別添資料 1

Islamic Republic of Iran
MINISTRY OF AGRICULTURE

JAPAN INTERNATIONAL
COOPERATION AGENCY

Minutes of Understanding Notes

for

The Preliminary Study

on

The Caspian Sea Coastal Area

Agricultural Development

in

The Islamic Republic of Iran

February 28, 1984

In response to the request of the Government of the Islamic Republic of Iran made by H.E. Mr. Mir-Hossein Musavi Khamenei, Prime Minister of the Islamic Republic of Iran, to H.E. Mr. Shintaro Abe, Minister for Foreign Affairs of Japan, during the latter's visit to the Islamic Republic in August, 1983, the contact mission for the Caspian Sea Coastal Area Agricultural Development, headed by Mr. Toru MASE, was dispatched from 16 Feb. '84 to 29 Feb. '84 by Japan International Cooperation Agency (JICA), the sole agency responsible for the technical cooperation on behalf of the Government of Japan. The contact mission had a series of discussions with the Ministry of Agriculture and other authorities concerned, and carried out the field survey in the Caspian Sea Coastal Area with reference to technical cooperation in the field of agriculture.

The mission exchanged general views on the present situation and future outlooks of agriculture in the aforementioned area and had discussions with a view to exploring possible modes and means of Japanese technical cooperation with the Iranian authorities concerned.

This Minutes describes the main contents exchanged between both sides during the stay of the mission in the Islamic Republic of Iran.

1. The contact mission appreciated the several plans or measures for agricultural improvement being undertaken by Iranian authorities concerned; meanwhile, the mission observed the importance of the study on inter-relationship and integrated function among the plans mentioned above.

2. Besides, the mission referred to the necessity of the study to recognize present situation of agriculture in the area and to find suitable fields for technical cooperation, prior to possible technical cooperation in the future.

3. Accordingly, both sides recognized the necessity of the master plan study on agricultural improvement in the area. And also, the both sides agreed to carry on necessary arrangements to realize the study in the earliest opportunity with the cooperation of related authorities.

4. In addition, the both sides agreed that the study which is to be sponsored by JICA should be framed under the following concepts.

4-1) To select the typical study area. (e.g. the area fed by LAR dam irrigation project as a model case) for the sake of early prescription of improvement program, and so on.

4-2) To formulate the project which consists of rice production increase as a core and surrounding improvement plans including technical, socio-economical, and financial evaluation.

4-3) To recommend integrated method for improved farm management and extension to farmers.

4-4) To recommend the necessary activities such as demonstration and research to endorse the above mentioned integratred method.

4-5) To transfer the necessary technical know-how concerning the item 4-2) above mentioned through the study.

5. The outline of terms of reference for the study proposed by Iranian side in eight articles and two notes is attached.

6. The mission will submit the proposals mentioned in the article 5 to the Government of Japan for taking into consideration.

7. This Minutes is prepared and signed in seven articles and two pages attachment.

Mr. Toru Mase
Leader of the Contact Mission,
Japan International
Cooperation Agency

Mr. Jalal Rasoulof
Deputy Minister in Agronomy
Ministry of Agriculture

Ministry Of Agriculture

Islamic Republic of Iran

ATTACHMENT

Outline of terms of rererences for tne study of a master plan in a typical area of the caspian sea region

I- On Farm Development

a) Land reclamation and drainage in paddy fields with particular attention to the areas under sea water intrusion.

b) Improvement of irrigation and drainage systems with appropriate soil and water management and water quality control.

c) Land Consolidation Considering the land ownerships, land leveling and effective mechanization

d) Renovation or existing irrigation and drainage chanals on paddy fields and its Comformity to delivery networks.

II-Improvement of existing water delivery network regarding structure, diversions, alignement and chanal linnings.

III- Farm management improvement

a) Exchange of research information, materials and experts in Connection with agricultural extension and training

b) Investigation and research on suitable and high yielding varieties

c) Appropriate cropping pattern and system, possibly double cropping

d) Agricultural input programming (e.g. seed, water, rertilizer, machinery, credit, ...)

IV- Effective mechanization and relevant Industries

a) Evaluation of required mechanization Considering the industrial and labor potentialities.

b) Agrobusiness, rural, food industries and processing in order to absorb released labour

V- Agricultural development and its influences in the other fields. including environmental consideration.

VI- Investigation and introduction of socio economic aspects resulting the implimentation of Master Plan.

VII- Provision of a pilot project on a typical area considering the master plan criteria.

VIII-Evaluation and introduction of financial and administration requirements for carring out of the master plan and pilot project.

Notes:

1) The cooperation will be carried out through a japanease expert team and Iranian counterparts with taking into consideration the all policies and strategies establisning of the five years development plan.

2) Program of the work is to be scheduled for two years beginning from June 1984.

別添資料 2

項目	内容	発行・担当機関名	国外搬出可否	日本国内入手可否	今回入手分
地形他	1/250,000 地形図－全地域	Geographic Dept., Army	△○	×	
	1/50,000 〃 〃	〃 〃	△○	×	
	1/5,000～1/20,000－開発実施地域(1)	Natlonal Cavtoqraphic Center	△○	×	
	1/20,000 Aero-Photo Mosaic	〃 〃	×	×	
	Landsat Photo	合州国		△	
土壌・地質	1/2,500,000 地質図－全図	Natlonal Iranian Oil Oompany	△	×	○
	1/250,000 Land Evaluation Map－全域(2)	Soil a Soil Fertility Res Inst., MOA	?	×	○
	1/50,000 Soil Map－開発実施地域	〃 〃	?	×	○
水文・気象	Meleoro logical Year Book	Westher Dureau, MORT（道路運輸省）	○	△(3)	
	Hydro logical Year Book	Hydrolegy Dept., MOE	○	△(3)	
	Water Quality Survey	〃 〃	○	△(3)	
	Rainfall Yeav Book	〃 〃	○	△(3)	
農業・農村	農業センサス－1352－全国（イクレ ）(4)	Iran Statistc Conter PBO	○	×	○
	〃 －1354－ 〃 〃	〃 〃	○	×	○
	〃 －1361－ 〃 〃	〃 〃	○	×	○
	全国農業センサス－1939 〃 〃	National Census Bureau, MOI（内務省）	○	×	
	Village Gazette－1345/55－州別	Iran Statistic Conter, PBO	○	×	○(5)
人口他	人口・住宅センサス－1345/55－州別	〃 〃	○	×	
	〃 〃 －郡別	〃 〃	○	×	
一般	Statisticnl Year Book－1351(6)	〃 〃	○	×	○
	〃 1361－（イラン語）		○	×	○

(注) (1) 1/5000～1/20,000 地形図はNortbern Regional Water Boardがかんがい計画を実施又は計画中の地域に限って作成されている。→ テシトのBoardから国土地理院あてLetterかいてもらえば入手できるかも。

(2) 1/250,000 Land Evaluation Map if Land use Mspに準じる。現場で入手可能、Reconnaissance Level、1/50,000 Soil MapはSemi-detail LevelでMazandaran州については相当部分ができているがGilar州については不明。

(3) 水文・気象データについては、一部を三拓コンサルタンツカン保管。但し最近10年余は未入手。 地建事務所にある？

(4) 農業センサス関係については1339（1964）にFAOの指導で全国センサス（州別）が行われて以降、人口センサスなどに伴いVillage Gozeltae（州別）として作成されている他、不定期にサンプル・センサスが行われている。

(5) 人口・住宅センサスについては1976（1355）年分、Mazandaran, Gilan両州のみ入手したが郡別も入手可能。

(6) Statistical year Bookは1351（1972）年版のみ英語。1361（1982）年版はイラン語であるが内容は1351年版と略々同じ。

別添資料3

Basic data about Agriculture and Irrigation
in Iran as the questionaire of Embassy of Japan

1. Status quo of Agriculture and Irrigation in Iran and problems to be solved:

1-1. Area under cultivation: 7.3 million hectars from which 2.5 million hectares are under irrigation.

1-2. Major crops: wheat, barley, rice, cotton

1-3. Water resources development:

2.5 million hectares are under irrigation in the whole country, which requires about 38×10^9 cubic meters of water, 48 storage and diversion dams were constructed which produces 23×10^9 cubic meters of water, 14×10^9 cubic meters of developed water resources are used for irrigation and the remaining are used for domestic, industry and etc.

The ground water potential in Iran is 35×10^9 cubic meters from which only 27×10^9 cubic meters is being used in agriculture, domestic and industry.

1-4. Irrigation system: About 800,000 hectars of area is under irrigation system in Iran.

2. Future plan in agriculture esp. in 5 years plan:

Future plan in water resources development and agriculture are summarized in figures 1 and 2.

3. Requested of Technical cooperation

3-1. Field increase in rice production

3-2. Long terms comprehensive study in rice production towards a self-sufficiency in this product and step by step program and policies together with a specific projects.

3-3. Concerned ministries and organization: Ministry of agriculture will be envolved in this project.

Water Resources Development

(5 years plan)

Agriculture	18945	MCM
Domestic and Industry	1818	MCM
Total	20763	MCM
Surface Water Development		15760
- Improvement	7016	
- Development	8744	

Soil and Water Development (Ha)

Soil & Water Activities	10 years plan		5	
	Development	Improvement	Development	Improvement
Improving & maintenance	18,000	340,000	8,170	159,940
Drilling	350,000	30,000	157,700	10,640
Reservoirs	12,000	120,000	6,725	68,425
Dredging of canals	-	300,000	-	149,400
Intake structures	10,000	50,000	-	24,700
Canals	120,000	100,000	45,070	56,170
Small earth dams	75,000	5,000	46,450	1,900
Flood protection	5,000	1,500,000	2,250	90,420
Canal lining	70,000	180,000	59,872	73,617
Land leveling	40,000	50,000	25,200	
Drainage and soil reclamation	100,000	400,000	64,500	236,250
Pumping plants	140,000	10,000	54,526	2,360
Land reclamation	100,000	65,000	48,600	10,000
Total	1,050,000	2,000,000	519,075	956,372

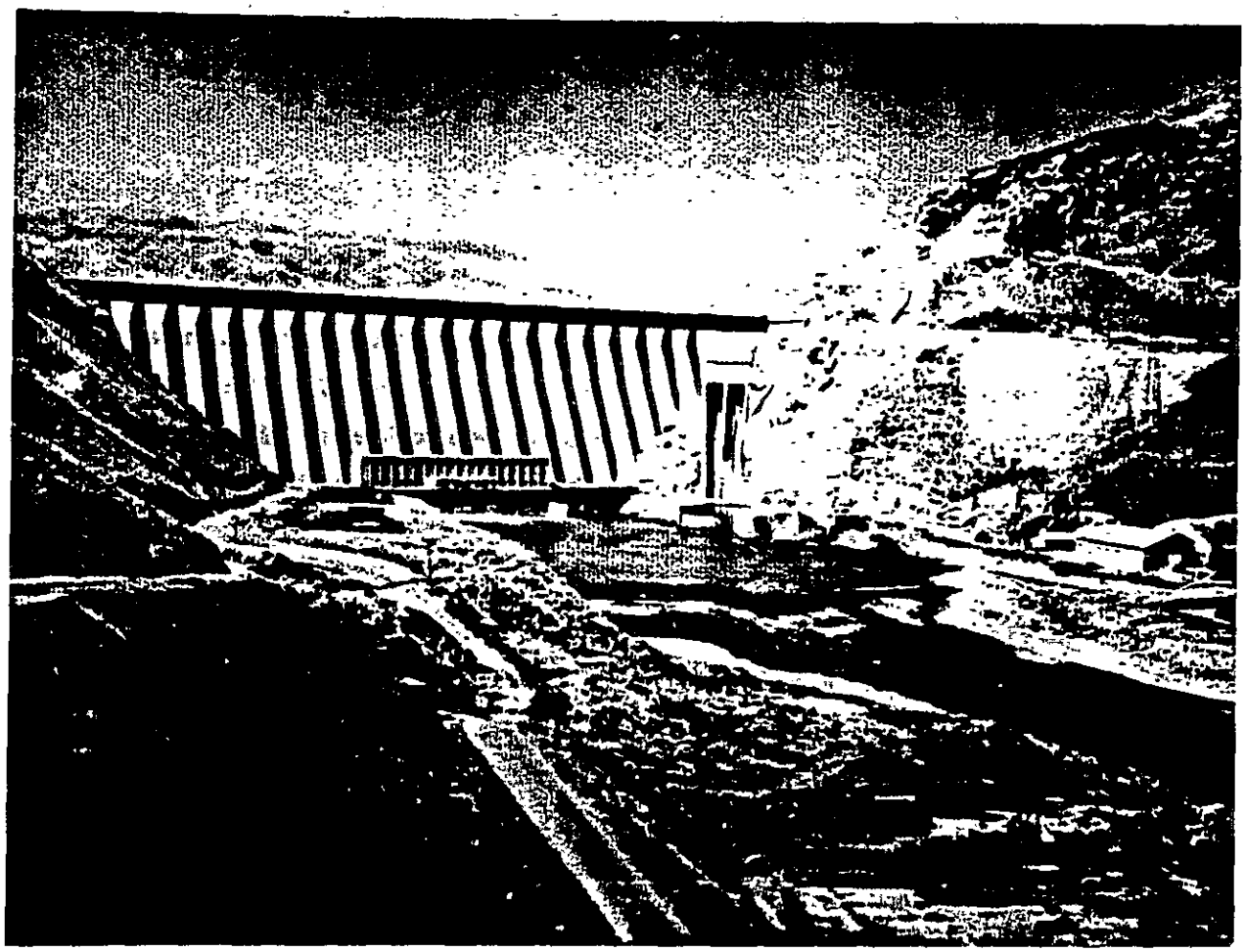
別添資料 4

EMPIRE OF IRAN

MINISTRY OF POWER

WATER & POWER ORGANIZATION OF

NORTH REGION



SHAHBANOU FARAH DAM

AND DEVELOPMENT OF WATER RESOURCES IN GUILAN

I

NORTHERN REGION WATER & POWER AUTHORITY

Guilan - A General Geographical and Agricultural Description of the Region

Guilan situated between 49°30' and 50° East and 37° and 37° 30' North is one of the most fertile regions of Iran. According to the latest census it has a population of 1,600,000 and covers an area of 3750 square km. The temperature in Guilan varies between - 16°C to + 37° and has an average annual precipitation rate of 900 to 1500 mm. The Shahbanu Farah Dam irrigates some 170,000 hectares of land in Guilan.

Sefid Rud River - Characteristics

The Sefid Rud river originates from the confluence of the rivers Gezel Ozan and Shahrud at Menjil. The Gezel Ozan has a length of 500km and a catchment area of approx. 50,000 square kms. The Shahrud has a length of 180 kms and a catchment area of about 6,000 square kms.

- The maximum flow measured for the Sefid Rud was 4200 m^3/second on 3-3-1968.

- The minimum flow recorded is 5m^3/second

- The maximum annual run off of water is 12000 million cubic meters.

- The minimum annual run off of water is 1550 million cubic metres.

- The average annual volume of water over a 15 year period is around 4.5 million cubic metres.

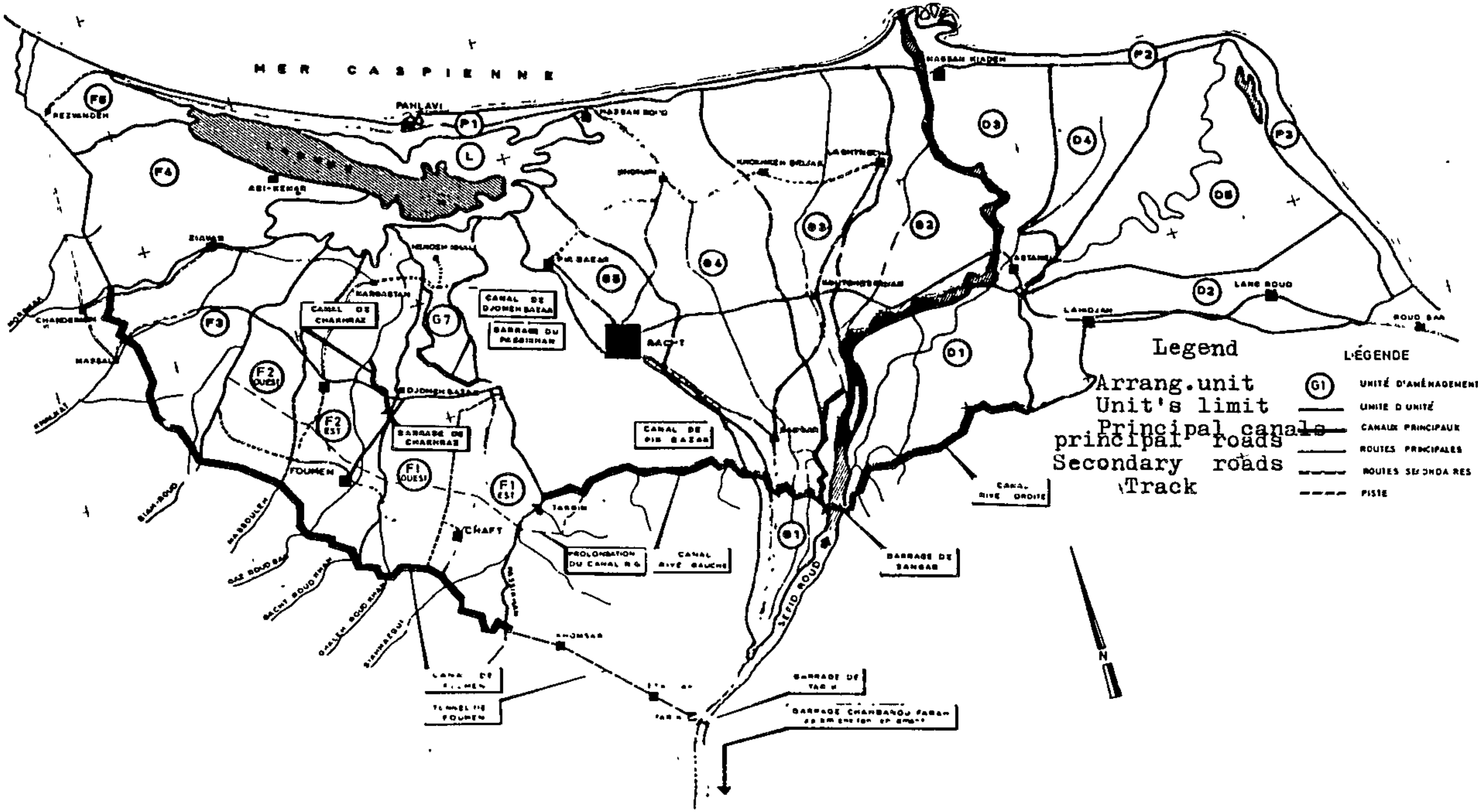
At the end of spring and during the summer season, when the flow in the Sefid Rud diminishes considerably great losses were suffered by the land under cultivation- Sometimes as much as 30% of the land under cultivation would lose its yield due to water shortage and caused irreparable damage to the inhabitants of the region.

His Imperial Majesty Shahanshah Aryamehr, who during his 36 years of reign has added many brilliant and glorious pages to our history with his ceaseless heroic sacrifices and struggles and who has led his nation to the gates of higher civilisation ordered for necessary measures to be taken to overcome the above difficulties. These measures led to the study, design and finally construction of the Shahbanu Farah Dam and its associated works in the Guilan plain.

Preliminary studies began on February 12th 1953 and the construction of the dam started on November 20th 1954 and was completed by February 12th 1961. The Shahbanu Farah Dam was inaugurated on April 30th 1962 by His Imperial Majesty Shahanshah Aryamehr.

Shahbanu Farah Dam

The choice for the site of the dam was led by the geological and topographical considerations. The river channel between Menjil and Imamzadeh Hashem 50 km. further downstream is founded on a layer of rock 200m. thick orientated at right angles to the river channel in an east-west direction. The above rock is composed of volcanic anchestic lava branches formed at the time of formation of the Alborz mountain range. The above rock slopes upstream


MER CASPIENNE
PAHLAVI
HASSAN KIADEH
RACHT
SEFID ROUD
FOUMEN
CHAFT
ABI-KENAR
CANAL DE CHARHRAZ
CANAL DE DJOMEH BAZAR
BARRAGE DU PASSIKHAN
BARRAGE DE CHARHRAZ
CANAL DE PIR BAZAR
CANAL RIVE GAUCHE
PROLONGATION DU CANAL R.G.
CANAL RIVE DROITE
BARRAGE DE SANGAR
BARRAGE DE TARIK
TUNNEL DE FOUMEN
LANGROUD
LAHIDJAN
ASTANEH
ROUD SAR
P1
P2
P3
F1 EST
F1 OUEST
F2 EST
F2 OUEST
F3
F4
F5
G1
G7
D1
D2
D3
D4
D5
L
N
Legend
L'ÉGENDE
Arrang.unit
UNITÉ D'AMÉNAGEMENT
Unit's limit
UNITE D UNITÉ
Principal canals
CANAUX PRINCIPAUX
principal roads
ROUTES PRINCIPALES
Secondary roads
Track
PISTE

of the river hence constituting a favourable support for construction of a dam at a site upstream of the river where the layer of rock originates. The valleys through which Gezel Ozan and Shahrud rivers flow reach the point of Confluence at Sefid Rud from almost opposite directions creating a large basin on which a storage reservoir with a surface area of approximately 56 square kms could be built. The area and value of land to go under-water in order to create the above lake is a small proportion of the amount of land that would be irrigated as a result of construction of the dam.

The width of the Sefid Rud valley on the dam site plus the size of the floods and the favourable foundation conditions led to the choice of a concrete butress dam. The Sahbanu Farah is one of the highest butress dams constructed in the world.

The foundation of the dam has been made water tight by means of a 100 m deep grout curtain with a surface area of 60,000 m^2. A total of 17000m of boreholes were drilled using 6500 tons of cement.

Like all other dams, as the level of water in the reservoir falls or rises, deformations occur within the dam. In order to ensure compliance with the design assumptions the deformations are measured by means of five combined operations consisting of pendulums, inverted pendulums (Stopani type), 35 acoustic slope indicators, 320 acoustic strain gauges and 70 thermosondes (Telemac type.).

The forecasting of floods into the reservoir is announced by two water level gauging stations one is situated at Stour on the Gezel Ozan near the town of Mianeh and the other is on the Shahrud at the village of Paronbar. The results of these measurements are transmitted by radio to the receiving station at Menjil.

Technical characteristics of the Shahbanu Farah Dam are as follows:-

- Type: Butress Gravity Dam, 30 butresses at 14m centres

- Height: 106m from the bedrock level.
  : 92m from the river bed.

- Thickness of each butress: 5m

- Width of dam at the Site of the largest butress: 100m

- length along the crest of the dam: 425m.

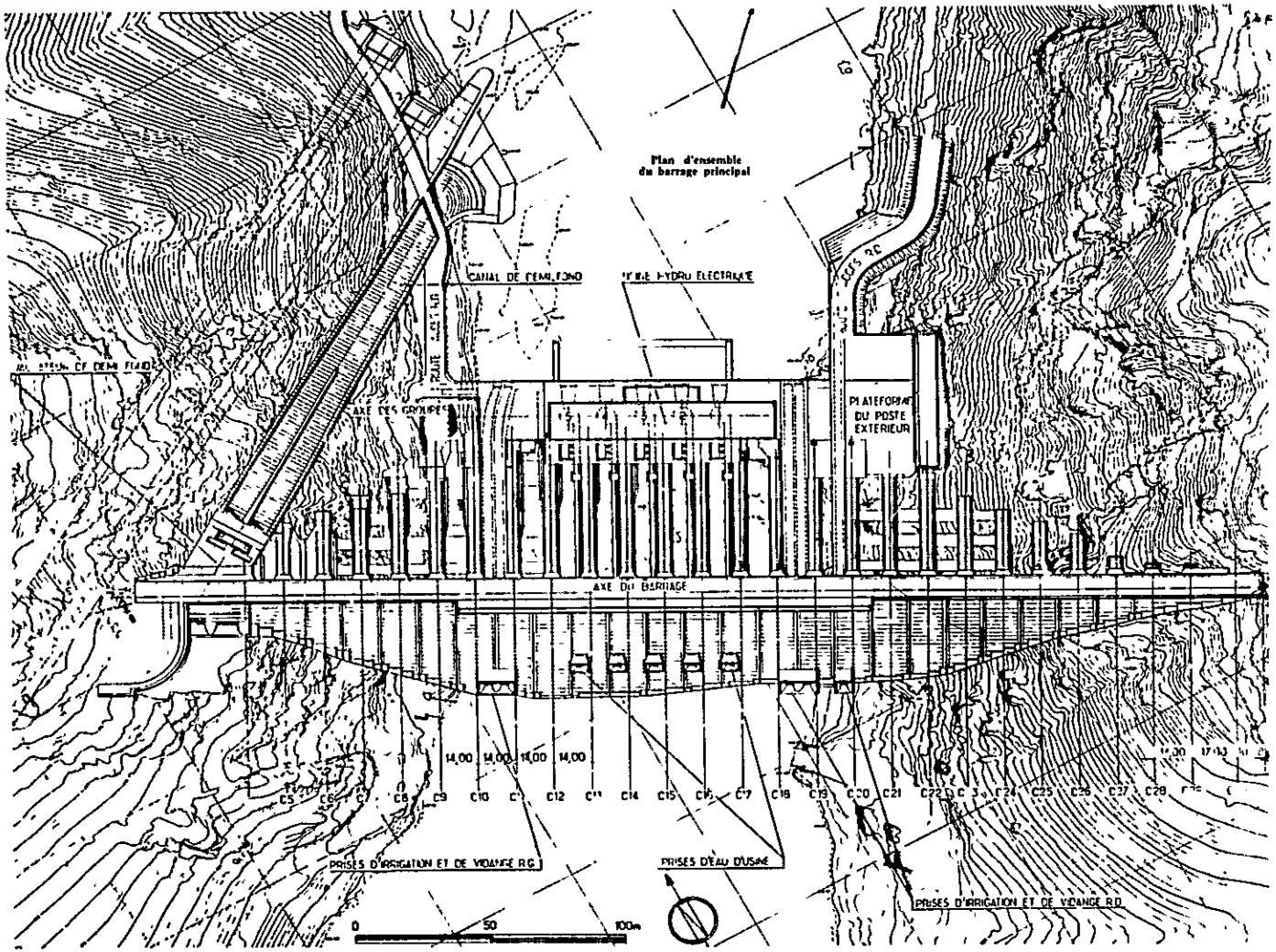
- Surface area of the reservoir: 56 km^2 at 276.25m above M.S.L.

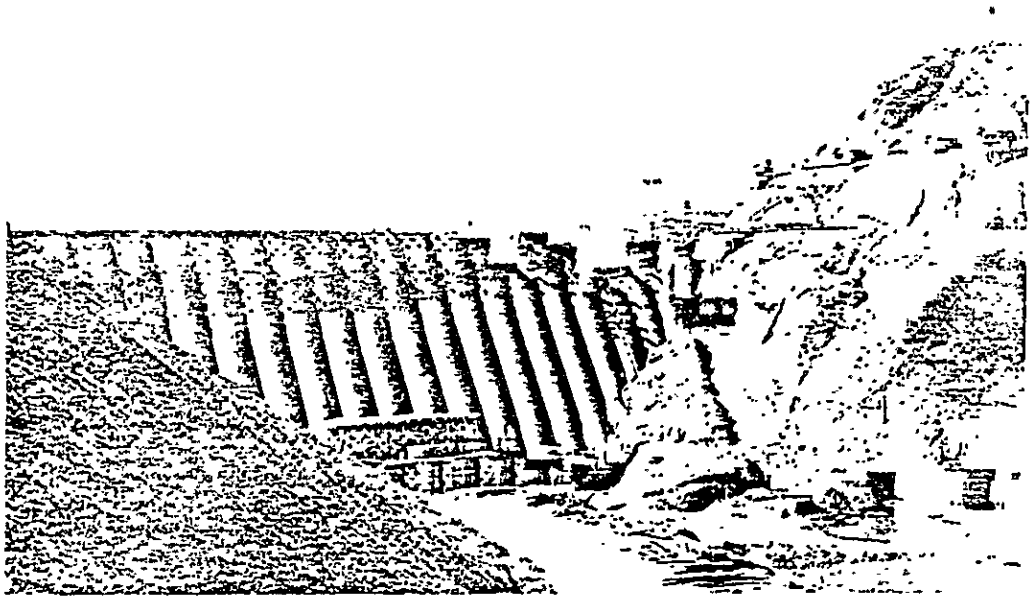
- Length of reservoir at 276.25m above M.S.L.
  on the Gezel Ozan : 25 km.
  " " Shah Rud : 13 km.

- Reservoir capacity 1;800 million m^3

The butresses are independent of one another, water tightness being achieved by means of a thin copper plate and a plastic water-stop.

Entier plane of principal dam

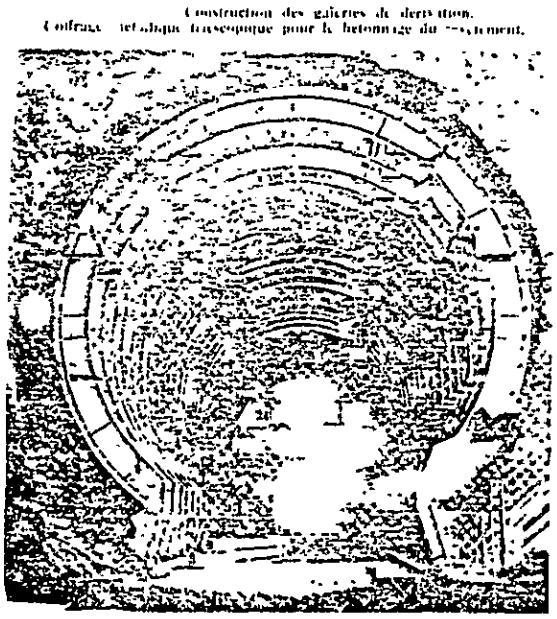




Vue aval du barrage. Evacuateur de demi-fond en cours de construction sur la rive gauche.

Downstream sight of the dam . Semi - Bottom Evacuator in course of construction on the right bank

— Construction du déversoir de surface des évacuateurs de fond le barrage en cours de construction.

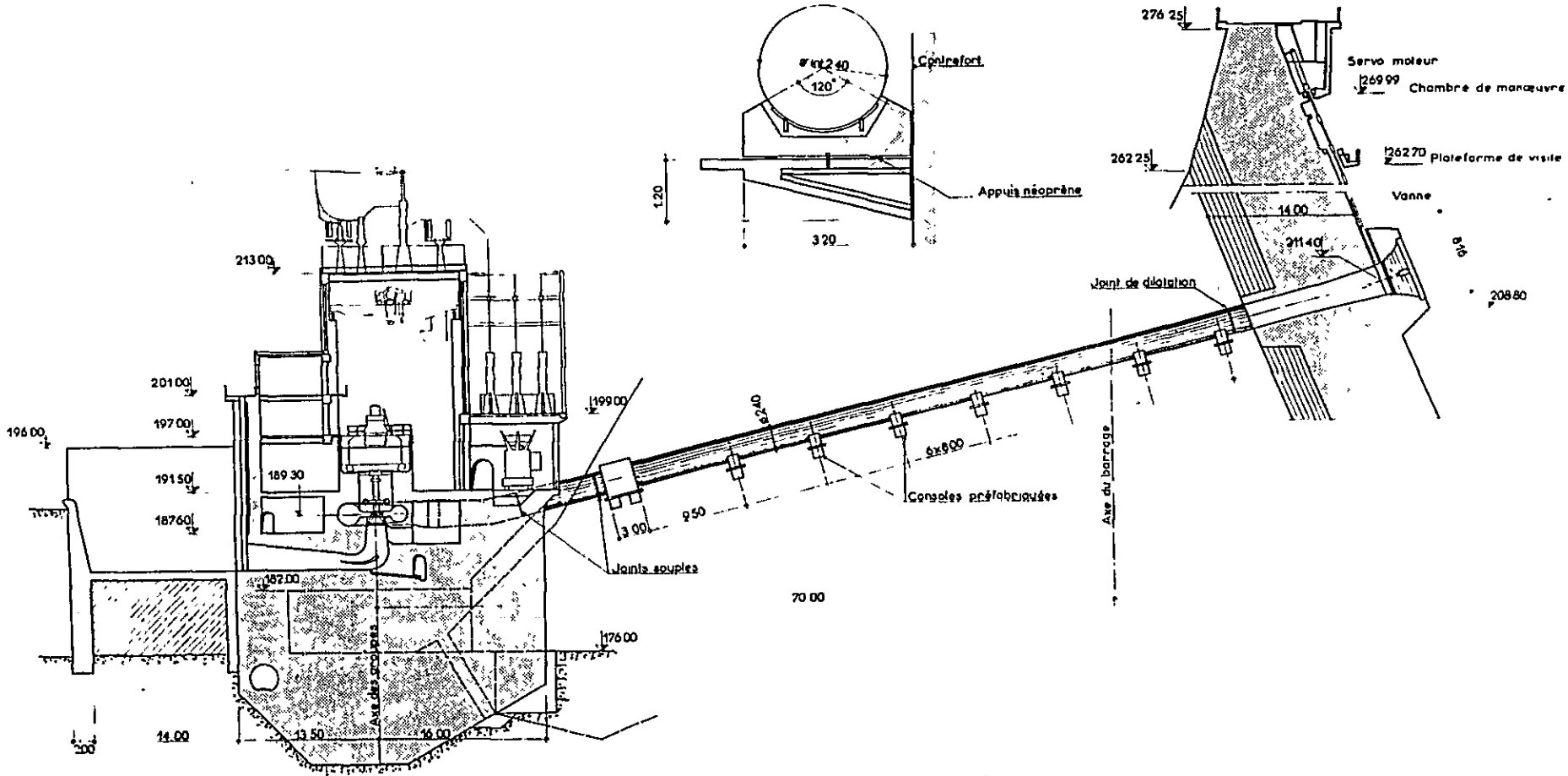


Construction des galeries de dérivation.
Coffrage métallique transportable pour le bétonnage du revêtement.

Construction of the diversion galleries

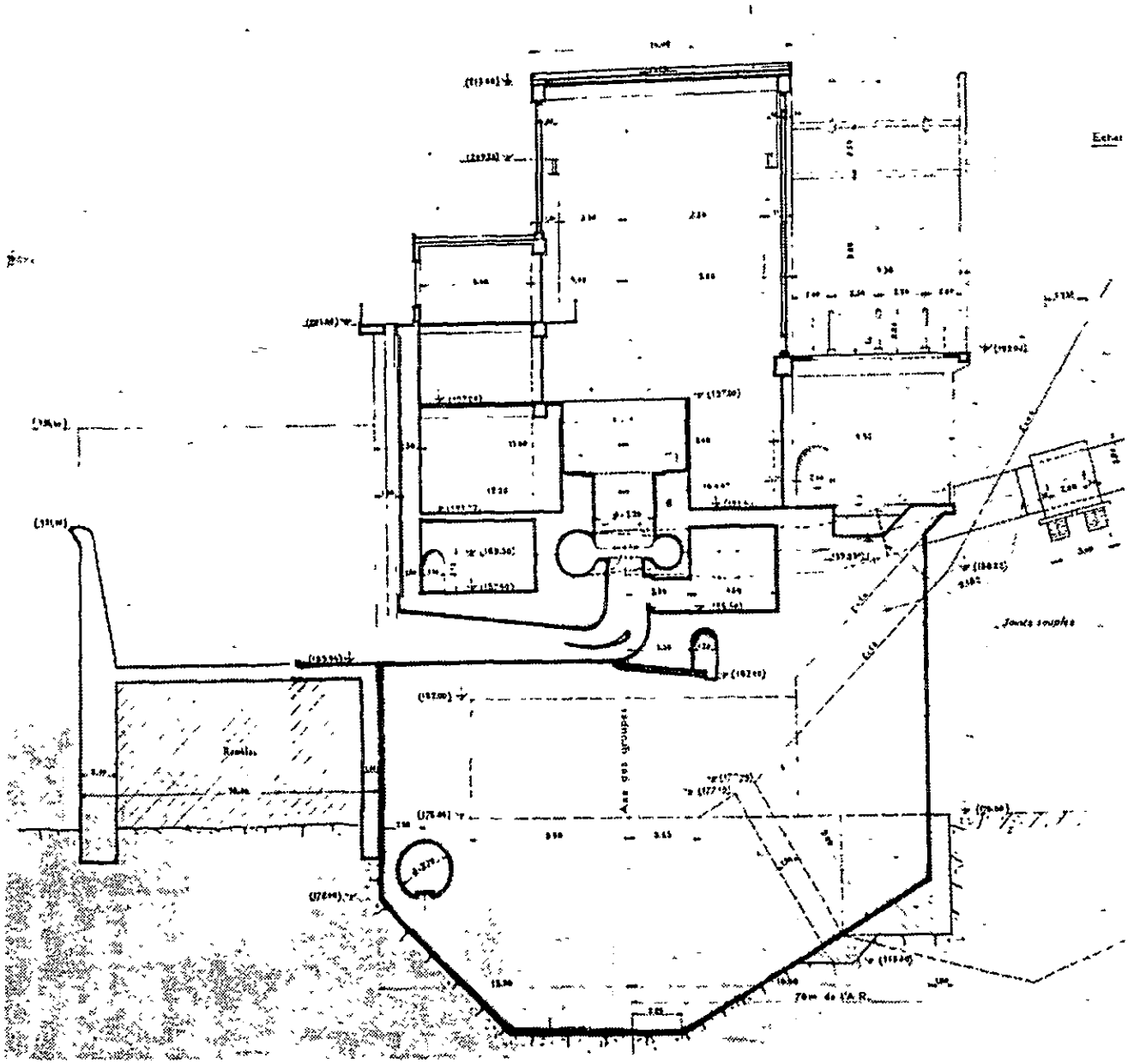
Construction of surface spillway of bottom evacuator

Détail des appuis de la conduite.



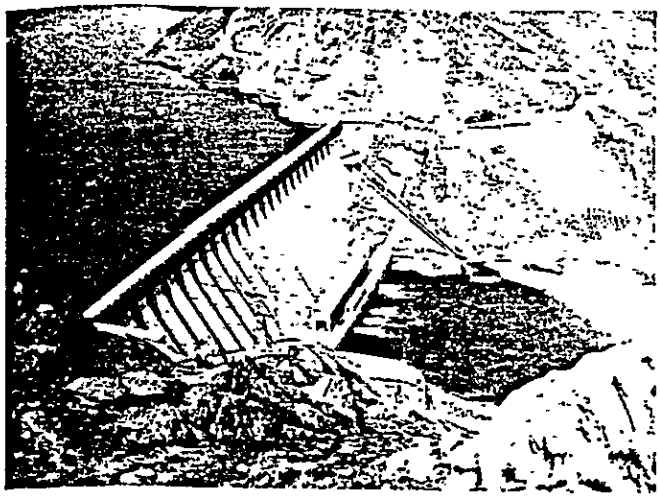
— Usine hydro-électrique, prises d'eau et conduites forcées.
Coupe longitudinale dans l'axe d'un groupe.

Power station , water intakes and forced pipes
lengitudinal section in the axis of a group



Coupe du bâtiment de l'Usine Hydroélectrique au droit d'un des 5 groupes

Power house building section on the right of one of the 5 groups



BARRAGE DE CHAHBANOU FARAH

AU DEBUT DU PREMIER REMPLISSAGE

SHAHBANOU FARAH DAM

At the commencement of the first fillingup of the reservoir

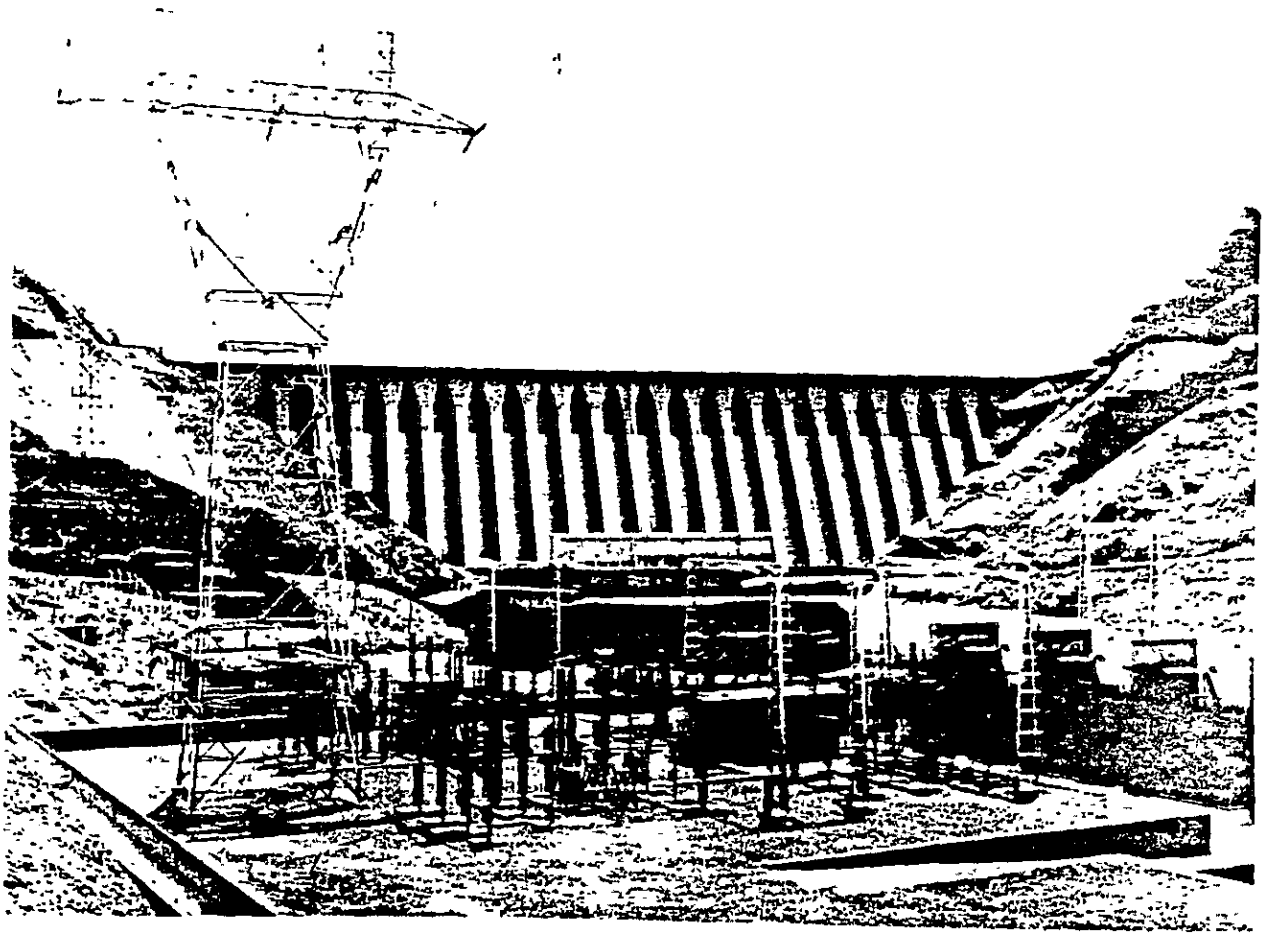
STATUE DE SA MAJESTE IMPERIALE

CHAHBANOU FARAH INSTALLEE SUR

L'ILE SITUEE DANS LA RETENUE DU

BARRAGE.

Statue of HER MAJESTY IMPERIAL SHAHBANOU FARAH installed over the island situated in the reservoir of dam



BARRAGE DE CHAHBANOU FARAH

SHAHBANOU FARAH DAM

Discharge arrangements:

Three irrigation gates on the right bank of the reservoir at a level of 191.3m above the sill with a discharge capacity of 430 m^3/sec.

- 2 irrigation gates on the left bank at 193.8m above the sill and discharge capacity of 550m^3/sec.

- 2 spillway gates at 271.65m above the sill with discharge capacity of 2000m^3/sec.

- 2 Surface Spillways with discharge capacity of 2000 m^3/sec.

- 5 turbine pressure pipes with a total discharge capacity of 165 m^3/sec.

Hydroelectric Power Station

The Power Station situated downstream of the dam has 5 turbo-generators. The turbines are of the Francis type with vertical axis. The operation of two of the turbines started on 23.9.64 and the remaining three were operational by 3.9.67.

Hydroelectric Power Station Characteristics

Turbines

Type	Vertical Francis
Diameter of inlet pipe	2.4 m
Diameter of Butterfly valve	2.6 m
Discharge at 63 m head	32.9 m^3/s

Generators

Continuous rating	17500 kw
Power factor	0.8
Nominal output	22000 KVA
Nominal Speed	300 rpm

Seismological Station

To investigate ground movements in the vicinity of the dam a seismological station has been constructed downstream from the dam. The results from studies carried out at the station are exchanged with stations in several countries including France America Belgium and Morocco.

Hydraulic Works in the Guilan Plain

Irrigation Network

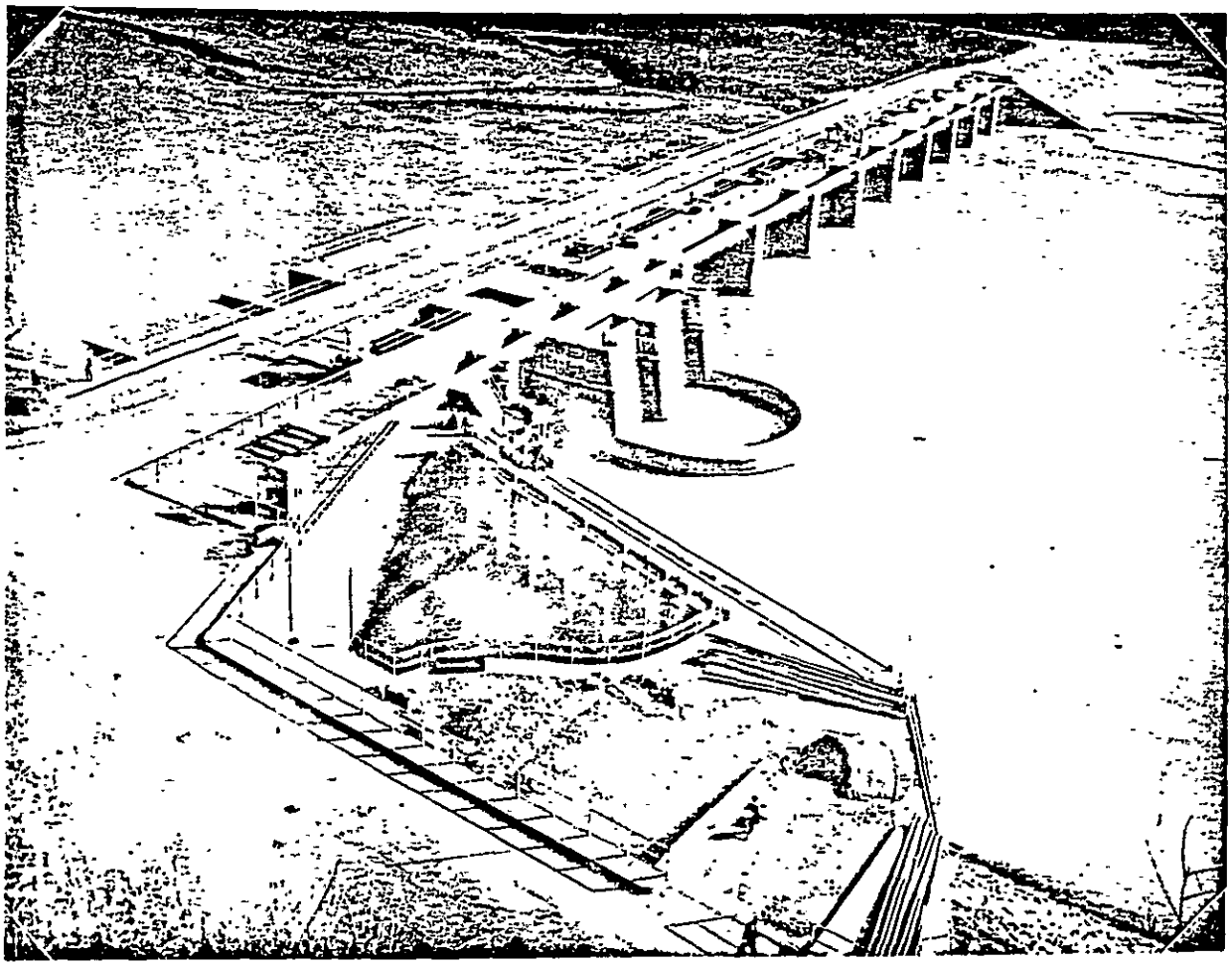
Tarik Diversion Dam

Tarik Dam is the first diversion intake downstream from Shahbanu Farah Dam and was constructed from 5th July, 1965 to 10th August, 1969. The dam diverts a flow of $35m^3/s$ into the Foumen tunnel which is 16.6 km long. The tunnel supplies water to the Foumen Canal, 51 km long which will irrigate the regions of Foumenat.

Dam Characteristics

Type	Composite Concrete - earth fill
Gross reservoir capacity	4 900 000m^3
Useable capacity	1 500 000m^3
3 no. deep discharge gates length of crest	250m
Width of dam at foundation level	51m
Number of sector gates	9
Dimensions of sector gate	15m x 5.5m

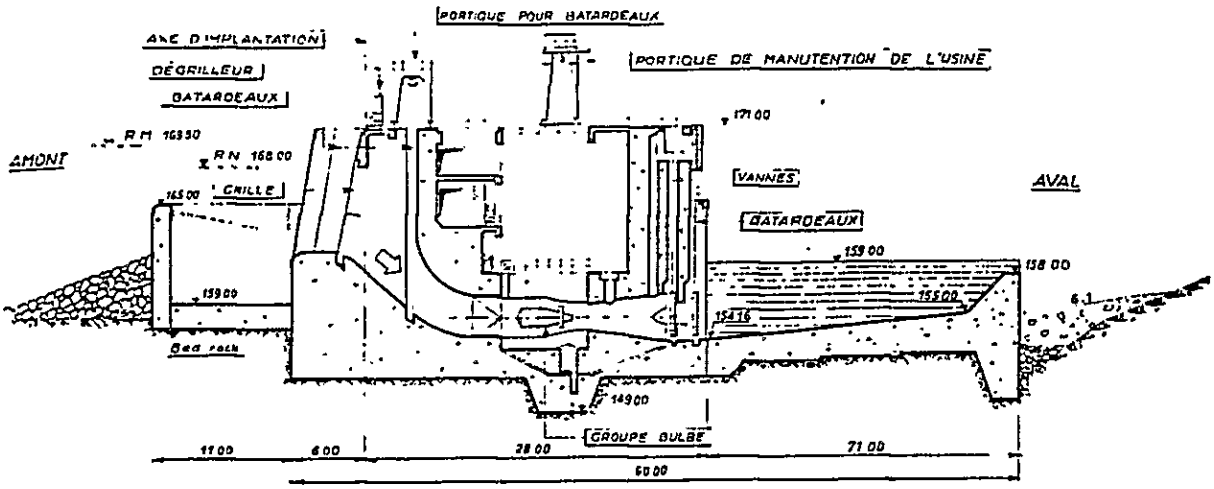
Provision has been made for the installation of two turbo-generators with a total capacity of 3000 kw between gates 2 and 3.



BARRAGE DE TARIK TARIK DAM

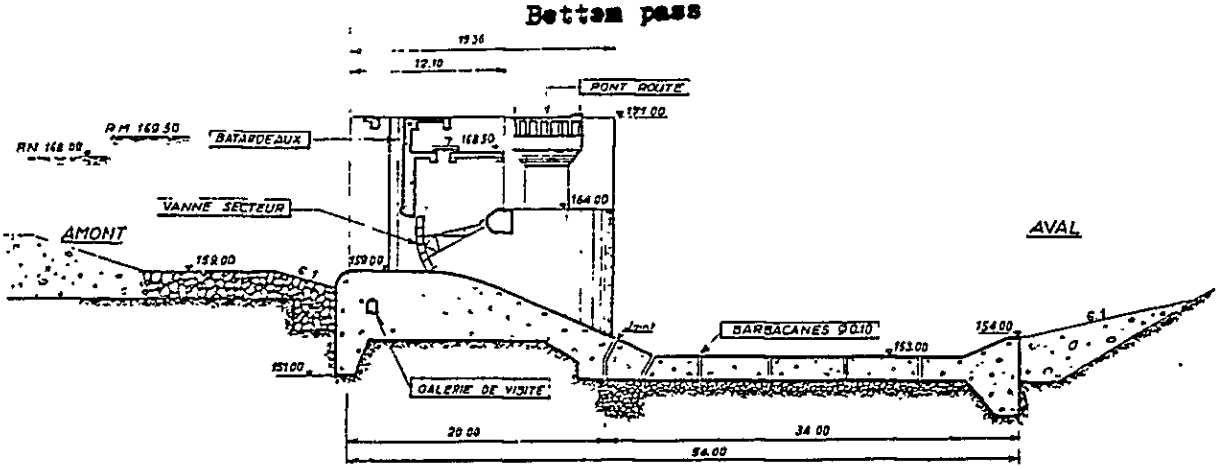
Section of power house in the axis

Coupe dans l'Axe de l'Usine



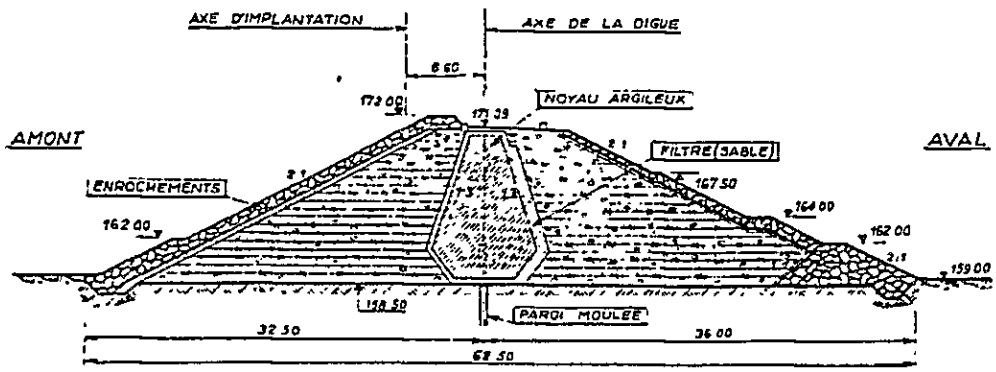
Passe de Fond

Bottom pass



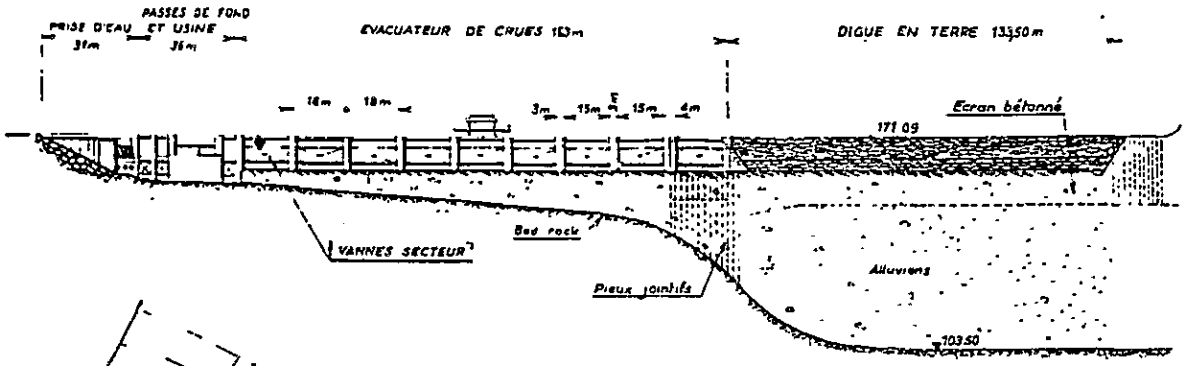
gue en Terre

ike in earth

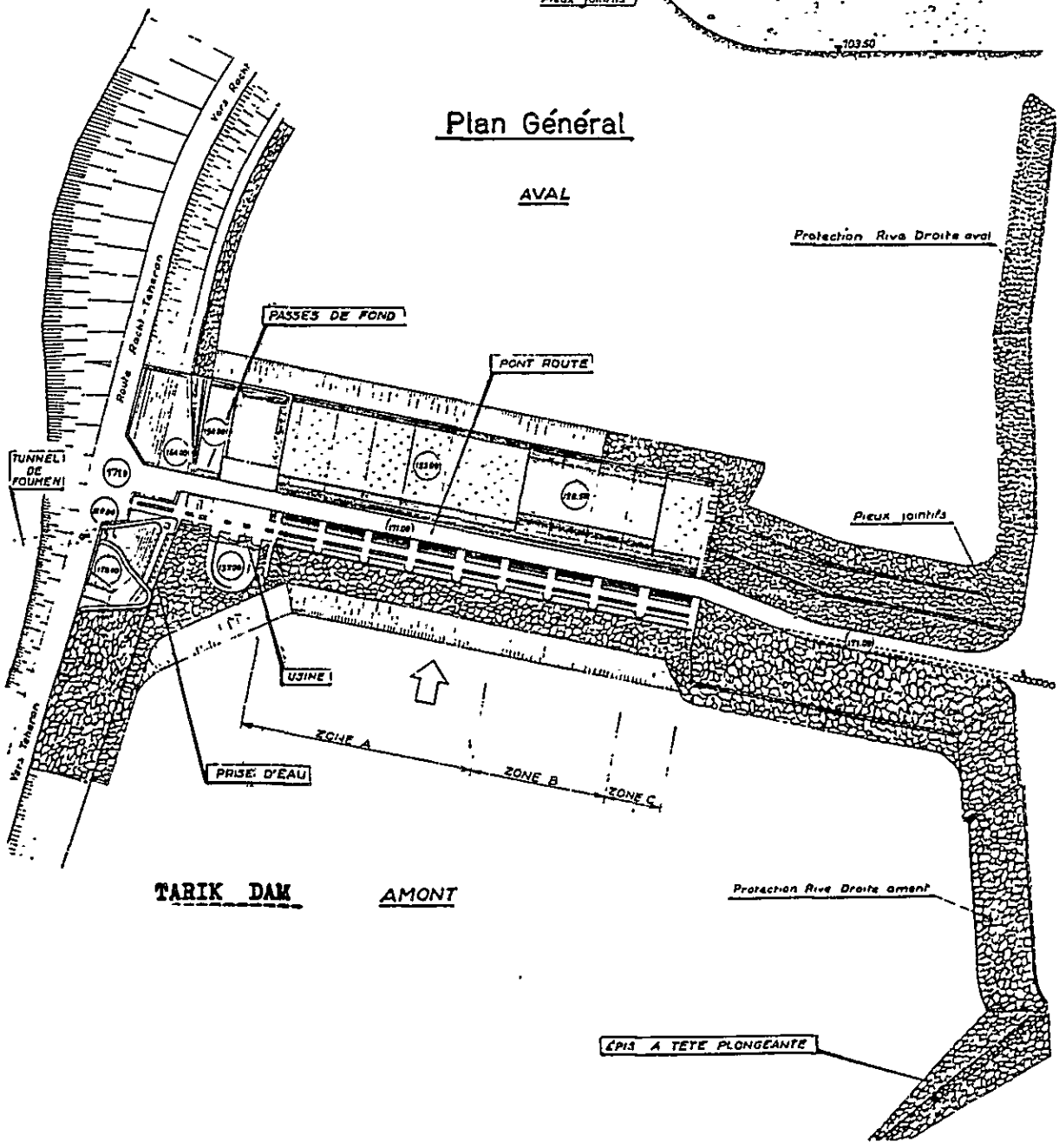


BARRAGE DE TARIK

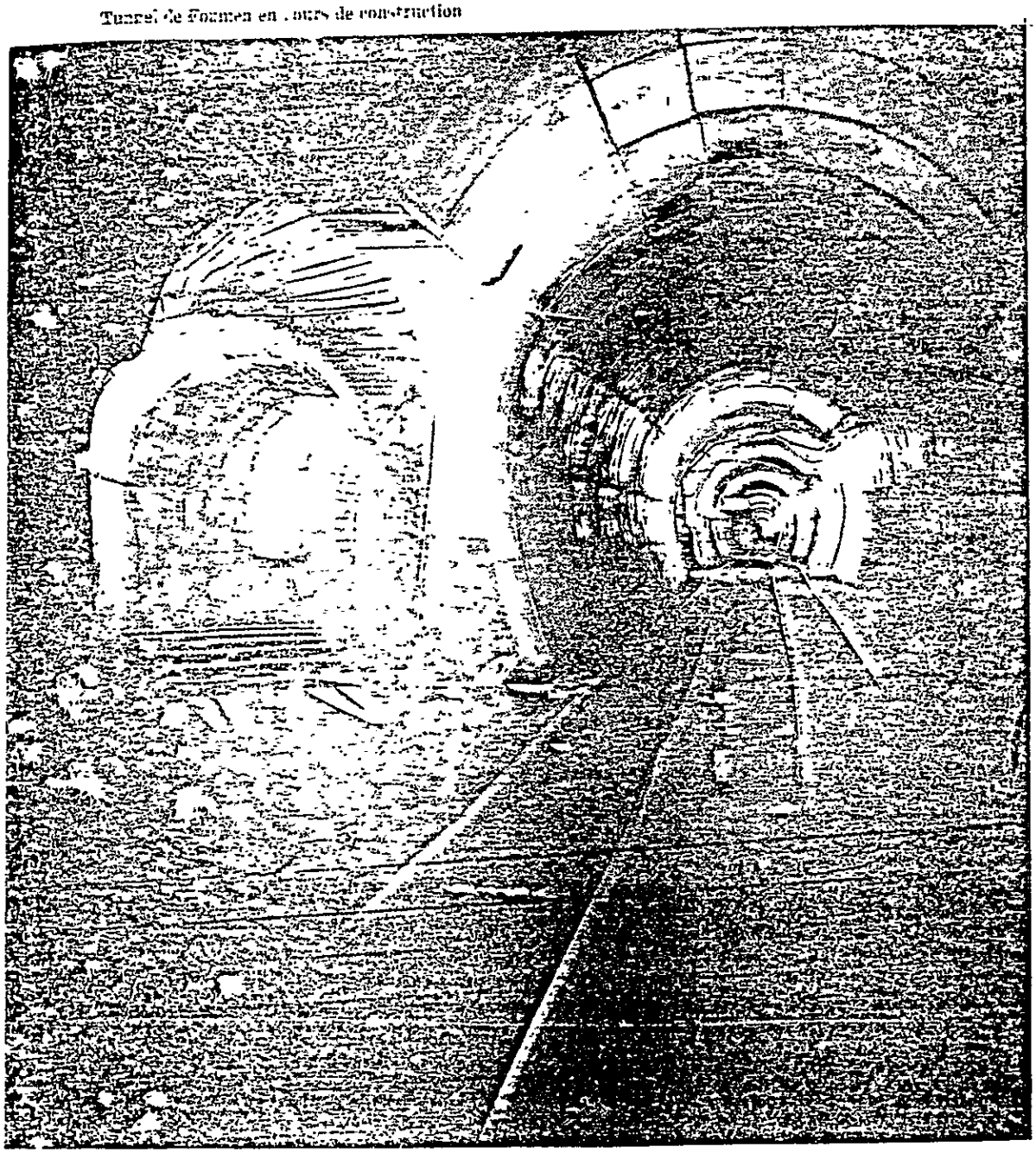
Elevation Vue d'Amont



Plan Général



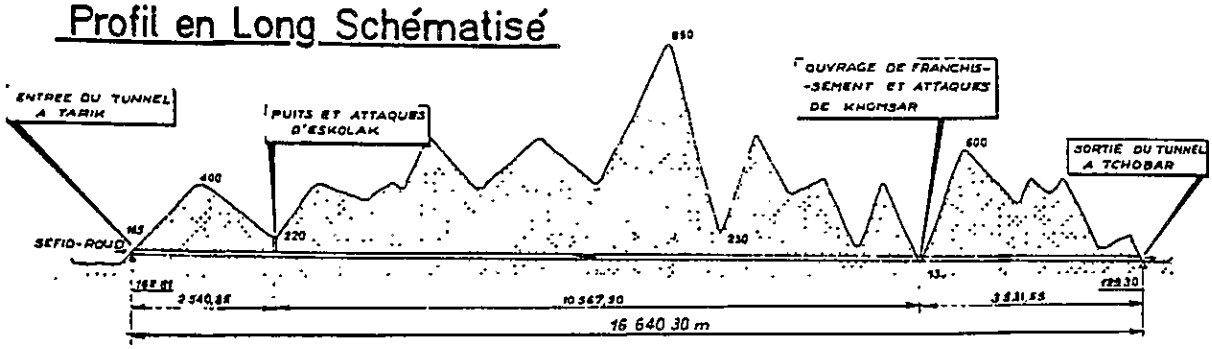
Tunnel de Fourmen en cours de construction



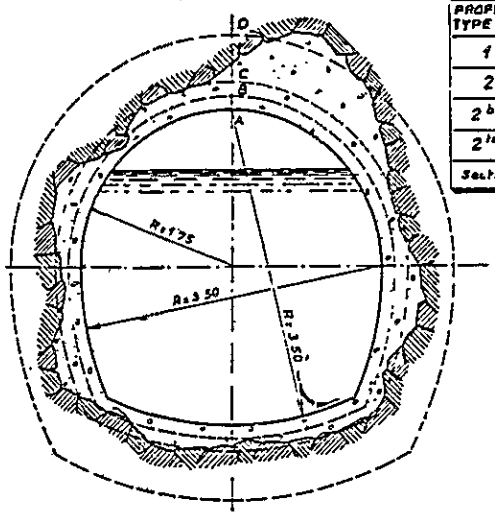
FUMEN TUNNEL IN COURSE OF CONSTRUCTION

TUNNEL DE FOUMEN — FUMEN TUNNEL

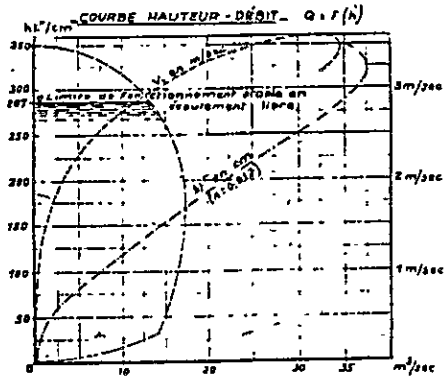
Profil en Long Schématisé



Section Type du Tunnel



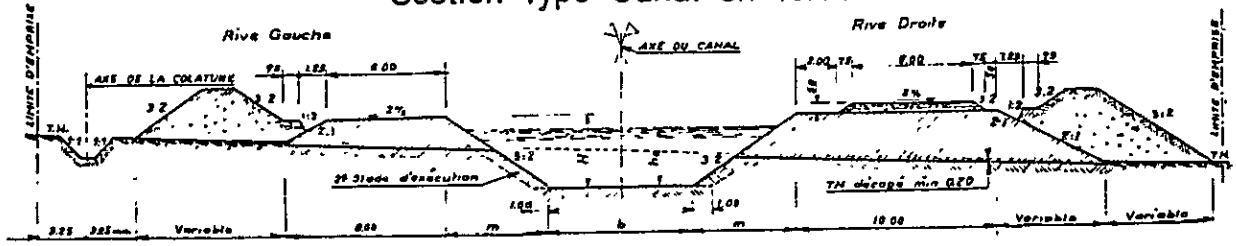
PROFIL TYPE N°	AB	AC	AD
1	0.10	0.15	0.50
2	0.15	0.30	1.00
2 bis	0.20	0.35	1.00
2 ter	0.25	0.45	1.00
Section intérieure 10.153 m²			



FUMEN CANAL

CANAL DE FOUMEN

Section Type Canal en Terre



Foumen Tunnel

Because the Foumen tunnel was one of the first works of its type to be constructed considerable difficulties were encountered particularly with water inflow which reached a rate of 213 litres/second.

Characteristics

Length	16 569 m
Slope	
Flow	32 to 35 m^3/s
Horseshoe section area	10.028 m^2
Maximum ground cover	800 m
Inlet level	162.81
Outfall level	129.30

The nature of the ground through which the tunnel has been driven is very variable:
black schest schists and aluvium, green rock, greasy marls and calcareous dolomitic conglomate have been encountered.

Foumen Canal

Characteristics

Length	51 m
Velocity of flow	0.80 m/s
Maximum discharge - present	32 m^3/s
- future	35 m^3/s
Height of canal above river beds crossed	10 to 15 m

Water level regulation in the canal is by means of automatic gates to give constant downstream level and by static regulators. Along the length of the canal gated offtakes are provided to supply existing canals and the secondary canals.

Auxiliary Works and Installations

Access road is provided along the length of the canal with river crossings by ford together with culverts and siphons.

Bridges and footbridges are provided across the canal to maintain access. A few small culverts maintain traditional canals.

Sangar Diversion Dam

Construction of this dam commenced on 19th December, 1962 and was completed on 19th May, 1965. The dam has been in use since March, 1965.

The dam is situated 60 km downstream from the Shahbanou Farah Dam and diverts water to two canals, one on each side of the dam.

Characteristics

Number of gates	13
Type of gate	Sector
Dimensions of gate	10m x 5.5m
Discharge capacity	5200 m^3/s

Each sector gate is operated by two motor driven winches which are installed under the bridge. The gated barrage is connected by two dikes to two settling basins and to the river banks. The crest width of the dikes is 1.1m with a 6m road.

DEPART DU CANAL

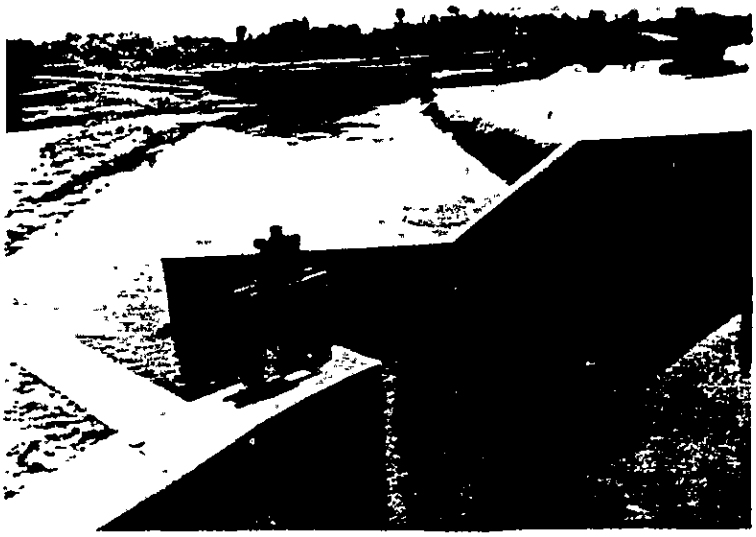
DE FOUMEN

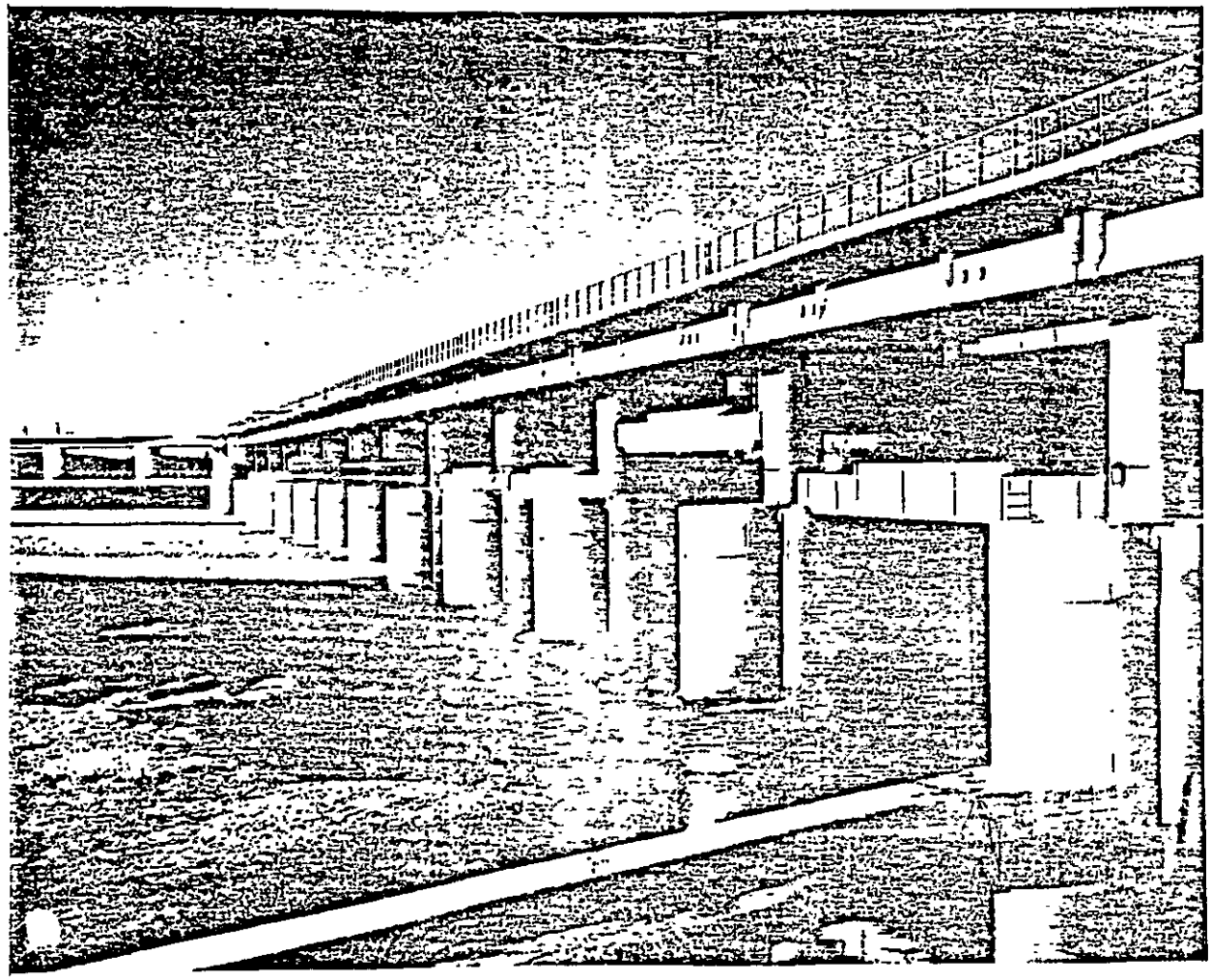
FUMEN CANAL STARTING

BARRAGE DE

CHAKHRAZ

SHAKHRAZ DAM





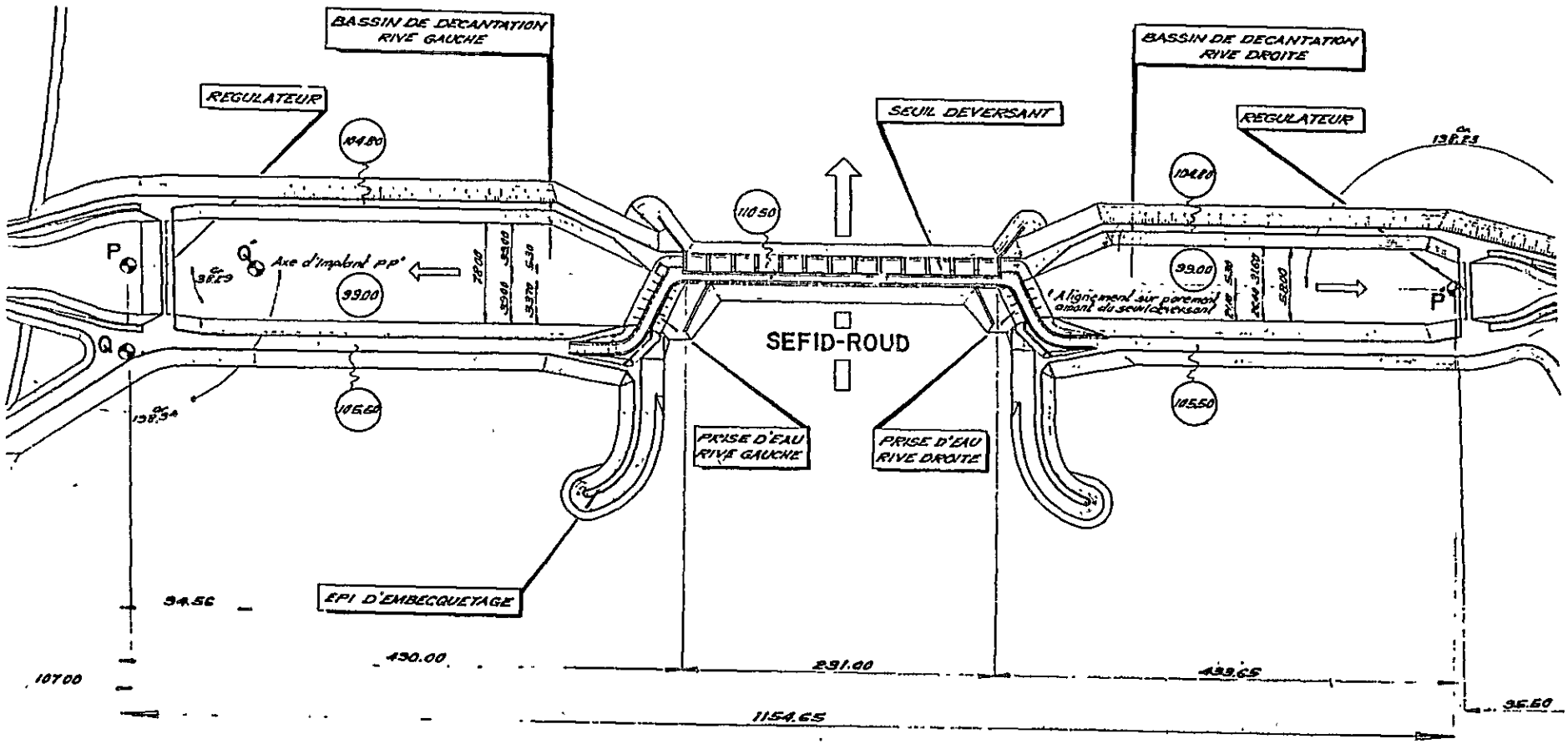
SANGAR DAM

BARRAGE DE SANGAR

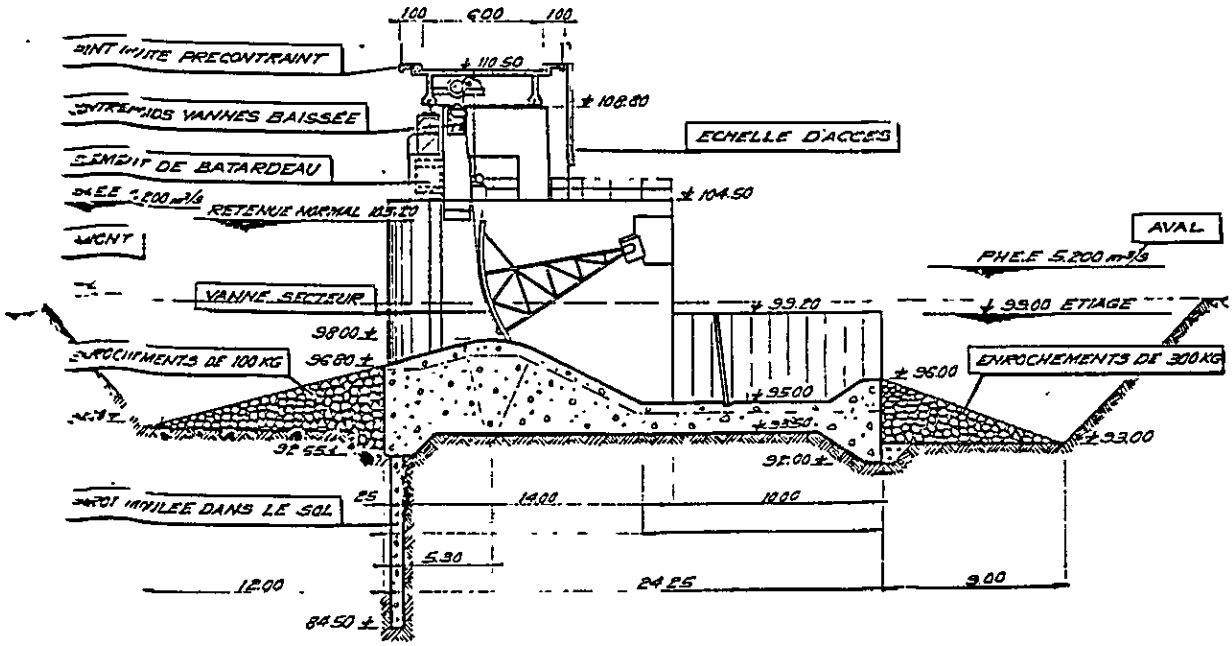
SANGAR DAM -- GENERAL PLANE

BARRAGE DE SANGAR

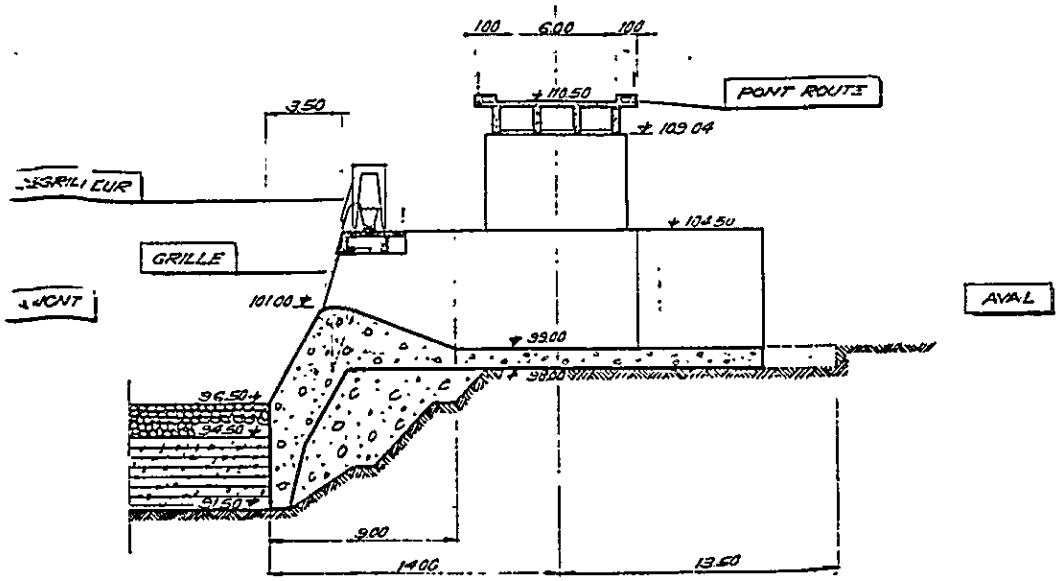
Plan Général



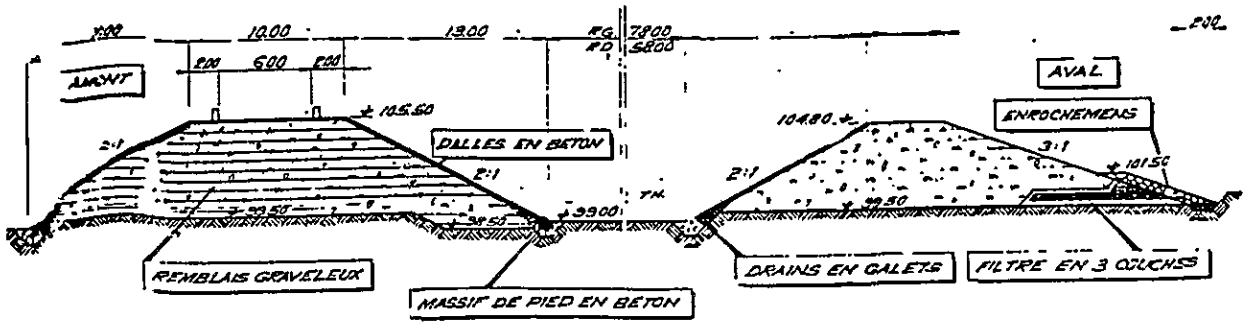
Passe Courante CURRENT PASS



Prise d'Eau INTAKE OF WATER



Décanteur DECANTER



Size of Settling basins

Left bank	508m x 78m
Right bank	58m x 4.5m

Level of gate sill 37.87 m
Normal Water Level

Sangar Right Main Canal

This work was started on 22nd April 1963 and was completed on 12th April 1969. The total length of the canal is 19km and it runs between the Sefid Rud and Shem Rud valleys.

The first 3.5Kms of canal are concrete lined the remainder being unlined. The velocity of flow is 0.85m/s.

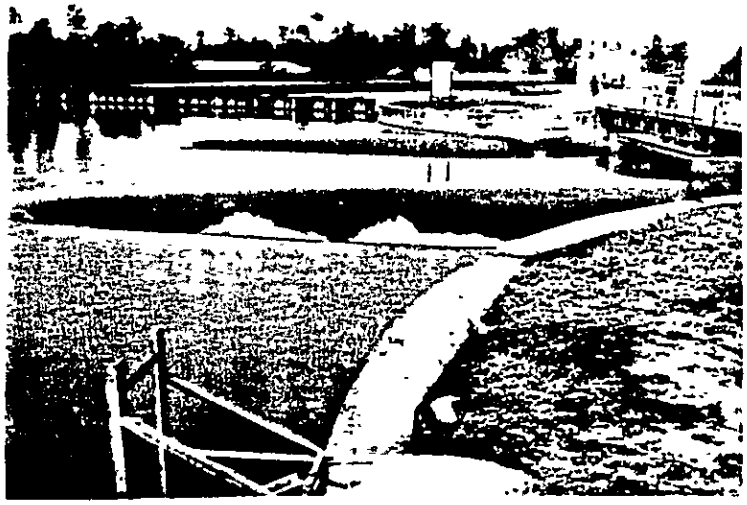
The right main canal transfers some $40m^3/sec$ of water from Dissam Rud to the Heshmat Rud canal which also supplies water for the right bank of the Sefid Rud delta. At present the right main canal supplies $7m^3/sec$ of water for the Kia Jube canal and it is intended to supply $11m^3/sec$ of water to Shem Rud for the future irrigation development of the Lahijan-Langarood region. The access road along the Right main canal is of particular importance, as by means of a bridge over the Sangar dam this road has linked the Sefid Rud and Siahkol regions together for the first time.

Sangar Left Main Canal

This work was started on 27th April, 1963 and completed by 23rd August, 1966. It has a length of 24.5 kms and extends from the Sangar dam to the valley of Pasikhan. The canal is unlined and trapezoidal in shape. Its' gradient varies from $\frac{2}{1000}$ to $\frac{5}{1000}$ and has a velocity of approximately 0.9 m/sec. Its main function is to supply water for the three rivers of Khomam Rud, Now Rud and Tosha Jube. The first 883 m of this canal has been designed to carry a flow of 114m^3/sec. The left main canal also supplies the irrigation water for southern and western regions of Rasht which are at present under development. In dry periods it supplies 4.5 m^3/sec of water for Pasikhan river which in turn transfers it to the Jomeh Bazar Canal and irrigates the north eastern region of Foumenat.

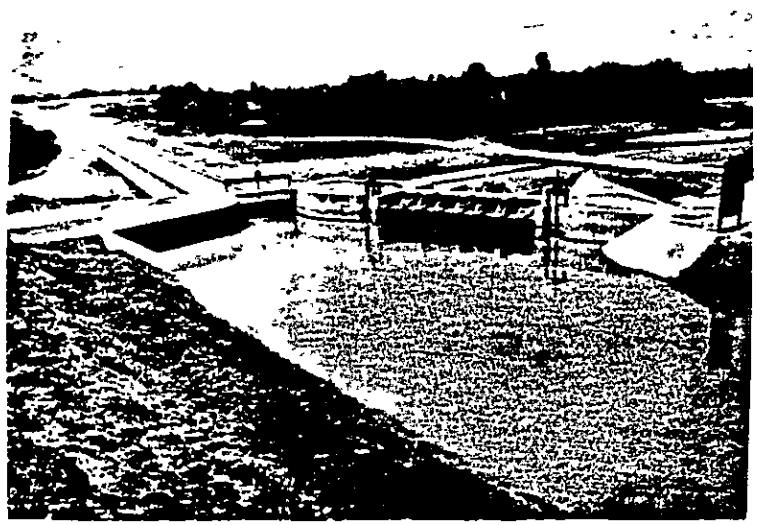
At the present moment, after supplying water to the major 3 rivers above the flow in the canal reduces from 20.8 m^3/sec to 6 m^3/sec but for the future development stages it is planned to extend this canal to Mosuleh river to overcome the water shortage at the same time as expanding the irrigation development in the north of the Foumenat region.

3 culverts totalling 530m in length make it possible for the left main canal to cross to rivers and a depression. 6 stilling basins and a flume are constructed to guide the water to the Pasikhan river. The regulation of the water is assured by authomatic gates

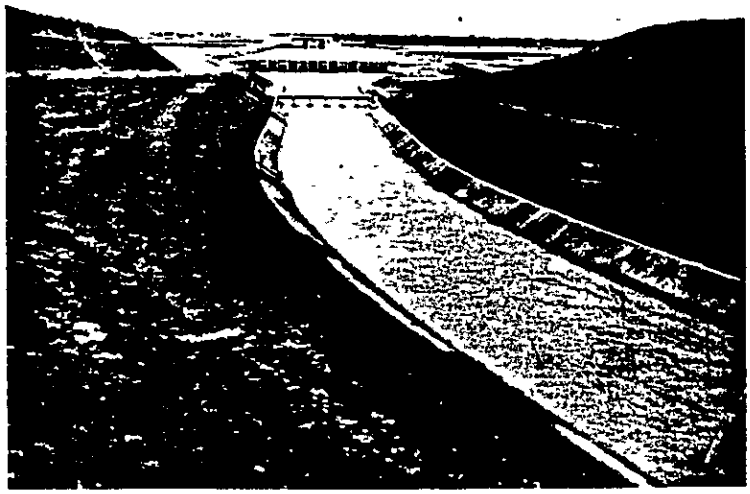


OUVRAGES D'IRRIGATION DANS LE GUILAN

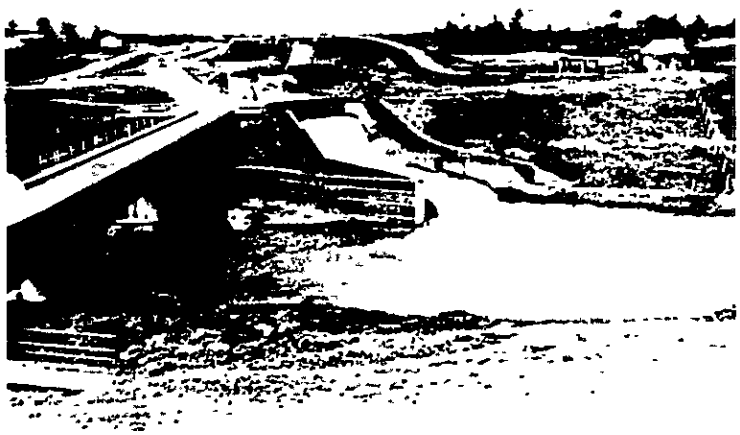
IRRIGATION WORKS IN GUILAN



CANAL STARTING



DEPART DU CANAL



GRAND DISSAM WORKS

OUVRAGE DU

GRAND DISSAM

The Pir Bazar Canal

The Pir Bazar main canal is supplied by the Sangar left main canal and irrigates some 13000 ha of land in the South Western region of Rasht. The canal is 11 km in length, 1250m of it is concrete lined. The flow in the canal is $13m^3/sec$.

Shakhraz Weir

This weir is fed 2 m^3/sec by the Foumen Canal and distributes the water for irrigation via the Shakhraz Canal the weir has a length of 60m. and the canal has a length of 5500m.

Pasikhan Weir

This weir is constructed on the Pasikhan river and regulates the $4m^3/sec$ of water which comes from the Sangar left main canal Downstream of the weir is the Jomeh Bazar canal 8 km long and its tributary canals which distribute the water in the region between the Shakhraz and Pasikhan rivers.

Irrigation network of the Foumenat and Sefid Rud delta region.

By the end of the 3rd Development Plan all the construction work on the Shahbanou Farah and the infrastructure work of the Guilan plain and Foumenat irrigation network were completed. The infrastructure included the Tarik, Sangar, Pasikhan, Shakhraz diversion weirs, the Foumen tunnel and 133 kms of main canals.

During the 4th Development plan work started on conversion from the traditional farming methods to the more modern techniques in order to improve quantity of yield per hectare. Projects for irrigation network

(1st and 2nd class) and drainage for 96000 ha of land in Guilan and Foumenat were prepared and the works on 72000 ha of the land was later started.

During the 5th Development Plan the Northern Region Water and Power Authority decided to extend the irrigation works under way in the 4th plan by a further 48000 ha so that by the end of the 5th Plan some 120,000 ha of land shall be developed. The network of canals supplying water to the above area shall consist of primary and secondary canals that will be constructed in two stages. The first stage includes primary canals and drainage channels together with access roads and relevant installation whose works for the 72000 has have been completed. The second stage includes construction of secondary canals and relevant installations. These canals are made of prefabricated concrete sections manufactured at the Authority's plant at Rasht.

The Northern Region Water and Power Authority is continuing its studies for construction of irrigation etworks in other regions of Guilan plain and Foumenat. The work for the above region shall be completed by the end of the 6th Development Plan. Some of the projects under study are given below:

- Enlargement and extension of the Sangar Main Canals (Left and Right) for irrigation development of the right bank of Sefid Rud delta and Southern region of the Foumenat Plain.

- Enlargement and extension of the Foumen canal for irrigation of the West Foumen lands.

- Construction of the Gulrud water intake for supply of irrigation water for the left bank of the Sefid Rud delta, water for Rasht industrial town and water supply for Guilan towns. Also from the above intake water shall be taken for the Shilat fishery development.

Studies for development of water resources in East and West Guilan.

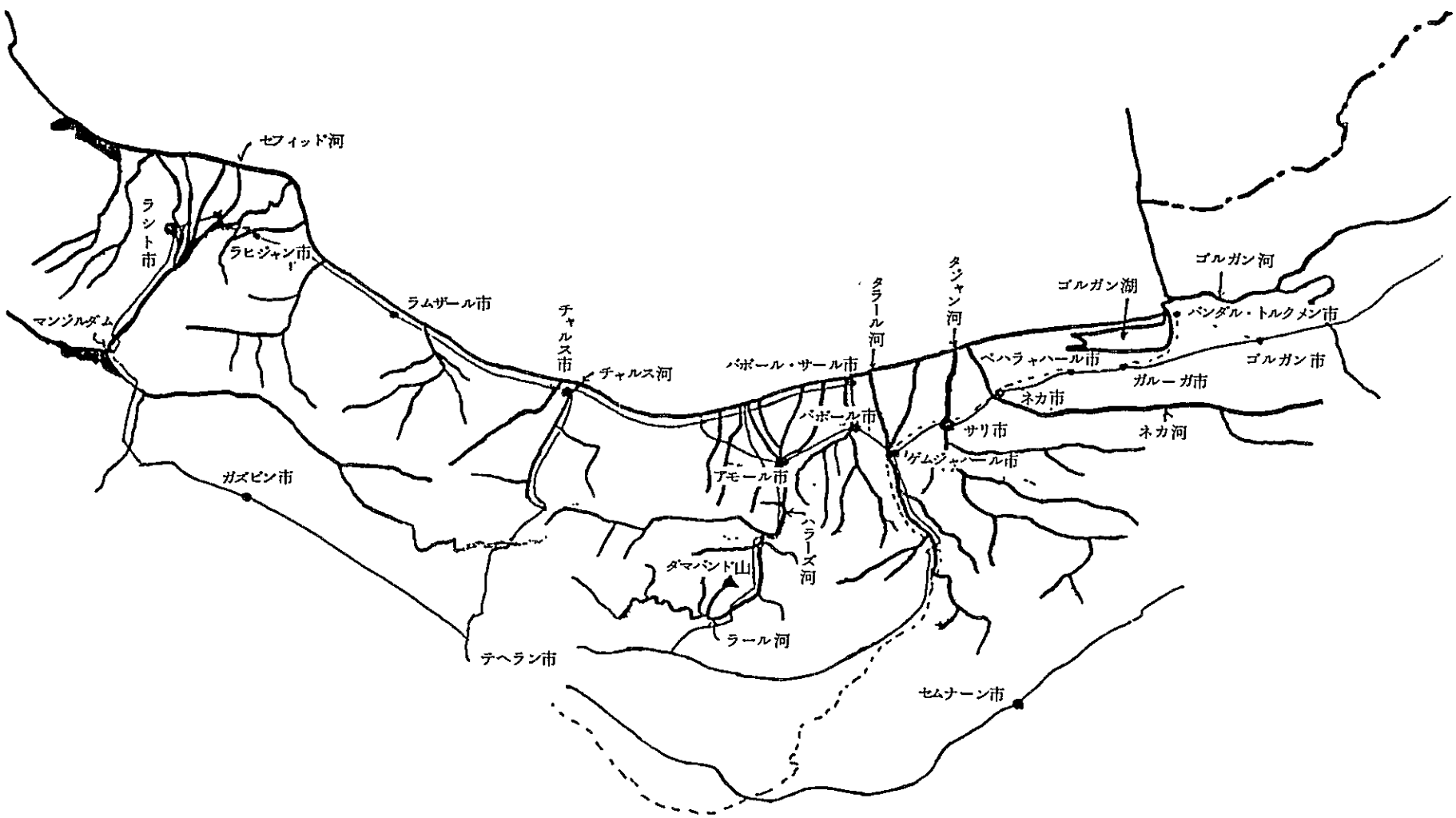
Shahbanou Farah Dam and its associated work has provided irrigation water for the Sefid Rud delta and Foumenat regions. For further development of water in the east and west of the province the Authority has comissioned Consulting Engineers to study the possibilities of construction of dams on the following rivers:-

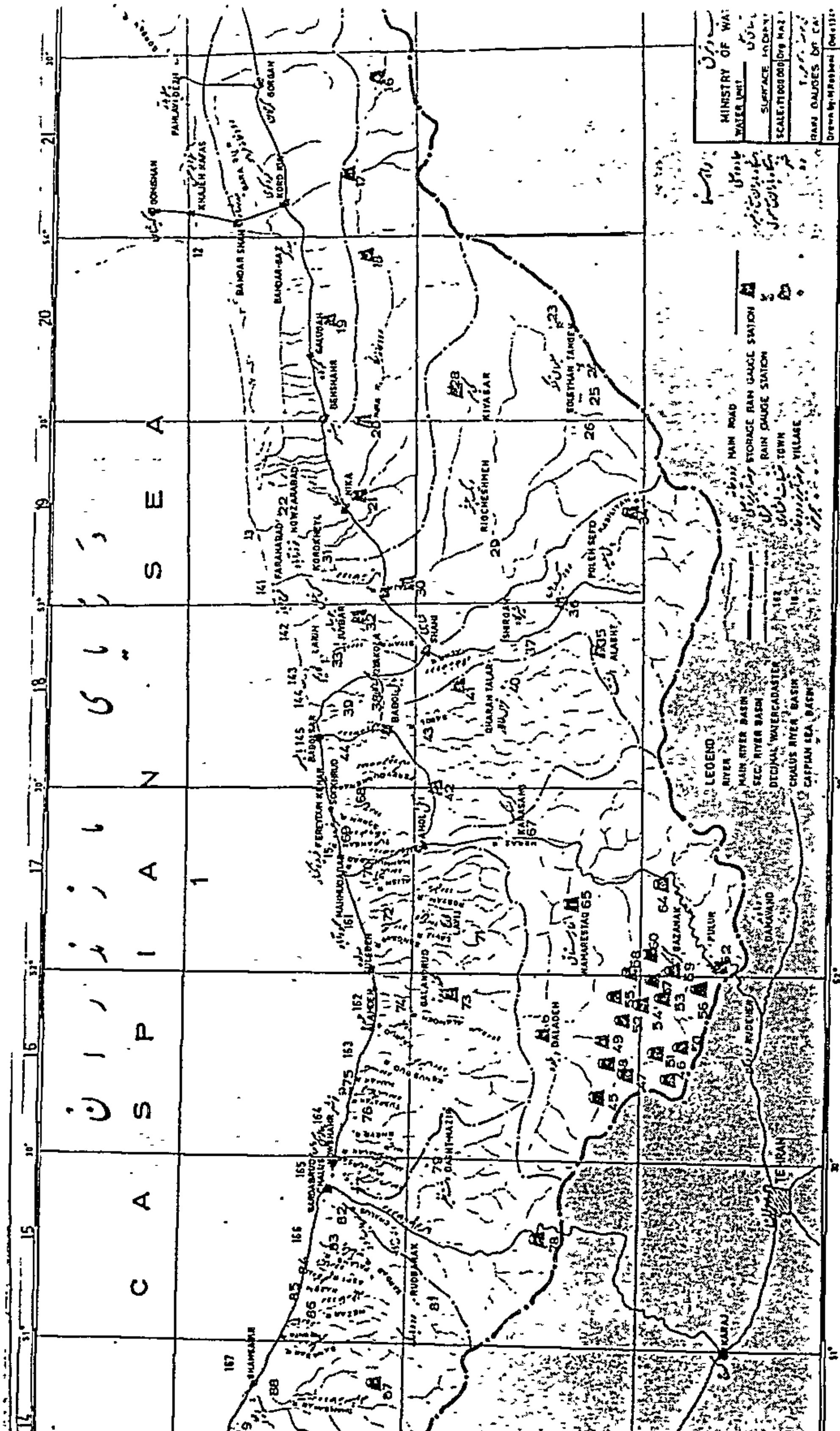
- Polrud
- Shafa rud
- Garakan rud
- Nav rud.

Prefabricated canal sections Plant

For construction of secondary canals a fully automatic plant was set up 12 km. from Rasht. This plant manufactures 120 km of prefabricated canal sections per annum. It can also produce 12km of prefabricated high pressure pipes per annum that can be used for the Northern Cities Water Supply. Studies are underway to increase the pipe production to between 30 to 50 kms per annum.

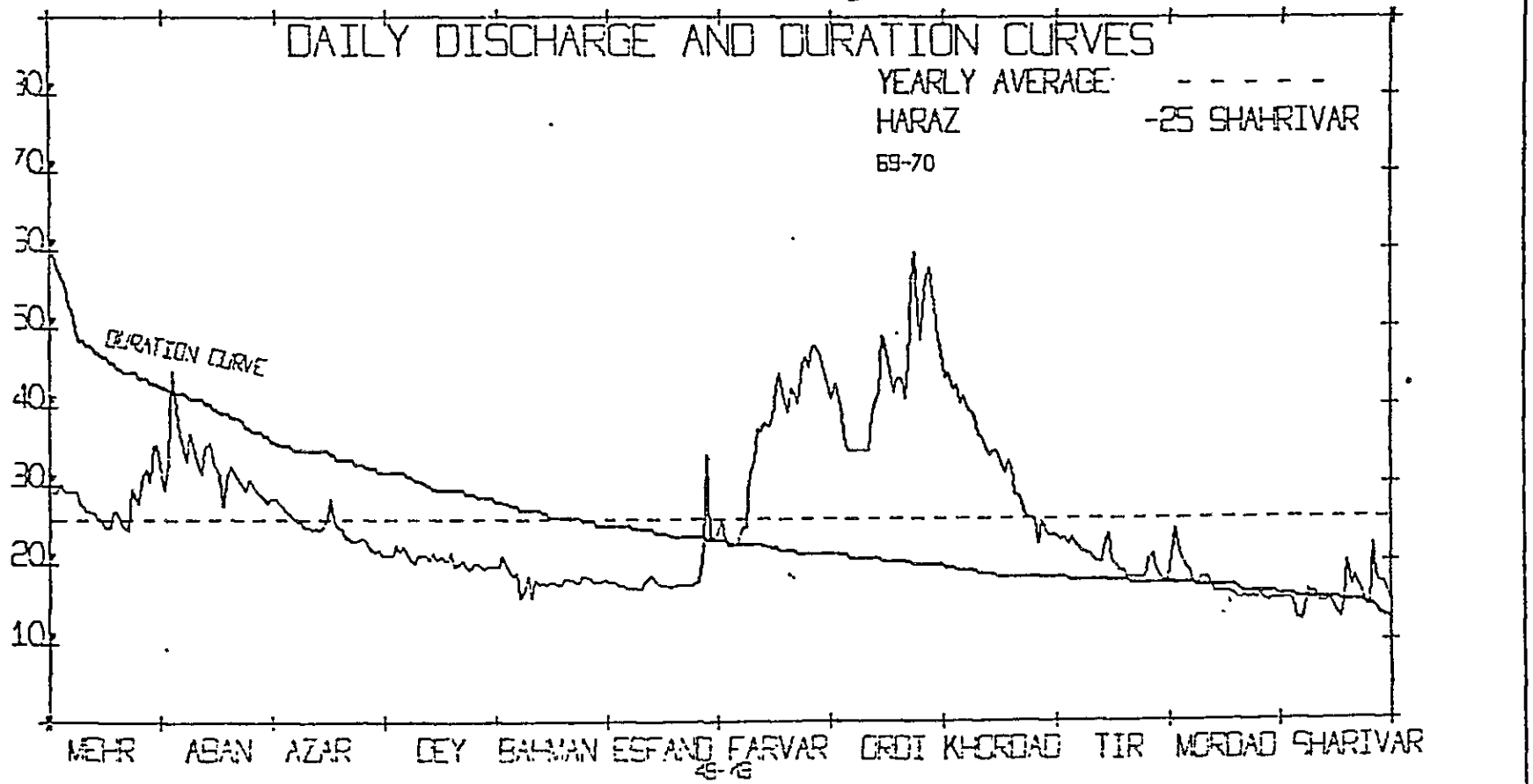
別添資料５


セフィッド河
ラシト市
ラヒジャン市
マンジルダム
ラムザール市
チャルス市
チャルス河
バボール・サール市
バボール市
タラール河
タジャン河
ゴルガン湖
ゴルガン河
バンダル・トルクメン市
ゴルガン市
ベハラャバール市
ガルーガ市
ネカ市
ネカ河
サリ市
ゲムジャバール市
アモール市
ハラーズ河
ダマバンド山
ラール河
ガズビン市
テヘラン市
セムナーン市


CASPIAN SEA
LEGEND
RIVER
MAIN ROAD
STORAGE RAIN GAUGE STATION
RAIN GAUGE STATION
TOWN
VILLAGE
MAIN RIVER BASIN
SEC. RIVER BASIN
DECIMAL WATERCADASTER
CHALUS RIVER BASIN
CASPIAN SEA BASIN
MINISTRY OF WA
TEHRAN
KARAJ
CHALUS
BABOLSAR
SHAHI
GORGAN
DAMAVAND

نمودار تغییرات دبی سالیانه ومنحنی دبی کلاسه رود خانه هراز در ایستگاه ۲۵ شهریور

سال آبی ۴۹ — ۱۳۴۸



BASIN NUMBER H-159 — شماره حوضه ۱۰۹

LOCATION E 52-22 N 36-17 — موقعیت جغرافیائی طول ۲۲ ـ ۵۲ عرض ۱۷ ـ ۳۶

DRAINAGE AREA 4086.0 SQ.KM. — مساحت حوضه آبریز ۴۰۸۶ کیلومترمربع

DATA AVAILABLE 1328 — آمار در دست از سال ۱۳۲۸

AVERAGE DISCHARGE - DURING PERIOD OF RECORD 33.56 M3/SEC IN 1969-70 25.63 M3/SEC
دبی متوسط رودخانه از بدو تأسیس تاکنون ۲۳/۰۶ مترمکعب درثانیه ودرسال ۷۰ ـ ۱۹۶۹ برابر ۲۵/۶۳ مترمکعب درثانیه

PEAK DISCHARGE 75.00 M3/SEC DATE MAY 16th,701\7/11 — ماکزیمم لحظه ای برابر ۷۵/۰۰ مترمکعب درثانیه درتاریخ

PEAK DISCHARGE - M3/SEC DURING PERIOD OF RECORD — ماکزیمم لحظه ای از بدو تأسیس ـ مترمکعب درثانیه

STATION EQUIPMENTS-GAGE-CABLE WAY-WATER LEVEL RECORDER — تجهیزات ایستگاه ـ اشل ـ تلفریک ـ لیمنگراف

REMARK — ملاحظات

DISCHARGE RATING CURVE(DISCHARGE IN M3/SEC GAGE IN METER) — رابطه دبی واشل ـ اشل برحسب متر ـ دبی برحسب مترمکعب درثانیه

GAGE	DISCHARGE	GAGE	DISCHARGE
0.85	12.750	1.45	42.250
0.95	16.500	1.55	49.250
1.05	20.650	1.65	56.500
1.15	25.250	1.75	64.500
1.30	33.000	1.85	72.750

DAILY DISCHARGES (MEHR 1348 TO SHAHRIVAR 1349) — دبی متوسط روزانه ازمهر ۴۸ تا شهریور ۴۹

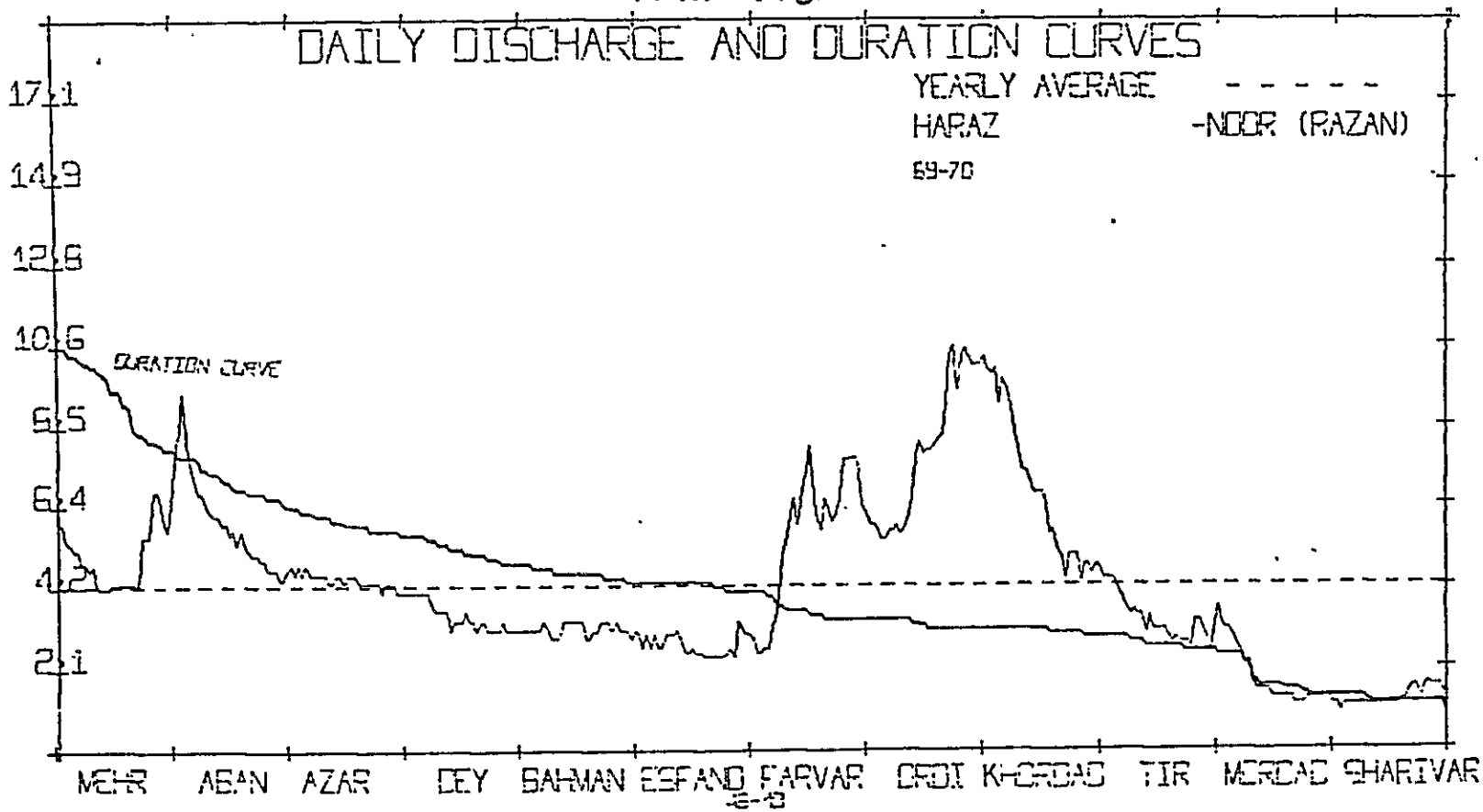
DAY	MEHR	ABAN	AZAR	DEY	BAH.	ESF.	FAR.	ORDI.	KHOR.	TIR	MORD.	SHAHR.
1	29.21	29.21	28.16	20.93	19.62	17.95	23.20	44.14*	48.22*	23.68	17.55	15.24
2	29.21	32.99	27.64	20.93	19.62	17.55	23.20	42.83*	46.51*	23.20	20.93	15.24
3	30.20	44.68	27.12	20.93	20.93	17.55	23.68	40.89*	43.42*	22.74*	24.15	15.24
4	29.21	39.63	26.62	22.43	19.62	17.55	25.61	42.83*	44.20*	23.20	22.28	14.87
5	29.21	36.57	26.11*	21.37	18.78	17.15	22.74	40.89*	42.07*	22.28	20.49	12.78
6	29.21	34.79	25.61	22.28	18.36	17.15	22.28	38.39*	42.56*	23.20	19.20*	12.45
7	29.21	33.06	25.12	20.93	18.78	16.76	22.28	34.79*	40.26*	22.28*	18.78	13.81
8	27.64	36.57	25.12	20.49	15.61	16.76	22.28	34.21*	41.29*	21.82	17.15	16.37
9	27.12*	34.21	24.63	20.05	16.76	16.76*	23.68	34.21*	39.37*	21.37	16.76	15.99
10	26.62	32.49	24.63	20.93	18.36	16.76	24.63*	34.21*	39.01	20.93	17.95	15.99
11	26.62	31.38	24.15	20.93	15.61*	16.76	24.63*	34.21*	38.39	20.93	17.95	14.87
12	26.11	34.79	24.63	20.93	17.95	17.55	31.38*	34.21*	35.97	20.49	17.95	14.87
13	25.61	35.38*	24.15	20.49	17.15	17.95	33.06*	34.21*	35.97	20.05	16.76	14.87
14	25.61	33.06	24.63	21.37	17.55	18.36*	36.96*	39.01*	34.21	20.05	15.99	15.24
15	24.63	31.93	25.50	20.49	17.15	17.55	36.63*	40.89*	33.63	22.83	15.99	14.16
16	24.63	31.38	28.16	20.93*	17.55	17.15	37.78*	41.53*	34.21*	23.68	15.99	13.12
17	26.62	27.12	25.61	20.49	17.55	17.15	37.17*	48.87*	34.21	20.05	15.99*	12.78
18	26.62	31.38	24.63	20.49	17.15	17.15	38.39*	46.86*	32.49	19.62	15.99	14.87
19	25.61	32.49	24.15*	21.37	17.15	16.76	42.18*	44.14*	31.38*	18.78	15.61	20.05
20	24.63	31.38	23.20	19.62	17.95	17.15*	44.14*	41.53*	33.06	18.78	15.24	16.76
21	24.15	30.83	23.20	20.05	17.95	17.15	41.53*	43.48*	31.93	17.95	15.24	17.95
22	29.58	29.74*	22.74	20.49	17.95	17.15	39.01*	43.48*	28.68	17.95*	15.61	16.76
23	28.68	29.21	22.74	19.62	17.55	17.15	42.18*	40.89*	28.16*	17.95	15.24	15.99
24	27.64*	30.83	23.20	19.20	17.55	17.15	41.53*	45.48*	26.62	17.95	15.61	14.16
25	31.49	30.28	23.20	20.05	18.36	17.15	40.26*	55.80*	25.61	17.95	15.24	14.16
26	31.93	29.21	22.74	20.05	18.36*	17.55	45.48*	59.61*	25.61*	17.95	15.99	22.28
27	30.30	28.68	21.82	19.62*	17.95	17.55	46.16*	48.22*	25.12	20.33	15.24	17.95
28	34.96	28.16	21.37	19.20	17.55	22.06	44.81*	52.11*	22.28*	20.93	14.87	17.15
29	34.91	27.64*	21.82	19.62	17.55	33.86	47.52*	56.49*	25.12	18.78	15.24	17.15
30	31.38	28.16	20.93	19.62	17.55		47.52*	57.56*	24.15*	17.95	15.24	15.99
31							46.16*	52.83*	23.20	17.55	15.24	14.87
QMAX	=	34.96	44.68	28.16	22.43	20.93	33.86	47.52	59.61	48.22	23.68	24.15	22.28
QMIN	=	24.15	27.12	20.93	19.20	15.61	16.76	22.28	34.21	22.28	17.55	14.87	12.45
MEAN	=	28.29	32.24	24.45	20.53	17.92	18.01	34.78	43.51	34.09	20.43	17.02	15.61
TOTAL	=	73.335	83.581	63.377	53.220	46.460	45.139	93.157	116.549	91.331	54.722	45.588	41.833
RUN OFF	MM	17.	20.	15.	13.	11.	11.	22.	28.	22.	13.	11.	10.
LT/S /KM2		6.92	7.89	5.98	5.02	4.38	4.40	8.51	10.64	8.34	5.00	4.16	3.82

WATER YEAR 48-49 TOTAL 808.297IN MILLION CUBIC METERS 197. MM LT/SEC/KM2 6.26

INDICATES DAYS WITH DISCHARG MEASUREMENTS — ٭ علامت روزها ی اندازه گیری

نمودار تغییرات دبی سالیانه و منحنی دبی کلاسه رود خانه هراز در ایستگاه نور (رازان)

سال آبی ۴۹ـ ۱۳۴۸



RIVER HARAZ STATION NOOR (RAZAN) رودخانه هـــراز ایستگاه نور (رزن)

BASIN NUMBER H-157-158 شماره حوضه H-۱۵۷-۱۵۸

LOCATION E 52-11 N 36-11 موقعیت جغرافیائی: طول ۱۱ ـ ۵۲ عرض ۱۱ ـ ۳۶

DRAINAGE AREA 1270 SQ.KM. مساحت حوضه‌آبریز ۱۲۷۰ کیلومترمربع

DATA AVAILABLE 1969 آمار در دست از سال ۱۳۴۸

AVERAGE DISCHARGE - DURING PERIOD OF RECORD - M³/SEC IN 69-70 4.30 M³/SEC.

دبی متوسط رودخانه از بدو تأسیس تاکنون ـ متر مکعب در ثانیه و در سال ۴۹ ـ ۴۸ برابر ۴/۳۰ متر مکعب در ثانیه

PEAK DISCHARGE 11.00 M³/SEC DATE MAY21st 71/3/31 ماکزیمم لحظه‌ای برابر ۱۱/۰۰ متر مکعب در ثانیه در تاریخ

PEAK DISCHARGE-M³/SEC DURING PERIOD OF RECORD " " ماکزیمم لحظه‌ای از بدو تأسیس ـ

STATION EQUIPMENTS - GAGE تجهیزات ایستگاه ـ اشل

REMARK ملاحظات

DISCHARGE RATING CURVE(DISCHARGE IN M³/SEC GAGE IN METER) رابطه دبی و اشل ـ اشل برحسب متر ـ دبی برحسب متر مکعب در ثانیه

GAGE	DISCHARGE	GAGE	DISCHARGE
0.15	0.780	0.40	6.600
0.20	1.700	0.45	7.700
0.25	2.900	0.50	8.800
0.30	4.100	0.55	9.900
0.35	5.250	0.60	11.000

DAILY DISCHARGES (MEHR 48 TO SHAHRIVAR 49) دبی متوسط روزانه از مهر ۴۸ تا شهریور ۴۹

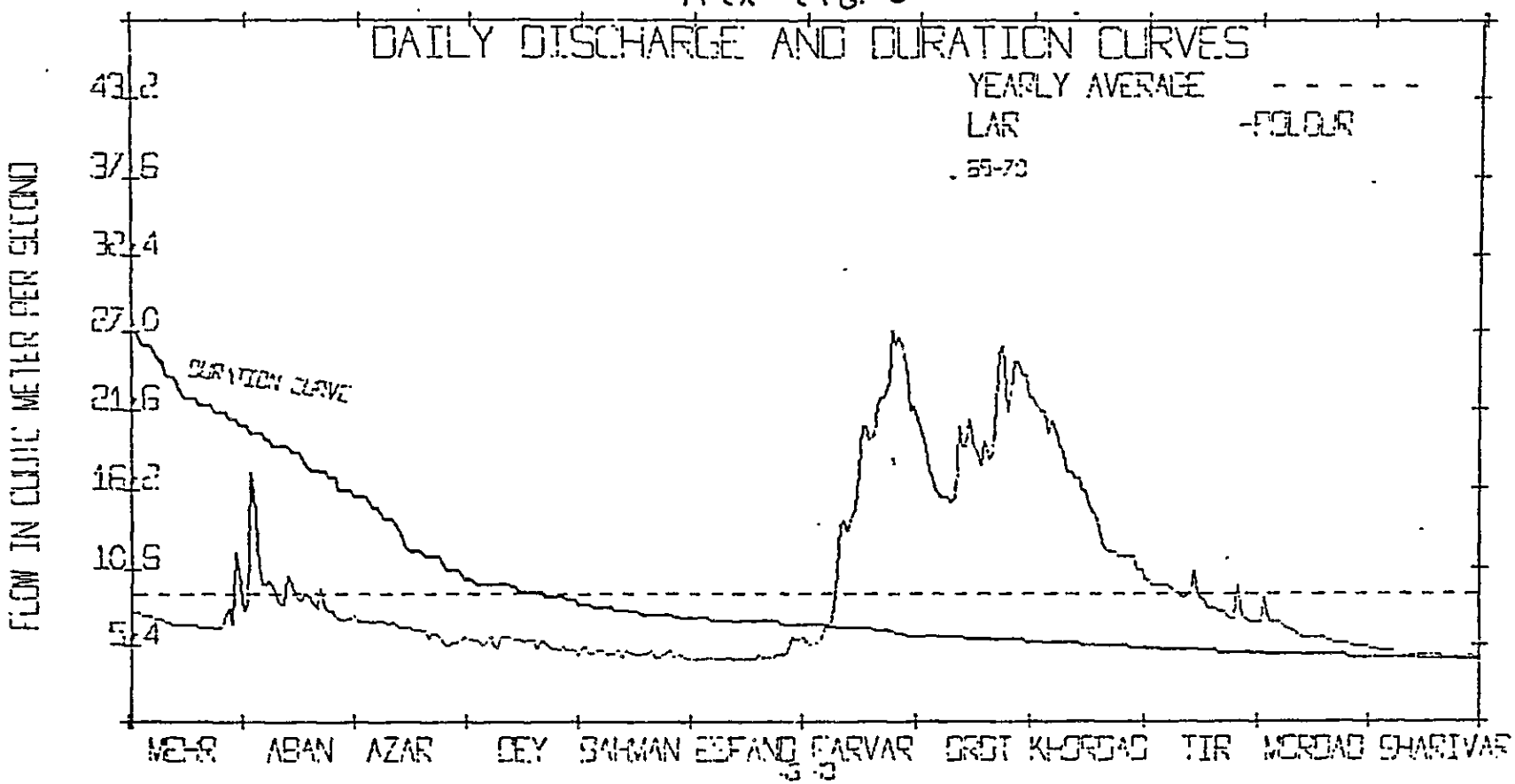
DAY	MEHR	ABAN	AZAR	DEY	BAH.	ESF.	FAR.	ORDI.	KHOR.	TIR	MORD.	SHAHR.
1	5.97	8.14	4.85	4.10	3.14	2.90	3.26	7.26	10.20	4.85	3.26	1.15
2	5.47	8.47	4.60	4.10	3.14	3.14	3.02	6.35	10.20	4.72	3.74	1.15
3	5.35	9.46	4.85	4.10	3.14	3.02	3.02	6.22	10.40	4.47	3.26	0.96
4	5.22	7.70	4.60	4.10	3.14	2.66	2.90	5.85	10.00	4.47	3.14	1.15
5	5.22	7.37	4.85	4.10	3.14	3.02	2.54	5.85	9.90*	4.47	3.14	1.15
6	4.92	7.04	4.60	4.10	3.14	2.66	2.54	5.72	10.10	4.35	2.90	1.15*
7	4.85	6.71	4.60	4.10	3.14	3.02	2.66	5.47	9.13	4.12	2.66	1.15
8	4.72	6.71	4.60	3.86	3.38	2.66	2.66	5.47	9.80	3.97	2.54	1.15
9	4.85	6.35	4.60	3.62	3.14	2.66	3.26	5.72	9.46*	3.74	2.18	1.15
10	4.35	6.22	4.60	3.62	2.90	3.02	3.38	5.72	9.02	3.50	2.18	1.15
11	4.22	6.10	4.35	3.62	2.90	3.02	3.97	5.85	8.36	3.62	1.70	1.15
12	4.22	6.10	4.35	3.62	2.90	3.02	5.10	5.60	7.92	3.50	1.52	1.15
13	4.22	5.85	4.60	3.14	3.38	3.14	5.60	5.85	7.37	3.50*	1.52	1.15
14	4.35	5.97	4.60	3.38	3.38	2.90	6.17	6.10	7.26	3.02	1.52	1.15
15	4.35	5.60	4.35	3.38	3.38	2.54	6.60	6.60	7.04	3.50	1.52	1.15
16	4.35	5.72	4.60	3.38	3.38	2.54	5.85	7.70*	6.71	3.14	1.33	1.15*
17	4.35	5.35	4.60	3.62	3.38	2.66	6.82	8.14	6.71*	3.14	1.33*	1.15
18	4.35	5.72	4.60	3.38	3.38	2.54	7.26	7.81	6.71	3.14	1.33	1.15
19	4.35	5.35	4.35	3.38	2.90*	2.54	8.04	7.92	6.37	3.14	1.33	1.25
20	4.35	5.22	4.35*	3.14	2.90	2.42	7.10	7.92	5.60	2.90	1.33	1.33
21	4.35	5.10	4.35	3.38	3.14	2.42	6.10	8.10	5.72	2.78	1.33	1.52
22	5.60	5.10	4.35	3.38	3.14	2.42	5.72	8.25*	5.22	2.90	1.15	1.61
23	5.60	4.97	4.35	3.14	3.38	2.42	6.60	8.36	4.97	2.78	1.15	1.61
24	5.60	4.97	4.35	3.14	3.38	2.42	6.35	9.13	4.47	2.78	1.15	1.33
25	6.82	4.72	4.10	3.14	3.38	2.42	5.97	10.40	5.10	2.78	1.33	1.61
26	6.82	4.72	4.35	3.14	3.14	2.54	6.22	10.70	5.10	2.66	1.33	1.70
27	6.47	4.72	4.35	3.38*	3.38	2.66	6.60	9.46	5.10	3.38	1.33	1.61
28	5.92	4.47	4.35	3.14	3.14	2.42	7.70	10.40	4.35	3.38	1.33	1.61
29	5.72	4.47*	4.10	3.14	3.14	3.38	7.60	10.60	4.85	3.14	1.33	1.61
30	6.91	4.72	4.10	3.14	3.14	-	7.70	10.30	4.85	2.90*	1.33	1.42
31	-	-	-	-	-	-	7.70	10.10	4.60	2.54	1.33*	1.42
QMAX-	6.91	9.46	4.85	4.10	3.38	3.38	8.04	10.70	10.40	4.85	3.74	1.70
QMIN-	4.22	4.47	4.10	3.14	2.90	2.42	2.54	5.47	4.35	2.54	1.15	0.96
MEAN-	5.12	5.97	4.47	3.53	3.18	2.73	5.35	7.57	7.18	3.46	1.85	1.29
TOTAL-	13.292	15.475	11.599	9.155	8.263	6.841	14.343	20.297	19.232	9.269	4.970	3.468
RUN OFF MM	10.	12.	9.	8.	6.	5.	11.	16.	15.	7.	4.	3.
LT/S/KM2	4.03	4.70	3.52	2.78	2.50	2.15	4.21	5.96	5.65	2.72	1.45	1.01

WATER YEAR TOTAL 136.204 IN MILLION CUBIC METERS 106 MM LT/SEC/KM² 3.39

. INDICATES DAYS WITH DISCHARG MEASUREMENTS o علامت روزهای اندازه‌گیری

نمودار تغییرات دبی سالیانه ومنحنی دبی کلاسه رودخانه لار در ایستگاه پلور

سال آبی ۴۹ — ۱۳۴۸



RIVER LAR STATION POLOUR

BASIN NUMBER H-151

LOCATION E 52-03: N 35-52

DRAINAGE AREA 1250.0 SQ.KM.

DATA AVAILABLE 1325

AVERAGE DISCHARGE - DURING PERIOD OF RECORD 13.79 M3/SEC IN 1969-70 9.04 M3/SEC

PEAK DISCHARGE 30.10 M3/SEC DATE OCT.24th,69

PEAK DISCHARGE - M3/SEC DURING PERIOD OF RECORD

STATION EQUIPMENTS-GAGE-CABLE WAY-WATER LEVEL RECORDER

REMARK

DISCHARGE RATING CURVE(DISCHARGE IN M3/SEC GAGE IN METER)

GAGE	DISCHARGE	GAGE	DISCHARGE
0.10	4.180	0.60	19.550
0.20	6.200	0.65	21.950
0.30	8.600	0.70	24.550
0.40	11.620	0.75	27.150
0.50	15.220	0.80	30.000

DAILY DISCHARGES (MEHR 1348 TO SHAHRIVAR 1349)

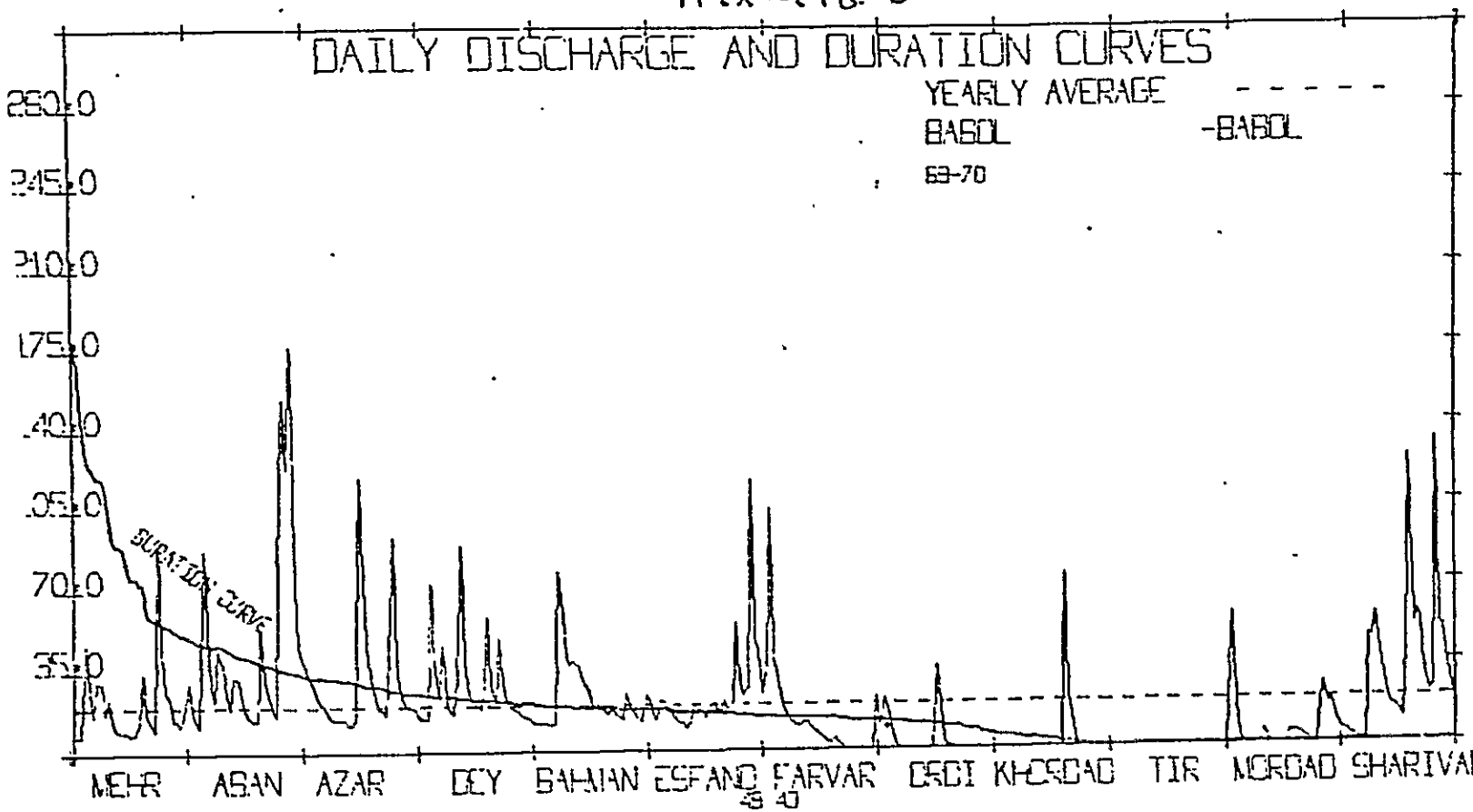
DAY	MEHR	ABAN	AZAR	DEY	BAH.	ESF.	FAR.	ORDI.	KHOR.	TIR	MURD.	SHAHR.
1	7.73	8.25	7.00	5.69	4.61	4.30	5.69	21.34	23.82	10.58	7.00	5.12
2	7.73	17.34	7.00	5.69	5.12	4.30	5.69	21.82	22.31	9.96	7.00	5.12
3	7.48	16.02	7.00	5.69*	5.31	4.30	5.89	20.86	22.31	9.96	8.80	5.12
4	7.48	10.90	7.00	5.50	4.77	4.30	5.50	19.92	21.82	9.66	7.48	4.95*
5	7.48	9.66	7.00	5.31	4.77	4.30	5.31	19.01	21.34	9.66	7.00	4.95
6	7.23	9.66	7.00	5.50	4.95	4.45	5.50	17.26	21.34	9.66	7.00	4.95
7	7.23	9.96	7.00	5.89	4.95	4.45	5.50	16.83	19.92	9.66	7.00	4.95
8	7.23	9.66	7.00	5.31	4.95	4.30	5.89	16.00	20.86	9.66	6.76	4.77
9	7.00	8.80	6.76	5.12	4.61	4.30	6.76	15.60	19.92	9.37	6.54	4.77
10	7.00	8.25	7.00	5.89	4.77	4.30	6.76	15.60	19.01	9.08	6.32	4.77
11	6.76	8.25	6.76	5.89	4.77	4.30	7.23	15.60	18.56	9.08	6.32	4.77
12	6.76	10.27	6.54	5.89	4.95	4.45	9.08	15.20	17.26	8.80	6.10	4.61
13	6.76	9.66	6.54	5.69	4.45	4.30	13.67	15.60	17.26	8.80	5.89	4.61
14	6.76	9.08	6.54	5.69	4.95	4.30	14.04	20.39	16.83	9.08	5.89	4.61
15	6.76	8.52	6.54	5.69	4.77	4.30	13.30	19.01	16.83	10.58	5.89	4.61
16	6.76	8.52	6.32*	5.50	4.77	4.30	14.04*	19.01	16.00	9.08	5.89	4.61
17	6.76	9.08	6.32	5.69	4.61	4.30	14.83	20.86*	16.00	8.80	5.89	4.61
18	6.54	8.80	6.32	5.69	4.61	4.30	17.42	19.01	14.81*	8.52	5.89	4.61
19	6.54	8.25	6.32	5.69	4.77	4.30	20.39	18.56	14.42	7.99	5.89	4.61
20	6.54	7.99*	5.69	5.12	4.77	4.61	20.39	17.68	14.04	7.99	5.69	4.61
21	6.54	9.37	6.10	5.69	4.95	4.45	19.46	19.46	12.94	7.99	5.69	4.45
22	6.54	7.99	6.10	5.50	4.45	4.45	19.92	18.12	12.23	7.73	5.50	4.45
23	6.54*	7.73	5.89	5.31	4.45	4.45	21.82	18.56	11.89	7.73	5.50	4.45
24	6.54	7.73	5.50	5.12	4.61	4.45	22.31	21.82	11.89	7.48	5.50	4.45
25	7.48	7.48	5.31	5.12	4.77	4.61	22.31	25.52	11.89	7.23	5.50	4.45
26	7.99	7.23	5.31	4.95	4.95	4.61	23.31	25.92	11.55	7.23	5.50	4.45
27	6.76	7.00	5.50	5.31	4.45	4.61	27.01	21.34	11.55	9.66	5.31	4.45
28	11.89	7.23	5.50	4.95	4.61	5.12	25.92	22.81	11.55	7.48	5.31	4.61
29	10.58	7.23	5.69	4.95	4.61	5.89	26.46	24.86*	11.55	7.23*	5.31	4.61
30	7.73	7.48	5.89	4.95	4.45		25.92	24.86	11.55	7.00	5.31	4.45
31							23.82	23.82	10.58	7.00	5.31	4.30
QMAX=	11.89	17.34	7.00	5.89	5.31	5.89	27.01	25.92	23.82	10.58	8.80	5.12
QMIN=	6.54	7.00	5.31	4.95	4.45	4.30	5.31	15.20	10.58	7.00	5.31	4.30
MEAN=	7.30	9.11	6.35	5.47	4.75	4.46	14.88	19.75	16.25	8.70	6.13	4.67
TOTAL	18.945	23.633	16.461	14.161	12.328	11.190	39.858	52.913	43.548	23.316	16.424	12.529
RUN OFF MM	15.	18.	13.	11.	9.	8.	31.	42.	34.	18.	13.	10.
LT/S/KM2	5.84	7.29	5.08	4.37	3.80	3.57	11.90	15.80	13.00	6.96	4.90	3.74

WATER YEAR 48-49 TOTAL 285.333IN MILLION CUBIC METERS 228. MM LT/SEC/KM2 7.19

*INDICATES DAYS WITH DISCHARG MEASUREMENTS

نمودار تغییرات دبی سالیانه و منحنی دبی کلاسه رود خان بابل در ایستگاه بابل

سال آبی ۴۹ـ ۱۳۴۸



RIVER BABOL STATION BABOL

حانه بابل ایستگاه بابل

BASIN NUMBER H-145

ره حوضه H-11•

LOCATION E 52-47 N 36-47

ست جغرافیائی طول ۴۷ـ۵۲° عرض ۳۶ـ۴۷

DRAINAGE AREA 1430.0 SQ.KM.

احت حوضه آبریز ۱۴۳۰ کیلومترمربع

DATA AVAILABLE 1328

ده دست از سال ۱۳۲۸

AVERAGE DISCHARGE - DURING PERIOD OF RECORD 17.70 M3/SEC IN 1969-70 19.46 M3/SEC

ر متوسط رودخانه ازبدو تأسیس تاکنون ۱۷/۷۰ مترمکعب درثانیه ودرسال ۱۹ـ۱۸ برابر ۱۹/۴۶ مترمکعب درثانیه

PEAK DISCHARGE 243.00 M3/SEC DATE NOV. 18*,69(۱۳۴۸/۸/۲۷ مترمکعب درثانیه درتاریخ ۱۳/۰۰

ریم لحظه ای برابر

PEAK DISCHARGE - M3/SEC DURING PERIOD OF RECORD

ریم لحظه ای ازبدو تأسیس ـ مترمکعب درثانیه

STATION EQUIPMENTS-GAGE -CABLE WAY-WATER LEVEL RECORDER

سهیزات ایستگاه ـ اشل ـ تلفریك ـ لیمنگراف

REMARK

حظات :

DISCHARGE RATING CURVE(DISCHARGE IN M3/SEC GAGE IN METER) بطه دبی واشل ـ اشل برحسب متر ـ دبی برمترمکعب درثانیه

GAGE	DISCHARGE	GAGE	DISCHARGE
0.75	1.000	2.35	87.500
1.05	7.700	2.70	119.000
1.35	21.000	3.05	155.500
1.65	36.500	3.40	198.000
2.00	59.800	3.75	242.200

DAILY DISCHARGES (MEHR 1348 TO SHAHRIVAR 1349) دبی متوسط روزانه ازمهر۴۸ تا شهریور ۴۹

DAY	MEHR	ABAN	AZAR	DEY	BAH.	ESF.	FAR.	ORDI.	KHOR.	TIR	MORD.	SHAHR.
1	7.73	18.20	33.74	15.04	12.89	23.52	47.86	0.00	0.00	0.00	0.00	5.90
2	7.73*	13.74	31.48	13.74	12.06	21.54	43.36	22.69	0.00	0.00	33.95	4.85
3	46.55*	11.24	27.14	14.17	12.06	15.48	24.03	10.83	0.00	0.00	56.75*	3.83
4	27.67	87.61	23.02	72.52	12.06	13.32	37.24	22.03	0.00	0.00	17.62	2.85
5	16.37	53.60	21.05	35.48	12.06	21.54	104.37*	17.28	0.00	0.00	3.83	1.58
6	30.93	27.67	18.20	24.54	11.24	20.09	40.25	10.43	0.00	0.00	0.00	1.28
7	30.93	22.52	15.48	45.32	12.06	18.20*	30.93	3.50	0.00	0.00	0.00	1.28
8	17.28	44.25	13.74	21.05	77.67	16.37	20.57	0.38	0.00	0.00	0.00	46.05
9	23.52	37.84	13.74	17.74	59.48	14.17	15.93	0.00	0.00	0.00	0.00	45.38
10	14.60	24.54*	13.74*	15.93	40.25	12.06	13.32	0.00	0.00	0.00	0.08	55.25
11	10.83	18.87	13.74	31.41*	37.24	11.65	12.06	0.00	0.00	0.00	6.26	39.53
12	8.87	31.95	12.06	88.95	38.43	10.04	10.83	0.00	0.00	0.00	3.50	28.11*
13	8.87*	31.48	12.06	34.89	36.65*	11.65	10.83	0.00	0.00	0.00	0.08	20.09
14	8.87	22.52	13.74	24.54	30.37	19.61	11.65	0.00	0.00	0.00	0.00	16.37
15	7.73	17.28	118.84	21.54	27.67	17.74	11.65	0.00	0.00	0.00	0.00	14.60
16	9.25	15.48	75.91	19.61	25.57	16.83	9.64	0.00	0.00	0.00	0.00	13.32
17	13.42	13.74	45.91	18.20	18.67	14.17	7.73	0.00	0.00	0.00	0.00*	10.43
18	34.20	13.74	32.04	28.74	20.09	18.67	6.62	34.89	0.00	0.00	5.55	40.87
19	17.74	52.01	23.02	58.09	18.20	20.09	5.20*	19.14	0.00	0.00	5.20	124.81*
20	14.17	30.93	18.20	27.67	17.74	17.28	3.17	4.51	0.00	0.00	4.85	50.50
21	10.04	25.05	18.20	21.05	16.37	15.93	2.53	0.97	75.22*	0.00	4.17	56.68
22	89.46*	18.20*	15.93	48.69	18.20	21.54	5.20	0.67	22.06	0.00	2.85	52.53
23	44.63	16.37	42.02	29.83	15.93	17.74	2.53	0.00	8.87	0.00	2.21	29.28
24	26.09	119.49	93.38	22.03	14.60	20.57	1.58*	0.00	0.97	0.00	0.08	21.05
25	23.02	153.65*	33.74	19.14	13.74	54.59	0.00	0.00	0.00	0.00	0.00	23.02
26	14.17	123.39	24.54	18.20	24.54	30.37	0.00	0.00	0.00	0.00	18.20	132.41
27	14.17	176.89	21.05*	17.28	17.28	23.02	0.00	0.00	0.00	0.00	25.68	50.50
28	12.06	72.99	19.14	15.93	15.93	26.61	0.00	0.00	0.00	0.00	16.83	49.17
29	15.93	45.26	19.14	15.04	13.74*	116.56	0.08	0.00	0.00	0.00	18.67	32.61
30	30.37	40.87	18.20	13.74	12.89		0.08	0.00	0.00	0.00	12.47	23.02
31							0.00	0.00	0.00	0.00	8.48	17.74
QMAX=	89.46	176.89	118.84	88.95	77.67	116.56	104.37	34.89	75.22	0.00	56.75	132.41
QMIN=	7.73	11.24	12.06	13.74	11.24	10.04	0.00	0.00	0.00	0.00	0.00	1.28
MEAN=	21.24	46.04	29.41	25.34	23.19	22.79	15.46	4.75	3.45	0.00	7.98	32.74
TOTAL	55.065	119.347	76.233	73.459	60.119	57.114	41.416	12.734	9.256	0.000	21.378	87.702
RUN OFF MM	38.	83.	53.	51.	42.	39.	28.	8.	6.	0.	14.	61.
LT/S/KM2	14.85	32.19	20.56	19.81	16.21	15.94	10.81	3.32	2.41	0.00	5.58	22.89

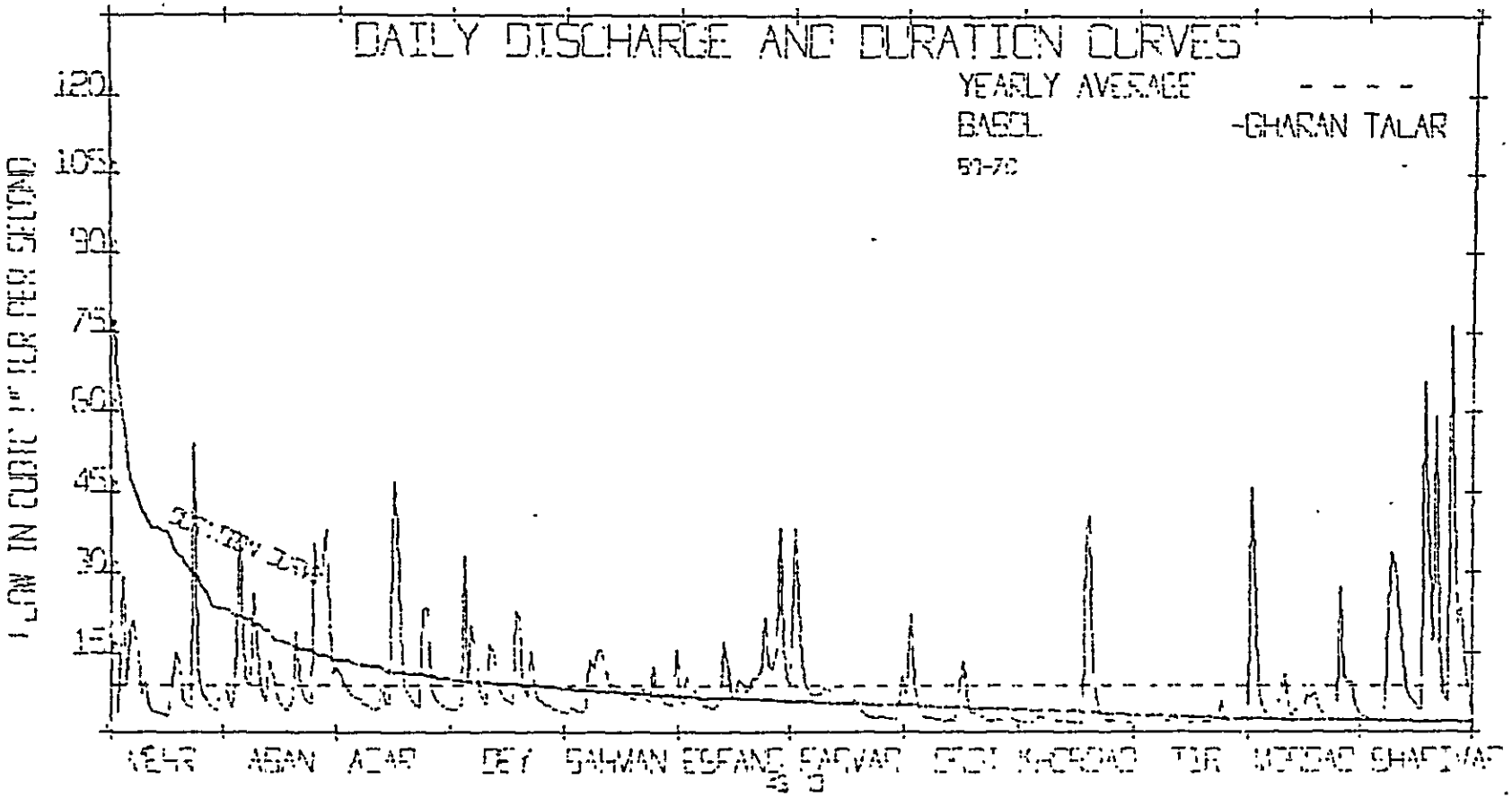
WATER YEAR 48-49 TOTAL 613.828 IN MILLION CUBIC METERS 429. MM LT/SEC/KM2 13.72

*INDICATES DAYS WITH DISCHARG MEASUREMENTS

* علامت روزهای اندازه گیری

نمودار تغییرات دبی سالیانه ومنحنی دبی کلاسه رود خانه بابل در ایستگاه قران طالار

سال آبی ۴۹ – ۱۳۴۸



RIVER BABOL STATION GHARAN TALAR رودخانه بابل ایستگاه قران طالار

BASIN NUMBER H-145 شماره حوضه H-۱۴۵

LOCATION E 52-41 N 36-18 موقعیت جغرافیائی طول ۴۱ـ۵۲ عرض ۱۸ـ ۳۶

DRAINAGE AREA 515.0 SQ.KM. مساحت حوضه آبریز ۵۱۵ کیلومترمربع

DATA AVAILABLE 1328 آمار در دست از سال ۱۳۲۸

AVERAGE DISCHARGE = DURING PERIOD OF RECORD 7.67 M3/SEC IN 1969-70 9.08 M3/SEC

دبی متوسط رودخانه از بدو تأسیس تاکنون ۷/۶۷ مترمکعب در ثانیه ودر سال ۱۹۶۹ـ۷۰ برابر ۹/۰۸ مترمکعب در ثانیه

PEAK DISCHARGE 192.40 M3/SEC DATE SEP.16th,70/1/1/10 ماکزیمم لحظه ای برابر ۱۹۲/۴۰ مترمکعب در ثانیه در تاریخ

PEAK DISCHARGE M3/SEC DURING PERIOD OF RECORD ماکزیمم لحظه ای از بدو تأسیس ـــ مترمکعب در ثانیه

STATION EQUIPMENTS-GAGE تجهیزات ایستگاه ـــ اشل

REMARK ملاحظات :

DISCHARGE RATING CURVE(DISCHARGE IN M3/SEC GAGE IN METER) رابطه دبی واشل ـــ اشل برحسب متر ـ دبی برحسب مترمکعب در ثانیه

GAGE	DISCHARGE	GAGE	DISCHARGE
0.30	2.000	1.50	52.400
0.50	2.700	1.75	75.000
0.75	8.500	2.00	104.400
1.00	18.200	2.25	138.100
1.25	32.500	2.50	177.800

DAILY DISCHARGES (MEHR 1348 TO SHAHRIVAR 1349) دبی متوسط روزانه ازمهر ۴۸ تا شهریور ۴۹

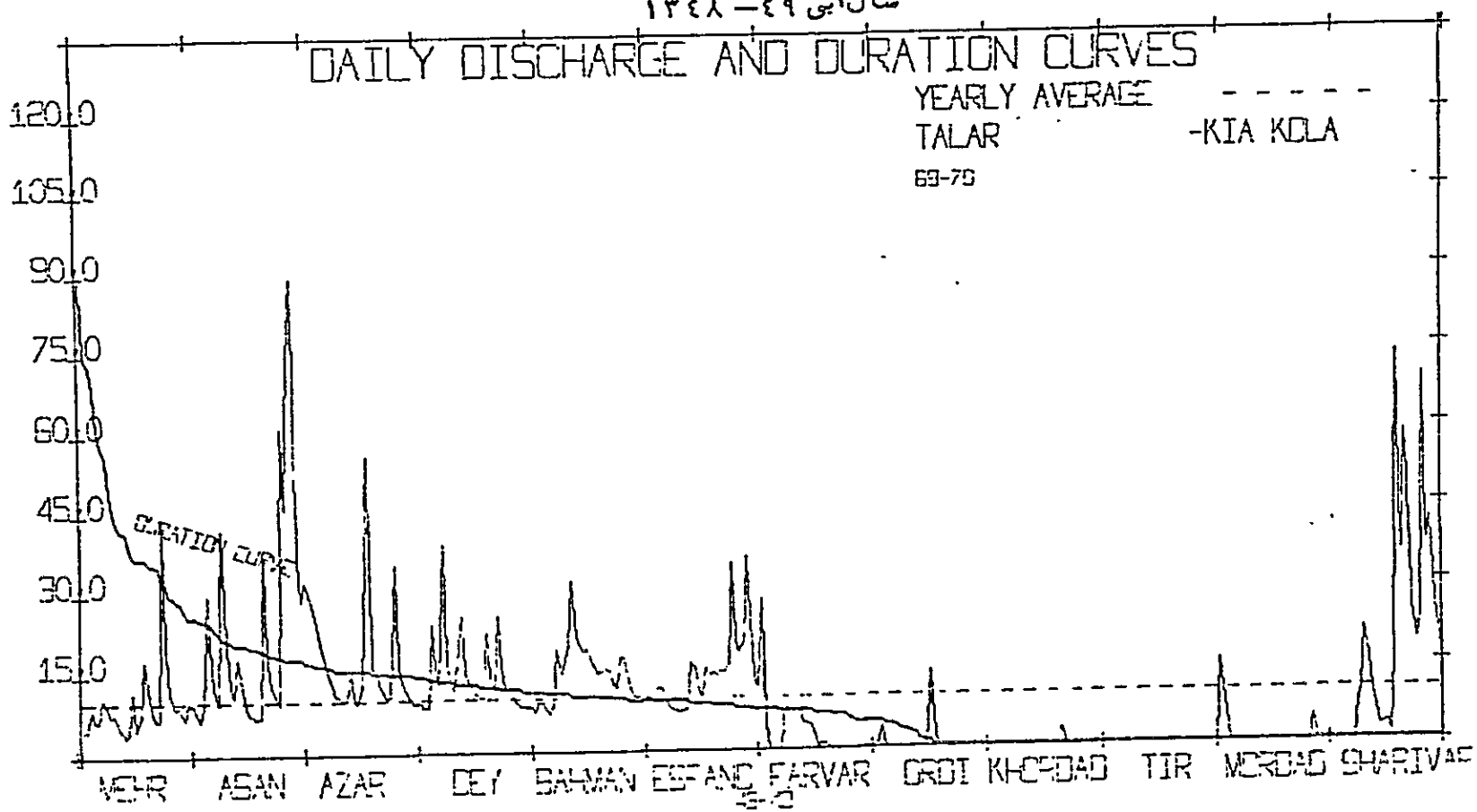
DAY	MEHR	ABAN	AZAR	DEY	BAH.	ESF.	FAR.	ORDI.	KHOR.	TIR	MORD.	SHAHR.
1	2.72	6.41	10.77	4.19	3.84	15.72	16.12	5.91	2.42	1.90	1.96	3.08
2	3.22	4.58	9.05	4.19	3.67	6.68	10.06	10.77	1.96	1.90	45.76	2.95
3	29.20	9.38	8.10	4.99	4.78	5.44	9.38	7.51	1.91	2.42	32.59	2.51
4	9.05	37.39	7.22	32.96	4.19	10.89	38.16	22.18	1.90	2.26	10.06	2.13
5	19.04	16.58	6.68	9.05	4.01	9.05	25.01	9.38	1.90	2.61	4.99	1.99
6	21.09	8.41	6.16	20.21	3.84	7.80	13.49	5.67	1.91	3.22	3.36	1.93
7	14.34	9.38	5.44	14.55	4.78	6.41	9.71	4.01	2.63	2.72	2.61	6.15
8	7.22	26.20	5.21	7.80	13.91	5.44	7.51	3.08	3.08	2.26	2.26	23.09
9	9.71	12.28	4.58	6.16	12.28	4.99*	6.95	2.83	2.34*	2.03	4.01	33.00
10	5.44	6.95	4.19	5.44	15.29	4.78	7.22	2.72	2.13	1.96	9.66	31.25
11	4.01	5.67	4.38	16.72	15.66	4.58	7.22	2.42	2.51	2.13	11.14	21.63
12	3.51	13.49	10.78	14.34	13.49	5.21	8.41	2.42	2.19	4.60	4.58	13.08
13	3.51	10.41	5.44*	9.05	8.72	0.41	8.10	2.13	1.99	2.42	3.08	8.41
14	3.22*	6.16	5.44	7.51	9.38	17.14	6.95	2.19	1.99	2.26	4.38	6.68
15	3.08	5.21	47.23	6.41	9.05	11.51	6.16	2.26	1.96	2.13	3.51	5.67
16	9.38	4.38	38.97	5.67	8.72*	6.95	5.67*	2.13	1.90	1.93	4.19	4.58
17	15.02	4.01	19.52	5.44	8.10	6.41	5.44	6.68	1.90	1.92	7.22	4.38
18	13.49	6.16	8.72	22.95	7.51	10.06	4.78	13.49	1.90	1.97	6.68	65.69
19	6.16	19.01	6.95	21.63	6.68	9.05	4.19	7.51	1.91	2.00	7.51	41.23
20	4.99	11.14	5.67	8.72	6.41	7.80	6.41	4.01	37.38	2.04	4.58	17.05
21	4.38	7.22	4.99	6.95	7.22	8.41	5.44	3.51	40.64	2.04	3.84	59.09
22	54.12	5.67	4.78	15.41	8.41	10.41	3.84	3.84	11.51	2.22	3.22	17.05
23	12.68	5.44	22.99	8.72	6.16	10.06	3.22	2.95*	5.21	2.15	2.72	7.51
24	7.80	35.35	23.29	6.41*	5.67	12.68	3.08	2.42	3.22	2.09	2.42	5.91
25	6.16	29.97	9.05	5.67	12.68	21.45	2.72	2.07	2.34*	5.86	4.19	76.62
26	5.21*	29.30	6.95	5.21	7.80	12.68	2.72*	2.13	2.19	2.34	27.18	43.56
27	4.38	37.92	5.91	4.99	6.68	11.89	3.08	2.26	2.19	2.03	10.41	20.04
28	4.19	21.09	5.21	4.38	5.67	15.66	2.95	2.26	2.19	1.92	9.38	23.49
29	7.80	11.14*	4.58	4.19	5.44	38.23	2.83	2.03	2.34	2.00	9.71	10.77
30	11.14	12.28	4.58	4.01	4.99		2.61	1.93	2.07	2.22	5.44	8.10
31							2.42	2.72	1.93	2.09	3.84	4.01
QMAX.	54.12	37.92	47.23	32.95	15.66	38.23	38.16	22.18	40.64	5.86	45.76	76.62
QMIN.	2.72	4.01	4.19	4.01	3.67	4.58	2.42	1.93	1.90	1.90	1.96	1.93
MEAN.	10.18	13.95	10.43	9.80	7.83	10.47	7.80	4.76	4.96	2.38	8.27	18.49
TOTAL	26.387	36.177	27.038	25.407	20.320	26.258	20.909	12.751	13.289	6.376	22.173	49.530
RUN OFF MM	51.	70.	52.	49.	39.	50.	40.	24.	25.	12.	43.	96.
LT/S/KM2	19.76	27.10	20.25	19.03	15.22	20.34	15.15	9.24	9.63	4.62	16.07	35.90

WATER YEAR 40-49 TOTAL 286.620 IN MILLION CUBIC METERS 556. MM LT/SEC/KM2 17.69

*INDICATES DAYS WITH DISCHARG MEASUREMENTS . ملاحظات روزهای اندازه گیری

نمودار تغییرات دبی سالیانه ومنحنی دبی کلاسه رود خانه طالار در ایستگاه کیاکلا

سال آبی ۴۹ — ۱۳۴۸



رودخانه طالار ایستگاه کیاکلا

RIVER TALAR STATION KIA KOLA

شماره حوضه ۱۴۴- H

BASIN NUMBER H-144

موقعیت جغرافیائی طول ۴۹ـ ۵۲ عرض ۳۶ـ۳۵

LOCATION E 52-49 N 36-35

مساحت حوضه آبریز ۲۸۴۵ کیلومترمربع

DRAINAGE AREA 2845.0 SQ.KM.

آمار در دست از سال ۱۳۲۹

DATA AVAILABLE 1329

AVERAGE DISCHARGE - DURING PERIOD OF RECORD 10.20 M3/SEC IN 1969-70 9.76 M3/SEC

دبی متوسط رود خانه ازبدو تأسیس تاکنون ۱۰/۲۰ مترمکعب درثانیه ودرسال ۶۹ـ۶۸ برابر ۹/۷۶ مترمکعب درثانیه

PEAK DISCHARGE 137.00 M3/SEC DATE NOV. 18th,69 ماکزیمم لحظه ای برابر ۱۳۷ مترمکعب درثانیه درتاریخ ۶۸/۸/۲۷

PEAK DISCHARGE - M3/SEC DURING PERIOD OF RECORD ماکزیمم لحظه ای ازبدو تأسیس ـ مترمکعب درثانیه

STATION EQUIPMENTS-GAGE-CABLE WAY-WATER LEVEL RECORDER تجهیزات ایستگاه ـ اشل ـ تلفریك ـ لیمنگراف

ملاحظات :

REMARK

DISCHARGE RATING CURVE(DISCHARGE IN M3/SEC GAGE IN METER) رابطه دبی واشل ـ اشل برحسب متر ـ دبی برحسب مترمکعب درثانیه

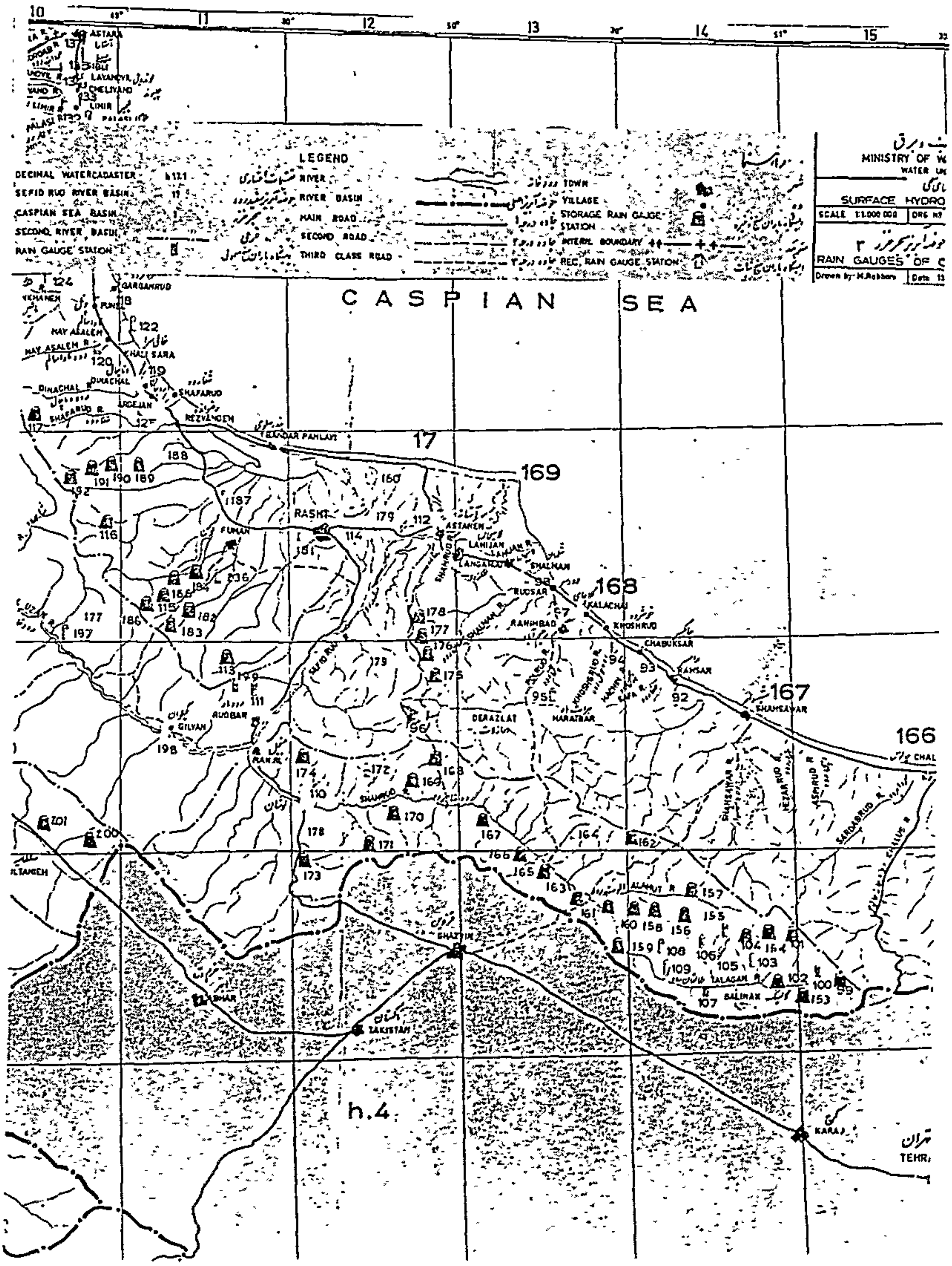
GAGE	DISCHARGE	GAGE	DISCHARGE
1.50	0.750	2.65	56.200
1.70	3.200	2.90	75.600
1.90	9.500	3.10	91.400
2.15	22.000	3.30	114.000
2.40	38.000	3.50	135.800

DAILY DISCHARGES (MEHR 1348 TO SHAHRIVAR 1349) دبی متوسط روزانه ازمهر ۴۸ تاشهریور ۴۹

DAY	MEHR	ABAN	AZAR	DEY	BAH.	ESF.	FAR.	ORDI.	KHOR.	TIR	MORD.	SHAHR.
1	4.93	7.50	29.04	9.30	8.39	11.16	24.88	0.00	0.00	0.00	0.00	0.00
2	4.93	6.19	26.64	8.39	7.06	10.22	13.59	0.00	0.00	0.00	15.60	0.00
3	8.84	9.30	24.30	8.39	9.30	9.76	12.12	0.00	0.00	0.00	10.22	0.00
4	6.63	29.74	20.91	23.98	9.30	9.30	28.08	1.24	0.00	0.00	5.77	0.00
5	6.19*	15.60	18.20	15.60	7.94	12.12*	4.93	4.10	0.00	0.00	0.00	0.00
6	10.69	11.16*	15.09	12.99	7.06	11.64	0.00	0.00	0.00	0.00	0.00	0.00
7	9.30	9.30	13.09	38.91	8.84*	9.76	0.00	0.00	0.00	0.00	0.00	7.06
8	7.06	41.93*	11.16*	16.63	19.28	8.39	0.00	0.00	0.00	0.00	0.00	9.30*
9	7.94	20.36	10.69	13.59*	14.58	7.94	0.00	0.00	0.00	0.00	0.00	20.91
10	6.19	12.61	9.76	11.64	17.15	7.50	8.84*	0.00	0.00	0.00	0.00	15.60
11	4.93	10.69	10.22	16.68	19.82	7.06	7.06	0.00	0.00	0.00	0.00	9.30
12	3.69*	18.09	15.60	25.38	31.74	7.50	7.50	0.00	0.00	0.00	0.00	6.19
13	4.10	12.61	11.16	14.58	21.47	7.94	7.50	0.00	0.00	0.00	0.00	2.50
14	12.10	8.84*	9.30	13.09	19.82	16.63	7.06	0.00	0.00	0.00	0.00	2.89
15	4.93	7.50	12.61	12.12	18.74	15.60	4.93	0.00	0.00	0.00	0.00	3.29
16	7.50	7.06	36.64	10.69	19.28	11.16	4.93	0.00	0.00	0.00	0.00	1.34
17	17.67	6.63	55.51	10.22	17.67	10.22	4.10	0.00	0.00	0.00	0.00	15.09*
18	13.09	7.06	16.11	10.22	15.60	15.60*	2.50	14.37	0.00	0.00	0.00	72.95*
19	9.30	36.50	14.58	22.55	14.58	14.08	0.00	5.34	0.00	0.00	0.00	35.34
20	6.63	17.67*	12.61	14.08*	15.09	14.58	0.96	0.00	0.00	0.00	0.00	20.91
21	6.63	12.61	11.64	11.64	15.60	14.08	0.96	0.00	0.00*	0.00	0.00	50.23
22	43.04*	10.69	10.22	25.51	15.09*	15.09	0.00	0.00	2.89	0.00	0.00	46.15
23	19.82	9.30	10.69	15.60	12.61	14.58	0.00	0.00	0.00	0.00	0.00	2.58
24	11.64	61.06	35.34	12.12	12.12	16.11	0.00*	0.00	0.00	0.00	0.00	18.74
25	8.84	45.96	16.63	10.69	17.67	34.69	0.00	0.00	0.00	0.00	0.00	23.15
26	9.30	74.45*	13.59*	10.22	17.67	20.36	0.00	0.00	0.00	0.00	0.00	68.73
27	7.94	89.10	11.64	9.30	13.09	18.20	0.00	0.00	0.00	0.00	4.93	37.30
28	6.63	36.64	10.22	8.84	11.16	20.36	0.00	0.00	0.00	0.00	0.00	41.35
29	9.76	28.43	9.30	8.39	10.22	35.99	0.00	0.00	0.00	0.00	0.00	25.46
30	9.30	32.14	9.30	8.39	10.22		0.00	0.00	0.00	0.00	0.00	20.38
31							0.00	0.00	0.00	0.00	0.00	17.15
QMAX=	43.04	89.10	55.91	38.91	31.74	35.99	28.08	14.37	2.89	0.00	15.60	72.95
QMIN=	3.69	6.19	9.30	8.39	7.06	7.06	0.00	0.00	0.00	0.00	0.00	0.00
MEAN=	9.65	23.23	17.07	14.33	14.61	14.06	4.51	0.81	0.09	0.00	1.17	18.91
TOTAL	25.029	60.212	44.267	37.148	37.871	35.234	12.095	2.174	0.250	0.000	3.156	50.663
RUN OFF MM	8.	21.	15.	13.	13.	12.	4.	0.	0.	0.	1.	17.
LT/S/KM2	3.39	8.16	6.00	5.03	5.13	4.94	1.58	0.28	0.03	0.00	0.41	6.64

WATER YEAR 48-49 TOTAL 308.100IN MILLION CUBIC METERS 108. MM LT/SEC/KM2 3.47

*INDICATES DAYS WITH DISCHARG MEASUREMENTS * علامت روزهای اندازه گیری


LEGEND
RIVER
RIVER BASIN
MAIN ROAD
SECOND ROAD
THIRD CLASS ROAD
TOWN
VILLAGE
STORAGE RAIN GAUGE STATION
REC. RAIN GAUGE STATION
DECIMAL WATERCADASTER
SEFID RUD RIVER BASIN
CASPIAN SEA BASIN
SECOND RIVER BASIN
RAIN GAUGE STATION
CASPIAN SEA
BANDAR PAHLAVI
RASHT
FUMAN
ASTANEH
LAHIJAN
RUDSAR
SHAHSAVAR
RUDBAR
GILVAN
QAZVIN
TAKISTAN
KARAJ
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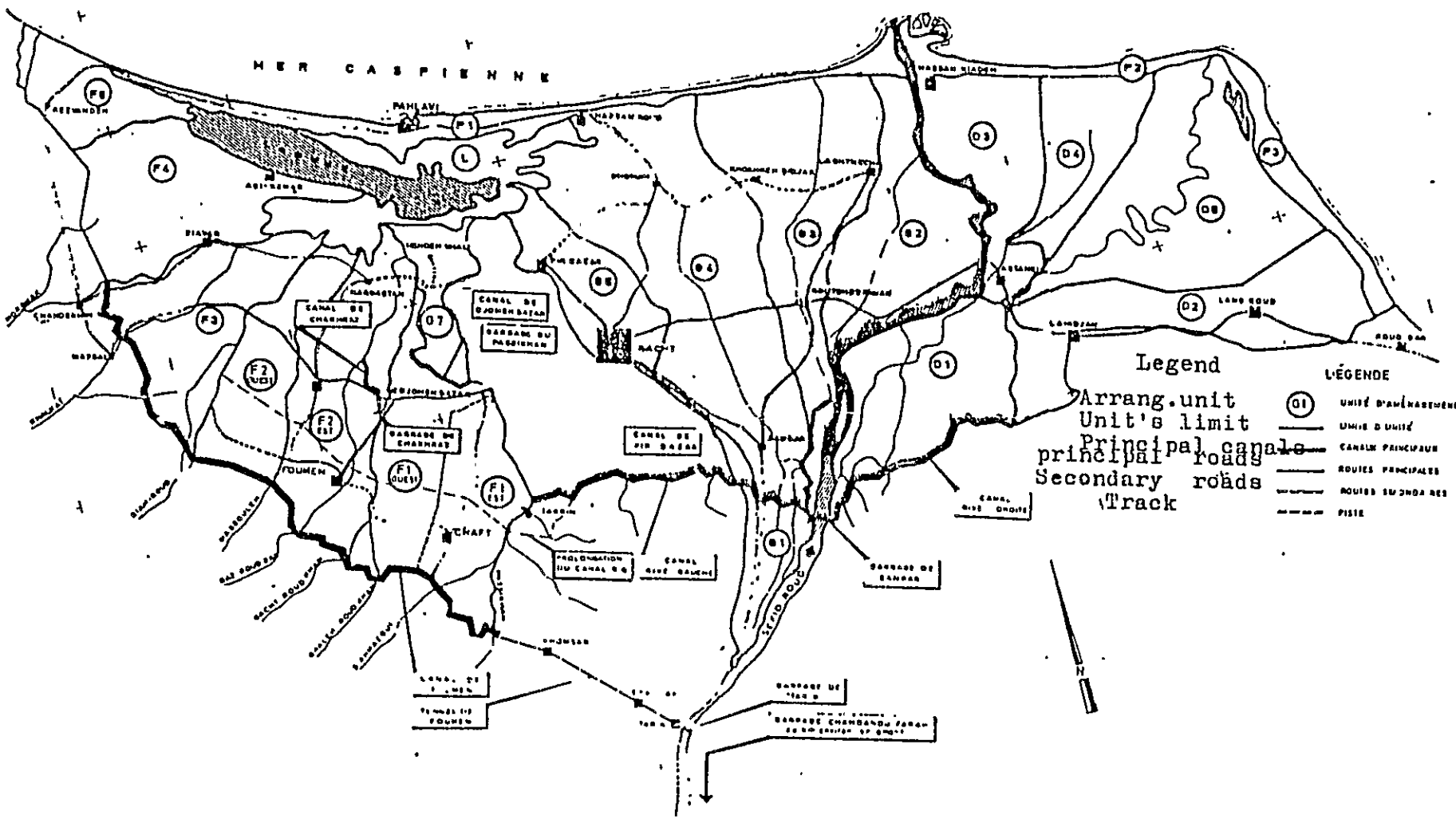
MER CASPIENNE
PAHLAVI
ANZALI
RASHT
Legend
Arrang.unit
Unit's limit
Principal canals
principal roads
Secondary roads
Track
L'ÉGENDE

別添資料6

ＩＦＡＤにて高野専門家を通じての資料リスト　59. 2. 29　Rome

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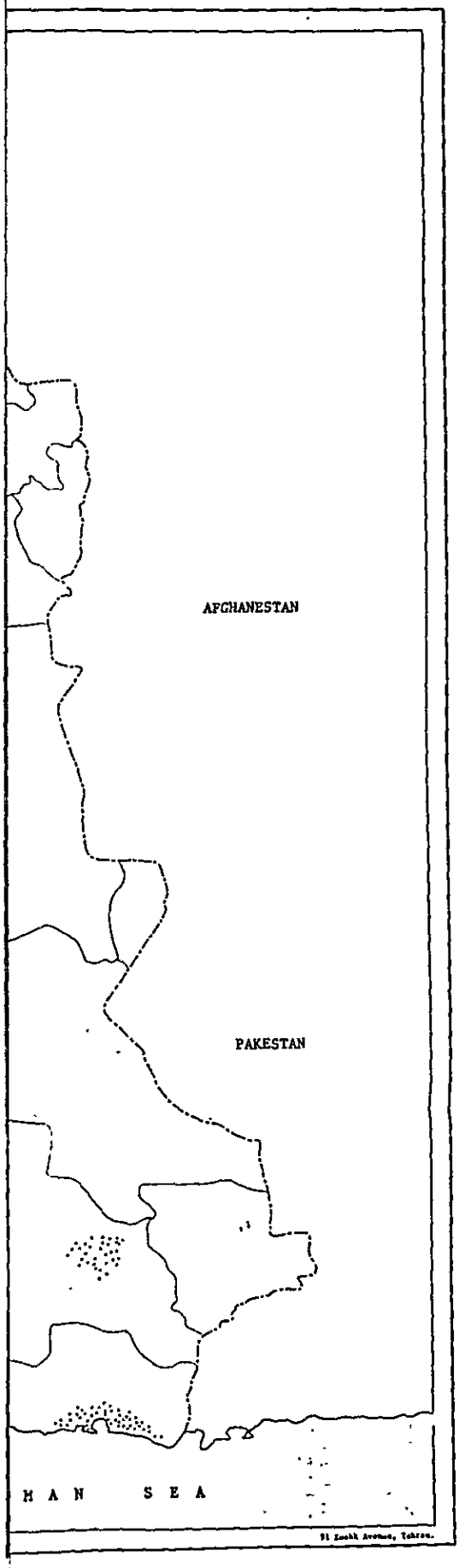

別添資料7

LANDS UNDER CULTIVATION OF RICE IN TOTAL COUNTRY BASED ON NATIONAL CENCOUS: NOVEMBER 1966.