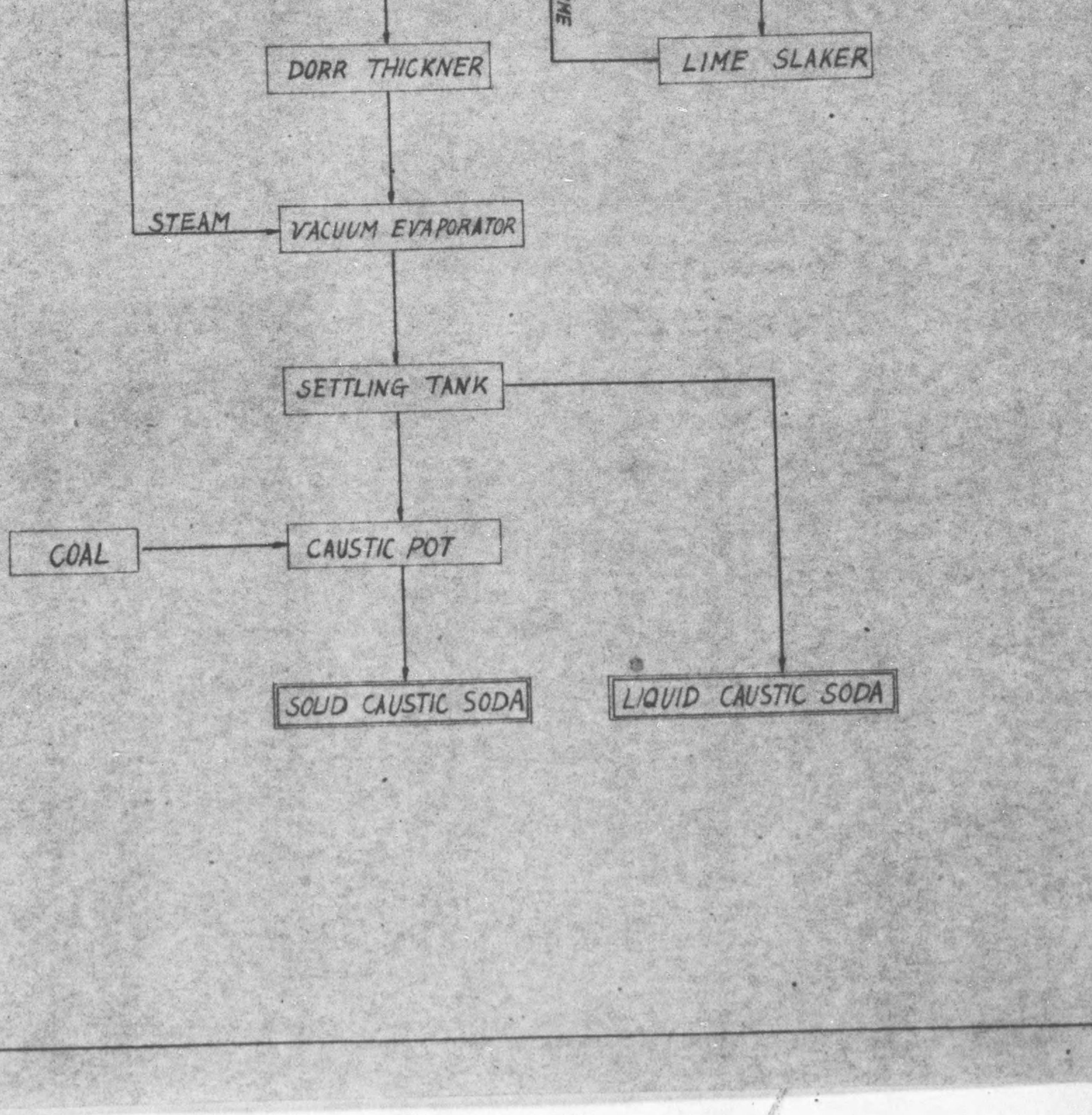
DECLASSIFIED E.O. 12065 SECTION 3 402/NNSG NO.

FLOW SHEET OF SODA ASH PRODUCTION



DECLASSIFIED E.O. 12065 SECTION 3 4(b)/NNSA NSI

FLOW SHEET OF CAUSTIC SODA PRODUCTION



DECLASSIFIED E.O. 12065 SECTION 3 402/NNSS NO.

FLOW SHEET OF PORTLAND CEMENT PRODUCTION

TOKUYAMA SODA CO., LTD.

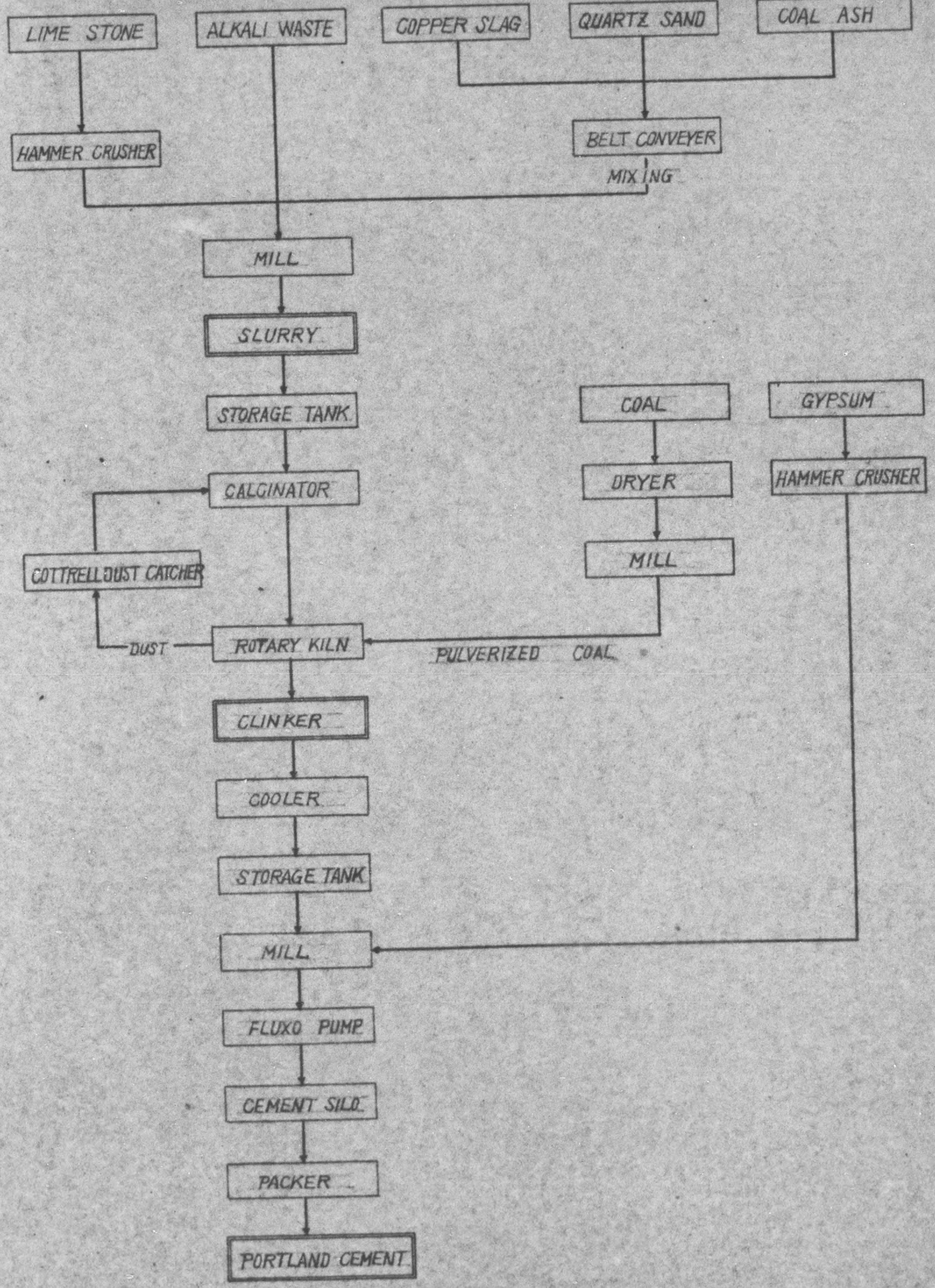
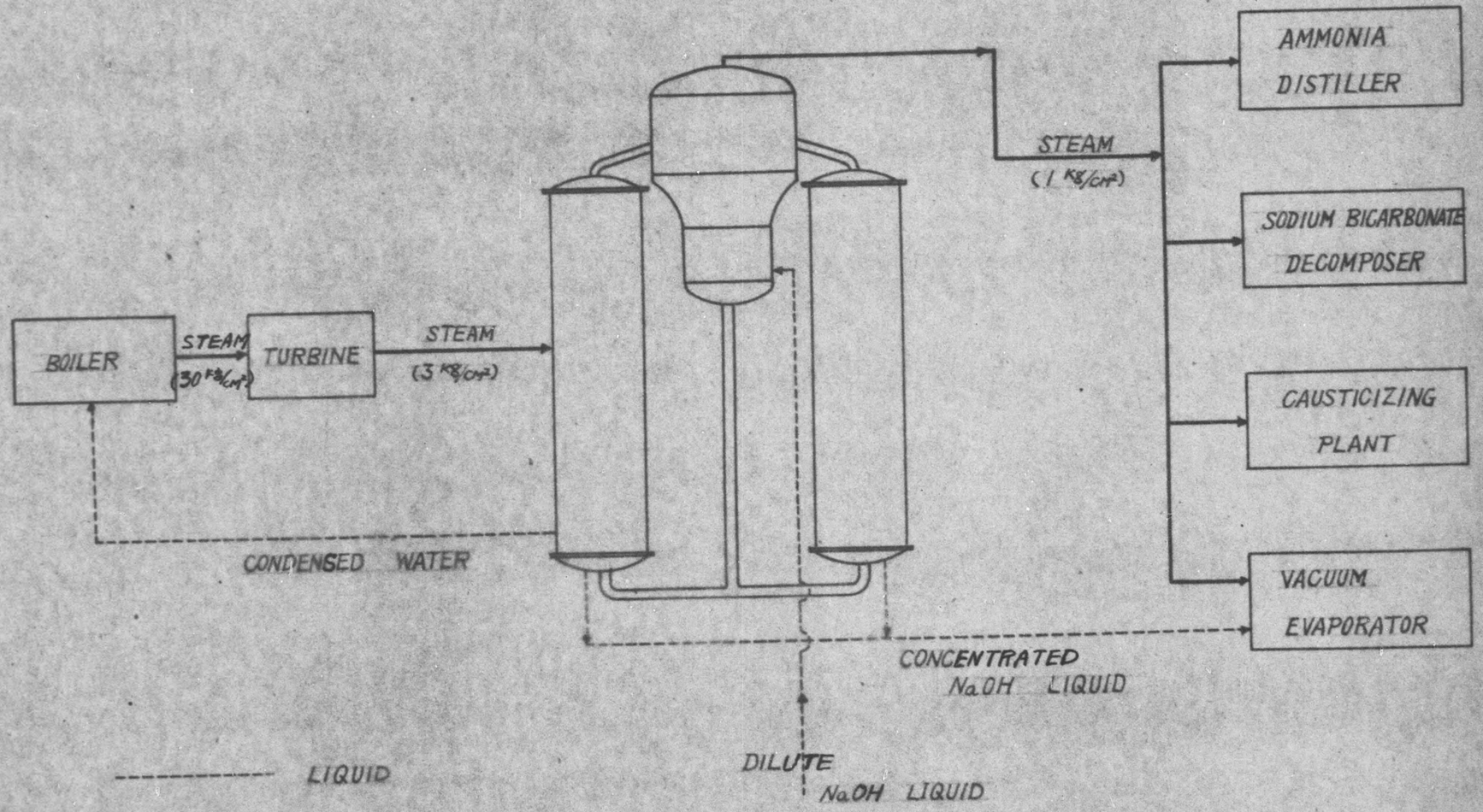


DIAGRAM OF PRESSURE EVAPORATOR

TOKUYAMA SODA CO,, LTD.



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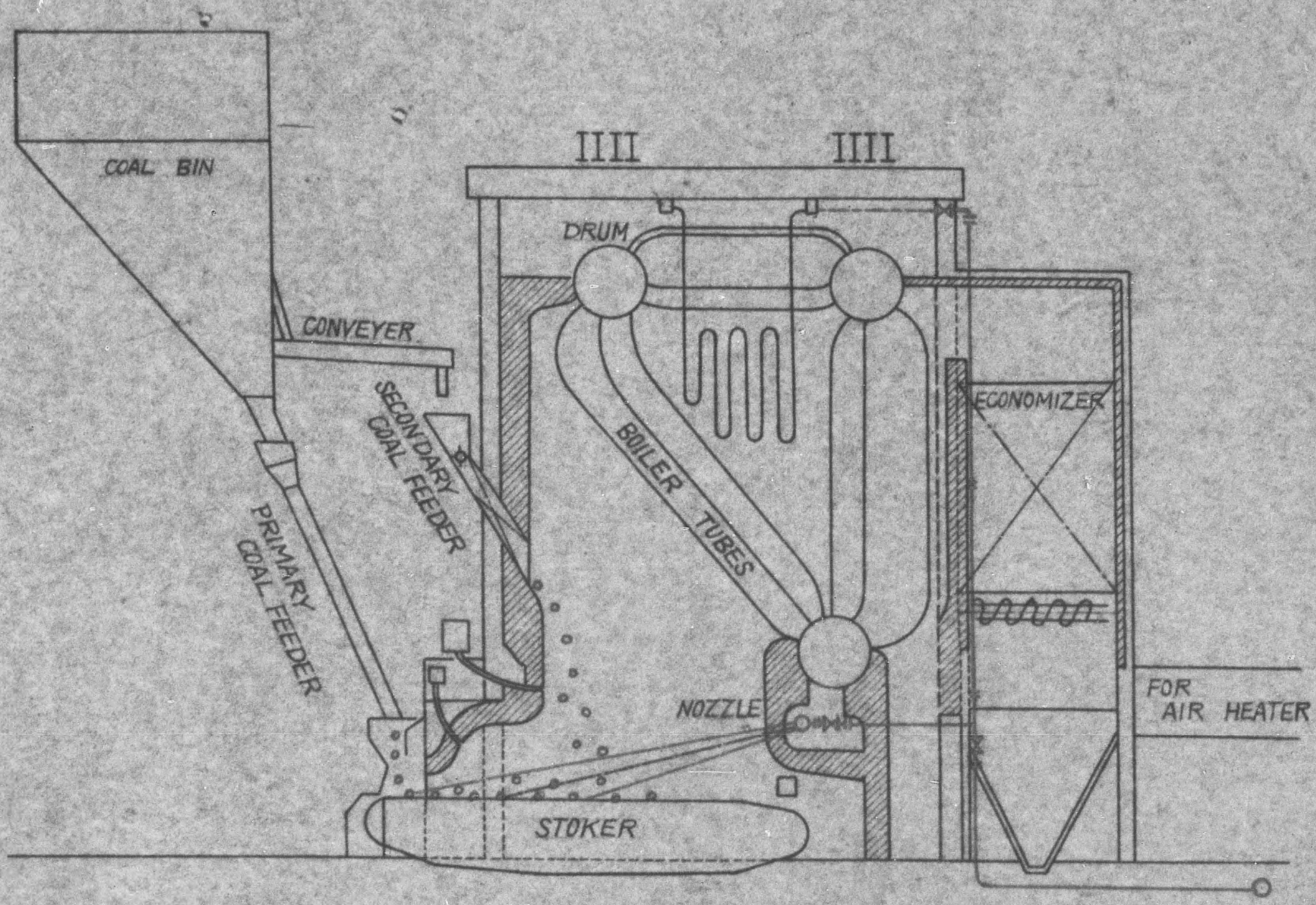
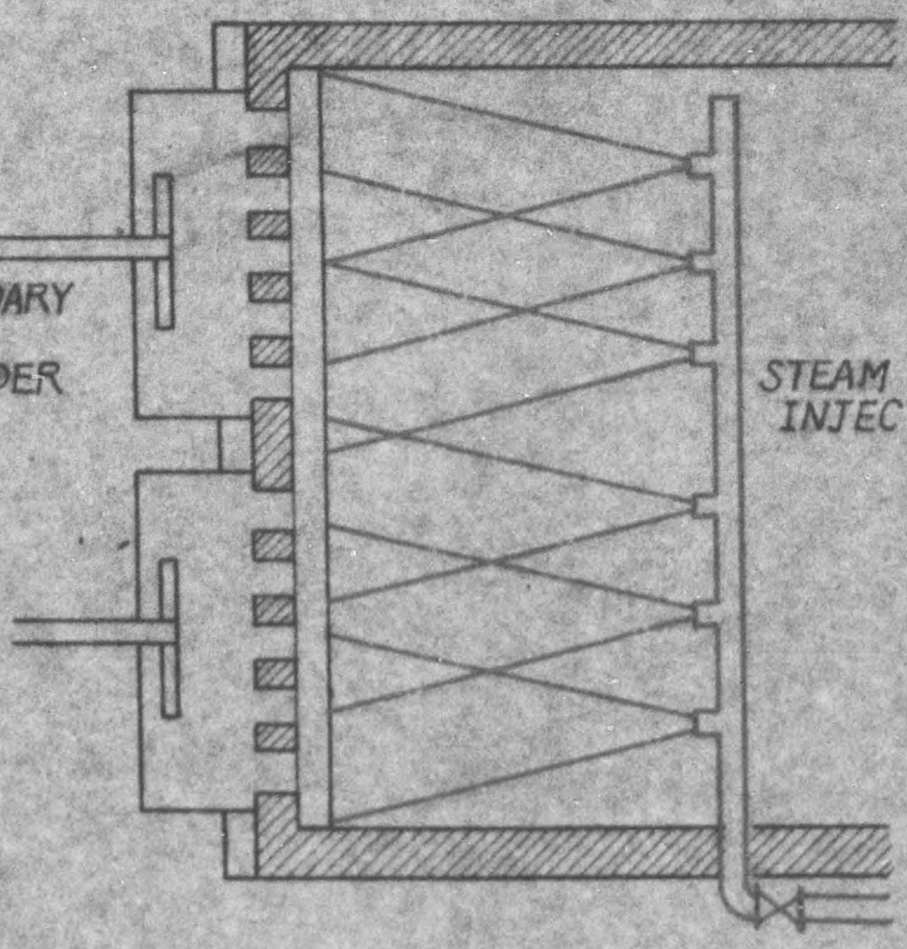
DECLASSIFIED E.O. 12065 SECTION 3 402/NNBS NO:

DOUBLE FEEDING & STEAM INJECTING SYSTEM IN OUR BOILER PLANT

TOKUYAMA SODA CO.LTD.





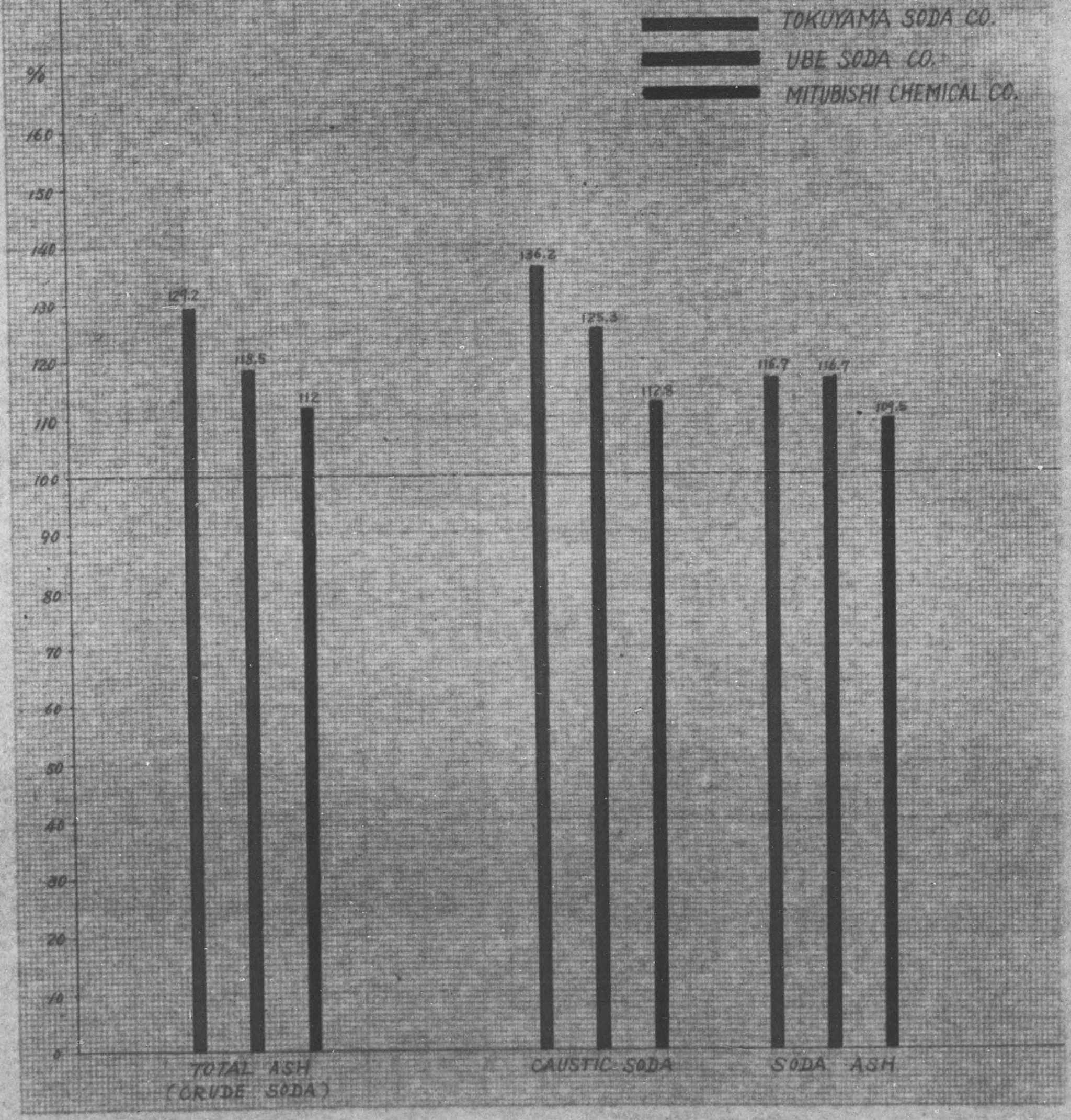
DECLASSIFIED E.O. 12065 SECTION 3 402/NNBS NO:

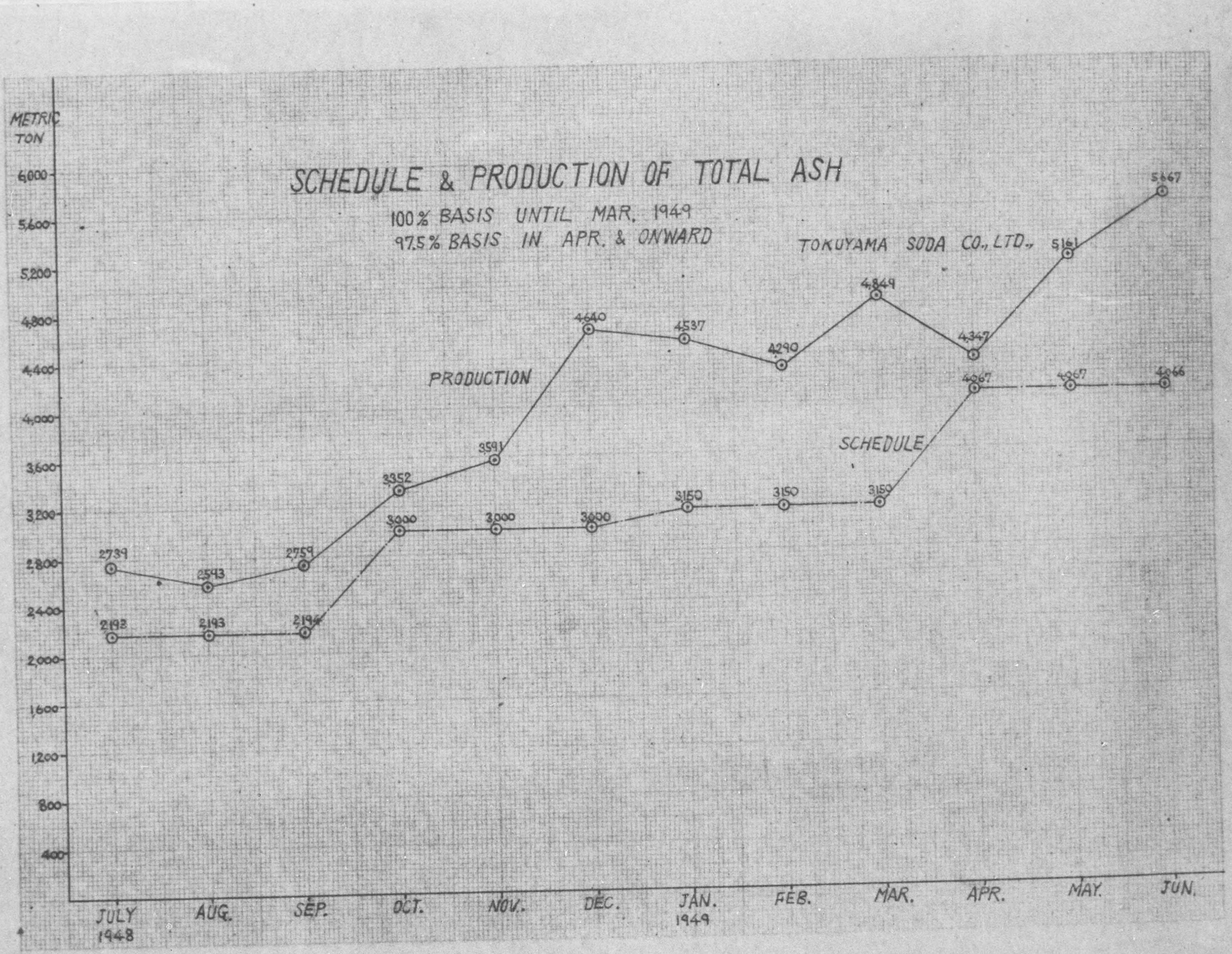
PRODUCTION AGAINST SCHEDULE (100%)

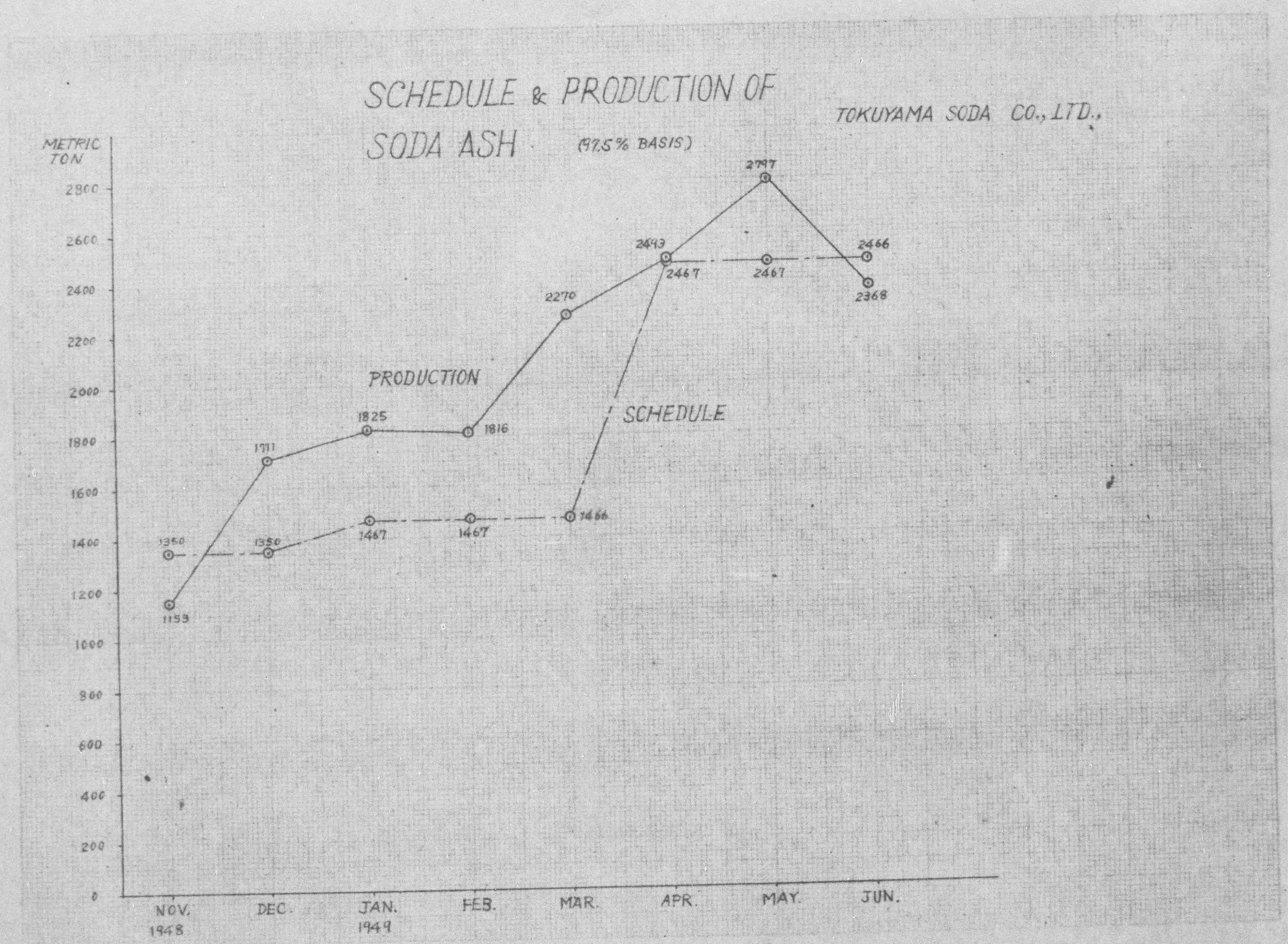
(JULY, 1948 — MAY, 1949)

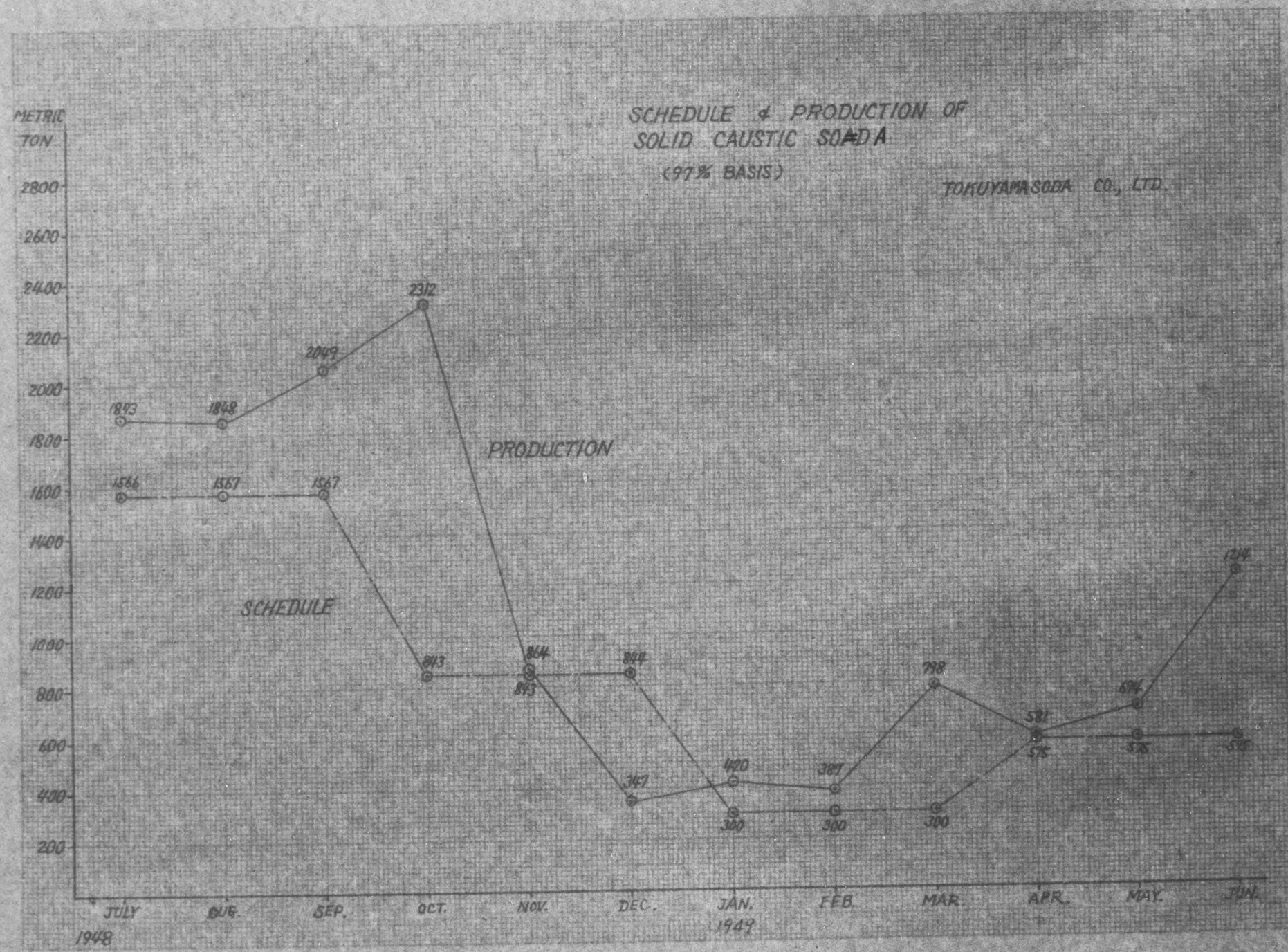
TOKUYAMA SODA CO., LTD.

RAW MATERIALS ARE ALLOCATED BY THE FIGURES OF SCHEDULE




SCHEDULE & PRODUCTION OF TOTAL ASH
100% BASIS UNTIL MAR. 1949
97.5% BASIS IN APR. & ONWARD
TOKUYAMA SODA CO., LTD.,
PRODUCTION
SCHEDULE
METRIC TON
6,000
5,600
5,200
4,800
4,400
4,000
3,600
3,200
2,800
2,400
2,000
1,600
1,200
800
400
2739
2593
2759
3352
3591
4640
4537
4290
4849
4347
5161
5667
2193
2193
2194
3000
3000
3000
3150
3150
3150
4067
4067
4066
JULY 1948
AUG.
SEP.
OCT.
NOV.
DEC.
JAN. 1949
FEB.
MAR.
APR.
MAY.
JUN.


SCHEDULE & PRODUCTION OF
SODA ASH
(97.5% BASIS)
TOKUYAMA SODA CO., LTD.,
METRIC TON
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
PRODUCTION
SCHEDULE
1153
1350
1711
1825
1816
2270
2493
2797
2466
1350
1467
1467
1466
2467
2467
2368
NOV. 1948
DEC.
JAN. 1949
FEB.
MAR.
APR.
MAY.
JUN.

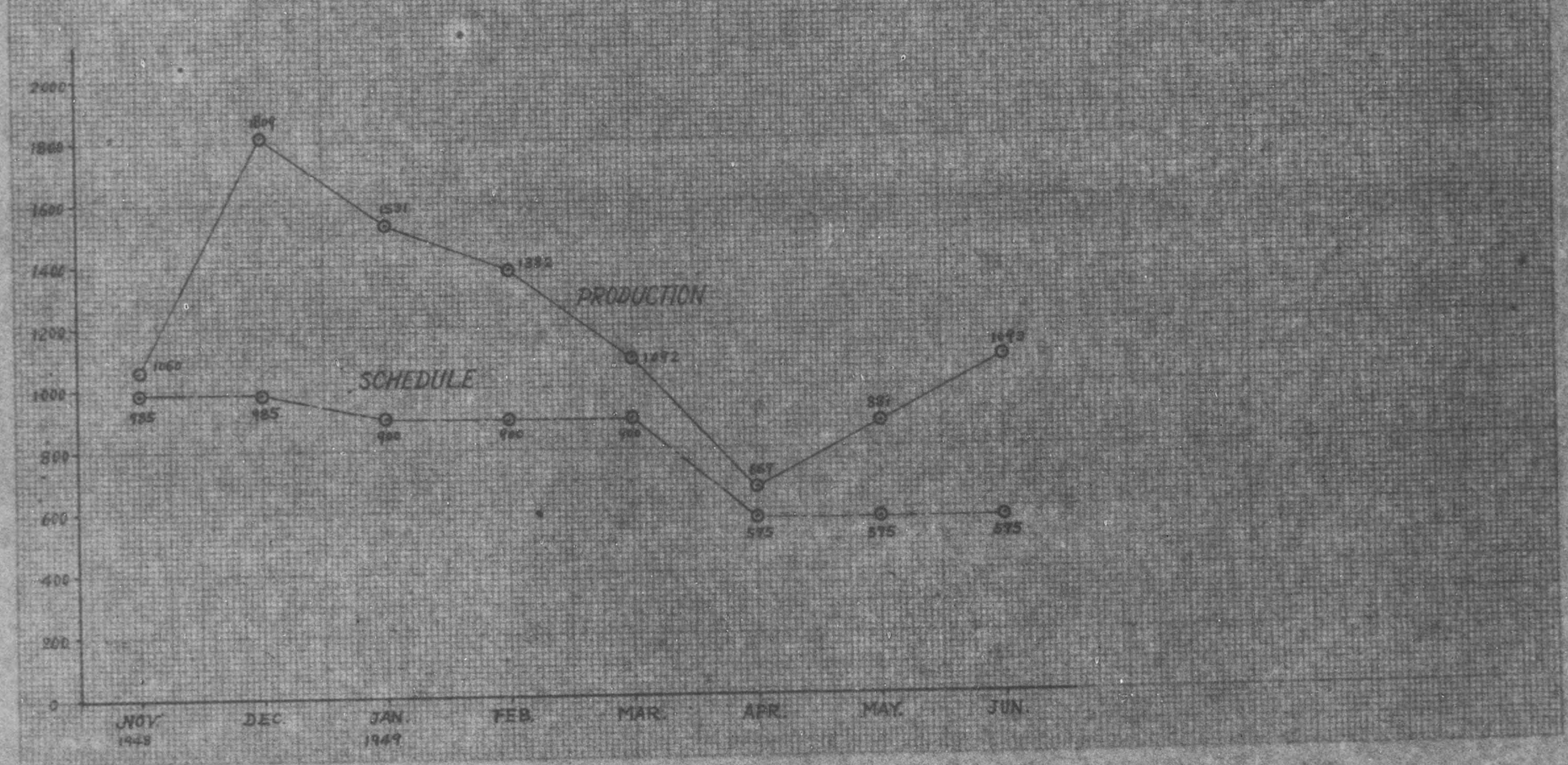

SCHEDULE & PRODUCTION OF
SOLID CAUSTIC SODA
(97% BASIS)
TOKUYAMASODA CO., LTD.
METRIC TON
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
PRODUCTION
SCHEDULE
1873
1848
2049
2312
1566
1567
1567
843
864
843
844
347
420
300
387
300
798
300
581
575
694
575
1214
575
JULY
AUG.
SEP.
OCT.
NOV.
DEC.
JAN.
FEB.
MAR.
APR.
MAY.
JUN.
1948
1949

DECLASSIFIED E.O. 12065 SECTION 3 NND

SCHEDULE & PRODUCTION OF LIQUID CAUSTIC SODA

(97% BASIS)

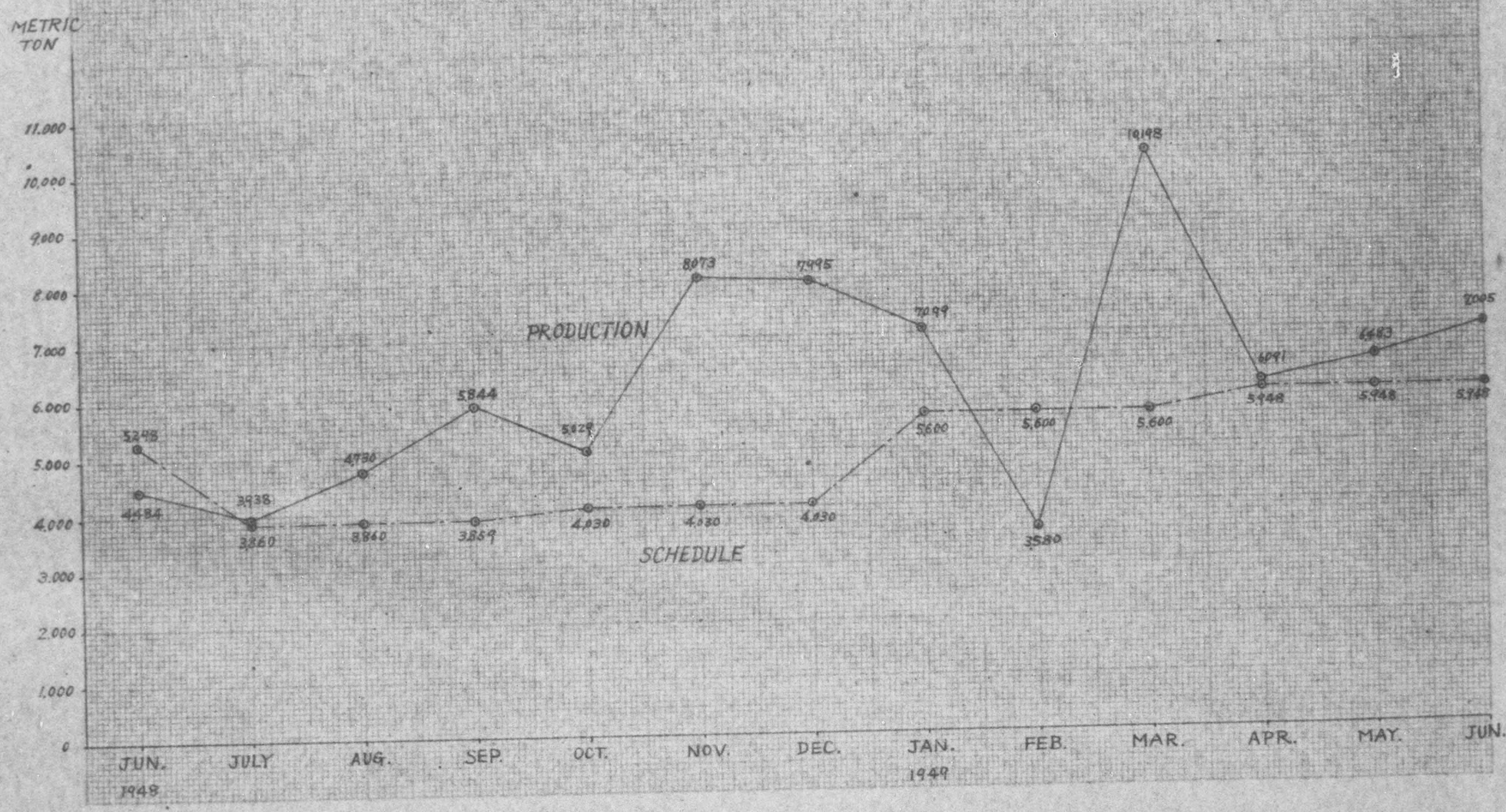
TOKUYAMA SODA CO., LTD.,



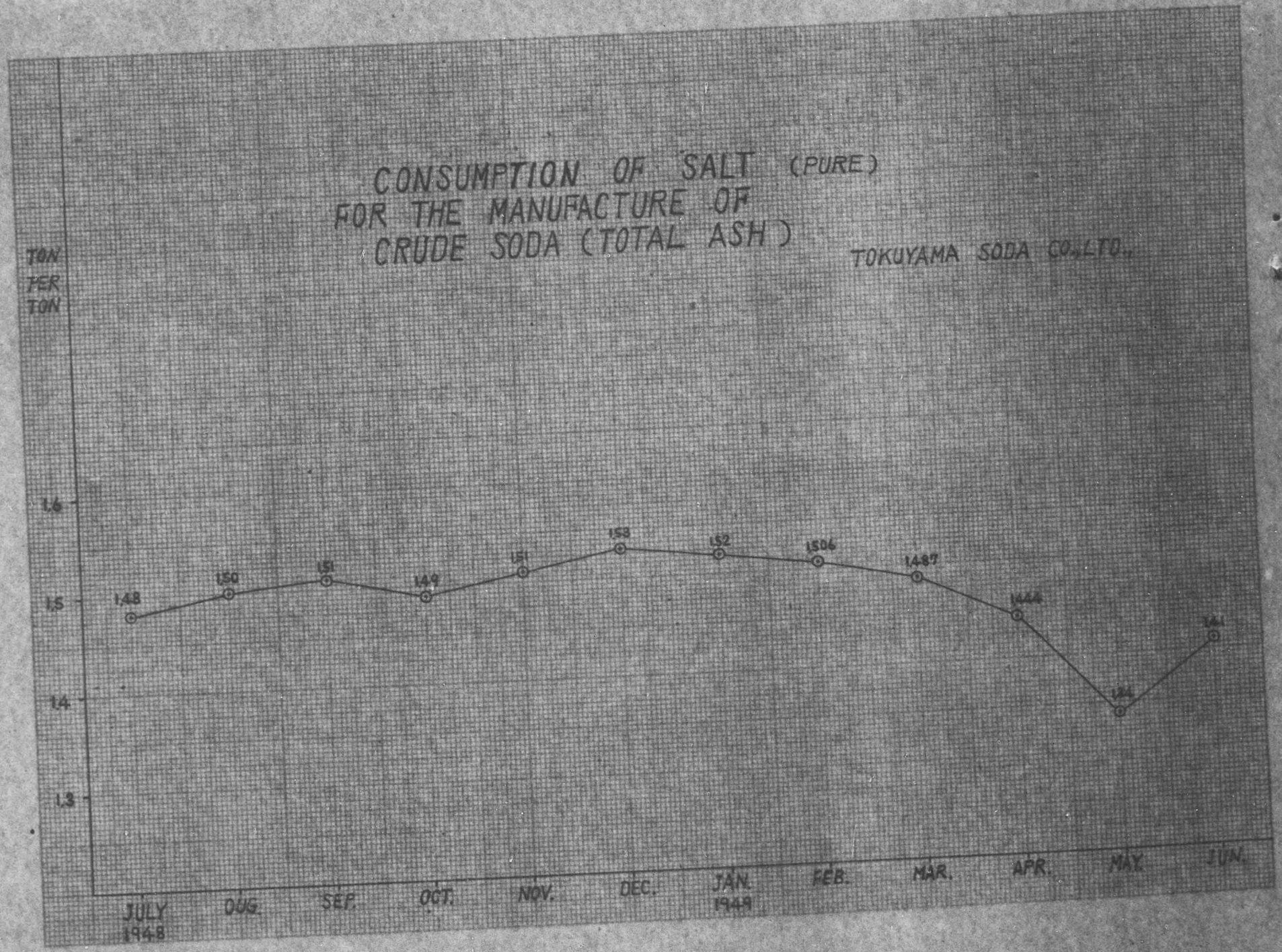
DECLASSIFIED E.O. 12065 SECTION 3 NARA DATE

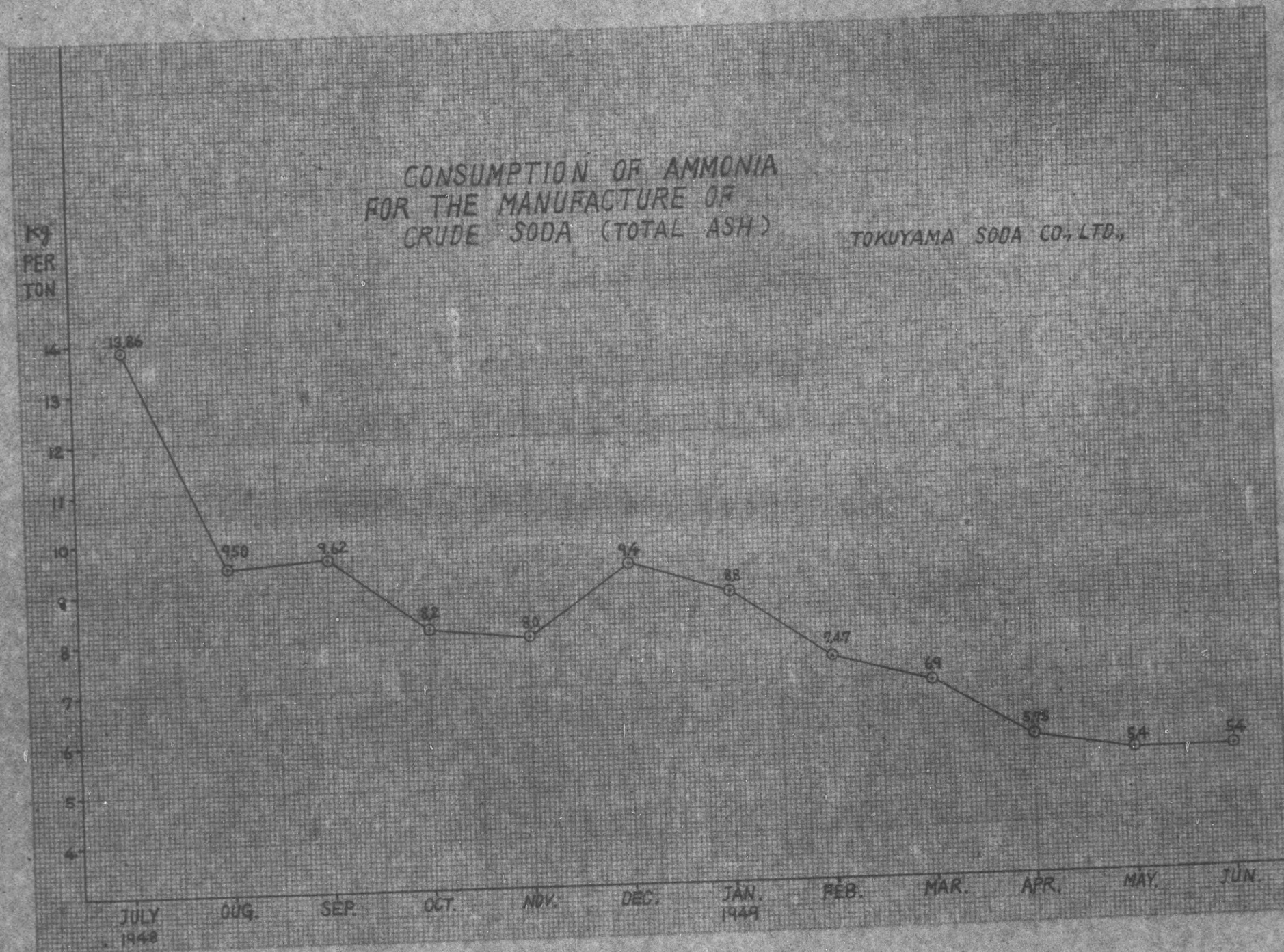
SCHEDULE & PRODUCTION OF CEMENT

TOKUYAMA SODA CO., LTD.,



DECLASSIFIED E.O. 12065 SECTION 3 [illegible]

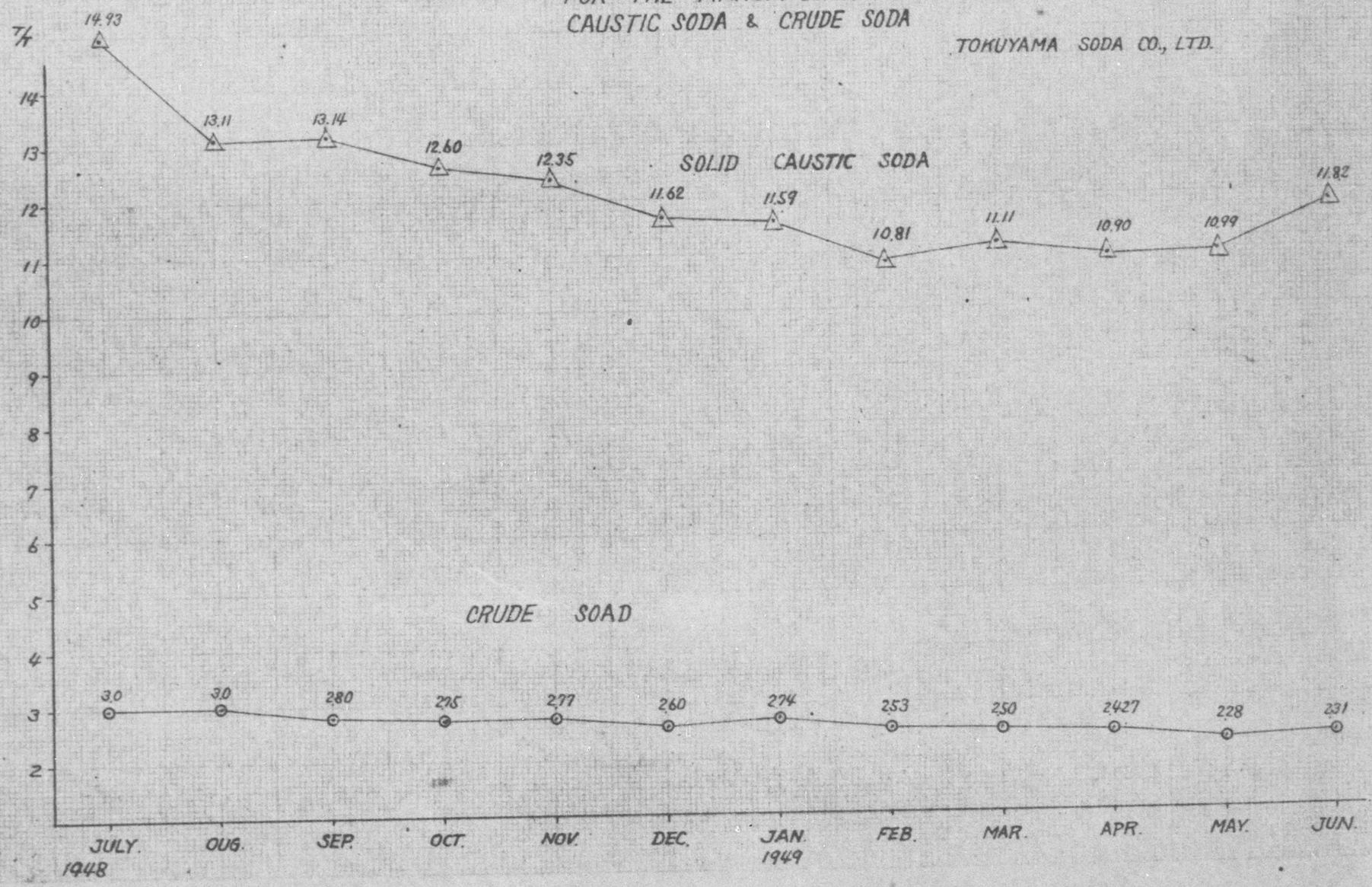



CONSUMPTION OF AMMONIA
FOR THE MANUFACTURE OF
CRUDE SODA (TOTAL ASH)
TOKUYAMA SODA CO., LTD.,
Kg PER TON
14
13
12
11
10
9
8
7
6
5
4
13.86
9.50
9.62
8.2
8.0
9.4
8.8
7.47
6.9
5.75
5.4
5.4
JULY 1948
AUG.
SEP.
OCT.
NOV.
DEC.
JAN. 1949
FEB.
MAR.
APR.
MAY.
JUN.

DECLASSIFIED E.O. 12065 SECTION 3-402/NWDS

CONSUMPTION OF STEAM FOR THE MANUFACTURE OF CAUSTIC SODA & CRUDE SODA

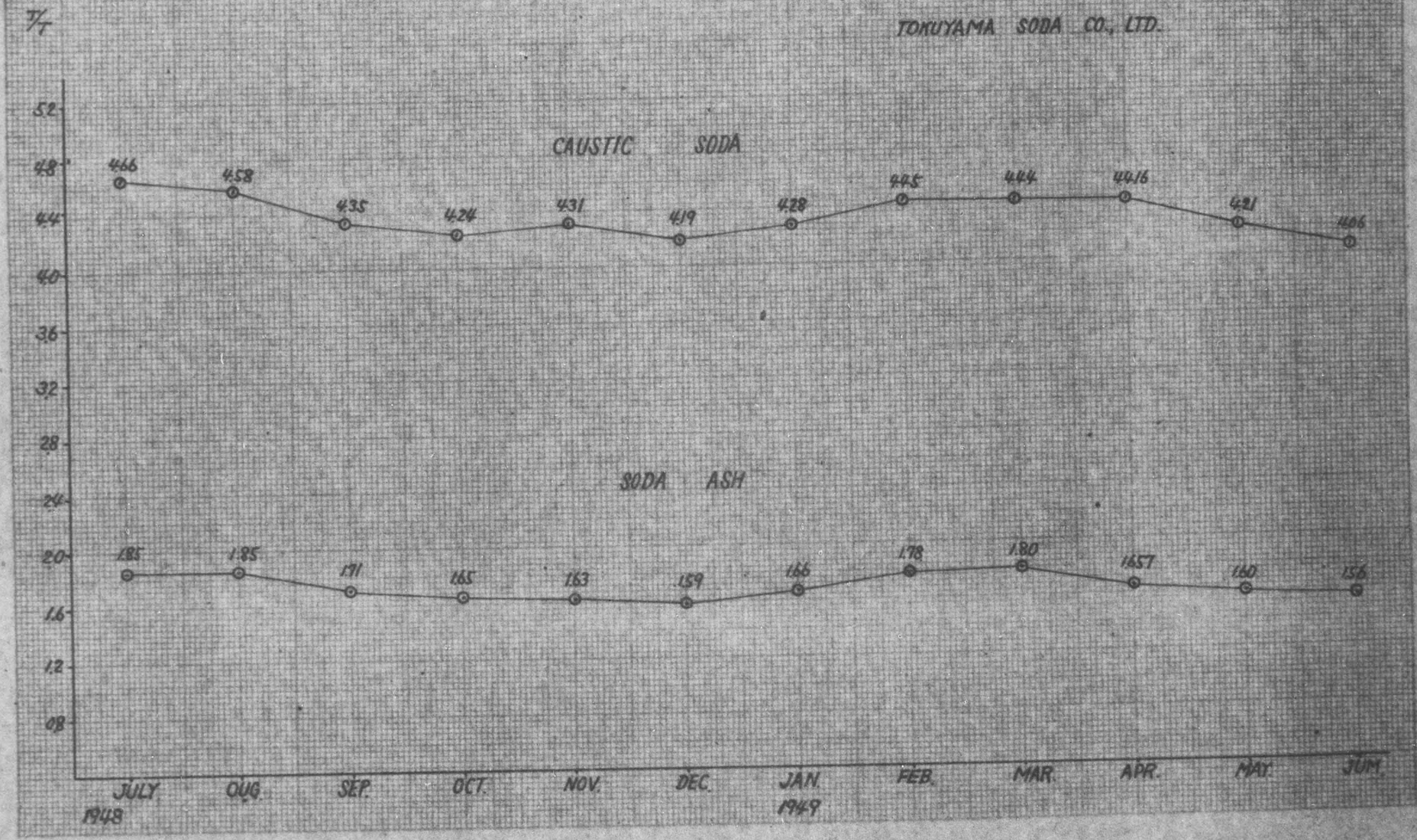
TOKUYAMA SODA CO., LTD.



DECLASSIFIED E.O. 12065 SECTION 3-402/NND NO.

CONSUMPTION OF LIMESTONE FOR THE MANUFACTURE OF CAUSTIC SODA & SODA ASH

TOKUYAMA SODA CO., LTD.



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SODA INDUSTRY

IN

JAPAN

COPY

From

"Journal of Finance and Commerce"

("Nippon Times" monthly)

December 25, 1948

DECLASSIFIED E.O. 12065 SECTION 3-402/NNDS No. [illegible]

COPY

SODA INDUSTRY

Soda production in Japan restored 65 per cent of the prewar level with much expectation in future export market.

It is fortunate that the soda industry of Japan which was one of her basic industries suffered slight damage in the war. While making efforts for early recovery, the factories of this industry are now focusing their energy on elevating technology and overcoming the stortage of materials. If over-seas markets are opened up for domestic caustic soda and soda ash there will be a marked increase in production, and bright future can be foreseen.

Prewar Days

Let us make a summarized statement of how the soda industry has developed in our country, referring to the ammonia soda process and the electrolysis process.

A) Ammonia Soda Process

In 1791, the Le Blanc process was adopted in France, and the production of caustic soda was first industrialized.

In 1866 Solvay of Belgium announced that he had succeeded in industrializing the production by the ammonia soda process. This was the first stage of development of this business as one of modern industries.

In the early years of the Meiji era, the Le Blanc process was introduced into our country. But the business did not prosper, for most of the domestic demand relied on foreign products.

When the import of this material was interrupted by the outbreak of World War I, the then Asahi Glass Co., Ltd. (the present Mitsubishi Kasei K.K.) constructed for the first time in 1916 a plant for ammonia soda process capable of manufacturing ten metric tons of soda ash per day. The factory started operation in the following year and about 1,000 metric tons were produced.

Two years later, in 1918, the Nihon Soda Kogyo K.K. (now the Tokuyama Soda K.K.) was established. A plant was built at Tokuyama to manufacture 50 metric tons of soda ash per day.

Then both companies did their best to improve technology and management, following their predecessors in Europe and America and continued prosperous business. Spurred by the boom about 1934 and the sudden development of glass and rayon industries, soda ash and caustic soda were greatly demanded, and the output reached an exceedingly high level.

In 1935 two more plants were added, and in 1937 plants of ammonia soda process totalled seven.

As demands exceeded the expansion of equipment the operational efficiency increased yearly, and more than 80 per cent efficiency on a national average contined until 1938. It is needless to say that the soda industry achieved sound development.

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But the fact that Japan had to rely on foreign countries for the principal material, industrial salt, constituted a fundmental deterrent to this industry. Therefore, efficiency sharply declined from the China Incident to the Pacific War.

Output of Soda Ash and Caustic Soda Unit : metric ton

Year	Soda Ash	Caustic Soda		Total
		Ammonia Soda Process	Electrolytic Process	
1937	234,238	231,193	130,832	362,025
1938	244,908	301,787	135,963	437,750
1939	244,415	283,148	145,532	428,680
1940	214,369	266,044	140,445	406,489
1942	145,435	112,857	117,485	
1941	152,958	181,494	123,173	304,667
1942	145,435	112,857	117,485	230,342
1943	126,066	106,220	115,009	221,229
1944	98,308	46,845	96,202	143,047
1945	27,757	8,482	25,604	34,086
1946	22,922	6,507	23,745	30,252
1947	46,711	12,121	40,049	52,170

B) Electrolytic Process

In 1915, the Hodogaya Soda K.K. erected a plant at Hodogaya which produced caustic soda by electrolysis with a diaphragm. This was the beginning of the electrolytic process in Japan. In the same year the Osaka Soda K.K. built a plant using the mercury process.

As a result of increasing demands for chlorine during World War I, electrolytic plants came into being one after another, until in 1918 there were 16 plants with an aggregate monthly capacity to produce 1,000 metric tons of caustic soda.

After this war, however, the market price fell sharply due to the import of European and American products and the decline of related industries.

Such were the circumstances that some plants were closed and production was restricted by agreement among manufacturers.

In 1925, the year of the great Kanto earthquake demands were revived suddenly and the industry again enjoyed a boom for some time. In about 1929, operational efficiency began to improve and sound development was witnessed.

Designed Capacity and Percentage of Actual Operation of Soda Plants of Electrolytic Process

Year	No. of Plants	Designed Capacity	Percentage of Actual Operation
1937	24	179,712	73
1938	25	204,966	66
1939	30	126,938	67
1940	30	222,608	63
1941	32	234,958	52
1942	33	234,424	50
1943	35	237,079	49
1944	35	235,868	41
1945	36	250,925	10
1946	36	251,610	12
1947	36	251,610	16

DECLASSIFIED E.O. 12065 SECTION 3 NND NO.

Present Situation

Three plants of ammonia soda process were closed due to the reorganization of enterprises in 1940. At present the following four plants are existing :

At present the actual production of soda ash is only 252,000 metric tons against the designed capacity of 835,200 metric tons. This is because 70 per cent of the equipment is worn out due to negligence of repairs during the past ten years.

Designed and Actual Capacity Per Day of Plants of Ammonia Soda Process (As of 1947)

Name of Company	Name of Plant	Crude Soda Ash Designed (MT)	Crude Soda Ash Actual (MT)	Soda Ash Designed (MT)	Soda Ash Actual (MT)	Caustic Soda Designed (MT)	Caustic Soda Actual (MT)
Mitsubishi Kasei K.K.	Makiyama	800	300	500	300	250	150
Ube Soda K.K.	Ube	360	300	200	150	200	100
Tokuyama Soda K.K.	Tokuyama	600	100	250	90	350	100
Toyo Soda K.K.	Tonda	560	---	170	---	320	---
Total		2,320	700	1,120	540	1,120	350

Annual Capacity and Percentage of Actual Operation of Plants of Ammonia Soda Process

Year	No. of Plant	--Crude Soda Ash-- Capacity MT	Percentage of Actual Operation	--Soda Ash-- Capacity MT	Percentage of Actual Operation	--Caustic Soda -- Capacity MT	Percentage of Actual Operation
1937 ...	7	716,400	78	399,600	59	339,120	68
1941 ...	4	835,200	49	403,200	39	403,200	45
1945 ...	4	835,200	11	403,200	7	403,200	1
1946 ...	4	835,200	5	403,200	6	403,200	15
1947 ...	4	835,200	8	403,200	12	403,200	3

As shown in the foregoing table, plants of electrolytic process have not fallen so low in production as in the case of factories of ammonia soda process. This is because the electrolytic plants can turn out various byproducts besides caustic soda, and consume less salt per ton of the product.

However, the operational efficiency of these plants declined yearly. And the cause can be traced to the war damage done to the equipment as is the case with plants of ammonia soda process.

Mitsubishi Kasei K.K.	Kamiyama	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Ube Soda K.K.	Ube	360	300	200	150	200	100
Tokuyama Soda K.K.	Tokuyama	600	100	250	90	350	100
Toyo Soda K.K.	Tonda	560	---	170	---	320	---
Total		2,320	700	1,120	540	1,120	550

Annual Capacity and Percentage of Actual Operation of Plants of Ammonia Soda Process

Year	No. of Plant	--Crude Soda Ash-- Capacity MT	Percentage of Actual Operation	--Soda Ash-- Capacity MT	Percentage of Actual Operation	--Caustic Capacity MT	Soda — Percentage of Actual Operation
1937 ...	7	716,400	78	399,600	59	339,120	68
1941 ...	4	835,200	49	403,200	39	403,200	45
1945 ...	4	835,200	11	403,200	7	403,200	2
1946 ...	4	835,200	3	403,200	6	403,200	15
1947 ...	4	835,200	8	403,200	12	403,200	3

As shown in the foregoing table, plants of electrolytic process have not fallen so low in production as in the case of factories of ammonia soda process. This is because the electrolytic plants can turn out various hyproducts besides caustic soda, and consume less salt per ton of the product.

However, the operational efficiency of these plants declined yearly. And the cause can be traced to the war damage done to the equipment as is the case with plants of ammonia soda process.

List of Soda Plants of Electrolytic Process as of 1947

Name of Company	Name of Plant
Nisshin Kagaku	Sakata
Tekkosha	Sakata
Kureha Kagaku	Nishiki
Hodogaua Kagaku	Koriyama
Showa Denko	Hirota
Nihon Soda	Nihongi
"	Takaoka
Toa Gosei	Fushiki
Nissan Kagaku	Toyama
Kanto Denka	Shibukawa
Nisshin Kagaku	Oji
Asahi Denka	Ogu
Hodogaya Denka	Hodogaya
Tsurumi Soda	Tsurumi
Toa Gosei	Nagoya
Showa Denko	Yokohama
*Kanegafuchi Kaisui Riyo ..	Nagai
Ajinomoto	Kawasaki
Mitsubishi Kasei	Yodogawa
Naniwa Gosei	Osaka
*Toa Koko	Osaka
Yamatogawa Senko	Sakai
*Yura Kagaku	Amagasaki
*Osaka Soda	Amagasaki
Kanegafuchi Boseki	Takasago
Nankai Kagaku	Wakayama
Nisshin Kagaku	Okayama
Toyo Soda	Tonda
Toa Gosei	Sakaide
Nankai Kagaku	Tosa
Nisshin Kagaku	Niihama
Osaka Soda	Kokura
Nihon Soda	Karita
Mitsubishi Kagaku	Kurosaki
Asahi Kagaku	Nobeoka
Mitsui Kagaku	Miike

NOTE : Plants marked with * are now out of operation

DECLASSIFIED E.O. 12065 SECTION 3 402/NND

Annual Capacity and Percentage of Actual Operation of Plants of Ammonia Soda Process

Year	--Crude Soda Ash-- No. of Plant	Capacity MT	Percentage of Actual Operation	--Soda Ash-- Capacity MT	Percentage of Actual Operation	--Caustic Soda-- Capacity MT	Percentage of Actual Operation
1937 ...	7	716,400	78	399,600	59	339,120	68
1941 ...	4	835,200	49	403,200	39	403,200	41
1945 ...	4	835,200	11	403,200	7	403,200	1
1946 ...	4	835,200	3	403,200	6	403,200	15
1947 ...	4	835,200	8	403,200	12	403,200	3

As shown in the foregoing table, plants of electrolytic process have not fallen so low in production as in the case of factories of ammonia soda process. This is because the electrolytic plants can turn out various hyproducts besides caustic soda, and consume less salt per ton of the product.

However, the operational efficiency of these plants declined yearly. And the cause can be traced to the war damage done to the equipment as is the case with plants of ammonia soda process.

List of Soda Plants of Electrolytic Process as of 1947

Name of Company	Name of Plant	Name of Company	Name of Plant
Nisshin Kagaku	Sakata	Mitsubishi Kasei	Yodogawa
Tekkosha	Sakata	Naniwa Gosei	Osaka
Kureha Kagaku	Nishiki	*Toa Koko	Osaka
Hodogaua Kagaku	Koriyama	Yamatogawa Senko	Sakai
Showa Denko	Hirota	*Yura Kagaku	Amagasaki
Nihon Soda	Nihongi	*Osaka Soda	Amagasaki
"	Takaoka	Kanegafuchi Boseki	Takasago
Toa Gosei	Fushiki	Nankai Kagaku	Wakayama
Nissan Kagaku	Toyama	Nisshin Kagaku	Okayama
Kanto Denka	Shibukawa	Toyo Soda	Tonda
Nisshin Kagaku	Oji	Toa Gosei	Sakaide
Asahi Denka	Ogu	Nankai Kagaku	Tosa
Hodogaya Denka	Hodogaya	Nisshin Kagaku	Miihama
Tsurumi Soda	Tsurumi	Osaka Soda	Kokura
Toa Gosei	Nagoya	Nihon Soda	Karita
Showa Denko	Yokohama	Mitsubishi Kagaku	Kurosaki
*Kanegafuchi Kaisui Riyo ..	Nagai	Asahi Kagaku	Nobeoka
Ajinomoto	Kawasaki	Mitsui Kagaku	Miike

NOTE : Plants marked with * are now out of operation

DECLASSIFIED E.O. 12065 SECTION 3 402/NNSS NO.

PLANS OF REPARATIONS

It is estimated that 100 or 200 million yen will be required to rehabilitate one war-damaged plant of ammonia soda process. The question is how reparations will be decided regarding the equipment of such plants.

	Pauley's Statement	FEC Decision	First Strike Report	Second Strike Report
Caustic Soda of Electrolytic Process	20 plants remained	Capacity in Excess of 82,500 MT/Y removed	Capacity of 82,500 MT/Y (14 plants) removed	All plants retained
Chlorine	No reference	Capacity in Excess of 75,000 MT/Y removed	Same as above	Same as above
Soda Ash	1 plant removed	Capacity in Excess of 630,000 MT/Y removed	All plants except one retained Retained capacity at 49,300 MT/Y	Same as above Retained capacity set at 493,000 MT/Y

Quarterly Output in 1946-1947

Term		Crude Soda Ash (MT)	Soda Ash (MT)	—Caustic Soda— Ammonia (MT)	Electrolysis (MT)	Total (MT)
1946	1 qurt.	9,337	5,130	2,291	4,667	6,958
	2 "	6,688	4,665	1,445	6,655	8,100
	3 "	8,915	6,039	2,054	6,725	8,779
	4 "	6,492	6,088	717	5,698	6,415
1947	1 qurt.	10,648	8,471	1,555	10,301	11,856
	2 "	15,978	11,680	3,070	11,231	14,301
	3 "	14,608	11,858	1,964	9,172	11,136
	4 "	22,447	14,702	5,532	9,345	14,877

Recent Monthly Output and Total in the 2nd Quarter of 1948

Term	Caustic Soda (MT)	Soda Ash (MT)
1948 August	11,427	6,820
" September	11,384	8,557
Total in the 2nd Quarter 1948 ...	33,38?	21,339

As shown in the above tables, the production of soda ash and Caustic soda is showing upward trends recently.

Material Salt

Salt is chiefly used for industrial and food purposes. More than 90 per cent of the industrial salt is consumed in the production of soda.

DECLASSIFIED E.O. 12065 SECTION 3 402/NNSC NO.

Year	Domestic	Supply Imported	Total	Consumption Domestic	Industrial	Total
1937	536	1,742	2,278	891	1,413	2,304
1938	439	1,751	2,190	971	1,476	2,447
1939	634	1,860	2,496	1,029	1,409	2,438
1940	574	1,725	2,299	1,062	1,356	2,418
1941	389	1,506	1,895	1,006	930	1,936
1942	475	1,533	2,058	1,038	787	1,825
1943	415	1,410	1,825	1,101	710	1,811
1944	353	944	1,297	927	590	1,517
1945	224	457	681	489	165	654
1946	357	412	769	647	141	787
1947	246	805	1,051	625	193	818

Before the war the domestic production of salt was about 600,000 metric tons. But as this was not even sufficient for food purposes one or two million metric tons were imported every year. In 1947 the domestic output was only 250,000 metric tons and the imported amount was 800,000 tons.

The salt-supply project for 1948 (including the imported amount nearly the same as in prewar days) is as follows:

Supply (in metric ton)	
Stock at beginning of the year ..	90,000
Domestic output	300,000
Imported	1,300,000
Total	1,690,000

Demand (in metric ton)	
General purpose, chiefly as food ...	1,046,300
Soda	378,700
Loss	75,000
Stock at end of the year	190,000
Total	1,690,000

The imported salt is divided into near-water salt and distant-water salt(product from the Mediterranean and farther regions and America). Since Japan has lost the big supply source of China for whose growth and development she has taken great pains, the import of salt from North and Central China has so sharply declined that the salt of distant waters only is imported at present. As to the near-water product, Formosa is now the principal supply source.

Classification of Imported Salt by Source (Unit: 1,000 MT)

	Distant Water		Near Water		
Year	Amount	%	Amount	%	Total
1937	803	46	859	54	1,742
1938	642	37	1,109	63	1,751
1939	955	51	905	49	1,860
1940	471	27	1,254	73	1,725
1941	143	10	1,363	90	1,506
1942	30	2	1,503	98	1,533
1943	23	2	1,387	98	1,410
1944	1	0	943	100	944
1945	—	0	457	100	457
1946	127	31	285	69	412
1947	606	95	199	25	825

DECLASSIFIED E.O. 12065 SECTION 3 402/NNSC NO. _____

4D

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BASIC: Ltr, Yamaguchi MG Team, Serial No. 432-B, dtd 22 March 1948, subj: "Petition to Resume Production."

CMGR 004 (D-Ma) 5th Ind

Headquarters, Chugoku Military Government Region, APO 317, Kure, Honshu, 24 May 1948

TO: Commanding Officer, Yamaguchi Military Government Team, APO 317

Your attention is invited to 3rd indorsement.

BY ORDER OF COLONEL SNYDER:

JERRY W. TOM
1st Lt, USAF
Adjutant

1 Incl:
n/c

2432

DECLASSIFIED E.O. 12065 SECTION 3 402/NSC MR:

BASIC: Ltr, Yamaguchi MG Team, Serial No. 432-B, dtd 22 March 1948, subj: "Petition to Resume Production."

5th Ind

CMGR 004 (D-Ma)

Headquarters, Chugoku Military Government Region, APO 317, Kure, Honshu, 24 May 1948

TO: Commanding Officer, Yamaguchi Military Government Team, APO 317

Your attention is invited to 3rd indorsement.

BY ORDER OF COLONEL SNYDER:

JERRY W. TOM
1st Lt, USAF
Adjutant

1 Incl:
n/c

DECLASSIFIED E.O. 12065 SECTION 3 402/NNBS NO. [illegible]

ETE/dn

HEADQUARTERS
YAMAGUCHI MILITARY GOVERNMENT TEAM
YAMAGUCHI, HONSHU, JAPAN
APO 317

22 March 1948

Serial No. 432-B

SUBJECT: Petition to Resume Production

THRU: Commanding Officer, Chugoku Military Government Region, APO 317.

TO: GHQ, SCAP
APO 500
Attn: Economic & Scientific Section

1. Recommend approval.

2. Subject company is well equipped and, consistent with availability of the necessary raw materials, it is considered desirable that production be resumed.

Alfred P. Robertson
ALFRED P. ROBERTSON
Major, Infantry
SMGO

1 Incl:
Petition
Tokuyama Soda Co.

7-93

DECLASSIFIED E.O. 12065 SECTION 3 402/NNBS NO. 1

BASIC: Ltr, Hq Yamaguchi MG Team, APO 317, Serial No. 432-B, dtd 22 Mar 48, subject: "Petition to Resume Production."

CMGR 091.31 (D-No) 1st Ind

Headquarters, Chugoku Military Government Region, APO 317, Kure, Honshu,
3 April 1948

TO: Commanding General, Eighth Army, APO 343

7188

1. Attention is invited to petition of the Tokayama Soda Company, Ltd. in which it is stated that SCAP and ESB omitted this company from April, May and June 1948 coal allocation because of high cost of production of this company.

2. Because of the improved coal production picture in Japan at this date, and the efforts of this company to improve its facilities and lower production cost, it is recommended that this company be reconsidered for a coal allocation because of its importance to the economics of this region.

RUSSELL C. SNYDER
Colonel, FA
Commanding

1 Incl:
n/c

AG 004 (MG-En) 2nd Ind 16 APR 1948

Headquarters Eighth Army, APO 343

TO: Supreme Commander for the Allied Powers, APO 500
(Attn: Chemicals Branch, Ind. Div, ESS)

1. Forwarded for your consideration in accordance with telephone conversation with Mr. Bready on 10 April 1948.

2. Request this headquarters be notified of decisions made concerning the operation of the Tokuyama Plant.

FOR THE COMMANDING GENERAL:

R. SCHAFER
Lt.Col, AGD
Asst Adj Gen

1 Incl:
n/c

DECLASSIFIED E.O. 12065 SECTION 3 402/NNBS NO:

BASIC: Ltr, Hq Yamaguchi MG Team, Serial No. 432-B, subj: Petition to Resume Production, 22 Mar 48.

AG 004.03(22 Mar 48)ESS/IN 3rd Ind

GENERAL HEADQUARTERS, SUPREME COMMANDER FOR THE ALLIED POWERS, APO 500
3 May 1948

TO: Commanding General, Eighth Army, APO 343

9497

1. Allocations to the soda industry are made by competent Japanese governmental agencies under supervision of General Headquarters, Supreme Commander for the Allied Powers, the policy being to attempt to achieve maximum production from available raw materials.

2. Present plans for soda chemicals include increased production for direct export this summer. It is considered probable that Tokayama Soda Company will be able to resume operations by June or July of this year unless unforeseen raw material shortages develop.

BY COMMAND OF GENERAL MacARTHUR:

J. F. Bradshaw
J. F. BRADSHAW
Major, AGD
Asst Adj Gen

1 Incl
n/c

AG 004 (MG-En) 4th Ind

Headquarters Eighth Army, APO 343 17 MAY 1948

TO: Commanding Officer, Chugoku Military Government Region, APO 317

Your attention is invited to the preceding indorsement.

8

BY COMMAND OF LIEUTENANT GENERAL EICHELBERGER:

R. SCHAFER
Lt Col, AGD
Asst Adj Gen

1 Incl:
n/c

2052

DECLASSIFIED E.O. 12065 SECTION 3-402/NNDS NO.

Tokuyama Soda Co.,Ltd.

Petition

untrue GB

Our company is one of the three Ammonia Soda Process Plants at present in Japan. The equipment, history and actual results in the past, etc. are shown in the separate papers attached.

August, 1945 when the war which was unhappy to the world and ourselves ended, we started at once repair of the plant which was devastated by the war.

Resuming the production of Soda Ash in February 1946 we consumed up stocked salt by July in the same year; consequently we stopped the operation of plant for a time.

Since then we devoted ourselves to the completion of equipment prepairing ourselves for the arrival of salt.

However, motivated by the increasse of wages a labor strike broke out in our plant in October, the same year, and it came to an end in January, 1947, having lasted 100 days.

This dispute became the chief reason for the discontinuation of the allotment of salt, coal, etc., thus the operation of plant has been suspended up to the present.

Meanwhile, we have been narrowly keeping the plant alive by producing cement and potassium fertilizer, etc., which are by-products on the one hand, while, on the other hand,

Incl 1