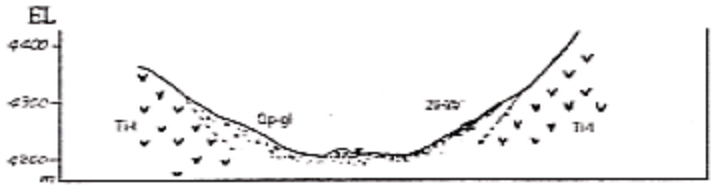
Table S.2.4.1.3 **General Characteristics of Proposed Dam and Intake Site (18/18)**

Site	Paucarcocha	Department : Lima	Province : Yauyos	District : Tanta	River : Cañete

Topography	Riverbed width	Approximately 320 meters of outlet of the Paucarcosha lake
	Characters	In outlet of the Paucarcocha lake, large amount of glacial and fluvio-glacial deposits are accumulated to form drumlin as natural dam.
Schematic section		 Qp-fg: Fluvio-glacial deposit Qp-gl: Glacial deposit Ti-t: Tantará Formation

Geology	Geology of Basement	Left bank	River bed	Right bank
		Lower Tertiary	No present	Lower Tertiary
		Tantará Formation		Tantará Formation
		Andesitic lava (distributed in the high spur)		Andesitic lava (distributed in the high spur)
	Condition of Basement: Fault	No faults are present.	—	No faults are present.
	Condition of Basement: Fracture	Fine irregular fractures	—	Fine irregular fractures
	Condition of Basement: Alteration	No present	—	No present
	Condition of Basement: Weathering	Ordinary brownish and reddish weathering	—	Ordinary brownish and reddish weathering
	Overlying Sediment	Wide distribution of fluvio-glacial and glacial deposits.	Wide distribution of fluvio-gladcial and glacial deposits.	Talus, glacial and fluvio-glacial deposits on undulated slope.
	Landslide and/or Failure	No present	No present	No present
	Remarks	Glacial and fluvio-glacial deposits are largely distributed in the outlet of the Paucarcocha lake.		

Dam site	a. Glacial and fluvio-glacial deposits form drumlin in the outlet. b. Rocky outcrop is shown in the upper part of right abutment.
Reservoir	a. Fine materials are accumulated in the upper stream of thePaucarcocha Lake, where meanders and swamps are distributed. b. Storage capacity seems to be large for reasons of large depth (70-80m).
Evaluation	Plan of the Paucarcocha dam is included in "El Pratanal" Project. Taking into consideration of existing similar dam near the site, it's possible to make a low fill type dam.
Issues	Characteristics of soft deposits and hydrogeological aspects will be key points for the detailed design stage.

Site photo

Negative No.9-E

Table S.2.4.1.4 Items and Procedures of Dam Geological Investigation

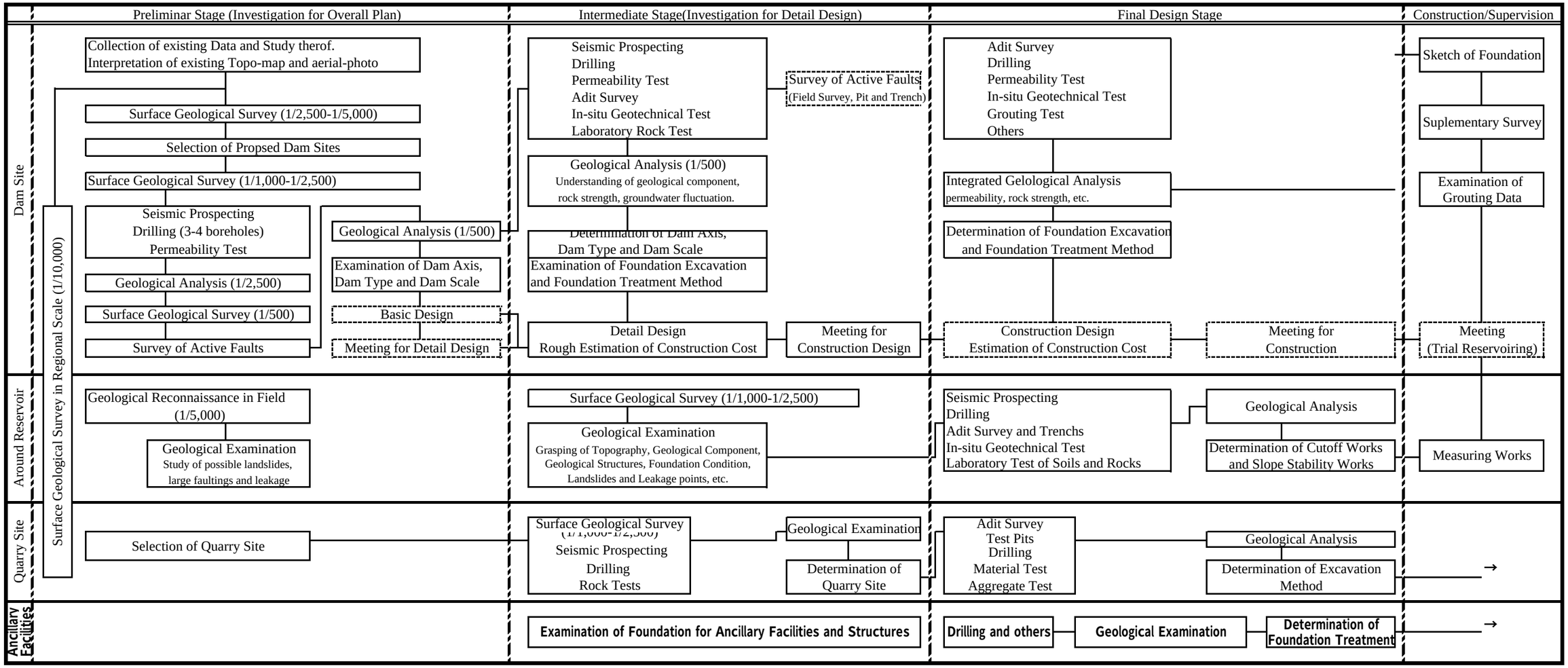


Table S.2.4.1.5 Quantity of Dam Geological Investigation and Laboratory Tests

Item	Quantity	Remarks
Dam site		
- Seismic prospecting	3 lines x 3 lines	3 lines paralell to dam axis and 3 lines in cross section
- Drilling		
①Left abutment	1unit x 50m in depth	Along dam axis, φ= NX, including permeability test (Lefranc, Lugeon test), every 5m in depth, lateral loading test (LLT) every 3m depth and borehole VTR
②Riverbed	1unit x 150m in depth	ditto
③Right abutment	1unit x 30m in depth	ditto
Quarry site		
- Seismic prospecting	2 lines x 2 lines	Tantará Formation area near from dam site
- Drilling	3units x 30m in depth	ditto

Laboratory test of foundation and materials

Item	Quantity	Purpose	Remarks
- Physical Test			
①Physical constants		Rock classification and	
・ Specific gravity	5 units	quality evaluation of	3 units for dam site and 2 units for quarry site
・ Porosity	5 units	rock material	ditto
・ Absorbed moisture	5 units		ditto
・ Unit weight	5 units		ditto
②Ultrasonic wave test	5 units	Rock classification	
- Chemical Test			
①Alkali reaction test	2 units		
- Mechanical tests			
①Unconfined Compressio test	5 units	Rock classification, excava-tion, quality evaluation of rock material	
②Triaxial compression	3 units	Rock classification	
③Brazilian test	3 units	ditto	
④Restitution hardness tes	3 units	ditto	

Table S.2.4.2.1 Well Inventory (1/3)

Well Code	Well Property	Elevation (m.a.s.l)	Drilling					Pumping Equipment						Runoff and Water Table							C.E	Exploitation						
			Const. Year (19__)	Type	Inicial Depth (m)	Current Depth (m)	Diameter (m)	Moter			Pump			Date, 1999	PR/ Soil (m)	Static Level		Q (l/s)	Dynamic Level		m-mhos cm a +25° C	Well Status	Purpose	Regimen			Period	Volume (m^3/year)
								Maker	Type	H.P.	Marker	Type	Diameter Discharge			Depth (m)	Elevation (m.a.s.l.)		Pumping Time	Depth (m)				h d	d s	m a		
San Vicente																												
3	ESSALUD	48.20	45	T.A	14.0		1.44	HIDROSTAL	E	7.5	HIDROSTAL	C.S	2.0	19.08	0.80	14.23	34.77				1.56	Used	P	24	7	12	1-12	46720
4	Universidad Nac. Agraria	45.30		T.A	8.0			Reparation	E			C.S		13.08	0.00	6.96	38.34					Used	D		7	12	1-12	219
5	UNANUE	27.80	40	T.A	10.0	7.80	1.88	HIDROSTAL	E		HIDROSTAL	C.S	1.5	14.08	0.00	6.23	21.57	2	-			Used	D	7.5	7	12	1-12	50.4
7	Ex. Hacienda Palo	137.24		T.A	19.0																	Closed	D					
8	Agua Potable Herbay Alto	93.35	58	T	20.3	20.74		ALLIS-CHALMERS	E	20	LAYNE BOWLER	T.V	6.0	13.08	0.20	5.79	87.76	15.0*	-			Used	D		4	12	1-12	18,250
11	Barrantes	10.96		T.A	5.9										0.00	1.63	9.33					Used	D		7	12	1-12	182.5
13	Fundo9 San Martin	27.85	65	T.A			1.60				HIDROSTAL	C.S	1.0		0.31	2.35	25.81					Used	D		7	12	1-12	182.50
15	Cia.. La Union	35.70		T.A	8.1	3.79		Without			Without			14.08	0.00	3.69	32.01					Used	D		7	12	1-12	1,095
16	Universidad Nac. Agraria	45.90	62	T.A	9.5				E			C.S			0.34	7.52	38.72					Used	D		7	12	1-12	182.5
20	Jose Matayoshi	50.75	65	T.A	5.0	4.00	1.70	HIDROSTAL	E	0.5	HIDROSTAL	C.S										Used	D					492.75
22	La Pampilla (casa hacienda)	38.35		T.A	5.5	5.24	1.49							14.08	0.00	4.44	33.91					Used	D		3	12	1-12	133.8
23	Lorenso Ochoa	34.10	30	T.A	4.1	4.10	2.30								0.00	3.85	30.25					Used	D		7	12	1-12	6,387.5
24	La Pampilla	33.81		T.A	4.1	3.60	1.60								0.00	3.29	30.52					Used	D		7	12	1-12	182.5
25	LA PAMPILLA RANCHERIA 2	31.00	55	T.A		4.30									0.00	3.67	27.33					Used	D		7	12	1-12	2,737.5
26	Siles	31.67	35	T.A	8.5	6.50	1.20	HIDROSTAL	E		HIDROSTAL (2)	C.S	1.5		0.39	5.73	26.33					Used	I		7	12	1-12	58,400
27	Dos (La Encanada)	23.05		T.A	8.7		1.40		E			C.S			0.73	7.80	15.98					Used	D		7	12	1-12	5,110
32	Vicente Sanchez (J.Ferrero)	6.00	67	T.A	2.0										0.00	2.31	3.69					Used	D		7	12	1-12	91.25
35	Juan Palomino	36.01		T.A	4.5	4.46	0.88								0.58	4.12	32.47				0.88	Used	D		7	12	1-12	73
36	Estuardo Masias (Amardil)	46.40		T.A			1.00								0.67	3.56	43.51					Used	D		7	12	1-12	9,490
38	Antonio Vicente Moran	31.12		T.A	3.4		1.46	No-working							0.12	3.16	28.08				0.76	Used	D		7	12	1-12	14.6
39	Florencio Nada	51.56		T.A	2.8		0.80								0.36	2.21	49.71					Used	D		7	12	1-12	164.25
40	Fdo. La Isla Alta	129.21		T.A	4.6	2.47	2.20								0.38	2.37	127.22					Used	D		7	12	1-12	182.5
42	Santiago Queirolo	70.50	70	T.A	9.2	8.51	1.57								0.56	8.33	62.73					Used	D		7	12	1-12	657
46	Paulino Aburto	45.10	68	T.A	3.5	4.35	0.93					C.S	1.5			3.90	-					Used	D		7	12	1-12	183
47	Esmeralda (Rancheria)	11.00	50	T.A		4.39	1.40	HIDROSTAL			HIDROSTAL		2.5		0.40	3.80	7.60					Used	D		7	12	1-12	4,928
49	Victorio Lavezollo	68.00	70	T.A	3.8			HIDROSTAL					1.0		0.23	4.87	63.45	0.83	-			Used	D		7	12	1-12	365
51	Raul Ramos (Hualcara)	68.56	71	T.A	3.4	5.82			S			S		14.08	0.00	3.54	65.02	42	-			Used	D	3	7	12	1-12	16,425
J-1	AGROCONSA		99	T		70.00	15"							14.08	0.60	4.43	-				0.75	Drilling	I					
J-2	Alvaro - Garcia Sayan			T.A		7.69	1.45			1	HIDROSTAL		1.0			6.94	-	0.37	-		0.95	Used	D		7	12	1-12	730
J-3	Cuiva Town	48.19		T.A		8.15	1.20							14.08	0.67	7.72	41.14				1.15	Used	D		7	12	1-12	4,562
J-20	Palacios		97	T.A			1.15						0.5		0.19	1.89	-					Used	D		7	12	1-12	182.5
M-J1	MANANTIAL (Isla alta)																	5	-		0.57	Used	D					5,475
J-22	EMAPA # 1			T		50.00		DELCROSA	E	75	U.S	T.V	8.0	31.08				45	-			Used	D	22	7	12	1-12	1,300,860
J-23	EMAPA # 2			T		50.00		DELCROSA	E	40	BJ	T.V	6.0	31.08	0.18			18	-			Used	D	21	7	12	1-12	496,692
M-J2	Filtrante Gallery			GALERIA														30				Used	D	14	7	12	1-12	551,880

(note): M:Spring and Filtering Gallery, T: Tubular Well, T.A.: Open Cut Well, E: Electric, S: Submeasible, T.V.: Vertical Axis Turbine, C.S.: Suction Centrifugal, D: Domestic, Pe: Livestock, P: Public,

Estimado, *Informed, C.E. Water Electric Conductivity, Period: Example 7-12 means from July to December

Table S.2.4.2.1 Well Inventory (2/3)

Well Code	Well Property	Elevation (m.a.s.l.)	Drilling					Pumping Equipment						Runoff and Water Table							C.E	Exploitation						
			Const. Year (19__)	Type	Inicial Depth (m)	Current Depth (m)	Diameter (m)	Moter			Pump			Date, 1999	PR/ Soil (m)	Static Level		Q (l/s)	Dynamic Level		m-mhos cm a +25° C	Well Status	Purpose	Regimen			Period	Volume (m^3/year)
								Maker	Type	H.P.	Marker	Type	Diameter Discharge			Depth (m)	Elevation (m.a.s.l.)		Pumping Time	Depth (m)				h d	d s	m a		
Quilmana																												
1	Enrique Flores	99.80	57	T	52.60	-		PETTER MCLAREN	D	50	JOHNSTON	T.V	8.00	16.08	0.00	12.18	87.62	30				Used	D/pe	1	7	12	1-12	39420
5	Calvo	162.53	56	T	83.00	-		G.M.	D		TWIN DISC	T.V	8.00	16.08				60**			-0.60	Used	R	24	5	4	6-9	414720
6	EMAPA (Portable Water)	148.40	68/70	T	58.50	-		DELCROSA	E		B.J.		6.00	17.08				22	12h	37.28	0.72	Used	D	19	7	12	1-12	549,252.00
6A	Municipality (portable Water)	-	97	T	-									17.08								Usable	D					
10	Instituto Tecnologico	111.56	63	T	25.00		12"							17.08	0.00	5.71	105.85					Used	D		7	12	1-12	1,095.00
11	BRYCE	123.55	57	T	50.50	-					DELCROSA	T.V	8.00	17.08				50*			0.67	Used	R	24	6	4	6-9	414,720.00
16	Valle Riestra	97.90	-	T.A	3.30		0.86				HIDROSTAL	C.S	1.50		0.74	5.16	93.48				0.68	Used	D		7	12	1-12	200.00
19	Antonio Rotondo	107.70	-	T.A	5.00		1.79	HIDROSTAL	E	3.4	HIDROSTAL	C.S	2.00		0.65	2.50	105.85					Used	D		7	12	1-12	730.00
23	Fernando Toro	117.50	71	T.A	6.80		3.00								0.00	7.21	110.29					Used	D		7	12	1-12	547.50
24	Revilla Cecilia	82.20	60	T	16.00		20"	U.S. MOTOR				C.S	1.50	16.08	0.00	17.32	64.88					Used	D		7	12	1-12	255.50
26	Sr. Elis	95.60	-	T.A	6.00		1.44															Used	D					18.20
28	Asociac. El Rosario	168.00	62	T	88.00	82.37	14"	CATERPILLAR		110	GEAR-DRIVE	T.V	8.00		0.00	57.38	110.62	60*				Used	R	2	2	12	1-12	48,384.00
39	Aurelio Moreyra	-		T.A		8.81		HIDROSTAL	E		HIDROSTAL	C.S				7.83						Used	D		7	12	1-12	273.75
42	Adalguiza Garcia	-		T.A		15.10	1.80								0.30	13.77						Used	D		7	12	1-12	18.20
43	Narciso Sanchez	-		T.A		17.00	1.70					C.S			0.58	15.43					0.78	Used	D		7	12	1-12	91.20
49	Jovanni Rayo	-		T.A			1.00	HIDROSTAL			HIDROSTAL		1.00		0.00	5.17						Used	D					273.70
56	Almide	-		T.A		6.91	1.18	HIDROSTAL			HIDROSTAL		2.50		0.19	5.84						Used	D/I		7	12	1-12	912.50
60	SOLPRODUCE S.A.	-		T		47.60									0.00	27.72			10'	41.00	0.84	Usable	R/I		7	12	1-12	
61	Vda. de Revilla *	78.223	85	T				DELCROSA			DELCROSA		8.00		-	-		100*				Usable	R					
65	Roldan			T.A			2.47								0.45	26.90						Abandonated	-					
J-5	Farmer's Asociation			T		121.00	15"	-			-				0.20	86.58						Drilling	R					
J-6	Solis Family			T											-	-						Used	Pe					
J-7	Felix Yanes Lazama			T.A											0.60	21.54					0.79	Used	D					18.20
J-8	Victoria Sanchez de Luyo			T.A		22.00	1.00								0.64	18.50						Used	D					18.20
J-9	Raymundo Luyo			T.A			1.60								0.54	15.88						Used	D					18.20
J-10	Jesus Gomez Romero			T.A			1.50									9.87					0.81	Used	D					127.70
J-11	Manuel Ruiz			T.A			1.50								0.80	18.31						Used	D					182.50
J-12	Fundo Buenos Aires	170.00	54	T		65.00	M					T.V			0.00	44.40	125.60	58.00				Used	R		7	12	1-12	144,000.00
J-13	Ex Campesinos sin tierras			T		-	12"	DEEP NELL PUMP		130		T.V	8.00	18.08	0.20	-		-				Usable	R					
J-14	Natalia Huaringa			T.A		3.55	1.09									3.35						Used	D					73.00
J-15	Carmen Espinoza			T.A			1.62								0.28	3.30						Used	D					182.50
J-21				T			20"							18.08	0.80	-						Used	R					

(note): M:Spring and Filtering Gallery, T: Tubular Well, T.A.: Open Cut Well, E: Electric, S: Submeasible, T.V.: Vertical Axis Turbine, C.S.: Suction Centrifugal, D: Domestic, Pe: Livestock, P: Public,

Estimado, *Informed, C.E. Water Electric Conductivity, Period: Example 7-12 means from July to December

Table S.2.4.2.1 Well Inventory (3/3)

Well Code	Well Property	Elevation (m.a.s.l.)	Drilling					Pumping Equipment						Runoff and Water Table							C.E	Exploitation						
			Const. Year (19__)	Type	Inicial Depth (m)	Current Depth (m)	Diameter (m)	Moter			Pump			Date, 1999	PR/ Soil (m)	Static Level		Q (l/s)	Dynamic Level		m-mhos cm a +25° C	Well Status	Purpose	Regimen			Period	Volume (m^3/year)
								Maker	Type	H.P.	Marker	Type	Diameter Discharge			Depth (m)	Elevation (m.a.s.l.)		Pumping Time	Depth (m)				h d	d s	m a		
Imperial																												
5	Casa Hacienda Dibos	140.00	[80] 66	T	75.00		8"/2.90	PERKINS	D	75.00	JOHNSON	T.V	6.00		0.86	11.62	129.24					Used	D		7	12	1-12	
6	SNATA AMELIA	109.34	60	T	47.50							T.V										AbaBANndnated						-
7	IAN PERU / Frigorifico	110.41	63	$T_{(M)}$	21.30	28.00	20"					S	6.00	18/08	0.34	23.08	87.67				0.67	Used	I		7	12	1-12	438,000.00
8	Cantagallo Broad of Users	100.00	-	TA	12.00	5.16		DELCROSA		4.80			2.50	17/08	0.54	4.15	96.39				0.77	Used	D		7	12	1-12	18,250.00
10	Enrique Bustamante C.	102.95	70	T	13.00	16.80					HIDROSTAL	C.S	2.00		0.27	4.43	98.79				0.71	Used	D		7	12	1-12	2,920.00
26	La Quebrada			TA				POR VISITAR														Used	D		7	12	1-12	109,500.00
14	Board of Users (San Benito)	67.05	31	TA	14.40	21.00							4.00			14.0*	-					Used	D		7	12	1-12	109,500.00
19	Agricultural Experimental Station	116.88	50	TA	4.90	4.95	1.40								0.60	4.00	113.48					AbaBANndnated	D					
30	Asato	101.13	70	TA	9.70		2.27	-			-		1.00		0.92	9.25	92.80					Used	D	1	7	12	1-12	1,970.00
31	Hugo Aguayo Peralta	73.23	50	TA	12.00		1.40								0.54	10.08	63.69					AbaBANndnated	D					
40	Vidal Vega Belleza	-	-	TA	-	9.03	1.50								0.55	7.42	-					Used	D		7	12	1-12	292.00
J-16	Jose Ramos	-	-	TA	-										0.00	8.50	-					Used	D		7	12	1-12	36.50
J-17	Ricardo Yaya Vicente	-	-	TA	-																0.70	Used	D		7	12	1-12	36.50
J-18	Plaza de Arma Imperial	-	-	TA	-		1.43				HIDROMECANICA		1.50		-3.51	5.85	-					Used	P		7	12	1-12	-
J-24	Casa Pintada Board of Users			TA									2.00		0.67							Used	D		7	12	1-12	9,125.00
15/3/9																												689,630.00
Nuevo Imperial																												
10	Cerro Alegre Potable Water	120.00	36	T	25.60		20"		E			S	3.00	19/08	0.30			10.00	1"20'	30.20	0.63	Used	D	3	7	12	1-12	39,420.00
11	Cerro Alegre Potable Water	123.65	62	T	40.00	40.00	20"		E			S	3.00	19/08		25.0*	-	15.00	1"20'	34.18		Used	D	2	7	12	1-12	39,420.00
13	Raul del Prado		-	TA	-	10.18				1.50	HIDROSTAL		1.00		0.40	9.36	-					Used	D		7	12	1-12	273.70
14	La Cruz de Nolazco		-	TA	-	10.88					HIDROSTAL	C.S	2.00		0.58	10.10	-					Used	D		7	12	1-12	91.20
J-19	Conservadora MENDAVIA S.R.L.		97	T	41.00	41.00										22.00	-					Used	I					79,204.90
15/3/13																												
San Luis																												
2	Grifo Petro Peru	23.15	69	T	35.50						HIDROSTAL		1.00	15/08	0.45	8.39	15.21				0.87	Used	D		7	12	1-12	273.70
5	Hacienda Sta. Cruz	6.00	60	TA	3.90								1.50	15/08	0.38	2.80	3.58				1.48	Used	D		7	12	1-12	1,368.70
7	Fundo San Pedro	6.00	51	TA	4.50		1.62								0.48	1.57	4.91					Usable	D		7	12	1-12	
16	Santa Cruz	4.90	-	TA	3.00									19/08	0.40	2.90	2.40					Used	D		7	12	1-12	36.50
20	Alfonso Pesquera	14.50	-	TA	-		1.98				HIDROSTAL				0.34	4.65	10.19					Used	D		7	12	1-12	456.20

(note): M:Spring and Filtering Gallery, T: Tubular Well, T.A.: Open Cut Well, E: Electric, S: Submeasible, T.V.: Vertical Axis Turbine, C.S.: Suction Centrifugal, D: Domestic, Pe: Livestock, P: Public,

Estimado, *Informed, C.E. Water Electric Conductivity, Period: Example 7-12 means from July to December

Table S.2.4.2.9 Variation of Groundwater Tables

San Vicente de Canete District

				01/1969		04/1969		12/1971		01/1972		11/1981		11/1990		12/1990		01/1991		1991		1999	
Well No.	Property Name	EL.	Depth	Depth	EL.	Depth	EL.	Depth	EL.	Depth	EL.	Depth	EL.	Depth	EL.	Depth	EL.	Depth	EL.	Depth	EL.	Depth	EL.
2	Jeobaldo Meza	32.00	12.70	11.81	20.19			10.18	24.43	10.24	24.37	11.62	23.00			10.76	23.85	10.74	23.87	8.45			
4	German Larrabure	33.00	12.00	7.11	25.89	6.92	26.08					7.02	38.30							6.63		6.96	
5	Casa Had. Unanue	17.40	10.00	8.40	9.00	5.24	12.16							6.25						5.71		6.23	
7	Neeg. Arriola El Palo	143.00	19.60	19.15	123.85			18.65	118.59	18.66	118.58					18.75	118.49	18.66	118.58	18.66			
10	Arelardo Fukosaki	57.10		11.00				10.71	46.35	10.66	46.40	10.67	47.20			10.58	46.48	10.61	46.45	10.61			
12	Familia Ramos	70.40		8.80				4.77	65.60	4.64	65.73	4.59	66.60			3.57	66.80	3.85	66.52	3.85			
17	Cuiva Alta Casa Had.	47.00	8.00	6.47	40.53			6.30	41.89	6.39	41.80			7.10		5.85	42.34	6.00	42.19			7.05	
29	Had. Sta. Rosa	5.00		2.60	2.40			2.75	13.52	2.56	13.71					2.15	14.12	2.10	14.17				
31	Anexo Herbar Bajo	22.00		6.62	15.38	7.29	14.71	8.92	10.91	8.34	11.49					8.60	11.23	8.54	11.29				
40	Hector Amaro (La Isla)	139.00						2.94	126.27	2.81	126.40			2.45		2.05	127.16	2.05	127.16	2.05		1.99	
51	Raul Ramos - Hualcara	63.60										3.12	61.10	2.90	-					2.15		3.54	

Imperial District

			01/1969		06/1971		04/1972		11/1990		12/1990		02/1991		04/1991		08/1999	
Well No.	Property Name	EL.	Depth	EL.	Depth	EL.	Depth	EL.	Depth	EL.	Depth	EL.	Depth	EL.	Depth	EL.	Depth	EL.
6	Sta. Amelia No.3	109.34	21.17	88.17	19.90	89.44	20.42	88.92			20.38	88.96	20.26	89.08	20.47	88.87		
7	Cia. Frigorifico	110.41	22.55	87.86	20.81	89.60	26.70	83.71	20.00		21.18	89.23	21.00	89.41	21.45	88.96		
11	Had. Hualcava	106.99	12.86	94.13	3.90	103.09	4.19	102.80			4.35	102.64	4.35	102.64	4.12	102.87		
19	Est. Exp. De Asociac.		3.53	-	3.12	113.76	3.23	113.65			3.26	113.62	-	-	2.58	114.30		
24	Elena Carrasco				6.45	80.05	7.33	79.17			11.70	74.80			12.14	74.36		
30	Samuel Chiok 3				8.00	93.13	8.42	92.71			9.30	91.83			7.28	93.85		
31	Ingeniero Boza				8.45	64.78	8.80	64.43			8.94	64.29			8.35	64.88	9.54	

Quilmana District

	15/3/14		01/1969		04/1969		06/1971		04/1972		02/1991		11/1990		12/1990		04/1991		08/1999	
Well No.	Property Name	EL.	Depth	EL.	Depth	EL.	Depth	EL.	Depth	EL.	Depth	EL.	Depth	EL.	Depth	EL.	Depth	EL.	Depth	EL.
2	Carlos Peirano	108.07	13.02	89.98			12.26	95.81	13.30	94.77	12.80	95.27			13.70	94.37	11.95	96.12		
7	Teodoro Quim	168.23	45.07	125.00			44.30	123.93	44.97	123.26	46.50	121.73			46.70	121.53	46.50	121.75		
10	Inst. Exp. Agropecuario	111.56	2.10	95.90	1.65	98.00					5.44	106.12							5.71	105.85
12	Anexo Cantagallo Ranch	88.22	-				3.76	84.56	3.77	84.55	3.45	84.87			3.50	84.82	3.41	84.91		
16	Valle Riestra	97.92					2.00	95.92	2.58	95.34	1.75	96.16			1.77	96.15	1.24	96.68	4.42	93.48
17	Felipe Valle Riestra	101.63					4.15	97.48	4.22	97.41	4.65	96.97			3.87	96.76	8.98	92.65		
19	Antonio Rotundo	107.73					2.00	105.73	1.83	105.90	1.56	106.17			1.68	106.05	1.47	106.26	1.85	105.85
																				p

Table S.2.4.2.10 Variation of Piezometric Level

		1971							1972					1990	1991			
Code No.	Elevation (m.a.s.l.)	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Dec.	Jan.	Feb.	Mar.	Apr.
San vicente de Canete district																		
15-03-14-02	34.61	25.61	25.01	24.36	24.19	24.03	24.12	24.43	24.37	24.80	24.90	25.12	24.92	23.85	23.87	23.89	24.07	
15-03-14-07	137.24	121.69	120.35	119.32	118.95	117.84	118.34	118.59	118.58	118.63	118.07	117.92	117.95	118.49	118.58	119.92	120.89	121.81
15-03-14-10	57.06	47.06	46.93	46.52	46.46	46.40	46.37	46.35	46.40	46.43	46.44	46.40	46.38	46.48	46.45	46.34	46.50	46.59
15-03-14-11	10.96	9.64	9.79	9.71	9.78	9.72	9.74	9.75	9.73	9.60	9.62	9.88	9.72	8.96	9.44	9.44	9.34	9.56
15-03-14-12	70.37	65.29	65.93	65.74	65.74	65.74	65.72	65.60	65.73	65.82	65.73	65.67	65.61	66.80	66.52	66.54	66.62	66.60
15-03-14-17	48.19	41.62	42.54	42.09	41.77	41.61	41.54	41.89	41.80	41.76	41.84	41.70	41.49	42.34	42.19	42.24	42.13	42.04
15-03-14-18	94.59	90.80	91.19	90.20	90.00	90.28	90.49	90.93	91.19	90.80	91.51	91.00	90.73	91.52	91.83	91.64	91.80	91.48
15-03-14-19	89.53	85.04	84.55	84.21	82.92	82.30	81.08	81.57	83.29	83.18	82.39	81.83	81.60	82.33	82.47	82.63	83.06	83.06
15-03-14-20	50.75	48.35	48.25	48.10	47.55	47.51	47.59	48.03	48.01	48.05	47.88	47.73	47.68	48.72	48.56	48.54	48.28	48.45
15-03-14-24	33.81	30.34	30.59	30.80	30.33	30.18	30.38	30.46	31.53	30.51	31.04	30.52	30.36	30.81	30.90	31.09	30.76	30.76
15-03-14-29	16.27	13.44	13.58	13.46	13.44	13.37	13.36	13.52	13.71	13.77	13.59	14.29	13.98	14.12	14.17	14.33	14.24	14.15
15-03-14-31	19.83	12.55	12.23	11.83	11.15	11.06	10.35	10.91	11.49	12.43	12.74	13.39	12.09	11.23	11.29	12.86	13.87	13.15
15-03-14-35	36.01	31.96	31.92	32.01	31.78	31.83	31.60	32.75	32.25	32.90	33.54	32.75	32.48	33.46	33.40	33.51	33.53	34.29
15-03-14-37	76.94	73.94	73.86	73.56	73.35	73.99	74.00	74.22	73.92	73.84	73.81	73.46	73.59	74.72	75.23	75.22	74.97	74.76
15-03-14-40	129.21	126.21	126.21	126.00	125.96	126.01	126.15	126.27	126.40	126.62	126.36	126.10	125.96	127.16	127.16	127.39	127.38	127.48
15-03-14-41	101.48	97.63	97.53	97.35	97.02	96.76	96.47	96.65	97.13	97.50	97.44	97.10	96.64	96.43	96.39	96.60	96.85	96.95
15-03-14-42	70.50	63.90	63.85	63.78	62.57	62.37	62.18	62.55	64.26	63.89	63.43	62.50	62.19	63.00	63.57	63.90	66.99	64.50
15-03-14-48	72.14	68.04	68.02	67.99	67.80	67.80	68.17	68.59	68.34	68.54	68.66	68.48	68.28	69.18	69.22	69.51	69.54	69.84
15-03-14-50	68.21	66.21	66.21	66.61	65.73	65.39	64.94	65.11	65.59	66.06	65.82	65.11	64.89	65.71	66.54	66.97	66.92	67.30
San Luis district																		
15-03-13-04	4.09	0.65	0.40	0.42	0.35	0.36	0.37	0.20	0.41	1.02	1.17	0.83	0.73	1.75	1.98	1.63		1.61
15-03-13-16	4.90	3.05	3.02	2.97	3.09	3.16	3.02	3.14	3.22	3.30	3.67	3.32	3.10	2.41	2.36	2.50	2.61	2.43
Imperial district																		
15-03-06-06	109.34	89.44	89.39	89.34	89.28	89.31	89.24	89.09	89.08	88.98	89.03	88.92	88.85	88.96	89.00	89.08	89.04	88.87
15-03-06-07	110.41	89.60	90.07	89.45	89.33	87.24	88.96	88.80	88.73	88.78	88.80	83.71	88.79	89.23	89.41	89.33	89.41	88.96
15-03-06-11	106.99	103.09	103.09	103.09	103.05	102.91	102.71	102.66	102.76	102.69	102.71	102.80	102.72	102.64	102.73	102.64	102.73	102.87
15-03-06-19	116.88	113.76	113.38	112.07	112.26	112.43	112.37	112.44	112.88	113.88	113.88	113.65	113.61	113.62	113.55	114.17	114.25	114.30
15-03-06-24	86.50	80.05	80.00	79.94	79.82	79.71	79.33	78.65	78.33	78.66	78.97	79.17	79.06	74.80	73.24	73.52	73.89	74.36
15-03-06-30	101.13	93.13	93.09	93.13	92.74	92.25	91.37	90.98	91.48	92.38	93.17	92.71	92.22	91.83	92.31	92.56	93.72	93.85
15-03-06-31	73.23	64.78	64.75	64.71	64.68	64.60	64.49	64.44	64.52	64.55	64.60	64.43	64.39	64.29	64.66	64.77	64.88	64.88
Quilmana district																		
15-03-11-02	108.07	95.81	95.86	95.31	95.41	95.17	95.15	95.01	95.63	95.82	95.39	94.77	94.57	94.37	94.87	95.27	95.87	96.12
15-03-11-07	168.23	123.93	123.83	123.79	124.15	123.53	123.29	123.25	123.21	123.23	123.54	123.26	122.88	121.53	121.55	121.73	121.86	121.75
15-03-11-12	88.32	84.56	84.69	84.76	84.50	84.63	84.59	84.77	84.72	84.69	84.55	84.55	84.82	84.82	84.98	84.87	84.96	84.91
15-03-11-16	97.92	95.92	95.87	95.70	95.88	95.91	95.67	96.32	96.19	96.24	95.52	95.34	95.50	96.15	96.13	96.17	96.58	96.68
15-03-11-17	101.63	97.48	97.45	97.45	97.63	97.54	97.35	97.27	97.46	97.54	97.59	97.41	97.29	96.76	97.14	96.98	97.51	92.65
15-03-11-19	107.73	105.73	105.83	105.76	105.87	105.83	105.76	105.73	105.74	105.95	105.86	105.90	105.87	106.05	106.18	106.17	106.01	106.26
15-03-09-08	196.06	188.26	187.84	186.54	186.13	186.16	186.21	186.90	187.10	186.66	186.26	185.52	185.53	187.06	187.56	190.93	187.40	187.31

Table S.2.4.2.11 Results of Pumping Tests (1969-1971)

Well Code	Test Date	N.D (m)	Well Depth (m)	Duration Hours		Q (l/s)	Descend		Reba-timient (m)	Tranmissivity		Obtained Thickness (m)	Piezometer	Trans-missivity (m^2/s)	Storage Coeficient (S%)
				Outflow (hrs)	Inflow (hrs)		Static level	Dynamic level		Pumping Descend (m^2/s)	Recovery (m^2/s)		Distance to well (m)		
San Vicente de Canete district															
15-03-14-08	0-04-69	7.0	20.3	11	7	33.0	4.95	8.85	3.9	$6.2x10-^{3}$	$6.0x10-^{3}$		26.5	$5.3x10-^{3}$	$1.4x10.^{2}$
Quilimana district															
15-03-11-01	0-04-69	12.1	52.6	24	12	53.0	10.39	12.59	2.2	$9.5x10-^{2}$	$9.3x10-^{2}$		-	-	-
06	25/09/71	32.4	58.5	12	4	18.0	30.22	32.72	2.5	$1.6x10-^{2}$	-		-	-	-
09	?-04-69	34.9		20	27	110.0	19.27	36.27	17.0	-	$12.6x10-^{2}$		-	-	-
10	09/09/71			3	3	10.0	2.10	2.90	0.8	$3.0x10-^{2}$	$3.6x10-^{2}$		-	-	-
11	04/04/69	34.9		28	5	65.0	6.15	10.65	4.5	$3.6x10-^{2}$	$3.4x10-^{2}$		-	-	-
07	17/12/68	49.6	60.5	25	6	45.0	43.35	47.85	4.5	$5.0x10-^{2}$	$5.0x10-^{2}$				-
07	20/09/71		60.5	13	10	45.0	43.35	49.55	6.2	$2.2x10-^{2}$	$4.8x10-^{2}$				
Nuevo Imperial district															
15-03-09-02	-		43.7	25	15	5.0	30.22	-	14.3	$2x10-^{3}$	$1.0x10-^{3}$	18.0	-	-	-
05	22/09/71	-	20.3	23	12		19.42	-	5.5	$1.4x10-^{3}$	-				-
Imperial district		-													
15-03-06-05	?-01-69	-	75.0	25	50	40.0	33.25	47.55	14.3	$1.4x10-^{2}$	$0.9x10-^{2}$		-	-	-
06	?-01-69	-	47.5	18	30	50.0	21.17	23.57	2.4	$1.5x10-^{2}$	$1.5x10-^{2}$		-	-	-
27	?-04-69	-	35.0	23	30	50.0			2.0	$2.8x10-^{2}$	-		200.0		$1.5x10-^{2}$
27	16/09/71	-	35.0	23	11	40.0	12.46	14.46		$3.2x10-^{2}$	$4.0x10-^{2}$		201.5		$5.0x10-^{2}$
11		-								$2.8x10-^{2}$				-	-

Table S.2.4.2.13 Physical-Chemical Analysis of Groundwater

Well Code	E.C. m mhos cm	Hardness °F	pH	Cations (meq/lit)					Anions (meq/lit)					Date
				Ca ++	Mg ++	Na +	K +	Total	Cl	SO_4	HCO_3	NO_3	Total	
15-03-03-A01	3.825		7.80	7.00	5.00	5.00	0.90	17.90	20.00	12.40	4.00	2.00	38.40	
15-03-03-S/N	1.660		7.70	100.00	5.00	5.00	70.00	180.00	3040.00	185.00	30.00	0.00	3255.00	
15-03-06-01	0.880	22.00	7.90	3.40	1.02	3.30	0.03	7.75	1.00	1.70	4.00	1.00	7.70	1969/2/13
15-03-06-02	0.770		7.90	3.40	1.02	1.02	0.03	5.47	1.00	1.70	4.00	1.00	7.70	
15-03-06-05	0.580	23.00	7.20	3.60	0.95	1.70	0.05	6.30	1.40	1.30	3.60	0.00	6.30	1971/7/28
15-03-06-07	0.910	18.00	7.00	5.20	1.40	3.30	0.06	9.96	2.20	0.30	4.40	3.00	9.90	1971/7/26
15-03-06-11	1.157		8.40	7.00	2.60	2.60	0.36	12.56	2.80	3.10	4.00	2.00	11.90	
15-03-06-14	0.830	24.00	8.00	3.60	1.25	3.70	0.05	8.60	1.60	2.10	3.90	1.00	8.60	1969/2/14
15-03-06-16	0.810	28.00	8.00	4.50	1.00	6.70	0.02	12.22	1.20	9.10	1.40	0.50	12.20	1972/4/14
15-03-06-19	1.390	54.00	7.90	9.20	1.55	4.20	0.16	15.11	2.20	8.50	3.90	0.50	15.10	1969/2/14
15-03-06-26	0.860	22.00	7.10	3.40	1.00	5.00	0.06	9.46	2.00	1.40	4.00	2.00	9.40	1971/7/27
15-03-06-27	1.800	53.00	7.10	8.40	2.10	7.80	0.10	18.40	6.40	3.00	4.00	5.00	18.40	1971/7/27
15-03-06-30	0.962		7.40	6.40	0.26	3.01	0.11	9.78	1.50	3.80	3.90	0.53	9.73	
15-03-06-51	0.796		7.40	3.92	1.84	2.31	0.09	8.16	1.30	2.10	4.30	0.53	8.23	
15-03-06-S/N	1.296		7.90	9.20	1.55	1.55	0.16	12.46	2.20	8.50	3.90	0.50	15.10	
15-03-09-02	0.870	32.00	8.10	4.55	1.92	2.10	0.08	8.65	2.20	3.30	2.60	0.50	8.60	1969/2/14
15-03-09-03	0.970	42.00	7.00	6.00	2.30	2.80	0.06	11.16	2.40	3.30	4.40	1.00	11.10	1971/7/26
15-03-09-04	1.250	45.00	7.20	6.00	2.90	3.90	0.10	12.90	4.20	3.30	4.40	1.00	12.90	1971/5/29
15-03-09-05	1.220	55.00	6.90	7.60	3.40	2.80	0.06	13.86	2.40	6.40	5.00	0.00	13.80	
15-03-09-07	2.530	104.00	8.00	10.80	10.00	13.20	1.60	35.60	22.20	24.60	5.00	0.00	51.80	1969/2/14
15-03-09-08	2.130	38.00	8.00	6.00	1.50	14.00	0.18	21.68	11.00	5.20	3.40	2.00	21.60	1969/2/14
15-03-09-14	1.062		7.50	6.52	0.90	4.97	0.14	12.53	3.00	3.61	3.50	0.53	10.64	
15-03-09-26	0.879		7.40	6.30	0.68	3.93	0.10	11.01	1.30	3.09	3.90	0.50	8.79	
15-03-11-01	0.870	24.00	-	3.05	1.67	3.70	0.07	8.49	1.20	3.40	2.80	1.00	8.40	1969/2/12
15-03-11-02	0.750	13.00	7.10	4.70	0.85	1.60	0.14	7.29	1.80	0.80	2.80	2.00	7.40	1971/7/26
15-03-11-03	2.040		8.40	3.60	0.90	0.90	0.16	5.56	5.60	7.10	6.60	0.50	19.80	
15-03-11-04	1.020	21.00	7.60	3.80	0.45	7.20	0.08	11.53	4.40	2.90	4.00	0.20	11.50	1969/2/12
15-03-11-05	0.860	15.00	7.80	2.80	0.25	5.00	0.05	8.10	3.20	3.90	1.00	0.00	8.10	1971/7/24
15-03-11-06	0.590	8.00	7.90	1.20	0.40	9.00	0.01	10.61	0.70	6.90	2.70	0.30	10.60	1972/4/14
15-03-11-07	1.740	34.00	-	6.20	0.60	10.60	-	17.40	10.80	4.30	1.80	0.50	17.40	1969/2/15
15-03-11-10	0.600	15.00	7.20	2.30	0.75	5.80	0.03	8.88	1.80	0.80	5.20	1.00	8.80	1971/7/24
15-03-11-11	0.730	13.00	8.00	2.30	0.30	9.20	0.02	11.82	1.20	7.70	2.80	0.20	11.90	1972/4/14
15-03-11-12	1.410	45.00	7.60	2.40	6.60	11.20	0.08	20.28	3.00	2.00	7.20	2.00	14.20	
15-03-11-14	0.750	3.00	8.10	0.40	0.10	6.90	0.04	7.44	1.20	0.10	5.20	1.00	7.50	1971/7/24
15-03-11-16	0.860	39.00	7.80	5.30	2.50	3.20	0.01	11.01	1.40	7.50	1.40	0.70	11.00	1972/4/14
15-03-11-20	1.020	5.00	-	0.80	0.20	10.60	0.04	11.64	1.40	1.20	7.00	2.00	11.60	1969/3/14
15-03-11-31	1.360		7.50	1.96	0.72	11.03	0.18	13.89	1.50	3.08	9.00	0.10	13.68	
15-03-11-S/N	1.020		8.10	0.80	0.20	0.20	0.04	1.24	1.40	1.20	7.00	2.00	11.60	
15-03-13-04	1.380	50.00	6.80	7.20	1.80	5.40	0.28	14.68	5.40	0.60	3.60	5.00	14.60	
15-03-13-09	2.050	77.00		12.00	3.30	6.80	0.26	22.36	9.60	6.70	6.00	0.00	22.30	1969/2/14
15-03-13-15	2.120	68.00	7.60	10.80	2.80	13.80	0.60	28.00	9.40	14.70	3.90	0.00	28.00	
15-03-13-S/N	2.300		8.00	12.00	3.30	3.30	0.26	18.86	9.60	6.70	6.00	0.00	22.30	
15-03-14-03	1.500	8.00	7.20	1.20	0.40	13.00	0.04	14.64	4.60	0.20	5.00	5.00	14.80	1971/7/16
15-03-14-04	1.050	36.00	8.50	5.40	1.80	3.00	0.14	10.34	4.60	0.90	3.80	1.00	10.30	1969/2/15
15-03-14-06	0.420	16.00	7.90	2.20	0.95	1.30	0.09	4.54	1.00	1.80	1.70	0.00	4.50	1969/2/14
15-03-14-08	1.140	45.00	7.70	6.80	2.30	3.00	0.11	12.21	6.00	2.00	4.00	0.20	12.20	1969/2/14
15-03-14-11	2.500	90.00	7.60	13.60	4.40	11.80	0.36	30.16	13.80	12.70	3.60	0.00	30.10	1969/2/15
15-03-14-12	1.560	50.00	7.10	8.80	1.20	6.80	0.09	16.89	4.40	8.60	3.80	0.00	16.80	1971/7/16
15-03-14-17	1.020	41.00	6.80	6.60	1.50	3.20	0.10	11.40	3.60	1.80	4.00	2.00	11.40	
15-03-14-18	0.670	28.00	7.80	4.20	1.32	0.80	0.11	6.43	1.10	0.30	3.00	2.00	6.40	1969/2/13
15-03-14-19	0.670	26.00	6.90	4.90	1.35	0.95	0.05	7.25	1.60	0.40	4.20	1.00	7.20	1971/6/24
15-03-14-20	0.640	28.00	7.10	4.20	1.30	0.90	0.12	6.52	1.10	0.80	3.60	1.00	6.50	1969/2/13
15-03-14-21	0.670	29.00	6.90	4.60	1.15	1.30	0.05	7.10	1.40		9.00	1.00	11.40	1971/7/24
15-03-14-29	1.670	54.00	6.60	8.80	1.90	5.80	0.10	16.60	7.40	0.10	4.20	5.00	16.70	1971/7/24
15-03-14-30	0.790	53.00	6.90	5.00	1.62	1.30	0.12	8.04	1.60	0.50	3.90	2.00	8.00	1969/2/13
15-03-14-31	0.860	40.00	6.90	6.30	1.65	1.50	0.17	9.62	2.20	0.20	2.20	5.00	9.60	1971/7/24
15-03-14-S/N	2.325	-	7.60	13.60	4.40	4.40	0.36	22.76	13.80	12.70	3.60	0.00	30.10	
15-03-14-S/N	0.635	-	7.80	4.20	1.32	1.32	0.11	6.95	1.10	0.30	3.00	2.00	6.40	
15-03-14-S/N	0.628	-	7.10	4.20	1.30	1.30	0.12	6.92	1.10	0.80	3.60	1.00	6.50	
15-03-14-S/N	0.765	-	6.90	5.00	1.62	1.62	0.12	8.36	1.60	0.50	3.90	2.00	8.00	
15-03-14-S/N	0.900	340.00	7.40	4.80	2.00	2.30	0.06	9.16	2.60	2.48	3.80	0.20	9.08	
15-03-14-S/N	1.350	380.00	7.10	6.00	1.60	7.40	0.09	15.09	5.40	5.30	3.75	0.20	14.65	
15-03-14-S/N	1.060	330.00	7.30	4.60	2.00	4.10	0.05	10.75	3.00	3.60	3.90	0.20	10.70	

(note) S/N: without number, oF: French degree, E.C.: Electric Conductivity