

**EW – 13**

**BOREHOLE EW13 REPORT (HUSACA)  
TEAM B D.G.H.**

This borehole is the most easy site carried out by the team BDGH in 48 hours from the 23rd to the 25th November 1998.

**I- SETTING UP THE SITE**

It was done on November 23 rd 1998.

**II- BOREHOLE : (see figures sheet)**

a) Drilling in weathring zone : realized with wing-bit 12" ¼ then with three-cone 12" ¼ from 0 m to 11 m the same day of the setting up site (bedrock 11).

b) Casing : The setting up of the provisory pipe was immediatly done after the drilling operation weathering layer from 0 m to 14,40 m.

c) Drilling in the bedrock : this step was done with the 9" 5/8 hammer from the 24th to the 25 th November 1998 from, 14,40 m to 44,30 m with an important water flowing at 28m-32m-35m-40m.

d) Final realization : It was effective on November 25 th 1998 as shown on the technical figure sheet.

**III- LEAVING THE SITE** : Done the same day of the final realization. The EW13 borehole was an easy one with a bit clear water under the drilling. Almost at 31 m, flow was above 17 m3/h. 1000 L of gaz oil, 2 sacks of bentonite, 1 sack of foam agent were consumed during the drilling.

Bangui, November 28th 1998.

THE CHIEF OF THE SITE

Constant ZOUKOUA.-

DIRECTION GENERALE DE L'HYDRAULIQUE

REPUBLIQUE CENTRAFRICAINE

Unité - Dignité - Travail

PROJET MISE EN VALEUR DU SECTEUR DE L'EAU  
EN REPUBLIQUE CENTRAFRICAINE

FICHE DE FORAGE

Données Géographiques	Données de foration	Données de forage
Préfecture de: <b>OMBELLA HIPOKO</b>	Appareil de Forage: .....	N° de Forage: <b>EW.13/</b> .....
Sous/Préfecture de: <b>BIMBO</b>	Poste de Travail n°: <b>5</b>	Débit Air lift: ..... m3/h
Commune de: <b>BIMBO</b>	Chef de chantier: <b>ZOKOVA Constant</b>	Débit d'essai: ..... m3/h.
Groupement de Villages: <b>HUSACA</b>	Date Début: <b>23.1.11/1998</b>	N.S..... m3/h.
Village: .....	Date Fin: <b>25.1.11/1998</b>	N. Dynamique: ..... m
Coord. Géogr. LONG:..... LAT:..... ALT:.....		Transmissivité m2/s

Ech. 1,5m	Coupe Technique	Géologie			Prof. N.S/V.E.	Observations
		Log	Niv	Lithologie		
1		X/X X/X	2m	sol brun argileux		<p>Forage facile, avec importante venue d'eau à 32m, 35m. Eau peu claire pour foration.</p>
		---	4m	Argile jaune		
2				graviers+argile		
			11m			
3						
4						
5				Calcaire	V.E - 28m	
6					- 32m	
7					- 35m	
8					- 39,6m	
9			44,2m			
10						

Forage		Tube Provisoire		Tube d'équipement		Gravier annulaire		Autres renseignements	
Diam. de	à	Diam. de	à	Plein	Crépine	Calibre			
17.1/2" 0	5m	14.1/2" 0	5m	de	à	2-5		Hydrogéologue:	
12.1/4" 5m	14,40m	10" 0	44,4m	+1	32,2	32,20	40m	Vol. lin.	29l
9. 5/8" 44,4m	44,30m	7"		40m	44,3m			Hauteur	19,30m
6. 1/4"		Cimentation		de	0	à	5m	Quantité	649l
									Date / / 19....
									Signature



## FICHE ANALYSE CHIMIQUE

N° : ..... Enquêteur: BIDANA FABIEN Date (j/m/a): 7.12.98  
 IRH : ..... Laboratoire : PROJET Heures (hh:mm) : 9...h.40...mn  
 N° de forage : EW13 Dates d'analyse : 7.12.98 - .../.../... Temps de transport (h) : .....

### I Localisation Géographique

Préfecture: ..... S/Préfecture: .....  
 Commune: BANGUI VILLE  
 Village: ..... 2° nom : .....  
 Quartier : BIMBO (HUSACA) 2° nom : .....  
 GPS<sup>1</sup> Longitude: .....° .....'  
 GPS  Altimètre  Autres  
 Latitude: .....° .....' Altitude: .....m

### II Caractères organoleptiques

Goût :  Goût forte  Goût légère  Sans goût  
 Odeur :  Forte odeur  Légère odeur  Sans odeur  
 Aspect :  Clair  Trouble  Particules en suspension

### II Paramètres physiques

Température: 28 °C Turbidité: 0,5 NTU  
 Ph: 7,20 Dureté Totale: 335 mg/l de CaCO<sub>3</sub>  
 Conductivité: 534 µs/cm Couleur: 2 PtCo  
 T.D.S. / Rés. Sec: 256 mg/l

<sup>1</sup> Cocher case au cas affirmatif



#### IV Paramètres chimiques

##### Cations

Sodium: ..... mg/l de Na<sup>+</sup>  
 Potassium: > 7 ..... mg/l de K<sup>+</sup>  
 Magnésium: 28,3 mg/l de Mg<sup>++</sup>  
 Calcium: 87,6 mg/l de Ca<sup>++</sup>  
 Fer: 0,18 mg/l de Fe<sup>++</sup>  
 Ammonium: 0,36 mg/l de NH<sub>4</sub><sup>+</sup>  
 Zinc: ..... mg/l de Zn<sup>++</sup>  
 Manganèse: 0,4 mg/l de Mn<sup>++</sup>  
 Cuivre: 0,64 mg/l de Cu<sup>++</sup>

##### Anions

Chlorure: 7,9 mg/l de Cl<sup>-</sup>  
 Sulfate: 4 mg/l de SO<sub>4</sub><sup>2-</sup>  
 Bicarbonate: 224 mg/l de HCO<sub>3</sub><sup>-</sup>  
 Carbonate: ..... mg/l de CO<sub>3</sub><sup>2-</sup>  
 Nitrate: 7,5 mg/l de NO<sub>3</sub><sup>-</sup>  
 Nitrite: 0,039 mg/l de NO<sub>2</sub><sup>-</sup>  
 Phosphate: 0,50 mg/l de PO<sub>4</sub><sup>3-</sup>  
 Fluor: ..... mg/l de F<sup>-</sup>

Autres : - 8 mV

Salinité totale: 0,3 ‰ mg/l

Iode: 0,37 mg/l de I<sub>2</sub>

Ammoniac: 0,34 mg/l de NH<sub>3</sub>

#### V Analyses bactériologiques

Coliformes totaux: ..... / 100ml

Streptocoques fécaux: ..... / 100ml

Coliformes Fécaux: ..... / 100ml

Clostridium sulfo-reducteur : ..... / 100ml

Conclusion :  Très bonne  Bonne  Acceptable  Mauvaise

#### VI Observations générales de l'enquêteur / remarques supplémentaires

Les analyses organoleptiques sont acceptables  
le PH de l'eau est acceptable et une bonne minéralisation  
Les ions Ca<sup>++</sup> et HCO<sub>3</sub><sup>-</sup> Prédominent cette eau.



**INSTITUT PASTEUR  
DE BANGUI**

*Docteur Jacques M. MORVAN*  
*Biologiste des Hôpitaux*  
*Directeur*

**LABORATOIRE D'ANALYSES MEDICALES**

Nom : EAU USAKA BIMBO EW 13

Prélèvement n° : 43810N

Date du prélèvement : 08.12.1998

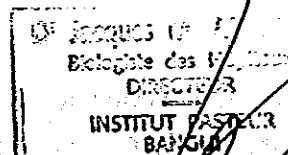
Médecin prescripteur : NP

**ANALYSE BACTERIOLOGIQUE DE L'EAU**

GERMES POUR 100 ml	ECH 1
Coliformes thermorésistants	20
Coliformes	20
Streptocoques Fécaux	0
Clostridium sulfito réducteur	0
Staphylocoques	
Bactéries aérobies totales 30°	0
Bactéries aérobies totales 37 °	40 000

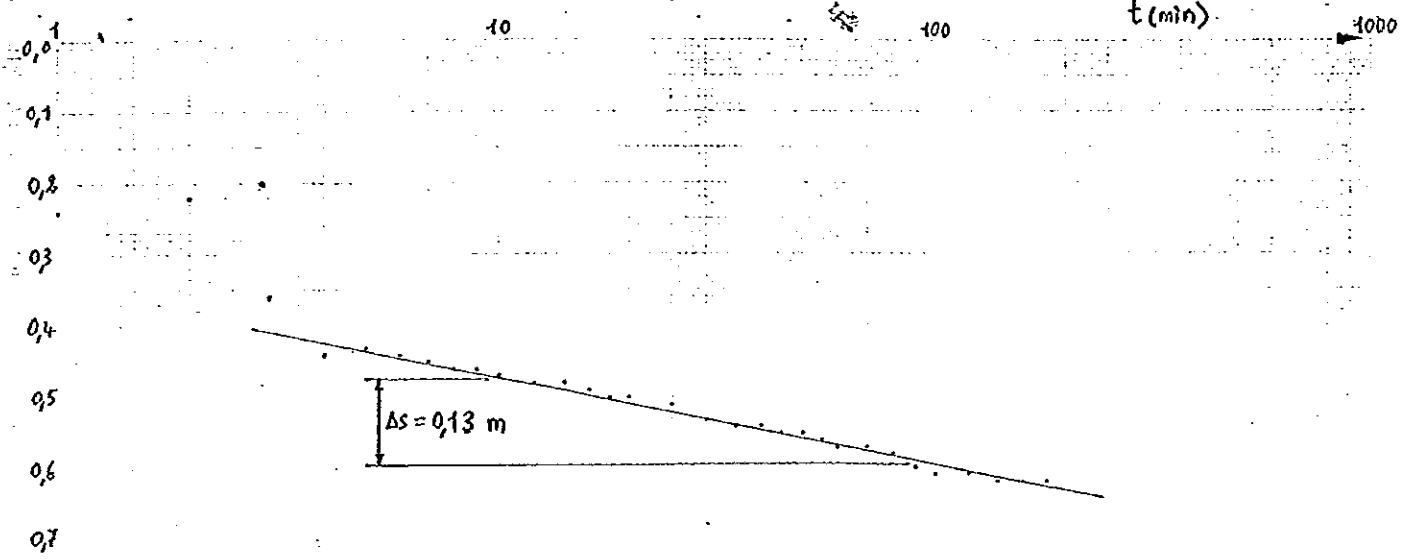
**CONCLUSION : EAU NON POTABLE** ✓

Docteur Jacques M. MORVAN



7<sup>er</sup> Puits  
Descente

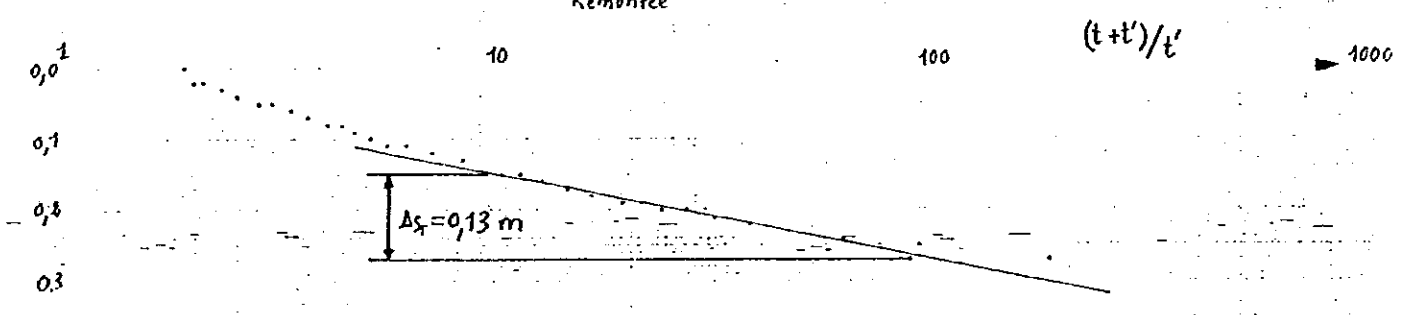
EW-13 ①



$$T = 338 \text{ m}^2/\text{s} = 3,91 \cdot 10^{-3} \text{ m}^2/\text{s}$$

$S(m)$

Remontée



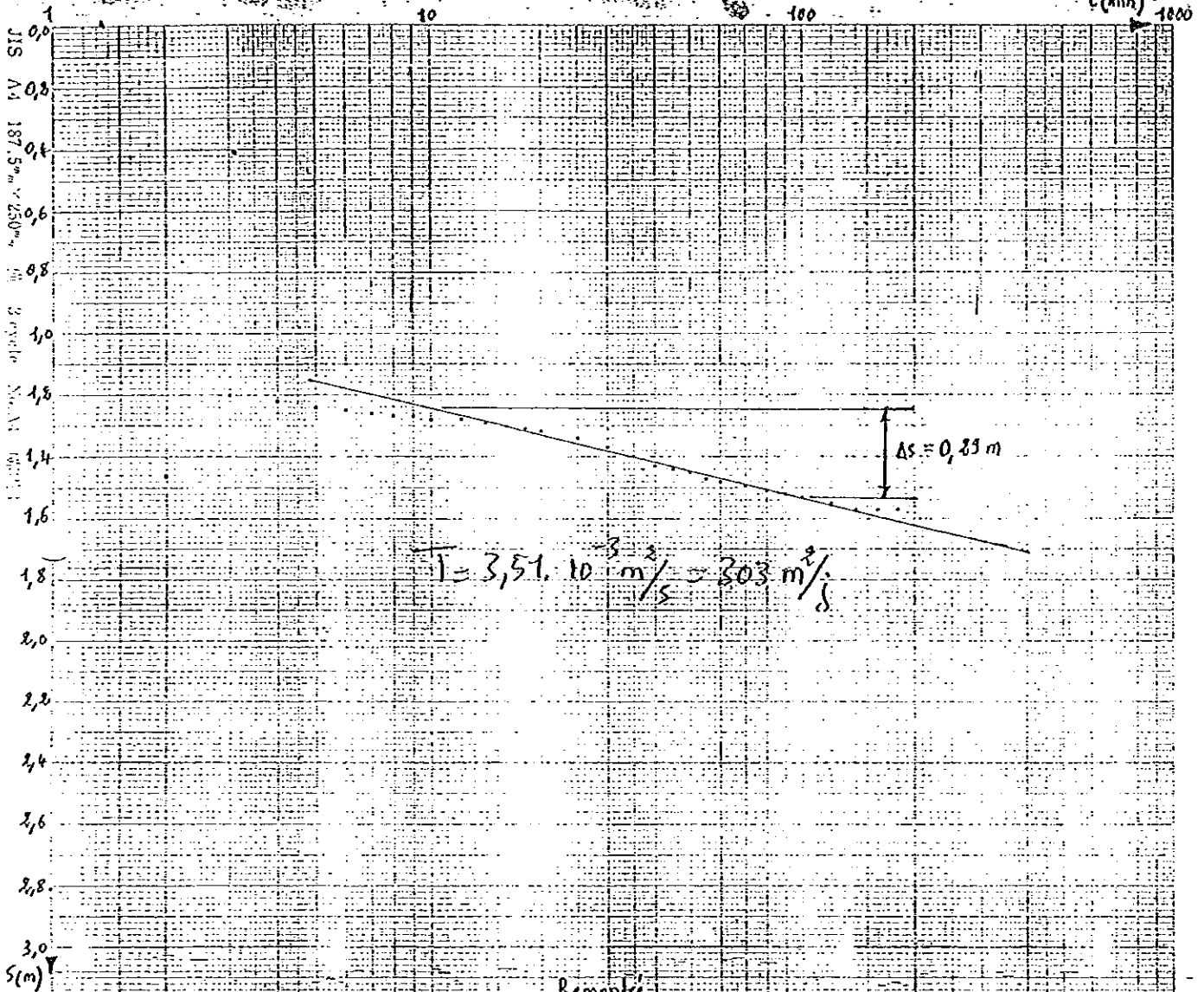
$$T = 3,91 \cdot 10^{-3} \text{ m}^2/\text{s} = 338 \text{ m}^2/\text{s}$$

$S_r(m)$

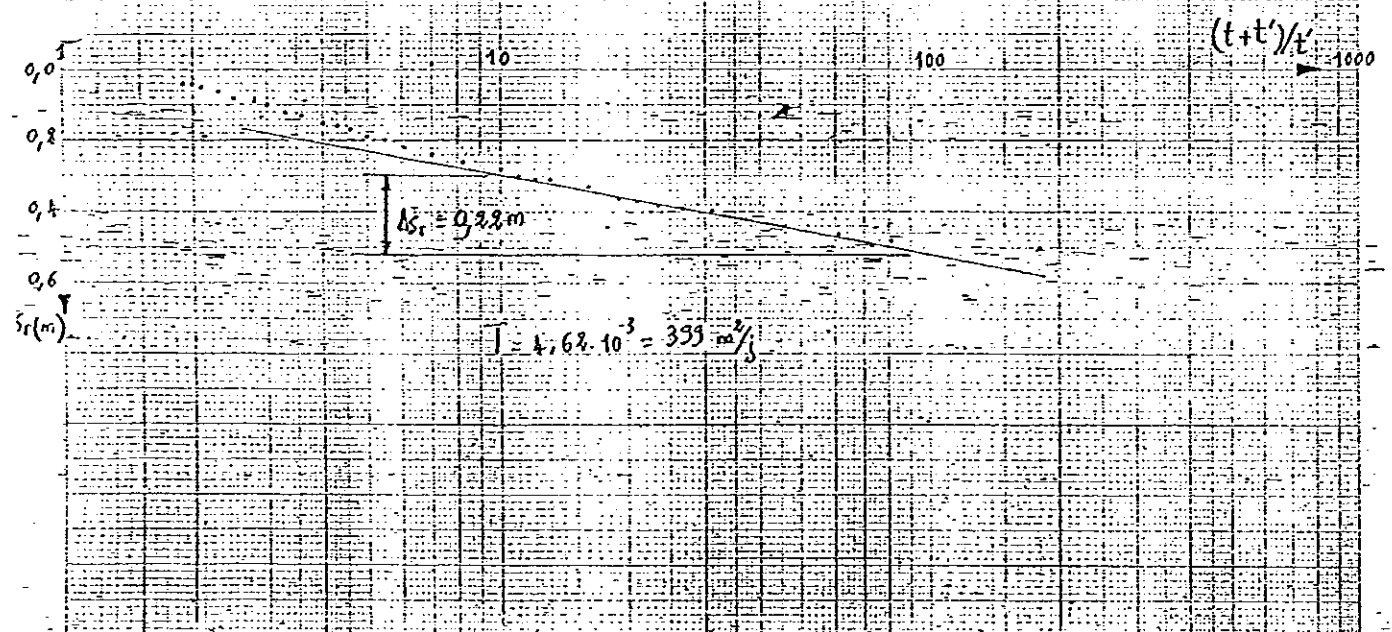
2<sup>e</sup> Pair

Descente

EW-13(2)



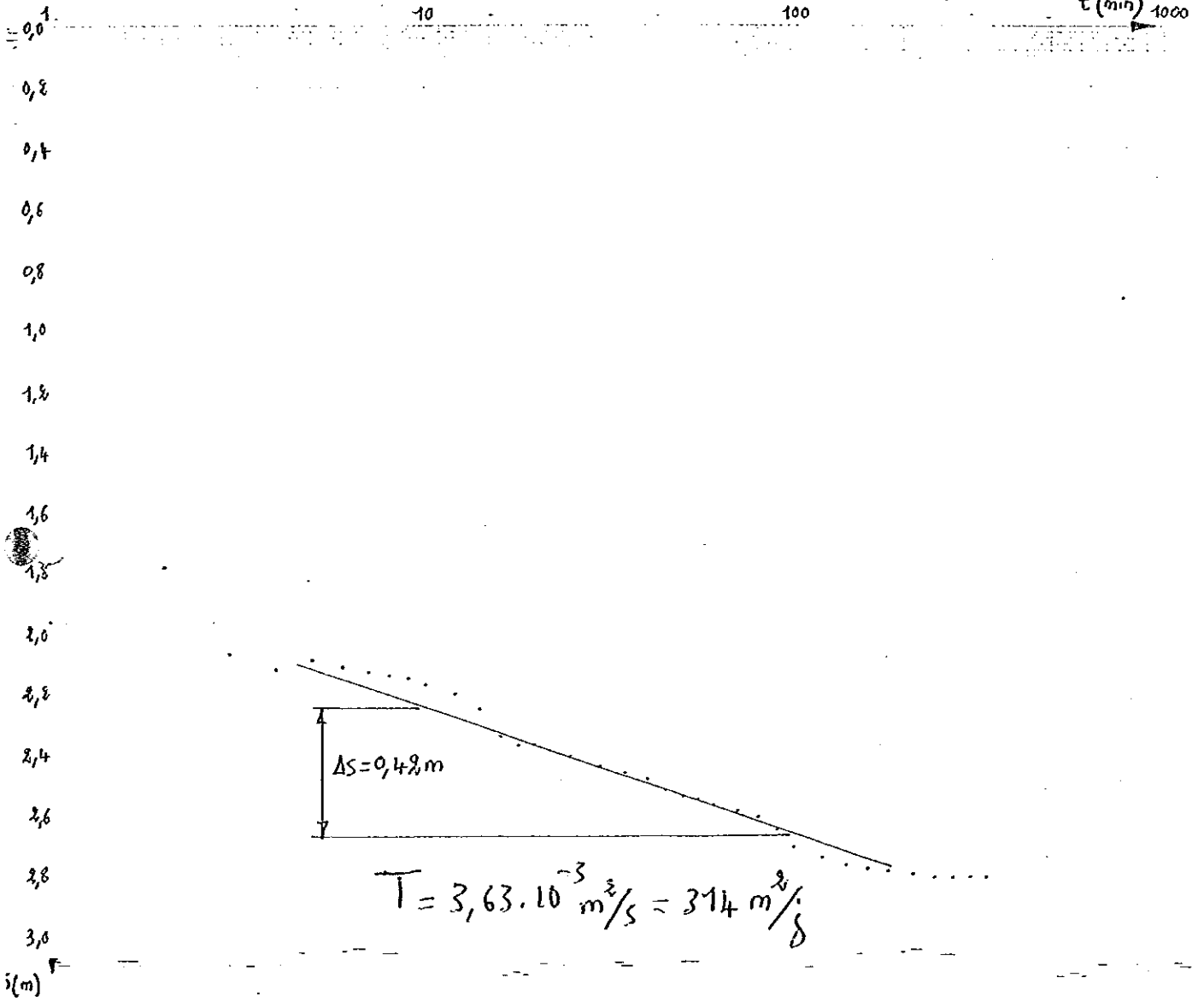
Remontée



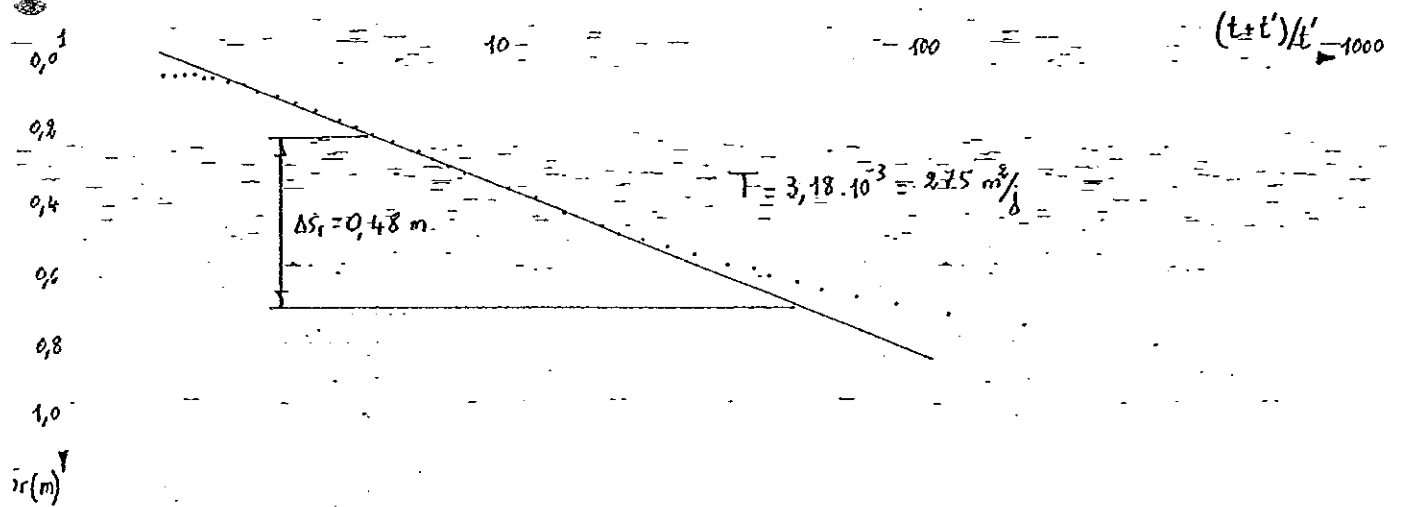


EW-13 (3)

Descente



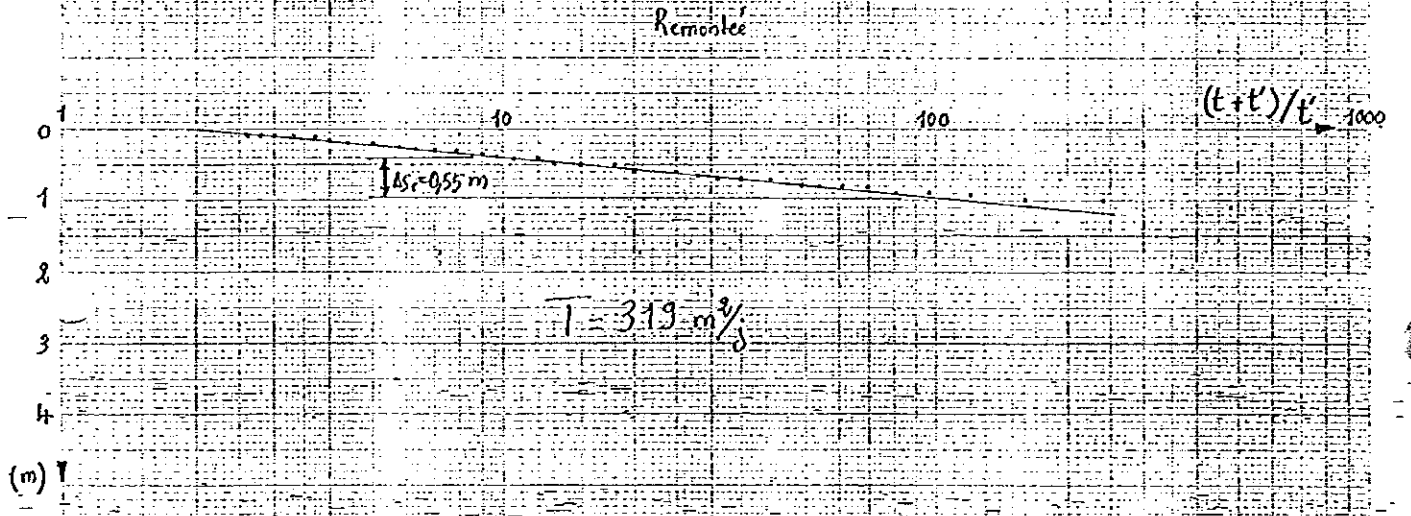
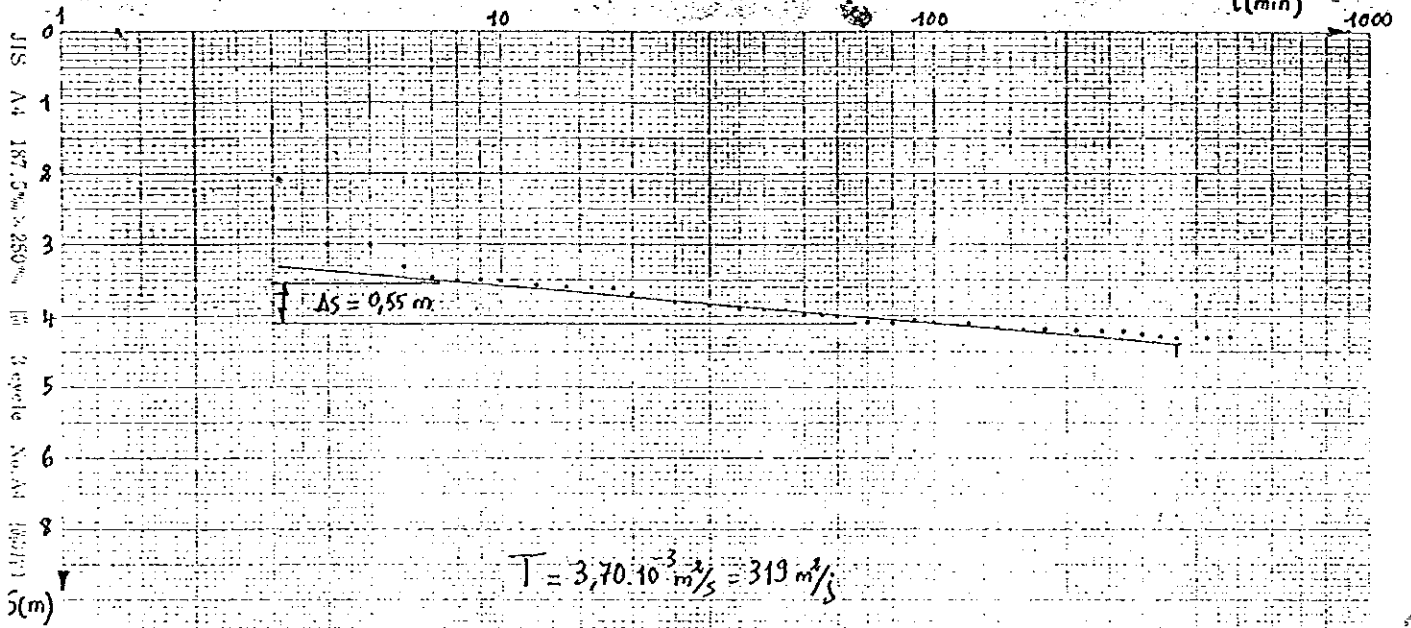
Remontée



4<sup>o</sup> Tabier

EW-13 (4)

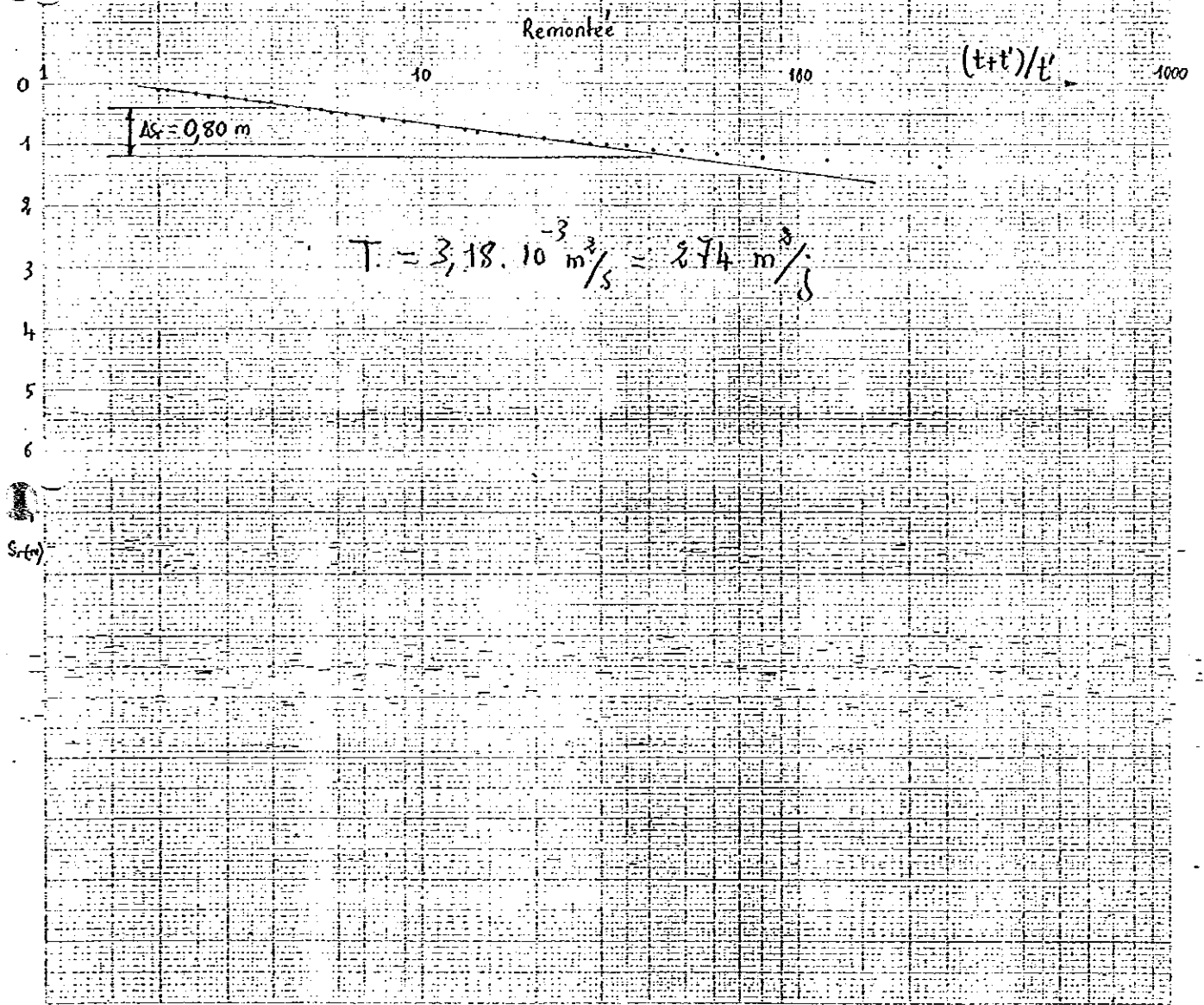
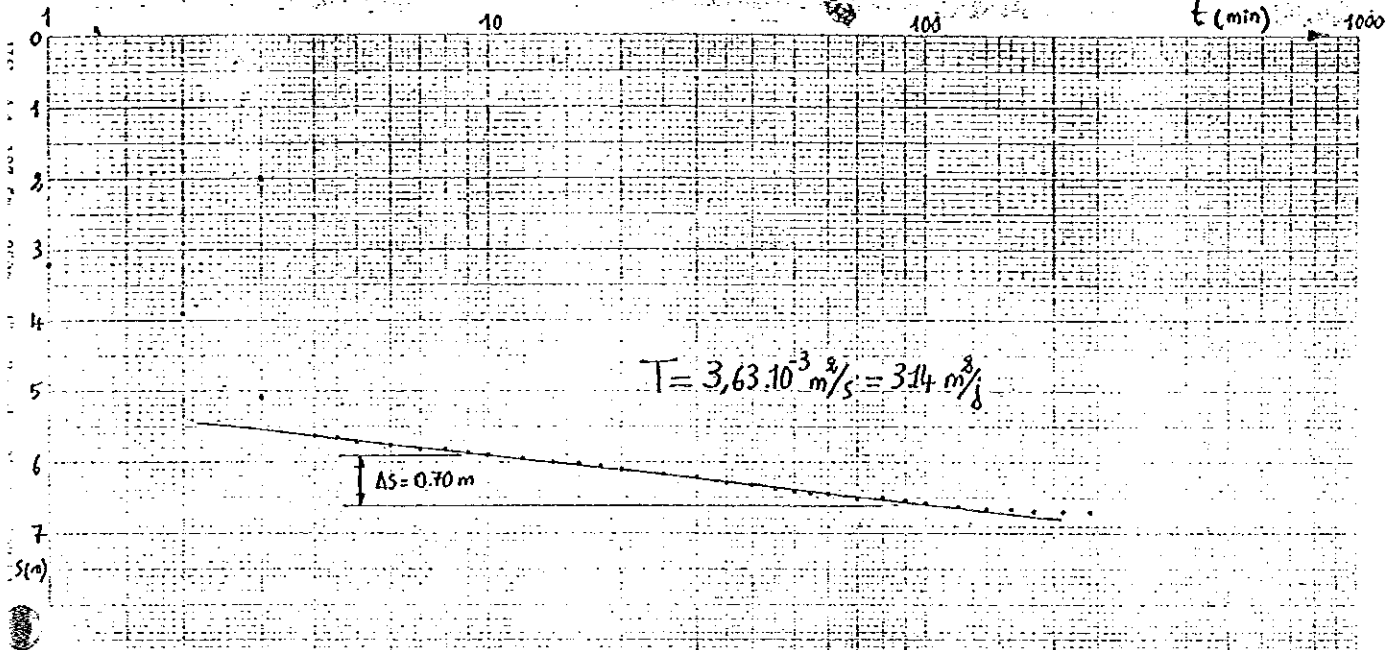
Descente



5<sup>e</sup> Palier

Descente

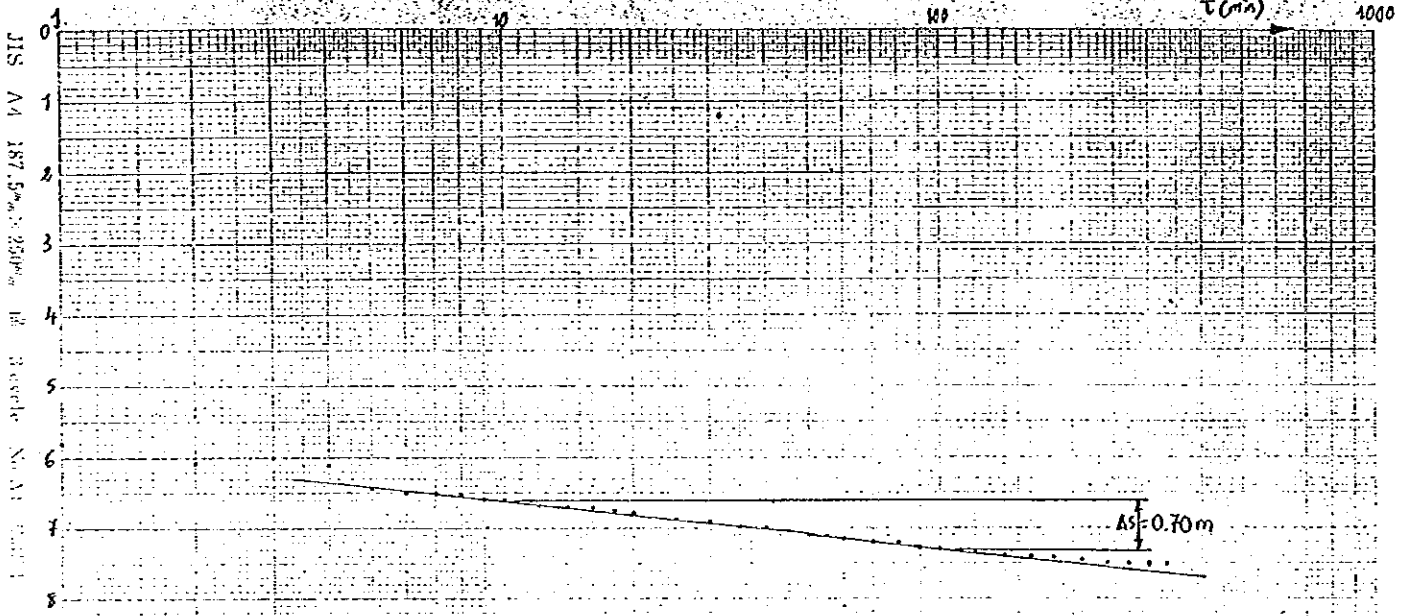
EW-13 (5)



6<sup>e</sup> Pétier

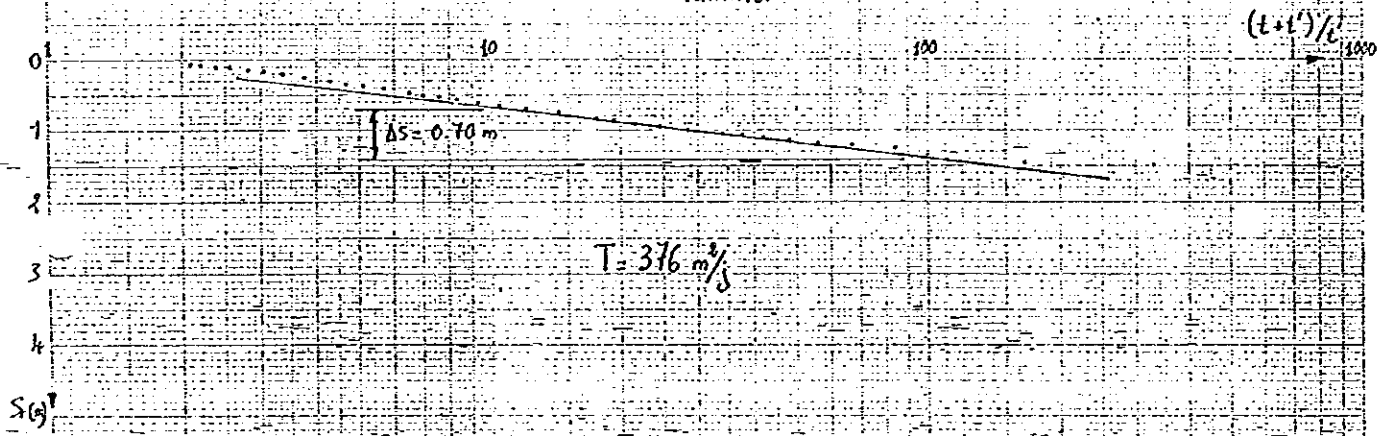
EW-13 (6)

Descente



$$T = 4,36 \cdot 10^{-3} \text{ m}^2/\text{s} = 3,76 \text{ m}^2/\text{s}$$

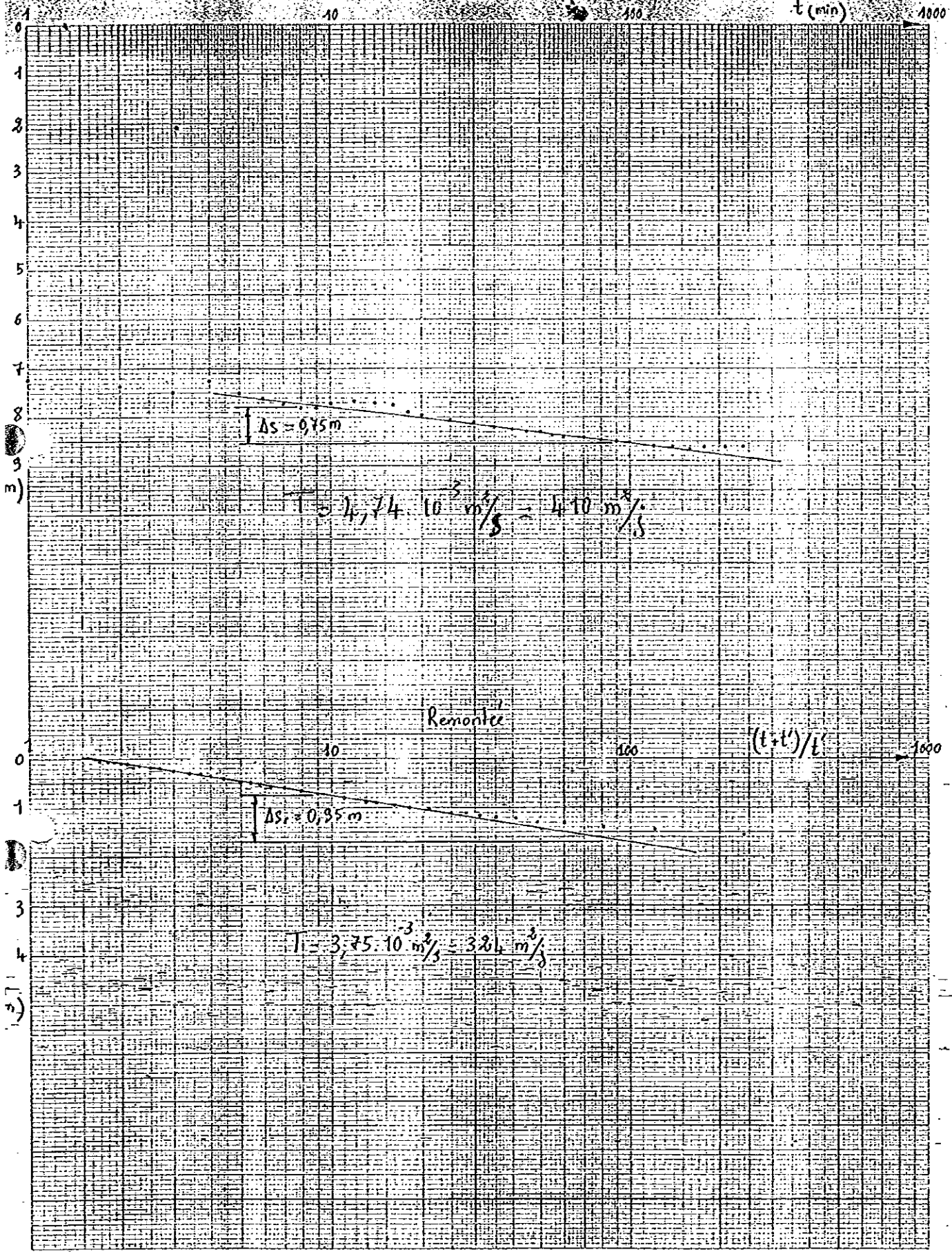
Remontée



$$T = 3,76 \text{ m}^2/\text{s}$$

7<sup>e</sup> Papier  
Descente

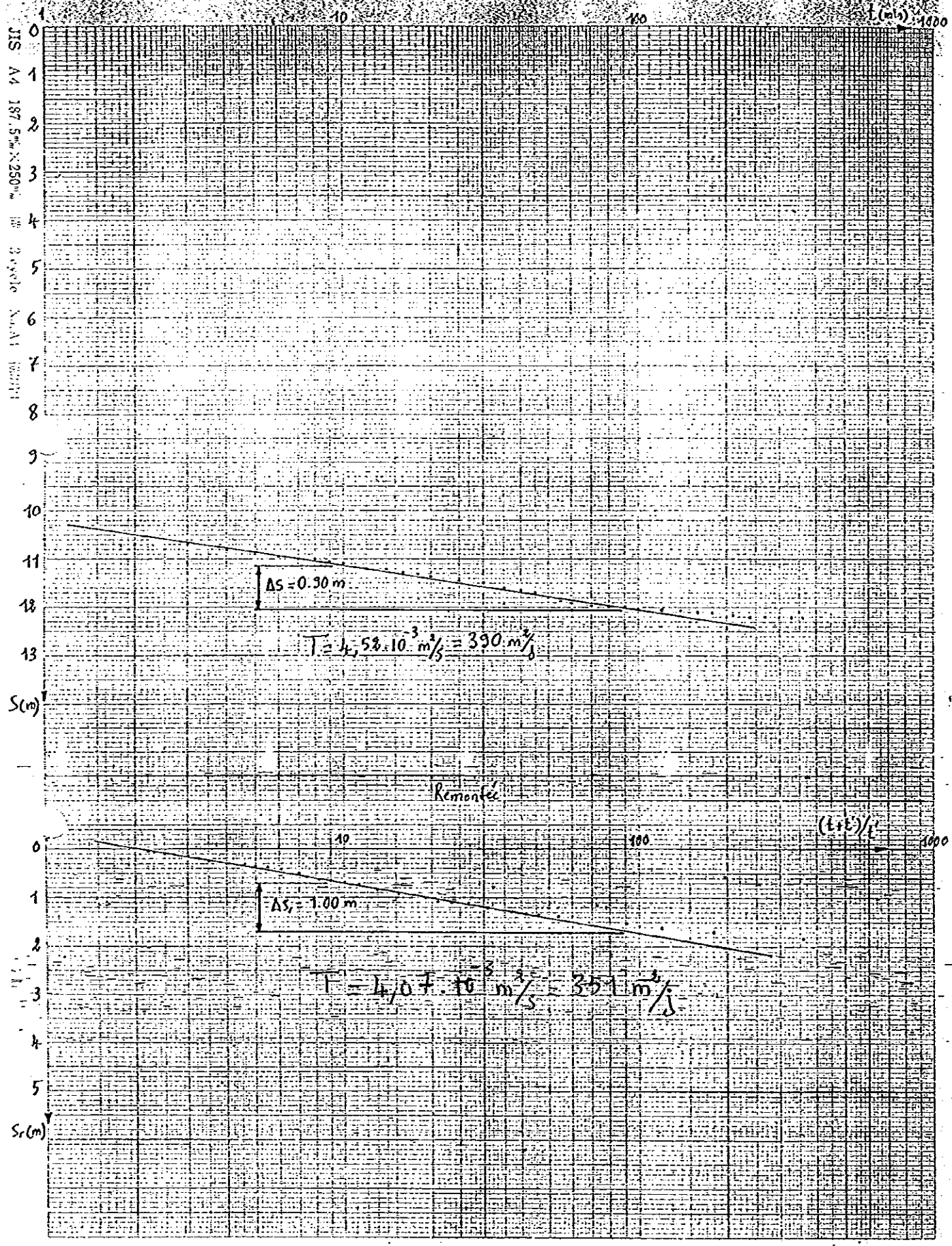
EW-13 ①



8-1410

EW-13 (8)

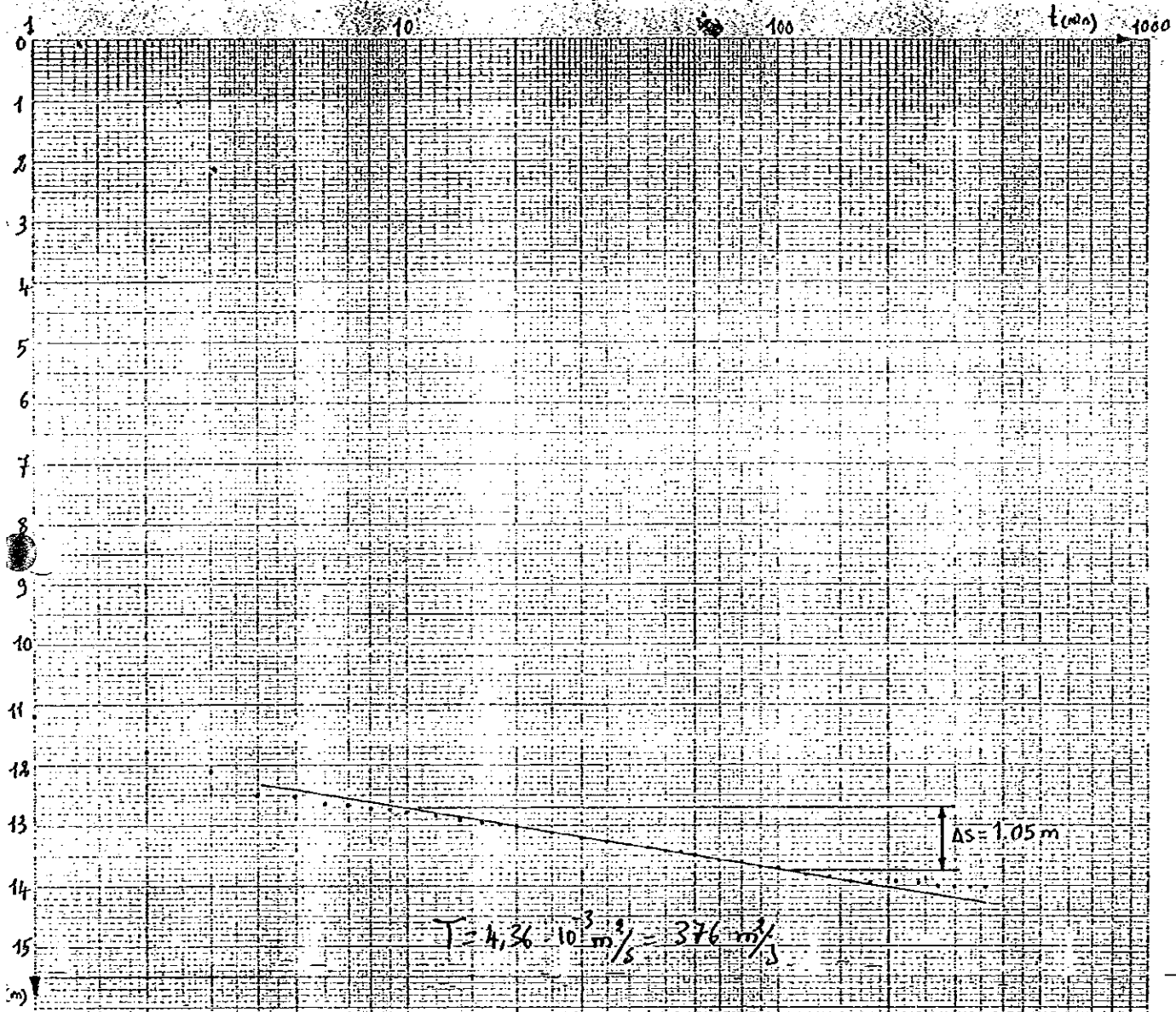
Descente



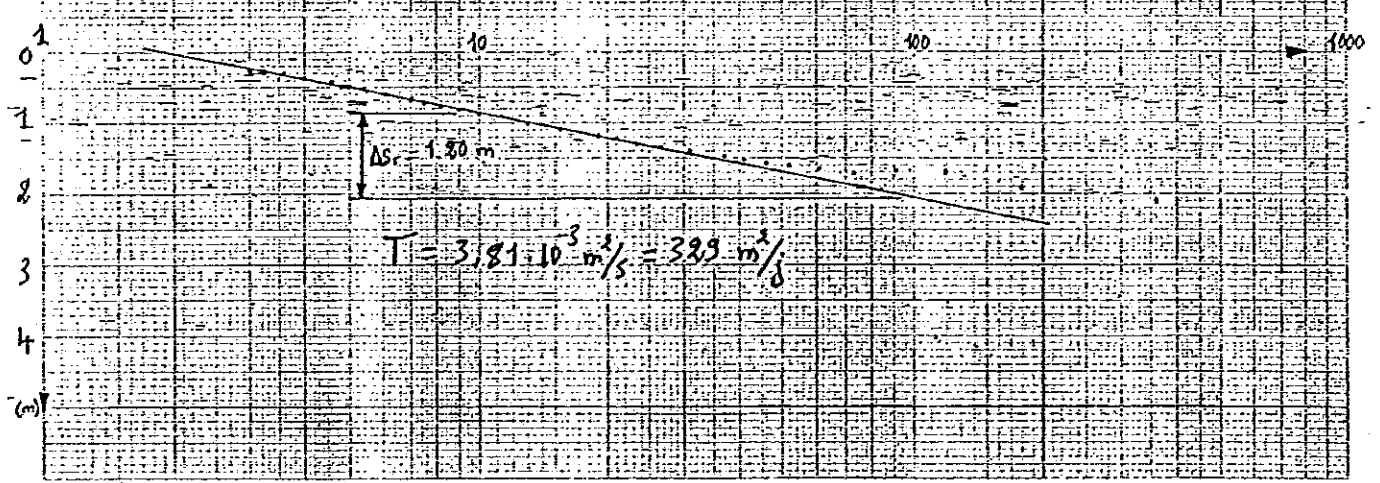


Descente 3<sup>e</sup> Pavé

EW-13 (9)

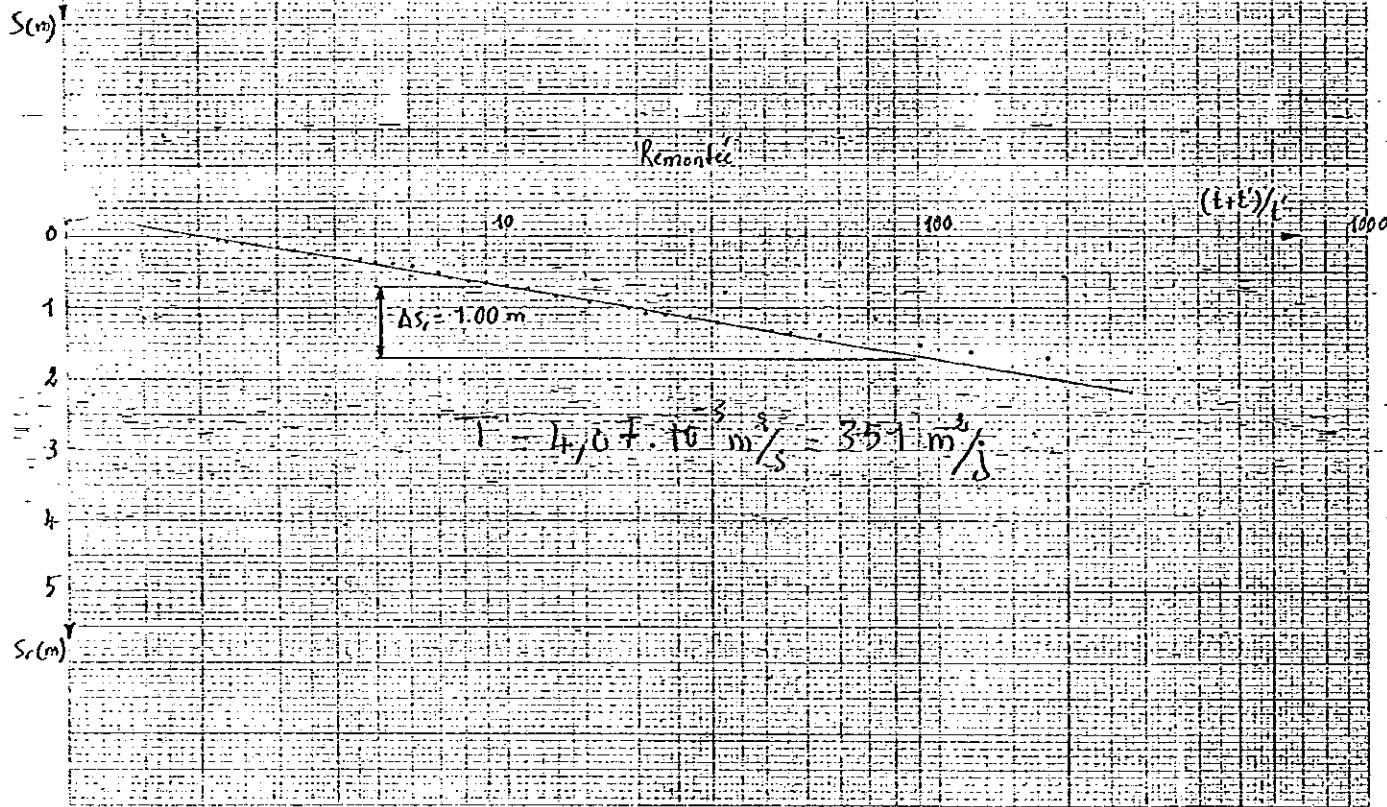
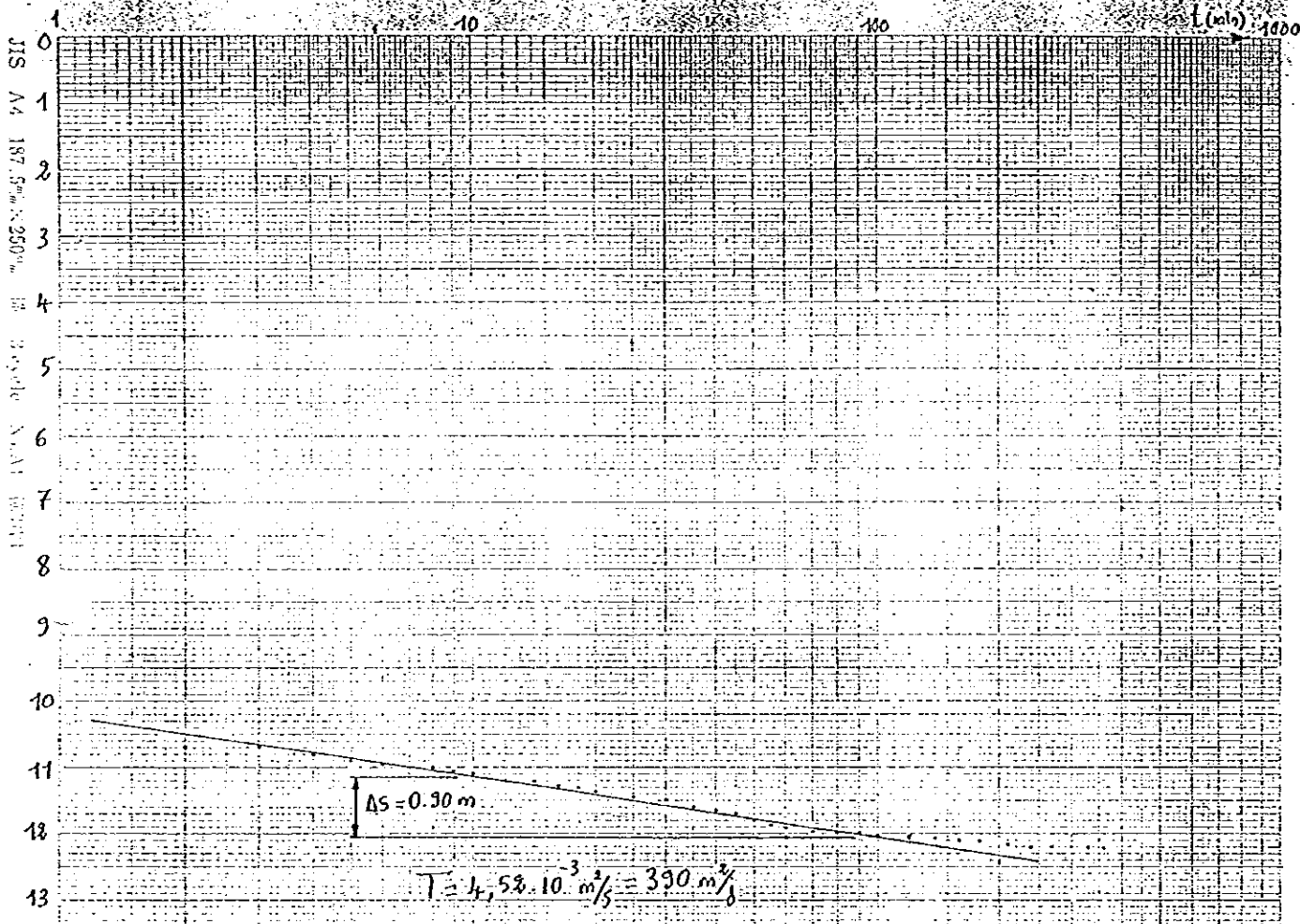


Remonte

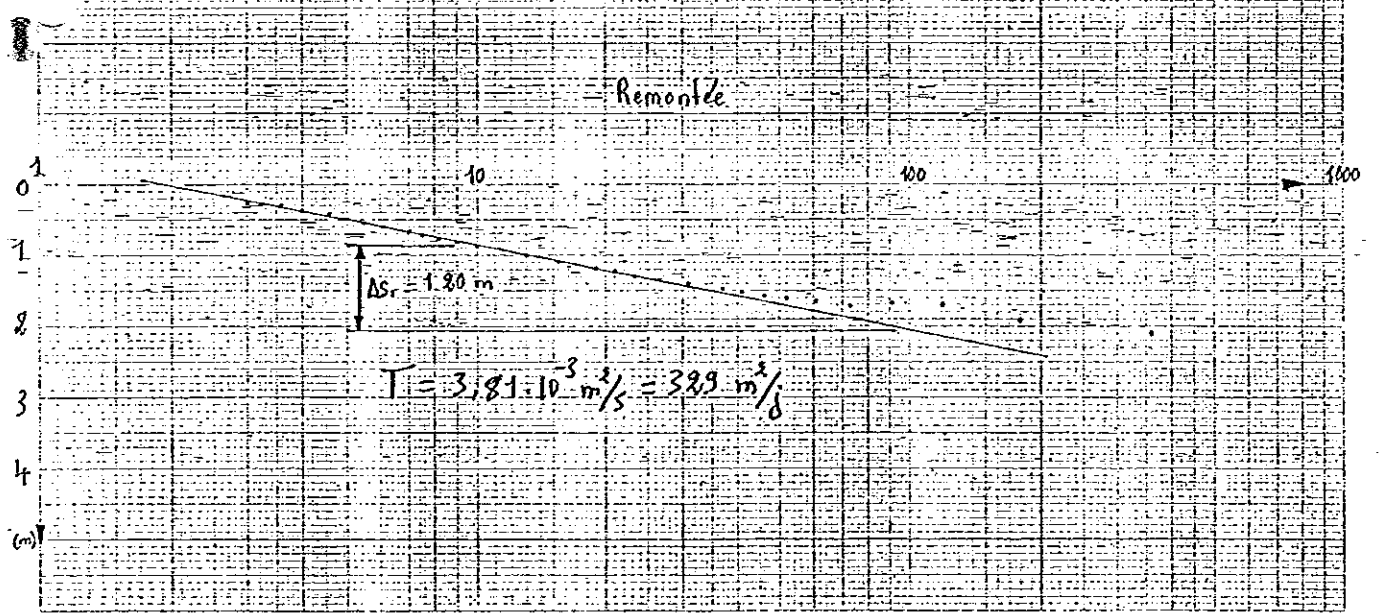
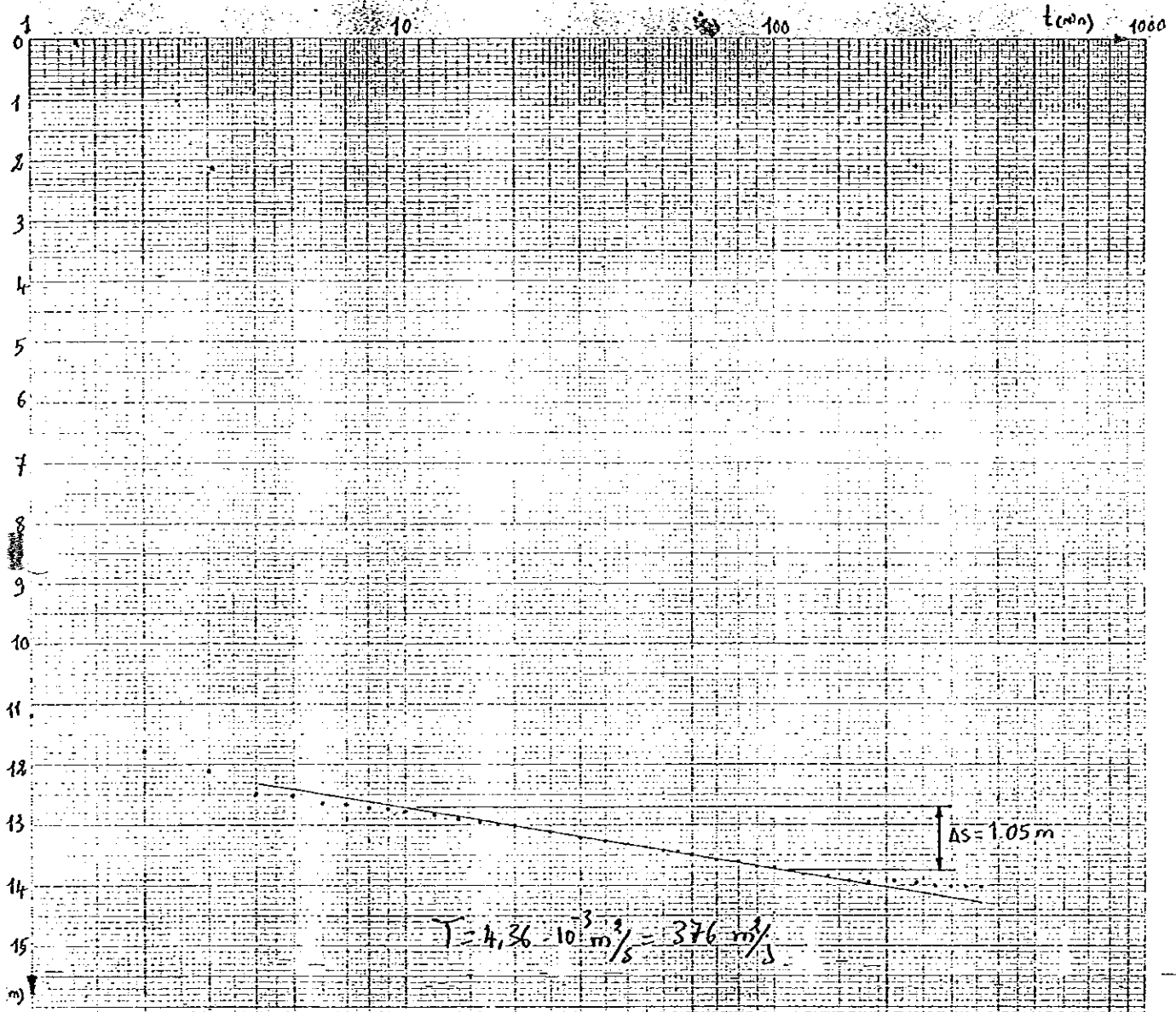


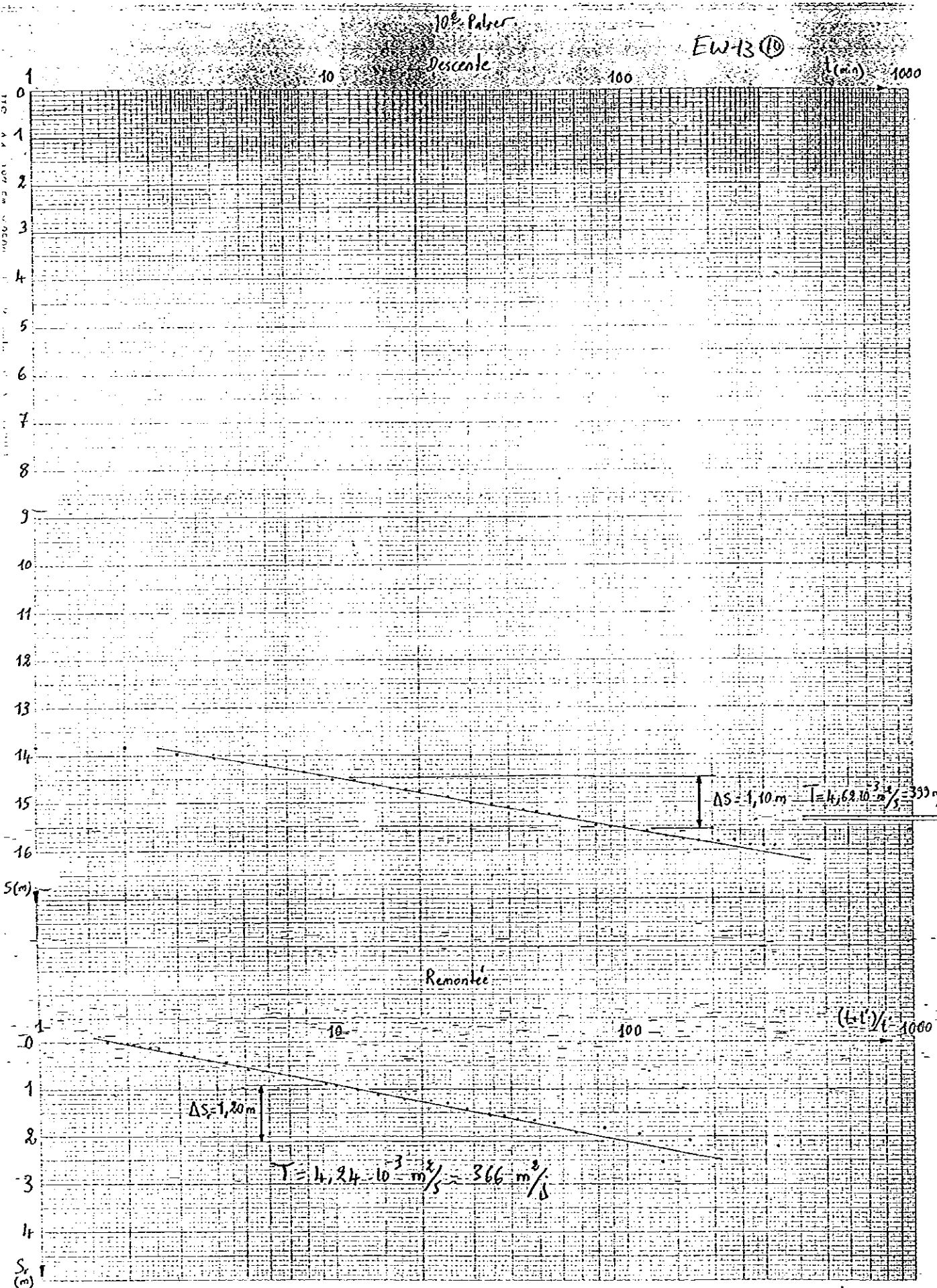
Descente

EW-13 (8)



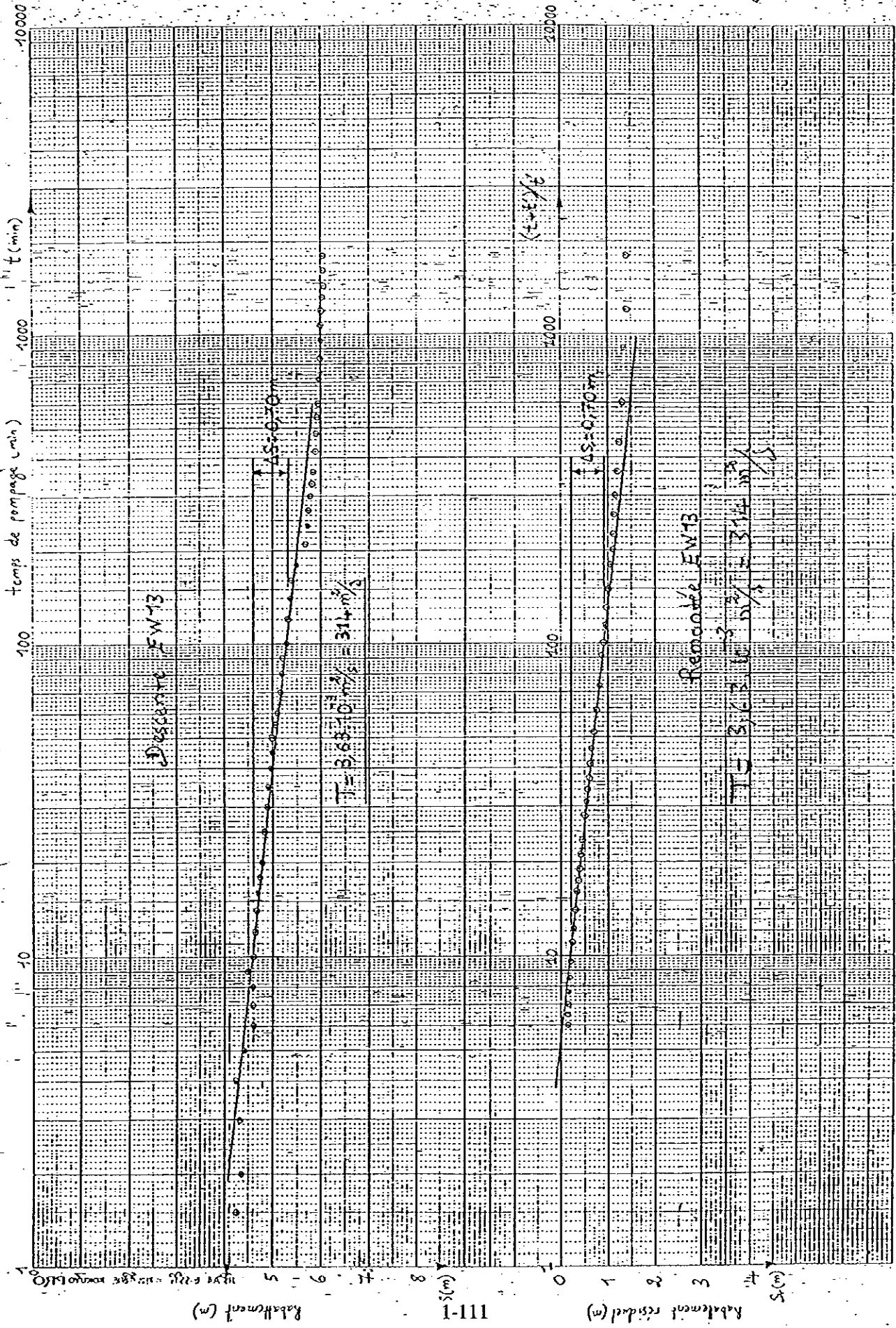






Courbe / Essai d'exploitation pompage EW-13

EW-13 (11)



1-111

**EW - 14**

**BOREHOLE EW14 REPORT (NGOLA 2)  
TEAM B D.G.H.**

The works of the unsuccessful borehole were carried out from the 26 th of November to the 23 nd December 1998 without any major difficulty.

**I- SETTING OF THE SITE :**

It is set up on November 26 th 1998 at 7 h 30 to 9 h 35.

**II- BOREHOLE:** The drilling weathering layer realized with three-cone 12 ¼ inch based on rotary method. It lasted from the 26 th of November to the 2 nd of December 1998 with 95,35 m final depth.

**III- LEAVING SITE :** This operating was done on December 3 rd 1998. In general, the unsuccessful borehole EW14 digged down 95,35 m deep weathering did not present any technical difficulties. However, the site EW14 would be an old jamming bassin full with sand and gravel.

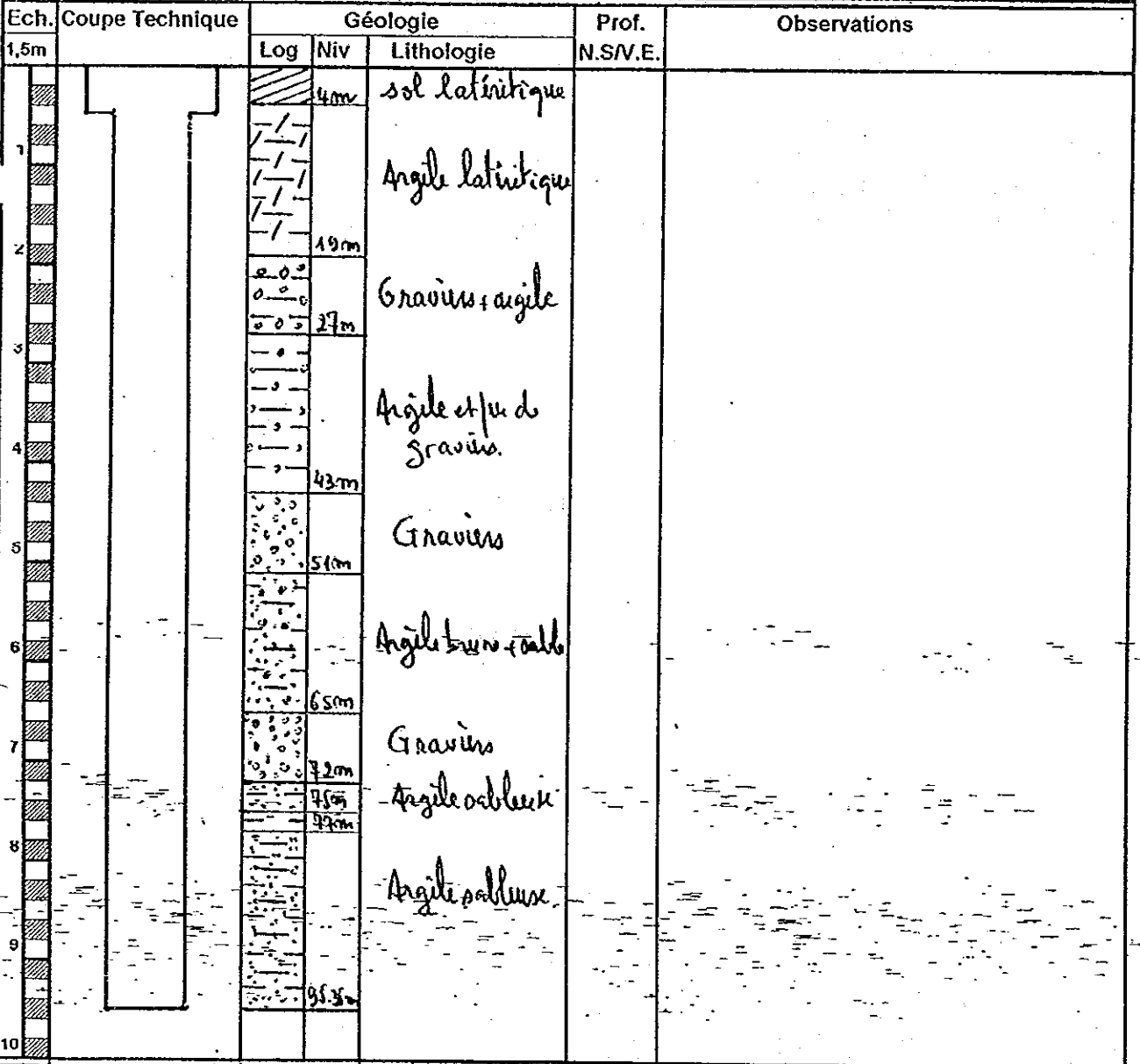
Bangui, January 31 rst 1998

THE CHIEF OF THE SITE

Constant ZOUKOUA.-

DIRECTION GENERALE DE L'HYDRAULIQUE  
 REPUBLIQUE CENTRAFRICAINE  
 Unité - Dignité - Travail  
 PROJET MISE EN VALEUR DU SECTEUR DE L'EAU  
 EN REPUBLIQUE CENTRAFRICAINE  
**FICHE DE FORAGE**

Données Géographiques	Données de foration	Données de forage
Préfecture de: <b>OMBELLA MPOKO</b>	Appareil de Forage: .....	N° de Forage: <b>EW14 / Ngola 2</b>
Sous/Préfecture de: <b>BIMBO</b>	Poste de Travail n°: <b>6</b>	Débit Air lift: ..... m3/h
Commune de: .....	Chef de chantier: <b>ZOKOUA (m/trauc)</b>	Débit d'essai: ..... m3/h
Groupement de Villages: .....	Date Début: <b>26 / 11 / 1998</b>	N.S. .... m3/h
Village: <b>NGOLA 2</b>	Date Fin: <b>03 / 12 / 1998</b>	N. Dynamique: ..... m
Coord. Géogr. LONG: ..... LAT: ..... ALT: .....		Transmissivité ..... m2/s



Forage		Tube Provisoire		Tube d'équipement		Gravier annulaire		Autres renseignements	
Diam. de	à	Diam. de	à	Plein	Crépine	Calibre		Hydrogéologue:	
17.1/2" Ø	5m	14.1/2" Ø	5m	de	à	de	à	Vol. lin.	Date / / 19.....
12.1/4" 5m	95.3m	10"						Hauteur	Signature
7. 5/8"		7"						Quantité	
6. 1/4"		Cimentation		de	à	de	à		

EW-14

004

03/12/1998

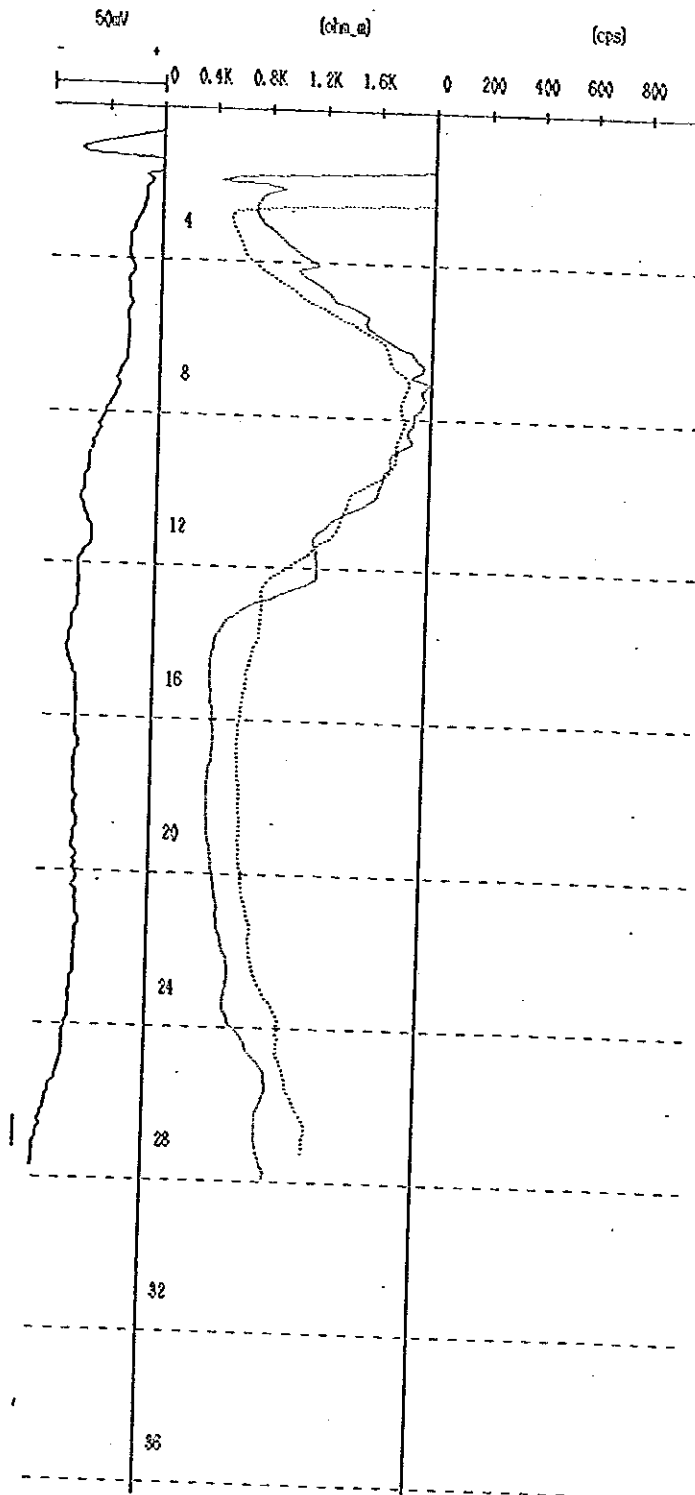
28m 以 深 口

既 記 筋 線

こ ち 測 定

不 能

FIELD :  
ID NO. : 004  
DATE 19-12-03  
TIME 2:57:05 AM  
GAMMA : .....  
SHORT NORMAL : .....  
LONG NORMAL : .....  
SP : .....



**EW – 15**



**BOREHOLE EW15 REPORT(DAMALA)**  
**TEAM B D.G.H**  
**§§§§§§§§§§**

This well was unsuccessful . Technically it was very difficult to realize it within the period of the 4 th to the 21 rst of December 1998.

**I- SETTING UP THE SITE**

It was set up on December 4 th 1998

**II- BOREHOLE**

a) Drilling in the weathering layer : It was done with rotary method with three-cone 12 ¼ " inch 0 m to 82 m. At this depth, an important loss of mud was discharged 4 days long.

**III- CASING** : It was realized in order to change the rotary method to a down the hole hammer. This step achieved on December 12 th 1998.

**IV- DRILLING WITH HAMMER**

It was realized from the 17 th to 18 th of December 1998 with a cloudy water flowing from 84 m to 89 m. Beyond 89 m there was no water flowing under the drilling until 98. 35 m, the final depth was of the borehole declared unsuccessful. The negative EW15 was the one that consumed much bentonite (30 sacks) because of the loss of mud at 81 m to 82 m. the bedrock is practically non-existent with an important sediment of quartzit-Sandstone fragments (from 81 m).

Bangui, January the 2 nd 1999

THE CHIEF OF THE SITE

Constant ZOUKOUA.-

DIRECTION GENERALE DE L'HYDRAULIQUE  
 REPUBLIQUE CENTRAFRICAINE  
 Unité - Dignité - Travail  
 PROJET MISE EN VALEUR DU SECTEUR DE L'EAU  
 EN REPUBLIQUE CENTRAFRICAINE  
**FICHE DE FORAGE**

Données Géographiques	Données de foration	Données de forage
Préfecture de: <b>OMBEUA NIPOKO</b>	Appareil de Forage: .....	N° de Forage: <b>EWA 15 / Damale</b>
Sous/Préfecture de: <b>BIHBO</b>	Poste de Travail n°: <b>4</b>	Débit Air lift: ..... m3/h
Commune de: .....	Chef de chantier: <b>ZOKOUA Constant</b>	Débit d'essai: ..... m3/h.
Groupement de Villages: .....	Date Début: <b>04 / 12 / 198..</b>	N.S.: ..... m3/h.
Village: <b>DAHALA</b>	Date Fin: <b>21 / 12 / 198..</b>	N. Dynamique: ..... m
Coord. Géogr. LONG:..... LAT:..... ALT:.....		Transmissivité m2/s

Ech. 1,5m	Coupe Technique	Géologie			Prof. N.S.V.E.	Observations
		Log	Niv	Lithologie		
			5m	ml gris		
1			14m	Argile		
2			19m	Graviers + argile		
			24m	sable fin argileux		
3			31m	Graviers + argile		
4			44m	sable fin argileux		
5			48m	sable argileux		
			56m	Graviers + argile		
6			62m	sable argileux		
7			81m	sable fin argileux		
8						
9				Graviers + argile		
10			98.55			

Forage		Tube Provisoire		Tube d'équipement		Gravier annulaire		Autres renseignements	
Diam de	à	Diam de	à	Plein	Crépine	Calibre		Hydrogéologue:	
17.1/2" 0	5m	14.1/2" 0	5m	de	à	de	à	Vof. lin.	Date / / 19.....
12.1/4" 5m	81m	10" 0	81m					Hauteur	Signature
9. 5/8" 81m	98.35m	7"						Quantité	
6. 1/4"		Cimentation		de	à	de	à		

**EW - 16**

DIRECTION GENERALE DE L'HYDRAULIQUE

REPUBLIQUE CENTRAFRICAINE

Unité - Dignité - Travail

PROJET MISE EN VALEUR DU SECTEUR DE L'EAU  
EN REPUBLIQUE CENTRAFRICAINE

FICHE DE FORAGE

Données Géographiques		Données de foration		Données de forage	
Préfecture de: <u>EMPELLA MPALG</u>	Appareil de Forage: <u>ANDEUSE KOKEN</u>	N° de Forage: <u>EW16/1</u>		Débit Air lift: ..... m3/h	
Sous/Préfecture de: <u>BAMB</u>	Poste de Travail n°: <u>12</u>	Débit d'essai: ..... m3/h		N.S. .... m3/h	
Commune de: <u>BIMBO</u>	Chef de chantier: <u>LAVOU km</u>	N. Dynamique: ..... m		Transmissivité ..... m2/s	
Groupement de Villages: <u>SAKAT I</u>	Date Début: <u>13.10.1999</u>				
Village: <u>SAKAT I</u>	Date Fin: <u>26.10.1999</u>				
Coord. Géogr. LONG: .....	LAT: .....	ALT: .....			

Ech. 1,5m	Coupe Technique	Géologie			Prof. N.S.V.E.	Observations
		Log	Niv	Lithologie		
		P1	5m	Lat rouge brique		<p>- Zone présomée aquifère</p> <p>* Prof.: 117 - 120 m.</p> <p>- le forage a été exécuté dans sa grande partie à la boue (Rotary boue Toxicose 9 5/8)</p> <p>- Eboulement de 3 m survenant le fond du forage à 125 m</p> <p>- Une couche de sable a été insérée entre le massif filtrant et le bouchon pour améliorer la filtration vu l'épaisseur d'argile sur la partie captée.</p>
		P2	15m	Lat argileuse		
			19m	Argile beige		
			45m	Argilite grise		
			47m	Argile jaune		
				Argilite grise		
			98m			
			123m	Argile Jaune		
			125m	Argilite		
			128m	Argile grise		

Forage		Tube Provisoire		Tube d'équipement		Gravier annulaire		Autres renseignements	
Diam de	à	Diam de	à	Plein	Crépine	Câlibre	2-5mm	Hydrogéologue:	
17.1/2"		14.1/2"		de	à	Vol. lln.	33	Date	/ / 19....
12.1/4"		10"		125	123,4	Hauteur	12 m	Signature	
9.5/8"	128 m	7"		115,7	115,7	Quantité	400 l		
6.1/4"		Cimentation		de	110 à 110	de	6,4 à 6,2		

**EW - 17**

# BOREHOLE EW 17 FINAL REPORT

\$\$\$\$\$\$

Operations were realized from September the 4<sup>th</sup> to 29, September 1998

## A- SETTING UP THE SITE

This phase consisted of preparing, ranging, changing the necessary materials for works, unloading and setting up rig B. It took 48 h because of the distant PK 12 to the site and of the mud.

## B- BOREHOLE

Works started from the 7<sup>th</sup> September 1998 and ended by the 25<sup>th</sup>. Lot of difficulties have been registered : irregular supply in water, lack of equipments for the staff, bad weather, the deficiency in 10" steel tube and 48 hours strike observed by the staff.

### Technical data

Diameter	Depth	Temporary pipe	Drilling method	Tool
17 ½ "	0 à 5 m	14 " de 0 à 5 m	rotary	wing bit 17 ½ "
12 ¼ "	5 à 83,5 m	10 " de 0 à 83,5 m	rotary	wing bit 12 ¼ "
9 5/8 "	83,5 m à 123,5 m		down hole the hammer	down hole the hammer 9 5/8 "

Depth : 123,5 m  
weathering : from 0 to 83,5 m  
quartzit landstone  
+ clay } from 83,5 m to 93 m  
clay set from 93 m to 123,5

## LEAVING THE SITE

From September 26<sup>th</sup> to 29<sup>th</sup>, this last phase took much time and has been difficult because of the extraction of the temporary pipe from about 83 m depth. It was too difficult for the trucks to get out from the site because of the last rain .

In general, the EW 17 with essentially weathering lithology at about 123,5 m depth was unsuccessful. During the borehole drilling, quantities of the following products have been consumed : 13 sacks of bentonit, 3 sacks of foam agent , 15 sacks CMC, more than 20 liters of gazoil, and particulary 90 m<sup>3</sup> of water for the rotary.

However, the surrounding population was kind, sympathetic and sometimes curious with us. They also wish the drilling works to be resumed.

Bangui, September 30<sup>th</sup> 1998

LE CHIEF OF SITE

Constant ZOUKOUA.-

DIRECTION GENERALE DE L'HYDRAULIQUE

REPUBLIQUE CENTRAFRICAINE

Unité - Dignité - Travail

PROJET MISE EN VALEUR DU SECTEUR DE L'EAU  
EN REPUBLIQUE CENTRAFRICAINE

FICHE DE FORAGE

Données Géographiques	Données de foration	Données de forage
Préfecture de:.....	Appareil de Forage:.....	N° de Forage: <u>E.W.17</u>
Sous/Préfecture de:.....	Poste de Travail n°: <u>1</u>	Débit Air lift:..... m3/h
Commune de:.....	Chef de chantier: <u>ZOKOUA Combarck S.</u>	Débit d'essai:..... m3/h.
Groupement de Villages:.....	Date Début: <u>04.1.03.1998</u>	N.S..... m3/h.
Village: <u>E. Cole Koudou Kou</u>	Date Fin: <u>29.1.03.1998</u>	N. Dynamique:..... m
Coord. Géogr. LONG:..... LAT:..... ALT:.....		Transmissivité <u>m2/s</u>

Ech. 1,5m	Coupe Technique	Géologie			Prof. N.S.V.E.	Observations
		Log	Niv	Lithologie		
1 2 3 4 5 6 7 8 9 10		2m		Sol argileux		Forage négatif (le sable est pratiquement inexistant après 123,5m de profondeur).
		5m		Argile latéritique		
		10m		Gravier argileux		
		15m		Argile et gravier		
		29m		Argile grise		
		32m		Sable argileux		
		34m		Argile grise		
		38m		Sable argileux		
		54m		Argile beige		
		83,5		Argile rouge brique		
83m		Craie quartzite et Argile				
123,5		Argile brune				

Forage		TUBE PROVISOIRE		TUBE D'ÉQUIPEMENT		GRAVIER ANNULAIRE		AUTRES RENSEIGNEMENTS	
Diam. de	à	Diam. de	à	Plein	Crépine	Calibre		Hydrogéologue:	
17.1/2" 0	5m	10" 0	5m	de	à	de	à	Date / / 19....	
12.1/4" 5	83,5m	8" 5m	83,5m			Hauteur		Signature	
9.5/8" 83,5m	123,5m	7"				Quantité			
7.5/8"		Cimentation		de	à	de	à		

**EW - 18**



# BOREHOLE( EW 18) REPORT

\*\*\*\*\*

Works of this unsuccessful well started on December 12, 1998 and ended on January 5, 1999.

## 1- Setting up the site

This step has been effective on, November 21, 98

## 2- Drilling in the weathring zone

It has been done essentially with 17 inch from 0 to 5 m then continued with 12 ¼ inch from 5 m to 125 m from December 21, 1998 to January 5, 1999. At that depth the drilling work stopped. The bedrock was praticly non -existent and the geological structure was weathered.

## 3- Leaving the site

It was effective on January 5, 1999

## Conclusion

Generally the North-West area of Bangui city is presented as an collapsing area rich in sedimentary deposit because three wells completed (EW14-Ew15-Ew18) showed that at more than 95 m, the geological structure is weathered.

DIRECTION GENERALE DE L'HYDRAULIQUE

REPUBLIQUE CENTRAFRICAINE

Unité - Dignité - Travail

PROJET MISE EN VALEUR DU SECTEUR DE L'EAU  
EN REPUBLIQUE CENTRAFRICAINE

FICHE DE FORAGE

Données Géographiques	Données de foration	Données de forage
Préfecture de: <b>OMBELLA M'POKO</b>	Appareil de Forage: .....	N° de Forage: <b>EW 19 / SINISTRE</b>
Sous/Préfecture de: .....	Poste de Travail n°: <b>8</b>	Débit Air lift: ..... m3/h
Commune de: <b>Bangui</b>	Chef de chantier: <b>ZOKOU/Constant</b>	Débit d'essai: ..... m3/h.
Groupement de Villages: .....	Date Début: <b>21 / 12 / 1998</b>	N.S.: ..... m3/h.
Village: <b>SINISTRE</b>	Date Fin: <b>05 / 01 / 1999</b>	N. Dynamique: ..... m
Coord. Géogr. LONG:..... LAT:..... ALT:.....		Transmissivité m2/s

Ech. 1,5m	Coupe Technique	Géologie			Prof. N.S/V.E.	Observations
		Log	Niv	Lithologie		
			5m	Latérite		
1			14m	Argile jaune claire		
			17m	Sable fin argileux		
			19m	Sable fin + argile		
			21m	Argile jaune d'gris		
2			27m	Sable fin + argile		
			30m	argile + graviers fins		
3				argile + graviers		
			41m			
4						
5						
6				Argile		
7						
			94m			
8			103m	Sable fin + argile		
			110m	Graviers fins argileux		
9			117m	Argile		
10			125m	Graviers		

Forage		Tube Provisoire		Tube d'équipement		Gravier annulaire		Autres renseignements	
Diam. de	à	Diam. de	à	Plein	Crépiné	Callbre		Hydrogéologue:	
17.1/2" Ø	5m	14.1/2" Ø	5m	de	à	de	à	Vol. lin.	Date / / 19....
12.1/4" 5m	125m	10"						Hauteur	Signature
9. 5/8"		7"						Quantité	
6. 1/4"		Cimentation		de	à	de	à		

# EW - 19

# BOREHOLE (EW19) REPORT

\*\*\*\*\*

We met some difficulties during the completion of this well even successful. it was completed from January 8 to January 20, 1999.

## 1- Setting up the site

The site was set<sup>up</sup> on January 8, 1999

## 2- Drilling in the weathering zone : it consists of 3 phases.

- drilling with 17 ½ inch three-cone from 0 to 5 m (casing 14 inch)
- drilling with three-cone or mud wing-bit from 5 m to 49 m. This depth corresponds to the top of the limestone bedrock of Ngouciment with an important loss mud.

## 3- Temporary casing 10<sup>4</sup> inch

The installation of the 10" inch casing has been done on January 14, 1999 from 0 to 51 m.

## 4- Drilling in the bedrock

It was done with a 9 5/8 hammer from 51 m to 56 m with an important water rush at 52 m for a flow of more than 50 m<sup>3</sup>/h. As the limestone was very cracked the blocks could not help the hammer to drill. After great efforts we decided to equip.

## 5- Equiping

It has been done ~~done~~ with 6 inch FRP pipe with the top of the slotted massif at 49 m on January 19, 1999 .

## 6- Leaving the site

This operation has been realized on January 20, 1999 after the installation of the all water coming and cementation of the surface.

## Conclusion

If 15 m were drilled in the bedrock, the well EW19 should be the borehole which would have the most important flow with regard to all the drilling works implementes by the team B.

DIRECTION GÉNÉRALE DE L'HYDRAULIQUE

REPUBLIQUE CENTRAFRICAINE

Unité - Dignité - Travail

PROJET MISE EN VALEUR DU SECTEUR DE L'EAU  
EN REPUBLIQUE CENTRAFRICAINE

FICHE DE FORAGE

Données Géographiques		Données de foration		Données de forage	
Préfecture de: <b>OMBELLA HIPOKO</b>		Appareil de Forage: <b>TT 3569 BC</b>		N° de Forage: <b>EW 10 / Ngoument</b>	
Sous/Préfecture de: .....		Poste de Travail n°: <b>09</b>		Débit Air lift: ..... m3/h	
Commune de: <b>Bangui</b>		Chef de chantier: <b>ZOKOJA Constant</b>		Débit d'essai: ..... m3/h	
Groupement de Villages: .....		Date Début: <b>09 / 01 / 1999</b>		N.S.: ..... m3/h	
Village: .....		Date Fin: <b>20 / 01 / 1999</b>		N. Dynamique: ..... m	
Coord. Géogr. LONG: ..... LAT: ..... ALT: .....				Transmissivité m2/s	

Ech. 1,5m	Coupe Technique	Géologie			Prof. N.S.V.E.	Observations
		Log	Niv	Lithologie		
1			5m			Forage difficile à l'avancement du marteau dans le calcaire dû à de nombreux éboulements.
2						
3						
4			30m			
5			37m	Argile et gravais fins		
6			42m	Argile rouge brune et gravais moyens		
7			49m	Argile sombre et gravais calcaire	V.E 52m	
8			56m			
9						
10						

Forage		TUBE PROVISOIRE		TUBE D'ÉQUIPEMENT		GRAVIER ANNULAIRE		AUTRES RENSEIGNEMENTS	
Diam. de	à	Diam. de	à	Plein	Crépine	Calibre	2.5mm	Hydrogéologue:	
17.1/2"	5m	14.1/2"	5m	de	à	Vol. lln.	26	Date / / 19....	
12.1/4"	5m	10"	5m	54.75	56	Hauteur	4m	Signature	
9.5/8"	5m	7"		54.75	56	Quantité	280.0		
6.1/4"		Cimentation		de 39m	à 49m	de 43	à 56m		



## FICHE ANALYSE CHIMIQUE

N° : .....

Enquêteur: *BIDANA FABIE M.*

Date (j/m/a): *06.10.99*

IRH : .....

Laboratoire : *A.G.H.*

Heures (hh:mm) : .....h.....m

N° de forage : *EW 19*

Dates d'analyse : *06.10.99 - 01.11.99*

Temps de transport (h) : .....

### I Localisation Géographique

Préfecture: .....

S/Préfecture: .....

Commune: *BANGUI ville*

Village: .....

2° nom : .....

Quartier: *NGOU SIMA*

2° nom : .....

GPS<sup>1</sup> Longitude: .....° .....

GPS  Altimètre  Autres

Latitude: .....° .....

Altitude: .....m

### II Caractères organoleptiques

Goût :  Goût forte  Goût légère  Sans goût

Odeur :  Forte odeur  Légère odeur  Sans odeur

Aspect :  Clair  Trouble  Particules en suspension

### II Paramètres physiques

Température: *28* °C

Turbidité: *1* NTU

Ph: *7.02*

Dureté Totale: *294* mg/l de CaCO<sub>3</sub>

Conductivité: *564* µs/cm

Couleur: *2* PtCo

T.D.S. / Rés. Sec: *280* mg/l

<sup>1</sup> Cocher case au cas affirmatif



IV Paramètres chimiques

Cations

Sodium: ..... mg/l de Na<sup>+</sup>  
 Potassium: 27 ..... mg/l de K<sup>+</sup>  
 Magnésium: 33,4 ..... mg/l de Mg<sup>++</sup>  
 Calcium: 62,8 ..... mg/l de Ca<sup>++</sup>  
 Fer: 0,06 ..... mg/l de Fe<sup>++</sup>  
 Ammonium: 0,30 ..... mg/l de NH<sub>4</sub><sup>+</sup>  
 Zinc ..... mg/l de Zn<sup>++</sup>  
 Manganèse: 0,3 ..... mg/l de Mn<sup>++</sup>  
 Cuivre: 0,11 ..... mg/l de Cu<sup>++</sup>  
 Autres : -12.M.V

Anions

Clorure: 2,2 ..... mg/l de Cl<sup>-</sup>  
 Sulfate: 8 ..... mg/l de SO<sub>4</sub><sup>--</sup>  
 Bicarbonate: 200 ..... mg/l de HCO<sub>3</sub><sup>-</sup>  
 Carbonate: 0 ..... mg/l de CO<sub>3</sub><sup>--</sup>  
 Nitrate: 1,8 ..... mg/l de NO<sub>3</sub><sup>-</sup>  
 Nitrite: 0,027 ..... mg/l de NO<sub>2</sub><sup>-</sup>  
 Phosphate: 0,25 ..... mg/l de PO<sub>4</sub><sup>3-</sup>  
 Fluor: 0 ..... mg/l de F<sup>-</sup>  
 Salinité totale: 0,2/100 mg/l  
 Ammoniac: 0,28 ..... mg/l de NH<sub>3</sub>

V Analyses bactériologiques

Coliformes totaux: ..... / 100ml      Streptocoques fécaux: ..... / 100ml  
 Coliformes Fécaux: ..... / 100ml      Clostridium sulfo-reducteur : ..... / 100ml  
 Conclusion :  Très bonne     Bonne     Acceptable     Mauvaise

VI Observations générales de l'enquêteur / remarques supplémentaires

Les analyses organoleptiques sont acceptables  
 le PH de l'eau est normal - Bonne minéralisation  
 des ions HCO<sub>3</sub><sup>-</sup> et Ca<sup>++</sup> prédominent. Cette eau



**INSTITUT PASTEUR  
DE BANGUI**

*Docteur Jacques M. MORVAN  
Biologiste des Hôpitaux  
Directeur*

**LABORATOIRE D'ANALYSES MEDICALES**

Nom : EAU FORAGE NGOUSSIMA EW<sup>19</sup>

Prélèvement n° : 1914N

Date du prélèvement : 06.02.1999

Médecin prescripteur : NP

**ANALYSE BACTERIOLOGIQUE DE L'EAU**

GERMES POUR 100 ml	ECH 1
Coliformes thermorésistants	2
Coliformes	10
Streptocoques Fécaux	0
Clostridium sulfite réducteur	INCOMPTABLE
Staphylocoques	
Bactéries aérobies totales 30°	0
Bactéries aérobies totales 37 °	0

CONCLUSION : EAU NON POTABLE //

Docteur Jacques M. MORVAN



Descente

Temps de pompage (min)

t (min)

10000

1000

100

10

1

$$T = \frac{16,03 \cdot 10^{-3} \cdot 2}{5} = 1385 \frac{m^3}{h}$$

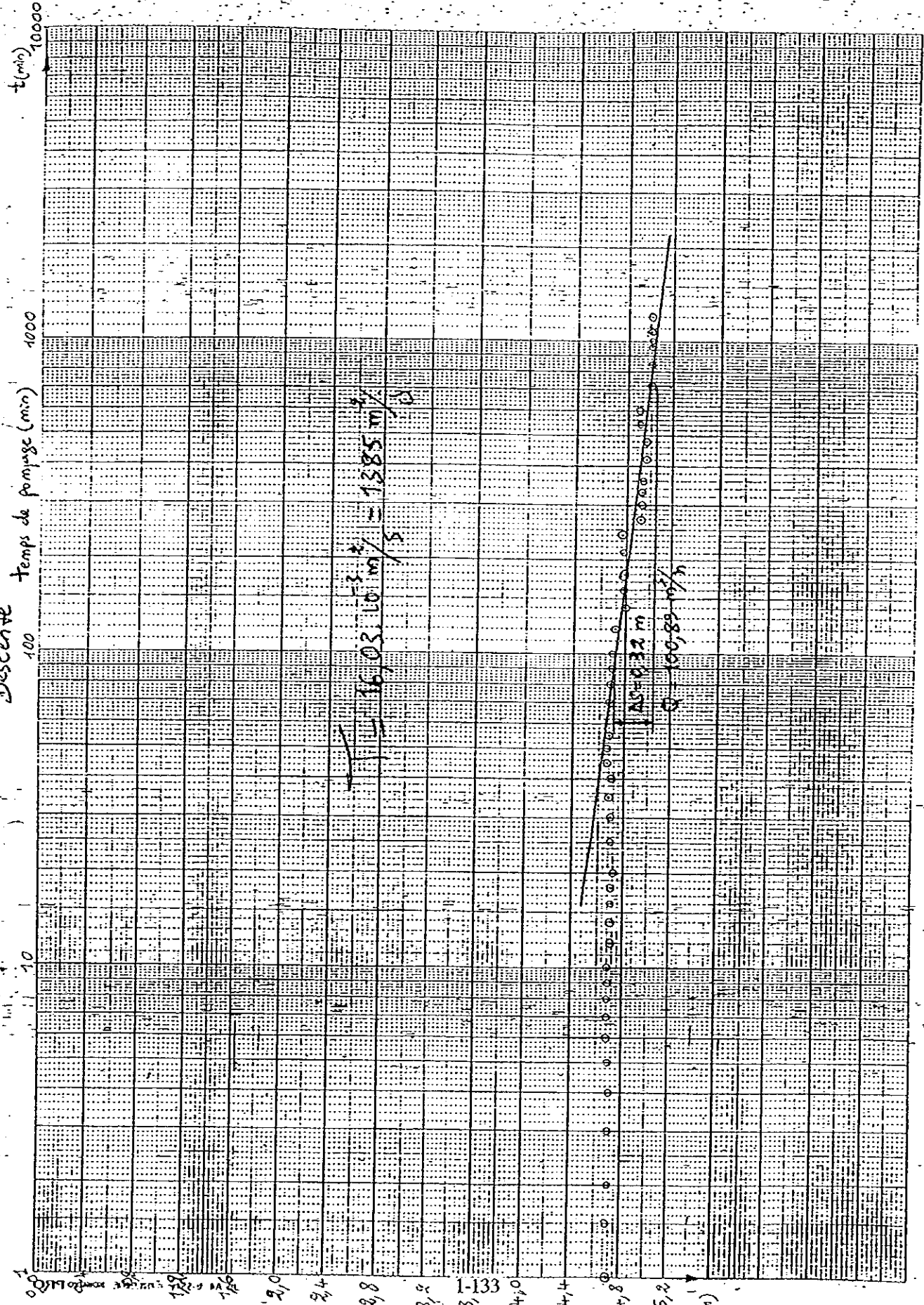
$$Q = 100,89 \frac{m^3}{h}$$

$$AS = 0,32 m$$

Rabattement (m)

S (m)

EW-19



**EW - 20**

# SITE(A) REPORT RELATED TO THE CARRYING OUT OF THE BOREHOLE DRILLING EW 20

.\_\*.\_\*.\_\*.\_\*.\_\*.\_\*.\_\*.\_

## I. Introduction

The implementation of the borehole drilling is full of difficulties :

- Difficulties related to equipments
- Difficulties related to lithology (geology of the field)
- The target population was not well informed.

Works carried out the EW 20 were broken down into two steps :

The first step from 4<sup>th</sup> to 18<sup>th</sup> of September 1998 concerns the first realization which did not succeed leading to technical giving up.

For the second step we were obliged to come back again on the site EW 20 from 12<sup>th</sup> to 28<sup>th</sup> of October 1998 because the other sites were flooded.

## II. Drawings

These drawings briefly show the progress (depth related to the number of days for the realization). We notice also that these drawings will also show the different difficulties we met during the carrying out of the borehole drilling.

II-1 Drawing of works from 4<sup>th</sup> to 18<sup>th</sup> of September 1998 :  
Daily progress of drilling (Drawing n° 1)

II-2 Drawing of resumed works from 12<sup>th</sup> to 16<sup>th</sup> of October 1998 : daily progress of drilling  
( drawing n° 2).

II-3 Brief interpretation of drawings

Drawing n° 1. This drawing shows the three important parts that explain the progress of the drilling and the difficulties met during the carrying out of the borehole drilling EW 20.

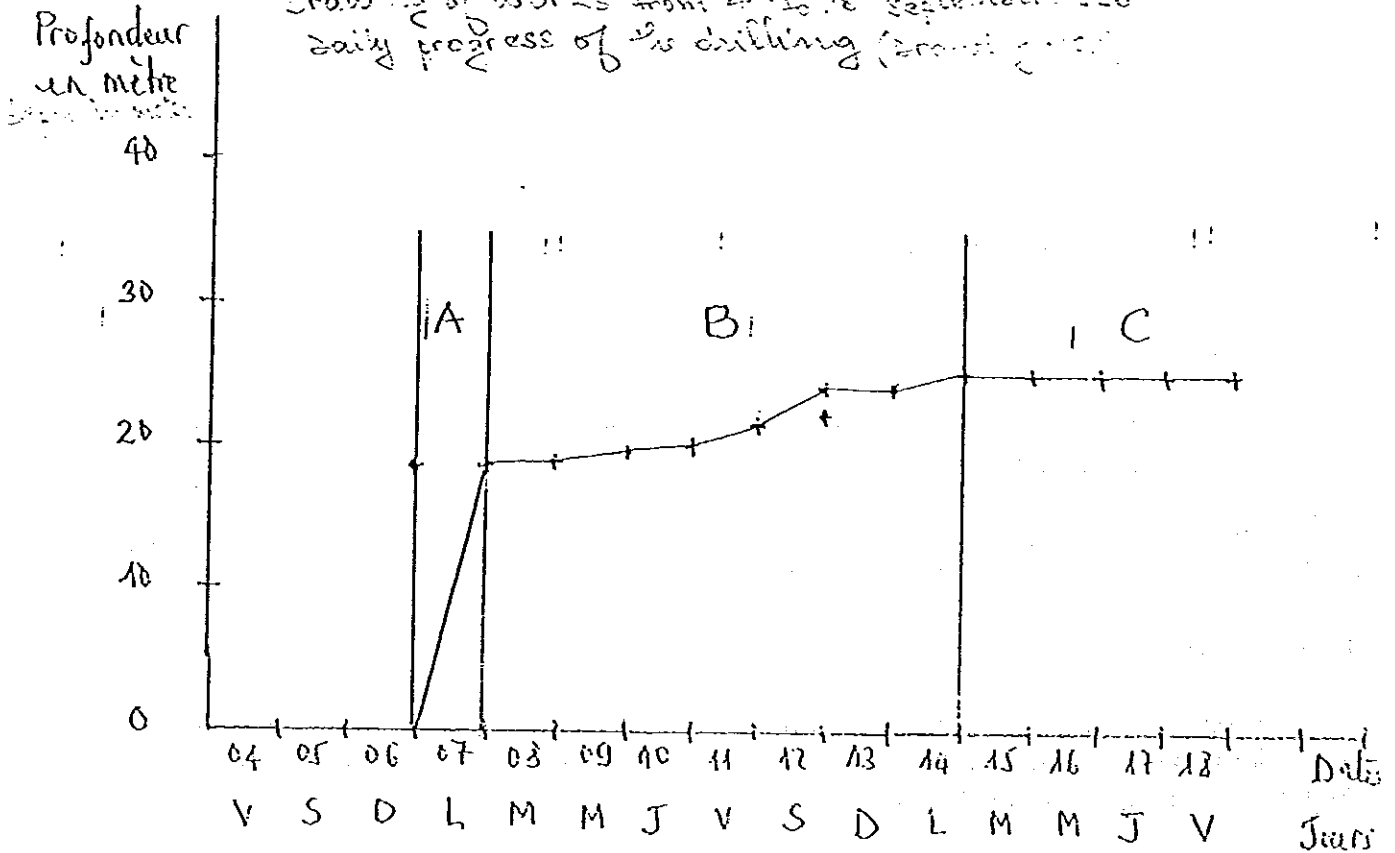
**Part A** : shows that at the first day there was no difficulties for the drilling and the progress was good. At the first day we attained a depth of 18,75 m. At that level there was an important loss of mud.

**Part B** : the loss of mud persists, but we attained the depth of 19,65 m. At that depth we placed the temporary 10" casings. After the casings we hardly attained the depth of 25 m because at that level the layer was very cracked ( there were big pebbles).

Thus, caving in, jamming, filling in of the bottom of the hole started. At that period we adjusted the 10" casing until 25 m, but the situation did not change because the big pebbles continued to jam the tools and the progress was unsuccessful (very cracked layer and presents caving in).

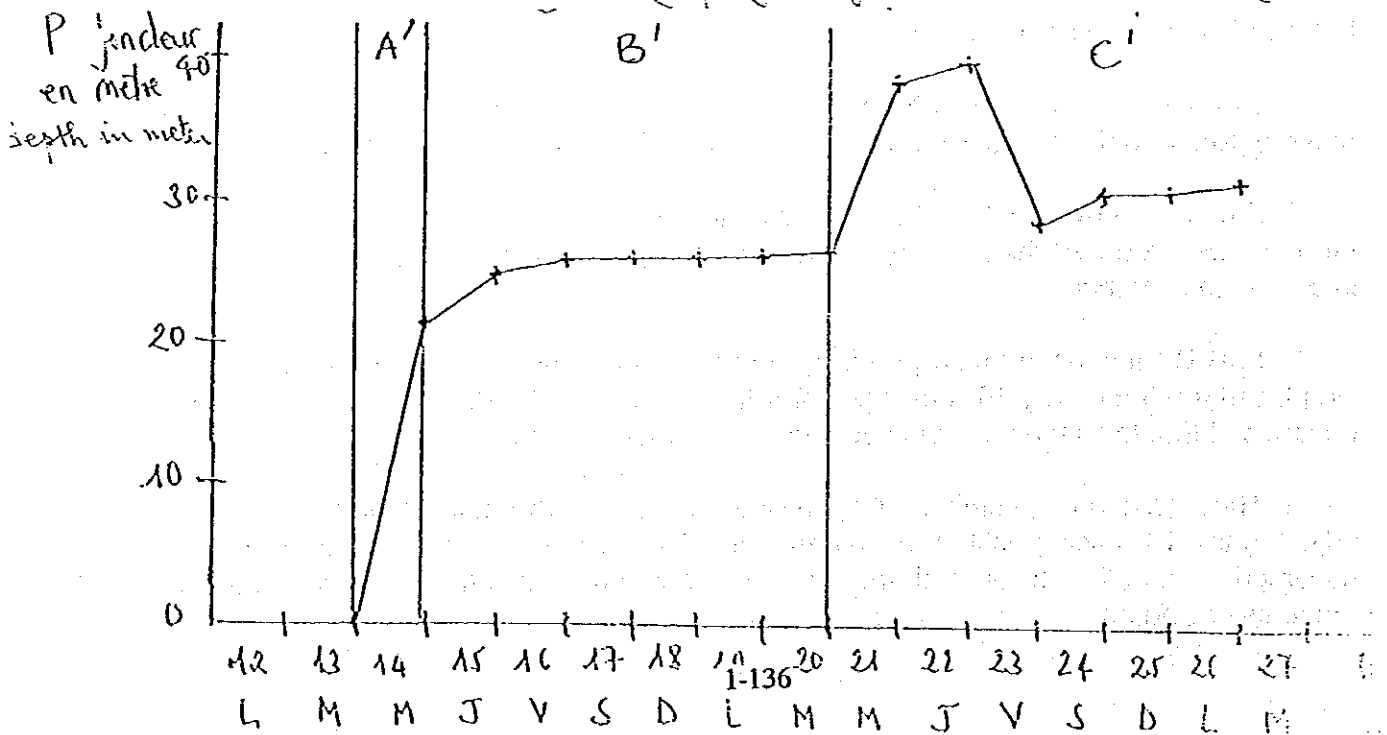
II-1 GRAPHIQUE DES TRAVAUX DU 04 AU 18 SEPTEMBRE 1998 :  
 AVANCEMENT JOURNALIER DE LA FORATION (GRAPHIQUE N° 1)

*Drawing of works from 4<sup>th</sup> to 18<sup>th</sup> September 1998  
 daily progress of the drilling (drawing N° 1)*



II-2 GRAPHIQUE DES TRAVAUX DE REPRISE DU 12 AU 16 OCTOBRE 1998 :  
 AVANCEMENT JOURNALIER DE LA FORATION (GRAPHIQUE N° 2)

*Drawing of resumed works from 12<sup>th</sup> to 16<sup>th</sup> October 1998 : daily progress of the drilling (drawing N° 2)*



**Part C.** We noticed that the depth was completely stagnated and the progress was unsuccessful so far we could not exceed the depth of 25 m during four days, so we chose to give up technically and we suggested to shift the point of the borehole to another point more resistant than the first one.

Drawing n° 2 . There was a kind of similarity between the curve G1 and the curve G2. The different parts A,B,C of the curve show the same difficulties met during the first drilling. The only difference is that the resumed borehole being on a relatively resistant zone contrary to the first one. The adjustment of the 10" temporary casings has been done until 29,35 m. In spite of the difficulties met, we attained the depth of 40 m before the caving in of the layer started and this matter reduced the bottom of the borehole to 28 m. But we attained 31,15 m, depth. It was at that depth that we accomplished the borehole and we placed the equipments ( the intake mechanism : 1 plug of 1 m, a 4 m slotted casing + 26,15 FRP 6" casing).

### **III- Difficulties we met**

As we said in our introduction, works of realization of the borehole EW 20 had many difficulties.

### **III- Difficulties of equipments**

1- Difficulties related to the oldness of the drilling rig :

\* Flexibles which snap, spare parts which are not available on the site, a lot of times must be wasted to take it out from the stock house at Pk 22

\* the assisted pliers' rod broken.

2. Difficulties related to the lack of temporary 10" casings. As the number of the casings is not sufficient, if the other site (B) is casing on an important depth of alteration, we were obliged to wait for them finish before we case also.

Not only there is not a sufficient number of temporary 10" casings, there is a lack of medium size casings (1,00 m, 1,50 m and 2,00). This matter penalizes and delays the works when we have to adjust the casing on a small depth.

3- The lack of stabilizer 12" ¼ on the site A makes us wait for the site B team finish their works before giving us theirs in the case of a great caving in. That fact also causes delay in the works.

### **III-2 Difficulties related to the lithology (Geology)**

The insular shelf at that level is shallow, very cracked and contained a lot of aquifer ; this causes caving in of the layer, the tools jammings and a very important loss of mud during the drilling. For that reason, we have to provide water on the site permanently. This was what we tried to do. But the water supply is not done regularly and continuously, because we have to wait for one hour to one hour and half to resupply, and the water tank capacity of 6.000 L is quickly finished because of the great quantity of the loss of mud, so in less than one hour we have to send again for water. All those practices make the works delay.

During the installation of the screened clump (2-5 mm) we noticed that the annular space around the FRP 6 " casing has consumed more gravel puck than what was foreseen 660 L of screened clump, however theoretically on a length of about three folds what theoretical calculations foresee.

### **III-3 Difficulties related to the target public**

We were not attacked physically on the site EW20, but we were object to many verbal threats. Let us notice also that on Friday october 16 th 1998 many people came to us to complain for their houses flooding because of the borehole water. That matter made us leave the site early the next day. We took one day to construct a small mud dike in order to canalize the borehole water.

**NB** : For further informations and for a good knowledge of the difficulties we met on the site EW20, please have a look on the daily report note book of site A.

### **IV- Conclusion**

Works of realization on site EW20 went on very well in spite of all difficulties we met. What we can notice is the lack of equipments that made the works delay. We have to know that time is necessary and we would like to ask for necessary arrangements for futur works and this will enable us to achieve all works in the suitable period.