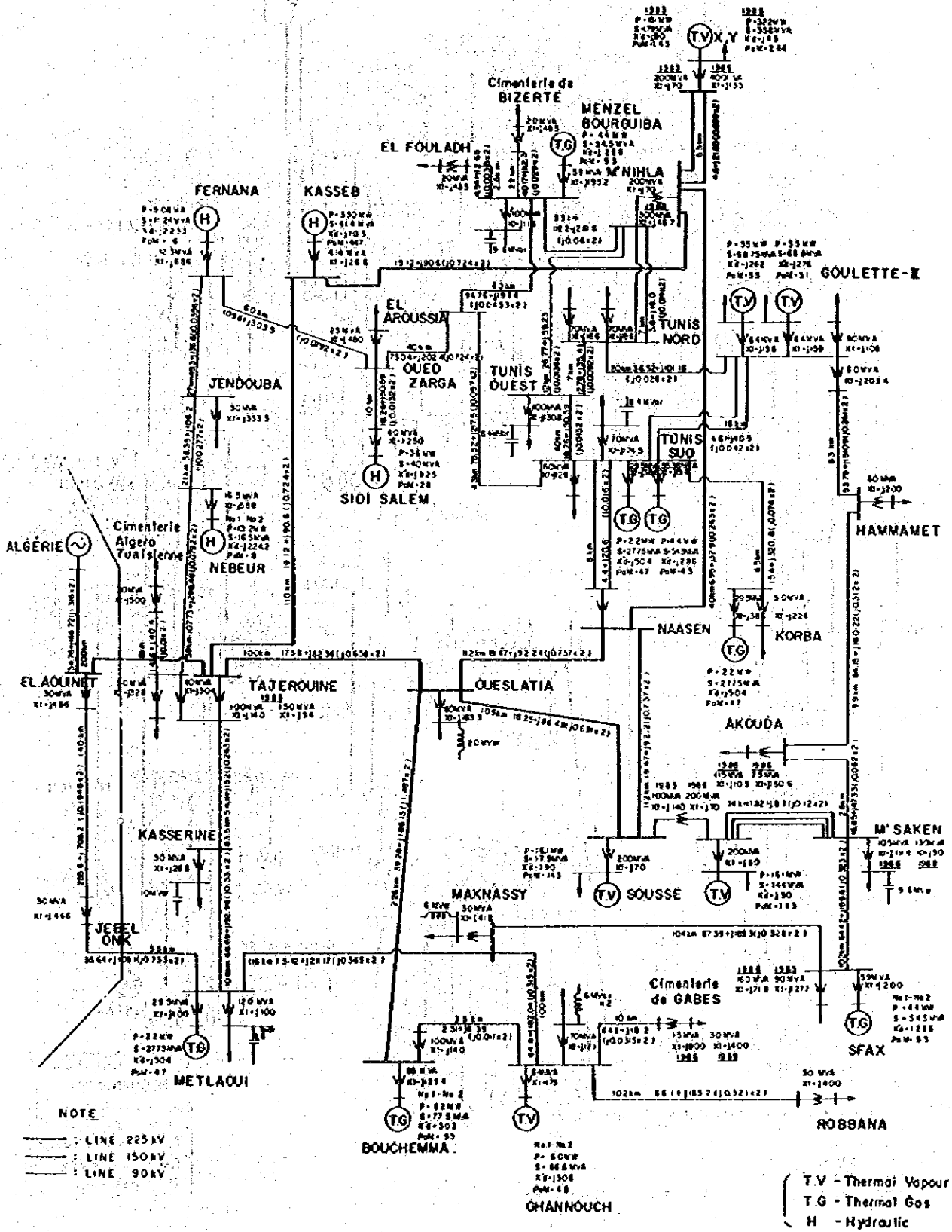


APPENDICE

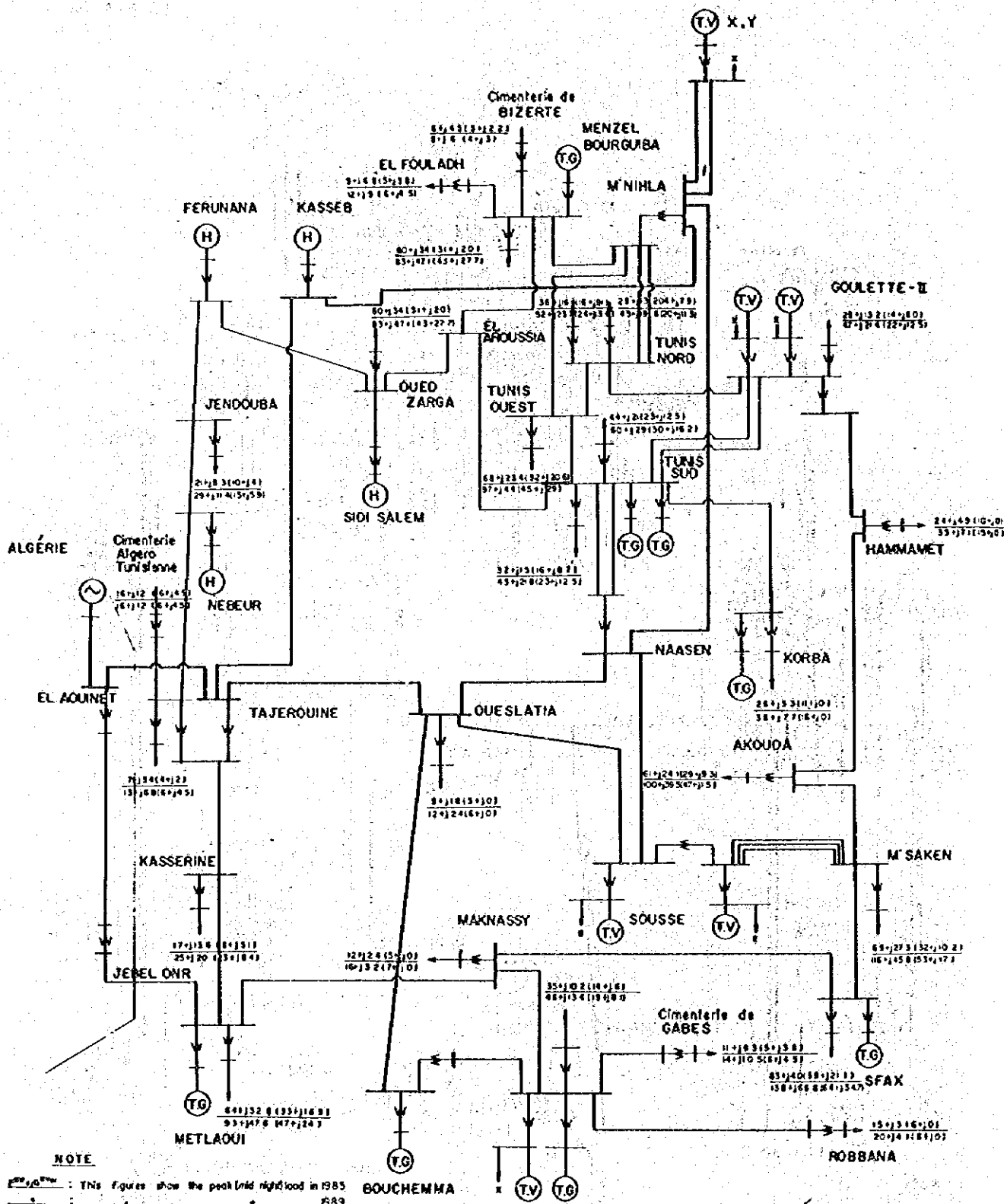
- **IMPEADANCE MAP IN STEG POWER SYSTEM IN 1989**
- **LOAD DISTRIBUTION**
- **POWER FLOW AND VOLTAGE REGULATION AT PEAK TIME IN 1985**
- **POWER FLOW AND VOLTAGE REGULATION AT MIDNIGHT TIME IN 1985**
- **POWER FLOW AND VOLTAGE REGULATION AT PEAK TIME IN 1989**
- **POWER FLOW AND VOLTAGE REGULATION AT MIDNIGHT TIME IN 1989**

Impedance Map in STEG POWER SYSTEM in 1989

1,000 MVA Base



Load Distribution



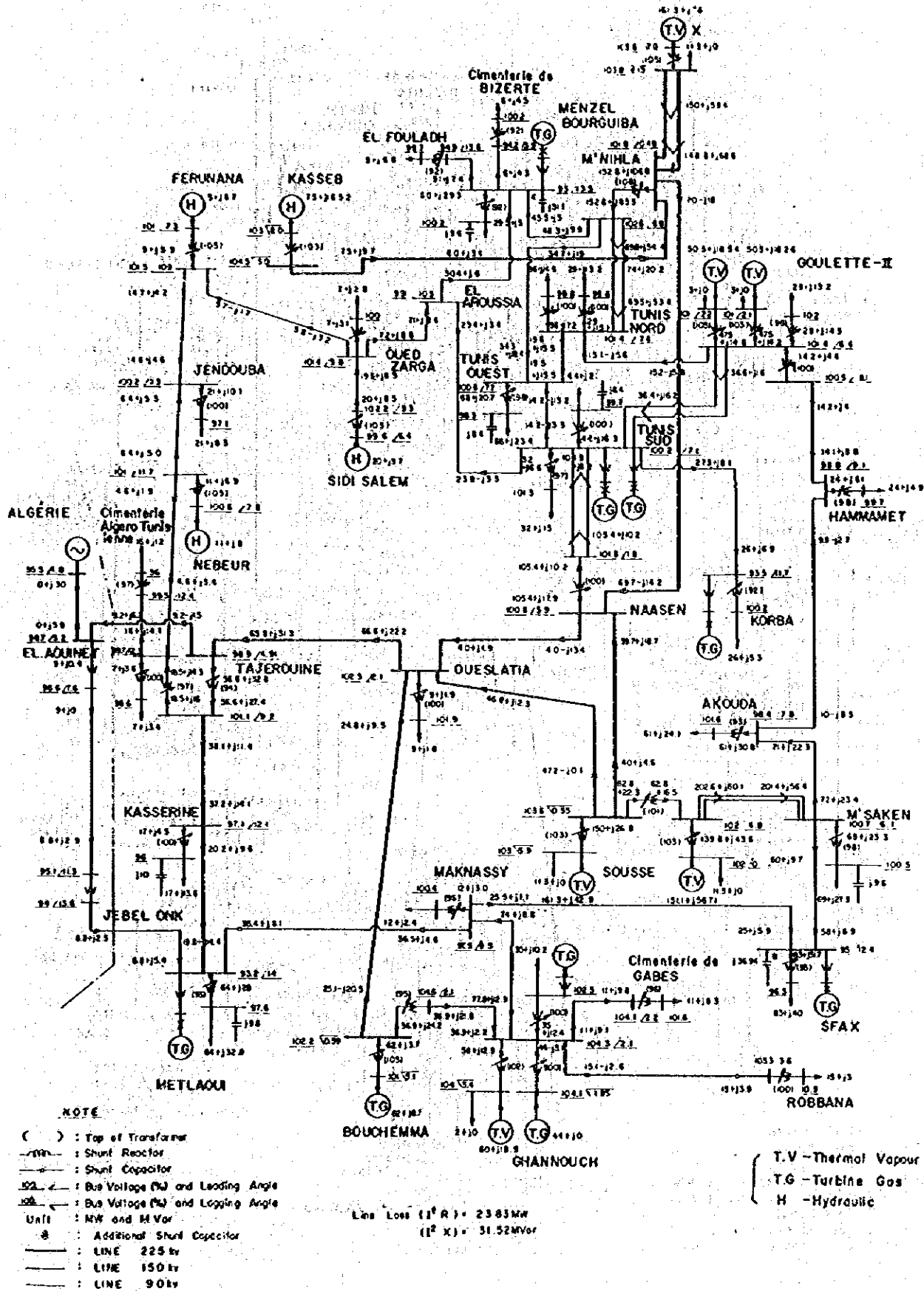
NOTE

- 1985/1989 : This figures show the peak load night load in 1985
- 1989 : 1989
- ⊕ : Auxiliary use
- : LINE 225 kV
- : LINE 150 kV
- : LINE 90 kV

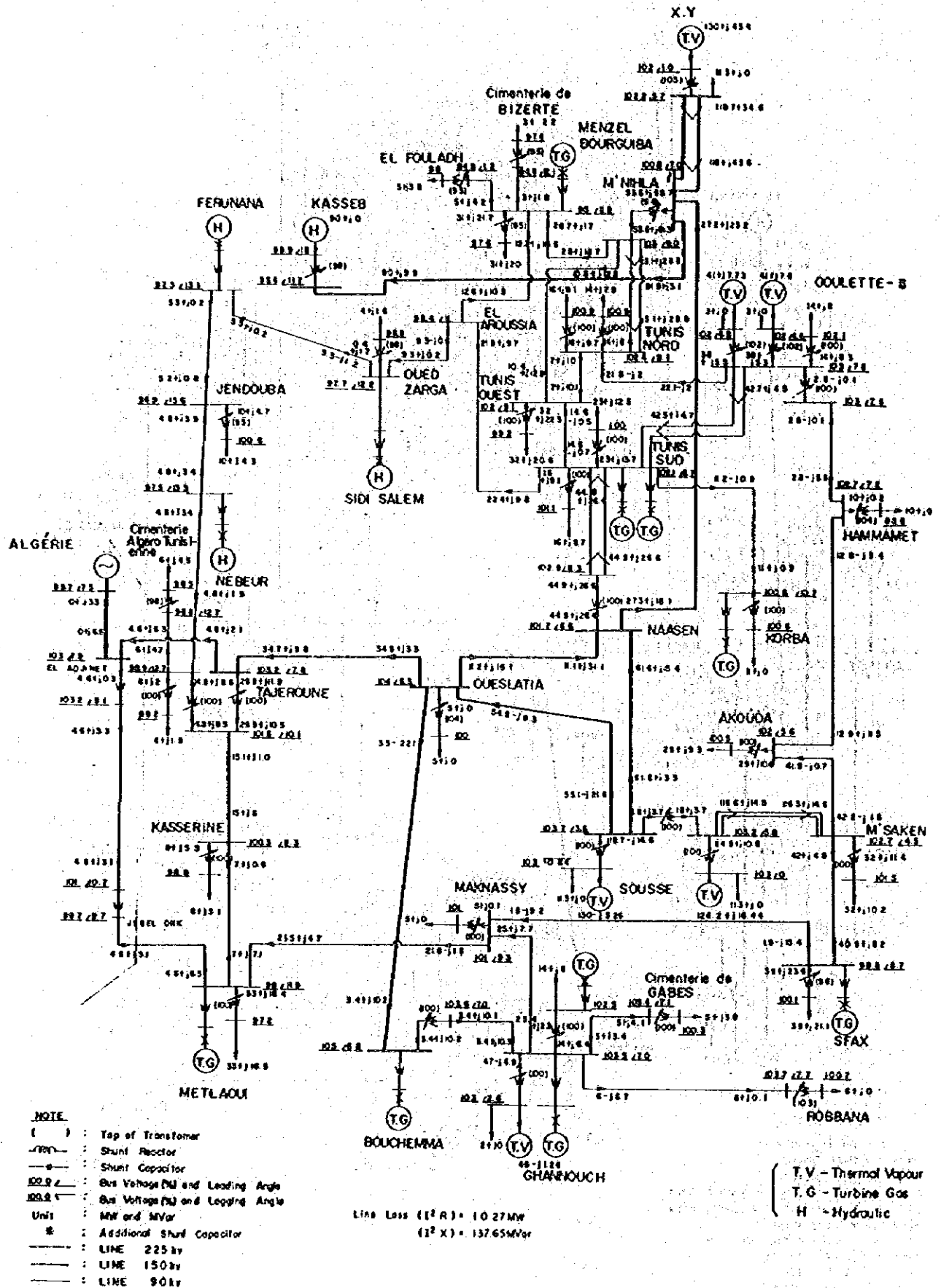
Total Demand in 1985 = 750 MW
in 1989 = 1170 MW

T.V - Thermal Vapour
T.G - Turbine Gas
H - Hydraulic

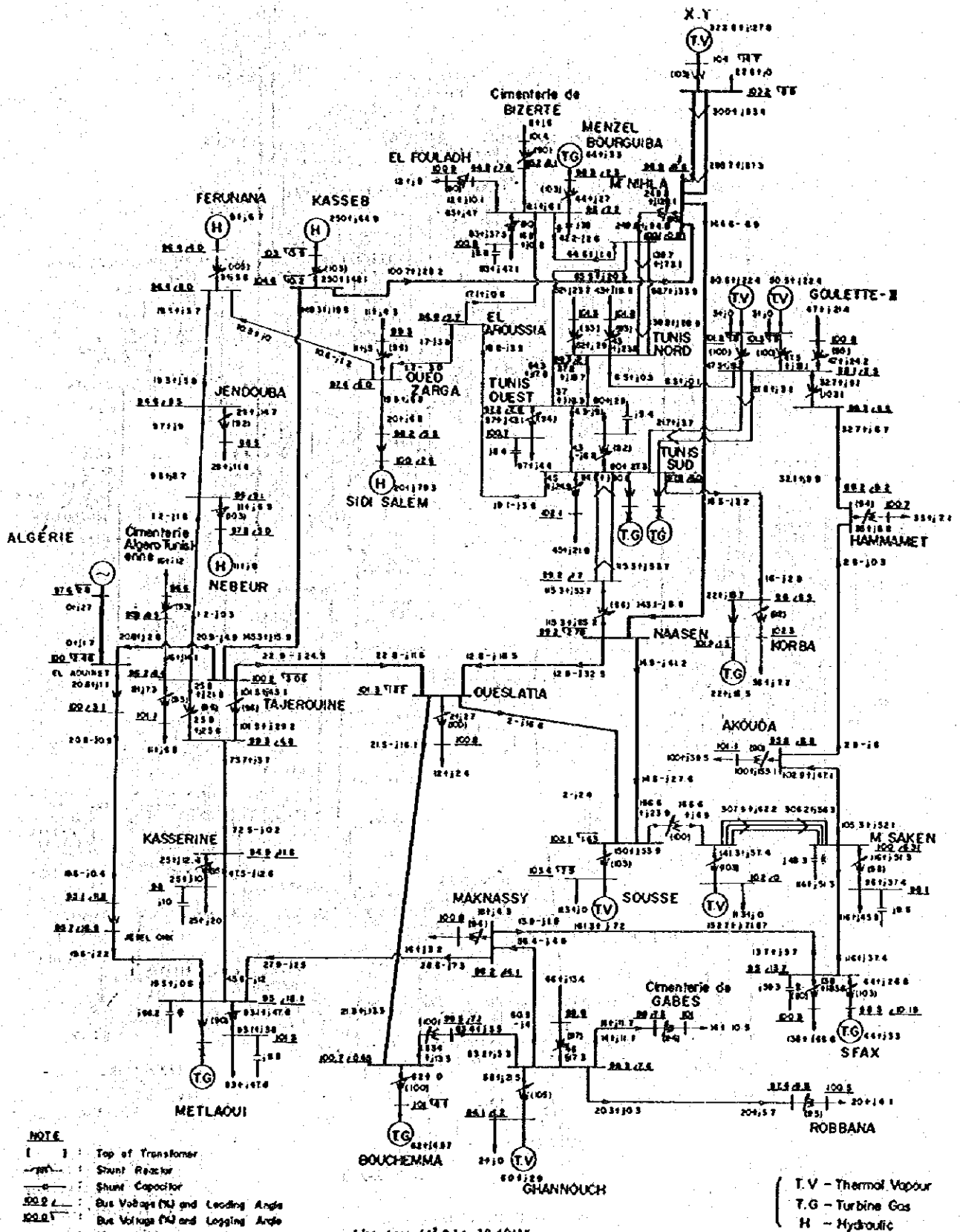
Power Flow and Voltage Regulation at Peak Time in 1985



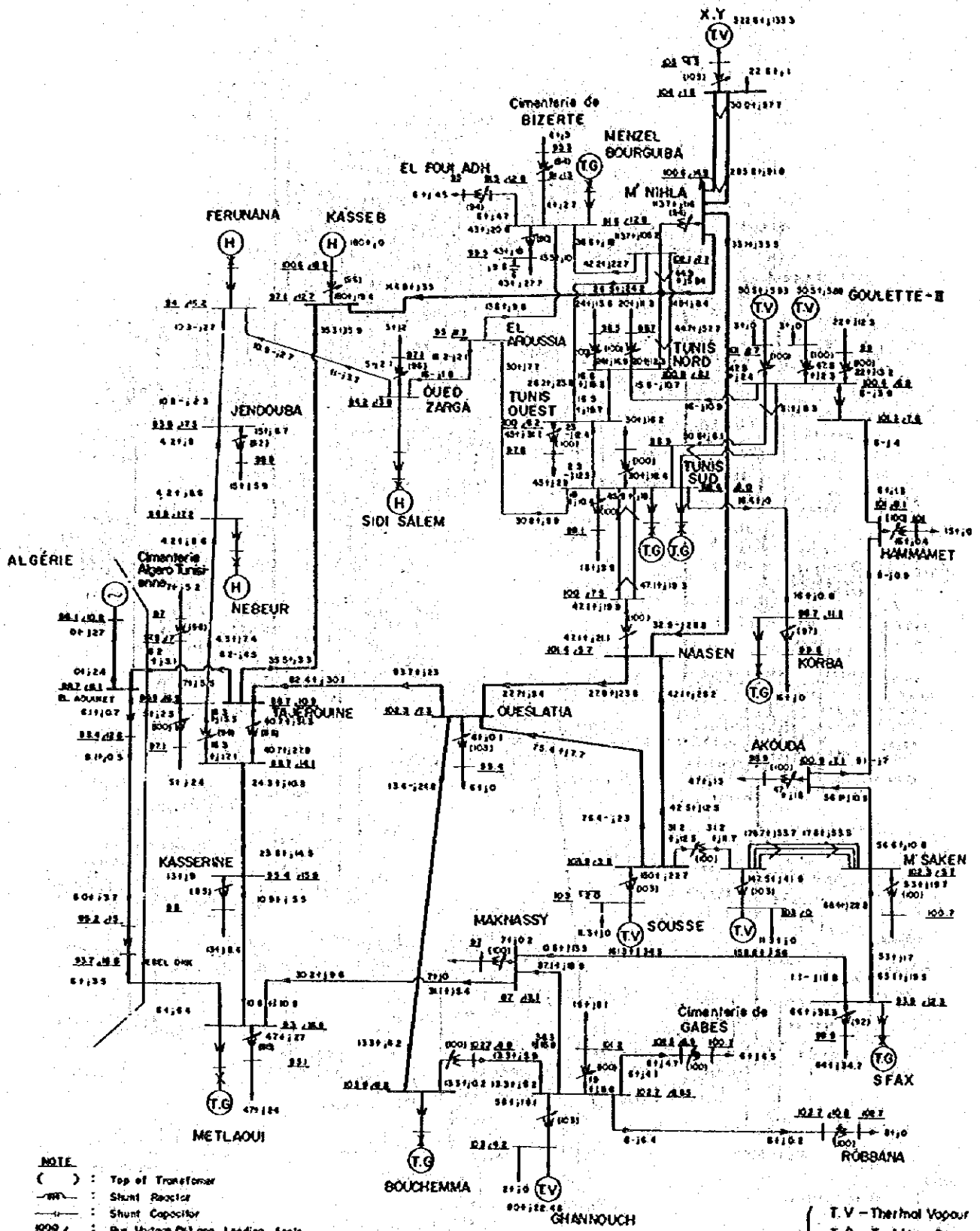
Power Flow and Voltage Regulation of Midnight Time in 1985



Power Flow and Voltage Regulation at Peak Time in 1989



Power Flow and Voltage Regulation at Midnight Time in 1989



- NOTE**
- () : Top of Transformer
 - R— : Shunt Reactor
 - C— : Shunt Capacitor
 - 22.2 / 10.1 : Bus Voltage (kV) and Leading Angle
 - 22.2 / 10.2 : Bus Voltage (kV) and Lagging Angle
 - Unit : MW and MVar
 - * : Additional Shunt Capacitor
 - : LINE 225 kv
 - : LINE 150 kv
 - : LINE 90 kv

Line Loss (P) = 25.57 MW
(P X) = -9.57 MVar

T.V - Thermal Vapor
T.G - Turbine Gas
H - Hydrolic

FIGURES

**FIGURE LIST
(LISTE DES FIGURES)**

1.	General Geologic Plan (Carte Géologique Générale)	Fig. - 5.1
2.	Project Area Geologic Plan (Carte Géologique du Site)	- 5.2
3.	Upper Dam Site Geologic Profile (Profil Géologique du Site du Barrage Supérieur)	- 5.3
4.	Water Way Alignment Geologic Profile (Profil Géologique des Galeries)	- 5.4
5.	Dam and Diversion (Outlet) (Barrage et Dérivation Provisoire)	- 8.3
	— Upstream Alternative (A) — (Drawdown : 15 m) (— Variante Amont (A) —) (Marnage : 15 m)	
6.	Plan (Plan)	- 8.4
7.	Waterway Tunnels (Galeries)	- 8.5
8.	Intake and Outlet (Prise d'eau amont et Prise d'eau aval)	- 8.6
9.	Power House (1-3) (Centrale (1-3))	- 8.7
10.	Power House (2-3) (Centrale (2-3))	- 8.8
11.	Power House (3-3) (Centrale (3-3))	- 8.9
	— Downstream Alternative (A) — (Drawdown : 15 m) (— Variante Aval (A) —) (Marnage : 15 m)	
12.	Plan (Plan)	- 8.10
13.	Waterway Tunnel and Surge Chamber (Galeries et Chambres d'équilibre)	- 8.11
14.	Intake and Outlet (Prise d'eau amont et Prise d'eau aval)	- 8.12
15.	Power House (1-3) (Centrale (1-3))	- 8.13
16.	Power House (2-3) (Centrale (2-3))	- 8.14

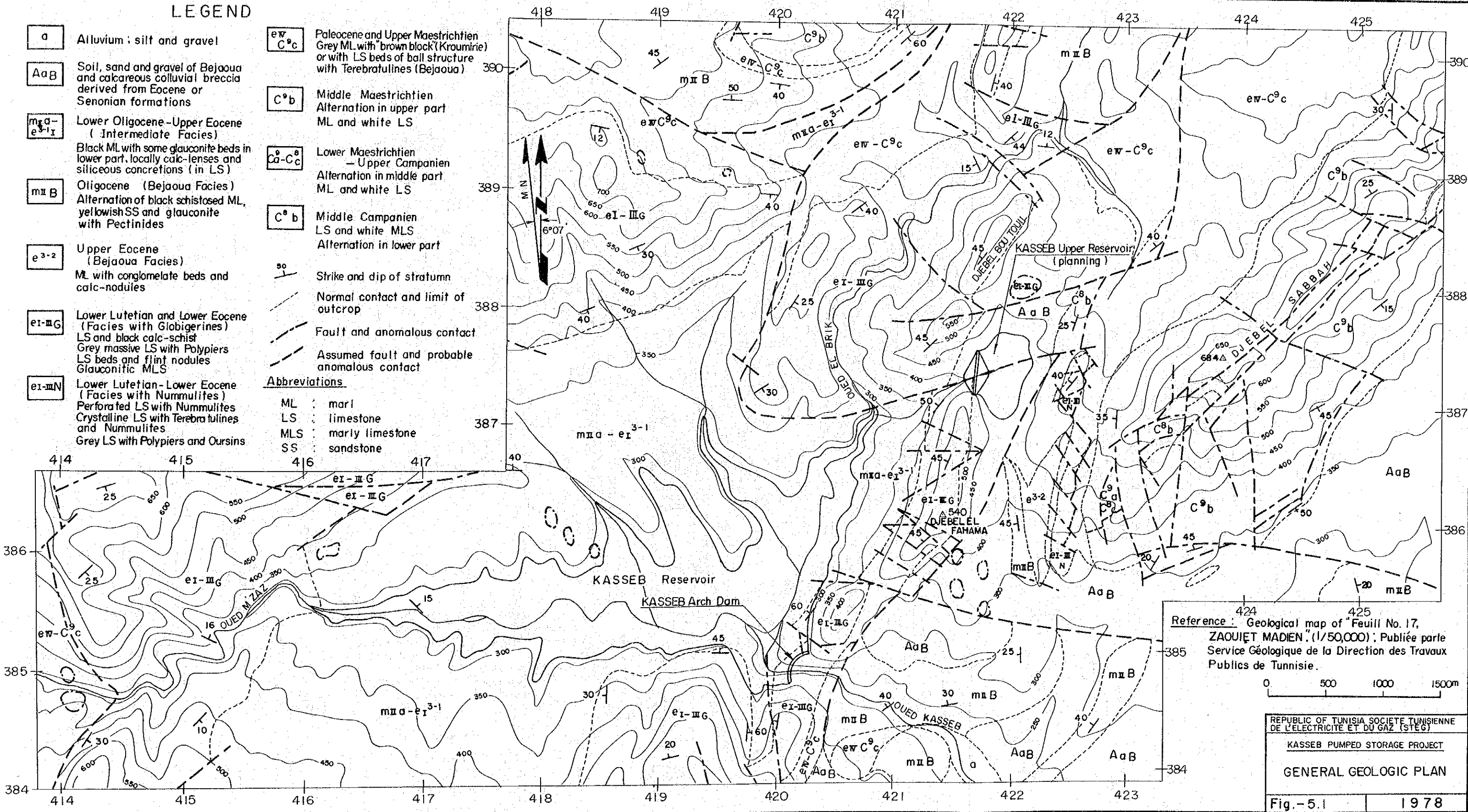
17.	Power House (3-3) Fig. - 8.15 (Centrale (3-3)) – Downstream Alternative (B) – (Drawdown : 20 m) (– Variante Aval (B) –) (Marnage : 20 m)	
18.	Intake and Outlet - 8.16 (Price d'eau amont et Prise d'eau aval)	
19.	225 kV Outdoor Switchyard (1-2) - 8.17 (Poste Extérieur de Sectionnement - 225 kV (1-2))	
20.	225 kV Outdoor Switchyard (2-2) - 8.18 (Poste Extérieur de Sectionnement - 225 kV (2-2))	

LEGEND

- | | | | |
|---|---|--------------------------------------|---|
| a | Alluvium : silt and gravel | ew-C^{9c} | Paleocene and Upper Maestrichtien
Grey ML with brown block (Kroumirie)
or with LS beds of ball structure
with Terebratulines (Bejaoua) |
| AaB | Soil, sand and gravel of Bejaoua
and calcareous colluvial breccia
derived from Eocene or
Senonian formations | C^{9b} | Middle Maestrichtien
Alternation in upper part
ML and white LS |
| m₁a-e₁³⁻¹ | Lower Oligocene-Upper Eocene
(Intermediate Facies)
Black ML with some glauconite beds in
lower part, locally calc-lenses and
siliceous concretions (in LS) | C^{8a}-C^{8b} | Lower Maestrichtien
- Upper Campanien
Alternation in middle part
ML and white LS |
| m₁B | Oligocene (Bejaoua Facies)
Alternation of black schistosed ML,
yellowish SS and glauconite
with Pectinides | C^{8b} | Middle Campanien
LS and white MLS
Alternation in lower part |
| e³⁻² | Upper Eocene
(Bejaoua Facies)
ML with conglomerate beds and
calc-nodules | 50 | Strike and dip of stratum |
| ei-III G | Lower Lutetian and Lower Eocene
(Facies with Globigerines)
LS and black calc-schist
Grey massive LS with Polyiers
LS beds and flint nodules
Glaucouitic MLS | --- | Normal contact and limit of
outcrop |
| ei-III N | Lower Lutetian-Lower Eocene
(Facies with Nummulites)
Perforated LS with Nummulites
Crystalline LS with Terebratulines
and Nummulites
Grey LS with Polyiers and Oursins | - - - | Fault and anomalous contact |
| | | - - - - | Assumed fault and probable
anomalous contact |

Abbreviations

- | | |
|-----|-------------------|
| ML | : marl |
| LS | : limestone |
| MLS | : marly limestone |
| SS | : sandstone |

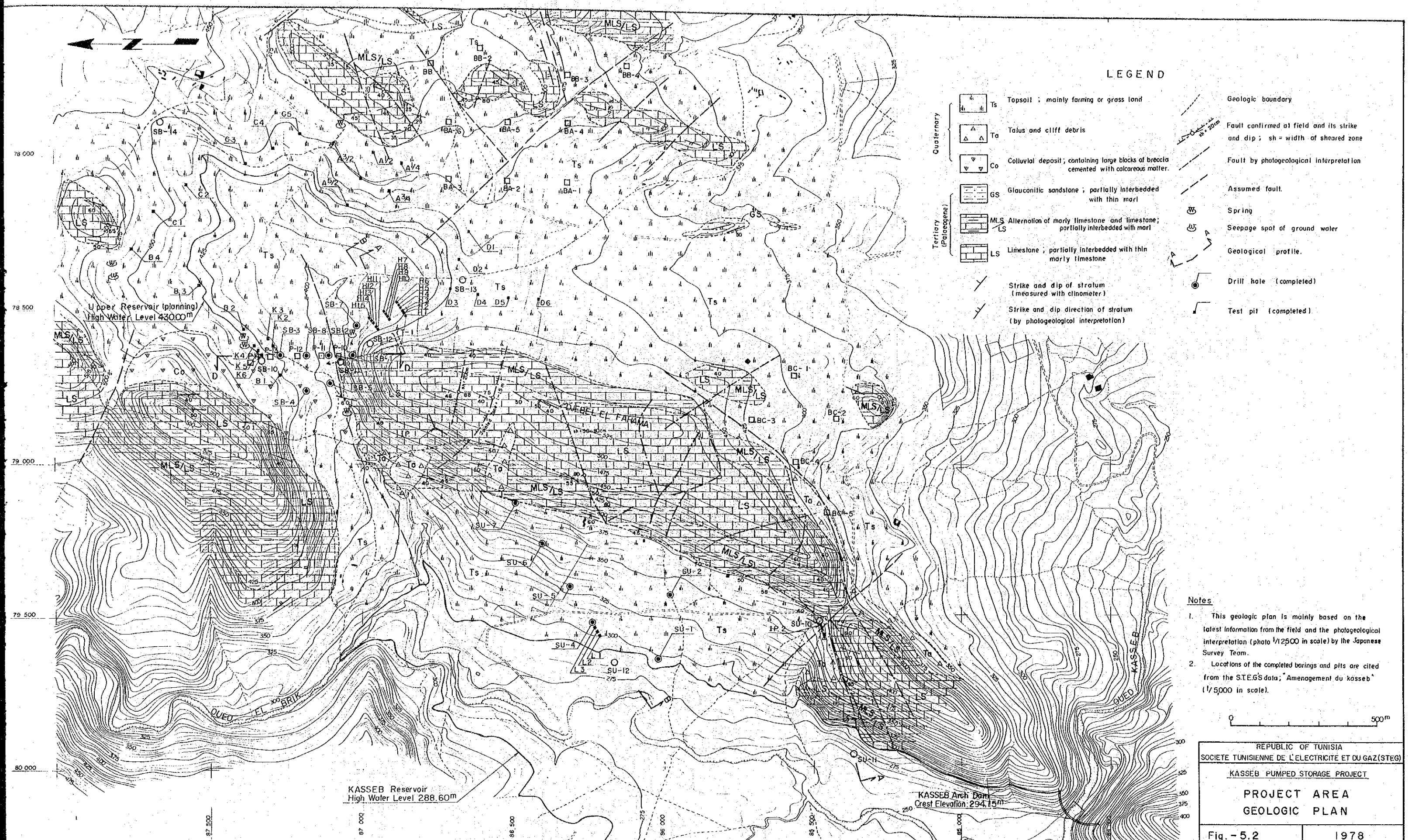


Reference : Geological map of "Feuill No. 17,
ZAOUÏET MADIEN" (1/50,000) ; Publiée par le
Service Géologique de la Direction des Travaux
Publics de Tunisie.



REPUBLIC OF TUNISIA SOCIÉTÉ TUNISIENNE
DE L'ÉLECTRICITÉ ET DU GAZ (STEG)
KASSEB PUMPED STORAGE PROJECT
GENERAL GEOLOGIC PLAN

Fig.-5.1 1978



LEGEND

- | | | | | | |
|-----------------------|--|--|--|------------------------------|--|
| Quaternary | | Ts Topsoil ; mainly farming or grass land | | Geologic boundary | |
| | | Ta Talus and cliff debris | | | Fault confirmed at field and its strike and dip ; sh = width of sheared zone |
| | | Co Colluvial deposit ; containing large blocks of breccia cemented with calcareous matter. | | | Fault by photogeological interpretation |
| Tertiary (Palaeogene) | | GS Glauconitic sandstone ; partially interbedded with thin marl | | Assumed fault. | |
| | | MLS/LS Alternation of marly limestone and limestone ; partially interbedded with marl | | Spring | |
| | | LS Limestone ; partially interbedded with thin marly limestone | | Seepage spot of ground water | |
| | | Strike and dip of stratum (measured with clinometer) | | Geological profile. | |
| | | Strike and dip direction of stratum (by photogeological interpretation) | | Drill hole (completed) | |
| | | | | Test pit (completed) | |

Notes

1. This geologic plan is mainly based on the latest information from the field and the photogeological interpretation (photo 1/12500 in scale) by the Japanese Survey Team.
2. Locations of the completed borings and pits are cited from the S.T.E.G.S data, "Aménagement du kasseb" (1/5000 in scale).



REPUBLIC OF TUNISIA	
SOCIETE TUNISIENNE DE L'ELECTRICITE ET DU GAZ (S.T.E.G.S)	
KASSEB PUMPED STORAGE PROJECT	
PROJECT AREA	
GEOLOGIC PLAN	
Fig. - 5.2	1978

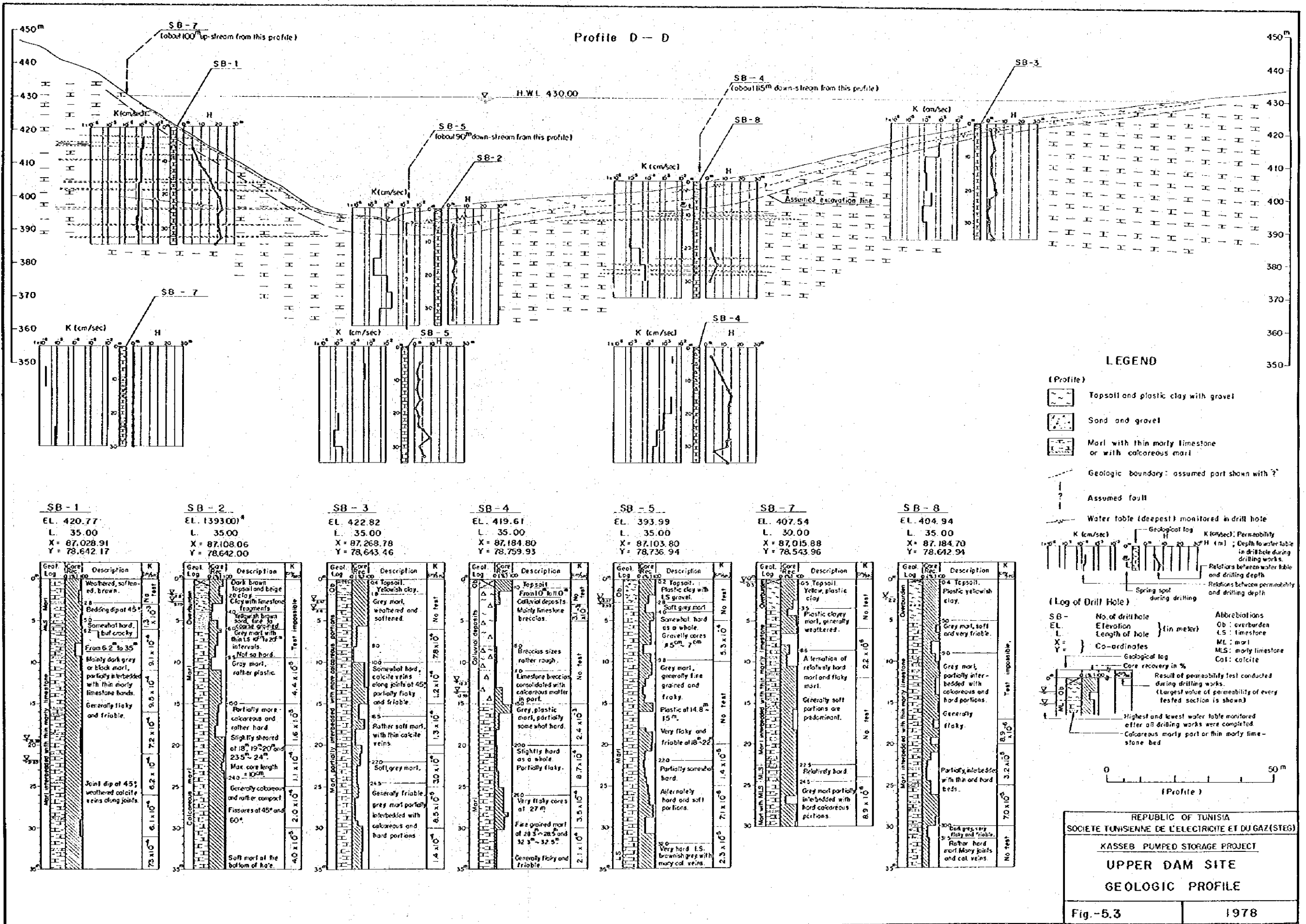
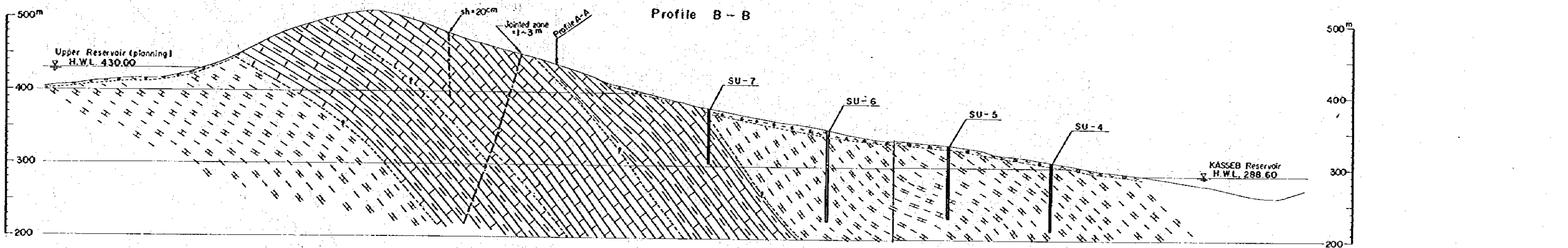
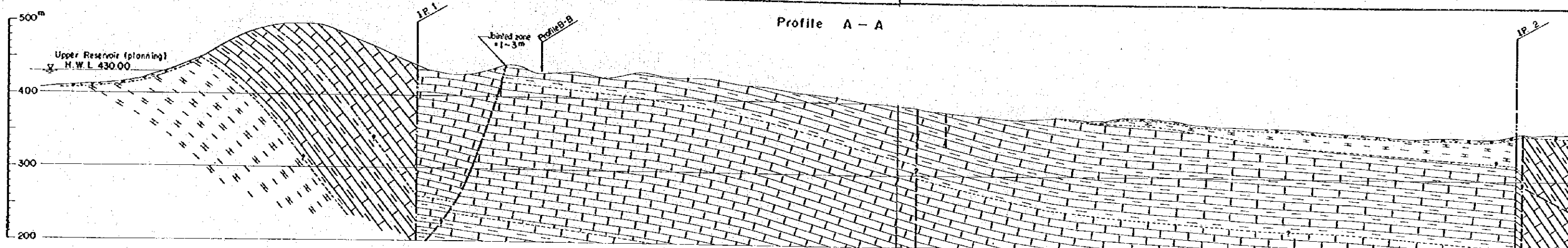


Fig.-5.3

1978

REPUBLIC OF TUNISIA
SOCIETE TUNISSENE DE L'ELECTRICITE ET DU GAZ (STEG)
KASSEB PUMPED STORAGE PROJECT
UPPER DAM SITE
GEOLOGIC PROFILE



SU - 1
 EL. 298.57
 L. 70.0
 X = 86,022.03
 Y = 79,644.05

Geol. Log	Core Rec. (m)	Description	K (cm/sec)
0-20	0-20	Yellow clay, plastic.	No test
20-40	20-40	Yellow sandy clay with marl gravel.	6.2 x 10 ⁻⁵
40-50	40-50	Weathered marl, partially gray and hard. Generally softened.	5.1 x 10 ⁻⁵
50-60	50-60	Mainly friable and friable marl, partially interbedded with thin hard marl.	6.4 x 10 ⁻⁵
60-70	60-70	Gray marl with thin glauconitic-sandy marl, somewhat friable in part.	1.4 x 10 ⁻⁵
70-80	70-80	Glauconitic-sandy marl, rather hard and cracky.	2.9 x 10 ⁻⁵
80-90	80-90	Mainly gray marl, partially interbedded with glauconitic-sandy marl.	7.6 x 10 ⁻⁵
90-100	90-100	Rather hard in glauconitic-sandy part.	9.4 x 10 ⁻⁵
100-110	100-110	Marl with thin sandy part.	1.2 x 10 ⁻⁴
110-120	110-120	Mainly gray or dark gray marl, flaky and friable as a whole.	3.2 x 10 ⁻⁵
120-130	120-130	Bedding approximately horizontal.	2.4 x 10 ⁻⁵
130-140	130-140	Partially greenish gray and somewhat hard cores.	2.1 x 10 ⁻⁵
140-150	140-150	Generally flaky and friable. Partially interbedded with thin glauconitic-sandy marl.	3.8 x 10 ⁻⁵
150-160	150-160	Gray, slightly sandy marl, somewhat hard and compact. Core length 5 to 10m in part. Bedding at 45°.	10 x 10 ⁻⁶
160-170	160-170	Marl, partially interbedded with thin glauconitic and sandy marl.	
170-180	170-180	Mainly gray or dark gray marl, flaky and friable as a whole.	
180-190	180-190	Bedding approximately horizontal.	
190-200	190-200	Partially glauconitic marl, friable in part.	

End of hole at 70m

SU - 2
 EL. 339.79
 L. 38.5
 X = 85,985.16
 Y = 79,429.74

Geol. Log	Core Rec. (m)	Description	K (cm/sec)
0-20	0-20	Topsoil and yellow clay.	No test
20-40	20-40	Weathered marl, schistosity at 45°.	
40-60	40-60	Mainly gray marl, partially interbedded with thin limestone and/or glauconitic-sandy marl.	No test
60-80	60-80	Generally rather flaky and friable.	2.0 x 10 ⁻⁴
80-100	80-100	Somewhat hard in calcareous or glauconitic-sandy part.	1.3 x 10 ⁻⁴
100-120	100-120	Disrupted and fractured, brittle, cracks at 45°.	No test
120-140	120-140	Hard limestone, pack of 60°.	

End of hole at 38.5m

SU - 4
 EL. 310.22
 L. 100.0
 X = 86,242.47
 Y = 79,516.81

Geol. Log	Core Rec. (m)	Description	K (cm/sec)
0-20	0-20	Topsoil and yellowish clay with small gravel.	No test
20-40	20-40	Mainly gray marl, softened. Many thin calcite veins. Cores broken into fragments in general.	No test
40-60	40-60	Gray, slightly schistose marl. Generally flaky and friable.	No test
60-80	60-80	Gray marl, slightly weathered, generally flaky and friable. Bedding at 60°-70°.	1.2 x 10 ⁻⁴
80-100	80-100	Partially greenish gray and somewhat hard cores.	1.4 x 10 ⁻⁴
100-120	100-120	Generally flaky and friable. Partially interbedded with thin glauconitic-sandy marl.	1.1 x 10 ⁻⁴
120-140	120-140	Very flaky or clayey at 430-445m and 480-55m.	2.7 x 10 ⁻⁴
140-160	140-160	Dark gray marl, with thin glauconitic marl in part. Core length 5 to 20m, somewhat exfoliative and friable as a whole.	3.5 x 10 ⁻⁴
160-180	160-180	Dark gray marl, with glauconitic and sandy marl in part. Core length 5m-10m and the rest gravelish cores.	2.2 x 10 ⁻⁴
180-200	180-200	Generally exfoliative, partially very flaky and friable. Bedding of 0°-20° in 675-78m and of 20°-30° in 78-100m.	7.5 x 10 ⁻⁵
200-220	200-220	Mainly gray or dark gray marl, flaky and friable as a whole.	4.4 x 10 ⁻⁴
220-240	220-240	Partially glauconitic marl, friable in part.	2.6 x 10 ⁻⁴

End of hole at 100m

SU - 5
 EL. 330.00
 L. 100.0
 X = 86,319.87
 Y = 79,400.52

Geol. Log	Core Rec. (m)	Description	K (cm/sec)
0-20	0-20	Topsoil and yellowish clay.	No test
20-40	20-40	Gray marl, very soft, plastic.	No test
40-60	40-60	Gray-dark gray marl, slightly schistose. Generally flaky and friable. Core length max 5-6m, mainly small fragments. Weak shearing recognizable as a whole. Bedding at 20° to 30°.	4.3 x 10 ⁻⁵
60-80	60-80	Dark gray marl, mainly flaky cores with some flint cores like coin.	No test
80-100	80-100	Bedding approximately horizontal.	2.6 x 10 ⁻⁴
100-120	100-120	Very flaky or clayey at 430-445m and 480-55m.	6.4 x 10 ⁻⁵
120-140	120-140	Dark gray marl, with thin glauconitic marl in part. Core length 5 to 20m, somewhat exfoliative and friable as a whole.	2.1 x 10 ⁻⁴
140-160	140-160	Dark gray marl, mainly flaky cores with some flint cores like coin.	2.3 x 10 ⁻⁵
160-180	160-180	Bedding approximately horizontal.	4.0 x 10 ⁻⁵
180-200	180-200	Very flaky or clayey at 430-445m and 480-55m.	No test
200-220	200-220	Dark gray marl, with thin glauconitic marl in part. Core length 5 to 20m, somewhat exfoliative and friable as a whole.	3.1 x 10 ⁻⁵
220-240	220-240	Dark gray marl, with glauconitic and sandy marl in part. Core length 5m-10m and the rest gravelish cores.	1.4 x 10 ⁻⁵
240-260	240-260	Generally exfoliative, partially very flaky and friable. Bedding of 0°-20° in 675-78m and of 20°-30° in 78-100m.	1.2 x 10 ⁻⁵
260-280	260-280	Mainly gray or dark gray marl, flaky and friable as a whole.	No water loss under 7kg/cm ²
280-300	280-300	Partially glauconitic marl, friable in part.	5.6 x 10 ⁻⁵
300-320	300-320	Partially glauconitic marl, friable in part.	6.1 x 10 ⁻⁵

End of hole at 100m

SU - 6
 EL. 350.14
 L. 125.0
 X = 86,413.12
 Y = 79,260.43

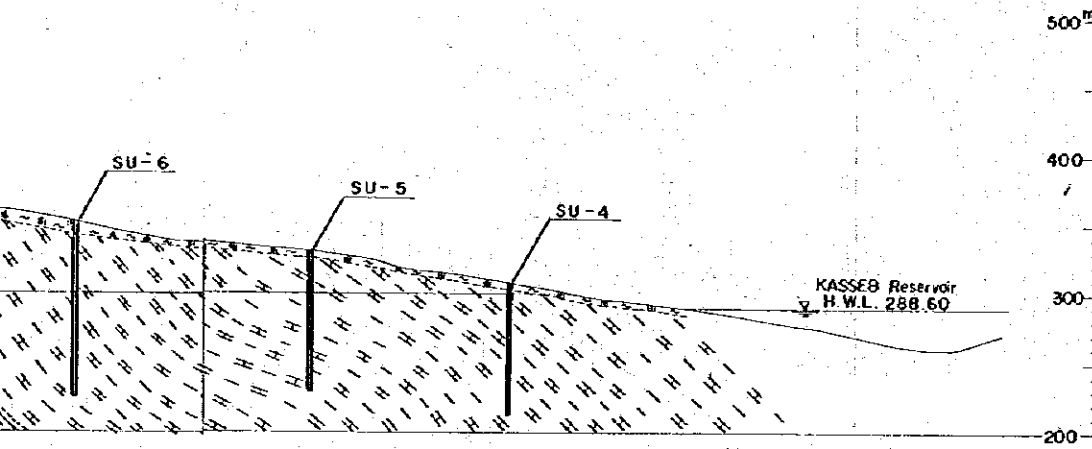
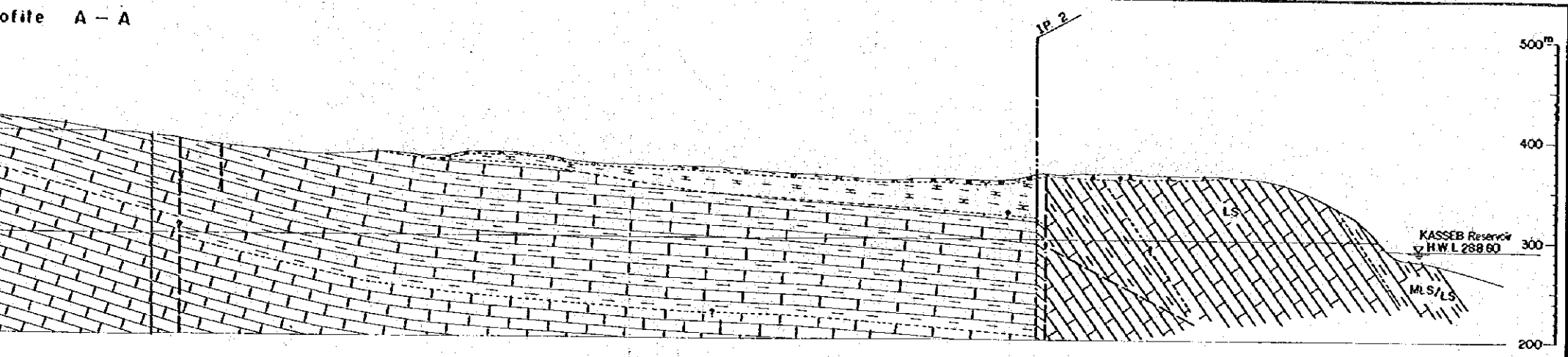
Geol. Log	Core Rec. (m)	Description	K (cm/sec)
0-20	0-20	Topsoil and yellowish sandy clay with a few gravels.	No test
20-40	20-40	Weathered marl, partially softened and brittle, partially clayey.	No test
40-60	40-60	Dark gray marl, mostly gravelish cores, partially very flaky.	No test
60-80	60-80	Some long cores (max 30cm) in part. Generally rather weathered and brittle.	(Test impossible)
80-100	80-100	Many thin calcite veins as a whole.	1.1 x 10 ⁻⁴
100-120	100-120	Partially flaky and brittle. Horizontal bedding of 50.5m. Dip 49° bedding of 52.5m.	1.2 x 10 ⁻⁴
120-140	120-140	Dark gray marl, somewhat hard as a whole. Core length 20cm-30cm, partially gravelish cores.	No test
140-160	140-160	Core broken into small pieces, rather brittle.	5.4 x 10 ⁻⁴
160-180	160-180	Mainly marl, partially with thin glauconitic and sandy marl. Core length 20cm to 30cm, somewhat hard but exfoliative in general.	4.1 x 10 ⁻⁴
180-200	180-200	Partially sheared and clayey. At 85m bedding about 60°.	7.6 x 10 ⁻⁵
200-220	200-220	Partially sheared and clayey. At 85m bedding about 60°.	2.9 x 10 ⁻⁴

End of hole at 125m

SU - 7
 EL. 360.24
 L. 75.0
 X = 86,502.77
 Y = 79,125.87

Geol. Log	Core Rec. (m)	Description	K (cm/sec)
0-20	0-20	Topsoil (30cm thick) and yellowish brown silt with limestone gravels (1.2cm to 10cm).	No test
20-40	20-40	Dark gray marl, generally weathered, flaky. Partially sandy or glauconitic. Bedding at 45°. Core length: average 10cm to 20cm.	2.8 x 10 ⁻⁴
40-60	40-60	Dark gray-marl, marly limestone. Dark colored part more marly, and slightly brittle.	3.0 x 10 ⁻⁴
60-80	60-80	Generally hard and compact. Bedding at 45°.	1.5 x 10 ⁻⁴
80-100	80-100	Core length: average 10cm to 20cm, max. 40cm.	1.6 x 10 ⁻⁴
100-120	100-120	Mainly gray limestone with only a few thin marly limestone.	1.4 x 10 ⁻⁴
120-140	120-140	Generally very hard and compact. Partially thin calcite veins.	50 x 10 ⁻⁴
140-160	140-160	Core length: average 20-30cm, max. 70cm.	2.0 x 10 ⁻⁴
160-180	160-180	Bedding at 45°.	

End of hole at 75m



LEGEND

- (Profile)
- Topsoil and mainly clay with gravel
 - Talus or cliff debris
 - Marl: partially interbedded with thin marly limestone
 - Alternation of marly limestone and limestone: partially interbedded with marl
 - Limestone: partially interbedded with thin marly limestone
 - Geologic boundary: assumed part shown with "?"
 - Fault and width of sheared zone
sh = width of sheared zone (in cm)
 - Assumed fault or assumed part of fault
 - Intersection point of profile
 - Drill hole

- (Log of Drill Hole)
- SU - No. of drill hole
 - EL - Elevation (in meter)
 - L - Length of hole (in meter)
 - X - Co-ordinates
 - Y - Co-ordinates
- Geological log
Core recovery in %
Result of permeability test conducted during drilling works. (Largest value of permeability of every tested section is shown.)
Calcareous marly part or thin marly limestone bed
Water table monitored during drilling works
Highest and lowest water table monitored after all drilling works were completed.
- 0 300m
(Profile)

SU - 6	
EL. 350.14 L. 125.0 X = 86,413.12 Y = 79,260.43	
Geol. Log	Description
0-10	Topsoil and yellowish sandy clay with a few gravels.
10-15	Weathered marl softened and brittle, partially clayey.
15-20	Dark grey marl, mostly gravelly cores, partially very flaky.
20-30	Some long cores (max 30cm) in part.
30-40	Generally rather weathered and brittle.
40-50	Many thin calcite veins as a whole.
50-55	3-2-522 Sheared and brittle. Partially flaky and brittle. Horizontal bedding at 50.5m. Dip 45° bedding at 52.5m.
55-60	Dark grey marl, somewhat hard as a whole. Core length 20cm to 30cm, partially gravelly cores.
60-65	Core broken into small pieces, rather brittle.
65-70	From 73.5m to 102m
70-80	Mainly marl, partially with thin glauconitic and sandy marl. Core length 20cm to 30cm, somewhat hard but exfoliative in general.
80-90	Partially sheared and clayey. At 85m, bedding about 60°.

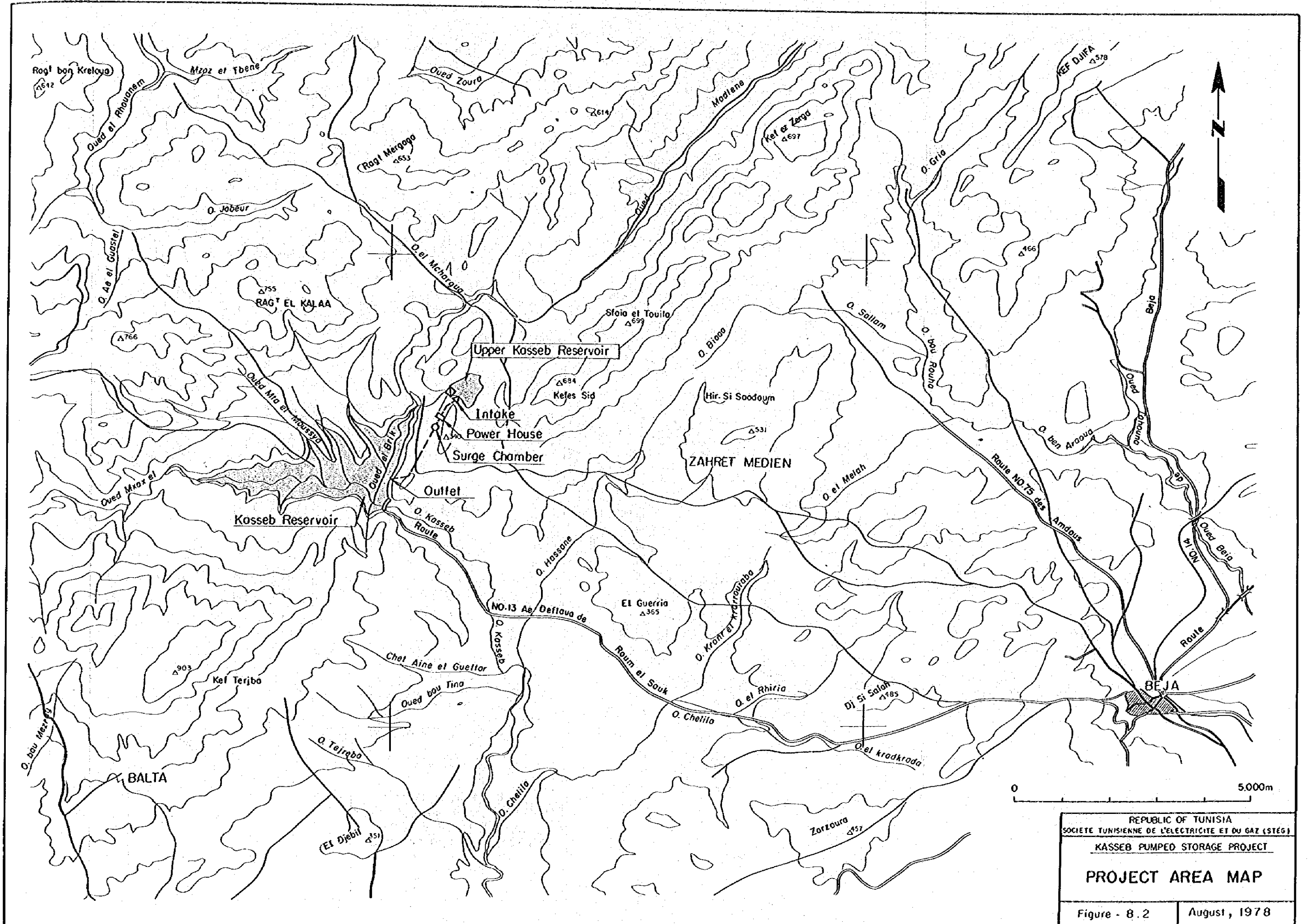
SU - 7	
EL. 380.24 L. 75.0 X = 86,502.77 Y = 79,125.87	
Geol. Log	Description
0-10	Topsoil (30cm thick) and yellowish brown silt with limestone gravels 1#2cm to 10cm.
10-15	Dark grey marl, generally weathered, flaky. Partially sandy or glauconitic. Bedding at 45°.
15-20	Dark grey-grey, marly limestone. Dark colored part more marly and slightly brittle.
20-30	Generally hard and compact. Bedding at 45°.
30-40	Core length: average 10cm to 20cm, max. 40cm.
40-50	Mainly grey limestone with only a few thin marly limestone.
50-60	Generally very hard and compact. Partially thin calcite veins.
60-70	Core length: average 20-30cm, max. 70cm.
70-75	Bedding at 45°.

REPUBLIC OF TUNISIA
SOCIETE TUNISIENNE DE L'ELECTRICITE ET DU GAZ (STEG)

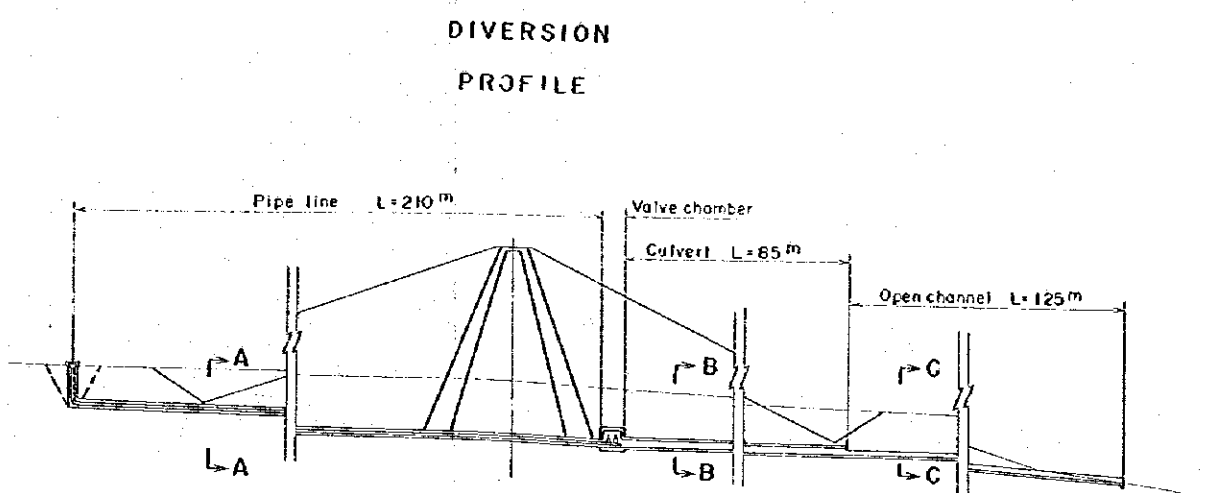
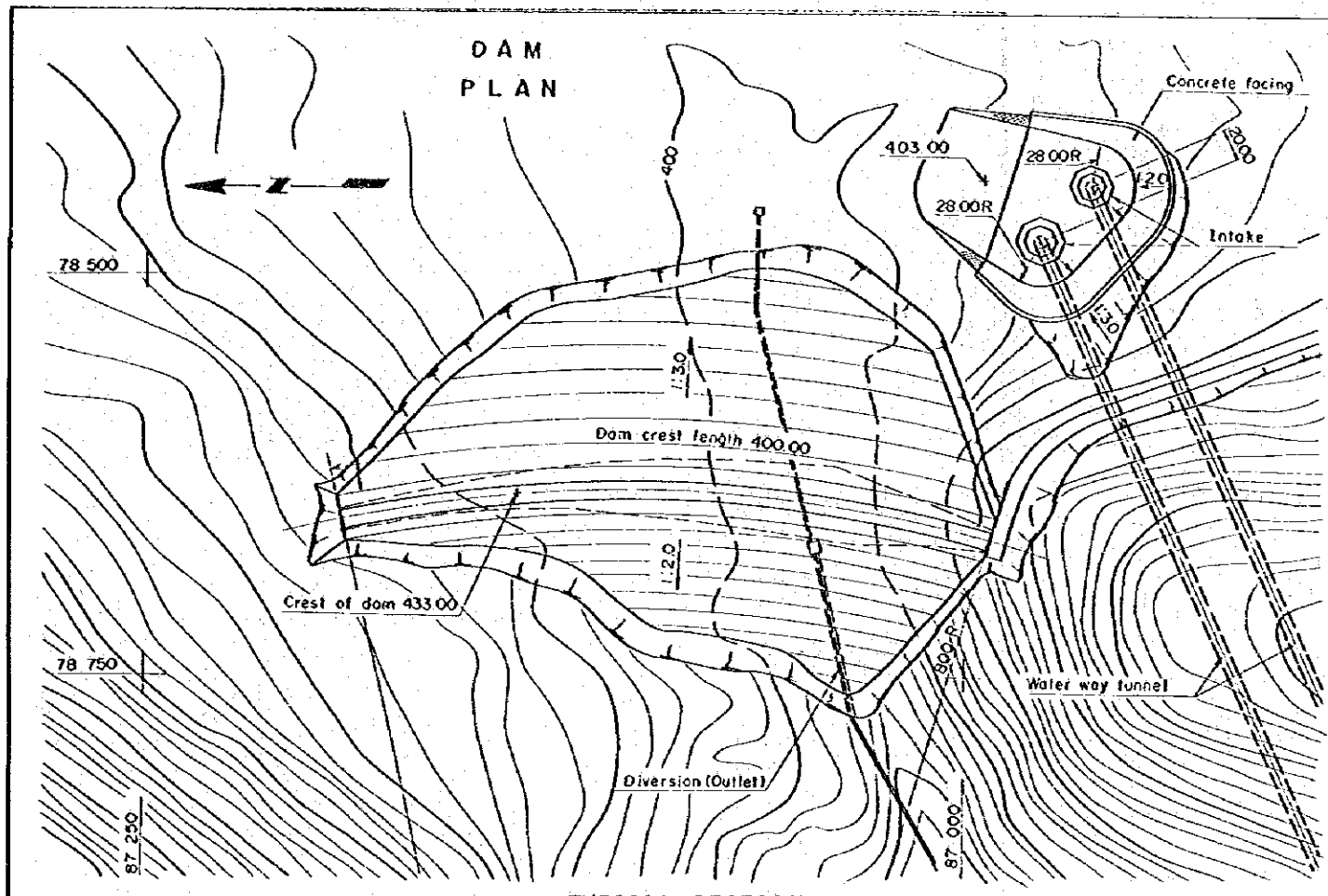
KASSEB PUMPED STORAGE PROJECT

WATER WAY ALIGNMENT
GEOLOGIC PROFILE

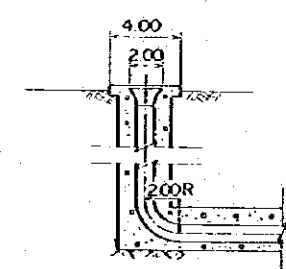
Fig - 5.4 1978



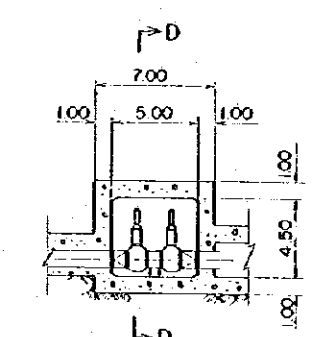
REPUBLIC OF TUNISIA
 SOCIETE TUNISIENNE DE L'ELECTRICITE ET DU GAZ (STEG)
 KASSEB PUMPED STORAGE PROJECT
PROJECT AREA MAP
 Figure - 8.2 August, 1978



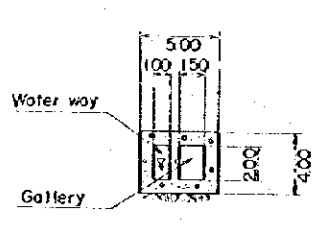
INTAKE LONGITUDINAL SECTION VALVE CHAMBER LONGITUDINAL SECTION B-B SECTION



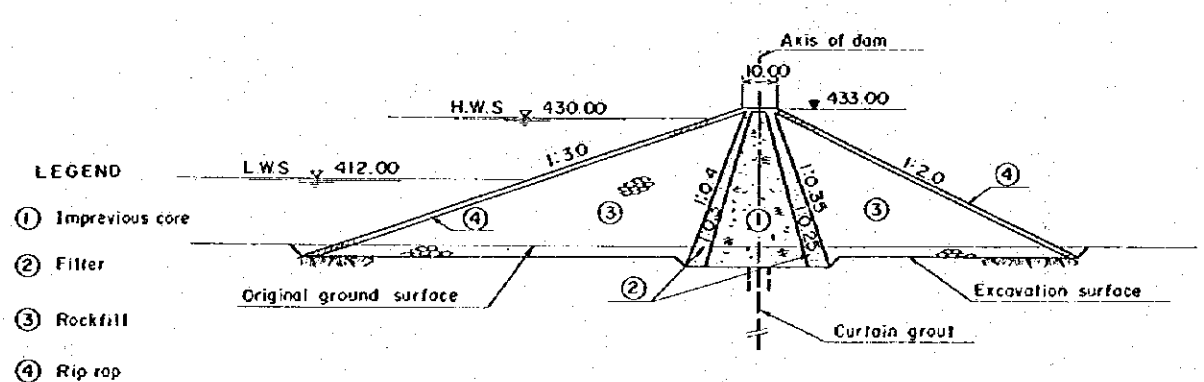
A-A SECTION



D-D SECTION

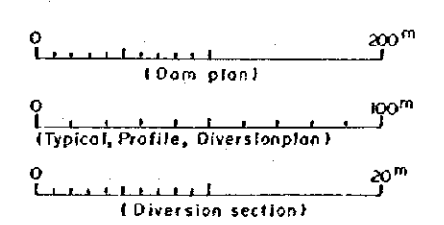
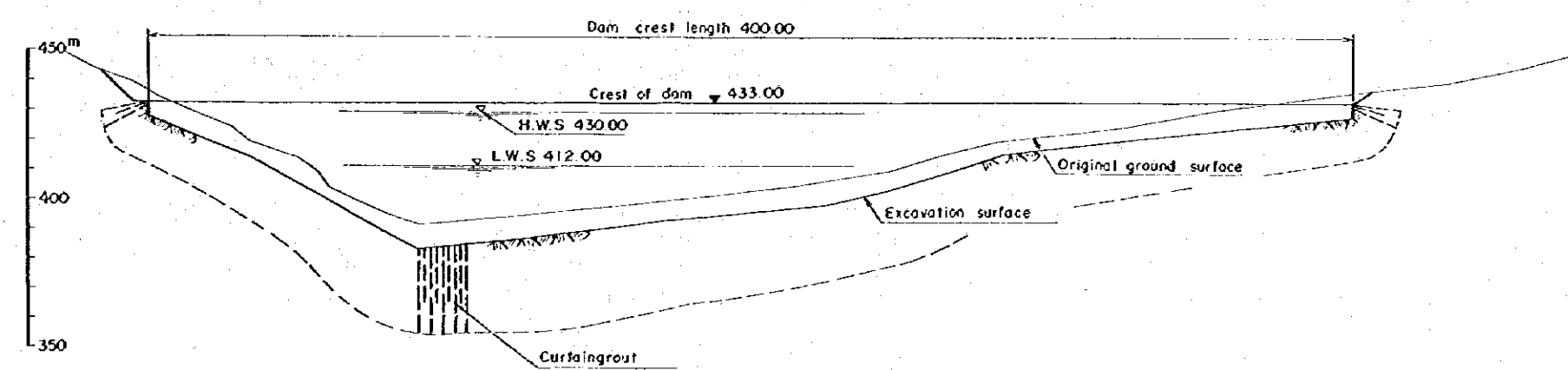


C-C SECTION

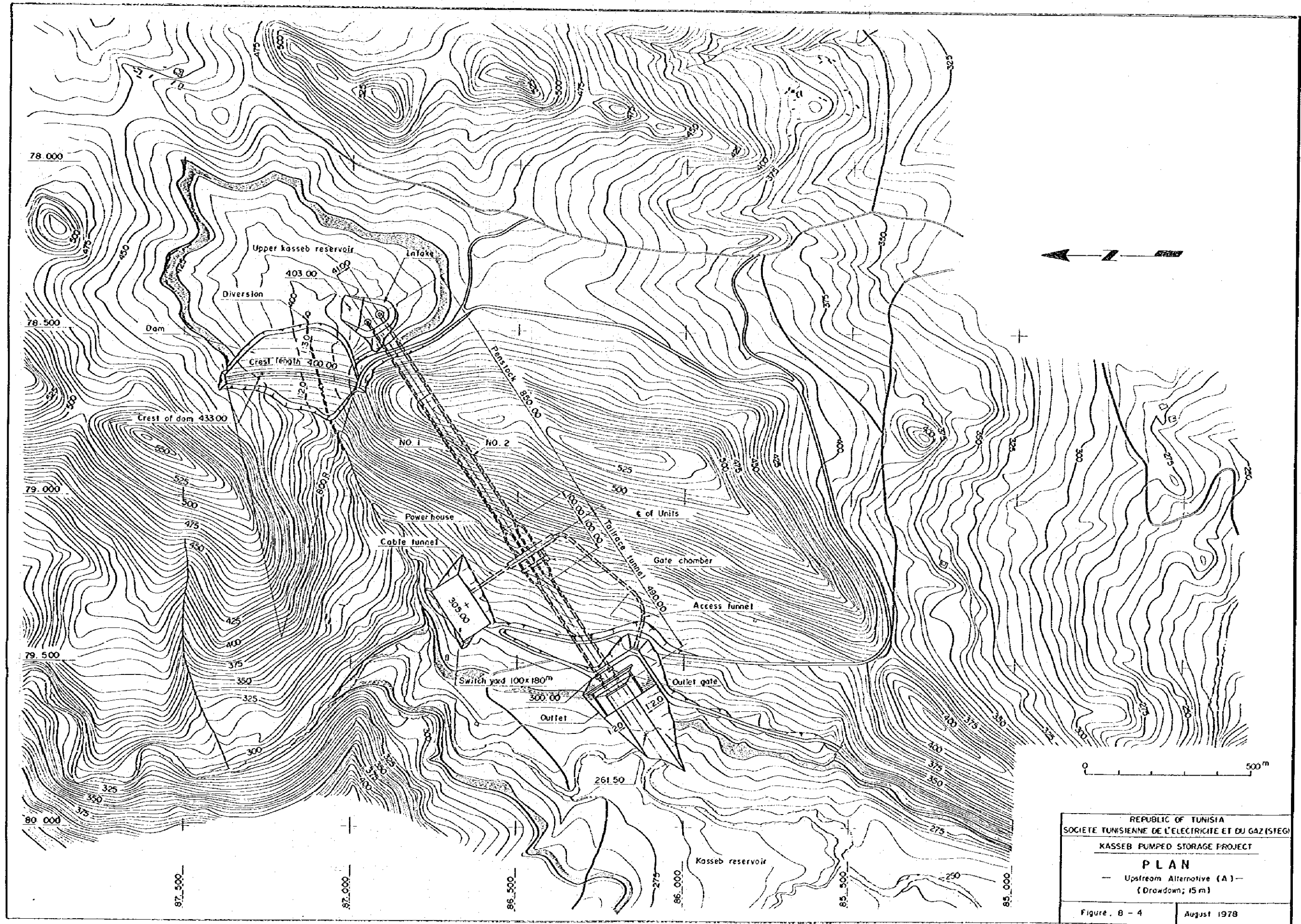


- LEGEND
- ① Impervious core
 - ② Filter
 - ③ Rockfill
 - ④ Rip rap

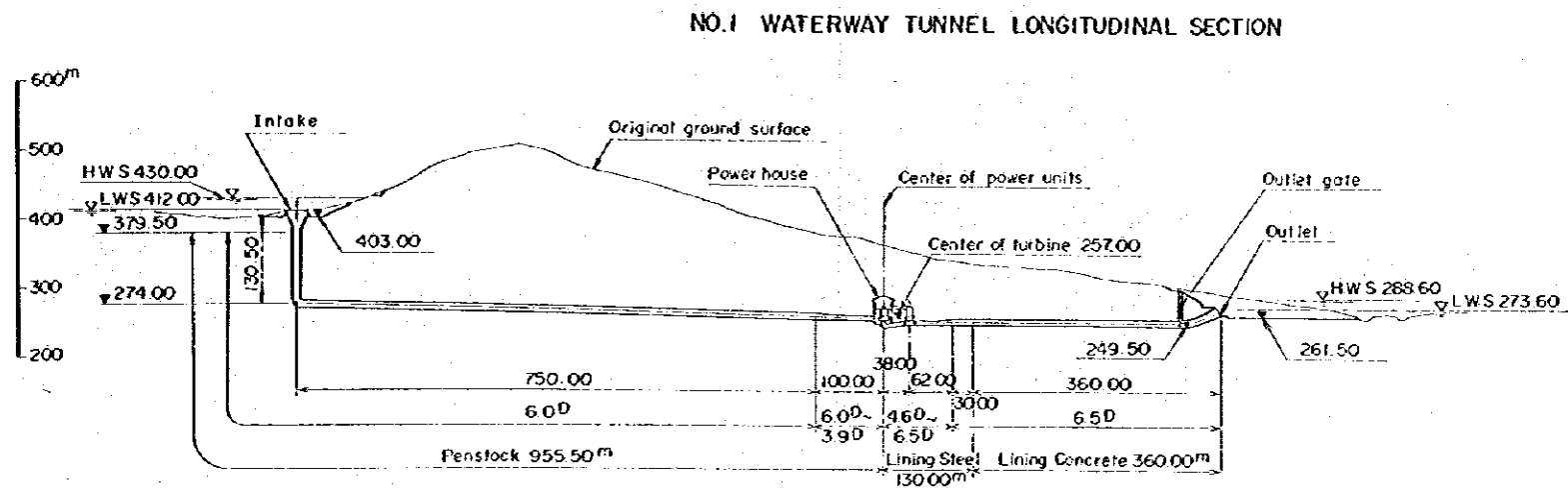
PROFILE



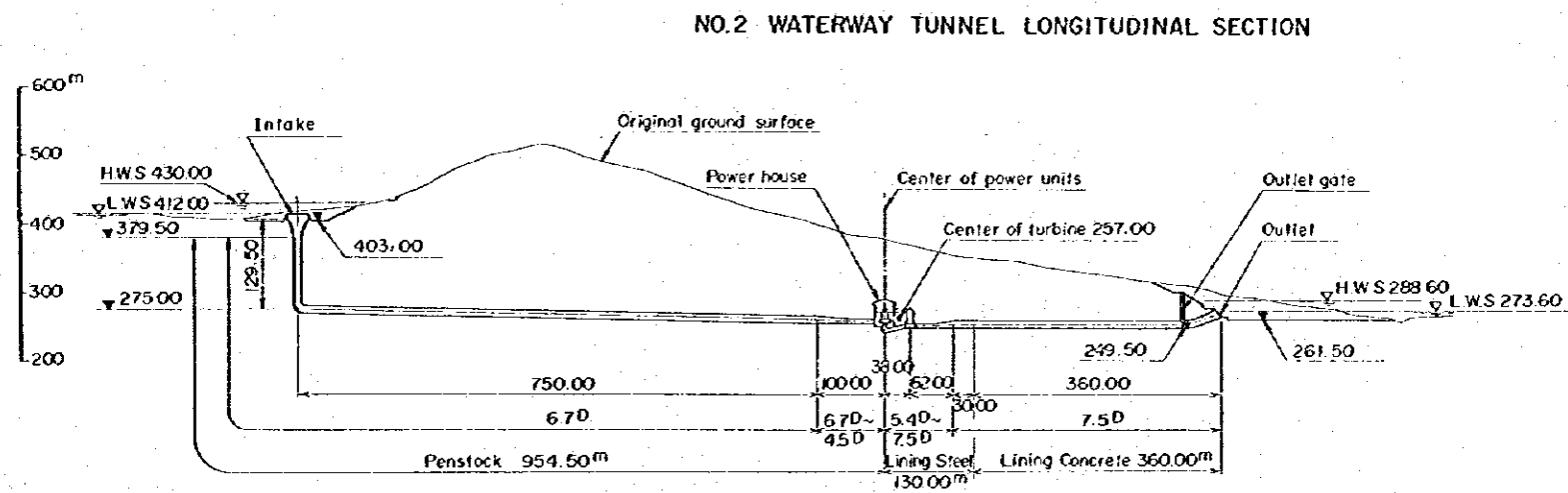
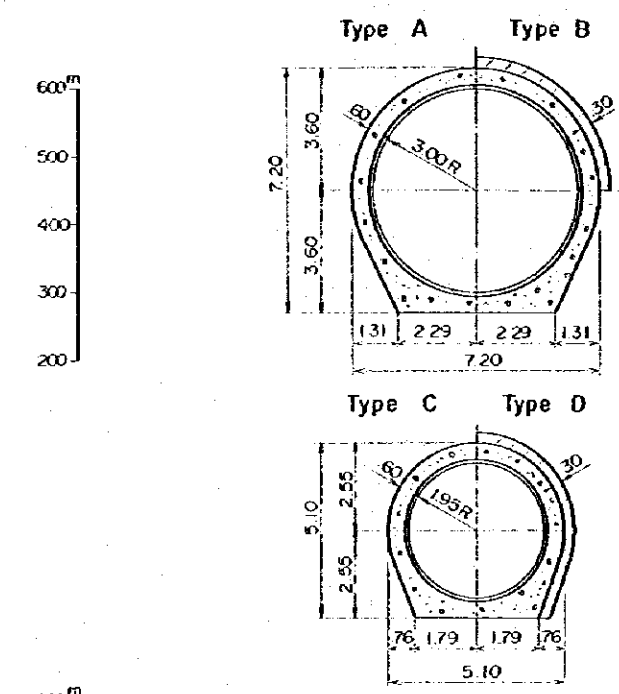
REPUBLIC OF TUNISIA
 SOCIÉTÉ TUNISIENNE DE L'ÉLECTRICITÉ ET DU GAZ (STEG)
 KASSEB PUMPED STORAGE PROJECT
DAM AND DIVERSION (OUTLET)
 - Upstream Alternative (A) -
 (Drawdown: 15 m)
 Figure 8-3 August 1978



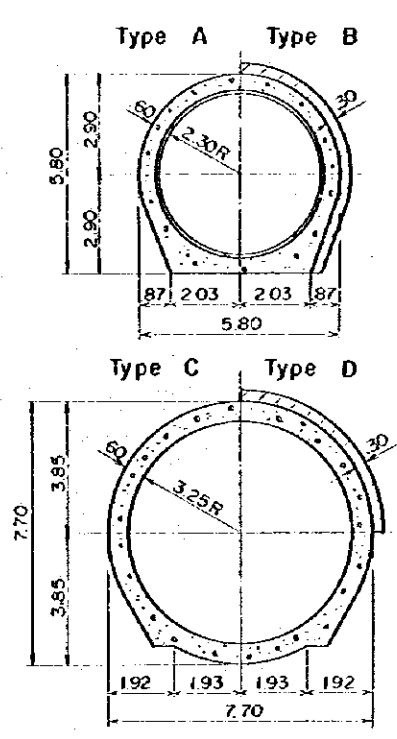
REPUBLIC OF TUNISIA
 SOCIETE TUNISienne DE L'ELECTRICITE ET DU GAZ (STEG)
 KASSEB PUMPED STORAGE PROJECT
PLAN
 — Upstream Alternative (A) —
 (Drawdown; 15 m)
 Figure . 8 - 4 August 1978



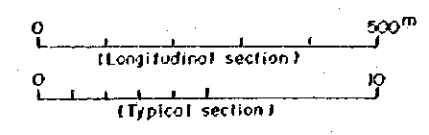
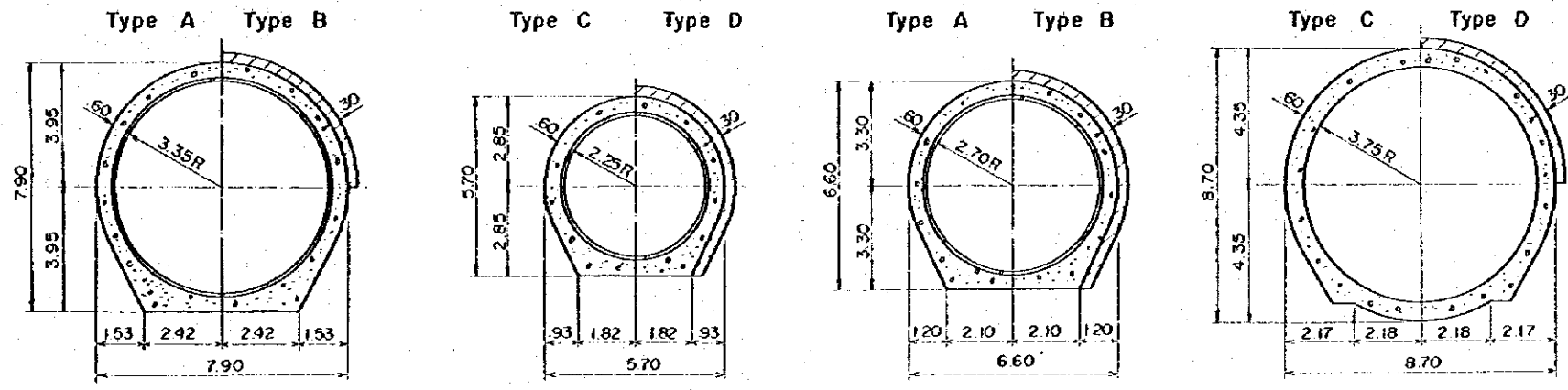
NO.1 WATERWAY TUNNEL TYPICAL SECTION PENSTOCK



TAILRACE TUNNEL



NO.2 WATERWAY TUNNEL TYPICAL SECTION PENSTOCK TAILRACE TUNNEL

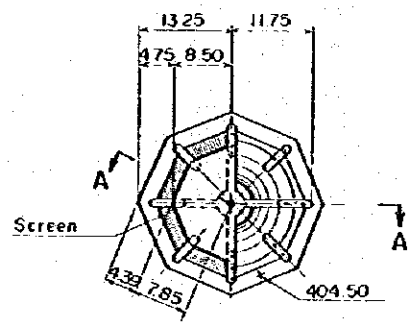


REPUBLIC OF TUNISIA
SOCIETE TUNISIENNE DE L'ELECTRICITE ET DU GAZ (STEG)

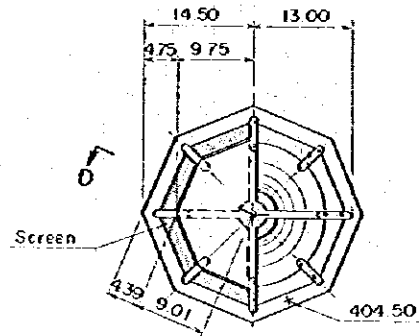
KASSEB PUMPED STORAGE PROJECT
WATERWAY TUNNELS
— Upstream Alternative (A) —
(Drawdown: 15m)

Figure. 8-5 August 1978

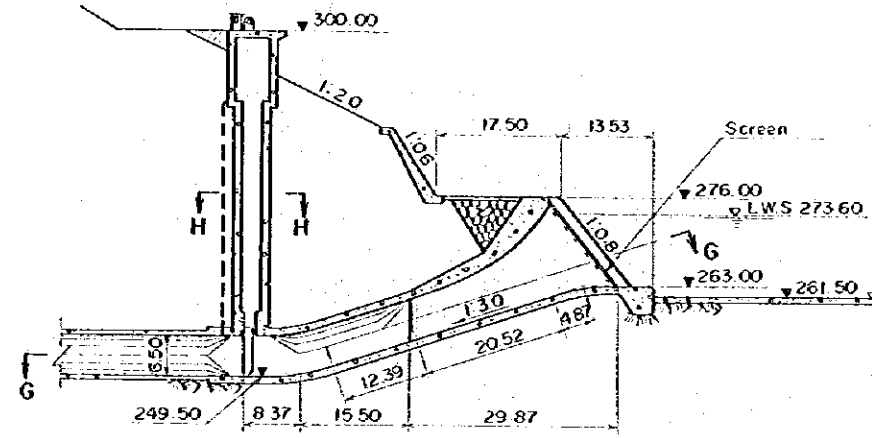
NO. 1 INTAKE
PLAN



NO. 2 INTAKE
PLAN

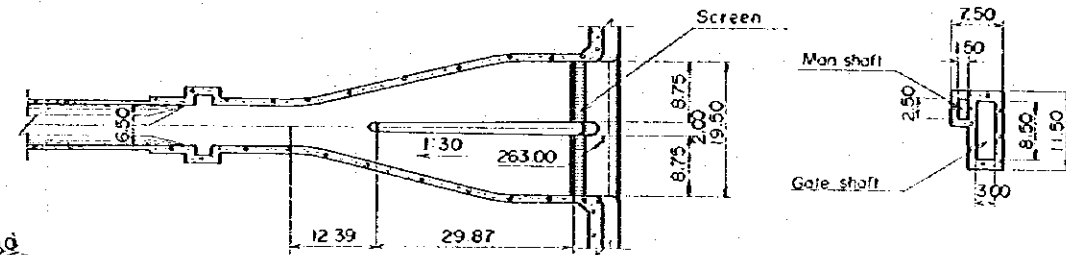


NO. 1 OUTLET LONGITUDINAL SECTION

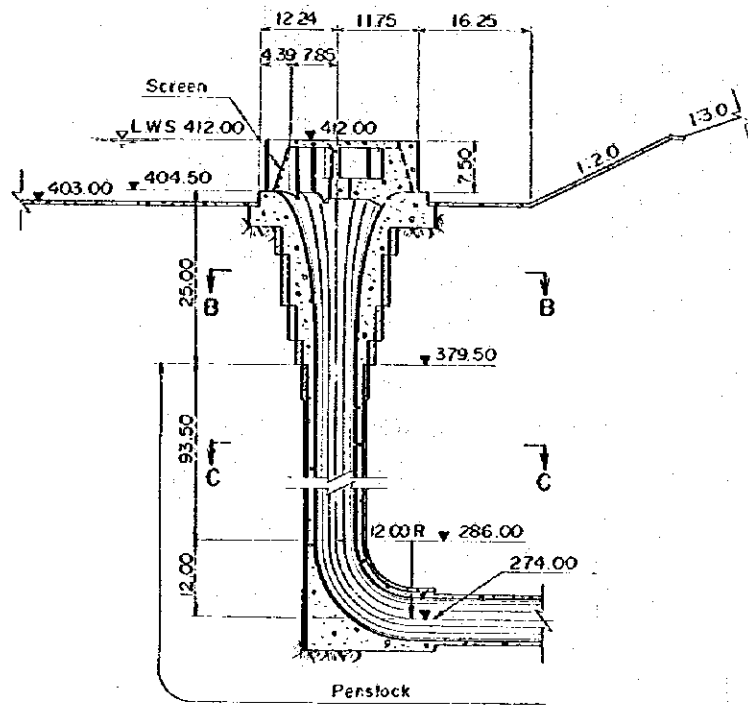


G-G SECTION

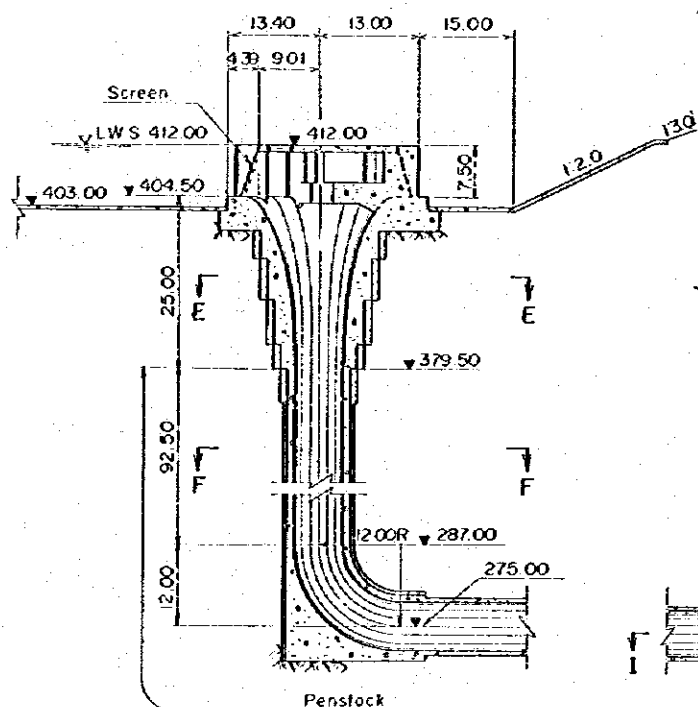
H-H SECTION



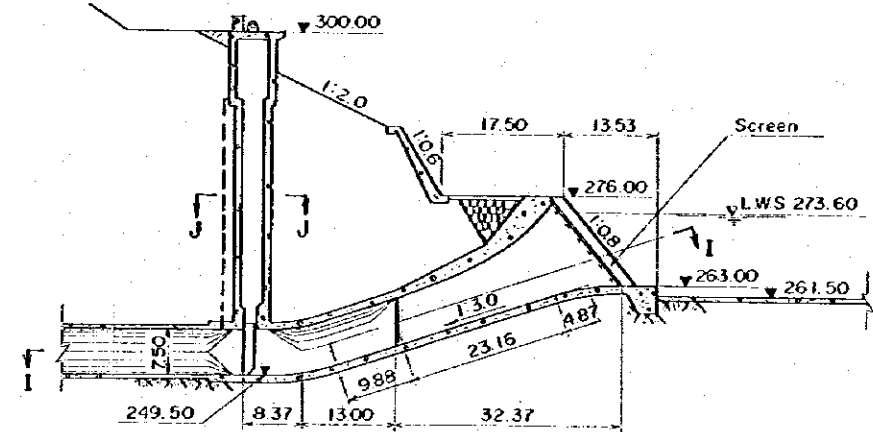
A-A SECTION



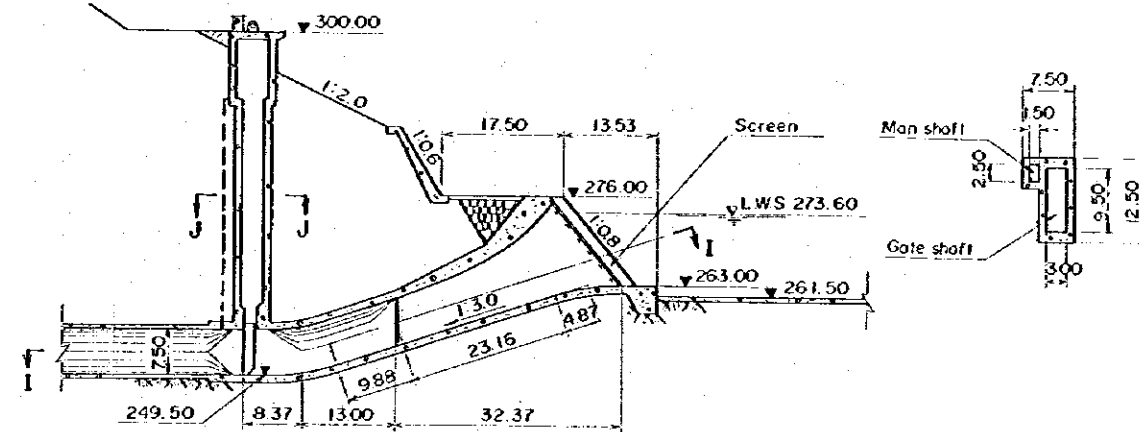
D-D SECTION



NO. 2 OUTLET LONGITUDINAL SECTION

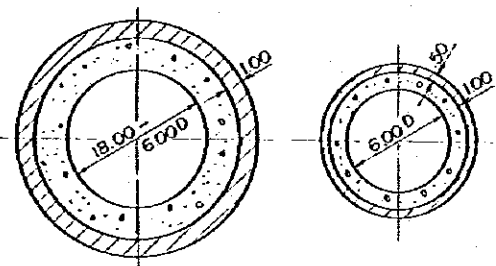


J-J SECTION



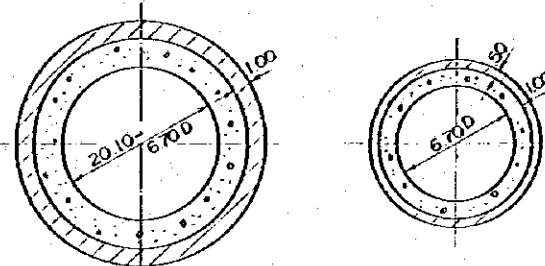
B-B SECTION

C-C SECTION

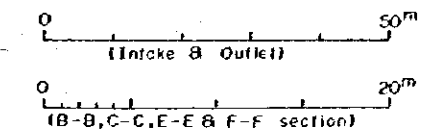
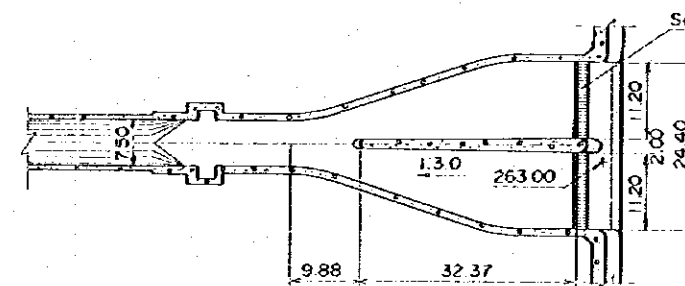


E-E SECTION

F-F SECTION

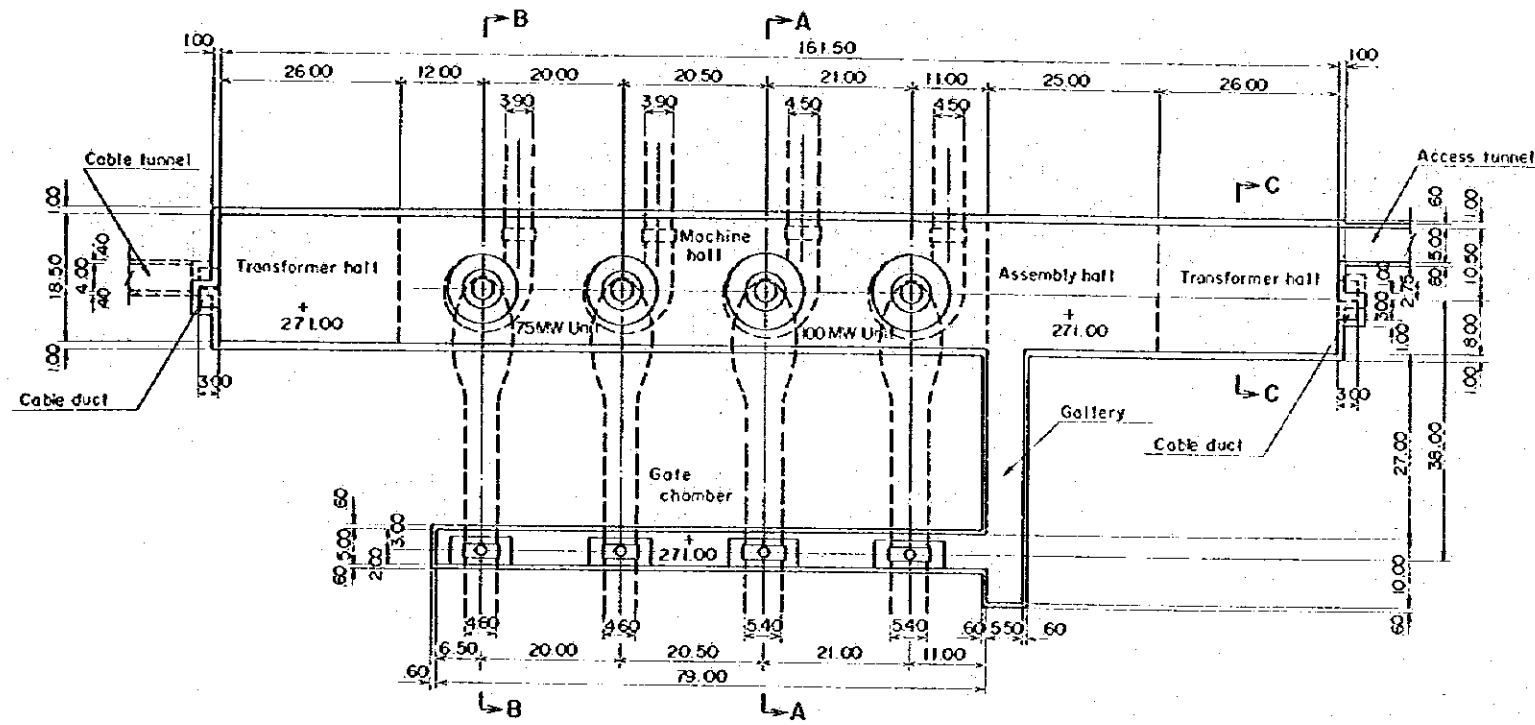


I-I SECTION

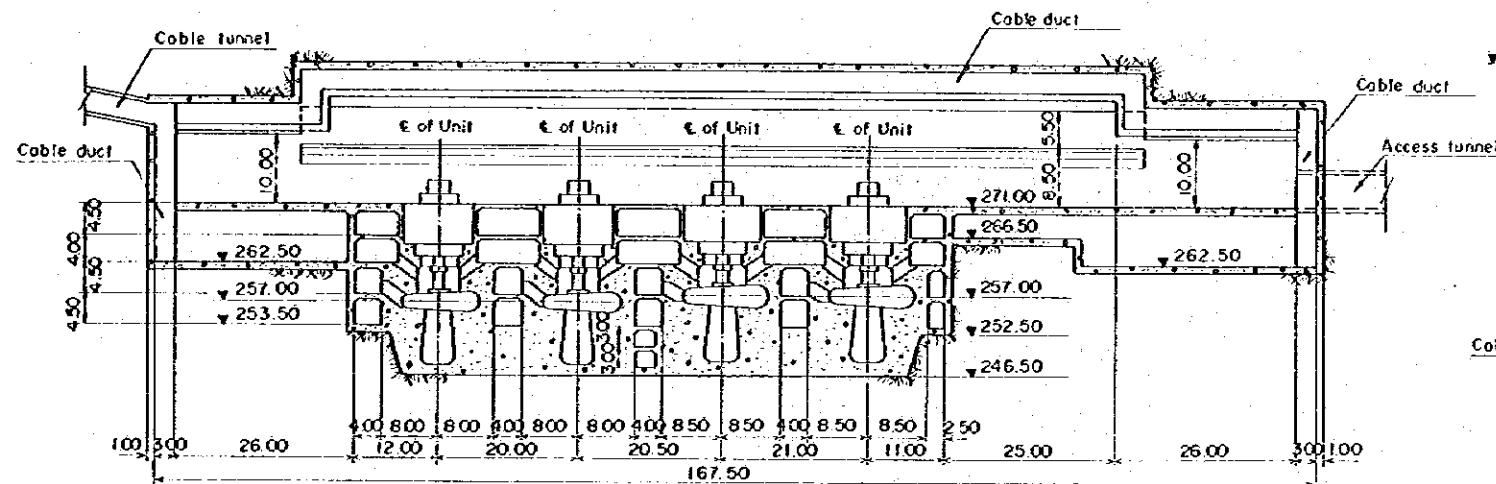


REPUBLIC OF TUNISIA
SOCIÉTÉ TUNISIENNE DE L'ÉLECTRICITÉ ET DU GAZ (STEG)
KASSEB PUMPED STORAGE PROJECT
INTAKE AND OUTLET
— Upstream Alternative (A) —
(Drawdown: 15 m)

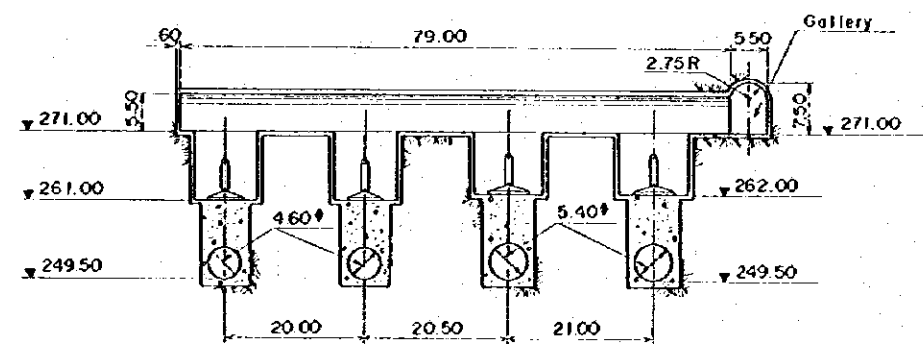
POWERPLANT PLAN



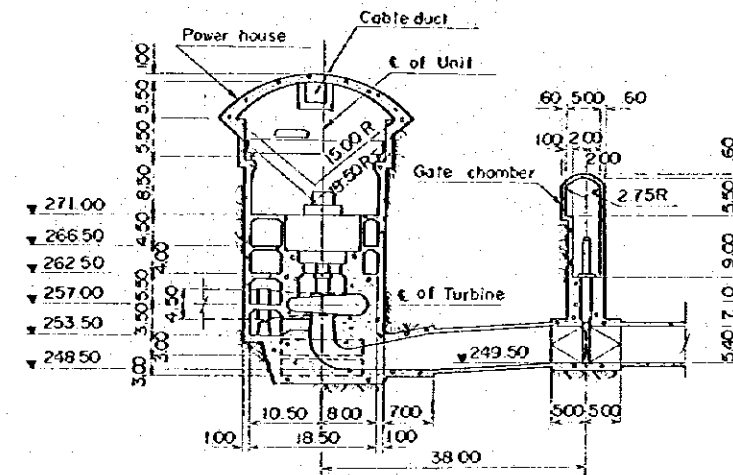
POWER HOUSE LONGITUDINAL SECTION



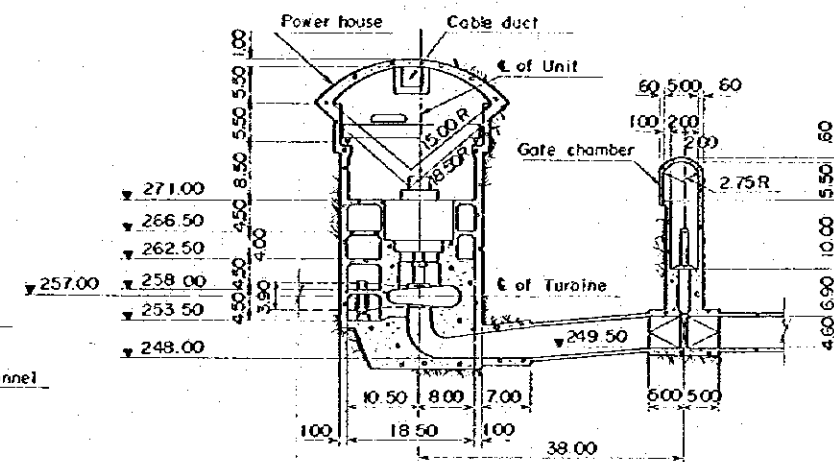
GATE CHAMBER LONGITUDINAL SECTION



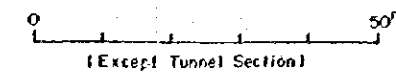
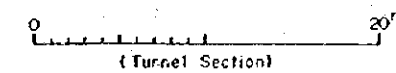
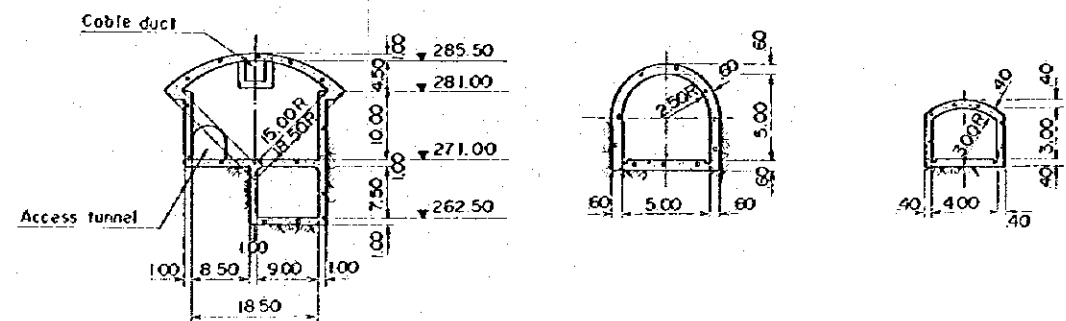
A-A SECTION (100MW SIDE)



B-B SECTION (75MW SIDE)

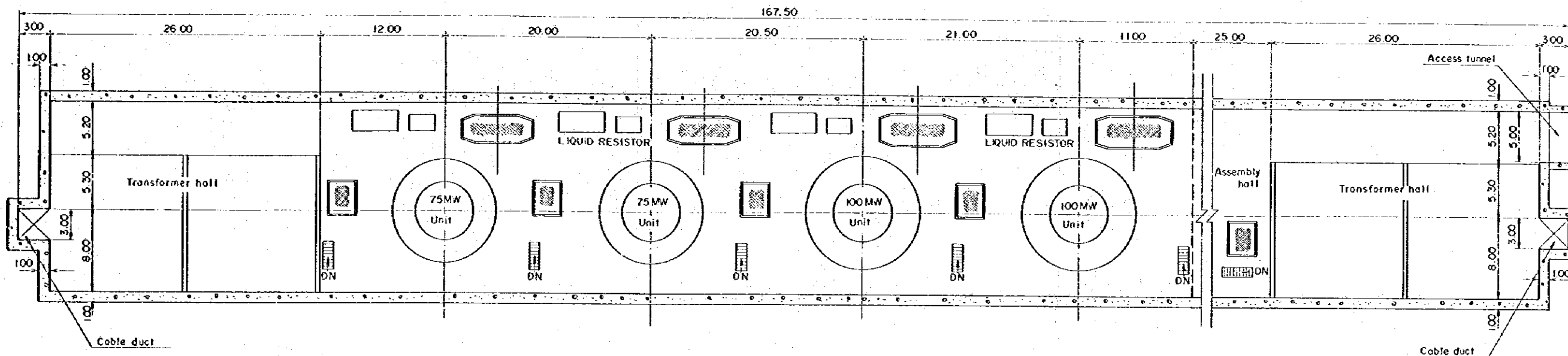


TRANSFORMER HALL (C-C) SECTION ACCESS TUNNEL SECTION CABLE TUNNEL SECTION

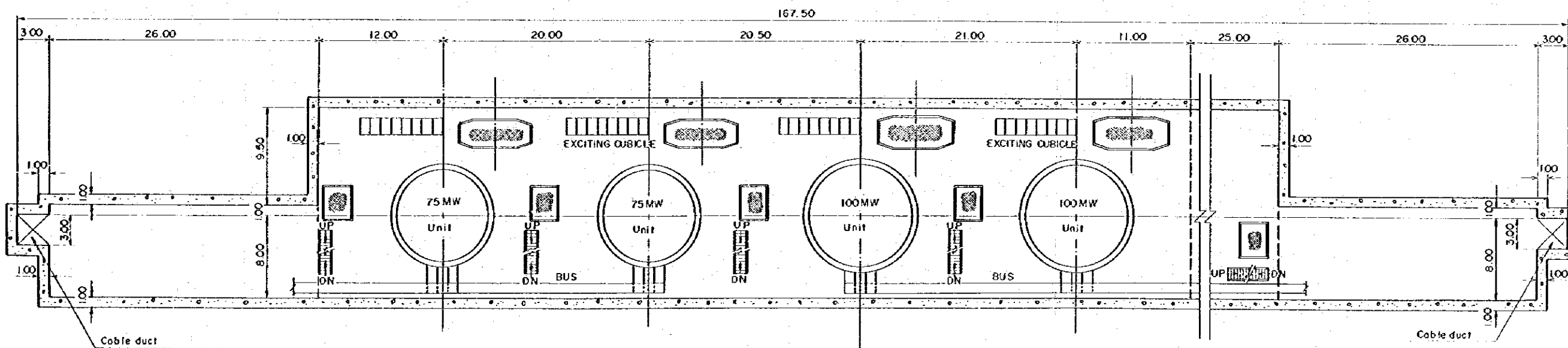


REPUBLIC OF TUNISIA
SOCIETE TUNISIENNE DE L'ELECTRICITE ET DU GAZ (STEG)
KASSEB PUMPED STORAGE PROJECT
POWER HOUSE (1-3)
Upstream Alternative (A1)
(Drawdown: 15 m)

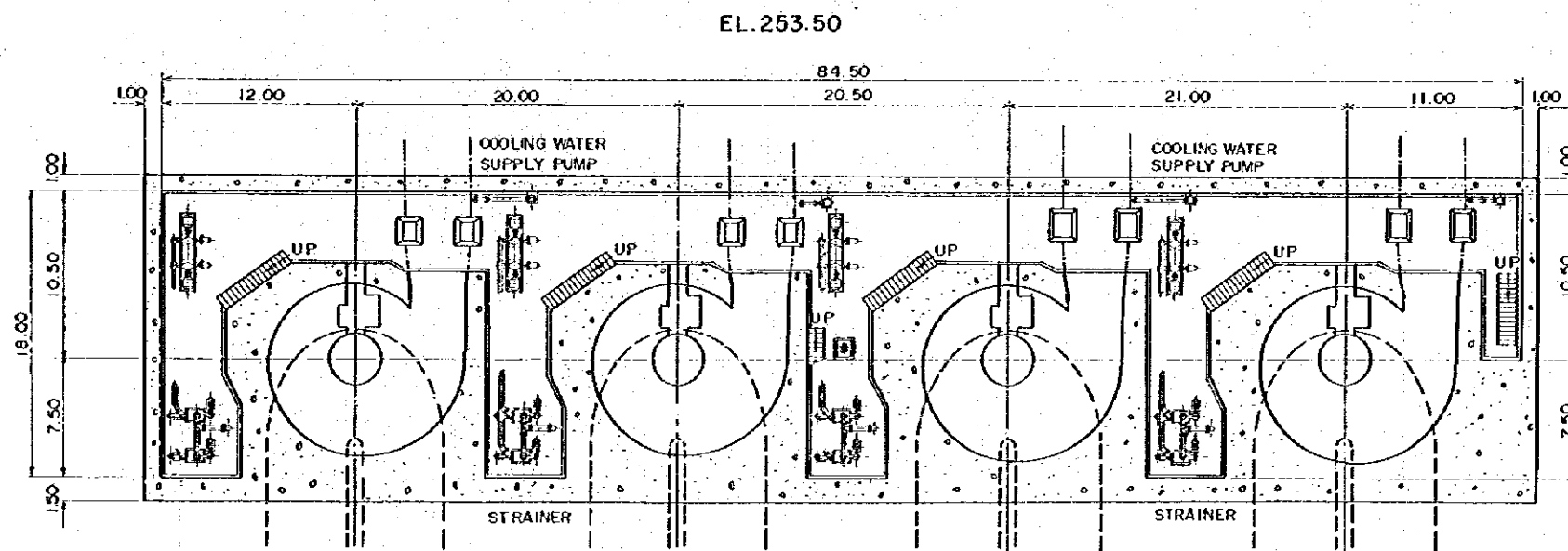
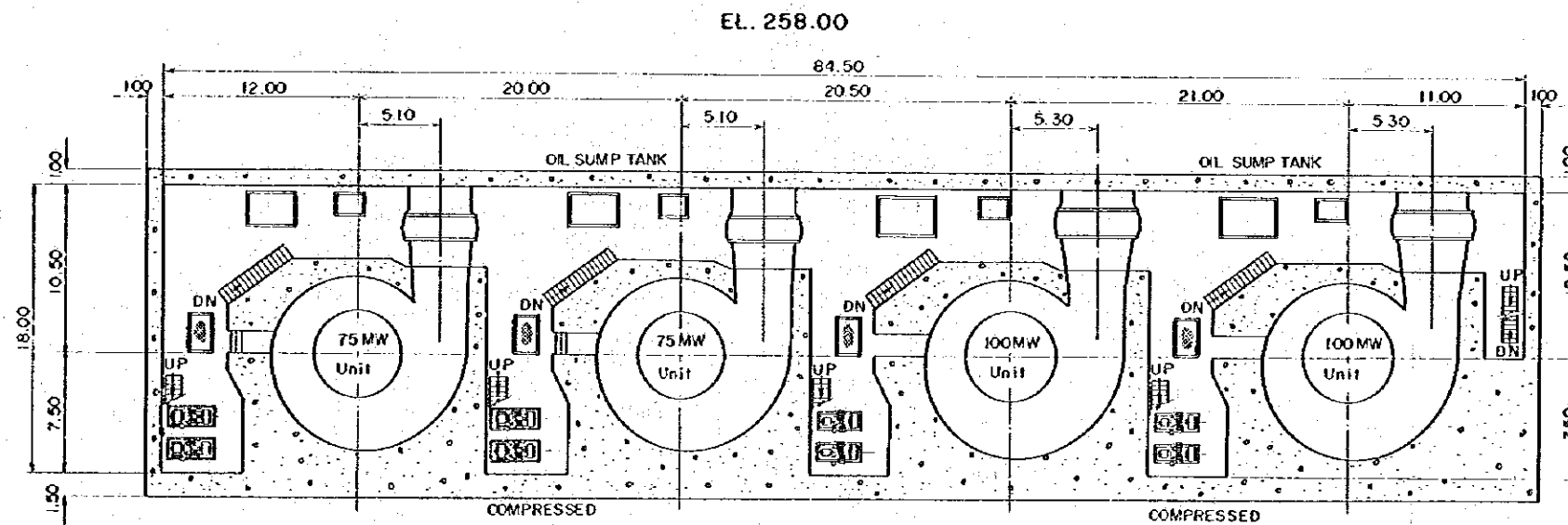
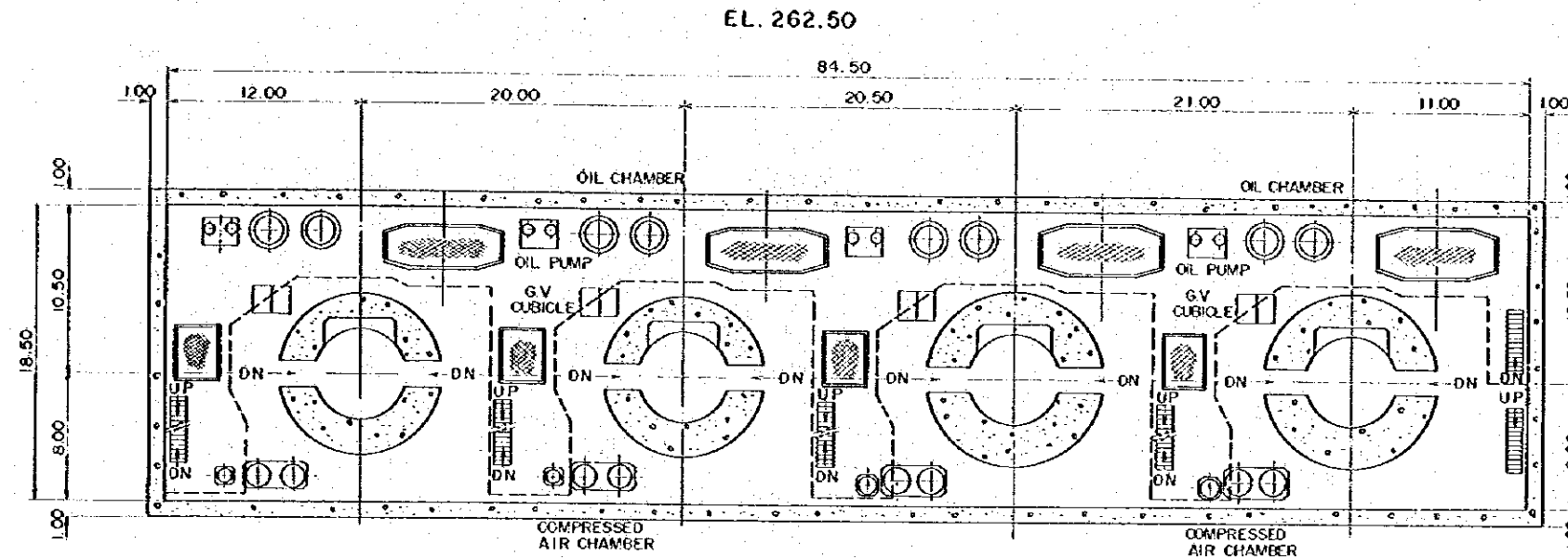
EL. 271.00



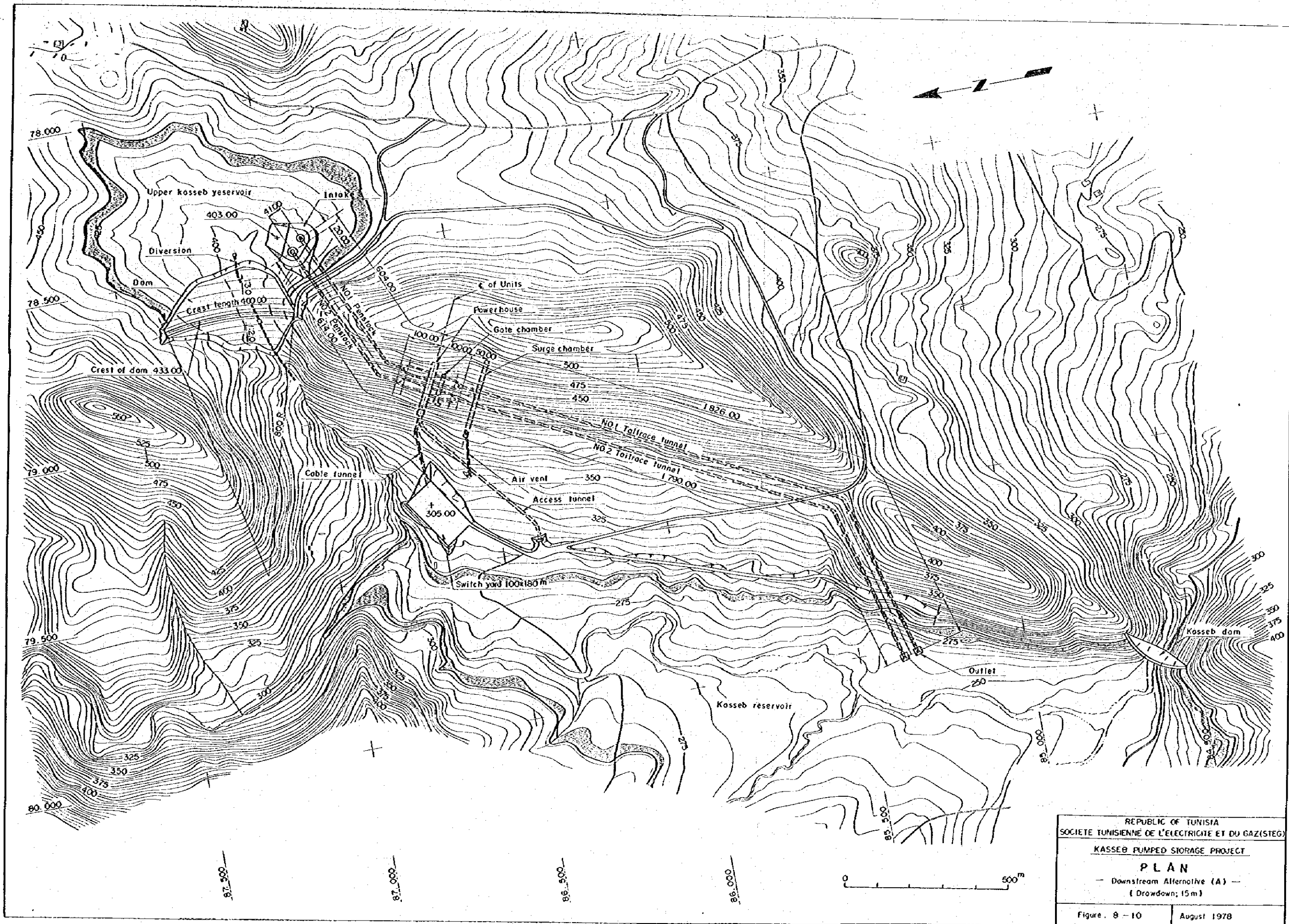
EL. 266.50



REPUBLIC OF TUNISIA	
SOCIETE TUNISIENNE DE L'ELECTRICITE ET DU GAZ (STEG)	
KASSEB PUMPED STORAGE PROJECT	
POWER HOUSE (2-3)	
— Up stream Alternative (A) —	
(Drawdown, 15m)	
Figure 8 - 8	August 1978

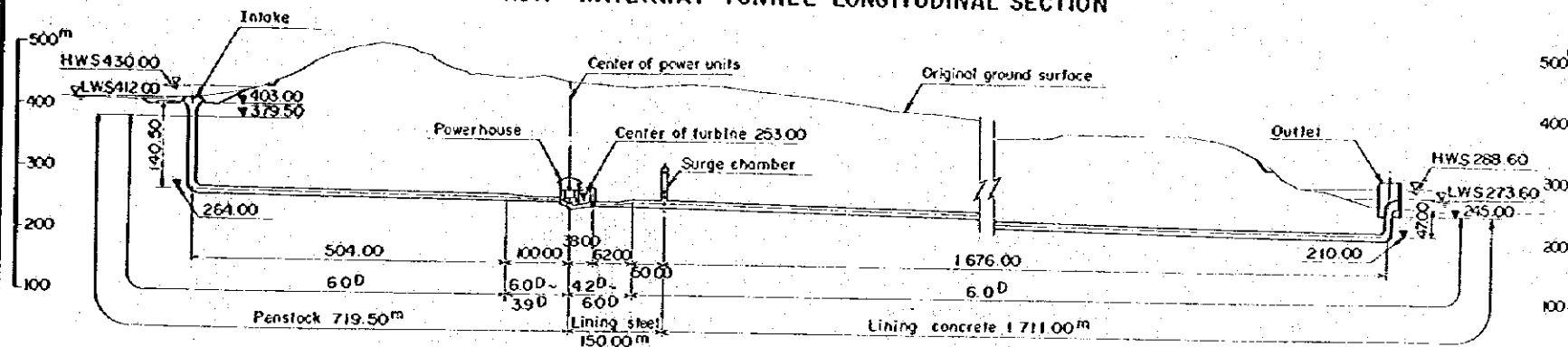


REPUBLIC OF TUNISIA	
SOCIÉTÉ TUNISIENNE DE L'ÉLECTRICITÉ ET DU GAZ (STEG)	
KASSÉB PUMPED STORAGE PROJECT	
POWER HOUSE (3-3)	
— Up stream Alternative (A) —	
(Drowdown, 15m)	
Figure - 8 - 9	August 1978

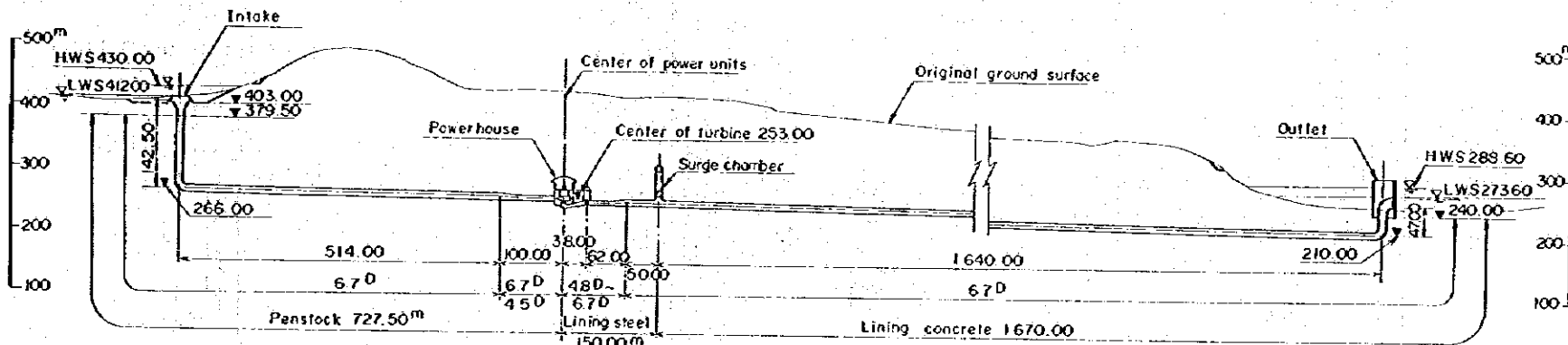


REPUBLIC OF TUNISIA
 SOCIETE TUNISIENNE DE L'ELECTRICITE ET DU GAZ (STEG)
 KASSEB PUMPED STORAGE PROJECT
PLAN
 - Downstream Alternative (A) -
 (Drowdown: 15 m)
 Figure. 8 - 10 August 1978

NO.1 WATERWAY TUNNEL LONGITUDINAL SECTION



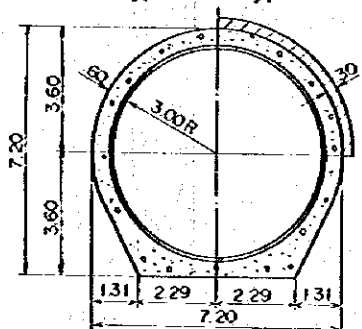
NO.2 WATERWAY TUNNEL LONGITUDINAL SECTION



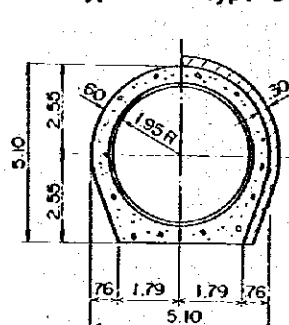
WATERWAY TUNNEL TYPICAL SECTION

NO.1 PENSTOCK

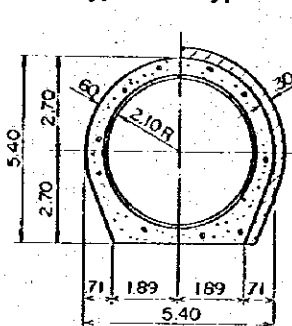
Type A Type B



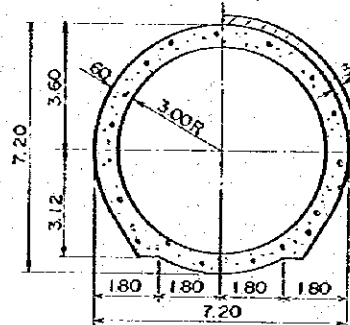
Type C Type D



Type A Type B

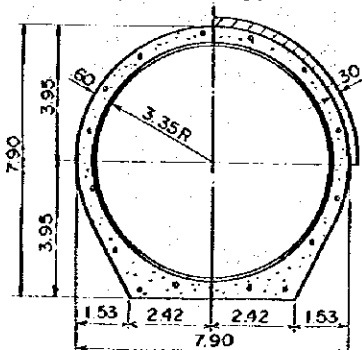


Type C Type D

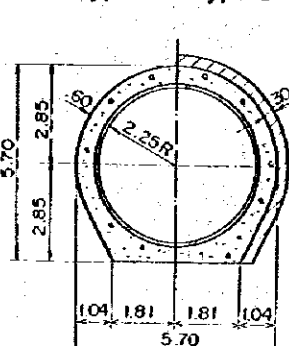


NO.2 PENSTOCK

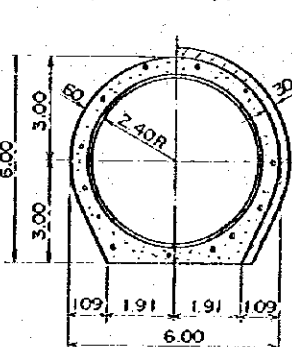
Type A Type B



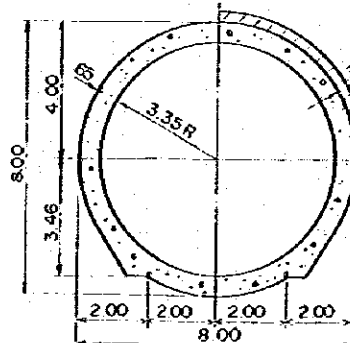
Type C Type D



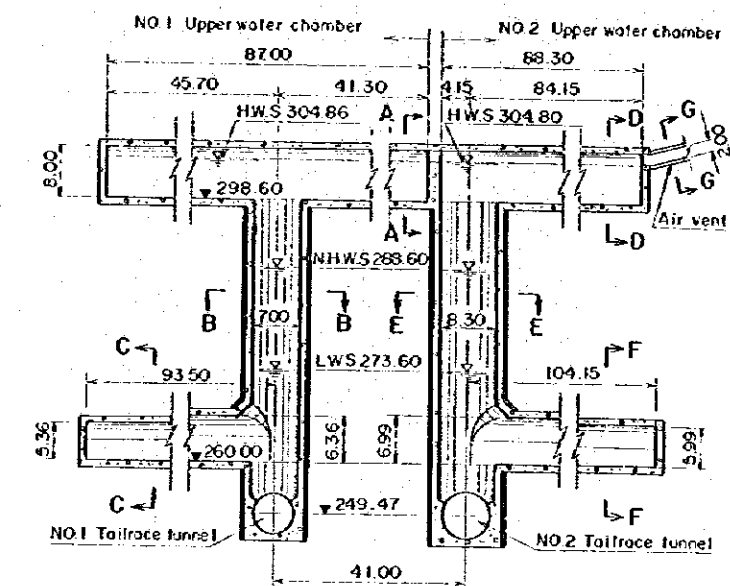
Type A Type B



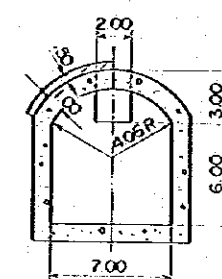
Type C Type D



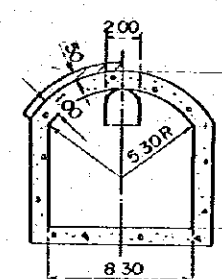
SURGE CHAMBER



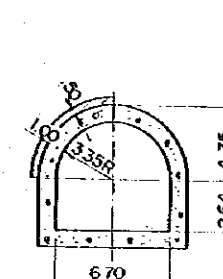
A-A SECTION



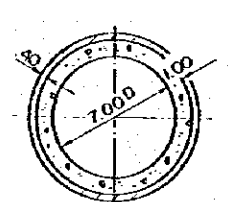
D-D SECTION



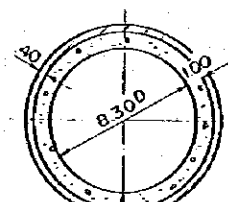
F-F SECTION



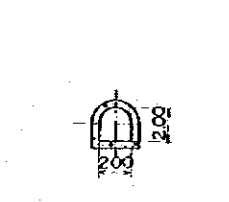
B-B SECTION



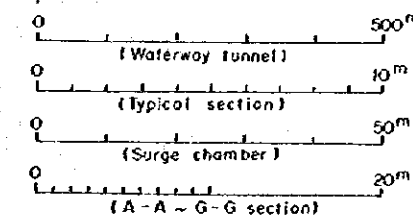
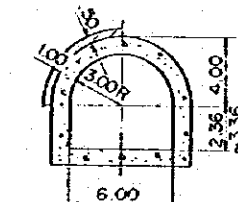
E-E SECTION



G-G SECTION

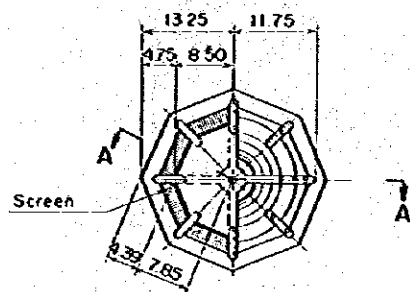


C-C SECTION

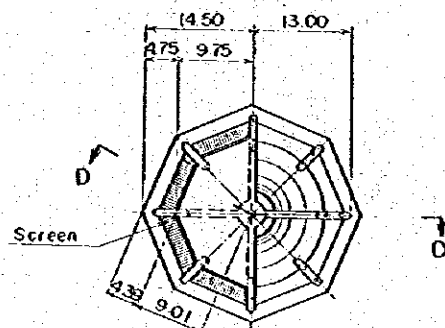


REPUBLIC OF TUNISIA
 SOCIETE TUNISIENNE DE L'ELECTRICITE ET DU GAZ (STEG)
 KASSEB PUMPED STORAGE PROJECT
 WATERWAY TUNNEL AND SURGE CHAMBER
 - Downstream Alternative (A) -
 (Drawdown: 15 m)

NO. 1 INTAKE
PLAN

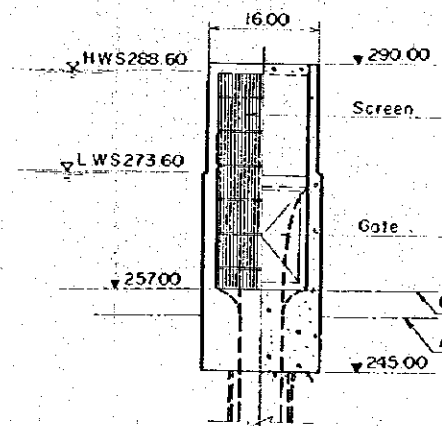


NO. 2 INTAKE
PLAN



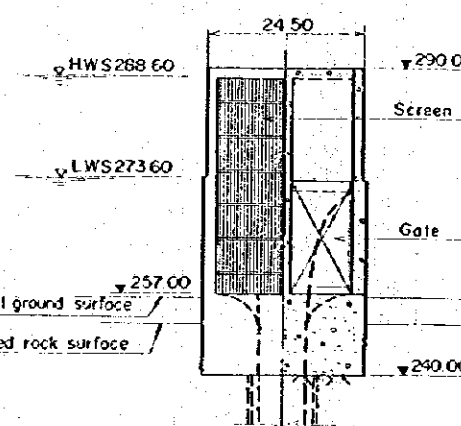
NO. 1 OUTLET

G-G SECTION H-H SECTION

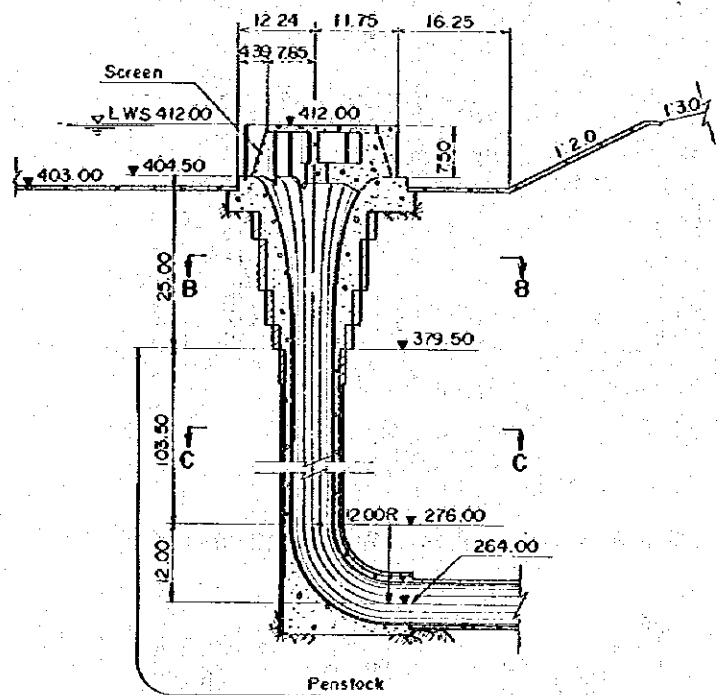


NO. 2 OUTLET

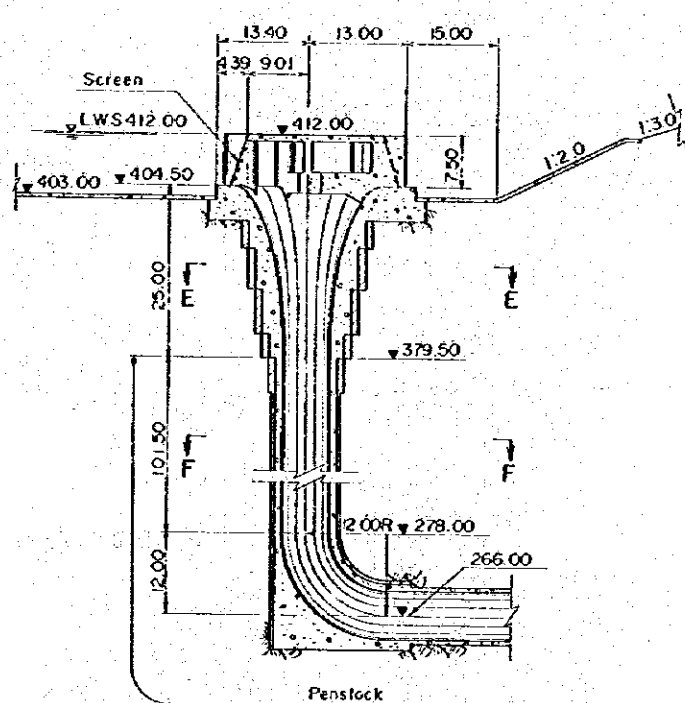
K-K SECTION L-L SECTION



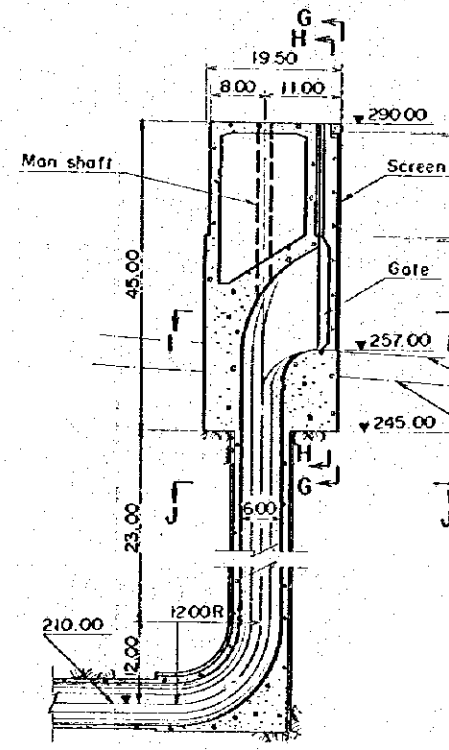
A-A SECTION



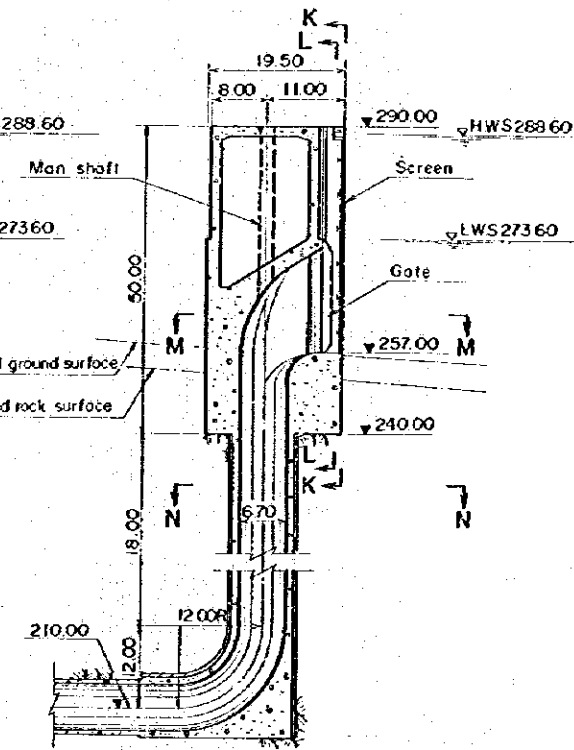
D-D SECTION



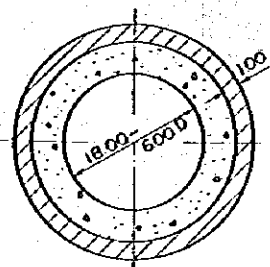
LONGITUDINAL SECTION



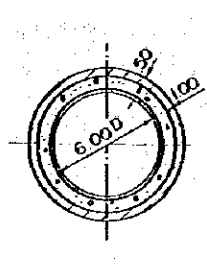
LONGITUDINAL SECTION



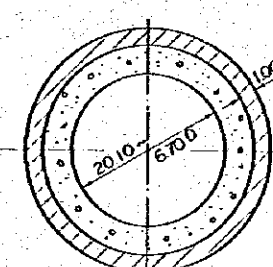
B-B SECTION



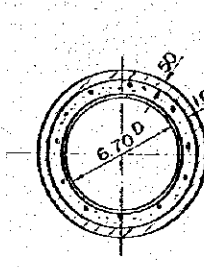
C-C SECTION



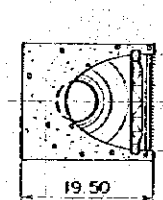
E-E SECTION



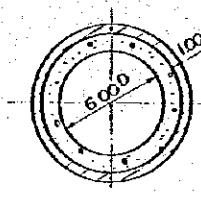
F-F SECTION



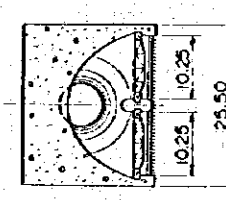
I-I SECTION



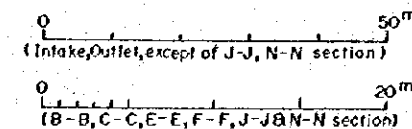
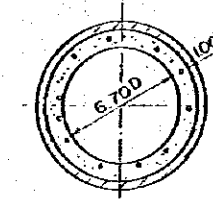
J-J SECTION



M-M SECTION



N-N SECTION



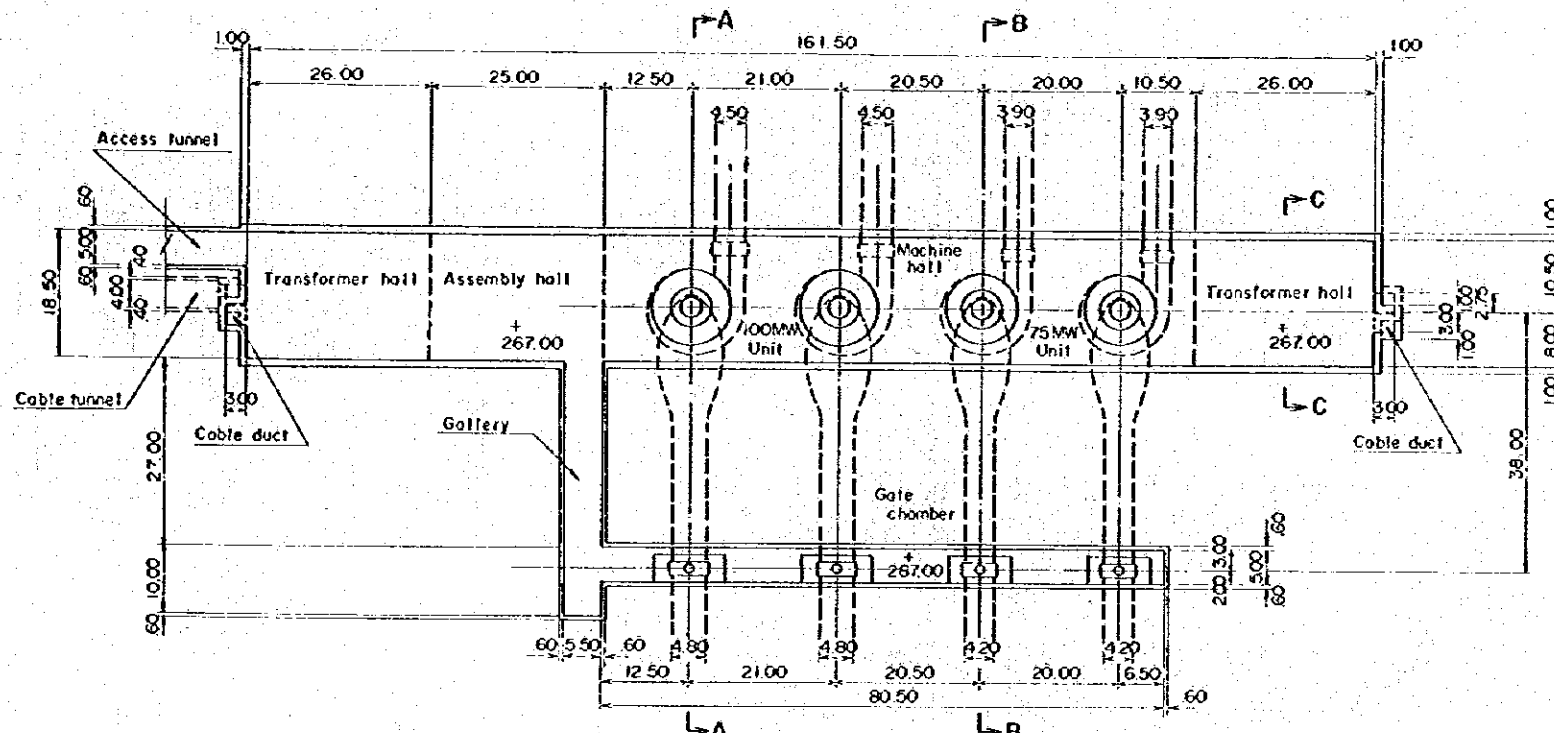
REPUBLIC OF TUNISIA
SOCIETE TUNISIENNE DE L'ELECTRICITE ET DU GAZ (STEG)

KASSEB PUMPED STORAGE PROJECT

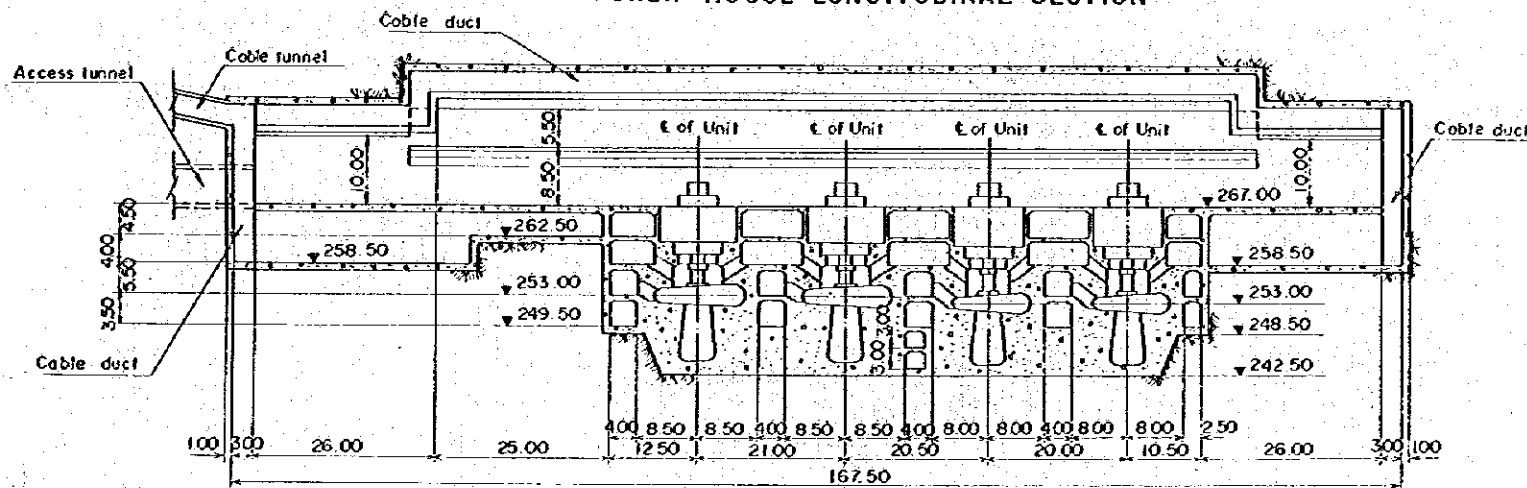
INTAKE AND OUTLET

— Downstream Alternative (A) —
(Drawdown; 15 m)

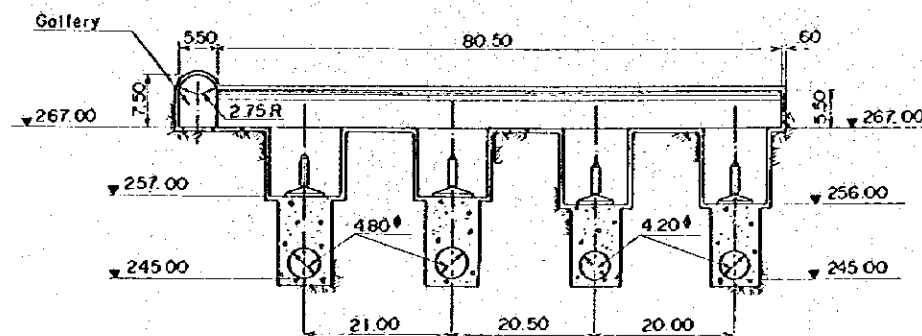
POWERPLANT PLAN



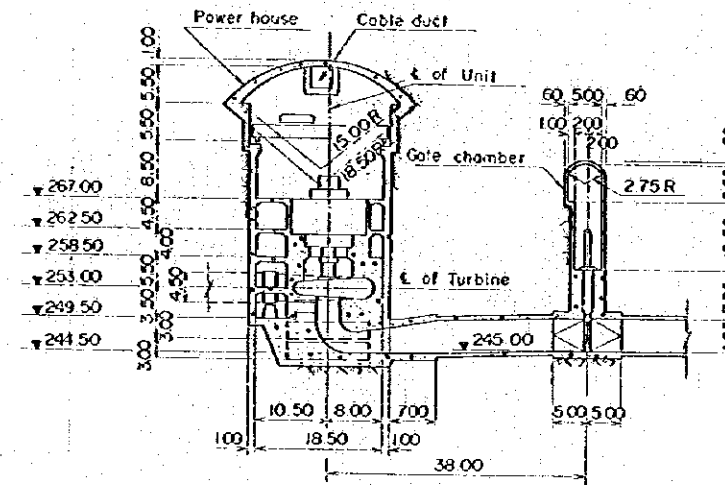
POWER HOUSE LONGITUDINAL SECTION



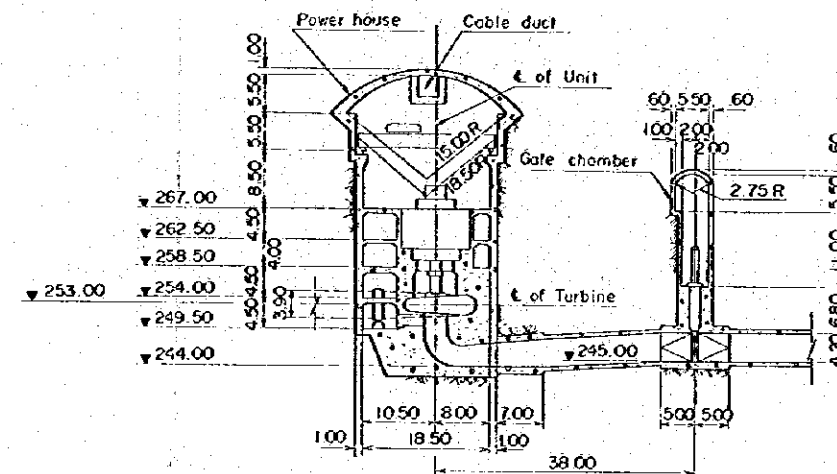
GATE CHAMBER LONGITUDINAL SECTION



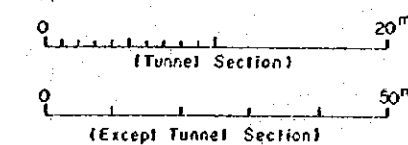
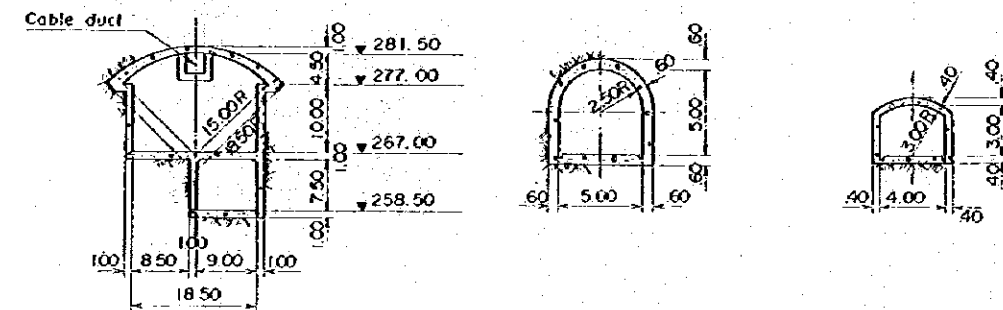
A-A SECTION (100MW SIDE)



B-B SECTION (75MW SIDE)

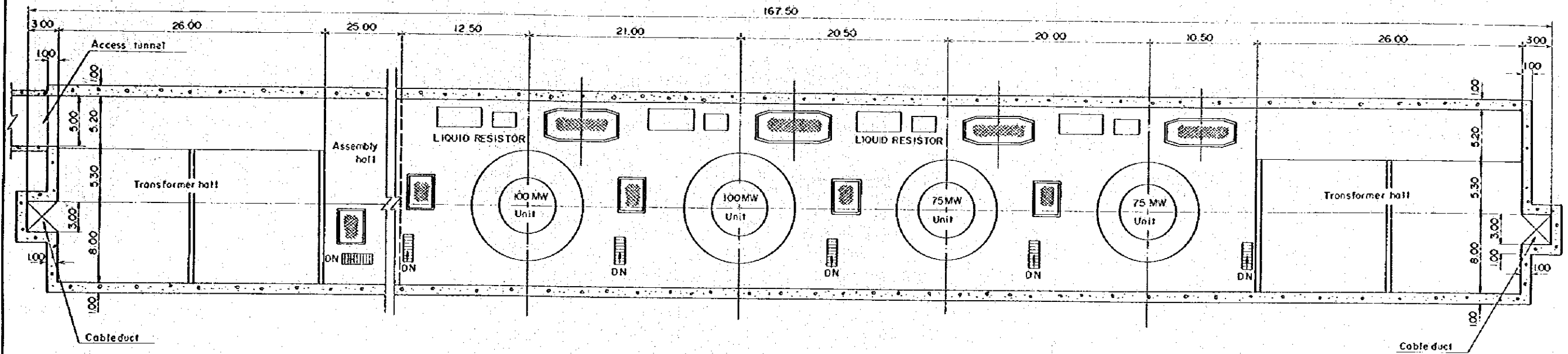


TRANSFORMER HALL (C-C) SECTION ACCESS TUNNEL SECTION CABLE TUNNEL SECTION

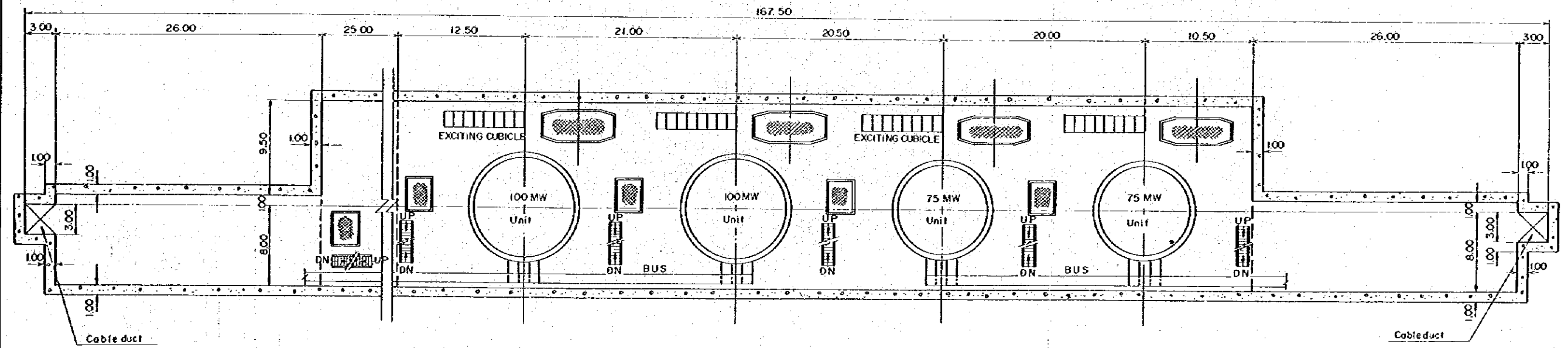


REPUBLIC OF TUNISIA
SOCIÉTÉ TUNISIENNE DE L'ÉLECTRICITÉ ET DU GAZ (STEG)
KASSEB PUMPED STORAGE PROJECT
POWER HOUSE (1-3)
— Downstream Alternative (A) —
(Drawdown: 15 m)

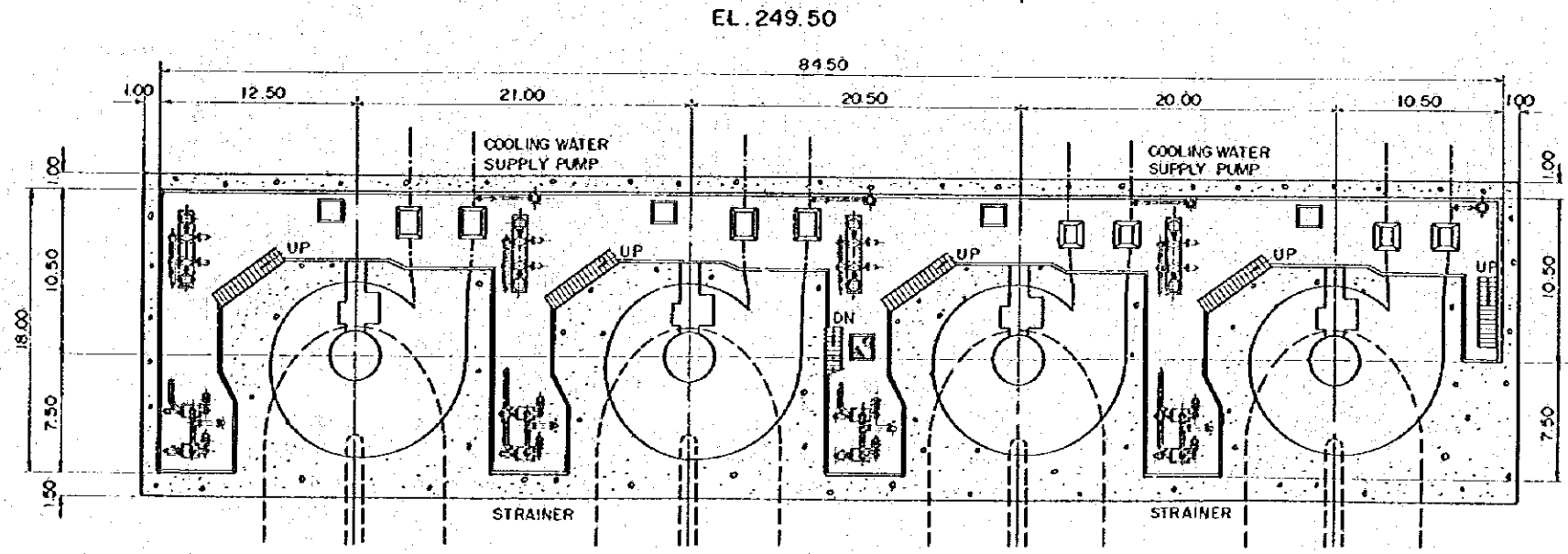
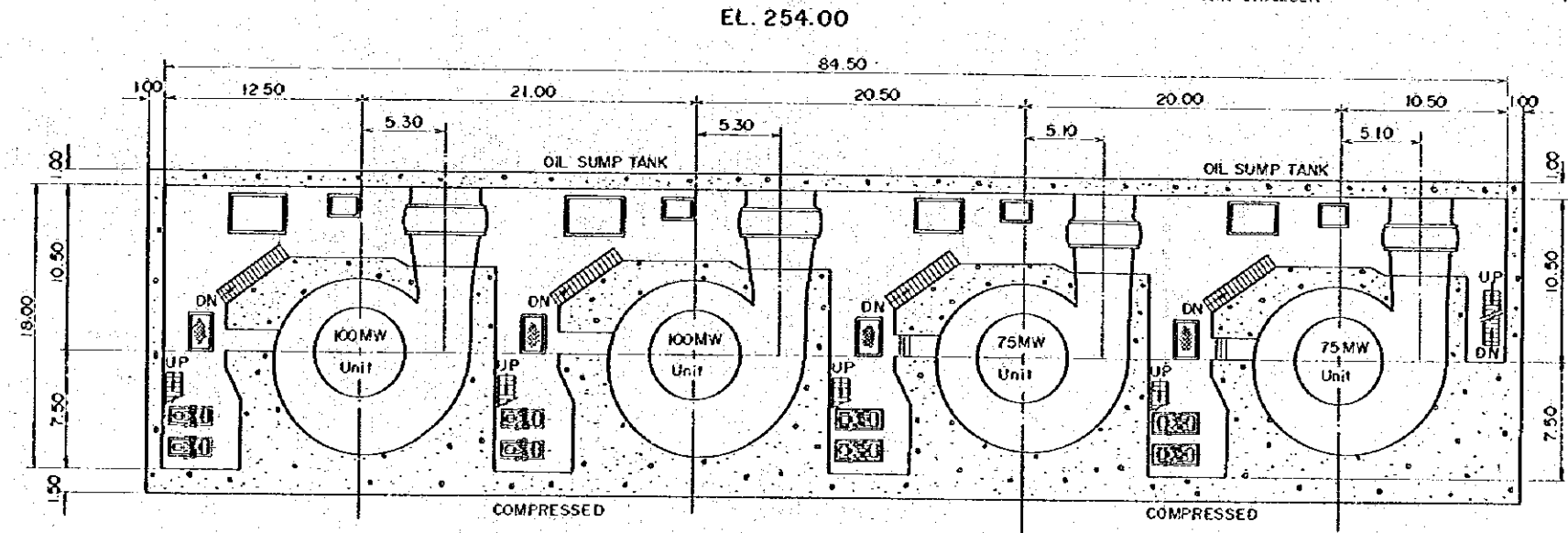
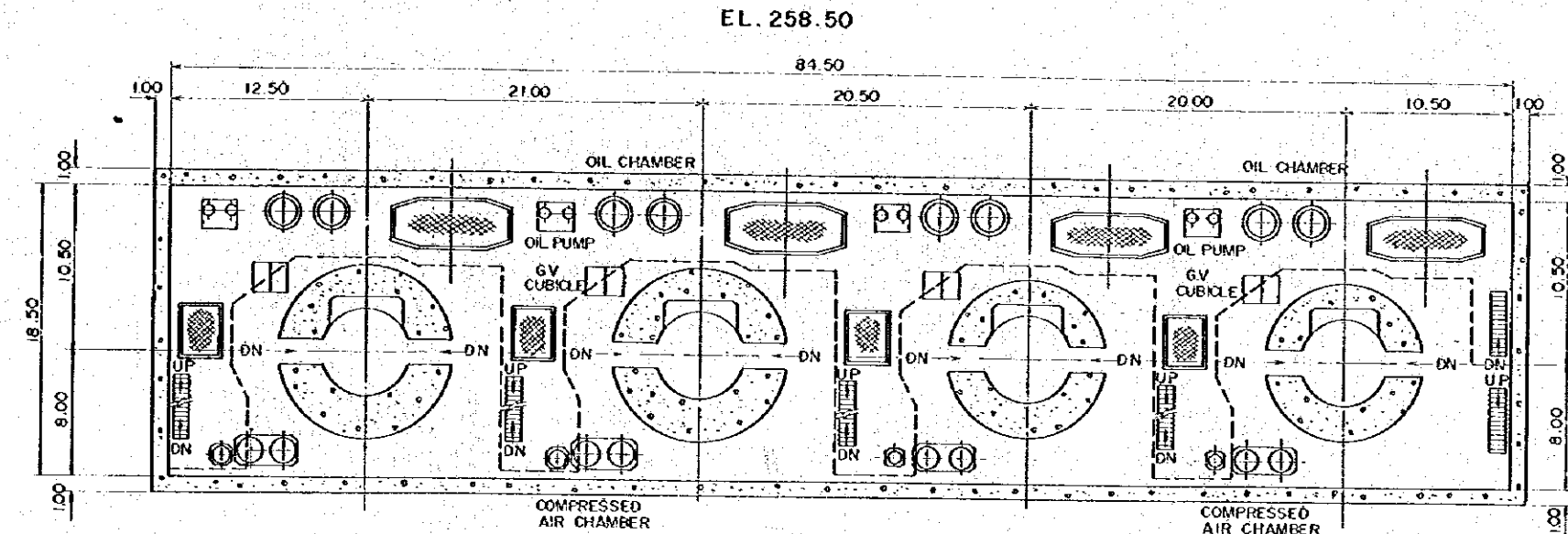
EL. 267.00



EL. 262.50



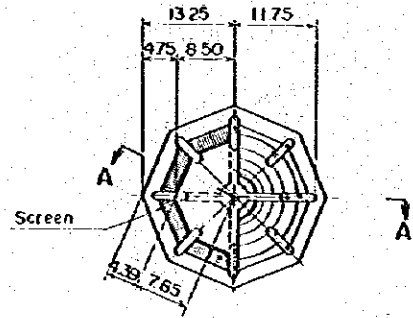
REPUBLIC OF TUNISIA
SOCIÉTÉ TUNISIENNE DE L'ÉLECTRICITÉ ET DU GAZ (STEG)
KASSEB PUMPED STORAGE PROJECT
POWER HOUSE (2-3)
- Down stream Alternative (A) -
(Drawdown, 15m)
Figure 8 - 14 August 1978



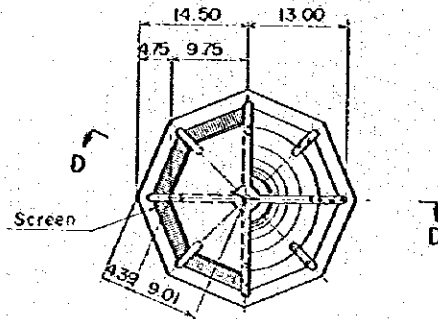
REPUBLIC OF TUNISIA
 SOCIÉTÉ TUNISIENNE DE L'ÉLECTRICITÉ ET DU GAZ (STEG)
 KASSEB PUMPED STORAGE PROJECT
 POWER HOUSE (3-3)
 - Downstream Alternative (A) -
 (Drawdown, 15m)

Figure 8 - 15 August 1978

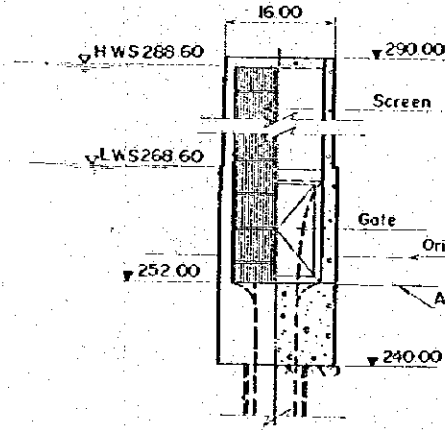
NO.1 INTAKE
PLAN



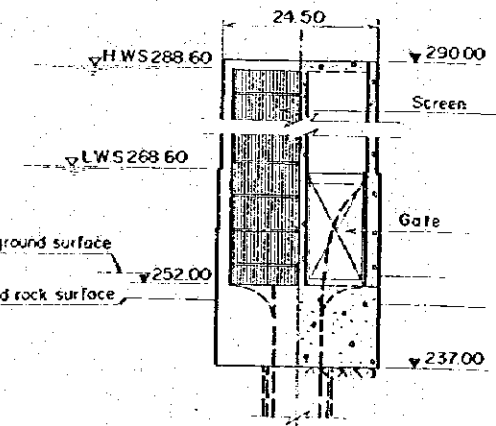
NO.2 INTAKE
PLAN



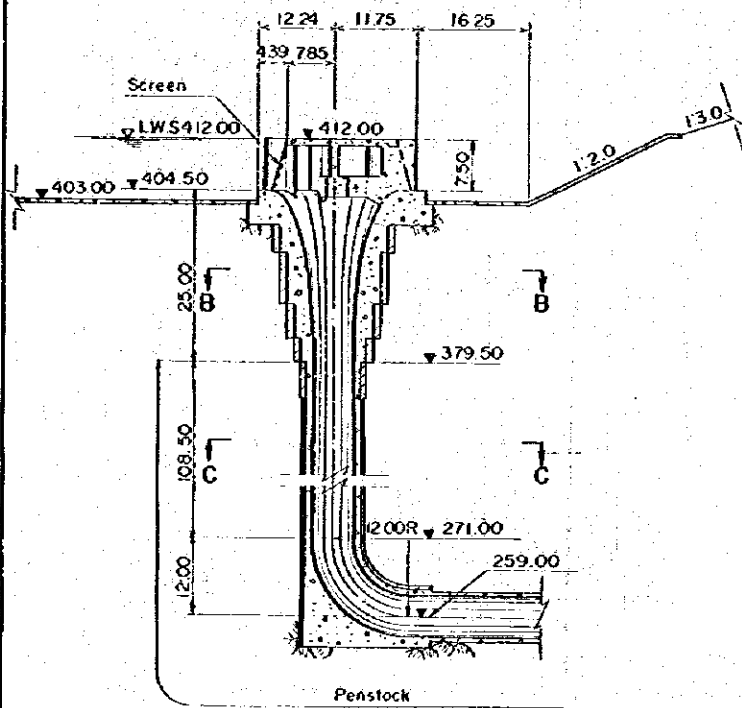
NO.1 OUTLET
G-G SECTION H-H SECTION



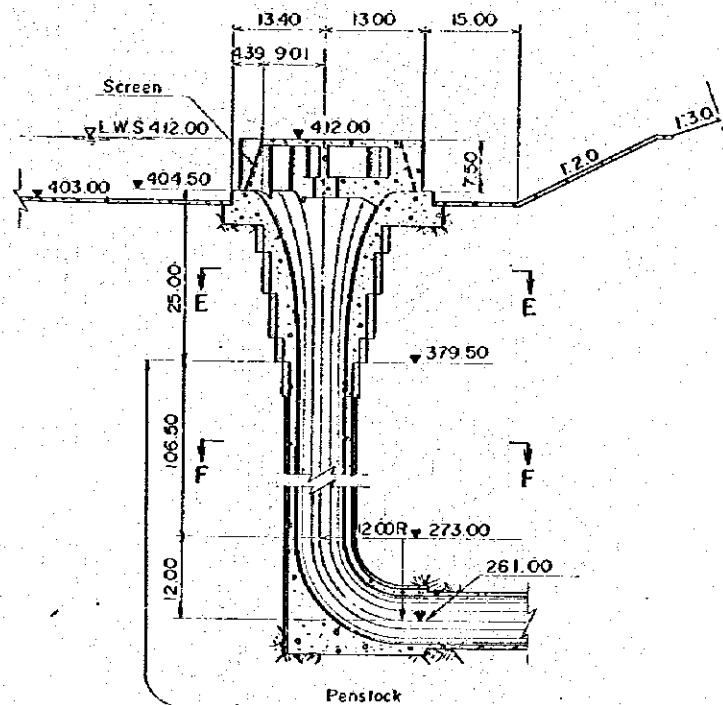
NO.2 OUTLET
K-K SECTION L-L SECTION



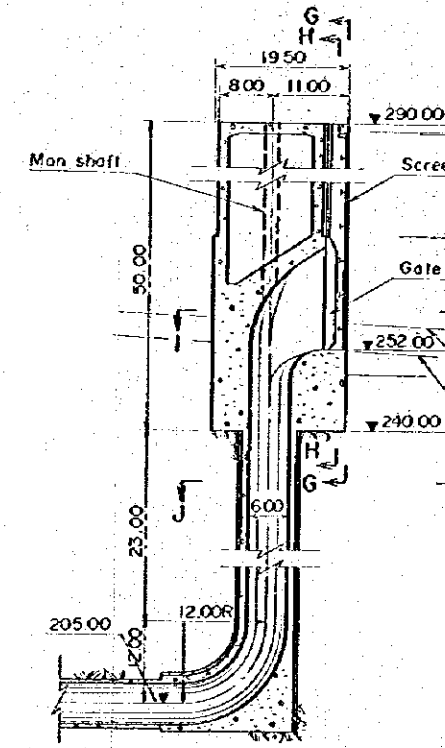
A-A SECTION



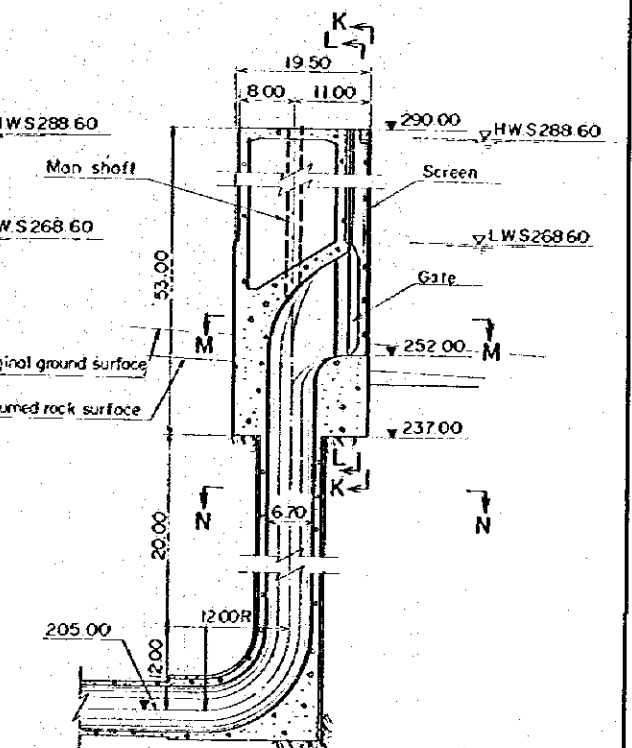
D-D SECTION



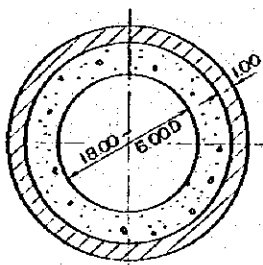
LONGITUDINAL SECTION



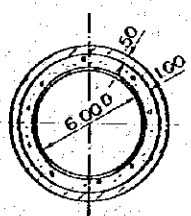
LONGITUDINAL SECTION



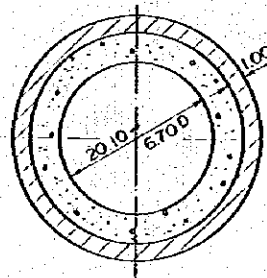
B-B SECTION



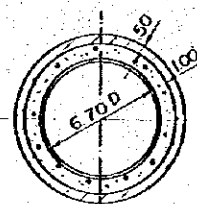
C-C SECTION



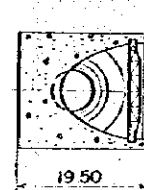
E-E SECTION



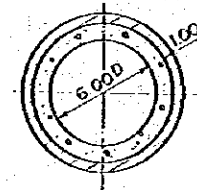
F-F SECTION



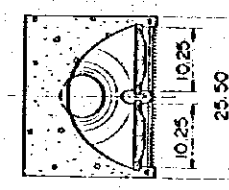
I-I SECTION



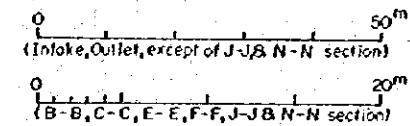
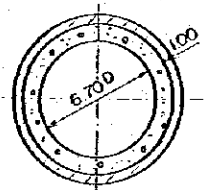
J-J SECTION



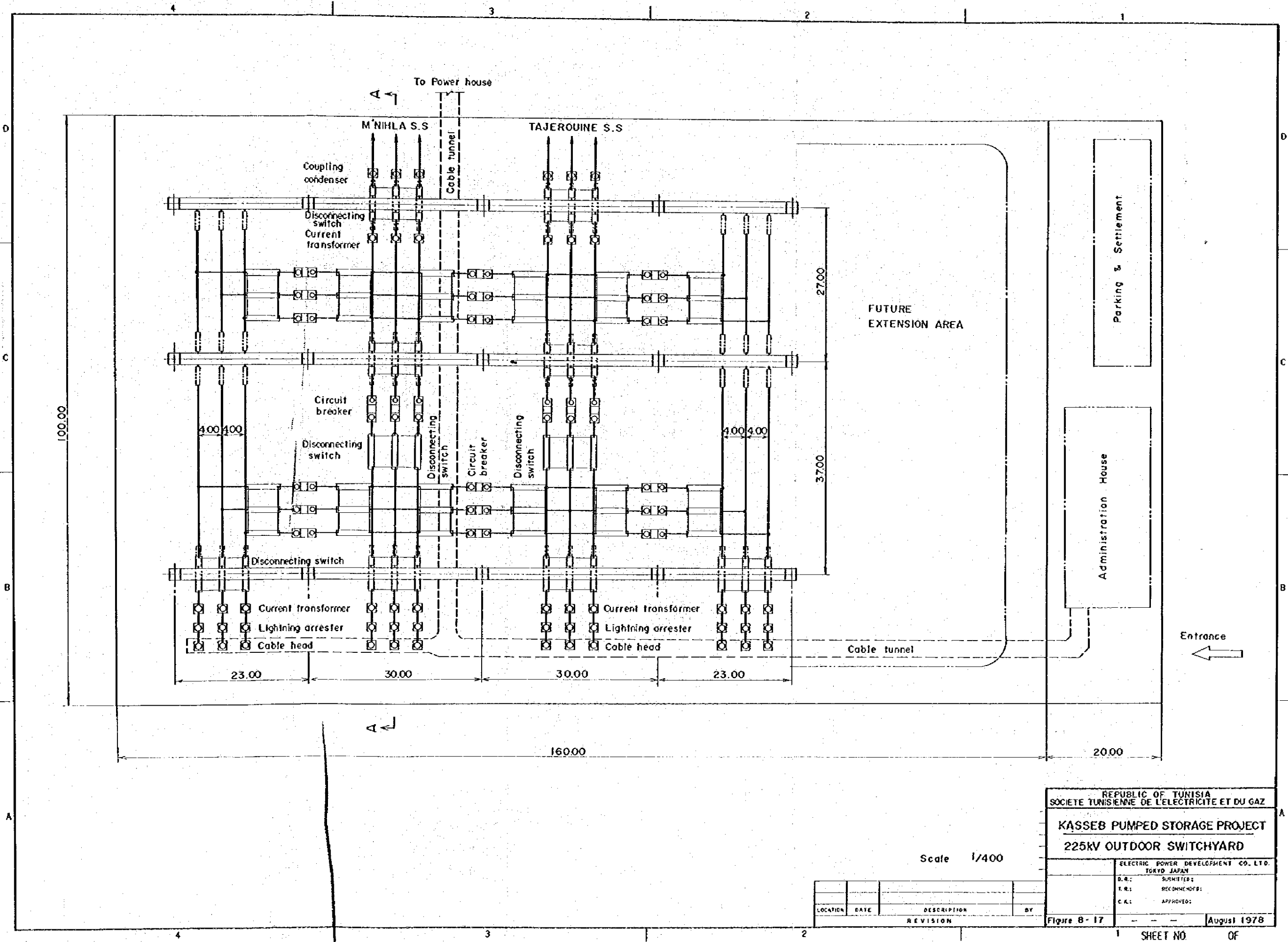
M-M SECTION



N-N SECTION



REPUBLIC OF TUNISIA
SOCIETE TUNISIAINE DE L'ELECTRICITE ET DU GAZ (STEG)
KASSEB PUMPED STORAGE PROJECT
INTAKE AND OUTLET
— Downstream Alternative (B) —
(Drawdown: 20m)
Figure. 8-16 August 1978

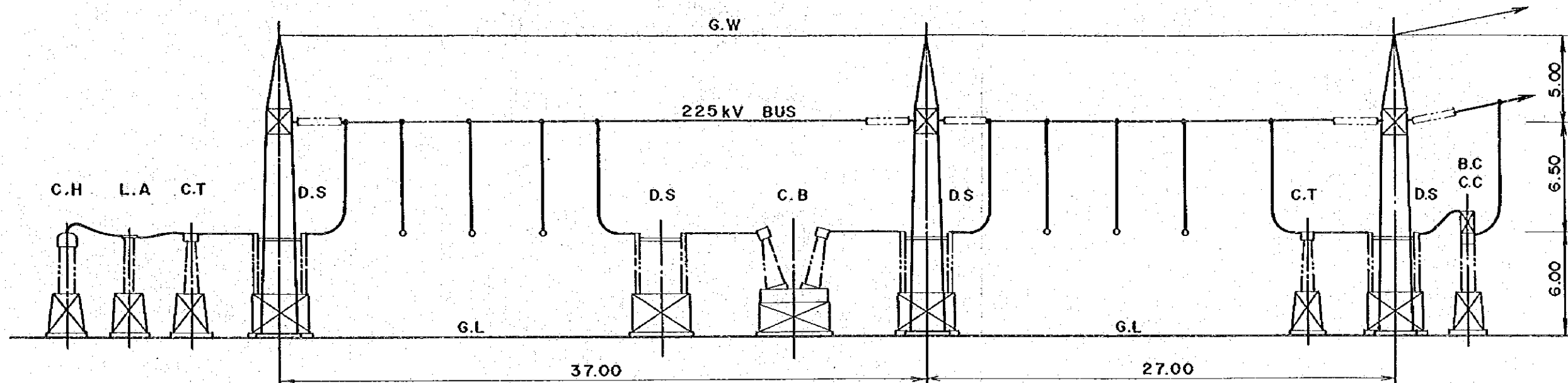


Scale 1/400

LOCATION	DATE	DESCRIPTION	BY
		REVISION	

REPUBLIC OF TUNISIA SOCIETE TUNISIENNE DE L'ELECTRICITE ET DU GAZ	
KASSEB PUMPED STORAGE PROJECT 225KV OUTDOOR SWITCHYARD	
ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN	
D.R.:	SUBMITTER:
T.R.:	RECOMMENDER:
C.A.:	APPROVER:
Figure B-17	August 1978

A - A VIEW



- LEGEND :
- C.H Cable Head
 - L.A Lightning Arrester
 - C.T Current Transformer
 - D.S Disconnecting Switch
 - C.B Circuit Breaker
 - B.C Blocking Coil
 - C.C Coupling Condenser
 - G.W Ground Wire
 - G.L Ground Level

REPUBLIC OF TUNISIA
SOCIETE TUNISIENNE DE L'ELECTRICITE ET DU GAZ

KASSEB PUMPED STORAGE PROJECT
225KV OUTDOOR SWITCHYARD (2-2)

ELECTRIC POWER DEVELOPMENT CO. LTD.
TOKYO JAPAN

D.R.: SUBMITTED:
T.R.: RECOMMENDED:
C.A.: APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

Figure 8-18

August 1978

JICA