

CONFIDENTIAL
EIGHTEENTH AAF PHOTO INTELLIGENCE DETACHMENT
HEADQUARTERS, FOURTEENTH U. S. AIR FORCE
A. P. O. #627, NEW YORK, N. Y.
18 March 1944

THIRD PHASE P. I. REPORT NO. 53

LOCALITY : LAKE JITSUGETSUTAN DISTRICT, FORMOSA (23-52 N, 120-55 E)

MISSION NOS. : M 13/4 C, and M 13/7 C.

DATES : 12 January 1944 - 24 January 1944.

APPROX. PHOTO SCALES : M 13/4 C --- 1:15,575 and 1:62,300.
M 13/7 C --- 1:16,500 and 1:66,000.

PHOTOS BY : 21st Photo Rcn. Sq.

ENCLOSURES : Annotated Mosaic M 13/7 C.
Ground Photo of Jitsugetsutan Power Plant No. 1.

REFERENCES : (1) AIR OBJECTIVE FOLDER - TAIWAN (FORMOSA), Issued December 1, 1942, Intelligence Service, USAF.
(2) SURVEY OF THE ISLAND OF FORMOSA (TAIWAN) - (S30-783), prepared by the Military Intelligence Service, War Department General Staff.
(3) INDUSTRIAL INSTALLATIONS IN THE ASIATIC AXIS, JITSUGETSUTAN HYDROELECTRIC PLANTS, EO-22.1, Office of Economic Warfare (Enemy Branch), September 15, 1943.
(4) INDUSTRIAL EQUIPMENT HANDBOOK; Volume II; EO-172, published by the Foreign Economic Administration, Office of Economic Warfare (Enemy Branch), December 1, 1943.
(5) MAP OF FORMOSA (TAIWAN) 1:250,000, prepared under the direction of the Chief of Engineers, U. S. Army, Washington, D. C.: First Edition 1943.

REMARKS : This report, based on two photo missions and the above mentioned references, covers Lake Jitsugetsutan, two associated power plants, and nearby installations of military importance. It should be noted that a few of the interpretations in this report differ from those in the second phase reports due to the fact that more complete studies suggest the advisability of such changes. All ground information, and economic and strategic evaluations included herein have the approval of the Objective Information Officer of the 14th Air Force.

SUMMARY

I. LAKE JITSUGETSUTAN.

Lake Jitsugetsutan is a large natural reservoir located almost in the center of the Island of Formosa. The water capacity of this lake has been increased by the construction of two rolled earth dams. An intake station at the lake feeds water through underground tunnels to a large power plant.

II. POWER PLANTS.

Two power plants referred to here as Jitsugetsutan Power Plants Nos. 1 and 2, are located on the Suiri River less than four miles W of Lake Jitsugetsutan. It is reported that water for Power Plant No. 2 is derived from Plant No. 1. These two power plants are the most important hydro-electric installations on Formosa. The capacity of Jitsugetsutan No. 1, completed in 1943, is reported to be 100,000 KW, and that of Jitsugetsutan No. 2, completed in 1937, 60,000 KW.

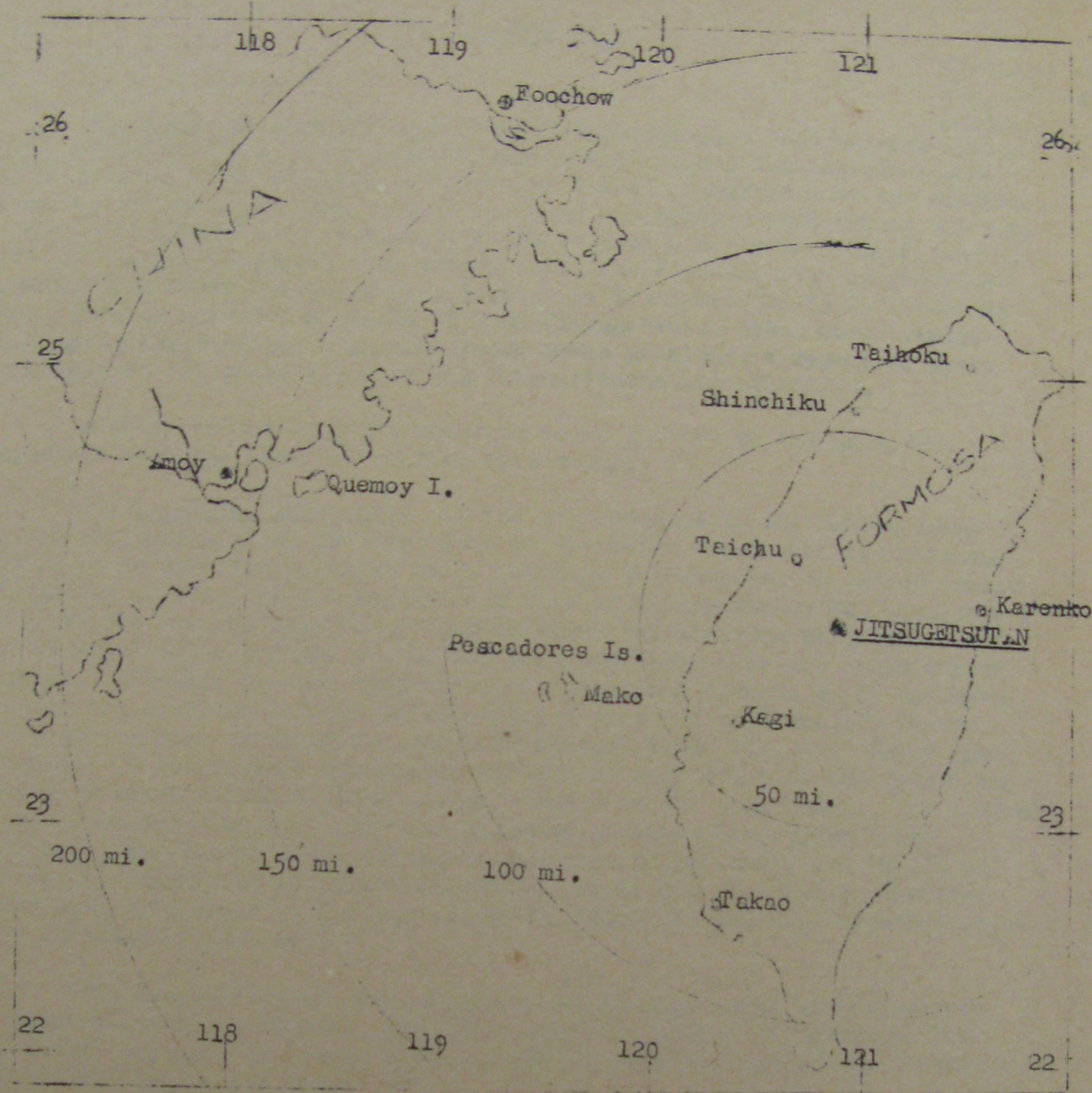
III. DEFENSES.

Four heavy AA guns are visible in the area.

IV. TRANSPORTATION FACILITIES.

The Jitsugetsutan Lake area is served by a single track electric rail line, as well as by numerous first class roads.

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DETAILED INTERPRETATION

Installation No.
(See Attached
Mosaic.)

I. LAKE JITSUGETSUTAN.

4. Location: Lake Jitsugetsutan is located practically in the center of Formosa Island, approximately 6.3 miles NE of the confluence of the Dakusui and Suiri Rivers. The Dakusui River which leads directly to the Lake can be picked up on the west coast of Formosa, approximately 8 miles SW of Nirin, and followed to the Lake District.

Distances from Lake Jitsugetsutan to nearby localities:

- a. To W coast of Formosa ----- 40 miles
- b. To E coast of Formosa ----- 43 miles
- c. To Amoy, China (WNW) -----175 miles
- d. To Taichu (NW) ----- 25 miles
- e. To Kagi (SW) ----- 40 miles
- f. To Sei: a (WSW) ----- 30 miles
- g. To Suichwan, China (WNW) -----442 miles
- h. To Pescadores Island (WSW) -----100 miles

B. Size and Description: Lake Jitsugetsutan, a deep natural reservoir of irregular shape, covers approximately 2500 acres; its shoreline measures 11.4 miles. The capacity of this lake has been increased by the construction of two rolled earth dams as well as by an underground feed tunnel which is reported to originate at a tributary of the Dakusui River near Musha (24-02 N, 121-07 E). Another report to the effect that Lake Jitsugetsutan is provided with water from Bukai Lake, probably located at Bukai-Sia (23-55 N, 121-04 E), which is located nine (9) miles NE of Lake Jitsugetsutan seems more likely. ~~Lack of photo cover of the Musha and Bukai areas precludes a report on their relationship to the power setup in the Jitsugetsutan Lake District.~~

A seaplane anchorage is reported to be located on the Lake, but photographic coverage does not confirm this report.

C. Economic Importance: In the area covered by the photos there are two power plants which are dependent on the water from Lake Jitsugetsutan. ~~According~~ to information believed to be reliable the capacity of Jitsugetsutan #1 completed in 1943, is 100,000 kw. and that of Jitsugetsutan #2, completed in 1937, is 60,000 kw. In 1939 the output of these two stations represented 86% of the hydro-electric and 64% of the combined hydro-electric and steam output on Formosa. Allowing for the completion of additional plants, it is estimated that these two stations in 1940 still produced over 50% of Formosa's power. However, more recent construction may have changed these figures. Power from these plants is distributed throughout the entire west coast of the Island and the northern section from Keelung (Murun) to Suo on the east coast. The largest industrial consumers in 1939 were the Japanese Aluminum Company at Takao (27,000 kw.), the Taiwan Denka Kaisha at Keelung (12,300 kw.), and the Japan (Gold) Mining Company at Kinkaseki (22-06 N, 121-51 E). The Taiwan Chemical Industry Company's plant at Chikuto (24-46 N, 121-04 E) was also expected to be a heavy consumer (27,000 kw.).*

"The destruction of the usefulness of Jitsugetsutan hydro-electric plant (probably meaning plants), the most important source of power (on Formosa), would seriously interfere with industrial activity and affect Technical operations at Keelung and Takao".**

II. TOSHA DAM.

A. Location: Tosha Dam is located at the SW end of Lake Jitsugetsutan in a valley between two hills. ----- 1

B. Size and Description:

1. Length ----- 590'
2. Width at bottom ----- 295'
3. Width at top ----- 30'

4. Description: Tosha Dam is made of rolled earth, with a probable protective concrete wall along its base on the water's edge. A small mass of mulching material is visible in the water near the dam. This material will probably be placed on the eastern side of the dam surface as a protective covering. Hills of medium elevation (probably less than 1,000' above the top of Tosha Dam) are located on the NW and SE ends of the dam. A hill approximately the same elevation as Tosha Dam is located 500' to the SSW, but other than this, no high elevations are to be encountered for roughly 0.8 miles to the SSW where a relatively flat and broad valley is located. From the dam to the NNE there is a clearance of approximately 1.9 miles across the Lake before encountering hills of medium elevation.

* Reference No. 3.

** Reference No. 2.

III. SUISHA DAM.

A. Location: Suisha Dam is located at the NW end of Lake Jitsu- ----- 2
getsutan.

B. Size and Description:

1. Length ----- 1100'

2. Width at bottom ----- 620'

3. Width at top ----- 35'

4. Description: Suisha Dam is made of rolled earth very

similar to Tosha Dam. A hard surfaced road which goes East and West from the Lake passes over the top of the dam. A small mass of mulching material is visible in the water near the dam. This material, like that situated near Tosha Dam, will probably be used as a protective covering for the dam surface.

There is at least a one mile clearance of water south of Suisha Dam before encountering hills up to seven or eight hundred feet above the Lake level. To the north of the dam there is a narrow valley which extends at least a mile before joining precipitous hills.

Approximately 165' E of the dam there is a small gauge station ----- 3
which projects out into the water. It is believed that this station is used for measuring the depth of water.

Approximately 410' east of the dam is a trickle or overflow tube which is 90' in diameter. The top of the tube is slightly lower than the top of the dam, thus serving in lieu of a spillway to handle what little flood water accumulates.

IV. LAKE JITSUGETSUTAN MAIN INTAKE STATION.

A. Location: Approximately 1475' south of Suisha Dam. ----- 4

B. Size: 110' x 65'.

C. Description: A tall building of solid construction, which stands in the water approximately 245' from the road which runs along the shoreline at the NW corner of the Lake. A narrow suspension foot bridge connects this installation with the shoreline.

This is the only intake station visible on the Lake, and it is believed that this intake serves the main power plants near the Lake.

V. JITSUGETSUTAN POWER PLANT NO. 1.

A. Location: Jitsugetsutan Power Plant #1 is located at Monpai- ----- 5
tan on the east bank of the Suiri River 2.2 miles WSW of Suisha Dam.

B. Size: The main power plant and associated transformer and switching stations are included in an area approximately 910' x 365'. Individual installations are as follows:

1. Main Power Plant: 290' x 70'.

a. Turbine House - 290' x 45'.

b. Electrical Gallery - 290' x 25'.

2. Transformers and switching station -- located off the south ----- 6
end of the power plant, 530' x 180'. The switching station is reported to be located in the west central part of the transformer yard. Three buildings, probably for supplies, are located at the SE end of the transformer yard. Their sizes are: 50' x 30', 65' x 35', and 150' x 35'.

C. Description: The Turbine House and the Electrical Gallery together form Jitsugetsutan Power Plant #1. Both buildings are connected, the roof of the latter being slightly below the roof level of the former. Ground information reveals that this plant is of ferro-concrete construction. The following data is known concerning this installation:

GENERATORS

Total capacity (K VA) -----	111,110
Capacity each unit (5) -----	22,222
Connection -----	Y
Voltage -----	11,000
Frequency per second -----	60
Neutral resistance (ohms) -----	(nonground)
Manufacturer -----	G. E.
Exciter capacity -----	125

WATER WHEEL

Kind -----	Pelton Type
Output (HP) x No. of units -----	33,000 x 5
Effective head (meters) -----	320.5 (av.)
Water quantity (cu. meters per sec.) -----	41.6 (max.)
Manufacturer -----	Voith

TRANSFORMERS

K VA of one unit -----	7,400
Phase -----	single-phase
Number of transformers -----	15
Connection -----	-Y
Voltage -----	
Primary terminal voltage (V) -----	11,000
Secondary terminal voltage (V) -----	154,000
Tertiary terminal voltage (V) -----	-----
Method of cooling -----	oil immersed* water cooled
Type -----	Core
Manufacturer -----	G. E.

D. Associated Installations and Cycle of Operations:

1. It is reported that water for this plant is provided by underground pressure tunnels from Lake Jitsugetsutan. However, the actual existence of such tunnels cannot be definitely verified from photo coverage in spite of the fact that a clearing is noticeable from the Lake to Power Plant No. 1.

2. Water relayed through tunnels from the Lake flows to a surge tank, approximately 100' in diameter, which is located atop a hill approximately 1665' E of the plant. ----- 7

3. Five penstocks, each approximately 7' in diameter which form the ultimate head, lead from the surge tank down the hillside to the Power Plant. A clearing in the wooded hillside has been made; and the penstocks, slightly raised off the ground, lie exposed. ----- 8

There is approximately a 7' space between each of the penstocks before they fan out prior to entering the Power Plant. Approximately 185' E of the Plant is located the concrete anchor block from which the

*Reference #4 - Vulnerability of Oil-Cooled Transformers. "Oil-cooled transformers would be most susceptible to damage by hot bomb fragments which might pierce the shell and the cooling coils and set fire to the oil. Blast might also loosen transformers on their foundation."

penstocks fan out before entering their individual turbines in the Plant. At this anchor block the penstocks cover an area 63' wide, but fan out into an area 216' wide at the E end of the Power Plant.

4. There are at least nine separate pipe sections of varied lengths leading from the surge tank to the power plant. At three of the connections there are small check-valve stations, 65' x 30', which probably control the flow of water through the penstocks. Five anchor blocks are located at the other connections.

5. A probable off-shoot or spillway pipe leads from the surge tank down the hillside to a tunnel under the transformer yard. It is believed that this offshoot is utilized to by-pass the water when repairs are being made on the surge tank or other associated installations.

6. No tailrace of water is visible at this plant. This fact appears to coincide with ground information which states the water used at this plant is subsequently utilized at Jitsugetsutan Power Plant No. 2.

7. Living quarters for personnel working in the Power Plant are located immediately W of the Power Plant on top of a hill. Visible here are fifteen buildings, approximately 50' x 20', and five buildings approximately 70' x 25'. ----- 9

8. A probable office building, 70' x 30', is located approximately 1300' S of the plant near the road on the E bank of the Suiri River.

E. Surrounding Terrain: Jitsugetsutan Power Plant No. 1 lies in the valley of the Suiri River and is surrounded by hills which rise abruptly.

VI. JITSUGETSUTAN POWER PLANT NO. 2. (reported to have three 20,000 KW generators. In 1939 it was reported to be producing only 43,000 KW.)

A. Location: Jitsugetsutan Power Plant #2 is located approximately 3.5 miles SW of Lake Jitsugetsutan in the small town of Suriko, near the confluence of the Dakusui and Suiri Rivers. ----- 10

B. Size: The main power plant and associated transformer and switching stations cover an area approximately 860' x 265'. Individual installations are as follows:

1. Main Power Plant - 125' x 90'.
 - a. Turbine House - 125' x 60'.
 - b. Electrical Gallery - 125' x 30'.
2. The transformer and switching stations cover an area approximately 640' x 220'. ----- 11
 - a. The switching station is probably confined in a building 90' x 40' on the E end of the transformer yard.

C. Description: The Turbine House and Electrical Gallery together form Jitsugetsutan Power Plant #2. Both buildings are connected, the roof of the latter being slightly below the roof level of the former. This plant is also reported to be of ferro-concrete construction.

The tailrace of water passes from the power plant along a concrete flume which connects with the Suiri River immediately west of the Plant.

D. Associated Installations and Cycle of Operations:

1. A small lake, roughly 1090' x 110', is located in a ravine approximately 1/2 mile east of Jitsugetsutan Power Plant No. 2. The lake is formed by an arch-shaped concrete dam, 200 ft. long and approximately 8 ft. wide at the top. The dam is located at the west end of the lake. The exact function, if any, of this small lake in the cycle of operations cannot be determined. ----- 12

2. The photos reveal nothing to indicate how the water is brought to the surge tank above the power plant, but it is reliably reported that pressure tunnels are used. Ground information states that the water from Power Plant No. 1 is used in Power Plant No. 2 but this can neither be confirmed nor denied.

3. A surge tank, 45' in diameter, is located on top of the hill 935 ft. east of the Power Plant.

4. A single pipe, approximately 7' in diameter and 100' long, leads from the surge tank to a valve-gate station, 50' x 40', on the crest of the hill E of the plant.

5. Two penstocks, each 7' in diameter, in four sections, and covering an area roughly 20' wide before fanning out near the Power Plant, run from the above mentioned valve-gate station down the hillside to the Power Plant located 730' to the west.

6. At the section connection nearest the plant there is another check-valve station housed in a building 40' x 40'. Concrete anchor blocks are located at two of the other section connections.

7. A tailrace of water flows from the plant onto a concrete ~~flume~~ and finally into the Suiri River.

8. Living quarters for personnel working in the Power Plant are ----- 13 located approximately 1550' to the SW of the Plant. Visible here are 14 buildings, each approximately 55' x 30'.

VII. DEFENSES.

A battery of four (4) heavy A/A guns is located in the railroad yard ----- 14 which is located approximately half way between Power Plants No. 1 and 2. Each gun is contained in a circular revetment which is approximately 30' in diameter.

VIII. HIGH POWER TRANSMISSION LINES.

(See annotated mosaic for location of pylons and lines. Each dot on ----- 15 the mosaic represents a pylon.)

IX. TRANSPORTATION FACILITIES.

1. Railroads: A single track electric RR line connects this area ----- 16 with the main RR lines which run along the western coast of Formosa. The electric RR line ends at the Gaishatei RR Yards, where it is connected with a 18"-24" gauge push-car line which runs northward to Hori.

Two railroad yards are located in the Jitsugetsutan Lake District. A small one is located at Suriko, near Power Plant No. 2, and a large one at Gaishatei (see below).

1. Suriko RR yard:

- a. Location: Approximately 1500' ^{WNW}ENE of Power Plant #2. ----- 17
- b. Size: The yard covers an area roughly 1900' x 650'.
- c. Description: Alongside the tracks are eight (8) unloading sheds with dimensions as follows:
- | | |
|-------------|------------------|
| 155' x 45'. | Two 45' x 15'. |
| 85' x 25'. | Three 58' x 37'. |
| 55' x 25'. | |

There are three tracks within the yard.

2. The photos reveal nothing to indicate how the water is brought to the surge tank above the power plant, but it is reliably reported that pressure tunnels are used. Ground information states that the water from Power Plant No. 1 is used in Power Plant No. 2 but this can neither be confirmed nor denied.

3. A surge tank, 45' in diameter, is located on top of the hill 935 ft. east of the Power Plant.

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Two railroad yards are located in the Jitsugetsutan Lake District. A small one is located at Suriko, near Power Plant No. 2, and a large one at Gaishatei (see below).

1. Suriko RR yard:

- a. Location: Approximately 1500' ^{WNW} ENE of Power Plant #2. ----- 17
- b. Size: The yard covers an area roughly 1900' x 650'.
- c. Description: Alongside the tracks are eight (8) unloading sheds with dimensions as follows:
- | | |
|-------------|------------------|
| 155' x 45'. | Two 45' x 15'. |
| 85' x 25'. | Three 58' x 37'. |
| 55' x 25'. | |

There are three tracks within the yard.

No RR cars were visible in the yard at the time of the two photo coverages. However, on the photos of Mission 13/4 C an electric train approximately 210' long is in motion just W of the Suriko RR Yard.

Throughout the entire area large quantities of loose stores are visible. It is possible that a major portion of these consist of lumber. It is to be noted that the Jitsugetsutan Lake District is located in the great camphor forest belt of Formosa.

Adjacent to the RR tracks, off the E end, is situated a compact concentration of buildings which appear to serve as homes and/or warehouses.

2. Gaishatei RR Yard:

- a. Location: Approximately 2.9 miles NE of Power Plant #2. ----- 18
- b. Size: The yard covers an area approximately 1325' x 750'.
- c. Description: Alongside the tracks within the RR yard are approximately 16 unloading sheds and warehouses with dimensions as follows:

485' x 30'.	15' x 15'.
130' x 30'.	95' x 50'.
Two 40' x 20'.	120' x 15'.
60' x 15'.	Three 60' x 45'.
Three 140' x 15'.	Two 60' x 30'.

There are five sets of tracks within the yards.

No RR cars are visible on either of the two photo coverages.

The yard is surrounded on all four sides by high hills.

B. Motor Roads: The Jitsugetsutan Lake District is served by numerous good roads.

1. The road from Hori, eight (8) miles to the NNE, enters the ----- 19 Lake area E of Tessa Dam. It proceeds over Tessa Dam along the W side of the lake, and finally connects with the road which runs along the Dakusui River. The road averages roughly 15' wide and appears to be well travelled.

2. A good motor road approximately 15' wide leads directly into ----- 20 the Lake area from Seira thirty (30) miles to the WSW. This road runs directly to Suriko and Power Plant No. 1, and finally runs into the road which goes to Hori.

3. Another well-travelled 15' road leaves Suriko and proceeds ----- 21 south along the Dakusui River.

X. MISCELLANEOUS:

1. A small combination barracks and storage area is located approx- ----- 22 imately 3115' S of the Suriko RR Yard. A considerable quantity of stores lies on the ground outside some of the large buildings.

1. Four warehouse-type buildings, roughly 155' x 40', are situated around a parade ground which is heavily scarred. Numerous small buildings are located near this area.

2. A large building, 310' x 150', which is believed to be for storage, is the most conspicuous building in the area.

B. The Jitsugetsutan Lake District is heavily wooded, and it is reported that this area is located within the vast camphor forests. Strip-
ping of the forests is noticeable in many places throughout the locality.

C. A small village is situated on the lakeshore at the SSE end of the lake. Approximately thirty (30) buildings averaging 50' x 30' probably house agricultural workers who work the numerous small fields nearby.

----- 23

PREPARED BY: *W. S. Emons*
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P. I. Officer

APPROVED BY: *Sydney Franklin*
for R. C. WILSON
Capt., U. S. C.
Commanding

DISTRIBUTIONARMY

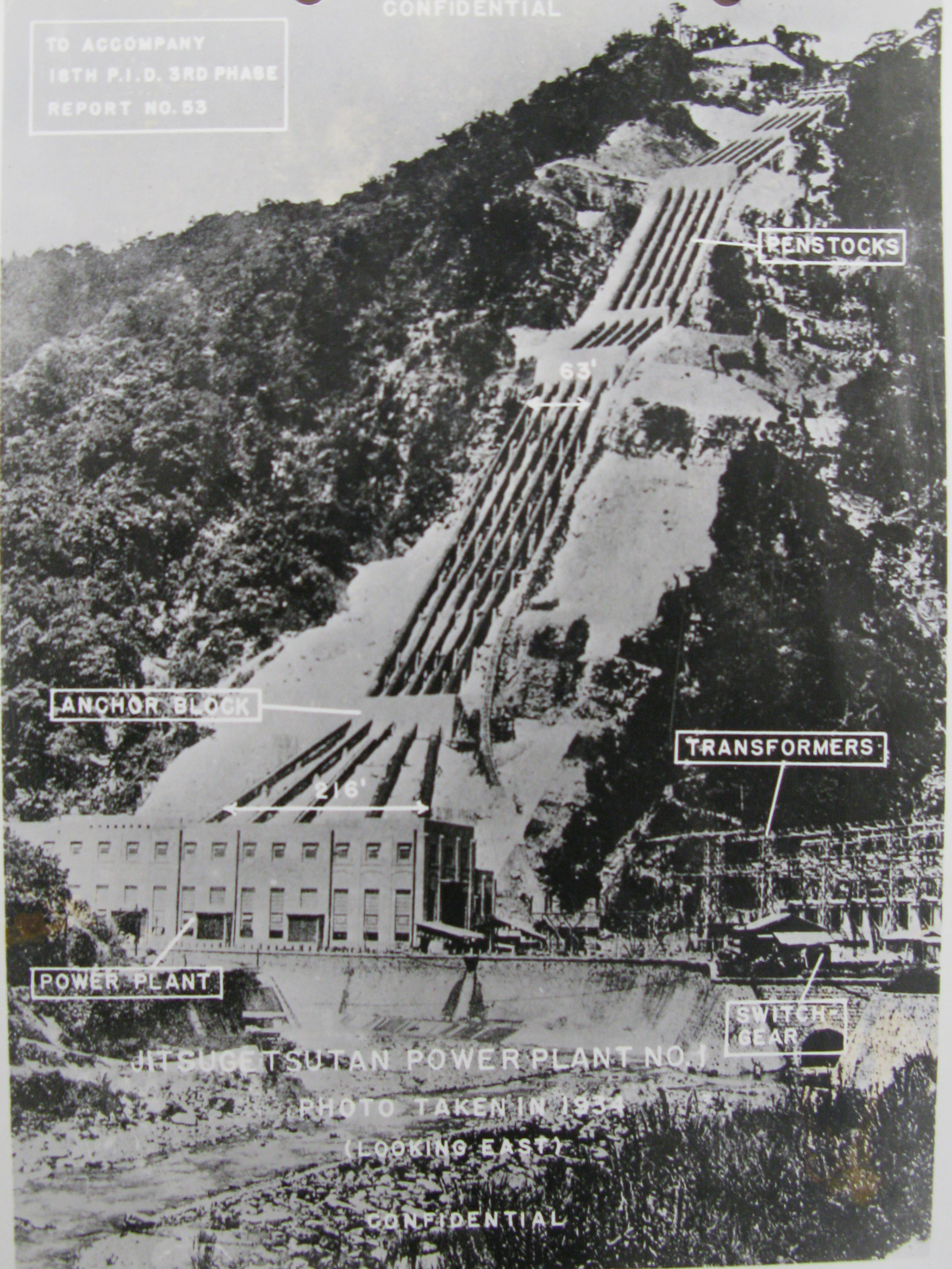
2 - WDGS A/C-S, G-2
2 - CG, USAAF, A/C-S, A-2
1 - USAAF TIB O/FES
1 - AFIS, Harrisburg
1 - CG, CB&I (Fwd)
1 - CG, 10th AF
3 - JICA
1 - CG, IB Sector
1 - R. A. F.
1 - A-2, HQ 14th AF
1 - A-2, HQ 68th Comp. Wing
1 - A-2, HQ 69th Wing
20 - A-2 File
3 - 18th PID
4 - 21st Photo Sq.
3 - 341st B. G.
5 - 23rd F. G.
7 - 51st F. G.
10 - C. A. C. W.
2 - 11th B. Sq.
5 - 308th B. G.

NAVY

1 - COMINCH
1 - CINCPAC
1 - COMSOWESPAC
1 - COMSOPAC
1 - ONI
1 - HO, Washington
1 - P. I. CENTER, Washington
1 - PRISICPOL
2 - ICB, Washington
2 - ALUSNOB, Chungking
1 - ALUSNL, Chungking
2 - P. I. F. U. #1 File

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TO ACCOMPANY
18TH P.I.D. 3RD PHASE
REPORT NO. 53



PENSTOCKS

63'

ANCHOR BLOCK

TRANSFORMERS

216'

POWER PLANT

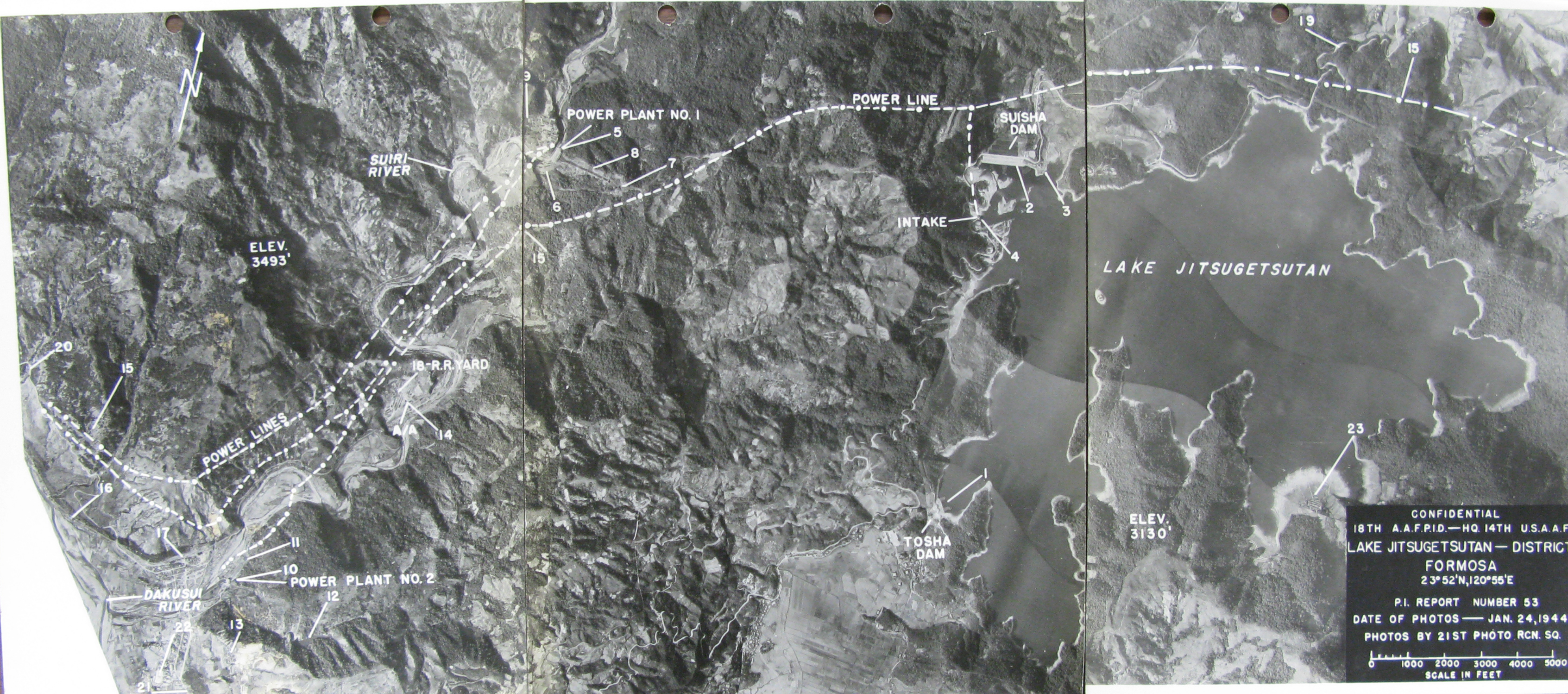
SWITCH GEAR

JITSUGETSUTAN POWER PLANT NO. 1

PHOTO TAKEN IN 1934

(LOOKING EAST)

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ELEV.
3493'

SUIRI RIVER

POWER PLANT NO. 1

SUISHA DAM

INTAKE

LAKE JITSUGETSUTAN

18-R.R. YARD

POWER LINES

TOSHA DAM

ELEV.
3130'

POWER PLANT NO. 2

DAKUSUI RIVER

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 18TH A.A.F.P.I.D.—HQ. 14TH U.S.A.A.F.
 LAKE JITSUGETSUTAN — DISTRICT
 FORMOSA
 23°52'N, 120°55'E

P.I. REPORT NUMBER 53
 DATE OF PHOTOS — JAN. 24, 1944
 PHOTOS BY 21ST PHOTO RCN. SQ.

0 1000 2000 3000 4000 5000
 SCALE IN FEET