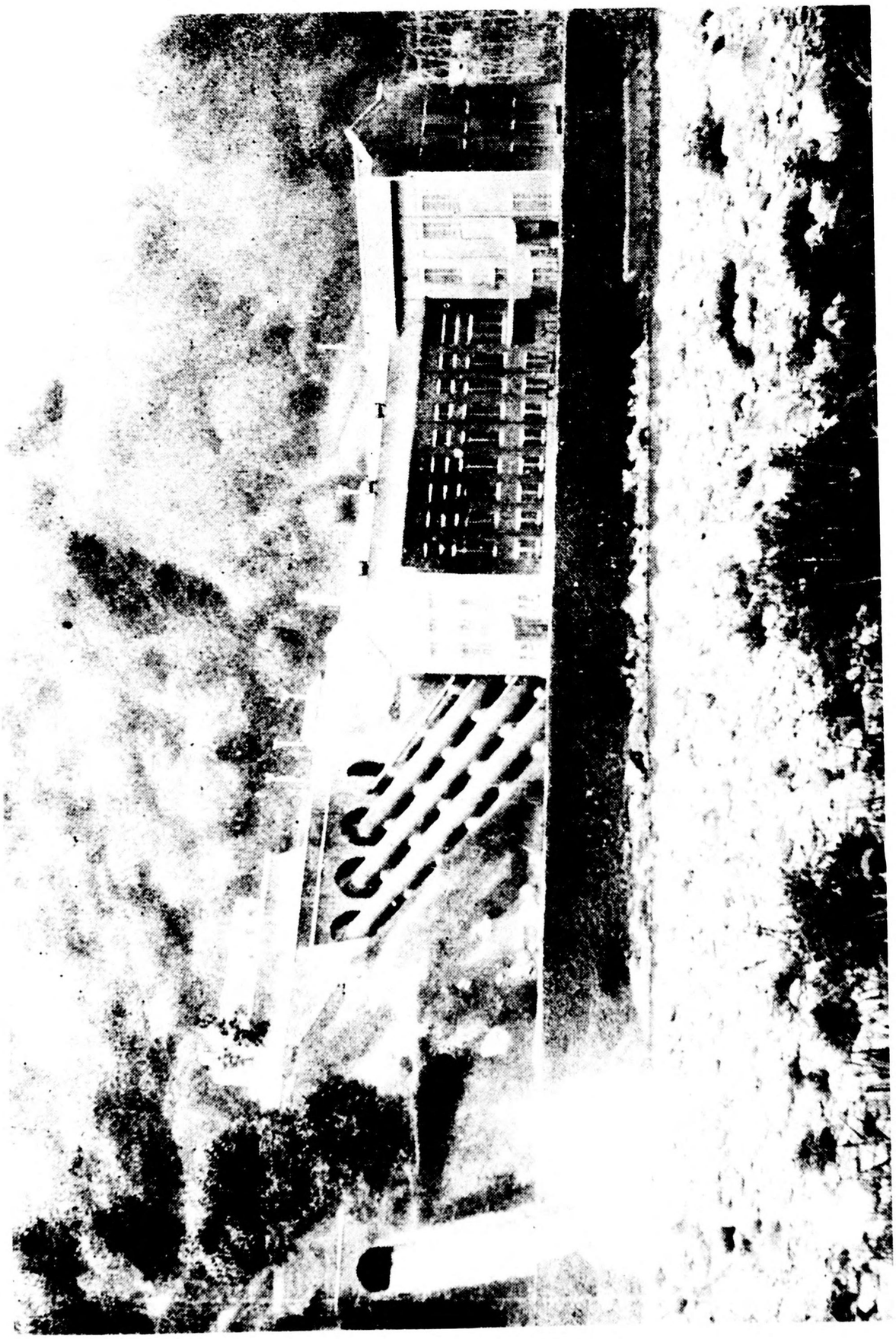
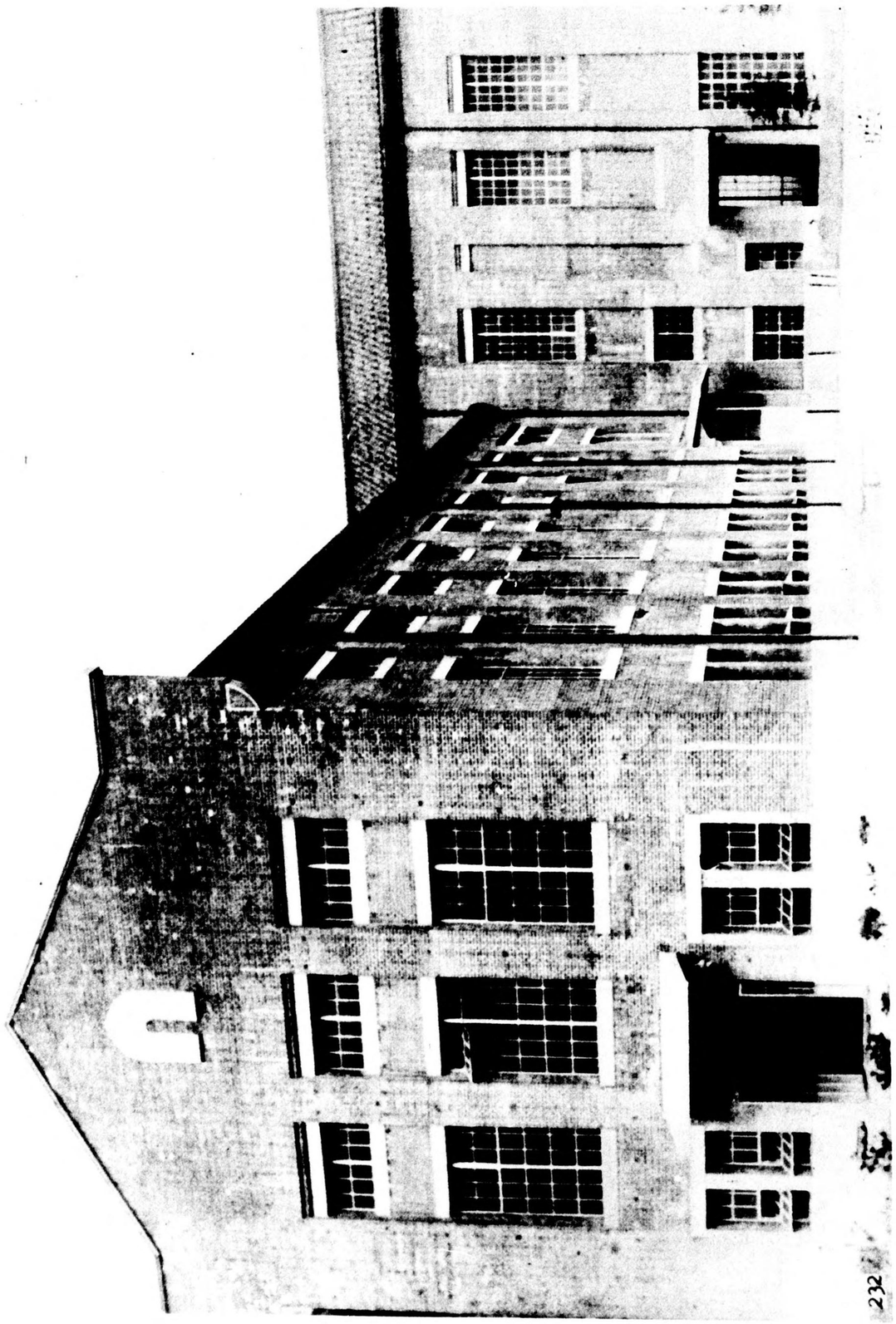
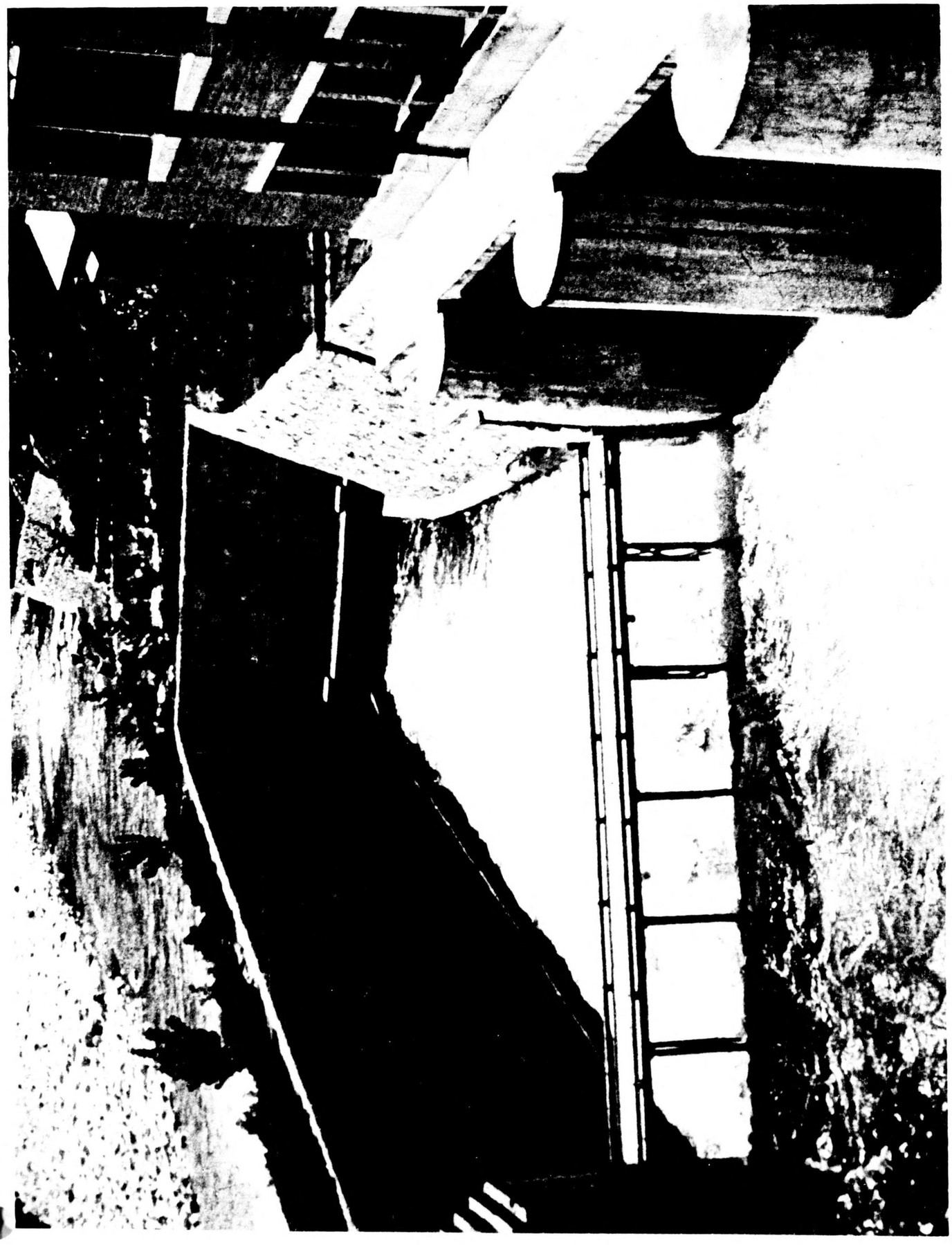


Photograph No. IV-56 Okuwa Hydro Plant

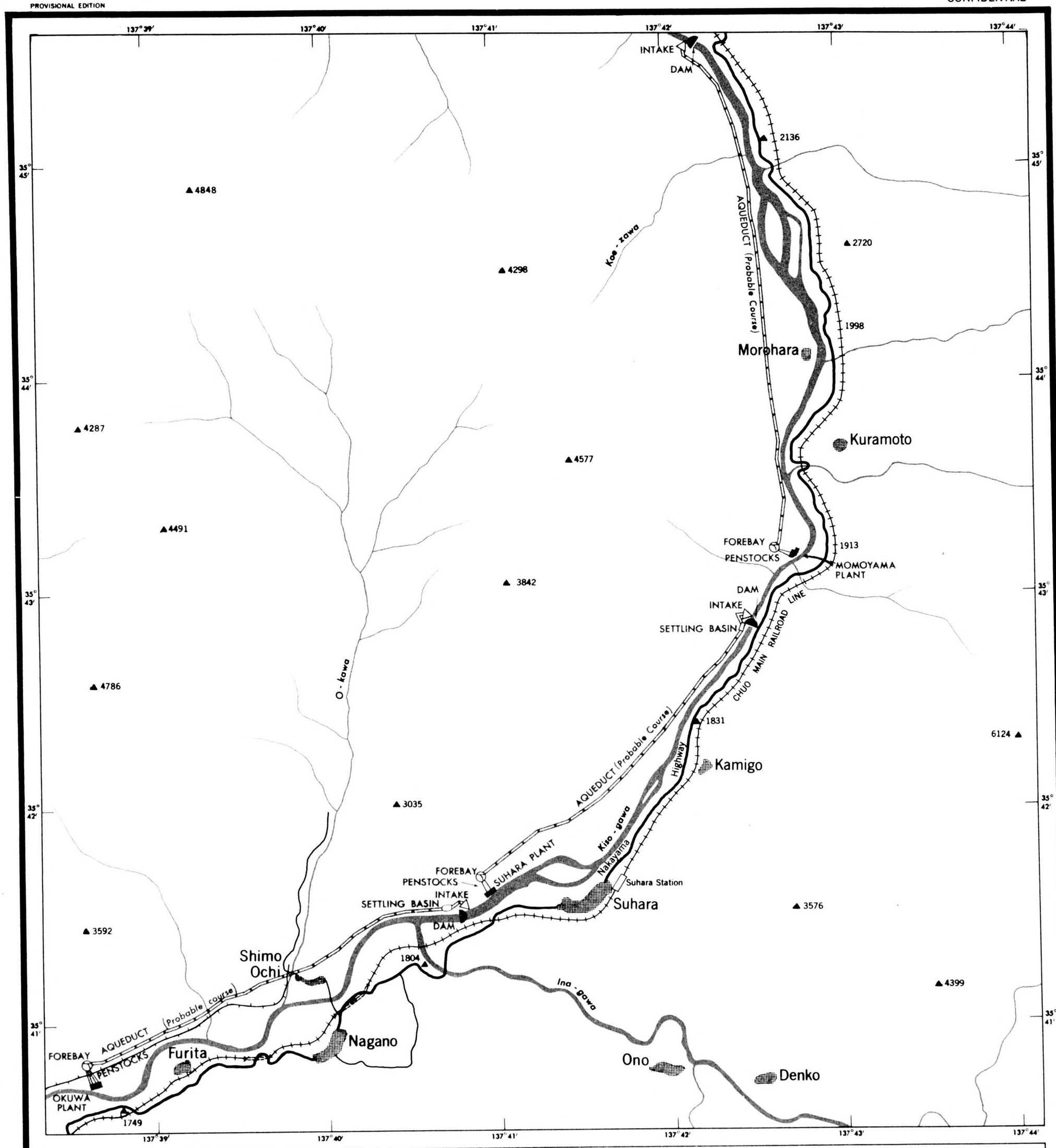


Photograph No. IV-57 Okuwa Hydro Plant



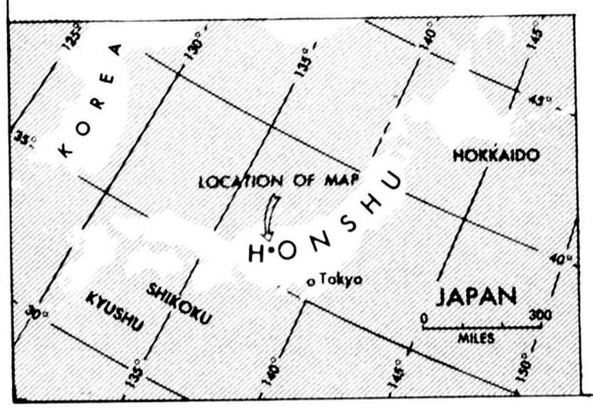
Photograph No. IV-58 Okuwa Hydro Plant tail race

PROVISIONAL EDITION



MOMOYAMA, SUHARA, AND OKUWA HYDROELECTRIC PLANTS

NAGANO-KEN



BASE MAP FROM 1:50,000 SERIES, JAPAN IMPERIAL LAND SURVEY BUREAU, 1934.

W.D.M.C. FILE NO. S30-JGS-50, SHEET 47-6.

½ 0 1
MILES

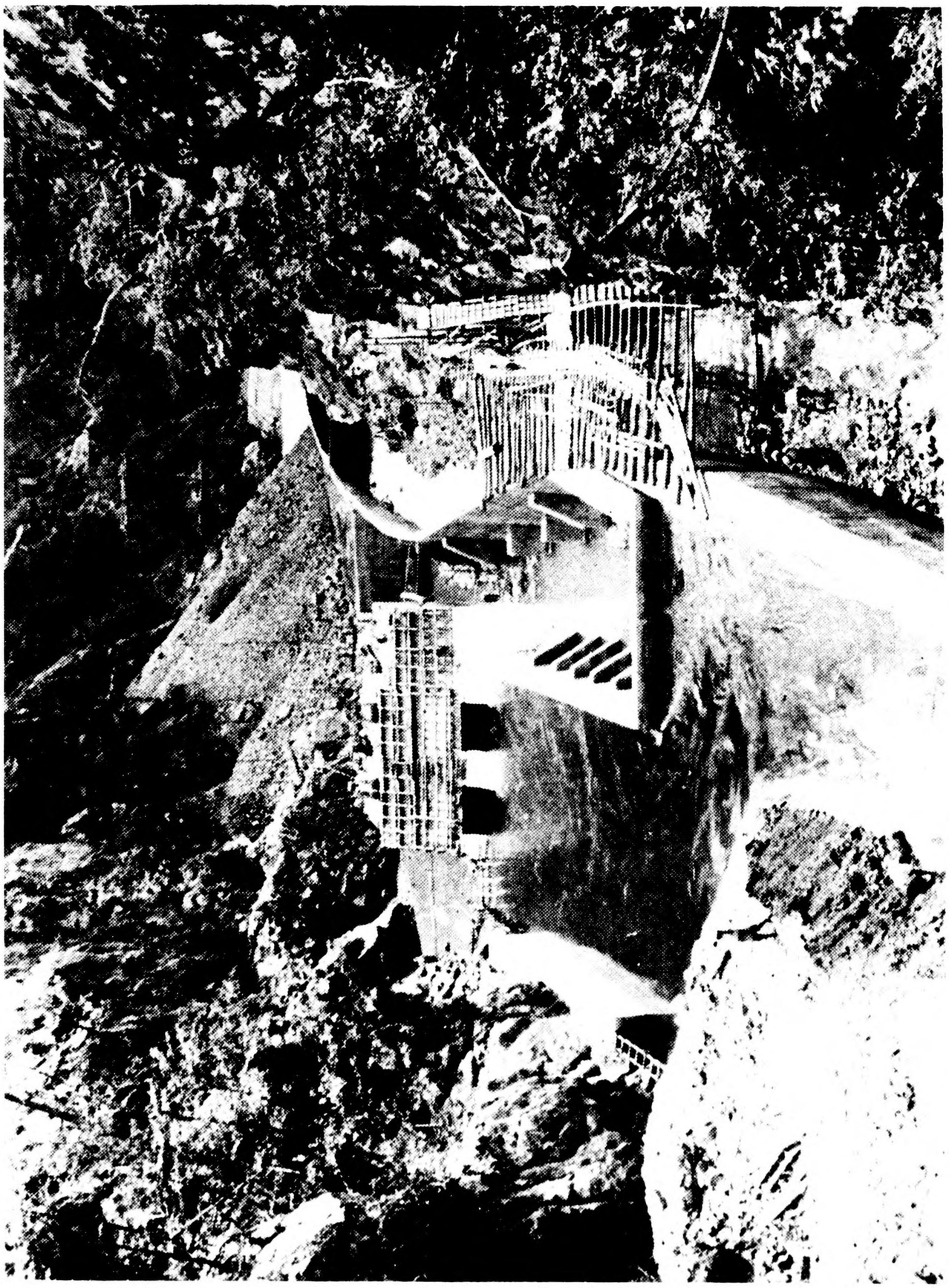
½ 0 1
KILOMETERS

Reliability Code 1B-1B-1

- SETTLEMENT CENTER
- NARROW GAUGE LOGGING RAILROAD
- TUNNEL
- PRINCIPAL HIGHWAY
- SECONDARY ROAD
- ▲3842 SPOT HEIGHT (IN FEET)

MAP NO. 2748
9 DECEMBER 1943

COMPILED AND DRAWN IN THE BRANCH OF RESEARCH AND ANALYSIS, OSS
LITHOGRAPHED IN THE REPRODUCTION BRANCH, OSS



Photograph No. IV-59 Oma Hydro Plant dam from downstream

Generators - 2 (incl 1 res) @ 10,000 kva, 85% pf, 3-ph, 300/360 rpm, 50/60 cyc, Shibaura-make
Transformers - 3 (incl 1 res) @ 10,000 kva, 3-ph, 50/60 cyc, Shibaura-make
Tail race - 449.5 m closed conduit

See: Photograph No. IV-59
Figure No. IV-22a

Sources: DnN 1940; KN 1939 p.166; SR 1/38 p.5, 6/39 p.(2); DGS 4/37 p.411, 5/37 p.530; DGS Kaimu 1937 p.99; DnGZ 7/37, 9/37 p.(139); Ohm 11/36 p.1136, 3/39 p.295; HSG pp.161,324

627. OMAKI HYDRO PLANT

Approx. Lat. 36°33'
Long. 137°00'

Company: Shokawa Suiryoku Denki KK

Location: Plant - Omaki-oaza, Toga-mura, Higashi Tonami-gun, Toyama-ken

Capacity Commonly in Use (in kw): 4620, as of May 1935

Importance: Rank in Japan - 250 + ; rank in Osaka-Nagoya supply area-100 +

Source of Power: Toga-gawa of the Sho-kawa system

Date of Construction: Completed in 1935

Details: Particular capacities (in kw) - 2770 reg; 1850 spec

Sources: Ohm 8/35 p.829

OMAKI HYDRO PLANT - See KOMAKI HYDRO PLANT

628. OMAMA HYDRO PLANT

Approx. Lat. 36°26'
Long. 139°16'

Company: Watarase Suiden KK

Location: Plant - Higashihara-aza, Kiriwara-oaza, Omama-machi, Yamada-gun, Gumma-ken

Capacity Commonly in Use (in kw): 1000, as of Nov 1938

Importance: Rank in Japan - 250 + ; rank in Tokyo supply area - 100 +

Source of Power: Watarase-gawa

Date of Construction: Construction was begun July 1937 and completed in Nov 1938; in operation Mar 1940

Details: Particular capacities (in kw) - 560 reg; 440 spec

Sources: DnN 1940; KN 1938 p.198, 1939 p.166; Ohm 10/37 p.1088, 2/39 p.204

629. OMINATO FACTORY STEAM PLANT

Approx. Lat. 41°17'
Long. 141°12'30"

Company: Nippon Tokushu Kokan KK

Location: Tanabe-machi, Shimokita-gun, Aomori-ken

Installed Capacity (in kw): At least 3000, as of July 1940

Importance: Rank in Japan - 250 + ; rank in Tohoku supply area - 20 +
Serves Ominato special steel tubing factory of the Nippon Tokushu Kokan KK

Date of Construction: Completed in 1940 with one unit in operation; two additional units were planned for completion by 1942

Details: Plant, equipment -
Turbines - 3 @ unknown cap
Generators - 3 @ at least 1000 kw, 3-ph

Sources: TKS 7/20/40 p.55

630. OMINATO STEAM PLANT

Approx. Lat. 41°17'
Long. 141°13'

Company: Aomori-ken; formerly Ominato Suiden KK

Location: 6 of 25, Ebigawa-aza, Tanabe-oaza, Tanabe-machi, Shimokita-gun, Aomori-ken

Installed Capacity (in kw): 1920 (see Date of Construction)

Importance: Rank in Japan - 250 + ; rank in Tohoku supply area - 20 +

Date of Construction: Unknown; construction was begun Oct 1934; in operation Mar 1940

Details: Particular capacities (in kw) - 480 reg; 1440 spec

Sources: DnN 1940; Ohm 1/35 p.119

631. OMINE HYDRO PLANT

Approx. Lat. 37°29'
Long. 140°20'

Company: Dai Nippon Denryoku KK; formerly Tobu Denryoku KK

Location: Plant - Marumori-mura, Asaka-gun, Fukushima-ken

Capacity Commonly in Use (in kw): 4000, as of Dec 1936

Importance: Rank in Japan - 250 + ; rank in Tohoku supply area - 20 +

Source of Power: Imo-gawa

Date of Construction: In operation as early as June 1928 and as recently as Mar 1940

Details: Particular capacities (in kw) - 4000 reg; *6000 inst cap
Eff head - 291 ft
Plant, equipment -
Turbines - 3 (incl 1 res) @ 3000 hp, Francis-type, Dengyosha-make
Generators - 3 (incl 1 res) @ 2500 kva, 3-ph, 3300 v, 600 rpm, 60 cyc, Shibaura-make
Transformers - 4 (incl 1 res) @ 1700 kva, 1-ph, 3.3/22,21 kv, D-D conn, water-cooled, 60 cyc, shell-type, Shibaura-make

Sources: DnN 1940; DnK; Ohm 6/31 supp p.7; DJY 1929 pp.285,392; TD Map

632. OMINE HYDRO PLANT

Approx. Lat. 34°52'
Long. 135°51'

Company: Ujigawa Denki KK

Location: Plant - Takao-oaza, Tahara-mura, Tsutsuki-gun, Kyoto-fu; 1 mile upstream from the Shizukawa Hydro Plant

Capacity Commonly in Use (in kw): 16,000, as of Dec 1936

Importance: Rank in Japan - 146 ; rank in Osaka-Nagoya supply area - 65

Source of Power: Uji-gawa of the Yodo-gawa system

Date of Construction: Completed Sept 1926; in operation Mar 1940

Details: Particular capacities (in kw) - *16,000 installed cap; no reg cap; 16,000 spec; 16,000 max pk. The dry season capacity of this plant has been increased due to the opening of the Seta dam in the winter months.
Eff head - 21.2 m; flow - 98 m^3/sec
Plant, equipment -
Turbines - 2 @ 12,500 hp, Francis-type, Voith-make
Generators - 2 @ 10,000 kva, 3-ph, 11,500 v, 150 rpm, 60 cyc, SS-make
Other equipment - 1 crane @ 50-ton cap, 3 exciters @ 120 kw
Area served - Osaka district

See: Figure No. IV-26

Sources: DnN 1940; ZKT 1939 p.1644; Ohm 6/31 supp p.6, 10/33 opp p.561; DnK; DJY 1929 p.340; Ohm-sha Guide 1933 p.15

633. OMOGO NO. 1 HYDRO PLANT Approx. Lat. 33°35'
Long. 132°59'

Company: Iyo Tetsudo Denki KK

Location: Plant - 3350 Dono-aza, Hinoura-oaza, Hirokata-mura, Kami Ukena-gun, Ehime-ken

Capacity Commonly in Use (in kw): 6264, as of Dec 1936

Importance: Rank in Japan - 250 + ; rank in Shikoku supply area - 15

Source of Power: Omogo-gawa of the Niyodo-gawa system

Date of Construction: Completed May 1928; in operation Mar 1940

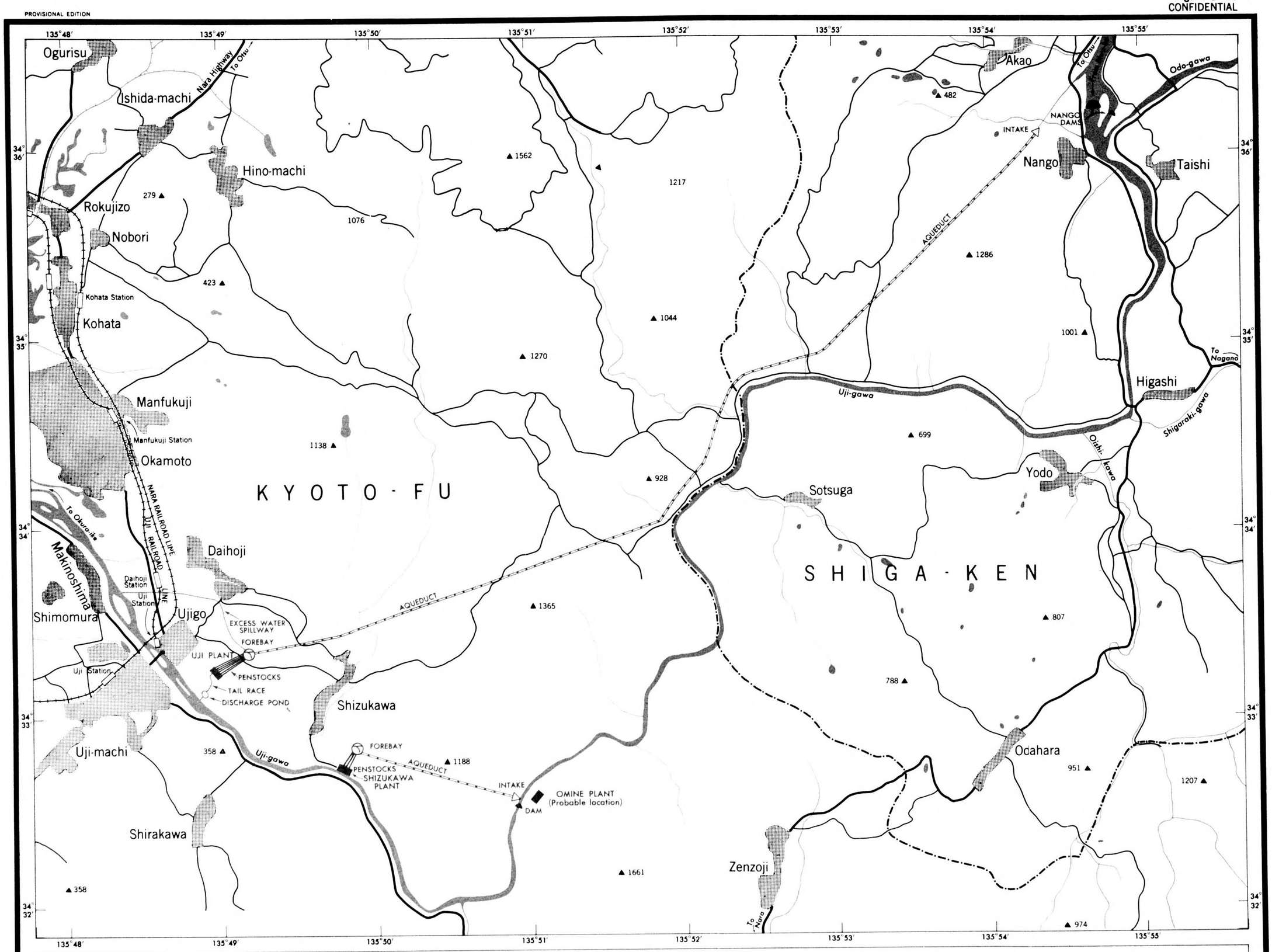
Details: Particular capacities (in kw) - *6971 installed cap; 3132 reg; 3132 spec; 7000 reg pk
Eff head - 304.2 ft
Dam - 15 m high, 61 m long, overflow, gravity-type; roller gates
Plant, equipment -
Turbines - 2 @ 5700 hp, Francis-type, vertical-shaft, Mitsubishi-make
Generators - 2 @ 4357 kva, 3-ph, 6600 v, 600 rpm, 60 cyc, Mitsubishi-make
Transformers - 3 @ 2900 kva, 1-ph, 6.6/66/3 kv, D-D-D conn, water-cooled, 60 cyc, shell-type, Hitachi-make

Sources: DnN 1940; ZKT 1939 p.1650; Ohm 1/28 p.80, 8/28 p.434, 7/30 p.367, 6/31 supp p.6; DnK; DJY 1929 pp.274,368; DnGZ 7/37; DGS 8/33 p.673

634. OMOGO NO. 2 HYDRO PLANT Approx. Lat. 33°33'
Long. 133°00'

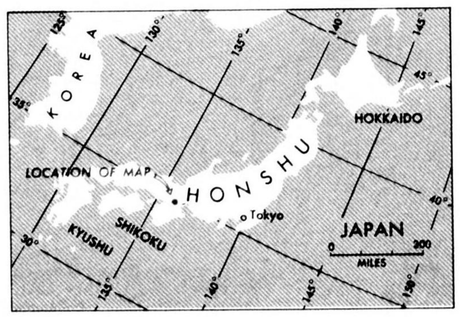
Company: Iyo Tetsudo Denki KK

PROVISIONAL EDITION



OMINE, SHIZUKAWA AND UJI HYDROELECTRIC PLANTS

KYOTO-FU, SHIGA-KEN



BASE MAP FROM 1:50,000 SERIES, JAPAN IMPERIAL LAND SURVEY BUREAU, 1932
W.D.M.C. FILE NO. JAPAN S30-JGS-50, SHEET 27-1

½ 0 1 2
MILES

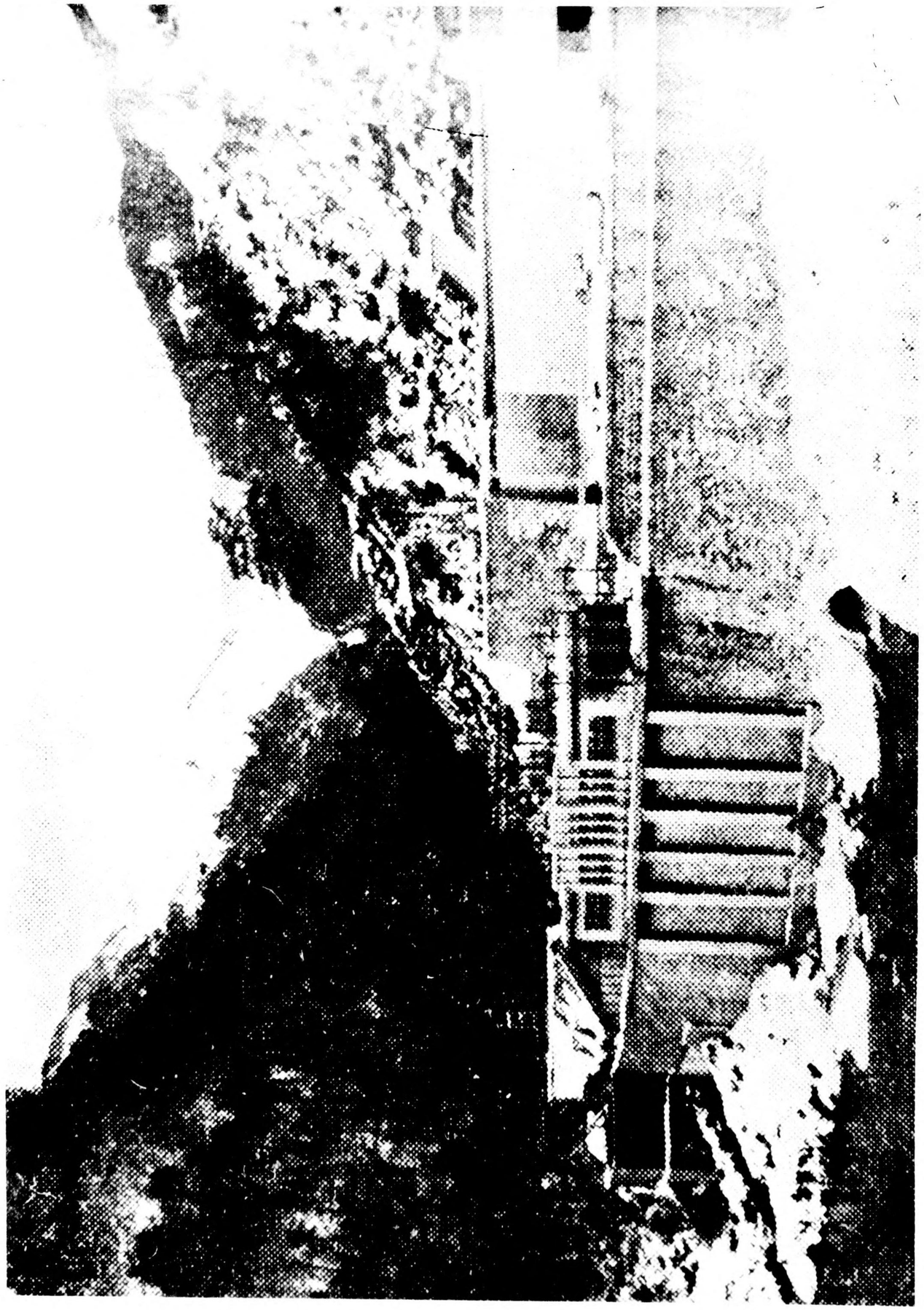
½ 0 1 2
KILOMETERS

Reliability Code 1B–1B–1

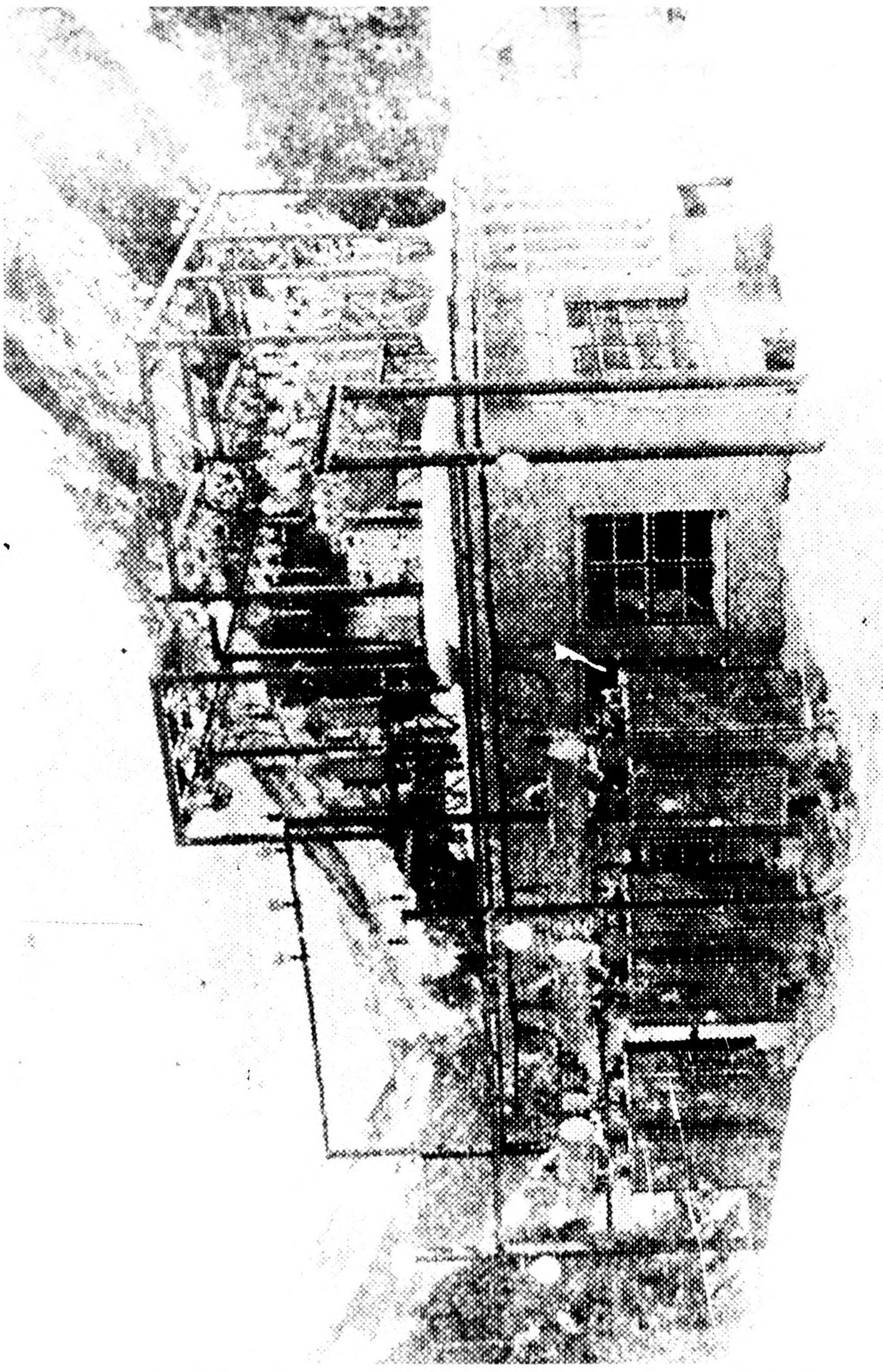
- SETTLEMENT CENTER
- PREFECTURAL BOUNDARY
- RAILROAD STATION
- PRINCIPAL HIGHWAY
- SECONDARY ROAD
- CANAL
- ▲ 928 SPOT HEIGHT (IN FEET)

MAP NO. 2907
22 JANUARY 1944

COMPILED AND DRAWN IN THE BRANCH OF RESEARCH AND ANALYSIS, OSS
LITHOGRAPHED IN THE REPRODUCTION BRANCH, OSS



Photograph No. IV-60 Omogo No. 2 Hydro Plant
in 1941



Photograph No. IV-61 Omogo No. 2 Hydro Plant in 1941

Location: Plant - Yanaigawa-oaza, Yanadani-mura, Kami Ukena-gun, Ehime-ken

Capacity Commonly in Use (in kw): 1700, as of 1940

Importance: Rank in Japan - 250 + ; rank in Shikoku supply area - 15 +

Source of Power: Omogo-gawa of the Niyodo-gawa system

Date of Construction: Construction was begun Oct 1929 and completed at the end of 1940

Details: Particular capacities (in kw) - 850 reg; 850 spec; *1800 inst cap
Layout - Aqueduct-type; receives water through a 2650 m channel from Omogo No. 1 Plant and discharge goes to Omogo No. 3 Plant
Eff head - 21.4 m
Aqueduct - 2650 m covered channel and ditch
Plant, external features - Of concrete construction, 2 stories high with switch-gear on roof
Plant, equipment -
Turbines - 1 @ 2200 kw, Kaplan-type, vertical-shaft Hitachi-make
Generators - 1 @ 2250 kva, 3-ph, 3000 v, 400 rpm, 60 cyc, Hitachi-make
Other equipment - 2 pumps for water discharge since plant is below high water level

See: Photographs No. IV-60, IV-61

Sources: DnN 1940; Ohm 1/30 p.72; HH 1/39 p.7, 1/40 p.3, 8/40 p.407, 1/41 p.3

635. OMOGO NO. 3 HYDRO PLANT Approx. Lat. 33°33'
Long. 133°01'

Company: Iyo Tetsudo Denki KK

Location: Plant - On the right bank of the Omogo-gawa in Yamasaki-aza, Yanaigawa-oaza, Yanadani-mura, Kami Ukena-gun, Ehime-ken
Dam - Futamata-aza, Yanaigawa-oaza, Yanadani-mura, Kami Ukena-gun, Ehime-ken

Capacity Commonly in Use (in kw): 7100, as of Dec 1937

Importance: Rank in Japan - 250 + ; rank in Shikoku supply area - 14

Source of Power: Omogo-gawa of the Niyodo-gawa system

Date of Construction: Construction was begun Jan 1936 and completed Dec 1937; in operation Mar 1940

Details: Particular capacities (in kw) - 2840 reg; 4260 spec; 7200 inst cap
Layout - Aqueduct-type

Eff head - 51.4 m; flow - 16.7 m^3/sec
Dam - 8 m high, 104 m long at top, 43 m wide at base, of stone construction with concrete facing, 5 roller gates
Intake - 6 reinforced concrete gates
Aqueduct - 4708 m long, incl 40 m covered ditch and 4668 m tunnel
Forebay - Of concrete construction, 52 m long, 17.4 m wide, 4.2 m deep
Penstocks - 3 @ 77.5 m long
Plant, equipment -
Turbines - 3 @ 2800 kw, reaction-type, Hitachi-make
Generators - 3 @ 3000 kva, 80% pf, 3-ph, 6600 v, 514 rpm, 60 cyc, Hitachi-make
Other equipment - 1 exciter @ 35 kw, 1 sub-exciter @ 1.5 kw
Tail race - 198.7 m long

See: Photographs No. IV-62, IV-63

Sources: DnN 1940; HH 8/40 p.407; DGS 4/37 p.111, 5/38 p.493; DGS Kaimu 1938 opp p.17; Ohm 4/36 p.401, 3/38 p.321; DnGZ 9/37 p.(139); KN 1938 p.199

636. OMUKAI HYDRO PLANT

Approx. Lat. 32°20'
Long. 131°01'

Company: Kyushu Denki KK; formerly Kumagawa Denki KK

Location: Plant - Eshiro-oaza, Minakami-mura, Kuma-gun, Kumamoto-ken

Capacity Commonly in Use (in kw): 1200 (see Date of Construction)

Importance: Rank in Japan - 250 + ; rank in Kyushu supply area - 50 +

Source of Power: Yokohoko-gawa and Kawaguchi-gawa of the Kuma-gawa system

Date of Construction: Construction was begun Aug 1930; no evidence of completion has been received.

Details: Particular capacities (in kw) - 660 reg; 540 spec

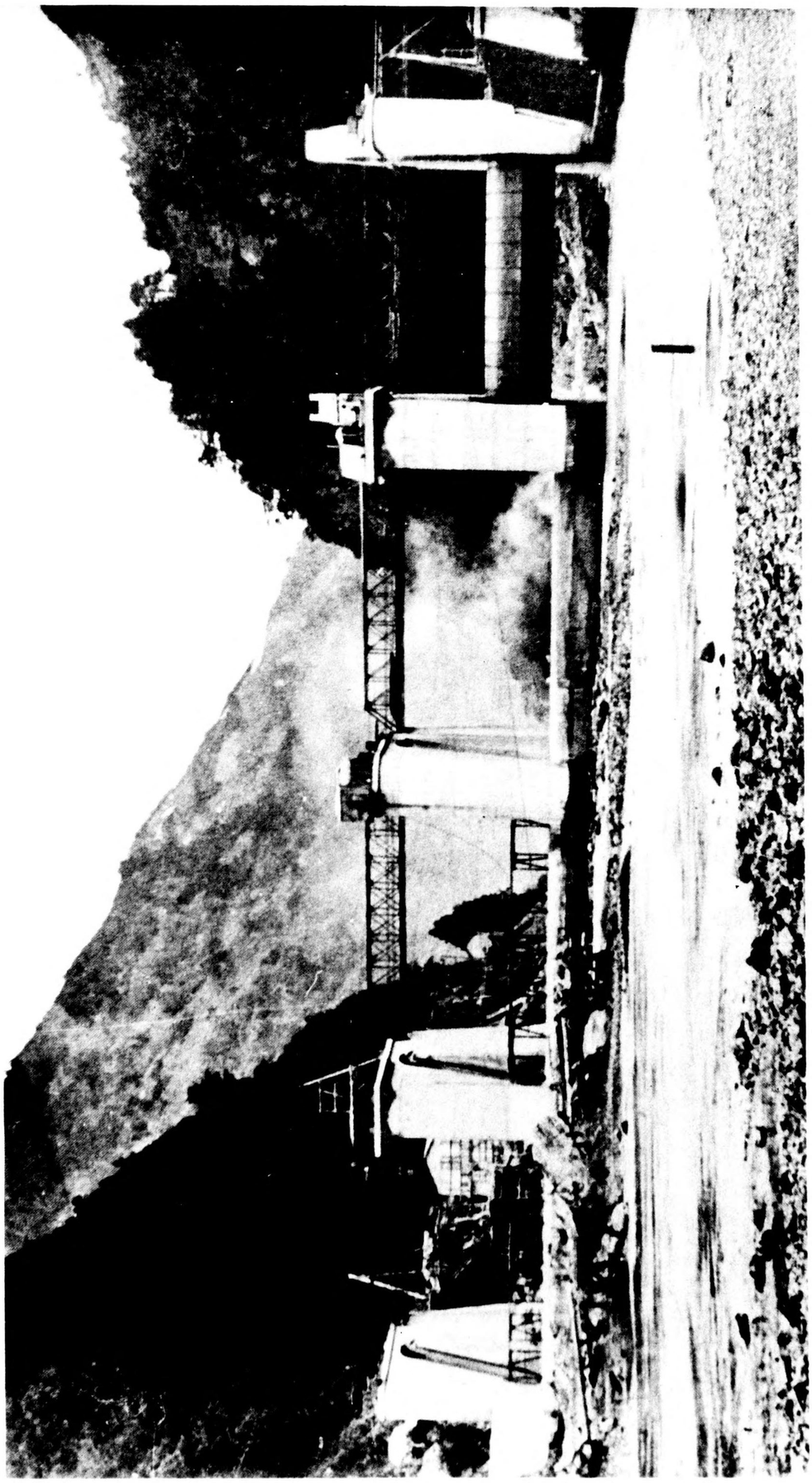
Sources: Ohm 11/30 p.557

637. OMUTA GAS PLANT

Approx. Lat. 33°00'
Long. 130°15'

Company: Mitsui Kozan KK

Location: Yakeishi-machi, Omuta-shi, Fukuoka-ken



Photograph No. IV-62 Omogo No. 3 Hydro Plant
dam and regulating pond in 1938

Photograph No. IV-63 Omogo No. 3 Hydro Plant
forebay in 1938

Installed Capacity (in kw): *8320, as of 1933

Importance: Rank in Japan - 250 + ; rank in Kyushu supply area - 38
Supplies power to the Mitsui mining establishment at Miike

Date of Construction: Completed July 1913 with an installed capacity of *4160 kw. This was increased in Oct 1914 to *6240 kw and in May 1919 to *8320 kw; in operation in 1933

Details: Plant, equipment -
Fuel supply - Gas
Gas producers - 4 @ coke oven-type
Engine - 2 @ 3000 hp, Nürnberg 4 cycle-type, horizontal-shaft, Nürnberg-make
2 @ 3000 hp, Nürnberg 4 cycle-type, horizontal-shaft, Miike Seisakusho-make
Generators - 2 @ 2600 kva, 2300 v, 100 rpm, 40 cyc, Reimer-make
2 @ 2600 kva, 2300 v, 100 rpm, 40 cyc, Shibaura-make
Other equipment - 4 exciters @ 80 kw

Sources: Ohm 6/31 supp p.7; Ohm-sha Guide 1933 p.58

638. ONAGOHATA HYDRO PLANT

Approx. Lat. 33°16'30"
Long. 130°58'30"

Company: Kyushu Suiryoku Denki KK

Location: Plant - On the left bank of the Kusu-gawa in Onagohata-oaza, Nakagawa-mura, Hida-gun, Oita-ken; about 4 miles southeast of Hidaka

Capacity Commonly in Use (in kw): 15,000, as of Mar 1931

Importance: Rank in Japan - 151 ; rank in Kyushu supply area - 22

Source of Power: Kusu-gawa and Oyama-gawa of the Chikugo-gawa system

Date of Construction: Completed Nov 1913; in operation Mar 1940

Details: Particular capacities (in kw) - 9750 reg; 5250 spec; 18,750 reg pk; 26,750 max pk; *23,000 installed cap
Layout - Aqueduct-type
Eff head - 71.2 m; flow - 34.8 m^3/sec
Dams - 1 - 9.69 m high, of earth construction
2 - 20.3 m high, 26.1 m long, of earth construction
3 - 26.3 m high, 176.9 m long, of earth construction
4 - 26.78 m high, overflow, gravity-type
Penstocks - 6 large ones, in 2 groups of 5 and 1, and 1 small one
Plant, external features - Of reinforced concrete construction, 2 and 3 stories high, built in 4 sections, one of which with peaked roof
Plant, equipment -
Turbines - 5 @ 5600 hp, Francis-type, Voith-make
1 @ 14,100 hp, Francis-type, Voith-make
1 @ 325 hp, Francis-type, Voith-make

Generators - 5 @ 3750 kva, 3-ph, 6600 v, 500/600 rpm, 50/60 cyc, GE-make
1 @ 10,000 kva, 3-ph, 6600 v, 250/300 rpm, 50/60 cyc, Hitachi-make
Transformers - 9 @ 2500 kva, 1-ph, 6.6/66 kv, D-D conn, water-cooled, 50 cyc, shell-type, Shibaura-make
6 @ 2500 kva, 1-ph, 6.6/66 kv, D-D conn, water-cooled, 50 cyc, shell-type, Mitsubishi-make
3 @ 2500 kva, 1-ph, 6.6/66 kv, D-D conn, water-cooled, 50 cyc, shell-type
3 @ 1500 kva, 1-ph, 6.6,6.3/22,21 kv, D-D conn, self-cooled, 50 cyc, core-type, Shibaura-make
3 @ 500 kva, 1-ph, 3.45,3.3,3.15/23,22,21 kv, D-D conn, self-cooled, 50 cyc, core-type, Yasykawa-make
Other equipment - Semi-automatic (1-man control) equipment installed
Area served - Fukuoka-ken and Oita-ken

See: Photographs No. IV-64, IV-65, IV-66, IV-67
Figure No. IV-27

Sources: DnN 1940; DnK; ZKT 1939 p.1651; DJY 1927; DJY 1929 p.374; DnGZ 6/30 p.697, 7/37; Ohm 6/31 p.309, supp p.6, 10/33 opp p.561; Ohm-sha Guide 1933 p.9; TD Map; DGS 8/33 p.673

639. ONIKOBE HYDRO PLANT

Approx. Lat. 38°52'
Long. 140°40'

Company: Miyagi-ken

Location: Plant - Samukazeuki-oaza, Onikobe-mura, Tamazukuri-gun, Miyagi-ken

Capacity Commonly in Use (in kw): 1000, as of Dec 1934

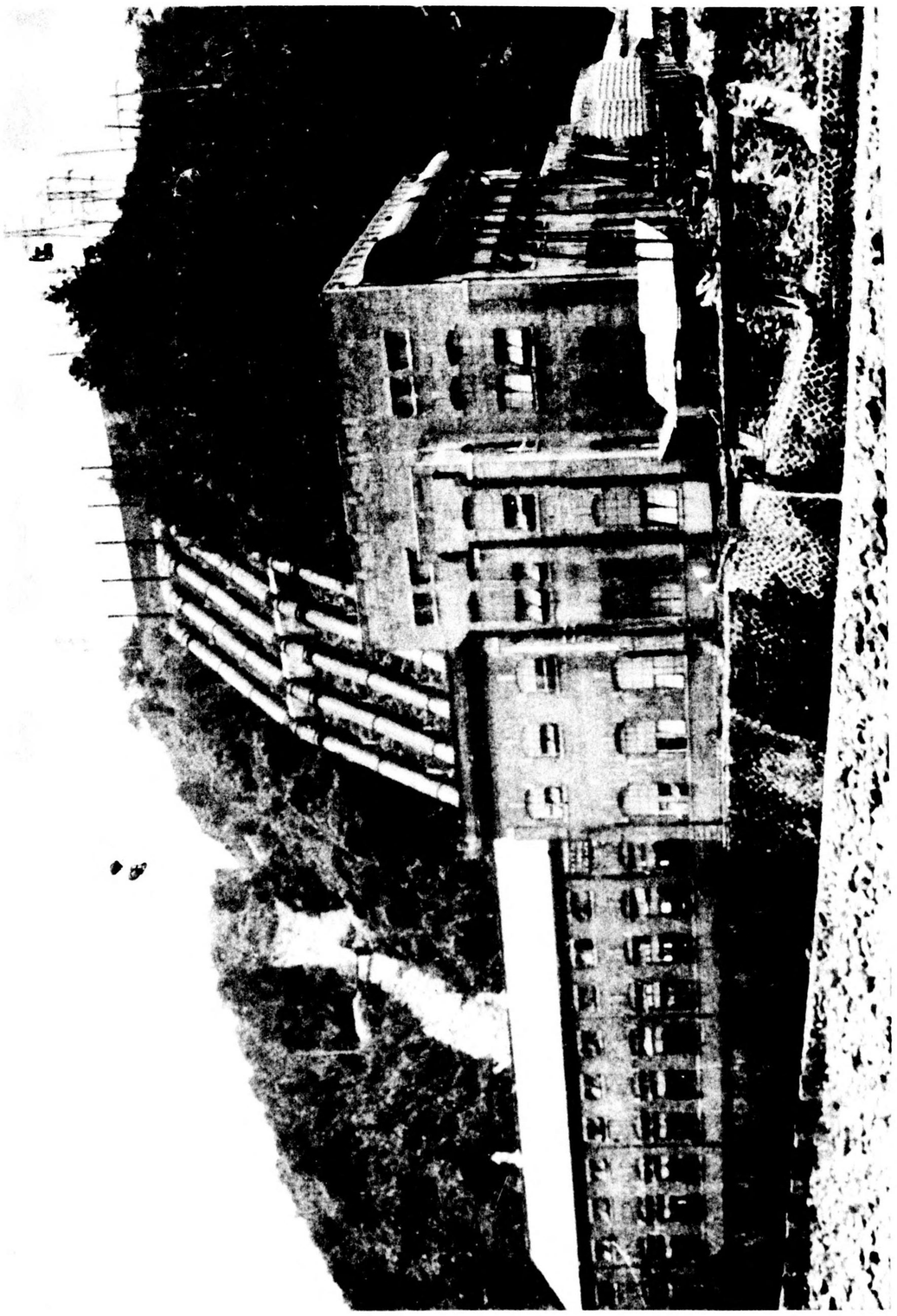
Importance: Rank in Japan - 250 + ; rank in Tohoku supply area - 20 +

Source of Power: Arao-kawa

Date of Construction: Founded Feb 1925; in operation Mar 1940

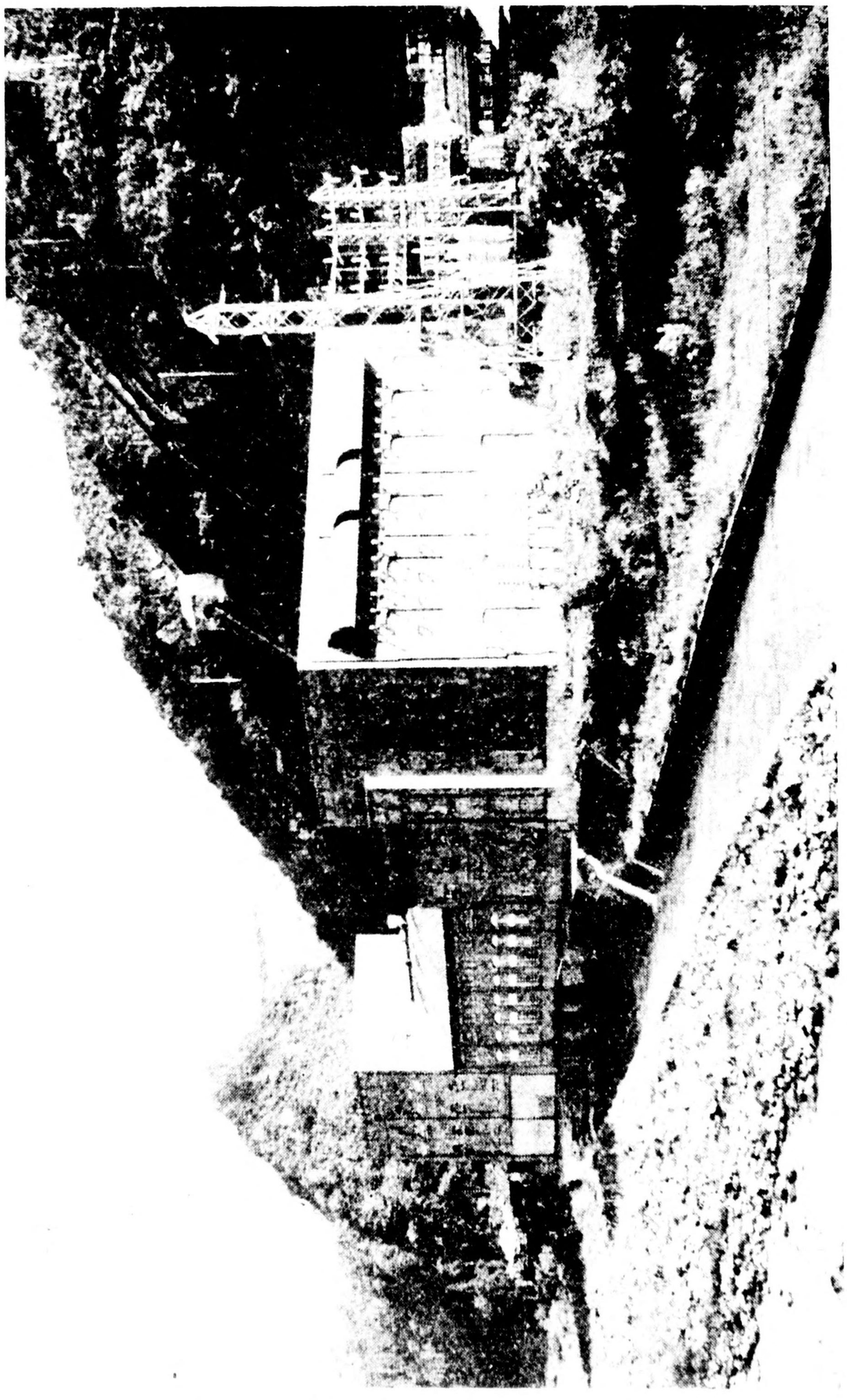
Details: Particular capacities (in kw) - 820 reg; 180 spec; *1000 inst cap
Eff head - 104 ft
Plant, equipment -
Turbines - 1 @ 1750 hp, Francis-type, horizontal-shaft, EW-make
Generators - 1 @ 1200 kva, 3-ph, 3500 v, 428 rpm, 50 cyc, Shibaura-make
Transformers - 4 (incl 1 res) @ 400 kva, 1-ph, 3.5,3.3,3.1/22,21,20,19 kv, D-Y conn, water-cooled, 50 cyc, shell-type, Mitsubishi-make

Sources: DnN 1940; ZKT 1939 p.1910; DJY 1927; DJY 1929 p.384

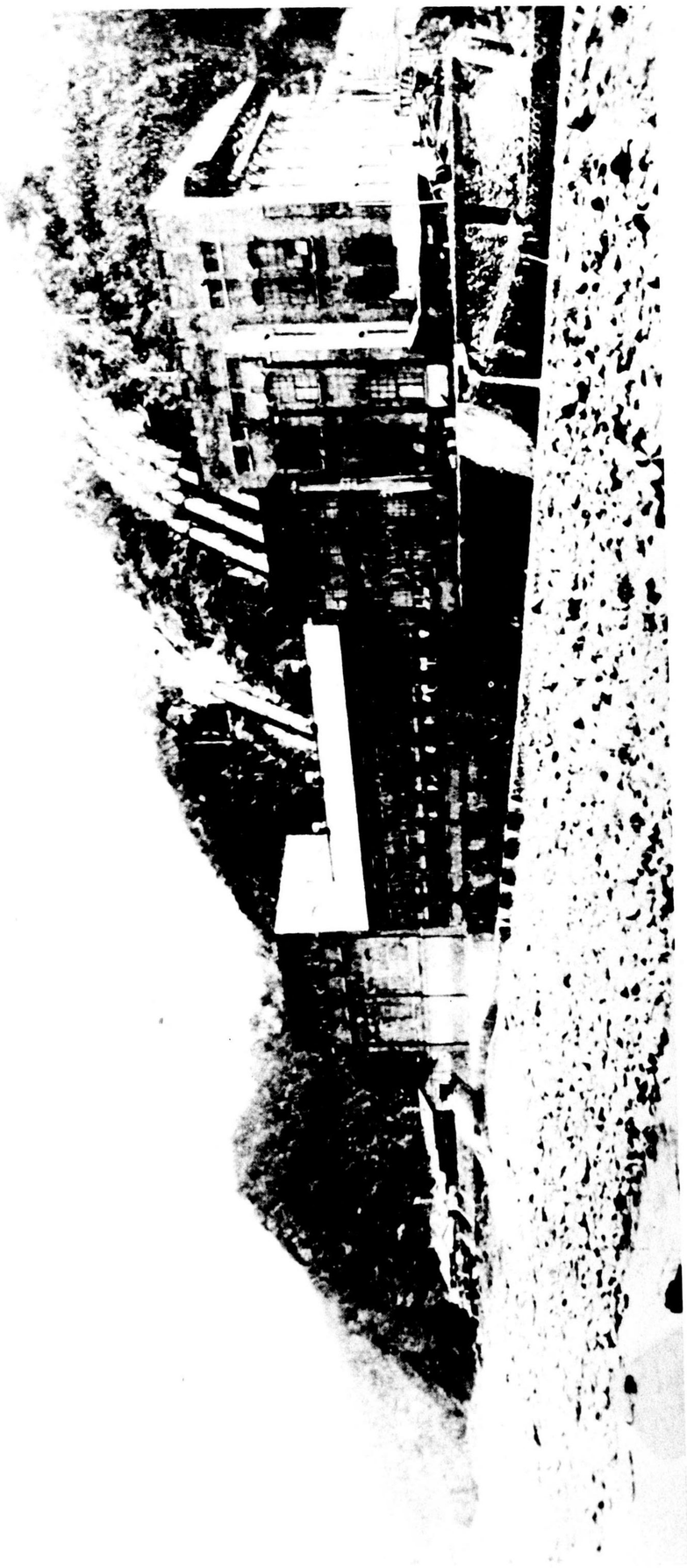


Photograph No. IV-64 Onagohata Hydro Plant
in 1930 before addition of new section

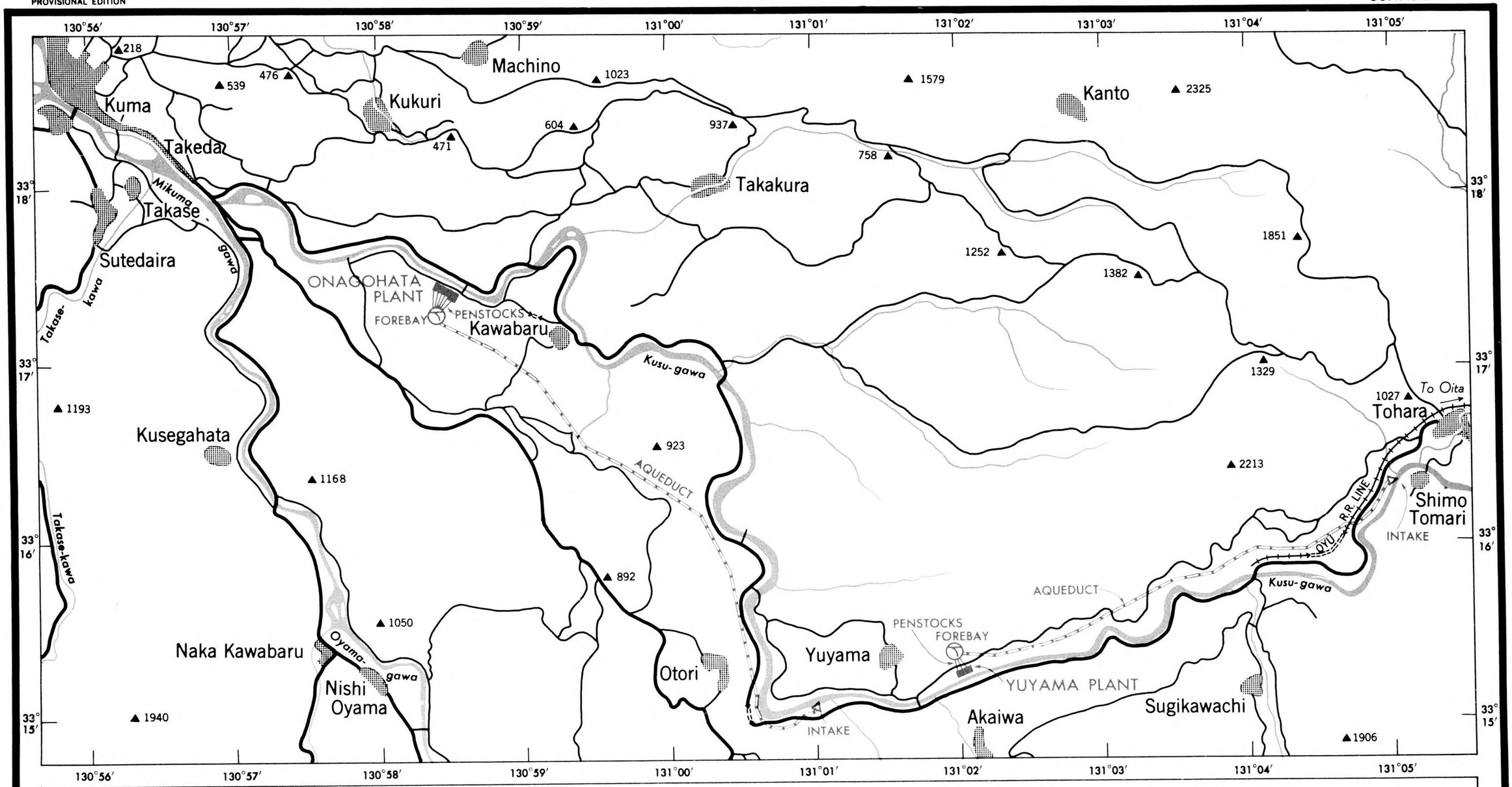
Photograph No. IV-65 Onagohata Hydro Plant
in 1928 before addition of new section



Photograph No. IV-66 Onagohata Hydro Plant in 1937
after completion of new section

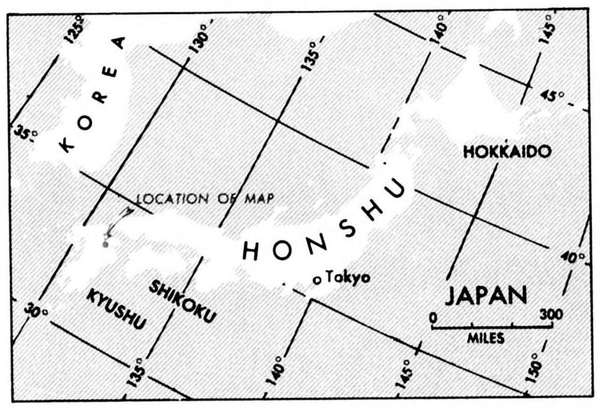


Photograph No. IV-67 Onagohata Hydro Plant after completion of new section



ONAGOHATA AND YUYAMA HYDROELECTRIC PLANTS

OITA-KEN



BASE MAP FROM 1:50,000 SERIES, JAPAN IMPERIAL LAND SURVEY BUREAU, 1934,
W.D.M.C. FILE NO. JAPAN S30-JGS-50, SHEETS 11-1 AND 12-13.

0 1 2 3
MILES

0 1 2 3
KILOMETERS

Reliability Code: 1B--1B--1

- SETTLEMENT CENTER
- RAILROAD
- TUNNEL
- PRINCIPAL HIGHWAY
- SECONDARY ROAD
- ▲ 539 SPOT HEIGHT (IN FEET)

MAP NO. 2846
1 JANUARY 1944

COMPILED AND DRAWN IN THE BRANCH OF RESEARCH AND ANALYSIS, OSS
LITHOGRAPHED IN THE REPRODUCTION BRANCH, OSS

640. ONODA STEAM PLANT

Approx. Lat. 33°59'
Long. 131°11'

Company: Nippon Hassoden KK

Location: Onoda-machi, Asa-gun, Yamaguchi-ken

Installed Capacity (in kw): Est 70,000 (see Date of Construction)

Importance: Rank in Japan - 23 ; rank in Chugoku supply area - 3

Date of Construction: Probably completed in 1943

Details: Plant, equipment -
Boilers - 4 @ 80 ton/hr, Mitsubishi-make
Turbines - 2 @ est 35,000 kw, believed to be Mitsubishi-make
Generators - 2 @ est 35,000 kw, 3-ph, believed to be Mitsubishi-make
Other equipment - B&W coal pulverizers

641. ONODA FACTORY STEAM PLANT

Approx. Lat. 33°59'
Long. 131°11'

Company: Onoda Cement Seizo KK

Location: Onoda-machi, Asa-gun, Yamaguchi-ken

Installed Capacity (in kw): Est 11,500 (see Date of Construction)

Importance: Rank in Japan - 207 ; rank in Chugoku supply area - 18
Serves the Onoda Factory of the Onoda Cement Seizo KK

Date of Construction: Completed in 1913 with No. 1 unit of 800 kw; 4 additional units were installed as follows: No. 2 - 1920 (500 kw), No. 3 - 1923 (1600 kw), No. 4 - 1924 (1600 kw), and No. 5 - 1938 (*7000 kw). Plant in operation Mar 1940

Details: Plant, external features - Of reinforced concrete construction with at least 1 chimney @ 50 m high and 2 @ 30 m high, all of reinforced concrete construction.
Plant, equipment -
Fuel supply - Uses waste gas from cement kilns
Boilers - No. 1 unit - 4 @ 170 m^2, 176.4 lbs/in^2, 300° C
No. 2 unit - 3 @ 232 m^2, 147 lbs/in^2, 245° C
No. 3 unit - 2 @ B&W-type, 574 m^2, 176.4 lbs/in^2, 300° C, B&W-make
No. 4 unit - 1 @ B&W-type, 909 m^2, 176.4 lbs/in^2, 300° C, B&W-make
Turbines - No. 1 unit - 1 @ 1200 hp, Zoelly-type
No. 2 unit - 1 @ 750 hp, Curtis-type
No. 3 and 4 units - 2 @ 2400 hp, Zoelly-type, 6000 rpm
No. 5 unit - 1 @ est 7000 kw
Generators - No. 1 unit - 1 @ 800 kw, 3-ph, 2000 v, 3000 rpm, 50 cyc, SS-make
No. 2 unit - 1 @ 500 kw, 3-ph, 2000 v, 3000 rpm, 50 cyc, GE-make
No. 3 and 4 units - 2 @ 1600 kw, 3-ph, 2000 v, 3000 rpm, 50 cyc, SS-make
No. 5 unit - 1 @ 8750 kva, 3-ph, 2200 v, 3000 rpm, 50 cyc, Shibaura-make
Other equipment - At least 10 superheaters, incl 4 @ 61 m^2, 3 @ 88 m^2, 2 @ 131 m^2, and 1 @ 66 m^2

See: Photograph No. IV-67a

Sources: DnN 1940 part II p.312; ZKT 1939 p.1002; SR 1/39 p.2; Sogyo Gojunen-shi 1931 pp.422-433

642. ONOGAWA HYDRO PLANT Approx. Lat. 37°39'
Long. 140°07'

Company: Tokyo Dento KK

Location: Plant - At the foot of the north slope of Bandai-yama in Terazawayama-aza, Hibara-mura, Yama-gun, Fukushima-ken
Intake - On the east shore of Onogawa-ko in Aokiguchi, Hibara-mura, Yama-gun, Fukushima-ken

Capacity Commonly in Use (in kw): 26,200, as of Sept 1937

Importance: Rank in Japan - 93 ; rank in Tokyo supply area - 35
Plant is used almost entirely in dry season as a supplementary plant

Source of Power: Onogawa-ko and the main course of the Nagase-gawa, both of the Agano-gawa system

Date of Construction: Construction was begun Dec 1935 and completed Dec 1937; in operation Mar 1940

Details: Particular capacities (in kw) - 26,100 installed cap; 4300 reg; 26,200 supp
Layout - Aqueduct-type
Eff head - 60.9 m
Aqueduct - 946 m pressure tunnel
Penstocks - 2
Plant, equipment -
Turbines - 1 @ 16,250 kw, Francis-type, vertical-shaft
1 @ 15,800 kw, Francis-type, vertical-shaft
Generators - 2 @ 14,500 kva, 90% pf, 3-ph, 11,000 v, 250 rpm, 50 cyc
Transformers - 2 @ 14,500 kva, 3-ph
Other equipment - 2 exciters @ 115 kw, 1 sub-exciter @ 4 kw
Tail race - To Akimoto-ko
Area served - Transmits power via the Nagasegawa line to the Inawashiro line

See: Figure No. IV-28

Sources: DnN 1940; Ohm 3/36 p.303, 12/36 inside front cover, 1/38 p.39, 3/38 p.321; DGS Kaimu 1936 p.94; DnGZ 9/37 p.(139); KN 1939 p.198

643. ONOMICHI STEAM PLANT Approx. Lat. 34°24'30"
Long. 133°13'30"

Company: Nippon Hassoden KK; formerly Hiroshima Denki KK

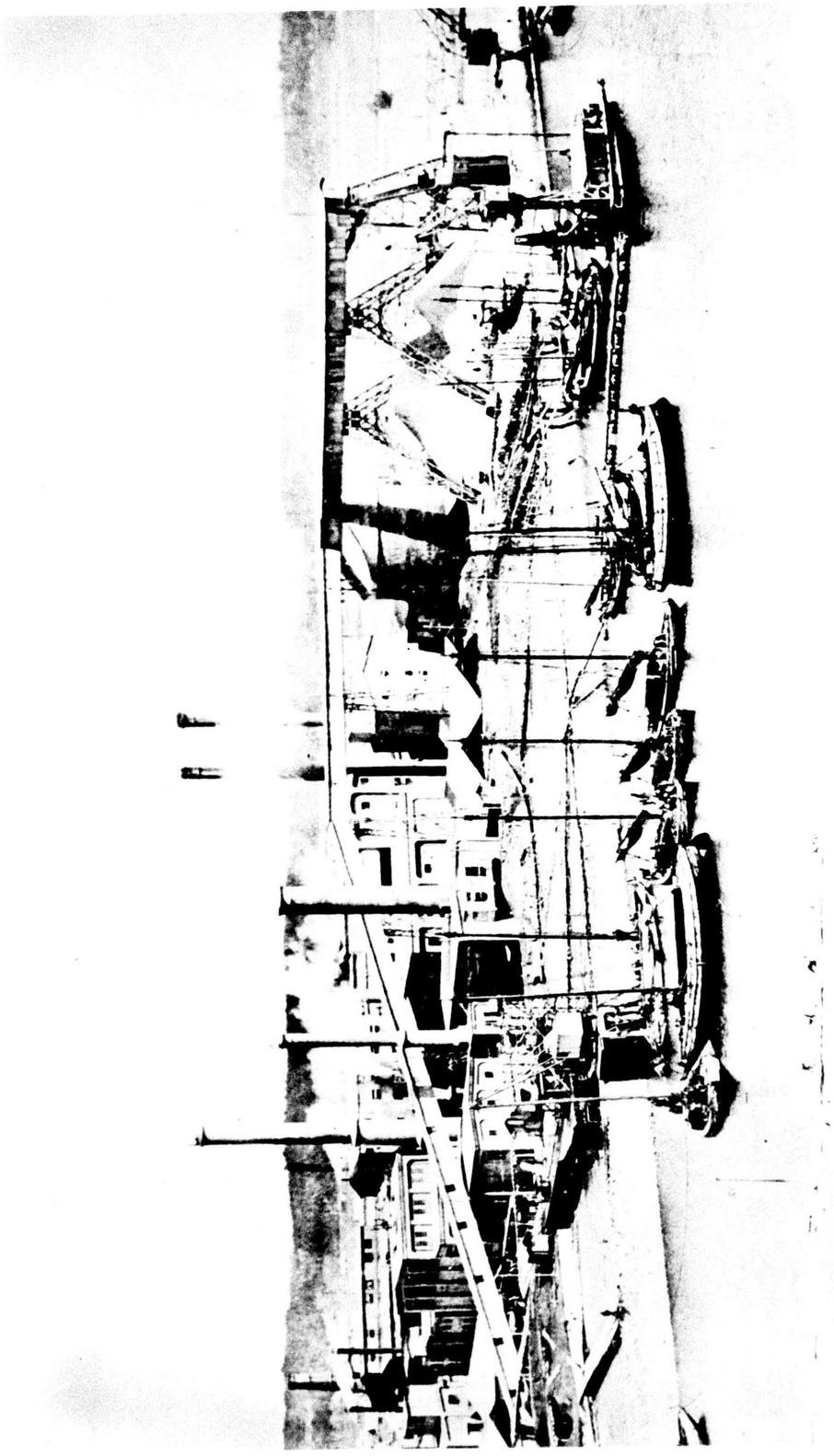
Location: 1 of 1424, Samba-mura, Numakuma-gun, Hiroshima-ken

Installed Capacity (in kw): 10,500, as of Dec 1936

Importance: Rank in Japan - 228 ; rank in Chugoku supply area - 21

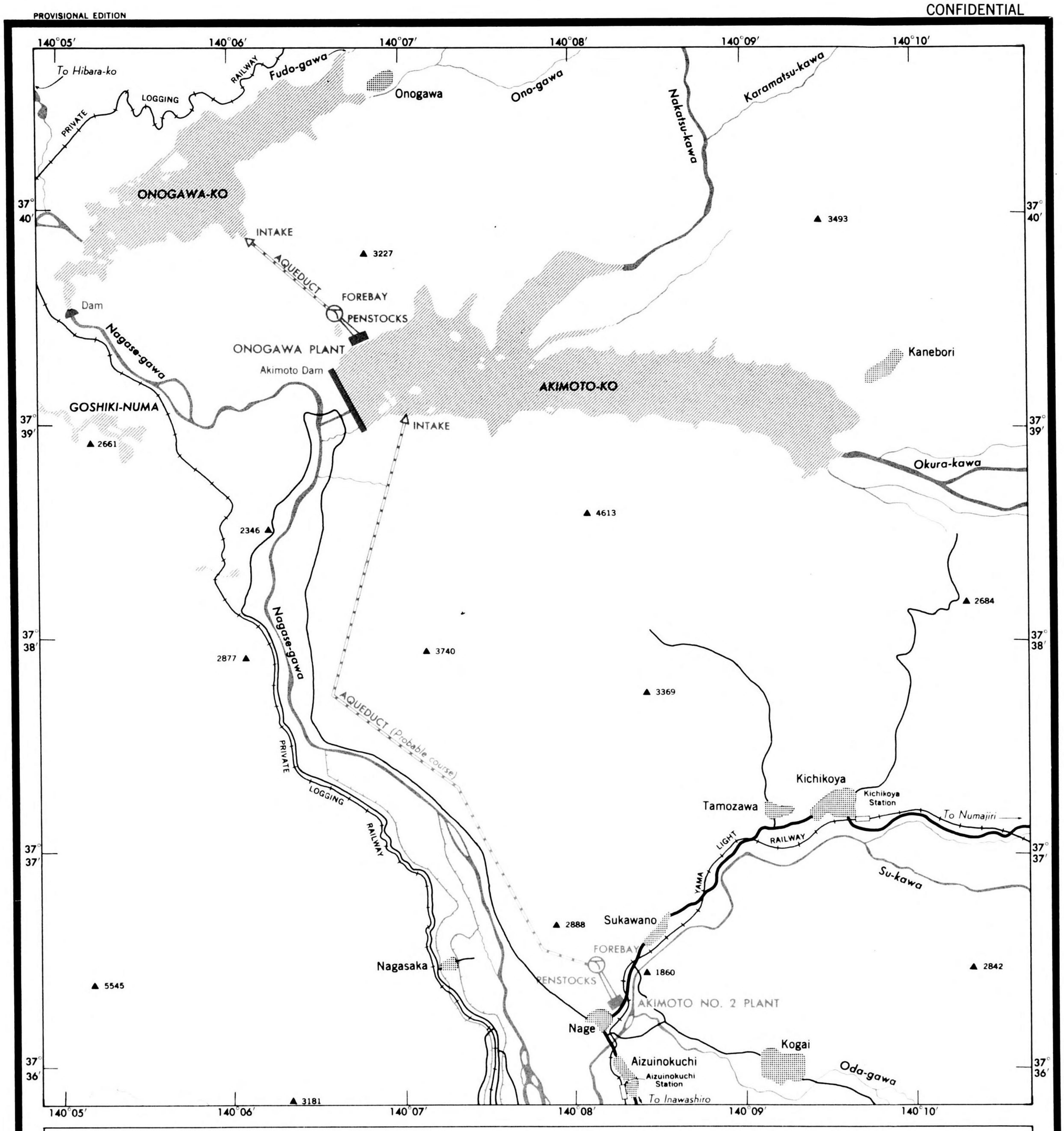
Date of Construction: Completed Apr 1923; in operation Mar 1940

Details: Particular capacities (in kw) - 7600 reg, 2900 supp
Plant, equipment -
Boilers - 3 @ Heine-type, 220 lbs/in^2, 389° C, 6000 ft^2, Heine-make
4 @ Garbe-type, 220 lbs/in^2, 390° C, 2691 ft^2, SB-make
Turbines - 1 @ 5167.7 hp, combined-type, W-make
2 (incl 1 res) @ 5500 hp, combined-type, BBC-make
Generators - 1 @ 4375 kva, 3-ph, 11,000 v, 3600 rpm, 60 cyc, W-make
2 @ 5150 kva, 3-ph, 11,000 v, 3600 rpm, 60 cyc, BBC-make



Photograph No. IV-67a Onoda Factory Steam Plant of the Onoda Cement Seizo KK in 1931

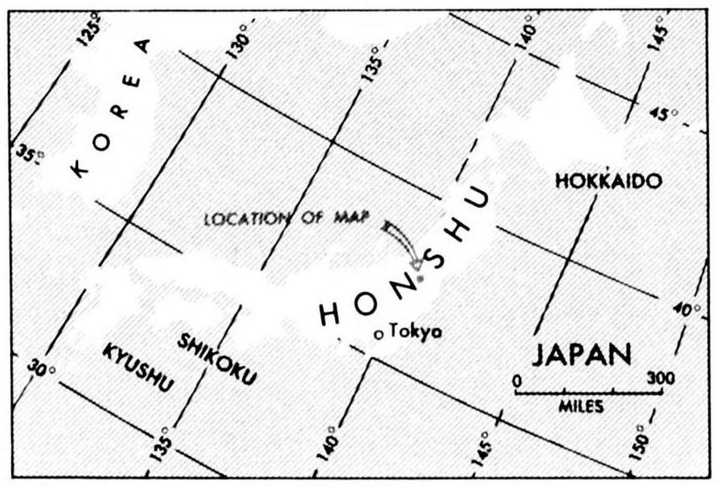
PROVISIONAL EDITION



AKIMOTO NO. 2 AND ONOGAWA HYDROELECTRIC PLANTS

FUKUSHIMA-KEN

BASE MAP FROM 1:50,000 SERIES, JAPAN IMPERIAL LAND SURVEY BUREAU, 1933
W.D.M.C. FILE NO. JAPAN S30-JGS-50, SHEETS 67-14 AND 67-15



SETTLEMENT CENTER
PRINCIPAL HIGHWAY
SECONDARY ROAD
DITCH
▲ 3369 SPOT HEIGHT (IN FEET)

0 1 2
MILES
0 1 2
KILOMETERS

Reliability Code: 1B–1B–2

MAP NO. 2843
18 JANUARY 1944

COMPILED AND DRAWN IN THE BRANCH OF RESEARCH AND ANALYSIS, OSS
LITHOGRAPHED IN THE REPRODUCTION BRANCH, OSS

Photograph No. IV-67b Onomichi Steam Plant (arrow)
OSS R 112585

133°12′ 133°13′ 133°14′

34° 26′ 34° 25′ 34° 24′

To Matsue

To Okayama

Fujii-kawa

ONOMICHI R.R.

Kosan

Mukatoge

Ota

▲11

Sanyo Highway

▲587

Samba-mura

▲10

MATSUNAGA-WAN

Onomichi-shi

▲10

SANYO MAIN R.R. LINE

ONOMICHI PLANT

Sangenya

Onomichi-ko

Miishi

▲13

Onomichi Station

Kaneyoshi

Uta

To-Saki

Oka-jima

To Itosaki-ko

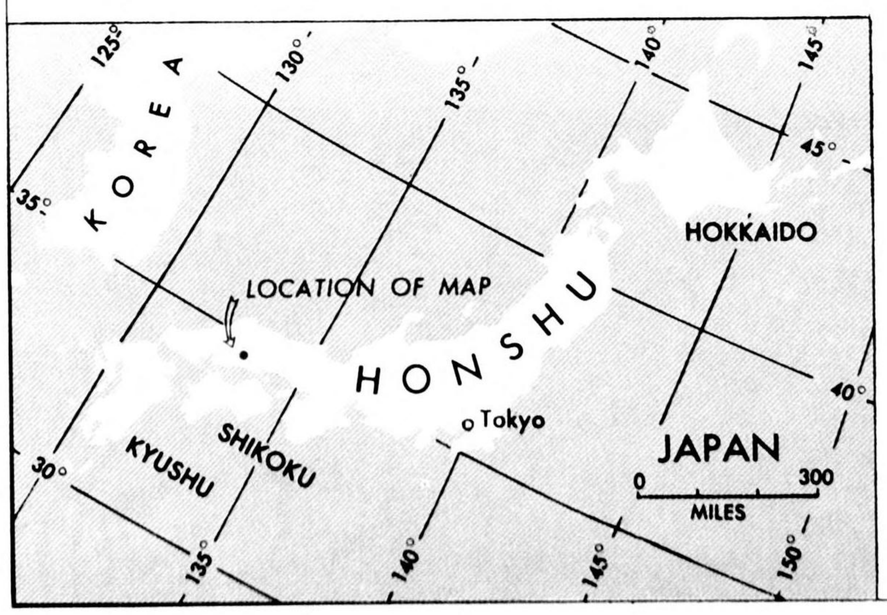
Furueoku

Furuehama

Morikane

ONOMICHI STEAM ELECTRIC PLANT

HIROSHIMA-KEN



BASE MAP FROM 1:50,000 SERIES, JAPAN IMPERIAL LAND SURVEY BUREAU, 1933
W.D.M.C. FILE NO. JAPAN S30-JGS-50, SHEET 25-14

- SETTLEMENT CENTER
- RAILROAD
- TRAMWAY
- TRAMWAY STATION
- PRINCIPAL HIGHWAY
- SECONDARY ROAD
- CANAL
- ▲587 SPOT HEIGHT (IN FEET)

0 ½ 1 MILES

0 ½ 1 KILOMETERS

Reliability Code 1B-1B-1

NO. 2918
4 MARCH 1944

COMPILED AND DRAWN IN THE BRANCH OF RESEARCH AND ANALYSIS, OSS
LITHOGRAPHED IN THE REPRODUCTION BRANCH, OSS

Transformers - 4 (incl 1 res) @ 2500 kva, 1-ph, 11/31.8,31,30, 29,22 kv, D-Y conn, self-cooled, 60 cyc, shell-type, Hitachi-make
4 (incl 1 res) @ 1500 kva, 1-ph, 11,10/22,21 kv, D-D conn, self-cooled, 60 cyc, shell-type, Shibaura-make
Other equipment - 1 surface condenser and 2 BBC condensers; 1 exciter @ 50 kw and 2 exciters @ 28.8 kw; 1 open-type feedwater heater; 7 superheaters; 3 Green chain-grate stokers and 4 underfeed chain-grate stokers; 2 economizers
Area served - Onomichi and Fukuyama districts

See: Photograph No. IV-67b
Figure No. IV-29
Sources: DnN 1940; Ohm 6/31 supp p.7, 12/32 p.667; ZKT 1939 p.1649; Ohm-sha Guide 1933 p.50; DnK; DJY 1927; DJY 1929 p.359

644. ONUMA NO. 1 HYDRO PLANT Approx. Lat. 42°02'
Long. 140°46'30"

Company: Teikoku Denryoku KK; formerly Hakodate Suiden KK

Location: Plant - Ogawa-oaza, Shikabe-mura, Kayabe-gun, Hokkaido

Capacity Commonly in Use (in kw): 2000, as of Aug 1931

Importance: Rank in Japan - 250 + ; rank in Hokkaido supply area - 15 +

Source of Power: Onuma-ko, Nishimasu-kawa, and Daishichi-gawa

Date of Construction: Founded Aug 1909; in operation Mar 1940

Details: Particular capacities (in kw)-2000 reg; 3000 reg pk; 3782 inst cap
Eff head - 220 ft
Plant, equipment -
Turbines - 3 (incl 1 res) @ 800 hp, Francis-type, horizontal-shaft, Dengyosha-make
1 @ 2600 hp, Hitachi-make
1 (res) @ 800 hp, Dengyosha-make
Generators - 3 (incl 1 res) @ 630 kva, 3-ph, 2300 v, 450 rpm, 60 cyc, GE-make
1 @ 2150 kva, 3-ph, 2300 v, 720 rpm, 60 cyc, Hitachi-make
1 (res) @ 687 kva, 3-ph, 2300 v, 720 rpm, 60 cyc, GE-make
Transformers - 4 (incl 1 res) @ 834 kva, 1-ph, 2.3/22 kv, D-D conn, water-cooled, 60 cyc, core-type, GE-make
1 @ 938 kva, 3-ph, 2.3/22 kv, D-D conn, water-cooled, 60 cyc, shell-type, GE-make
4 (incl 1 res) @ 400 kva, 1-ph, 2.3/22 kv, D-D conn, self-cooled, 60 cyc, shell-type, W-make

Sources: DnN 1940; DnK; ZKT 1939 p.1652; DJY 1927; DJY 1929 p.404; Ohm 11/31 p.570, 10/33 opp p.561; TD Map

645. ORAKUMAE HYDRO PLANT — Approx. Lat. 40°21' Long. 140°51'

Company: Osaka Kozan Denki KK

Location: Plant - Orakumae-oaza, Oyu-machi, Katsuno-gun, Akita-ken

Capacity Commonly in Use (in kw): 1300, as of May 1928

Importance: Rank in Japan - 250 + ; rank in Tohoku supply area - 20 +
Supplies Osaka Mine

Source of Power: Oyu-kawa of the Noshiro-gawa system

Date of Construction: Completed 1928; plant was damaged by flood in Aug 1935, and may no longer be in operation

Details: Eff head - 42.5 m

Sources: Ohm 5/28 p.256, 10/35 p.937

646. ORO HYDRO PLANT — Approx. Lat. 35°17' Long. 134°18'

Company: Nippon Denryoku KK; formerly Sanyo Suiryoku Denki KK

Location: Plant - 658, Oro-oaza, Chizu-machi, Yazu-gun, Tottori-ken

Capacity Commonly in Use (in kw): 2870, as of Dec 1936

Importance: Rank in Japan - 250 + ; rank in Chugoku supply area - 25 +

Source of Power: Kitamata-kawa of the Chiyo-gawa system

Date of Construction: Founded Apr 1923; in operation Mar 1940

Details: Particular capacities (in kw) - *2560 installed cap; 1190 reg; 1680 spec
Eff head - 760 ft
Plant, equipment -
Turbines - 2 @ 2400 hp, Pelton-type, Hitachi-make
Generators - 2 @ 1600 kva, 3-ph, 11,000 v, 514 rpm, 60 cyc, Hitachi-make

Sources: DnN 1940; ZKT 1939 p.1649; DJY 1927; DJY 1929 p.360; TD Map

ORYU NO. 1 HYDRO PLANT - See TOKIWA HYDRO PLANT

647. OSAEYAMA HYDRO PLANT

Approx. Lat. 35°25'
Long. 137°30'

Company: Yahagi Suiryoku KK

Location: Plant - 240, Miume-aza, Osaeyama-oaza, Inahashi-mura, Kita Shitara-gun, Aichi-ken

Capacity Commonly in Use (in kw): 3200, as of Dec 1936

Importance: Rank in Japan - 250 + ; rank in Osaka-Nagoya supply area-100+

Source of Power: Neo-kawa of the Yahagi-gawa system

Date of Construction: Founded Aug 1922; in operation Mar 1940

Details: Particular capacities (in kw) - *3600 installed cap; 1700 reg; 1500 spec
Eff head - 402 ft
Plant, equipment -
Turbines - 1 @ 5500 hp, Francis-type, horizontal-shaft, Dengyosha-make
Generators - 1 @ 4500 kva, 3-ph, 6600 v, 600 rpm, 60 cyc, Shibaura-make
Transformers - 3 @ 1350 kva, 1-ph, 6.6/77,73 kv, D-D conn, water-cooled, 60 cyc, shell-type, Hitachi-make

Sources: DnN 1940; ZKT 1939 p.1644; DnK; DJY 1927; DJY 1929 p.322; TD Map

648. OSAKA HYDRO PLANT

Approx. Lat. 35°57'
Long. 137°16'

Company: Kansai Denryoku KK

Location: Plant - Osaka-machi, Masuda-gun, Gifu-ken

Capacity Commonly in Use (in kw): *18,000, as of Dec 1936

Importance: Rank in Japan - 133 ; rank in Osaka-Nagoya supply area - 58

Source of Power: Masuda-gawa of the Kiso-gawa system

Date of Construction: Completed Nov 1930; in operation Dec 1936

Details: Particular capacities (in kw) - *16,000 installed cap
Eff head - 130 m; flow - 16.659 m^3/sec
Dam - 10 m high
Settling basin - 90.6 m long, 24.8 to 4.25 m wide
Plant, equipment -
Turbines - 2 @ 14,000 hp, reaction-type, vertical-shaft, Dengyosha-make
Generators - 2 @ 10,000 kva, 3-ph, 11,000 v, 450 rpm, 60 cyc, Westinghouse-make
Transformers - 4 @ 6666 kva, 1-ph, 11/89,84.8,80.8,76.8 kv, D-Y conn, water-cooled, core-type, Shibaura-make
Other equipment - 2 exciters @ 50 kw

See: Photograph No. IV-68
Figures No. IV-4a, IV-30

Sources: DnK; TD Map; Ohm-sha Guide 1933 p.15; HSG pp.223,289,318,324

OSAKA STEAM PLANTS

NO. 1 PLANT - See KUJO NO. 1 STEAM PLANT

NO. 2 PLANT - See KUJO NO. 2 STEAM PLANT

NO. 3 PLANT - See AJIKAWA STEAM PLANT

OSAKA FACTORY STEAM PLANT (ASANO CEMENT KK) - See TSUMORI FACTORY STEAM PLANT

649. OSAKA FACTORY STEAM PLANT — Approx. Lat. 34°43' Long. 135°32

Company: Kanegafuchi Boseki KK

Location: Probably at 300, Shigino-cho, Asahi-ku, Osaka-shi, Osaka-fu

Installed Capacity (in kw): 3,000, as of Dec 1928

Importance: Rank in Japan - 250 + ; rank in Osaka-Nagoya sypply area-100+
Supplies Osaka Factory of the Kanegafuchi Boseki KK

Date of Construction: Unknown; in operation Dec 1928

Sources: TD Map; Jinsen Nenkan 1941 p.A168

650. OSAKA FACTORY STEAM PLANT — Approx. Lat. 34°37' Long. 135°29'

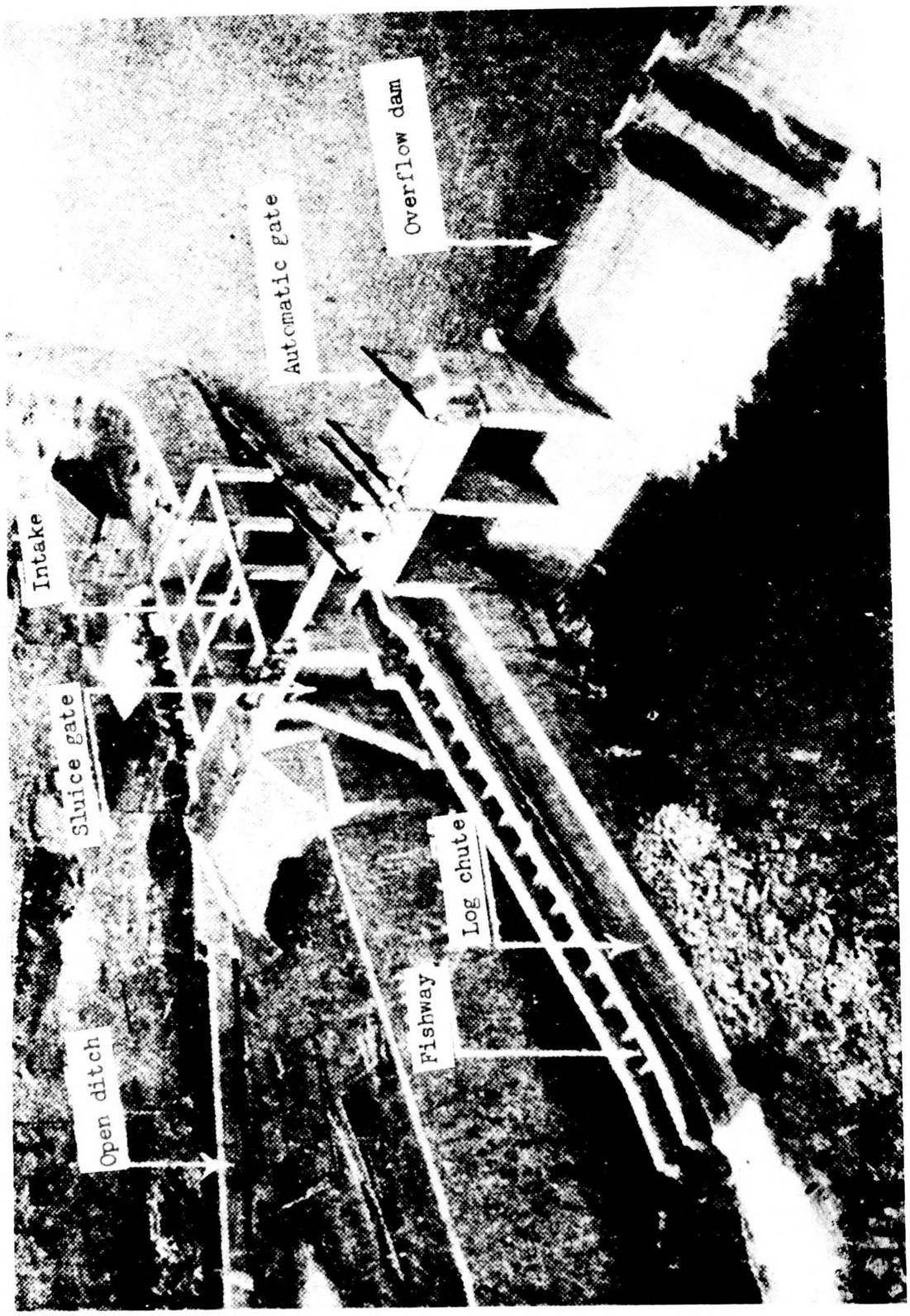
Company: Osaka Yogyo Cement KK

Location: 2 of 1-chome, Minami Ongajima-cho, Taisho-ku, Osaka-shi, Osaka-fu

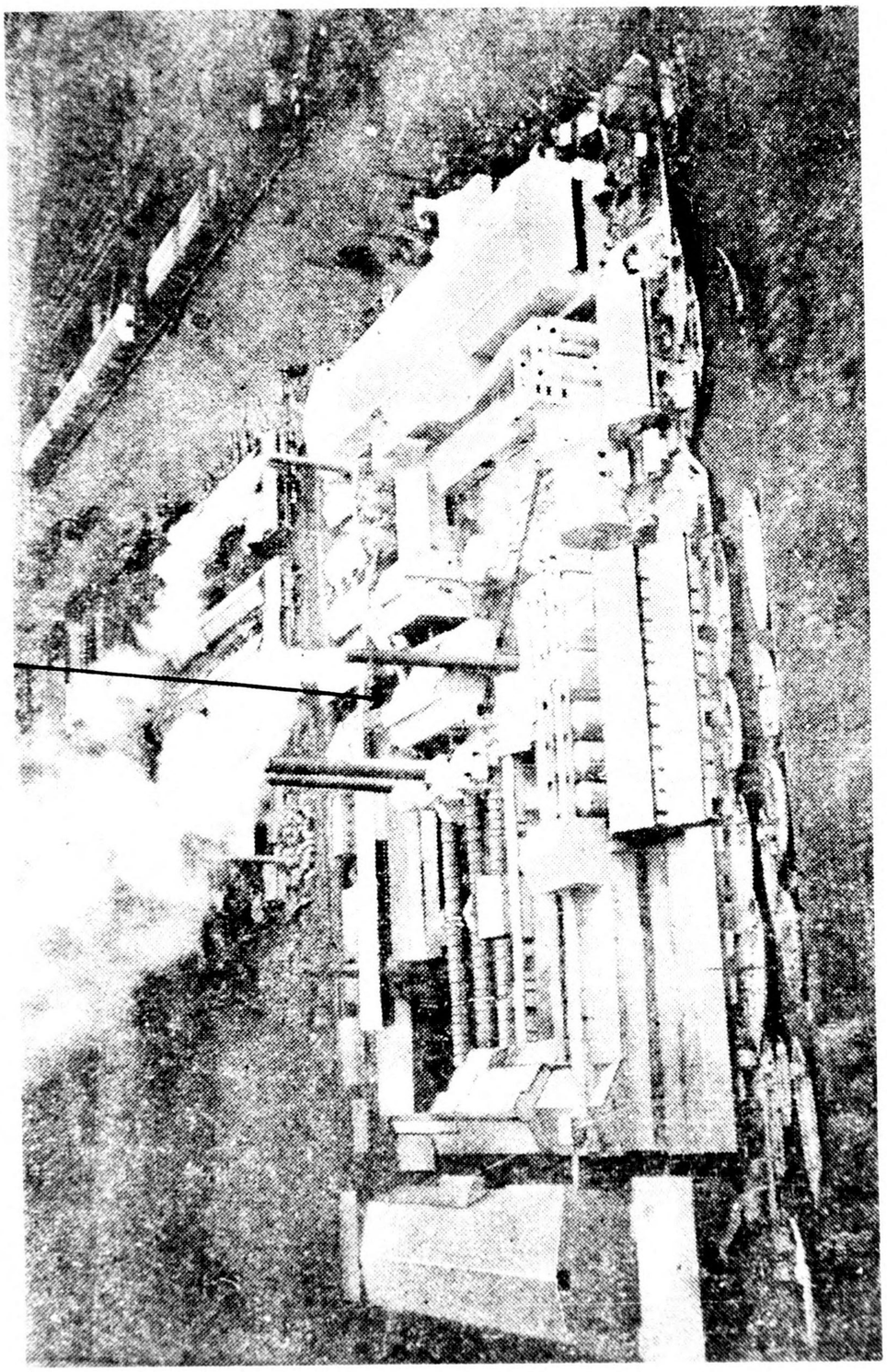
Installed Capacity (in kw): Est 15,000, as of 1935

Importance: Rank in Japan - 153 ; rank in Osaka-Nagoya supply area- 68
Supplies Osaka Factory of Osaka Yogyo Cement KK

Date of Construction: Completed in 1928; two later extensions brought plant capacity to estimated 15,000 kw in 1935



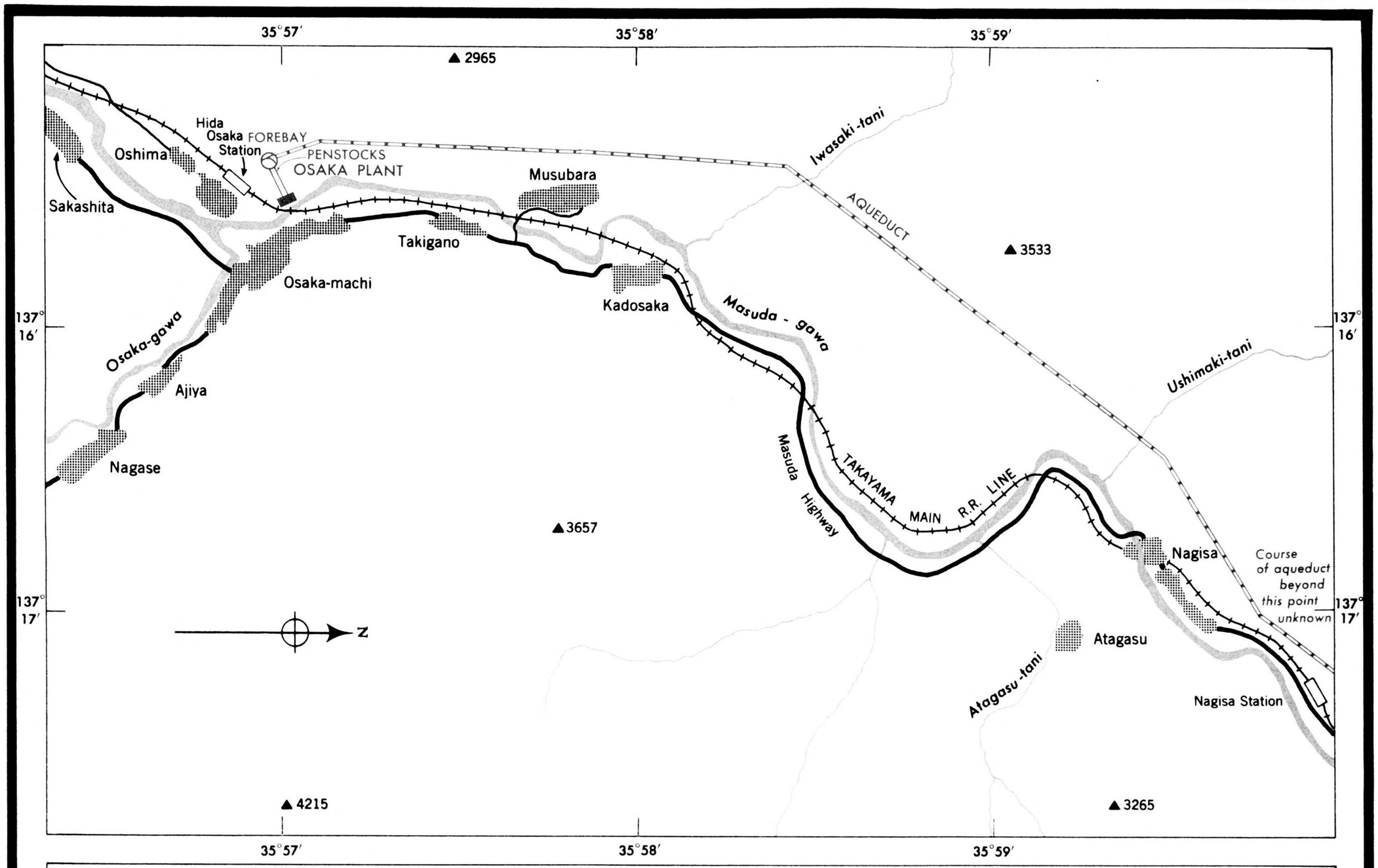
Photograph No. IV-68 Osaka Hydro Plant dam



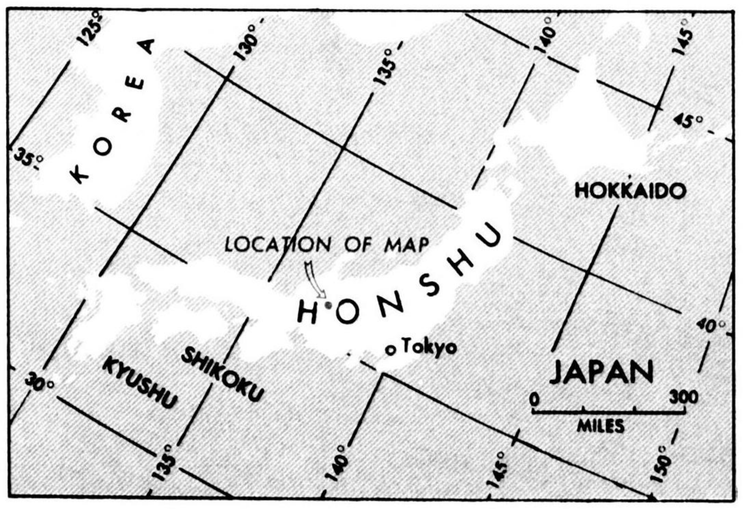
Photograph No. IV-68a Osaka Factory Steam Plant (arrow) of the Osaka Yogyo Cement KK in 1929.

PROVISIONAL EDITION

Figure IV-30
CONFIDENTIAL



OSAKA HYDROELECTRIC PLANT
GIFU-KEN



BASE MAP FROM 1:50,000 SERIES, JAPAN IMPERIAL LAND SURVEY BUREAU, 1935
W.D.M.C. FILE NO. JAPAN S30-JGS-50, SHEET 47-11

SETTLEMENT CENTER — RAILROAD

PRINCIPAL HIGHWAY — SECONDARY ROAD

4215 ▲ SPOT HEIGHT (IN FEET)

0 ½ 1
MILES

0 ½ 1
KILOMETERS

Reliability Code: 1B-1B-1

NO. 3012
4 MARCH 1944

COMPILED AND DRAWN IN THE BRANCH OF RESEARCH AND ANALYSIS, OSS
LITHOGRAPHED IN THE REPRODUCTION BRANCH, OSS

Details: Plant, external features - Building adjacent to cement plant which has 9 concrete chimneys @ about 200 ft high, 9 low kilns with one-story building and adjacent chimney at one end of each kiln
Plant, equipment -
Fuel supply - Uses waste gas from cement kilns
Boilers - 9 @ B&W-type, 15 ton/hr, 9000 ft^2, 250 lbs/in^2, 650° F, B&W-make
Turbines - 1 @ 5000-7000 kw, Ljungstrom-type, STAL-make
2 @ 5000-7000 kw, Ljungstrom-type, Mitsubishi-make
Generators - 1 @ 5000-7000 kw, 3-ph
2 @ 5000-7000 kw, 3-ph

See: Photograph No. IV-68a

Sources: Directory of Japanese Portland Cement Manufacturers 1929 p.71

651. OSEGAWA NO. 1 HYDRO PLANT — Approx. Lat. 34°14' Long. 132°08'

Company: Yamaguchi-ken

Location: Plant - Ikada-aza, Kishine-oaza, Sakaue-mura, Kuga-gun, Yamaguchi-ken

Capacity Commonly in Use (in kw): 2700, as of Dec 1936

Importance: Rank in Japan - 250 + ; rank in Chugoku supply area - 25 +

Source of Power: Ose-gawa

Date of Construction: Founded Apr 1924; in operation Mar 1940

Details: Particular capacities (in kw) - *2700 installed cap; 1650 reg; 1050 spec
Eff head - 225.7 ft
Plant, equipment -
Turbines - 3 @ 1300 hp, Francis-type, Dengyosha-make
Generators - 3 @ 1125 kva, 3-ph, 3300 v, 900 rpm, 60 cyc, Meidensha-make
Transformers - 10 (incl 1 res) @ 375 kva, 1-ph, 3.3/22 kv, D-D conn, water-cooled, 60 cyc, core-type, Meidensha-make

Sources: DnN 1940; ZKT 1939 p.1911; DnK; DJY 1927; DJY 1929 p.364; TD Map

652. OSEGAWA NO. 2 HYDRO PLANT — Approx. Lat. 34°13' Long. 132°11'

Company: Yamaguchi-ken

Location: Plant - 1 of 644, Fukase-aza, Ose-mura, Kuga-gun, Yamaguchi-ken

Capacity Commonly in Use (in kw): 2840, as of Oct 1938

Importance: Rank in Japan - 250 + ; rank in Chugoku supply area - 25 +

Source of Power: Ose-gawa

Date of Construction: Construction was begun July 1935 and completed Oct 1938; in operation Mar 1940

Details: Particular capacities (in kw) - 900 reg; 1940 spec .
Layout - Aqueduct-type
Eff head - 31.8 m
Plant, equipment -
Turbines - 2 @ 1750 kw, Francis-type, vertical-shaft, Hitachi-make
Generators - 2 @ unknown cap, 3-ph, 360 rpm, 60 cyc

Sources: DnN 1940; HH 1/39 p.4; KN 1939 p.166; Ohm 10/35 p.1034, 1/39 p.119; DnGZ 9/37 p.(139); DGS 4/37 p.111

653. OSHIKA HYDRO PLANT

Company: Chuo Denki KK

Location: Plant - In Niigata-ken; exact location unknown

Capacity Commonly in Use (in kw): 2020, as of Aug 1934

Importance: Rank in Japan - 250 + ; rank in Tokyo supply area - 100 +

Source of Power: Unknown

Date of Construction: Unknown; in operation Aug 1934

Details: Eff head - 820 ft

Sources: SR 8/34 p.272

654. OSHIROGAWA HYDRO PLANT Approx. Lat. 36°09'
Long. 137°40'

Company: Keihin Denryoku KK

Location: Plant - Azumi-mura, Minami Azumi-gun, Nagano-ken

Capacity Commonly in Use (in kw): 2950, as of Dec 1936

Importance: Rank in Japan - 250 + ; rank in Tokyo supply area - 100 +

Source of Power: Oshiro-gawa

Date of Construction: In operation as early as June 1928 and as recently as Mar 1940

Details: Particular capacities (in kw) - 900 reg; 2050 spec
This plant operates on 50 cyc

Sources: DnN 1940; DnK; DJY 1929 p.295

OSHITA HYDRO PLANT - See YONAI HYDRO PLANT

OTAIRA HYDRO PLANT - See ODAIRA HYDRO PLANT

OTAKAWA HYDRO PLANT - See MANODAIRA HYDRO PLANT

655. OTAKE STEAM PLANT

Approx. Lat. 35°06'
Long. 138°58'

Company: Tetsudo-sho

Location: At the entrance to the Tanna railroad tunnel in Kannami-mura, Tagata-gun, Shizuoka-ken

Installed Capacity (in kw): *2400, as of Nov 1933

Importance: Rank in Japan - 250+ ; rank in Tokyo supply area - 100 +
This plant was built as a source of extra electric power in the building of the Tanna railroad tunnel.

Date of Construction: Unknown; in operation Nov 1933

Details: Plant, external features - Of concrete construction, 3 stories high, with peaked roof, 1 chimney
Plant, equipment -
Turbines - 1 @ 4000 hp
Generators - 1 @ 3000 kva, 3-ph

See: Photograph No. IV-69

Sources: Ohm 11/33 p.611

OTAKI HYDRO PLANT - See TOKIWA HYDRO PLANT

656. OTANI NO. 1 HYDRO PLANT

Approx. Lat. 36°54'
Long. 138°13'

Company: Chuo Denki KK

Location: Plant - On the left bank of the Seki-kawa in Otani-oaza, Sekiyama-mura, Naka Kubiki-gun, Niigata-ken

Capacity Commonly in Use (in kw): 6500, as of Dec 1936

Importance: Rank in Japan - 250 +; rank in Tokyo supply area - 100; rank in Tohoku supply area - 18

Source of Power: Seki-kawa of the Ara-kawa system

Date of Construction: Completed June 1920; in operation Mar 1940

Details: Particular capacities (in kw) - *8400 installed cap; 6000 reg; 500 spec
Layout - Aqueduct-type
Eff head - 106.05 m; flow - 8.347 m^3/sec
Penstocks - 3
Plant, equipment -
Turbines - 2 @ 3500 hp, Francis-type, horizontal-shaft, Dengyosha-make
1 (res) @ 3600 hp, Francis-type, horizontal-shaft, Dengyosha-make
Generators - 2 @ 3250 kva, 3-ph, 3450 v, 500/600 rpm, 50/60 cyc, Shibaura-make
1 (res) @ 4000 kva, 3-ph, 3450 v, 500/600 rpm, 50/60 cyc, Meidensha-make
Transformers - 3 @ 3000 kva, 1-ph, 3.45/42.2,44.5,46.8/73,77, 81 kv, D-Y conn, water-cooled, shell-type, Shibaura-make
Other equipment - 2 exciters @ 30 kw and 1 exciter @ 35 kw
Area served - Tokyo district and sometimes the Takada district

See: Photograph No. IV-70
Map of Seki-kawa system, Volume V

Sources: DnN 1940; HSG p.10; DJY 1927; DJY 1929 pp.282,386; DnK; SR 8/34 p.272; Ohm 5/28 pp.255,265, 6/31 supp p.6, 12/32 p.667; Ohm-sha Guide 1933 p.28; TD Map

657. OTANI NO. 2 HYDRO PLANT

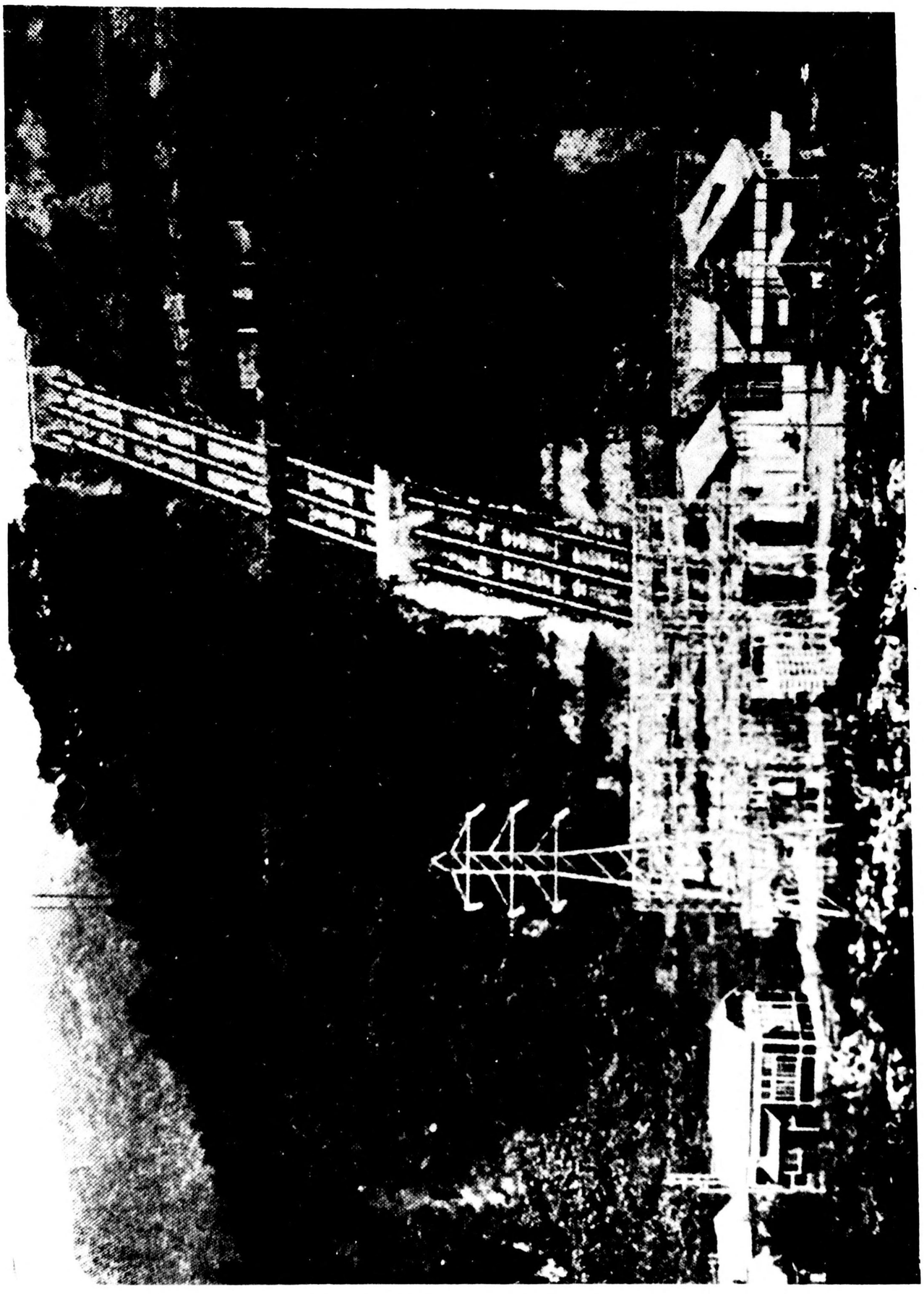
Approx. Lat. 36°54'
Long. 138°13'

Company: Chuo Denki KK

Location: Plant - On the left bank of the Seki-kawa in Shimo Nakahara-aza, Otani-oaza, Sekiyama-mura, Naka Kubiki-gun, Niigata-ken
Dams - 1 (Seki-kawa) - Nishikido-aza, Sekikawa-oaza, Nakayama-mura, Naka Kubiki-gun, Niigata-ken
2 (Ikejiri-kawa) - Akagawa-aza, Nojiri-oaza, Shinanojiri-mura, Kami Minochi-gun, Nagano-ken

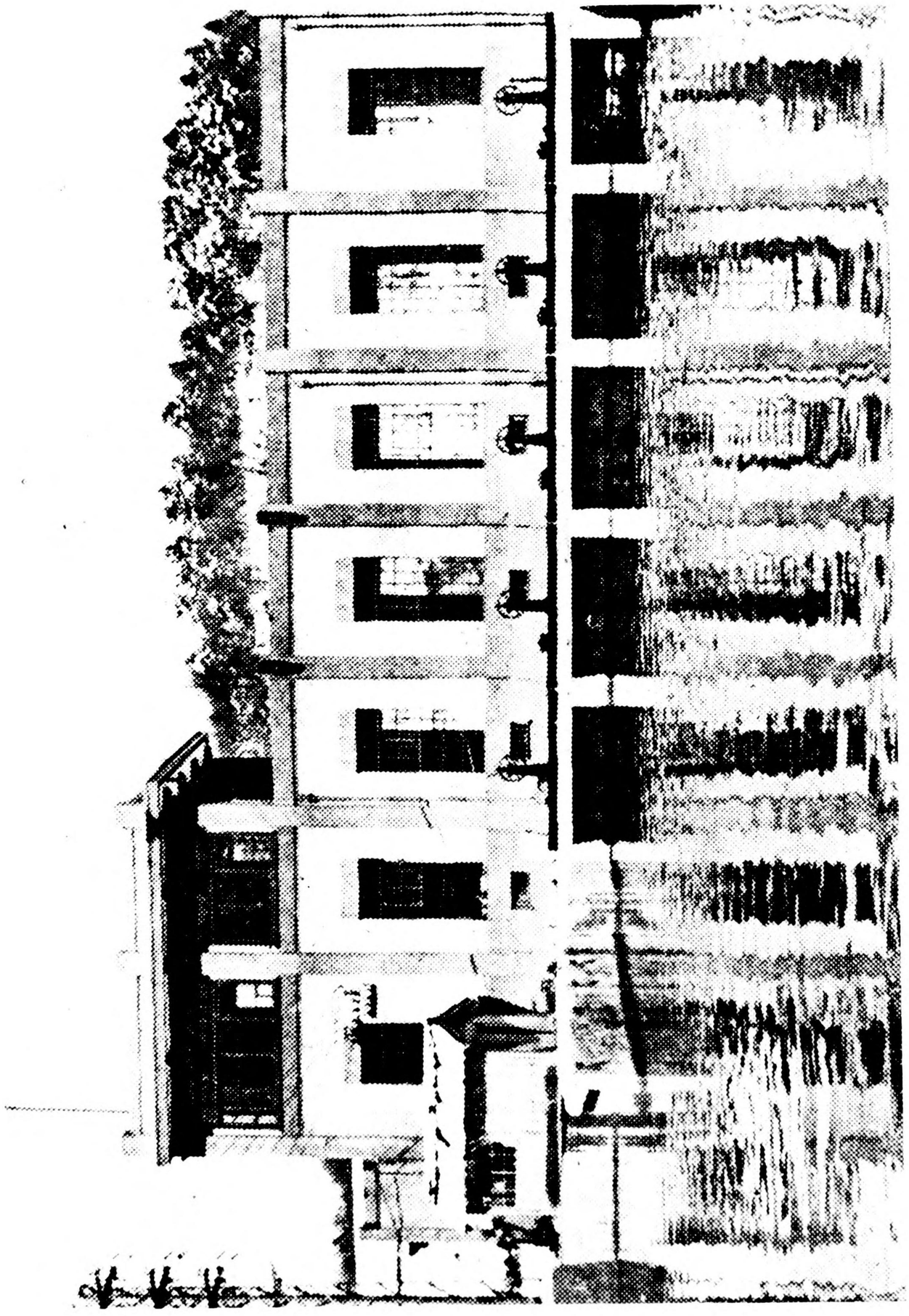
Capacity Commonly in Use (in kw): 7530, as of 1937

Photograph No. IV-69 Otake Steam Plant in 1933



Photograph No. IV-70 Otani No. 1 Hydro Plant in 1928

Photograph No. IV-71 Otani No. 2 Hydro Plant in 1937



Photograph No. IV-72 Nojiri-ko pumping station
for the Otani No. 2 Hydro Plant

Importance: Rank in Japan - 250 + ; rank in Tokyo supply area - 92 ; rank in Tohoku supply area - 16

Source of Power: Seki-kawa and Ikejiri-kawa of the Ara-kawa system and Nojiri-ko

Date of Construction: Construction was begun Dec 1935 and completed Feb 1937; in operation Mar 1940

Details: Particular capacities (in kw) - 7530 spec; *9600 inst cap
Layout - Aqueduct-type. A pumping station is used to get water from Nojiri-ko in dry season while in wet season, water is used from Seki-kawa and Ikejiri-kawa
Eff head - 230.7 m; flow - 4.17 m^3/sec
Penstocks - 2
Plant, external features - Of concrete construction, 2 stories high
Plant, equipment -
Turbines - 2 @ unknown cap, horizontal-shaft, Dengyosha-make
Generators - 2 @ 6000/5000 kva, 3-ph, 6600/5500 v, 300/250 rpm, 50/60 cyc, Shibaura-make

See: Photographs No. IV-71, IV-72
Map of Seki-kawa system, Volume V

Sources: DnN 1940; DGS 7/37 p.725; SR 1/37 p.4; Ohm 3/36 p.303, 5/37 p.612

658. OTANIGAWA HYDRO PLANT

Approx. Lat. 36°16'
Long. 136°41'

Company: Otanigawa Denryoku KK; formerly Deguchi Dehoka Nimmei

Location: Plant - 5 of 6, Chugu-oaza, Yoshinotani-mura, Ishikawa-gun, Ishikawa-ken
Dam - Chugu-oaza, Yoshinotani-mura, Ishikawa-gun, Ishikawa-ken

Capacity Commonly in Use (in kw): 3000, as of Dec 1936

Importance: Rank in Japan - 250 + ; rank in Osaka-Nagoya supply area-100+

Source of Power: Otani-gawa, a branch of the Ozoe-kawa of the Tetori-gawa system

Date of Construction: Construction was begun June 1934 and completed July 1935

Details: Particular capacities (in kw) - 880 reg; 2120 spec; 3200 installed cap
Layout - Aqueduct-type
Dam - 13.6 m high, 31.67 m long at top, 2.12 m wide at top, gravity-type, of concrete construction with rock base, with 4 iron gates @ 1.818 m wide and 2.24 m high, powered by 2 motors @ 20 hp
Intake - 10 m long, 5 m wide, of concrete construction with wooden gates

Settling basin - 99 m from intake, 43 m long, 3 m wide, with overflow dam and silt gate
Aqueduct - 2819 m long, incl 8.2 m covered ditch and 2810.8 m tunnel, of concrete construction
Forebay - 87 m long, 11.24 m wide at widest point, 5.55 m deep
Penstocks - 1 @ 60.7 m long
Excess water spillway - Of concrete construction
Plant, equipment -
Turbines - 2 @ 1790 kw, Pelton-type, horizontal-shaft, Hitachi-make
Generators - 2 @ 2000 kva, 80% pf, 3-ph, 600 rpm, 60 cyc

Sources: DGS 3/36 p.341; DnN 1940; Ohm 10/35 pp.626,1034; DnGZ 5/36 p.(417); DnK

659. OTATSU HYDRO PLANT — Approx. Lat. 33°11' Long. 131°27'

Company: Kyushu Suiryoku Denki KK

Location: Plant - Otatsu-oaza, Higashi Shonai-mura, Oita-gun, Oita-ken

Capacity Commonly in Use (in kw): 2000, as of Dec 1936

Importance: Rank in Japan - 250 + ; rank in Kyushu supply area - 50 +

Source of Power: Asono-gawa of the Oita-gawa system

Date of Construction: Founded Sept 1917; in operation Mar 1940

Details: Particular capacities (in kw) - 2000 reg; *2400 inst cap
Eff head - 105 ft
Plant, equipment -
Turbines - 1 @ 3600 hp, Francis-type, Dengyosha-make
Generators - 1 @ 2400 kw, 3-ph, 6600 v, 375/400 rpm, 50/60 cyc, Shibaura-make
Transformers - 4 (incl 1 res) @ 1000 kva, 1-ph, 6.6/66,53 kv, D-D conn, water-cooled, 60 cyc, shell-type, Shibaura-make

Sources: DnN 1940; ZKT 1939 p.1651; DJY 1927; DJY 1929 p.376; TD Map

OTE or OTEMACHI STEAM PLANT - See SENDENCHO STEAM PLANT

OTO HYDRO PLANT - See OKAWA HYDRO PLANT

660. OTOSHI NO. 1 HYDRO PLANT

Approx. Lat. 37°04'
Long. 140°48'

Company: Nihonmatsu Denki KK

Location: Plant - Okawasaki-aza, Otoshi-oaza, Minowa-mura, Iwaki-gun, Fukushima-ken

Capacity Commonly in Use (in kw): 1000, as of Dec 1934

Importance: Rank in Japan - 250 + ; rank in Tohoku supply area - 20 +

Source of Power: Yoshima-gawa of the Natsui-kawa system

Date of Construction: Founded Feb 1920; in operation Dec 1938

Details: Particular capacities (in kw) - 800 reg; 200 spec; *1000 inst cap
Eff head - 366 ft
Plant, equipment -
Turbines - 1 @ 1850 hp, Francis-type, horizontal-shaft, Okumura-make
Generators - 1 @ 1250 kva, 3-ph, 2200 v, 720 rpm, 60 cyc, Okumura-make
Transformers - 4 (incl 1 res) @ 500 kva, 1-ph, 2.5,2.2,2/22 kv, D-D conn, self-cooled, 60 cyc, shell-type, Okumura-make

Sources: DJY 1927; DJY 1929 p.394; ZKT 1939 p.1648

OTOTATE HYDRO PLANT - See OTSUTATE HYDRO PLANT

661. OTSU HYDRO PLANT

Approx. Lat. 36°33'
Long. 138°37'

Company: Toshin Denki KK; formerly Agatsumagawa Denryoku KK

Location: Plant - 24, Tsuboi-aza, Otsu-oaza, Naganohara-machi, Azuma-gun, Gumma-ken

Capacity Commonly in Use (in kw): 2000, as of Dec 1936

Importance: Rank in Japan - 250 + ; rank in Tokyo supply area - 100 +

Source of Power: Agatsuma-gawa

Date of Construction: Construction was begun Apr 1929 and completed Feb 1932; in operation Mar 1940

Details: Particular capacities (in kw) - *2000 installed cap; 1400 reg; 600 spec
Eff head - 14.55 m; flow - 16.67 m^3/sec
Dam - 19.9 m high, 60.6 m long
Plant, external features - Of concrete construction, 3 stories high, with peaked roof
Plant, equipment -
Turbines - 1 @ 3500 hp, Kaplan-type, Voith-make
Generators - 1 @ 2500 kva, 3-ph, 11,000 v, 333 rpm, 50 cyc

See: Photographs No. IV-73, IV-74

Sources: DnN 1940; DnK; Ohm 7/29 p.355, 4/32 p.238, 5/32 p.291, 7/35 p.724; DnGZ 7/37

662. OTSU FACTORY STEAM PLANT

Approx. Lat. 35°00'
Long. 135°53'

Company: Asahi Bemberg Kenshi KK

Location: Otsu-shi, Shiga-ken

Installed Capacity (in kw): 5000, as of Nov 1936

Importance: Rank in Japan - 250 + ; rank in Osaka-Nagoya supply area-100+
Supplies Otsu rayon factory of Asahi Bemberg Kenshi KK

Date of Construction: Unknown; in operation as early as Nov 1935 and as recently as Mar 1940

Sources: DnN 1940

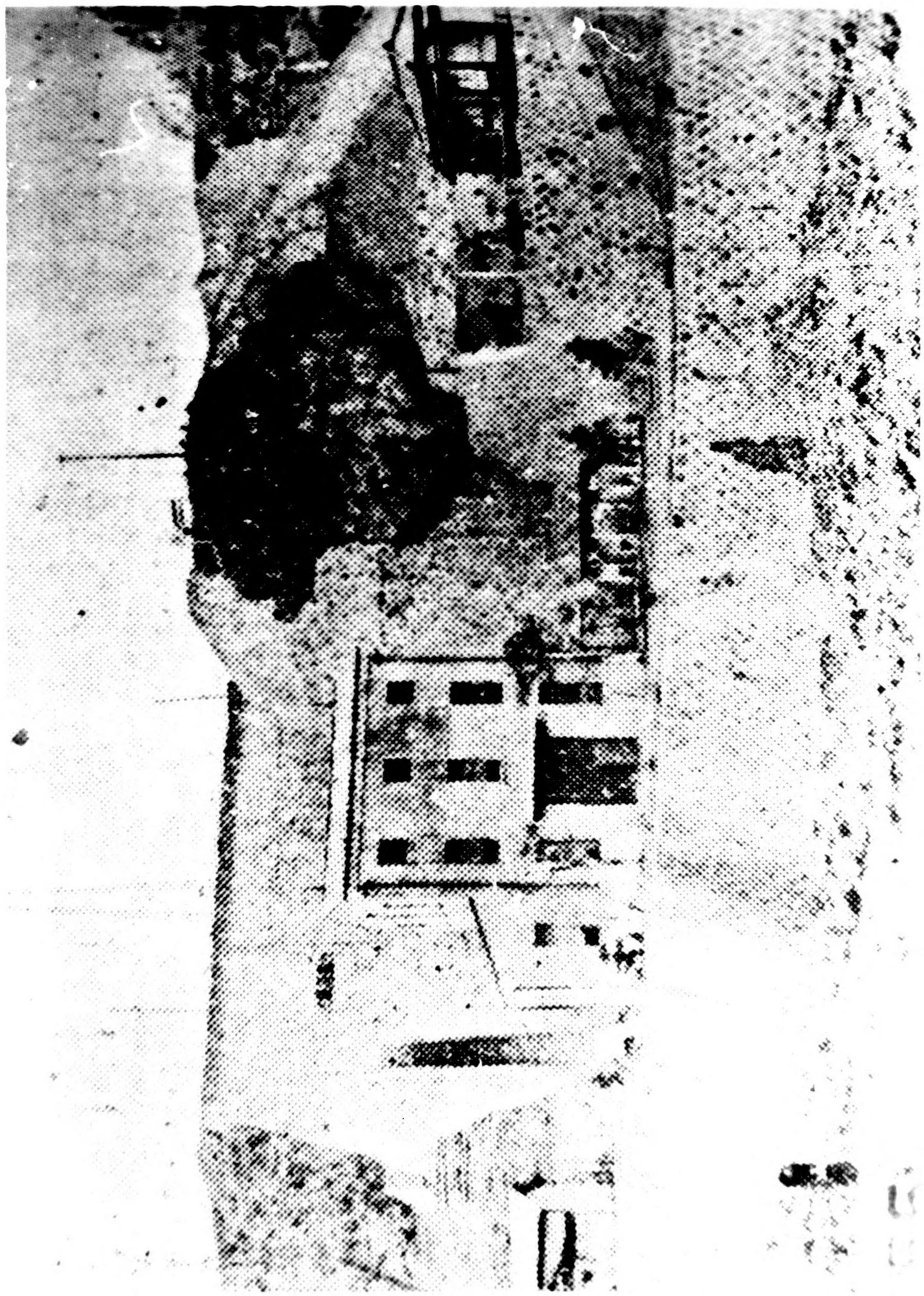
OTSUNA HYDRO PLANT - See OAMI HYDRO PLANT

OTSUTACHI HYDRO PLANT - See OTSUTATE HYDRO PLANT

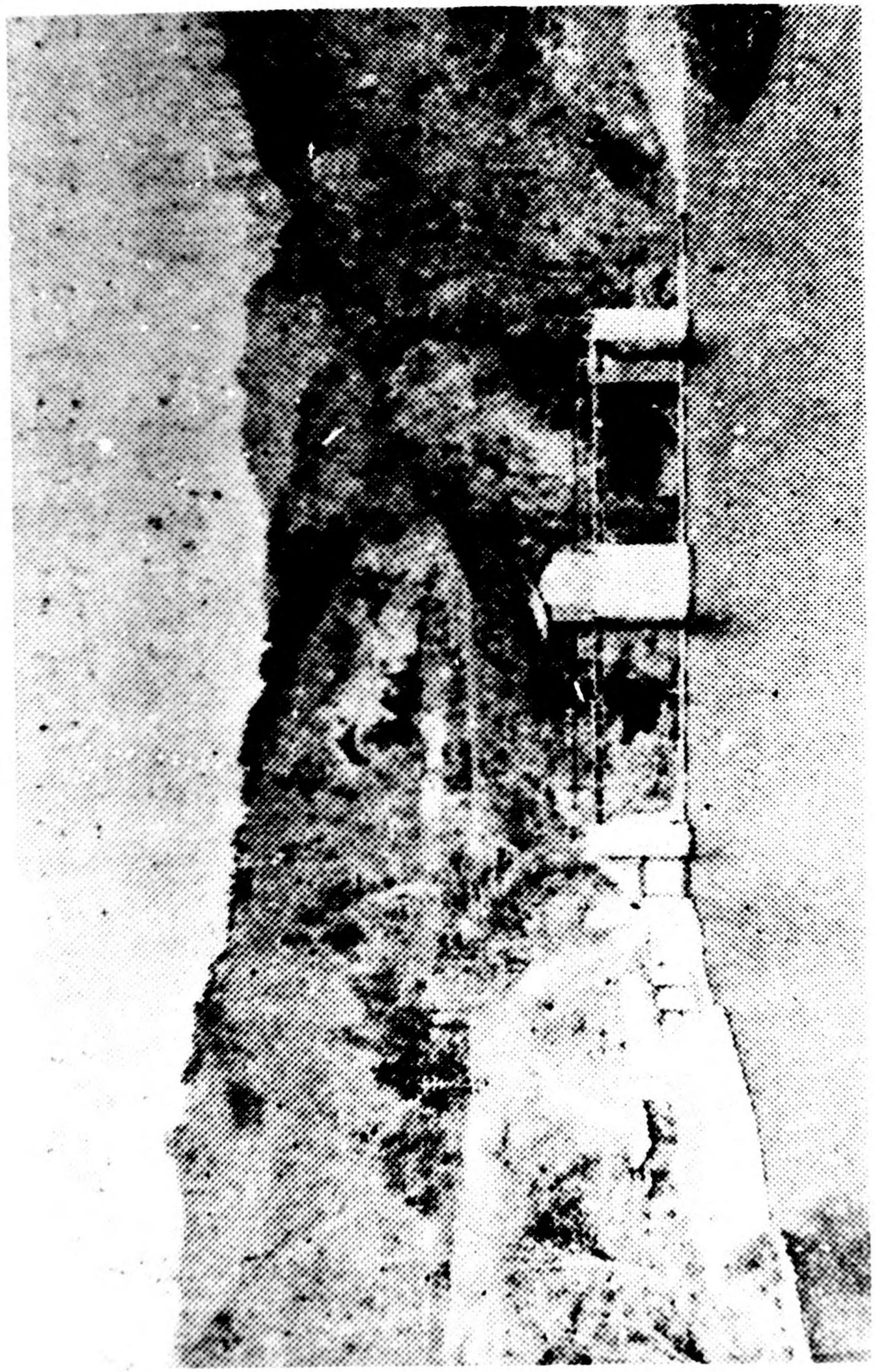
663. OTSUTATE HYDRO PLANT

Approx. Lat. 35°16'
Long. 132°43'

Company: Izumo Denki KK



Photograph No. IV-73 Otsu Hydro Plant in 1932



Photograph No. IV-74 Otsu Hydro Plant dam in 1932

Location: Plant - 1 of 1722, Otsutate-oaza, Otsutate-mura, Hinokawa-gun, Shimane-ken

Capacity Commonly in Use (in kw): 1500, as of Dec 1934

Importance: Rank in Japan - 250 + ; rank in Chugoku supply area - 25 +

Source of Power: Kobe-gawa

Date of Construction: Founded June 1924; in operation Mar 1940

Details: Particular capacities (in kw) - 750 reg; 750 spec; 1440 inst cap
Eff head - 112.5 ft
Plant, equipment -
Turbines - 1 @ 2250 hp, Francis-type, EW-make
Generators - 1 @ 1800 kva, 3-ph, 3500 v, 450 rpm, 60 cyc, AEG-make
Transformers - 4 (incl 1 res) @ 625 kva, 1-ph, 3.5,3.4,3.3/20 kv, D-Y conn, water-cooled, 60 cyc, shell-type, Hitachi-make

Sources: DnN 1940; ZKT 1939 p.1649; DJY 1927; DJY 1929 p.360

664. OURA STEAM PLANT

Approx. Lat. 33°13'
Long. 132°35'

Company: Iyo Tetsudo Denki KK

Location: 990, Tatsubigaura-aza, Sumiyoshi-machi, Uwajima-shi, Ehime-ken

Capacity Commonly in Use (in kw): 1100, as of Dec 1934

Importance: Rank in Japan - 250 + ; rank in Shikoku supply area - 15 +

Date of Construction: Founded Mar 1923; in operation Mar 1940

Details: Particular capacities (in kw) - 1100 supp
Plant, equipment -
Boilers - 3 (incl 1 res) @ Heine-type, 200 lbs/in^2, 2632 ft^2, Heine-make
Turbines - 1 @ 1800 hp, W-make
Generators - 1 @ 1562 kva, 3-ph, 3300 v, 3600 rpm, 60 cyc, W-make
Transformers - 3 @ 500 kva, 1-ph, 3,3.3/30,31,33 kv, D-D conn, self-cooled, 60 cyc, shell-type, Shibaura-make
3 @ 135 kva, 1-ph, 1.992,1.905/5.562,6.347 kv, Y-Y conn, water-cooled, 60 cyc, core-type, Osaka Denki-make
1 @ 1000 kva, 3-ph, 3.3,3/33,31,30 kv, D-D conn, self-cooled, 60 cyc, core-type, Kawakita-make

Sources: DnN 1940; ZKT 1939 p.1650; DJY 1927; DJY 1929 p.368

665. OURA STEAM PLANT

Approx. Lat. 33°00'
Long. 130°15'

Company: Mitsui Kozan KK

Location: 86, Inari-cho, Omuta-shi, Fukuoka-ken

Installed Capacity (in kw): 34,000 (see Date of Construction)

Importance: Rank in Japan - 66 ; rank in Kyushu supply area - 11
Supplies power to the Mitsui mining establishment at Miike

Date of Construction: Completed in 1930 with No. 1 unit of 7000 kw. Additional units were installed as follows: No. 2 - July 1932 (*9000 kw); Nos. 4 and 5 - 1937 (*19,000 kw each). In operation Mar 1940

Details: Plant, equipment -
Boilers - 2 @ B&W-type, 52.5 kg/cm^2, 1310 m^2, B&W-make
At least 5 additional boilers have been installed.
Turbines - No. 1 unit - 1 @ 5000/7000 kw, Ljungstrom-type
No. 2 unit - 1 @ 12,060 hp, Zoelly-type, EW-make
No. 3 and 4 units - 2 @ 17,060 hp, Dengyosha-make
Generators - No. 1 unit - 1 @ 5000/7000 kw, 3-ph, 11,000 v, 3600 rpm, 60 cyc, Mitsubishi-make
No. 2, 3, and 4 units - 3 @ 11,250 kva, 3-ph, 2300 v, 3600 rpm, 60 cyc, Shibaura-make
Transformers - 4 @ 50 kva, 1-ph, 2300/220,110 v, D-D conn self-cooled, Shibaura-make
Other equipment - 1 exciter @ 45 kw; 1 superheater @ 281 m surface; 4 mill stokers and pulverized coal firing equipment. Additional auxiliary equipment of the same types has been installed.

See: Photographs No. IV-75, IV-76, IV-76a

Sources: Ohm 1/31 adv p.5, 7/32 pp.349,402; DnGZ 1/31 back cover, 6/31 adv p.9, 10/37 p.(143); SR 1/37 p.2, 1/38 p.2; Ohm-sha Guide 1933 p.56

666. OYAMA HYDRO PLANT

Approx. Lat. 35°05'
Long. 138°07'

Company: Oikawa Denryoku KK; formerly Tokyo Dento KK

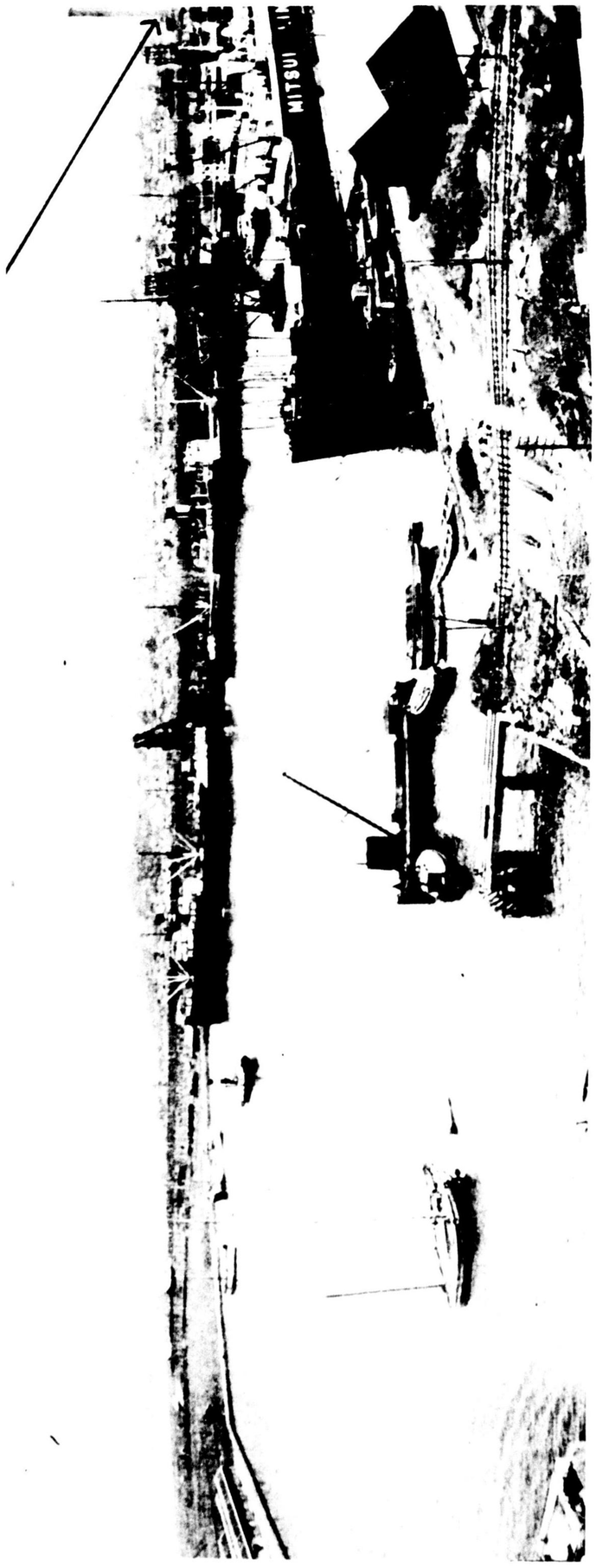
Location: Plant - Sakidaira-aza, Okuizumi-oaza, Kami Kawane-mura, Haibara-gun, Shizuoka-ken

Capacity Commonly in Use (in kw): 1400, as of Dec 1935

Importance: Rank in Japan - 250 +; rank in Tokyo supply area - 100 + ; rank in Osaka-Nagoya supply area - 100 +

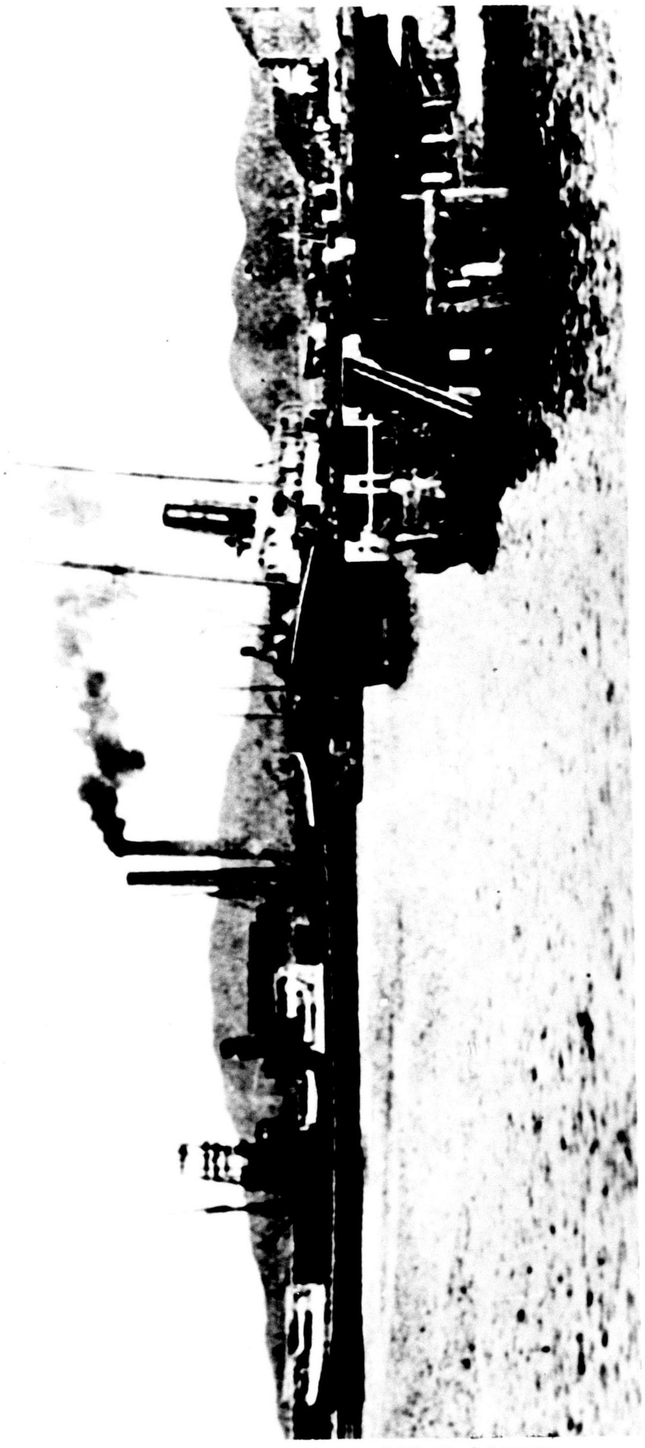
Source of Power: Oi-kawa

Date of Construction: Completed June 1912; in operation Mar 1940



Photograph No. IV-75 Oura Steam Plant (arrow)

Photograph No. IV-76 Oura Steam Plant (arrow)



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Photograph No. IV-76a Oura Steam Plant

Details: Particular capacities (in kw) - 1400 reg; *1320 inst cap
Layout - Aqueduct-type
Eff head - 80 ft
Dam - 63.6 m long, 4.55 m high, of rubble stone construction with timber frame
Intake - 3 gates
Aqueduct - 4.6 m open channel, 164 m tunnel
Forebay - 676 m^2 water surface
Penstocks - 2 @ 60.3 m long
Excess water spillway - 79.4 m long
Plant, external features - Of wood construction, 1 story high; a half-dozen wood are located nearby
Plant, equipment -
Turbines - 2 @ 1300 hp, Francis-type, horizontal-shaft
Generators - 2 @ 825 kva, 3-ph, 3450 v, 514 rpm, 60 cyc, Shibaura-make
Transformers - 4 (incl 1 res) @ 550 kva, 1-ph, 3.45/20.2 kv, D-Y conn, water-cooled, 60 cyc, shell-type, Shibaura-make
Tail race - 19.4 m long

See: Figure No. IV-22a

Sources: DnN 1940; Ohm 3/36 p.303; DJY 1927; DJY 1929 p.302

667. OYODOGAWA NO. 1 HYDRO PLANT Approx. Lat. 31°54'
Long. 131°08'

Company: Oyodogawa Suiden KK; formerly Denki Kagaku Kogyo KK

Location: Plant - On the left bank of the Oyodo-gawa at 640, Tomarimizu Maeda-aza, Tomarimizu-oaza, Takasaki-mura, Kita Morokata-gun, Miyazaki-ken

Capacity Commonly in Use (in kw): 15,000, as of Dec 1936

Importance: Rank in Japan - 153 ; rank in Kyushu supply area - 22

Source of Power: Oyodo-gawa

Date of Construction: Completed Dec 1925; in operation Mar 1940

Details: Particular capacities (in kw) - 7450 reg; 7550 spec; 13,200 max pk; *1440 inst cap
Layout - Aqueduct-type
Eff head - 52.5 m; flow - 44.6 m^3/sec
Penstocks - 2
Plant, external features - Of concrete construction, 2 stories high, with switch-gear directly in front of plant
Plant, equipment -
Turbines - 3 @ 7500 hp, reaction-type, vertical-shaft, Wehman Sieber Morgan-make
Generators - 3 @ 6000 kva, 3-ph, 6600 v, 300 rpm, 60 cyc, Shibaura-make
Transformers - 4 (incl 1 res) @ 6000 kva, 1-ph, 6.6/63.6 kv, D-Y conn, water-cooled, core-type, Fuji Denki-make
Other equipment - 3 exciters @ 40 kw

See: Photograph No. IV-77
Figure No. IV-31

Sources: DnN 1940; DnK; ZKT 1939 p.1651; Ohm 5/27 p.204, 6/31 supp p.6 9/32 p.485, 10/33 opp p.561, 2/36 p.212; DJY 1929 p.296; SR 6/32 p.204; Ohm-sha Guide 1933 p.18; TD Map

668. OYODOGAWA NO. 2 HYDRO PLANT

Approx. Lat. 31°56'
Long. 131°14'30"

Company: Oyodogawa Suiden KK; formerly Denki Kagaku Kogyo KK

Location: Plant - On the left bank of the Oyodo-gawa in Mensoryu-aza, Takaoka-machi, Higashi Morokata-gun, Miyazaki-ken; 18 km west of Miyazaki-shi

Capacity Commonly in Use (in kw): 30,000, as of Dec 1936

Importance: Rank in Japan - 77 ; rank in Kyushu supply area - 12

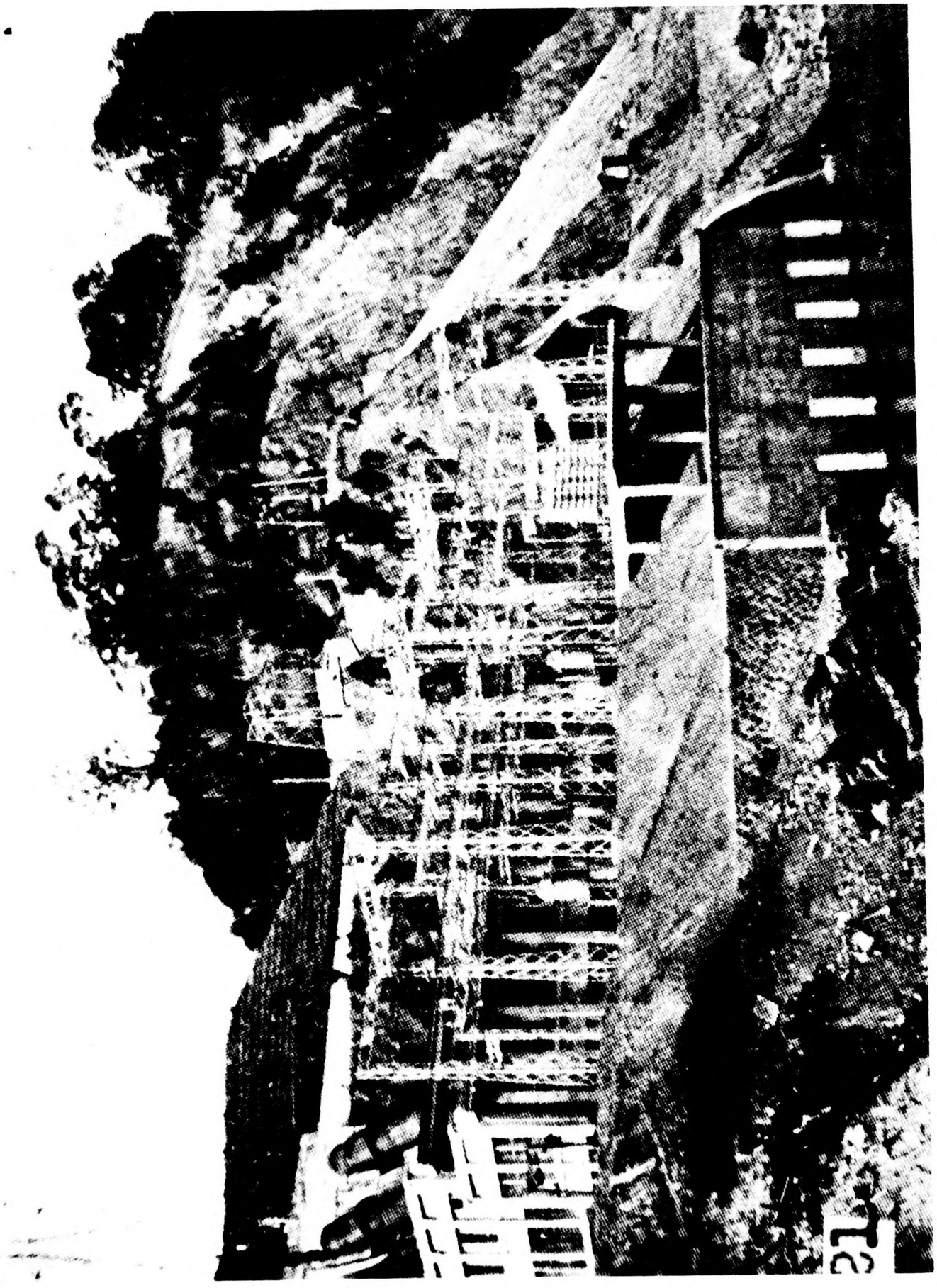
Source of Power: Oyodo-gawa

Date of Construction: Completed Sept 1931; in operation Mar 1940

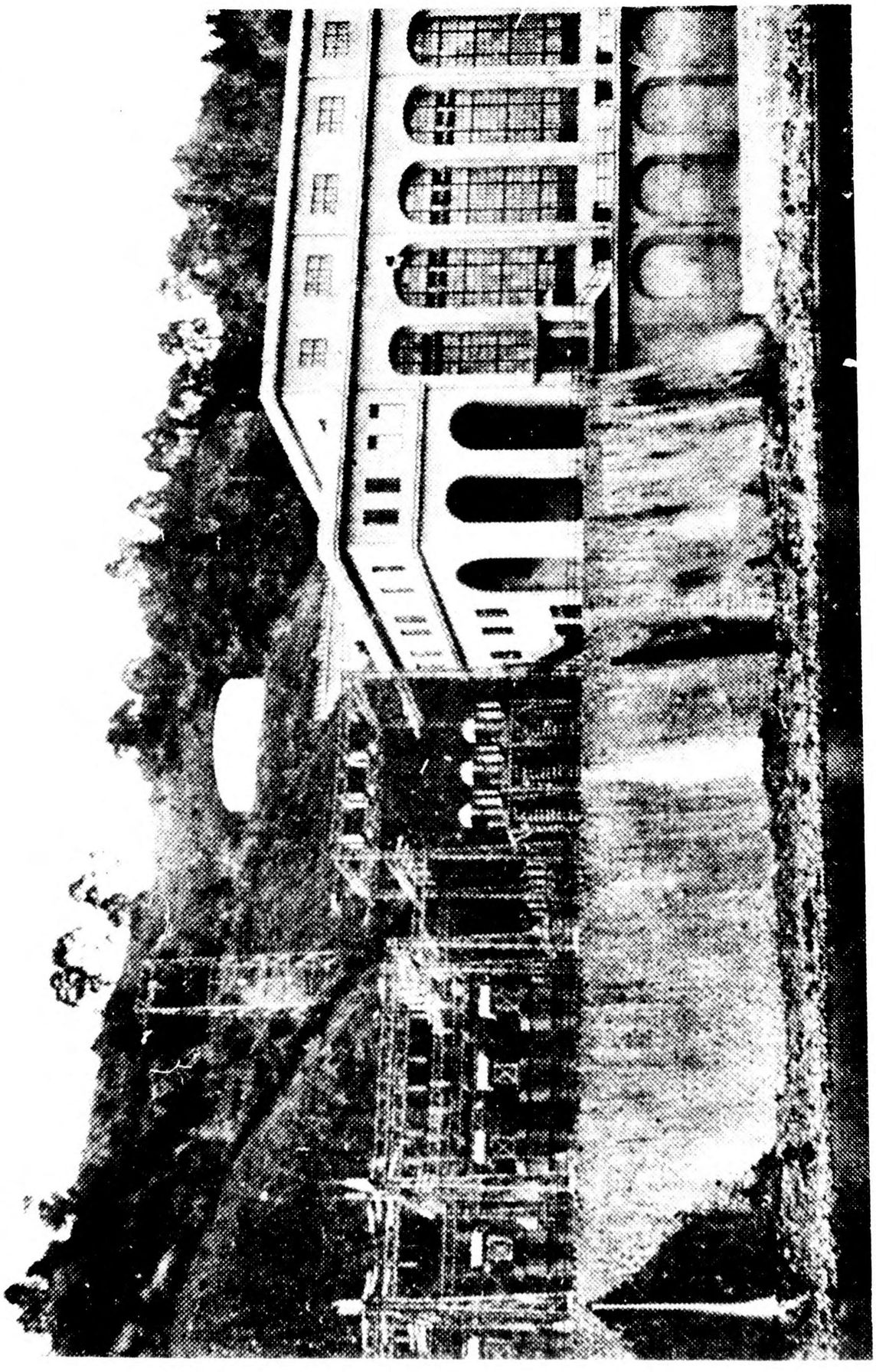
Details: Particular capacities (in kw) - 15,750 reg; 14,250 spec; 20,000 reg pk; 29,997 inst cap
Layout - Aqueduct-type
Eff head - 55.8 m; flow - 66.8 m^3/sec
Dam - 124 m high, incl 37.4 m above water level, 32.3 m height of fixed part, and 5.1 m height of movable part; 410 ft long; 8 tainter gates @ 5 m high and 11 m wide; 2 sluice gates @ 5.5 m wide and 7.3 m high
Aqueduct - 2798 m long
Surge tank - Simple-type, 16.4 m diam, 21.9 m high, with 3 head gates and 1 silt gate
Penstocks - 3
Fishway - 2.4 m wide
Plant, external features - Of reinforced concrete construction, 3 stories high, 51 m x 195 m
Plant, equipment -
Turbines - 3 @ 16,000 hp, Francis-type, vertical-shaft, Dengyosha-make
Generators - 3 @ 11,111 kva, 90% pf, 3-ph, 11,000 v, 257 rpm, 60 cyc, Shibaura-make
Transformers - 7 (incl 1 res) @ 5555 kva, 1-ph, 6.6/63.5 kv, D-Y conn, water-cooled, core-type, Fuji Denki-make
Other equipment - 3 exciters @ 85 kw
Area served - Omuta region

See: Photographs No. IV-78, IV-78a, IV-79, IV-80
Figure No. IV-31

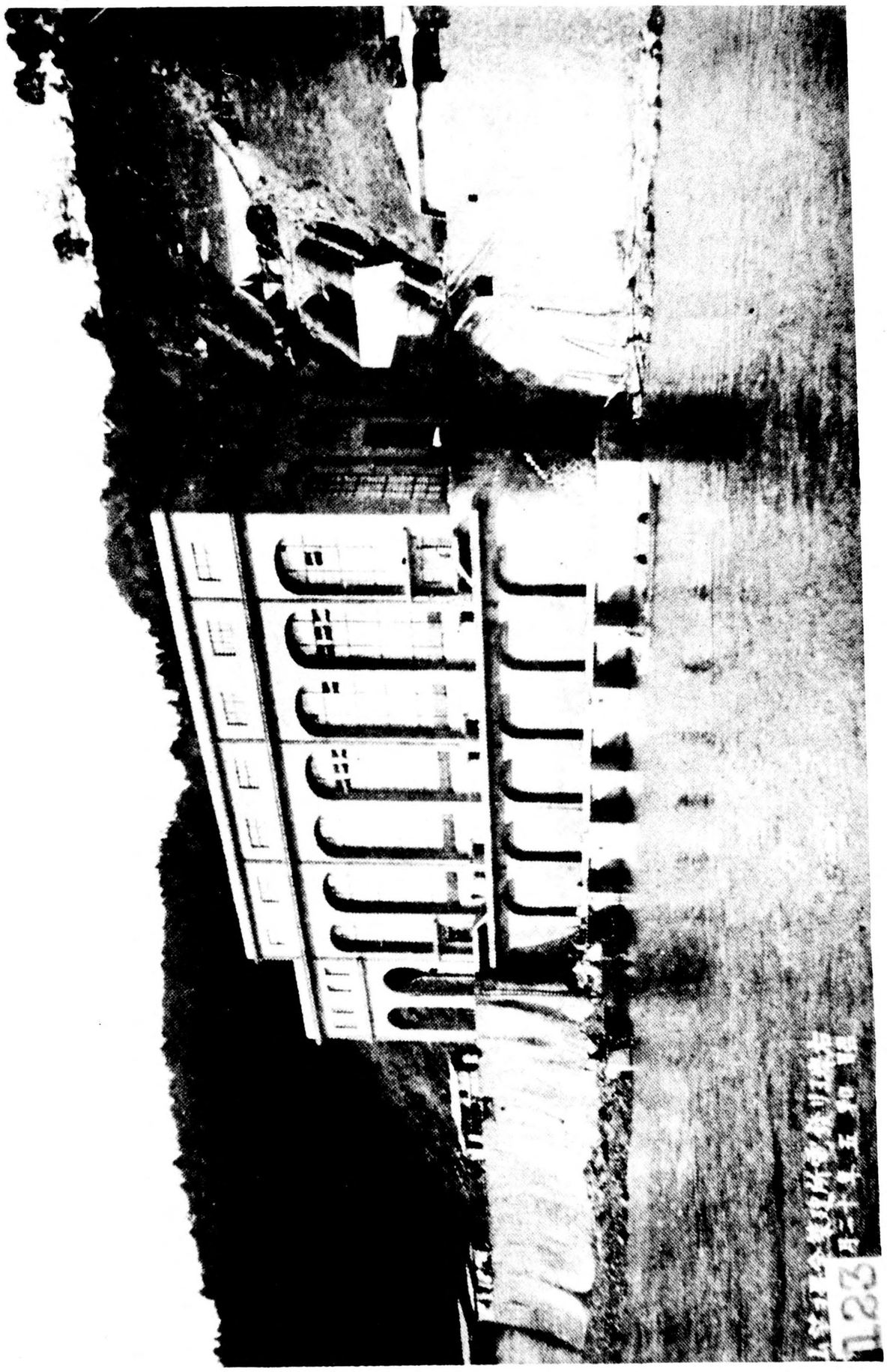
Sources: DnN 1940; DnK; Ohm 2/26 p.212, 4/31 p.175, 6/31 supp p.6, 9/32 pp.460,485; SR 4/31 front page, 6/32 pp.203,217; Ohm-sha Guide 1933 p.7; HSG p.318



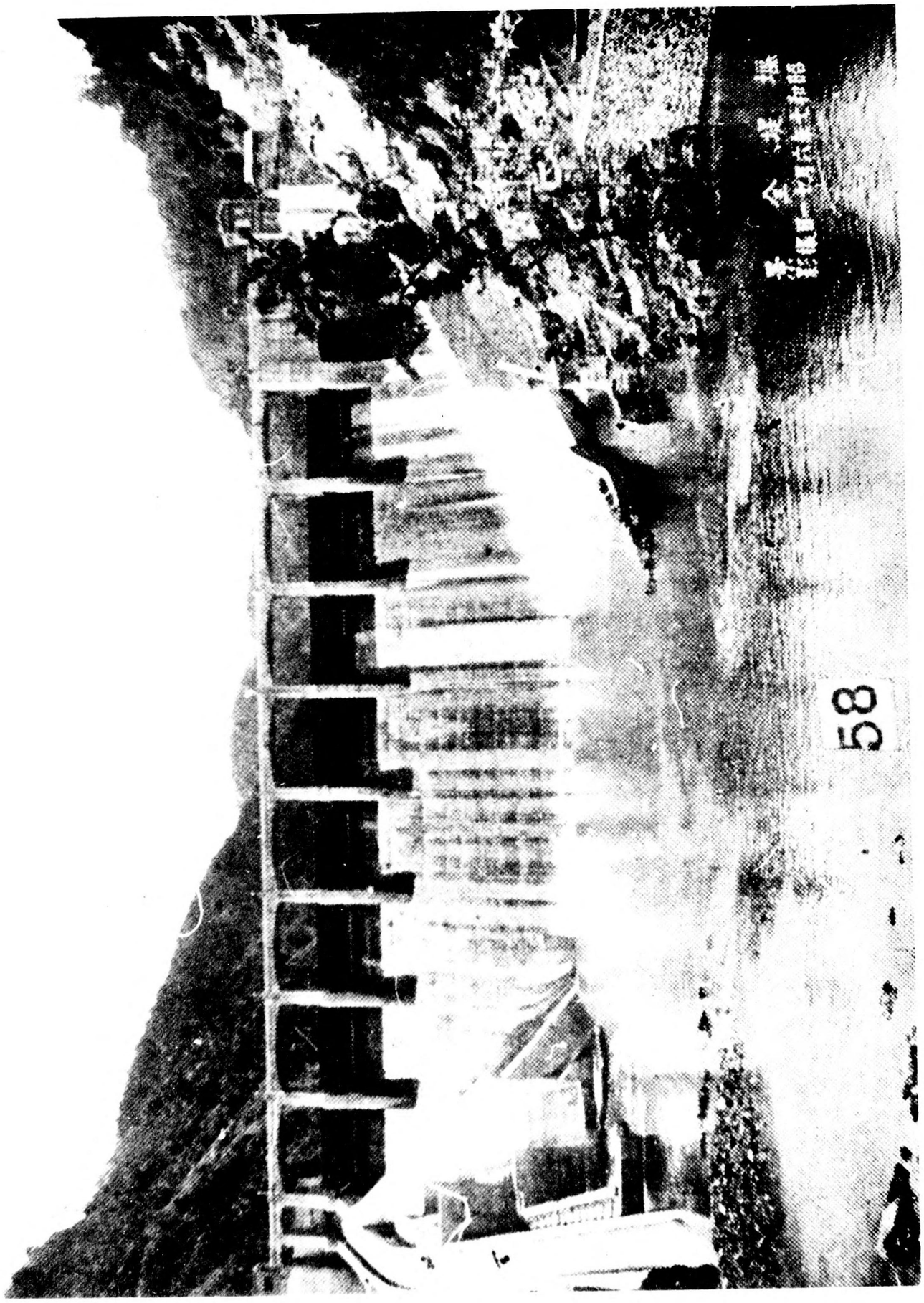
Photograph No. IV-77 Oyodogawa No. 1 Hydro Plant in 1927



Photograph No. IV-78 Oyodogawa No. 2 Hydro Plant in 1932



Photograph No. IV-78a Oyodogawa No. 2 Hydro Plant in 1931

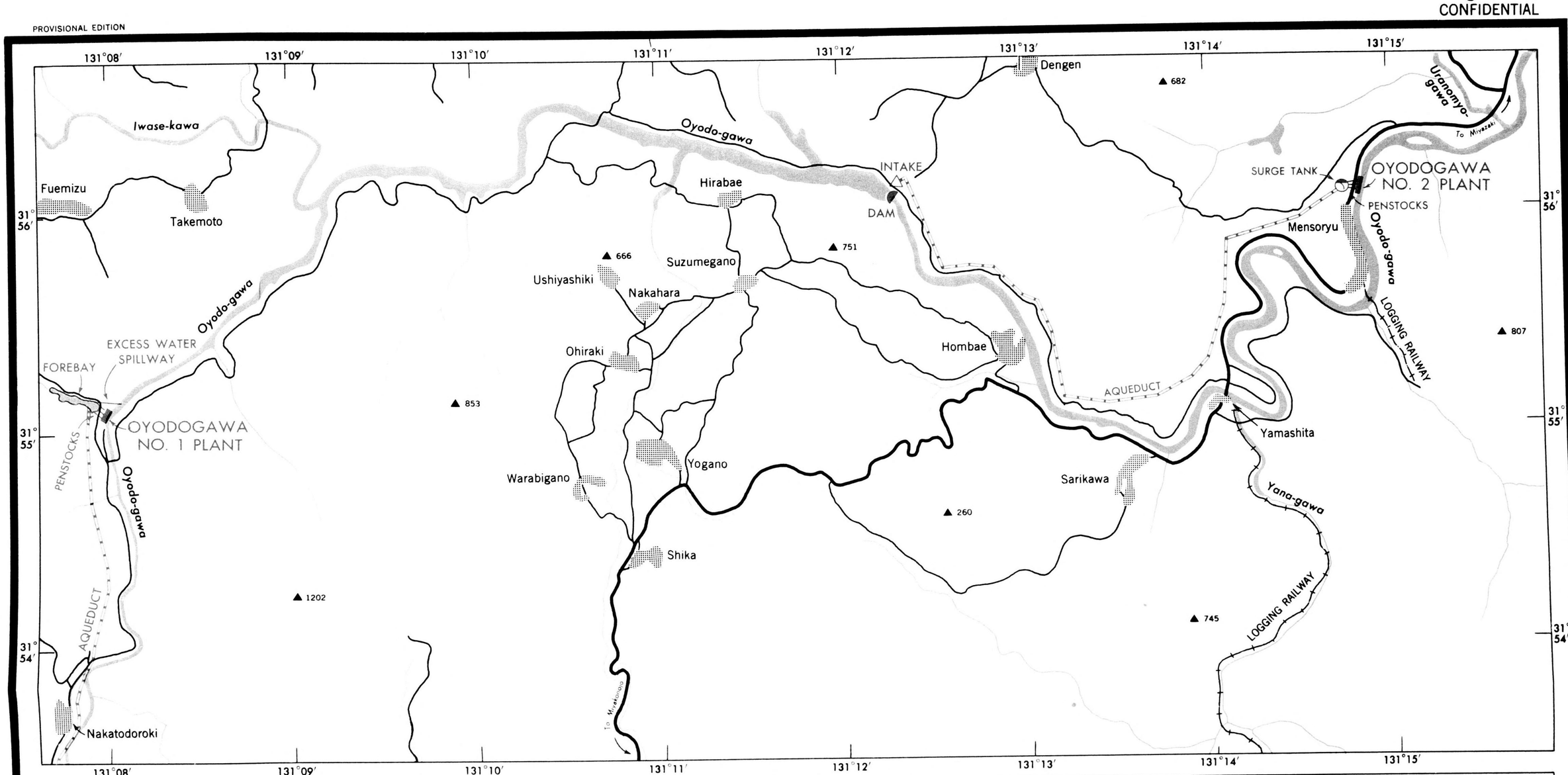


Photograph No. IV-79 Oyodogawa No. 2 Hydro Plant dam in 1932

Photograph No. IV-80 Oyodogawa No. 2 Hydro
Plant reservoir in 1932

Figure IV-31
CONFIDENTIAL

PROVISIONAL EDITION

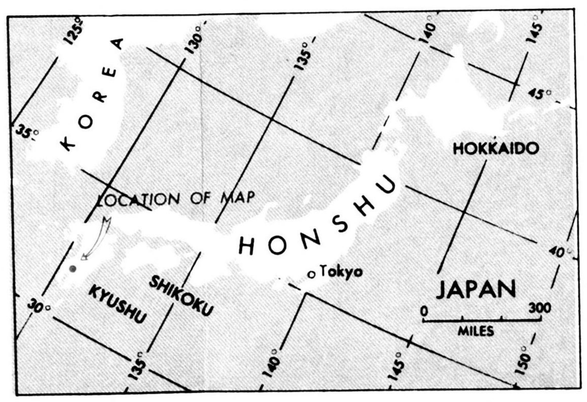


OYODOGAWA NOS. 1 AND 2 HYDROELECTRIC PLANTS

MIYAZAKI-KEN

BASE MAP FROM 1:50,000 SERIES, JAPAN IMPERIAL LAND SURVEY BUREAU, 1937

W.D.M.C. FILE NO. JAPAN S30-JGS-50, SHEETS 4-13 AND 4-9



0 ½ 1 2
MILES

0 ½ 1 2
KILOMETERS

SETTLEMENT CENTER

PRINCIPAL HIGHWAY

SECONDARY ROAD

▲ 1202 SPOT HEIGHT (IN FEET)

Reliability Code: 1B–1B–1

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LITHOGRAPHED IN THE REPRODUCTION BRANCH, OSS

669. OYU HYDRO PLANT

Approx. Lat. 40°20'
Long. 140°46'

Company: Osaka Kozan Denki KK

Location: Plant - At the Osaka mine in Osaka-machi, Katsuno-gun, Akita-ken

Capacity Commonly in Use (in kw): 1500, as of May 1928

Importance: Rank in Japan - 250 +; rank in Tohoku supply area - 100 +
Supplies Osaka mine

Source of Power: Probably Osaka-kawa

Date of Construction: Completed in 1908; in operation May 1928

Sources: Ohm 5/28 p.271

RANGAWA HYDRO PLANT - See ARANOGIKAWA HYDRO PLANT

RINSAI STEAM PLANT - See NIPPON SEITETSU-SHO WANISHI STEAM PLANT

670. RYUJIMA HYDRO PLANT

Approx. Lat. 36 11'
Long. 137 47'

Company: Tokyo Dento KK

Location: Plant - Miyanohira-aza, Hata-mura, Higashi Tsukuma-gun, Nagano-ken

Capacity Commonly in Use (in kw): 20,100 kw

Importance: Rank in Japan - 47 ; rank in Tokyo supply area - 48

Source of Power: Oshiro-kawa, Kuro-kawa, Mizutono-gawa and Sai-kawa, all of the Shinano-gawa system

Date of Construction: Completed 1923; in operation Mar 1940

Details: Particular capacities (in kw) - 11,200 reg; 8900 spec; 23,400 inst cap
Layout - Aqueduct-type

Eff head - 130.91 m; flow - 20.04 m^3/sec
Dams - 1 - 33.3 m long, 10.91 m wide, of concrete construction with stone pitching
2 - 18.18 m long, 2.73 m wide, of concrete construction with stone pitching
3 - 9.09 m long, 2.42 m wide, of concrete construction with stone pitching
4 - 5.76 m long, 3.03 m wide, of concrete construction with stone pitching
Intakes - 1 - 8 gates
2 - 1 gate
3 - 1 gate
4 - 1 gate
Settling basins - 3; leading to a regulating reservoir with a dam 35.91 m long and 4.7 m high
Aqueduct - 198 m open channel, 96 m culvert, 10,265 m tunnel
Forebay - 22 m long, 6.1 m wide
Penstocks - 2 @ 246 m
Excess water spillway - 315 m long
Plant, external features - Of concrete construction, 3 stories high, 30 wooden shacks are on premises
Plant, equipment -
Turbines - 2 @ 18,000 hp, Francis-type, vertical-shaft, AC-make
Generators - 2 @ 13,000 kva, 90% pf, 3-ph, 6600 v, 375 rpm, 50 cyc, GE-make
Transformers - 6 (incl 3 res) @ 6000 kva, 1-ph, 6.6/89, 86.775,84.55 kv, D-Y conn, water-cooled, core-type, GE-make
Other equipment - 1 crane @ 25.4-ton cap and 1 crane @ 55.8-ton cap; 2 exciters @ 180 kw
Tail race - 51.8 m long

See: Photographs No. IV-81, IV-82, IV-82a
Figure No. IV-32

Sources: DnN 1940; ZKT 1939 p.1646; Ohm 6/31 supp p.6, 10/33 opp p.561, 12/34 p.955; DnK; DJY 1927; DJY 1929 p.300; Ohm-sha Guide 1933 p.11

RYUZU STEAM PLANT - See TAKIGASHIRA STEAM PLANT

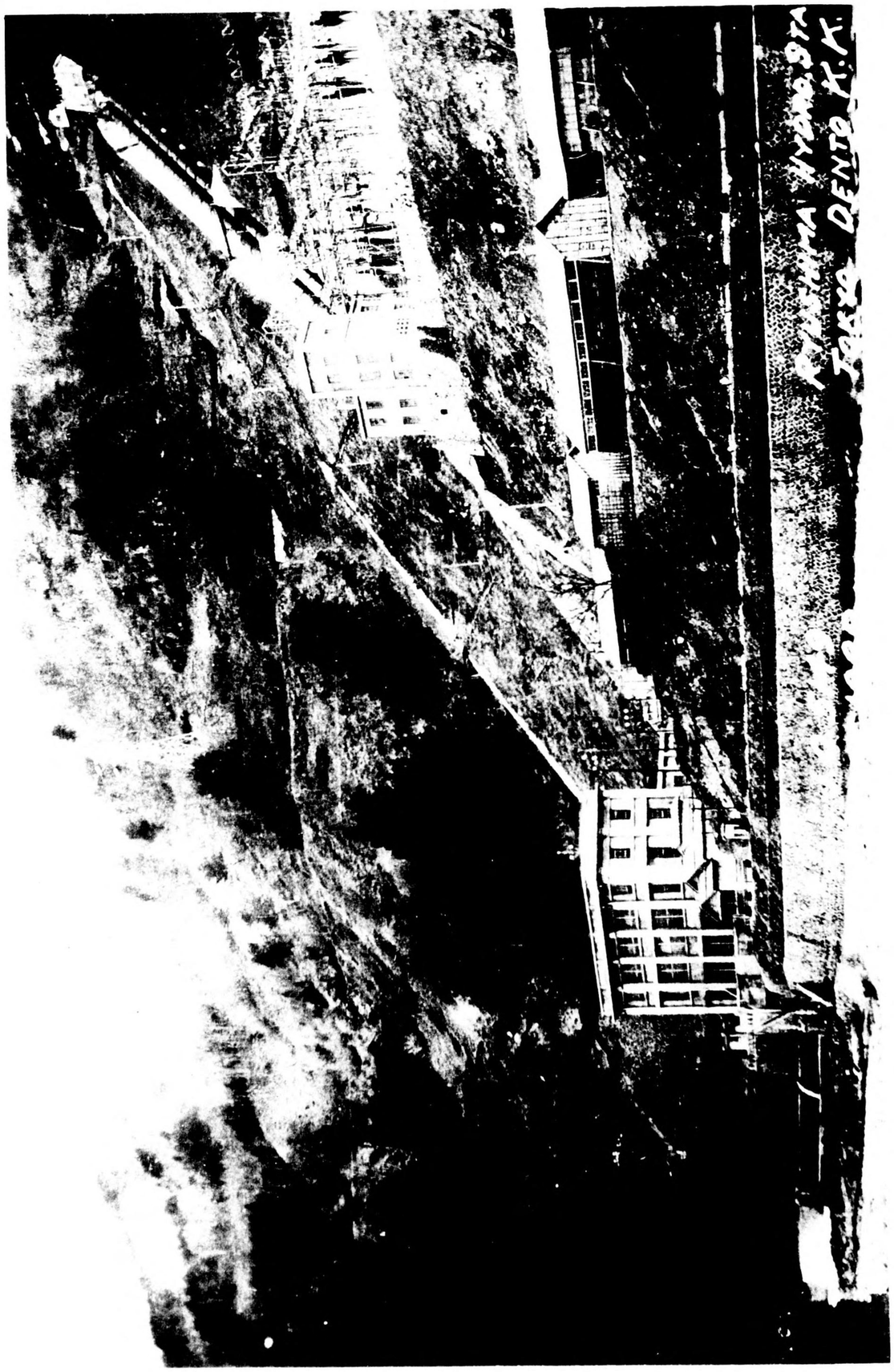
671. SADAYAMATANI HYDRO PLANT

Approx. Lat. 43°01'
Long. 141°21'

Company: Hokkai Suiryoku Denki KK

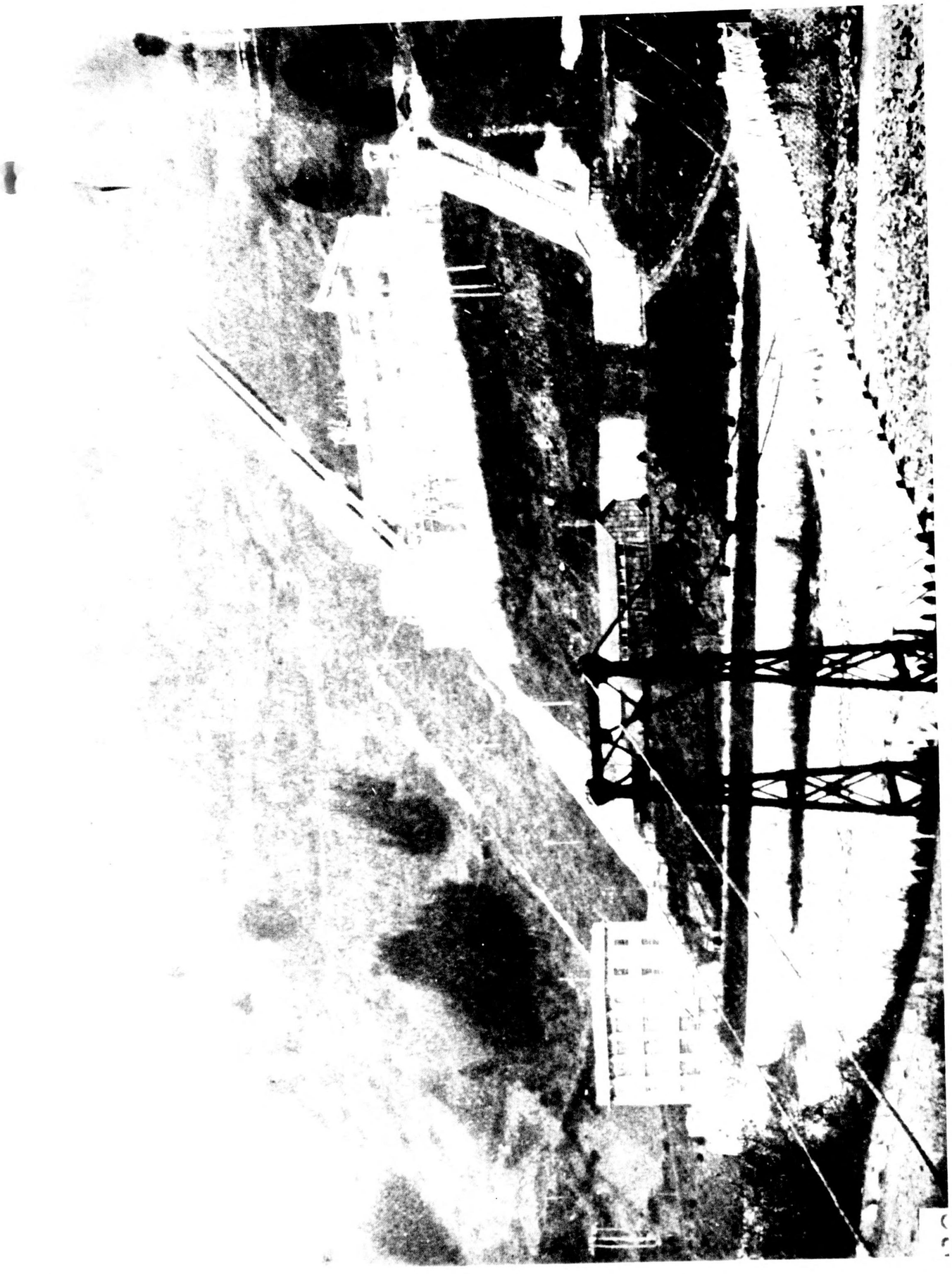
Location: Plant - Hirakishi-oaza, Toyohira-machi, Sapporo-gun, Hokkaido

Capacity Commonly in Use (in kw): 1570, as of Dec 1934

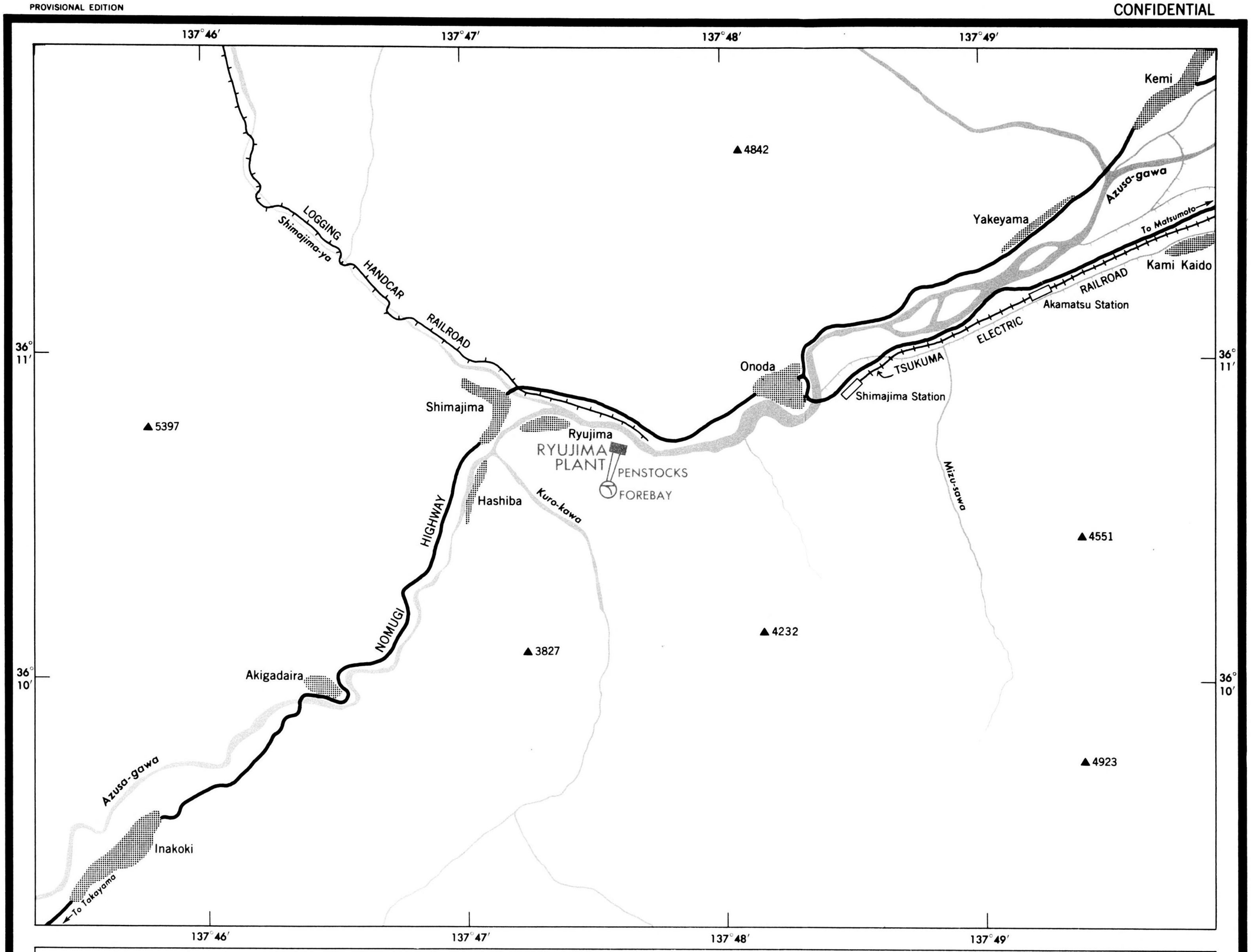


Photograph No. IV-81 Ryujima Hydro Plant in 1928

Photograph No. IV-82 Ryujima Hydro Plant from the rear in 1928



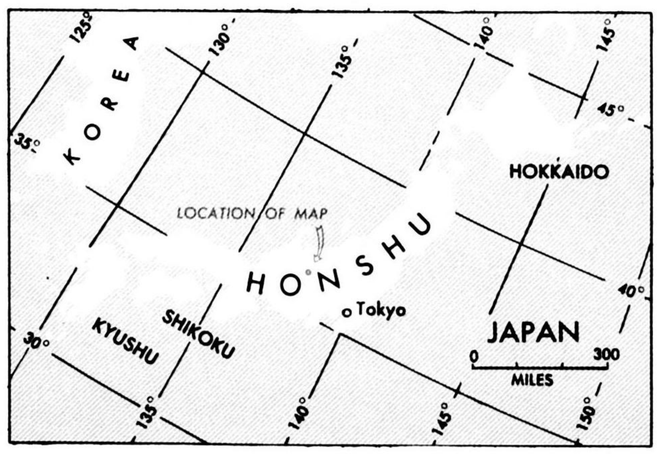
Photograph No. IV-82a Ryushima Hydro Plant



RYUJIMA HYDROELECTRIC PLANT

NAGANO-KEN

BASE MAP FROM 1:50,000 SERIES, JAPAN IMPERIAL LAND SURVEY BUREAU, 1931, 1933
W.D.M.C. FILE NO. JAPAN S30-JGS-50, SHEETS 54-3 AND 54-4



SETTLEMENT
RAILROAD
LOGGING HANDCAR RAILROAD
PRINCIPAL HIGHWAY
CANAL
▲4842 SPOT HEIGHT (IN FEET)

0 ½ 1 2
MILES

0 ½ 1 2
KILOMETERS

Reliability Code 1B–1B–1

MAP NO. 2841
4 JANUARY 1944

COMPILED AND DRAWN IN THE BRANCH OF RESEARCH AND ANALYSIS, OSS
LITHOGRAPHED IN THE REPRODUCTION BRANCH, OSS

Importance: Rank in Japan - 250 + ; rank in Hokkaido supply area - 15 +

Source of Power: Probably Toyohira-kawa

Date of Construction: Founded May 1907; in operation Mar 1940

Details: Particular capacities (in kw) - 606 reg; 964 spec

Sources: DnN 1940; ZKT 1939 p.1652; Ohm 7/30 p.367

672. SAEKI FACTORY STEAM PLANT

Approx. Lat. 32°59'
Long. 131°53'

Company: Nippon Cement KK

Location: Yawata-mura, Minami Amabe-ken, Oita-ken

Installed Capacity (in kw): Est 7500, as of Nov 1936

Importance: Rank in Japan - 250 + ; rank in Kyushu supply area - 43

Date of Construction: Unknown; in operation as early as 1929 and as recently as Mar 1940

Details: Plant, equipment -
Fuel supply - Uses waste gas from cement kilns
Turbines - 1 @ 2500 kw
Generators - 1 @ 2500 kw, 3-ph
Other turbo-generator units are in operation.

Sources: DnN 1940; Directory of Japanese Portland Cement Manufacturers 1929 p.45

673. SAGA HYDRO PLANT

Approx. Lat. 33°06'
Long. 133°06'

Company: Watarikawa Suiryoku Denki KK

Location: Plant - 100, Hirohata-aza, Ichinonogawa-oaza, Saga-mura, Hata-gun, Kochi-ken
Dam - Kachigawa-oaza, Kubokawa-machi, Takaoka-gun, Kochi-ken

Capacity Commonly in Use (in kw): 10,700 kw, as of Dec 1937

Importance: Rank in Japan - 222*; rank in Shikoku supply area - 7

Source of Power: Watari-kawa

Date of Construction: Construction was begun Mar 1936 and completed Dec 1937; in operation Mar 1940; it was planned to expand this plant to 15,000 kw after 1940.

Details: Particular capacities (in kw) - *13,040 installed cap; 4600 reg; 6100 spec
Layout - Aqueduct-type
Eff head - 154.3 m; flow - 8.35 m^3/sec
Dam - 102 m long at top, with 4 gates @ 18 m wide
Aqueduct - 6867 m long pressure tunnel
Surge tank - 26.85 m high, 8 m inner diam
Penstocks - 1 @ 339 m long, probably dividing into 2 at plant
Plant, external features - Of concrete construction, 3 stories high
Plant, equipment -
Turbines - 2 @ 8000 kw, Francis-type, vertical-shaft

Generators - 2 @ 8150 kva, 80% pf, 3-ph, 6600 v, 720 rpm, 60 cyc
Transformers - 4 (incl 1 res) @ 5500 kva
Other equipment - 1 exciter @ 48 kw, 1 sub-exciter @ 2.5 kw
Area served - Transmits power via a 106.5 km transmission line to the Niihama No. 2 Steam Plant

See: Photographs No. IV-83, IV-84, IV-85
Figures No. IV-33a, IV-33b

Sources: DnN 1940; DGS 4/37 p.111, 9/38 p.983; DGS Kaimu 1938 opp p.86; Ohm 4/36 p.401, 3/38 p.321; KN 1938 p.199; DnGZ 6/38 p.(4), 9/37 p.(139)

674. SAIJO STEAM PLANT

Company: Nippon Hassoden KK

Location: Believed to be in Saijo-machi, Nii-gun, Ehime-ken

Installed Capacity (in kw): *60,000 kw, as of Jan 1941

Importance: Rank in Japan - 31; rank in Shikoku supply area - 1

Date of Construction: Completed in late 1940

Details: Plant, equipment -
Boilers - 3 @ 60 ton/hr steam cap, Hitachi-make
Turbines - 3 @ unknown cap
Generators - 3 @ 25,000 kva, 3-ph, 3600 rpm, 60 cyc, Hitachi-make

Sources: HH 1/40 p.110, 1/41

675. SAIKAWA HYDRO PLANT

Approx. Lat. 36°21'
Long. 137°55'

Company: Shinshu Denki KK; formerly Azumi Denki KK

Location: Plant - Nakagawate-mura, Higashi Tsukuma-gun, Nagano-ken

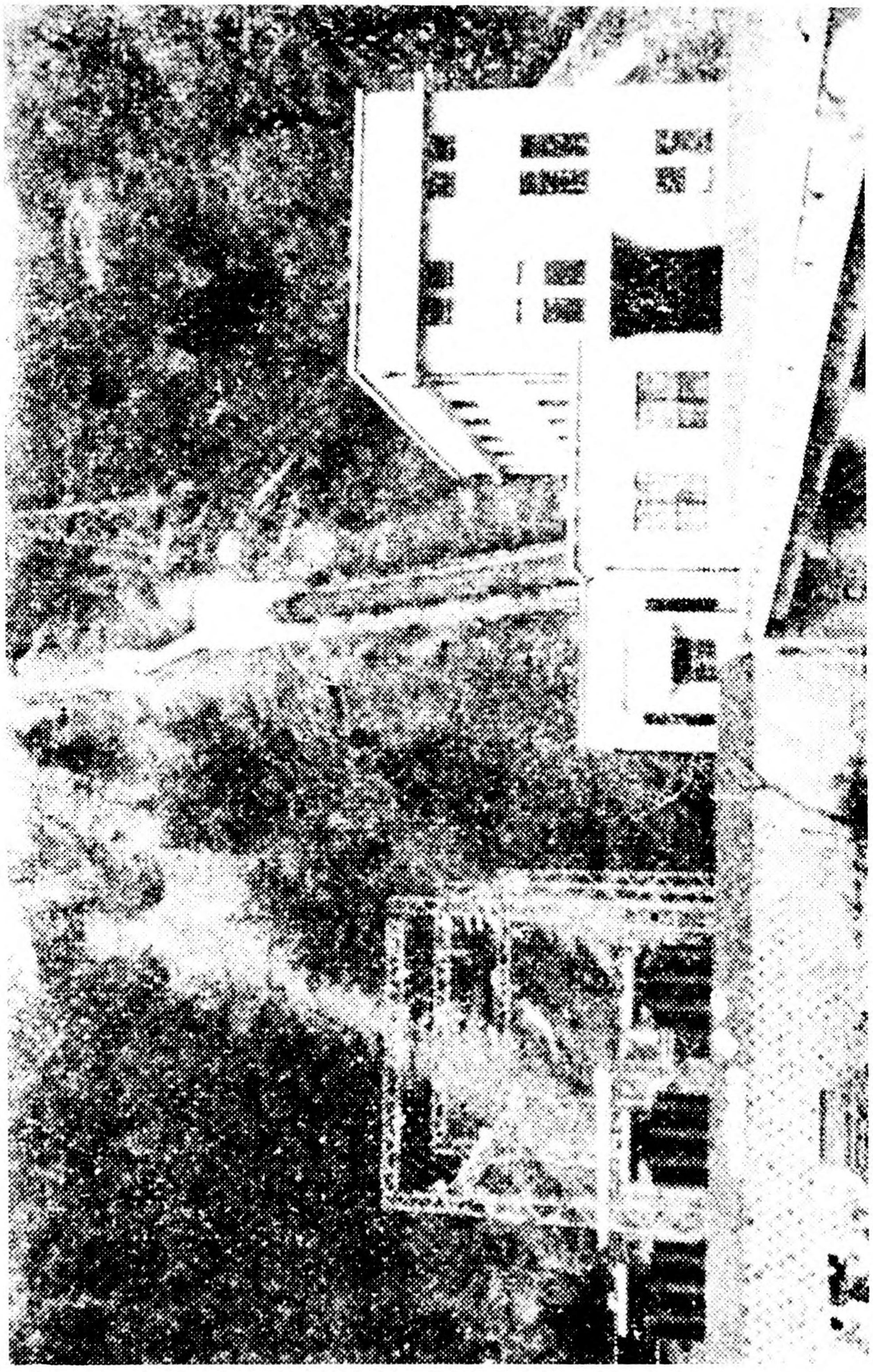
Capacity Commonly in Use (in kw): 2400, as of Dec 1936

Importance: Rank in Japan - 250 + ; rank in Tokyo supply area - 100 +

Source of Power: Sai-kawa of the Shinano-gawa system

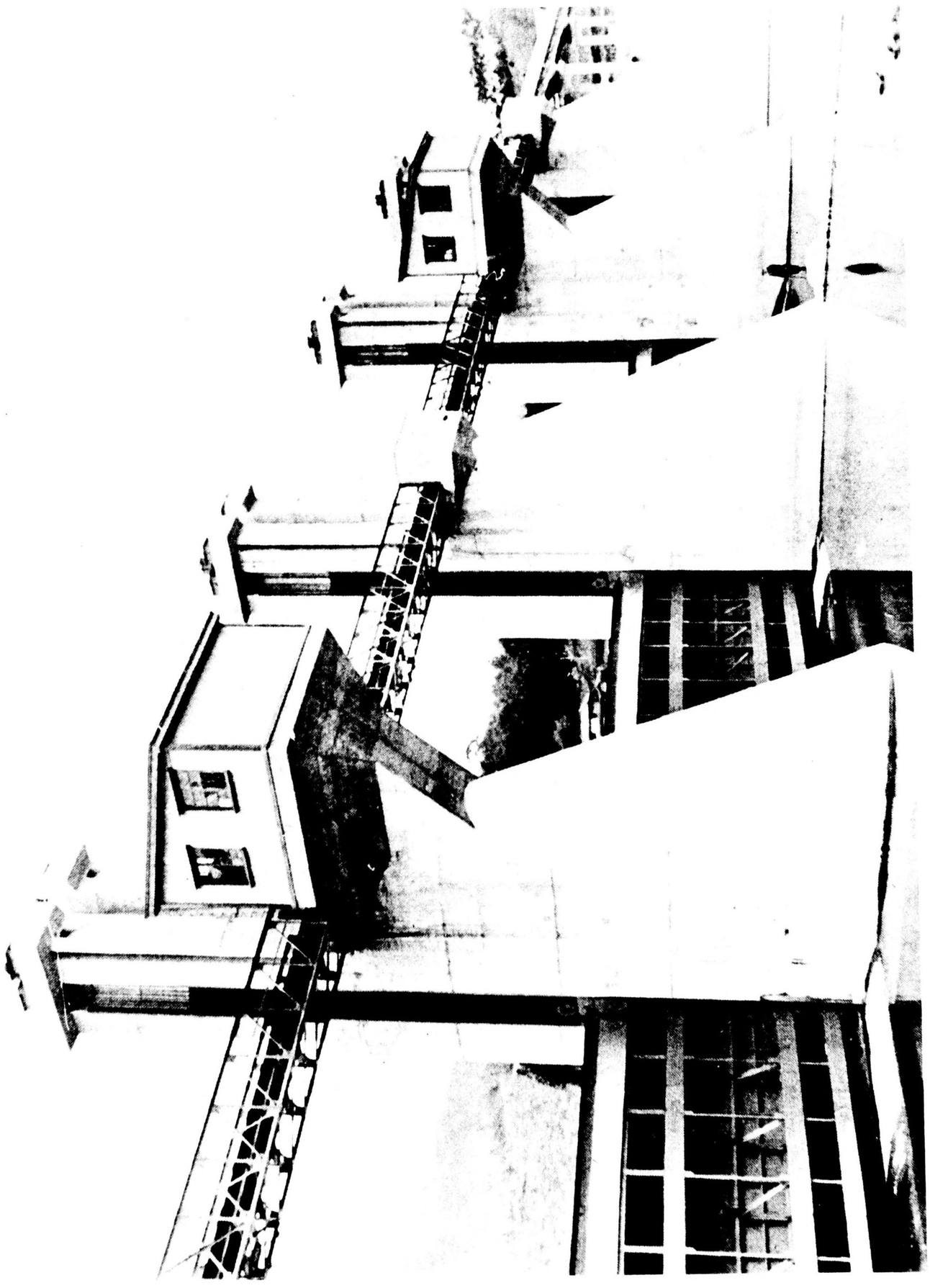
Date of Construction: Founded 1923; in operation Mar 1940

Details: Particular capacities (in kw) - *2400 installed cap; 2000 reg; 4000 spec
Eff head - 62 ft



Photograph No. IV-83 Saga Hydro Plant in 1938

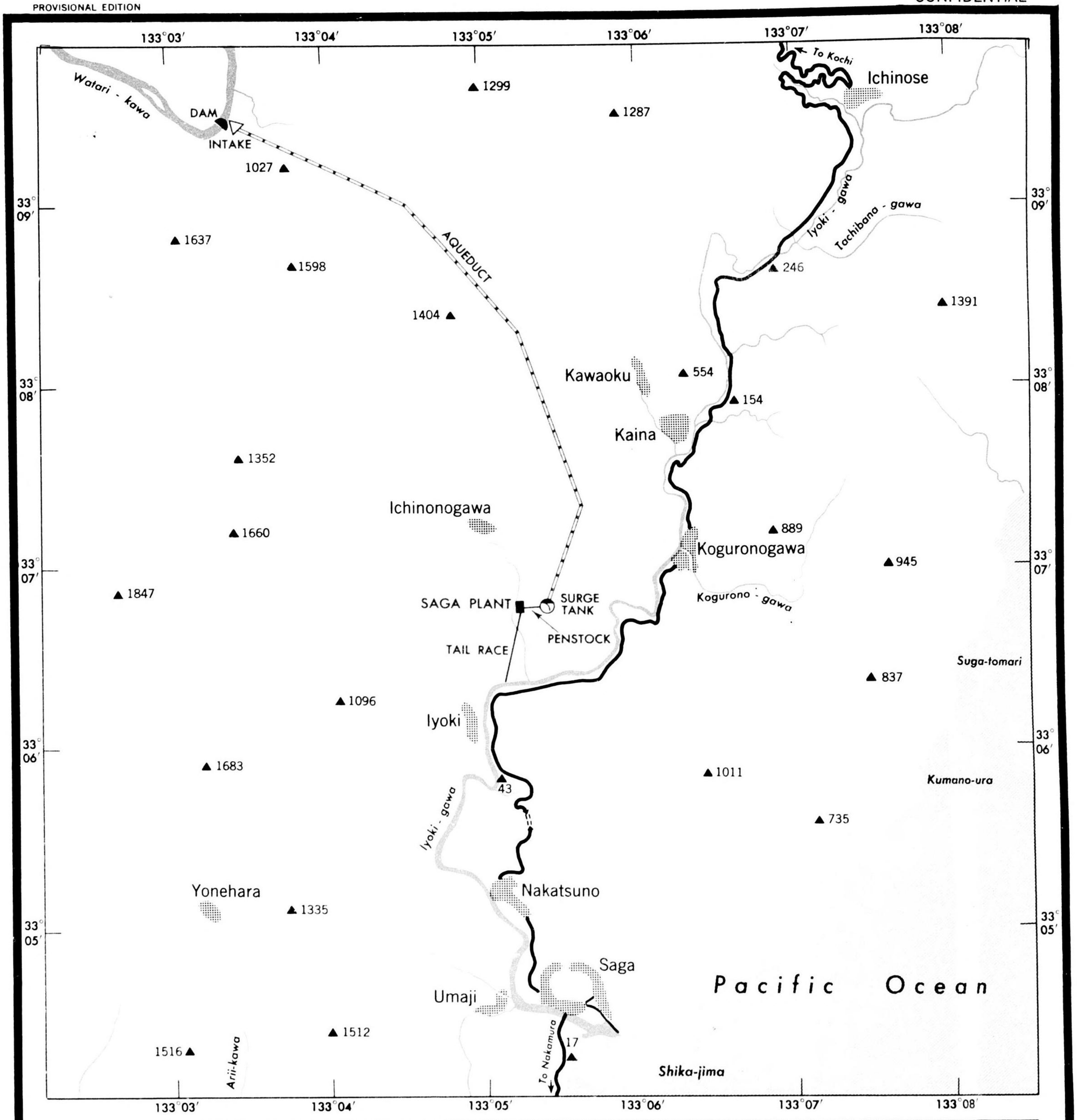
Photograph No. IV-84 Saga Hydro Plant dam and intake in 1938



Photograph No. IV-85 Saga Hydro Plant dam gates in 1938

Figure IV-33 a
CONFIDENTIAL

PROVISIONAL EDITION

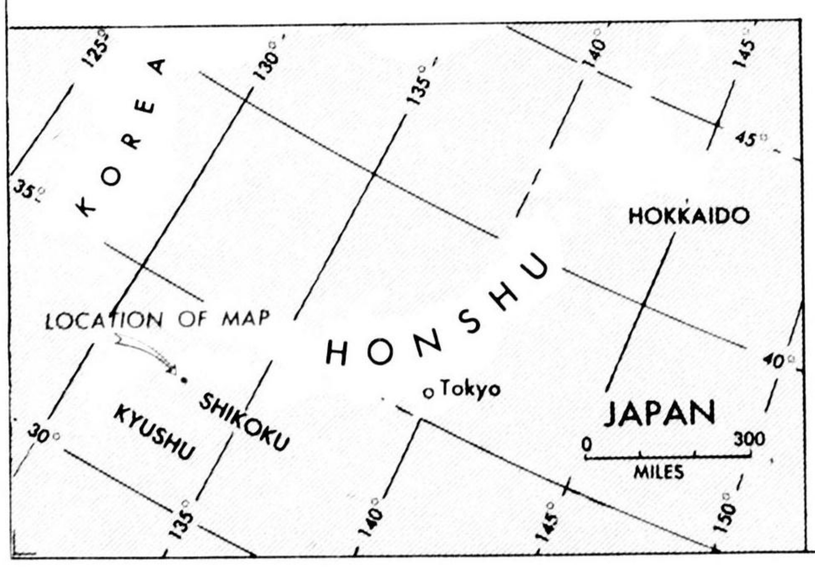


SAGA HYDROELECTRIC PLANT
KOCHI-KEN

BASE MAP FROM 1:50,000 SERIES, JAPAN IMPERIAL LAND SURVEY BUREAU, 1936,
W.D.M.C. FILE NO. JAPAN S30-JGS-50 SHEET 14-14.

1 ½ 0 1 2 3
MILES

1 ½ 0 1 2 3
KILOMETERS



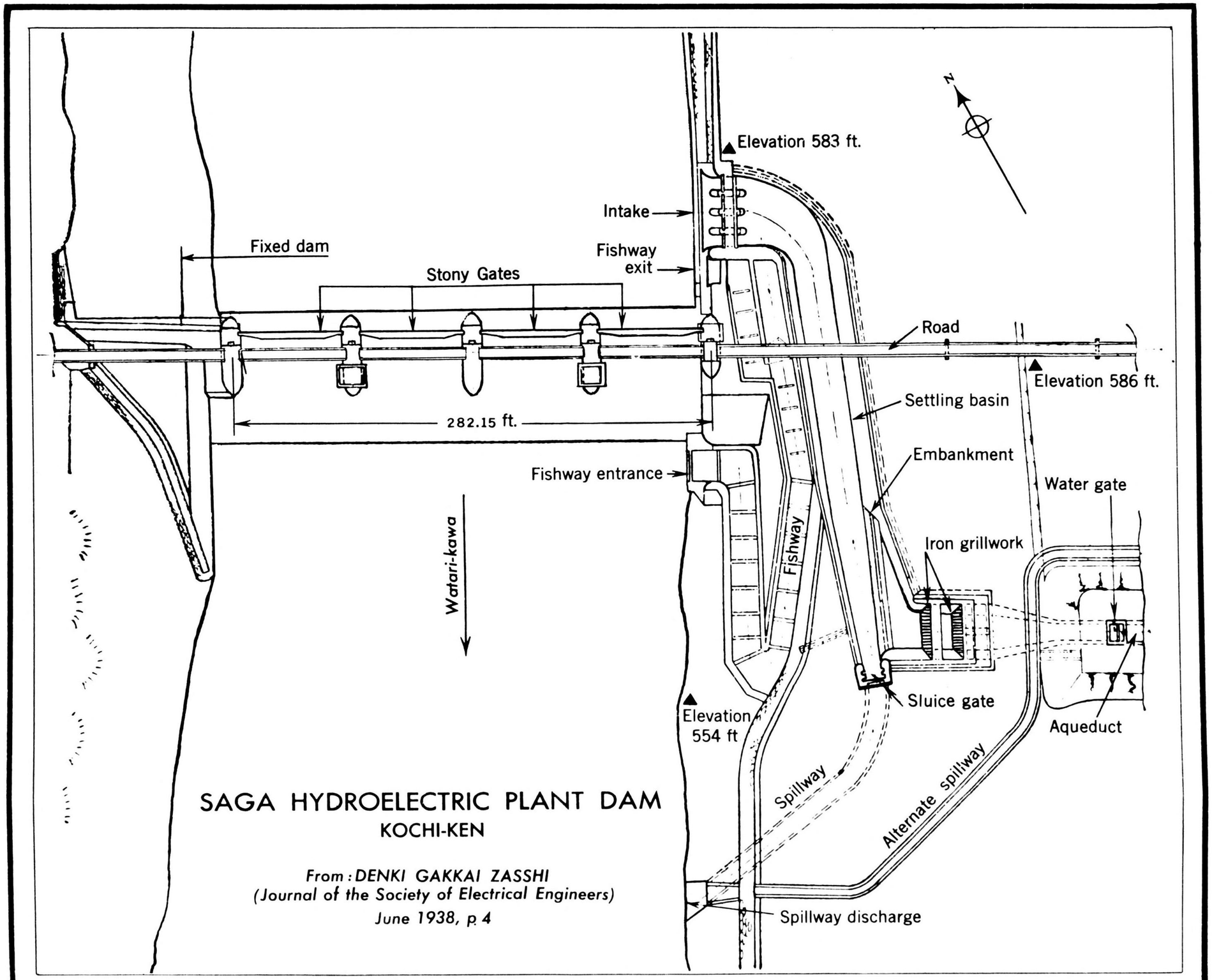
SETTLEMENT CENTER
PRINCIPAL HIGHWAY
SECONDARY ROAD
TUNNEL
▲889 SPOT HEIGHT (IN FEET)

Reliability Code 1B-1B-1

MAP NO. 2911
31 DECEMBER 1943

COMPILED AND DRAWN IN THE BRANCH OF RESEARCH AND ANALYSIS, OSS
LITHOGRAPHED IN THE REPRODUCTION BRANCH, OSS

Figure IV-33b
CONFIDENTIAL



SAGA HYDROELECTRIC PLANT DAM
KOCHI-KEN

From: DENKI GAKKAI ZASSHI
(Journal of the Society of Electrical Engineers)
June 1938, p. 4

NO. A-2969-RA, OSS
1 MARCH 1944

LITHOGRAPHED IN THE REPRODUCTION BRANCH, OSS

Plant, equipment -
Turbines - 1 @ 1750 hp, frontal (axial flow)-type, Dengyosha-make
1 @ 1750 hp, frontal (axial-flow)-type, Voith-make
Generators - 1 @ 1500 kva, 3-ph, 11,000 v, 428 rpm, 50 cyc, Shibaura-make
1 @ 1500 kva, 3-ph, 11,000 v, 500 rpm, 50 cyc, W-make
Transformers - At least 1 @ 600 kva, 1-ph, 11/44,42,40 kv, D-D conn, self-cooled, 50 cyc, shell-type
3 @ 130 kva, 1-ph, 12,11,6/3.3 kv, D-D conn, self-cooled, 50 cyc, core-type

Sources: DnN 1940; ZKT 1939 p.1646; DJY 1927; DJY 1929 p.330; DnK; TD Map

676. SAIKO HYDRO PLANT

Approx. Lat. 35°30'
Long. 138°43'

Company: Tokyo Dento KK

Location: Plant - Kuchiya-aza, Nagahama-mura, Minami Tsuru-gun, Yamanashi-ken

Capacity Commonly in Use (in kw): 2000, as of Dec 1936

Importance: Rank in Japan - 250 + ; rank in Tokyo supply area - 100 +

Source of Power: Sai-ko

Date of Construction: Completed Apr 1919; in operation Mar 1940

Details: Particular capacities (in kw) - 4000 installed cap; 1000 reg; 1000 spec; 2000 reg pk
Layout - Aqueduct-type
Eff head - 63.64 m; flow - 7.8 m^3/sec
Intake - 1 gate
Aqueduct - 1035 m tunnel
Surge tank - 5.45 m diam, 18.5 m high
Penstocks - 1 @ 149 m
Plant, external features - Of wood, 1-story high; about a half-dozen wooden shacks are on premises.
Plant, equipment -
Turbines - 2 (incl 1 res) @ 3000 hp, Francis-type, horizontal-shaft, Dengyosha-make
Generators - 2 (incl 1 res) @ 2500 kva, 80% pf, 3-ph, 13,500 v, 500 rpm, 50 cyc, Shibaura-make
Other equipment - 2 exciters @ 20 kw
Tail race - 182 m long

Sources: DnN 1940; DnK; DJY 1927; DJY 1929 p.298; TD Map

677. SAKA STEAM PLANT

Approx. Lat. 34°20'30"
Long. 132°31'

Company: Nippon Hassoden KK; formerly Hiroshima Denki KK

Location: On the shore of Kaida-wan just west of Yano railway station 4 miles south of Hiroshima-shi in Maruko-oaza, Saka-mura, Aki-gun, Hiroshima-ken

Installed Capacity (in kw): 51,200 kw, as of Apr 1935

Importance: Rank in Japan - 37 ; rank in Chugoku supply area - 4
Is believed to supply the Kure naval arsenal

Date of Construction: Completed in Dec 1927 with a total installed cap of 25,000 kw; extension of 26,200 kw completed in July 1935

Details: Plant, external features - Of reinforced concrete construction, 4 and 5 stories high with 3 chimneys @ 60.75 m high and 4 stacks. Coal yard is at side of plant.

Plant, equipment -

Fuel supply - Probably via Kaida-wan; coal yard @ 15,000-ton cap; 1 grab-bucket crane @ 50 ton/hr cap, 2 belt conveyors @ 100 ton/hr cap, 1 belt conveyor @ 70 ton/hr, loading bridge @ 44 m span length, 70 ton/hr cap

Boilers - 4 @ B&W-type, 23.2 kg/cm^2, 1092 m^2, B&W-make
3 @ B&W-type, B&W-make

Turbines - 2 @ 12,500 kw, extraction-type, BBC-make
1 @ 27,200 kw, Mitsubishi-make

Generators - 2 @ 15,625 kva, 3-ph, 11,000 v, 3600 rpm, 60 cyc, BBC-make
1 @ 31,250 kva, 80% pf, 3-ph, 11,000 v, 3600 rpm, 60 cyc
1 @ 1715 kva, 70% pf, 3-ph, 3300 v, 3600 rpm, 60 cyc

Transformers - 7 @ 5200 kva, 1-ph, 11/31.8,31,30,29 kv, D-Y conn, water-cooled, 60 cyc, shell-type, Shibaura-make
7 (incl 1 res) @ 5200 kva, 11/31.8 kv

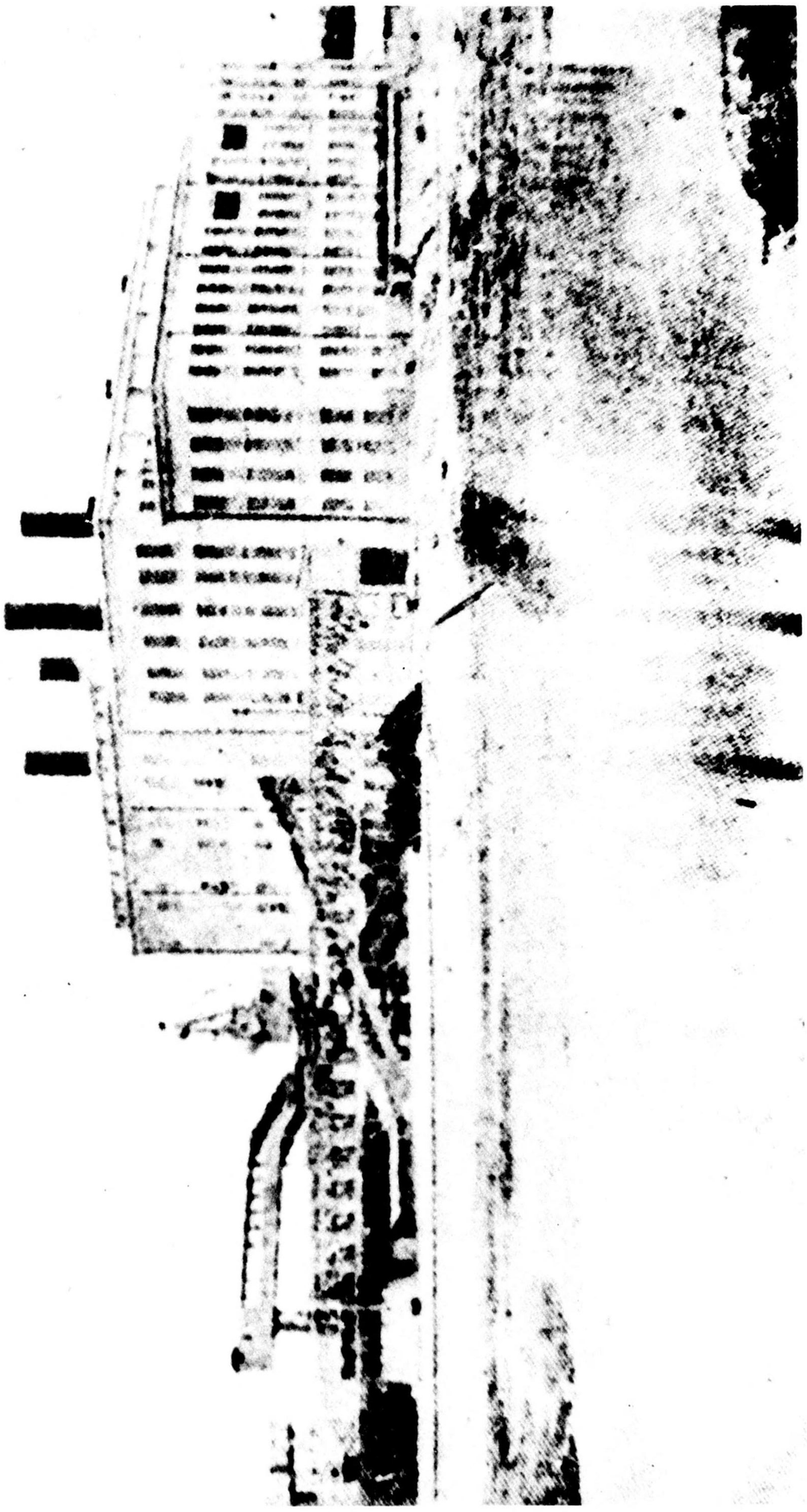
Other equipment - 2 exciters @ 61.5 kw; 1 exciter @ 95 kw; 7 superheaters (incl 3 @ B&W-make); 2 BBC condensers; 4 extraction and evaporator-type of feedwater heaters; 12 B&W compartment stokers; pulverized coal firing equipment; at least 4 economizers

Area served - Hiroshima and Kure districts

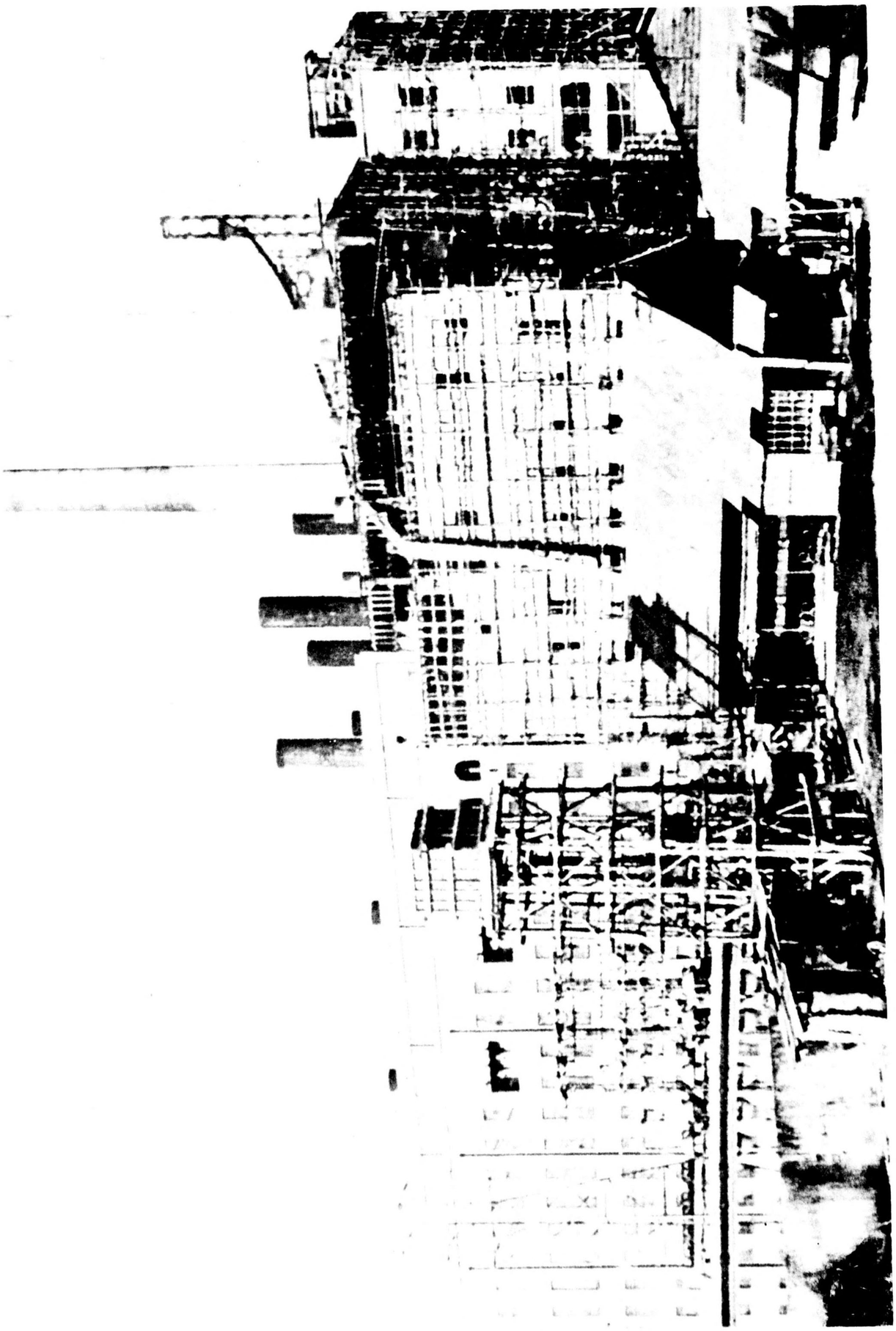
See: Photographs No. IV-86, IV-87, IV-88
Figure No. IV-34

Sources: DnN 1940; ZKT 1939 p.1649; Ohm-sha Guide 1933 p.41; Ohm 5/28 p.301, 5/29 cover and p.253, 6/31 supp p.7, 12/32 p.667, 3/33 p.209, 4/35 pp.338,393, 5/35 p.532, 11/35 adv p.2; DnGZ 4/35 English edition p.42, 10/35 p.(100), 4/36 pp.(3),262; DnK; DJY 1929 pp.269,358

SAKAI HYDRO PLANT - See SHIOKAWA HYDRO PLANT (NAGANO-KEN)

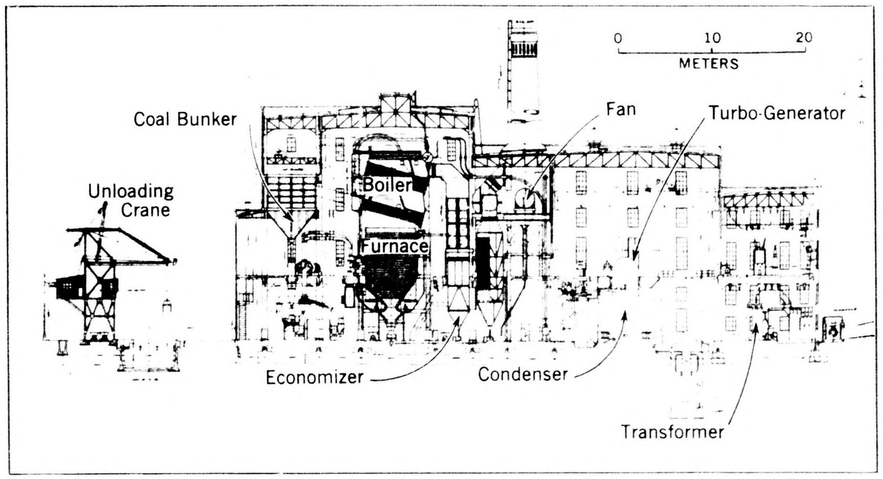


Photograph No. IV-86 Saka Steam Plant in 1928 before extension in 1935



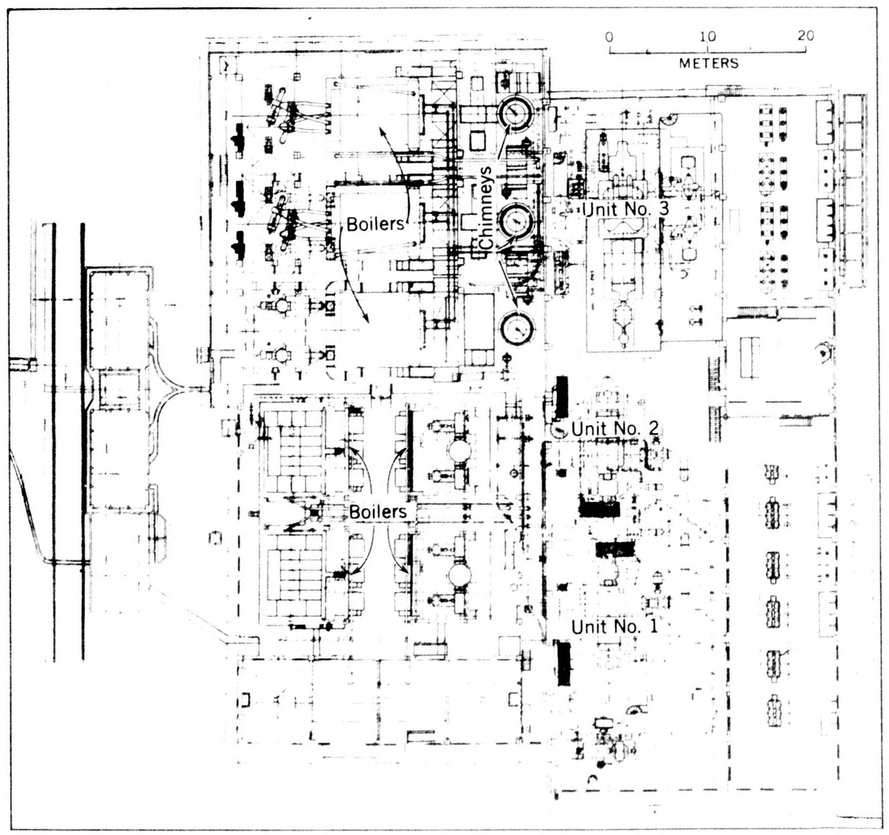
Photograph No. IV-87 Saka Steam Plant in 1935 with extension under construction

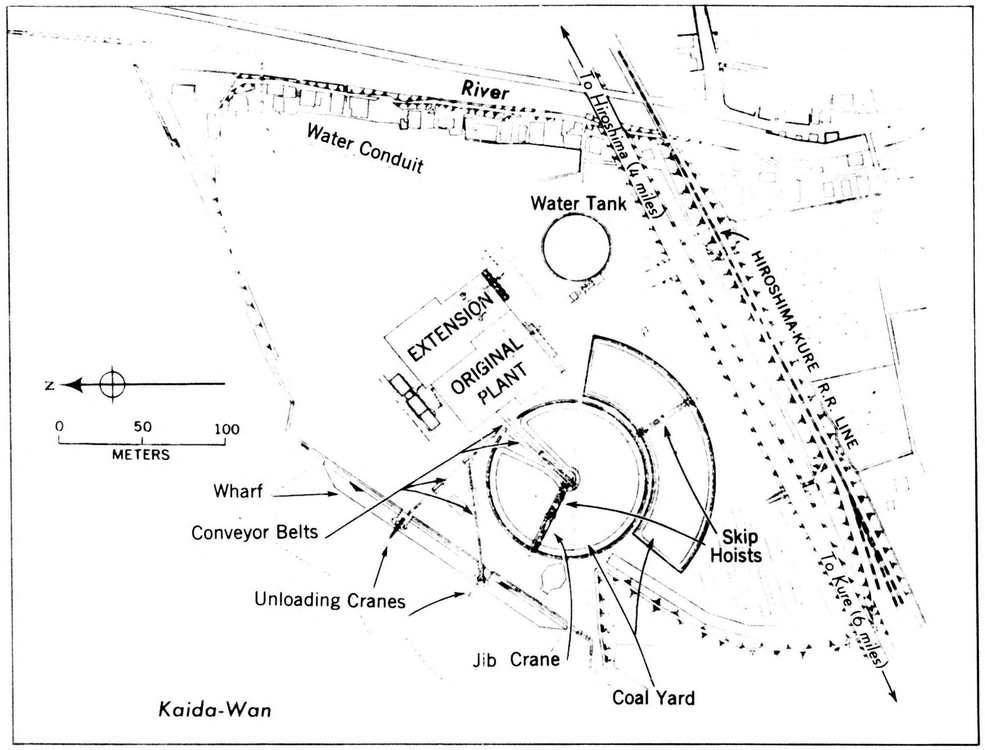
Photograph No. IV-88 Saka Steam Plant, artist's drawing of completed plant



CROSS SECTION OF EXTENSION (UNIT NO. 3)

FLOOR PLAN





GENERAL LAYOUT

SAKA
STEAM ELECTRIC PLANT
HIROSHIMA-KEN

Source: DENKI GAKKAI ZASSHI
(Journal of the Society of Electrical Engineers)
April, 1936 pp. (3), 262

R & A, OSS
LITHOGRAPHED IN THE REPRODUCTION BRANCH, OSS

678. SAKAI STEAM PLANT

Approx. Lat. 34°35'
Long. 135°28'

Company: Nankai Tetsudo KK

Location: Ebisujima-machi, Sakai-shi, Osaka-fu

Installed Capacity (in kw): 5000, as of June 1928

Importance: Rank in Japan - 250 + ; rank in Osaka-Nagoya supply area-100+

Date of Construction: Unknown; in operation as early as Dec 1926 and as recently as June 1928

Details: Particular capacities (in kw) - 5000 supp
Plant, equipment -
Boilers - 8 @ B&W-type, 105 lbs/in^2, 28,106 ft^2, B&W-make
Turbines - 2 (res) @ 2200 hp, Curtis-type, GE-make
2 (res) @ 1500 hp, Curtis-type, horizontal-shaft, AEG-make
Generators - 2 (res) @ 1875 kva, 3-ph, 3450 v, 1500 rpm, 25 cyc, GE-make
2 (res) @ 1250 kva, 3-ph, 375 v, 1500 rpm, 25 cyc, AEG-make
Transformers - 6 (res) @ 500 kva, 3-ph, 22/3.45 kv, D-D conn, water-cooled, 25 cyc, shell-type, Hitachi-make

See: Figure No. IV-34a

Sources: DJY 1927; DJY 1929 pp.260,340; TD Map

679. SAKAINISHI STEAM PLANT

Approx. Lat. 34°35'
Long. 135°28'

Company: Nippon Hassoden KK; formerly Nankai Tetsudo KK

Location: 3 of 152, 5-chome, Azumabashi-dori, Ebisujima-machi, Sakai-shi, Osaka-fu

Installed Capacity (in kw): *33,500, as of 1933

Importance: Rank in Japan - 67 ; rank in Osaka-Nagoya supply area - 29

Date of Construction: Completed Nov 1927; in operation Mar 1940

Details: Plant, external features - Of concrete construction, 4 stories high with 2 chimneys
Plant, equipment -
Boilers - 5 (incl 2 res) @ Garbe-type, 320 lbs/in^2, 720° C, 70,470 ft , SB-make
Turbines - 1 (res) @ 19,000 hp, Rateau impulse tandem-type, MV-make
1 @ 11,000 hp, Ljungstrom-type, Osaka Tekkosho-make
2 @ 11,000 hp, Ljungstrom-type, Mitsubishi-make
Generators - 1 (res) @ 15,625 kva, 3-ph, 11,000 v, 3600 rpm, 60 cyc, MV-make
1 @ 8750 kva, 3-ph, 11,000 v, 3600 rpm, 60 cyc, Hitachi-make
2 @ 8750 kva, 3-ph, 11,000 v, 3600 rpm, 60 cyc, Mitsubishi-make

Transformers - 1 @ 10,000 kva, 1-ph, 11/31.8 kv, D-Y conn, shell-type, Hitachi-make
Other equipment - 1 exciter @ 50 kw, Hitachi-make, and 2 exciters @ 60 kw, Mitsubishi-make; 2 surface condensers; 1 closed-type of feedwater heater; 10 superheaters; chain-grate stokers; 15 economizers
Area served - Osaka-fu and portions of Wakayama-ken

See: Photographs No. IV-89, IV-89a
Map of the City of Osaka
Figure No. IV-34a

Sources: DnN 1940; ZKT 1939 p.1644; DnK; Ohm 2/28 p.134, 3/28 p.180, 12/28 p.623, 4/29 p.212, 12/29 p.608, 6/31 supp p.7, 5/36 p.490; Ohm-sha Guide 1933 p.38; DJY 1929 pp.340,260

680. SAKASHITA HYDRO PLANT

Approx. Lat. 35°32'
Long. 137°32'

Company: Daido Denryoku KK

Location: Plant - Sakashita-machi, Ena-gun, Gifu-ken

Capacity Commonly in Use (in kw): 4430, as of Dec 1937

Importance: Rank in Japan - 250 + ; rank in Osaka-Nagoya supply area-100+

Source of Power: Kiso-gawa

Date of Construction: Completed Oct 1926; probably in operation Dec 1937

Details: Layout - Aqueduct-type
Plant probably operates on 60 cyc

See: Figure No. IV-4a

Sources: Ohm 12/37 p.1390

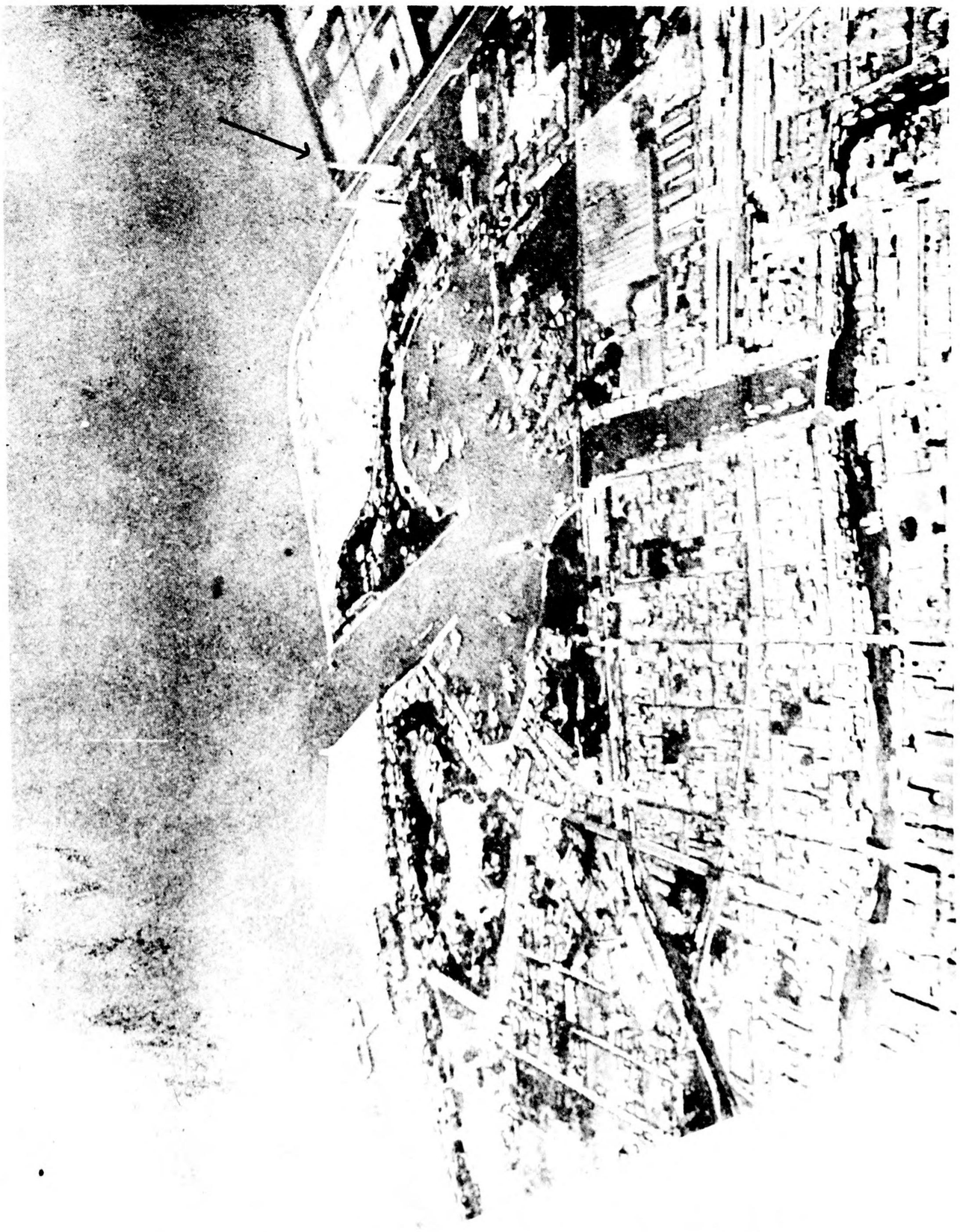
SAKATA-SHI NO. 1 HYDRO PLANT - See KUSATSU HYDRO PLANT

SAKIDO CHUO STEAM PLANT - See CHUO STEAM PLANT

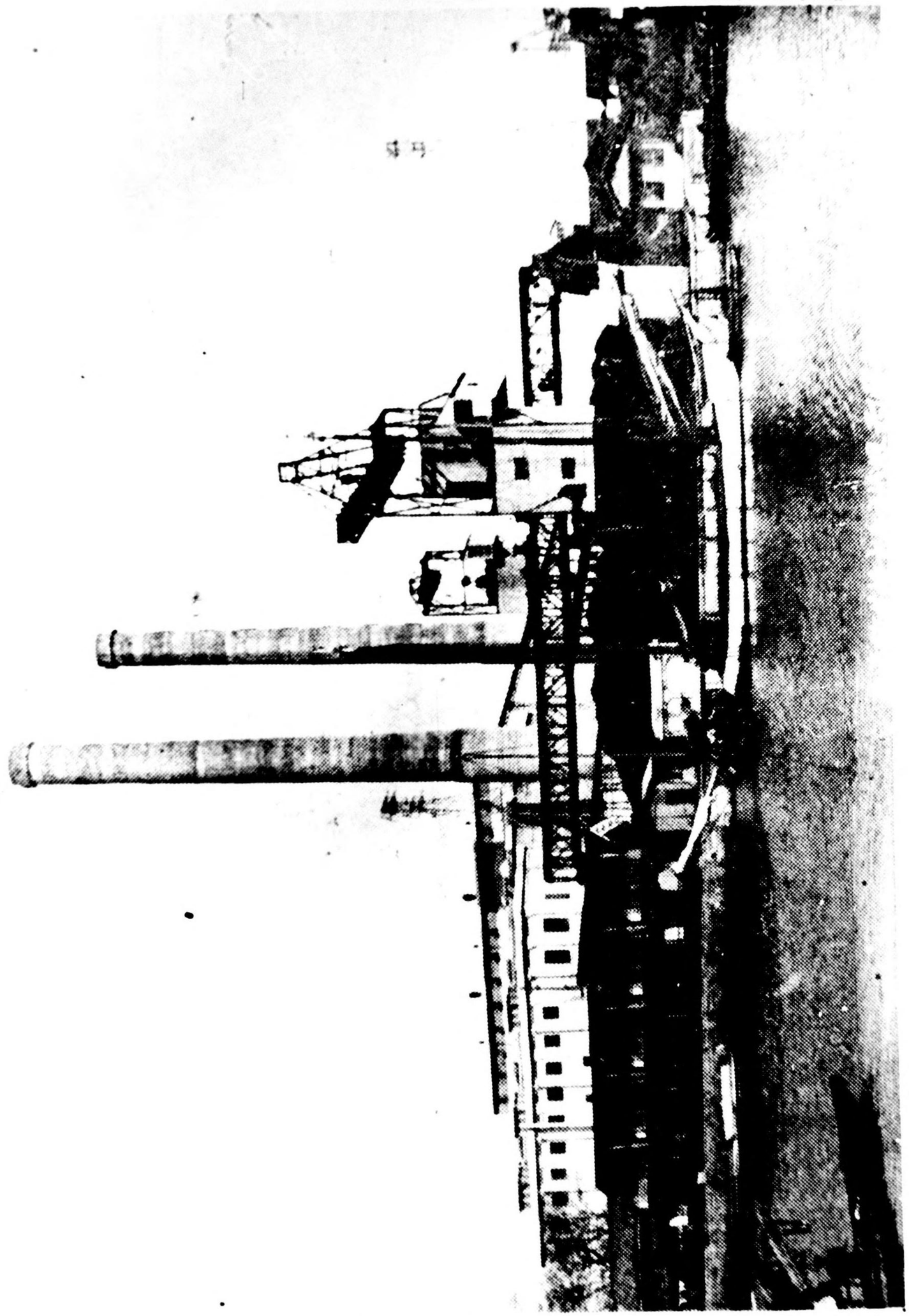
681. SAKU HYDRO PLANT

Approx. Lat. 36°29'
Long. 139°01'

Company: Kanto Suiryoku Denki KK



Photograph No. IV-89 Sakainishi Steam Plant (arrow)

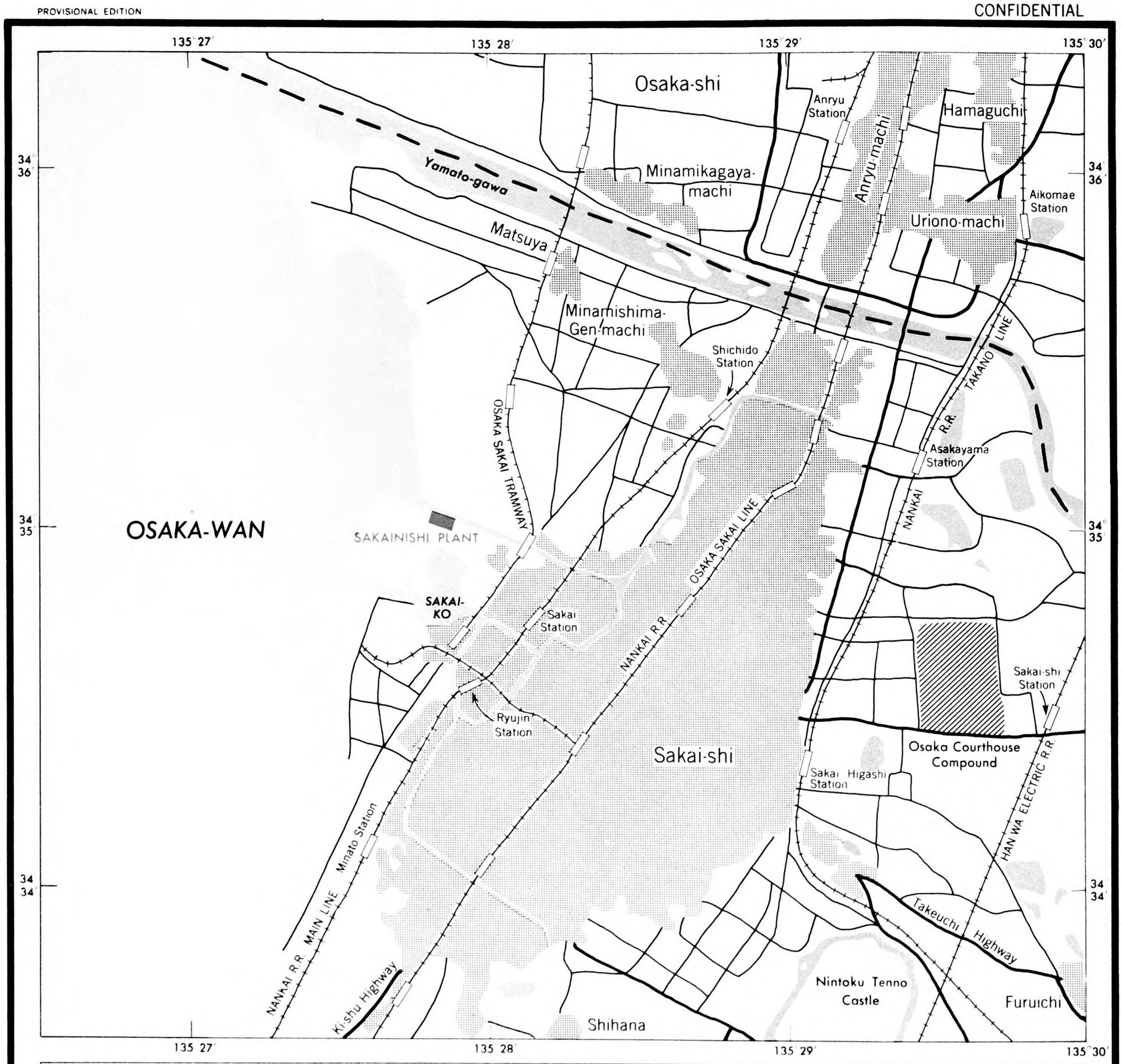


OSS R 94956

Photograph No. IV-89a Sakainishi Steam Plant

PROVISIONAL EDITION

Figure IV-34a
CONFIDENTIAL

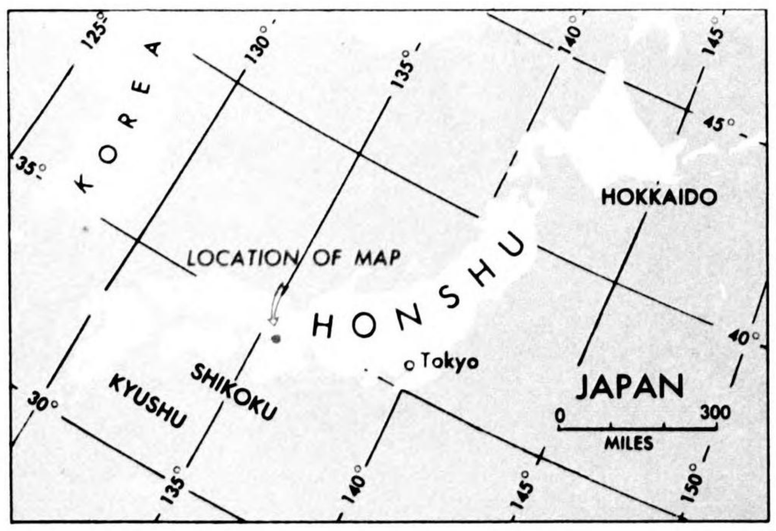


SAKAINISHI STEAM ELECTRIC PLANT

OSAKA-FU

BASE MAP FROM 1:50,000 SERIES, JAPAN IMPERIAL LAND SURVEY BUREAU, 1932

W.D.M.C. FILE NO. JAPAN S30-JGS-50, SHEET 27-9



SETTLEMENT
PRINCIPAL HIGHWAY
SECONDARY ROAD (SELECTED)
TRAMWAY ON HIGHWAY
RAILROAD
RAILROAD STATION
OSAKA CITY LIMITS

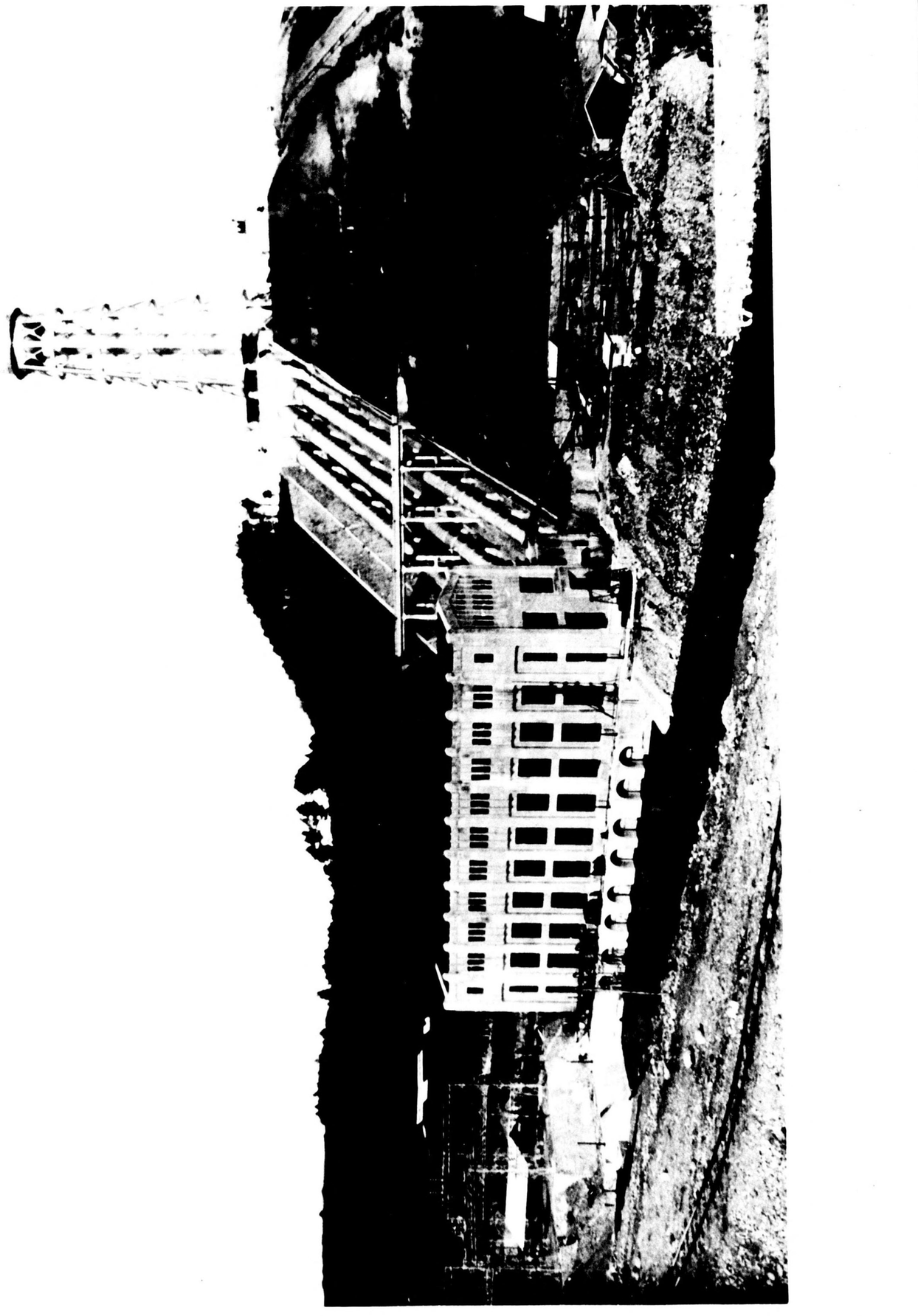
½ 0 1
MILES

½ 0 1
KILOMETERS

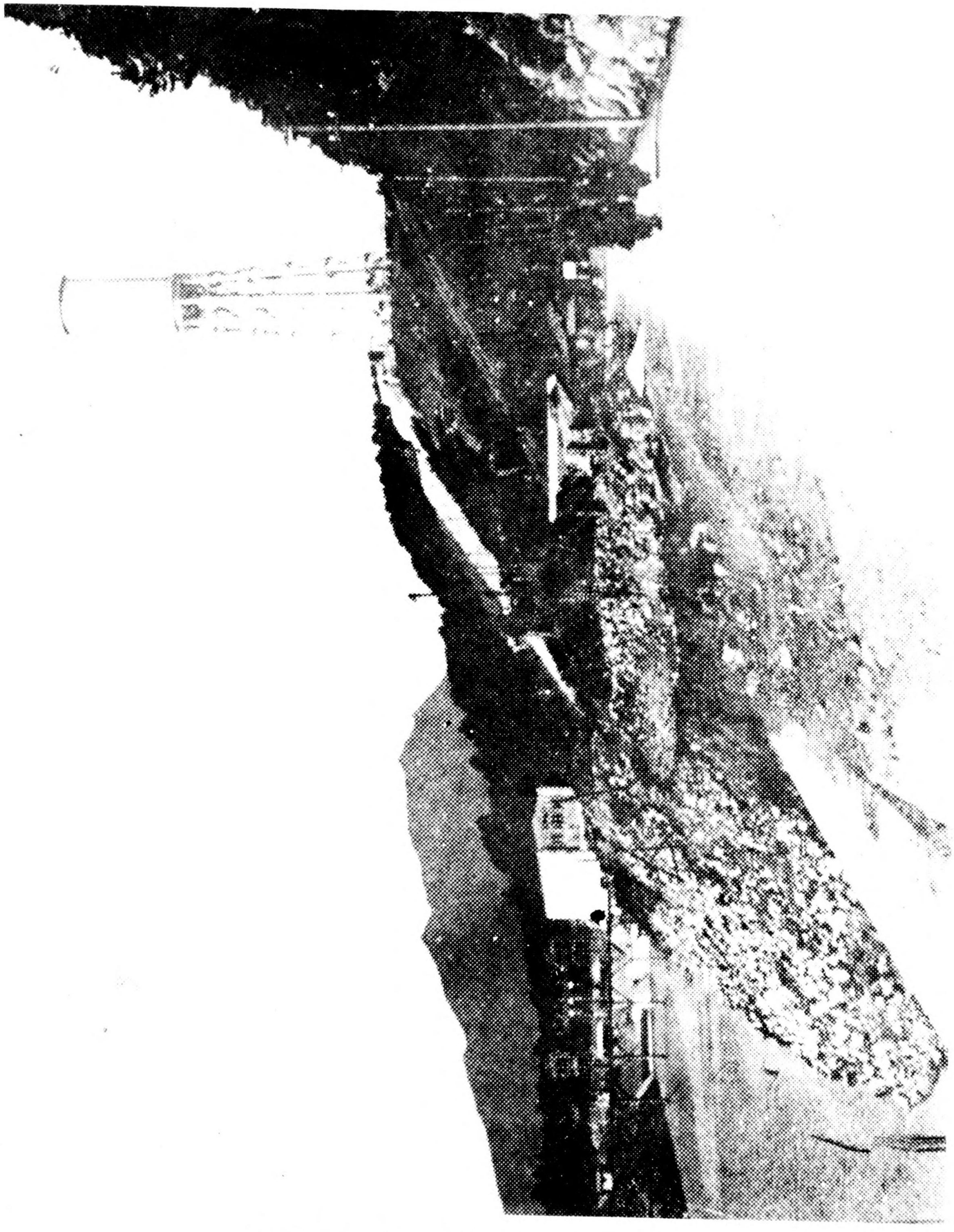
Reliability Code: 1B--1B--1

NO. 3149
23 MARCH 1944

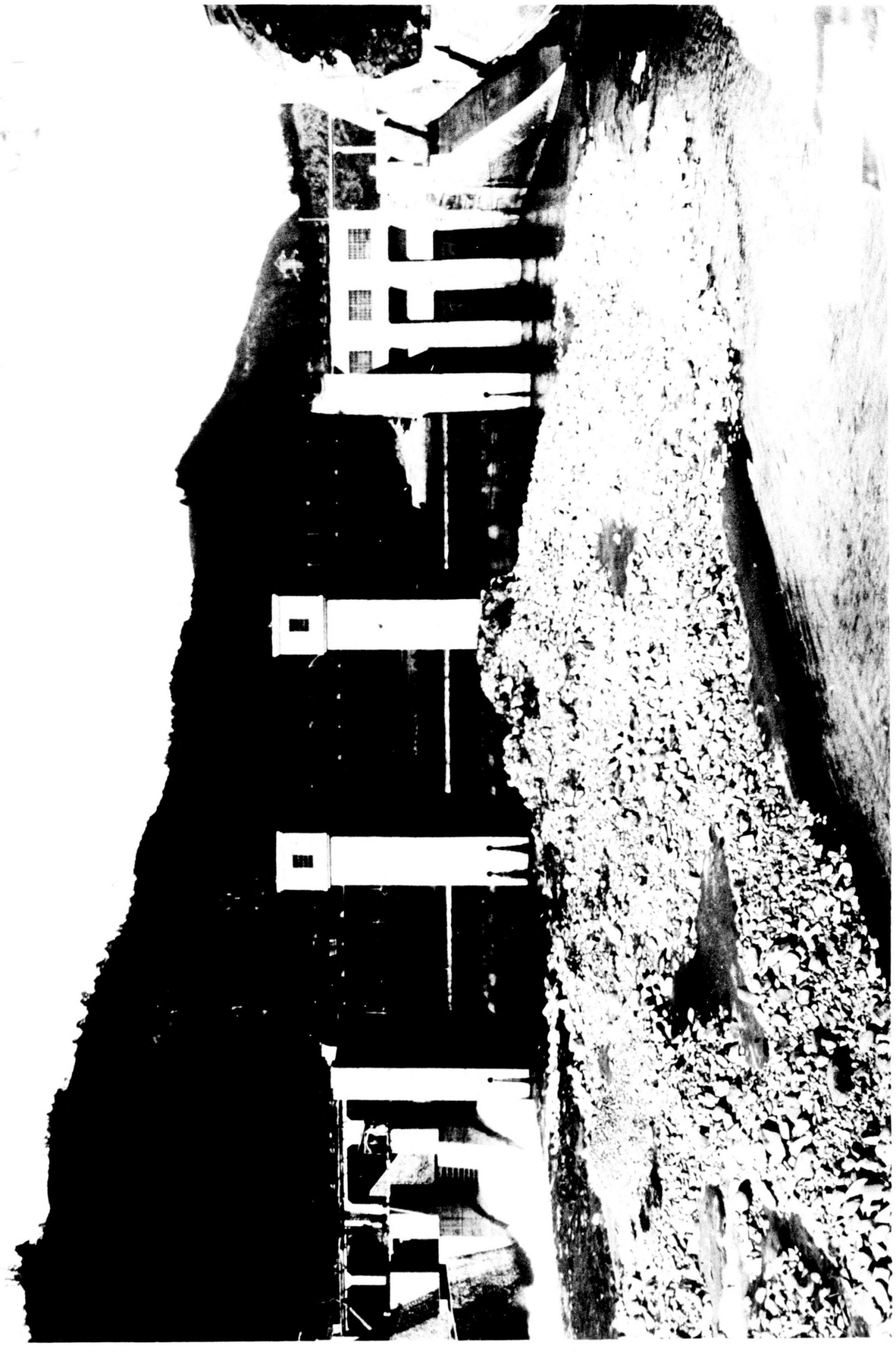
COMPILED AND DRAWN IN THE BRANCH OF RESEARCH AND ANALYSIS, OSS
LITHOGRAPHED IN THE REPRODUCTION BRANCH, OSS



Photograph No. IV-90 Saku Hydro Plant in 1928.
An additional unit was installed in 1938
and an additional penstock was
constructed.



Photograph No. IV-91 Saku Hydro Plant

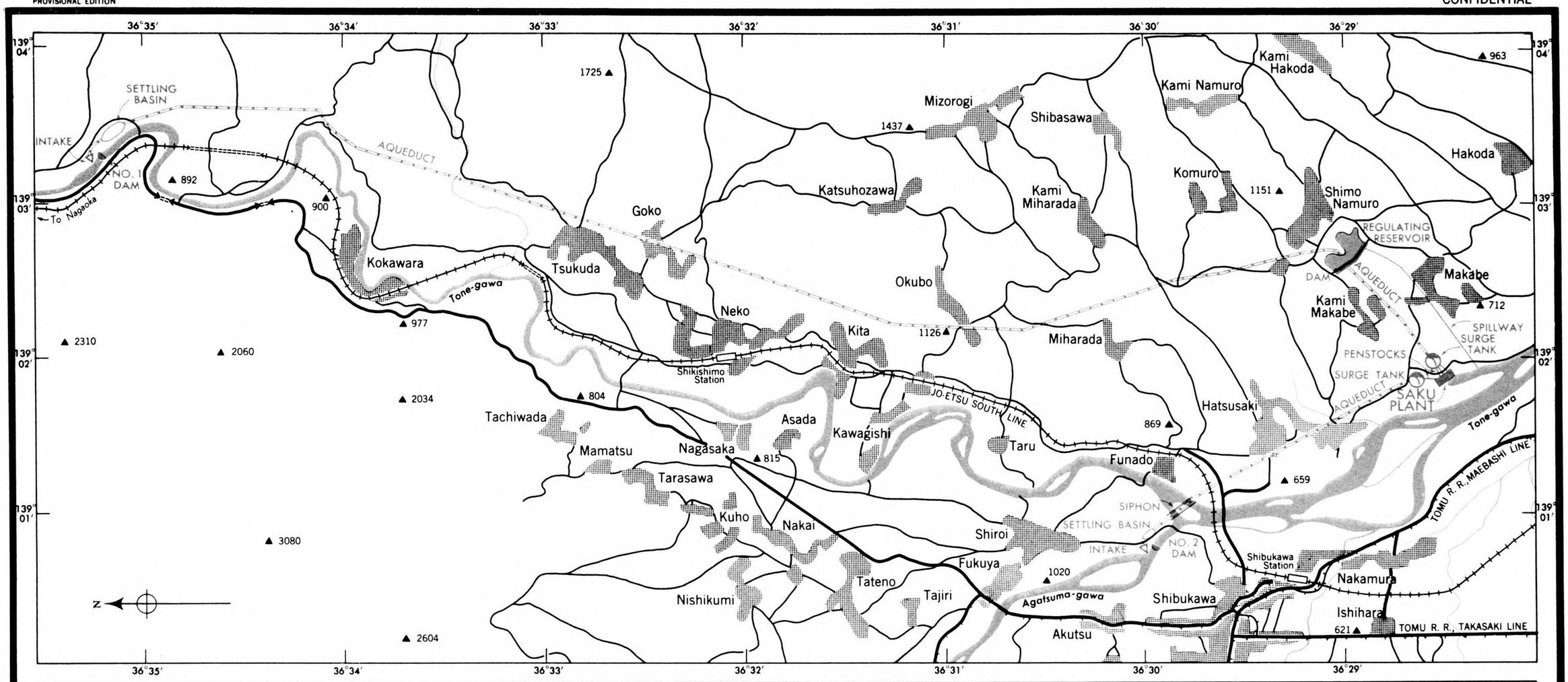


Photograph No. IV-92 Saku Hydro Plant dam

Photograph No. IV-93 Saku Hydro Plant dam and settling basin

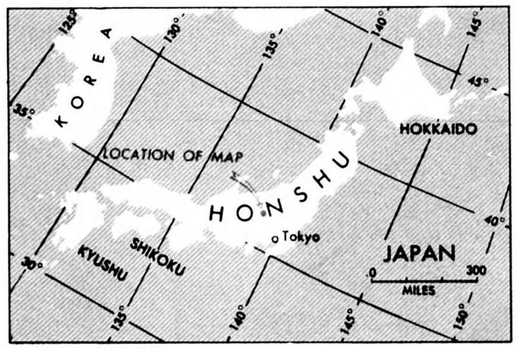
PROVISIONAL EDITION

Figure IV-35 a
CONFIDENTIAL



SAKU HYDROELECTRIC PLANT

GUMMA-KEN



BASE MAP FROM 1:50,000 SERIES, JAPAN IMPERIAL LAND SURVEY BUREAU, 1932
W.D.M.C. FILE NO. JAPAN S30-JGS-50, SHEETS 56-13 AND 56-14

0 1 2
MILES

0 1 2
KILOMETERS

Reliability Code: 1B--1B--1

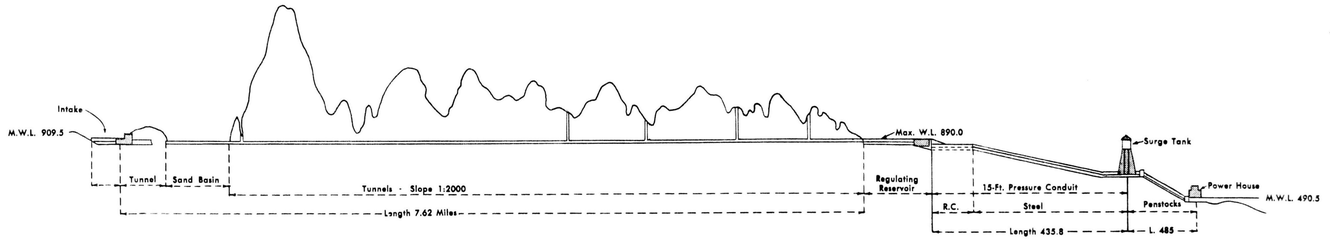
- SETTLEMENT CENTER
- RAILROAD
- TRAMWAY
- TRAMWAY ALONG PRINCIPAL HIGHWAY
- PRINCIPAL HIGHWAY
- SECONDARY ROAD, SELECTED
- TUNNEL
- DITCH
- ▲815 SPOT HEIGHT (IN FEET)

MAP NO. 2845
5 JANUARY 1944

COMPILED AND DRAWN IN THE BRANCH OF RESEARCH AND ANALYSIS, OSS
LITHOGRAPHED IN THE REPRODUCTION BRANCH, OSS

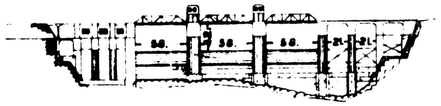
SKETCH PLAN OF SAKU POWER PLANT DEVELOPMENT

KANTO HYDROELECTRIC POWER CO.



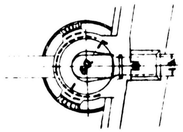
DIAGRAMMATIC CROSS SECTION OF SAKU POWER PROJECT

ELEVATION OF DIVERSION DAM



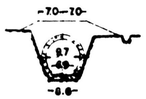
RESERVOIR DAM

INTAKE TOWER

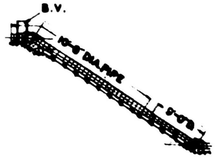


TUNNEL (CROSS SECTION)

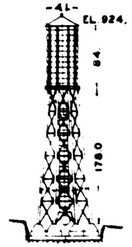
SPILLWAY



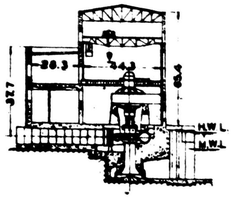
PENSTOCK



SURGE TANK

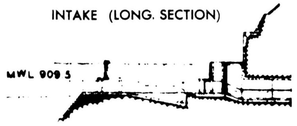


POWER HOUSE

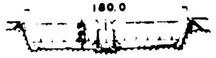


ELEVATION OF INTAKE SECTION OF DAM

INTAKE (LONG. SECTION)



SAND BASIN (CROSS SECTION)



TAIL RACE (CROSS SECTION)

Dimensions Are in Feet

NO. A-2977-RA, OSS
3 MARCH 1944

LITHOGRAPHED IN THE REPRODUCTION BRANCH, OSS

Location: Plant - On the left bank of the Tone-gawa at Nakaohayashi-aza, Makabe-oaza, Kitatachibana-mura, Seta-gun, Gumma-ken
Dams - 1 - Iwamoto-oaza, Kawada-mura, Tone-gun, Gumma-ken
2 - Ochiai-aza, Shiroi-oaza, Nagao-mura, Gumma-gun, Gumma-ken

Capacity Commonly in Use (in kw): 61,520, as of July 1938

Importance: Rank in Japan - 30 ; rank in Tokyo supply area - 11

Source of Power: 1 - Tone-gawa
2 - Agatsuma-gawa of the Tone-gawa system

Date of Construction: Construction was begun Sept 1927 and completed Nov 1928; an extension was completed in July 1938; in operation Mar 194(

Details: Particular capacities (in kw) - *73,950 installed cap
Layout - Aqueduct-type
Eff head - 1 - 117 m; flow - 1 - 59 m^3/sec
2 - 24.27 m; 2 - 33.4 m^3/sec
Dams - 1 - 40 ft high (fixed part), 354 ft long, straight-line, gravity-type, 3 roller gates @ 15 ft high and 58 ft wide, 2 stony gates @ 15 ft high and 21 ft wide, 3 sluice gates @ 32 ft high and 12.5 ft wide
2 - Of concrete with 7 gates
Intakes - 1 - 4 gates; 2 - unknown
Settling basins - 1 - 180 ft long, 29.3 ft deep; 2 - unknown
Aqueducts - 1 - 12,000 m long
2 - 1173 m covered channel of reinforced concrete construction, 1265 m tunnel, 4 m open channel, and 255 m siphon
Surge tank - 80.5 m high, 12.5 m diam, 32 m long (for Aqueduct 1
Forebay - 10 m wide, 89.8 m long, 5.5 m ave depth(for Aqueduct 2
Penstocks - 4 (incl 3 @ 10 ft diam and 1 @ 45.2 m long)
Excess water spillway - 94.9 m long
Log chute - 4.5 m wide, 1.1 m deep, 81 m long
Fishway - 4.5 m wide
Plant, external features - Of concrete construction, 3 stories high with peaked roof. A bridge crosses penstocks in back of plant, and tall surge tank is directly behind plant. Extension with penstock and surge tank is situated at right of plant.
Plant, equipment -
Turbines - 3 @ 36,000 hp, reaction-type, vertical-shaft, AC-make
1 @ 7850 kw, propeller-type, vertical-shaft, Hitachi-make
Generators - 3 @ 28,000 kva, 3-ph, 11,000 v, 300 rpm, 50 cyc, W-make
1 @ 7500 kva, 90% pf, 3-ph, 11,000 v, 250 rpm, 50 cyc, Hitachi-make
Transformers - 7 @ 9333 kva
Area served - Transmission line connected with Joetsu line 2 km away

See: Photographs No. IV-90, IV-91, IV-92, IV-93
Figures No. IV-35a, IV-35b

Sources: DnN 1940; DGS 4/37 p.404; DGS Kaimu 1937 p.60; DnGZ 10/29 p.1132, 9/31 p.556, 12/35 p.(56), 9/38 back cover; HH 1/39 pp.5,6,9; DnK; Ohm 11/27 p.504, 12/27 p.540, 10/28 p.488, 1/29 pp.5,6,62, 4/29 p.212, 6/29 cover, 2/31 p.111, 6/31 supp p.6; KN 1939 p.166; Ohm-sha Guide 1933 p.1; HSG pp.222,227,318,324

682. SAKURADANI NO. 2 HYDRO PLANT Approx. Lat. 33°48'
Long. 134°23'

Company: Toho Denryoku KK; formerly Mie Godo Denki KK

Location: Plant - Takikura-aza, Ototani-oaza, Miyahama-mura, Naka-gun, Tokushima-ken

Capacity Commonly in Use (in kw): 1200, as of Dec 1934

Importance: Rank in Japan - 250 + ; rank in Shikoku supply area - 15 +

Source of Power: Naka-kawa

Date of Construction: Completed 1922; in operation Mar 1940

Details: Particular capacities (in kw) - *1200 installed cap; 1200 reg
Layout - Aqueduct-type
Eff head - 86 ft
Dam - Low, jetty-like, of concrete construction
Aqueduct - 4800 ft tunnel
Plant, external features - Of reinforced concrete construction
Plant, equipment -
Turbines - 1 @ 1700 hp, Francis-type, vertical-shaft, EW-make
Generators - 1 @ 1500 kva, 3-ph, 3450 v, 400 rpm, 60 cyc, W-make
Transformers - 4 (incl 1 res) @ 700 kva, 1-ph, 3.45,3.3/25.4 kv, D-D conn, water-cooled, 60 cyc, shell-type, Kawakita-make

Sources: DnN 1940; ZKT 1939 p.1650; DJY 1929; DJY 1929 p.354

683. SAMBAN STEAM PLANT Approx. Lat. 34°36'
Long. 133°58'30"

Company: Nippon Hassoden KK; formerly Chugoku Godo Denki KK

Location: 234, 9-wari, Enami-oaza, Samban-mura, Jodo-gun, Okayama-ken; at the mouth of the Asahi-kawa on the left bank, 3 miles southeast of Okayama-shi

Installed Capacity (in kw): 75,000, as of 1938

Importance: Rank in Japan - 18 ; rank in Chugoku supply area - 1

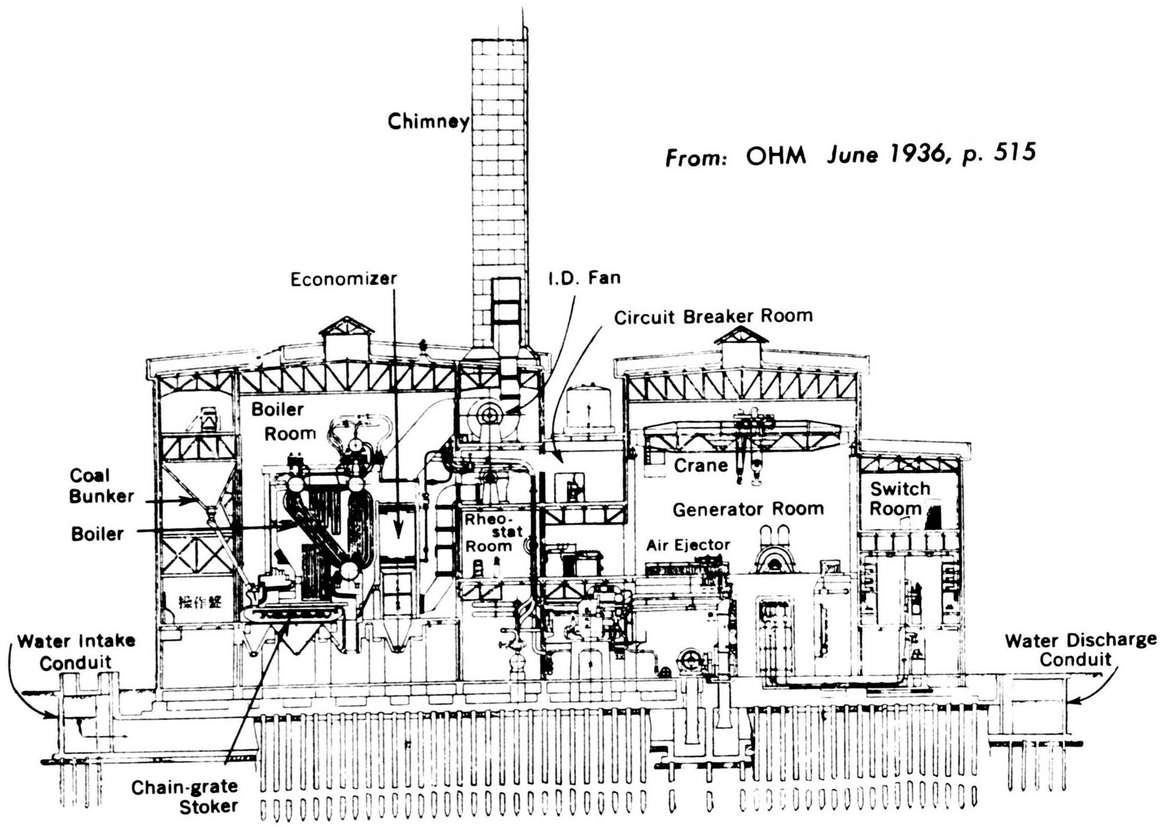
Date of Construction: Completed Feb 1936 with an installed capacity of 50,000 kw; an extension of 25,000 kw completed in 1938; in operation Mar 1940

Details: Plant, equipment -
Fuel supply - Unloaded by barge from the Asahi-kawa; 1 hoist @ 100 hp, 5 belt conveyors @ 100 tons/hr cap
Feedwater - Probably from the Asahi-kawa
Boilers - 4 @ water tube-type, 1300 m^2, Mitsubishi-make
Additional boiler plant equipment has been installed.

Figure IV-36
CONFIDENTIAL

CROSS SECTION OF SAMBAN STEAM ELECTRIC PLANT

OKAYAMA-KEN



From: OHM *June 1936, p. 515*

NO. A-2971-RA, OSS
1 MARCH 1944

LITHOGRAPHED IN THE REPRODUCTION BRANCH, OSS

Turbines - 2 @ 25,000 kw, Zoelly-type, Mitsubishi-make
1 @ 25,000 kw
Generators - 2 @ 31,250 kva, 80% pf, 3-ph, 11,000 v, 3600 rpm, 60 cyc
1 @ 31,250 kva, 3-ph
Transformers - 6 (incl 3 res) @ 11,000 kva
Other equipment - superheaters @ 630 m^2, 171° C

See: Figure No. IV-36

Sources: DnN 1940; ZKT 1939 p.1649; DnGZ 3/36 p.(97), 10/37 p.(143); DnK; Ohm 5/34 p.353, 5/36 p.490, 6/36 p.515

SAMBATA STEAM PLANT - See SAMBAN STEAM PLANT

684. SAMEKAWA HYDRO PLANT

Approx. Lat. 37°00'
Long. 140°30'

Company: Iwaki Tanko KK

Location: Samekawa-mura, Higashi Shirakawa-gun, Fukushima-ken

Capacity Commonly in Use (in kw): 2600 (see Date of Construction)

Importance: Rank in Japan - 250 + ; rank in Tohoku supply area - 20 +

Source of Power: Same-kawa

Date of Construction: Under construction as early as Sept 1938; probably put into operation since

Details: Particular capacities (in kw) -1550 reg; 950 spec
Layout - Aqueduct-type

Sources: KN 1938 p.198, 1939 p.166; ZKT 1939; DGS 4/37 p.111; DnGZ 9/37 p.(139)

685. SAMMAIBASHI HYDRO PLANT

Approx. Lat. 35°14'
Long. 139°06'

Company: Nippon Denryoku KK; formerly Odawara Denki Tetsudo KK

Location: Plant - Maeda-aza, Yumoto-machi, Ashigarashimo-gun, Kanagawa-ken

Capacity Commonly in Use (in kw): 2100, as of Dec 1936

Importance: Rank in Japan - 250 + ; rank in Tokyo supply area - 100 +

Source of Power: Sukumo-kawa of the Haya-kawa system

Date of Construction: In operation as early as Dec 1926 and as recently as Mar 1940

Details: Particular capacities (in kw) - *3600 installed cap; 1050 reg; 1050 spec
Plant, equipment -
Turbines - 3 (incl 1 res) @ 2000 hp, Pelton-type
Generators - 3 (incl 1 res) @ 1500 kva, 3-ph, 3300 v, 500 rpm, 50 cyc, Shibaura-make
Transformers - 3 @ 1300 kva, 3-ph, 3.3,3.15,3/22 kv, D-D conn, water-cooled, 50 cyc, Shibaura-make

Sources: DnN 1940; Ohm 2/31 p.73, 2/36 p.212; DnK; DJY 1927; DJY 1929 pp. 237,304; TD Map

686. SANGASHO HYDRO PLANT Approx. Lat. 32°39'
Long. 131°14'

Company: Kyushu Soden KK

Location: Plant - 5632, Kamedo-aza, Kuwanouchi-oaza, Sangasho-mura, Nishi Usuki-gun, Miyazaki-ken

Capacity Commonly in Use (in kw): 1320, as of Dec 1934

Importance: Rank in Japan - 250 + ; rank in Kyushu supply area - 50 +

Source of Power: Sangasho-kawa of the Gokase-gawa system

Date of Construction: Construction was begun Oct 1930 and completed Feb 1933; in operation Mar 1940

Details: Particular capacities (in kw) - 740 reg; 580 spec
This plant operates on automatic control.
Area served - Transmits power to the Takachiho Hydro Plant

Sources: DnN 1940; Ohm 10/32 p.61, 5/33 p.293; DnGZ 2/33 p.159

SANGO HYDRO PLANT - See YAMASATO HYDRO PLANT

SANSUHARA HYDRO PLANT - See YAMASUHARA HYDRO PLANT

687. SAPPORO KARYOKU STEAM PLANT

Approx. Lat. 43°05'
Long. 141°24'30"

Company: Sapporo Soden KK

Location: 21, Kariki-aza, Sapporo-mura, Sapporo-gun, Hokkaido

Installed Capacity (in kw): 7500, as of Dec 1936

Importance: Rank in Japan - 250 + ; rank in Hokkaido supply area - 15

Date of Construction: Founded June 1925; in operation Mar 1940

Details: Particular capacities (in kw) - 1750 reg; 5750 supp
Plant, equipment -
Boilers - 3 (incl 1 res) @ B&W-type, 250 lbs/in^2, 357° F, B&W-make
Additional boiler plant equipment has been installed.
Turbines - 1 @ 5000 hp, Zoelly-type, EW-make
At least 1 additional turbine has been installed.
Generators - 1 @ 4687 kva, 3-ph, 3300 v, 3600 rpm, 60 cyc, SS-make
At least 1 additional generator has been installed.
Transformers - 4 (incl 1 res) @ 1500 kva, 1-ph, 40,23.1/3.15,3.3,3.45 kv, Y-D conn, water-cooled, 60 cyc, core-type, Shibaura-make

Sources: DnN 1940; DnK; ZKT 1939 p.1652; Ohm 5/28 p.301, 12/28 p.623, 6/31 supp p.7; DJY 1929 pp.294,410; TD Map

688. SARUGAISHI HYDRO PLANT

Approx. Lat. 39°21'
Long. 141°09'

Company: Tohoku Dento KK

Location: Plant - 12, Oki-aza, Higashi-oaza, Yazawa-mura, Hienuki-gun, Iwate-ken

Capacity Commonly in Use (in kw): 2800, as of Dec 1936

Importance: Rank in Japan - 250 + ; rank in Tohoku supply area - 20 +

Source of Power: Sarugaishi-kawa

Date of Construction: Completed May 1931; in operation Mar 1940

Details: Particular capacities (in kw) - 2000 reg; 800 spec
Plant probably operates on 50 cyc

Sources: DnN 1940; DnK; Ohm 8/31 p.411

SARUTOBI HYDRO PLANT - See KUROBE NO. 3 HYDRO PLANT

689. SASADO HYDRO PLANT Approx. Lat. 35°13'
Long. 137°19'

Company: Nippon Hassoden KK; formerly Daido Denryoku KK

Location: Plant - On the right bank of the Yahagi-gawa in 27, Hirahata-Sasado-oaza, Asahi-mura, Higashi Kamo-gun, Aichi-ken
Dam - 15, of 4-banchi, Seigo-aza, Odo-oaza, Asahi-mura, Higashi Kamo-gun, Aichi-ken

Capacity Commonly in Use (in kw): 9000, as of Dec 1935

Importance: Rank in Japan - 250 + ; rank in Osaka-Nagoya supply area - 100+

Source of Power: Yahagi-gawa

Date of Construction: Completed Dec 1935; in operation Mar 1940

Details: Particular capacities (in kw) - 2950 reg; 6050 spec
Layout - Aqueduct-type
Eff head - 43.3 m; flow - 25.7 m^3/sec
Dam - 3 m high, 80 m long, overflow-type
Aqueduct - 411 m covered channel and 4655 m tunnel
Forebay - 31.8 m long, 10.2 m greatest width, 5 m deep
Penstocks - 1 @ 217.2 m long
Excess water spillway - 230 m long steel pipe
Fishway - 2 m wide
Plant, external features - Of reinforced concrete construction, 3 stories high
Plant operates on 60 cyc

See: Photographs No. IV-94, IV-95, IV-96

Sources: DnN 1940; ZKT 1939 p.1644; DGS 5/36 p.548; Ohm 3/35 p.297, 3/36 p.303; DnGZ 5/36 p.(417); TD Map; HSG p.318

690. SASAMADO HYDRO PLANT Approx. Lat. 34°57'
Long. 138°05'

Company: Tokai Shiryo KK

Location: Plant - Sasamado-oaza, Ikumi-mura, Shinda-gun, Shizuoka-ken

Capacity Commonly in Use (in kw): Est 4030, as of Dec 1936

Importance: Rank in Japan - 250 + ; rank in Tokyo supply area - 100 +

Source of Power: Oi-kawa

Date of Construction: Completed Jan 1931; in operation Dec 1938

Sources: DnK; ZKT 1939 p.1647

SASAMAWATARI HYDRO PLANT - See SASAMADO HYDRO PLANT