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Capt 1

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HEADQUARTERS
U.S. STRATEGIC BOMBING SURVEY
(PACIFIC)
APO #234
C/O POSTMASTER, SAN FRANCISCO
Oil and Chemical Division #88

INTERROGATION NO. 385

PLACE: Tokyo

DATE: 16 November 1945

Division of Origin: Oil, Chemical & Rubber

Subject: Control and Manufacture of Jet Propellants

Personnel interrogated and background of each:

SUZUKI CAPT., IJN - Member Section #2 Munitions Bureau
MITSUI, COMDR., IJN - Special Chemical Section, IJN Munitions Bureau
(For background, see inside cover)

Where interviewed: IJN Ministry

Interrogator: Lt. Comdr. W. H. Evans, USNR

Interpreter: Mr. J. Taji

Allied Officers Present: Lt. Comdr. Cooley (NavTechJap)

Lt. DeLacey, RNVR (NavTechJap)

Summary:

(1) The IJN started feverish erection of producing facilities for Hydrogen Peroxide (H_2O_2), Hydrazine Hydrate ($(NH_2)_2.H_2O$) and Sodium Permanganate ($NaMnO_4$) on receipt of the bare, basic plans from the Germans in early 1944. The planned capacity in July 1944 was 35% H_2O_2 - 9840 tons/month; 80% H_2O_2 - 2400 tons/month; $NaMnO_4$ - 100 tons/month Actual production reached only about 25% of planned capacity however, due to inadequate technical and engineering "savvy," a shortage of raw materials and the destruction of nearly all the stores of a special porcelain material by e arthquake in December 1944.

(2) Overall basic plans and control from July 1944 until September 1944 was in the hands of the Rogo-Yaku Committee (Code Name for Jet and Rocket Propellants) under the IJN Technical Department. The actual execution of the plans made by the Rogo-Yaku Committee was accomplished by the Toku Bu under the IJN Bureau of Munitions. In September 1944 the Munitions Ministry formed a National Committee for Rogo-Yaku which included representatives from the War and Navy Ministries. This action resulted in the IJN being responsible for production of Jet Propellants, the Ministry being responsible for raw materials, production facilities and equipment and the Army got representation on the Toku Yaku Bu which continued to operate as the executive body in control under the IJN Bureau of Munitions.

(3) Although the project received the highest top priority, production bogged down badly due to critical shortages of pure Sulphuric Acid, Ammonia and Caustic Soda.

(4) The basic chemicals which Capt. Suzuki felt were most responsible for Japan's military collapse were in order of importance (1) Salt (2) Ammonium compounds and (3) Acids.

(5) All official records as well as private notes were burned according to both officers. The IJN official records were consumed by the fire of 27 May 1945 which destroyed the Navy Ministry. Capt. Suzuki's and Comdr. Mitsui's private files were burned the same date in a fire that destroyed the Tokyo offices of the Mitsui interests where they had been taken for safekeeping.

(6) Comdr. Mitsui will prepare a report of planned production versus actual production for both propellants from July 1944 to 15 August 1945 by months.

PERSONAL BACKGROUND

DATE	ACTIVITY
CAPTAIN SUZUKI	
1927	Was graduated Tokyo Imperial University in chemistry.
1932	Naval Engineering College in post-graduate chemistry. Selected by the IJN for further training at Kyoto University.
1933	Member of the Research Section of the Naval Fuel Depot at Tokuyama.
1941	Transferred to Section #2 IJN Munitions Bureau engaged in research and technical matters connected with the testing of fuels of all types.
1944	Member of the Rogo-Yaku (code name for jet and rocket propellant fuels) which was charged with planning and development of this type of fuel.
1944 (July)	Transferred to Bureau of Munitions in the IJN as chief of the 1st Branch, Section #2 in charge of fuel technical matters.
COMMANDER MITSUI	
1928	Was graduated from the Imperial University at Kyoto in chemical engineering.
1929	Laboratory assistant at Kyoto Imperial University specializing in fuels.
1935	Graduate student in fuel chemistry engineering.
1939	Lieutenant, IJN in Tokuyama Fuel Depot concentrating on hydrogenation of coal.
1944	Naval Fuel Laboratory at Ofuna specializing in aviation fuels.
1945	Bureau of Munitions, IJN.

From the time he was assigned duty at the Naval Fuel Depot at Tokuyama, Capt. Suzuki has been engaged in the research and development of fuels for the IJN. In June 1944 he was assigned duty as a member of the Rogo-Yaku Committee. This is a code name for all rocket propellants as well as jet propellants. At the time Capt. Suzuki joined the Rogo-Yaku, it was organized under the IJN Technical Department (Kansei Hombu) along the lines indicated in Fig. 1. Captain Suzuki was a member of this group under Section #3 from July to Sept. 1944. The primary function of this section was the development and

FIG. 1

ORGANIZATION
July 1944

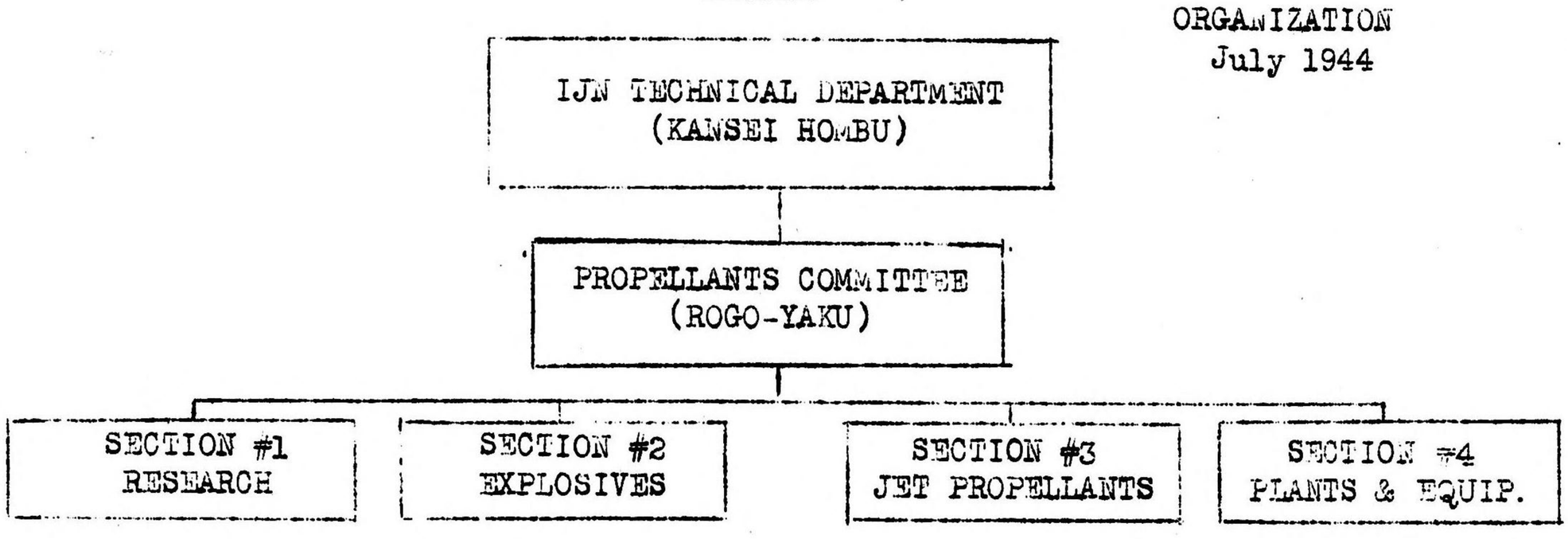


FIG. 2

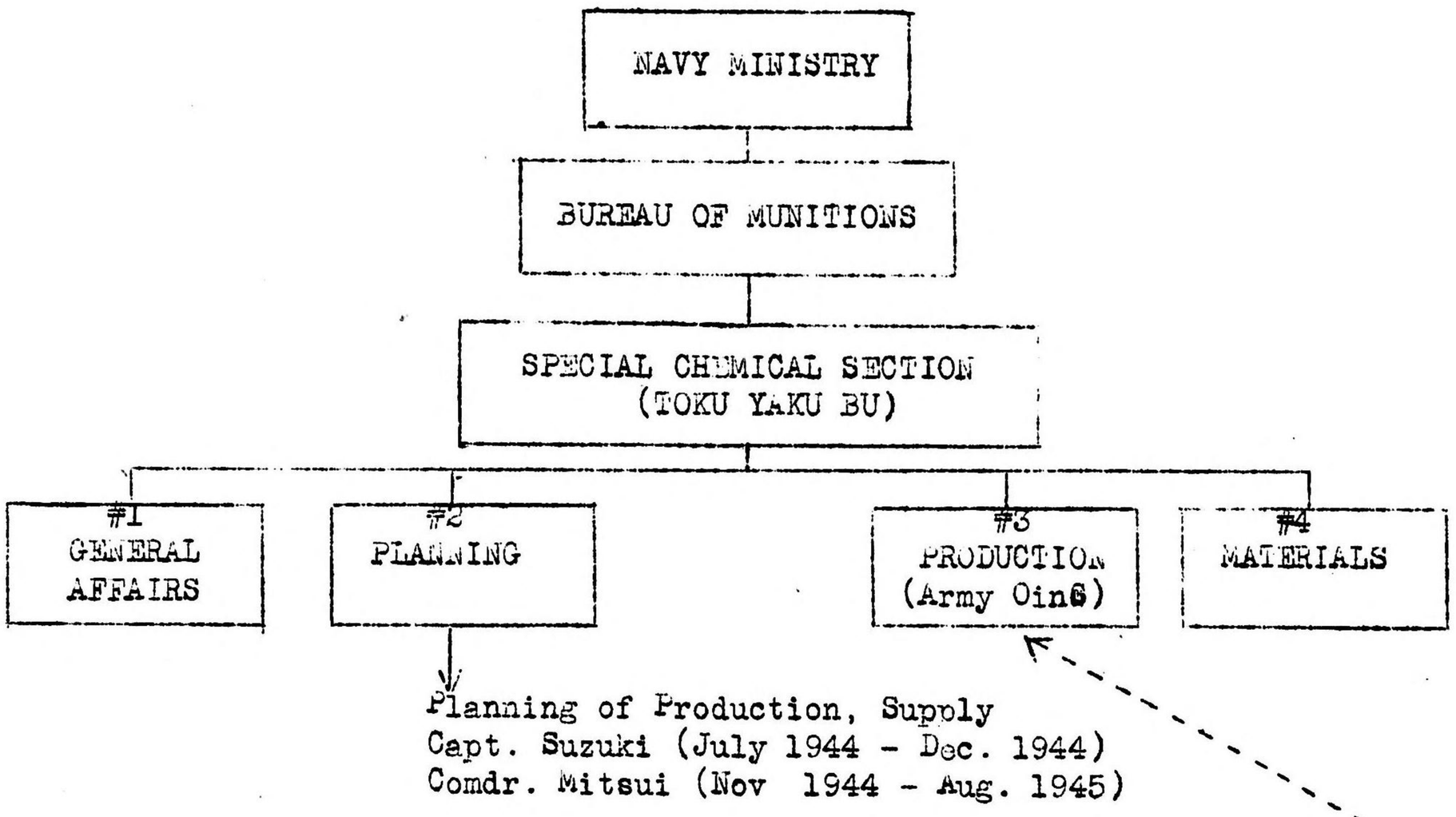
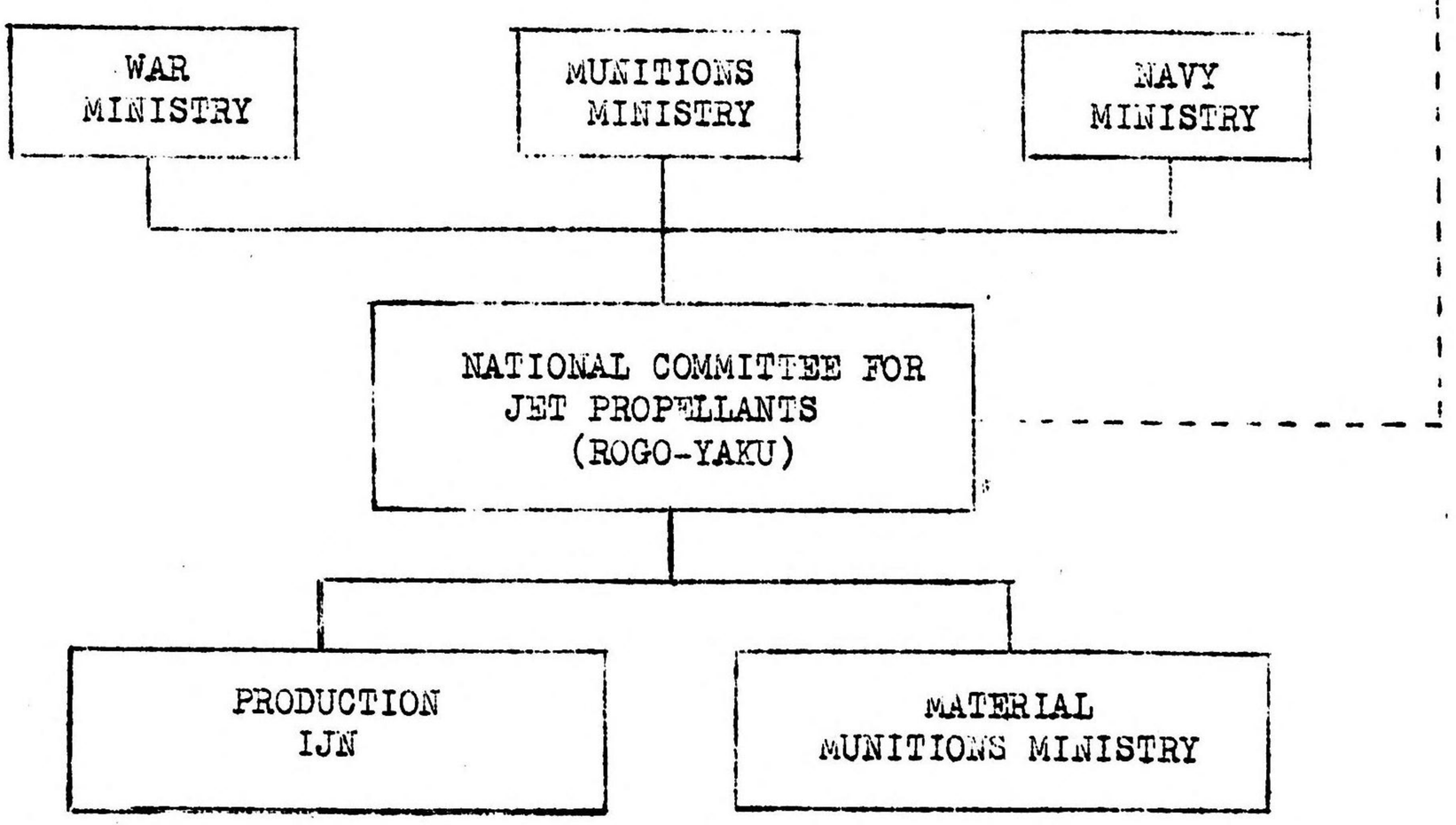


FIG. 3



planning for the manufacture of Hyrdazine Hydrate, Hydrogen Peroxide and Sodium Permanganate.

In July 1944 a Special Section was created in the IJN Munitions Bureau called the Toku Yaku Bu, which was a special section dealing only with Hydrogen Peroxide. Fig. 2 shows the relationship of the four sections making up the Special Chemical Section. Capt. Suzuki was assigned the additional duty in the Planning Section while still carrying on in Section #3 of the Rogo-Yaku.

The division of authority and responsibility between the Rogo-Yaku and the Toku Yaku Bu was one of overall planning (the former) and the execution of the plans (the latter). The Rogo-Yaku was primarily a discussion group which planned how much of the different products would be made and what capacity new installations would have. Actual technical details would be worked out by the Toku Yaku Bu who were responsible for erection and maintenance.

Bare, basic plans for the processes outlined below were received from the Germans in early 1944. No actual technical assistance was rendered other than the simple instruction sheet. Immediate construction plans were effected calling for the erection of the plants tabulated below. No improvements in German technique were considered due to the nature of the project. Adequate research was impossible prior to actual operation of the plants with the result that engineering difficulties hounded the plants managers to such an extent that only about 25% of designed capacity was realized.

The great discrepancy between capacity and actual production during the early period during which time plants were just starting production was due to technical and engineering shortcomings; while later when these were largely overcome, the greatest factor in the discrepancy was not skill, but a shortage of raw materials. An earthquake in December 1944 which destroyed most of the supply of a special porcelain liner material considerably aggravated the production difficulties of the Rogo-Yaku.

In September 1944 a National Committee on Rogo-Yaku was formed. This organization and its relationship to the Munitions Ministry and the Toku Yaku Bu is shown in Fig. 3. This reorganization resulted in the IJN being made responsible for all production of Rogo-Yaku materials while the Munitions Ministry was made responsible for all matters relating to material. Another result of the formation of the National Rogo-Yaku Committee was that the Army got representation on the Toku Yaku Bu under the IJN Munitions Bureau. An Army officer was placed in charge of Section #3 - Production.

RECORDS

All official records of the Rogo-Yaku and the Toku Yaku Bu were burned along with those of the National Rogo-Yaku Committee in the fire that destroyed the IJN Munitions Bureau offices in May of 1945. Personal data held by both Captain Suzuki and Commander Mitsui were taken to the offices of the Mitsui Interests prior to this particular raid, but were all burned simultaneously with the official records.

Capt. Suzuki and Comdr. Mitsui will colaborate in the preparation of reconstructed data showing both production capacity and actual production by months from July 1945, for the three chemicals - Hydrogen Peroxide, Hydrazine Hydrate and Sodium Permanganate. These two officers are the best qualified persons to effect this reconstruction.

DIFFICULTIES ENCOUNTERED

Although these fuels admittedly played no important role in Japan's air effort during the war, they offered great promise as a propellant medium for the Japanese version of the Me 263. No aircraft of this type ever became operational before the termination of the war and all flights were limited to a couple by test pilots. However, this plane was being groomed as a fast interceptor for B-29's and the High Command were relying quite heavily on the three chemicals listed below as propellants for such interceptors. The entire project received the highest priority and great initial strides were taken in

the erection of production facilities.

Due to several factors, however, production never reached much more than a quarter of that planned. The following factors accounted for the great discrepancy between capacity and actual production:

1. Faulty engineering technique and inadequate production data.

2. An earthquake in December 1944 destroyed most of the supply of a special porcelain used in the distillation apparatus.

3. A shortage of equipment and maintenance materials.

4. Raw material shortage.

During the early stages in the summer and fall of 1944 factor (1) was most important in causing the discrepancy. This was never completely overcome and even when production reached a maximum the presence of minute quantities of impurities in the product reduced the yield in a geometric regression. During March of 1945, however, a shortage of raw material developed which was attributed to bombing, earthquake and floods. Particularly short were Sulfuric Acid, Ammonia, Ammonium Sulphate and Caustic Soda in that order. Raw material shortages continued to the end despite the priority rating allotted the project by the Munitions Ministry. This fact was explained by taking Ammonia as an example. Ammonia production fell off all during the war, according to Capt. Suzuki and there never was enough to go around. The explosives producers required vast amounts and at the same time it was a grave fertilizer requirement. The manufacture of propellants was particularly dependent upon Ammonia and the production bogged down badly from lack of supply.

PRODUCTION - BOMB DAMAGE

Table I lists the names of the plants, their location and monthly production in metric tons for the four products:

1. H_2O_2 (80%)
2. H_2O_2 (35%)
3. $(NH_2)_2 \cdot H_2O$ (80%)
4. $NaMnO_4$ (40%)

These figures on production represent actual constructed capacity and does not represent tonnage yields.

Table II indicates the bomb damage according to the type of raid and expressed in terms of capacity destroyed.

Tables I and II are shown on the following page.

Comdr. Mitsui will prepare accurate tables showing the following data. This report will be submitted on 26 November following an inspection trip and consultation.

A Overall Planned Capacity

(Monthly for the products shown above)

B Actual Erected Capacity

(Monthly for the products shown above)

C Actual Production

(Monthly for the products shown above)

Basic technical data on the equipment and processes is available in the files of the Oil Chemical and Rubber Division.

Planned production capacity for all three products as of July 1944 is shown in the following table:

TABLE I

PRODUCT	PLANT	LOCATION	CAPACITY *
H_2O_2 (80%)	First Naval Fuel Depot (Lab.)	Ofuna	300
"	Second Naval Fuel Depot	Yokkaichi	1,100
"	Nippon Chisso Hiryo K.K.	Konan	1,000
		Total	2,400
H_2O_2 (35%)	Second Naval Fuel Depot	Yokkaichi	2,040
"	Edogawa K.K.	Yamakita	520
"	Sumitomo Chemical Mfg. Co.	Osaka; Tsuruaki	440
"	Nissan Chemical Mfg. Co.	Toyama	400
"	Kanto-Asahi Chemical Mfg.Co.	Shibukawa	360
"	Takayama Steel Mfg. Co.	Kochi	120
"	Yura Mfg. Co.	Wakayama	80
"	Showa Denko Mfg. Co.	Yokoyama; Toyama	320
"	Hodogaya Chemical Mfg.Co.	Yokoyama	120
"	Nippon-Koku Chemical Mfg.Co.	Yokohama	120
"	Shimaue Chemical Mfg.Co.	Goten	240
"	Nippon Soda Chemical Mfg.Co.	Nipongi	80
"	Teikoku-Jinken Mfg.Co.	Nihara; Gwakuin	1,000
"	Nippon Chisso Hiryo Mfg. Co.	Konan	4,000
		Total	9,840
(80%) $(NH_2)_2.H_2O$	Mitsubishi Kasei Mfg. Co.	Kurosaki	100
"	Mitsui Chemical Mfg. Co.	Miike	30
"	Nippon Chisso Hiryo Mfg.Co.	Konan	100
		Total	230
$NaMnO_4$ (40%)	Nippon Chemical Mfg. Co.	Koriyama	100
		Total	100

* Expressed in metric tons per month.

TABLE II

Bomb Damage to these installations was assessed as follows:

PLANT	LOCATION	TYPE OF RAID	DAMAGE **
Sumitomo Chemical Mfg. Co.	Osaka;Tsurusaki	I	20
Nakayama Steel Mfg. Co.	Kochi	I and GP	100
Showa Denko Mfg. Co.	Yokohama;Toyama	GP	20
Hodogaya Chemical Mfg.Co.	Yokohama	I	30
Nippon-Koku Chemical Mfg.Co.	Yokohama	I	10
Mitsubishi Kasei Mfg. Co.	Kurosaki	I and GP	30
Mitsui Chemical Mfg.Co.	Miike	I	10

** Expressed in per cent of capacity destroyed.