

REPUBLICA DEL PERU
MINISTERIO DE ENERGIA Y MINAS
DIRECCION GENERAL DE ELECTRICIDAD

**EVALUACION DEL POTENCIAL
HIDROELECTRICO NACIONAL**
VOLUMEN VIII
**POTENCIAL HIDROELECTRICO
TEORICO**

REPUBLICA FEDERAL DE ALEMANIA
SOCIEDAD ALEMANA DE COOPERACION TECNICA, GTZ
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VOLUMEN VIII POTENCIAL HIDROELECTRICO TEORICO LINEAL

CONTENIDO	PAGINA
1. INTRODUCCION	1
2. RESUMEN DEL POTENCIAL HIDROELECTRICO TEORICO DEL PERU	3
3. INDICE DE LOS RESULTADOS	6
4. RESULTADOS	12

VOLUME VIII THEORETICAL LINEAR HYDROELECTRIC POTENTIAL

CONTENTS	PAGE
1. INTRODUCTION	2
2. SUMMARY OF THE THEORETICAL HYDROELECTRIC POTENTIAL OF PERU	3
3. INDEX TO RESULTS	6
4. RESULTS	12

El parametro hidrológico básico para la selección y evaluación de centra les hidroeléctricas potenciales es el caudal medio esperado en el emplazamiento del proyecto, sea el que ocurra naturalmente o el aumentado por derivación. Para los pro pósitos de planeamiento a nivel de cuenca o nacional esto implica que se requieren es timados del caudal medio en puntos de todos los ríos significativos y de sus mayores a fluentes. Disponiéndose de dichos valores estimados y la información topográfica per tinente, se puede entonces calcular el potencial hidroeléctrico de la región.

Como parte de la evaluación del potencial hidroeléctrico del Perú llevado a cabo durante el período de Octubre de 1976 a Marzo de 1979, se elaboró un mode lo matemático simple de cada cuenca. El estudio fue realizado por un Consorcio de ingenieros consultores de la República Federal de Alemania compuesto por las firmas Lahmeyer International GmbH y Salzgitter Consult, en cooperación con el Ministerio de Energía y Minas del Perú.

El presente volumen contiene el potencial hidroeléctrico teórico lineal estimado de todos los sistemas fluviales considerados en este estudio, sobre la base de los caudales medios estimados utilizando el modelo hidrológico.

En el volumen IV se presentan mapas que muestran la descripción geográfi ca de cada cuenca así como las ubicaciones de todas las estaciones hidrométricas y pluviométricas conocidas, en tanto, en el volumen II, Sección 4 se da una descripción total de la metodología empleada en la construcción, operación y calibración de los modelos.

El Volumen VI contiene diagramas que muestran la representación esque mática de cada sistema de ríos así como resúmenes de las características topográficas e hidrológicas de cada tramo de río y afluente. Las relaciones hidrológicas utilizadas y los caudales medios estimados resultantes en cada punto definido se reproducen en el Volumen VII.

INTRODUCTION

The basic hydrological parameter for the selection and evaluation of potential hydropower plants is the expected mean flow at the project site, whether naturally occurring or as augmented by diversion. For the purpose of planning at the river basin or national level this implies that estimates of the mean flow are required at points on all significant rivers and their important tributaries. Given the availability of such estimates and relevant topographic information, the theoretical hydropower potential of the region can be calculated.

As part of the evaluation of the hydroelectric potential of Peru undertaken during the period October 1976 to March 1979, a simple mathematical model of each river basin was constructed. The study was effected by a consortium of West German consulting engineers composed of Lahmeyer International GmbH and Salzgieter Consult, in cooperation with the Peruvian Ministry of Energy and Mines.

The present volume contains the estimated theoretical linear hydroelectric potential of all river systems considered in the above study, based on the mean flow estimated using the hydrological model employed.

Maps showing the geographic layout of each river basin are given in Volume IV together with the locations of all known streamflow and rainfall measuring stations, while a full description of the methodology underlying the construction, operation and calibration of the models is given in Volume II, Section 4. Volume VI contains diagrams showing the schematic representation of each river system together with summaries of the topographic and hydrological characteristics of each river reach and tributary. The hydrological relationships used and the resulting estimated mean flows at each defined point are reproduced in Volume VII.

*CODIGO	NV	NC	NOMBRE	AREA	ALT	LLUV	LONG	NS	PTT	PTE	PTX	PTD	PTN	*
101	1	1	ZARUMILLA	817.0	279	369	129	1	17	0.13	0	14E	10.0	
102	1	2	TUMBES	2729.0	362	422	236	2	278	1.18	56E	83E	180.5	
103	1	3	CHIRA	11564.0	960	550	1033	5	722	0.70	0	252E	596.0	
104	1	4	PIURA	10476.0	539	377	720	12	209	0.29	0		209.0	
105	1	5	CASCAJAL	4147.0	228	219	288	0	21	0.07	0		21.0	
106	1	6	OLMOS	965.0	730	365	91	0	22	0.24	0		22.0	
107	1	7	MOTUPE	1951.0	665	279	237	2	61	0.26	0		61.0	
108	1	8	LA LECHE	1578.0	1255	584	150	1	107	0.71	0		107.0	
109	1	9	CHANCAY-LAMBAYEQUE	4906.0	1509	669	396	2	531	1.34	0		531.0	
110	1	10	ZANA	2080.0	1069	514	169	5	125	0.74	0		125.0	
111	1	11	CHAMAN	1248.0	671	370	99	0	19	0.19	0		19.0	
112	1	12	JEQUETEPEQUE	4257.0	2220	731	408	4	695	1.70	0		695.0	
113	1	13	CHICAMA	4454.0	1772	558	451	1	443	0.98	0		443.0	
114	1	14	MOCHE	2161.0	2221	496	304	1	278	0.91	0		278.0	
115	1	15	VIRU	1967.0	2015	429	225	1	151	0.67	0		151.0	
116	1	16	CHAO	1443.0	1433	324	161	0	82	0.51	0		82.0	
117	1	17	SANTA	12479.0	3403	650	1140	15	4953	4.34	0		4953.0	
118	1	18	LACRAMARCA	685.0	1560	161	71	0	9	0.13	0		9.0	
119	1	19	NEPENA	1885.0	2034	266	266	1	87	0.33	0		87.0	
120	1	20	CASMA	3064.0	2309	315	305	3	207	0.68	0		207.0	
121	1	21	CULEBRAS	671.0	1615	191	105	0	16	0.15	0		16.0	
122	1	22	HUARMEY	2354.0	2477	353	191	1	169	0.88	0		169.0	
123	1	23	FORTALEZA	2342.0	2434	330	280	1	114	0.41	0		114.0	
124	1	24	PATIVILCA	4908.0	3078	480	514	1	1675	3.26	0		1675.0	
125	1	25	SUPE	1078.0	2165	302	114	1	78	0.68	0		78.0	
126	1	26	HUAURA	4483.0	3061	592	360	6	1062	2.95	0		1062.0	
127	1	27	CHANCAY-HUARAL	3382.0	2665	410	243	1	576	2.37	0		576.0	
128	1	28	CHILLON	2321.0	2485	364	211	3	332	1.57	0		332.0	
129	1	29	RIMAC	3134.0	3157	520	298	6	887	2.98	0		887.0	
130	1	30	LURIN	1600.0	2456	326	166	3	176	1.06	0		176.0	
131	1	31	CHILCA	798.0	1589	170	96	0	29	0.30	0		29.0	
132	1	32	MALA	2522.0	2999	427	236	1	527	2.23	0		527.0	
133	1	33	OMAS	1741.0	1702	188	101	0	82	0.81	0		82.0	
134	1	34	CANETE	5981.0	3645	541	563	1	1927	3.42	0		1927.0	
135	1	35	TOPARA	489.0	1993	216	60	0	24	0.40	0		24.0	
136	1	36	SAN JUAN	5333.0	2567	354	310	1	774	2.50	0		774.0	
137	1	37	PISCO	4054.0	3049	468	349	1	872	2.50	0		872.0	
138	1	38	ICA	7366.0	1756	183	339	1	458	1.35	0		458.0	
139	1	39	GRANDE	10522.0	2138	285	1129	11	424	0.38	0		424.0	
140	1	40	ACARI	4082.0	3013	438	339	3	660	1.95	0		660.0	
141	1	41	YAUCA	4589.0	2757	380	357	2	298	0.83	0		298.0	
142	1	42	CHALA	1284.0	2072	234	161	0	42	0.26	0		42.0	
143	1	43	CHAPARRA	1387.0	2776	332	141	0	67	0.48	0		67.0	
144	1	44	ATICO	1425.0	2239	226	151	0	32	0.21	0		32.0	
145	1	45	CARAVELI	2009.0	2516	286	196	0	75	0.38	0		75.0	
146	1	46	OCONA	15908.0	3719	768	1430	2	3248	2.27	0		3248.0	
147	1	47	MAJES-CAMANA	17141.0	3509	552	1039	9	2910	2.80	0		2910.0	
148	1	48	QUILCA O CHILI	13254.0	3422	343	881	6	1030	1.17	0		1030.0	
149	1	49	TAMBO	12697.0	3472	351	919	2	1508	1.64	0		1508.0	
150	1	50	OSMORE	3595.0	1971	108	321	3	164	0.51	0		164.0	
151	1	51	LOCUMBA	5316.0	2599	176	384	8	97	0.25	0		97.0	
152	1	52	SAMA	4809.0	2260	107	278	3	83	0.30	0		83.0	
153	1	53	CAPLINA	1629.0	3095	167	126	2	54	0.43	0		54.0	

* SUB-TOTAL VERTIENTE PACIFICO : POTENCIAL TEORICO = 29256.5 M.W. *

*CODIGO	NV	NC	NOMBRE	AREA	ALT	LLUV	LONG	NS	PTT	PTE	PTX	PTD	PTN	*
2101	21	1	ALTO MARANON	28500.0	3009	815	1932	2	8636	4.47	0	0	8636.0	
2102	21	2	CRISNEJAS	4660.0	3150	762	700	6	606	0.87	0	0	606.0	
2103	21	3	LLAUCANO	2823.0	2574	1058	303	10	856	2.83	0	0	856.0	
2104	21	4	CHAMAYA	3380.0	1682	1036	197	5	729	3.70	0	0	729.0	
2105	21	5	HUANCABAMBA	3448.0	2122	688	301	6	310	1.03	0	0	310.0	
2106	21	6	CHOTANO	1694.0	2298	1068	183	7	334	1.83	0	0	334.0	
2107	21	7	CHINCHIPE	7157.0	1434	1074	375	0	814	2.17	231E	168E	499.0	
2108	21	8	TABACONAS	3792.0	1941	1234	225	3	888	3.95	0	0	888.0	
2109	21	9	CENEPA	7360.0	732	940	434	0	313	0.72	0	0	313.0	
2110	21	10	SANTIAGO	33000.0	692	2655	2091	0	5684	2.72	2232E	0	3452.0	
2111 A	21	11	MARANON MEDIO	24225.0	368	1177	1884	0	6252	3.32	0	0	6252.0	
2111 B	21	11	MORONA	16070.0	526	2534	830	0	2585	3.11	832E	0	1753.0	
2112	21	12	PASTAZA	40997.0	1077	2389	2692	0	10955	4.07	9304E	0	1651.0	
2113	21	13	TIGRE	34120.0	386	2964	1914	0	4817	2.52	0	0	4817.0	
2114	21	14	BAJO MARANON	44730.0	176	2376	1867	0	2731	1.46	0	0	2731.0	
2115	21	15	UTCUBAMBA	7507.0	1903	840	384	3	1232	3.21	0	0	1232.0	
2116	21	16	CHIRIACO	4125.0	1755	803	247	1	832	3.37	0	0	832.0	
2117	21	17	NIEVA	4330.0	711	603	335	0	258	0.77	0	0	258.0	
2118 A	21	18	HUALLAGA SUP	75130.0	1496	1344	4324	5	26362	6.10	0	0	26362.0	
2118 B	21	18	HUALLAGA INF	17433.0	295	1430	1158	0	917	0.79	0	0	917.0	
2201	22	1	URUBAMBA	52041.0	1577	1253	3536	1	10591	3.00	0	0	10591.0	
2202	22	2	VILCANOTA	7272.0	4366	753	682	1	1265	1.85	0	0	1265.0	
2203 A	22	3	APURIMAC SUP	13538.0	4237	732	1522	0	1884	1.24	0	0	1884.0	
2203 B	22	3	SANTO TOMAS	3072.0	4196	909	372	0	593	1.59	0	0	593.0	
2203 C	22	3	PUNANQUI	793.0	4103	903	79	0	99	1.25	0	0	99.0	
2203 D	22	3	VILCABAMBA	2575.0	4356	932	227	0	568	2.50	0	0	568.0	
2203 E	22	3	PACHACHACA	5608.0	4157	994	427	0	1347	3.15	0	0	1347.0	
2203 F	22	3	APURIMAC INF	15357.0	2960	948	1057	0	12645	11.96	0	0	12645.0	
2204	22	4	PAMPAS	23742.0	3821	853	1446	3	4403	3.04	0	0	4403.0	
2205 A	22	5	MANTARO SUP	9190.0	4333	810	917	17	683	0.74	0	0	683.0	
2205 B	22	5	MANTARO MED	18580.0	3958	782	1207	11	4469	3.70	0	0	4469.0	
2205 C	22	5	MANTARO INF	6823.0	3078	763	555	1	5026	9.06	0	0	5026.0	
2206	22	6	PACHITEA	26980.0	857	2303	1355	0	6146	4.54	0	0	6146.0	
2207	22	7	AGUAYTIA	11540.0	600	2392	652	0	1085	1.66	0	0	1085.0	
2208 A	22	8	ENE	7576.0	945	1691	451	0	2015	4.47	0	0	2015.0	
2208 B	22	8	TAMBO	5171.0	700	1780	293	0	2127	7.26	0	0	2127.0	
2208 C	22	8	UCAYALI	111928.0	289	2081	4667	0	14203	3.04	0	0	14203.0	
2209	22	9	PERENE	20552.0	2229	1170	1146	3	6760	5.90	0	0	6760.0	
2301	23	1	AMAZONAS	57461.0	112	2734	3068	0	5795	1.89	0	0	5795.0	
2302	23	2	NAPO	44822.0	228	2769	2918	0	3142	1.08	0	0	3142.0	
2303	23	3	PUTUMAYO	40138.0	160	2747	2130	0	742	0.35	0	638C	423.0	
2304	23	4	YAVARI	59170.0	370	2811	1875	0	7077	3.77	772BS	0	6305.0	
2305	23	5	PURUS	16900.0	414	1888	825	0	269	0.33	0	0	269.0	
2306	23	6	MADRE DE DIOS	37600.0	948	3490	1005	0	8837	8.79	0	0	8837.0	
2307	23	7	INAMBARI	17376.0	2658	2683	1552	0	10110	6.51	0	0	10110.0	
2308	23	8	TAMBOPATA	14710.0	990	1624	470	0	1187	2.53	0	0	1187.0	
2309	23	9	ACRE	3230.0	454	1859	170	0	36	0.21	0	36BS	18.0	
2310	23	10	LAS PIEDRAS	15550.0	396	1895	520	0	609	1.17	0	0	609.0	
2311	23	11	YURUA	9492.0	329	1935	565	0	264	0.47	0	19BS	254.5	
*****														*
* SUB-TOTAL VERTIENTE ATLANTICO : POTENCIAL TEORICO = 176286.5 M.W.														*

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*****
*CODIGO NV NC NOMBRE AREA ALT LLUV LONG NS PTT PTE PTX PTD PTN *
*****
301 3 1 SUCHES 1453.0 4656 604 168 0 33 0.20 0 18BV 24.0
302 3 2 HUANCANE 3557.0 4259 692 437 1 64 0.15 0 0 64.0
303 3 3 RAMIS 14444.0 4307 676 1426 1 228 0.16 0 0 228.0
304 3 4 COATA 4757.0 4338 854 557 3 157 0.27 0 0 152.0
305 3 5 ILLPA 1165.0 4133 737 181 0 14 0.08 0 0 14.0
306 3 6 ILAVE 7977.0 4333 468 767 3 62 0.08 0 0 62.0
307 3 7 MAURE 1687.0 4542 403 227 4 12 0.05 0 0 12.0
308 3 8 ZAPATILLA 474.0 4011 598 80 0 2 0.02 0 0 2.0
309 3 9 CCALLACCANE 1299.0 4121 536 180 0 6 0.03 0 0 6.0
300 3 0 LAGO TITICACA 9140.0 0 0 0 0 0 0.00 0 0 0.0
*****
* SUB-TOTAL VERTIENTE DEL LAGO TITICACA : POTENCIAL TEORICO = 564.0 M.W. *
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* POTENCIAL TEORICO DE TODO EL PERU = 206107.0 M.W. *
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CLAVE : KEY

- NV = NUMERO DE VERTIENTE : WATERSHED NUMBER
NC = NUMERO DE CUENCA : RIVER BASIN NUMBER
AREA = AREA DE CAPTACION : CATCHMENT AREA (KM*KM)
ALT = ALTURA PROMEDIO DE LA CUENCA (M.S.N.M.) : MEAN ELEVATION OF CATCHMENT (M.A.S.L.)
LLUV = LLUVIA PROMEDIA (MM/ANO) : MEAN RAINFALL (MM/YEAR)
LONG = LONGITUD TOTAL DE LOS RIOS Y AFLUENTES CONSIDERADOS : TOTAL STREAMLENGTH OF MAIN RIVERS AND TRIBUTARIES CONSIDERED (KM)
NS = NUMERO DE ESTACIONES HIDROMETRICAS CONSIDERADAS : NUMBER OF STREAMFLOW STATIONS WITH ADEQUATE DATA
PTT = POTENCIAL TEORICO TOTAL DE LA CUENCA : TOTAL THEORETICAL POTENTIAL OF THE BASIN (MW)
PTE = POTENCIAL ESPECIFICO : SPECIFIC POTENTIAL (MW/KM)
PTX = POTENCIAL REALIZADO EN PARTES EXTRANJERAS DE LA CUENCA : POTENTIAL ARISING IN NON-PERUVIAN PARTS OF THE BASIN (MW)
PTD = POTENCIAL TEORICO REALIZADO EN RIOS INTERNACIONALES : THEORETICAL POTENTIAL ARISING IN INTERNATIONAL RIVERS (MW)
PTN = POTENCIAL TEORICO NETO DE LA PARTE PERUANA : NET THEORETICAL POTENTIAL ATTRIBUTABLE TO PERU (MW)
(PTN = PTT - PTX - 0.5 * PTD)
E = ECUADOR BS = BRASIL BV = BOLIVIA C = COLOMBIA

CUENCAS DE LA VERTIENTE DEL PACIFICO

CODIGO	NOMBRE	DESCRIPCION DE FIGURA	HOJAS	PAGINA
101	ZARUMILLA	POTENCIAL TEORICO LINEAL	1	12
102	TUMBES	POTENCIAL TEORICO LINEAL	1	13
103	CHIRA	POTENCIAL TEORICO LINEAL	4	14
104	PIURA	POTENCIAL TEORICO LINEAL	4	18
105	CASCAJAL	POTENCIAL TEORICO LINEAL	1	22
106	OLMOS	POTENCIAL TEORICO LINEAL	1	23
107	MOTUPE	POTENCIAL TEORICO LINEAL	2	24
108	LA LECHE	POTENCIAL TEORICO LINEAL	2	24
109	CHANCAY-LAMBAYEQUE	POTENCIAL TEORICO LINEAL	2	26
110	ZANA	POTENCIAL TEORICO LINEAL	1	28
111	CHAMAN	POTENCIAL TEORICO LINEAL	1	29
112	JEQUETEPEQUE	POTENCIAL TEORICO LINEAL	3	30
113	CHICAMA	POTENCIAL TEORICO LINEAL	2	33
114	MOCHE	POTENCIAL TEORICO LINEAL	2	34
115	VIRU	POTENCIAL TEORICO LINEAL	2	37
116	CHAO	POTENCIAL TEORICO LINEAL	1	39
117	SANTA	POTENCIAL TEORICO LINEAL	6	40
118	LACRAMARCA	POTENCIAL TEORICO LINEAL	1	46
119	NEPEÑA	POTENCIAL TEORICO LINEAL	2	47
120	CASMA	POTENCIAL TEORICO LINEAL	2	49
121	CULEBRAS	POTENCIAL TEORICO LINEAL	1	51
122	HUARMEY	POTENCIAL TEORICO LINEAL	1	52
123	FORTALEZA	POTENCIAL TEORICO LINEAL	2	53
124	PATIVILCA	POTENCIAL TEORICO LINEAL	3	55
125	SUPE	POTENCIAL TEORICO LINEAL	1	58
126	HUAURA	POTENCIAL TEORICO LINEAL	2	59
127	CHANCAY-HUARAL	POTENCIAL TEORICO LINEAL	1	61

CODIGO	NOMBRE	DESCRIPCION DE FIGURA	HOJAS	PAGINA
128	CHILLON	POTENCIAL TEORICO LINEAL	2	62
129	RIMAC	POTENCIAL TEORICO LINEAL	2	64
130	LURIN	POTENCIAL TEORICO LINEAL	1	66
131	CHILCA	POTENCIAL TEORICO LINEAL	1	67
132	MALA	POTENCIAL TEORICO LINEAL	2	68
133	OMAS	POTENCIAL TEORICO LINEAL	1	70
134	CANETE	POTENCIAL TEORICO LINEAL	3	71
135	TOPARA	POTENCIAL TEORICO LINEAL	1	74
136	SAN JUAN	POTENCIAL TEORICO LINEAL	2	75
137	PISCO	POTENCIAL TEORICO LINEAL	2	77
138	ICA	POTENCIAL TEORICO LINEAL	1	79
139	GRANDE	POTENCIAL TEORICO LINEAL	5	80
140	ACARI	POTENCIAL TEORICO LINEAL	2	85
141	YAUCA	POTENCIAL TEORICO LINEAL	2	87
142	CHALA	POTENCIAL TEORICO LINEAL	1	89
143	CHAPARRA	POTENCIAL TEORICO LINEAL	1	90
144	ATICO	POTENCIAL TEORICO LINEAL	1	91
145	CARAVELI	POTENCIAL TEORICO LINEAL	1	92
146	OCONA	POTENCIAL TEORICO LINEAL	7	93
147	MAJES-CAMANA	POTENCIAL TEORICO LINEAL	5	100
148	QUILCA O CHILI	POTENCIAL TEORICO LINEAL	4	105
149	TAMBO	POTENCIAL TEORICO LINEAL	4	109
150	OSMORE	POTENCIAL TEORICO LINEAL	2	113
151	LOCUMBA	POTENCIAL TEORICO LINEAL	2	115
152	SAMA	POTENCIAL TEORICO LINEAL	2	117
153	CAPLINA	POTENCIAL TEORICO LINEAL	1	119

CUENCAS DE LA VERTIENTE DEL ATLANTICO : SISTEMA DEL RIO MARANON

CODIGO	NOMBRE	DESCRIPCION DE FIGURA	HOJAS	PAGINA
2101	ALTO MARANON	POTENCIAL TEORICO LINEAL	6	120
2102	CRISNEJAS	POTENCIAL TEORICO LINEAL	4	126
2103	LLAUCANO	POTENCIAL TEORICO LINEAL	3	130
2104	CHAMAYA	POTENCIAL TEORICO LINEAL	2	133
2105	HUANCABAMBA	POTENCIAL TEORICO LINEAL	2	135
2106	CHOTANO	POTENCIAL TEORICO LINEAL	2	137
2107	CHINCHIPE	POTENCIAL TEORICO LINEAL	1	139
2108	TABACONAS	POTENCIAL TEORICO LINEAL	2	140
2109	CENEPA	POTENCIAL TEORICO LINEAL	1	142
2110	SANTIAGO	POTENCIAL TEORICO LINEAL	5	143
2111A	MARANON MEDIO	POTENCIAL TEORICO LINEAL	3	148
2111B	MORONA	POTENCIAL TEORICO LINEAL	2	151
2112	PASTAZA	POTENCIAL TEORICO LINEAL	3	153
2113	TIGRE	POTENCIAL TEORICO LINEAL	3	156
2114	BAJO MARANON	POTENCIAL TEORICO LINEAL	3	159
2115	UTCUBAMBA	POTENCIAL TEORICO LINEAL	2	162
2116	CHIRIACO	POTENCIAL TEORICO LINEAL	1	164
2117	NIEVA	POTENCIAL TEORICO LINEAL	1	165
2118A	HUALLAGA SUP	POTENCIAL TEORICO LINEAL	8	166
2118B	HUALLAGA INF	POTENCIAL TEORICO LINEAL	2	174

CUENCAS DE LA VERTIENTE DEL ATLANTICO : SISTEMA DEL RIO UCAYALI

CODIGO	NOMBRE	DESCRIPCION DE FIGURA	HOJAS	PAGINA
2201	URUBAMBA	POTENCIAL TEORICO LINEAL	6	176
2202	VILCANOTA	POTENCIAL TEORICO LINEAL	3	182
2203A	APURIMAC SUP	POTENCIAL TEORICO LINEAL	4	185
2203B	SANTO TOMAS	POTENCIAL TEORICO LINEAL	2	186
2203C	PUNANQUI	POTENCIAL TEORICO LINEAL	1	188
2203D	VILCABAMBA	POTENCIAL TEORICO LINEAL	1	189
2203E	PACHACHACA	POTENCIAL TEORICO LINEAL	2	190
2203F	APURIMAC INF	POTENCIAL TEORICO LINEAL	3	192
2204	PAMPAS	POTENCIAL TEORICO LINEAL	5	195
2205A	MANTARO SUP	POTENCIAL TEORICO LINEAL	5	200
2205B	MANTARO MED	POTENCIAL TEORICO LINEAL	5	205
2205C	MANTARO INF	POTENCIAL TEORICO LINEAL	2	210
2206	PACHITEA	POTENCIAL TEORICO LINEAL	2	212
2207	AGUAYTIA	POTENCIAL TEORICO LINEAL	1	214
2208A	ENE	POTENCIAL TEORICO LINEAL	1	215
2208B	TAMBO	POTENCIAL TEORICO LINEAL	1	216
2208C	UCAYALI	POTENCIAL TEORICO LINEAL	6	217
2203	PERENE	POTENCIAL TEORICO LINEAL	3	223

CUENCAS DE LA VERTIENTE DEL ATLANTICO : SISTEMA DEL AMAZONAS

CODIGO	NOMBRE	DESCRIPCION DE FIGURA	HOJAS	PAGINA
2301	AMAZONAS	POTENCIAL TEORICO LINEAL	4	226
2302	NAPO	POTENCIAL TEORICO LINEAL	4	230
2303	PUTUMAYO	POTENCIAL TEORICO LINEAL	2	234
2304	YAVARI	POTENCIAL TEORICO LINEAL	2	236
2305	PURUS	POTENCIAL TEORICO LINEAL	2	238
2306	MADRE DE DIOS	POTENCIAL TEORICO LINEAL	2	240
2307	INAMBARI	POTENCIAL TEORICO LINEAL	5	242
2308	TAMBOPATA	POTENCIAL TEORICO LINEAL	2	241
2308	ACRE	POTENCIAL TEORICO LINEAL	1	247
2310	LAS PIEDRAS	POTENCIAL TEORICO LINEAL	2	240
2309	YURUA	POTENCIAL TEORICO LINEAL	2	248

CUENCAS DE LA VERTIENTE DEL LAGO TITICACA

CODIGO	NOMBRE	DESCRIPCION DE FIGURA	HOJAS	PAGINA
301	SUCHES	POTENCIAL TEORICO LINEAL	1	250
302	HUANCANE	POTENCIAL TEORICO LINEAL	2	251
303	RAMIS	POTENCIAL TEORICO LINEAL	5	253
304	COATA	POTENCIAL TEORICO LINEAL	3	258
305	ILLPA	POTENCIAL TEORICO LINEAL	1	261
306	ILAVE	POTENCIAL TEORICO LINEAL	3	262.
307	MAURE	POTENCIAL TEORICO LINEAL	2	265
308	ZAPATILLA	POTENCIAL TEORICO LINEAL	1	267
309	CCALLACCANE	POTENCIAL TEORICO LINEAL	1	268
		Clave de Cuadros		269

 * EL POTENCIAL TEORICO TOTAL DEL RIO ZARUMILLA ES DE 17.2 MW *
 * Y TIENE UNA LONGITUD ACUMULADA DE 129.0 KM *
 * Y UN POTENCIAL ESPECIFICO DE 0.13 MW/KM *

I	L	H	Q	AFQ	DL	DH	PE	QC	POT	ESP	CUM
AFLUENTE RIO SECO											
1	33.0	600.0	0.0	0.0	13.0	365.0	2.81	0.22	0.81	0.06	0.00
2	20.0	235.0	0.4	0.0	10.0	80.0	0.80	0.53	0.41	0.0	0.81
3	10.0	155.0	0.6	0.0	10.0	105.0	1.05	0.68	0.70	0.07	1.22
4	0.0	50.0	0.7	0.0							1.92
SUBTOTAL					33.0	550.0			1.42	0.06	
AFLUENTE RIO ELBUQUE											
5	22.0	350.0	0.0	0.0	12.0	255.0	2.12	0.15	0.37	0.03	0.00
6	10.0	95.0	0.3	0.0	10.0	35.0	0.35	0.41	0.14	0.01	0.37
7	0.0	60.0	0.5	0.0							0.51
SUBTOTAL					22.0	290.0			0.51	0.02	
AFLUENTE RIO PALMALES											
8	27.0	370.0	0.0	0.0	12.0	285.0	2.37	0.11	0.30	0.03	0.00
9	15.0	85.0	0.2	0.0	10.0	25.0	0.25	0.31	0.08	0.01	0.30
10	5.0	60.0	0.4	0.5	5.0	15.0	0.30	1.00	0.15	0.03	0.38
11	0.0	45.0	1.0	0.0							0.53
SUBTOTAL					27.0	325.0			0.53	0.02	
AFLUENTE ZARUMILLASUP											
12	47.0	500.0	2.0	0.0	12.0	405.0	3.37	2.63	10.44	0.87	0.00
13	35.0	95.0	3.3	0.0	10.0	45.0	0.45	3.31	1.46	0.15	10.44
14	25.0	50.0	3.4	0.7	4.0	5.0	0.12	4.13	0.20	0.05	11.90
15	21.0	45.0	4.2	1.0	4.0	23.0	0.57	5.30	1.20	0.30	12.11
16	17.0	22.0	5.4	0.0							13.30
SUBTOTAL					30.0	478.0			13.30	0.44	
AFLUENTE ZARUMILLAINF											
16	17.0	22.0	5.4	0.0	7.0	9.0	0.13	5.04	0.44	0.06	0.00
17	10.0	13.0	4.7	0.0	10.0	11.0	0.11	4.71	0.51	0.05	0.44
18	0.0	2.0	4.7	0.0							0.95
SUBTOTAL					17.0	20.0			0.95	0.06	

 * EL POTENCIAL TEORICO TOTAL DEL RIO TUMBES ES DE 277.6 MW *
 * Y TIENE UNA LONGITUD ACUMULADA DE 236.0 KM *
 * Y UN POTENCIAL ESPECIFICO DE 1.18 MW/KM *

POTENCIAL TEORICO DEL RIO TUMBES 12/17/78

I	L	H	Q	AFQ	DL	DH	PE	QC	POT	ESP	CUA
=====											
AFLUENTE RIO CUZCO											
1	32.0	1200.0	0.0	0.0	12.0	690.0	5.75	0.33	2.21	0.16	0.00
2	20.0	510.0	0.6	0.0	10.0	205.0	2.05	0.95	1.91	0.19	2.21
3	10.0	305.0	1.3	0.0	10.0	71.0	0.71	1.67	1.16	0.12	4.12
4	0.0	254.0	2.1	0.0							5.29
SUBTOTAL					32.0	966.0			5.29	0.17	
=====											
AFLUENTE CASADEROS											
5	75.0	600.0	15.0	0.0	14.0	155.0	1.11	15.36	25.58	1.67	0.00
6	61.0	445.0	15.8	0.0	10.0	47.0	0.47	15.97	7.36	0.74	23.36
7	51.0	398.0	16.2	0.0	10.0	88.0	0.88	16.23	14.01	1.40	30.74
8	41.0	310.0	16.3	0.0	10.0	55.0	0.55	16.60	8.96	0.90	44.76
9	31.0	255.0	16.9	0.0	10.0	16.0	0.16	17.23	2.71	0.27	53.72
10	21.0	239.0	17.5	2.1	11.0	43.0	0.39	19.91	8.40	0.76	56.42
11	10.0	196.0	20.2	0.0	10.0	42.0	0.42	20.27	8.55	0.84	64.82
12	0.0	154.0	20.4	0.0							73.17
SUBTOTAL					75.0	446.0			73.17	0.96	
=====											
AFLUENTE TUMBES SUP											
13	129.0	260.0	60.0	0.0	10.0	35.0	0.35	61.24	21.05	2.10	0.00
14	119.0	225.0	62.5	0.0	10.0	15.0	0.15	62.74	9.23	0.92	21.05
15	109.0	210.0	63.0	0.0	10.0	35.0	0.35	64.79	22.25	2.22	30.26
16	99.0	175.0	66.6	0.0	10.0	21.0	0.21	66.97	13.80	1.38	52.51
17	89.0	154.0	67.4	20.4	5.0	24.0	0.48	67.77	20.66	4.13	66.50
18	84.0	130.0	67.8	0.0	10.0	35.0	0.35	67.95	30.20	3.02	86.97
19	74.0	95.0	68.1	0.0	10.0	20.0	0.20	68.55	17.37	1.74	117.17
20	64.0	75.0	69.0	0.0	10.0	29.0	0.29	69.22	25.38	2.54	134.54
21	54.0	46.0	69.4	0.0	10.0	6.0	0.06	69.55	5.27	0.53	159.92
22	44.0	40.0	69.7	0.0	10.0	5.0	0.05	70.34	4.43	0.44	165.19
23	34.0	35.0	91.0	0.0							169.62
SUBTOTAL					95.0	225.0			169.62	1.79	
=====											
AFLUENTE TUMBES MED											
23	34.0	35.0	91.0	0.0	4.0	5.0	0.12	91.07	4.47	1.12	0.00
24	30.0	30.0	91.1	0.0	10.0	5.0	0.05	91.56	4.49	0.45	4.47
25	20.0	25.0	92.0	0.0	6.0	13.0	0.22	91.99	11.75	1.96	8.96
26	14.0	12.0	92.0	0.0							20.69
SUBTOTAL					20.0	25.0			20.69	1.03	
=====											
AFLUENTE TUMBES INF											
26	14.0	12.0	92.0	0.0	4.0	5.0	0.12	92.01	4.51	1.13	0.00
27	10.0	7.0	92.0	0.0	10.0	5.0	0.05	92.04	4.51	0.45	4.51
28	0.0	2.0	92.1	0.0							9.03
SUBTOTAL					14.0	10.0			9.03	0.64	
=====											

 * EL POTENCIAL TEORICO TOTAL DEL RIO CHIRA ES DE 722.3 MW *
 * Y TIENE UNA LONGITUD ACUMULADA DE 1033.0 KM *
 * Y UN POTENCIAL ESPECIFICO DE 0.70 MW/KM *

POTENCIAL TEORICO DEL RIO CHIRA 12/17/78

I	L	H	Q	AFQ	DL	DH	PE	QC	POT	ESP	CUM
AFLUENTE REMOLINOS											
1	33.0	650.0	0.0	0.0	13.0	375.0	2.88	0.23	0.86	0.07	0.00
2	20.0	275.0	0.5	0.0	10.0	77.0	0.77	0.73	0.55	0.06	0.86
3	10.0	198.0	1.0	0.0	10.0	52.0	0.52	1.03	0.53	0.05	1.41
4	0.0	146.0	1.1	0.0							1.94
SUBTOTAL					33.0	504.0			1.94	0.06	
AFLUENTE ARANZA											
5	30.0	3700.0	0.0	0.0	10.0	1700.0	17.00	0.28	4.68	0.47	0.00
6	20.0	2000.0	0.6	0.0	10.0	640.0	6.40	1.05	6.58	0.66	4.68
7	10.0	1360.0	1.5	0.0	10.0	130.0	1.30	1.69	2.15	0.22	11.25
8	0.0	1230.0	1.8	0.0							13.41
SUBTOTAL					30.0	2470.0			13.41	0.45	
AFLUENTE TULMAN											
9	32.0	3400.0	0.0	0.0	12.0	1690.0	14.08	0.66	10.93	0.91	0.00
10	20.0	1710.0	1.3	0.0	10.0	350.0	3.50	1.96	6.74	0.67	10.93
11	10.0	1360.0	2.6	0.0	10.0	335.0	3.35	2.97	9.78	0.98	17.67
12	0.0	1025.0	3.3	0.0							27.44
SUBTOTAL					32.0	2375.0			27.44	0.86	
AFLUENTE SUYO											
13	25.0	1400.0	0.0	0.0	5.0	745.0	14.90	0.14	1.04	0.21	0.00
14	20.0	655.0	0.3	0.0	10.0	210.0	2.10	0.71	1.47	0.15	1.04
15	10.0	445.0	1.2	0.0	10.0	145.0	1.45	1.44	2.05	0.21	2.51
16	0.0	300.0	1.7	0.0							4.57
SUBTOTAL					25.0	1100.0			4.57	0.18	
AFLUENTE QUIROZ SUP											
17	157.0	3200.0	0.0	0.0	10.0	490.0	4.90	0.21	1.01	0.10	0.00
18	147.0	2710.0	0.4	0.0	10.0	165.0	1.65	1.18	1.92	0.19	1.01
19	137.0	2545.0	2.0	0.0	10.0	1025.0	10.25	2.86	28.76	2.88	2.92
20	127.0	1520.0	3.8	0.0	10.0	290.0	2.90	4.84	13.76	1.38	31.68
21	117.0	1230.0	5.9	1.8	8.0	80.0	1.00	8.55	6.71	0.84	45.44
22	109.0	1150.0	9.3	0.0	10.0	125.0	1.25	11.50	14.10	1.41	52.14
23	99.0	1025.0	13.7	3.3	7.0	65.0	0.93	18.85	12.02	1.72	66.25
24	92.0	960.0	20.7	0.0	10.0	110.0	1.10	22.43	24.21	2.42	78.27
25	82.0	850.0	24.2	0.0	10.0	225.0	2.25	16.78	37.04	3.70	102.48
26	72.0	625.0	9.4	0.0	5.0	80.0	1.60	10.74	8.43	1.69	139.51
27	67.0	545.0	12.1	0.0							147.95
SUBTOTAL					90.0	2655.0			147.95	1.64	

POTENCIAL TEORICO DEL RIO CHIRA

12/17/78

I	L	H	Q	AFQ	DL	DH	PE	QC	POT	ESP	CUM
=====											
AFLUENTE QUIROZ INF											
27	67.0	545.0	12.1	0.0							0.00
28	57.0	445.0	13.4	0.0	10.0	100.0	1.00	12.74	12.49	1.25	12.49
29	47.0	355.0	14.8	0.0	10.0	90.0	0.90	14.09	12.44	1.24	24.93
30	36.0	300.0	15.3	1.7	11.0	55.0	0.50	15.07	8.13	0.74	33.07
31	23.0	225.0	17.6	0.0	13.0	75.0	0.58	17.35	12.77	0.96	45.83
32	10.0	170.0	18.9	0.0	13.0	55.0	0.42	18.27	9.86	0.76	55.69
33	0.0	138.0	19.0	0.0	10.0	32.0	0.32	18.95	5.95	0.59	61.64
SUBTOTAL					67.0	407.0			61.64	0.92	
=====											
AFLUENTE PILAREZ											
34	40.0	445.0	0.0	0.0	10.0	135.0	1.35	0.11	0.15	0.02	0.00
35	30.0	310.0	0.2	0.0	10.0	50.0	0.50	0.34	0.17	0.02	0.15
36	20.0	260.0	0.5	0.0	10.0	50.0	0.50	0.55	0.27	0.03	0.52
37	10.0	210.0	0.6	0.0	10.0	70.0	0.70	0.70	0.48	0.05	0.59
38	0.0	140.0	0.7	0.0							1.07
SUBTOTAL					40.0	305.0			1.07	0.03	
=====											
AFLUENTE ALAMOR											
39	97.0	750.0	0.0	0.0	12.0	280.0	2.33	0.46	1.26	0.11	0.00
40	85.0	470.0	0.9	0.0	10.0	100.0	1.00	1.48	1.45	0.15	1.26
41	75.0	370.0	2.1	0.0	10.0	60.0	0.60	2.19	1.29	0.13	2.71
42	65.0	310.0	2.3	0.0	10.0	55.0	0.55	2.43	1.51	0.13	4.00
43	55.0	255.0	2.5	0.0	10.0	30.0	0.30	2.86	0.84	0.06	5.31
44	45.0	225.0	3.2	0.0	10.0	30.0	0.30	3.33	0.98	0.10	6.16
45	35.0	195.0	3.5	0.0	10.0	35.0	0.35	3.51	1.20	0.12	7.14
46	25.0	160.0	3.6	0.0	10.0	14.0	0.14	3.95	0.54	0.05	8.44
47	15.0	146.0	4.3	0.0	12.0	6.0	0.05	4.44	0.26	0.02	8.88
48	3.0	140.0	4.5	0.7	3.0	11.0	0.37	5.30	0.57	0.19	9.14
49	0.0	129.0	5.3	0.0							9.72
SUBTOTAL					97.0	621.0			9.72	0.10	
=====											
AFLUENTE JABONILLOS											
50	35.0	400.0	0.0	0.0	5.0	80.0	1.60	0.02	0.02	0.00	0.00
51	30.0	320.0	0.0	0.0	10.0	60.0	0.60	0.08	0.05	0.00	0.02
52	20.0	260.0	0.1	0.0	10.0	50.0	0.50	0.31	0.15	0.02	0.07
53	10.0	210.0	0.5	0.0	10.0	25.0	0.25	0.52	0.13	0.01	0.22
54	0.0	185.0	0.5	0.0							0.35
SUBTOTAL					35.0	215.0			0.35	0.01	
=====											
AFLUENTE ENCANTADOS											
55	34.0	750.0	0.0	0.0	14.0	430.0	3.07	0.05	0.19	0.01	0.00
56	20.0	320.0	0.1	0.0	10.0	100.0	1.00	0.16	0.16	0.02	0.19
57	10.0	220.0	0.2	0.0	10.0	75.0	0.75	0.25	0.18	0.02	0.35
58	0.0	145.0	0.3	0.0							0.53
SUBTOTAL					34.0	605.0			0.53	0.02	

AFLUENTE TAMARINUU

59	40.0	575.0	0.0	0.0	10.0	223.0	2.23	0.02	0.04	0.00	0.00
60	30.0	352.0	0.0	0.0	10.0	102.0	1.02	0.07	0.07	0.01	0.04
61	20.0	250.0	0.1	0.0	10.0	55.0	0.55	0.12	0.06	0.01	0.11
62	10.0	195.0	0.1	0.0	10.0	55.0	0.55	0.20	0.11	0.01	0.17
63	0.0	140.0	0.2	0.0							0.28
SUBTOTAL					40.0	435.0			0.28	0.01	

AFLUENTE SOLANO

64	67.0	1075.0	0.0	0.0	12.0	600.0	5.00	0.06	0.36	0.03	0.00
65	55.0	475.0	0.1	0.0	10.0	130.0	1.30	0.19	0.24	0.02	0.30
66	45.0	345.0	0.3	0.0	10.0	115.0	1.15	0.32	0.37	0.04	0.60
67	35.0	230.0	0.4	0.0	10.0	35.0	0.35	0.43	0.15	0.01	0.97
68	25.0	195.0	0.5	0.5	12.0	50.0	0.42	1.05	0.52	0.04	1.11
69	13.0	145.0	1.1	0.3	5.0	5.0	0.10	1.38	0.07	0.01	1.63
70	8.0	140.0	1.4	0.2	8.0	20.0	0.25	1.65	0.32	0.04	1.70
71	0.0	120.0	1.7	0.0							2.02
SUBTOTAL					67.0	955.0			2.02	0.03	

POTENCIAL TEORICO DEL RIO CHIRA

12/17/78

I	L	H	D	AFQ	DL	DH	PE	QC	POT	ESP	CUM
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AFLUENTE CHIPILICO A

72	121.0	3200.0	0.0	0.0	10.0	145.0	1.45	0.16	0.23	0.02	0.00
73	111.0	3055.0	0.3	0.0	10.0	40.0	0.40	0.46	0.18	0.02	0.23
74	101.0	3015.0	0.6	0.0	10.0	365.0	3.65	0.73	2.60	0.26	0.41
75	91.0	2650.0	0.8	0.0	10.0	1450.0	14.50	0.93	13.30	1.33	3.01
76	81.0	1200.0	1.0	0.0	10.0	715.0	7.15	1.36	9.54	0.95	16.31
77	71.0	485.0	1.7	0.0							25.85
SUBTOTAL					50.0	2715.0			25.85	0.52	

AFLUENTE CHIPILICO B

77	71.0	485.0	1.7	0.0	11.0	175.0	1.59	1.45	2.50	0.23	0.00
78	60.0	310.0	1.2	0.0	10.0	65.0	0.65	1.51	0.96	0.10	2.50
79	50.0	245.0	1.8	0.0	10.0	50.0	0.50	1.98	0.97	0.10	3.46
80	40.0	195.0	2.1	0.0	10.0	25.0	0.25	2.27	0.56	0.06	4.43
81	30.0	170.0	2.4	0.0	10.0	40.0	0.40	2.59	1.02	0.10	4.99
82	20.0	130.0	2.8	0.0	10.0	40.0	0.40	3.00	1.18	0.12	6.00
83	10.0	90.0	3.2	0.0	10.0	14.0	0.14	3.25	0.45	0.04	7.18
84	0.0	76.0	3.3	0.0							7.63
SUBTOTAL					71.0	409.0			7.63	0.11	

POTENCIAL TEORICO DEL RIO CHIRA

12/17/78

I	L	H	Q	AFQ	DL	DM	PE	QC	POT	ESP	CUM
=====											
AFLUENTE CHIRA A											
85	322.0	3325.0	1.0	0.0	13.0	1525.0	11.73	2.00	29.89	2.30	0.00
86	309.0	1800.0	3.0	0.0	10.0	590.0	5.90	3.88	22.44	2.24	29.89
87	299.0	1210.0	4.8	0.0	10.0	225.0	2.25	5.74	12.68	1.27	52.33
88	289.0	985.0	6.7	0.0	10.0	75.0	0.75	9.91	7.29	0.73	65.01
89	279.0	910.0	13.1	0.0	10.0	65.0	0.65	14.46	9.22	0.92	72.30
90	269.0	845.0	15.8	0.0	10.0	180.0	1.80	17.18	30.34	3.03	81.52
91	259.0	665.0	18.6	0.0	10.0	120.0	1.20	21.12	24.86	2.49	111.86
92	249.0	545.0	23.7	0.0	10.0	90.0	0.90	25.19	22.24	2.22	136.72
93	239.0	455.0	26.7	0.0	10.0	48.0	0.48	28.43	15.39	1.34	158.95
94	229.0	407.0	30.2	0.0	12.0	92.0	0.77	32.68	29.49	2.46	172.34
95	217.0	315.0	35.2	0.0	10.0	40.0	0.40	36.51	14.33	1.43	201.84
96	207.0	275.0	37.8	0.0	10.0	30.0	0.30	38.27	11.26	1.13	216.16
97	197.0	245.0	38.7	0.0	11.0	47.0	0.43	53.87	24.84	2.26	227.43
98	186.0	198.0	69.0	0.0	10.0	28.0	0.28	69.07	18.97	1.90	252.26
99	176.0	170.0	69.1	0.0	10.0	24.0	0.24	69.16	16.28	1.63	271.23
100	166.0	146.0	69.2	1.1	6.0	8.0	0.13	70.30	5.52	0.92	287.52
101	160.0	138.0	70.3	19.0	4.0	5.0	0.12	89.38	4.36	1.10	293.03
102	156.0	133.0	89.4	0.0	10.0	4.0	0.04	89.79	3.52	0.35	297.42
103	146.0	129.0	90.2	5.3	6.0	7.0	0.12	95.88	6.58	1.10	300.94
104	140.0	122.0	96.3	0.0							307.53
SUBTOTAL					182.0	3203.0			307.53	1.69	
=====											
AFLUENTE CHIRA B											
104	140.0	122.0	96.3	0.0	3.0	2.0	0.07	96.30	1.89	0.63	0.00
105	137.0	120.0	96.3	1.7	5.0	5.0	0.10	98.01	4.81	0.96	1.89
106	132.0	115.0	98.0	0.0	10.0	25.0	0.25	98.11	24.06	2.41	6.70
107	122.0	90.0	98.2	0.0	10.0	10.0	0.10	91.58	8.98	0.90	30.76
108	112.0	80.0	85.0	0.0							39.74
SUBTOTAL					28.0	42.0			39.74	1.42	
=====											
AFLUENTE CHIRA C											
108	112.0	80.0	85.0	0.0	3.0	4.0	0.13	85.07	3.34	1.11	0.00
109	109.0	76.0	85.1	3.3	9.0	16.0	0.18	88.54	13.90	1.54	3.34
110	100.0	60.0	88.7	0.0	10.0	13.0	0.13	90.01	11.48	1.15	17.24
111	90.0	47.0	91.4	0.0	10.0	5.0	0.05	92.71	4.55	0.45	28.71
112	80.0	42.0	94.1	0.0	4.0	3.0	0.07	94.18	2.77	0.69	33.26
113	76.0	39.0	94.3	0.0							36.03
SUBTOTAL					36.0	41.0			36.03	1.00	
=====											
AFLUENTE CHIRA D											
113	76.0	39.0	94.3	0.0	6.0	5.0	0.08	94.34	4.63	0.77	0.00
114	70.0	34.0	94.4	0.0	10.0	5.0	0.05	94.77	4.65	0.46	4.63
115	60.0	29.0	95.2	0.0	10.0	5.0	0.05	95.32	4.66	0.47	9.28
116	50.0	24.0	95.5	0.0	10.0	5.0	0.05	95.56	4.69	0.47	13.95
117	40.0	19.0	95.7	0.0	10.0	5.0	0.05	95.71	4.69	0.47	18.64
118	30.0	14.0	95.7	0.0	10.0	5.0	0.05	95.83	4.70	0.47	23.33
119	20.0	9.0	95.9	0.0	10.0	4.0	0.04	96.02	3.77	0.38	28.03
120	10.0	5.0	96.1	0.0	10.0	3.0	0.03	96.13	2.83	0.28	31.80
121	0.0	2.0	96.2	0.0							34.63
SUBTOTAL					76.0	37.0			34.63	0.46	

 * EL POTENCIAL TEORICO TOTAL DEL RIO PIURA ES DE 209.0 MW *
 * Y TIENE UNA LONGITUD ACUMULADA DE 719.5 KM *
 * Y UN POTENCIAL ESPECIFICO DE 0.29 MW/KM *

POTENCIAL TEORICO DEL RIO PIURA 12/17/78

I	L	H	Q	AFQ	DL	DH	PE	GC	POT	ESP	CUM
AFLUENTE SAN MARTIN											
1	24.5	2250.0	0.0	0.0	4.5	1125.0	25.00	0.10	1.06	0.24	0.00
2	20.0	1125.0	0.2	0.0	10.0	625.0	6.25	0.59	3.61	0.36	1.06
3	10.0	500.0	1.0	0.0	10.0	228.0	2.28	1.28	2.87	0.29	4.67
4	0.0	272.0	1.6	0.0							7.54
SUBTOTAL					24.5	1978.0			7.54	0.31	
AFLUENTE PATA A											
5	25.0	2200.0	0.0	0.0	5.0	1010.0	55.67	0.01	0.11	0.04	0.00
6	20.0	1190.0	0.0	0.0	10.0	850.0	8.50	0.16	1.53	0.15	0.11
7	10.0	340.0	0.3	0.0							1.45
SUBTOTAL					15.0	1860.0			1.45	0.11	
AFLUENTE PATA B											
7	10.0	340.0	0.3	0.0	10.0	140.0	1.40	0.33	0.45	0.05	0.00
8	0.0	200.0	0.4	0.0							0.45
SUBTOTAL					10.0	140.0			0.45	0.05	
AFLUENTE PUSMALCA A											
9	29.0	2700.0	0.0	0.0	9.0	1675.0	18.61	0.21	3.41	0.38	0.00
10	20.0	1025.0	0.4	0.0	15.0	790.0	5.27	0.63	4.87	0.52	3.41
11	5.0	235.0	0.9	0.0							8.29
SUBTOTAL					24.0	2465.0			8.29	0.55	
AFLUENTE PUSMALCA B											
11	5.0	235.0	0.9	0.0	5.0	59.0	0.78	0.42	0.55	0.07	0.00
12	0.0	196.0	1.0	0.0							0.55
SUBTOTAL					5.0	59.0			0.55	0.07	
AFLUENTE BIGOTE A											
13	48.0	3050.0	0.0	0.0	12.0	2000.0	16.67	0.67	15.21	1.10	0.00
14	36.0	1050.0	1.5	0.0	10.0	675.0	6.75	2.54	15.47	1.55	15.21
15	26.0	375.0	3.3	0.0	10.0	153.0	1.53	5.61	5.42	0.54	28.68
16	16.0	222.0	3.9	0.0	10.0	47.0	0.47	4.04	1.86	0.19	34.11
17	6.0	175.0	4.2	0.0							35.97
SUBTOTAL					42.0	2875.0			35.97	0.86	
AFLUENTE BIGOTE B											
17	6.0	175.0	4.2	0.0	6.0	29.0	0.48	4.20	1.20	0.20	0.00
18	0.0	146.0	4.2	0.0							1.20
SUBTOTAL					6.0	29.0			1.20	0.20	
AFLUENTE SECO											
19	30.0	950.0	0.0	0.0	10.0	648.0	6.48	0.02	0.12	0.01	0.00
20	20.0	302.0	0.0	0.0	10.0	112.0	1.12	0.14	0.16	0.02	0.12
21	10.0	190.0	0.2	0.0	10.0	64.0	0.64	0.40	0.25	0.03	0.27
22	0.0	126.0	0.6	0.0							0.53
SUBTOTAL					30.0	824.0			0.53	0.02	

AFLUENTE CHALACO											
23	27.0	3100.0	0.0	0.0	7.0	1350.0	19.29	0.21	2.79	0.40	0.00
24	20.0	1750.0	0.4	0.0	10.0	985.0	9.85	0.91	8.78	0.88	2.79
25	10.0	765.0	1.4	0.0	10.0	561.0	5.61	1.51	8.30	0.83	11.57
26	0.0	204.0	1.6	0.0							19.87
SUBTOTAL					27.0	2896.0			19.87	0.74	
AFLUENTE LA GALLEGA A											
27	33.0	3150.0	0.0	0.0	4.0	1465.0	36.62	0.22	3.16	0.79	0.00
28	29.0	1685.0	0.4	0.0	10.0	935.0	9.35	0.99	9.08	0.91	3.16
29	19.0	750.0	1.6	0.0							12.24
SUBTOTAL					14.0	2400.0			12.24	0.87	
AFLUENTE LA GALLEGA B											
29	19.0	750.0	1.6	0.0	9.0	485.0	5.39	1.58	7.51	0.83	0.00
30	10.0	265.0	1.6	0.0	10.0	140.0	1.40	1.63	2.24	0.22	7.51
31	0.0	125.0	1.6	0.0							9.75
SUBTOTAL					19.0	625.0			9.75	0.51	
AFLUENTE CORRALES A											
32	44.0	3075.0	0.0	0.0	11.0	2175.0	19.77	0.37	7.93	0.72	0.00
33	33.0	900.0	0.7	0.0	10.0	107.0	1.07	1.03	1.08	0.11	7.93
34	23.0	793.0	1.3	0.0	10.0	589.0	5.89	1.44	8.29	0.83	9.01
35	13.0	204.0	1.6	1.6	1.0	10.0	1.00	3.18	0.31	0.31	17.30
36	12.0	194.0	3.2	0.0							17.62
SUBTOTAL					32.0	2881.0			17.62	0.55	
AFLUENTE CORRALES B											
35	12.0	194.0	3.2	0.0	6.0	56.0	0.93	3.30	1.81	0.30	0.00
37	6.0	138.0	3.4	0.0							1.81
SUBTOTAL					6.0	56.0			1.81	0.30	
AFLUENTE CORRALES C											
37	6.0	138.0	3.4	0.0	4.0	13.0	0.32	2.90	0.37	0.09	0.00
38	2.0	125.0	2.4	1.6	2.0	21.0	1.05	4.06	0.84	0.42	0.37
39	0.0	104.0	4.1	0.0							1.21
SUBTOTAL					6.0	34.0			1.21	0.20	
AFLUENTE CHARANAL A											
40	44.0	3075.0	0.0	0.0	4.0	925.0	23.12	0.08	0.77	0.19	0.00
41	40.0	2150.0	0.2	0.0	10.0	1205.0	12.05	0.46	5.39	0.54	0.77
42	30.0	945.0	0.8	0.0	10.0	680.0	6.80	1.00	6.64	0.66	6.16
43	20.0	265.0	1.2	0.0	10.0	160.0	1.60	1.50	2.36	0.24	12.80
44	10.0	105.0	1.8	0.0	9.0	17.0	0.19	1.83	0.31	0.03	15.16
45	1.0	88.0	1.9	0.0							15.47
SUBTOTAL					43.0	2987.0			15.47	0.36	
AFLUENTE CHARANAL B											
45	1.0	88.0	1.9	0.0	1.0	2.0	0.20	1.90	0.04	0.04	0.00
46	0.0	86.0	1.9	0.0							0.04
SUBTOTAL					1.0	2.0			0.04	0.04	
AFLUENTE YAPATERO											
47	40.0	3150.0	0.0	0.0	10.0	2000.0	20.00	0.28	5.54	0.55	0.00
48	30.0	1150.0	0.6	0.0	10.0	750.0	7.50	0.68	5.00	0.50	5.54
49	20.0	400.0	0.8	0.0	10.0	275.0	2.75	0.85	2.29	0.23	10.54
50	10.0	125.0	0.9	0.0	10.0	40.0	0.40	0.93	0.36	0.04	12.83
51	0.0	85.0	1.0	0.0							13.20
SUBTOTAL					40.0	3065.0			13.20	0.33	

POTENCIAL TEORICO DEL RIO PIURA

12/17/78

I	L	H	Q	AFO	DL	DM	PE	QC	POT	ESP	CUM
=====											
AFLUENTE SANCOR											
52	35.0	1650.0	0.0	0.0							0.00
					5.0	720.0	14.40	0.07	0.49	0.10	0.49
53	30.0	930.0	0.1	0.0	10.0	630.0	6.30	0.20	1.25	0.12	1.74
54	20.0	300.0	0.3	0.0	10.0	180.0	1.80	0.30	0.54	0.05	2.28
55	10.0	120.0	0.3	0.0	10.0	44.0	0.44	0.45	0.19	0.02	2.47
	0.0	76.0	0.6	0.0							
SUBTOTAL					35.0	1574.0			2.47	0.07	
=====											
AFLUENTE SN FRANCISCO											
57	45.0	320.0	9.0	0.0							0.00
					5.0	107.0	2.14	9.03	9.48	1.90	9.48
	40.0	213.0	9.1	0.0	10.0	53.0	0.53	9.13	4.75	0.47	14.22
59	30.0	160.0	9.2	0.0	10.0	47.0	0.47	9.34	4.30	0.43	18.53
60	20.0	113.0	9.5	0.0	10.0	28.0	0.28	9.07	2.49	0.25	21.02
61	10.0	85.0	8.7	0.0	10.0	21.0	0.21	8.25	1.70	0.17	22.72
	0.0	64.0	7.8	0.0							
SUBTOTAL					45.0	256.0			22.72	0.50	
=====											
AFLUENTE PIURA A											
65	297.0	3000.0	0.0	0.0							0.00
					10.0	1820.0	18.20	0.15	2.74	0.27	2.74
	287.0	1180.0	0.3	0.0	10.0	623.0	6.23	0.91	5.55	0.56	8.29
66	277.0	557.0	1.5	0.0	10.0	257.0	2.57	1.67	4.20	0.42	12.49
67	267.0	300.0	1.8	0.0	3.0	28.0	0.93	1.82	0.50	0.17	12.99
68	264.0	272.0	1.8	1.6	3.0	32.0	1.07	3.42	1.07	0.36	14.06
69	261.0	240.0	3.4	0.0	10.0	40.0	0.40	3.59	1.41	0.14	15.47
70	251.0	200.0	3.7	0.4	1.0	4.0	0.40	4.10	0.16	0.16	15.63
71	250.0	196.0	4.1	1.0	4.0	19.0	0.48	4.51	0.84	0.21	16.47
72	246.0	177.0	3.9	0.0	10.0	24.0	0.24	3.27	0.77	0.08	17.24
	236.0	153.0	2.6	0.0							
SUBTOTAL					61.0	2847.0			17.24	0.28	
=====											
AFLUENTE PIURA B											
72	236.0	153.0	2.6	0.0							0.00
					3.0	7.0	0.23	2.60	0.18	0.06	0.18
73	233.0	146.0	2.6	4.2	7.0	20.0	0.29	6.33	1.24	0.18	1.42
74	226.0	126.0	5.8	0.6	10.0	14.0	0.14	5.93	0.81	0.08	2.24
75	216.0	112.0	5.5	0.0	10.0	8.0	0.08	5.05	0.40	0.04	2.63
76	206.0	104.0	4.6	4.1	2.0	3.0	0.15	8.70	0.26	0.13	2.89
77	204.0	101.0	8.7	0.0							
SUBTOTAL					32.0	52.0			2.89	0.09	
=====											
AFLUENTE PIURA C											
77	204.0	101.0	8.7	0.0							0.00
					4.0	4.0	0.10	9.21	0.36	0.09	0.36
78	200.0	97.0	9.7	0.0	10.0	6.0	0.06	9.76	0.57	0.06	0.94
79	190.0	91.0	9.8	0.0	10.0	5.0	0.05	9.84	0.48	0.05	1.42
80	180.0	86.0	9.9	1.9	0.5	0.5	0.10	11.80	0.06	0.12	1.48
81	179.5	85.5	11.8	0.0							
SUBTOTAL					24.5	15.5			1.48	0.06	

POTENCIAL TEORICO DEL RIO PIURA

12/17/78

I	L	H	Q	AFO	DL	DH	PE	QC	PQT	ESP	CUM
AFLUENTE PIURA D											
81	179.5	85.5	11.8	0.0	0.5	0.5	0.10	11.83	0.06	0.12	0.00
82	179.0	85.0	11.9	1.0	5.0	5.0	0.10	12.83	0.63	0.13	0.06
83	174.0	80.0	12.8	0.0	10.0	4.0	0.04	13.01	0.51	0.05	0.69
84	164.0	76.0	13.2	0.6	9.0	5.0	0.06	13.76	0.68	0.08	1.20
85	155.0	71.0	13.8	0.0	10.0	7.0	0.07	13.17	0.90	0.09	1.87
86	145.0	64.0	12.6	7.8	2.0	2.0	0.10	19.90	0.39	0.20	2.78
87	143.0	62.0	19.4	0.0							3.17
SUBTOTAL					36.5	23.5			3.17	0.09	

AFLUENTE PIURA E											
87	143.0	62.0	19.4	0.0	7.0	4.0	0.06	19.81	0.78	0.11	0.00
88	136.0	58.0	20.2	0.0	10.0	4.0	0.04	20.96	0.82	0.08	0.78
89	126.0	54.0	21.7	0.0	10.0	4.0	0.04	22.03	0.86	0.09	1.60
90	116.0	50.0	22.4	0.0	10.0	3.0	0.03	22.58	0.66	0.07	2.46
91	106.0	47.0	22.8	0.0	10.0	3.0	0.03	22.90	0.67	0.07	3.13
92	96.0	44.0	23.0	0.0	10.0	3.0	0.03	23.12	0.68	0.07	3.80
93	86.0	41.0	23.2	0.0	10.0	3.0	0.03	25.27	0.74	0.07	4.48
94	76.0	38.0	27.3	0.0	10.0	3.0	0.03	28.60	0.84	0.08	5.23
95	66.0	35.0	29.9	0.0							6.07
SUBTOTAL					77.0	27.0			6.07	0.08	

AFLUENTE PIURA F											
95	66.0	35.0	29.9	0.0	6.0	7.0	0.12	29.99	2.06	0.34	0.00
96	60.0	28.0	30.1	0.0	10.0	4.0	0.04	21.26	0.83	0.08	2.06
97	50.0	24.0	12.4	0.0	10.0	5.0	0.05	12.58	0.62	0.06	2.89
98	40.0	19.0	12.7	0.0	10.0	5.0	0.05	12.99	0.64	0.06	3.51
99	30.0	14.0	13.3	0.0	10.0	4.0	0.04	13.44	0.53	0.05	4.15
100	20.0	10.0	13.6	0.0	10.0	5.0	0.05	13.73	0.67	0.07	4.68
101	10.0	5.0	13.8	0.0	10.0	5.0	0.05	13.96	0.68	0.07	5.35
102	0.0	0.0	14.1	0.0							6.03
SUBTOTAL					66.0	35.0			6.03	0.09	

```

*****
* EL POTENCIAL TEORICO TOTAL DEL RIO CASCAJAL ES DE 21.3 MW *
* Y TIENE UNA LONGITUD ACUMULADA DE 288.0 KM *
* Y UN POTENCIAL ESPECIFICO DE 0.07 MW/KM *
*****

```

POTENCIAL TEORICO DEL RIO CASCAJAL 12/17/78

I	L	H	Q	AFO	DL	DH	PE	UC	POT	ESP	CUM
=====											
AFLUENTE TOCTO											
1	30.0	2850.0	0.0	0.0							0.00
2	20.0	900.0	0.3	0.0	10.0	1950.0	19.50	0.16	2.98	0.30	2.98
3	10.0	245.0	0.9	0.0	10.0	655.0	6.55	0.58	5.73	0.37	6.71
4	0.0	156.0	1.0	0.0	10.0	89.0	0.89	0.95	0.83	0.08	7.54
SUBTOTAL					30.0	2694.0			7.54	0.25	
=====											
AFLUENTE SAN CRISTOBA											
5	51.0	1450.0	0.0	0.0							0.00
6	40.0	325.0	0.3	0.0	11.0	1125.0	10.23	0.14	1.56	0.14	1.56
7	30.0	172.0	0.5	0.0	10.0	153.0	1.53	0.38	0.57	0.06	2.13
8	20.0	110.0	0.6	0.0	10.0	62.0	0.62	0.55	0.34	0.03	2.47
9	0.0	87.0	2.1	0.0	20.0	23.0	0.12	1.37	0.31	0.02	2.78
SUBTOTAL					51.0	1363.0			2.78	0.05	
=====											
AFLUENTE VEGA DEL PAD											
10	49.0	252.0	0.0	0.0							0.00
11	40.0	156.0	0.1	0.0	9.0	96.0	1.07	0.05	0.05	0.01	0.05
12	20.0	82.0	1.0	0.0	20.0	74.0	0.37	0.53	0.38	0.02	0.43
13	0.0	55.0	1.5	0.0	20.0	27.0	0.13	1.24	0.33	0.02	0.76
SUBTOTAL					49.0	197.0			0.76	0.02	
=====											
AFLUENTE CASCAJAL											
14	158.0	2025.0	0.0	0.0							0.00
15	146.0	545.0	0.5	0.0	12.0	1480.0	12.33	0.23	5.52	0.28	3.32
16	136.0	247.0	0.8	0.0	10.0	298.0	2.98	0.64	1.87	0.19	5.14
17	126.0	156.0	0.4	1.0	10.0	91.0	0.91	0.63	0.56	0.06	5.75
18	100.0	87.0	1.9	2.1	26.0	69.0	0.27	1.69	1.14	0.04	6.90
19	86.0	72.0	4.2	0.0	14.0	15.0	0.11	4.11	0.61	0.04	7.50
20	66.0	55.0	4.9	1.5	20.0	17.0	0.08	4.56	0.76	0.04	8.26
21	47.0	34.0	5.5	0.0	19.0	21.0	0.11	5.96	1.23	0.06	9.49
22	37.0	24.0	4.2	0.0	10.0	10.0	0.10	4.86	0.48	0.05	9.97
23	14.0	18.0	2.7	0.0	23.0	6.0	0.03	3.48	0.20	0.01	10.17
24	0.0	15.0	2.9	0.0	14.0	3.0	0.02	2.81	0.08	0.01	10.26
SUBTOTAL					158.0	2010.0			10.26	0.06	
=====											


```

*****
* EL POTENCIAL TEORICO TOTAL DEL RIO OLMOS      ES DE      21.8 MW *
*                                               Y TIENE UNA LONGITUD ACUMULADA DE      91.0 KM *
*                                               Y UN POTENCIAL ESPECIFICO DE      0.24 MW/KM *
*****

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```

=====
I      L      H      Q      AFQ      DL      DH      PE      QC      POT      ESP      CUM
(KM)   (M)   (M /S)  (M /S)  (KM)   (M)   (%)   (M /S)  (MW)   (MW/KM) (MW)
=====

```

```

I      =  NUMERO DEL PUNTO
L      =  KILOMETRAJE
H      =  ALTURA
Q      =  CAUDAL EN EL PUNTO
AFQ    =  CAUDAL ADICIONAL DEBIDO AL AFLUENTE
DL     =  DISTANCIA ENTRE LOS PUNTOS
DH     =  DIFERENCIA DE NIVEL ENTRE LOS PUNTOS
PE     =  LA PENDIENTE DEL TRAMO
QC     =  CAUDAL DE CALCULO DEL TRAMO
POT    =  EL POTENCIAL TEORICO DEL TRAMO
ESP    =  EL POTENCIAL ESPECIFICO DEL TRAMO
CUM    =  POTENCIAL ACUMULADO

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POTENCIAL TEORICO DEL RIO OLMOS 12/17/78

```

=====
I      L      H      Q      AFQ      DL      DH      PE      QC      POT      ESP      CUM
=====
                                AFLUENTE OLMOS
=====
1      91.0  2550.0  0.2  0.0
2      80.0  770.0   1.1  0.0   11.0  1780.0  16.18  0.64  11.25  1.02  11.25
3      70.0  416.0   1.5  0.0   10.0  354.0   3.54   1.31  4.54  0.45  15.79
4      60.0  219.0   1.7  0.0   10.0  197.0   1.97   1.63  3.15  0.31  18.93
5      50.0  126.0   2.4  0.0   10.0  93.0    0.93   2.06  1.88  0.19  20.81
      40.0  101.0   1.8  0.0   10.0  25.0    0.25   2.10  0.51  0.05  21.33
7      30.0  89.0    1.2  0.0   10.0  12.0    0.12   1.48  0.17  0.02  21.50
8      20.0  78.0    0.4  0.0   10.0  11.0    0.11   0.77  0.08  0.01  21.58
9      10.0  56.0    0.6  0.0   10.0  22.0    0.22   0.49  0.10  0.01  21.69
10     0.0   40.0    0.6  0.0   10.0  16.0    0.16   0.62  0.10  0.01  21.78
=====
                                SUBTOTAL
                                91.0  2510.0
                                21.78  0.24
=====

```

 * EL POTENCIAL TEORICO TOTAL DEL RIO MOTUPE ES DE 168.3 MW *
 * Y TIENE UNA LONGITUD ACUMULADA DE 387.0 KM *
 * Y UN POTENCIAL ESPECIFICO DE 0.43 MW/KM *

POTENCIAL TEORICO DEL RIO MOTUPE 12/17/78

I	L	H	Q	AFQ	DL	DH	PE	GC	POT	ESP	CUM
AFLUENTE CHOCHOPE											
1	33.0	3455.0	0.1	0.0	13.0	2535.0	19.50	0.41	10.25	0.79	0.00
2	20.0	920.0	0.7	0.0	10.0	624.0	6.24	0.96	5.88	0.59	10.25
3	10.0	296.0	1.2	0.0	10.0	159.0	1.59	1.27	1.99	0.20	16.13
4	0.0	137.0	1.3	0.0							18.12
SUBTOTAL					33.0	3318.0			18.12	0.55	
AFLUENTE CHOLOQUE SUP											
5	56.0	1350.0	0.0	0.0	9.0	868.0	9.64	0.13	1.14	0.13	0.00
6	47.0	482.0	0.2	0.0	10.0	287.0	2.87	0.67	1.89	0.19	1.14
7	37.0	195.0	1.1	0.0							5.03
SUBTOTAL					19.0	1155.0			3.03	0.16	
AFLUENTE CHOLOQUE INF											
7	37.0	195.0	1.1	0.0	7.0	52.0	0.74	1.31	0.67	0.10	0.00
8	30.0	143.0	1.5	0.0	10.0	25.0	0.25	1.57	0.38	0.04	0.67
9	20.0	118.0	1.6	0.0	10.0	25.0	0.25	1.75	0.43	0.04	1.05
10	10.0	93.0	1.9	0.0	10.0	18.0	0.18	1.92	0.34	0.03	1.48
11	0.0	75.0	2.0	0.0							1.82
SUBTOTAL					37.0	120.0			1.82	0.05	
AFLUENTE DE SALAS											
12	43.0	2090.0	0.1	0.0	13.0	1740.0	13.38	0.26	4.45	0.34	0.00
13	30.0	350.0	0.4	0.0	10.0	226.0	2.26	0.69	1.54	0.15	4.45
14	20.0	124.0	1.0	0.0	10.0	38.0	0.38	0.97	0.36	0.04	5.99
15	10.0	86.0	1.0	0.0	10.0	18.0	0.18	1.31	0.23	0.02	6.35
16	0.0	68.0	1.6	0.0							6.58
SUBTOTAL					43.0	2022.0			6.58	0.15	
AFLUENTE MORAN											
17	29.0	2860.0	0.4	0.0	9.0	605.0	6.72	1.02	6.08	0.68	0.00
18	20.0	2255.0	1.6	0.0	10.0	1107.0	11.07	2.15	23.39	2.34	6.08
19	10.0	1148.0	2.7	0.0	10.0	798.0	7.98	2.88	22.56	2.26	29.47
20	0.0	350.0	3.1	0.0							52.03
SUBTOTAL					29.0	2510.0			52.03	1.79	
AFLUENTE SANJON											
21	34.0	187.0	0.1	0.0	14.0	53.0	0.38	0.27	0.14	0.01	0.00
22	20.0	134.0	0.4	0.0	10.0	28.0	0.28	0.67	0.18	0.02	0.14
23	10.0	106.0	0.9	0.0	10.0	24.0	0.24	0.94	0.22	0.02	0.32
24	0.0	82.0	1.0	0.0							0.55
SUBTOTAL					34.0	105.0			0.55	0.02	