7. MONTHLY PRODUCTION OF TREATED WATER AT EACH TREATMENT PLANT

SAMAPA

AÑO : 1986.

DEPTO. PLANTAS DE TRATAMIENTO A.P.

I.I. EMBALSES Y REPRESAS

II.1 HAMPATURI

CAPACIDAD DE EMBALS. 3.174.257 M³

NIVEL MAXIMO DE EMBALS. 4.203 M. S. N. M.

NIVEL CERO : 4.187 M. S. N. M.

	BALANCE DE OPERACION PREVISTO			COMPORTAMIENTO REAL			
	ALTURA M. S.N.M.	VOLUMEN A DESPACHAR M³	VOLUMEN A EMBALSAR M³	ALTURA M.S.N.M.	VOLUMEN DESPACHADO M³	VOL. DESP. ACUMULADO M³	VOLUMEN EMBALSADO M³
ENE.	4203	766000	3174.257.	4203	747103	747103	3174257
FEB.	4203	692000	3174257.	4203	689.149.	1436,252.	3.174.257
MAR.	4203	766000	3174257.	4203	753905	2190.157	3.174.257
ABR.	4203	742000	3174257.	4203	765209	2955 366	3174257
MAY.	4202.31	766000	2.994.000.	4202.55	721 288	3676654	2999133
JUN.	4201.33	742000	2.526.000.	4201.36	775258	4451 912	2536026
JUL.	4191.87	766000	1.992.000.	4199.66	814 680	5266 592	1922270
AGO.	4198.31	766000	1.483.000	4197.82	783428	6050 020	1335540
SEP.	4196.94	742000	1.086.000.	4197.7	759251	6809271	1301163
OCT.	4196.80	766000	1.050.000.	4199.13	456166	7265437	1743731
NOV.	4197.65	742000	1.288.000.	4201.08	765209	8030646	2427060
DIC.	4202.18	766000	2.589.000	4203	784276	8814922	3174257

TOTAL ANUAL 8814922 24150.47 l/d

II.2 INCACHACA

CAPACIDAD DE EMBALS. 1.050.446 M³

NIVEL MAXIMO DE EMBALS. 4343.8 M. S. N. M.

NIVEL CERO : M. S. N. M.

	BALANCE DE OPERACION PREVISTO			COMPORTAMIENTO REAL			
	ALTURA M. S.N.M.	VOLUMEN A DESPACHAR M³	VOLUMEN A EMBALSAR M³	ALTURA M.S.N.M.	VOLUMEN DESPACHADO M³	VOL. DESP. ACUMULADO M³	VOLUMEN EMBALSADO M³
ENE.	4343.8	406000	1050446	4343.8	533402	533402	1050446
FEB.	4343.69	363000	1030000	4343.8	526.407	1059.809.	1.050.446.
MAR.	4343.69	406000	1030000	4343.8	672.785	1732.594	1.050.446
ABR.	4343.52	393000	1000000	4343.8	861518	2584112	1050446
MAY.	4342.16	406000	761000	4341.4	956523	3540635	638738
JUN.	4339.74	393000	403000	4338.43	644312	4184947	244158
JUL.	4335.59	406000	34000	4338.69	0	4184947	274727
AGO.	4332.43	— 120.000.	0	4339.18	0	4184947	332239
SEP.	4332.43	— 24.000.	0	4339.62	159657	4344604	387296
OCT.	4332.43	— 206.000.	0	4337.8	567728	4912332	177815
NOV.	4341.14	393000	600000	4338.71	440175	5352507	277079
DIC.	4338.12	406000	212000	4343.8	459585	5812092	

TOTAL ANUAL 5812092 15,923.5 l/d

SAMAPA

DEPTO. PLANTAS DE TRATAMIENTO A.P.

AÑO 1986

I.I. EMBALSES Y REPRESAS

CAPACIDAD DE EMBALS 24.000.000 M³
NIVEL MAXIMO DE EMBALE. 4.434,5 M. S. N. M.
NIVEL CERO: 4.421,5 M. S. N. M.

II.3 TUNI-CONDORIRI

	BALANCE DE OPERACION PREVISTO			COMPORTAMIENTO REAL			
	ALTURA M.S.N.M.	VOLUMEN A DESPACHAR M³	VOLUMEN A EMBALSAR M³	ALTURA M.S.N.M.	VOLUMEN DESPACHADO M³	VOL. DESP. ACUMULADO M³	VOLUMEN EMBALSADO M³
ENE.	4429.1	1457000	12875000	4429.07	1414102	1414102	12874707
FEB.	4430.6	1480000	16018000	4430.79	1.442.091.	2856193.	16427094.
MAR.	4431.56	1325000	18085000	4432.15	1547.382	4403.575	19.367.120
ABR.	4432.08	1282000	19208000	4432.41	1530841	5934416	19933018
MAY.	4431.71	1910000	18415000	4432.26	1237544	7171960	19606539
JUN.	4431.21	1848000	17329000	4431.82	1401383	8573343	18648866
JUL.	4430.59	1910000	15962000	4431.12	1882715	10456058	17125296
AGO.	4429.91	1910000	14512000	4430.34	1825731	12281789	15427604
SEP.	4429.31	1848000	13344000	4429.83	1779428	14061217	14356199
OCT.	4428.75	1910000	12252000	4429.37	1589746	15650963	13459507
NOV.	4429.02	1282000	12785000	4429.34	1285454	16936417	13401026
DIC.	4429.62	1325000	13946000	4430.69	1319478	18255895	16189390

61,612.9 m³/d

Nov. (47,848...) Jul (60,733...) Ago (58,874...) Dic (...) Jun (...)

TOTAL ANUAL 18255895 50,016.15/d

CAPACIDAD DE EMBALS. 9.536.625 M³
NIVEL MAXIMO DE EMBALS. 9,7 M. S. N. M.
NIVEL CERO: M. S. N. M.

II.4 MILLUNI

	BALANCE DE OPERACION PREVISTO			COMPORTAMIENTO REAL			
	ALTURA M.S.N.M.	VOLUMEN A DESPACHAR M³	VOLUMEN A EMBALSAR M³	ALTURA M.S.N.M.	VOLUMEN DESPACHADO M³	VOL. DESP. ACUMULADO M³	VOLUMEN EMBALSADO M³
ENE.	9.75	1364000	9536625	9.75	1371358	1371358	9536.625
FEB.	9.76	1237000	9536625	9.75	1173.840.	2545.198.	9536.625.
MAR.	9.75	1364000	9536625	9.75	1357.450	3902.648	9.536.625
ABR.	9.75	1320000	9536625	9.75	1174021	5076669	9.536625
MAY.	9.31	1364000	8640000	9.7	1183900	6260569	9433599
JUN.	8.78	1320000	7536000	9.33	1362612	7623181	8671204
JUL.	8.21	1364000	6370000	8.86	1445710	9068891	7702756
AGO.	7.64	1364000	5363000	8.5	1389060	10457951	6960967
SEP.	7.1	1320000	4375000	8.17	1417480	11875431	6296846
OCT.	6.93	1364000	4088000	7.76	1741750	13617181	5560359
NOV.	6.8	1320000	3892000	7.5	1532810	15149991	4988877
DIC.	7.13	1364000	4434000	8.58	1459890	16609881	7125809

Oct. (56,183.5)
Nov. (51,093.7)
Feb. (41,922.8)
Abr. (37,134)

TOTAL ANUAL 16'609.881 45,506.52/d

S A M A P A

DEPTO. PLANTAS DE TRATAMIENTO A.P. — AÑO 1986

I.III PLANTAS DE TRATAMIENTO

CAPACIDAD DE TRATAMIENTO: 3.600 M³/hra. (= 86,400 m³/d)

Lts/seg.

I.3.1 ACHACHICALA

CAPACIDAD ESTANQUE DE RESERVA: 10.000 M³

	FUENTE			CAUDAL DE AGUA		CONSUMO DE REACTIVOS						ENERGIA ELECTRICA	
				CRUDA	TRATADA	CAL		SULFATO		CLORO			
	TUNI	MILL	CHOQ.	M³	M³	Kg.	$us.	Kg.	$us.	Kg.	$us.	Kw.	$us.
ENE.	X	X	X	1837915	1801800	203668	32158	—	—	690	828	5899.58	268.41
FEB.	X	X	--	1.608.000	1.568.870	188.427	29783	1.840	264.31	680	816	5497.82	260.13
MAR.	X	X	–	1859 520	1820 700	140246	22144	1 500	213.15	770	924	6973.42	317.27
ABR.	X	X	X	1812 800	1780 400	134223	21193	34170	4855.56	915	1098	6166.51	280.56
MAY.	–	X	X	1873 050	1811 500	174169	27497	4470	635.14	826	991.	6832.8	
JUN.	X	X	X	1784 200	1744 200	206670	32630	—	—	834	1001	7156.2	
JUL.	X	X	–	2065 300	1995 683	236799	37387	—	—	878	1054	7656	
AGO.	X	X	–	1997 500	1941 500	247130	39018	—	—	807	969	7051.53	
SEP.	X	X	X	2247700	1885100	280593	44301	—	—	680	816	10286.94	
OCT.	X	X	X	2860350	2011 400	286591	45248	—	—	829	995	8087.79	
NOV.	—	X	X	2371510	1927000	230897	35891	—	—	793	953	8045.56	
DIC.		X	X	2066 590	1803800	134167	20855	—	—	756	908	6714.15	
TOTAL ANUAL				24384435	22091953	2463770	388105	42000	5968.16	9458	11.353	86368.32	

CAPACIDAD DE TRATAMIENTO: 1.500 M³/hra.

Lts/seg.

I.3.2 PAMPAHASI

CAPACIDAD ESTANQUE DE RESERVA: 5.000 M³

	FUENTE			CAUDAL DE AGUA		CONSUMO DE REACTIVOS						ENERGIA ELECTRICA	
				CRUDA	TRATADA	CAL		SULFATO		CLORO			
	HAM	INC		M³	M³	Kg.	$us.	Kg.	$us.	Kg.	$us.	Kw.	$us.
ENE.	X	X		861117	852237	6390	1008.95	1000	142.10	390	468	7662.44	328.54
FEB.	X	X		798.450.	793.608.	10.250	1618.47	353	50.16	360	432	5881.80	252.19
MAR.	X	X		902.278	889.503	7.150	1111.4	665	94.49	516	619	7365.68	315.81
ABR.	X	X		949.550	942.279	5750	907.9	40	5.68	390	468	6776.	290.53
MAY.	X	X		975.320	970.011	9000	1421.1	—	—	395	474	7243.8	
JUN.	X	X		907 010	901 686	7500	1184.1	—	—	390	468	6730.7	
JUL.	X	—		647290	641 659	8050	1270.9	—	—	360	432	7006.9	
AGO.	X	—		645431	642945	7500	1184	50	7.1	325	390	5377.05	
SEP.	X	X		704120	684575	6550	1034.03	250	35.52	390	468	5839.36	
OCT.	X	X		783280	781969	8400	1326.1	1052	149.47	393	472	7352.15	
NOV.	X	X		960278	949831	9050	1429	520	73.88	390	468	7913.14	
DIC.	X	X		953560	953059	8950	1413	1800	255.74	455	546	8143.64	
TOTAL ANUAL				10087684	10003362	94540	14909	5730	814.14	4754	5705	83292,7	

Nov (32,009.3)

Dic (30760)

S A M A P A

DEPTO. PLANTAS DE TRATAMIENTO A.P.

I.III PLANTAS DE TRATAMIENTO

AÑO: 1986

CAPACIDAD DE TRATAMIENTO: 2224 X 4.000 96,000 m³/d M³/hra.

Lts/seg.

CAPACIDAD ESTANQUE DE RESERVA: 10.000 M³

I.3.3 EL ALTO

	FUENTE			CAUDAL DE AGUA		CONSUMO DE REACTIVOS						ENERGIA ELECTRICA	
						CAL		SULFATO		CLORO			
	TUNI			CRUDA M³	TRATADA M³	Kg.	$ us.	Kg.	$ us.	Kg.	$ us.	Kw.	$ us.
ENE.	X			1168405	1158400	2375	375	—	—	411	493,2	3035.9	278.25
FEB.	X			1.007.931.	999.300.	2.100	331.67	—	—	334	400,8	1613.08	147.84
MAR.	X			1.045.312	1038.700	2.275	359,20	—	—	461	553,2	3594,45	329.44
ABR.	X			1145 362	1137 300	3208	506.52	—	—	686	823,2	4394	402.72
MAY.	X			1237 544	1232020	2550	402.63	—	—	532	638.4	4316.9	
JUN.	X			1211495	1206000	3402	537.12	—	—	520	624.0	5833.8	
JUL.	X			1263125	1250800	5063	799.36	—	—	674	808.8	6924	
AGO.	X			1217291	1212100	4036	637.21	—	—	691	829.2	6558.7	
SEP.	X			1184108	1174000	3707	585.27	—	—	478	961.2	5769.4	
OCT.	X			1305946	1297000	4014	633.74	—	—	585	702	8431,13	
NOV.	X			1285454	1278900	2470	389.97	—	—	503.5	1121.76	7302.74	
DIC.	X			1319478	1308400	2870	453.12	—	—	585	702	7002.55	
TOTAL ANUAL				14391451	14292920	38070	6010.71			6406.5	8657.74	64776.6	

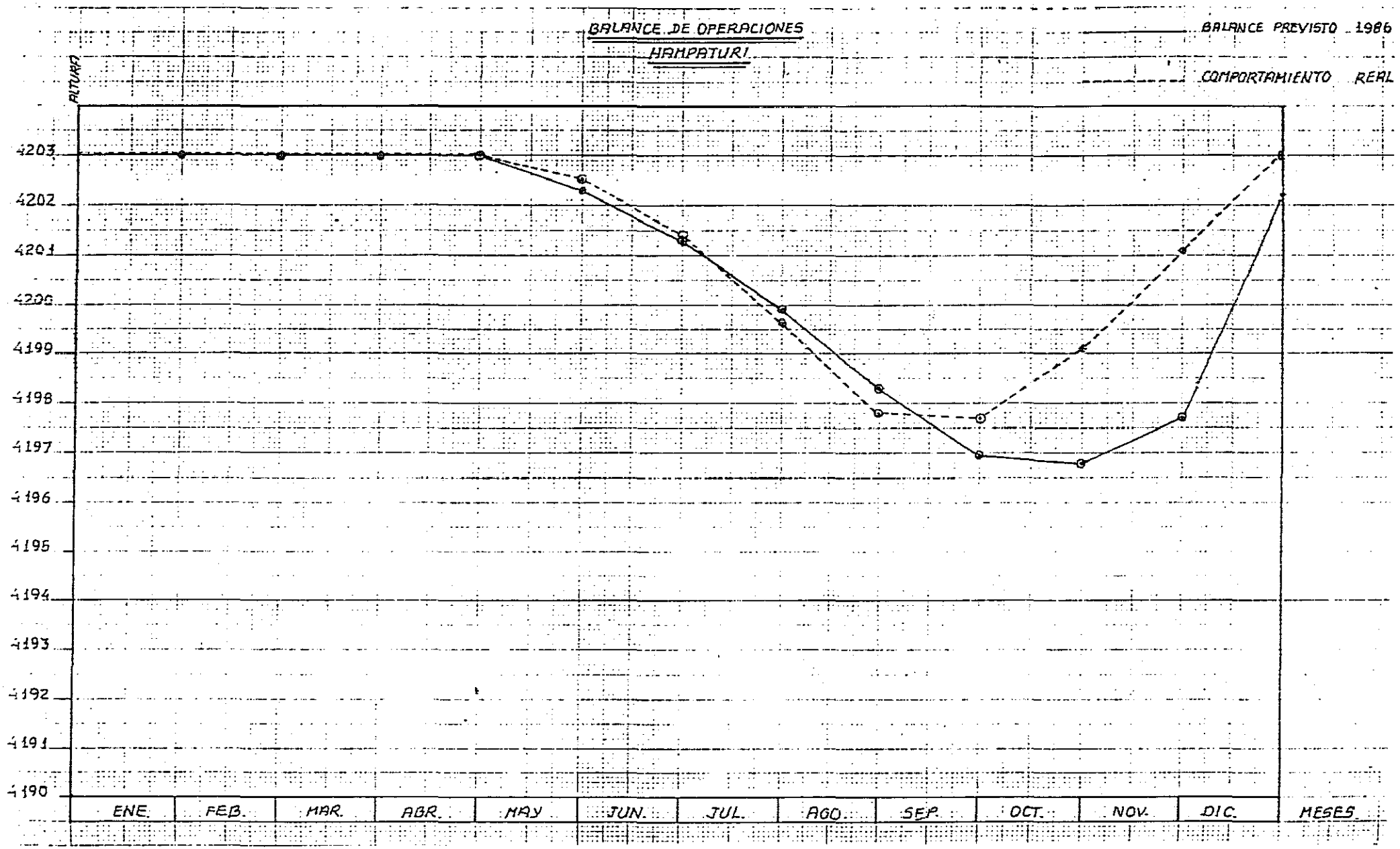
NOTA.- En el mes de Agosto se utilizó 136 Kg. de cloro y 555 Kg. de Hipoclorito de calcio.

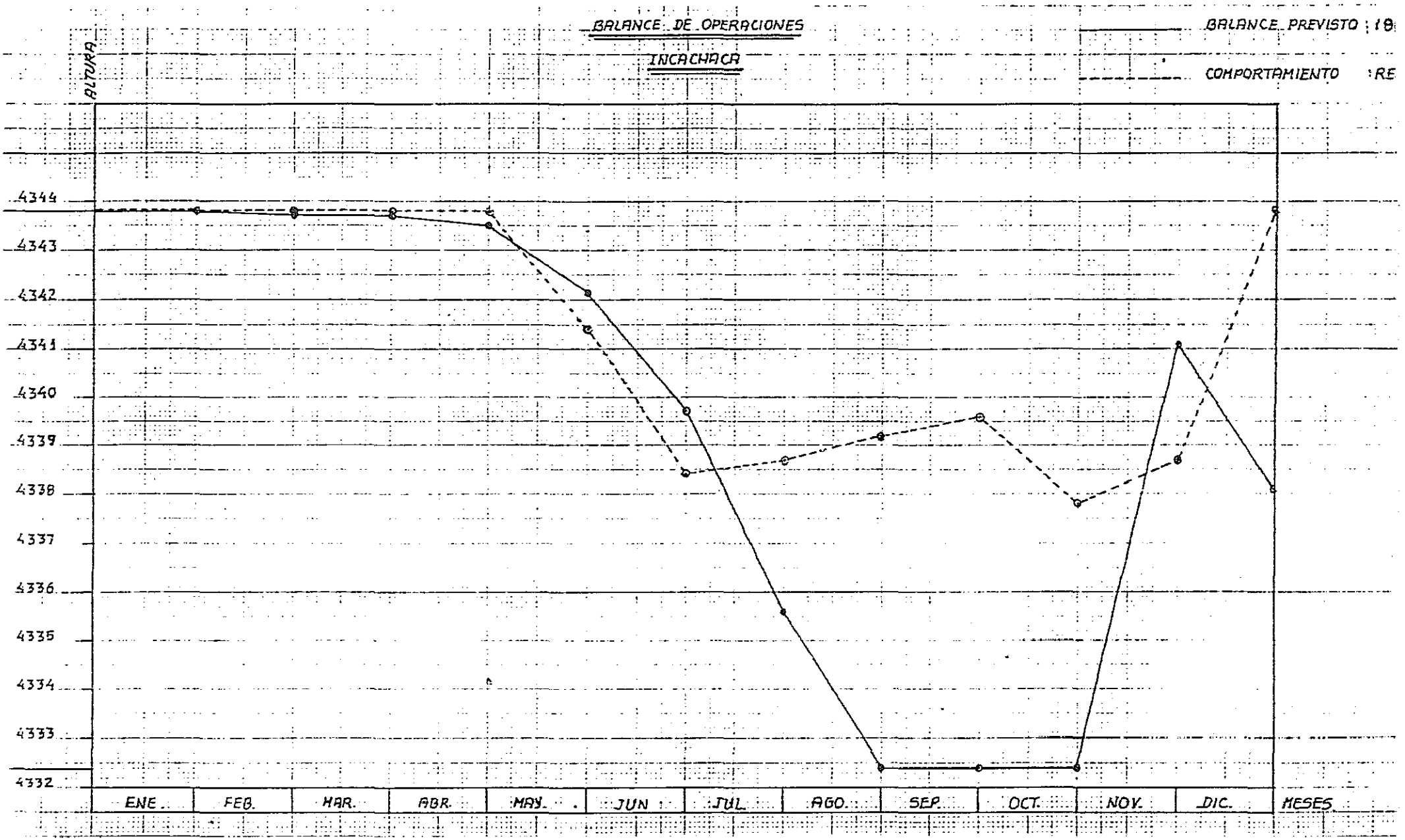
CAPACIDAD DE TRATAMIENTO: _____ M³/hra.

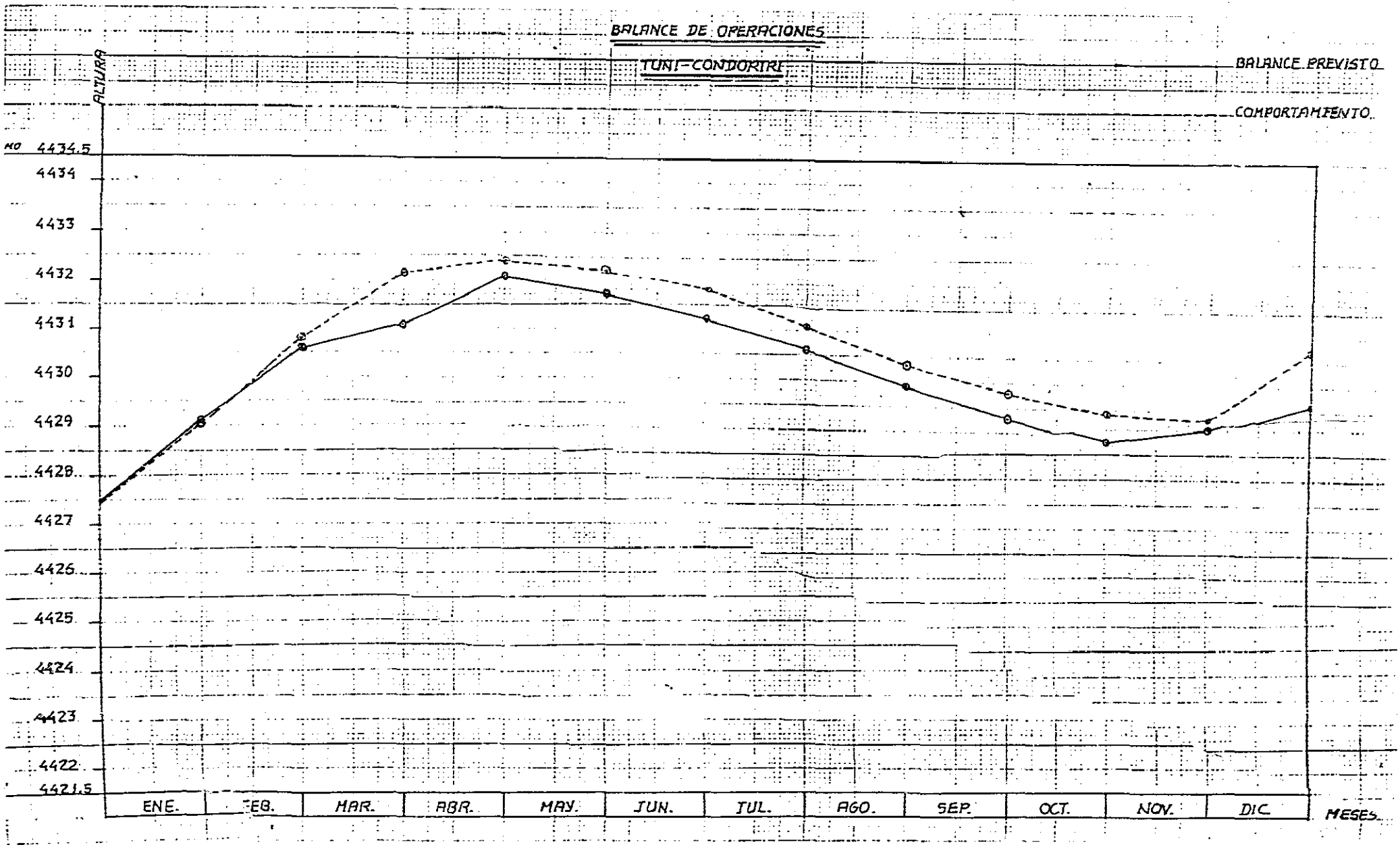
Lts/seg.

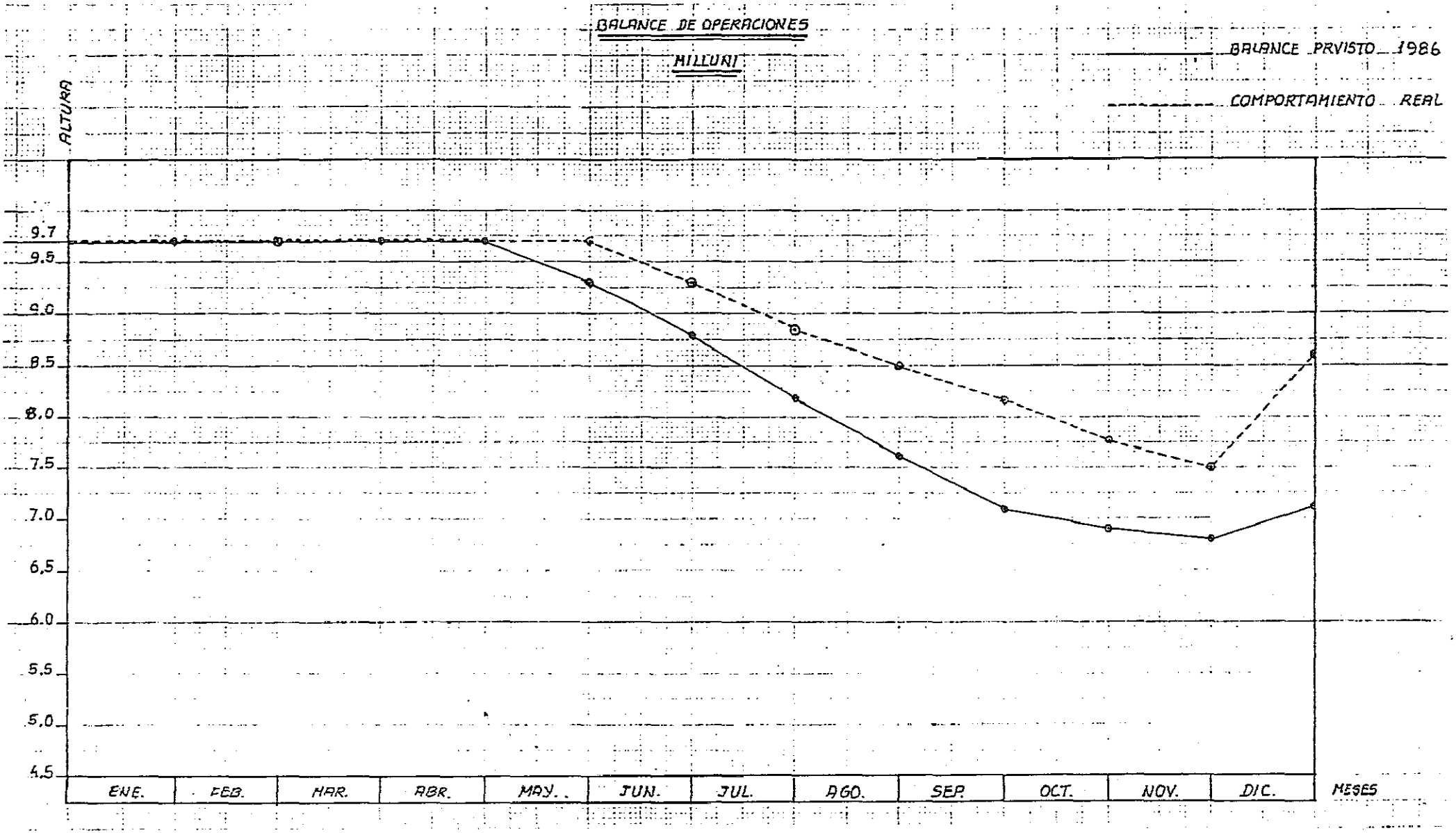
CAPACIDAD ESTANQUE DE RESERVA: M³

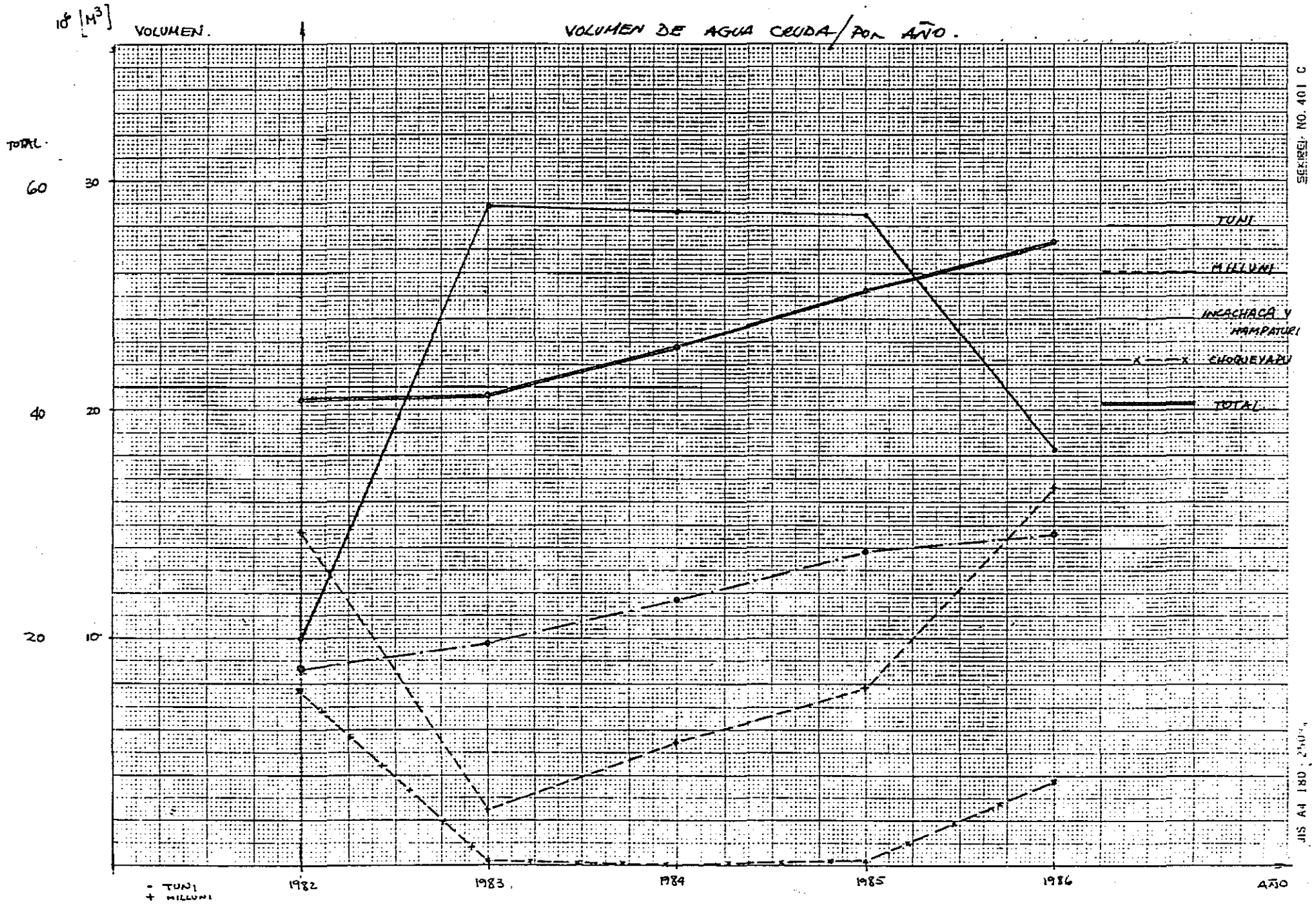
	FUENTE			CAUDAL DE AGUA		CONSUMO DE REACTIVOS						ENERGIA ELECTRICA	
						CAL		SULFATO		CLORO			
				CRUDA M³	TRATADA M³	Kg.	$ us.	Kg.	$ us.	Kg.	$ us.	Kw.	$ us.
ENE.													
FEB.													
MAR.													
ABR.													
MAY.													
JUN.													
JUL.													
AGO.													
SEP.													
OCT.													
NOV.													
DIC.													
TOTAL ANUAL													

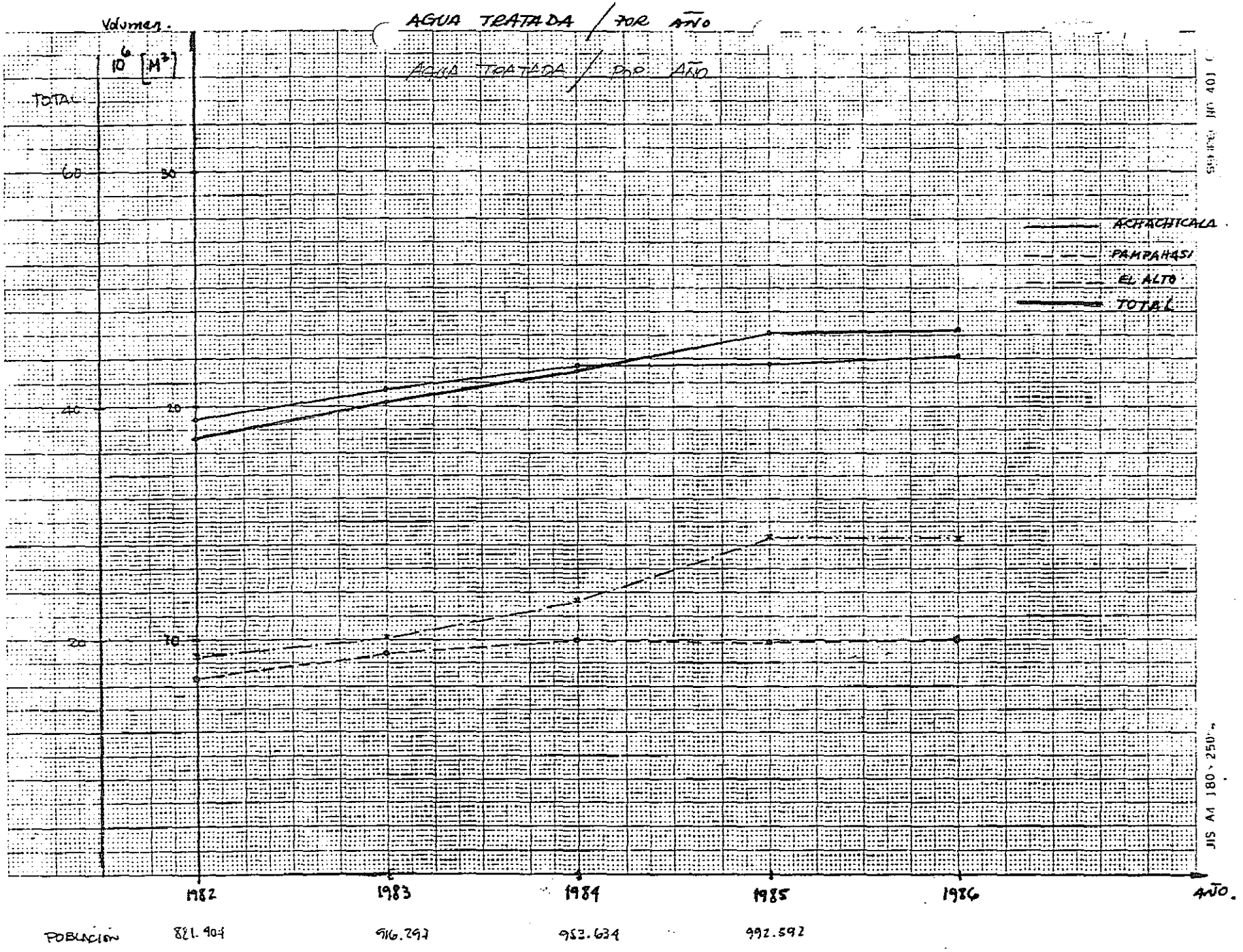

BALANCE DE OPERACIONES
HAMPATURI
BALANCE PREVISTO 1986
COMPORTAMIENTO REAL
ALTURA
4203
4202
4201
4200
4199
4198
4197
4196
4195
4194
4193
4192
4191
4190
ENE.
FEB.
MAR.
ABR.
MAY
JUN.
JUL.
AGO.
SEP.
OCT.
NOV.
DIC.
MESES


BALANCE DE OPERACIONES
INCACHACA
BALANCE PREVISTO : 19
COMPORTAMIENTO : RE
ALTURA
4344
4343
4342
4341
4340
4339
4338
4337
4336
4335
4334
4333
4332
ENE.
FEB.
MAR.
ABR.
MAY.
JUN
JUL.
AGO.
SEP.
OCT.
NOV.
DIC.
MESES


BALANCE DE OPERACIONES
TUNEL-CONDORTIRE
BALANCE PREVISTO
COMPORTAMIENTO
ALTURA
MO
4434.5
4434
4433
4432
4431
4430
4429
4428
4427
4426
4425
4424
4423
4422
4421.5
ENE.
FEB.
MAR.
ABR.
MAY.
JUN.
JUL.
AGO.
SEP.
OCT.
NOV.
DIC.
MESES


BALANCE DE OPERACIONES
MILLONI
BALANCE PRVISTO 1986
COMPORTAMIENTO REAL
ALTURA
9.7
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
ENE.
FEB.
MAR.
ABR.
MAY.
JUN.
JUL.
AGO.
SEP.
OCT.
NOV.
DIC.
MESES


VOLUMEN DE AGUA CRUDA / POR AÑO.
VOLUMEN.
10^6 [M³]
TOTAL
60
40
20
30
20
10
1982
1983
1984
1985
1986
AÑO
TUNI
MILLUNI
INCACHACA Y HAMPATURI
CHOQUEYAPU
TOTAL
- TUNI
+ MILLUNI
SEKISEI NO. 401 C
JIS A4 180 × 210


AGUA TRATADA / POR AÑO
AGUA TRATADA / POR AÑO
Volumen.
10^6 [M³]
TOTAL
60
40
20
30
20
10
ACHACHICALA
PAMPAHASI
EL ALTO
TOTAL
1982
1983
1984
1985
1986
AÑO.
POBLACION
821.904
916.293
952.634
992.592

BALANCE
TUNJ
ENERO
FEBRERO
MARZO
ABRIL
MAYO
JUNIO
JULIO
AGOSTO
SEPTIEM
OCTUBRE
NOVIEMBRE
DICIEMBRE
4421.5

8. POPULATION FORECAST IN EL ALTO AREA

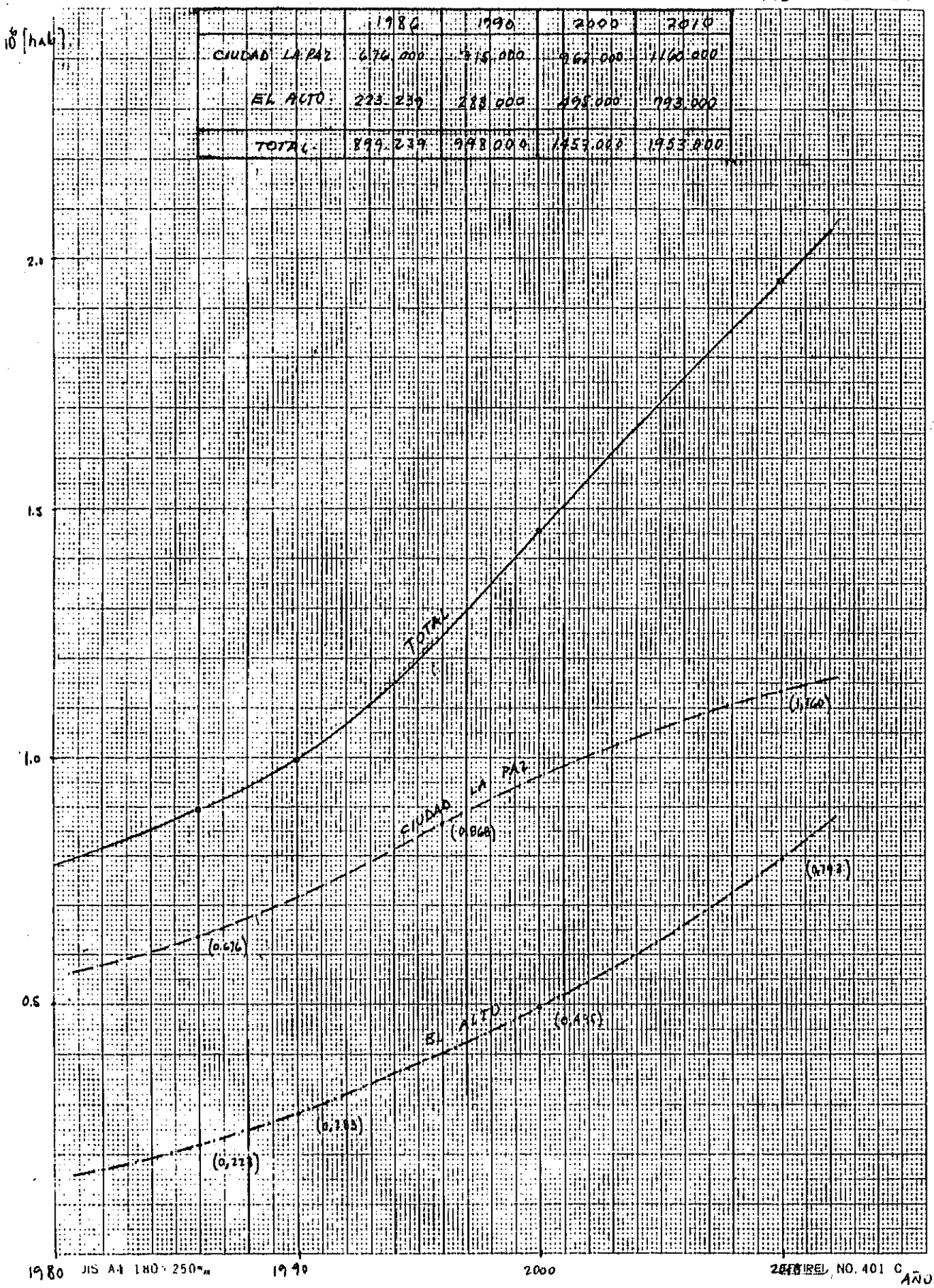
POPULATION FORECAST IN EL ALTO AREA

(1986~2010)

CRECIMIENTO DE POBLACION.

FUENTE: GITEC.

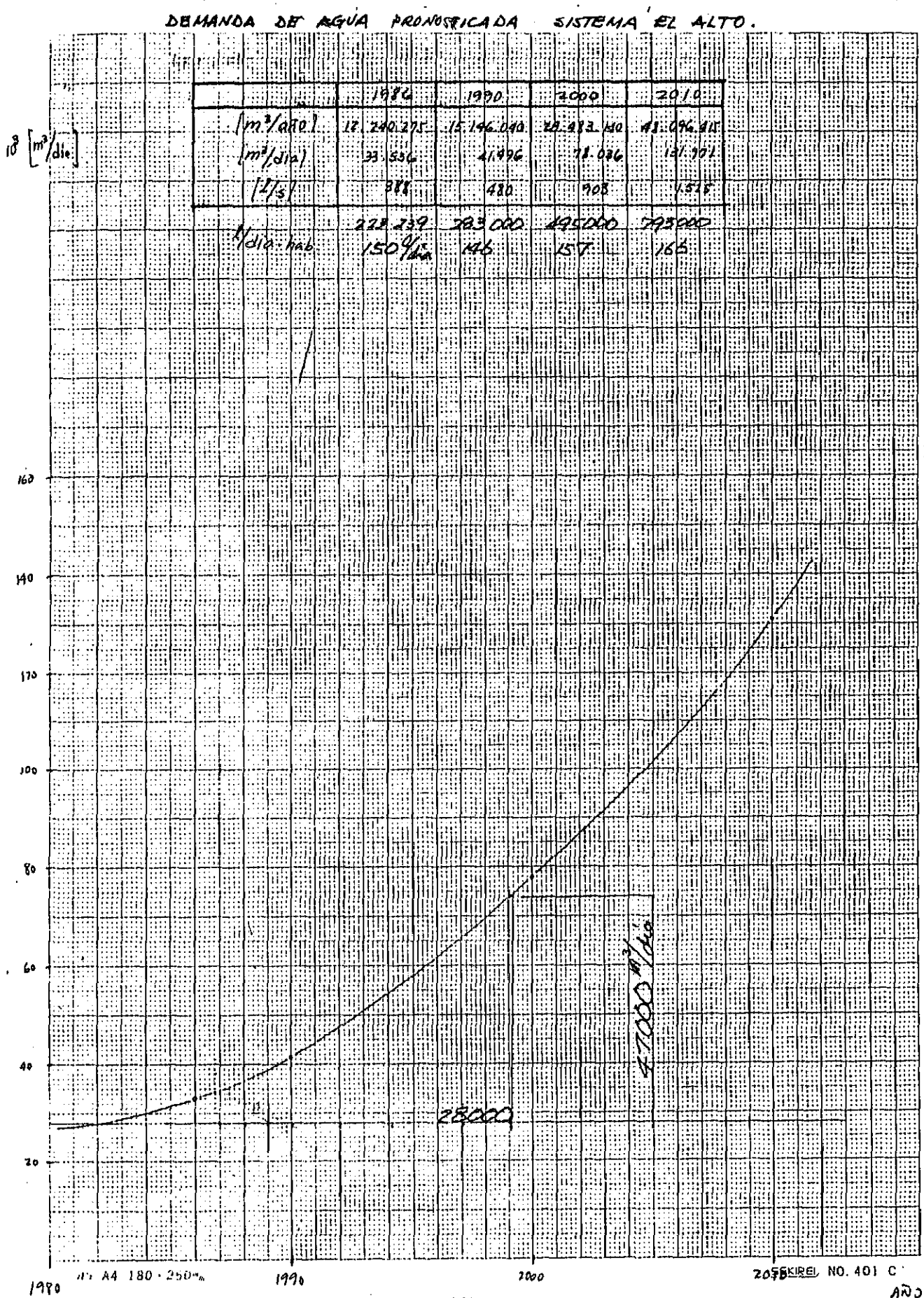
	1980	1990	2000	2010
CIUDAD LA PAZ	676.000	815.000	960.000	1160.000
EL ALTO	223.239	283.000	495.000	793.000
TOTAL	899.239	998.000	1455.000	1953.000



JIS A4 180 · 250 mm

KEUFFEL NO. 401 C

WATER DEMAND AT EL ALTO TREATMENT PLANT



9. MONTHLY RAINFALL IN STUDY AREA

1982 RAIN FALL (mm)

Location Mon.	1	2	3	4	5	6	7	8	9	10	11	12	Total
EL ALTO	152.6	48.3	116.4	38.2	-	8.5	2.1	2.0	38.0	62.6	72.3	61.8	602.8
MILLUNI	149.8	54.6	137.5	21.8	4.7	6.6	17.2	6.2	58.5	44.6	158.0	82.6	741.9
TUNI	105.1	68.2	97.8	44.6	6.2	4.3	3.5	8.4	43.0	60.0	104.3	69.9	609.9
CONDORIRI	78.9	68.1	97.8	44.6	6.2	4.3	3.5	8.4	36.4	54.2	105.0	43.4	550.8
AERO PUERTO	161.4	36.5	72.4	37.6	0.3	8.9	0.8	4.1	22.6	46.4	68.2	46.9	506.1

1983 RAIN FALL (mm)

Location Mon.	1	2	3	4	5	6	7	8	9	10	11	12	Total
EL ALTO	59.9	47.1	56.0	31.6	32.1	3.0	11.8	6.4	26.0	38.7	13.5	102.4	428.5
MILLUNI	27.4	79.5	32.8	3.9	17.6	5.4	3.9	4.7	60.2	87.3	46.6	87.3	456.7
TUNI	89.9	74.4	36.2	59.8	23.8	3.8	3.8	9.7	39.3	28.3	16.7	57.5	443.2
CONDORIRI	108.2	100.1	36.0	81.8	24.3	3.9	3.9	9.2	30.6	28.9	26.0	57.5	510.6
AERO PUERTO	64.2	35.5	24.4	56.4	30.8	7.9	8.6	19.6	45.4	24.1	14.0	92.8	423.7

1984 RAIN FALL (mm)

Location Mon.	1	2	3	4	5	6	7	8	9	10	11	12	Total
EL ALTO	205.4	171.6	101.5	11.3	4.3	6.2	0.0	29.4	10.4	30.6	74.7	95.5	744.9
MILLUNI	173.1	165.1	160.5	72.2	15.6	37.4	1.6	16.7	7.4	58.2	99.7	79.1	886.2
TUNI	168.8	135.5	78.5	25.1	15.5	18.3	0.6	16.9	5.3	59.3	95.5	98.1	717.4
CONDORIRI	162.1	136.0	80.5	25.3	19.2	17.6	0.5	17.3	5.3	61.2	83.7	48.6	657.3
AERO PUERTO	183.2	176.8	127.0	14.4	3.1	9.3	0.6	17.5	4.6	36.6	60.9	77.3	711.3

1985 RAIN FALL (mm)

Location Mon.	1	2	3	4	5	6	7	8	9	10	11	12	Total
EL ALTO	156.6	52.1	47.2	77.5	2.2	12.7	0.0	0.0	53.0	21.5	105.8	143.6	672.2
MILLUNI	355.0	224.3	345.6	255.6	68.0	70.2	0.0	9.3	61.5	43.8	166.5	131.6	1751.4
TUNI	128.0	67.0	109.6	69.0	19.0	29.3	0.8	2.0	31.5	16.2	85.0	125.0	682.4
CONDORIRI	39.2	83.4	119.3	88.3	14.3	43.9	0.0	0.0	51.0	19.1	106.6	149.2	714.3
AERO PUERTO	90.4	120.0	102.2	66.9	0.0	13.5	0.7	5.3	37.0	51.5	144.7	152.2	784.4

1986 RAIN FALL (mm)

Location Mon.	1	2	3	4	5	6	7	8	9	10	11	12	Total
EL ALTO	102.5	133.1	117.2	38.2	12.5	0.0	0.0	36.3	39.0	43.7	75.0	126.6	722.1
MILLUNI	115.8	123.5	112.1	94.9	15.6	0.0	7.9	124.7	40.4	3.3	40.6	149.3	828.1
TUNI	98.9	98.0	116.6	86.4	10.2	0.0	5.3	31.8	53.9	10.7	102.3	124.5	738.6
CONDORIRI	98.7	106.9	129.0	76.9	16.1	0.0	7.9	24.3	59.7	11.9	89.2	141.7	762.3
AERO PUERTO	94.2	168.0	82.5	62.1	16.0	1.3	3.0	30.2	49.3	30.2	68.0	114.0	719.2

ANNUAL RAIN FALL (mm)

Location	1982	1983	1984	1985	1986
EL ALTO	602.8	428.5	744.9	672.2	722.1
MILLUNI	741.9	456.7	866.2	1751.4	828.1
TUNI	609.9	443.2	717.4	682.4	738.6
CONDORIRI	550.8	510.6	657.3	714.3	762.3
AERO PUERTO	506.1	423.7	711.3	784.4	179.2

10. RESULTS OF SOIL TESTS

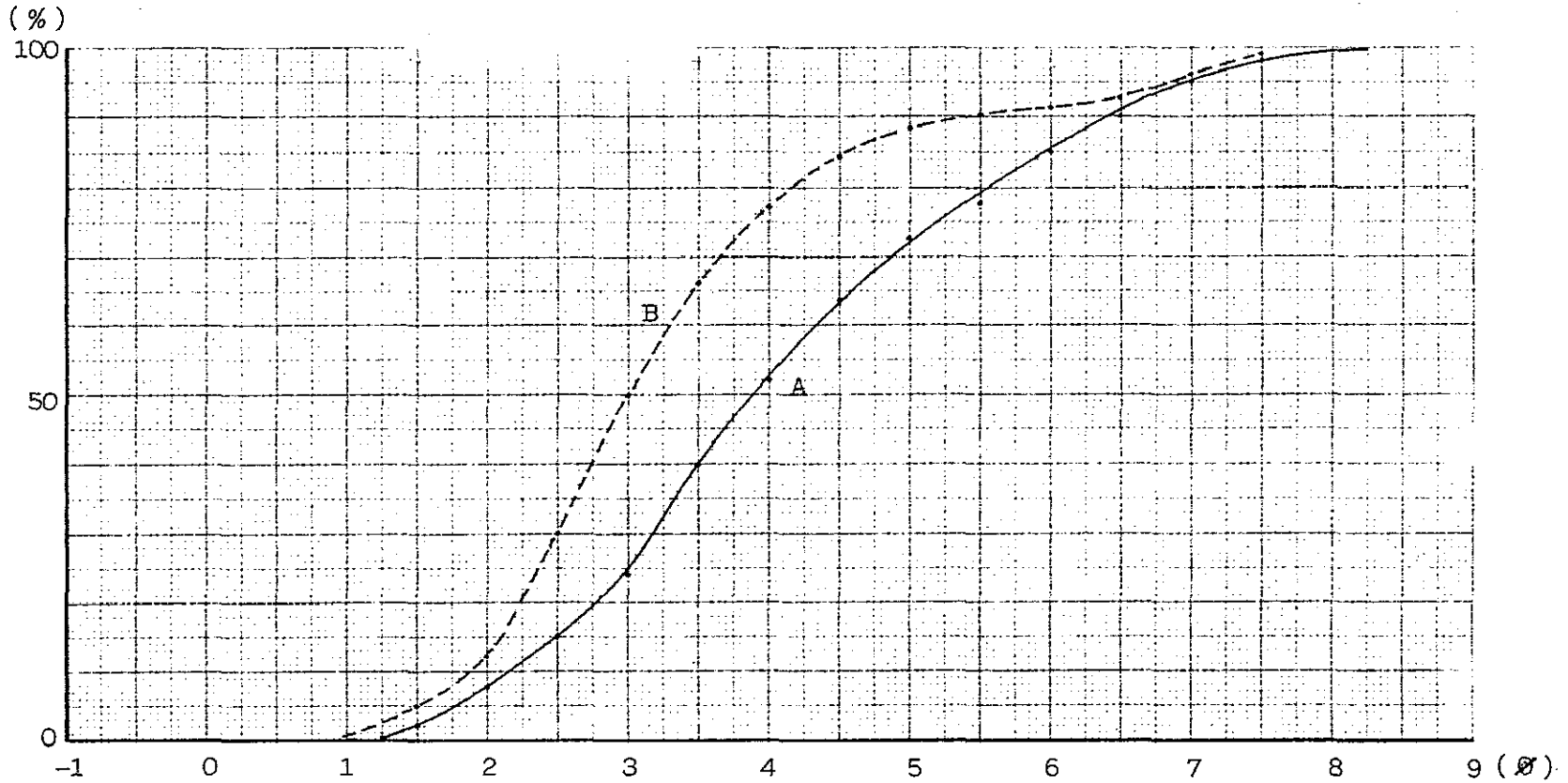


Fig. 1 RESULT OF GRAIN-SIZE ANALYSIS No.1 (LA PAZ Stratum)

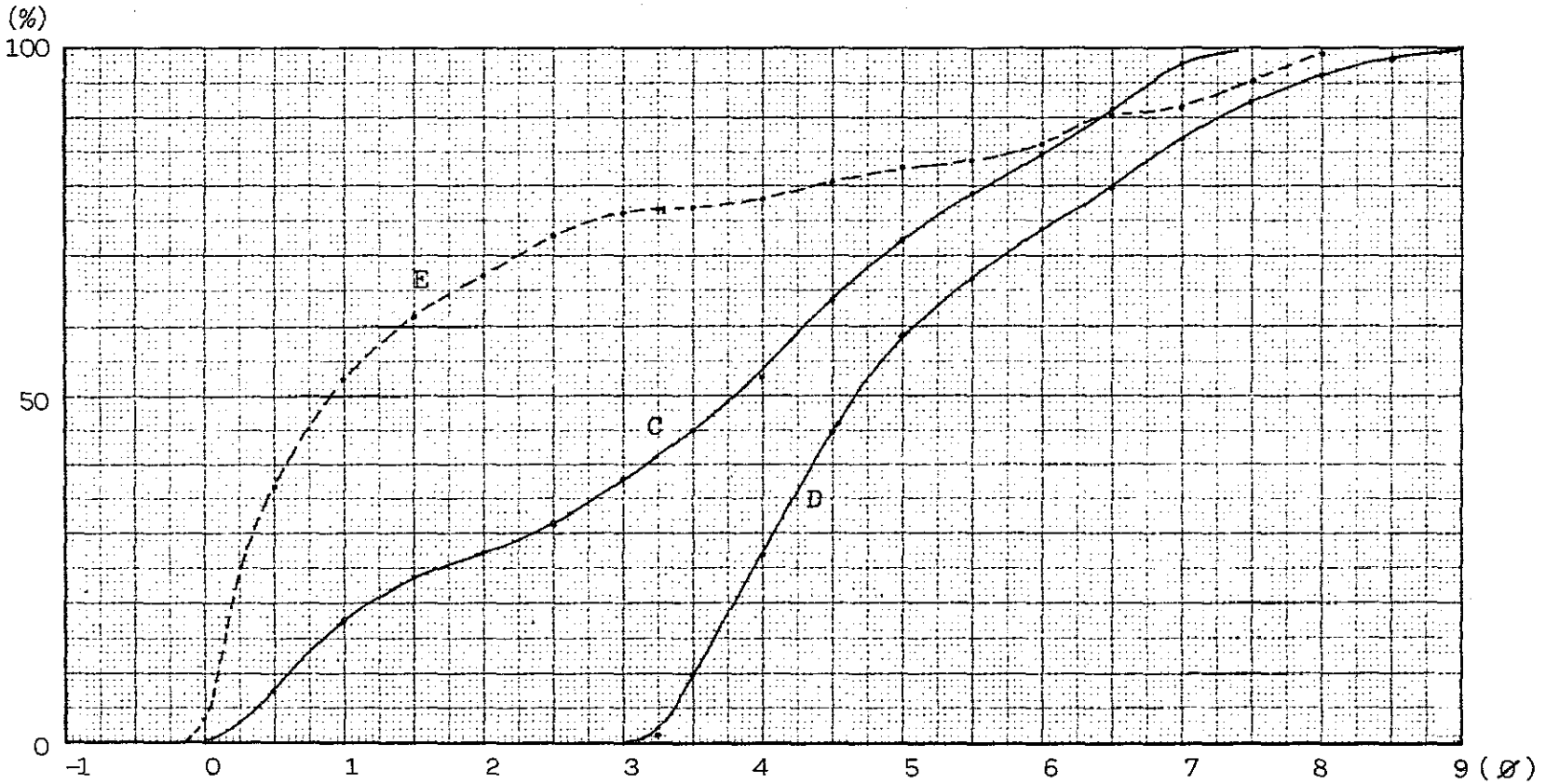


Fig. 2 RESULT OF GRAIN-SIZE ANALYSIS No.2 (Glacial Moraine)

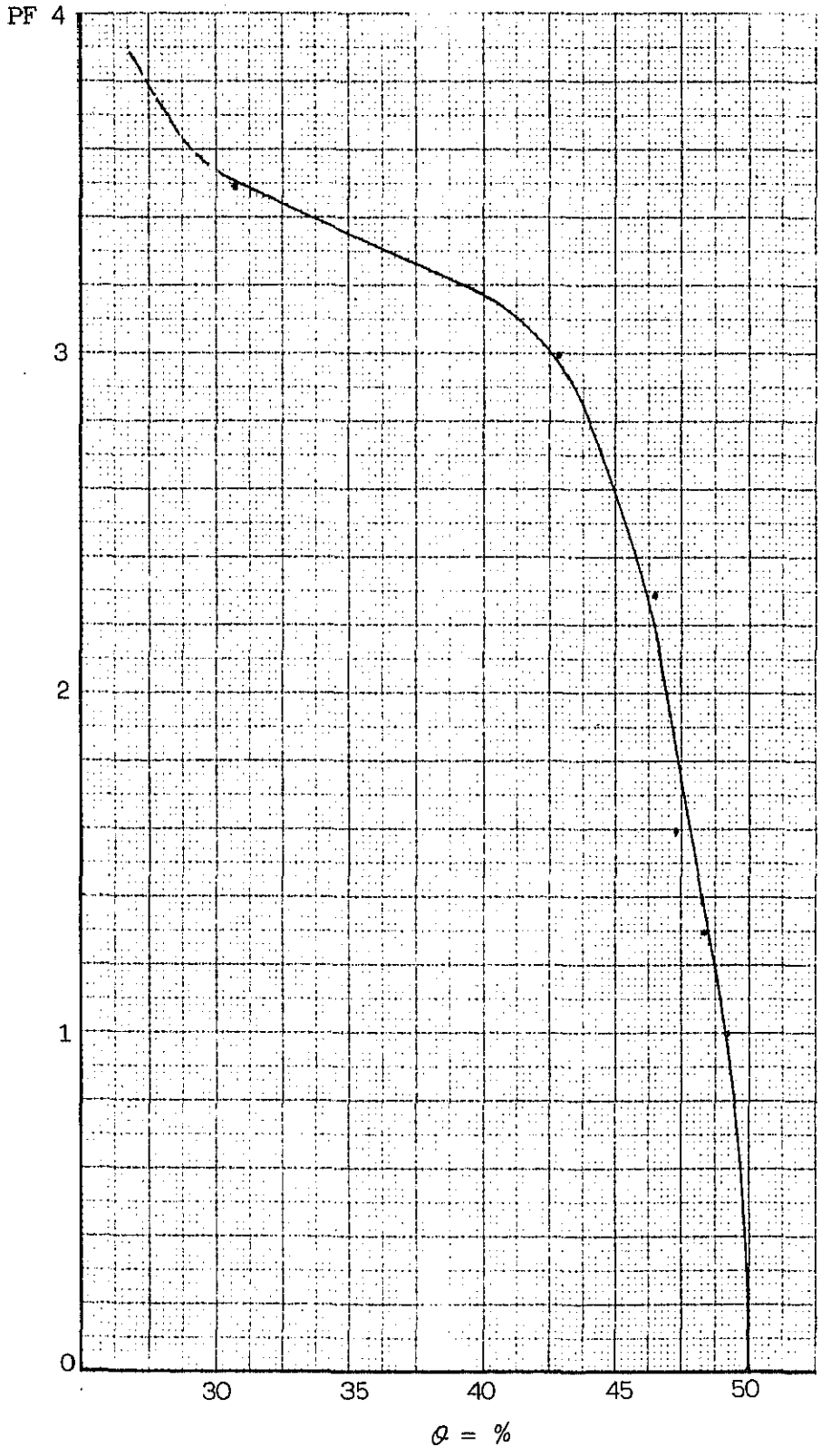
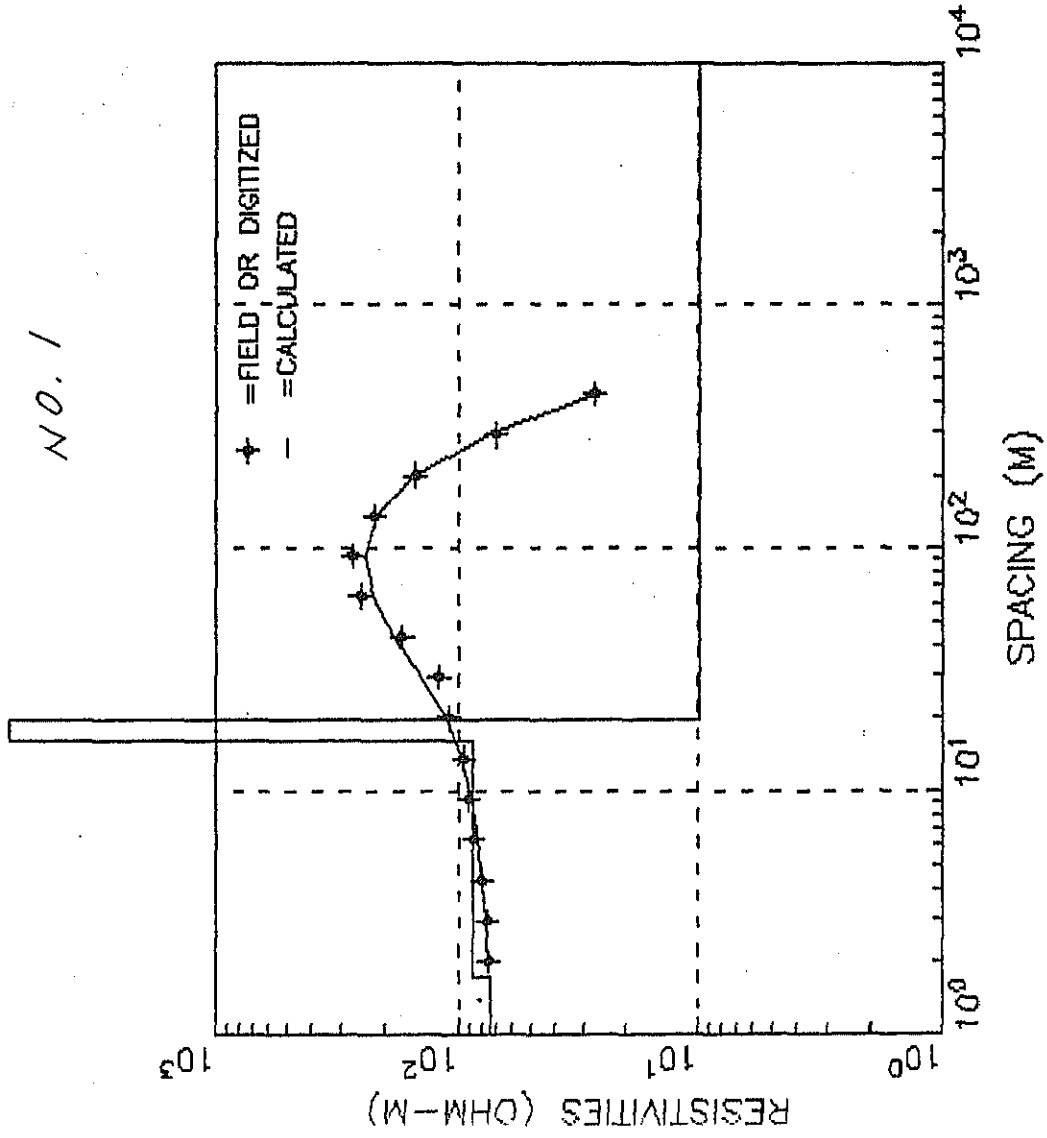


Fig. 3 RESULT OF PF-TEST Sample;B (LA PAZ Stratum)

11. RESULTS OF ELECTRIC PROSPECTING SURVEY

```
MODEL:     4 LAYERS
RESISTIVITIES:
   7.35E+01    8.79E+01    7.01E+03    9.86E+00
THICKNESSES:
   1.74E+00    1.44E+01    3.54E+00
  SPACING       DATA        CALC       % ERROR
   2.00E+00    7.50E+01    7.52E+01     -0.253
   2.94E+00    7.60E+01    7.72E+01     -1.578
   4.31E+00    8.00E+01    8.03E+01     -0.317
   6.32E+00    8.70E+01    8.39E+01      3.687
   9.28E+00    9.10E+01    8.85E+01      2.848
   1.36E+01    9.60E+01    9.63E+01     -0.333
   2.00E+01    1.10E+02    1.12E+02     -2.041
   2.94E+01    1.20E+02    1.41E+02    -15.072
   4.31E+01    1.70E+02    1.81E+02     -6.322
   6.32E+01    2.50E+02    2.21E+02     13.369
   9.28E+01    2.70E+02    2.39E+02     13.034
   1.36E+02    2.20E+02    2.17E+02      1.578
   2.00E+02    1.50E+02    1.51E+02     -0.865
   2.94E+02    7.00E+01    7.44E+01     -5.902
   4.31E+02    2.70E+01    2.66E+01      1.550
SCHL ARRAY,  15 DATA POINTS, DATA = EL ALTO STATION
RMS LOG ERROR =     2.94E-02, ANTILOG YIELDS     7.0056 %
PARAMETER RESOLUTION MATRIX:
"F" MEANS FIXED PARAMETER
P 1   0.96
P 2   0.02   0.95
P 3   0.00   0.00   0.50
P 4  -0.01   0.02   0.03   0.48
T 1  -0.06  -0.07   0.00   0.01   0.05
T 2   0.03  -0.05   0.00   0.06   0.05   0.91
T 3   0.00   0.00   0.50   0.03   0.00   0.00   0.50
        P 1    P 2    P 3    P 4    T 1    T 2    T 3
```

NO. 1


NO. 1
+ =FIELD OR DIGITIZED
– =CALCULATED
RESISTIVITIES (OHM-M)
SPACING (M)
10⁰
10¹
10²
10³
10⁴
10⁰
10¹
10²
10³

12. RESULTS OF PUMPING TEST

PRUEBAS DE BOMBEO

5-3m.
- 5/40

POZO No. 22 PROPIETARIO INFOL 8"s/c FECHA 26-7-87

Máxima Presion = 7 kg/cm²

Q (l/sec)	minutos	H (CM)	NIVEL DE AGUA WATER LEVEL	OBSERVACIONES
1 l/sec.	0.0	5.52 cm	12,88	Arranque 60 A. 22.8 K.V.A.
(6 kg/cm²)	1.0	"		380. V.
"	2 10	"	15.14	
"	3 15	"	15.55	
"	5.0	"	15.77	
"	10.0	"	15.93	
"	15.0	"	16.01	
"	20.0	"	16.06	
"	30.0	"	16.15	
"	45.0	"	16.24	
"	60.0	"	16.30	
2 l/sec.	0.0	7.28 cm	16,30	
(3.5 kg/cm²)	1.0	"	19.78	
	2,0	"	20,02	
	3.0	"	20.12	
(4.0 → 3.5 kg/cm²)	5.0	"	19.62	
(3.8 kg/cm²)	10.0	"	20.14	
"	15.0	"	20,06	
"	20.0	"	20.12	
"	30 0	"	20.22	
"	45.0	"	20.345	
"	60.0	"	20.44	
"	75.0	"	20.51	
"	90.0	"	20.58	
"	105 0	"	20.65	

PRUEBAS DE BOMBEO

POZO No. 22 PROPIETARIO INFOL FECHA 26-7-87

Q (l/sec) minutos		H (CM)	NIVEL DE AGUA WATER LEVEL	OBSERVACIONES
3 l/sec	0.0	8.56 cm.	23.47	
(1.4 kg/cm²)	1.0	"	23.84	
	2.0	"	23.86	
	3.0	"	23.87	
	5.0	"	23.93	
	10.0	"	24.05	
	15.0	"	24.15	
	21.0	"	24.22	
	30.0	"	24.33	
	45.0	"	24.45	
	60.0	"	24.56	
3.59 l/sec.	0.0	9.20 cm.	25.35	15 Amperios 5.7 K.V.A
(0.0 kg/cm²)	1.0	"	25.73	380. V.
	2.0	"	25.94	
	3.0	"	26.04	
	5.0	"	26.14	
	10.0	"	26.25	
	15.0	"	26.32	
	20.0	"	26.38	
	30.0	"	26.47	
	45.0	"	26.57	
	60.0	"	26.67	

PRUEBAS DE BOMBEO

POZO No. 22 PROPIETARIO INFOL FECHA 26-7-87

Q (l/sec). minutos	H (CM)	NIVEL DE AGUA WATER LEVEL	OBSERVACIONES
STOP 0.0 l/sec. 0.0	0.0	26.65	
3.0	"	16.68	
5.0	"	16.07	
10.0	"	15.39	
15.0	"	15.07[5]	
20.0	"	14.86[3]	
30.0	"	14.59	
45.0	"	14.32[8]	
60.0	"	14.14	
75.0	"	14.01	

PRUEBAS DE BOMBEO

63.6 -6.5 m.

POZO No. 29 PROPIETARIO CENACO. 6 5/8 FECHA 1/08/87

Presión Máxima 6 kg/cm² Nivel estático. 21.715

Q (l/sec)	minutos	H (CM)	NIVEL DE AGUA WATER LEVEL	OBSERVACIONES
1 l/sec.	0.0	5.52 cm.	23.23	BOMBA SUMERGIBLE EBARA MODEL 80BHS10-15
(6 kg/cm²)	1.0	"	23.22	Linea Eléctrica 220 V. (3 fases) Intensidad de arranque = 87 A.
	2.0	"	23.20	Intensidad de funcionamiento con máxima presión = 55 A.
	3.0	"	23.18	Intensidad con presión cero = 40 A
	5.0	"	23.16	
	10.0	"	23.15	
	15.0	"	23.19	
	20.0	"	23.21	
	25.0	"	23.20⁵	
	30.0	"	23.22	
	45.0	"	23.23	
2 l/sec	0.0	7.28 cm.	24.45	
(5.5 kg/cm²)	1.0	"	24.24	15D 15
	2.0	"	24.13	
	3.0	"	24.09⁵	16E
	4.0	"	24.40	
	5.0	"	24.64	
	10.0	"	24.73	
	15.0	"	24.73⁴	
	30.0	"	24.75	
	40.0	"	24.74	
		25		

PRUEBAS DE BOMBEO

POZO No. 29 PROPIETARIO CENACO. FECHA 1/08/87

Q (l/sec)		H (CM)	NIVEL DE AGUA WATER LEVEL	OBSERVACIONES
3 l/sec (5 Kg/cm²)	minutos 0.0.	8,56 cm.	26,30	
	1.0	"	26.56	
	2.0	"	26.60	
	3.0	"	26.61	
	4.0	"	26.61	
	5.0	"	26.62	
	10.0	"	26.65	
	15.0	"	26.66	
	20.0	"	26.66	
	30 0	"	26.69	
	45.0	"	26.56	
5 l/sec. (4 Kg/cm²)	0.0	10.5 cm.	30.15	
	1.0	"	30.55	
	2.0	"	30.64	
	3.0	"	30.67	
	4.0	"	30.67	
	5.0	"	30,74	
	10.0	"	30 81	
	15.0	"	31.02	
	20.0	"	31.05	
	30.0	"	31,22	
	45.0	"	31,21	

PRUEBAS DE BOMBEO

POZO No. 29 PROPIETARIO CENACO FECHA 1/08/87

Q (l/sec)	minutos	H (CM)	NIVEL DE AGUA WATER LEVEL	OBSERVACIONES
6.65 l/sec.	0.0		36.82	
(0 Kg/cm²)	0.75		36.67	
	1.0		36.76	
	2.0		37.06	
	4.0		36.85	
	5.0		37.06	
	17.0	]	36.80	
	20.0	205	36.90	
(STOP.)	T'0.0	205 — l/t'	36.90	
	1.0	206	23.91	
	2.0	103.5	22.96	
	3.0	69	22.81⁵	
	4.0	52.25	22.77	
	5.0	42⁵	22.72⁵	
	10.0	21.5	22.44	
	15.0	14.6	22.28⁵	
	20.0	11.3	22.20	
	30.0	7.3	22.08⁵	
	45.0	5.5	22.01	
	60.0	4"	21.96	
START 5 l/sec.	0.0	10.5 cm.	21.96	
(5 Kg/cm²)	2.0	"	30.70	
	3.0	"	30.73	
	4.0	"	30.79	
	5.0	"	30.83	

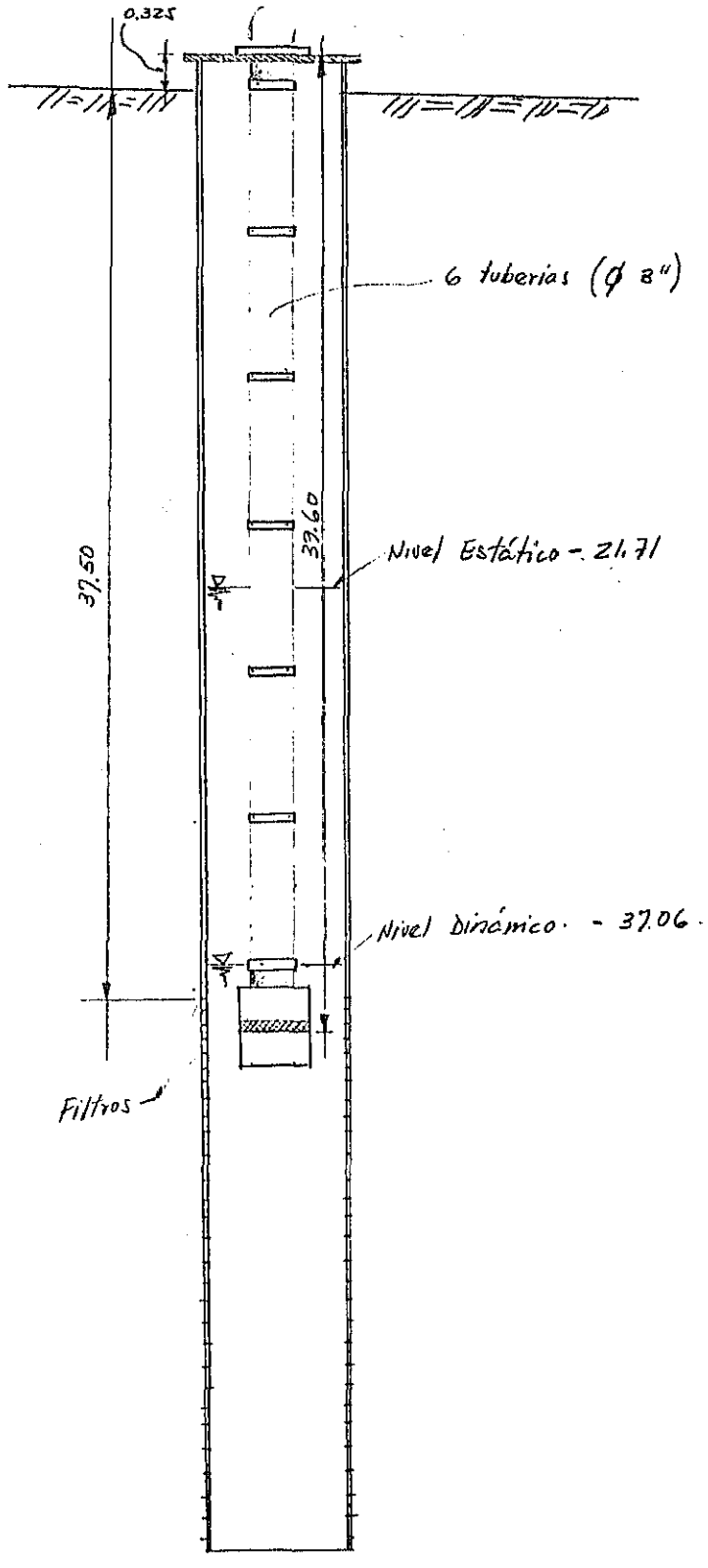
PRUEBAS DE BOMBEO

POZO No. 29 PROPIETARIO CENACO FECHA 1/08/87

Q (1/sec)	H (CM)	NIVEL DE AGUA WATER LEVEL	OBSERVACIONES
5 l/sec minutos 12.0	10.5 cm	30.98 s	
15.0	"	30.98	
30.0	"	30.99 s	

UBICACION DE LA BOMBA PARA LA PRUEBA DE BOMBEO.

POZO No 29 CENACO. 31/07/87
1/07/87



PRUEBAS DE BOMBEO

POZO No. 29 PROPIETARIO CENACO FECHA 31/07/87

Nivel Estático · 21.67

Q (l/sec)	H (CM)	NIVEL DE AGUA WATER LEVEL	OBSERVACIONES
Limpieza	15 minutos de funcionamiento de la bomba		
minutos		STOP	
0.0		37.20	
0.5		25.50	
1.0		23.20	
2.0		22.40	
3.0		22.28	
4.0		22.25 s	
5.0		22.22	
6.0		22.16 s	
7.0		22.11 s	
8.0		22.07	
9.0		22.04	
10.0		22.01	
11.0		21.98 s	
12.0		21.96 s	
13.0		21.94 s	
14.0		21.93	
15.0		21.91 s	
20.0		21.86	
25.0		21.82 s	
30.0		21.80	
35 0		21.79 s	
45.0		21.75	
60.0		21.73 s	

PRUEBAS DE BOMBEO

POZO No. 39 PROPIETARIO SAMAPA (RIO SECO) FECHA 7/08/87

Q 1 / seg		H (CM)	NIVEL DE AGUA WATER LEVEL	OBSERVACIONES
1 l/sec.	minutos. 0.0	5.52 cm	9.00	La prueba se realizó con la bomba de
	4.0	"	12.93	CORPAGUAS. Bomba : Turbina
	8.0	"	12.30	Instalada a 30.0 m. de profundidad.
	10.0	"	12.34	
	15.0	"	12.15	
	20.0	"	12.21	
	25.0	"	12.24 5	
	30.0	"	12.25	
	45.0	"	12.30	
	60.0	"	12.33	
2 l/sec	0.0	7.28 cm	12.33	
	1.0	"	14.43	
	2.0	"	15.03	
	3.0	"	15.41	
	4.0	"	15.59	
	5.0	"	15.72	
	10.0	"	16.01	
	15.0	"	16.22 5	
	20.0	"	16.29	
	25.0	"	16.32	
	30.0	"	16.40 5	
	45.0	"	16.62	
	60.0	"	16.74	
	75.0	"	16.94	
	90.0	"	17.01	

PRUEBAS DE BOMBEO

POZO No. 39 PROPIETARIO SAMAPA (RIO SECO FECHA 7/09/87

Q l / seg	minutos	H (CM)	NIVEL DE AGUA WATER LEVEL	OBSERVACIONES
3 l/sec.	0.0	8.56 cm	17.01	
	1.0	"	19.50	
	2.0	"	19.81	
	3.0	"	20.01	
	4.0	"	20.16	
	5.0	"	20.25	
	10.0	"	21.38	
	15.0	"	21.85	
	20.0	"	21.90	
	25.0	"	21.91	
	30.0	"	21.92 s	
	45.0	"	22.37	
	60.0	"	22.81	
4.21 l/sec	0.0	9.80 cm	22.81	Válvula abierta totalmente
	1.0	"	23.28	
	2.0	"	25.50	
	3.0	"	25.52	
	5.0	"	25.40	
	10.0	"	25.41	
	24.0	"	25.45	
	45.0	"	25.43	
	60.0	"	25.45	
	STOP.			

PRUEBAS DE BOMBEO

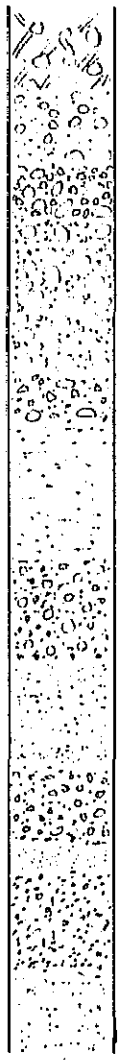
POZO No. 39 PROPIETARIO SAMAPA (RIO SECO) FECHA 7/08/87

Q l / seg	H (CM)	NIVEL DE AGUA WATER LEVEL	OBSERVACIONES
minutos STOP. 0.0		25.42	Recuperación
1.0		19.95	
2.0		14.27	
3.0		12.40	
4.0		11.88	
5.0		11.54 5	
10.0		10.90	
15.0		10.62	
20.0		10.44	
25.0		10.32	
30.0		10.22	
45.0		10.04	
60.0		9.93	

POZO No. 39.

SAMAYA (RIO SECO).

PERFIL GEOLOGICO

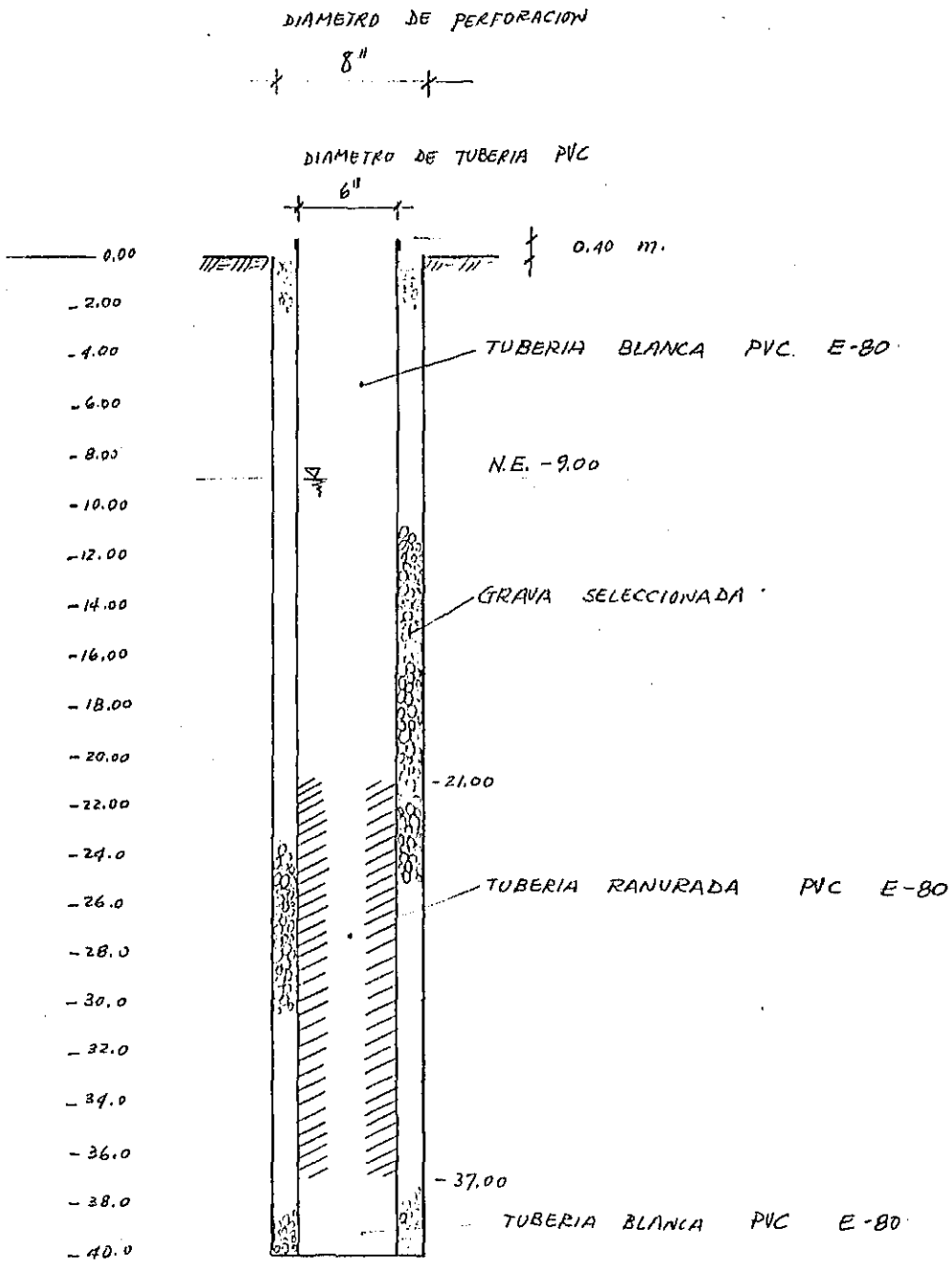


1 MATERIAL DE RELLENO
2 " "
3 " "
4 FORMACION CONGLOMERADO CON POCA ARCILLA AMARILLA.
5 " "
6 " "
7 ARENA CON GRAVA Y CANTO RODADO
8 " "
9 ARENA FINA GRAVOSA CON CANTO RODADO
10 " "
11 " "
12 " "
13 " "
14 " "
15 GRAVA ARENOSA CON CANTO RODADO Y POCA ARCILLA
16 " "
17 ARCILLA COLOR MARRON PLASTICA
18 " "
19 " "
20 " "
21 " "
22 ARENA CON GRAVA Y PIEDRA RODADA
23 " "
24 " "
25 " "
26 ARENA FINA CON POCA ARCILLA
27 " "
28 " "
29 " "
30 GRAVA ARENOSA CON POCA ARCILLA
31 " "
32 " "
33 ARENA FINA
34 ARENA GRUESA GRAVOSA
35 " "
36 " "
37 " "
38 ARENA FINA ARCILLOSA
39 " "
40 " "

POZO No. 39

PROPIETARIO SAMAPA

UBICACION: RIO SECO



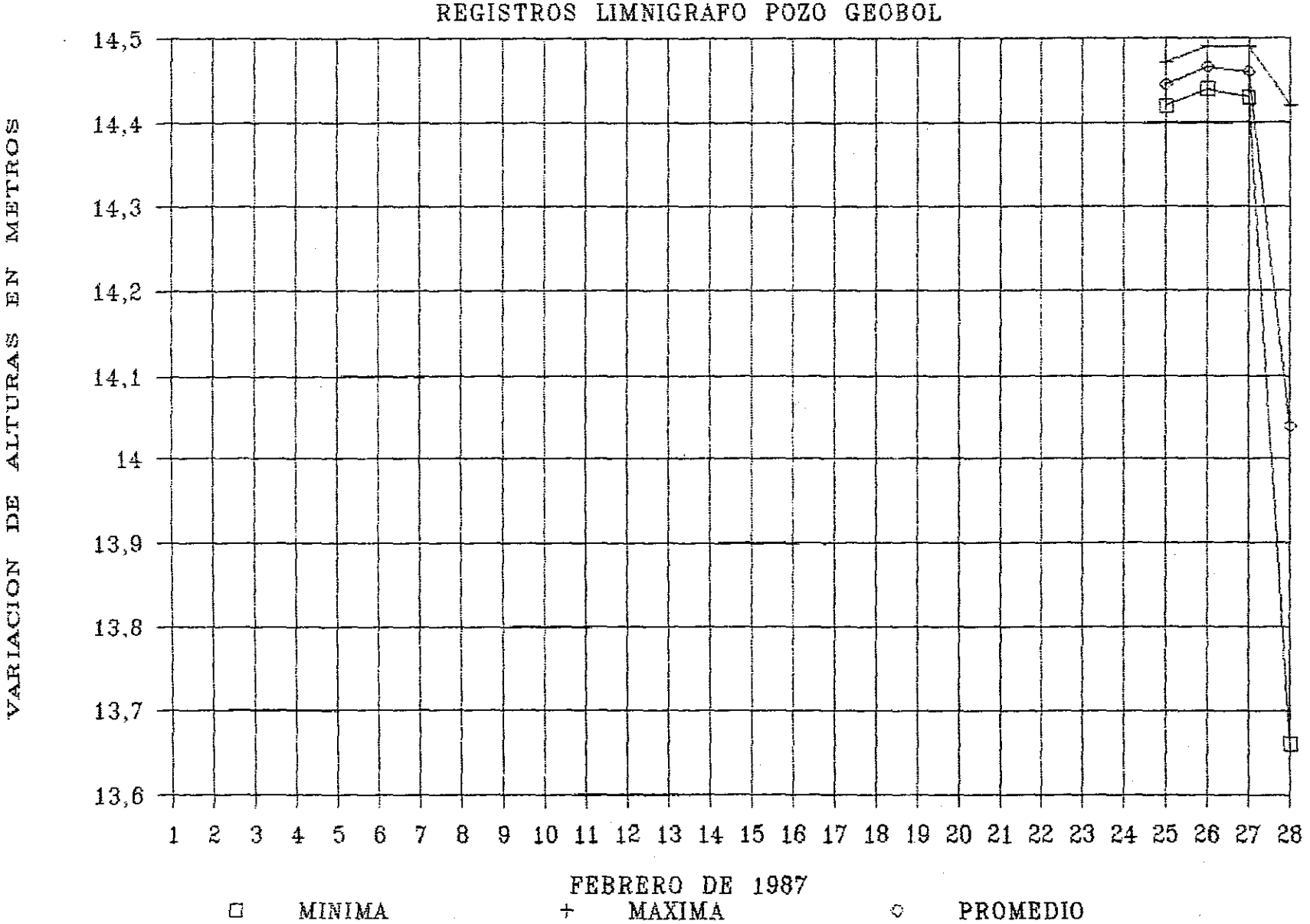
13. RESULTS ON WATER LEVEL BY AUTOMATIC WATER LEVEL RECORDER

PROYECTO AGUAS SUBTERRANEAS EN EL ALTO DE LA PAZ — DATOS DEL LIMNIGRAFO INSTALADO EN EL POZO DE GEOBOL — SAMAPA — JICA

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
FEBRERO	MINIMA																									14,42	14,44	14,43	13,86			
	MAXIMA																									14,47	14,49	14,49	14,42			
	PROMEDIO																									14,45	14,47	14,46	14,04			
MARZO	MINIMA	13,71	13,76	13,84	13,80	13,74	13,74	13,76	13,79	13,74	13,74	14,40	14,42	14,47	14,35	14,30	14,39	14,41	14,13	14,21	14,24	14,28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	MAXIMA	13,76	13,84	13,87	13,86	13,79	13,76	13,79	13,79	13,79	14,40	14,47	14,54	14,54	14,47	14,39	14,42	14,43	14,20	14,23	14,28	14,31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PROMEDIO	13,74	13,80	13,86	13,83	13,77	13,75	13,78	13,79	13,77	14,07	14,44	14,48	14,51	14,41	14,35	14,41	14,42	14,17	14,22	14,26	14,30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ABRIL	MINIMA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	14,74	14,83	14,86	14,75	14,71	14,71	14,91	14,90	
	MAXIMA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	14,82	14,92	14,92	14,85	14,74	14,90	14,93	14,94	
	PROMEDIO	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	14,78	14,88	14,89	14,80	14,73	14,81	14,92	14,92	
MAYO	MINIMA	14,86	14,89	14,70	14,66	14,70	14,76	15,06	15,14	15,10	15,00	14,84	14,86	14,86	14,95	14,96	14,94	14,82	14,78	14,81	14,87	14,94	15,05	15,05	14,91	14,85	14,83	14,87	14,86	14,84	14,93	14,83
	MAXIMA	14,94	14,86	14,80	14,70	14,76	15,00	15,15	15,18	15,18	15,10	14,91	14,91	14,94	14,96	15,00	15,00	14,93	14,82	14,87	14,94	15,00	15,15	15,15	15,00	14,90	14,85	14,90	14,90	14,93	14,96	14,93
	PROMEDIO	14,90	14,83	14,75	14,68	14,73	14,88	15,11	15,16	15,14	15,05	14,88	14,89	14,90	14,97	14,98	14,97	14,88	14,80	14,84	14,91	14,97	15,10	15,10	14,96	14,86	14,84	14,89	14,88	14,90	14,95	14,88
JUNIO	MINIMA	14,78	14,81	14,84	14,88	14,93	14,90	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	15,03	15,02	14,87	14,80	14,82	
	MAXIMA	14,83	14,84	14,88	14,93	14,98	14,98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	15,03	15,03	15,02	14,84	14,83	
	PROMEDIO	14,81	14,83	14,86	14,91	14,96	14,94	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	15,03	15,03	14,95	14,82	14,83	
JULIO	MINIMA	14,83	14,84	14,95	14,92	14,79	14,75	14,82	14,87	14,93	14,98	14,94	14,83	14,79	14,83	14,87	14,95	14,89	14,88	14,83	14,81	14,79	14,79	14,78	14,84	14,88	14,79	14,76	14,88	15,31	15,32	15,31
	MAXIMA	14,84	14,95	14,96	14,96	14,88	14,78	14,87	14,92	14,98	15,01	15,01	14,94	14,83	14,86	14,94	14,98	14,93	14,89	14,88	14,83	14,82	14,81	14,79	14,90	14,91	14,88	14,79	15,34	15,34	15,35	15,34
	PROMEDIO	14,84	14,90	14,96	14,94	14,84	14,77	14,85	14,90	14,96	15,00	14,98	14,89	14,81	14,85	14,91	14,97	14,91	14,89	14,86	14,82	14,81	14,80	14,79	14,87	14,90	14,84	14,78	15,11	15,33	15,34	15,33

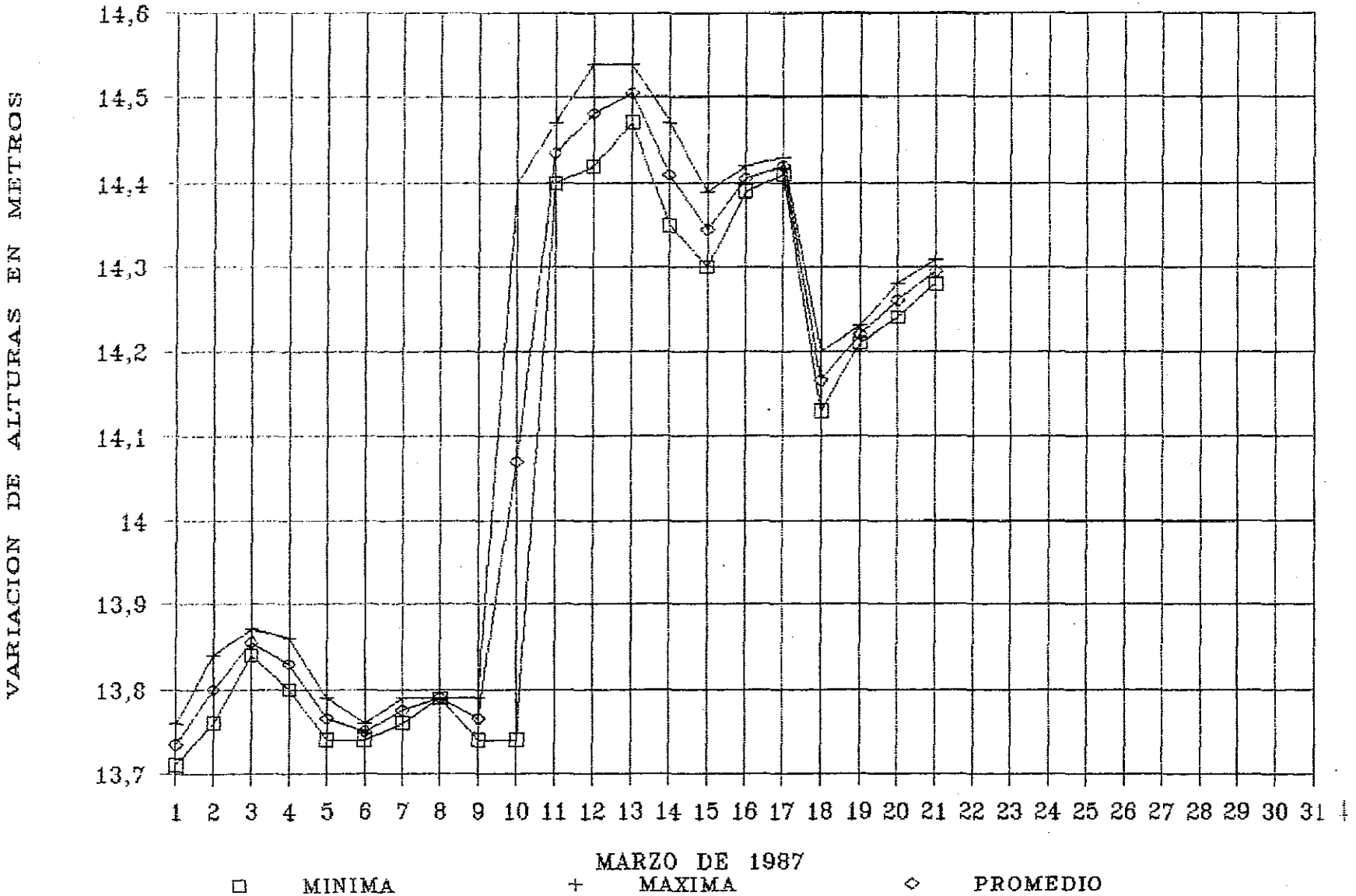
ND = DATOS NO DISPONIBLES

PROYECTO AGUAS SUBTERRANEAS (JICA)



PROYECTO AGUAS SUBTERRANEAS (JICA)

REGISTROS LIMNIGRAFO POZO GEOBOL



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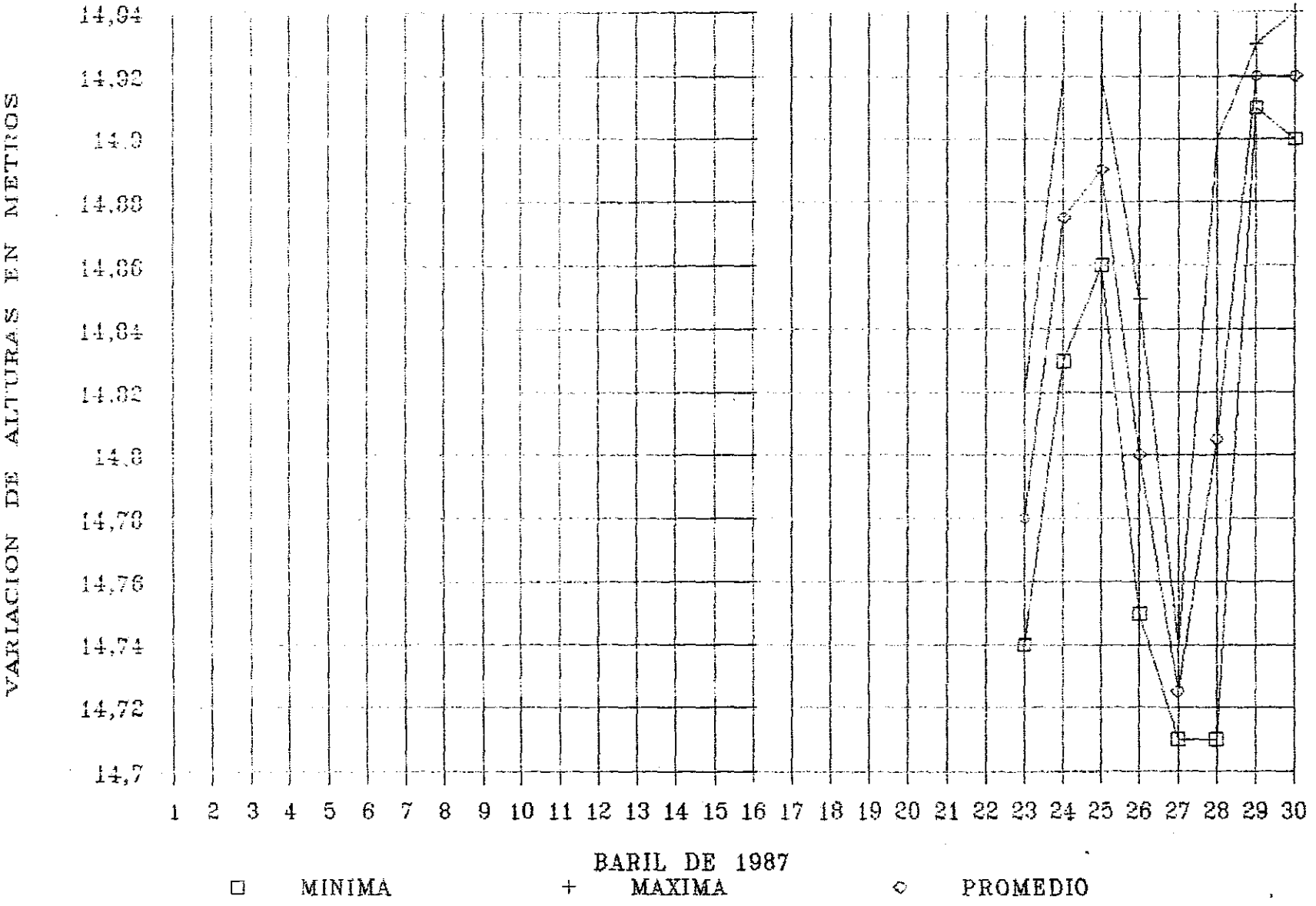
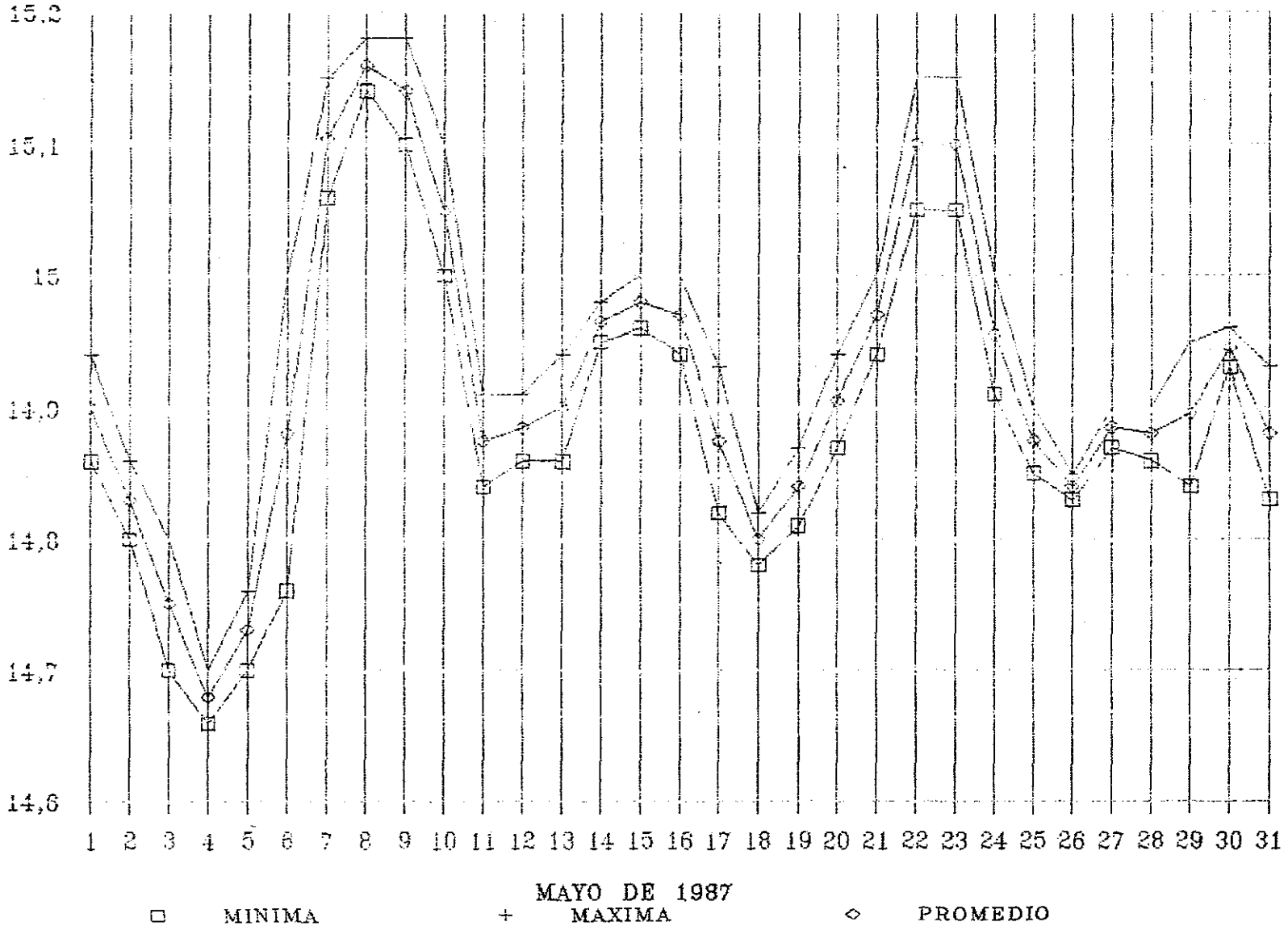
REGISTROS LIMNIGRAFO POZO GEOBOL



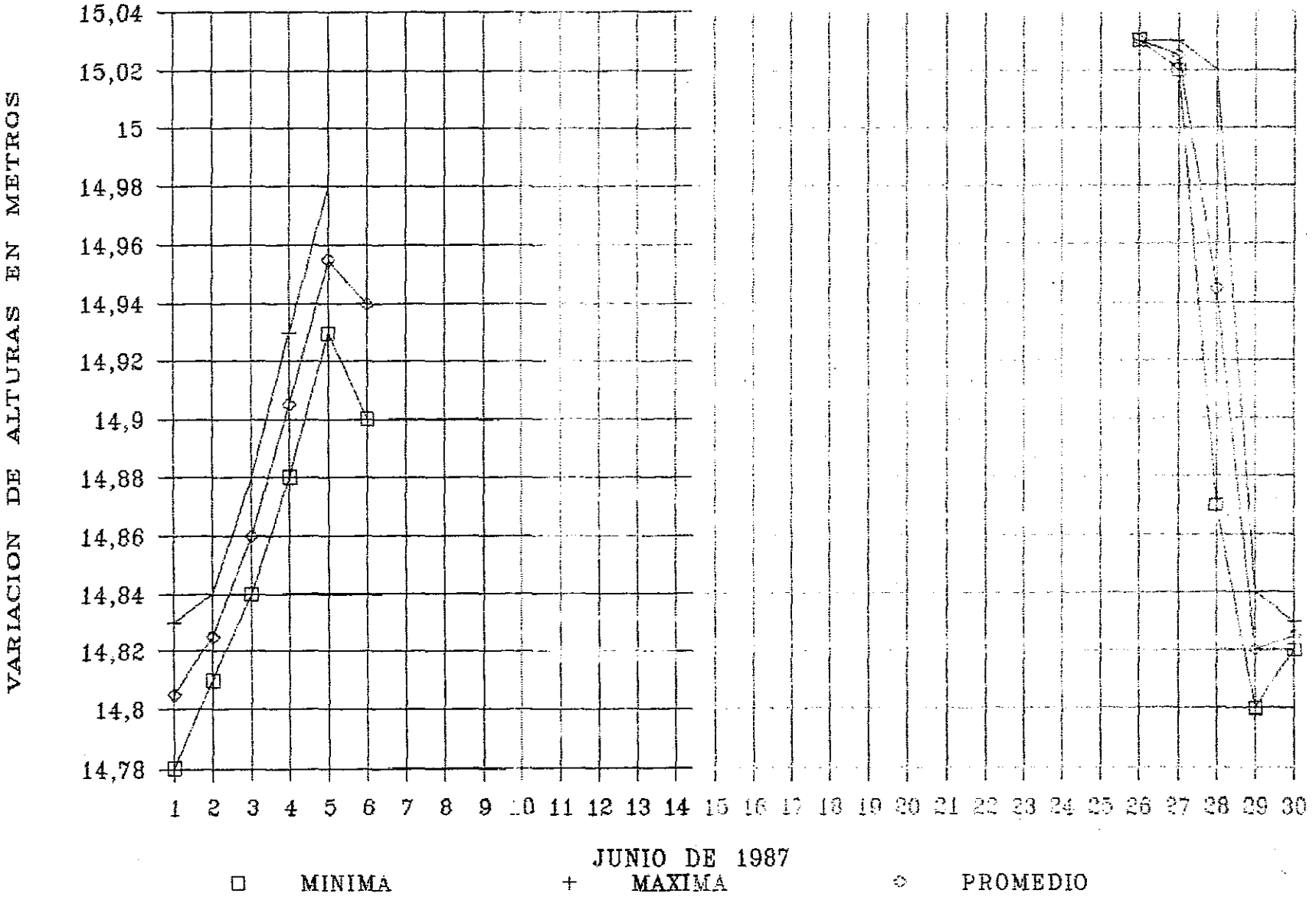
PROYECTO AGUAS SUBTERRANEAS (JICA)

REGISTROS LIMNIGRAFO POZO GEOBOL



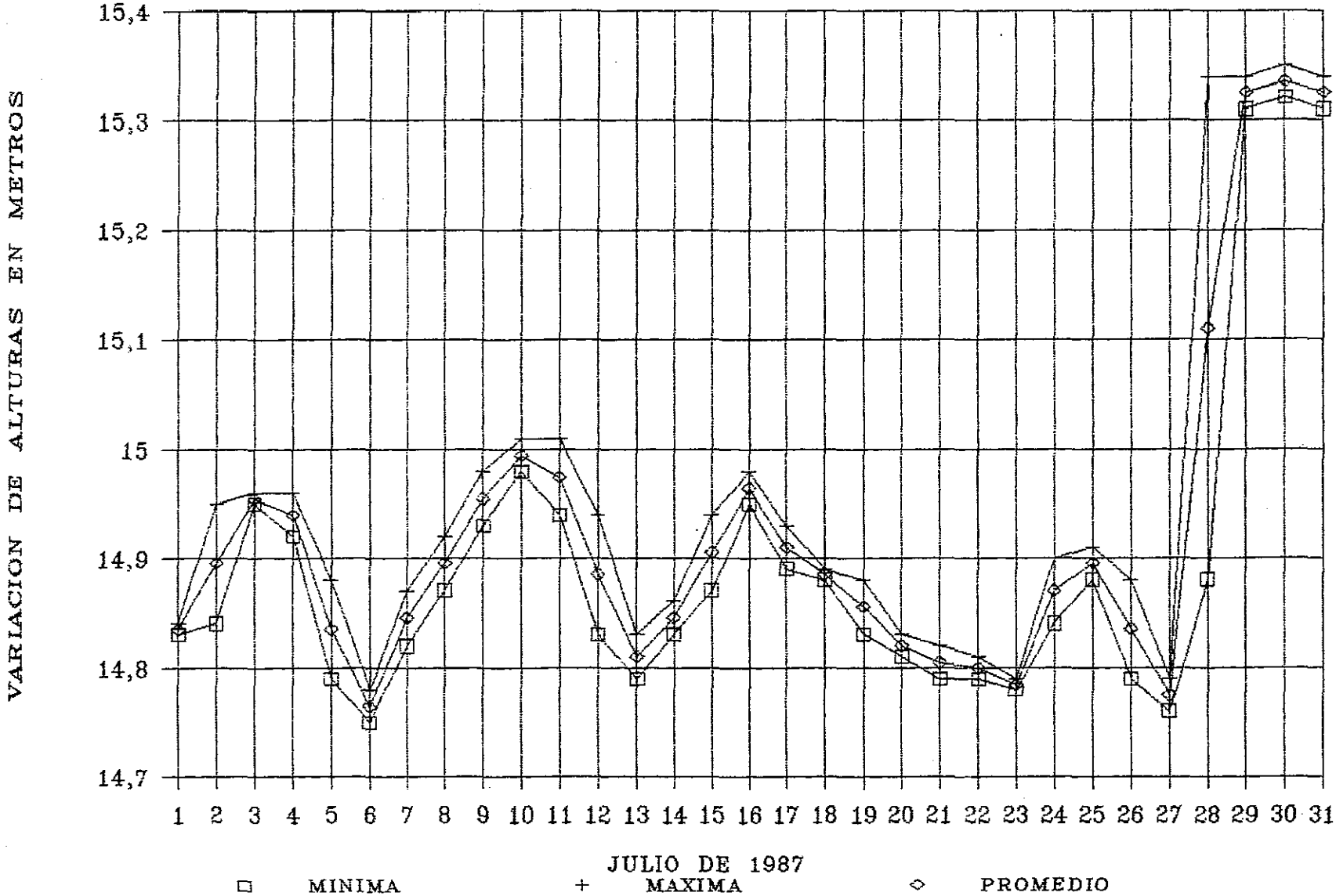
PROYECTO AGUAS SUBTERRANEAS (JICA)

REGISTROS LIMNIGRAFO POZO GEOBOL



PROYECTO AGUAS SUBTERRANEAS (JICA)

REGISTROS LIMNIGRAFO POZO GEOBOL



14. DATA ON COST ESTIMATION

PRECIOS DE MATERIALES DE CONSTRUC

A DICIEMBRE DE 1986

PINTURA LATEX	GAL	Bs. 13.90
PINTURA ANTICORROSIVA	GAL	18.80
PINTURA AL OLEO	GAL	18.00
FIERRO DE CONSTRUCCION	KG	1.60
VIDRIO SENCILLO	P2	98
VIDRIO DOBLE	P2	1.20
CAL VIVA	KG	25
ALAMBRE TEJIDO	M2	92
LADRILLO GAMBOTE	PZA	17
LADRILLO 6 HUECOS	PZA	22
ADOBES	PZA	14
PIEDRA CORTADA	PZA	1.00
SIKA-1	KG	3.00
GRAVA	M3	15.00
PIEDRA BRUTA	M3	15.00
ARENA GRUESA	M3	15.00
ARENA FINA	M3	20.00
CEMENTO PORTLAND	KG	28
MADERA VIGAS	P2	85
CLAVOS	KG	2.00
CLAVOS DE CALAMINA	KG	3.00
ESTUCO PANDO	KG	20
ALAMBRE NEGRO	KG	2.00
CALAMINA # 30 1.80x0.90	HJA	8.40
CALAMINA # 30 2.15x0,90	HJA	9.80
CALAMINA # 30 2.45x0.90	HJA	11.20
CALAMINA # 30 3.00x0.90	HJA	20.00
CALAMINA PLANA 2.00x1.00	HJA	18.00
TUBOS DE CEMENTO Ø 4"	PZA	4.80
FIERRO ANGULAR 1"	ML	2.08
OCRE NACIONAL	KG	2.50
TINTE EXTRANJERO CORAL	FCO	4.00
CALAMINA PLASTICA 3.00x0.80	HJA	40.00
CABLE BIPOLAR # 14	ML	50
CABLE BIPOLAR # 12	ML	80
CABLE BIPOLAR # 10	ML	1.10
FOCO DE 100 W	PZA	1.00
TOMACORRIENTE MIXTO	PZA	1.00
CAJA PARA ENCHUFE	PZA	20
SOQUETS	PZA	50
CINTA AISLANTE	RLLO.	1.00
REJILLA DE PISO	PZA	3.00
DUCHA LORENZETTI PLASTICA	PZA	15.00
DUCHA LORENZETTI METALICA	PZA	48.00
CAÑERIA Fo. Go. 1/2"	ML	2.84
JABONCILLERA	PZA	8.00
PERNOS 3/8"x 7"	PZA	69
PERNOS 3/8" x 3 1/2"	PZA	41
SOLDADURA	KG	14.52
REMACHES	KG	7.40

MACHIMBRE	P2	1.40
PUERTA 2.10x0.90	PZA	130.00
PUERTA 1.60x0.80	PZA	85.00
VENTANA 1.30x0.90	PZA	30.00
VENTANA 1.20x0.80	PZA	15.00
MALLA OLIMPICA	M2	9.50
VENESTA 2.20x 0.90	PZA	11.60
VENESTA BLANCA	M2	5.90
LLAVE DE PASO Ø 1/2"	PZA	7.00
CODO Fo. Go. 1/2" x 90°	PZA	80
NIPLE Fo. Go. 1/2" x 2"	PZA	1.00
NIPLE fO. gO. 1/2" x 5"	PZA	1.50
COPLA Fo. Go. 1/2"	Pza	1.00
UNION UNIVERSAL 1/2"	PZA	3.80
REDUCCION 2" a 1/2"	PZA	4.00
TAPON 1 1/2"	PZA	3.50
TUBO PVC Ø 3" x 6 ML	PZA	26.50
AZULEJOS BLANCOS	M2	14.50
CEMENTO BLANCO	KG	1.60
BISAGRA 3"	PZA	1.00
PARKET	M2	9.00
PEGAMENTO PARKET	GAL	14.00
VINILO	M2	24.20
PEGAMENTO VINILO	KG	1.10
MOSAICO	PZA	42
TORNILLOS 1 1/2"	KG	3.00
MASILLA PARA VIDRIOS	KG	3.00
CHAPA YALE	PZA	130.00
FIERRO PLATINO 1/8" x 1/2"	ML	1.90
COLA	KG	7.00
LIJA	HJA	2.00
OCRE IMPORTADO	KG	5.00
ACEITE LINAZA	LT	3.50
TIZA	KG	1.00
BARNIZ	GAL	18.50
ALAMBRE DE PUAS	ML	12
TUBO Fo. Go. Ø 2"	ML	11.61

COSTO HORARIO MANO DE OBRA SAMAPA

AYUDANTE TECNICO I	(MECANICO)	3.41	hra.
AYUDANTE TECNICO III	(CARPINTERO)	2.89	
OPER. MECANICO I	(MAQUINISTA)	2.16	
OPERARIO I	(ALBAÑIL)	1.38	
OPERARIO III	(AYUDANTE)	1.22	
PEON II	(PEON)	1.09	

I. TRANSPORTATION

1.1 Harbour.

(1) Location

a. Name of available Port Nearest Site (Distance from Japan)

a) ARICA (Chile) b) MATARANI (Peru) c) ANTOFAGASTA (Chile)

b. Days required for voyage

a) From Japan to Arica, almost 2 months (9.287 Millas Nauticas)

b) From Japan to Matarani almost 2 "

c) From Japan to Antofagasta " 2 months(9.462 Millas Nauticas)

c. Route of Inland transportation to site

a) From Arica by trucl. 4 & 5 days/by train app.29 days. to La Paz

b) From Matarani by truck 4 & 5 days/ closed by the moment.to La Paz

c) From Antofagasta by truck 4 & 5 days/ by train 15 days. to La Paz.

(2) Charges

a) Stevedorig charge USD 17,12 per shift

b) Lightering charge

c) Landing charge @ = USD 50. / 1.000 Kg.

d) Storage 30 Kgs. Free @ = USD 0.20 / 1000 Kgs.

e) Hirage

f) Port Charges

1.2 Customs

1) Organization : "Administracion autonoma de Almacenes Aduaneros" (AADAA) El Alto La Paz.

a) Customs house AADAA - Plaza Alonzo de Mendoza
AADAA - Av.Panamericana el Alto LaPaz.
carretera Oruro Km. 3.

b) Place of customs La Paz AADAA

c) Possibility of customs clearance at site or ship YES

2) Customs broker a)

3) Procedure

a) Tariff (Possibility for exemption)

b) Procedure

c) Special item (Contrabond goods and protected goods)

d) Procedure for return equipment

4) Custom fee

1.3 Inland transportation

1) Road condition — not good

2) Available roads — Yes

3) Rout and distance. — From Arica crossing the frontiere in Charaña 471 Km.
From Antofagasta crossing the frontiere Ollague = 1.163 Km.
" Matarani isn't working

4) Width — 4 - 6 m. changeable

5) Forwarding agent —

1.4 Other transportation.

a) Air way - Only Arica - La Paz

b) Rail road - From Arica and from Antofagasta

c) Road - From Arica, Matarani and Antofagasta.

2. Temporary construction

1) Construction area

2) Temporary road on site — Definitive

3) Water — Yes

4) Sewer — Yes

5) Electric power — 220 Volt. 110 Volts. 3 Phase

6) Comunication — Good National and International

7) Facilities

Hospital — Yes Private Hopitals and Goverment Hospitals

Security — Yes Police ,

8) Camp

3. Local Procurement

3.1 Construction Equipment

Equipment	Specification	Procurability	Rental Fee (/day,hr)	Operator (with or without)	Fuel (include or not)	Repairable or not	Owner	Remarks
Power shovel Truck crane	JD model 500 Small	yes		without	not		SAMAPA	
Bulldozer	-	Rent		"	"	not	National R. Service	
Dump Truck	4 m3.	No		Yes	yes	not	SAMAPA	
Trailer	No	yes		yes	--	-	—	
Truck	D. 400	yes		yes	not		SAMAPA	
1 Forklifth truck	5mts.	yes		yes	yes		Samapa	
Vibrador	small	yes		yes	yes		SAMAPA	
Passenger car Micro bus	use for personnel	yes		yes	yes		SAMAPA	
Wagon	use for Departaments	yes		yes	yes		SAMAPA	

3.2 GENERAL EQUIPMENT, Instrument

Equipment	Specification	Procurability	Rental Fee (/ day, hr)	Attachment	Reparable or not	Owner	Remarks
Generador	220 trifasico cos 0.8 13KVA	yes	difficult			SAMAPA	
"	380 trifasico cos o.8 13KVA	yes	difficult			SAMAPA	
	5KVA 220V.Monofasico 50 Hz.	YES			2 for repair	SAMAPA	
Engine Welder	Hovart	yes			yes	SAMAPA	
Arc Welder	Hovart	yes				SAMAPA	
Compresor	Big	yes			Good.	SAMAPA	
Water pump	4 good funtion	Regular 1			yes	SAMAPA	
Winch	8 - 10 Tons	yes			good	SAMAPA	
Wheel barrow	normal	yes				SAMAPA	
COnveyer		yes	eassy to buy			-	
Electric drill	Hilty	yes				SAMAPA	
Topografic survey instrument	same	yes				SAMAPA	

3.3 Materials

Materials	Specification	Unit Price	Availability Yes	Availability No	Remarks
Cement	1 bag	14 Bs.	yes		
Sand	3 cubos	40 Bs.	yes		
Gravel	3 cubos	40 Bs.	yes		
Crushed stone	3 cubos	40 Bs.	yes		
Ready Mixed Concrete	m 3.	70 SUS.	yes		
Brick	1000 ladrillos	240 Bs.	yes		
Structural steel	1 Kilo	2.4 Bs.	yes		
Angle	1 Kilo	2. 08 Bs.	yes		
Chanel	1 Kilo	2. 08 Bs.	yes		
Steel plate	1 Kilo	2 Bs.	yes		
Steel pipe	1 pza. 6 mts.	22 Bs.	yes		
Galvanized iron sheet	1 sheet No.28 3x0.90	115 Bs	yes		
Welding rod	Barra	2 Bs.	yes		
I and H	1 Kilo	2.40Bs.	yes		
Ordinary Plywood			for construction		
Planed Plank			yes		
Square timber			yes		
Fuel Gasoline	1 liter	0.50 Bs	yes		
Diesel	1 liter	0.60 Bs.	yes		
Lubricant oil	1 liter	2.70 Bs.	yes		
Gas (Acetilene, Oxigen	1 Kilo	3.4 app.	yes yes		

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4 Labor circumstances

4.1. General conditions

(1) Standard Law and Regulations

a) Name of low and regulations

Ley General del trabajo - Decretos supremos 21060 - 21137 21591 ,No. 843 of Reforma Tributaria. -Aportes institucionales.

b) Social security system

Decreto supremo 21637

c) Limitation in hireing Foreign labor No

d) Hiring conditions of local labor

Experience - Personal identification - Documents of last job.

(2) Governmental Authority in charge of Labor

Ministerio de Trabajo y Desarrollo laboral

a) Address

a) Yanacocha esq. Mercado (La Paz)

b) Office hours

8 - 12 a.m. 14.30 - 18.30

(3) Sindicatos

a) Existence of labor's union (Sindicato) Yes

b) Influence Strong

c) Present circumstances (frecuency of strike, Demonstration, sabotage) Frecuently strike of sindicatos in diferents Institucions like YPFB. Teachers, and also general strikes in all country by the Bolivian Laborers Central (COB)

(4) Social security system

a) Existence of workman accident Yes

b) Existence of unemployment Insurance No

(5) Technical school

a) Mechanic - welder - Inst. Pedro Domingo Murillo

b) Mechanic - Car - " " " "

c) Driving - Private instituts: Automovil Club. Indianapolis.

d) Others : Electricity and Electronic. Inst. Tech. Pedro Domingo Murillo.

e) Number of graduates per year 25 (app) technitians in each carreer.

(6) Laborers custom :

a) Pray No

b) Take a bath No

c) Siesta No

(7) Contract interpreter

a) Japones Japones / Español Possible

b) Ingles Ingles / Español Certainly

c) Area for interpreter in English:

a) Technical c) Director e) Operator

b) Manager d) Employee f) Per day

(8) Salary :

a) Minimmun 500 Bs. (250) USD /per month - Interpreter

b) Minimmun 50 Bs. (25) USD /Per month - Employee

c) Daily food expense of laborer 5 Bs. /per day

4.2 Labor conditions

a) Working hours per day 8 Hrs. / day

b) Working time From 8:00 to 12:00 (Recess) From 14:00 to 18:00

c) Normal working days per week 5 days

d) National hollidays 4 days (double payment if works)

Religious Holidays 2 days

e) Annual vacation 15 days / year

f) Overtime premium Yes (according how much earn)

g) Bonus (Amount) 1 Bonus / year

Patronal obligation for social insurance 2 % For "Caja Nacional de Seguridad social "

4.3 Hiring conditions

a) Existence of forms Yes 'Yes

b) Requirement of notification No

c) Existence of bonus for retirement Yes

d) Advise of retirement 3 months before.

Foreign workers

Requirement for job. Proffesion - Technical level

Juridical Control Yes