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A-1 STUDY ON CHIPAN POWER STATION TAILWATER LEVEL

The existing Liwu Power Station was originally a run of river station without pond. In 1965, the existing Chipan Dam was raised and provided with gates to create regulating capacity, but head created is controlled by the intake gate, so that the headrace is a non-pressure tunnel as originally designed.

Therefore, in regard to the tailwater level of the Chipan Power Station, there are two alternative settings which may be considered - one called Alternative I is to release the discharge of the Chipan Station into the Chipan Pond and the other called Alternative III is to lower the turbine setting to the crest elevation of the existing Chipan Dam to release the discharge of the station into the existing settling basin of Liwu Power Station.

According to the Alternative I, there would be no wasted discharge but a head of approximately 13 m will not be utilized, while in the Alternative III, the head could be used effectively, but when the Chipan Station is at full-loaded operation, approximately 6 cu.m/sec in excess of the maximum usable flow of the existing Liwu Station would be wasted.

Between the two alternatives there are two conceivable means. One called Alternative II is to have the two turbines at different setting for releasing one unit discharge into the existing Chipan Pond and the existing settling basin respectively. And the other called Alternative IV is so to lower the turbine setting as to release the surplus discharge of 6 cu.m /sec into the Chipan Regulating Pond during periods other than the rainy season.

The dependable peak capability and energy production of the Chipan Power Station will vary with the head available in the 4 alternative settings, while there will be a reduction in the energy production of the existing Liwu Power Station due to spilling in Alternative III. The annual benefits of the alternatives are NT\$205.91 x 10⁶ for Alternative I, NT\$208.65 x 10⁶ for Alternative II, NT\$209.56 x 10⁶ for Alternative III and NT\$208.50 x 10⁶ for Alternative IV.

As for the construction costs of the 4 alternatives, they vary according to the length of penstocks, types of turbine and generator, and length and cross section of tailrace tunnel. In Alternative II the volume of excavation of the underground powerhouse will increase. The annual costs for the various alternatives based on the above considerations are NT\$116.72 x 10⁶, NT\$118.22 x 10⁶, NT\$118.08 x 10⁶ and NT\$117.5 x 10⁶ for Alternatives I to IV respectively.

Based on the above, an economic comparison for the 4 alternatives is presented in Table A-1-1 which gives the benefit - cost ratios of 1.764, 1.765, 1.775, and 1.774, for the 4 alternatives in the order from I to IV. It will be noted that there is no significant difference between each of the alternatives.

The factors involved in comparison of Alternative II are the complex problems depending much on the maintenance and operation. In Alternative III, the utilization factor of the existing Chipan Regulating Pond will be less than in Alternative I, thus

reducing the merit of the investment made to heighten the Chipan Dam. In the calculation of energy production of the existing Liwu Power Station, it is assumed that the peaking duration of Chipan Power Station is 6 hours even in the dry season, whereas in actual operation it is conceivable that the plant will be operated at full capacity for shorter hours which would result in the spilling of water in excess of the maximum usable flow of the Liwu Power Station, except for the case of Alternative II & IV.

In consideration of the above conditions, the adoption of either Alternative I or Alternative IV is conceivable, but in this report the Alternative I was adopted.

However, the decision of whether to adopt Alternative I or Alternative IV should be made in the definite study of the project after careful and detail studies. Studies made so far reveal that the costs are almost the same and the difference is small in the total construction costs between Alternatives I and IV.

Table A-1-1

Economic Study on Turbine Setting of Chipan Power Station

Alternatives Tailrace Water Level (m)	I		II		III	IV	Remarks	
	2 Units	170.0	1 Unit	170.0	2 Units	156.6		2 Units
Dependable Peak Capability (MW)	120.1		121.7		123.3		121.7	
Annual Energy Production (10 ⁶ kWh)								
Annual Benefit Chipan P.S.	623.93		632.26		640.58		631.27	
Liwu P.S.	0		0		-12.08		0	
Total	623.93		632.26		628.50		631.27	
Benefit								
kW Benefit	110.76		112.23		113.71		112.23	709.4 NT\$/kW x 1.3 = 922.22
kWh Benefit	95.15		96.42		95.85		96.27	0.1525 NT\$/kWh
Total (B)	205.91		208.65		209.56		208.50	
Construction Cost (10 ⁶ NT\$)	1,360.0		1,369.4		1,377.6		1,370.2	
Annual Cost								
Fixed Cost	105.62		107.12		106.98		106.41	0.07776
Variable Cost	11.10		11.10		11.10		11.10	74 NT\$/kW
Total (C)	116.72		118.22		118.08		117.51	
Benefit-Cost Ratio (B)/(C)	1,764		1,765		1,775		1,774	

A-2 ADVANCED CONSTRUCTION OF CHIPAN POWER STATION

Alternative I.

Structures enlarged to get the same Inflow at Kuyuan Regulating Pond as that in case of Simultaneous Construction

If Chipan Power Station is developed first with the same structures as those in the case of simultaneous construction, the runoff from Topokuo, Tzuen, Hualu and Fuhsing catchment areas, from which Kuyuan Power Station will draw water, would flow down freely to the Kupaiyang and Mantou Shan intake sites so that the available flow at Kuyuan would be very small during the low runoff season while there would be more spilling during flood runoff season. Therefore, a study was made of the possibility enlarging structures to take in water from Kupaiyang and Mantou Shan so that inflow into Kuyuan Regulating Pond would be the same as in the case of simultaneous construction with Kuyuan Power Station.

The result as shown in Table A-2-1 is that there will be an increase in energy production of 86,130,000 kWh annually. As for dependable peaking capability, it is not possible to have additional capability as the dry season runoff is small and can be drawn regardless of the size of structures.

On the other hand, the construction cost required to enlarge intake structures at Kupaiyang and Mantou Shan would be roughly NT\$41,000,000.

Alternative II.

Construction of Yingchiao Regulating Pond to set the same inflow at Kuyuan Regulating Pond as that in the case of Simultaneous Construction

In the Liwu Chi basin development scheme, it is not possible to construct a regulating pond of a capacity to regulate the inflow from the entire drainage area because of the topography and geology at the Kuyuan site and only the runoff of the catchment area of Chipan Power Station can be regulated. Because of this condition, the operation of Kuyuan and Chipan Power Stations must be in series at all times.

If Chipan Power Station is developed first, there would be a shortage of water equal to the effective storage capacity of Topokuo Regulating Pond.

It becomes conceivable to construct a storage pond at Mantou Shan intake site to secure the required storage capacity. However, in the case a regulating pond is constructed at this site, it would result in drawing water from an elevation higher than the normal high water level of Kuyuan Regulating Pond so that operation would be complex requiring the release of water from Mantou Shan pond by operating gates, while watching the water level of Kuyuan Regulating Pond. For these reasons, a study was made of constructing a regulating pond at the Yingchiao site which is less favorable than Mantou Shan as a damsite, but would be at a lower elevation and would not require operation of gates to release water.

As the river gradient is steep at the Yingchiao stie, and the drawdown of Kuyuan Regulating Pond is limited to 7 m, it would not be possible to secure the required regulating capacity of 425,000 cu.m, and as shown in Fig. A-2-1, this capacity would be 215,000 cu.m. As indicated in this figure, the low water level of Inchao Regulating Pond was taken at an elevation 1 m above that of the Kuyuan Pond so that during operation of Chipan Power Station the required inflow would flow by gravity without operating gates.

As shown in Table A-2-2, there will result an increase of energy production of 86,130,000 kWh annually and an increase of 26.7 MW in dependable peak capability. Increment of energy production is equal to that of Alternative I.

On one hand, the construction cost of the Inchao regulating dam and enlargement of intake structures of Kupaiyang and Mantou Shan is roughly NT\$244,000,000.

Based on the above estimated additional benefits and costs, the economic analysis is made and shown in Tables A-2-1 and A-2-2. According to this analysis, the separate construction would not be economically feasible for the cases of Alternative I and II if the Kuyuan Project is constructed 3 and 8 years after Chipan Project respectively.

Table A-2-1 Alternative I

Proposal Plan	Annual Energy (10 ³ kWh)	Output (MW)		Remark
		Maximum	Dependable Peak	
(1) Final Proposed Plan (III) with Chipan Power Station to be developed first	537,806	150.0	91.3	Quantity of water taken at Kupaiyang 6.51 m ³ /s Quantity of water taken at Mantou Shan 8.25 m ³ /s
(2) Chipan Power Station to be developed first including extension of intake structure	623,935	150.0	91.3	Quantity of water taken at Kupaiyang 14.96 m ³ /s Quantity of water taken at Mantou Shan 19.95 m ³ /s
Energy Increment (2) - (1)	86,129	0	0	Benefit 0.1525 NT\$/kWh

Number of years required to justify the additional cost is calculated below.

$$\text{Present worth factor} : \frac{(1+i)^n - 1}{i(1+i)^n}$$

$$\text{Annual benefit} : \text{NT\$ } 13.1 \times 10^6 = 86,129 \times 0.1525 \text{ NT\$/kWh}$$

$$\text{Investment} : \text{NT\$ } 41.0 \times 10^6$$

$$\text{Interest} : i = 0.07$$

$$41.0 \times 10^6 = \frac{(1+0.07)^n - 1}{0.07(1+0.07)^n} \times 13.1 \times 10^6$$

$$\therefore n = 3.7 \text{ (year)}$$

Table A-2-2 Alternative II

Proposed Plan	Annual Energy (10 ³ kWh)	Output (MW)		Remark
		Maximum	Dependable Peak	
(1) Final Proposed Plan (III) with Chipan Power Station to be developed first	537,806	150.0	91.3	Quantity of water taken at Kupaiyang 6.51 m ³ /s Quantity of water taken at Mantou Shan 8.25 m ³ /s
(2) In case of built Yingchiao regulating pond including extension of intake structure	623,935	150.0	118.0	Quantity of water taken at Kupaiyang 14.96 m ³ /s Quantity of water taken at Mantou Shan 19.95 m ³ /s
Energy Increment (2) - (1)	86,129	0	26.7	Benefit 0.1525 NT\$/kWh 709.4 x 1.3 NT\$/kW

Number of years required to justify the additional cost is calculated below.

$$\text{Present worth factor} : \frac{(1+i)^n - 1}{i(1+i)^n}$$

$$\text{Annual benefit} : \text{NT\$ } 37.7 \times 10^6$$

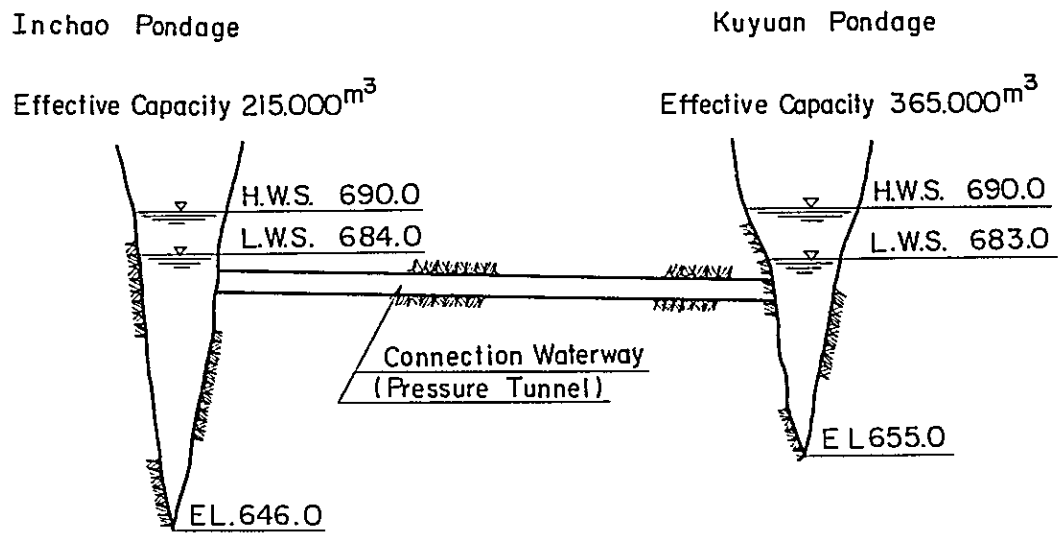
$$\text{Investment} : \text{NT\$ } 244.0 \times 10^6$$

$$\text{Interest} : i = 0.07$$

$$244.0 \times 10^6 = \frac{(1+0.07)^n - 1}{0.07(1+0.07)^n} \times 37.7 \times 10^6$$

$$\therefore n = 8.9 \text{ (year)}$$

Fig. A-2-1 Sketch of Kuyuan and Yingchiao Pondage



A-3 LOAD FORECAST

The load forecast prepared by Taipower and checked by EPDC of Japan classified customers into two principal categories; namely lighting and power or industry customers. Both historical data and past trend of growth of various categories and other factors affecting load demand were analysed to estimate future power requirements of each category and then the overall system power requirements. The forecast was found to be reasonable and accepted.

In order to get a realistic estimate of future power requirement, the future production, sales plan and power requirements of the next three years of each of large power customers were investigated, and the parameters of economic activities and the future development of each of the industries were analysed. The estimates of the power requirements for each of the two categories are described as follows:

1. Lighting Demand

(1) Illumination was formerly the main item under the lighting category. However, as a result of increase in per capita income and wider use of electric appliances, such as cooker, TV-set, refrigerator and air conditioner, lighting consumption has been much affected and has grown in recent years. For example, wider application of electric appliances in Japan during the period 1960-63 produced a high growth rate of over 17.0 percent for the lighting requirement (dropped to 14.9% in 1964, 11.3% in 1968). Such high growth rates of 18.0 percent and 17.5 percent also appeared in Taiwan in 1964 and 1965, respectively. Though these high rates were stimulated by the rapid economic growth during those years, yet they directly resulted from the sharp increase of application of domestic electric appliances as mentioned above. The growth rate was 21.1 percent in 1967 and 20.4 percent in 1968.

The application of domestic electric appliances and its future growth trend will be the most important factor in making the forecast of lighting requirement. The present and future densities of domestic appliances in Taiwan are shown in Table A-3-1.

Lower part of Table A-3-1 shows the growth trend of densities of TV-set and refrigerator in Japan. General application of these appliances in Japan started around 1953 and rose sharply from 1960, resulting in a rapid growth of lighting demand.

The average per capita income in Taiwan in 1968 was around US\$237, corresponding to that in Japan in 1956; while the densities of TV-set and refrigerator in Taiwan in 1968 corresponded to those in Japan in 1960 and 1962 respectively.

The average per capita income in Taiwan in 1978 is anticipated to be US\$475, corresponding to that in Japan in 1962. At that time, the density of TV-set in Japan was about 49.5%, and that of refrigerator, 14.5%. However, the densities of TV-set and refrigerator in Taiwan in 1978 would exceed those in

Japan in 1962 and are anticipated to reach Japanese levels of 1963 and 1965, respectively. As far as cooker is concerned, the density in Taiwan in 1968 was over 28.7%, corresponding to that in Japan in 1961; while that in Taiwan in 1978 will be higher than that level in Japan in 1968.

In general, the density of application of electric appliances in 1968 has reached the Japanese level of 1960-1962. The per capita lighting requirement in Taiwan in 1968 is 138 kWh which is very close to that of Japan in 1960 (143 kWh). In other words, it is about eight years behind the Japanese level (see Table A-3-2). From Fig. A-3-1 it can be seen that an annual growth rate of above 16 percent happened only four times in Japan, but this rate might be maintained in Taiwan for six years (1967-1972). It is anticipated that three years later, the growth rate of lighting demand in Taiwan might decrease as the increase of electric appliances will saturate at that time.

Consumption in lighting of 1966 and 1968 were 1,291 GWh and 1,881 GWh respectively. Among the increase of 590 GWh in these two years, 227.1 GWh was due to increase of electric appliances (see Table A-3-3). If there were no increase of electric appliances, the lighting consumption for 1968 would be only 1,654 GWh which would give an average annual growth rate of 14 percent only. But the actual rate was 20.4 percent, so the electric appliances attributed about 6.4 percent of the 20.4 percent increase in lighting consumption. This situation will not continue for more than another three years.

It is anticipated that the annual growth rate of lighting demand in the coming ten years will be between 12.3 - 19.5 percent, averaging at 15.3 percent.

(2) Based on the 1958-1968 actual figures, the following were established by extrapolation for forecasting 1969 to 1978 requirements.

By lighting energy consumption relation:

$$\log Y = 2.9433 + 0.0584 X \quad (1)$$

By GNP vs lighting energy relation assuming future growth rate of GNP is 9.65%.

$$\log Y = 0.06187 + 1.4589 \log X_1 \quad (2)$$

where,

X = Number of year, taking 1963 as based year (1963 = 0)

X_1 = GNP in NT\$10⁹ as of 1964 price level.

Y = Total lighting consumption in GWh

The results obtained from the above formulas are shown in Table A-3-4.

Based on the above two estimates and after considering the trend of use of domestic electric appliances, the annual lighting consumption per capita for 1969-1978 period is estimated as shown in Column 2 of Table A-3-4 wherein the average per capita consumption will be 456.6 kWh for 1978. The total lighting consumption, estimated by multiplying the per capita lighting consumption by population, will be 7,804 GWh for 1978, resulting in an average annual growth rate of 15.3 percent during 1969-1978 period.

2. Industrial Power Demand

Industrial power demand includes requirements of both large power and small power customers. Large power customers are those with contracted capacity of 500 kW and above. Industrial customers other than large power customers are small ones. The annual growth rate of small power was not stable and subject to substantial variation year by year, because some of the high tension small power customers became large users when their contract demand exceeded 500 kW, and vice versa. As the number of small power customers is great (approximately 79,000), the method of long-range trend can be applied to its load forecast. Based on the 1958-1968 actual figures, the growth tendency for small power, by using least square method and logarithm correlation, can be expressed by the following two equations:

$$Y = 996 + 126.3 X + 11.0 X^2 \quad (1)$$

$$\log Y = 3.015 + 0.050 X \quad (2)$$

where,

X = Number of year, 1963 as base year (1963 = 0)

Y = Power consumption in GWh.

By extrapolating these two equations, the small power consumption is estimated to be 5,363 GWh and 5,733 GWh respectively for 1978 (see Column 2, 3 of Table A-3-5).

For estimating the large power requirement, investigation of various individual customers was made to collect data concerning future production and sales plans for the coming three years, and reference was also made to the fifth Four-year Economic Development Plan launched by the Government. Large power consumption for 1969-1978 is estimated and tabulated in Column 4 of Table A-3-5. Small power consumption plus large power consumption then is the industrial power consumption as tabulated in Columns 5, 6 of Table A-3-5.

Based on the 1958-1968 actual power requirement and Gross Domestic Product (GDP), growth tendency of industrial power requirement in term of GDP can be expressed as follows:

$$\log Y = 0.9597 + 1.13171 \log X \quad (3)$$

where,

Y = Power consumption in GWh

X = GDP in NT\$10⁹ of 1964 price level

Based on the 1958-1968 actual power requirement and Industrial Gross Domestic Product (IGDP), growth tendency of industrial power requirement in term of IGDP can be expressed as follows:

$$\log Y = 0.2261 + 1.1351 \log X \quad (4)$$

where,

Y = Power consumption in GWh

X = IGDP in NT\$10⁹ at 1964 price level

For the future ten years, the results of equations (3), (4) tabulated in Columns 7, 8 of Table A-3-5 and the industrial power requirements of 1978 are calculated as 23,264 GWh and 23,344 GWh which are 7 percent and 7.4 percent higher than this (Column 1 of Table A-3-5).

In estimating load for the large power category, the customers were divided into 12 groups, namely: textile, aluminum, metal, machinery, ceramic, fertilizer, alkali, paper, chemicals, food, mining and others. Power requirements for these 12 groups are estimated in accordance with their respective production plan, production method and power consumption per unit production for 1978, with reference to the targets of industrial production projected in the ten-year long-range economic development program sponsored by the government. Power consumption and the growth rates for the various industries for the next decade are summarized in Table A-3-6 and Table A-3-7 respectively.

3. Status and Trend of Various Industrial Groups

The status and trend of power consumption for each group of industries are described as follows:

(1) Textile Industry

As great demands are still existing in both domestic and international markets, the textile industry has rapidly expanded in 1968, especially the synthetic fiber production and cloth-making industry has made great improvement in both quality and facilities. Textile industry consumed 578 GWh of power in 1968, an increase of 18.9 percent, which was 8.4 percent of the total industrial power requirement.

The great expansion of the textile industry was mainly due to the success of gaining international markets, such as African market and others. The export

of textile products is now the highest among those of the 12 groups of industries. In the future, Taiwan's textile industry will face the following problems: keen competition in the international market, limitations of the countries to be exported such as American limitation measures, gradual increase of wage in Taiwan and the limited size of domestic market. Continuing expansion can not be maintained unless efforts are made continuously by government and the textile community itself, production for export be inspected strictly, production quality be improved, new products be developed so as to meet the requirement of international market.

Therefore, the annual growth rate of power consumption of textile industry is anticipated to be only 10.1 percent.

(2) Aluminum Industry

The aluminum industry consumed 418 GWh of power in 1968, a growth rate of 5.8 percent, which was 6 percent of total industrial power requirement. Successive expansion of the aluminum industry was accomplished in the past and some are still under way. The annual production capacity is 20,000 ton of ingots, 15,000 ton of aluminum plate and 1,600 ton of aluminum foil. Expansion project has been launched in 1967 to raise ingot production from the present 20,000 ton to 38,000 ton, aluminum oxide production from the present 42,000 ton to 76,000 ton. This expansion project is scheduled to be completed in 1971. For this expansion project, capacities of 14,000 kW should be added by September 1969; 4,500 kW, by June 1969; 16,000 kW, by January 1971; 5,000 kW, by July 1971 and 10,000 kW, by July 1973. Total capacity for Taiwan Aluminum Corporation (TAC) would be over 100,000 kW in 1973. According to the TAC plan, ingot production will be 70,000 ton and power requirement would be around 1,300 GWh in 1978, resulting in a 12 percent average annual growth rate of power consumption during 1969-1978.

The Taiwan Aluminum Corporation and Taiwan Alkali Corporation are planning to set-up power plant of installed capacity of 90,000 kW which is scheduled to be completed by end of 1971. In this load forecast, this capacity of 90,000 kW is not considered.

(3) Metal Industry

In 1968, metal industry consumed 778 GWh of power, an increase of 10.5 percent over the previous year, which was 11.2 percent of the total industrial power requirement.

Steel and iron production increased from less than 20,000 ton in 1952 to 750,000 ton in 1968. By the recent year's expansion, it is anticipated that total production will be about 1,000,000 ton in 1970.

The Stanford Research Institute of U.S.A. sent a team to identify investment opportunities in this country and listed the steel and iron industry as one of the 14 industries most favorable for further development in Taiwan. The Government has now a plan to establish an integrated steel factory, using

blast furnace to produce high-quality steel. The initial capacity of about 500,000 ton per year is programmed to be in operation by 1972, and to be boosted to 1,000,000 metric tons in 1974.

Though there is much room for improvement in the management of steel and iron works, yet the industry will still expand gradually because of product demand. It is anticipated that an average annual growth rate of power consumption by this sub-group in the coming ten years will be 10.1 percent and power consumption by this industry will be 2,028 GWh in 1978.

(4) Machinery Industry

In 1968, machinery industry consumed 224 GWh of power which was 3.2 percent of the total industry power consumption. The annual growth rate is 29.5 percent which is the highest among all industries.

In the past ten years, annual growth rate of power consumption by this industry was low: 12.2 percent in 1957-1960, 10.2 percent in 1961-1964, while it jumped to 22.9, 34.1 and 29.5 percent in 1966, 1967 and 1968 respectively.

Production of TV-set was started in 1964, annual production of TV-set increased from 30,000 in 1964 to 650,000 in 1968; while that of refrigerators, from 9,000 in 1963 to 100,000 in 1968; that of air conditioners, from 136 in 1964 to 5,860 in 1968; that of transistors, from 487,000 in 1964 to 4,013,000 in 1968. The transistor industry has a bright future in Taiwan wherein skilled technicians and cheap wage are available. It is anticipated that two or three years later, the transistor industry will take the place of the textile industry as the top foreign exchange earner.

Since machinery is of vital importance for the further development of the Island, more effort is expected in this group of industries. The production of automobiles, electrical machines, electric components, and shipbuilding are taking shape either through international technical cooperation or as a result of experience gained during the past years. It is anticipated that power consumption by this sub-group will be 1,060 GWh in 1978, resulting in an average annual growth rate of 16.8 percent in the coming ten years.

(5) Ceramics

In 1968, ceramics consumed 599 GWh of power, an annual increase of 19.3 percent, which was 8.7 percent of total industrial power consumption. The main products of this industry are cement and plate glass with cement absorbing 84 percent of the power consumed. In 1968, cement production was 4,000,000 ton, an annual increase of 15 percent, among which 3,080,000 ton were for domestic sales and 920,000 ton for international markets. At the end of 1968, cement production capacity reached 4,400,000 ton. As many factories are being expanded or expected to be expanded and based on the fifth Four-Year Economic Development Program, it is anticipated that cement production in 1972 and 1978 will be 7,200,000 ton and 12,000,000 ton respectively with 2,400,000 ton going to international markets. The average annual increase rate of cement

production will be around 12 percent in 1973-1978 period without considering the 2,400,000 ton for international markets. It is estimated that power consumption by this industry in 1978 will be 1,811 GWh, growing at an average annual rate of 11.7 percent in the coming ten years.

(6) Fertilizer Industry

In 1969, fertilizer industry consumed 816 GWh of power, an annual growth rate of 7.2 percent, which was 11.8 percent of the total industrial power requirements.

It is anticipated that power consumption by this category will be 1,200 GWh, increasing at an annual rate of 3.9 percent in the next ten years. The reduction of power consumption from 1964 to 1967 was due to the use of large quantities of natural gas and some oil for ammonia production.

(7) Alkali Industry

In 1968, alkali industry consumed 391 GWh of power, an annual growth rate of 12.3 percent, which was 5.6 percent of the total industrial power consumption.

Alkali is the basic industry that supplies chemicals of the soda family and its related products, such as caustic soda, soda ash, chlorine etc., to other processing industries. Raw materials for alkali, such as limestone and salt, are plentiful in Taiwan. Production of caustic soda products in 1967 and in 1968 were both 90,000 ton. A number of plants are either under expansion or planned. So production will increase to 170,000 ton in 1972. It is forecasted that by 1978, 340,000 ton of caustic soda products will be turned out and 1,300 GWh of power is required. It is estimated that the average annual growth rate of power demand for the coming ten years will be 12.8 percent.

(8) Paper Industry

In 1968, paper industry consumed 412 GWh of power, an annual growth rate of 12.3 percent, which was 6 percent of the total industrial power consumption.

Taiwan has plentiful supply of fibrous materials, such as timber, rice straw, bamboo, and bagasse from sugar mills. Pulp and paper making has long been an established industry. Poor management, inefficient equipment and wasteful competition between paper mills have hampered the development of this industry. Presently, the improvement of technique and modernization of equipment together with the centralization of pulp supply has greatly reduced the cost of production. With the development of other industries, demand for paper and packing cartons has broadened the domestic market. Export prospect is also optimistic, if better quality paper can be turned out. The total production of paper was 240,000 ton in 1968.

The paper industry consumed 412 GWh in 1968. It is estimated that power requirements of this industry will be 1,330 GWh in 1978, giving an average

annual growth rate of 12.4 percent for the coming ten years.

(9) Chemical Industry

This group comprises a large number of industries such as plastics, petrochemical, oil-refining, synthetic fibers, paints and resins and many others. In 1968, this industry consumed 969 GWh of power, an annual growth rate of 21.3 percent, which was 14.0 percent of the total industrial power consumption. Although some of the chemical factories consume a lot of electric energy in their production process, yet many of this group are not in large scale production, and do not need bulk motive power. They are, therefore, classified into the following miscellaneous power groups.

(a) Raw material for calcium carbide is locally available. At present, calcium carbide is being utilized to make plastics. In the future, it can be cooperated with ethylene produced by naphtha cracking plant to support the further expanding plastics industry and to make other valuable chemicals.

(b) Dye-stuffs and synthetic resins are manufactured by utilizing by-products that can be utilized by the textile, paint and plywood industries. Moreover, a naphtha cracking plant began operation in the summer of 1968 to produce intermediate raw material for plastic, resins, and artificial fiber. It set a milestone for the petro-chemical industry which undoubtedly has a bright future.

(c) Of fermentation products, alcohol is produced in large quantities.

(d) Taiwan produces very little cotton and practically no wool. Artificial fiber is probably the only raw material potentially available in quantity to the textile industry from local sources. Nylon yarns can supplement cotton for the knitted goods. If production technique can be improved and cost reduced, there will be a bright prospect for both the artificial fiber industry and textiles. Dacron and Orlon industries are the immediate development in this category.

Total power consumed by the chemical industry was 432 GWh in 1965 (including oil-refining and treatment of natural gas) and increased to 630 GWh in 1966, 799 GWh in 1967, 969 GWh in 1968 giving a growth rate as high as 45.8, 26.8 and 21.3 percent respectively. At present, plastics for domestic use and export is very promising. Production of PVC powder was 62,000 ton in 1967 and 67,000 ton in 1968. From 1969 on, a moderate rate of increase in power consumption for plastics will be expected because the ethylene dichloride plant of CPC will be completed in 1969 and a part of raw material for PVC powder will be supplied from EDC and PE. It is estimated that power requirement for the chemical industry will be 4,654 GWh in 1978, growing at an average annual rate of 17 percent in the coming ten years.

(10) Food Industry

This industry includes the sugar-refining, canned food processing, breweries, other food processing, and gourmet powder factories. In 1968, this industry consumed 480 GWh of power, an annual growth rate of 15.9 percent, which was 6.9 percent of the total industrial power consumption. A large portion of this industry (over 18,000 customers) has less than 500 kW contracted capacity each. Processing of agricultural products is an important item both for domestic consumption and for exportation.

Sugar, bananas, canned pineapples, canned mushrooms and asparagus and tea are the major export items. Taiwan ranks among leading regions in the world in exporting these products. Export of other items such as canned fruits, processed sea food, preserved fruits, etc. are also being developed.

Except for the sugar refining industry, which is very much dependent on the world market and land available for sugar cane plantation, the future development of the food processing industry is expected to be very rapid. Total power consumption by the industry was 480 GWh in 1968. It is estimated that power requirements for this industry will be 900 GWh in 1978, growing at an average annual rate of 6.5 percent in the future ten years.

(11) Mining Industry

Along with the establishment and expansion of industries and the addition of thermal power generating plants, the demand for coal will increase. In 1968, mining industry consumed 287 GWh of power, an annual growth rate of 6.7 percent, which was 4.1 percent of total industrial power consumption. From 1964 to present, annual coal production is kept at the 5,000,000 ton level, while the power required to produce each ton of coal has increased as existing mines go deeper to reach coal seams. Power consumption per each metric ton of coal production was 34 kWh in 1964, 49 kWh in 1968. Production in 1978 is forecasted to be 7,500,000 ton and the power consumption per unit production will be 74 kWh. The mining of other minerals does not appear to be of great importance.

Total power consumption by this sub-group was 287 GWh in 1968. It is estimated that power requirements will be 655 GWh in 1978, giving an average annual increase rate of 8.6 percent for the future ten years.

(12) Power Required by Other Industries

This group of industries include processing business, city-water pumping station, agriculture, irrigation, transportation, timber mills, public water supply, plywood and press-board, hospital use, rubber factories, cigraette and tobacco, harbor facilities, wireless and telecommunication system, large construction installations, etc.

The electrification of railways, constructions of new harbors and airports will be realized in the next decade and are essential elements to be considered in this group.

In 1968, this group consumed 973 GWh of power, an annual growth rate of 9.9 percent, which was 14.1 percent of the total industrial power consumption. The total requirement for this group is estimated to be 4,000 GWh in 1978, resulting in an annual increase rate of 15.2 percent for the future ten years.

Table A-3-1

Density of Electric Appliance in Taiwan and Japan

Year	Density of Electric Appliance in Taiwan and Japan										Per Capita Income (US\$)
	Radio	Fan	Iron	Cooker	Refrigerator	Air Conditioner	Washing Machine	TV-Set	Unit: (%)		
Oct. 1962	38.2 (783)	43.6 (894)	10.5 (21.5)	3.1 (64)	1.1 (23.2)	0.4 (7.2)	0.3 (5.2)	0.1 (1.8)			129
1966	47.4 (1,100)	66.8 (1,550)	13.4 (310)	24.6 (570)	3.4 (80)	0.9 (20)	0.9 (20)	6.3 (145)			190
1968	49.3	69.8	14.4	28.7	12.3	1.2	1.9	16.4			237
1969	53.5 (1,600)	93.6 (2,800)	26.7 (800)	80.2 (2,400)	40.1 (1,200)	6.7 (200)	33.4 (1,000)	66.8 (2,000)			475
Average annual growth rate (%) 1969-1978	5.9	10.5	18.0	28.0	36.9	48.1	85.9	38.0			7.2
Japan											
1960	-	20.0	72.4	21.8	5.2	-	21.1	23.2			374
1961	-	24.3	75.0	30.4	8.8	-	27.0	33.2			439
1962	-	30.6	80.0	38.3	14.5	-	35.0	49.5			493
1963	-	40.4	82.9	44.1	24.1	-	43.6	64.8			559
1964	-	47.6	82.6	50.4	33.6	-	51.7	75.9			631
1965	-	75.3	86.6	54.0	57.7	2.8	70.4	100.7			694
1966	-	81.9	87.8	55.9	64.2	3.4	76.5	104.0			792
1967	-	91.2	89.2	56.8	73.8	4.6	81.5	110.0			928
1968	-	102.0	91.9	57.6	81.7	5.8	86.5	108.3			-

Table A-3-2
Actual Lighting Requirement

Year	Energy sale for lighting (GWh)	Per capita lighting requirement (kWh)	Per capita lighting requirement (kWh)
1958	479	47.7	109
1959	533	51.1	122
1960	590	54.7	143
1961	662	59.4	167
1962	737	64.0	197
1963	805	67.7	229
1964	949	77.5	260
1965	1,115	88.3	288
1966	1,291	99.4	320
1967	1,563	117.5	356
1968	1,881	137.8	390

Table A-3-3

Increasing Status of Electric Appliances in 1966-1968

Categories	Average capacity (watts)	Hour per day	kWh/month	kWh/year	Annual Increase of Electric Appliance in 1968 (1000 set)	Power requirement (GWh)
Radio	60	2.5	4.5	54	100	5.4
Fan	60	10	18	126	150	18.9
Cooker	600	1.5	27	324	130	42.1
Refrigerator	150	10	45	540	170	91.8
Air conditioner	1,000	10	300	2,100	8	16.8
Washing Machine	200	0.5	2.25	27	25	0.7
TV set	140	4	16.8	201.6	255	51.4
Total	-	-	-	-	-	227.1

Table A-3-4

Forecast of Lighting Requirement

Year	Forecast of Aug. 1969	By formula		Population at year-end, excluding military persons (1000 persons) (5)	
	Lighting Requirement (1)	Per capita Lighting (kWh) (2)	log Y = 2 9433 + 0.0584X (GWh) (3)		log Y = 0.0618 + 1.4589X (GWh) (4)
1968	1,881	137.8	1,881	13,650	
1969	2,248	161.0	2,154	13,961	
1970	2,652	185.8	2,466	14,276	
1971	3,103	212.7	2,824	14,590	
1972	3,610	242.2	3,233	14,904	
1973	4,140	272.1	3,702	15,217	
1974	4,740	305.2	4,239	15,529	
1975	5,404	341.2	4,853	15,840	
1976	6,150	380.8	5,557	16,149	
1977	6,930	421.1	6,363	16,456	
1978	7,804	465.6	7,285	16,760	
Average annual growth rate (%) 1969-1978	15.3	12.9	14.0	13.7	2.1

Table A-3-5

Forecast of Industrial Power Requirement

Unit : GWh

Year	Small Power			Total Power			Correlation Formula With GDP	Correlation Formula With IGDP
	Forecast (1)	Long-Range Trend (2)	Logarithm Formula (3)	Large Power (4)	(5)=(2)+(4)	(6)=(3)+(4)		
1969	7,929	2,150	2,052	5,797	7,947	7,849	7,780	7,817
1970	9,044	2,419	2,301	6,831	9,250	9,132	8,787	8,827
1971	10,237	2,710	2,579	7,783	10,493	10,362	9,924	9,968
1972	11,540	3,023	2,891	8,561	11,584	11,452	11,209	11,257
1973	12,892	3,358	3,240	9,400	12,758	12,640	12,659	12,712
1974	14,387	3,715	3,632	10,302	14,017	13,934	14,297	14,354
1975	16,008	4,094	4,071	11,270	15,361	15,341	16,147	16,210
1976	17,822	4,495	4,563	12,307	16,802	16,870	18,238	18,305
1977	19,689	4,918	5,114	13,414	18,332	18,528	20,598	20,672
1978	21,746	5,363	5,733	14,595	19,958	20,328	23,264	23,344
Average annual growth rate (%) 1969-1978								
	12.2	10.8	10.8	9.7	11.4	11.4	13.0	13.0

Table A-3-6
Forecast of Power Requirement for Various Industrial Groups

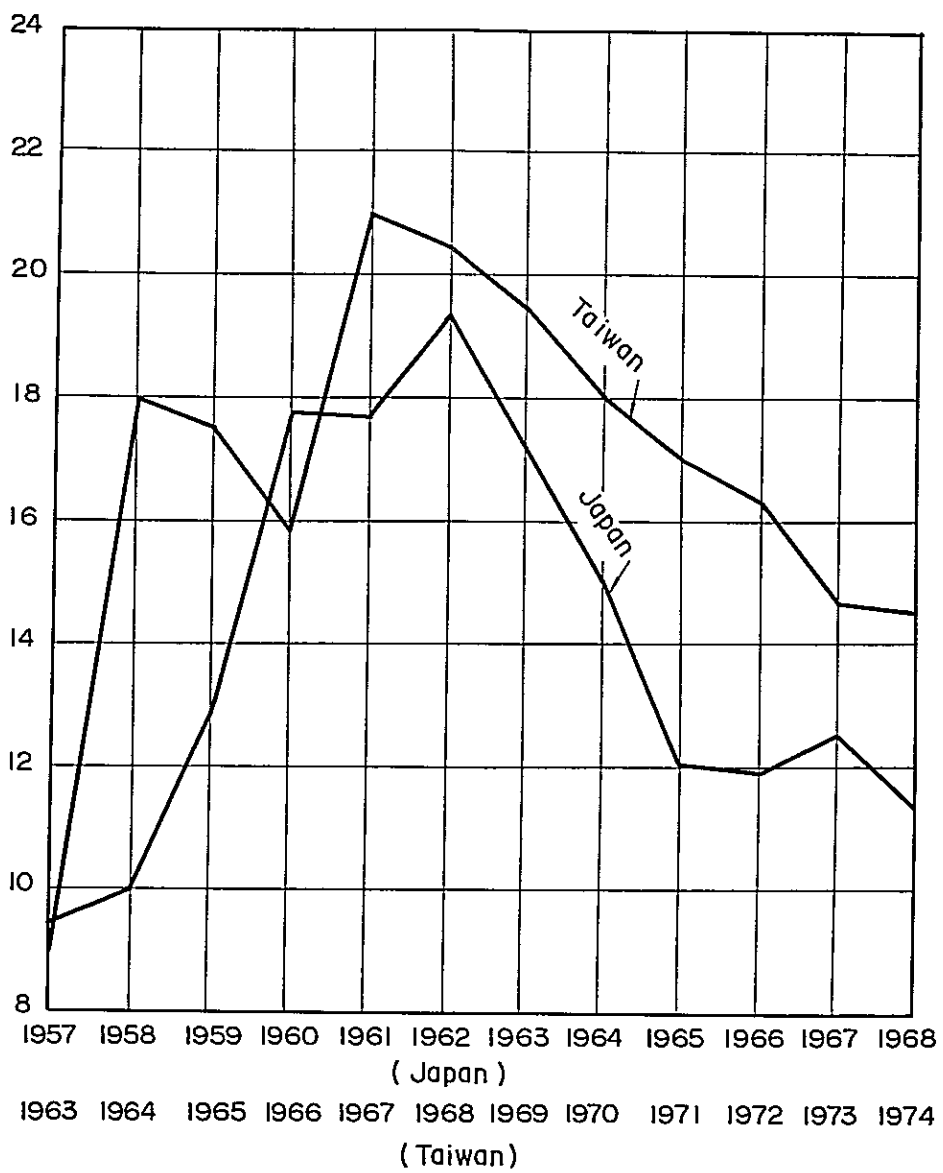
Year	Unit : GWh											Total	
	Textile	Aluminium	Metals	Machinery	Ceramics	Fertilizer	Alkali	Paper	Chemical	Food Industry	Mining		Other
1958	118	229	175	62	92	504	114	118	81	154	131	209	1,987
1965	318	389	552	105	317	848	271	284	432	337	225	647	4,715
1966	383	396	623	129	421	849	303	320	630	368	250	749	5,421
1967	486	395	704	173	502	761	346	367	799	414	269	885	6,109
1968	578	418	778	224	599	816	391	412	969	480	287	973	6,922
1969	716	466	849	298	654	812	456	467	1,239	526	311	1,135	7,929
1970	759	578	979	361	763	820	558	569	1,486	564	337	1,270	9,044
1971	832	680	1,140	430	953	820	614	670	1,702	599	369	1,428	10,237
1972	917	708	1,278	508	1,061	992	683	751	1,938	650	413	1,641	11,540
1973	1,005	791	1,392	579	1,170	1,033	767	833	2,261	692	450	1,920	12,892
1974	1,098	881	1,513	658	1,287	1,073	858	922	2,632	736	489	2,240	14,387
1975	1,195	977	1,637	745	1,408	1,108	958	1,017	3,052	778	529	2,604	16,008
1976	1,299	1,083	1,770	843	1,541	1,145	1,067	1,120	3,535	822	572	3,024	17,822
1977	1,400	1,138	1,898	946	1,670	1,174	1,179	1,221	4,057	860	613	3,483	19,689
1978	1,508	1,300	2,028	1,060	1,811	1,200	1,300	1,330	4,654	900	655	4,000	21,746
Average Annual Growth Rate (%)	17.2	6.2	16.1	13.7	20.6	4.9	13.1	13.3	28.2	12.0	8.2	16.6	13.5
	10.1	12.0	10.1	16.8	11.7	3.9	12.8	12.4	17.0	6.5	8.6	15.2	12.2

Table A-3-7

Forecasted Growth Rate of Power Requirement for Various Industrial Groups

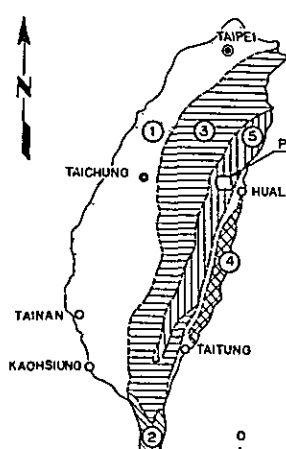
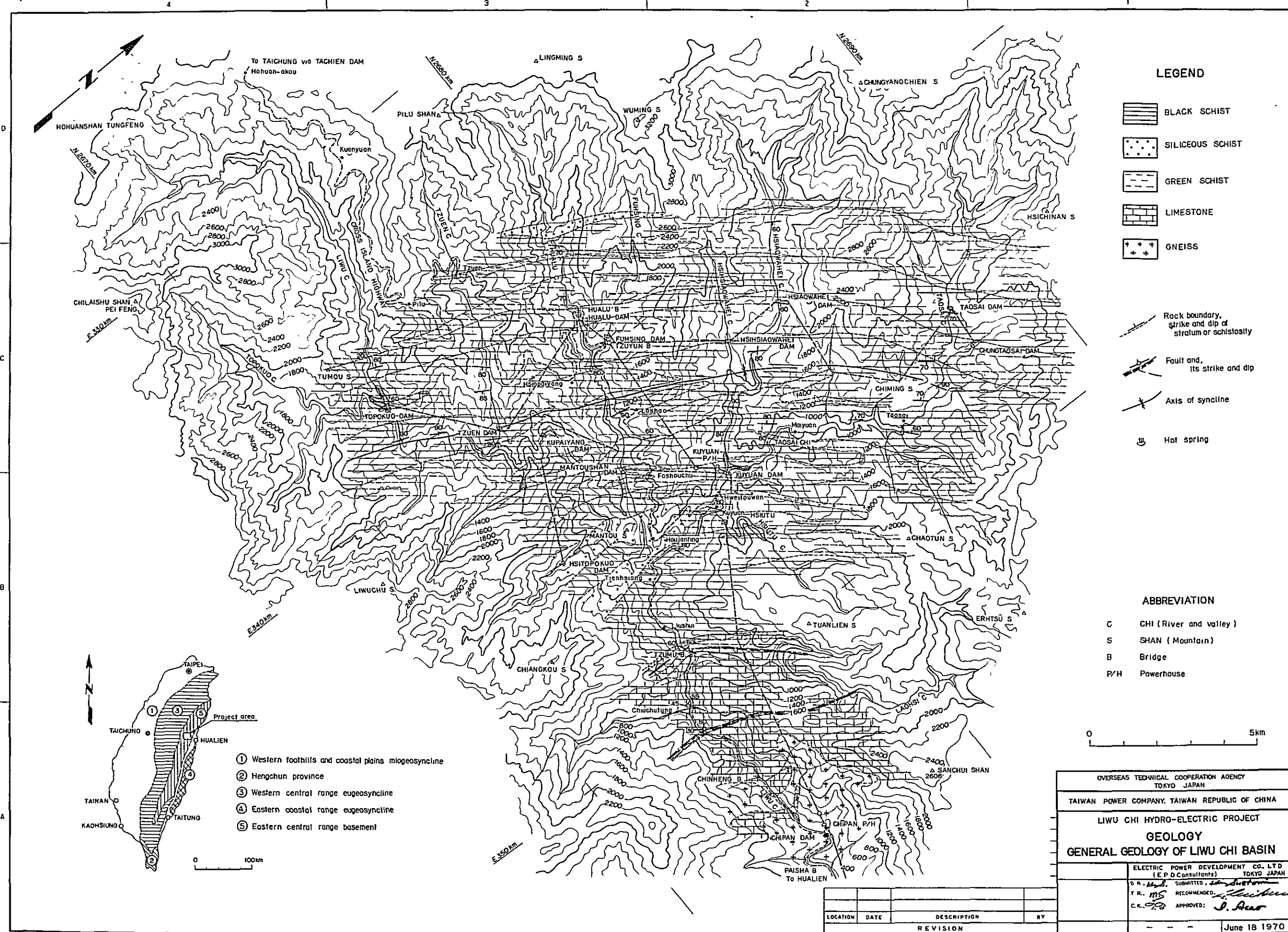
Year	Textile	Aluminium	Metals	Machinery	Ceramics	Fertilizer	Alkali	Paper	Chemical	Food Industry	Mining	Others	Total	Unit : (%)	
1965	16.1	3.5	23.8	15.4	7.8	-3.7	13.9	10.5	33.3	10.9	10.8	16.2	11.1		
1966	20.4	1.8	12.9	22.9	32.8	0.1	11.8	16.8	45.8	9.2	11.1	15.8	15.0		
1967	26.9	-0.3	13.0	34.1	19.2	-10.4	14.2	14.7	26.8	12.5	7.6	18.2	12.7		
1968	18.9	5.8	10.5	29.5	19.3	7.2	13.0	12.3	21.3	15.9	6.7	9.9	13.3		
1969	23.9	11.5	9.1	33.0	9.2	-0.5	16.6	13.4	27.9	9.6	8.4	16.7	14.6		
1970	6.0	24.1	15.3	21.2	16.7	1.0	22.4	21.8	19.9	7.2	8.4	11.9	14.1		
1971	9.6	17.7	16.5	19.1	24.9	0	10.0	17.8	14.5	6.2	9.5	12.4	13.2		
1972	10.2	4.1	12.1	18.1	11.3	20.9	11.2	12.1	13.9	8.5	11.9	14.9	12.7		
1973	9.6	11.7	8.9	14.0	10.3	4.1	12.3	10.9	16.7	6.5	9.0	17.0	11.7		
1974	9.3	11.4	8.7	13.6	10.0	3.9	11.9	10.7	16.4	6.4	8.7	16.7	11.6		
1975	8.8	10.9	8.2	13.2	9.4	3.3	11.7	10.3	16.0	5.7	8.2	16.3	11.3		
1976	8.7	10.8	8.1	13.2	9.4	3.3	11.4	9.0	15.8	5.7	8.1	16.1	11.3		
1977	7.8	9.7	7.2	12.2	8.4	2.5	10.9	9.0	14.8	4.6	7.2	15.2	10.5		
1978	7.7	9.4	6.8	12.1	8.4	2.2	10.3	8.9	14.7	4.7	6.9	14.8	10.4		
Average Annual Growth Rate (%)	1964-1968	19.3	6.1	4.8	22.3	17.1	0.2	12.6	13.7	29.0	8.3	14.9	13.2		
	1969-1972	12.2	6.2	3.2	22.7	15.4	5.0	15.0	16.2	18.9	9.5	14.0	13.6		
	1973-1976	9.1	14.1	8.5	13.5	9.8	3.7	11.8	10.5	16.2	8.5	16.5	11.5		
	1969-1976	10.7	11.1	10.8	18.0	12.5	4.3	13.4	13.3	17.6	9.0	15.2	12.5		

Fig. A-3-1 Lighting Increase Rate of Taiwan and Japan



APPENDIX - 4
List of Drawings

DWG. No.	1	General geology of Liwu Chi basin
	2	Severely eroded land and landslide
	3	Geologic map of Topokuo dam site
	4	Geologic map of Tzuen dam site
	5	Geologic map of Hualu dam site
	6	Geologic map of Fuhsing dam site
	7	Geologic map of Chungtaosai dam site
	8	Geologic map of Taosai dam site
	9	Geologic map of Hsiaowahei and Hsihsiaowahei dam site
	10	General geology of Kuyuan powerhouse site
	11	Geologic feature of Kuyuan powerhouse site
	12	General geology of pressure tunnel (1-3)
	13	Geologic map of Kuyuan dam site
	14	Geologic map of Hsitopokuo dam site
	15	Geologic map of Kupaiyang dam site
	16	Geologic map of Mantou Shan dam site
	17	General geology of Chipan powerhouse site
	18	Geologic feature of Chipan powerhouse site
	19	General geology of pressure tunnel (2-3)
	20	General geology of pressure tunnel (3-3)
	21	Geologic map of Hsiutu dam site
	22	Concrete aggregate plan of Taroko deposit
	23	Concrete aggregate plan of Taosai, Tungtaosai and Topokuo deposit
	24	General plan
	25	General profile
	26	Topokuo pondage dam
	27	Kuyuan powerhouse
	28	Kuyuan pondage dam
	29	Chipan powerhouse
	30	Chipan tailrace
	31	Intake dam and combining tanks



- ① Western foothills and coastal plains miogeosyncline
- ② Hengchun province
- ③ Western central range eugeosyncline
- ④ Eastern coastal range eugeosyncline
- ⑤ Eastern central range basement

LEGEND

- BLACK SCHIST
- SILICEOUS SCHIST
- GREEN SCHIST
- LIMESTONE
- GNEISS
- Rock boundary, strike and dip of stratum or schistosity
- Fault and its strike and dip
- Axis of syncline
- Hot spring

ABBREVIATION

- C CHI (River and valley)
- S SHAN (Mountain)
- B Bridge
- P/H Powerhouse



OVERSEAS TECHNICAL COOPERATION AGENCY
TOKYO JAPAN

TAIWAN POWER COMPANY, TAIWAN REPUBLIC OF CHINA

LIWU CHI HYDRO-ELECTRIC PROJECT

GEOLOGY

GENERAL GEOLOGY OF LIWU CHI BASIN

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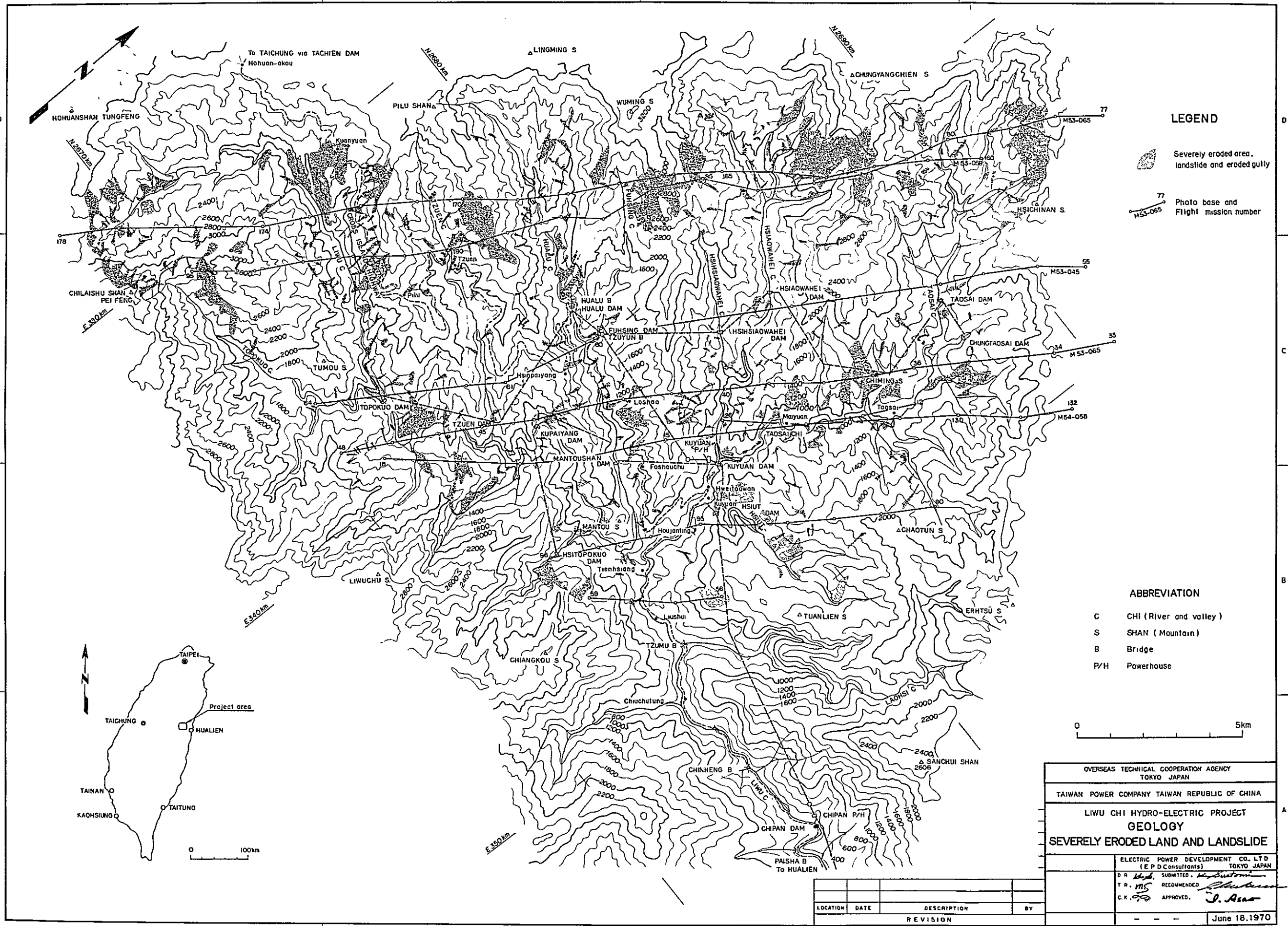
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T.R. *[Signature]* RECOMMENDED: *[Signature]*



C.K. *[Signature]* APPROVED: *[Signature]*

June 18 1970

LOCATION	DATE	DESCRIPTION	BY



LEGEND

-  Severely eroded area, landslide and eroded gully
-  Photo base and Flight mission number

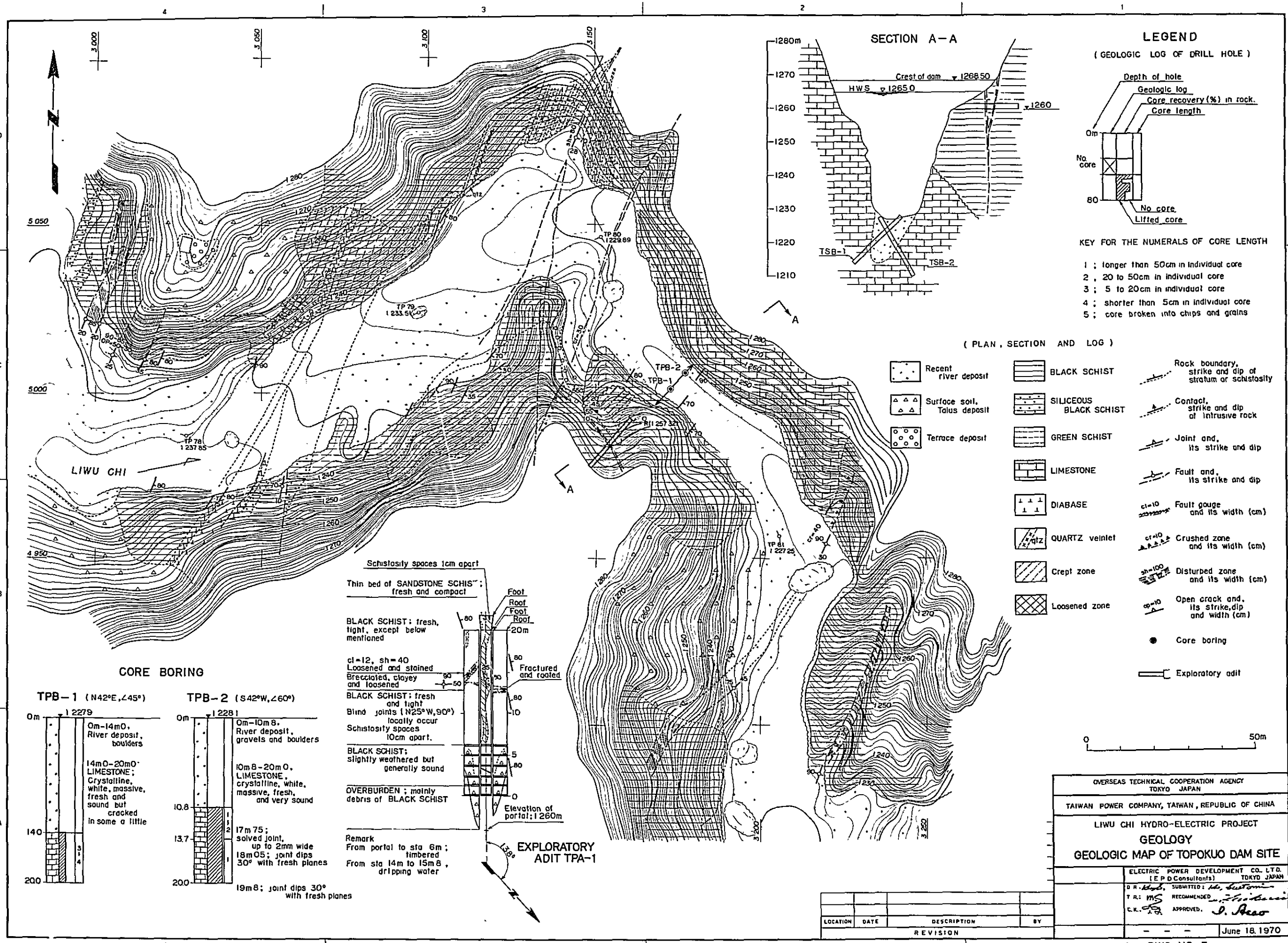
ABBREVIATION

- C CHI (River and valley)
- S SHAN (Mountain)
- B Bridge
- P/H Powerhouse

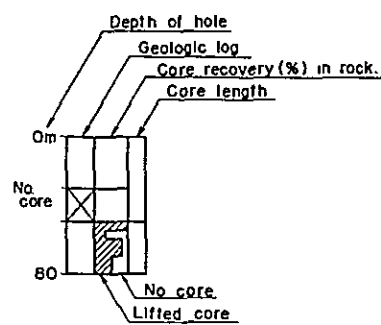


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LIWU CHI HYDRO-ELECTRIC PROJECT	
GEOLOGY	
SEVERELY ERODED LAND AND LANDSLIDE	
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T.R. <i>[Signature]</i> RECOMMENDED	
C.K. <i>[Signature]</i> APPROVED	<i>[Signature]</i>
June 18, 1970	

LOCATION	DATE	DESCRIPTION	BY
REVISION			



LEGEND
(GEOLOGIC LOG OF DRILL HOLE)



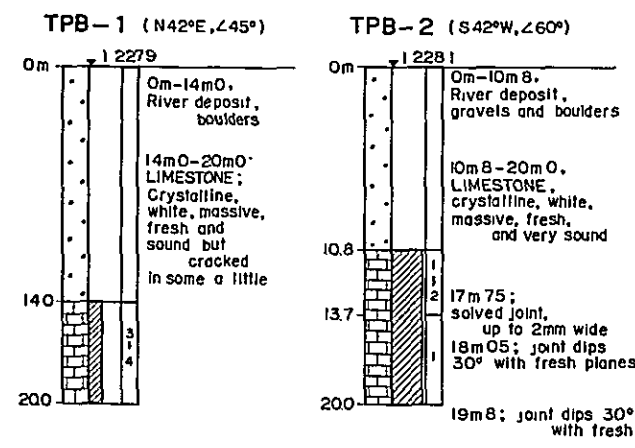
KEY FOR THE NUMERALS OF CORE LENGTH

1 ; longer than 50cm in individual core
 2 ; 20 to 50cm in individual core
 3 ; 5 to 20cm in individual core
 4 ; shorter than 5cm in individual core
 5 ; core broken into chips and grains

(PLAN , SECTION AND LOG)

- | | | | | | |
|--|-----------------------------|--|------------------------|--|---|
| | Recent river deposit | | BLACK SCHIST | | Rock boundary, strike and dip of stratum or schistosity |
| | Surface soil, Talus deposit | | SILICEOUS BLACK SCHIST | | Contact, strike and dip of intrusive rock |
| | Terrace deposit | | GREEN SCHIST | | Joint and, its strike and dip |
| | | | LIMESTONE | | Fault and, its strike and dip |
| | | | DIABASE | | ci=10 Fault gauge and its width (cm) |
| | | | QUARTZ veinlet | | cr=10 Crushed zone and its width (cm) |
| | | | Crept zone | | sh=100 Disturbed zone and its width (cm) |
| | | | Loosened zone | | op=10 Open crack and, its strike, dip and width (cm) |
| | | | | | Core boring |
| | | | | | Exploratory adit |

CORE BORING



Schistosity spaces 1cm apart

Thin bed of SANDSTONE SCHIST; fresh and compact

BLACK SCHIST: fresh, tight, except below mentioned

ci=12, sh=40
Loosened and stained
Brecciated, clayey and loosened

BLACK SCHIST: fresh and tight
Blind joints (N25°W, 90°) locally occur
Schistosity spaces 10cm apart.

BLACK SCHIST; slightly weathered but generally sound

OVERBURDEN; mainly debris of BLACK SCHIST

Remark
From portal to sta 6m; timbered
From sta 14m to 15m 8, dripping water

EXPLORATORY ADIT TPA-1

Elevation of portal: 1260m

OVERSEAS TECHNICAL COOPERATION AGENCY
 TOKYO JAPAN

TAIWAN POWER COMPANY, TAIWAN, REPUBLIC OF CHINA

LIWU CHI HYDRO-ELECTRIC PROJECT
GEOLOGY
GEOLOGIC MAP OF TOPOKUO DAM SITE

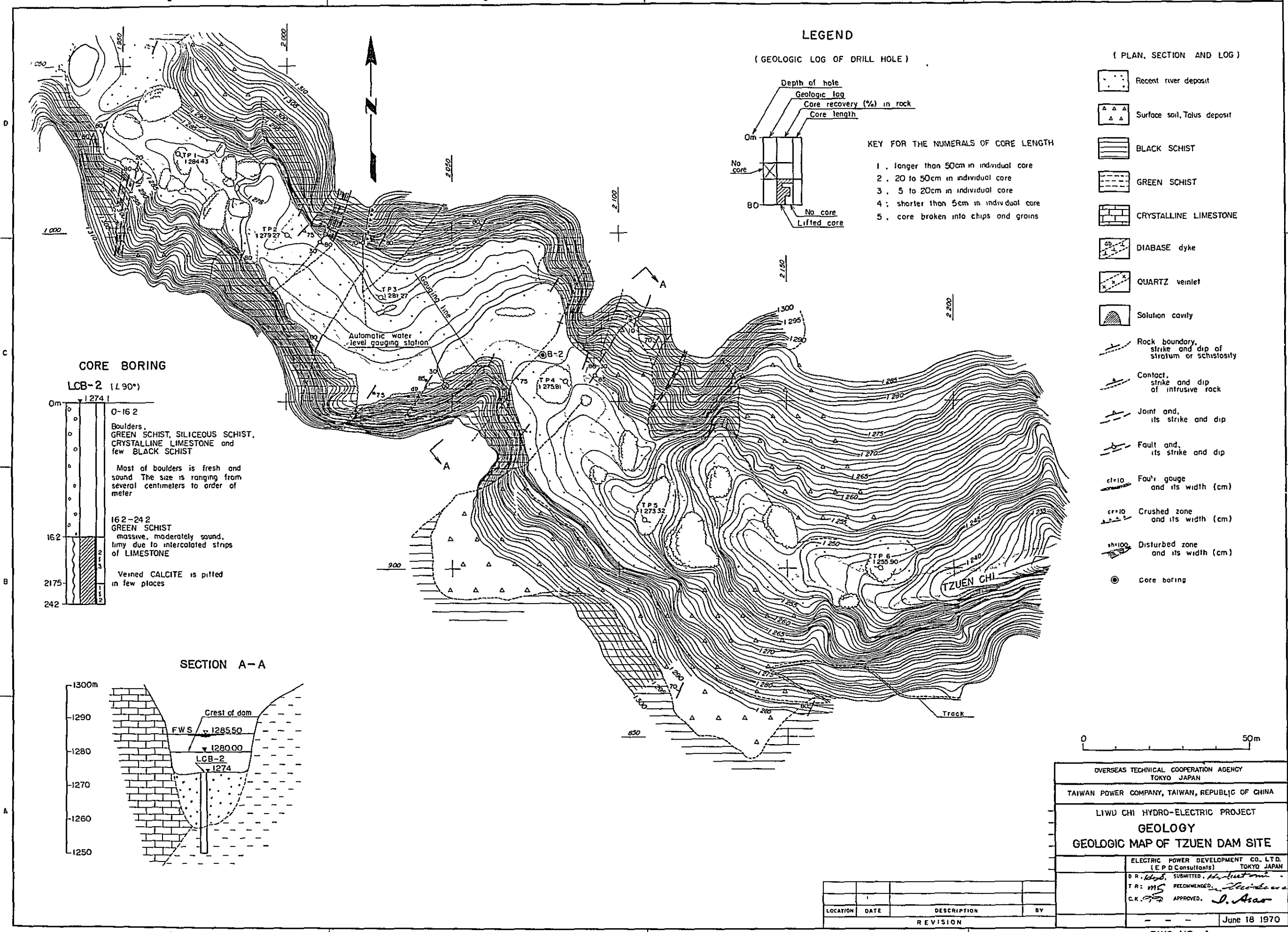
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June 18, 1970

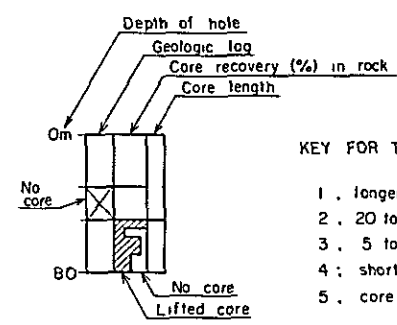
LOCATION	DATE	DESCRIPTION	BY

REVISION



LEGEND

(GEOLOGIC LOG OF DRILL HOLE)



KEY FOR THE NUMERALS OF CORE LENGTH

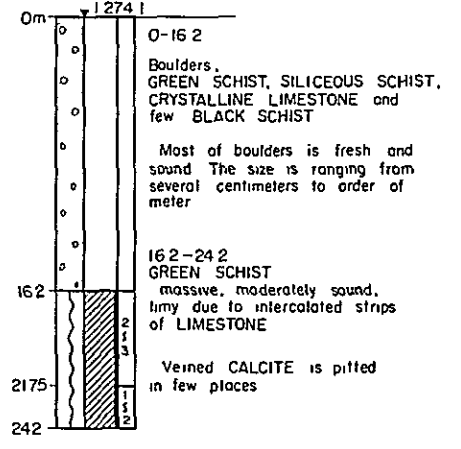
- 1. longer than 50cm in individual core
- 2. 20 to 50cm in individual core
- 3. 5 to 20cm in individual core
- 4. shorter than 5cm in individual core
- 5. core broken into chips and grains

(PLAN, SECTION AND LOG)

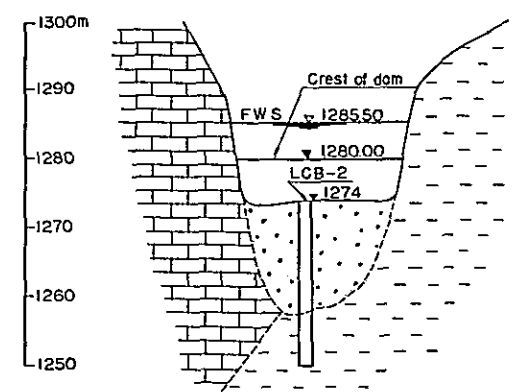
- Recent river deposit
- Surface soil, Talus deposit
- BLACK SCHIST
- GREEN SCHIST
- CRYSTALLINE LIMESTONE
- DIABASE dyke
- QUARTZ veinlet
- Solution cavity
- Rock boundary, strike and dip of stratum or schistosity
- Contact, strike and dip of intrusive rock
- Joint and, its strike and dip
- Fault and, its strike and dip
- Fault gouge and its width (cm)
- Crushed zone and its width (cm)
- Disturbed zone and its width (cm)
- Core boring

CORE BORING

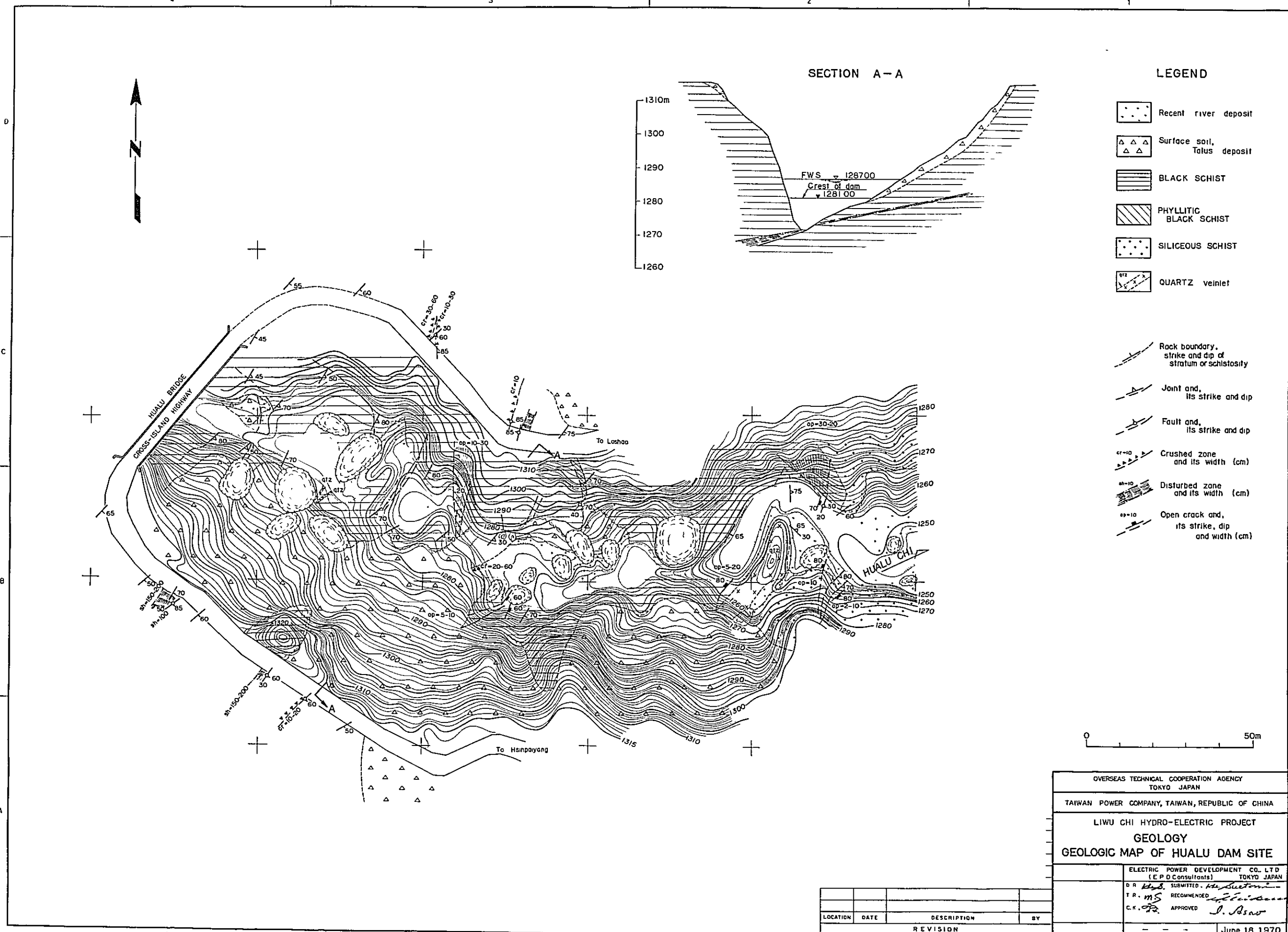
LCB-2 (L 90°)



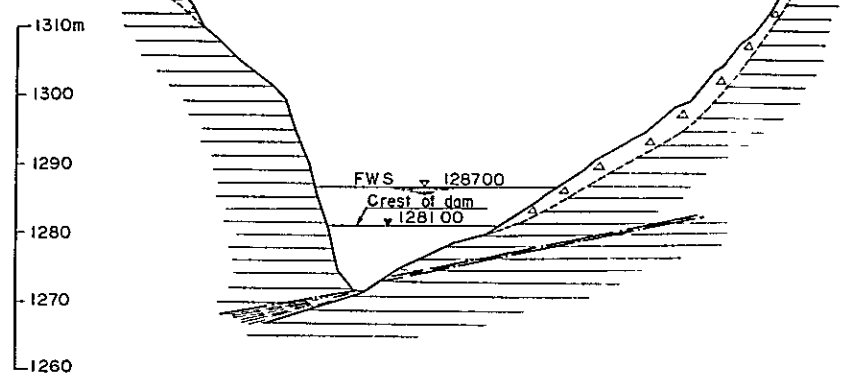
SECTION A-A



OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN			
TAIWAN POWER COMPANY, TAIWAN, REPUBLIC OF CHINA			
LIWU CHI HYDRO-ELECTRIC PROJECT			
GEOLOGY			
GEOLOGIC MAP OF TZUEN DAM SITE			
ELECTRIC POWER DEVELOPMENT CO. LTD. (E.P.D. CONSULTANTS) TOKYO JAPAN			
D.R. <i>[Signature]</i> SUBMITTED. <i>[Signature]</i>			
T.R. <i>[Signature]</i> RECOMMENDED.			
C.K. <i>[Signature]</i> APPROVED. <i>[Signature]</i>			
REVISION			June 18 1970

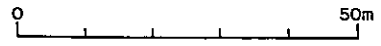


SECTION A-A



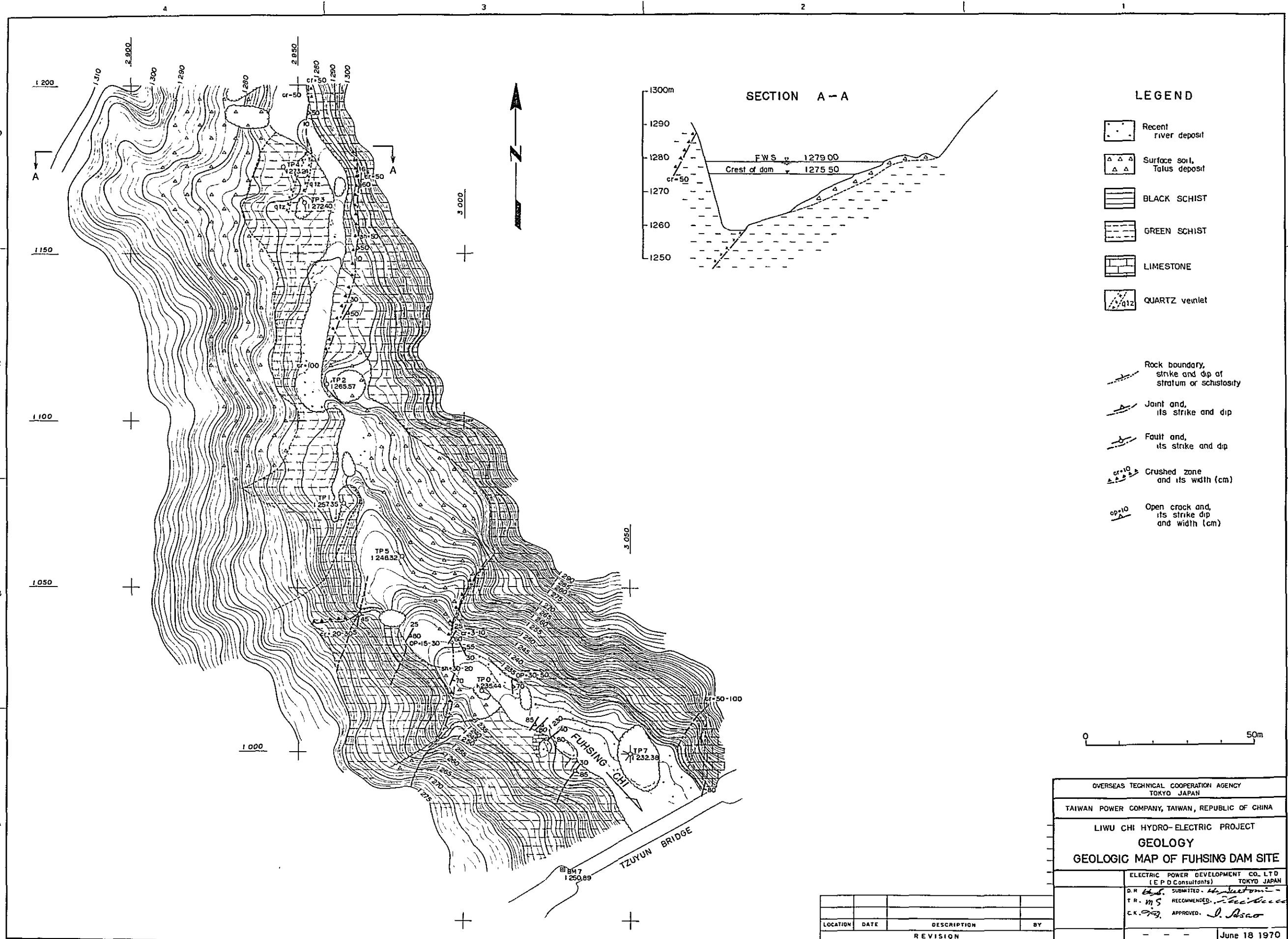
LEGEND

- Recent river deposit
- Surface soil, Talus deposit
- BLACK SCHIST
- PHYLLITIC BLACK SCHIST
- SILICEOUS SCHIST
- QUARTZ veinlet
- Rock boundary, strike and dip of stratum or schistosity
- Joint and, its strike and dip
- Fault and, its strike and dip
- Crushed zone and its width (cm)
- Disturbed zone and its width (cm)
- Open crack and, its strike, dip and width (cm)



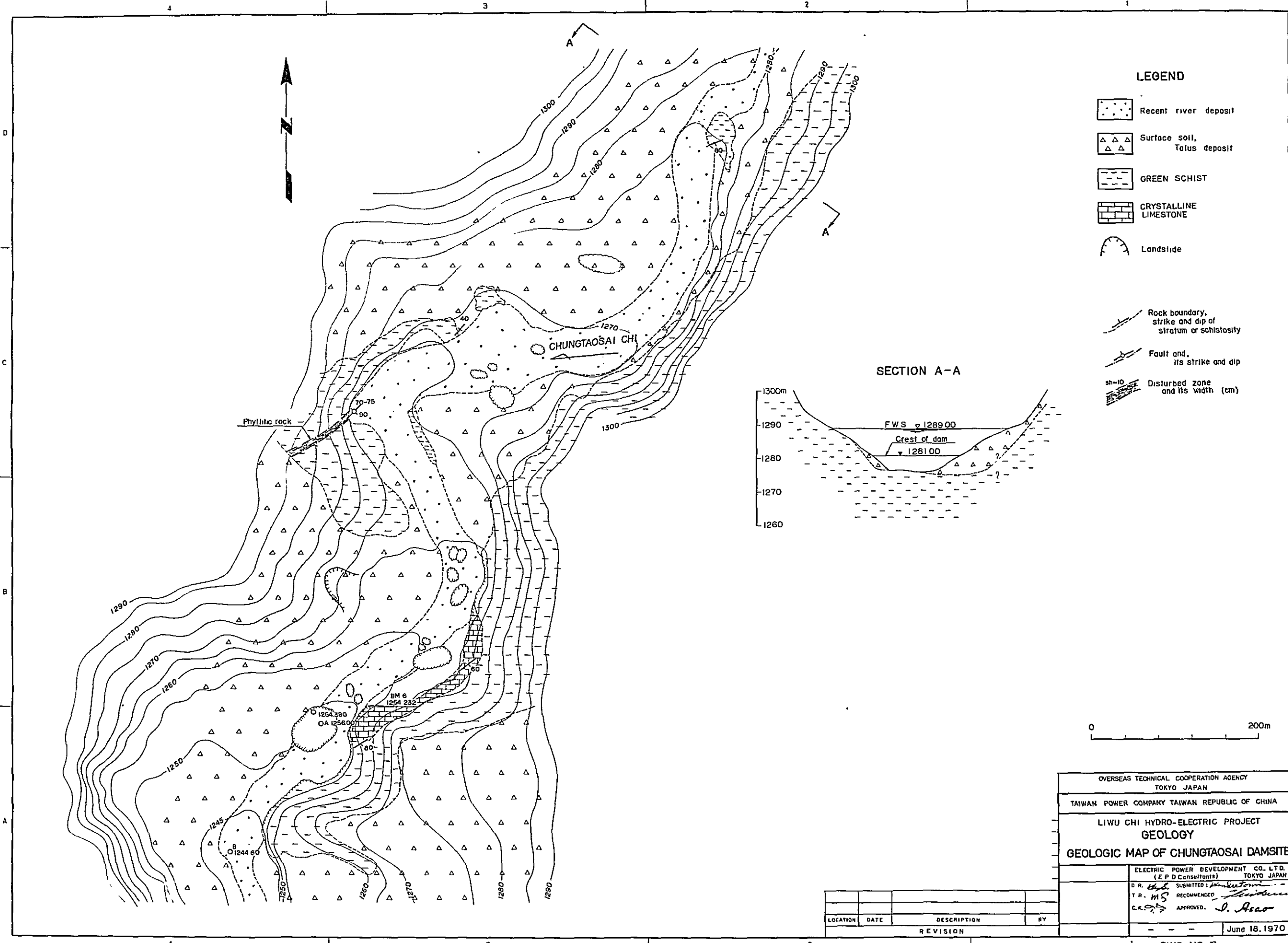
OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN	
TAIWAN POWER COMPANY, TAIWAN, REPUBLIC OF CHINA	
LIWU CHI HYDRO-ELECTRIC PROJECT GEOLOGY GEOLOGIC MAP OF HUALU DAM SITE	
ELECTRIC POWER DEVELOPMENT CO., LTD. (E.P.D. Consultants) TOKYO JAPAN	
D.R. <i>[Signature]</i> SUBMITTED	<i>[Signature]</i>
T.R. <i>[Signature]</i> RECOMMENDED	<i>[Signature]</i>
C.K. <i>[Signature]</i> APPROVED	<i>[Signature]</i>
June 18 1970	

LOCATION	DATE	DESCRIPTION	BY
REVISION			



OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN			
TAIWAN POWER COMPANY, TAIWAN, REPUBLIC OF CHINA			
LIWU CHI HYDRO-ELECTRIC PROJECT			
GEOLOGY			
GEOLOGIC MAP OF FUHSING DAM SITE			
ELECTRIC POWER DEVELOPMENT CO. LTD. (E.P.D. Consultants) TOKYO JAPAN			
D.R.	SubMITTED	<i>[Signature]</i>	
T.R.	RECOMMENDED	<i>[Signature]</i>	
C.K.	APPROVED	<i>[Signature]</i>	
REVISION			June 18 1970

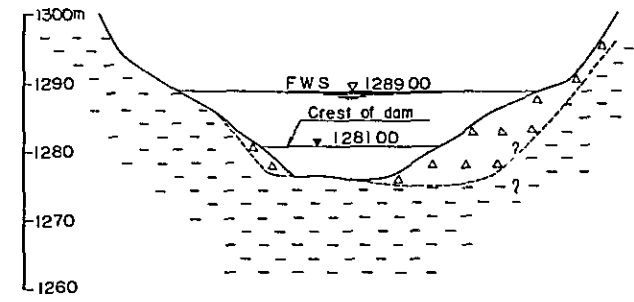
LOCATION	DATE	DESCRIPTION	BY
REVISION			



LEGEND

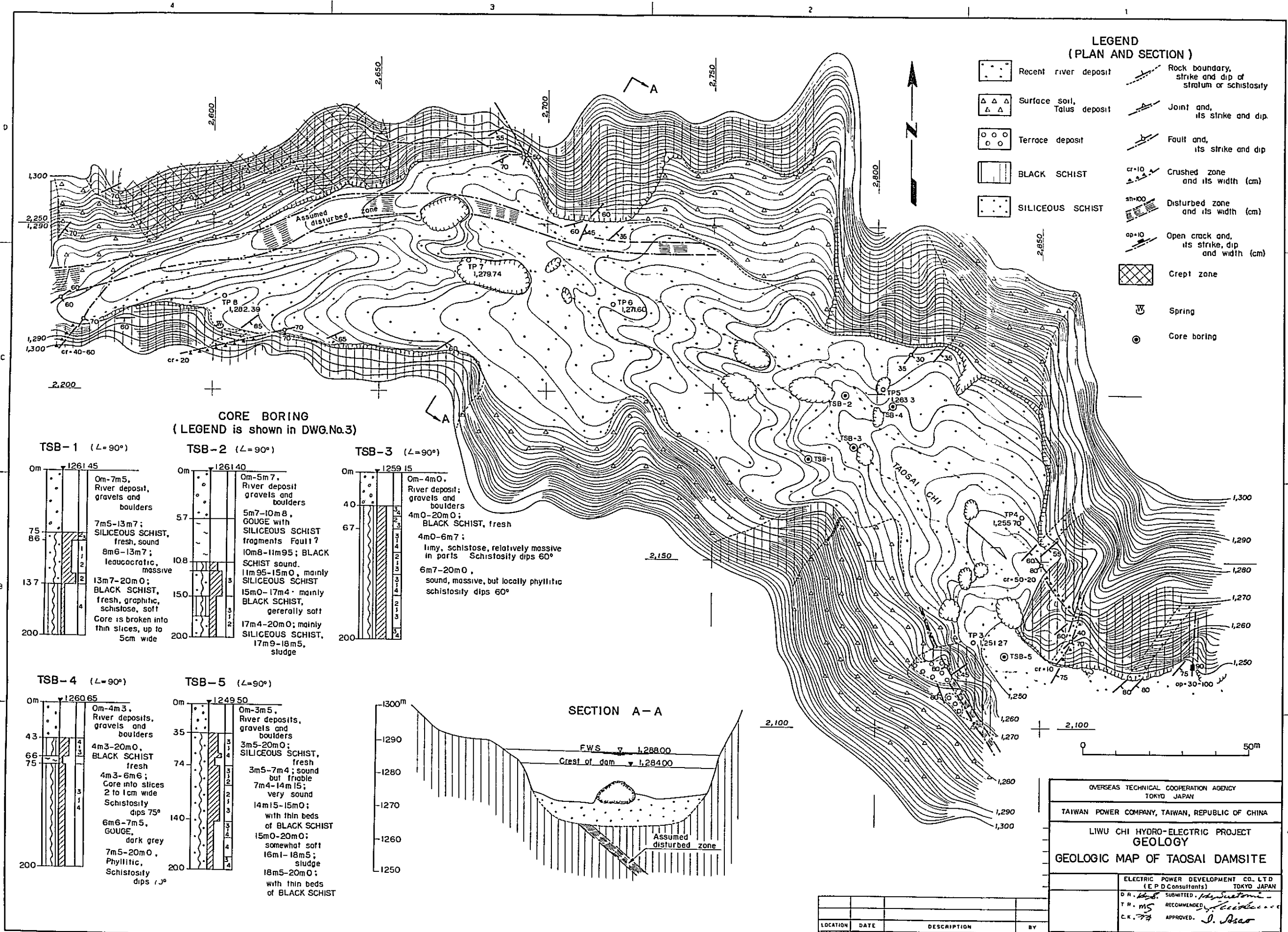
- Recent river deposit
- Surface soil, Talus deposit
- GREEN SCHIST
- CRYSTALLINE LIMESTONE
- Landslide
- Rock boundary, strike and dip of stratum or schistosity
- Fault and its strike and dip
- Disturbed zone and its width (cm)

SECTION A-A



OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN	
TAIWAN POWER COMPANY TAIWAN REPUBLIC OF CHINA	
LIWU CHI HYDRO-ELECTRIC PROJECT GEOLOGY	
GEOLOGIC MAP OF CHUNGTAOSAI DAMSITE	
ELECTRIC POWER DEVELOPMENT CO. LTD. (E.P.D. Consultants) TOKYO JAPAN	
D.R. <i>[Signature]</i>	SUBMITTED: <i>[Signature]</i>
T.R. <i>[Signature]</i>	RECOMMENDED: <i>[Signature]</i>
C.K. <i>[Signature]</i>	APPROVED: <i>[Signature]</i>
June 18, 1970	

LOCATION	DATE	DESCRIPTION	BY
REVISION			

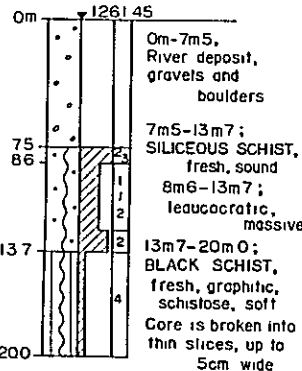


**LEGEND
(PLAN AND SECTION)**

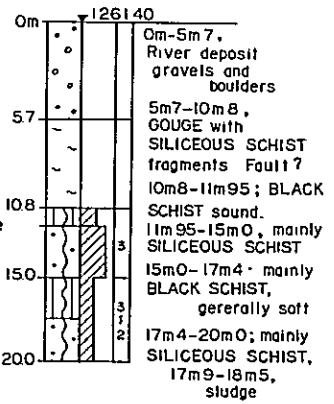
- Recent river deposit
- Surface soil, Talus deposit
- Terrace deposit
- BLACK SCHIST
- SILICEOUS SCHIST
- Rock boundary, strike and dip of stratum or schistosity
- Joint and, its strike and dip
- Fault and, its strike and dip
- Crushed zone and its width (cm)
- Disturbed zone and its width (cm)
- Open crack and, its strike, dip and width (cm)
- Crept zone
- Spring
- Core boring

**CORE BORING
(LEGEND is shown in DWG.No.3)**

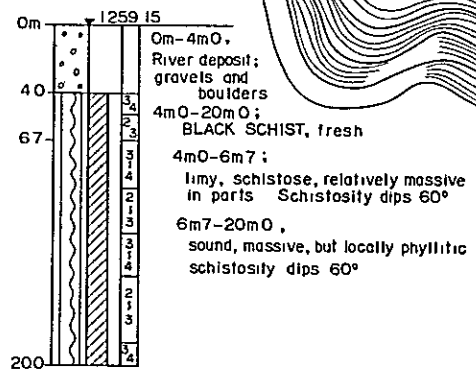
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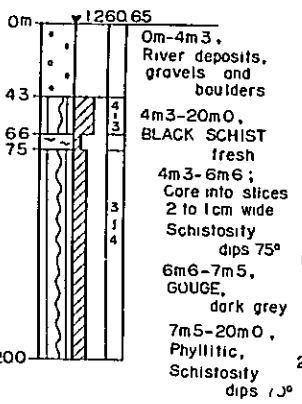
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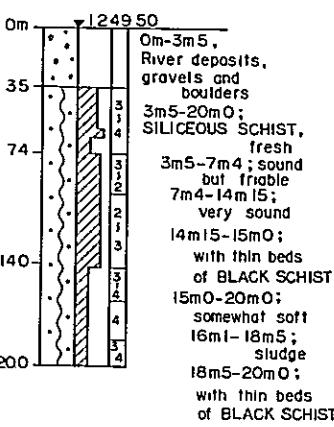
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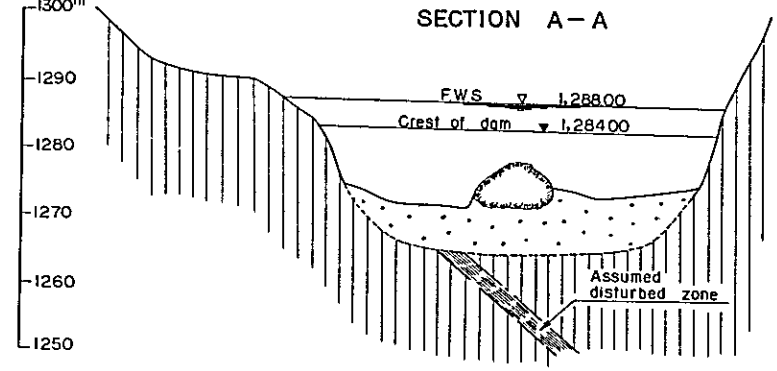
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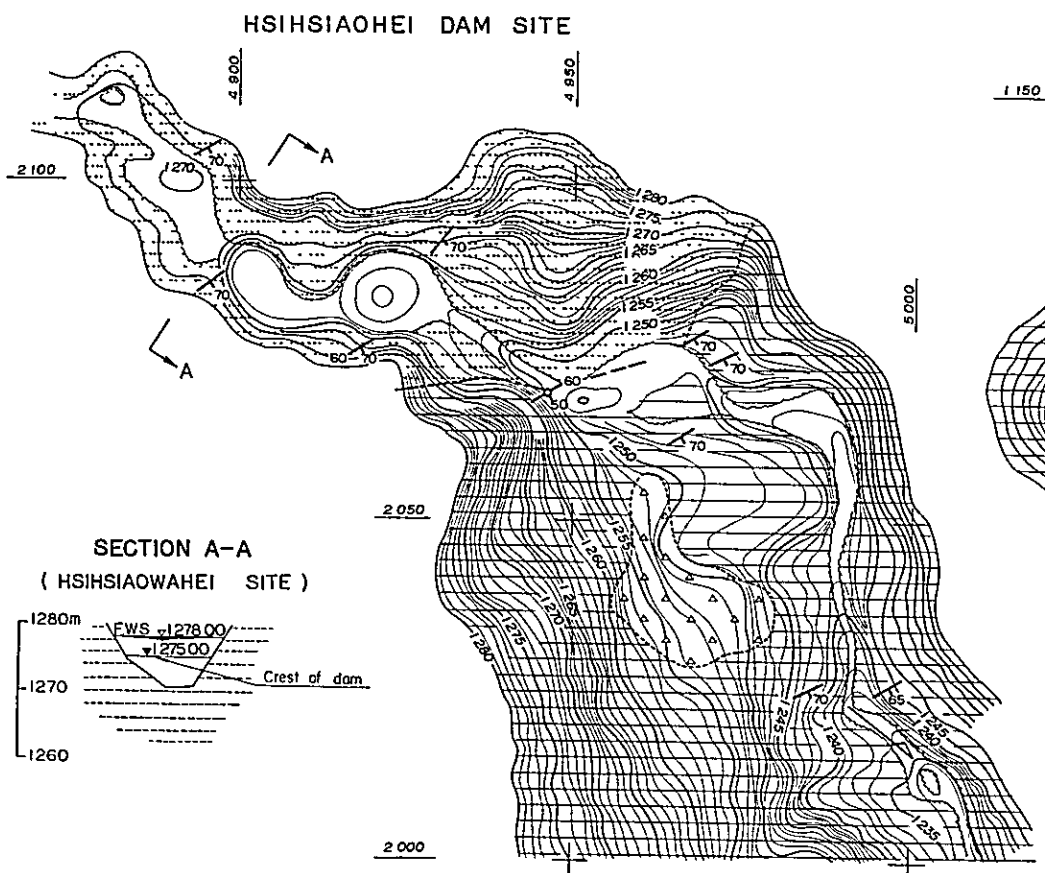
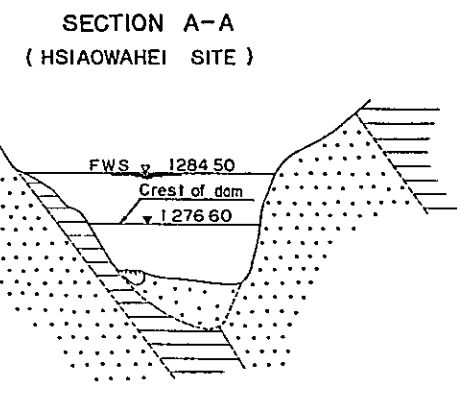
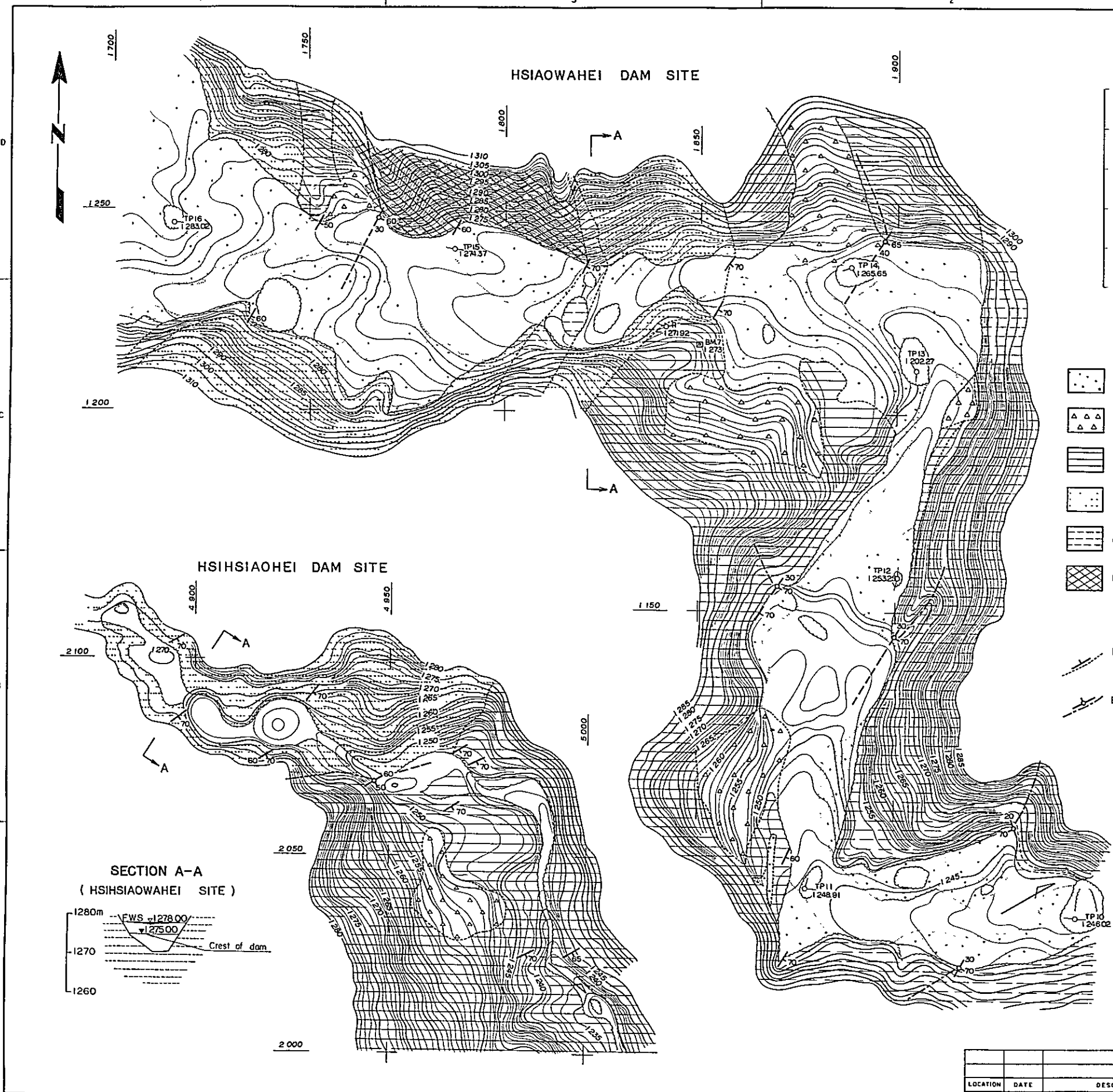
TSB-5 (L=90°)



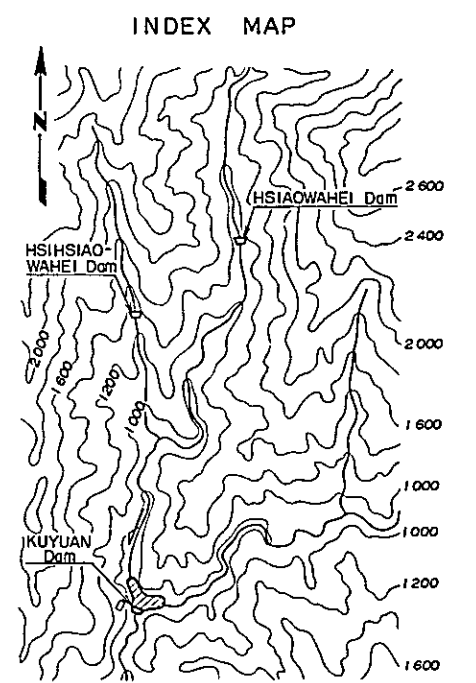
SECTION A-A



OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN			
TAIWAN POWER COMPANY, TAIWAN, REPUBLIC OF CHINA			
LIWU CHI HYDRO-ELECTRIC PROJECT GEOLOGY			
GEOLOGIC MAP OF TAOSAI DAMSITE			
ELECTRIC POWER DEVELOPMENT CO., LTD (E.P.D. Consultants) TOKYO JAPAN			
D.R. [Signature]		SUBMITTED [Signature]	
T.R. [Signature]		RECOMMENDED [Signature]	
C.K. [Signature]		APPROVED [Signature]	
LOCATION		DATE	
DESCRIPTION		BY	
REVISION			
June 18, 1970			

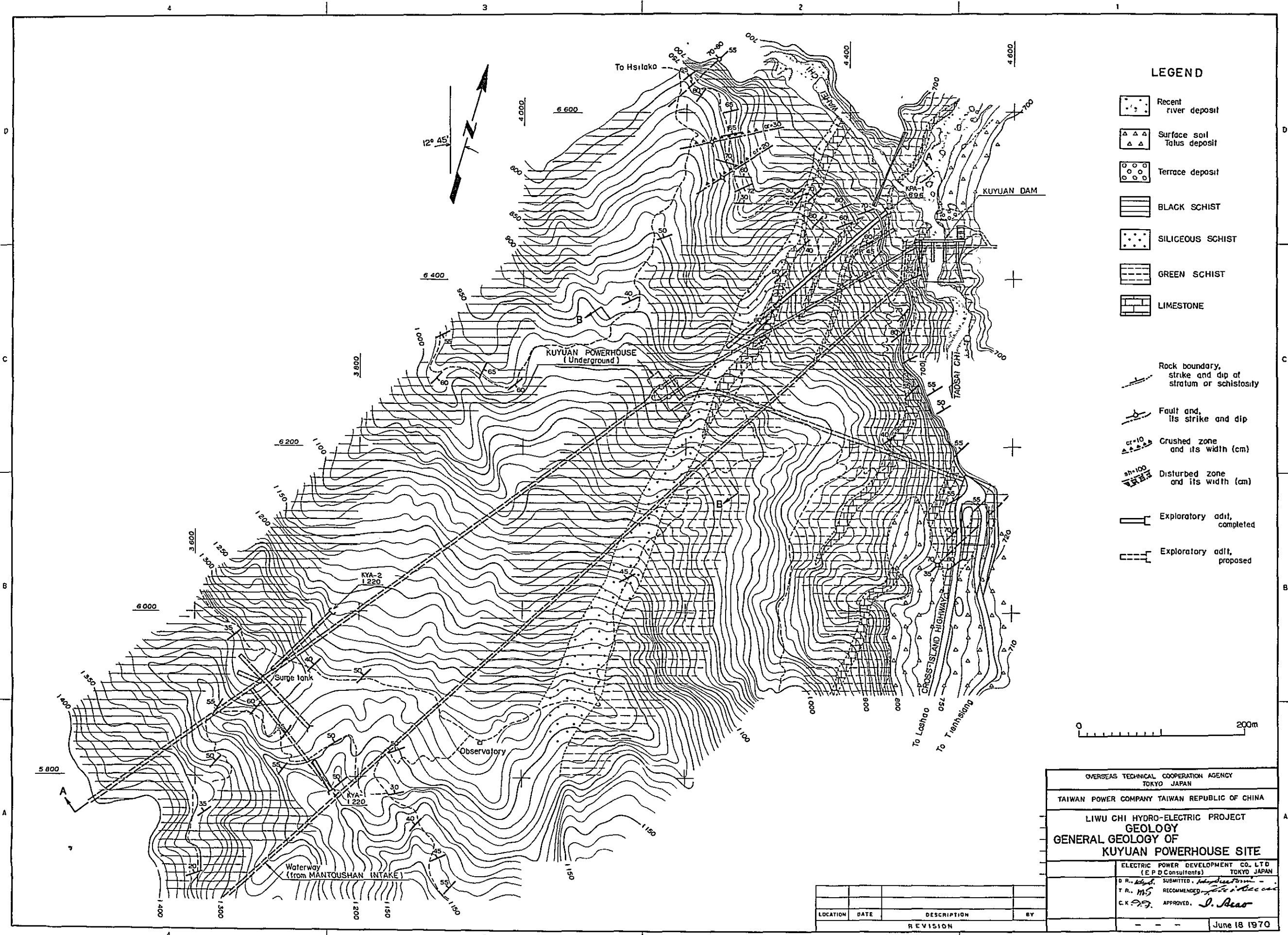


- LEGEND**
- Recent river deposit
 - Surface soil, Talus deposit
 - BLACK SCHIST
 - SILICEOUS SCHIST with thin-bedded GREEN SCHIST
 - GREEN SCHIST
 - Loosened zone
 - Rock boundary, strike and dip of stratum or schistosity
 - Fault and, its strike and dip



OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO, JAPAN			
TAIWAN POWER COMPANY, TAIWAN, REPUBLIC OF CHINA			
LIWU CHI HYDRO-ELECTRIC PROJECT GEOLOGY GEOLOGIC MAP OF HSIAOWAHEI AND HSIHSIAOWAHEI DAM SITE			
ELECTRIC POWER DEVELOPMENT CO., LTD. (E.P.D. Consultants) TOKYO, JAPAN			
D.R. <i>[Signature]</i> SUBMITTED: <i>[Signature]</i>			
T.R. <i>[Signature]</i> RECOMMENDED: <i>[Signature]</i>			
C.K. <i>[Signature]</i> APPROVED: <i>[Signature]</i>			
			June 18, 1970

LOCATION	DATE	DESCRIPTION	BY
REVISION			

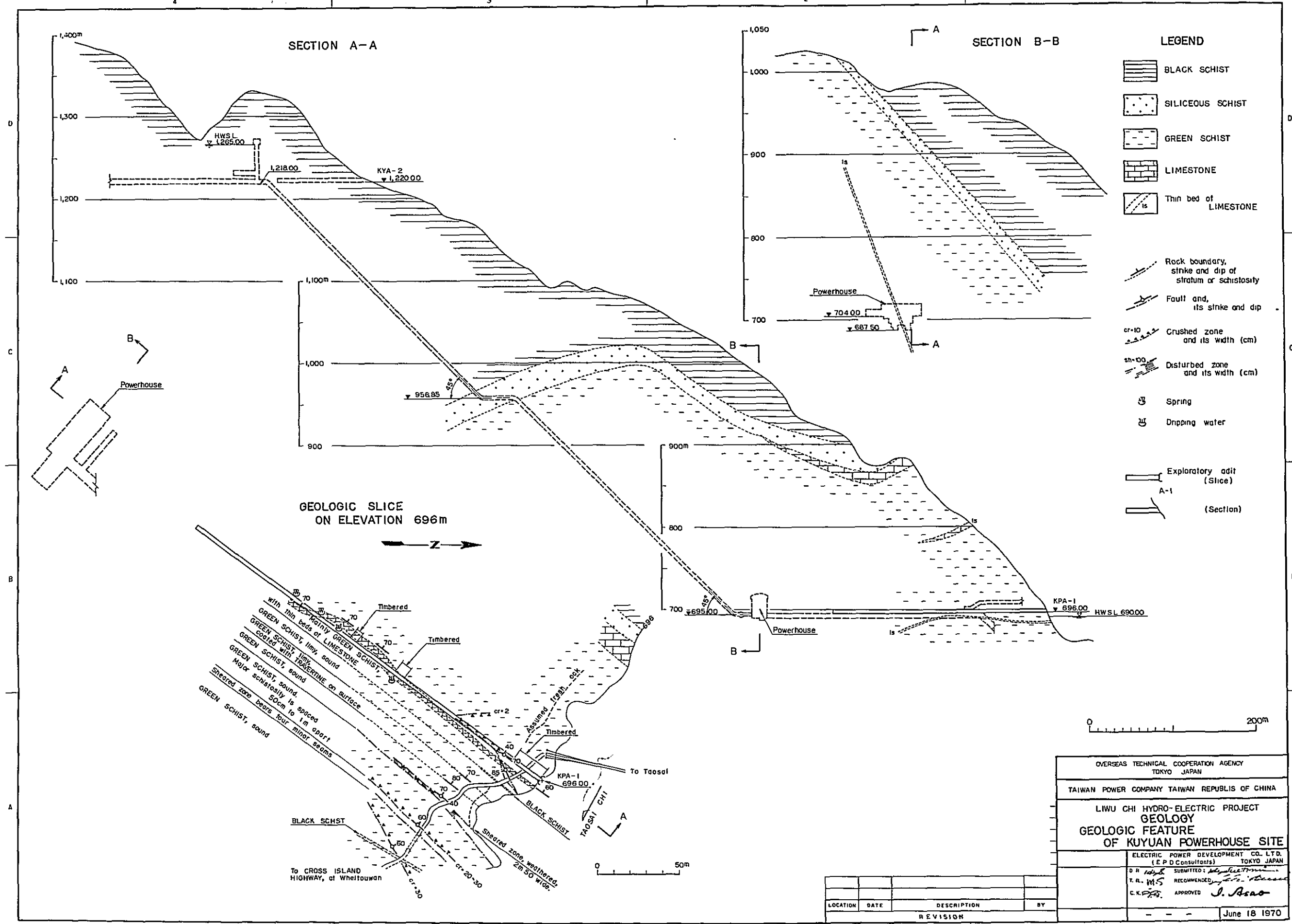


LEGEND

- Recent river deposit
- Surface soil
Talus deposit
- Terrace deposit
- BLACK SCHIST
- SILICEOUS SCHIST
- GREEN SCHIST
- LIMESTONE
- Rock boundary,
strike and dip of
stratum or schistosity
- Fault and,
its strike and dip
- Crushed zone
and its width (cm)
- Disturbed zone
and its width (cm)
- Exploratory adit,
completed
- Exploratory adit,
proposed

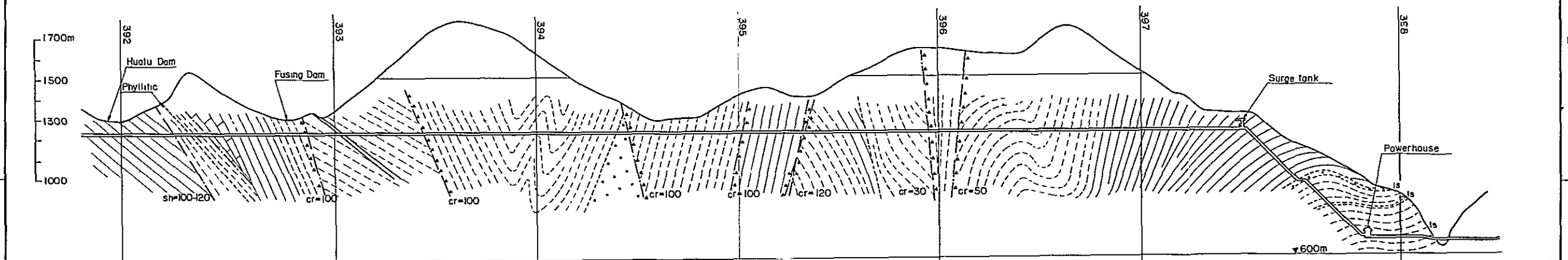
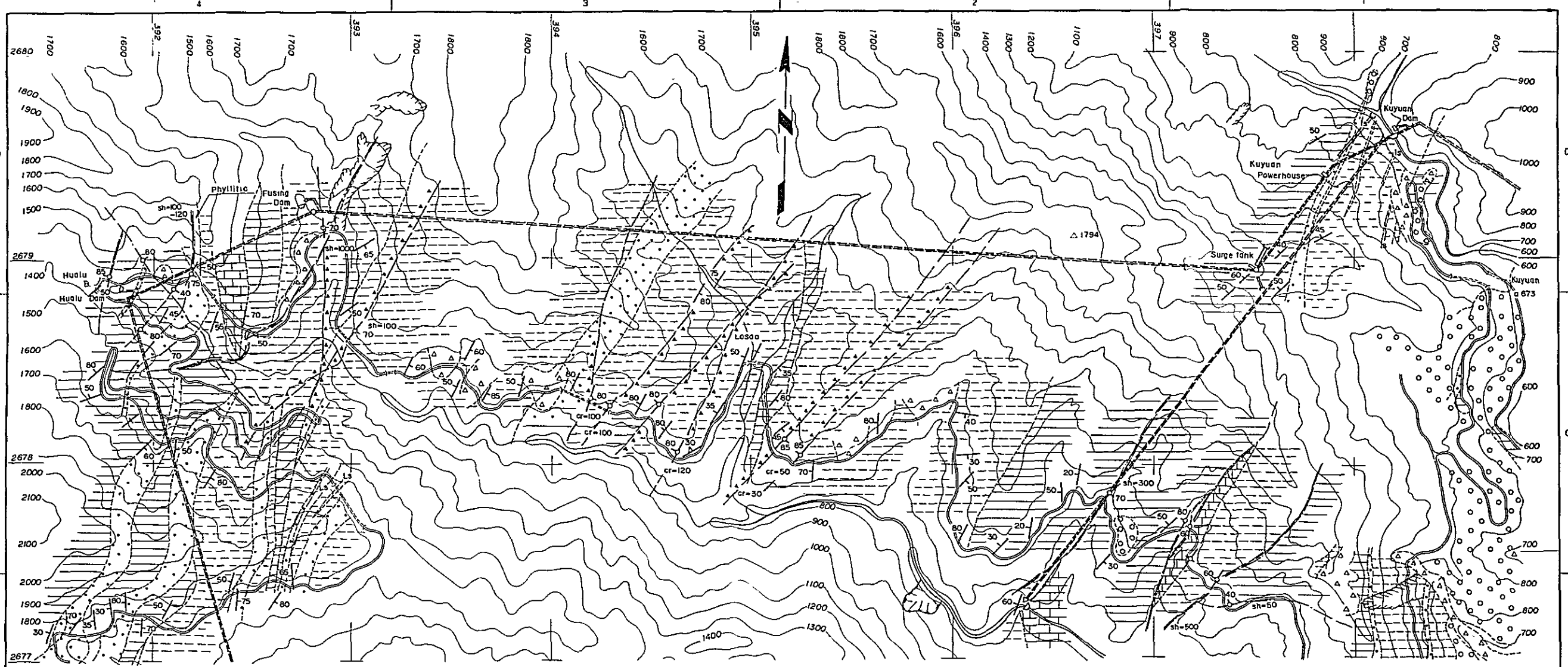
OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN	
TAIWAN POWER COMPANY TAIWAN REPUBLIC OF CHINA	
LIWU CHI HYDRO-ELECTRIC PROJECT GEOLOGY GENERAL GEOLOGY OF KUYUAN POWERHOUSE SITE	
ELECTRIC POWER DEVELOPMENT CO. LTD (E.P.D.C. Consultants) TOKYO JAPAN	
D.R. <i>[Signature]</i> SUBMITTED <i>[Signature]</i>	
T.R. <i>[Signature]</i> RECOMMENDED <i>[Signature]</i>	
C.K. <i>[Signature]</i> APPROVED <i>[Signature]</i>	
June 18 1970	

LOCATION	DATE	DESCRIPTION	BY
REVISION			



OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN	
TAIWAN POWER COMPANY TAIWAN REPUBLICS OF CHINA	
LIWU CHI HYDRO-ELECTRIC PROJECT GEOLOGY GEOLOGIC FEATURE OF KUYUAN POWERHOUSE SITE	
ELECTRIC POWER DEVELOPMENT CO. LTD. (E.P.D. Consultants) TOKYO JAPAN	
D.R. <i>[Signature]</i>	SUBMITTED: <i>[Signature]</i>
T.R. <i>[Signature]</i>	RECOMMENDED: <i>[Signature]</i>
C.K. <i>[Signature]</i>	APPROVED: <i>[Signature]</i>
June 18 1970	

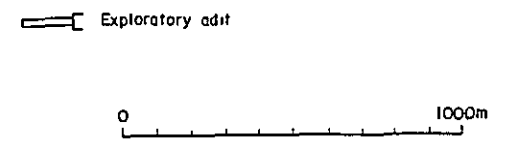
LOCATION	DATE	DESCRIPTION	BY
REVISION			



LEGEND

(Common with DWG NO 19 and DWG NO 20)

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LOCATION	DATE	DESCRIPTION	BY

OVERSEAS TECHNICAL COOPERATION AGENCY
TOKYO JAPAN

TAIWAN POWER COMPANY TAIWAN REPUBLIC OF CHINA

LIWU CHI HYDRO-ELECTRIC PROJECT

**GEOLOGY
GENERAL GEOLOGY OF
PRESSURE TUNNEL (1-3)**

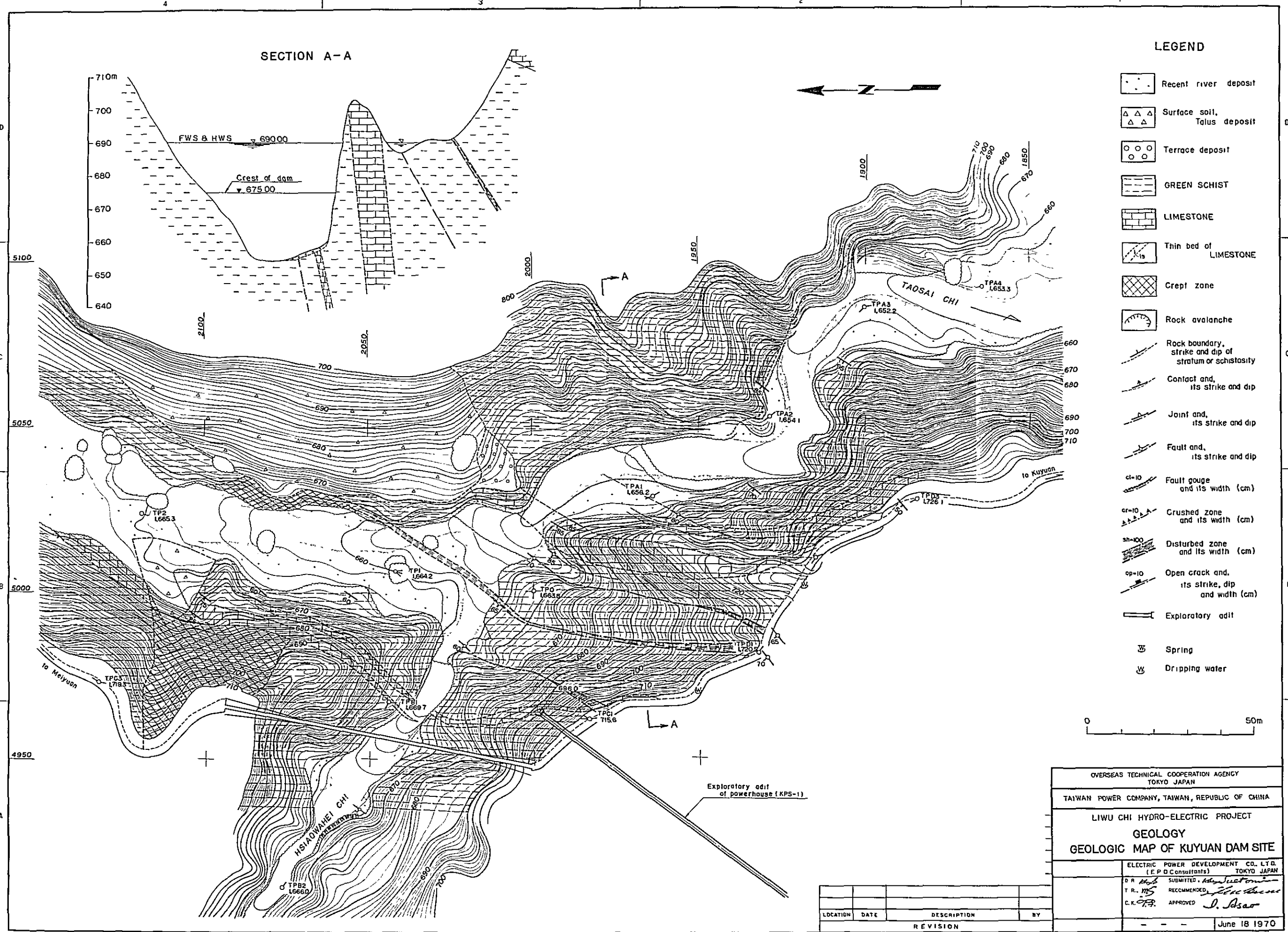
ELECTRIC POWER DEVELOPMENT CO. LTD
(E.P.D. Consultants) TOKYO JAPAN

D.R. *[Signature]* SUBMITTED: *[Signature]*

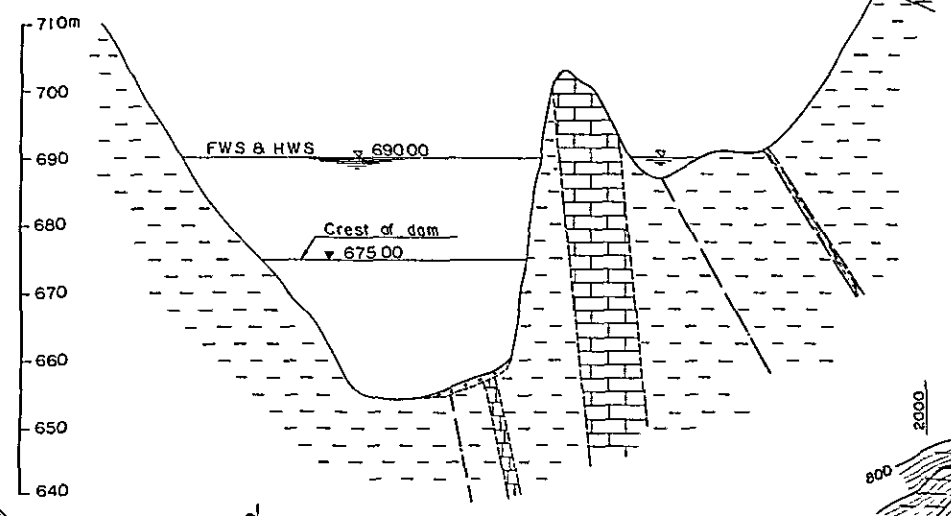
T.R. *[Signature]* RECOMMENDED: *[Signature]*

C.K. *[Signature]* APPROVED: *[Signature]*

June 18 1970



SECTION A-A



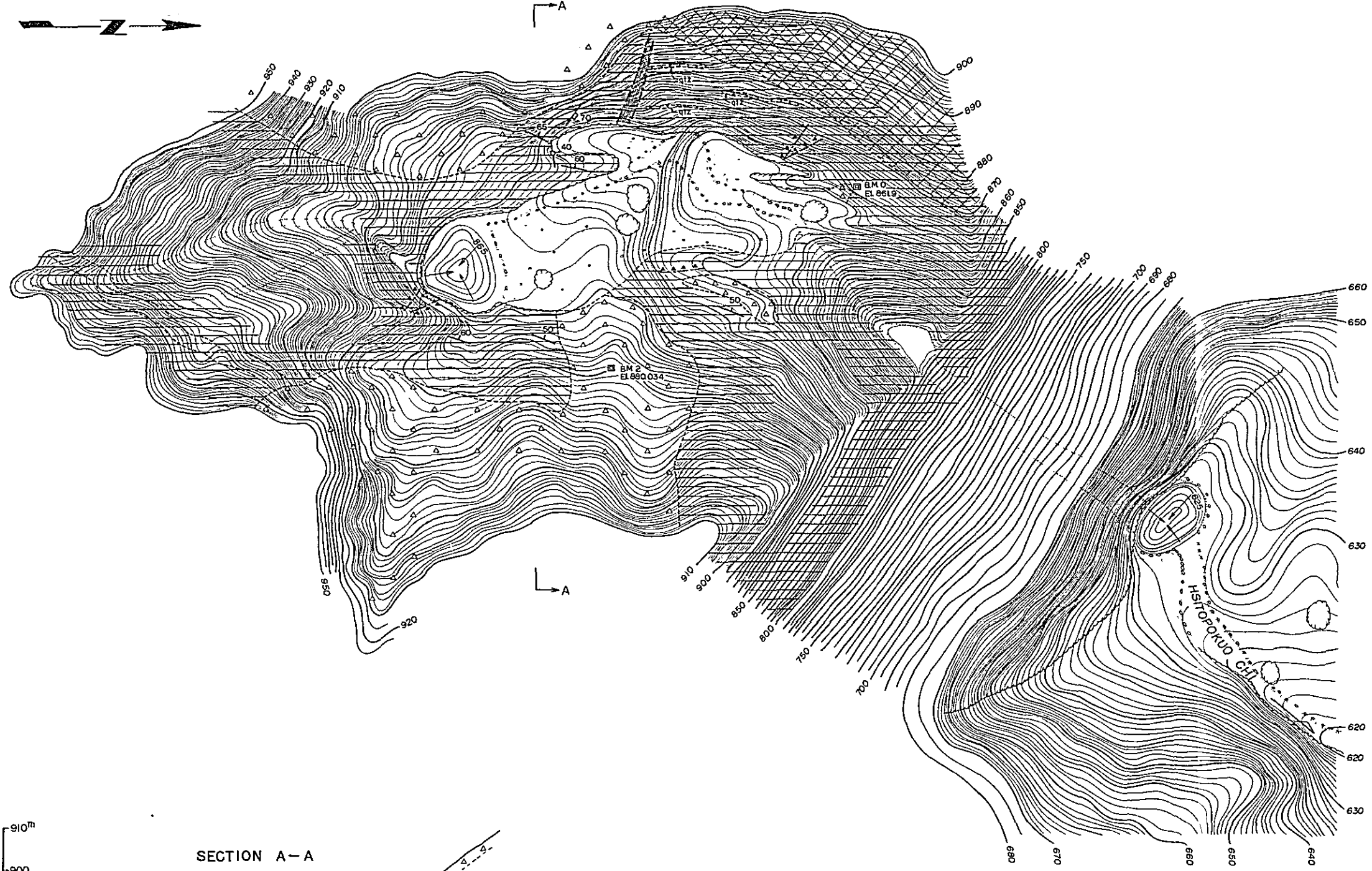
LEGEND

- Recent river deposit
- Surface soil, Talus deposit
- Terrace deposit
- GREEN SCHIST
- LIMESTONE
- Thin bed of LIMESTONE
- Crept zone
- Rock avalanche
- Rock boundary, strike and dip of stratum or schistosity
- Contact and, its strike and dip
- Joint and, its strike and dip
- Fault and, its strike and dip
- Fault gouge and its width (cm)
- Crushed zone and its width (cm)
- Disturbed zone and its width (cm)
- Open crack and, its strike, dip and width (cm)
- Exploratory adit
- Spring
- Dripping water

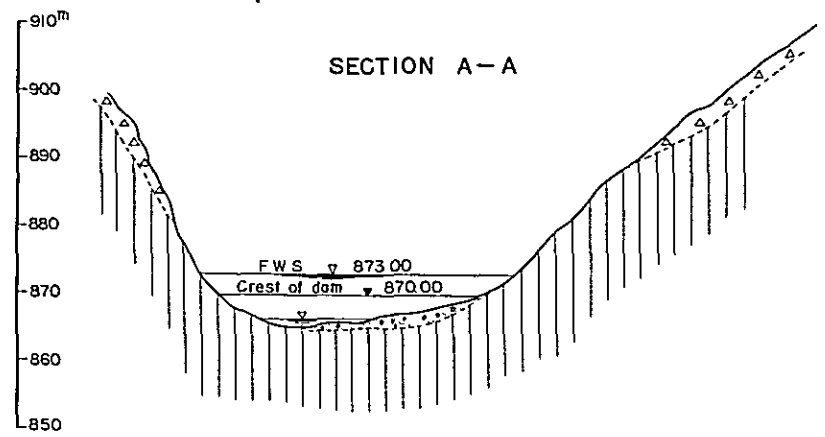


OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN	
TAIWAN POWER COMPANY, TAIWAN, REPUBLIC OF CHINA	
LIWU CHI HYDRO-ELECTRIC PROJECT	
GEOLOGY GEOLOGIC MAP OF KUYUAN DAM SITE	
ELECTRIC POWER DEVELOPMENT CO. LTD. (E.P.D. Consultants) TOKYO JAPAN	
D.R. <i>[Signature]</i>	SUBMITTED <i>[Signature]</i>
T.R. <i>[Signature]</i>	RECOMMENDED <i>[Signature]</i>
C.K. <i>[Signature]</i>	APPROVED <i>[Signature]</i>
June 18 1970	

LOCATION	DATE	DESCRIPTION	BY
REVISION			



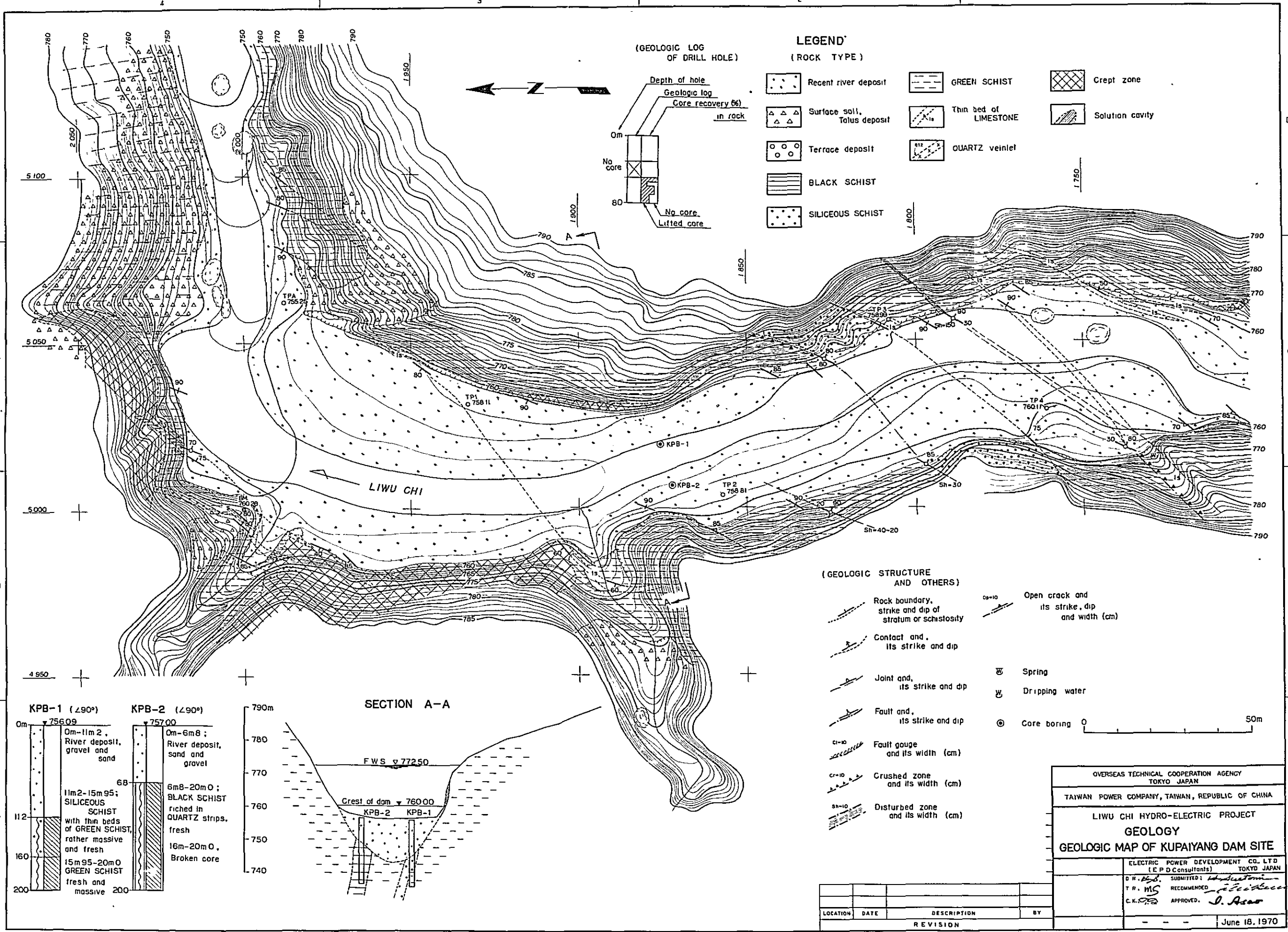
- LEGEND**
- Recent river deposit
 - Surface soil, Talus deposit
 - SILICEOUS
 - GREEN SCHIST
 - QUARTZ veinlet
 - Crept zone
 - Rock boundary, strike and dip of staturm or schistosity
 - Joint and, its strike and dip
 - Fault and, its strike and dip
 - Crushed zone and its width (cm)
 - Disturbed zone and its width (cm)



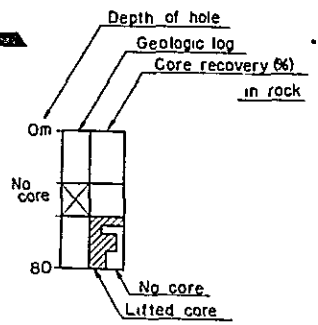
LOCATION	DATE	DESCRIPTION	BY
REVISION			

OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN	
TAIWAN POWER COMPANY, TAIWAN REPUBLIC OF CHINA	
LIWU CHI-HYDRO-ELECTRIC PROJECT GEOLOGY GEOLOGIC MAP OF HSITOPOKUO DAMSITE	
ELECTRIC POWER DEVELOPMENT CO. LTD. (E.P.D. Consultants) TOKYO JAPAN	
D.R. <i>[Signature]</i> SUBMITTED	
T.R. <i>[Signature]</i> RECOMMENDED	
C.K. <i>[Signature]</i> APPROVED	
June 18 1970	

DWG NO 14



(GEOLOGIC LOG OF DRILL HOLE)

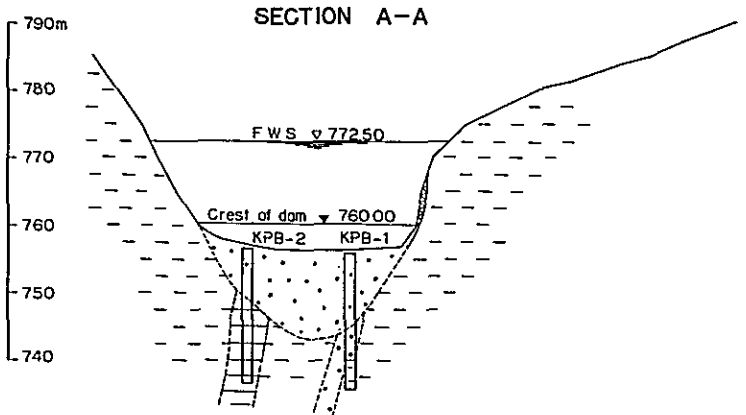
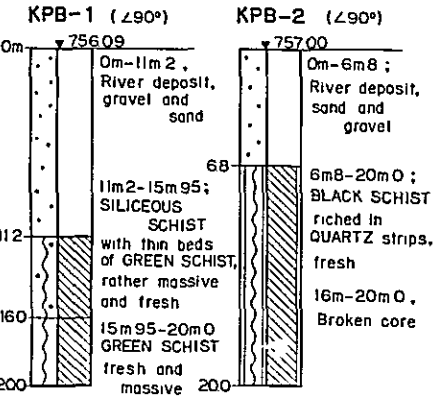


LEGEND (ROCK TYPE)

- Recent river deposit
- Surface soil, Talus deposit
- Terrace deposit
- BLACK SCHIST
- SILICEOUS SCHIST
- GREEN SCHIST
- Thin bed of LIMESTONE
- QUARTZ veinlet
- Crept zone
- Solution cavity

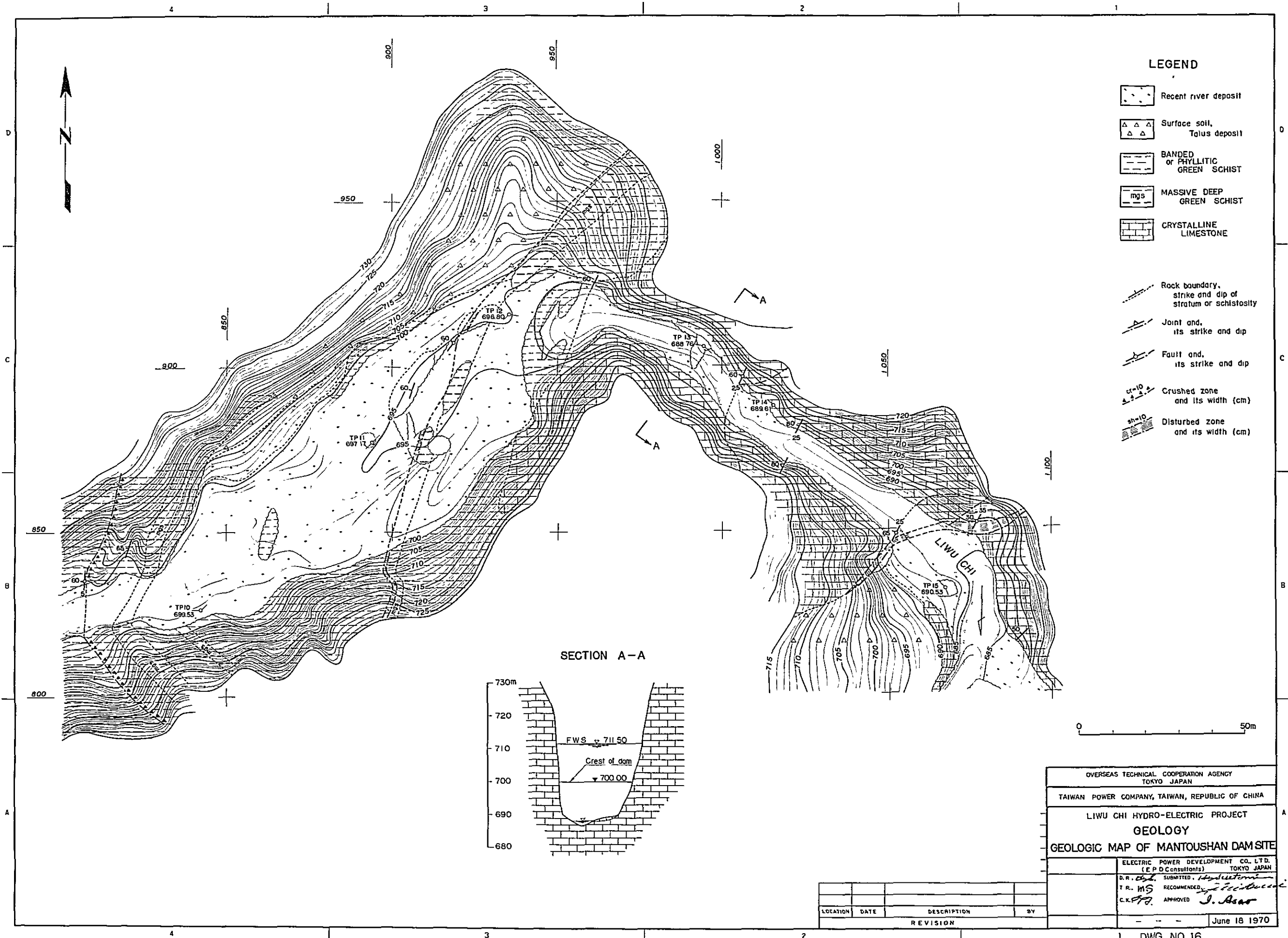
(GEOLOGIC STRUCTURE AND OTHERS)

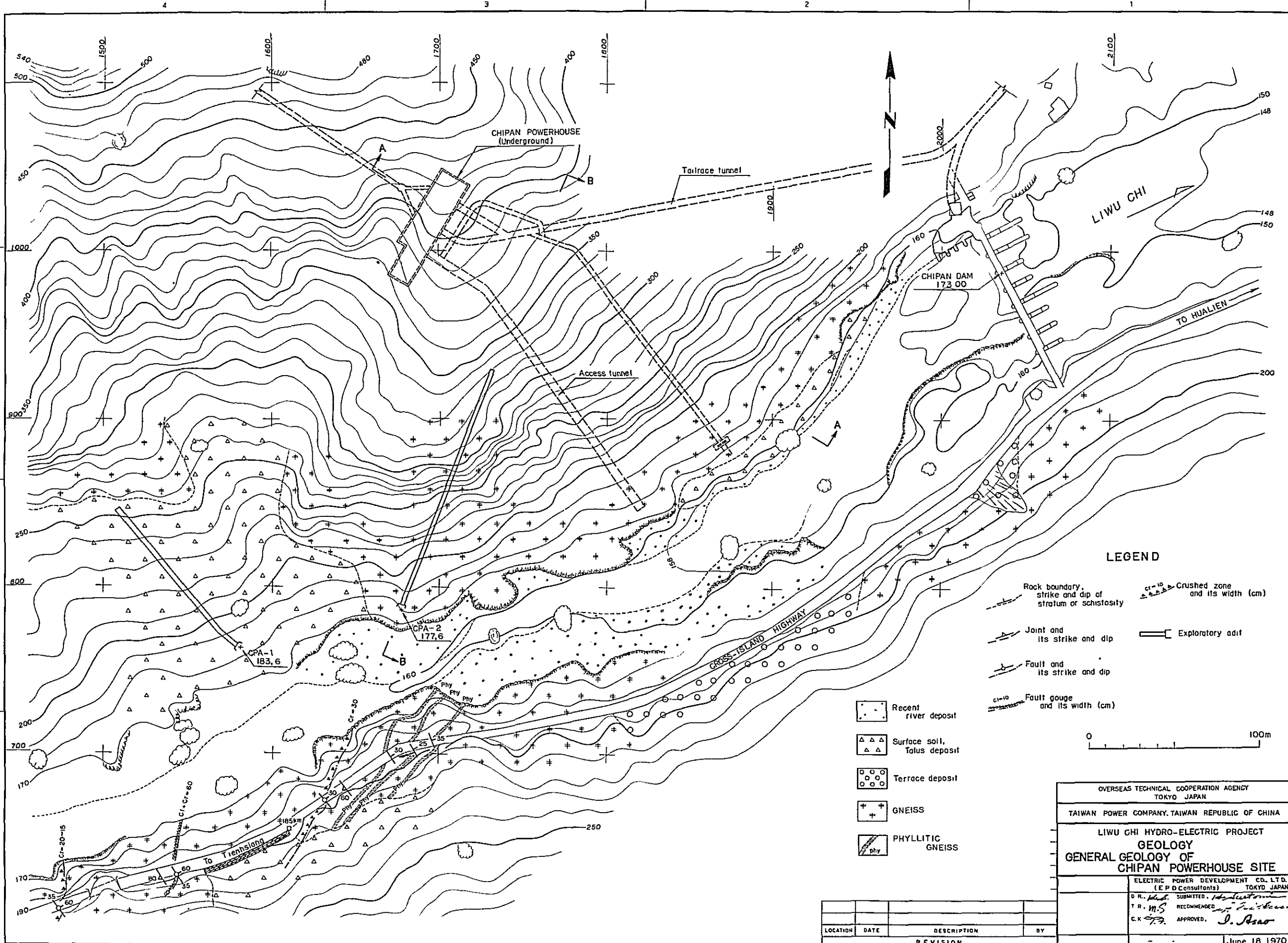
- Rock boundary, strike and dip of stratum or schistosity
- Contact and its strike and dip
- Joint and its strike and dip
- Fault and its strike and dip
- Fault gouge and its width (cm)
- Crushed zone and its width (cm)
- Disturbed zone and its width (cm)
- Open crack and its strike, dip and width (cm)
- Spring
- Dripping water
- Core boring



OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN			
TAIWAN POWER COMPANY, TAIWAN, REPUBLIC OF CHINA			
LIWU CHI HYDRO-ELECTRIC PROJECT			
GEOLOGY			
GEOLOGIC MAP OF KUPAIYANG DAM SITE			
ELECTRIC POWER DEVELOPMENT CO. LTD. (E.P.D. Consultants) TOKYO JAPAN			
D.R. MS. SUBMITTED: [Signature]		T.R. MS. RECOMMENDED: [Signature]	
C.K.P. APPROVED: [Signature]		[Signature]	
June 18, 1970			

LOCATION	DATE	DESCRIPTION	BY

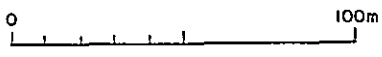




LEGEND

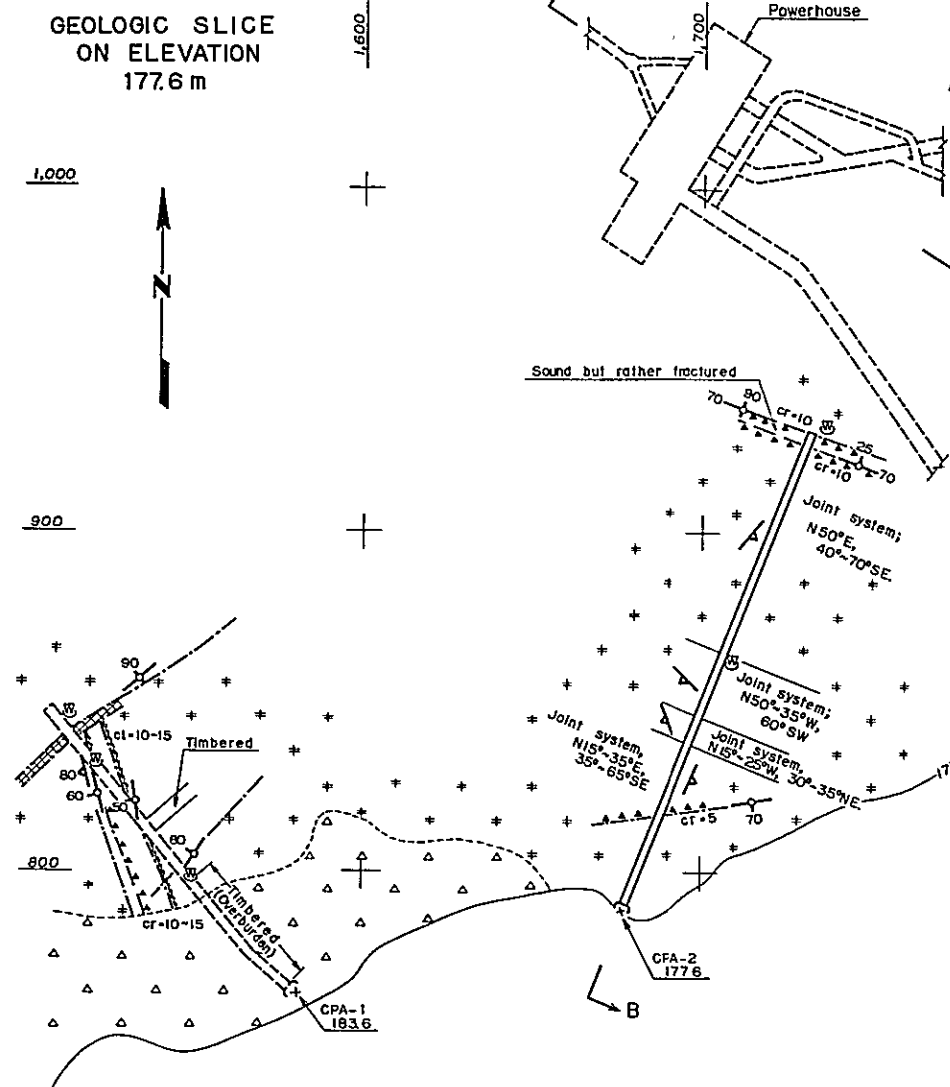
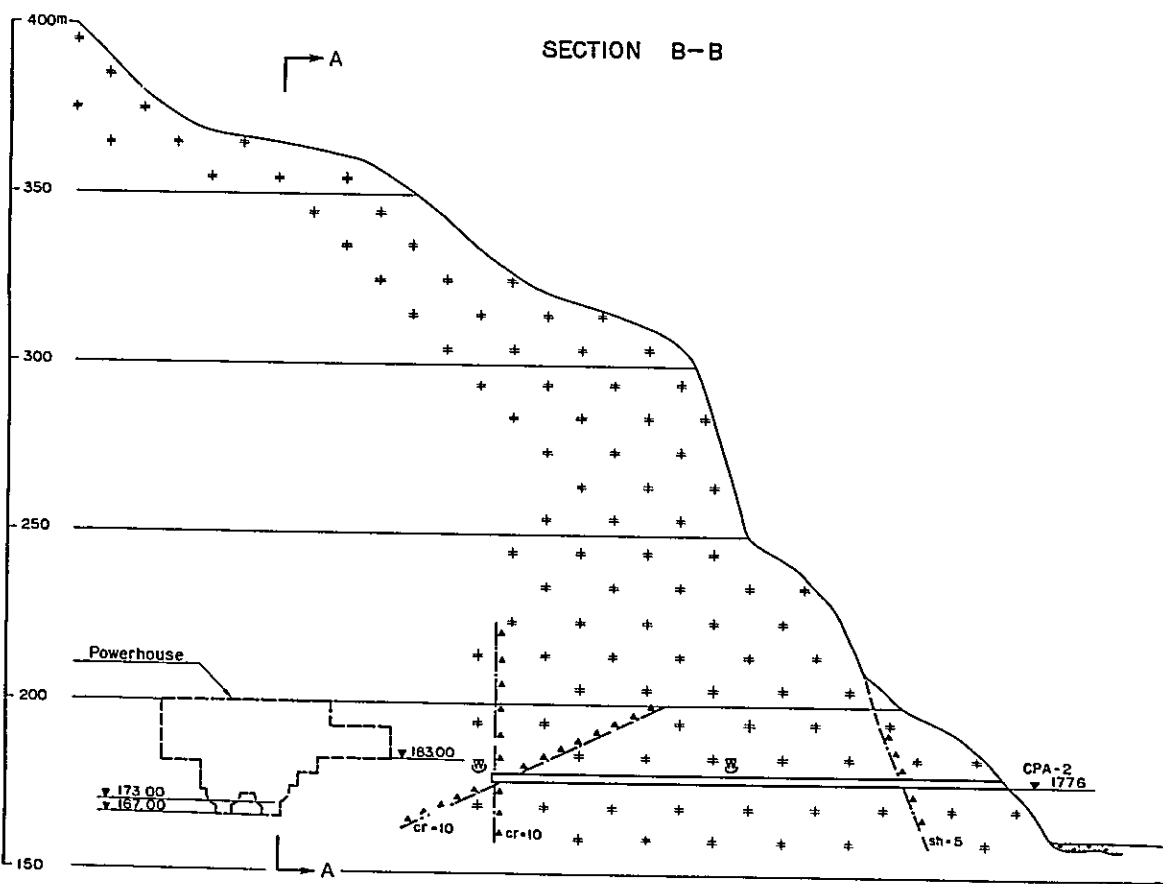
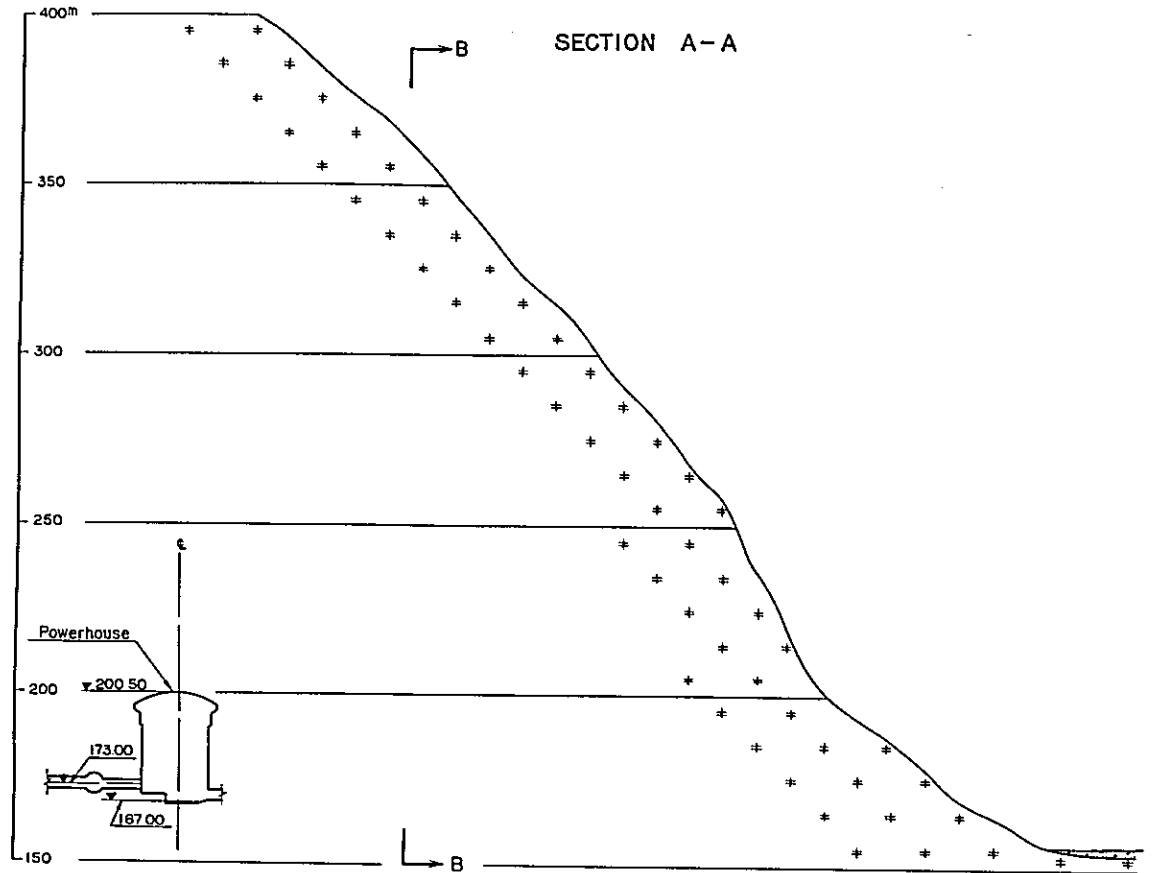
- Rock boundary, strike and dip of stratum or schistosity
- Joint and its strike and dip
- Fault and its strike and dip
- Fault gouge and its width (cm)
- Crushed zone and its width (cm)
- Exploratory adit

- Recent river deposit
- Surface soil, Talus deposit
- Terrace deposit
- GNEISS
- PHYLLITIC GNEISS

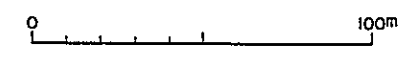


OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN	
TAIWAN POWER COMPANY, TAIWAN REPUBLIC OF CHINA	
LIWU CHI HYDRO-ELECTRIC PROJECT	
GEOLOGY GENERAL GEOLOGY OF CHIPAN POWERHOUSE SITE	
ELECTRIC POWER DEVELOPMENT CO. LTD. (E.P.D. Consultants) TOKYO JAPAN	
D.R. <i>phs</i>	SUBMITTED, <i>Indication</i>
T.R. <i>M.S.</i>	RECOMMENDED, <i>Indication</i>
C.K. <i>phs</i>	APPROVED, <i>J. Asao</i>
June 18 1970	

LOCATION	DATE	DESCRIPTION	BY
REVISION			



- LEGEND**
- Recent river deposit
 - Surface soil, Talus deposit
 - GNEISS
 - Rock boundary
 - Joint and its strike and dip
 - Fault and its strike and dip
 - Fault gouge and its width (cm)
 - Crushed zone and its width (cm)
 - Fractured to disturbed zone and its width (cm)
 - Spring
 - Exploratory adit (Slice) CPA-2
 - (Section) CPA-2



LOCATION	DATE	DESCRIPTION	BY
REVISION			

OVERSEAS TECHNICAL COOPERATION AGENCY
TOKYO JAPAN

TAIWAN POWER COMPANY TAIWAN REPUBLIC OF CHINA

LIWU CHI HYDRO-ELECTRIC PROJECT
GEOLOGY
GEOLOGIC FEATURE
OF CHIPAN POWERHOUSE SITE

ELECTRIC POWER DEVELOPMENT CO. LTD
(E.P.D. Consultants) TOKYO JAPAN

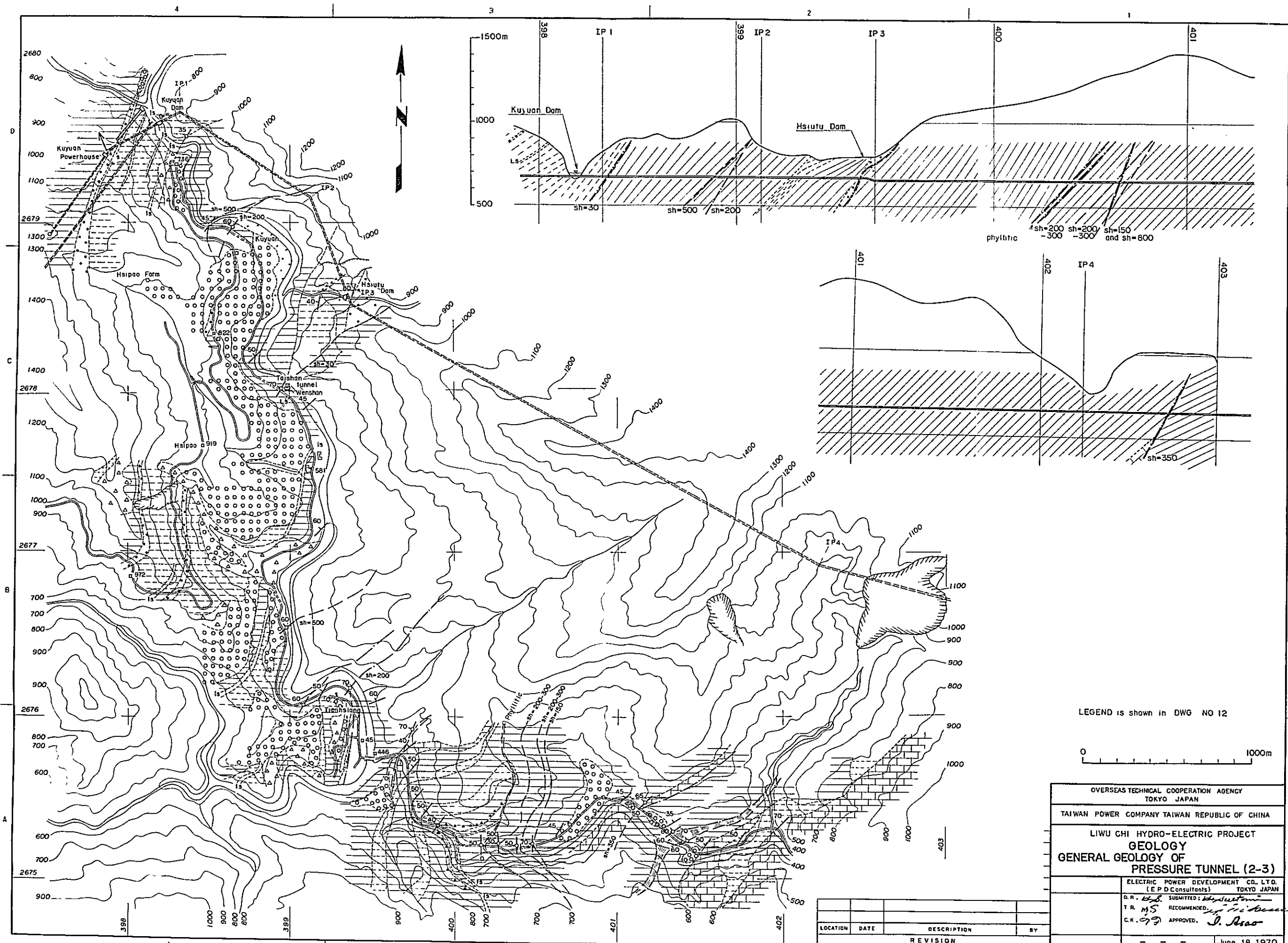
S.R. *[Signature]* SUBMITTED *[Signature]*

T.R. *[Signature]* RECOMMENDED *[Signature]*

C.K. *[Signature]* APPROVED: *[Signature]*

June 18 1970

DWG NO 18

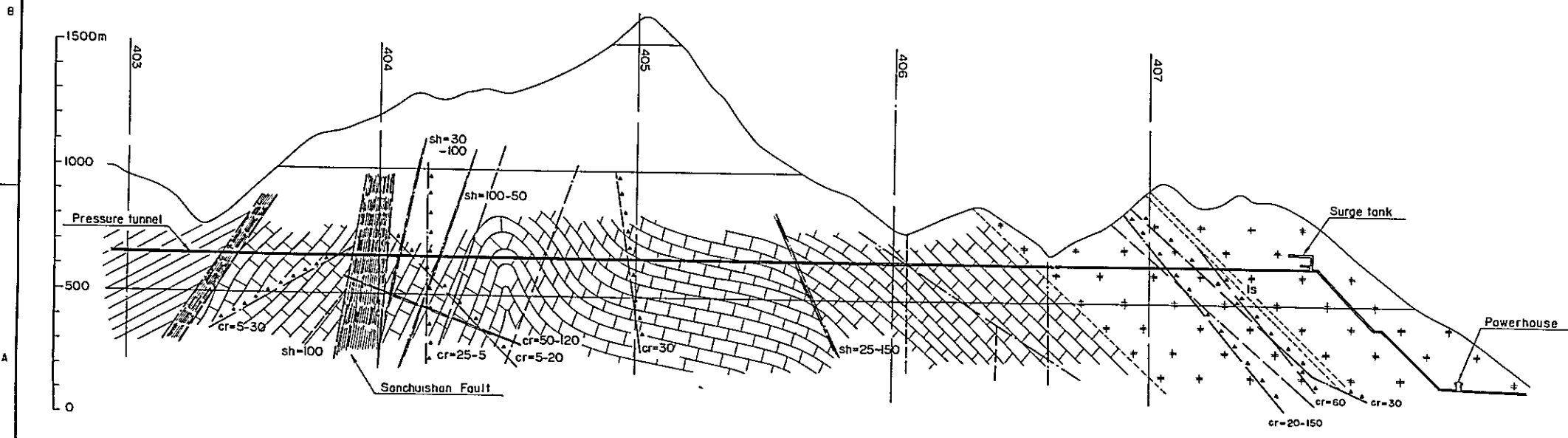
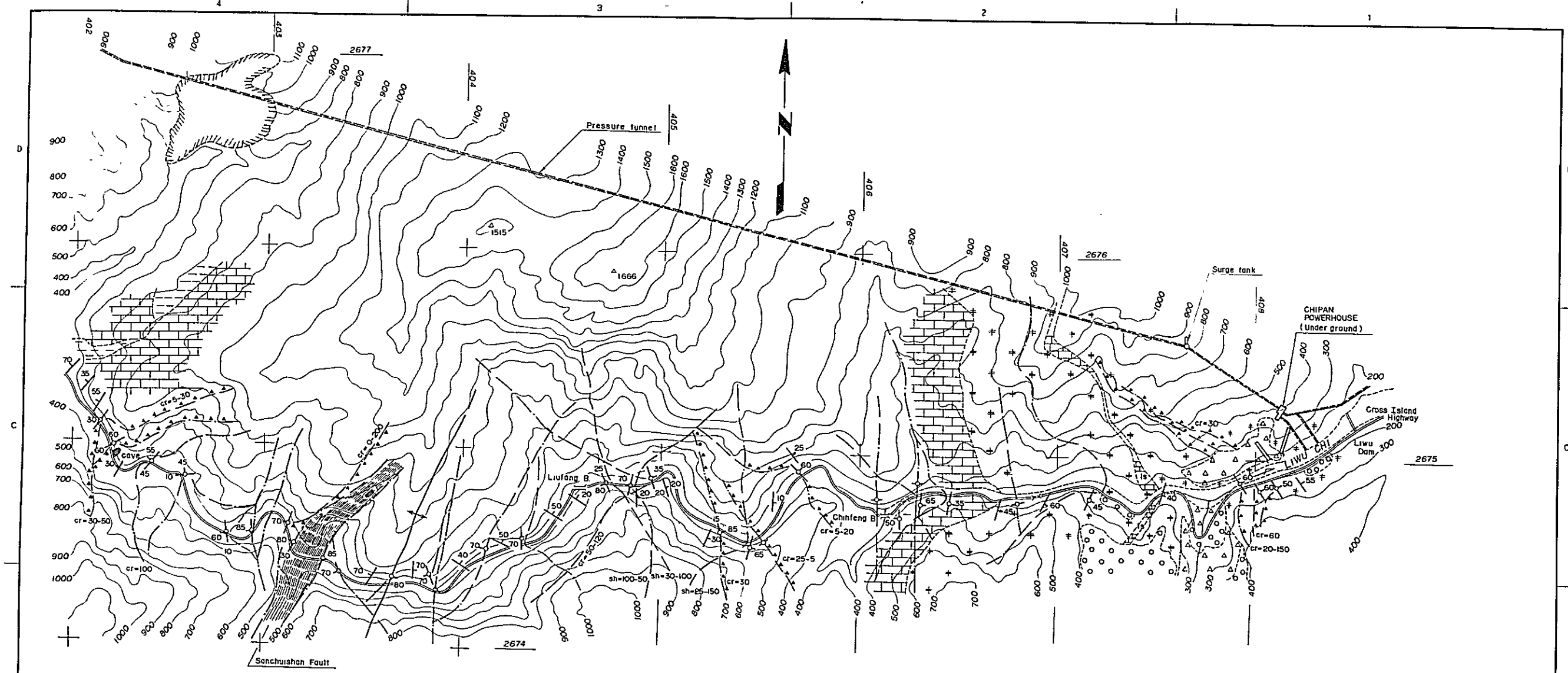


LEGEND is shown in DWG NO 12



OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN	
TAIWAN POWER COMPANY TAIWAN REPUBLIC OF CHINA	
LIWU CHI HYDRO-ELECTRIC PROJECT GEOLOGY GENERAL GEOLOGY OF PRESSURE TUNNEL (2-3)	
ELECTRIC POWER DEVELOPMENT CO. LTD. (E.P.D. Consultants) TOKYO JAPAN	
D.R. <i>[Signature]</i>	SUBMITTED: <i>[Signature]</i>
T.R. <i>[Signature]</i>	RECOMMENDED: <i>[Signature]</i>
C.K. <i>[Signature]</i>	APPROVED: <i>[Signature]</i>
June 18 1970	

LOCATION	DATE	DESCRIPTION	BY
REVISION			

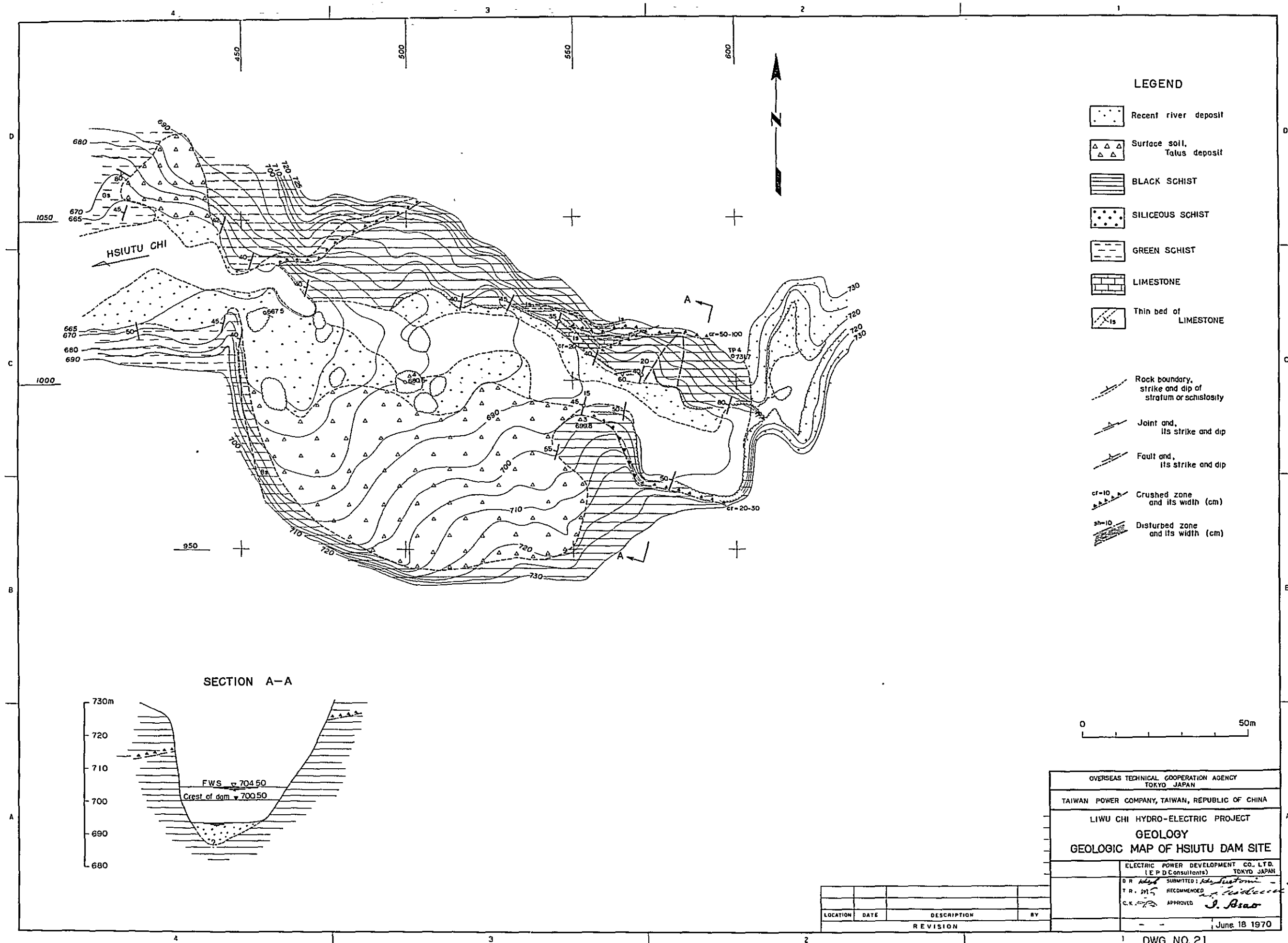


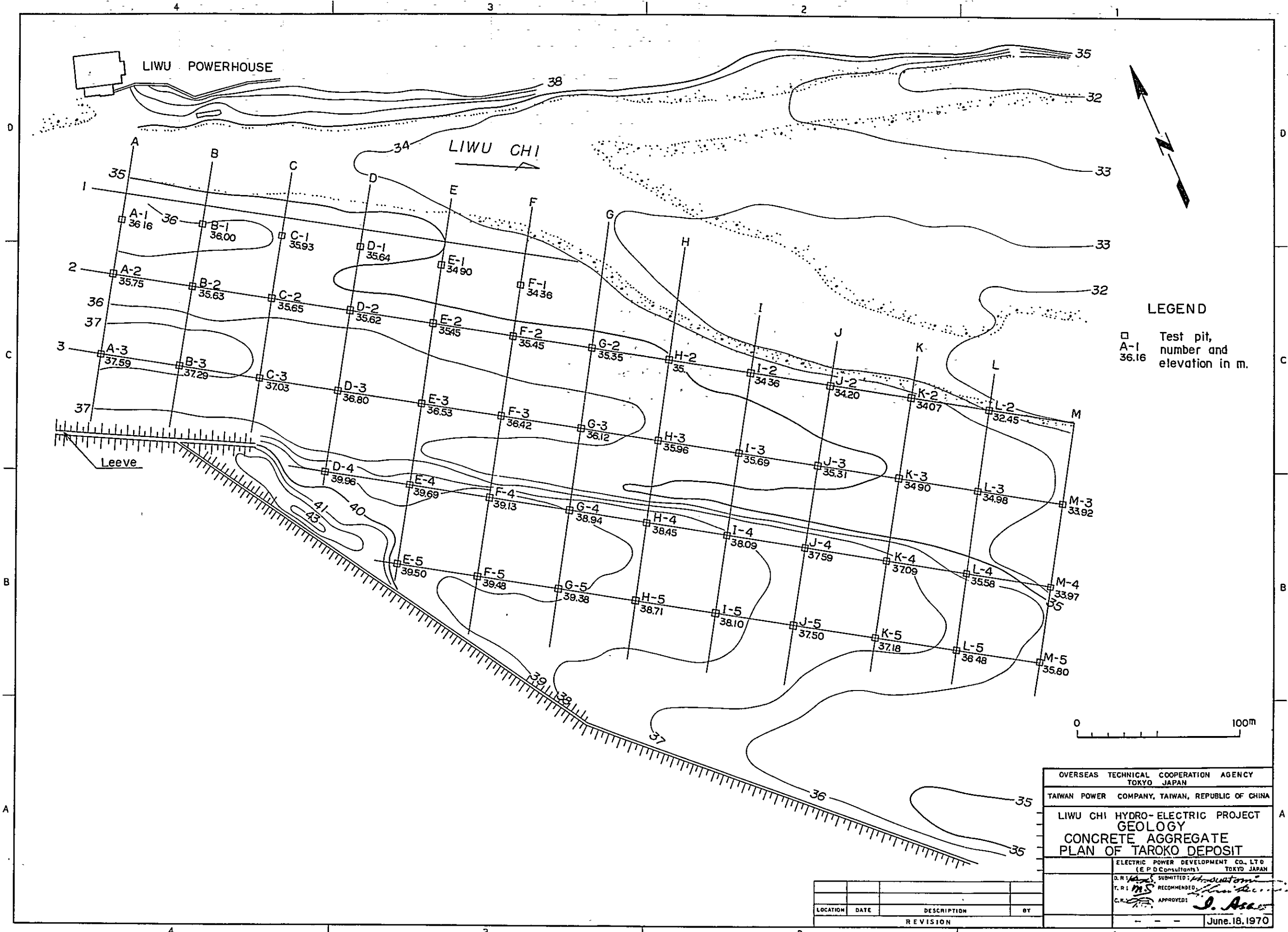
LEGEND is shown in DWG NO 12



OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN	
TAIWAN POWER COMPANY TAIWAN REPUBLIC OF CHINA	
LIWU CHI HYDRO-ELECTRIC PROJECT	
GEOLOGY GENERAL GEOLOGY OF PRESSURE TUNNEL (3-3)	
ELECTRIC POWER DEVELOPMENT CO. LTD. (E.P.D. Consultants) TOKYO JAPAN	
D.R. <i>[Signature]</i>	SUBMITTED. <i>[Signature]</i>
T.R. <i>[Signature]</i>	RECOMMENDED. <i>[Signature]</i>
C.K. <i>[Signature]</i>	APPROVED. <i>[Signature]</i>
June 18 1970	

LOCATION	DATE	DESCRIPTION	BY
REVISION			

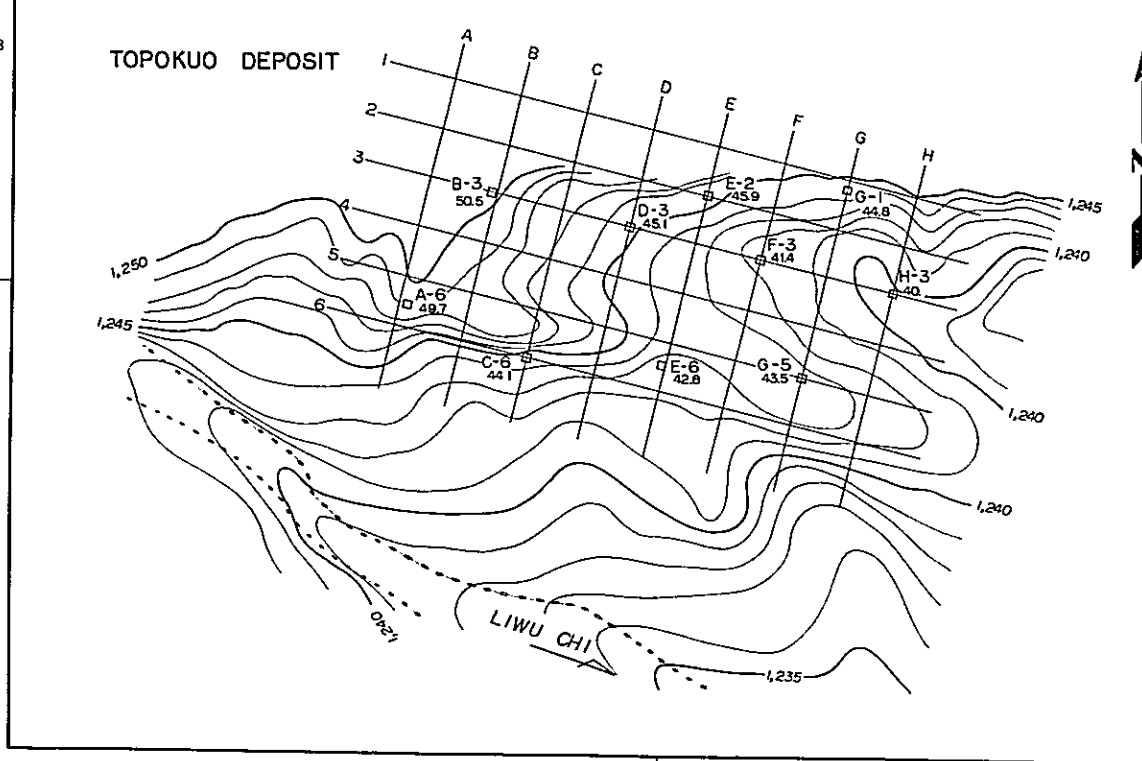
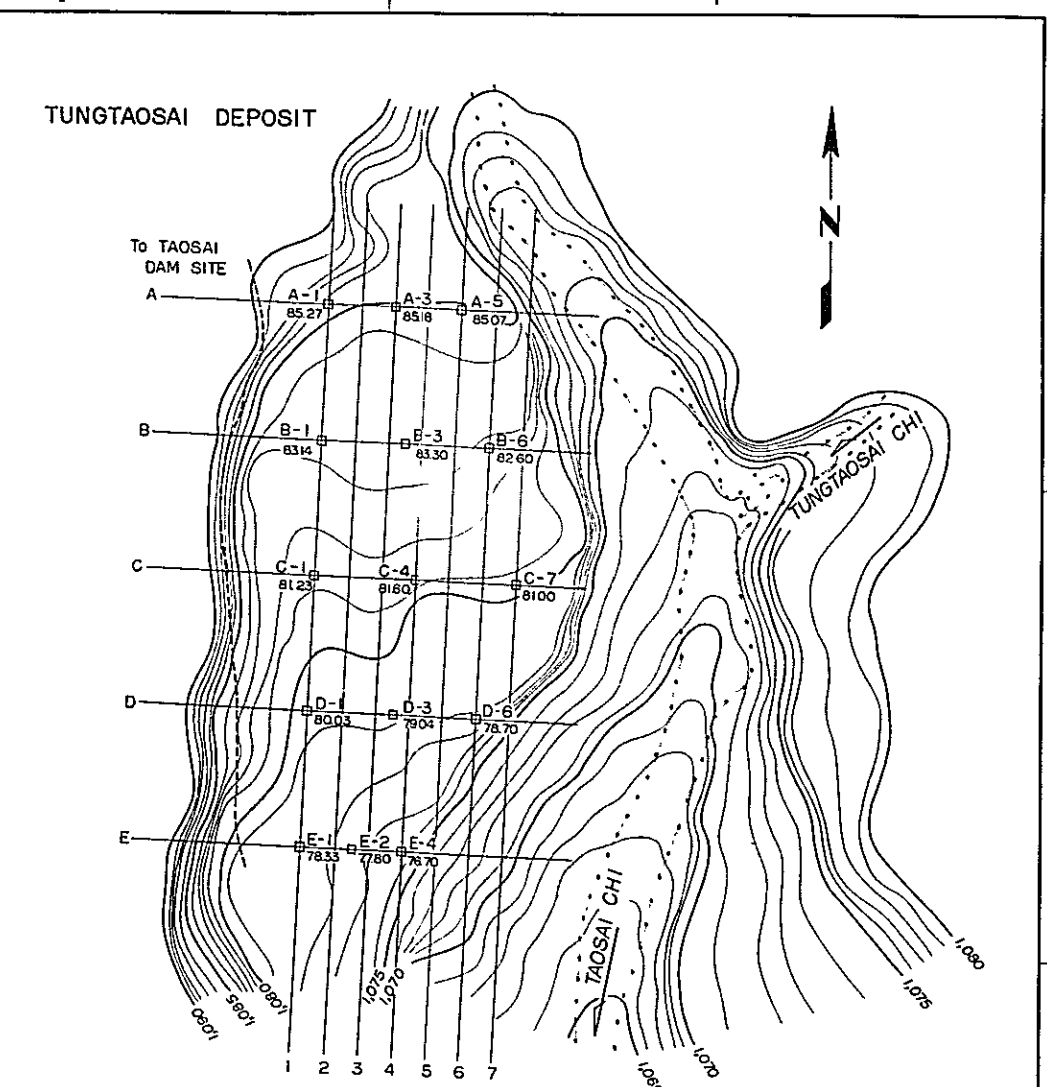
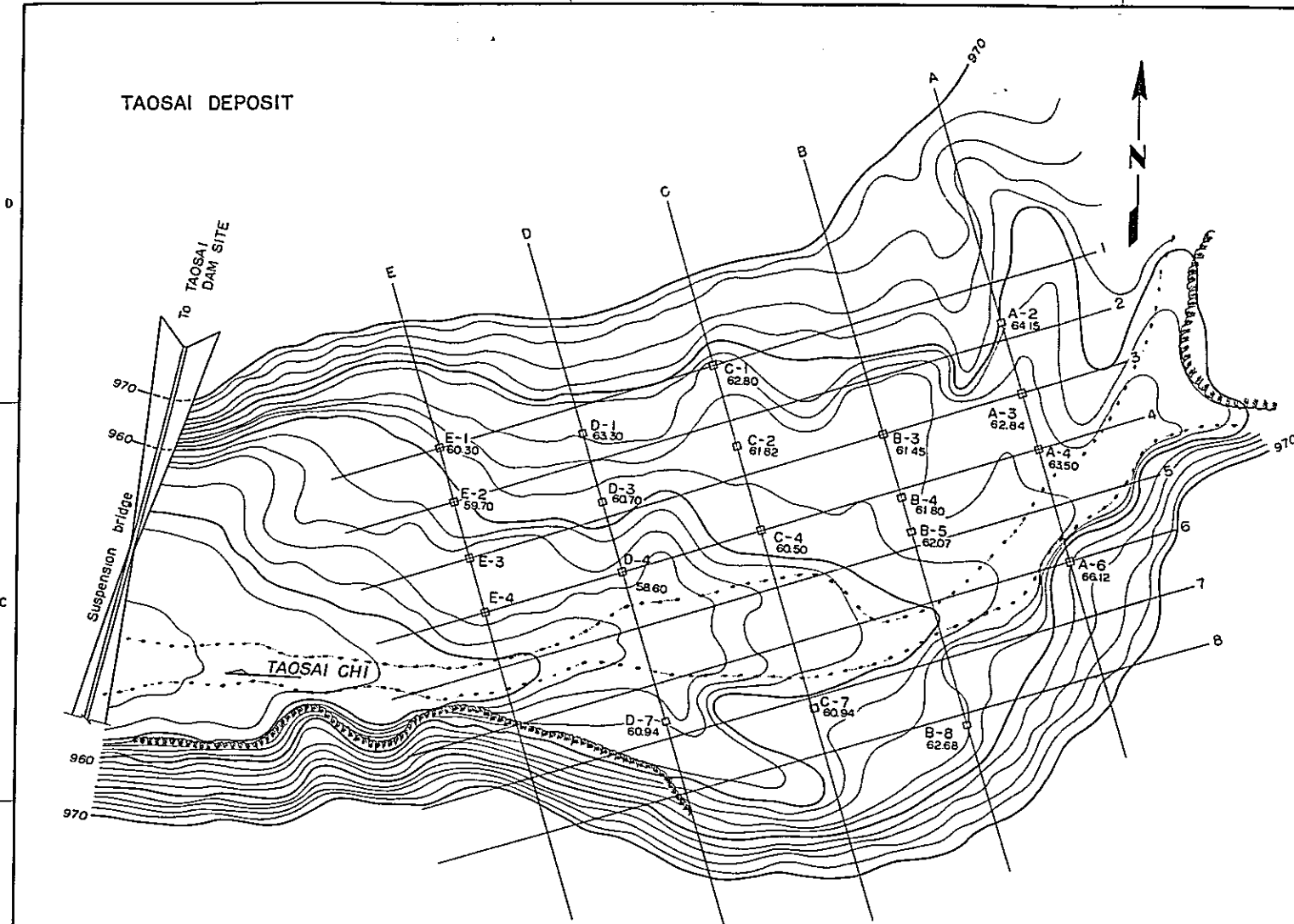




LEGEND
 □ Test pit,
 A-1
 36.16
 number and
 elevation in m.

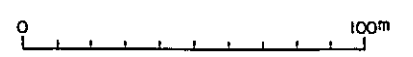
OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN	
TAIWAN POWER COMPANY, TAIWAN, REPUBLIC OF CHINA	
LIWU CHI HYDRO-ELECTRIC PROJECT GEOLOGY CONCRETE AGGREGATE PLAN OF TAROKO DEPOSIT	
ELECTRIC POWER DEVELOPMENT CO., LTD (E.P.D. Consultants) TOKYO JAPAN	
D.R.:	SUBMITTED: <i>[Signature]</i>
T.R.:	RECOMMENDED: <i>[Signature]</i>
C.W.:	APPROVED: <i>[Signature]</i>
June 18, 1970	

LOCATION	DATE	DESCRIPTION	BY
REVISION			



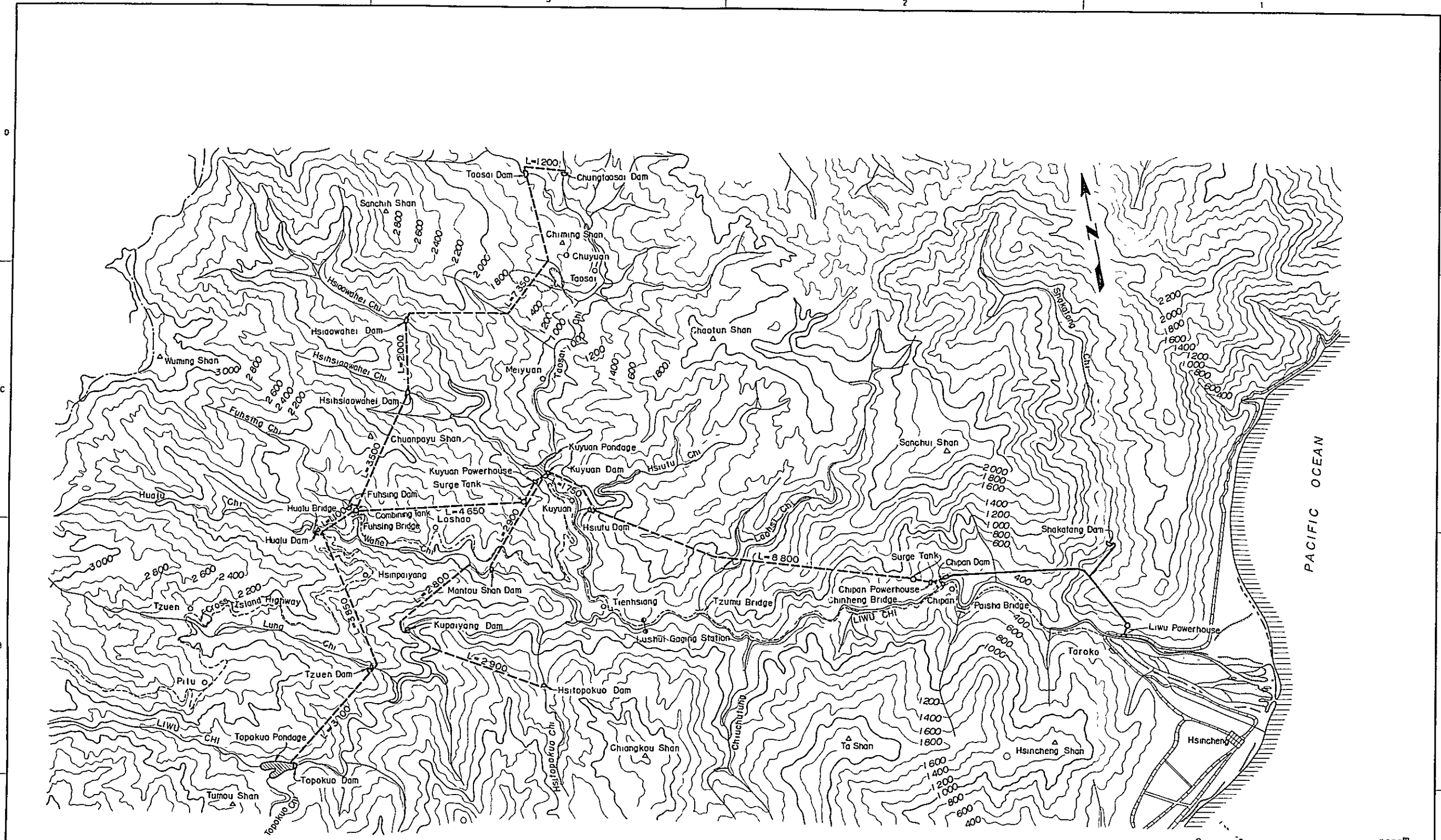
LEGEND

□ 85.27 Test pit, number and elevation of top of pit in meter, abridged orders of thousand and hundred (example, 85.27=1,085.27)



LOCATION	DATE	DESCRIPTION	BY
REVISION			

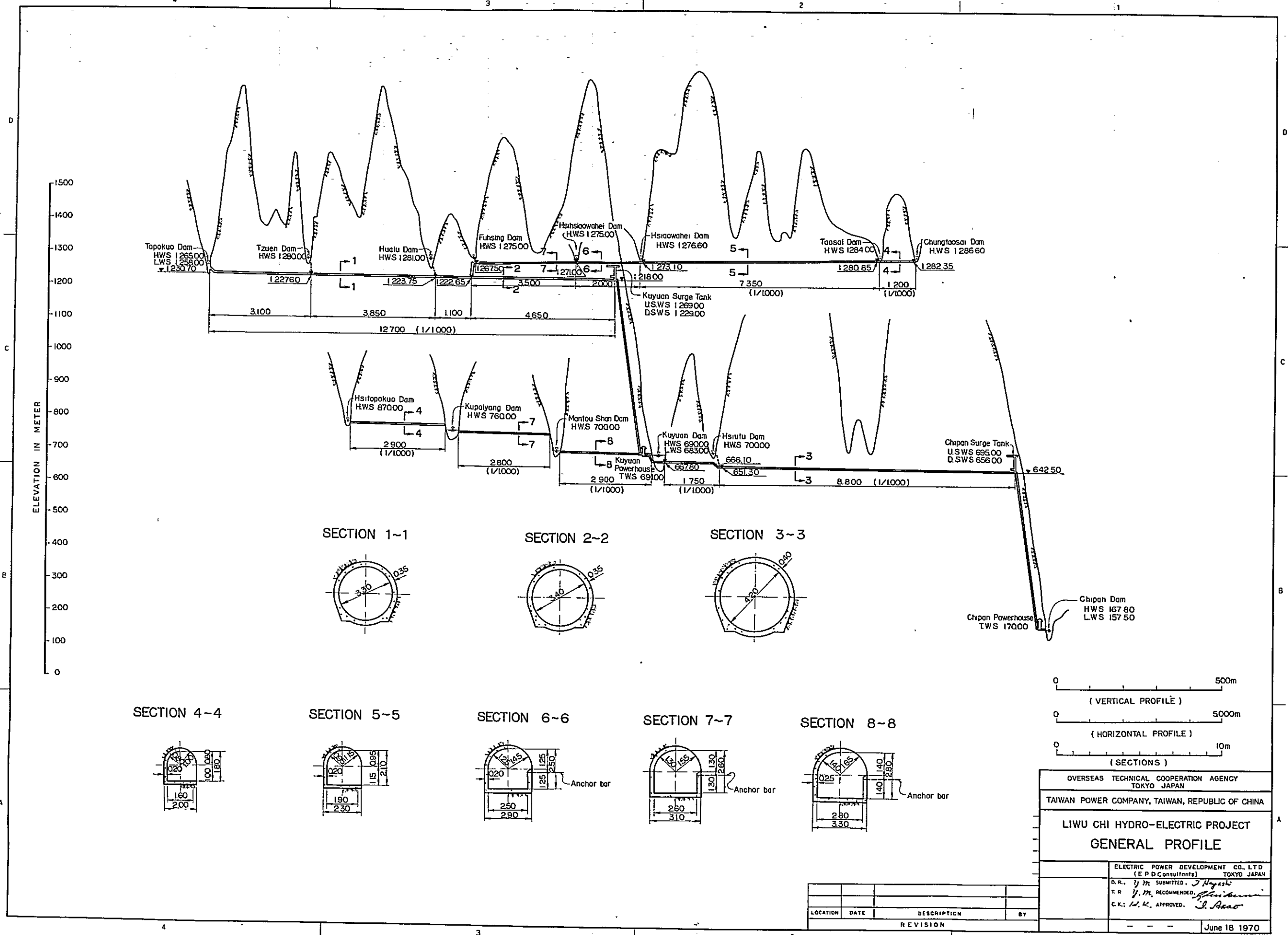
OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN	
TAIWAN POWER COMPANY, TAIWAN, REPUBLIC OF CHINA	
LIWU CHI HYDRO-ELECTRIC PROJECT GEOLOGY CONCRETE AGGREGATE TAOSAI, TUNGTAOSAI AND TOPOKUO DEPOSIT	
ELECTRIC POWER DEVELOPMENT CO. LTD. (E.P.D. Consultants) TOKYO JAPAN	
D.R. <i>[Signature]</i>	SUBMITTED: <i>[Signature]</i>
T.R. <i>[Signature]</i>	RECOMMENDED: <i>[Signature]</i>
C.K. <i>[Signature]</i>	APPROVED: <i>[Signature]</i>
June 18, 1970	



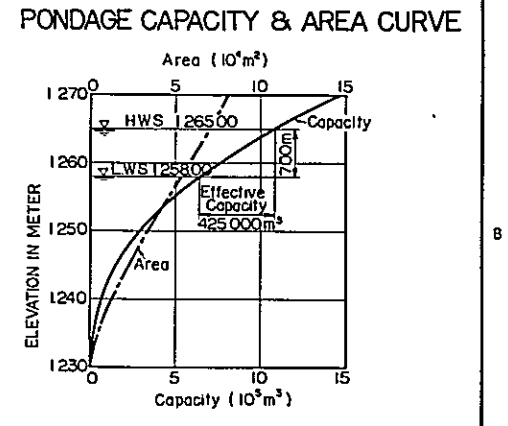
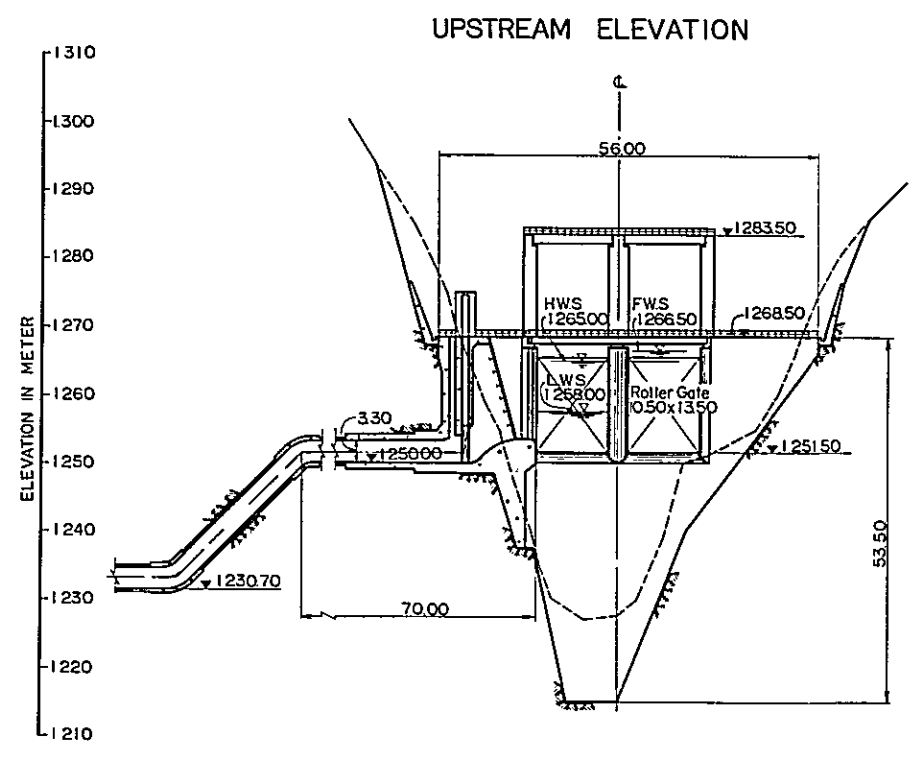
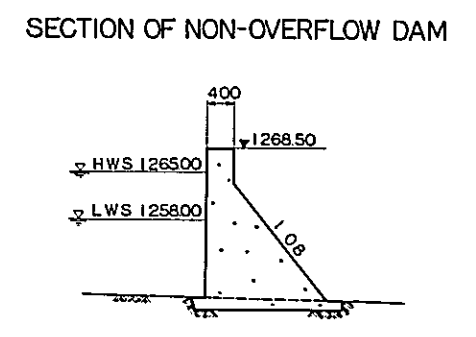
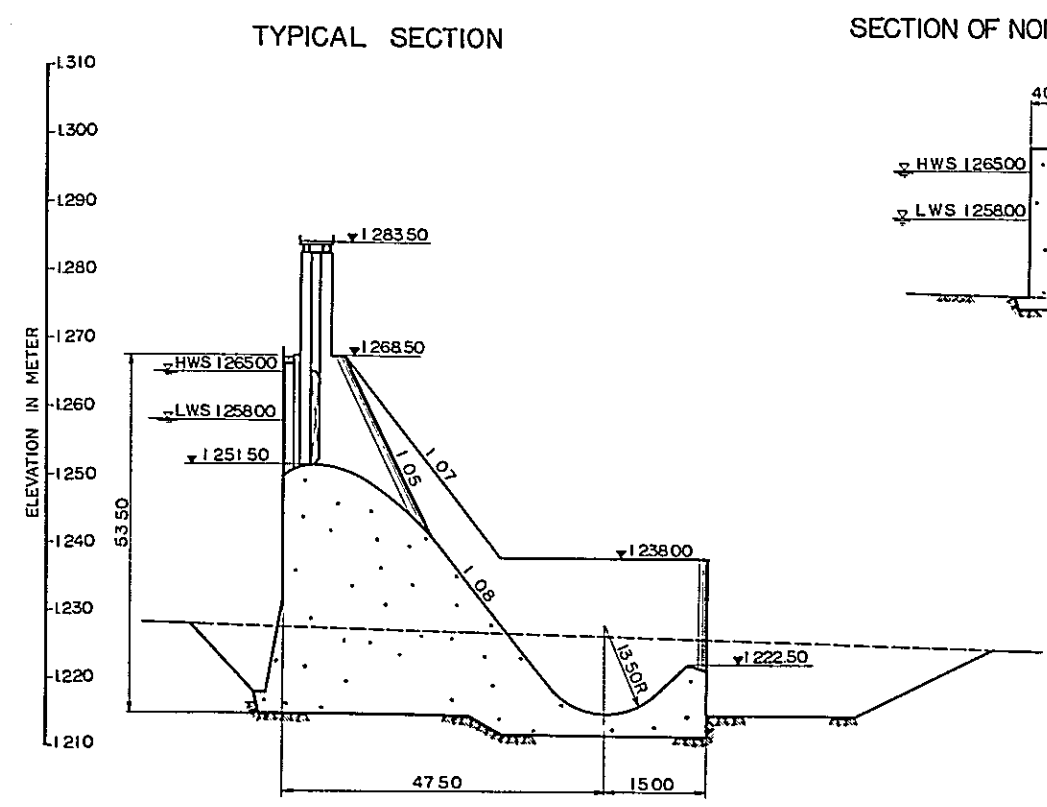
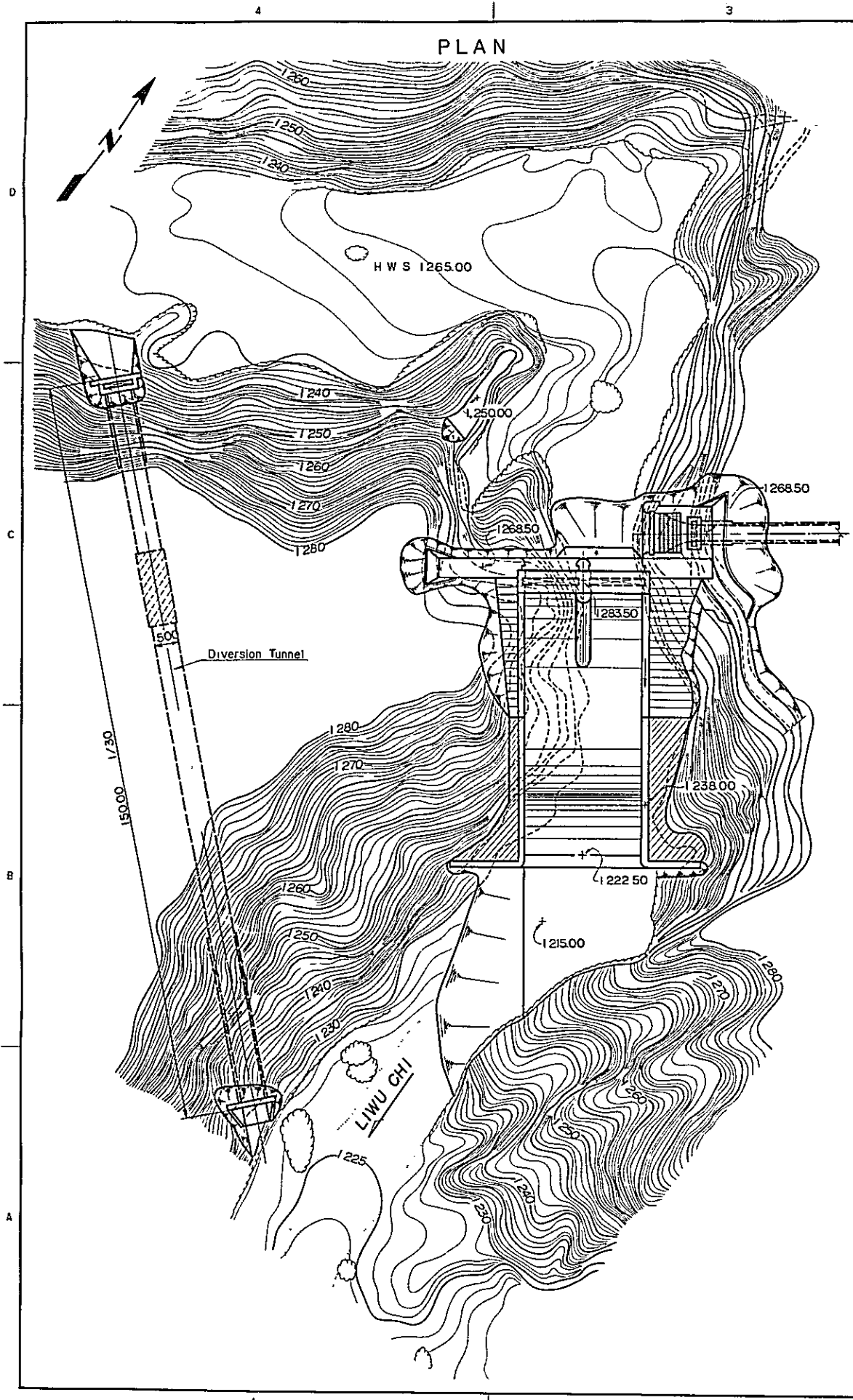
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TAIWAN POWER COMPANY, TAIWAN, REPUBLIC OF CHINA	
LIWU CHI HYDRO-ELECTRIC PROJECT GENERAL PLAN	
ELECTRIC POWER DEVELOPMENT CO., LTD. (E.P.D. Consultants) TOKYO JAPAN	
D.R. <i>J.M.</i> SUBMITTED <i>J. Noyori</i>	
T.A. <i>J.M.</i> RECOMMENDED <i>J. Noyori</i>	
C.K. <i>A.K.</i> APPROVED <i>S. Asao</i>	
June 18 1970	

LOCATION	DATE	DESCRIPTION	BY
REVISION			

DWG NO 24



OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN			
TAIWAN POWER COMPANY, TAIWAN, REPUBLIC OF CHINA			
LIWU CHI HYDRO-ELECTRIC PROJECT GENERAL PROFILE			
ELECTRIC POWER DEVELOPMENT CO. LTD. (E.P.D. Consultants) TOKYO JAPAN			
D.R. <i>Y.M.</i> SUBMITTED, <i>J. Hayashi</i>			
T.R. <i>Y.M.</i> RECOMMENDED, <i>J. Hayashi</i>			
C.K. <i>H.K.</i> APPROVED, <i>S. Rao</i>			
LOCATION	DATE	DESCRIPTION	BY
		REVISION	
			June 18 1970



(PLAN, ELEVATION AND SECTIONS)

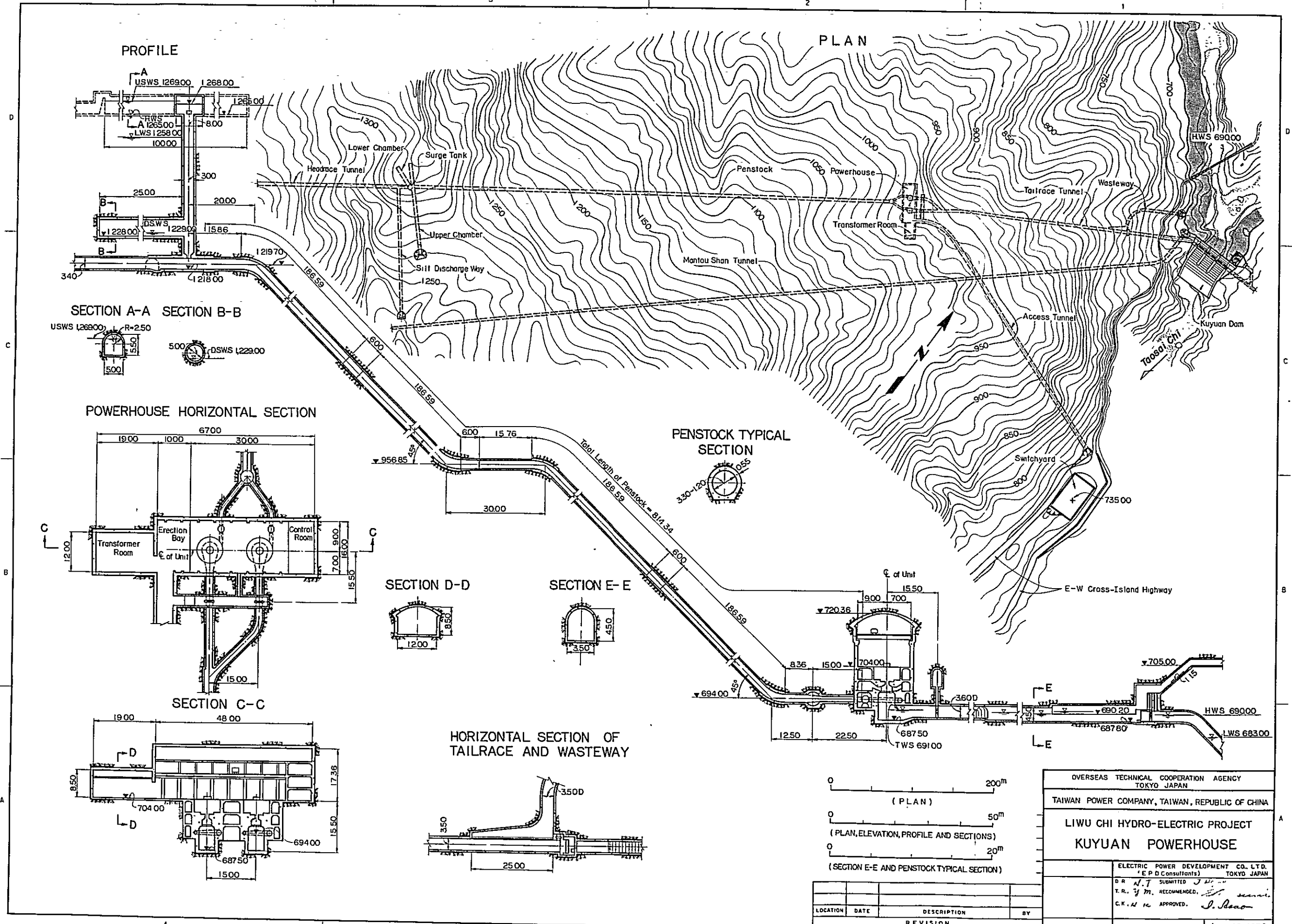
OVERSEAS TECHNICAL COOPERATION AGENCY
TOKYO JAPAN

TAIWAN POWER COMPANY, TAIWAN, REPUBLIC OF CHINA

LIWU CHI HYDRO-ELECTRIC PROJECT
TOPOKUO PONDAGE DAM

ELECTRIC POWER DEVELOPMENT CO., LTD (E.P.D.C. Consultants) TOKYO JAPAN	
D.R. N.T. SUBMITTED. <i>J. Hayashi</i>	
T.R. Y.H. RECOMMENDED. <i>Shiomi</i>	
C.K. N.K. APPROVED. <i>J. Ageo</i>	
REVISION	June 18 1970

LOCATION	DATE	DESCRIPTION	BY



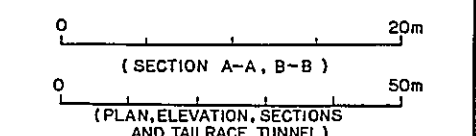
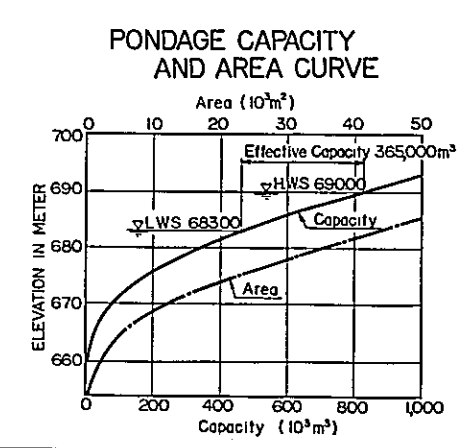
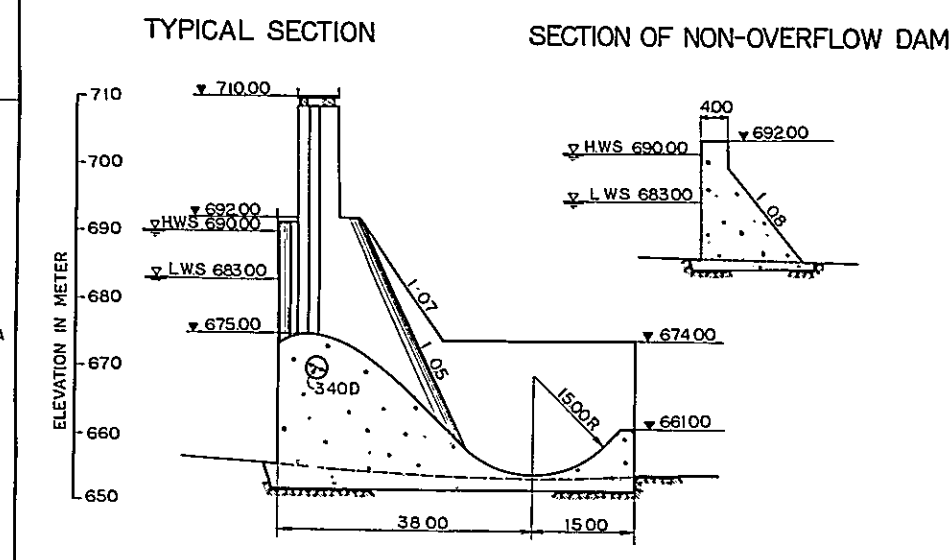
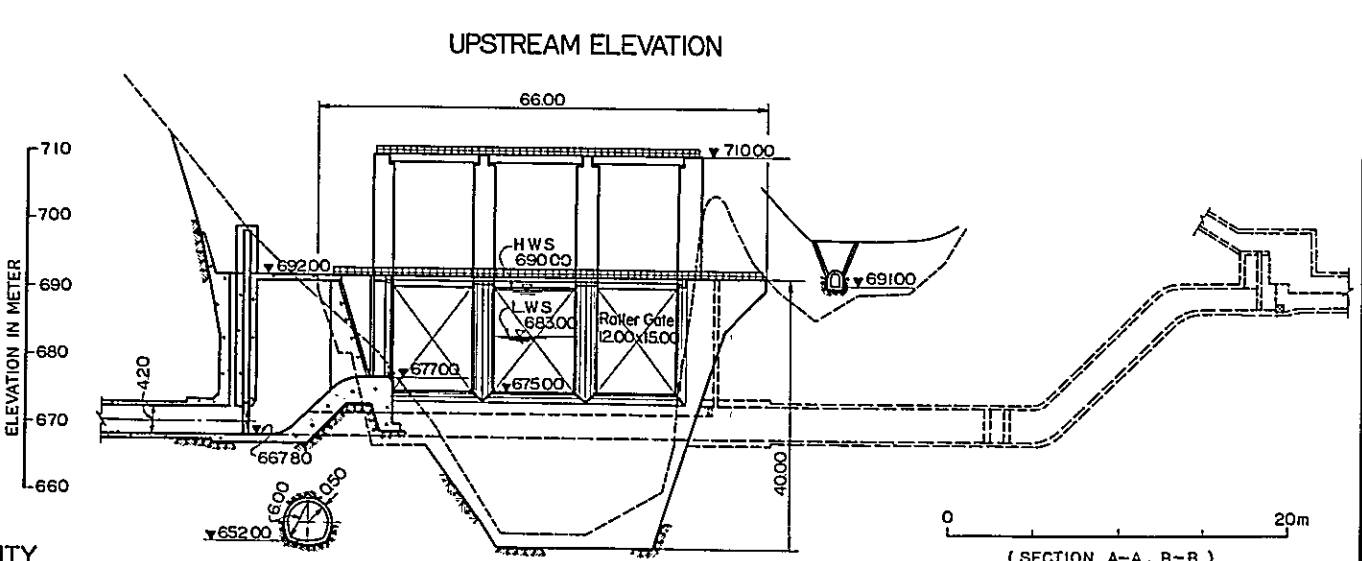
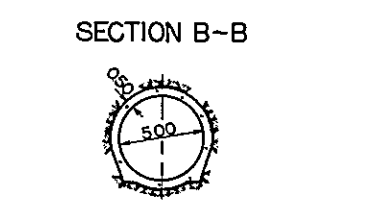
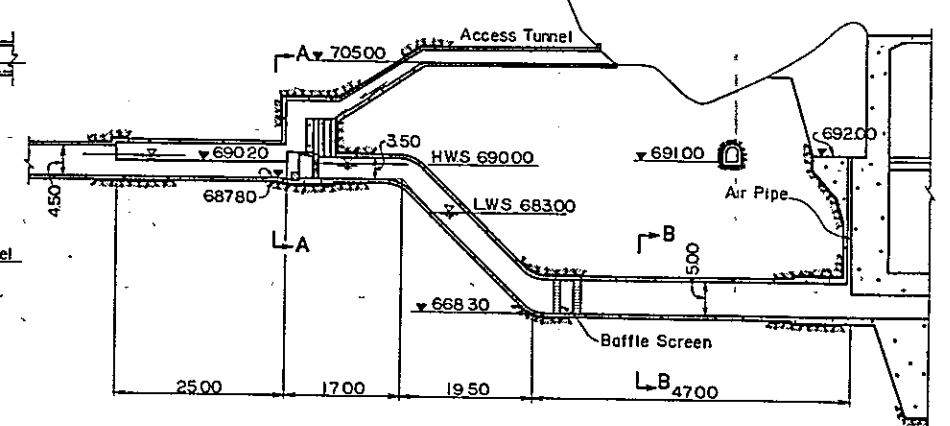
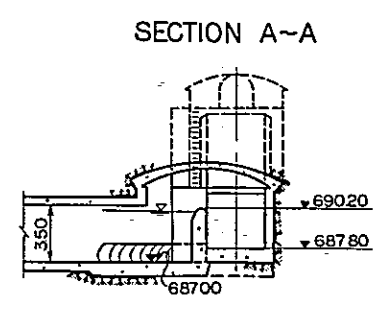
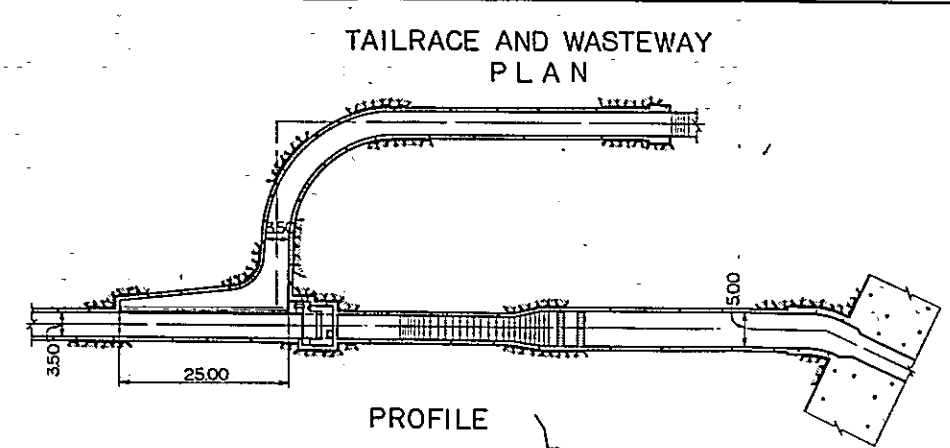
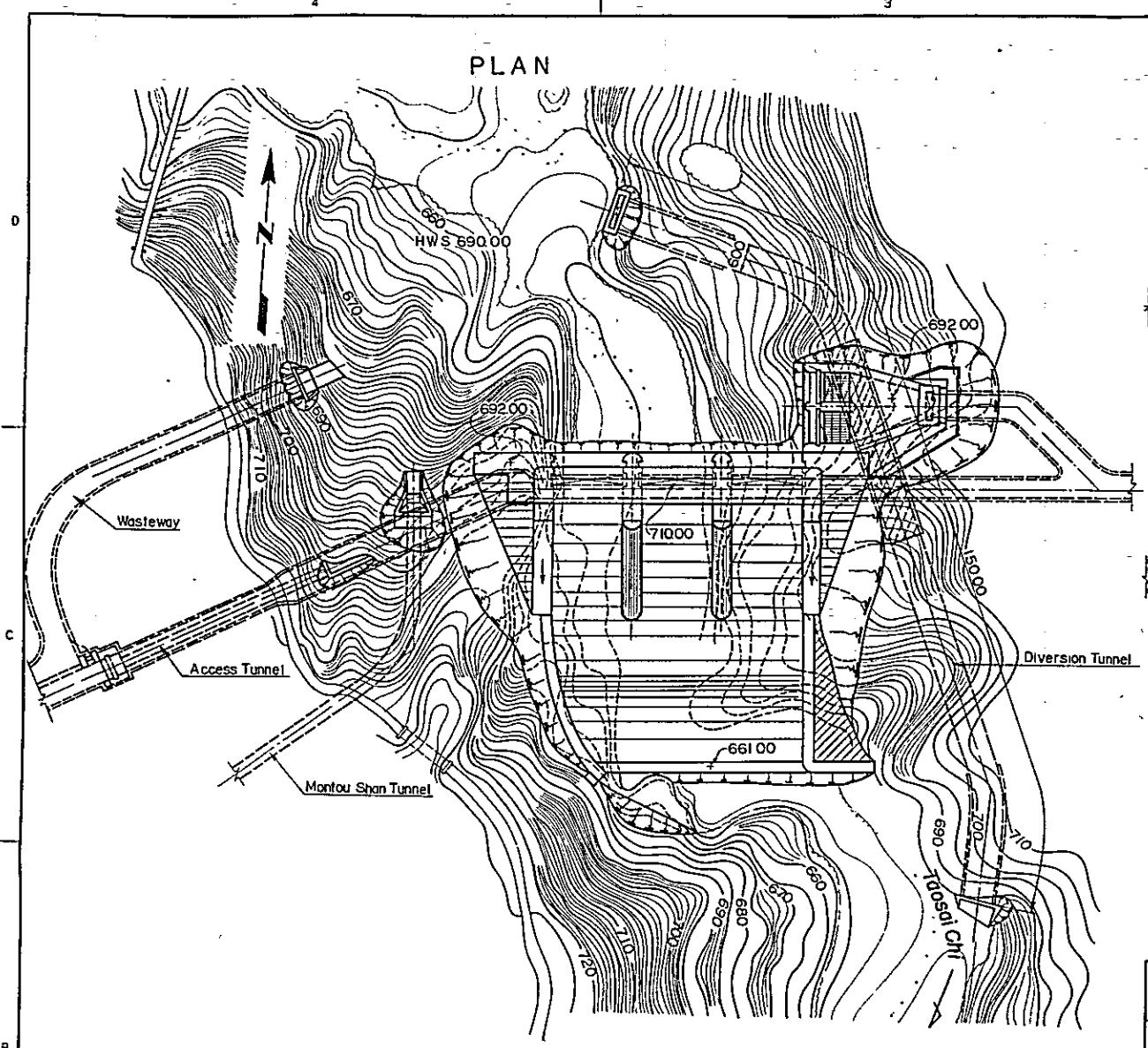
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(PLAN)

0 50m
(PLAN, ELEVATION, PROFILE AND SECTIONS)

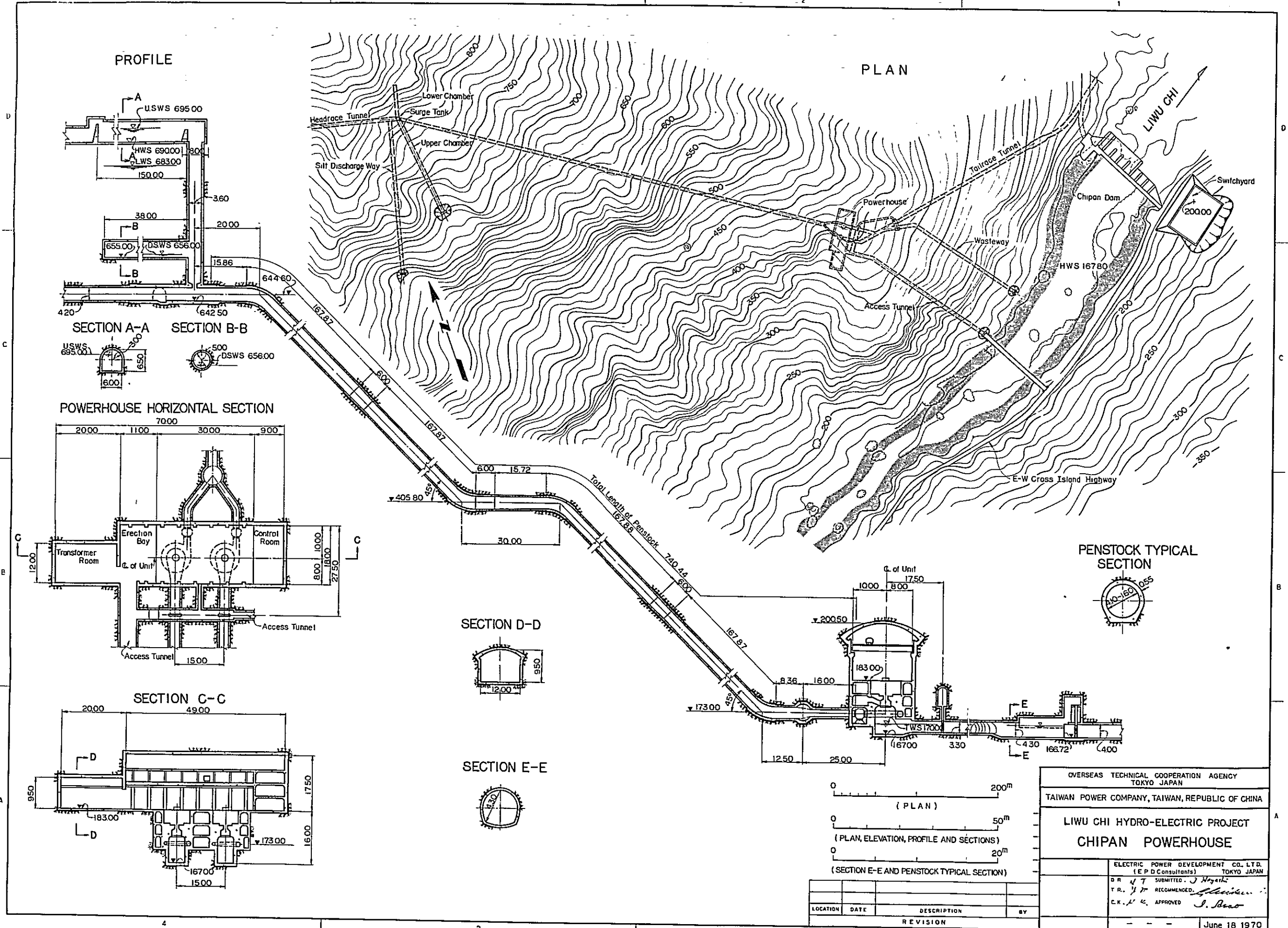
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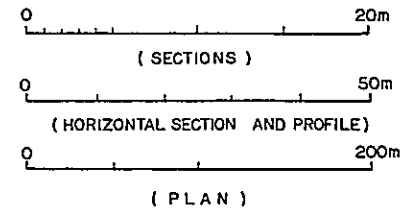
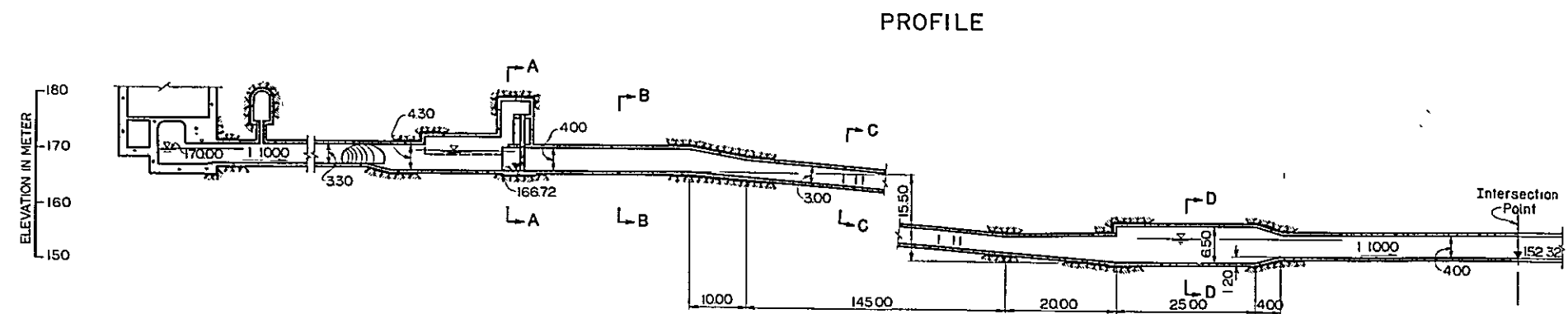
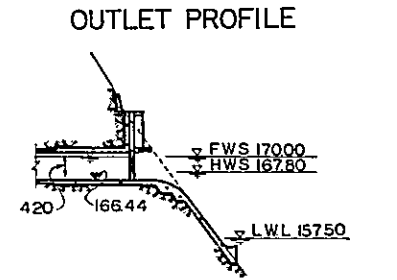
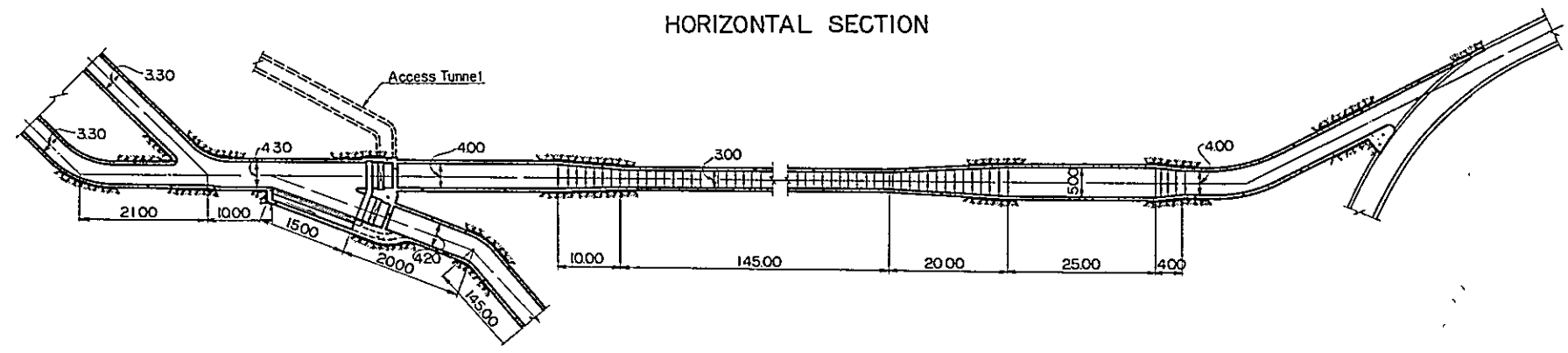
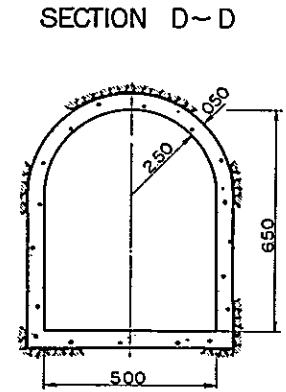
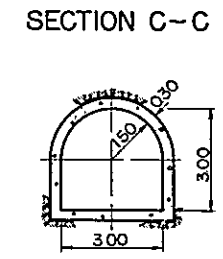
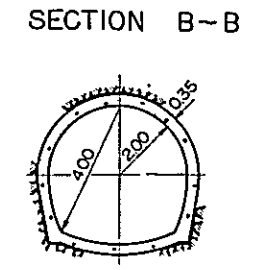
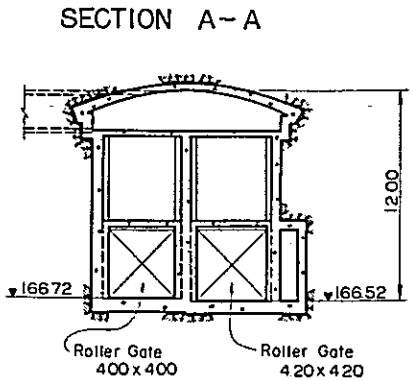
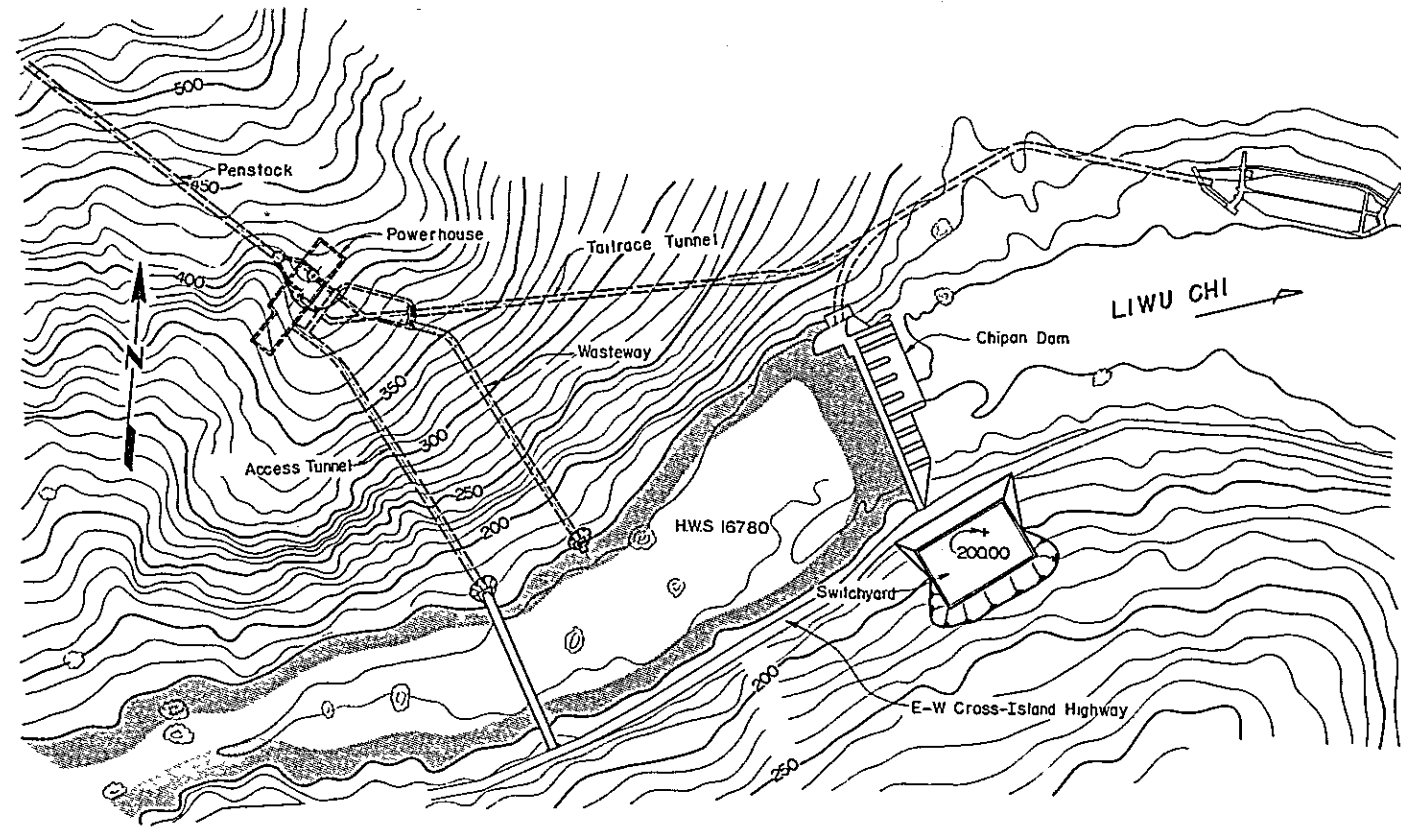
LOCATION	DATE	DESCRIPTION	BY

OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN	
TAIWAN POWER COMPANY, TAIWAN, REPUBLIC OF CHINA	
LIWU CHI HYDRO-ELECTRIC PROJECT KUYUAN POWERHOUSE	
ELECTRIC POWER DEVELOPMENT CO. LTD. E.P.D. Consultants TOKYO JAPAN	
D.R. <i>A.T.</i> SUBMITTED <i>J.M.</i>	
T.R. <i>y.m.</i> RECOMMENDED <i>J.M.</i>	
C.K. <i>N.R.</i> APPROVED <i>S. Bao</i>	
	June 18, 1970



OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN			
TAIWAN POWER COMPANY, TAIWAN, REPUBLIC OF CHINA			
LIWU CHI HYDRO-ELECTRIC PROJECT KUYUAN PONDAGE DAM			
ELECTRIC POWER DEVELOPMENT CO. LTD. (E.P.D. Consultants) TOKYO JAPAN			
D.R. A.D. SUBMITTED, J. Hayashi			
T.R. Y.M. RECOMMENDED, J. Hayashi			
C.K. W.K. APPROVED, J. Hayashi			
REVISION			BY
LOCATION	DATE	DESCRIPTION	BY
			June 18 1970





LOCATION	DATE	DESCRIPTION	BY
		REVISION	

OVERSEAS TECHNICAL COOPERATION AGENCY
 TOKYO JAPAN

TAIWAN POWER COMPANY, TAIWAN, REPUBLIC OF CHINA

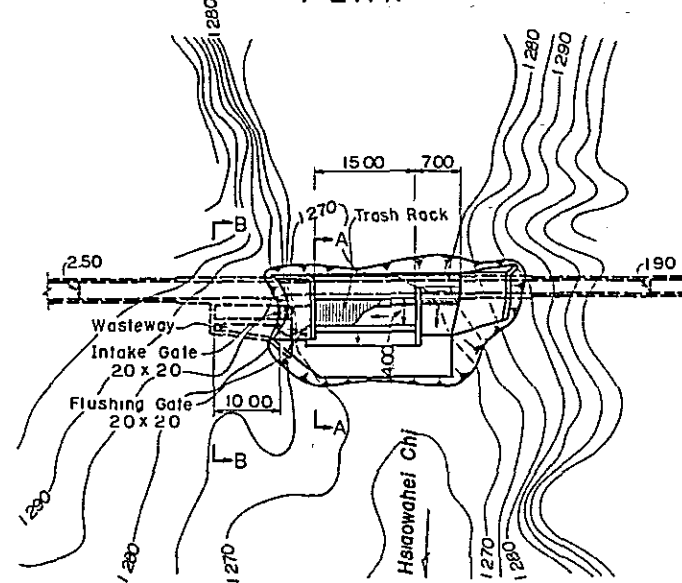
LIWU CHI HYDRO-ELECTRIC PROJECT
CHIPAN TAILRACE

ELECTRIC POWER DEVELOPMENT CO. LTD.
 (E.P.D. Consultants) TOKYO JAPAN

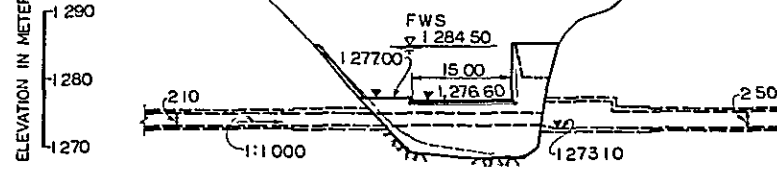
D.R.: A.O. SUBMITTED. J. H. S.
 T.R.: Y.M. RECOMMENDED. J. H. S.
 C.V.: K.K. APPROVED. J. H. S.

June 18 1970

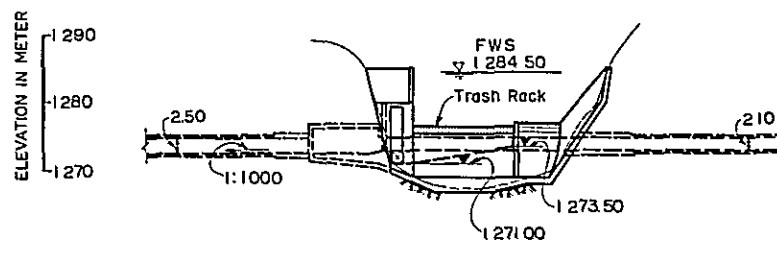
INTAKE DAM (HSIAOWAHEI DAM)
PLAN



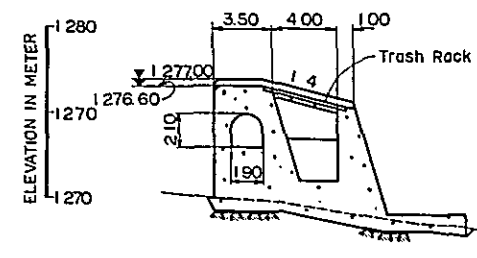
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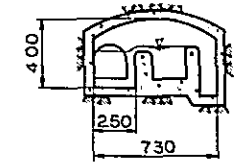
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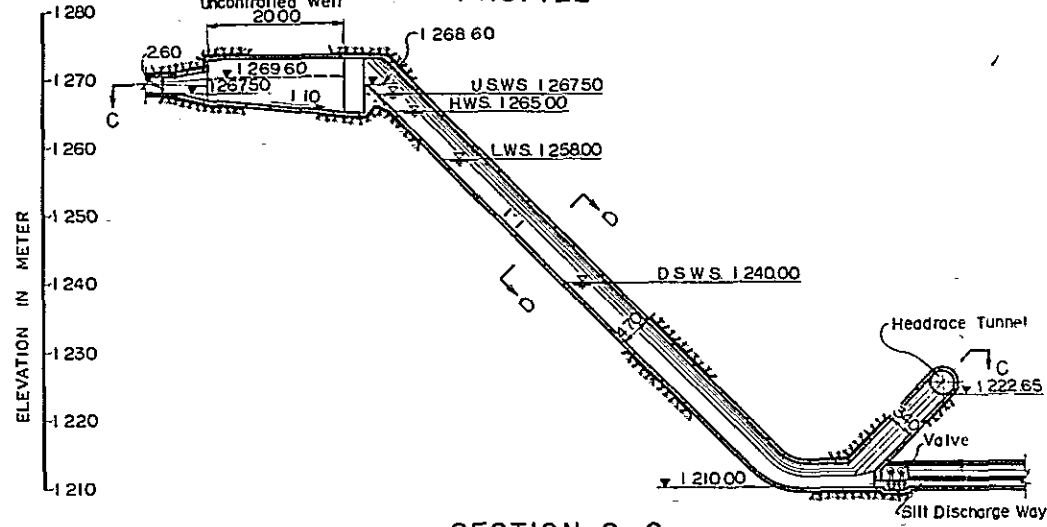
SECTION A-A



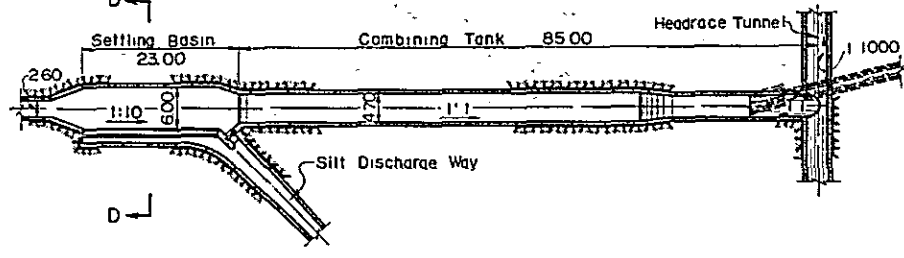
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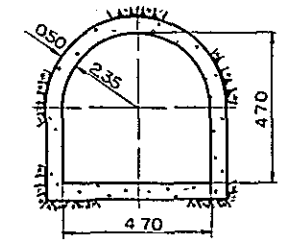
FUHSING COMBINING TANK
PROFILE



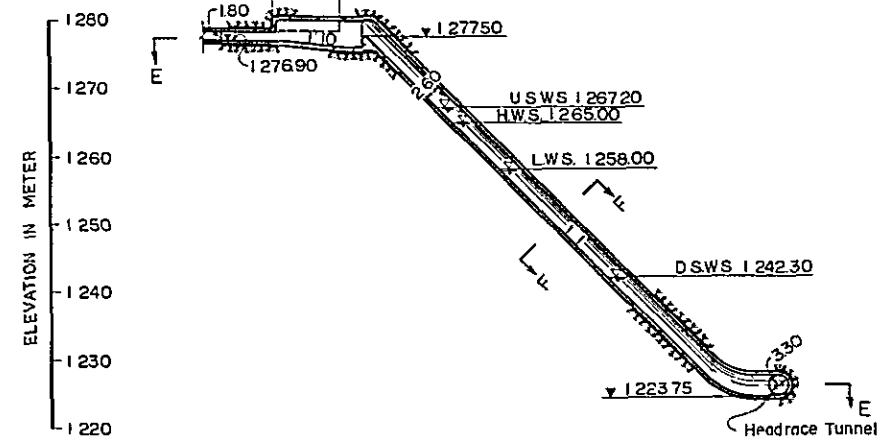
SECTION C-C



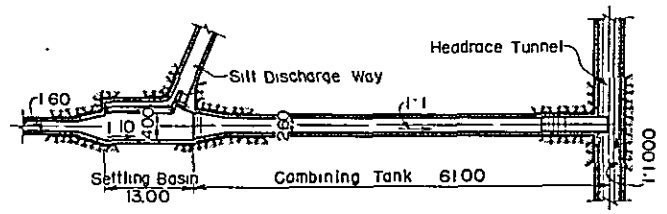
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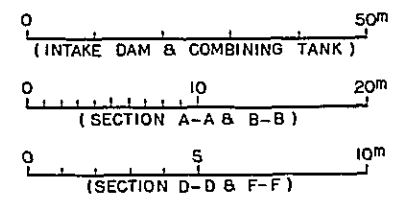
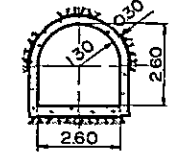
HUALU COMBINING TANK
PROFILE



SECTION E-E



SECTION F-F



OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN	
TAIWAN POWER COMPANY, TAIWAN, REPUBLIC OF CHINA	
LIWU CHI HYDRO-ELECTRIC PROJECT INTAKE DAM AND COMBINING TANKS	
ELECTRIC POWER DEVELOPMENT CO. LTD (E.P.D. Consultants) TOKYO JAPAN	
D.R. / M. SUBMITTED: J. Nigam	
T.R. / M. RECOMMENDED: [Signature]	
C.K. / M. APPROVED: J. Asoo	
LOCATION	DATE
DESCRIPTION	BY
REVISION	
June 18 1970	

LOCATION	DATE	DESCRIPTION	BY
REVISION			

APPENDIX - 5

Hydrological Data

APPENDIX - 5

List of Run-off Record

Name of Gaging Station	Drainage Area (km ²)	Elevation (m)	Period
1. Lushui	434.6	379	1957 - 1967
2. Topokuo	115.2	1,130	1964 - 1968
3. Tzuen	18.6	1,244	"
4. Hualu	27.1	1,273	"
5. Fuhsing	12.0	1,205	"
6. Hsilako	51.4	826	"
7. Taosai	37.8	1,233	"
8. Mantou Shan	51.8	721	"
9. Kuyuan	152.1	643	"

Correlation Formula (1)

3. Treen Coking/Statth

YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL	MEAN	MAX	MIN
64	24.94	26.52	17.61	11.34	10.56	27.41	27.00	54.88	26.00	6.00	27.00	18.00	321.00	0.00	0.00	0.00
65	14.94	11.95	14.76	11.19	12.92	25.31	119.50	47.20	19.50	14.42	18.27	20.00	330.40	0.00	0.00	0.00

YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL	MEAN	MAX	MIN
66	0.00	0.00	11.43	10.30	10.71	14.43	25.35	14.08	23.85	13.49	9.09	7.00	283.00	0.00	0.00	0.00
67	0.00	7.78	13.70	10.00	13.83	26.17	14.85	11.00	17.00	9.00	10.00	29.00	343.00	0.00	0.00	0.00

		TZOEN											
YFAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	
68 1	0.65	0.48	2.25	5.30	0.69	1.95	0.92	3.05	1.02	21.00	1.05	0.69	
2	0.65	0.61	2.10	4.30	0.69	2.25	0.84	2.85	1.02	13.30	1.05	0.69	
3	0.65	0.89	1.95	3.50	0.65	2.45	0.84	2.68	1.02	9.56	1.05	0.64	
4	0.69	0.84	1.70	3.00	0.65	2.45	0.84	2.68	1.02	7.70	1.05	0.64	
5	0.69	2.90	1.50	2.75	0.65	2.10	0.84	2.60	1.02	6.10	1.05	0.64	
6	0.69	3.65	1.50	2.45	0.69	1.60	0.84	2.30	1.02	2.45	1.05	0.64	
7	0.69	4.00	1.40	2.25	0.76	1.50	0.76	2.00	1.02	4.08	1.05	0.64	
8	0.65	3.65	1.40	1.85	0.76	1.40	0.69	1.91	5.00	3.65	1.05	0.64	
9	0.65	3.25	1.40	1.70	0.69	1.40	0.65	1.85	4.00	3.43	1.05	0.59	
10	0.65	2.90	1.30	1.60	0.69	3.25	0.65	1.85	3.05	3.10	0.96	0.59	
11	0.65	2.60	1.20	1.50	0.69	6.40	0.65	1.75	2.60	2.90	0.96	0.54	
12	0.65	2.35	1.20	1.40	0.69	3.65	0.65	1.65	2.10	2.70	0.90	0.54	
13	0.65	2.10	1.10	1.30	0.69	4.12	0.65	1.55	2.10	2.60	0.90	0.54	
14	0.65	2.45	1.00	1.30	0.65	3.35	0.65	1.55	1.93	2.48	0.90	0.54	
15	0.61	2.60	1.00	1.10	0.65	2.60	0.65	1.50	1.75	2.48	0.90	0.54	
16	0.61	2.35	0.92	1.10	0.65	2.10	0.57	1.50	1.66	2.20	0.90	0.54	
17	0.61	2.25	0.92	1.10	0.65	2.10	0.57	1.50	1.56	2.10	0.90	0.50	
18	0.61	2.10	0.84	1.10	0.65	2.10	0.57	1.50	1.50	1.99	0.83	0.50	
19	0.61	1.95	0.84	1.10	0.65	1.85	0.57	1.35	1.32	1.82	0.83	0.50	
20	0.61	1.95	0.92	1.10	0.65	1.85	0.57	1.35	1.32	1.82	0.83	0.50	
21	0.61	1.85	0.76	1.10	0.65	1.85	0.52	1.15	1.22	1.60	0.83	0.50	
22	0.61	1.95	0.76	1.00	0.76	1.70	0.52	1.07	1.15	1.53	0.83	0.50	
23	0.61	2.25	0.76	0.92	0.65	1.50	0.52	1.07	1.07	1.42	0.79	0.50	
24	0.60	2.25	0.92	0.92	0.61	1.40	0.52	1.15	1.07	1.30	0.74	0.50	
25	0.60	2.25	1.20	0.84	0.61	1.40	0.52	1.15	1.07	1.30	0.74	0.50	
26	0.60	2.10	1.20	0.84	0.61	1.40	0.52	1.15	1.07	1.30	0.74	0.50	
27	0.60	1.95	1.20	0.84	0.61	1.40	0.52	1.15	1.07	1.30	0.74	0.50	
28	0.60	2.60	2.75	0.76	1.25	0.92	4.00	1.02	1.02	1.18	0.69	0.50	
29	0.60	2.45	3.05	0.69	1.25	0.92	4.00	1.02	1.02	1.18	0.69	0.50	
30	0.60	2.45	3.05	0.69	1.25	0.92	4.00	1.02	1.02	1.18	0.69	0.50	
31	0.48	0.0	6.25	0.0	1.95	0.0	4.72	0.96	37.80	1.12	0.69	0.50	
TOTAL	18.44	65.47	52.84	49.37	27.63	65.05	77.25	50.11	123.19	113.78	26.44	17.14	
MEAN	0.59	2.26	1.70	1.65	0.89	2.17	2.49	1.62	4.11	3.67	0.84	0.55	
MAX	0.69	4.00	6.25	5.30	1.95	6.40	17.30	3.05	37.80	21.00	1.05	0.69	
MIN	0.48	0.48	0.76	0.69	0.61	0.92	0.52	0.96	1.02	1.05	0.69	0.50	

4. Buala Casing-Wellbore

YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
64	42.26	45.15	37.54	18.38	16.65	47.88	19.94	93.46	60.33	152.83	48.83	21.43
TOTAL												
MEAN	1.33	1.46	1.21	0.58	0.53	1.50	0.64	3.04	2.01	4.83	1.53	0.68
MAX	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
65	20.33	15.33	19.91	15.17	21.30	43.33	23.10	139.46	29.63	21.73	25.07	19.72
TOTAL												
MEAN	0.71	0.52	0.66	0.51	0.71	1.44	0.88	2.60	0.99	0.73	0.84	0.68
MAX	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Buata

YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
66	14.31	13.97	23.07	22.87	21.90	14.13	39.87	21.85	42.21	26.65	17.17	14.33
TOTAL												
MEAN	0.46	0.53	0.74	0.78	0.71	0.45	1.28	0.70	1.43	0.80	0.53	0.45
MAX	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67	16.21	20.19	30.70	24.66	34.12	55.11	31.65	29.23	30.20	144.22	150.15	59.80
TOTAL												
MEAN	0.53	0.66	0.98	0.78	1.10	1.73	1.02	0.94	1.01	4.67	4.67	1.83
MAX	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		Buale											
YEAR	DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
68	1	1.55	1.05	3.10	7.40	1.20	3.10	2.15	5.85	1.90	45.00	1.76	0.95
	2	1.55	2.90	3.10	4.95	1.20	3.45	2.15	5.35	1.90	32.50	1.70	0.95
	3	1.55	2.70	3.10	5.65	1.20	6.55	2.05	4.60	1.90	26.00	1.70	0.95
	4	1.55	3.10	3.10	4.95	1.20	5.50	2.05	4.40	1.75	15.75	1.70	0.95
	5	1.55	4.40	3.10	4.40	1.20	4.40	1.90	4.20	6.50	11.80	1.63	0.95
	6	1.55	3.55	2.70	3.95	1.20	3.95	1.70	4.90	10.30	11.60	1.57	0.95
	7	1.55	6.40	2.70	3.70	1.20	3.70	1.55	4.00	8.40	8.05	1.50	0.95
	8	1.40	4.95	2.70	3.70	1.20	3.45	1.40	3.80	6.50	7.90	1.42	0.84
	9	1.40	4.90	2.70	3.40	1.00	3.40	1.30	3.85	7.35	6.25	1.42	0.84
	10	1.40	4.90	2.70	3.10	1.00	4.20	1.20	3.50	4.85	5.60	1.35	0.84
	11	1.40	3.70	2.50	3.10	1.00	12.30	1.20	3.10	4.40	2.10	1.35	0.84
	12	1.40	3.25	2.50	3.10	1.00	5.30	1.20	3.10	4.00	2.10	1.35	0.84
	13	1.40	3.10	2.30	2.75	1.00	7.40	1.20	2.90	3.80	4.40	1.35	0.84
	14	1.40	3.10	2.30	2.75	1.00	5.85	1.20	2.60	3.25	4.05	1.28	0.84
	15	1.30	3.70	2.30	2.40	1.00	4.40	1.20	2.50	3.25	1.80	1.28	0.84
	16	1.30	3.50	2.30	2.40	1.00	4.20	1.05	2.90	2.90	3.65	1.20	0.84
	17	1.30	1.80	2.15	2.20	0.90	3.95	0.97	2.10	2.60	3.35	1.20	0.84
	18	1.30	3.25	2.15	2.20	0.90	3.50	0.97	2.10	2.10	3.20	1.15	0.79
	19	1.20	3.75	2.00	2.00	0.90	3.25	0.97	2.00	2.00	3.05	1.15	0.79
	20	1.20	3.45	2.00	2.00	0.90	3.45	0.97	2.00	1.90	2.95	1.15	0.79
	21	1.20	3.70	2.00	2.40	1.00	4.20	0.89	2.25	1.75	2.70	1.10	0.79
	22	1.20	3.70	2.00	2.40	1.00	3.70	0.97	2.10	1.55	2.50	1.10	0.79
	23	1.20	3.95	2.00	1.80	0.90	3.10	0.97	2.00	1.55	2.40	1.00	0.79
	24	1.20	3.50	2.15	1.80	0.90	3.40	1.05	2.10	1.25	2.25	1.06	0.79
	25	1.20	3.25	2.40	1.60	1.45	2.70	3.40	2.10	1.45	2.16	1.06	0.79
	26	1.20	3.10	3.45	1.60	3.10	2.70	29.40	2.10	1.27	2.08	1.06	0.79
	27	1.05	3.10	6.05	1.45	2.75	2.50	14.00	2.00	1.15	2.00	1.06	0.71
	28	1.05	3.10	6.05	1.45	3.10	2.30	11.25	1.75	1.15	1.93	1.00	0.71
	29	1.05	3.10	6.05	1.45	3.10	2.30	8.40	1.75	1.25	1.85	1.00	0.65
	30	1.05	0.0	6.65	1.30	3.45	2.15	7.90	1.65	94.00	1.85	1.00	0.65
	31	1.05	0.0	7.40	1.30	3.10	0.0	6.85	1.65	0.0	1.76	0.0	0.65
TOTAL		60.75	105.70	100.35	88.55	45.60	126.70	119.46	89.60	202.72	229.08	38.67	25.43
MEAN		1.31	3.41	3.24	2.95	1.47	4.22	3.85	2.89	6.76	7.39	1.29	0.82
MAX		1.55	6.40	6.00	7.40	3.45	12.30	29.40	5.35	94.00	45.00	1.76	0.95
MIN		1.05	1.05	2.00	1.30	0.90	2.15	0.89	1.65	1.15	1.76	1.00	0.65

YEAR	DATE	Fishing										QF	
		JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
68	1	0.78	0.47	0.99	2.15	0.58	0.76	0.61	1.73	0.66	13.80	0.74	0.42
	2	0.78	0.78	1.20	1.97	0.58	0.76	0.55	1.62	0.66	7.10	0.71	0.42
	3	0.78	0.78	1.20	1.80	0.58	1.80	0.55	1.37	0.66	2.95	0.71	0.42
	4	0.78	0.78	1.20	1.67	0.41	1.67	0.55	1.54	0.66	5.10	0.71	0.42
	5	0.78	1.45	0.99	1.67	0.41	1.35	0.51	1.37	1.73	4.45	0.58	0.42
	6	0.78	1.75	0.99	1.35	0.41	1.15	0.51	1.27	1.19	1.05	0.66	0.42
	7	0.78	2.00	0.99	1.35	0.41	1.15	0.51	1.16	2.58	3.45	0.66	0.42
	8	0.78	2.00	0.99	1.35	0.41	0.95	0.51	1.05	1.38	3.08	0.61	0.42
	9	0.78	1.75	0.99	1.35	0.41	0.95	0.51	0.95	1.73	2.70	0.61	0.42
	10	0.50	1.45	0.99	1.35	0.41	1.15	0.47	0.95	1.42	2.35	0.61	0.42
	11	0.50	1.20	0.78	1.15	0.41	1.02	0.47	0.85	1.37	7.01	0.61	0.42
	12	0.50	0.99	0.78	1.15	0.41	2.74	0.47	0.95	1.37	1.93	0.61	0.42
	13	0.50	0.99	0.78	0.95	0.41	2.25	0.47	0.87	1.37	2.77	0.61	0.42
	14	0.50	0.99	0.78	0.95	0.41	1.85	0.47	0.79	1.27	1.54	0.61	0.42
	15	0.50	1.20	0.78	0.95	0.41	1.62	0.47	0.79	1.16	1.45	0.55	0.42
	16	0.50	1.20	0.60	0.95	0.41	1.37	0.47	0.71	1.05	1.36	0.55	0.42
	17	0.50	1.45	0.60	0.76	0.41	1.16	0.42	0.71	0.95	1.28	0.55	0.42
	18	0.50	1.45	0.60	0.76	0.41	1.16	0.42	0.71	0.87	1.21	0.51	0.38
	19	0.50	1.20	0.60	0.76	0.41	1.05	0.42	0.71	0.87	1.15	0.51	0.38
	20	0.50	1.20	0.60	0.76	0.41	1.27	0.42	0.71	0.79	1.15	0.51	0.38
	21	0.50	1.45	0.60	1.15	0.41	1.37	0.42	0.71	0.79	1.15	0.51	0.38
	22	0.50	1.45	0.60	0.95	0.76	1.05	0.47	0.71	0.71	1.09	0.51	0.38
	23	0.50	1.45	0.60	0.95	0.76	0.79	0.47	0.66	0.71	1.04	0.47	0.38
	24	0.50	1.20	0.60	0.76	0.76	0.71	0.51	0.51	0.71	0.94	0.47	0.38
	25	0.50	1.20	0.99	0.76	0.58	0.66	0.05	0.79	0.66	0.91	0.47	0.38
	26	0.50	0.99	1.45	0.76	0.76	0.61	0.00	0.79	0.61	0.86	0.47	0.38
	27	0.50	0.99	1.20	0.55	0.76	0.61	0.68	0.79	0.61	0.86	0.47	0.38
	28	0.47	0.99	1.20	0.76	0.76	0.61	3.50	0.71	0.55	0.86	0.47	0.38
	29	0.47	0.99	1.45	0.58	0.76	0.61	3.19	0.71	3.27	0.80	0.47	0.38
	30	0.47	0.0	2.30	0.58	0.95	0.61	2.58	0.66	29.50	0.80	0.42	0.38
	31	0.47	0.0	2.30	0.0	0.76	0.0	1.98	0.66	0.0	0.74	0.0	0.33
	TOTAL	19.78	35.79	30.72	32.80	16.73	36.81	38.63	28.93	64.66	76.87	17.03	12.33
	MEAN	0.64	1.23	0.99	1.09	0.54	1.23	1.25	0.93	2.16	2.48	0.57	0.40
	MAX	0.78	2.00	2.30	2.15	0.95	3.02	3.50	1.73	29.50	15.80	0.74	0.42
	MIN	0.47	0.47	0.60	0.58	0.41	0.61	0.42	0.66	0.55	0.74	0.42	0.33

6. Hailko Caging Station

YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
64	1.34	5.93	7.26	1.41	1.04	1.44	1.45	1.45	1.45	1.45	1.45	1.45
MEAN	2.58	2.93	1.81	1.22	1.10	2.93	1.45	1.45	1.45	1.45	1.45	1.45
MAX	8.03	11.25	12.45	12.45	12.45	12.45	12.45	12.45	12.45	12.45	12.45	12.45
MIN	1.22	2.19	1.41	1.04	0.94	1.45	1.45	1.45	1.45	1.45	1.45	1.45

YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
65	1.23	1.37	0.86	0.86	0.95	0.90	1.66	10.00	4.42	2.36	1.15	1.44
MEAN	2.00	1.92	1.38	1.07	1.07	1.67	3.50	3.50	2.18	1.30	1.14	1.04
MAX	4.76	4.57	3.92	3.61	3.77	6.92	22.05	22.26	8.00	5.43	4.87	3.91
MIN	1.37	0.82	0.66	0.76	0.82	0.86	1.38	2.60	1.75	1.30	1.14	1.04

Hailko

YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
66	1.18	0.92	1.14	1.72	1.18	2.19	3.48	1.90	1.18	1.77	1.50	0.95
MEAN	1.18	1.41	1.41	1.38	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41
MAX	30.84	27.35	42.62	39.19	47.40	376.85	76.95	44.60	118.39	52.30	36.94	27.87
MIN	0.88	1.61	0.88	1.01	1.11	2.01	1.77	1.02	1.43	1.20	0.95	0.77

YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
67	0.78	1.55	3.10	1.13	1.13	2.30	2.00	1.32	3.70	2.60	4.62	5.82
MEAN	1.18	1.41	1.41	1.38	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41
MAX	31.86	39.28	47.18	42.59	50.27	96.57	60.56	64.72	64.59	208.64	392.82	116.64
MIN	0.78	1.00	1.05	0.90	0.90	1.33	1.45	1.23	1.05	0.98	1.0	10.30

Hailoko												
YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	1.01	1.72	5.26	5.10	2.92	10.33	2.59	11.70	1.56	58.90	8.25	4.85
2	1.22	2.90	5.05	13.70	2.59	14.75	3.09	12.52	3.98	25.60	8.10	1.45
3	2.77	4.13	4.31	9.05	1.40	17.10	3.92	11.79	1.82	26.20	7.74	1.45
4	2.77	3.54	4.08	8.35	1.88	12.10	2.64	9.87	1.93	28.30	7.07	1.39
5	2.77	9.23	4.70	6.12	1.70	3.14	2.94	9.57	11.93	25.00	6.76	1.39
6	2.99	4.70	1.61	5.43	1.30	1.87	2.72	8.91	12.50	21.30	2.49	1.39
7	2.92	11.33	1.54	4.72	1.30	1.47	2.56	7.22	6.87	21.40	2.41	1.29
8	3.69	10.48	1.47	4.51	1.03	1.47	2.50	6.85	8.52	21.40	2.35	1.29
9	4.38	8.75	3.36	4.13	1.57	1.47	2.50	6.85	7.66	20.20	2.26	1.24
10	4.50	8.05	1.29	4.03	2.32	1.89	2.16	6.19	7.22	18.10	5.20	4.51
11	5.43	6.80	3.22	3.84	2.02	2.57	2.21	5.89	6.92	17.10	2.15	1.24
12	5.26	5.79	1.11	3.74	2.02	16.20	2.14	5.31	6.48	15.90	2.10	1.24
13	2.26	1.63	3.06	3.66	2.21	7.81	2.21	5.31	5.89	15.00	2.15	1.45
14	4.26	5.15	2.91	3.22	2.21	5.30	1.91	2.72	5.45	15.00	2.10	1.39
15	2.17	6.33	2.91	1.11	2.02	2.29	1.84	2.01	5.45	15.00	2.04	1.39
16	1.90	5.90	2.88	3.44	2.47	2.59	1.84	2.01	5.45	14.00	1.99	1.29
17	2.94	2.29	2.88	1.01	1.47	9.59	1.84	2.01	5.45	13.70	1.89	1.29
18	2.04	4.83	2.77	2.91	1.47	2.37	1.78	2.01	5.45	12.50	1.83	1.29
19	2.74	4.98	2.79	2.81	1.47	2.07	1.66	2.01	5.30	12.20	1.77	1.24
20	2.34	3.45	2.95	3.01	1.47	2.91	1.57	2.01	5.27	11.90	1.78	1.24
21	2.04	4.29	2.72	4.36	1.47	2.91	1.66	2.01	5.01	11.00	1.78	1.24
22	2.11	4.51	2.64	3.46	2.52	4.42	1.78	2.22	5.01	10.70	1.74	1.18
23	1.30	6.01	2.72	3.14	1.57	4.27	1.87	2.22	4.74	10.70	1.74	1.18
24	1.95	6.33	2.90	2.91	1.47	3.93	1.53	2.67	4.64	10.50	1.70	1.12
25	1.88	5.73	9.47	2.99	2.59	3.90	60.20	2.22	4.64	10.50	1.70	1.12
26	1.78	3.51	7.51	2.98	1.47	3.93	75.90	2.22	4.27	10.50	1.62	1.05
27	1.88	6.01	7.03	2.47	14.29	3.47	19.40	1.96	4.27	10.50	1.62	1.05
28	1.88	5.27	7.30	2.47	16.20	3.02	16.20	1.68	4.27	8.40	1.51	1.05
29	1.66	0.0	15.18	2.59	16.20	2.58	15.37	3.56	105.80	8.25	1.45	1.05
30	1.78	0.0	18.57	0.0	10.31	0.0	13.70	3.56	0.0	8.25	0.0	3.73
TOTAL	69.62	165.66	151.54	123.25	109.24	220.82	146.48	196.61	315.22	519.22	96.40	53.66
MEAN	2.25	5.17	4.74	4.11	3.53	7.36	11.18	6.14	10.51	16.75	3.21	1.73
MAX	1.00	11.33	18.57	13.70	16.20	37.10	75.90	13.70	105.80	58.90	8.25	4.85
MIN	1.66	1.72	2.64	2.47	1.47	1.47	1.57	1.56	1.56	8.25	1.45	1.05

Tonnal													
YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	
01	1	2.15	1.55	4.72	6.95	2.15	3.48	2.72	7.60	2.45	30.60	3.65	1.65
	2	2.15	2.35	4.50	6.40	2.04	4.70	2.72	7.20	2.02	18.50	3.30	1.55
	3	2.15	2.85	4.10	5.60	1.95	6.60	2.06	6.70	1.90	14.00	3.30	1.55
	4	2.15	3.85	3.70	5.30	1.90	5.45	1.52	6.50	1.25	12.30	3.30	1.55
	5	2.15	6.80	3.60	4.93	1.70	4.50	1.52	6.50	0.75	10.60	2.95	1.55
	6	2.15	8.20	3.48	4.86	1.75	4.35	2.42	6.25	7.00	9.40	2.95	1.55
	7	2.15	8.20	3.48	4.50	1.75	3.84	2.35	5.80	6.10	9.00	2.65	1.55
	8	2.15	6.75	3.60	4.20	1.75	3.48	2.30	5.45	5.10	8.30	2.65	1.55
	9	2.15	6.00	3.53	4.10	1.75	3.35	2.35	5.10	4.76	7.70	2.55	1.45
	10	2.15	5.30	3.48	3.84	1.75	5.80	2.35	5.30	4.30	7.10	2.55	1.45
	11	2.15	4.80	3.40	3.70	1.75	11.50	2.04	4.65	4.20	6.90	2.45	1.45
	12	2.15	4.50	3.40	3.70	1.65	9.10	2.04	4.35	4.00	6.60	2.45	1.45
	13	2.04	3.84	3.12	3.60	1.55	7.15	1.95	4.10	3.85	6.60	2.45	1.45
	14	2.04	4.20	3.12	3.48	1.55	6.20	1.95	4.10	3.55	6.40	2.30	1.35
	15	1.95	4.70	3.05	3.48	1.55	5.45	1.75	4.00	3.20	5.90	2.30	1.35
	16	1.90	4.20	3.05	3.20	1.55	4.93	1.75	3.85	2.90	5.90	2.30	1.35
	17	1.65	4.20	3.05	3.12	1.55	4.50	1.75	3.70	2.75	6.20	2.20	1.26
	18	1.75	3.84	2.95	3.05	1.55	4.35	1.65	3.20	2.60	5.80	2.20	1.26
	19	1.75	3.84	2.95	3.05	1.55	4.10	1.65	3.20	2.45	5.52	2.05	1.23
	20	1.75	3.70	2.95	3.84	1.75	3.84	1.65	3.20	2.45	5.20	2.05	1.23
	21	1.65	3.60	2.95	3.84	1.75	3.70	1.55	3.55	2.22	5.10	2.05	1.18
	22	1.65	3.70	2.95	3.12	1.75	3.60	1.75	3.20	2.12	5.10	1.95	1.18
	23	1.40	4.20	3.12	2.95	1.95	3.60	1.65	3.20	2.12	5.10	1.95	1.18
	24	1.40	3.20	3.10	2.75	1.75	3.60	1.75	3.20	2.12	5.10	1.95	1.18
	25	1.55	3.84	4.10	2.75	1.93	3.65	2.80	3.40	2.02	4.80	1.75	1.18
	26	1.55	3.70	4.20	2.52	2.04	3.48	10.50	2.90	1.80	4.65	1.75	1.18
	27	1.55	3.84	4.10	2.52	2.04	3.35	25.00	2.90	1.80	4.35	1.75	1.18
	28	1.55	4.93	4.10	2.35	2.04	3.12	15.30	2.75	3.05	3.90	1.75	1.18
	29	1.55	4.70	4.93	2.35	2.04	3.12	11.70	2.60	2.50	3.80	1.75	1.18
	30	1.40	0.0	6.95	2.35	2.85	3.48	4.40	2.60	30.80	3.80	1.65	1.18
	31	1.40	0.0	7.60	0.0	3.48	0.0	8.20	2.45	0.0	3.80	0.0	1.18
TOTAL		57.28	130.87	117.63	111.49	61.24	140.85	176.54	133.76	150.96	238.27	70.35	41.54
MEAN		1.82	4.21	3.77	3.74	1.98	4.70	5.69	4.31	5.03	7.69	2.34	1.34
MAX		2.15	8.20	7.60	6.95	3.48	11.50	30.50	7.60	39.80	30.60	9.25	1.65
MIN		1.40	1.55	2.95	2.35	1.55	2.85	1.55	2.45	1.25	3.60	1.65	1.18

8 Nantow Shan Gaging Station

Table with columns for Year Date, Jan, Feb, Mar, Apr, May, June, July, Aug, Sept, Oct, Nov, Dec and rows for data points 64 and 65. Includes summary rows for TOTAL, MEAN, MAX, and MIN.

Nantow Shan

Table with columns for Year Date, Jan, Feb, Mar, Apr, May, June, July, Aug, Sept, Oct, Nov, Dec and rows for data points 66 and 67. Includes summary rows for TOTAL, MEAN, MAX, and MIN.

Nantou Shan													
YEAR	DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
68	1	2.63	1.88	5.60	10.60	1.92	5.10	3.10	12.00	2.65	83.00	2.85	1.60
	2	2.63	4.10	5.30	10.10	1.92	6.50	3.10	11.40	3.10	49.00	2.85	1.60
	3	2.50	4.30	5.10	8.80	1.75	8.90	2.70	11.40	3.10	34.75	2.85	1.60
	4	2.50	6.80	5.10	8.80	1.75	10.10	2.90	11.40	3.10	29.70	2.85	1.60
	5	2.50	9.60	5.10	7.20	1.75	6.50	2.50	10.75	3.10	30.30	2.85	1.60
	6	2.50	11.00	4.80	6.50	1.75	5.90	2.10	7.50	3.10	25.50	2.67	1.60
	7	2.37	13.50	4.80	5.90	1.75	5.10	2.10	6.00	2.50	19.50	2.50	1.60
	8	2.37	16.20	4.10	3.60	1.75	3.10	2.10	4.00	2.50	15.80	2.50	1.60
	9	2.37	19.60	4.10	3.10	1.75	3.10	2.10	3.50	2.50	11.60	2.50	1.60
	10	2.37	8.80	3.90	4.80	1.57	8.80	1.75	3.30	2.50	11.60	2.50	1.60
	11	2.37	8.00	3.83	4.50	1.57	14.10	1.75	3.30	2.50	9.55	2.35	1.60
	12	2.19	7.60	3.83	4.30	1.57	11.10	1.75	4.05	2.50	8.15	2.10	1.60
	13	2.19	7.20	3.37	4.10	1.57	8.80	1.75	3.80	2.50	7.90	2.00	1.60
	14	2.19	7.00	3.37	3.85	1.57	8.00	1.75	3.55	2.50	7.15	2.00	1.60
	15	2.10	6.80	3.37	3.57	1.57	7.20	1.75	3.33	2.50	6.40	2.00	1.60
	16	2.10	6.80	3.10	3.30	1.57	6.50	1.57	3.10	2.50	5.65	2.00	1.60
	17	2.10	6.50	3.10	3.10	1.57	5.90	1.57	2.85	2.50	4.90	2.00	1.60
	18	2.10	6.50	2.90	3.00	1.57	5.10	1.57	2.60	2.50	4.15	2.00	1.60
	19	2.10	6.50	2.77	2.90	1.57	4.40	1.57	2.33	2.50	3.40	2.00	1.60
	20	2.10	6.50	2.77	3.10	1.57	3.80	1.57	2.10	2.50	2.65	2.00	1.60
	21	2.10	6.80	2.77	3.85	1.57	3.90	1.57	1.80	2.50	1.90	2.00	1.60
	22	2.10	6.80	2.77	3.10	1.57	3.30	1.57	1.57	2.50	1.15	2.00	1.60
	23	2.00	7.20	2.77	2.70	1.75	2.10	1.57	1.30	2.50	0.40	2.00	1.60
	24	2.00	7.00	3.05	2.50	1.75	4.80	3.10	1.05	3.10	4.70	1.80	1.60
	25	2.00	6.20	4.10	2.50	1.75	4.10	4.70	1.00	3.10	4.20	1.70	1.60
	26	2.00	6.20	6.20	2.50	1.75	3.85	65.00	1.10	3.10	3.75	1.70	1.60
	27	2.00	6.20	8.80	2.30	1.57	3.85	36.50	0.88	3.10	3.75	1.70	1.60
	28	2.00	6.20	8.80	2.30	1.57	3.85	24.50	0.88	3.10	3.75	1.70	1.60
	29	1.88	6.20	8.80	2.10	1.57	4.80	22.50	0.85	2.50	3.37	1.60	1.60
	30	1.88	6.0	11.00	2.10	1.57	5.60	19.10	0.83	2.50	2.80	1.60	1.60
	31	1.88	6.0	13.50	2.10	1.57	5.10	14.75	0.83	2.50	2.80	1.60	1.60
	TOTAL	68.02	210.28	156.62	135.44	70.39	199.07	278.36	163.26	427.81	431.07	64.47	43.82
	MEAN	2.19	6.75	5.05	4.51	2.27	6.64	8.98	5.27	14.26	13.91	2.15	1.61
	MAX	2.63	13.50	13.50	10.60	5.60	15.70	65.00	12.00	158.00	83.00	2.85	1.60
	MIN	1.88	1.88	2.77	2.10	1.40	3.30	1.57	2.43	2.65	2.85	1.60	1.23

9. Kuyuan Coaling Station

YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
64	4.30	4.46	4.34	4.34	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42
TOTAL	242.58	236.07	174.07	118.47	112.20	264.65	124.93	4507.88	284.47	573.23	264.64	181.24
MEAN	7.83	8.83	5.62	3.95	3.62	8.82	3.95	148.38	9.48	18.00	8.83	6.00
MAX	21.58	17.33	6.90	4.90	4.90	23.43	3.10	84.02	21.90	74.00	11.47	5.87
MIN	3.60	6.72	4.90	3.40	3.40	4.61	3.27	3.14	6.32	9.26	11.21	5.87
65	4.82	3.40	3.60	3.40	4.00	3.40	6.90	23.80	11.07	7.21	4.15	7.17
TOTAL	136.12	98.90	125.03	100.43	120.54	180.25	1281.49	651.73	244.41	170.84	150.60	125.19
MEAN	4.40	3.60	4.00	3.60	3.60	5.81	16.74	51.34	8.15	5.51	4.60	4.04
MAX	6.17	7.90	6.40	4.90	4.90	16.74	20.00	71.02	13.00	9.20	7.02	6.00
MIN	3.60	3.60	3.40	2.50	2.90	3.15	4.27	7.86	5.70	4.30	3.35	3.35

Kuyuan												
YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
66	3.83	3.08	3.10	3.27	3.20	6.10	10.60	4.50	3.30	4.75	3.80	2.60
TOTAL	102.77	98.97	131.24	115.32	136.99	929.91	205.54	117.93	226.60	148.80	94.45	75.10
MEAN	3.30	3.23	4.27	3.61	3.62	15.83	16.83	3.80	7.73	4.80	3.23	2.60
MAX	5.90	4.07	7.90	3.80	3.80	31.00	4.50	5.30	16.20	6.00	4.00	3.80
MIN	2.60	2.07	2.90	3.20	3.20	6.10	4.25	3.30	3.30	3.20	2.60	2.60
67	2.20	3.40	8.40	3.40	3.80	6.75	8.55	3.20	7.30	5.20	12.70	17.04
TOTAL	81.75	93.03	133.80	137.04	142.40	290.74	153.90	137.60	155.60	478.60	1197.40	942.92
MEAN	4.64	3.30	8.80	3.61	3.60	9.67	9.67	4.94	8.18	12.40	31.77	18.00
MAX	11.20	4.20	13.05	5.00	5.00	18.70	11.80	13.00	17.50	16.00	42.00	30.88
MIN	2.20	2.20	3.05	3.00	3.00	3.70	3.50	3.00	3.00	4.30	6.12	2.20

Euyuan												
YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
68 1	9.04	5.37	15.45	21.20	6.87	12.30	9.90	29.20	7.05	229.61	9.60	5.20
2	8.90	6.73	14.84	18.20	6.87	14.70	8.40	27.67	7.27	112.30	9.10	5.00
3	8.37	12.25	13.32	16.50	6.59	17.40	9.10	27.67	7.02	69.22	9.10	5.00
4	8.37	10.57	12.09	15.00	6.41	16.70	8.70	26.65	7.02	59.75	8.40	5.00
5	8.37	26.76	11.76	14.40	6.41	17.20	8.30	21.93	26.70	49.36	8.80	5.00
6	8.12	20.20	10.37	14.10	6.26	17.70	8.00	18.70	63.11	45.39	8.10	5.00
7	8.12	31.34	10.35	13.40	5.86	15.50	7.50	18.00	41.73	40.81	7.80	4.70
8	8.12	29.18	10.05	11.00	5.86	13.70	7.50	18.80	21.37	23.90	7.60	4.70
9	8.12	23.40	9.83	12.70	5.86	13.70	6.60	16.20	21.87	30.42	7.60	4.50
10	7.99	19.27	9.95	12.00	5.88	12.50	6.60	15.10	19.50	26.76	7.30	4.50
11	6.90	16.40	12.70	11.70	5.68	18.50	6.60	14.50	19.10	19.12	7.10	4.50
12	6.90	16.10	12.50	11.40	5.68	27.20	6.60	14.50	19.10	19.12	7.10	4.50
13	6.90	16.10	12.50	11.40	5.68	27.20	6.60	14.50	19.10	19.12	7.10	4.50
14	6.90	16.10	12.50	11.40	5.68	27.20	6.60	14.50	19.10	19.12	7.10	4.50
15	6.86	16.21	11.90	10.60	6.00	22.00	6.60	14.00	14.10	17.59	6.60	4.20
16	7.40	17.29	11.70	9.90	5.37	15.00	6.00	13.20	12.50	18.60	6.30	3.90
17	6.79	16.40	11.70	9.04	5.37	13.00	6.00	14.70	12.00	18.50	6.30	3.90
18	6.79	14.23	11.40	8.76	5.13	12.30	6.00	12.40	11.70	19.00	6.00	3.60
19	6.79	14.69	11.40	8.49	5.37	11.70	6.40	12.20	11.20	17.40	6.00	3.60
20	6.79	18.80	11.70	9.04	5.68	12.00	6.40	11.90	11.20	16.90	6.00	3.60
21	6.29	14.69	11.70	12.89	4.90	12.70	2.40	11.20	11.20	16.30	6.00	3.90
22	6.77	13.37	11.40	10.37	7.11	11.70	6.00	15.70	10.90	15.80	6.00	3.90
23	6.00	19.24	11.70	8.30	6.26	19.40	6.00	13.00	10.40	12.30	5.80	3.60
24	6.01	18.53	11.90	8.76	6.26	19.40	6.00	13.70	9.65	14.60	5.60	3.30
25	6.01	17.24	15.70	8.37	10.57	10.60	11.10	13.00	9.40	14.10	5.60	3.30
26	5.83	16.80	16.90	8.12	19.84	10.60	15.30	13.70	9.65	14.60	5.60	3.30
27	5.83	18.20	17.40	7.82	9.90	10.60	89.19	13.00	9.40	14.10	5.60	3.30
28	5.83	17.59	19.70	7.51	19.12	11.10	63.42	8.43	9.40	13.00	5.60	3.30
29	5.83	15.76	22.40	7.51	15.76	10.60	49.98	8.21	14.40	12.20	5.60	3.30
30	6.00	0.0	24.40	8.00	15.42	0.90	30.80	7.16	14.54	11.90	5.60	3.30
31	5.56	0.0	23.30	0.0	12.30	0.0	25.62	7.05	443.46	10.60	6.60	2.90
TOTAL	217.21	510.46	417.66	340.93	241.95	463.20	676.34	469.77	1049.79	1023.53	206.30	127.00
MEAN	7.01	17.48	11.36	7.80	7.80	12.84	21.82	18.15	34.99	33.02	6.88	5.10
MAX	9.04	32.87	24.40	21.20	19.12	32.50	151.23	19.50	443.46	220.61	9.60	13.69
MIN	5.56	5.37	9.65	7.51	4.90	9.90	5.40	6.90	7.02	10.20	5.60	2.90

Correlation Formula (2)

Topokaa

YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
68	8.07	4.49	14.32	33.50	6.60	22.90	11.40	23.50	8.40	93.50	5.60	3.50
1	5.55	7.17	13.72	30.20	6.00	26.35	11.40	21.35	8.65	61.00	5.40	3.50
2	7.41	11.19	12.24	30.20	5.65	30.00	11.10	20.05	8.65	61.00	5.40	3.50
3	5.98	4.56	11.04	25.50	6.00	29.15	9.10	21.35	7.50	33.95	3.40	3.40
4	7.41	4.50	10.10	27.50	6.00	29.30	9.00	21.00	7.50	33.95	3.40	3.40
5	7.17	45.70	6.73	19.75	6.00	21.00	9.10	18.00	24.00	29.15	5.25	3.55
6	7.17	35.00	9.56	17.35	6.00	18.75	8.15	16.75	39.33	21.15	3.05	3.55
7	7.17	42.15	9.35	16.40	6.00	15.75	8.15	16.00	39.33	21.15	3.05	3.55
8	7.17	45.70	9.05	15.75	4.97	15.00	6.15	13.80	21.60	16.40	5.05	2.95
9	5.40	22.00	8.84	13.35	4.75	39.70	6.50	13.05	11.60	16.75	5.05	2.95
10	6.67	22.00	8.84	13.35	4.75	39.70	6.50	13.05	11.60	16.75	5.05	2.95
11	6.67	18.04	8.66	14.60	4.75	43.00	5.75	12.35	15.60	13.30	4.80	2.95
12	5.98	15.74	9.40	13.95	4.75	43.50	5.75	11.35	13.85	12.75	4.80	2.95
13	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
14	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
15	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
16	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
17	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
18	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
19	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
20	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
21	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
22	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
23	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
24	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
25	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
26	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
27	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
28	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
29	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
30	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
31	5.98	14.02	9.40	12.80	4.75	44.50	5.75	10.35	13.85	12.75	4.80	2.95
TOTAL	179.80	550.84	515.71	468.15	312.78	823.70	572.69	388.70	666.65	534.80	133.80	93.65
MEAN	5.80	19.00	16.64	12.60	10.09	27.70	18.75	12.55	21.18	17.46	4.46	3.00
MAX	8.07	55.00	73.79	33.50	34.50	93.00	93.00	23.50	204.00	93.50	3.50	14.15
MIN	4.00	4.49	6.66	7.60	4.25	13.10	4.80	6.95	4.15	5.60	3.50	2.95

		Tues											
YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	
68	1	0.65	0.48	2.25	2.30	0.69	1.95	0.92	3.05	1.02	21.00	1.05	0.69
	2	0.65	0.61	2.10	4.30	0.69	2.45	0.84	2.85	1.02	13.30	1.05	0.69
	3	0.65	0.69	1.99	3.50	0.65	2.45	0.84	2.85	1.02	9.30	1.05	0.69
	4	0.69	0.68	1.70	3.05	0.65	2.45	0.84	2.85	1.02	7.20	1.05	0.69
	5	0.69	2.90	1.30	1.75	0.65	1.10	0.84	2.85	1.02	4.30	1.05	0.69
	6	0.69	3.65	1.50	2.45	0.69	1.60	0.84	2.85	1.02	11.60	1.05	0.69
	7	0.65	4.00	1.40	1.75	0.78	1.50	0.76	2.02	1.02	5.00	1.05	0.69
	8	0.65	3.65	1.40	1.75	0.78	1.50	0.76	2.02	1.02	3.60	1.05	0.69
	9	0.65	3.25	1.40	1.70	0.69	1.40	0.65	1.93	1.02	4.00	1.05	0.69
	10	0.65	3.25	1.40	1.70	0.69	1.40	0.65	1.93	1.02	3.43	1.05	0.69
	11	0.65	3.25	1.40	1.70	0.69	1.40	0.65	1.93	1.02	3.10	1.05	0.69
	12	0.65	3.25	1.40	1.70	0.69	1.40	0.65	1.93	1.02	2.70	1.05	0.69
	13	0.65	3.25	1.40	1.70	0.69	1.40	0.65	1.93	1.02	2.30	1.05	0.69
	14	0.65	3.25	1.40	1.70	0.69	1.40	0.65	1.93	1.02	1.90	1.05	0.69
	15	0.65	3.25	1.40	1.70	0.69	1.40	0.65	1.93	1.02	1.50	1.05	0.69
	16	0.61	2.35	1.00	1.30	0.65	3.35	0.65	1.50	1.02	2.48	0.90	0.69
	17	0.61	2.35	0.92	1.10	0.65	2.60	0.65	1.50	1.02	2.42	0.90	0.69
	18	0.61	2.35	0.92	1.10	0.65	2.60	0.65	1.50	1.02	2.10	0.90	0.69
	19	0.61	2.10	0.84	1.0	0.65	1.80	0.57	1.50	1.02	1.60	0.83	0.69
	20	0.61	1.95	0.84	1.0	0.65	1.80	0.57	1.50	1.02	1.60	0.83	0.69
	21	0.61	1.85	0.76	1.0	0.65	1.80	0.57	1.50	1.02	1.60	0.83	0.69
	22	0.61	1.95	0.76	1.00	0.65	1.70	0.57	1.50	1.02	1.53	0.83	0.69
	23	0.61	2.25	0.76	0.92	0.65	1.50	0.57	1.50	1.02	1.42	0.83	0.69
	24	0.60	2.25	0.92	0.92	0.61	1.40	0.57	1.50	1.02	1.30	0.74	0.69
	25	0.60	2.25	1.20	0.84	0.92	1.20	10.90	1.07	1.07	1.24	0.74	0.69
	26	0.60	2.25	1.85	0.84	1.40	1.10	7.30	1.02	1.02	1.18	0.69	0.69
	27	0.60	1.95	2.60	0.76	1.60	1.00	10.60	1.02	1.02	1.18	0.69	0.69
	28	0.60	2.60	3.75	0.76	1.85	0.92	8.00	1.02	1.02	1.18	0.69	0.69
	29	0.60	2.45	3.05	0.69	1.85	0.92	8.00	1.02	1.02	1.18	0.69	0.69
	30	0.48	0.0	2.30	0.69	1.85	0.92	4.72	0.96	37.80	1.02	0.69	0.69
	31	0.48	0.0	6.25	0.0	1.95	0.0	1.88	0.96	0.0	1.05	0.69	0.69
TOTAL	18.44	65.47	51.84	49.37	27.63	65.05	77.25	50.11	123.19	113.78	26.64	17.14	66.89
MFAN	0.59	2.76	1.70	1.64	0.89	2.17	4.45	1.62	4.11	3.87	0.89	0.75	1.88
MAX	0.69	4.00	6.25	3.30	1.95	6.40	11.30	3.05	37.80	21.00	1.05	0.69	37.80
MIN	0.48	0.48	0.76	0.69	0.61	0.92	0.52	0.96	1.02	1.05	0.69	0.50	0.48

		Data											
YEAR	DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
68	1	1.55	1.95	3.10	7.40	1.20	3.10	2.15	5.85	1.90	45.00	1.76	0.95
	2	1.55	2.50	3.10	8.85	1.20	2.45	2.15	5.35	1.90	32.50	1.70	0.95
	3	1.55	2.70	3.10	8.85	1.20	2.45	2.15	5.35	1.90	32.50	1.70	0.95
	4	1.55	2.10	3.10	4.40	1.20	2.20	2.05	4.40	1.75	17.75	1.70	0.95
	5	1.55	2.40	3.10	4.40	1.20	2.20	2.05	4.40	1.75	17.75	1.70	0.95
	6	1.55	2.45	2.90	3.95	1.20	2.20	2.05	4.20	1.75	17.75	1.70	0.95
	7	1.55	2.45	2.90	3.95	1.20	2.20	2.05	4.20	1.75	17.75	1.70	0.95
	8	1.55	2.45	2.90	3.95	1.20	2.20	2.05	4.20	1.75	17.75	1.70	0.95
	9	1.40	2.49	2.70	3.70	1.20	2.20	1.70	4.00	1.80	10.30	1.60	0.90
	10	1.40	2.49	2.70	3.70	1.20	2.20	1.70	4.00	1.80	10.30	1.60	0.90
	11	1.40	2.49	2.70	3.70	1.20	2.20	1.70	4.00	1.80	10.30	1.60	0.90
	12	1.40	2.49	2.70	3.70	1.20	2.20	1.70	4.00	1.80	10.30	1.60	0.90
	13	1.40	2.49	2.70	3.70	1.20	2.20	1.70	4.00	1.80	10.30	1.60	0.90
	14	1.30	2.30	2.30	2.75	1.00	2.40	1.20	3.80	1.50	6.25	1.45	0.84
	15	1.30	2.30	2.30	2.75	1.00	2.40	1.20	3.80	1.50	6.25	1.45	0.84
	16	1.30	2.30	2.30	2.75	1.00	2.40	1.20	3.80	1.50	6.25	1.45	0.84
	17	1.30	2.30	2.30	2.75	1.00	2.40	1.20	3.80	1.50	6.25	1.45	0.84
	18	1.30	2.30	2.30	2.75	1.00	2.40	1.20	3.80	1.50	6.25	1.45	0.84
	19	1.20	2.25	2.00	2.40	0.90	2.20	0.97	3.25	1.40	5.00	1.35	0.84
	20	1.20	2.25	2.00	2.40	0.90	2.20	0.97	3.25	1.40	5.00	1.35	0.84
	21	1.20	2.25	2.00	2.40	0.90	2.20	0.97	3.25	1.40	5.00	1.35	0.84
	22	1.20	2.25	2.00	2.40	0.90	2.20	0.97	3.25	1.40	5.00	1.35	0.84
	23	1.20	2.25	2.00	2.40	0.90	2.20	0.97	3.25	1.40	5.00	1.35	0.84
	24	1.20	2.25	2.00	2.40	0.90	2.20	0.97	3.25	1.40	5.00	1.35	0.84
	25	1.20	2.25	2.00	2.40	0.90	2.20	0.97	3.25	1.40	5.00	1.35	0.84
	26	1.20	2.25	2.00	2.40	0.90	2.20	0.97	3.25	1.40	5.00	1.35	0.84
	27	1.05	2.10	1.80	1.80	0.90	2.20	1.05	2.10	1.10	2.25	1.06	0.79
	28	1.05	2.10	1.80	1.80	0.90	2.20	1.05	2.10	1.10	2.25	1.06	0.79
	29	1.05	2.10	1.80	1.80	0.90	2.20	1.05	2.10	1.10	2.25	1.06	0.79
	30	1.05	2.10	1.80	1.80	0.90	2.20	1.05	2.10	1.10	2.25	1.06	0.79
	31	1.05	2.10	1.80	1.80	0.90	2.20	1.05	2.10	1.10	2.25	1.06	0.79
	TOTAL	40.75	104.70	100.35	88.55	45.60	126.70	119.46	89.60	202.72	229.08	38.67	25.43
	MEAN	1.31	3.37	3.24	2.95	1.47	4.22	3.85	2.99	6.76	7.39	1.29	0.82
	MAX	1.55	6.40	8.50	7.40	1.45	12.50	11.25	5.85	9.00	45.00	1.76	0.95
	MIN	1.05	1.05	2.00	1.30	0.90	2.15	0.89	1.65	1.15	1.16	1.00	0.65
													1211.58
													3.31
													94.00
													0.65

		Fubasing											
YEAR	DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
68	1	0.78	0.47	0.99	2.15	0.58	0.76	0.61	1.73	0.66	13.80	0.74	0.42
	2	0.78	0.78	1.20	1.93	0.58	0.76	0.35	1.62	0.66	7.10	0.71	0.42
	3	0.78	0.78	1.20	1.80	0.41	1.80	1.37	0.66	0.66	3.95	0.71	0.42
	4	0.78	0.78	1.20	1.67	0.41	1.67	0.35	1.30	0.66	3.10	0.71	0.42
	5	0.78	0.78	0.99	1.67	0.41	1.35	0.51	1.30	0.66	4.45	0.66	0.42
	6	0.78	1.75	0.99	1.35	0.41	1.15	0.51	1.30	0.66	1.10	0.66	0.42
	7	0.78	2.00	0.99	1.35	0.41	1.15	0.51	1.16	2.58	3.45	0.66	0.42
	8	0.78	2.00	0.99	1.35	0.41	0.95	0.51	1.09	1.98	3.08	0.66	0.42
	9	0.78	1.75	0.99	1.35	0.41	0.95	0.51	0.95	1.71	3.08	0.66	0.42
	10	0.68	1.45	0.99	1.35	0.41	1.15	0.47	0.95	1.62	2.35	0.66	0.42
	11	0.60	1.20	0.78	1.15	0.41	3.02	0.47	0.95	1.37	1.05	0.66	0.42
	12	0.60	0.99	0.78	1.15	0.41	2.74	0.47	0.95	1.37	1.05	0.66	0.42
	13	0.60	0.99	0.78	0.95	0.41	1.65	0.47	0.75	1.37	1.05	0.66	0.42
	14	0.60	0.99	0.78	0.95	0.41	2.25	0.47	0.87	1.37	1.77	0.66	0.42
	15	0.60	1.20	0.60	0.95	0.41	1.62	0.47	0.79	1.16	1.45	0.55	0.42
	16	0.60	1.20	0.60	0.76	0.41	1.37	0.47	0.71	0.95	1.36	0.55	0.42
	17	0.60	1.45	0.60	0.76	0.41	1.16	0.42	0.71	0.87	1.21	0.51	0.38
	18	0.60	1.45	0.60	0.76	0.41	1.05	0.42	0.71	0.87	1.21	0.51	0.38
	19	0.60	1.20	0.60	0.76	0.41	1.27	0.42	0.71	0.79	1.15	0.51	0.38
	20	0.60	1.45	0.60	0.76	0.41	1.37	0.42	0.71	0.79	1.15	0.51	0.38
	21	0.60	1.45	0.60	0.76	0.41	1.05	0.47	0.71	0.71	1.05	0.51	0.38
	22	0.60	1.45	0.60	0.76	0.41	0.79	0.47	0.66	0.71	1.04	0.47	0.38
	23	0.60	1.20	0.60	0.76	0.41	0.58	0.47	0.66	0.71	0.91	0.47	0.38
	24	0.60	1.20	0.60	0.76	0.41	0.61	0.47	0.66	0.71	0.91	0.47	0.38
	25	0.60	1.20	0.60	0.76	0.41	0.61	0.47	0.66	0.71	0.91	0.47	0.38
	26	0.60	0.99	1.45	0.76	0.76	0.61	6.00	0.79	0.61	0.86	0.47	0.38
	27	0.60	0.99	1.20	0.58	0.76	0.61	4.68	0.79	0.61	0.86	0.47	0.38
	28	0.47	0.99	1.20	0.58	0.76	0.61	3.50	0.71	0.55	0.86	0.47	0.38
	29	0.47	0.99	1.45	0.58	0.76	0.61	3.19	0.71	0.55	0.86	0.47	0.38
	30	0.47	0.0	2.30	0.58	0.76	0.61	2.58	0.66	0.80	0.80	0.47	0.38
	31	0.47	0.0	2.30	0.0	0.76	0.0	1.98	0.66	0.0	0.74	0.0	0.33
	TOTAL	19.78	35.79	30.72	32.80	16.73	36.81	38.63	28.93	64.66	76.87	17.03	12.31
	MEAN	0.64	1.23	0.99	1.09	0.54	1.23	1.25	0.93	2.16	2.48	0.57	0.40
	MAX	0.78	2.00	2.30	2.15	0.95	3.02	6.00	1.73	13.80	13.80	0.74	0.42
	MIN	0.47	0.47	0.60	0.56	0.41	0.51	0.42	0.66	0.55	0.74	0.42	0.33
													411.05
													21.15
													29.50
													0.33

		Hullako											
YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	
68	1	3.04	1.72	5.75	5.30	2.59	10.72	2.59	3.56	58.90	8.75	4.85	
	2	3.20	2.93	4.15	13.70	2.59	4.75	3.09	3.98	25.40	5.10	1.45	
	3	3.20	3.20	4.18	9.20	1.80	37.10	3.42	3.62	26.50	3.74	1.45	
	4	2.80	3.50	4.14	4.30	1.80	12.16	11.79	3.62	22.80	3.07	1.38	
	5	2.80	9.42	4.70	6.23	1.80	5.14	0.87	3.53	22.00	2.76	1.38	
	6	2.70	4.70	3.50	2.90	1.80	1.80	2.22	1.53	24.30	5.52	1.38	
	7	2.70	11.62	3.50	2.90	1.80	1.47	2.72	1.53	27.40	2.33	1.38	
	8	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	9	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	10	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	11	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	12	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	13	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	14	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	15	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	16	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	17	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	18	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	19	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	20	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	21	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	22	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	23	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	24	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	25	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	26	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	27	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	28	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	29	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	30	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
	31	2.70	11.07	3.50	4.58	1.80	1.47	2.58	5.87	27.40	2.33	1.38	
TOTAL		70.01	168.44	153.78	124.57	109.79	220.82	346.48	196.61	315.22	519.22	96.60	
MEAN		2.26	5.43	4.96	4.15	3.53	7.36	11.18	6.94	10.51	16.75	3.22	
MAX		3.40	11.62	18.98	13.70	16.20	37.10	75.90	13.70	105.80	58.90	4.85	
MIN		1.66	1.72	2.67	2.49	1.47	1.47	1.57	3.56	3.56	1.45	1.04	

7. Trossel Caging Station

YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC
64	24.38 1.10 0.00	73.13 1.42 0.00	49.87 1.00 0.00	34.06 0.90 0.00	32.24 0.90 0.00	73.60 1.20 0.00	35.00 0.90 0.00	14.70 2.20 0.00	78.00 1.00 0.00	88.00 1.00 0.00	91.00 1.00 0.00	91.00 1.00 0.00
TOTAL MEAN	60.38	73.13	49.87	34.06	32.24	73.60	35.00	14.70	78.00	88.00	91.00	91.00
MAX	1.10	1.42	1.00	0.90	0.90	1.20	0.90	2.20	1.00	1.00	1.00	1.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
65	44.00 1.40 0.00	35.22 1.30 0.00	47.00 1.20 0.00	36.79 1.00 0.00	44.10 1.00 0.00	75.28 1.20 0.00	398.94 1.00 0.00	20.00 0.90 0.00	64.10 1.00 0.00	55.25 1.00 0.00	43.00 1.00 0.00	10.00 1.00 0.00
TOTAL MEAN	44.00	35.22	47.00	36.79	44.10	75.28	398.94	20.00	64.10	55.25	43.00	10.00
MAX	1.40	1.30	1.20	1.00	1.00	1.20	1.00	0.90	1.00	1.00	1.00	1.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Trossel

YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
66	24.71 0.91 0.77	26.73 0.90 0.00	34.00 0.90 0.00	31.74 0.90 0.00	37.40 0.90 0.00	26.00 0.90 0.00	66.00 1.00 0.00	34.00 0.90 0.00	8.00 0.90 0.00	45.00 1.00 0.00	2.00 0.90 0.00	22.00 0.90 0.00
TOTAL MEAN	24.71	26.73	34.00	31.74	37.40	26.00	66.00	34.00	8.00	45.00	2.00	22.00
MAX	0.91	0.90	0.90	0.90	0.90	0.90	1.00	0.90	0.90	1.00	0.90	0.90
MIN	0.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67	23.40 0.90 0.00	24.68 0.90 0.00	37.47 0.90 0.00	34.44 0.90 0.00	41.00 0.90 0.00	87.00 1.00 0.00	4.00 0.90 0.00	3.00 0.90 0.00	3.00 0.90 0.00	1.00 0.90 0.00	2.00 0.90 0.00	10.00 0.90 0.00
TOTAL MEAN	23.40	24.68	37.47	34.44	41.00	87.00	4.00	3.00	3.00	1.00	2.00	10.00
MAX	0.90	0.90	0.90	0.90	0.90	1.00	0.90	0.90	0.90	0.90	0.90	0.90
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		Tons											
YEAR	DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
68	1	2.15	1.55	4.70	6.95	2.15	3.48	2.72	7.60	2.45	30.60	3.45	1.65
	2	2.15	3.15	4.50	6.40	2.04	4.70	2.72	7.20	2.02	18.50	3.40	1.65
	3	2.15	2.85	4.10	5.60	1.95	6.60	2.72	7.00	1.50	14.70	3.40	1.65
	4	2.15	3.84	3.70	4.99	1.200	2.45	2.52	6.70	1.75	12.30	3.10	1.65
	5	2.15	4.80	3.60	4.53	1.200	4.50	2.52	6.55	6.25	10.60	2.95	1.65
	6	2.15	8.20	3.48	4.80	1.75	4.35	2.42	6.25	7.50	9.60	2.65	1.65
	7	2.15	6.70	3.48	4.50	1.75	3.84	2.30	5.80	6.10	8.30	2.65	1.65
	8	2.15	6.95	3.60	4.20	1.75	3.84	2.30	5.45	5.4	7.70	2.65	1.65
	9	2.15	6.00	3.60	4.10	1.75	3.35	2.15	5.20	4.76	7.00	2.65	1.65
	10	2.15	5.10	3.48	3.84	1.75	5.80	2.15	4.76	4.20	6.10	2.65	1.65
	11	2.15	4.80	3.20	3.70	1.75	11.50	2.04	4.20	4.20	5.40	2.65	1.65
	12	2.15	3.10	3.20	3.84	1.75	7.15	2.04	3.76	4.00	4.60	2.65	1.65
	13	2.15	3.84	3.10	3.80	1.50	4.45	1.75	3.55	4.00	4.40	2.65	1.65
	14	2.15	4.80	3.10	3.48	1.50	6.20	1.95	3.10	3.55	4.00	2.65	1.65
	15	2.15	4.70	3.05	3.20	1.50	4.93	1.75	2.85	3.20	3.70	2.65	1.65
	16	1.90	4.20	3.05	3.20	1.50	4.93	1.75	2.85	3.20	3.70	2.65	1.65
	17	1.65	4.20	3.05	3.20	1.50	4.50	1.75	2.70	2.75	3.20	2.65	1.65
	18	1.65	3.84	2.95	3.05	1.50	4.35	1.65	2.70	2.60	3.00	2.65	1.65
	19	1.75	3.84	2.95	3.05	1.50	4.10	1.65	2.70	2.60	3.00	2.65	1.65
	20	1.75	3.70	2.95	3.05	1.50	3.84	1.65	2.70	2.60	3.00	2.65	1.65
	21	1.65	3.60	2.95	3.05	1.50	3.84	1.65	2.70	2.60	3.00	2.65	1.65
	22	1.65	3.70	2.95	3.05	1.50	3.70	1.65	2.70	2.60	3.00	2.65	1.65
	23	1.40	4.20	3.12	3.12	1.95	3.60	1.65	2.70	2.60	3.00	2.65	1.65
	24	1.40	4.20	3.35	3.72	1.75	3.60	1.80	2.70	2.60	3.00	2.65	1.65
	25	1.55	3.84	3.10	3.20	1.90	3.60	2.80	2.70	2.60	3.00	2.65	1.65
	26	1.55	3.70	3.10	3.20	1.90	3.60	2.80	2.70	2.60	3.00	2.65	1.65
	27	1.55	3.84	3.10	3.20	2.04	3.48	30.50	2.70	1.80	4.45	1.75	1.65
	28	1.55	4.93	2.42	2.42	2.42	3.35	25.00	2.70	1.80	4.35	1.75	1.65
	29	1.55	4.70	4.93	5.12	3.02	3.02	17.30	2.75	3.05	3.90	1.75	1.65
	30	1.40	0.0	5.95	5.35	3.02	3.02	11.70	2.60	20.50	3.80	1.75	1.65
	31	1.40	0.0	7.60	6.35	3.48	3.48	8.20	2.40	39.80	3.80	1.65	1.65
	TOTAL	57.28	130.87	117.63	111.49	61.24	140.56	176.54	133.76	150.96	239.27	70.35	41.54
	MEAN	1.85	4.51	3.79	3.92	4.70	4.70	5.69	4.31	5.03	7.69	2.28	1.44
	MAX	2.15	8.20	7.60	6.95	3.48	11.50	30.50	7.60	39.80	30.60	5.65	39.80
	MIN	1.40	1.55	2.95	2.35	1.55	2.85	1.55	2.45	1.25	3.80	1.65	1.18
		1430.76											
		3.91											
		39.80											
		1.18											

8. Nantou Shan Crating Station

YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
64	1.00	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
TOTAL	80.00	85.52	55.01	34.92	32.33	88.42	37.03	177.05	93.62	200.94	90.19	57.70
MEAN	2.58	2.95	1.77	1.16	1.04	2.95	1.19	5.41	2.89	6.48	2.96	1.82
MAX	7.00	8.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
MIN	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00
65	1.48	1.02	0.95	0.95	0.95	1.02	2.90	15.10	3.28	1.57	1.15	1.43
TOTAL	42.88	28.42	37.60	27.76	35.87	96.22	63.36	231.48	63.31	44.31	45.80	35.66
MEAN	1.40	1.02	1.18	0.86	1.16	3.12	2.89	7.81	2.04	1.43	1.43	1.14
MAX	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
MIN	1.02	0.89	0.95	0.84	0.84	0.95	1.88	3.42	1.56	1.27	0.95	0.93

Nantou Shan

YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
66	1.15	0.90	1.15	1.63	1.03	1.63	3.25	1.63	1.35	1.82	1.20	0.95
TOTAL	30.96	27.17	43.27	40.96	43.58	351.31	70.82	43.47	73.96	46.57	31.79	27.48
MEAN	0.98	0.91	1.50	1.29	1.45	11.71	2.35	1.49	2.47	1.50	1.06	0.89
MAX	1.15	1.25	1.50	1.75	1.63	16.00	3.25	1.98	4.00	1.82	1.27	0.95
MIN	0.90	0.77	0.90	0.90	0.90	1.63	1.75	1.10	1.20	1.20	0.95	0.83
67	0.70	0.88	2.94	1.14	1.14	2.30	1.90	1.35	2.00	2.00	4.40	5.30
TOTAL	25.17	30.14	42.88	38.04	51.77	83.44	53.45	50.11	51.45	217.25	253.65	100.22
MEAN	0.81	1.08	1.58	1.27	1.57	2.78	1.72	1.62	1.71	3.81	4.86	2.73
MAX	1.14	1.14	7.00	1.63	1.63	3.00	3.75	1.90	2.00	2.00	7.00	7.00
MIN	0.65	0.83	0.88	1.05	1.05	1.90	1.35	1.14	1.45	1.45	0.80	0.80

Kantou Shan

YEAR	DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
63	1	2.63	1.88	5.62	10.62	1.92	5.10	3.10	12.00	2.65	83.00	2.85	1.60
	2	2.83	4.10	5.30	10.10	1.92	6.50	3.10	11.40	3.10	49.00	2.85	1.60
	3	2.50	4.50	5.10	8.80	1.75	10.10	2.90	11.40	3.10	34.75	2.85	1.60
	4	2.50	6.00	5.10	8.00	1.75	8.00	2.70	12.00	3.10	29.70	2.85	1.60
	5	2.50	9.60	5.10	7.20	1.75	6.50	2.50	10.75	3.10	30.30	2.85	1.60
	6	2.50	11.00	4.80	6.50	1.75	5.90	2.30	9.00	2.90	25.00	2.85	1.60
	7	2.50	13.50	4.80	5.90	1.75	5.10	2.10	7.55	2.90	19.50	2.85	1.60
	8	2.50	12.00	4.80	5.10	1.75	4.50	2.00	6.00	2.90	15.80	2.85	1.60
	9	2.50	10.50	4.80	4.80	1.75	4.00	1.90	5.30	2.90	12.75	2.85	1.60
	10	2.50	9.00	4.80	4.80	1.75	3.50	1.80	4.60	2.90	11.25	2.85	1.60
	11	2.50	8.00	3.83	4.50	1.57	3.00	1.70	3.90	2.90	10.75	2.85	1.60
	12	2.50	7.60	3.83	4.30	1.57	2.80	1.70	3.70	2.90	10.25	2.85	1.60
	13	2.50	7.20	3.37	4.10	1.57	2.60	1.70	3.50	2.90	9.75	2.85	1.60
	14	2.50	6.80	3.37	3.85	1.57	2.40	1.70	3.30	2.90	9.25	2.85	1.60
	15	2.50	6.40	3.37	3.65	1.57	2.20	1.70	3.10	2.90	8.75	2.85	1.60
	16	2.50	6.00	3.05	3.30	1.40	1.90	1.57	2.90	2.90	8.25	2.85	1.60
	17	2.50	5.60	3.05	3.10	1.40	1.70	1.57	2.70	2.90	7.75	2.85	1.60
	18	2.50	5.20	2.77	2.77	1.27	1.40	1.40	2.50	2.90	7.25	2.85	1.60
	19	2.50	4.80	2.77	2.50	1.10	1.10	1.27	2.30	2.90	6.75	2.85	1.60
	20	2.50	4.40	2.77	2.20	0.90	0.80	1.10	2.10	2.90	6.25	2.85	1.60
	21	2.50	4.00	2.77	1.90	0.70	0.60	0.90	1.90	2.90	5.75	2.85	1.60
	22	2.50	3.60	2.77	1.60	0.50	0.50	0.70	1.70	2.90	5.25	2.85	1.60
	23	2.50	3.20	2.77	1.30	0.30	0.30	0.50	1.50	2.90	4.75	2.85	1.60
	24	2.50	2.80	2.77	1.00	0.10	0.10	0.30	1.30	2.90	4.25	2.85	1.60
	25	2.50	2.40	2.77	0.70	0.00	0.00	0.10	1.10	2.90	3.75	2.85	1.60
	26	2.50	2.00	2.77	0.40	0.00	0.00	0.00	0.90	2.90	3.25	2.85	1.60
	27	2.50	1.60	2.77	0.10	0.00	0.00	0.00	0.70	2.90	2.75	2.85	1.60
	28	2.50	1.20	2.77	0.00	0.00	0.00	0.00	0.50	2.90	2.25	2.85	1.60
	29	2.50	0.80	2.77	0.00	0.00	0.00	0.00	0.30	2.90	1.75	2.85	1.60
	30	2.50	0.40	2.77	0.00	0.00	0.00	0.00	0.10	2.90	1.25	2.85	1.60
	31	2.50	0.00	2.77	0.00	0.00	0.00	0.00	0.00	2.90	0.75	2.85	1.60
	TOTAL	68.72	210.28	156.62	135.44	70.39	199.07	278.36	163.26	427.81	431.07	64.47	43.82
	MEAN	2.19	7.25	5.05	4.51	2.27	6.65	8.98	5.27	14.26	13.91	2.85	2.18
	MAX	2.50	13.50	13.50	10.60	2.50	16.70	65.00	12.00	158.00	83.00	15.00	15.00
	MIN	1.88	1.88	2.77	2.10	1.40	3.30	1.57	2.43	2.65	2.85	1.60	1.25

9. Ryan Caging Station:

YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
64	4.30	4.25	4.20	4.15	4.10	4.05	4.00	3.95	3.90	3.85	3.80	3.75
TOTAL	242.58	256.07	174.07	118.47	112.20	264.65	124.93	507.88	284.47	573.23	260.44	181.54
MEAN	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
MAX	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40
MIN	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94
65	4.82	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80
TOTAL	136.32	98.00	125.03	100.45	120.55	180.25	128.49	651.73	244.91	170.84	150.40	125.19
MEAN	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40
MAX	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17
MIN	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90

Kuyoa

YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
66	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85
TOTAL	102.77	90.97	131.24	115.32	136.90	92.01	205.54	117.95	226.40	148.80	94.45	72.10
MEAN	3.32	3.32	3.32	3.32	3.32	3.32	3.32	3.32	3.32	3.32	3.32	3.32
MAX	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
MIN	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90
67	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
TOTAL	81.75	93.05	137.00	137.04	142.60	290.74	153.90	137.60	155.40	479.60	1139.23	341.02
MEAN	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64
MAX	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20
MIN	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20

Koyaan												
YEAR DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
68 1	9.04	5.37	15.45	21.20	6.87	12.30	9.90	29.20	7.05	229.61	9.60	5.20
2	8.90	6.73	14.84	19.20	6.87	16.70	9.60	27.02	7.27	116.39	9.10	5.00
3	8.37	12.25	13.32	16.50	6.59	17.40	9.10	27.87	7.02	69.22	9.40	5.00
4	8.37	10.57	12.09	15.00	6.41	16.70	8.70	26.45	7.02	59.75	9.10	5.00
5	8.37	16.76	13.76	14.40	6.41	17.20	8.30	21.93	26.29	49.36	8.80	5.00
6	8.12	20.20	10.75	14.10	6.26	17.70	8.00	18.70	63.11	45.39	8.10	5.00
7	8.12	32.87	10.57	13.70	6.26	15.50	7.30	18.00	41.73	40.81	7.80	4.70
8	8.12	31.34	10.35	13.40	5.86	15.70	7.50	16.80	27.37	23.90	7.60	4.70
9	8.50	23.38	10.05	13.00	5.86	13.70	6.60	16.20	21.87	30.42	7.60	4.50
10	7.60	23.40	9.83	12.70	5.68	20.60	6.80	15.70	16.10	26.76	7.30	4.50
11	7.39	19.27	9.65	11.00	5.68	32.50	6.60	15.70	15.10	25.70	7.10	4.50
12	6.90	18.40	12.70	11.70	5.68	28.50	6.00	14.50	15.10	19.32	7.10	4.50
13	6.90	16.10	12.50	11.70	5.68	27.20	6.00	14.20	14.60	17.90	6.80	4.20
14	6.90	15.15	12.20	10.60	6.80	22.00	6.60	14.00	14.10	17.59	6.60	4.20
15	6.66	16.51	11.90	10.20	5.68	17.20	6.60	14.20	13.20	19.40	6.30	4.20
16	7.40	17.29	11.70	9.90	5.37	18.00	6.60	13.50	13.20	18.80	6.30	4.20
17	6.29	16.40	11.70	9.04	5.37	13.00	6.00	12.70	12.00	18.50	6.30	3.90
18	6.29	14.23	11.40	8.76	5.13	12.30	6.00	12.40	11.70	18.00	6.00	3.90
19	6.29	14.59	11.40	8.49	5.37	11.70	5.40	11.20	11.70	18.40	6.00	3.90
20	6.29	18.60	11.70	9.04	5.68	15.90	5.40	11.90	11.20	16.90	6.00	3.90
21	6.29	14.69	11.70	12.89	4.90	12.70	5.40	13.20	11.20	16.30	6.00	3.90
22	6.29	13.22	11.40	10.32	7.11	11.70	6.00	12.70	10.90	15.80	6.00	3.90
23	7.00	17.59	11.70	6.30	6.26	11.40	6.60	13.00	10.60	12.10	5.80	3.60
24	6.01	18.51	11.90	9.76	6.26	10.60	6.60	13.00	10.60	14.10	5.60	3.60
25	5.81	17.29	12.70	8.37	10.57	10.60	73.50	13.70	9.65	14.00	5.60	3.30
26	5.83	14.80	16.90	8.12	14.84	10.60	153.23	13.00	9.40	14.10	5.60	3.30
27	5.56	15.20	17.40	7.82	9.90	10.40	89.39	8.43	9.40	13.00	5.60	3.30
28	5.81	17.59	19.20	8.12	19.12	11.10	63.42	8.21	14.40	12.20	5.60	3.30
29	5.83	15.76	20.40	7.51	15.12	12.60	49.98	7.36	14.54	11.50	5.40	3.30
30	5.00	0.0	24.40	8.00	12.42	9.90	30.80	7.05	443.46	10.60	5.60	2.90
31	5.56	0.0	43.30	0.0	12.30	0.0	35.62	6.90	0.0	10.20	0.0	2.90
TOTAL	117.21	510.46	417.86	340.93	241.95	463.20	676.34	669.77	1049.79	1023.53	206.30	127.00
MEAN	7.01	17.60	13.48	11.36	7.80	15.44	21.82	15.15	34.99	33.02	6.88	4.10
MAX	9.04	32.87	24.40	21.20	19.12	32.50	153.23	29.20	443.46	229.61	9.60	5.20
MIN	5.56	5.37	9.65	7.51	4.90	9.90	5.40	6.90	7.02	10.20	5.60	2.90

APPENDIX - 6

List of Basic Data

I Maps

1. Topographic Maps and Aerial-Photographic Maps

(1)	General Topographic Maps of the Project Site (Aerial-Photographic Maps)	1 set consisting of 6 maps	1 : 50,000
(2)	Partial Topographic Maps of the Project Site (Aerial-Photographic Maps)	1 set consisting of 7 maps	1 : 25,000
(3)	General Topographic Maps of the Project Site (Aerial-Photographic Maps)	1 set consisting of 2 maps	1 : 10,000
(4)	Topographic Map of Topokuo Damsite		1 : 500
(5)	Topographic Map of Topokuo Regulating Pond		1 : 1,000
(6)	Topographic Map of Tzen Damsite		1 : 500
(7)	Topographic Map of Hualu Damsite		1 : 500
(8)	Topographic Map of Fushing Damsite		1 : 500
(9)	Topographic Map of Taosai Damsite		1 : 500
(10)	Topographic Map of Chungtaosai Damsite		1 : 500
(11)	Topographic Map of Hsiaowahei Damsite		1 : 500
(12)	Topographic Map of Hsihsiaowahei Damsite		1 : 500
(13)	Topographic Map of Kuyuan Damsite		1 : 500
(14)	Topographic Map of Kuyuan Regulating Pond		1 : 1,000
(15)	Topographic Map of Loshao Combining Tank		1 : 500
(16)	Topographic Map of Hsitopokuo Chi Damsite		1 : 500
(17)	Topographic Map of Kupaiyang Damsite		1 : 500
(18)	Topographic Map of Mantou Shan Damsite		1 : 500
(19)	Topographic Map of Hsiutu Chi Damsite		1 : 500
(20)	Topographic Map of Kuyuan Power Station Site		1 : 1,000
(21)	Topographic Map of Chipan Power Station Site		1 : 1,000
(22)	Topographic Map of Yingchiao Damsite		1 : 500

2. Geological Maps

(1)	Map of Geological Outline at Liwu Chi Project Site	1 : 50,000
(2)	Geological Map of Topokuo Damsite	1 : 500
(3)	Geological Map of Tzuen Damsite	1 : 500
(4)	Geological Map of Hualu Damsite	1 : 500
(5)	Geological Map of Fuhsing Damsite	1 : 500
(6)	Geological Map of Hsiaowahei Damsite	1 : 500
(7)	Geological Map of Hsihsiaowahei Damsite	1 : 500
(8)	Geological Map of Taosai Damsite	1 : 500
(9)	Geological Map of Chungtaosai Damsite	1 : 500
(10)	Geological Map of Kupaiyang Damsite	1 : 500
(11)	Geological Map of Mantou Shan Damsite	1 : 500
(12)	Geological Map of Kuyuan Damsite	1 : 500
(13)	Geological Map of Hsiutu Chi Damsite	1 : 500
(14)	Geological Map of Hsitopokuo Chi Damsite	1 : 500
(15)	Geological Map of Tienhsiang Damsite	1 : 500
(16)	Geological Map of Kuyuan Power Station Site	1 : 1,000
(17)	Geological Map of Test Adits at Kuyuan Underground Power Station Site	1 : 200
(18)	Geological Map of Chipan Project Site	1 : 25,000
(19)	Geological Map of Chipan Power Station Site	1 : 1,000
(20)	Location Map of Test Adits at Chipan Power Station	1 : 1,000
(21)	Geological Map of Loshao Combining Tank Site	1 : 500
(22)	Geological Ground Plan of Tienhsiang Power Station Site	1 : 5,000
(23)	Geological Ground Plan of Outcrop in Headrace Tunnel Route of Tienhsiang Project	1 : 5,000
(24)	Geological Ground Plan of Headrace Tunnel of Chipan Project	1 : 5,000
(25)	Geological Mineral Map alongside of E-W Cross-Island Highway	1 : 100,000
(26)	Geological Map of Laohsi Chi Damsite	1 : 500
(27)	Geological Map of Roads at Kuyuan Power Station	1 : 500

II Meteorological and Hydrological Data

1. Table of Atmospheric Temperature, Atmospheric Pressure, Relative Temperature, Water Temperature
2. Table of Annual Rainfall, Annual Runoff.
Record of Hourly Rainfall and Runoff
3. 10-days Average Runoff at Each Gaging Station
4. Rating Curve at Lushi, Kuyuan and Topokuo Gaging Station
Note: Above data involve only for the year of 1968
5. Absolute Maximum Temperature
6. Absolute Minimum Temperature
7. Mean Minimum Temperature
8. Mean Wind Velocity
9. Maximum Wind Velocity
10. Number of Days with Thunderstorm
11. Number of Days with Snow
12. Mean Temperature
13. Mean Maximum Temperature

III Geological Map

1. Geological Map of Kuyuan Underground Power Station
2. Geological Map of Chipan Underground Power Station
3. Geological Map of Test Adits for Kuyuan Surge Tank
4. Geological Map of Test Adits for Topokuo Dam
5. Geological Map of Test Adits for Chipan Power Station

IV Data for Cost Estimations

1. Wages of Laborers
2. Unit Price of Construction Materials
3. Table of Construction Unit Cost for Lower Tachien
4. Construction Scheme for Liwu Chi Project
5. Table of Road Distance within Liwu Chi Project Area
6. Freight Rate Table of Taiwan Railway

V Reference Books and Data

1. Ten-Year Power Development Program (1969-1978)
2. Tachien Dam Project
 - (1) Technical Feasibility Report
 - (2) Technical Feasibility Report, 1st Part
 - (3) Technical Feasibility Report, 2nd Part
 - (4) Technical Feasibility Report, 3rd Part
3. Liwu River Power Development Project Report on Geology (1970)
4. Liwu River Power Development Project Report on Hydrology (1969)
5. Liwu River Power Development Project Report on Aggregate and Concrete Test (1969)
6. Pre-Feasibility Report on Liwu Chi Hydroelectric Power Development Project (1968)
7. Long-Range Load Forecast (1969-1978) T.P.C. Aug. 1969
8. Transmission System Planning Related to Liwu River Power Development Project (draft) Nov. 1969.
9. CIECD Taiwan Statistical Data Book, 1969
10. Drawings of the existing Liwu Power Station

